SPOTSYLVANIA COUNTY PLANNING COMMISSION MEETING AGENDA
February 3, 2021 - 7:00 PM

Call to Order

Pledge of Allegiance

Determination of a Quorom

Organization of the Commission

- Election of Officers
- 2021 Planning Commission Meeting Schedules

Announcements

- Planning Update

Review and Approval of Minutes

- Review and approval of Draft Minutes from January 20, 2021 worksession.

Unfinished Business

Review and Approval of Plat

- P20-0004 Afton Villas Preliminary Plat - Battlefield District

Public Hearings

- R17-0005 Radio Reconnaissance Technologies, Inc. (Team Crucible, LLC) Berkeley District
- SUP17-0003 Radio Reconnaissance Technologies, Inc. (Team Crucible, LLC) Berkeley District

Public Comment

New Business

Adjournment

By Order of the Spotsylvania County Planning Commission: The Planning Commission reserves the right to amend this agenda on the day of the meeting. The Commission encourages the participation of all county citizens. For those with special needs, please notify the Planning Department Office of any accommodation required five days prior to the

meeting you wish to attend.

Spotsylvania County
Planning Commission
Executive Summary

Print

Meeting Date:	February 3, 2021
Title:	Election of Officers
Type:	Action
Agenda Title:	Election of Officers
Recommendation:	The Planning Commission needs to elect a Chairman and Vice-Chairman to serve for the next year.
Summary:	The Planning Commission Bylaws, Article II - Officers, outline the following procedures:

1. The presiding officer shall call for nominations from the membership.
2. Any member, after being recognized by the presiding officers, may place one or more names in nomination and discuss his or her opinions on the qualifications of the nominees.
3. When all nominations have been made, the presiding officer shall close the nominating process and call for the vote.
4. The presiding officers shall call the name of each nominee in the order nominated and tally the respective votes.
5. Each member may cast one vote for any one nominee.
6. A majority of those voting shall be required to elect the officers.

A candidate receiving a majority vote of the entire membership of the Planning Commission shall be declared elected. The newly-elected Chairperson shall take office immediately and follow the same procedure for the election of the Vice-Chairperson.

Committee/Commission Summary:

Review Date: Status:

Financial Impact:

Staff Contacts:	Paulette Mann, Commission Secretary
Legal Counsel:	Alexandra Spaulding, Senior Assistant County Attorney
Additional Background/Other Considerations:	
Consequence of Denial/Inaction:	

ATTACHMENTS:		
Name:	Description:	Type:
No Attachments Available		

Spotsylvania County
Planning Commission
Executive Summary

Print

Meeting Date:	February 3, 2021
Title:	2021 Planning Commission Meeting Schedules
Type:	Action
Agenda Title:	2021 Planning Commission Meeting Schedules
Recommendation:	Approval
Summary:	Regular Meetings of the Planning Commission take place on the first and third Wednesday of each month at 7 p.m. Worksession Meetings of the Planning Commission take place on the third Wednesday of each month at 5:00 p.m.
Committee/Commission Summary:	
Review Date:	Status:
Financial Impact:	
Staff Contacts:	Paulette Mann, Commission Secretary
Legal Counsel:	
Additional Background/Other Considerations:	
Consequence of Denial/Inaction:	

ATTACHMENTS:

Name:	Description:	Type:
Meeting_Schedule_2021_pc.doc	2021 Meeting Schedule	Calendar

Spotsylvania County
Planning Commission Meetings

Meeting Dates, Time, and Location for 2021

Planning Commission Regular Meetings

Time: 7:00 p.m.

Dates: 1st and 3rd Wednesday of each month

Regular meetings of the Planning Commission take place in the Board of Supervisors Chambers located at 9104 Courthouse Road, Spotsylvania, Va. 22553.

2021 Month	Meeting Date
February	3 and 17
March	3 and 17
April	7 and 21
May	5 and 19
June	2 and 16
July	7 and 21
August	4 and 18
September	1 and 15
October	6 and 20
November	3 and 17
December	1 and 15
2022 Month	
January	5 and 19
February	2

Planning Commission Worksession Meetings

Time: 5:00 p.m.

Dates: 3rd Wednesday of each month

Worksession meetings of the Planning Commission take place in the Code Compliance Conference Room located at 9019 Old Battlefield Boulevard, 3rd Floor, Spotsylvania, VA 22553.

2021 Month	Meeting Date
February	17
March	17
April	21
May	19
June	16
July	21
August	18
September	15
October	20

November	17
December	15
2022 Month	
January	19

Spotsylvania County
Planning Commission
Executive Summary

Print

Meeting Date:	February 3, 2021
Title:	Planning Update
Type:	No Action (Information Only)
Agenda Title:	Planning Update
Recommendation:	N/A
Summary:	The Planning Update is attached as well as notice of a remote community meeting in the Berkeley District.
Committee/Commission Summary:	
Review Date:	Status:
Financial Impact:	
Staff Contacts:	B. Leon Hughes, Director of Planning and Zoning
Legal Counsel:	
Additional Background/Other Considerations:	
Consequence of Denial/Inaction:	

ATTACHMENTS:

Name:	Description:	Type:
PC_Report_February_3_2021.doc	Planning Update	Backup Material
Monthly_Report.pdf	Monthly Report	Backup Material
Community_Meeting_Letter_1-22-2021.pdf	Community Meeting Notice	Backup Material

Board of Supervisors
DEBORAH H. FRAZIER
BARRY K. JETT
KEVIN W. MARSHALL
TIMOTHY J. MCLAUGHLIN
DAVID ROSS
GARY F. SKINNER
CHRIS YAKABOUSKI

Department of Planning & Zoning

B. LEON HUGHES, AICP
Director

9019 OLD BATTLEFIELD BLVD., STE 320
SPOTSYLVANIA, VA 22553
(540) 507-7434

PLANNING UPDATE

January 27, 2021

UPCOMING PLANNING COMMISSION MEETINGS:

Wednesday February 17, 2021 Regular Planning Commission Meeting 7:00 pm Holbert Building

CA21-0001 Amendments to Chapter 8 of County Code – Erosion and Sediment Control

R19-0010 Aspire at Lee's Hill Lee Hill Voting District

R19-0014 Hazel Run Glen Courtland Voting District

Wednesday, February 17, 2021 Work Session at 5:00 pm in the Merchants Square Building 3rd Floor

GIS Staff Presentation

COMMUNITY MEETINGS

A Zoom Online Community Meeting is scheduled for February 8th at 7 pm. For Staples Reserve, a proposed rezoning of two parcels on Massaponax Church Road from Rural (Ru) to Planned Development Housing (PDH-2). Instructions are found in the attached letter.

NEW PUBLIC HEARING CASES

None

NEW PRELIMINARY PLATS

None

OTHER UPDATES

S-Power

An amendment to the Phase 4 Site Plan was submitted January 25th and is under review.

A Notice of Violation was issued January 14th for exceeding the limits of disturbance. The violation has since been corrected and closed.

The contractor is staggering employee departures from the entrance on Orange Plank Road to help address issues at the Brock Road and Orange Plank Road 4-way stop during peak hours.

sPower held a virtual neighborhood meeting for property owners near their Post Oak entrance to inform them of what to expect when that entrance opens in late February.

Technical Review Committee Meeting February 4, 2021 via WebEx:

9:15 AM	PRE21-0003	Lake House Building	TM# 70A-1-16A	Livingston
9:45AM	ST21-0001	Goodwin Cove	TM# 54-A-40	Livingston

Technical Review Committee Meeting February 11, 2021 via WebEx:

9:15 AM	ST21-0004	Afton Villas	TM# 24-A-92A & 36-A-113,114,115, 117,117A	Lee Hill

Spotsylvania County Planning Department Public Hearing Cases Status Report

Application #	Lead Staff	Applicant	Project Name	Tax Map #	Address	Description	Proffer Law	Application Complete	Status	Voting District
COMPREHENSIVE PLAN & CODE AMENDMENTS										
CA21-0001`	Ben Leach	Spotsylvania County Board of Supervisors	Amendment to County Code	N/A	N/A	Amendment of Ch. 8 Erosion and Sediment Control	N/A	N/A	PC hearing scheduled 2/17/21	N/A
CPA17-0002	Jacob	Spotsylvania County Planning Commission	Comprehensive Plan Update	Multiple	Multiple	5 year review and update to the Comprehensive Plan per Code of VA	N/A	N/A	Seeking public input via GeoHub through 1/31/21	Countywide
REZONINGS & PROFFER AMENDMENTS										
R15-0006	Leon	David L. Hunter	The Towns at Point Seanna	69-5-B & 69-5-A5	4900 Corsair Terrace	Rezoning of approx. 47 acres from Resort Commercial (RC) and Resort Residential (RR) to Planned Development Housing 2 (PDH-2) for 81 townhouses.	Pre-7/2016	5/29/2015 (Applicant has consented to time extension)	BOS hearing TBD. PC recommended Denial 7-0 on 6/17/20	Livingston
R17-0005	Leon	Team Crucible, LLC	Crucible	76-A-2	6116 Jefferson Davis Hwy	Rezoning of 69.9 acres from Agricultural 2 (A-2) to Industrial 2 (I-2) for the development of a security training facility with a companion SUP application (SUP17-0003).	N/A	5/5/2017 (Applicant has consented to time extension)	PC hearing scheduled for 02/03/21.	Berkeley
R18-0001	Leon	2600 SCR, LLC	2600 Acqua	23-A-49, 23-A-49B & 23-A-42	2618 & 2622 Salem Church Rd	Rezoning of 20.77 acres from Commercial 2 (C-2) & Residential 1 (R-1) to Mixed Use 4 (MU-4) for a multifamily residential community with 12,000 sf commercial.	2016	1/24/2018 (Applicant has consented to time extension)	Under Review	Courtland
R18-0010	Leon	Old Plank Partners, LLC / Arthur and Patricia Tracy Trust	Chancellor Ridge	21-10-1, 21-10-2	7611 & 7613 Old Plank Rd	Rezoning from Rural (Ru) to Planned Development Housing 4 (PDH-4) for development of a single family detached subdivision of 65 lots on 39 acres.	2016	11/5/2018 (Extension to March 2021)	BOS hearing date TBD. PC Recommended Approval 5-2 on 1/6/2021.	Chancellor
R19-0003	Shannon	USGGB, LLC	Noah's Landing	24-A-64	East side Lafayette Blvd. at end of Marshall Drive and Normandy Ct	Rezoning of 18.5 acres from Residential 1 (R-1) to Planned Development Housing 8 (PDH-8) for 49 single family detached lots and 53 single family attached lots.	2016	3/27/2019 (Extension to 8/31/2021)	Under Review	Battlefield
R19-0007	Michael	Tricord Homes Inc	Village at Crossroads Station	37-A-48, 49, 50, 52, 52A, 53, 54, 55	South of Rt. 17 between Crossroads Parkway and Thornton Rolling Road	Rezoning request for approximately 115 acres from Rural (Ru), Industrial 1 (I-1), and Commercial 3 (C-3) to Mixed Use (MU-2, MU-3, and MU-4) for 770 single family attached and detached and multifamily residential units.	2016	6/17/2019 (Extension granted)	Under Review	Berkeley

KEY: TRC - Technical Review Committee meeting
PC - Planning Commission
BOS - Board of Supervisors

Spotsylvania County Planning Department Public Hearing Cases Status Report

Application #	Lead Staff	Applicant	Project Name	Tax Map #	Address	Description	Proffer Law	Application Complete	Status	Voting District
R19-0009	Shannon	Rappahannock Devt. Group, LLC and Sheri L. Kornegay	Lafayette Commons	24-A-49A, 24-A-57, 24-A-59, 24-A-60, 24-A-61, 24-A-62	111 Wakeview Dr., 3103 Lafayette Blvd., and 4 unaddressed properties	Rezoning request for approximately 27.5 acres from Residential 1 (R-1) to Mixed Use 2 & 3 (MU-2 & MU-3) for development of 217 single family attached units and up to 15,257 square feet of commercial space.	2016	7/12/2019 (Extension to 8/31/2021)	Under Review	Battlefield
R19-0010	Shannon	KW Commercial LLC and Bonaventure	Aspire at Lees Hill	36-17-FF	Spotsylvania Ave. between Goodwill and Weis	Rezoning request for approximately 13.69 acres from Commercial 2 & 3 (C-2, C-3) to Mixed Use 4 (MU-4) for an age-restricted development of 64 single family attached units, 146 apartments and a restaurant and additional commercial uses.	2019	7/22/2019 (Extension to 3/31/2021)	Scheduled for PC 02/17/21	Lee Hill
R19-0011	Leon	Monument Development Fifteen LLC	Upper Spotsy Redevelopment Project	25-7-B,C,E,F,G,P	11900,11812,11744 & 11800 Main Street	Rezoning request for approximately 14.372 acres from Industrial 2 (I-2) to Mixed Use 5 (MU-5) for the development of up to 525 multi-family units and 14,000 square feet of commercial space.	2019	10/3/2019	BOS Approved on 12/08/2020, 5-2 vote	Lee Hill
R19-0012	Shannon	Chancellorsville Investment Co, LLC	Legends of Chancellorsville Proffer Amendment	9-A-107	North Side Rt. 3, west of Elys Ford Rd	Proffer amendment to R14-0006 to change building material requirements.	2019	10/8/2019 (Extension to 8/31/2021)	Under Review	Chancellor
R19-0013	Shannon	Spotsylvania Mall Co / Bonaventure Investments, LLC	Aura at Towne Centre	13-A-107	At Sears at Spotsylvania Towne Centre	Rezoning of 4.82 acres from Commercial 2 (C-2) to Mixed Use (MU-4) to add a mixed use component to an existing commercial development, adding no more than 271 residential multi-family units within two buildings. One building having approximately 500 sq. ft. of retail on the main floor.	2019	10/29/2019 (Extension to 1/27/2021)	BOS Approved 5-2 on 01/26/21.	Courtland
R19-0014	Shannon	Patricia P. Preston / Ceresharrisonland, LLC	Hazel Run Glen	23-A-64A	5430 Harrison Rd	Rezoning of approximately 58.1 acres from Residential 1 (R-1) to Planned Development Housing 2 (PDH-2) for 110 single family homes.	2019	Extension to 3/31/2021	Scheduled for PC 02/17/21	Courtland
R20-0002	Shannon	International Development of Virginia LLC	Jackson Village Proffer Amendment	36-2-1, 35-A-88, 49-A-101, 35-4-1A	East side Jefferson Davis Hwy, south of Cosner's Corner	Amend proffers for Mixed Use zoned Jackson Village to allow 594 residential condominium units to be built as apartments instead.	2019	3/6/2020	Under Review	Lee Hill
R20-0007	Wanda	Tricord, Inc.	Ni River Proffer Amendment	34-14-A	6310 Smith Station Rd	Proffer amendment to Ni River (Courtland Park) rezoning to adjust timing requirement for commercial construction with cash payment to offset lost tax revenue	2019	5/14/2020	Under Review	Berkeley
R20-0008	Shannon	Rappahannock Devt. Group,Linda Curtis and Leigh Ann Curtis-Chapman	Saddle Creek	22-A-103,22-11-4B,22-11-5	11501 & 11513 Piedmont Dr.,6020 Harrison Rd	Rezoning of 47.9 acres from Residential 1(R-1) to Planned Development Housing-3(PDH-3) for 103 single-family detached units.	2019	7/8/2020	Under Review	Salem

KEY: TRC - Technical Review Committee meeting
PC - Planning Commission
BOS - Board of Supervisors

Spotsylvania County Planning Department Public Hearing Cases Status Report

Application #	Lead Staff	Applicant	Project Name	Tax Map #	Address	Description	Proffer Law	Application Complete	Status	Voting District
R20-0009	Shannon	Verdad Real Estate and Construction Services	7-11 Convenience Center	23-A-52D & 52E	5900 Harrison Road	Rezoning of 2.32 acres from Commercial 2 (C-2) to Commercial 3 (C-3) for a Convenience Store with fueling stations.	2019	7/10/2020	Under Review	Courtland
R20-0010	Michael	Luck Development	Ni Village	16 Parcels	0 River Run Parkway	Rezoning of 16 parcels totaling 323 acres from PDC,RU,I-2&VC to Mixed Use 3 (MU3)& Mixed Use 4(MU4) for the development of SFA, SFD, MF residential and commercial uses allowed in the MU3&MU4 districts.	2019	1/8/2021	Under Review	Berkeley
R20-0011	Shannon	Creighton Companies	7-11 Convenience Center	23A-2-21R & 23A-2-19R	10803 Courthouse Rd	Rezoning of 1.82 acres from Commercial 2 (C-2) to Commercial 3(C-3) for a Convenience Center with fuel sales.	2019	9/21/2020	Under Review	Battlefield
R20-0012	Michael	Courthouse Green Development,LLC	Courthouse Reserves	47-A-63,64,70B,73,A10 & 47-4-A	0 Pool Drive	Rezoning of six parcels totaling 24.2 acres from Commercial 2 (C-2) and Residential 2(R-2) to Residential 8 (R-8) for the development of 156 SFA homes.	2019	10/19/2020	Under Review	Livingston
R20-0013	Shannon	CeresMinRoad, LLC	Porchlight Commons	36-A-150,151 &154	4517 Mine Road	Rezoing of three parcels totaling 8.4 acres from Commercial 2 (C-2) to Residential 8 (R-8) for the development of 60 age restricted townhomes.	2019	9/23/2020	Under Review	Battlefield
R20-0014	Brad	LID,LLC & IWG Thornburg,LLC	Thornburg Village	63-12-C,D,E & 27;63-A-32,33 & 37	6306 Jefferson Davis Hwy.	Rezoning of six parcels totaling 98.3 acres from Agricultural 2 (A-2) and Commercial 3(C-3) to Planned Development Housing 5(PDH-5) and Commercial 3(C-3) for the development of 162 single family dettached and 212 single family attached units.	2019	12/11/2020	Under Review	Berkeley
R20-0015	Brad	Thornburg,LLC	Thornburg Commons	63-A-35 & 35C	0 Morris Road	Rezoning of two parcels totaling 59 acres from Agricultural 2(A-2) to Planned Development Housing 5 (PDH-5) for the development of 157 single family dettached and 62 single family attached units.	2019	12/11/2020	Under Review	Berkeley
SPECIAL USE PERMITS										
SUP17-0003	Leon	Team Crucible, LLC	Crucible	76-A-2	6116 Jefferson Davis Hwy	Special Use for security training facility (associated with R17-0005)	N/A	5/5/2017 (applicant has consented to a time extension)	Scheduled for PC 02/03/21	Berkeley
SUP18-0010	Leon	Zakia Walizada	Vertex Auto Sales and Repair	23-A-144R	112 Pegram Ln	Special Use Permit to allow vehicle sales on a parcel less than 2 acres in the Commercial 3 (C-3) zoning district.	N/A	7/20/2018 (applicant has consented to a time extension)	Under Review	Courtland

KEY: TRC - Technical Review Committee meeting
PC - Planning Commission
BOS - Board of Supervisors

January 22, 2021

Re: Staples Reserve
3736 Massaponax Church Road and 3715 Summit Crossing Road
Community Meeting

Dear Neighbor:

We are pleased to invite you to a Community Meeting to discuss Staples Reserve, the proposed single family residential development near the intersection of Massaponax Church Road and Summit Crossing Road. Traditionally, these Community Meetings were held in person, however given the risk of COVID-19, we will be holding this meeting virtually via Zoom, as follows:

Location:	Zoom Online Meeting (Instructions on Page 3)
Date:	February 8, 2021
Time:	7:00pm
Host:	Development Consulting Services

Staples Reserve encompasses the parcels at 3736 Massaponax Church Road (Tax Map: 50-A-115) and 3715 Summit Crossing Road (Tax Map: 50-A-118A). The current zoning for both parcels is RU and the new development will require rezoning to PDH-II. A map of the project and the surrounding areas is on the reverse side of this letter for your reference (Page 2). As part of the rezoning process, this Community Meeting is held to introduce the project to surrounding property owners as well as answer any questions they may have.

THE INSTRUCTIONS TO ATTEND THE ZOOM MEETING ARE ON PAGE 3.

We look forward to seeing you at the Community Meeting and sharing this exciting project with our neighbors.

Respectfully submitted,



Samer E. Shalaby, P.E.

Vicinity Map



Zoom Meeting Instructions

1. Before the meeting:
    a. We recommend logging into the Zoom meeting a few minutes before 7pm in case the process takes longer than expected.
    b. We HIGHLY recommend using a computer so that you can easily see the plans shown as well as enter questions into the chat box.
2. Open the web browser on your computer, smartphone, or tablet.
3. Navigate to the following meeting link (TYPE EXACTLY AS IT APPEARS):

bit.ly/2Nus5ly

4. Follow the prompts to download the app and join the meeting.
5. Once you have joined the meeting, you will be automatically muted.
6. To participate in the meeting, click on the chat icon on your computer, tablet, or phone and it will open the chat box. This is where you will enter your comments or questions.
    a. The host will answer all questions live as they are entered into the chat box.

Frequently Asked Questions

What is the meeting about? – The meeting will include an introduction to the project as well as an overview of the specific plan.

How can I see the plan? – During the meeting, the presenter will share the plan with all participants.

How do I ask questions? – You may ask questions via the chat box only. Whether you attend the Zoom meeting through a phone, tablet, or computer, you will have access to the chat box, however it is recommended that if you intend to ask questions to log on via a computer. Once you type a question in, the meeting host will answer it live.

Can I ask questions through my microphone? – Unfortunately, due to the number of participants questions can only be asked via the chat box. All attendees will be muted.

Can I attend part of the meeting only? – We hope that community members will join for at least the introduction at 7pm (5 minutes or so), but you are welcome to exit the meeting early.

How do I get a copy of the plan? – After the plan is released at the meeting, please send an email to zshalaby@dev-consulting.com and we will be happy to send out a copy of the plan.

What if I cannot attend? – You are welcome to email us at zshalaby@dev-consulting.com and we will be happy to answer your questions.

Spotsylvania County
Planning Commission
Executive Summary

Print

Meeting Date:	February 3, 2021
Title:	Review and approval of minutes from January 20, 2021
Type:	
Agenda Title:	Review and approval of Draft Minutes from January 20, 2021 worksession.
Recommendation:	Approval
Summary:	
Committee/Commission Summary:	
Review Date:	Status:
Financial Impact:	
Staff Contacts:	Paulette Mann, Commission Secretary
Legal Counsel:	
Additional Background/Other Considerations:	
Consequence of Denial/Inaction:	

ATTACHMENTS:

Name:	Description:	Type:
pcmin21_0120.docx	Draft Minutes from January 20, 2021	Minutes

Spotsylvania County Planning Commission Worksession

Holbert Building Board Room, 9104 Courthouse Road, Spotsylvania VA 22553

MINUTES:	January 20, 2021	
Call to Order:	Mr. Newhouse called the meeting to order at 7:00 p.m.	
Members Present:	Mary Lee Carter	Lee Hill *(participated remotely)*
	Jennifer Maddox	Berkeley
	Richard Thompson	Courtland
	Dr. Raymond Bell	Salem
	Jacob Lane	Livingston
	Gregg Newhouse	Chancellor
Members Absent:	C. Travis Bullock	Battlefield
Staff Present:	Paulette Mann, Planning Commission Secretary B. Leon Hughes, AICP, Director of Planning & Zoning Alexandra Spaulding, Senior Assistant County Attorney	

Announcements:

Mr. Hughes introduced new Planning Commissioner, Gerald Childress, to the Commission. He will begin his term on February 1, 2021.

Mr. Hughes also presented Mr. Newhouse with a plaque thanking him for his serving from 2014 to 2021.

Ms. Carter thanked Mr. Newhouse for his service to the County and that his wisdom and knowledge will be greatly missed. She welcomed Mr. Childress to the Commission.

Mr. Newhouse stated that he values the professional relationships that have been created during his time on the Commission and that he will miss everyone.

Public Comment: None

New Business:

At a regularly scheduled meeting of the Spotsylvania County Planning Commission held on January 20, 2021, on a motion by Mr. Newhouse, seconded by Mr. Thompson, and passed 6-0, the Planning Commission adopted the following resolution:

RESOLUTION NO. 2021-01

Location Change for February 3, 2021, 7 p.m. Planning Commission Meeting

DRAFT

WHEREAS, the Spotsylvania County Planning Commission will hold public hearings on February 3, 2021, at 7 p.m. or as soon thereafter as can be accommodated, for R17-0005 and SUP17-0003, which are a Rezoning and Special Use Permit applications, respectively, submitted by Team Crucible, LLC, for a security training facility; and

WHEREAS, the application has received considerable public interest and a large audience for the public hearings is expected; and

WHEREAS, we are in a time of pandemic and the Governor of the Commonwealth has recommended social distancing of at least six feet; and

WHEREAS, the Spotsylvania County Planning Commission, under Article IV of its Bylaws, may determine the location for any of its meetings and desires to hold the February 3, 2021, 7 p.m. meeting in which the Team Crucible, LLC, Rezoning and Special Use Permit applications will be considered at a larger venue to accommodate the anticipated audience;

WHEREAS, the next regularly scheduled meeting of the Spotsylvania County Planning Commission at 7 p.m. on February 17, 2021, will be held in the usual location of the Board Room at the Holbert Building, 9104 Courthouse Rd, Spotsylvania, VA, 22553;

NOW, THEREFORE, BE IT RESOLVED that the Spotsylvania County Planning Commission does hereby move the location of its regularly scheduled meeting on February 3, 2021, at 7 p.m., to the Marshall Center Auditorium, located at 8800 Courthouse Road, Spotsylvania, VA, 22553.

January 20, 2021 Meeting

Motion and vote: On a motion by Mr. Thompson, seconded by Mr. Lane, the Commission canceled their 7 p.m. meeting on January 20, 2021. The motion passed 6-0.

There was a brief discussion about notices for Crucible and that someone complained that they received notice of the meeting and also the cancellation notice on the same day.

Mr. Lane inquired about the Sheriff's office shooting range and whether they had to have a special use permit.

Mr. Hughes stated yes, it was issued as a conditional use permit back in 1994.

Mr. Lane stated that he would like a copy of that.

Mr. Hughes reminded Commissioners that elections would take place at the February 3, 2021 meeting.

Adjournment:

Motion and vote: On a motion by Mr. Lane seconded by Mr. Thompson, the Commission voted to adjourn. The motion passed 6-0.

DRAFT

The meeting adjourned at 5:35 p.m.

Paulette L. Mann

Date

DRAFT

Spotsylvania County
Planning Commission
Executive Summary

Print

Meeting Date:	February 3, 2021
Title:	P20-0004 Afton Villas Preliminary Plat - Battlefield District
Type:	Action, Resolution
Agenda Title:	P20-0004 Afton Villas Preliminary Plat - Battlefield District
Recommendation:	The preliminary plat was reviewed by the Technical Review Committee and meets the Ordinance requirements for approval. Staff recommends approval of P20-0004 by adoption of the attached resolution.
Summary:	The Afton Villas PDH-5 rezoning was approved with proffers by the Board of Supervisors on October 13, 2020 enabling the development of a residential development a seventy-seven (77) age-restricted single-family attached community and two (2) single family attached dwellings, with a maximum density of approximately 5 dwelling units per acre. The parcels are addressed as 4105, 4107, 4109, 4113, 4121 and 4125 Mine Road (RT. 636) and are approximately 736 feet west of the intersection with Lansdowne Road (RT. 638). The property is in an area identified as Low Density Residential on the Future Land Use Map of the Comprehensive Plan. The parcel is located in the Primary Development Boundary, within in the Battlefield Voting District, and is identified as tax parcels 24-A-92A, 36-A-113, 36-A-114, 36-A-115, 36-A-117 & 36-A-117A.
Committee/Commission Summary:	Planning Commission
Review Date:	February 3, 2021 Status:
Financial Impact:	
Staff Contacts:	Shannon D. Fennell, Planner III
Legal Counsel:	N/A
Additional Background/Other Considerations:	
Consequence of Denial/Inaction:	

ATTACHMENTS:

Name:	Description:	Type:
14-SP-0325_Afton_Villas_Preliminary_Plat_3rd_Submission_2021-01-22.pdf	Afton Villas Preliminary Plat	Plat
Approval_Resolution.docx	Approval Resolution	Resolution

PRELIMINARY PLAT
AFTON VILLAS
4113 MINE ROAD
TAX MAP 24 ((A)) 92 A, 36 ((A)) 113, 114, 115, 117 & 117A
LEE HILL MAGISTERIAL DISTRICT
BATTLEFIELD VOTING DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

APPROVED BY
COUNTY PLANNING COMMISSION

ON: _____

_____
DIRECTOR OF PLANNING OR
AUTHORIZED REPRESENTATIVE

REVISIONS APPROVED ON

_____

_____

_____

APPLICANT
MINE ROAD, LLC
ATTN: GENE BROWN
1975 ATLANTIC BUILDERS, LTD.
FREDERICKSBURG, VA 22401
(540) 891-8540

OWNER
BENCHMARK ROAD INVESTMENTS, LLC
ATTN: LEE GARRISON, PE
1109 CHARLES STREET
FREDERICKSBURG, VA. 22401
(540) 370-0633

SITE DATA

TAX MAP:	24 ((A)) 92A, 36 ((A)) 113, 114, 115, 117, 117A
TOTAL AREA:	19.0087 ACRES
EXISTING ZONE:	PDH-5 (WITH PROFFERS)
EXISTING USE:	VACANT: 24 ((A)) 92A, 36 ((A)) 113 RESIDENTIAL: 36 ((A)) 114, 115, 117, 117A
PROPOSED USE:	74 AGE-RESTRICTED SINGLE FAMILY ATTACHED DWELLINGS 2 SINGLE FAMILY DETACHED DWELLINGS
OVERLAY DISTRICTS:	AIRPORT OVERLAY DISTRICT (CONICAL ZONE) CHESAPEAKE BAY PRESERVATION AREA (RESOURCE MANAGEMENT AREA)
DENSITY:	5 DWELLINGS UNITS/AC PERMITTED 4.00 DWELLINGS UNITS/AC PROPOSED
WATER:	PUBLIC
SEWER:	PUBLIC
ESTIMATED VPD:	AFTON GROVE COURT: 274 TRIPS TOTAL (PER SENIOR ADULT HOUSING-ATTACHED; ITE TRIP GENERATION 10TH EDITION, CODE 252) 36 ((A)) 117 AND 117A (AFTER BLA): 19 TRIPS TOTAL (PER SINGLE FAMILY DETACHED HOUSING; ITE TRIP GENERATION 10TH EDITION, CODE 210) SINGLE FAMILY DWELLINGS DIRECTLY ACCESSING MINE ROAD SHALL HAVE COMMON DRIVEWAY ENTRANCE
HYDROLOGIC UNIT CODE:	02080104 (LOWER RAPPAHANNOCK)
WATERSHED:	E-20
SUBWATERSHED (VAHU6):	RA46 (RAPPAHANNOCK RIVER - HAZEL RUN)
WETLAND DISTURBANCE:	NONE
PLACES OF BURIAL:	NONE KNOWN
SOLID WASTE COLLECTION:	PRIVATE HAULER

ENGINEER'S CERTIFICATE
I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, ALL OF THE REQUIREMENTS OF THE BOARD OF SUPERVISORS AND ORDINANCES OF THE COUNTY OF SPOTSYLVANIA, VIRGINIA, REGARDING PREPARATION OF PRELIMINARY PLATS FOR SUBDIVISIONS WITHIN THE COUNTY HAVE BEEN COMPLIED WITH.

JANUARY 22, 2021
DATE

KEITH LUC OSTER, P.E.

CBPA NOTE
CBPA IS AN OVERLAY DISTRICT OF THE ENTIRE SPOTSYLVANIA COUNTY AND THE PARCEL DESCRIBED WITHIN THIS PLAN LIES WITHIN THE RMA FEATURES AND DOES CONTAIN RPA FEATURES WITH THE CHESAPEAKE BAY PRESERVATION AREA OVERLAY DISTRICT. THE RPA IS A 100 FOOT WIDE BUFFER AREA THAT SHALL REMAIN UNDISTURBED AND VEGETATED IN ACCORDANCE WITH SPOTSYLVANIA COUNTY CODE CHAPTER 6A, CHESAPEAKE BAY PRESERVATION. THE RPA WAS DETERMINED BY FIELD DELINEATION BY STANTEC.

PASS NOTE
DUE TO RECENT FINDINGS OF POSSIBLE ACID SULPHATE SOILS (PASS) WITHIN SPOTSYLVANIA COUNTY IT IS RECOMMENDED THAT THE DEVELOPER, BUILDERS AND ENGINEERS BE AWARE THAT IF ACID SULPHATE SOILS AS WELL AS OTHER SOILS THAT PRODUCE A PH OF 4 ARE PRESENT ON THE PROJECT SITE EXTENSIVE TREATMENT TO BRING THE SOILS ACID/PH LEVEL TO AN ACCEPTABLE LEVEL TO SUSTAIN ANY FORM OF PLANT GROWTH MAY BE REQUIRED.

STORMWATER / EROSION NARRATIVE
STORMWATER MANAGEMENT AND ASSOCIATED BEST MANAGEMENT PRACTICES TO BE PROVIDED AS SHOWN ON FINAL CONSTRUCTION PLAN. EROSION AND SEDIMENT CONTROL PLAN AND STORMWATER MANAGEMENT CONSTRUCTION SHALL BE IN ACCORDANCE WITH SPOTSYLVANIA COUNTY EROSION AND SEDIMENT CONTROL ORDINANCE AND VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.

GIS NOTE
THE PLAT OF THE LAND SHOWN HEREON IS REFERENCED TO THE VIRGINIA COORDINATE SYSTEM OF 1983 AS COMPUTED FROM A FIELD SURVEY WHICH TIES THIS SUBDIVISION BOUNDARY TO SPOTSYLVANIA COUNTY MONUMENTS "TIMBER".

THE GRID FACTOR THAT HAS BEEN APPLIED TO THE FIELD DISTANCE TO DERIVE THE REFERENCED COORDINATES IS 0.99995594. UNLESS OTHERWISE STATED THE PLAT DISTANCES SHOWN ARE INTENDED TO BE HORIZONTAL DISTANCES MEASURED AT THE MEAN ELEVATION OF THE SUBDIVISION.

THE BEARINGS SHOWN ARE REFERENCED TO VCS 1983 GRID NORTH. THE FOOT DEFINITION USED FOR CONVERSION OF THE MONUMENT COORDINATES IS THE "U.S. SURVEY FOOT" ON 1 FT = 1200/3937 METER.



VICINITY MAP
1"=2000'

2000' 0 2000' 4000'
GRAPHIC SCALE

SHEET INDEX

1 COVER SHEET
2 NOTES AND DETAILS
3 EXISTING CONDITIONS
4 OVERALL PLAN
5 LAYOUT PLAN SECTION 1
6 LAYOUT PLAN SECTION 2
7 SOIL, SLOPES AND OPEN SPACE ANALYSIS PLAN
8 PRE-DEVELOPMENT STORMWATER MANAGEMENT CONCEPT PLAN
9 POST-DEVELOPMENT STORMWATER MANAGEMENT CONCEPT PLAN
10 PROFFERS

EXISTING PARCEL DATA

TAX MAP ID	ADDRESS	OWNER	EXISTING ZONE	AREA
T.M. 24 ((A)) 92A	4105 MINE ROAD	BENCHMARK ROAD INVESTMENTS, LLC	PDH-5	1.0207 AC.
T.M. 36 ((A)) 113	4107 MINE ROAD	BENCHMARK ROAD INVESTMENTS, LLC	PDH-5	2.4053 AC.
T.M. 36 ((A)) 114	4109 MINE ROAD	BENCHMARK ROAD INVESTMENTS, LLC	PDH-5	0.4968 AC.
T.M. 36 ((A)) 115	4113 MINE ROAD	BENCHMARK ROAD INVESTMENTS, LLC	PDH-5	11.1774 AC.
T.M. 36 ((A)) 117	4121 MINE ROAD	BENCHMARK ROAD INVESTMENTS, LLC	PDH-5	2.9083 AC.
T.M. 36 ((A)) 117A	4125 MINE ROAD	BENCHMARK ROAD INVESTMENTS, LLC	PDH-5	1.0002 AC.
			TOTAL	19.0087 AC

DEVELOPMENT AREA SUMMARY

PARCEL DESCRIPTION	PARCEL AREA
74 INDIVIDUAL SFA LOTS	5.16 ACRES
COMMON AREA (AREA OUTSIDE SFA LOTS)	12.80 ACRES
TM 36 ((A)) 117	0.33 ACRES
TM 36 ((A)) 117A	0.25 ACRES
RIGHT-OF-WAY DEDICATION	0.46 ACRES
TOTAL	19.01 ACRES

LAND USE SUMMARY

ZONE: PDH-5 (PROFFERS)		ZONING REQUIREMENT	PER THIS PROJECT
MIN. LOT AREA		NOT SPECIFIED	2,604 SF
MIN. LOT WIDTH		NOT SPECIFIED	NOT SPECIFIED
DENSITY		5 D.U. PER ACRE	3.89 D.U. PER ACRE
AVERAGE LOT AREA		NOT SPECIFIED	3,039 SF (ATTACHED DWELLINGS)
MAXIMUM BUILDING HEIGHT		NOT SPECIFIED	35 FEET
SETBACKS:	FRONT	NOT SPECIFIED	10'
	REAR	NOT SPECIFIED	7'
	SIDE	NOT SPECIFIED	5' (END UNITS); 0' (ATTACHED)
MIN. PUBLIC ROAD FRONTAGE		NOT SPECIFIED	NOT SPECIFIED
OPEN SPACE (SEE NOTE BELOW)		35%	57%
PARKING (ATTACHED DWELLINGS)		2 PER UNIT (148 REQUIRED)	197 SPACES PROPOSED
PARKING (DETACHED DWELLINGS)		2 PER UNIT (4 REQUIRED)	4 TO BE PROVIDED IN DRIVEWAY

OPEN SPACE NOTE
THE OPEN SPACE DEPICTED IN THE LAND USE SUMMARY TABLE IDENTIFIES THE GREEN AREA REMAINING ON THE SITE EXCLUSIVE OF ALL PARCELS AND IMPERVIOUS SURFACES (CURB, SIDEWALK, PICKLEBALL COURT AND GAZEBO). THERE IS ADDITIONAL ON-LOT GREEN AREA IN THE FRONT, SIDE, AND REAR OF THE INDIVIDUAL LOTS NOT INCLUDED IN THIS OPEN SPACE PERCENTAGE.

SULLIVAN, DONAHOE & INGALLS
ENGINEERS, SURVEYORS & ENVIRONMENTAL SERVICES
P.O. BOX 614
FREDERICKSBURG, VIRGINIA 22404
PHONE 540-898-5878

COMMONWEALTH OF VIRGINIA
KEITH LUC OSTER
Lic. No. 35846
JANUARY 22, 2021
PROFESSIONAL ENGINEER

DATE	REVISIONS
12-22-2020	COUNTY COMMENTS
01-22-2021	COUNTY AND VDOT COMMENTS

SDI SULLIVAN DONAHOE & INGALLS
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AFTON VILLAS
LEE HILL MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

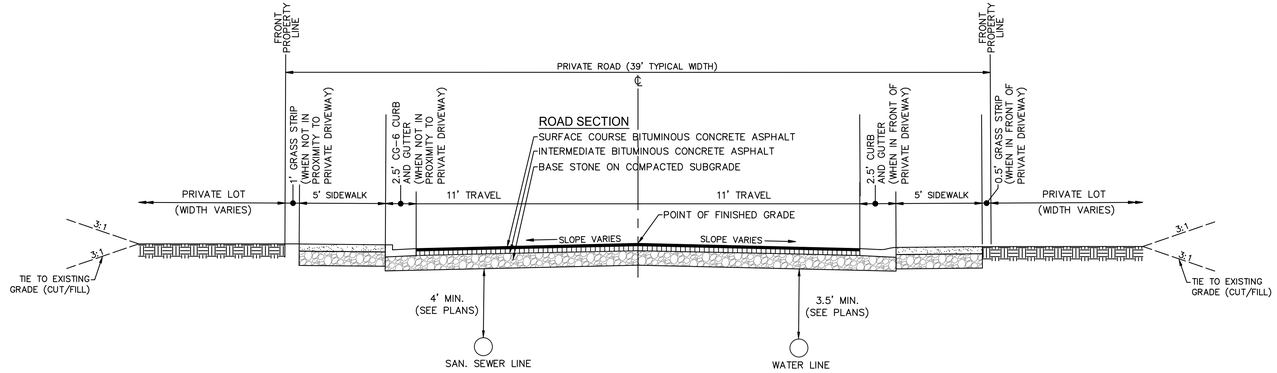
COVER SHEET

DES/DRFT: PLH
CHECKED: RHF
APPROVED: KLO
JOB NO.: 14-SP-0325
DATE: 11-03-2020
SCALE:

SHEET 1
OF 10 SHEETS

GENERAL NOTES:

1. THE STREETS INTERNAL TO THIS DEVELOPMENT ARE PRIVATE AND ARE NOT SUBJECT TO VDOT SUBDIVISION STREET REQUIREMENTS. IMPROVEMENTS WITHIN THE VDOT RIGHT-OF-WAY WILL BE PERFORMED IN ACCORDANCE WITH VDOT REQUIREMENTS.
2. ALL PUBLIC STREETS SHALL BE DESIGNED AND CONSTRUCTED TO THE REQUIREMENTS AND SPECIFICATIONS OF VDOT AND/OR SPOTSYLVANIA COUNTY. ALL PRIVATE STREETS SHALL BE CONSTRUCTED UTILIZING VDOT AND/OR SPOTSYLVANIA COUNTY SPECIFICATIONS.
3. ALL EASEMENTS FOR PUBLIC WATER, SANITARY SEWER, AND STORM DRAINAGE SHALL BE SHOWN ON FINAL PLANS AND PLATS, AND DEDICATED TO PUBLIC USE.
4. FINAL DESIGN PLANS SHALL SATISFY ALL EROSION AND SEDIMENT CONTROL REQUIREMENTS.
5. NO LAND SHOWN HEREON IS LOCATED IN THE 100 YEAR FLOOD PLAIN IN ZONE "A" AS SCALED FROM FLOOD INSURANCE RATE MAP, COMMUNITY-PANEL NO. 510308 0100C AND 0225C, BOTH DATED FEB. 18, 1998. THE SITE IS LOCATED IN ZONE "X", AREA OF MINIMAL FLOOD HAZARD.
6. THIS DEVELOPMENT SHALL MEET ALL C.B.P.O. REQUIREMENTS. C.B.P.O. SITE PLAN APPROVAL IS REQUIRED PRIOR TO FINAL PLAT APPROVAL.
7. ALL COMMON AREAS ARE PRIVATE AND SHALL BE OWNED AND MAINTAINED BY A HOMEOWNER'S ASSOCIATION.
8. FINAL DESIGN PLANS TO BE APPROVED BY THE FIRE MARSHAL AND UTILITIES DEPARTMENT PRIOR TO FINAL PLAT APPROVAL.
9. THERE ARE NO KNOWN PLACES OF BURIAL ON THIS SITE.
10. SOLID WASTE SHALL BE STORED BY INDIVIDUAL LOT OWNERS, PICKED UP BY A COMMERCIAL HAULER AND DISPOSED OF IN A SUITABLE MANNER AT AN APPROVED LOCATION.
11. ALL WETLAND FILLS & DISTURBANCES WILL BE PERMITTED BY THE U.S. ARMY CORPS OF ENGINEERS.
12. PUBLIC WATER AND SANITARY SEWER PROVIDED BY CONNECTING TO SPOTSYLVANIA COUNTY SYSTEM. (SEE SHEET 4 FOR POINT OF CONNECTION)
13. FINAL DESIGN PLAN TO INCLUDE STORM SEWER SYSTEM DESIGNS.
14. ALL PUBLIC STREET SIGNS SHALL BE IN ACCORDANCE WITH VDOT AND SPOTSYLVANIA COUNTY STANDARDS (ARTICLE 5.6, S.C.D.S.M.).
15. TYPICAL ROAD SECTIONS ARE FOR PRIMARY ROADS ONLY AND DO NOT INCLUDE ALLEYS OR LOW-TRAFFIC TRAVELWAYS.
16. SEE SURVEY NOTES ON EXISTING CONDITIONS PLAN FOR SOURCE DESCRIPTION FOR BOUNDARY AND TOPOGRAPHICAL INFORMATION.
17. SEE PLAN SHEETS FOR PHASING INFORMATION.
17. LIGHTING SHALL BE PROVIDED IN ACCORDANCE WITH THE STANDARDS IDENTIFIED IN ARTICLE 5 (5-7) OF THE SPOTSYLVANIA COUNTY DESIGN STANDARDS MANUAL AND SECTION 23-5.12 OF THE SPOTSYLVANIA COUNTY ZONING ORDINANCE.
18. PROPERTY OWNERS ARE RESPONSIBLE FOR PRESERVING DRAINAGE EASEMENTS ON/ACROSS THEIR PROPERTY. SUCH EASEMENTS SERVING ROADWAYS MAINTAINED BY VDOT WILL BE MAINTAINED BY VDOT ONLY AS REQUIRED TO PROTECT THE ROADWAY FROM DAMAGE OR FLOODING.
19. ANY WELLS FOUND WILL BE ABANDONED PER HEALTH DEPARTMENT REQUIREMENTS.
20. FINAL RECORD PLAT TO BE ON VIRGINIA STATE PLANE COORDINATES (GPS).
21. VDOT PERMIT REQUIRED FOR ENTRANCE AND ROADWAY IMPROVEMENTS WITHIN VDOT RIGHT-OF-WAY.
22. ZONING NOTE: A SEPERATE PERMIT IS REQUIRED FOR SIGNS, RETAINING WALLS, ABOVE GROUND AND UNDERGROUND TANKS, AND ANY OTHER STRUCTURES.



TYPICAL SECTION
PRIVATE ROADS

NTS

ROAD SECTION DEPTHS
- SURFACE ASPHALT: 1-1/2" OF SM-9.5A
- BASE ASPHALT: 2" OF IM-19.0
- BASE AGGREGATE: 8" OF 21A

WIDTH OF TRAVEL LANES, CURBS, AND OTHER FEATURES SHOWN MAY BE INCREASED OR DECREASED, PROVIDED THAT THEY MEET COUNTY AND/OR VDOT STANDARDS.

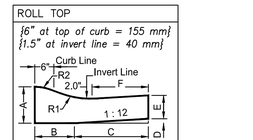
PAVEMENT DESIGN BASED ON VDOT PAVEMENT DESIGN GUIDE (2014), APPENDIX 1 FOR SPOTSYLVANIA COUNTY EAST OF I-95:
- PREDICTED RESILIANCY FACTOR = 2.5
- PREDICTED CBR = 10.0
- PREDICTED SOIL SUPPORT VALUE = 25.0

PROPOSED ROAD SECTION LAYER THICKNESS INDEX:
- 1.5" x 1.67
- 2.0" x 1.67
- 8.0" x 0.60
- RESULTING LAYER THICKNESS INDEX = 10.64
- (REQUIRED THICKNESS INDEX BASED ON NOMOGRAPH = 7.6)

NOTE: THE PROVIDED PAVEMENT DESIGN IS PREPARED IN ACCORDANCE WITH PREDICTED RESILIANCY FACTOR AND CBR DATA PROVIDED BY THE VIRGINIA DEPARTMENT OF TRANSPORTATION AND IS INTENDED AS A REPRESENTATIVE PAVEMENT SECTION. NO GEOTECHNICAL REPORT OR ANALYSIS WAS AVAILABLE DURING PLAN PREPARATION. FINAL PAVEMENT SECTION DESIGN IS SUBJECT TO SITE-SPECIFIC GEOTECHNICAL INFORMATION.

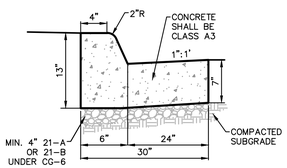
NOTE: PAVEMENT DESIGN WITHIN VDOT RIGHT-OF-WAY (INCLUDING ENTRANCE AND ALL ROAD IMPROVEMENT WORK) MUST MATCH OR EXCEED THAT OF ROUTE 636 (MINE ROAD).

ROLL TOP	
{6" at top of curb = 155 mm} {1.5" at invert line = 40 mm}	
Dimensions	
A	11.0 in.
B	1 ft 0 in
C	2 ft 0 in
D	2 in
E	7 in
F	1 ft 6 in
R1	1 ft 6 in
R2	1 ft 3 in



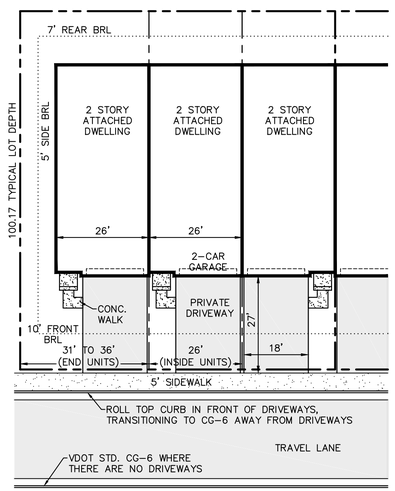
ROLL TOP CURB

N.T.S. SOURCE: SDI



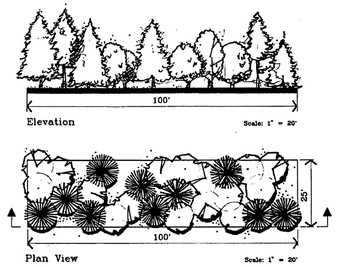
STANDARD CG-6 CURB

N.T.S. SOURCE: SDI



TYPICAL LOT LAYOUT

NOTE: SURFACE MATERIAL FOR PRIVATE DRIVEWAYS TO BE DETERMINED AT FINAL SITE PLAN.



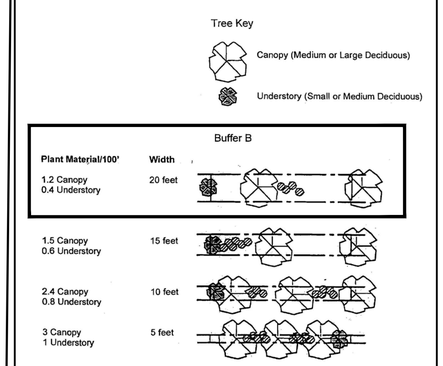
Transitional Screening 1 shall consist of an unbroken strip of open space a minimum of 25 feet wide and planted with:

(1) One large evergreen tree with an ultimate height of 40 feet or greater for every 10 linear feet, plus one medium evergreen tree with an ultimate height of 20 to 40 feet for every 5 linear feet.

OR

(2) With approval of the Director, one large evergreen tree with an ultimate height of 50 feet or greater for every 15 linear feet, plus one medium evergreen tree with an ultimate height of 20 to 40 feet for every 5 linear feet.

	TRANSITIONAL SCREENING 1	PLATE NO.	STD. NO
		6-18	



	Street Buffer B	PLATE NO.	STD. NO
		6-23	

COMMONWEALTH OF VIRGINIA
KEITH LUC OSTER
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JANUARY 22, 2021
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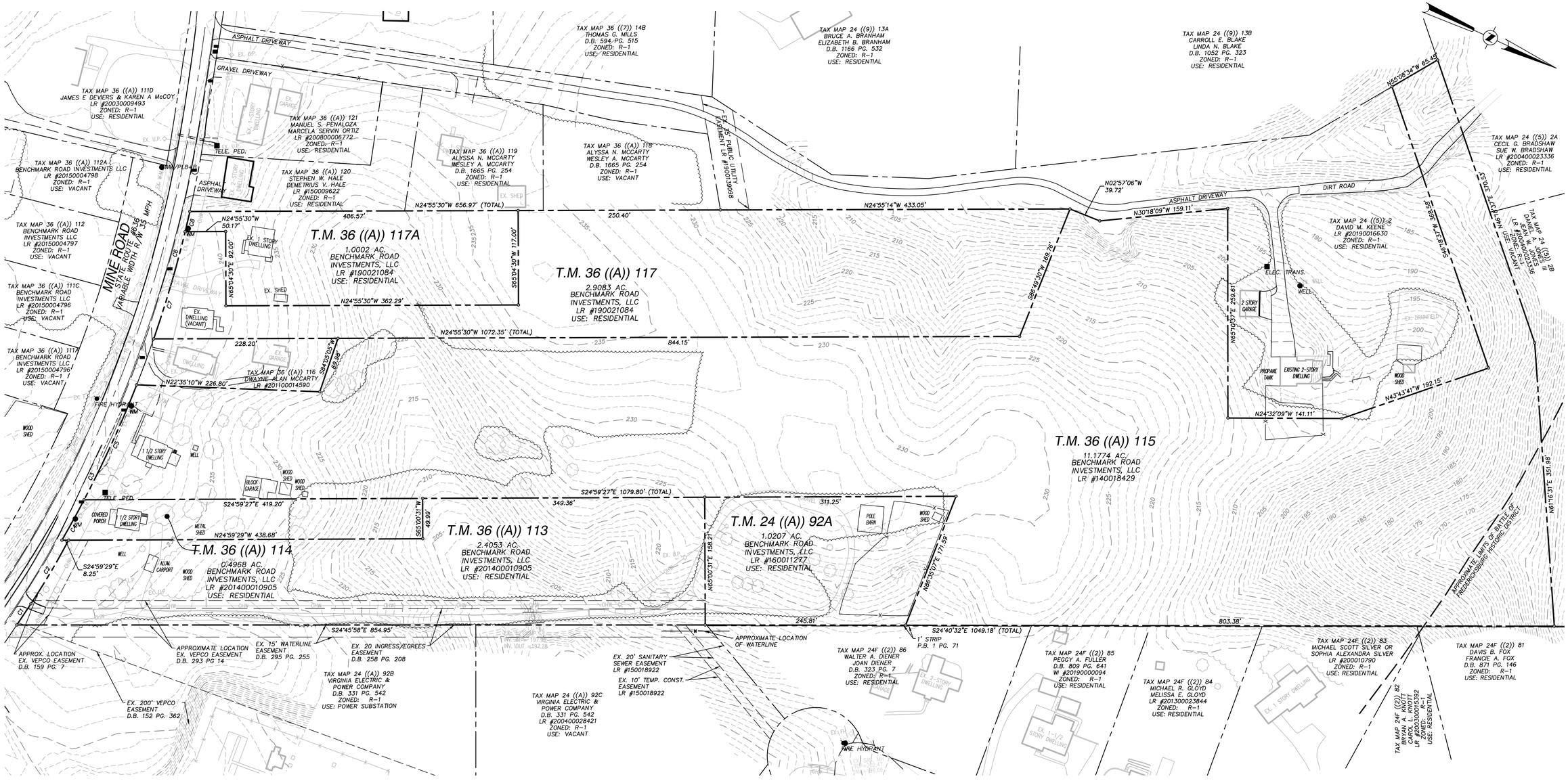
DATE	REVISIONS
12-22-2020	COUNTY COMMENTS
01-22-2021	COUNTY AND VDOT COMMENTS

AFTON VILLAS
LEE HILL MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

NOTES AND DETAILS

DES/DRFT: PLH
CHECKED: RHF
APPROVED: KLO
JOB NO.: 14-SP-0325
DATE: 11-03-2020
SCALE:

SHEET 2 OF 10 SHEETS



CURVE TABLE						
CURVE	RADIUS	DELTA	ARC	TANGENT	CH. BEARING	CHORD
C1	2703.24'	0°40'12"	31.62'	15.81'	N81°06'08"W	31.62'
C2	965.48'	5°26'10"	91.60'	45.84'	N84°09'19"W	91.57'
C3	1452.39'	8°26'06"	213.82'	107.10'	N89°04'03"W	213.63'
C4	1452.39'	2°15'20"	57.17'	28.59'	N85°58'40"W	57.17'
C5	1452.39'	6°10'47"	156.65'	78.40'	S89°48'17"W	156.57'
C6	1452.39'	6°28'33"	164.16'	82.17'	S81°04'52"W	164.07'
C7	1452.39'	5°27'45"	138.47'	69.29'	S81°35'16"W	138.42'
C8	1452.39'	1°00'48"	25.69'	12.84'	S78°20'59"W	25.69'

DEMOLITION NOTE

ALL EXISTING STRUCTURES WITHIN THE PROJECT AREA, WITH THE EXCEPTION OF THE EXISTING DWELLING ON TM 36((A))117A, SHALL BE RAZED. THE EXISTING DWELLING ON TM 36((A))117A MAY REMAIN OR BE RAZED AS DETERMINED BY THE LANDOWNER.

SURVEY NOTES

1. NO TITLE REPORT FURNISHED.
2. THIS PROPERTY IS SUBJECT TO ANY EASEMENTS AND RESTRICTIONS OF RECORD.
3. THIS PLAN DOES NOT REPRESENT THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THOSE SHOWN ARE LOCATED CORRECTLY.
4. SULLIVAN, DONAHOE & INGALLS DOES NOT CERTIFY AS TO THE LOCATION OF ANY UNDERGROUND UTILITIES.
5. TOPOGRAPHIC INFORMATION BASED ON FIELD RUN TOPOGRAPHIC SURVEY BY URBAN LTD. DATED NOVEMBER 15, 2019 AND SUPPLEMENT BY FIELD RUN SURVEY BY SULLIVAN, DONAHOE & INGALLS DATED OCTOBER 8, 2020.
6. MERIDIAN IS VIRGINIA STATE PLANE N.A.D. 1983. BOUNDARY PER FIELD RUN SURVEY BY SULLIVAN, DONAHOE AND INGALLS DATED FEBRUARY 6, 2020.
7. THERE ARE NO JURISDICTIONAL WETLANDS OR STREAMS ON THIS PROPERTY ACCORDING TO SITE EVALUATION PERFORMED BY ENVIRODATA, INC. ON JULY 16, 2019 AND SUMMARIZED IN LETTER TO PROPERTY OWNER ON AUGUST 5, 2019.

60' 0 60' 120'
GRAPHIC SCALE

COMMONWEALTH OF VIRGINIA
KEITH LUC OSTER
Lic. No. 35846
JANUARY 22, 2021
PROFESSIONAL ENGINEER

DATE	REVISIONS
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SULLIVAN DONAHOE & INGALLS
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AFTON VILLAS
LEE HILL MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

EXISTING CONDITIONS

DES/DRFT: PLH
CHECKED: RHF
APPROVED: KLO
JOB NO.: 14-SP-0325
DATE: 11-03-2020
SCALE:

SHEET 3 OF 10 SHEETS

TAX MAP 36 ((7)) 14B
THOMAS G. MILLS
D.B. 594 PG. 515
ZONED: R-1
USE: RESIDENTIAL

TAX MAP 24 ((9)) 13A
BRUCE A. BRANHAM
ELIZABETH B. BRANHAM
D.B. 1166 PG. 532
ZONED: R-1
USE: RESIDENTIAL

TAX MAP 24 ((9)) 13B
CARROLL E. BLAKE
LINDA N. BLAKE
D.B. 1052 PG. 323
ZONED: R-1
USE: RESIDENTIAL

N: 6776709.10
E: 11775572.15

TAX MAP 36 ((A)) 111D
JAMES E DEVIERS & KAREN A McCOY
LR #20030009493
ZONED: R-1
USE: RESIDENTIAL

TAX MAP 36 ((A)) 121
MANUEL S. PENALOZA
MARCELA SERVIN ORTIZ
LR #200800006772
ZONED: R-1
USE: RESIDENTIAL

TAX MAP 36 ((A)) 119
ALYSSA N. MCCARTY
WESLEY A. MCCARTY
D.B. 1665 PG. 254
ZONED: R-1
USE: RESIDENTIAL

TAX MAP 36 ((A)) 118
ALYSSA N. MCCARTY
WESLEY A. MCCARTY
D.B. 1665 PG. 254
ZONED: R-1
USE: VACANT

TAX MAP 24 ((5)) 2A
CECIL G. BRADSHAW
SUE W. BRADSHAW
LR #200400023336
ZONED: R-1
USE: RESIDENTIAL

TAX MAP 36 ((A)) 112A
BENCHMARK ROAD INVESTMENTS LLC
LR #20150004798
ZONED: R-1
USE: VACANT

TAX MAP 36 ((A)) 120
STEPHEN W. HALE
DEMETRIUS V. HALE
LR #150009622
ZONED: R-1
USE: RESIDENTIAL

N: 6775424.03
E: 11776371.48

25' TRANSITIONAL SCREENING 1

SECTION 1
37 LOTS
SEE SHEET 5

SECTION 2
37 LOTS
SEE SHEET 6

THIS PORTION OF COMMAND FIELD COURT AND AFTON GROVE COURT TO BE CONSTRUCTED WITH SECTION 1 FOR EMERGENCY VEHICLE ACCESSIBILITY AND CIRCULATION

TAX MAP 24 ((5)) 2
DAVID M. KEENE
LR #20190016630
ZONED: R-1
USE: RESIDENTIAL

TAX MAP 24 ((5)) 2B
DANIEL W. JONES
LR #200400023336
ZONED: R-1
USE: VACANT

TAX MAP 36 ((A)) 112
BENCHMARK ROAD INVESTMENTS LLC
LR #20150004797
ZONED: R-1
USE: VACANT

MINE ROAD
STATE ROUTE 646
VARIABLE WIDTH R/W
35 MPH

LOT 117A

FINAL CONFIGURATION OF BOUNDARY BETWEEN 117 AND 117A TO BE DEFINED AT TIME OF BLA

COMMAND FIELD COURT

LOT 117

25' TRANSITIONAL SCREENING 1

TAX MAP 36 ((A)) 111C
BENCHMARK ROAD INVESTMENTS LLC
LR #20150004796
ZONED: R-1
USE: VACANT

TAX MAP 36 ((A)) 116
DWAYNE ALAN MCCARTY
LR #201100014590

PARCEL A

POINT OF CONNECTION TO PUBLIC WATER

TAX MAP 36 ((A)) 111A
BENCHMARK ROAD INVESTMENTS LLC
LR #20150004796
ZONED: R-1
USE: VACANT

AFTON GROVE COURT

20' STREET BUFFER B

20' PUBLIC UTILITY EASEMENT (SEE EASEMENT NOTE ON SHEET 6 – LAYOUT PLAN SECTION 2)

25' TRANSITIONAL SCREENING 1

N: 6777134.20
E: 11776148.74

N: 6775441.47
E: 11776927.85

APPROX. LOCATION EX. VEPCO EASEMENT D.B. 159 PG. 7

APPROXIMATE LOCATION EX. VEPCO EASEMENT D.B. 293 PG 14

EX. 15' WATERLINE EASEMENT D.B. 295 PG. 255

EX. 20 INGRESS/EGREES EASEMENT D.B. 258 PG. 208

TAX MAP 24 ((A)) 92B
VIRGINIA ELECTRIC & POWER COMPANY
D.B. 331 PG. 542
ZONED:
USE: POWER SUBSTATION

EX. 200' VEPCO EASEMENT D.B. 152 PG. 362

EX. 12" CMP INV. IN = 197.28 INV. OUT =197.28

EX. 20' SANITARY SEWER EASEMENT LR #150018922

EX. 10' TEMP. CONST. EASEMENT LR #150018922

TAX MAP 24 ((A)) 92C
VIRGINIA ELECTRIC & POWER COMPANY
D.B. 331 PG. 542
LR #200400028421
ZONED: R-1
USE: VACANT

TAX MAP 24F ((2)) 86
WALTER A. DIENER
JOAN DIENER
D.B. 323 PG. 7
ZONED: R-1
USE: RESIDENTIAL

TAX MAP 24F ((2)) 85
PEGGY A. FULLER
D.B. 809 PG. 641
W #201900000094
ZONED: R-1
USE: RESIDENTIAL

TAX MAP 24F ((2)) 84
MICHAEL R. GLOYD
MELISSA E. GLOYD
LR #201300023844
ZONED: R-1
USE: RESIDENTIAL

TAX MAP 24F ((2)) 83
MICHAEL SCOTT SILVER OR SOPHIA ALEXANDRA SILVER
LR #200010790
ZONED: R-1
USE: RESIDENTIAL

TAX MAP 24F ((2)) 82
BRYAN A. KNOTT
CHERIE L. KNOTT
LR #200300015392
ZONED: R-1
USE: RESIDENTIAL

TAX MAP 24F ((2)) 81
DAVIS B. FOX
FRANCIE A. FOX
D.B. 871 PG. 146
ZONED: R-1
USE: RESIDENTIAL

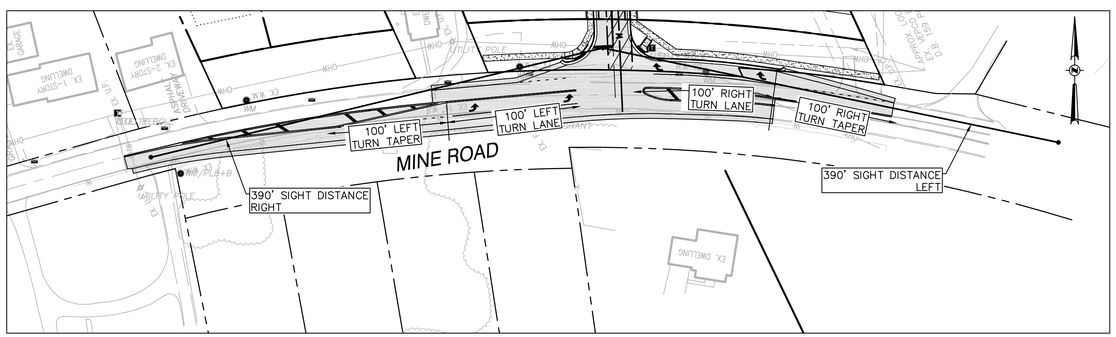
SANITARY SEWER CONNECTION TO BE CONSTRUCTED WITH SECTION 1

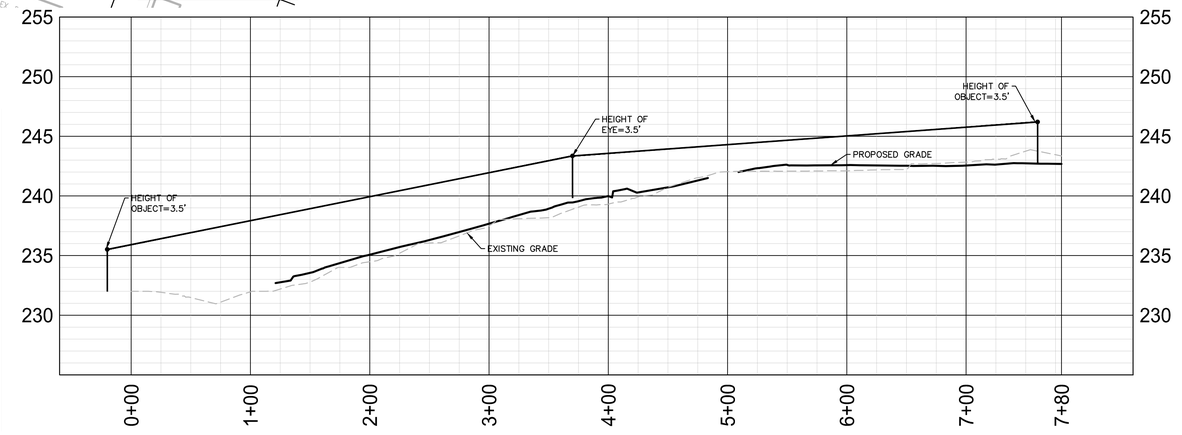
POINT OF CONNECTION TO PUBLIC SANITARY SEWER

PHASING PLAN

THIS PROJECT WILL BE DEVELOPMENT IN 2 SECTIONS.

60' 0 60' 120'
GRAPHIC SCALE





COMMONWEALTH OF VIRGINIA
KEITH LUC OSTER
Lic. No. 35846
JANUARY 22, 2021
PROFESSIONAL ENGINEER

DATE	REVISIONS
12-22-2020	COUNTY COMMENTS
01-22-2021	COUNTY AND VDOT COMMENTS

SDI SULLIVAN DONAHOE & INGALLS
ENGINEERS, SURVEYORS & ENVIRONMENTAL SERVICES
P.O. BOX 614
10720 COLUMBIA DRIVE
FREDERICKSBURG, VIRGINIA 22404
TELEPHONE 540-898-5878

AFTON VILLAS
LEE HILL MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

OVERALL PLAN

DES/DRFT: PLH
CHECKED: RHF
APPROVED: KLO
JOB NO.: 14-SP-0325
DATE: 11-03-2020
SCALE:

SHEET 4 OF 10 SHEETS

PARCEL A

PARCELS A IS TO BE OWNED AND MAINTAINED BY AN HOA.

PHASING PLAN

THIS SUBDIVISION WILL BE DEVELOPMENT IN 2 SECTIONS.

MATCH LINE
SEE SHEET 6 - LAYOUT PLAN SECTION 2

MATCH LINE
SEE SHEET 6 - LAYOUT PLAN SECTION 2

TAX MAP 36 ((A)) 111D
JAMES E DEVIERS & KAREN A MCCOY
LR #20030009493
ZONED: R-1
USE: RESIDENTIAL

TAX MAP 36 ((A)) 112A
BENCHMARK ROAD INVESTMENTS LLC
LR #20150004798
ZONED: R-1
USE: VACANT

TAX MAP 36 ((A)) 112
BENCHMARK ROAD INVESTMENTS LLC
LR #20150004797
ZONED: R-1
USE: VACANT

TAX MAP 36 ((A)) 111C
BENCHMARK ROAD INVESTMENTS LLC
LR #20150004796
ZONED: R-1
USE: VACANT

TAX MAP 36 ((A)) 111A
BENCHMARK ROAD INVESTMENTS LLC
LR #20150004796
ZONED: R-1
USE: VACANT

TAX MAP 36F ((5)) 136
LAURA E JENKINS
LR #20060018233
ZONED: R-1
USE: RESIDENTIAL

TAX MAP 36 ((A)) 121
MANUEL S. PENALOZA MARCELA SERVIN ORTIZ
LR #20080006772
ZONED: R-1
USE: RESIDENTIAL

TAX MAP 36 ((A)) 120
STEPHEN W. HALE DEMETRIUS V. HALE
LR #150009622
ZONED: R-1
USE: RESIDENTIAL

TAX MAP 36 ((A)) 116
DWAYNE ALAN MCCARTY
LR #201100014590

MINE ROAD
STATE ROUTE #636
VARIABLE WIDTH R/W

0.16 ACRES OF RIGHT OF WAY DEDICATION

RIGHT OF WAY IMPROVEMENTS IN MINE ROAD; FINAL DESIGN AT SITE PLAN

100' TAPER

100' TURN LANE

VARIABLE WIDTH RIGHT OF WAY

0.30 ACRES OF RIGHT OF WAY DEDICATION

VARIABLE WIDTH RIGHT-OF-WAY DEDICATION

20' STREET BUFFER B

PICKLEBALL COURT

VARIABLE WIDTH PUBLIC UTILITY EASEMENT

25' TRANSITIONAL BUFFER 1

PROPOSED INTERCONNECTED STORMWATER MANAGEMENT DEVICE

PROPOSED STORMWATER MANAGEMENT ACCESS EASEMENT

20' PUBLIC UTILITY EASEMENT

10' PRIVATE STORM DRAINAGE EASEMENT

VARIABLE WIDTH PUBLIC UTILITY EASEMENT

CONNECTION TO PUBLIC SANITARY SEWER (CONNECTION TO BE COMPLETED WITH CONSTRUCTION OF SECTION 1)

CLUSTER MAILBOX

LOT 117A
10,674Φ

LOT 117
14,525Φ

PARCEL A
557,670Φ

COMMAND FIELD COURT
PRIVATE ACCESS EASEMENT
33' PRIVATE RIGHT-OF-WAY

AFTON GROVE COURT
PRIVATE ACCESS EASEMENT
39' PRIVATE RIGHT-OF-WAY

39' PRIVATE RIGHT-OF-WAY

VARIABLE WIDTH PRIVATE RIGHT-OF-WAY

| | | |

MATCH LINE
SEE SHEET 5 - LAYOUT PLAN SECTION 1

TUTT
100139098

433.05
S24°55'14"E

39.72
S02°57'06"E

159.11
S30°18'09"E

VARIABLE WIDTH PUBLIC UTILITY EASEMENT

25' TRANSITIONAL BUFFER 1

33' PRIVATE RIGHT-OF-WAY

PROPOSED STORMWATER MANAGEMENT ACCESS EASEMENT

PROPOSED STORMWATER MANAGEMENT DEVICE

ASPHALT DRIVEWAY

TAX MAP: 24 ((5)) 2
DAVID M. KEENE
LR #20190016630
ZONED: R-1
USE: RESIDENTIAL

C.L.E.C. TRANS.

2 STORY GARAGE

S65°10'37"W
259.61

39' PRIVATE RIGHT-OF-WAY

10' PRIVATE STORM DRAINAGE EASEMENT

COMMAND FIELD COURT
PRIVATE ACCESS EASEMENT

PARCEL A
557,670Φ

PROPANE TANK

EXIST.

141.11
S24°32'09"E

AFTON GROVE COURT
PRIVATE ACCESS EASEMENT

39' PRIVATE RIGHT-OF-WAY

VARIABLE WIDTH PUBLIC UTILITY EASEMENT

20' PUBLIC UTILITY EASEMENT (SEE EASEMENT NOTE)

VARIABLE WIDTH PRIVATE RIGHT-OF-WAY

GAZEBO

TURNAROUND; DESIGNED TO SPOTSYLVANIA COUNTY DSM STANDARDS

PARCEL A
557,670Φ

20' PUBLIC UTILITY EASEMENT (SEE EASEMENT NOTE)

25' TRANSITIONAL BUFFER 1

25' TRANSITIONAL BUFFER 1

N24°40'32"W
1049.18

MATCH LINE
SEE SHEET 5 - LAYOUT PLAN SECTION 1

EASEMENT NOTE

ON-SITE PUBLIC UTILITY AND STORMWATER ACCESS EASEMENTS WILL BE DEPICTED ON THE FINAL SITE PLAN. THE 20' PUBLIC UTILITY EASEMENT CONNECTING TM 24F-2-86 TO TM 24-5-2B IS SHOWN ON THIS PLAN FOR CLARITY SINCE THERE WILL BE NO WATER LINE INSTALLED IN THIS AREA, AND FOR CONTINUITY WITH THE GENERALIZED DEVELOPMENT PLAN.

PARCEL A NOTE

PARCEL A IS TO BE PERPETUALLY OWNED AND MAINTAINED BY THE HOMEOWNERS ASSOCIATION (HOA).

PHASING PLAN

THIS SUBDIVISION WILL BE DEVELOPMENT IN 2 SECTIONS.

30' 0 30' 60'
GRAPHIC SCALE

COMMONWEALTH OF VIRGINIA
KEITH LOC OSTER
Lic. No. 35846
JANUARY 22, 2021
PROFESSIONAL ENGINEER

DATE	REVISIONS
12-22-2020	COUNTY COMMENTS
01-22-2021	COUNTY AND VDOT COMMENTS

SULLIVAN DONAHOE & INGALLS
SDI
ENGINEERS, SURVEYORS & ENVIRONMENTAL SERVICES
P.O. BOX 614
10720 COLUMBIA DRIVE
FREDERICKSBURG, VIRGINIA 22404
TELEPHONE 540-898-5878

AFTON VILLAS
LEE HILL MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

LAYOUT PLAN
SECTION 2

DES/DRFT: PLH
CHECKED: RHF
APPROVED: KLO
JOB NO.: 14-SP-0325
DATE: 11-03-2020
SCALE:

SHEET 6
OF 10 SHEETS



LEGEND

OPEN SPACE

AREAS OF GREATER THAN 15% SLOPES

OPEN SPACE CALCULATIONS

TOTAL PROJECT AREA:	19.0087 ACRES
MINIMUM REQUIRED TOTAL OPEN SPACE:	6.6530 ACRES (35% IN PDH-5)
MINIMUM UNIMPACTED OPEN SPACE:	3.3265 ACRES
TOTAL OPEN SPACE CALCULATION:	
GROSS AREA OF PARCEL A:	12.8023 ACRES
IMPERVIOUS AREAS WITHIN PARCEL A:	1.9927 ACRES
NET OPEN SPACE WITHIN PARCEL A:	10.6452 ACRES (> 6.65 AC MIN) (56.0%)
UNIMPACTED OPEN SPACE CALCULATION:	
NET OPEN SPACE WITHIN PARCEL A:	10.6452 ACRES
SLOPES GREATER THAN 15% WITHIN PARCEL A:	4.1536 ACRES
UNIMPACTED OPEN SPACE WITHIN PARCEL A:	6.4916 ACRES (> 3.33 AC MIN) (34.2%)

UNIMPACTED OPEN SPACE NOTE

UNIMPACTED OPEN SPACE IS LAND WITHIN PARCEL A THAT IS NOT IMPERVIOUS AND NOT WITHIN WETLANDS, RESOURCE PROTECTION AREAS, FLOODPLAINS, OR SLOPES GREATER THAN 15%. THERE ARE NO WETLANDS, RESOURCE PROTECTION AREAS, OR FLOODPLAINS WITHIN THE PROJECT AREA.

60' 0 60' 120'
GRAPHIC SCALE

COMMONWEALTH OF VIRGINIA
KEITH LOC OSTER
Lic. No. 35846
JANUARY 22, 2021
PROFESSIONAL ENGINEER

DATE	REVISIONS
12-22-2020	COUNTY COMMENTS
01-22-2021	COUNTY AND VDOT COMMENTS

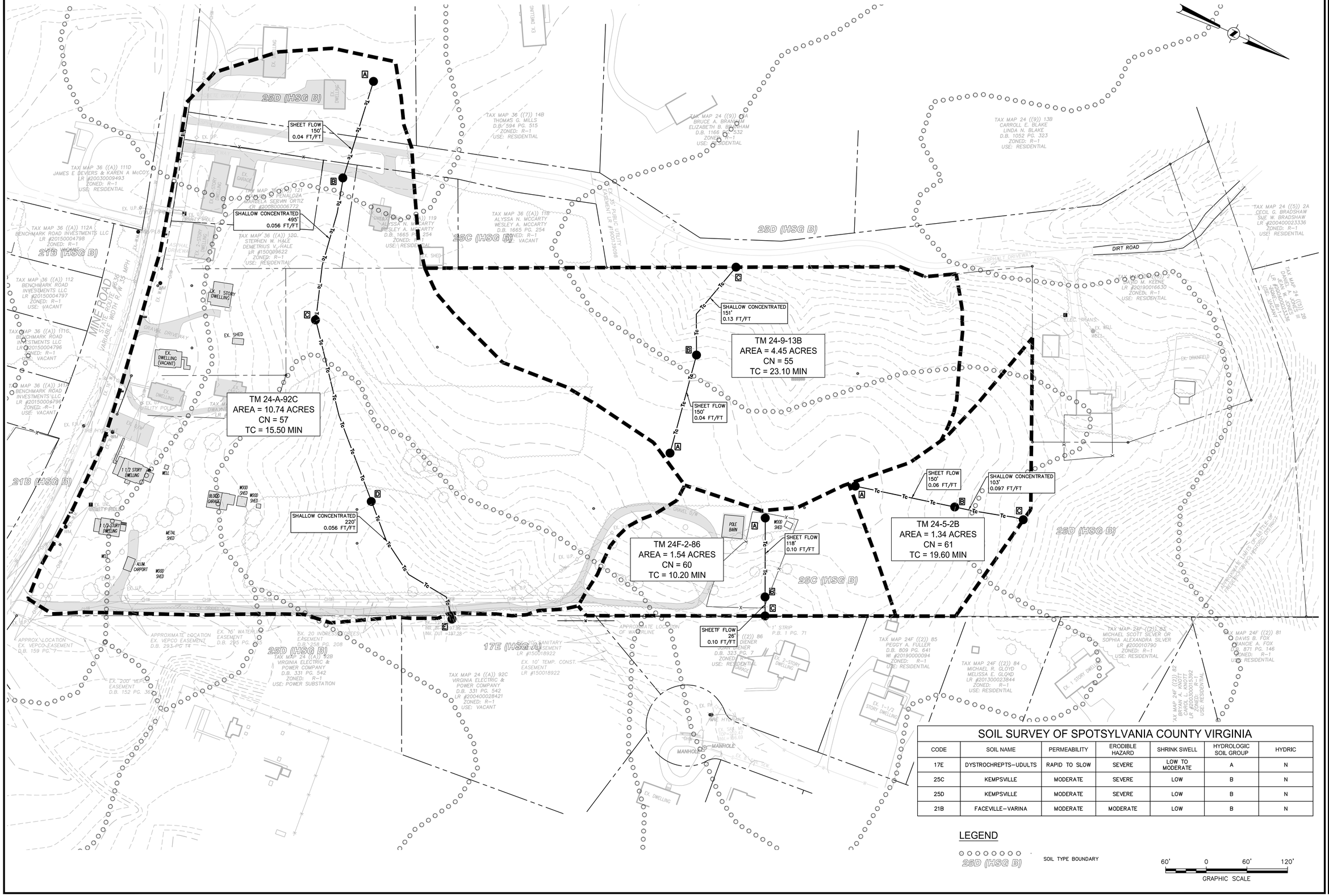
SULLIVAN DONAHOE & INGALLS
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TELEPHONE 540-898-5878

AFTON VILLAS
LEE HILL MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

SLOPES AND OPEN SPACE ANALYSIS PLAN

DES/DRFT: PLH
CHECKED: RHF
APPROVED: KLO
JOB NO.: 14-SP-0325
DATE: 11-03-2020
SCALE:

SHEET 7 OF 10 SHEETS



SOIL SURVEY OF SPOTSYLVANIA COUNTY VIRGINIA

CODE	SOIL NAME	PERMEABILITY	ERODIBLE HAZARD	SHRINK SWELL	HYDROLOGIC SOIL GROUP	HYDRIC
17E	DYSTROCHREPTS–UDULTS	RAPID TO SLOW	SEVERE	LOW TO MODERATE	A	N
25C	KEMPSVILLE	MODERATE	SEVERE	LOW	B	N
25D	KEMPSVILLE	MODERATE	SEVERE	LOW	B	N
21B	FACEVILLE–VARINA	MODERATE	MODERATE	LOW	B	N

LEGEND

25D (HSG B) — SOIL TYPE BOUNDARY

60' 0 60' 120'
GRAPHIC SCALE

COMMONWEALTH OF VIRGINIA
KEITH LUC OSTER
Lic. No. 35846
JANUARY 22, 2021
PROFESSIONAL ENGINEER

DATE	REVISIONS
12-22-2020	COUNTY COMMENTS
01-22-2021	COUNTY AND VDOT COMMENTS

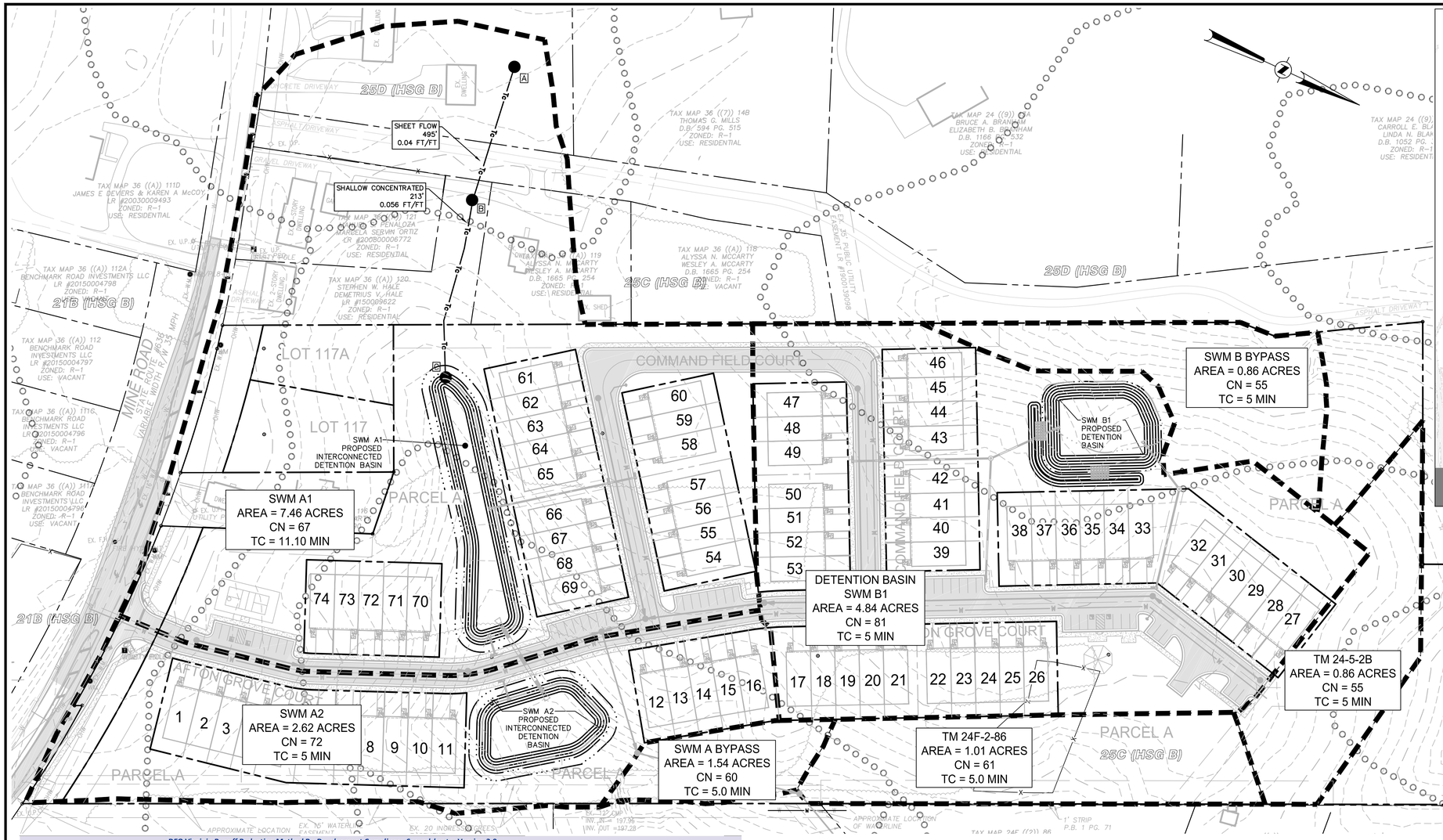
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P.O. BOX 614
10720 COLUMBIA DRIVE
FREDERICKSBURG, VIRGINIA 22404
TELEPHONE 540-898-5878

AFTON VILLAS
LEE HILL MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

PRE-DEVELOPMENT STORMWATER MANAGEMENT CONCEPT PLAN

DES/DRFT: PLH
CHECKED: RHF
APPROVED: KLO
JOB NO.: 14-SP-0325
DATE: 11-03-2020
SCALE: 1"=60'

SHEET 8
OF 10 SHEETS


SHEET FLOW
495'
0.04 FT/FT
SHALLOW CONCENTRATED
213'
0.056 FT/FT
25D (HSG B)
25C (HSG B)
21B (HSG B)
MINE ROAD
LOT 117A
LOT 117
PARCEL A
COMMAND FIELD COURT
COMMAND FIELD COURT
AFTON GROVE COURT
AFTON GROVE COURT
SWM A1
PROPOSED
INTERCONNECTED
DETENTION BASIN
SWM A1
AREA = 7.46 ACRES
CN = 67
TC = 11.10 MIN
SWM A2
AREA = 2.62 ACRES
CN = 72
TC = 5 MIN
SWM A2
PROPOSED
INTERCONNECTED
DETENTION
BASIN
DETENTION BASIN
SWM B1
AREA = 4.84 ACRES
CN = 81
TC = 5 MIN
SWM B1
PROPOSED
DETENTION
BASIN
SWM B BYPASS
AREA = 0.86 ACRES
CN = 55
TC = 5 MIN
SWM A BYPASS
AREA = 1.54 ACRES
CN = 60
TC = 5.0 MIN
TM 24-5-2B
AREA = 0.86 ACRES
CN = 55
TC = 5 MIN
TM 24F-2-86
AREA = 1.01 ACRES
CN = 61
TC = 5.0 MIN
TAX MAP 36 ((A)) 111D
JAMES E BEVERS & KAREN A McCOY
LR #20030009493
ZONED: R-1
USE: RESIDENTIAL
TAX MAP 36 ((A)) 112A
BENCHMARK ROAD INVESTMENTS LLC
LR #20150004798
ZONED: R-1
USE: VACANT
TAX MAP 36 ((A)) 112
BENCHMARK ROAD INVESTMENTS LLC
LR #20150004797
ZONED: R-1
USE: VACANT
TAX MAP 36 ((A)) 111G
BENCHMARK ROAD INVESTMENTS LLC
LR #20150004796
ZONED: R-1
USE: VACANT
TAX MAP 36 ((A)) 111F
BENCHMARK ROAD INVESTMENTS LLC
LR #20150004796
ZONED: R-1
USE: VACANT
TAX MAP 36 ((A)) 120
STEPHEN W. HALE
DEMETRIUS V. HALE
LR #150009622
ZONED: R-1
USE: RESIDENTIAL
TAX MAP 36 ((A)) 119
ALYSSA N. MCCARTY
WESLEY A. MCCARTY
D.B. 1665 PG. 254
ZONED: R-1
USE: VACANT
TAX MAP 36 ((A)) 118
ALYSSA N. MCCARTY
WESLEY A. MCCARTY
D.B. 1665 PG. 254
ZONED: R-1
USE: VACANT
TAX MAP 36 ((7)) 14B
THOMAS G. MILLS
D.B. 594 PG. 515
ZONED: R-1
USE: RESIDENTIAL
TAX MAP 24 ((9)) 1
BRUCE A. BRANHAM
ELIZABETH B. BRANHAM
D.B. 1166 PG. 532
ZONED: R-1
USE: RESIDENTIAL
TAX MAP 24 ((9)) 2
CARROLL E. BLA
LINDA N. BLAK
D.B. 1052 PG.
ZONED: R-1
USE: RESIDENT
TAX MAP 24F ((2)) 83
MICHAEL SCOTT SILVER OR
TAX MAP 24F ((2)) 81
EX. 35' PUBLIC UTILITY EASEMENT LR #190013998
EX. 25' UTILITY EASEMENT
EX. 20' UTILITY EASEMENT
EX. 16" WATERLINE
EX. 20' INGRESS/EGRESS
APPROXIMATE LOCATION OF WATERLINE
1' STRIP P.B. 1 PG. 71
APPROXIMATE LIMITS OF BATTLE OF FREDERICKSBURG HISTORIC DISTRICT
ASPHALT DRIVEWAY
CONCRETE DRIVEWAY
GRAVEL DRIVEWAY
EX. U/P
EX. SHED
EX. 1-STORY DWELLING
EX. 2-STORY DWELLING
EX. UTILITY POLE
EX. FH
EX. WV
EX. SSMH
EX. CMH
EX. DMH
EX. INLET
EX. CATCH BASIN
EX. 6" WATERLINE
EX. 8" SANITARY SEWER
EX. 12" STORM SEWER
EX. 18" STORM SEWER
EX. 24" STORM SEWER
EX. 30" STORM SEWER
EX. 36" STORM SEWER
EX. 42" STORM SEWER
EX. 48" STORM SEWER
EX. 54" STORM SEWER
EX. 60" STORM SEWER
EX. 66" STORM SEWER
EX.

VOLUNTARY PROFFER STATEMENT

Applicant/Owner:	Benchmark Road Investments, LLC ("Applicant") 1109 Charles Street, Fredericksburg, VA 22401
Representative:	Charles W. Payne, Jr., Hirschler Fleischer; 725 Jackson Street, Ste. 200, Fredericksburg, VA 22401; Phone: (540) 604-2108; Fax (540) 604-2101; Email: cpayne@hirschlerlaw.com
Project Name:	"Afton Villas"
Property:	Spotsylvania County Tax Parcels 24-A-92A, 36-A-113, 36-A-114, 36-A-115, 36-A-117 & 36-A-117A, consisting of approximately 19.01 acres, known as 4105, 4107, 4109, 4113, 4121 and 4125 Mine Road (collectively, the "Property")
Date:	September 3, 2020
GDP:	Generalized Development Plan, entitled "Afton Villas", prepared by Garrison Consulting Co., Inc., dated January 20, 2020, revised April 3, 2020, attached hereto as Exhibit A ("GDP")
Rezoning Request:	From R-1 & PDH-2 to PDH-5
Rezoning File No.:	R20-0003

I. General Information

The Applicant, its successors and assigns, hereby agrees that the development of the Property, subsequent to approval of the rezoning application to which these proffers are attached, will be in conformance with the GDP and the following proffered conditions ("Proffers") pursuant to Sections 15.2-2303 and 15.2-2303.4, et al. of the Code of Virginia (1950, as amended), and Section 23-4.6.3, et al. of the Zoning Ordinance of Spotsylvania County (1995, as amended). The Proffers are the only conditions offered in this rezoning application, and any prior proffers affecting the Property are hereby superseded by these Proffers. All previous proffers associated with the Property, whether of record or not, are hereby void and of no further force and effect. The Proffers will be enforceable only upon Spotsylvania County's ("County") full and final approval of rezoning application R20-0003 submitted by the Applicant to reclassify the Property from R-1 and PHD-2 to PDH-5 to allow the development of no more than seventy-seven (77) age-restricted single family attached units and two (2) single family detached units.

II. Land Use

A. **General Development.** The Property will be developed in conformance with the GDP. Notwithstanding the foregoing, all parcel lines, parcel sizes, building envelopes, building sizes, public road locations, private driveway and travelway locations, utility locations, waste management facilities, storm water management facilities, amenities, and dimensions of undeveloped areas shown on the GDP may be reasonably adjusted for purposes of final site or subdivision plans to allow the Applicant to be fully compliant with the requirements of state and federal agency regulations including, but not limited to, DHR, VDOT, DEQ, DCR, Army Corps., etc., and the County's zoning ordinance, subdivision ordinance and design standards manual. Notwithstanding the foregoing, any said adjustments to the GDP shall be subject to the approval of the County's Zoning Administrator, and in no event shall approved adjustments to the GDP relieve the Applicant from providing any of the Proffers.

B. **Use**. The Property shall be developed solely for no more than seventy-seven (77) age-restricted residential single family attached dwelling units ("SFA Units") and two (2) residential single family detached dwelling units ("SFD Units") as shown on the GDP. SFA and SFD may hereafter be collectively referred to as "Units". The Property shall not be developed for any other uses allowed under the PDH-5 district, except for any allowable accessory and home occupation uses authorized under said district.

C. **Phasing**. The SFA Units will be developed in two sections, all as shown on the GDP. Market demand will dictate the timing of those two sections.

D. **Age-Restricted Covenants**. All SFA Units constructed on the Property shall be age-restricted and qualify as "housing for older persons" in accordance with the criteria set forth in Code of Virginia Section 36-96.7, et al., as amended. Further, the Applicant, prior to construction of the first SFA unit, shall prepare and record restrictive covenants that define the qualification for initial and subsequent occupancy of any SFA unit associated with the Property and shall further restrict households to include at least one (1) person who is age 55 years or older. Additionally, a covenant shall be placed on the Property that further prohibits any resident 18 years or younger to reside within any SFA unit constructed on the Property for a period of time exceeding thirty (30) days within any six (6) month period. Notwithstanding the foregoing restrictions, any SFA unit constructed on the Property may be occupied by a physically or mentally disabled individual who is 18 years of age or older and is the child of an age-restricted occupant. All such covenants described herein shall be recorded among the land records of Spotsylvania County, Virginia and encumber the Property prior to the issuance of a certificate of occupancy for any SFA unit.

E. **Architectural Materials**. The building materials for only the SFA units will include one or more of the following: vinyl siding (Straight edge or Dutch lap in main areas; Board and batten in accent areas); 30 year architectural shingles; cultured stone veneer; 4" aluminum gutters; driveways: all will be either concrete or asphalt; Notwithstanding the foregoing, in the event any of these materials are discontinued or no longer available, then the Applicant will utilize substantially similar materials, subject to the approval of the County's Zoning Administrator.

III. Transportation

The Applicant agrees to provide the following transportation Proffers, all as generally shown on the GDP:

A. Dedication of approximately 0.4641 acres of right of way area along Mine Road and additional offsite right of way area across Mine Road, all in the areas generally designated on the GDP as "PROP. R/W";

B. A 100 foot right turn lane and a 100 foot right turn lane taper from Mine Road, as shown on the GDP; and

C. A 100 foot left turn lane and a 100 foot left turn lane taper from Mine Road, as shown on the GDP.

D. The Applicant agrees to dedicate right of way as provided herein and shown on the GDP upon final subdivision approval or sooner pursuant to the County's request but in no event earlier than the Applicant's initial site plan submission.

IV. Cash Proffers

A. The Applicant will provide the following cash Proffers to mitigate the project's impacts. For the purpose of calculating these cash Proffers, the number of SFA Units has been reduced from 77 to 49 to reflect the 28 by-right units that could be developed under the existing R-1 and PDH-2 zoning. Cash Proffers are only applicable to all SFA Units and will be paid on a per unit basis of $92.51 ($7,123.27 divided by 77 Units = $92.51 per Unit) ("Cash Contributions") after the final inspection and before the County's approval of any certificate of occupancy for each SFA Unit.

CASH AND IN-KIND PROFFERS

	SF Detached	SF Attached	Multi-Family	Age-Restricted	TOTAL
Per Unit Cash Proffer	*$0 x 0*	*$92.51* x 77	*$0 x 0*	*$0 x 0*	
TOTAL	*$0*	*$7,123.27*	*$0*	*$0*	*$7,123.27*

LUMP SUM AND IN-KIND CONTRIBUTIONS

PUBLIC FACILITY CATEGORY		TOTAL VALUE
Schools	$0.00 cash per unit to Schools	$0.00
Public Safety	$28.59 cash per SFA Unit to Public Safety	$2,201.43
Transportation	$0.00 cash per SFA Unit to Transportation	$0.00
Parks & Rec.	$63.92 cash per SFA Unit to Parks & Rec.	$4,921.84
	TOTAL CASH & IN KIND PROFFER VALUE	*$7,123.27*

PROFFERED PHASING AND TIMING

Phase or Contribution/Dedication	Timing
Cash Contributions to Public Safety	After the final inspection and before the County's approval of any certificate of occupancy for each SFA Unit
Cash Contributions to Parks & Rec.	After the final inspection and before the County's approval of any certificate of occupancy for each SFA Unit

B. Escalation Clause. Commencing five (5) years after the approval of this rezoning application, the cash Proffers for each single family attached residential Unit shall be adjusted annually on the next following January 1st to reflect any increase for the preceding year in the Consumer Price Index, U.S. City Average, All Urban Consumers (the "CPI-U") prepared and reported monthly by the U.S. Bureau of Labor Statistics of the United States Department of Labor. The adjustment shall be made by multiplying the Cash Contributions for the preceding year by the CPI-U as of December 1st in the preceding year. If the CPI-U is discontinued by the United States Department of Labor, the Marshall and Swift Building Cost Index formula shall be used as defined by Section 15.2.2303.3b of the Code of Virginia.

V. Additional Proffers

A. Amenities. The Applicant will construct prior to the issuance of the certificate of occupancy for the 10th SFA Unit, a pickleball court; and prior to the issuance of the certificate of occupancy for the 39th SFA Unit, a gazebo, all as shown on the GDP.

B. In addition to the above referenced cash proffers, the Applicant agrees to pay the sum of $10,000 toward Public Safety ("Additional Cash Proffer"). The Additional Cash Proffer will be paid prior to the issuance of the first certificate of occupancy permit for any SFA Unit.

The Applicant makes these Proffers voluntarily, in support of their rezoning application and by our signatures deem them reasonable and appropriate as set out in Virginia Code Section 15.2-2303.4 A.D.1.

WITNESS the following signatures:

APPLICANT/OWNER:

BENCHMARK ROAD INVESTMENTS, LLC, a Virginia limited liability company

By: Melvin L. Garrison, III, Manager

Date: 9/17/20

COMMONWEALTH OF VIRGINIA
CITY/COUNTY OF Fredericksburg

The foregoing was subscribed, sworn to and acknowledged before me this 17th day of September, 2020, by Melvin L. Garrison, III, Manager of Benchmark Road Investments, LLC, a Virginia limited liability company, on behalf of said company.

Notary Public

Print Name: Kathryn Lynn Nix-Khurshid
My Commission Expires: 8/31/2024
Registration No. 7883487
[SEAL]

KATHRYN LYNN NIX-KHURSHID NOTARY PUBLIC REG # 7883487 MY COMMISSION EXPIRES 8/31/2024 COMMONWEALTH OF VIRGINIA

PROFFER COMPLIANCE INFORMATION

I. THE PROPOSED DEVELOPMENT CONFORMS WITH THIS ITEM. THIS PRELIMINARY PLAT DEPICTS 74 AGE-RESTRICTED SINGLE FAMILY ATTACHED UNITS AND 2 SINGLE FAMILY DETACHED UNITS.

II. A. THE PROPOSED DEVELOPMENT IS IN GENERAL CONFORMANCE WITH THE PREVIOUSLY APPROVED GDP. THE ADJUSTMENTS MADE ARE IN RESPONSE TO MARKET CONDITIONS FOR UNIT SIZE AND REFINEMENT OF OTHER ELEMENTS.

B. THE PROPOSED DEVELOPMENT CONFORMS WITH THIS ITEM. THIS PRELIMINARY PLAT DEPICTS 74 AGE-RESTRICTED SINGLE FAMILY ATTACHED UNITS AND 2 SINGLE FAMILY DETACHED UNITS.

C. THE PROPOSED DEVELOPMENT CONFORMS WITH THIS ITEM. THERE IS A SECTION LINE CLEARLY DEPICTED ON THIS PRELIMINARY PLAT.

D. THE PROPOSED DEVELOPMENT WILL CONFORM WITH THIS ITEM BY WAY OF RESTRICTIVE COVENANTS PLACED ON THE PROPERTY.

E. THE PROPOSED DEVELOPMENT WILL CONFORM WITH THIS ITEM BY WAY OF THE BUILDING PLANS.

III. A. THE PROPOSED DEVELOPMENT CONFORMS WITH THIS ITEM. THE RIGHT-OF-WAY DEDICATION IS DEPICTED ON THIS PRELIMINARY PLAT.

B. THE PROPOSED DEVELOPMENT CONFORMS WITH THIS ITEM. THE IMPROVEMENTS ARE DEPICTED ON THIS PRELIMINARY PLAT AND WILL BE DETAILED IN THE FINAL SITE PLAN.

C. THE PROPOSED DEVELOPMENT CONFORMS WITH THIS ITEM. THE IMPROVEMENTS ARE DEPICTED ON THIS PRELIMINARY PLAT AND WILL BE DETAILED IN THE FINAL SITE PLAN.

D. THE PROPOSED DEVELOPMENT WILL CONFORM WITH THIS ITEM BY WAY OF A SUBDIVISION PLAT BEING FILED WITH SPOTSYLVANIA COUNTY AT THE APPROPRIATE TIME.

IV. A. THE PROPOSED DEVELOPMENT WILL CONFORM WITH THIS ITEM AT THE APPROPRIATE TIME.

B. THIS IS AN ADVISORY ITEM THAT WILL BE APPLIED AS APPROPRIATE.

COMMONWEALTH OF VIRGINIA
KEITH LUC OSTER
Lic. No. 35846
JANUARY 22, 2021
PROFESSIONAL ENGINEER

DATE	REVISIONS
12-22-2020	COUNTY COMMENTS
01-22-2021	COUNTY AND VDOT COMMENTS

SULLIVAN DONAHOE & INGALLS
ENGINEERS, SURVEYORS & ENVIRONMENTAL SERVICES
P.O. BOX 614
10720 COLUMBIA DRIVE
FREDERICKSBURG, VIRGINIA 22404
TELEPHONE 540-898-5878

SDI

AFTON VILLAS
LEE HILL MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

PROFFERS AND PROFFER COMPLIANCE

DES/DRFT: PLH
CHECKED: RHF
APPROVED: KLO
JOB NO.: 14-SP-0325
DATE: 11-03-2020
SCALE:

SHEET 10
OF 10 SHEETS

DRAFT

At a meeting of the Spotsylvania County Planning Commission held February 3, 2021 on a motion by _____, seconded by _____ and passed_____, the Commission approved the following resolution:

RESOLUTION

Approve Foxcroft Preliminary Plat

WHEREAS, the applicant requests approval of the Preliminary Plat for 19.01 acres of PDH-5 zoned land in order to construct seventy-four (74) single-family attached dwellings and (2) single-family detached dwellings. Tax map numbers 24-A-92A, 36-A-113, 36-A-114, 36-A-115, 36-A-116, 36-A-117, and 36-A-117A. Battlefield voting district; and

WHEREAS, staff has reviewed the Preliminary Plat and recommends approval of the plat dated; November 3, 2020, and last revised January 22, 2021; and

WHEREAS, general welfare and good subdivision practice are served by approval of the Plat; and

NOW, THEREFORE, BE IT ORDAINED that the Spotsylvania County Planning Commission does hereby approve P20-0004 the Afton Villas Preliminary Plat.

BE IT FINALLY ORDAINED that the Spotsylvania Planning Commission's approval does not relieve the applicant and/or subsequent owners from compliance with the provisions of any applicable ordinances, regulations, or adopted standards.

(SEAL) A COPY TESTE: _____

Paulette Mann
Planning Commission Secretary

Spotsylvania County
Planning Commission
Executive Summary

Print

Meeting Date:	February 3, 2021
Title:	R17-0005 Radio Reconnaissance Technologies, Inc. (Team Crucible, LLC) Berkeley District
Type:	Action, Public Hearing
Agenda Title:	R17-0005 Radio Reconnaissance Technologies, Inc. (Team Crucible, LLC) Berkeley District
Recommendation:	Staff Recommends Denial of R17-0005.
Summary:	Rezoning request of approximately 69.96 acres from Agricultural 2 (A-2) to Industrial 2 (I-2) with proffers for the development of a security training facility that teaches security techniques utilizing firearms and simulated IEDs. The complex will include two office buildings totaling approximately 55,300 square feet, a firing range, an outdoor rally course, an outdoor sea container scenario area, a tactical entry training center, and an emergency helicopter landing pad. This is a companion case to SUP17-0003. The property is addressed as 6116 Jefferson Davis Hwy approximately 3,500 feet south of Mudd Tavern Road (Route 606). The property is located in the Primary Development Boundary. The property is in an area identified as Employment Center on the Future Land Use Map of the Comprehensive Plan. Tax Parcel 76-A-2. Berkeley Voting District.
Committee/Commission Summary:	
Review Date:	Status:
Financial Impact:	The applicant has submitted an FIA which notes the project will have positive fiscal impact for the County.
Staff Contacts:	B. Leon Hughes, AICP Director of Planning and Zoning; Jacob Pastwik, Planner III
Legal Counsel:	Alexandra Spaulding, Esq. Senior Assistant County Attorney
Additional Background/Other Considerations:	n/a
Consequence of Denial/Inaction:	The property may be developed as permitted by the current Agricultural 2 (A-2) zoning.

ATTACHMENTS:		
Name:	Description:	Type:
PC_Staff_Report_1_26_2021-JP2F_wpFinal.docx.pdf	Staff Report	Staff Report
2020-08-14_Executed_Proffer_Statement_(00000002).pdf	Applicant's Proffer Statement	Agreement
Revised_May_2020_GDP_Narrative.docx	Applicant's GDP Narrative	Backup Material
2020-05-11_-Final_Crucible_GDP.pdf	Applicant's GDP	GDP
Accoustic_Assessment_(Rev_2).pdf	Applicant's Accoustic Assessment	Backup Material
Design_and_Safety_Evaluation_Report.pdf	Applicnat's Design Safety Report	Backup Material
Lead_Mitigation_Letter.pdf	Applicant's Lead Mitigation Letter	Backup Material
Economic_and_Fiscal_Impacts.pdf	Applicant's Economic and Fiscal Impact Report	Backup Material
Revised_Application.pdf	Application	Backup Material
Citizen_Submtted__Reference_Documents.pdf	Citizen Submitted Reference Documents	Backup Material
Letters_of_Support.pdf	Letters of Support	Backup Material
Letters_of_Opposition.pdf	Letters of Opposition	Backup Material
Citizen_Petitions.pdf	Citizens Petition	Backup Material
Letters_to_be_read_into_the_record.pdf	Letters to be read into the record	Backup Material
Citizen_PowerPoint_presentation_crucible_1.2021.pptx	Citizen PowerPoint	Backup Material
Citizen_comments_Crucible_(2nd_batch).pdf	Letters to be read into the record (second batch)	Backup Material
Letters_to_be_read_into_the_record_(3rd_batch).pdf	Letters to be read into the record (third batch)	Backup Material

County of Spotsylvania
Department of Planning
Staff Report

Rezoning # R17-0005
(Berkeley Voting District)

Planning Commission
February 3, 2021

Staff Recommendation:	Denial
Project:	R17-0005 "Crucible"
Owner/Applicant:	Radio Reconnaissance Technologies, Inc.
Request:	Request a rezoning of approximately 69.9 acres from Agricultural 2 (A-2) to Industrial 2 (I-2) with proffers for the development of a security training facility.
Tax Map Parcel(s):	76-A-2
Location:	The properties are located at 6116 Jefferson Davis Hwy on the approximately 3,500 feet south of Mudd Tavern Road (Rt. 606).
Zoning Overlay:	None
Future Land Use Designation:	Employment Center
Historic Resources:	A cemetery is located on the site.
Date Application Deemed Complete:	May 5, 2017
Community Meeting:	A community meeting was held on January 17, 2017. Citizens at the community meeting raised concerns about potential negative impacts on residential and commercial property values, negative impacts from consistent noise from the use, the safety of residents living down range of the site and compatibility of the use with the surrounding uses.

Figure 1: Zoning Map

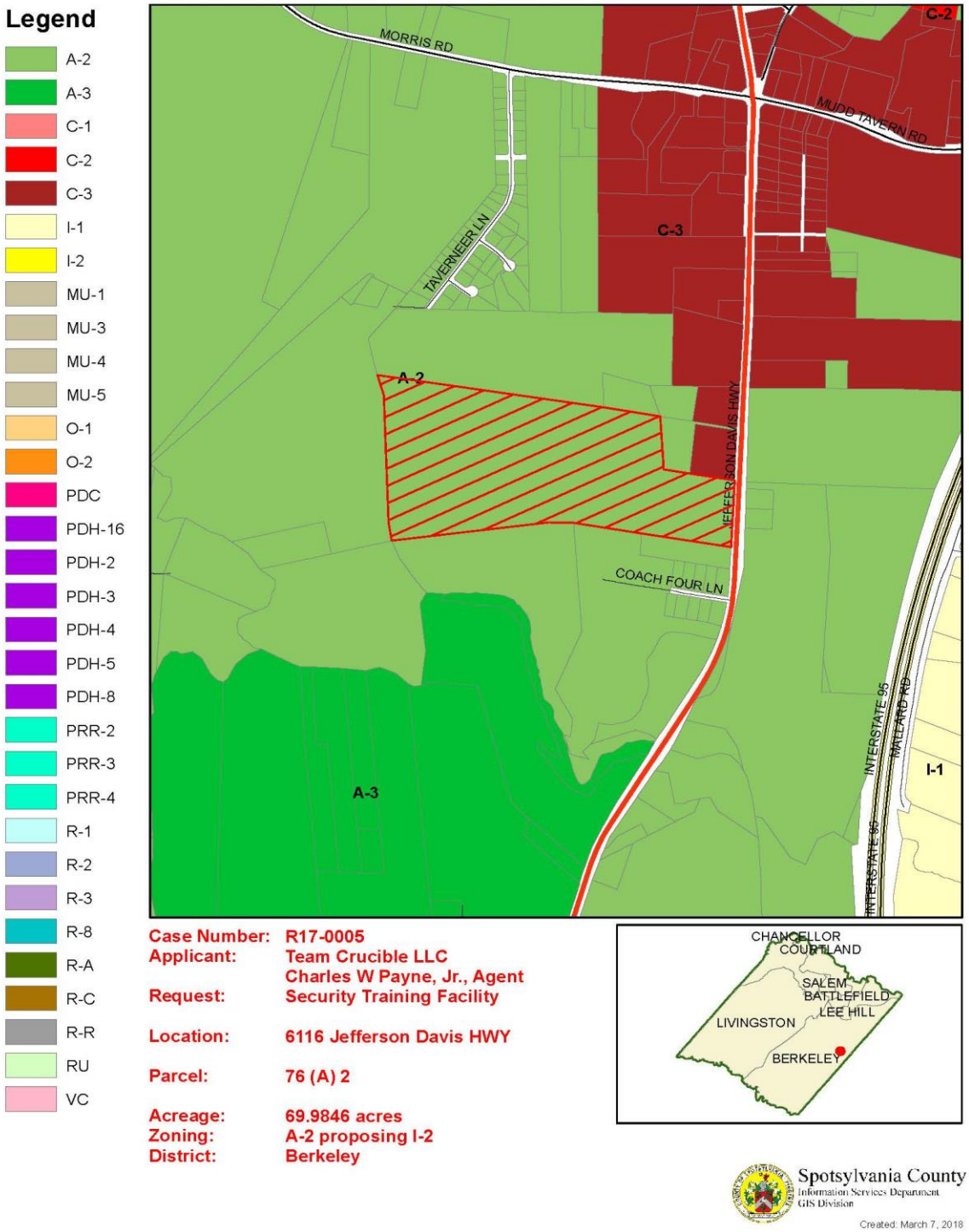


Figure 2: Aerial Map (2017)



Case Number: R17-0005
Applicant: Team Crucible LLC
Charles W Payne, Jr., Agent
Request: Security Training Facility

Location: 6116 Jefferson Davis HWY

Parcel: 76 (A) 2

Acreage: 69.9846 acres
Zoning: A-2 proposing I-2
District: Berkeley



Legend

Spotsylvania County
Information Services Department
GIS Division

Created: March 7, 2018

I. The Site

The Project site is located on the west side of U.S. Route 1 approximately 3,500 feet south of the intersection of U.S. Route 1 and Mudd Tavern Road (Route 606) and approximately 500 feet north of Coach Four Lane. The parcel has approximately 615 feet of frontage on U.S. Route1 and is partially cleared with mature trees and vegetation on the western portion of the property. The site is currently used for agricultural use with a single storage structure on the property. The following descriptions are identified on the map (located below) with the corresponding letter.

Area A
Adjacent to the site on the north boundary are a mix of commercial and residential uses. Immediately to the north fronting on Route 1 are Commercial 3 (C-3) zoned parcels one with a structure that is currently vacant and the others occupied with a tractor trailer training facility (A).

Area B
Immediately behind the C-3 parcel are two parcels that are zoned Agricultural 2 (A-2) with single family detached homes. These parcels are approximately 2.5 acres and 3 acres respectively (B).

Area C
Directly behind the two residences is a vacant parcel zoned Agricultural 2 (A-2) that is approximately 41 acres and has approximately 2,000 feet of common boundary with the subject site. This parcel is wooded with mature trees and vegetation (C).

Area D
Adjacent and north of the 41-acre parcel is the Taverneer Subdivision that is accessed via Mudd Tavern Road (Rout 606). Taverneer is a 55-home subdivision with an average lot size of 15,000 square feet (D).

Area E
Adjacent to the Taverneer Subdivision is a vacant 56-acre parcel that is zoned Agricultural 2 (A-2). The owner of this parcel has applied to rezone this parcel to Planned Development Housing 5 (PDH-5) for the 62 single family attached and 157 detached homes (E).

Adjacent and west of the above parcel is a 20-acre parcel also zoned Agricultural 2 (A-2) (Not labeled).

Area F
The adjacent parcel to the west of the subject parcel is a 73-acre parcel that is vacant and also zoned Agricultural 2 (A-2) and shares a common boundary of approximately 1,500 feet with the subject parcel (F).

Area G
Adjacent and west of the twenty-acre parcel is a 200-acre parcel that is zoned Agricultural 2 (A-2) that is vacant and is the western edge of the Primary Development Boundary on the south side of Mudd Tavern Road (G).

Area H
West of the adjacent to the 73-acre parcel is the Matta River Woods Subdivision on Harts Run Road accessed via Hams Ford Road. Matta River Run is a 41-lot subdivision of single family detached homes with lot sizes that range from 3-10 acres and covers an area of approximately 257 acres (H).

Area I & J
The intersection of Hams Ford Road and Harts Run Road is approximately one mile west from the subject parcel's western boundary. Approximately 500 feet south is the intersection of Hams Ford Road and Sunset Road (*). There are three single family home subdivisions within a half of a mile of the intersection of Hams Ford Road, Widows Dowry, Hams Ford, and Cardinal Forest. The Cardinal Forest is accessed only via Sunset Road. The Widows Dowry and Hams Ford subdivisions each have lots with frontage on Hams Ford and Sunset Road. The lot sizes in these subdivisions range from 1-18 acres and covers an area of approximately 589 acres, depicted in the image below (I&J).

Area K
Area K totals approximately 143 acres with residential and vacant lots that have frontage on Hams Ford Road. The lots range in size from two up to fifty acres with five of the lots occupied with residential dwellings.

Area L
Adjacent and to the south of the subject site are several vacant parcels that range in size from 33-35 acres. The Matta River is the boundary for the vacant parcels (L).

Area M & N
South of the Matta River are six parcels with single family detached homes that are accessed via Bear Lane, which is approximately seven tenths of a mile directly south of the subject parcel(M). Also adjacent to the subject parcel with frontage on U.S. Route 1 is the ten lot Matta River Estates Subdivision that currently has three single family detached homes in the subdivision on half acre lots (N).

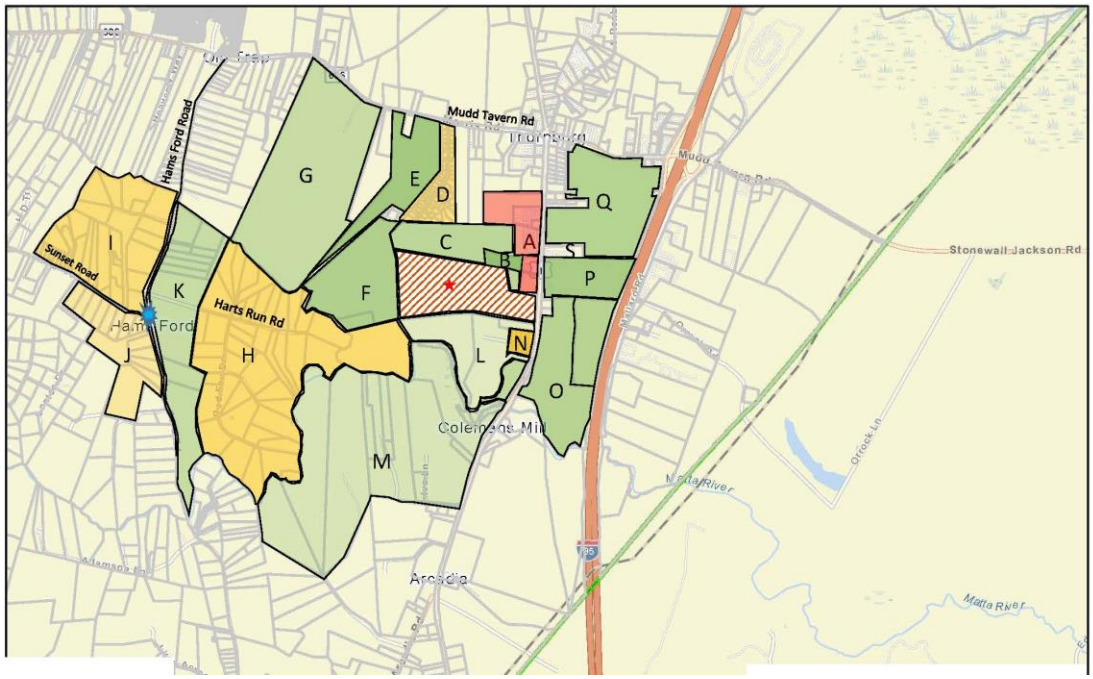
Area O
Directly across from the subject parcel on U.S. Route 1 there are 2 one-acre parcels occupied with single family detached homes. Immediately to the east of these parcels there are 2 large vacant parcels that total approximately 126 acres. The southern boundary of these parcels is the Matta River and the eastern boundary is Interstate I-95 (O).

Area P
Adjacent and to the north of these parcels is a 41acre parcel that is occupied with a single-family home. This parcel is also bounded on the east by Interstate I-95(P). These three large parcels total 236 acres and are zoned Agricultural 2 (A-2) with active agricultural uses.

Area Q
The parcel noted with the Q is a 100-acre parcel zoned Commercial 3 (C-3) with frontage on Mudd Tavern Road and U.S. Route 1(Q).

Area R & S
The adjacent parcel to the north of the 41-acre parcel is a five-acre parcel with the front 4 acres zoned Commercial 3 (C- 3) with an auto dealer ship and the rear acre zoned Agricultural 2 (A-2) that is occupied with several structures (S).

The image below indicates the subject parcel with the o star. The area represented by H-K is approximately 589 acres and is the total area of the noted subdivisions accessed via Hams Ford Road. The area represented by D-G is approximately 385 acres represents the mostly undeveloped area immediately west of the subject parcel with a current Future Land Use designation of Mixed Use. The approximate acres noted on the east side of Route 1 represent the mostly undeveloped area with the current Commercial and Employment Center Future Land Use designations totals approximately 242 as shown.



This section of the corridor from the intersection of Route 1 and Mudd Tavern Road is dominated by commercial uses of varying intensity predominantly consumer-oriented commercial uses such as grocery stores, carry out and eat in food establishments and personal service establishments. There are a number of auto dealer ships along this section of the corridor and a tractor trailer driving training facility. There are a number of parcels that are zoned Commercial 3 (C-3) that are vacant or suitable for redevelopment opportunities. It is expected that the pace of commercial development and redevelopment will increase in this corridor as there are plans for the widening of Mudd Tavern Road from two to four lanes from the Interstate 95 interchange to Route 1 with an anticipated completion in 2024. The improved access from I-95 to Route 1 is expected to facilitate the development and redevelopment of property on Mudd Tavern and Route 1. In conjunction with the transportation improvements the Utilities Department is upgrading the water and sewer infrastructure in Thornburg. These infrastructure improvements facilitate the transition expected along the frontage of the corridors and the development of large vacant parcels that are expected to transition to commercial, office, and/or light industrial uses. This expected transition is evidenced by the increased inquires and two recently submitted applications requesting the Mixed-Use classification on parcels adjacent to the subject parcel.

II. Project Proposal

This is a request to rezone approximately 69.98 acres from Agricultural 2 (A-2) to Industrial 2 (I-2) with proffers for the development of a security training facility which teaches security techniques, the use fire arms, driver training and scenario training with outdoor training areas. The property is addressed as 6116 Jefferson Davis Hwy. identified as Tax Parcel 76-A-2 approximately 3,500 south of Mudd Tavern Road (Route 606). The property is located in the Primary Development Boundary. The property is in an area identified as Employment Center on the Future Land Use Map of the Comprehensive Plan.

The applicant's GDP Narrative describes the proposed use as "a high-level security training facility for both governmental and private organizations that has trained over 25,000 persons for a variety of security clients, including without limitation U.S. agencies such as the Department of State, Justice Department, and Department of Defense; several large U.S. private companies; foreign companies; and State and local government agencies." The applicant's narrative notes the "Applicant does not permit "open classes" for attendance by the general public or host competitions. Clients attending training programs learn basic and advanced skills in tactical medicine, vehicle operation, small arms tactics, and individual protective measures" while listing a representative sample of teaching topics as Tactical Medicine, Small Arms Tactics, Vehicle operation, and Individual Protective Measures.

The narrative indicates the use will have two phases of build out and operation. "The Applicant anticipates that the Project will initially be a "medium intense" development plan and generally include a modular office with parking area, maintenance buildings and an existing one story metal building to support the training activities, all which are generally shown and depicted on the GDP." "Phase-1 Max build-out of the Project will also include one

(1) firing range, a rally track, and a scenario area, all as generally shown on the GDP. The firing range will include a minimum of 20 foot high earthen berms or HESCO[1] like barriers for the entire perimeter of the range, all as generally shown on the GDP."

"The Phase-2 Max build-out of the Project will include generally the construction of a training/office facility; another office building; a partially enclosed Tactical Entry Training Facility; the relocated operations building modular; and an additional scenario training area, all as shown on the GDP. None of the buildings will exceed 50' in height. Commencement of build out is dependent on market situations and government requirements. The two existing one-story metal buildings currently on the Property will remain and be used for training, maintenance and storage spaces."

"The Phase-1 Max build-out will support current operations and provide for a daily load of 50 students per day. The Phase-2 Max build-out will support a daily load of 90 students per day". Exhibit B in the Narrative notes that in 2016 there were 45 weeks or training with an average of 58 trainees per week. The applicant's narrative indicates that they expect business activity to be similar to the levels experienced from 2015-2017 depending on market variables. The narrative described the Phase One daily schedule for trainees:

- "Each day begins at 8:00am with lecture in the classroom.
- Training in respective practical application areas…"
- "Around 4:30pm students return to the classroom and return their equipment., clean up from the day."
- The instructors review the day's activities and prepare the students to return the next day…".

The applicant's narrative indicates that Phase Two or Ultimate Buildout operations would follow the Phase One model and that the number of trainees could be impacted by deployment of forces which would lead to more consecutive days of training. The narrative notes in Phase One consecutive days of training is 3 to 10 days. The applicant's narrative included a hypothetical month of training that would include 17 days of range activity.

A. Generalized Development Plan (GDP)- The applicant has submitted a Generalized Development Plan (GDP) that shows the proposed use being developed in two phases.

- Phase one consists of the construction of an approximately 4,200 square foot modular building for operations and training use.
- An 80 space storage lot for vehicles,
- An access road to the range, a rally courses with three driving training areas, a skid pad that will also serve as an emergency landing pad for helicopters and a service

[1] HESCO is made of a collapsible wire mesh container and heavy duty fabric liner, and used as a blast wall against explosions or small-arms.

road to the sea container scenario training area.

- A thirty station firing range, the firing range will be surrounded by twenty-foot-high earth berms. The firing stations will be at the base of a berm with a 2:1 slope, the range floor will have a one percent slope from the firing station to the targets over a distance of 350 feet. The floor elevation of the firing stations will be approximately 241and the floor elevation at the targets will be approximately 236. The target area of the range will have paper targets on wood supports that extend up not more than 8 feet, the impact area behind the targets, will be sloped up at 1.5: 1 to a height of twenty feet with eighteen inches of sand to capture rounds, a horizontal ricochet catcher will be fourteen feet above the targets and extend an angled twelve feet, the back side of the berm will have a 2:1 slope down to existing grade. The top of the back of the berm is shown as 1315 feet from the south west corner of the subject parcel.

- The installation of a 12-foot berm with plantings of Hollies along the base of the berm on the north boundary of the site adjacent to parcel 63-A-37B.

- The GDP also shows a 50-foot Street Buffer E along Route 1 and a variable width transitional screening buffer around the perimeter of the site that ranges from 35 -50 feet of undisturbed vegetation except along the southern boundary where it is reduced to zero to accommodate construction of the access road. The area where the access road is constructed adjacent to the south boundary extends for a length of approximately 360 feet. All existing vegetation within the road's path would be removed to allow for the construction of the road. This is done by the applicant as means of reducing impacts to wetland areas with the road construction hugging the property boundary. The GDP shows two areas of additional planting on the north side of the access road. The GDP also shows the 8-foot security fencing around the perimeter of the site. The Phase 1 GDP also shows the areas where simulated IEDs are permitted, this includes areas around the Sea Container training area and around the Rally Courses.

Phase 2 of the project as shown on the GDP shows:

- An increase in the uses shown in the Sea Container training area with a tactical entry training center, relocated operations modular buildings and a second Sea Container training area.

- The second Phase also includes the addition of a roundabout in the sea container area for vehicle training.

- The construction of two office buildings at the front of the parcel approximately 120 feet from Route 1. These buildings replace the 4,200 square feet of modular office space constructed in Phase 1. One building is a 2 story office building and the second is a one story office building totaling 15,300 square feet and 40,000 square feet respectively. In addition to the office buildings Phase 2 shows the installation of the

200-foot right turn taper on Route 1 for south bound traffic.

B. Proffer Statement Summary

The applicant has provided a proffer statement dated August 14, 2020 for the Planning Commission and Board of Supervisors' consideration

Below is an itemized list of the submitted proffers including a summary and staff analysis in italics.

II. Land Use

A. General Development- The applicant commits to develop the subject properties in conformance with the Generalized Development Plan (GDP), as last revised. Minor modifications may be made in order to address requirements to fulfill Federal, State, and local requirements.

Proffering to develop the project in accordance with the GDP is consistent with prior approved rezoning cases. However, staff is not supportive of this proffer. Although the GDP meets the minimum submission requirements, the GDP depicts a use that is not appropriate for the parcel as it not consistent with the surrounding development pattern or Comprehensive Plan.

B. GDP Phasing - The applicant commits that the property will be developed in two (2) phases.

1. Phase 1 will include:
- (i) the installation of an eight-foot security fence,
- (ii) the construction of a 12-foot berm and planning adjacent to Tax Parcel 63-A-37A&B and,76-A-2A.
- (iii) a firing range which shall include a 20-foot-high perimeter earthen berm with at least 18 inches of sand capture material in the impact area and a horizontal bullet catcher as shown on the GDP.

2. Phase 2 improvements that include:
- (i) the construction of a 200 foot right turn taper.
- (ii) the construction of sidewalks along Route 1 when the one and two story office building are completed,

3. The extension of public water and sewer to the property prior to the completion 55, 300 square feet of office space.

4. The dedication of 10 feet of right of way along Route 1, all as shown on the GDP.

Staff is not supportive of items in the Phase 2 section of this proffer as items (i)&(ii) as written do not require the improvements until both Office Buildings are completed and the proffers do not include any guarantee that the project will construct the Phase 2. Item 3 in this proffer ties the extension of utilities to an amount of office space that is not guaranteed to be constructed. The lack of clarity may lead to challenges when time to enforce the proffer. This proffer does not provide a trigger for the dedication of the right of way and the right turn taper and sidewalks are tied to improvements that are not guaranteed to be constructed.

C. Noise Mitigation - The Applicant and Owner will undertake the following measures onsite prior to any training or shooting activity for purposes of mitigating noise:

1. Construct minimum twenty foot (20') high earthen berms which will surround the outside of the firing range, all as generally depicted on the GDP.

   Staff notes that the berm height of 20' is the minimum height standard recommended by the NRA Range Source Book and does provide some noise attenuation. The applicant conducted an acoustical assessment that modeled potential noise levels at 7 locations measured as specified in the County's Noise Ordinance. The assessment measured firearms/rifle, simulated IED and driving noise of vehicles traveling 40mph on the rally course. The assessment concludes that the noise produced on site that will affect the surrounding community are expected to comply with the daytime impulsive noise criteria limits of the Spotsylvania County Noise Ordinance. Staff notes a provided acoustical assessment (Rev 2) suggests the project will equip rifles with a sound suppressor as the default condition for all rifle use however proposed noise mitigations do not commit to the use of suppressors.

2. Maintain in place all natural vegetation and trees to the extent reasonably possible and said natural vegetation and trees that must be removed for purposes of developing the Property (in accordance with the GDP and applicable governmental requirements) will be replanted in the areas generally shown on the GDP. All existing vegetation will remain undisturbed in the designated perimeter buffer areas shown on the GDP except: (i) the area where the road nears the southern parcel boundary; and (ii) the area needed to install and maintain the perimeter fence.

   Staff supports maintaining existing vegetation and the replacement of any removed vegetation. This proffer could be strengthened with a commitment that when the vegetation is installed they will supplement planting in areas where the project is

not screened sufficiently. However, there is no definition or measure of the term "reasonably possible".

3. Limit live and blank nighttime firing range training Monday through Friday to no later than two (2) hours after darkness, which is defined as "astronomical twilight as recorded by the United States Naval Observatory" ("USNO") or 10:00 p.m., whichever is earlier. Firing range training will end no later than 5:00 p.m. on Saturday and 4:00 p.m. on Sunday. Further, the Applicant and Owner agree to limit hours of firing range training to commence no earlier than: 8:00 a.m. Monday through Friday, 9:00 a.m. on Saturday, and 10:00 a.m. on Sunday.

   Staff is not supportive of this proffer. The nighttime stopping hour is more enforceable with a definitive time each day. i.e. no later than 8pm Monday through Friday. The astronomical twilight measure causes enforcement issues as it changes each day.

4. Limit simulated IED scenario training activities to commence after 8:00 a.m. Monday through Friday, and after 9:00 a.m. on Saturday and after 10:00 a.m. on Sunday. All simulated IED activity will end prior to astronomical twilight as recorded by the USNO. Simulated IEDs will be created using one ounce of Pyrodex RS, or other similar black powder, buried below the surface of the ground, as detailed on page 6 in The Crucible Spotsylvania Acoustical Assessment, dated November 18, 2019.

   Staff is not supportive of this proffer. The nighttime stopping hour should be definite each day. i.e. no later than 8pm Monday through Friday. The astronomical twilight measure causes enforcement issues as it changes each day. This proffer could be strengthened with the inclusion of the minimum depth the IED will be below the surface.

5. Prohibit use of any high explosives. "High explosive" means that the explosive detonates and the shock front passes through the material at a supersonic speed.

   This proffer could be strengthened by identifying prohibited explosives in accordance with the definition noted.

6. There will be no live weapons firing in the scenario areas shown on the GDP, but simulated IEDs will be utilized pursuant to training requirements within said areas.

D. Range Controls. The Applicant and Owner will undertake the following firing-range controls prior to any shooting or training activity on the Property:

1. All firing training targets shall be located against range backstops, as shown on the GDP, and target height shall not be any higher than eight feet (8') tall as measured from the range floor.

2. All backstops shall have horizontal bullet catchers consistent with NRA Range Source Book 2012, pages I-1-27 through I-1-28, page II-2-13, and Appendix A10.

3. All target firing activity shall be directed below firing positions at a grade not to exceed three percent (3%) to ensure fired rounds containment.

4. Include visible "No Trespassing" (in English and Spanish) signs which shall be spaced no more than one hundred feet (100') from one another around the perimeter of the Property. The signs will be 8.5" x 11", or larger, and affixed to the security fence.

5. Limit the caliber of weapons fired on the Property to the following:

   (i) handguns (pistols/revolvers) up to and including .45 caliber;

   (ii) shotguns (up to and including 12 gauge);

   (iii) routine use of rifles/carbines, no larger than .300 Blackout.

   Staff is not supportive of Proffer D Range Controls as written. There is no commitment to several of the minimum design criteria identified in the NRA Source Book 2012. The applicant's GDP narrative, which is not proffered, notes the range design follows the protocols in the NRA Source Book, but the narrative nor the GDP detail the complete range design to confirm adherence to the Source Book. There are a number of protocols and design considerations noted in the NRA Source Book the applicant's materials do not address. These omissions are significant as they address safety considerations inside of the range and more importantly the safety of the community outside of the range. Although the proffer places limits on the caliber of weapons fired on the property. Projectiles of the caliber authorized has the potential to travel beyond the property boundary for a distance down range capable of reaching properties with residential structures. The range has a west to southwest orientation and as noted there are several residential subdivisions and residential lots down range. The proffer only commits to Range controls in accordance to NRA Range Source Book 2012 on specified pages of the book regarding the design and installation of backstops and berm heights. The Range Controls per the Source Book identify the use of instructors to direct and control person using the range not design criteria. The NRA Source Book notes the need to ensure or take all precautions to ensure the safety of the community.

E. Environmental Controls. The Applicant and Owner will undertake the following environmental controls prior to any shooting or training activity on the Property:

1. All range facilities will be designed to follow *Environmental Protection Agency ("EPA")* Best Management Practices for Lead at Outdoor Shooting Ranges (EPA-902-B-01-001), as revised June 2005 ("EPA Manual"), to mitigate lead contamination;

2. For purposes of mitigating lead migration from the range, develop and implement an Environmental Stewardship Plan ("ESP"), in accordance with the EPA Manual, and include as part of the Storm water Pollution Prevention Plan ("SWPPP"), which will be submitted to the County during the initial site plan submission for the Project;

   Staff suggests this proffer be strengthened with a commitment and requirement that the "ESP" must be approved prior to any site plan approval that allows land disturbance.

3. Disburse and locate lime on range floors based on periodic measurements (intervals of measurements are based on soil content, to be determined after construction) for purposes of keeping pH levels within the firing range above 6.5;

   Staff suggests that intervals of measurement be defined and a reporting plan be implemented to ensure compliance.

4. Locate grass in swales and install limestone check dams, as provided for in the EPA Manual, and as generally shown on the GDP, which will be finalized at site plan stage. A "limestone check dam" is defined in the EPA Manual Chapter III - Page III-6 as a small dam constructed across a swale, drainage ditch, or waterway to counteract erosion by reducing water flow velocity;

5. Install water retention structures (infiltration or evaporation—based on geotechnical engineer report at site plan stage) in the general areas shown on the GDP;

6. On an annual basis, account for accumulated fired rounds for purposes of determining lead reclamation activities based on round count and soil measurement procedures, according to the thresholds for remediation as set forth in Applicant and Owner's ESP, as may thereafter be updated or amended; and

7. Keep record of fired rounds onsite, as provided in the ESP. The Applicant and Owner will make available to the County the fired rounds records upon request, and as part of the SWPPP review and monitoring process.
   The applicant's narrative references creating an Environmental Stewardship Plan, however they have not submitted a plan for evaluation.

F. **Community Engagement**.

1. Upon obtaining the initial certificate of occupancy permit (final) for the Project, Applicant and Owner agree to appoint a contact representative and to provide contact information for such person to both the County and the public, in order to address any community concerns or questions about the ongoing operations of the facility. An appointed contact representative will remain in place in perpetuity as long as the facility operates or exists.

2. Upon obtaining the initial certificate of occupancy permit (final) for the Project, Applicant and Owner agree to provide Spotsylvania County first responders and public safety personnel with access to the Applicant and Owner's firing range facilities, pursuant to a subsequent agreement between Spotsylvania County and the Applicant and Owner.

3. Upon obtaining the initial certificate of occupancy permit (final) for the Project, Applicant and Owner agree to provide Spotsylvania County Sheriff's Office access to the Applicant and Owner's facilities pursuant to a subsequent agreement between Spotsylvania County Sheriff's Office and the Applicant and Owner.

   Staff is supportive of arrangements with local authorities, but it is not clear if the term "access" also means use of the facilities. The project narrative speaks to annual internal fire inspections and coordination with County Fire and Rescue to develop an emergency management plan for the site. Staff recommends the applicant make a commitment to this by adding language to the proffer.

C. Fiscal Impact Analysis

The applicant has provided an Economic and Fiscal Impact Analysis prepared in July of 2016 by Dr. Stephen S. Fuller which asserts the proposed use will have a positive fiscal impact for the County during the initial stages of operation of $15,823.40 and at buildout $63,681.50. In response to comments from Staff, regarding any analysis of potential negative fiscal impacts the proposed use may have on adjacent or nearby commercial properties, Dr. Fuller suggested that "If adjacent properties were rezoned for commercial use, their value would be enhanced by the presence of the proposed facility. If adjacent properties remain as zoned agricultural with residential houses, property values would not be affected by the proposed project". Dr. Fuller noted the letter submitted by Christian P. Kaila, MAI, SRA as support for his response. Mr. Kaila in his letter concludes that "real estate value would not be affected either in a negative or positive manner." If the subject property is developed with the proposed use. Mr. Kaila sites a statistical analysis of home sales within one mile of the applicant's facility in Stafford, antidotal evidence to support the conclusions of the statistical analysis and a view that the real estate markets in Stafford and Spotsylvania are similar to reach his conclusion that "real estate value would not be affected either in a negative or positive manner." Staff does not agree that the methodology noted by Mr. Kaila is sufficient

to reach the conclusion presented. The location of the applicant's Stafford facility bears no similarity to the proposed location in Spotsylvania. Mr. Kaila's letter sites an article the describes the applicant's current location as "located in one of the most rural areas of Stafford County…" this description is not applicable to the proposed location in Spotsylvania, nor is it applicable to the residential property located west of the subject parcel. As previously described the proposed location is in the Primary Development Boundary, along the vibrant and emerging commercial Route 1 corridor, in an area that the current and draft Comprehensive Plans identify as appropriate for intense commercial, office and residential development with increased densities. Thornburg is designated as Tourism Zone, which is defined as an area of the County that is targeted and appropriate for tourist uses. Staff is concerned that the use if approved will have a negative impact on the County's ability to recruit tourist related businesses. Additionally, Mr. Kaila's letter only provided analysis of residential real estate. Staff has antidotal evidence that several adjacent property owners have indicated that they will alter plans for development or not develop their property if the proposed use is developed as proposed. If adjacent owners choose not to develop property to the highest and best use as the result of the proposed use being a neighbor, that will have a reduced positive fiscal impact on the County.

III. Staff Analysis

A. Transportation- This project is not expected to negatively impact level of service. Traffic generation from the project is low and does not warrant a Traffic Impact Analysis (TIA) or VDOT 527 Analysis as noted in the project narrative. As per the County Transportation Engineer, based on the Travel Model, Route 1 (where Crucible intends to locate) carries approximately 11,500 vehicles-per-day and is operating at a LoS A during both AM & PM peak periods. VDOT count data shows a higher volume of 15,000 vehicles-per-day from 2017 but it is based on a growth projection from an earlier count taken a few years ago. The LoS would likely be a "B". It is safe to say the LoS is either an A or a B during the peak periods, either of which are very good conditions.

B. Comprehensive Plan – Please find below a summary of the Crucible project's conformance with each component of the Comprehensive Plan. A complete Comprehensive Plan Analysis can be found in Appendix A.

1. **Land Use** –The property is presently zoned Agriculture 2 (A-2). The A-2 zoning and use types are most prevalent outside of the Primary Development Boundary. The existing Agricultural Zoning at this location is inconsistent with the current land use vision for the area going forward considering land use designation (Employment Center), the intent of the Primary Development Boundary, and recent development trends in the area. Per the Comprehensive Plan Land Use Element, "the Employment Center land use area is envisioned to be the primary location for new office and industrial development within the County, with the focus on larger scale office complexes, industrial users, and business parks. In the interests of maintaining a balanced economic base, industrial development within the County is also desired. Both light and heavy industrial uses are appropriate

and should be encouraged within the Employment Center category with the careful consideration of their location and transition to adjoining properties". This request if approved would add inventory to the available industrially zoned acreage in the County for future economic development prospects seeking appropriately zoned "shovel ready" sites. The inventory of Industrially zoned acreage in the County has been declining over the years. Staff also notes that the Future Land Use element of the Comprehensive Plan states that *"The Map is not intended to be parcel specific, but rather provides a flexible guide for the County's desired future development patterns."* Considering this current guidance, and the adjacent parcels to the west and north having Mixed Use and Commercial Land Use designations, from a land use standpoint this site could potentially be developed with a variety of supported zoning district designations that would more compatible with the emerging development pattern. Considering the use proposed with this application and the uses allowed with Industrial 2 (I-2) zoning district, staff is concerned about potential negative impacts of consistent noise and the potential of projectiles not being contained with an outdoor range. As an example adjacent land to the immediate west of the proposed project is designated as appropriate for Mixed Use development, that could result in additional more dense single-family attached and detached development, potential high density multi-story residential, intense commercial, office and outdoor land uses overlooking or in close proximity to the proposed development. The total acreage of this area is approximately 385 acres with the majority of this acreage currently undeveloped. Further examples of the emerging development pattern are the recent filing of two rezoning applications that are requesting the introduction of dense residential development and commercial uses. A general principal in land development is to not to propose a development in close proximity to an existing use that may be incompatible. Staff is concerned that if the development community adheres to this principal the development of the adjacent 385 acres currently designated as appropriate for Mixed Use development will be delayed or potentially not develop with uses that are consistent with the adopted future land use map., Adjacent and directly across from the subject parcel on Route 1 there are 237 acres of mostly undeveloped land that have both the Commercial and Employment Center FLUM designations and 100 of these acres are currently zoned Commercial 3 (C-3). The delayed development or under development of land along the corridor or in the area will have a negative impact on potential County revenues. As noted the proposed use is not a use that would customarily be considered appropriate development on a greenfield site with the location characteristics of the immediate area. There are significant implications if this parcel is rezoned to the most intense Industrial zoning classification. Although the request comes with proffers that will require an alternative development proposal to be approved via a public hearing process. The Industrial 2 (I-2) zoning and proposed use will not be compatible with the envisioned development pattern along the corridor or in the immediate area. This is an additional constraint on the property and burdens the marketing of the property.

In addition to the emerging development pattern and the infrastructure improvements underway and about to begin that will support and facilitate the changes in Thornburg. The County is in the final stages of the mandatory five-year update to the County's

Comprehensive Plan. Currently the draft plan is available for review and comment by the public on the County's web page and public hearings on the adoption of the new plan is anticipated in the first quarter of 2021. This process and draft document have significant relevance for this case because the draft plan amends the Future Land Use designations with more clarity and explanation of the expectations in the Land Use designations to facilitate the development in the area. The draft also introduces varying degrees/levels of Mixed Use development to better define the appropriate level of intensity for Mixed Use applications. Potentially the change with the most significant implications for this case is the change to the Future Land Use Map (FLUM) for the Thornburg area. Currently the subject parcel and the majority of the land area in Thornburg are designated as appropriate for Employment Center type uses and development. The Employment Center designation western boundary on Mudd Tavern Road is the Taverneer subdivision and extends south to the Matta River encompassing the subject parcel. The designation also extends north beyond Massaponax Church Road and east to the Spotsylvania County line on Mudd Tavern Road east of the Commercial designation near the Exit 118 interchange and south to the Spotsylvania County line. The Commercial Land Use designation overlays the majority of the land area along Route 1 both north and south of the Route 1 Mudd Tavern Road (Rt. 606) intersection and the area from Route 1 along Mudd Tavern extending across Interstate 95 and much of the land in close proximity to the Exit 118 interchange. The Mixed Use designation begins at the Taverneer subdivision extends west to the boundary of the Primary Development Boundary and south to the Matta River. The parcels that are adjacent and west of the subject parcel have a Mixed Use designation. The changes proposed to the FLUM that directly impact the subject parcel and the parcels either adjacent or in close proximity include the expansion of the Commercial designation south along the Route 1 Corridor with the introduction of the Mixed Use Commercial Core designation that will be adjacent to the Commercial Core and then addition of the Mixed Use Light designation extending to the boundary of the Primary Development Boundary. The explanation of the proposed designations is below. The implication for this case is that if draft plan is adopted as recommended, the proposed use will not will not be in conformance with the Comprehensive Plan Future Land Use designations. As noted these changes to the FLUM are intended to provide more clarity for the citizens and development community on the expectations for proposed development and allow a consistent development pattern with compatible uses in the designated areas. The

Mixed Use Light*- Mixed Use Light is the lowest intensity mixed-use category. This land use category envisions a mix of single-family detached and attached residential development at densities of 4 to 8 units/acre. Except for the development of commercial corridors as described below, most of the land within this land use designation is envisioned to be a mix of residential uses.*

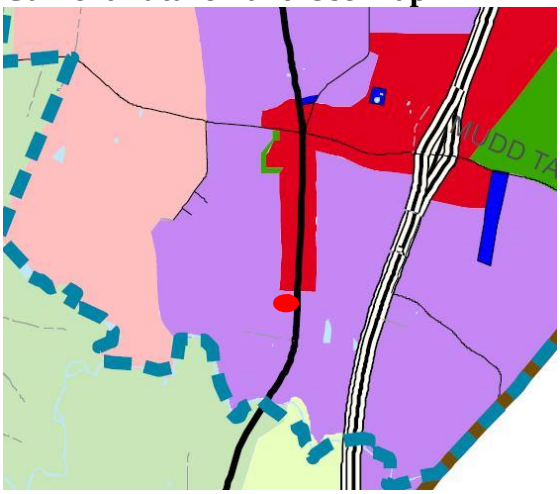
The land use designation also supports development of mixed-use commercial corridors of a neighborhood or regional scale along roads with a VDOT functional classification of Major Collector or higher.

In "greenfield" development (presently undeveloped or underdeveloped areas), this land use category is generally located as a transitional land use to promote a gradual, more harmonious increase in density and intensity between low-density residential areas and more intensive mixed-use, employment center, or commercial areas.

***Mixed Use Commercial Heavy**. This land use category envisions a commercial and office "heavy" mixed use district. This category promotes development of commercial (such as retail, office, service, lodging, food establishments, entertainment, "cottage" or "artisanal" industries) at a semi-urban or urban scale. Residential development within these areas is intended as a secondary or subordinate use (in total land area and square footage devoted) within the land use area. The land use designation encourages mixes of residential typologies for housing diversification. Residential development here is intended to help diversify the land use mix and provide the ability for residents to be located nearer to employment opportunities and commercial goods and services and inversely for businesses and employers to benefit from a geographically close customer base or "employee pool". Like the Mixed-Use General designation, residential densities, except for the Lake Anna Mixed Use Commercial Heavy designation, are intended to exceed 8 units/acre. Urban or semi-urban densities of 16 units/acre or more and resulting building scale are appropriate and encouraged in this land use area.*

***Commercial**- The commercial land use area consists of a variety of retail and office uses, examples of which include, but are not limited to: medical facilities, shopping centers, restaurants, hotels, automobile service and sales facilities, personal service establishments, office parks, entertainment facilities, and similar uses. The majority of the existing commercial developments within the County are located along Jefferson Davis Highway (U.S. Route 1), Plank Road (U.S. Route 3), and Southpoint Parkway. Connectivity to and accessibility from nearby residential development should be encouraged.*

Current Future Land Use Map



Proposed Future Land Use Map



Approximate Site Location

2. Public Facilities

a. **Fire, Rescue, and Emergency Services (FREM)** – Thornburg Fire and Rescue Station 8 located less than one-mile north of this site is the first response station. The applicant met with the Emergency Management Division Chief and other Fire, Rescue and Emergency Management ("FREM") officials on August 9, 2017. Applicant discussed the design characteristics and activities proposed for the facility. Roads are designed to provide FREM response vehicles access to all developed areas of the facility (as shown on GDP). Applicant expects to continue the dialog and provide an emergency management plan for their comment and documentation. Applicant further expects to hold annual review/training sessions to prepare for a response should the FREM be amenable and available. The project narrative speaks to annual internal fire inspections and coordination with County Fire and Rescue to develop an emergency management plan for the site. Staff recommends the applicant commit to this with language in the proffer statement.

b. Water and Sewer Facilities – The project will utilize well and septic. The applicant has proffered to extend public water to the site when the buildings associated with Phase 2 are complete.

c. **Historic Resources** – This site is not expected to have any negative impacts on significant natural, historic, and cultural resources. Staff consulted the Virginia Department of Historic Resources Virginia Cultural Resources Information Service, the County Cemetery Inventory, and Handbook of Historic Sites in Spotsylvania County. Staff notes a cemetery is located onsite. The cemetery is depicted on the GDP and the project narrative notes the applicant has already taken measures (including fencing the cemetery area) to ensure that the cemetery is not disturbed during the proposed build out as well as once operations begin. The cemetery will remain buffered and access will be allowed in accordance with applicable State law.

d. **Natural Resources** – As summarized in the applicant narrative and depicted within the generalized development plan, "the project's design will minimize the impact to the natural topography and vegetation located on the property. While there are both wetlands and RPAs on the site, they are limited in area, and applicant intends to utilize low impact development methods to address surface water and storm water management matters to the extent reasonably practical and feasible." Wetlands disturbances resulting from necessary road crossings have been minimized.

IV. Findings

<u>In Favor</u>:

1. Positive fiscal benefit of a new business and the associated benefits to businesses in the area that will support the use.

2. Increased Employment in the County.

3. Increased real estate tax from parcel with an Industrial zoning classification.

Against:

1. A security training facility is a niche use and, as proposed, is not a use that would traditionally be developed on a greenfield site along a vibrant commercial corridor with an emerging development pattern.
2. The Industrial 2 (I-2) zoning to allow the proposed use is not compatible with the current Comprehensive Plan and the envisioned development pattern along the corridor or in the immediate area.
3. There is insufficient commitment to minimum range design criteria identified in the NRA Source Book 2012.
4. There are potential negative impacts on surrounding properties because of consistent ambient noise from the use operations.
5. The potential of projectiles not being contained within the bounds of the range or property and have the capability of reaching residential structures down range.
6. The proposed use may hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof.
7. The project narrative speaks to annual internal fire inspections and coordination with County Fire and Rescue to develop an emergency management plan for the site. However, there is no commitment in the proffer statement.
8. The Acoustical Assessment (Rev 2) suggests the project will equip rifles with a sound suppressor as the default condition for all rifle use however, there is no commitment in the proffer statement to the use of suppressors.
9. The Thornburg area is designated as a tourism zone which is an area designated to foster the development and expansion of tourism businesses in the county. The allowance of this use may negatively impact efforts to attract tourist driven business to this area.

V. Conclusion and Recommendation

The applicant proposes a security training facility that includes an open air 30-station shooting range, rally driving course, partially enclosed scenario training areas, and areas for simulated IED detonation along with office and other support buildings. The facility would include a 20-foot tall berm around the -1% grade shooting range with backstops and a second 12-foot berm adjacent to the closest residential structure, transitional screening around the perimeter of 35’ to 50’ in width, and the proffers include limitations on the caliber of firearms permitted and hours of operation, among other measures to mitigate negative impacts of the project. Nonetheless, the design and characteristics of the security training facility results in the potential for regular detrimental impacts on abutting properties, including but not limited to the repetitive noise impacts of the outdoor activities and the opportunity for bullets to travel beyond the berms resulting in the potential for injury to persons and property. The security training facility conforms only in the most general sense to the intent of the Employment

Center Land Use in that it is a non-residential use that will generate tax revenues and jobs. The security training center is inconsistent with and potentially detrimental to envisioned development patterns, the promotion of tourism, and economic development in the Thornburg area. The property is located along a primary transportation route in the County's designated growth boundary. The area is planned for development at a higher intensity and density supported by public water and sewer infrastructure. While the facility requires Industrial zoning, the character of the security training facility is inconsistent with the adopted Comprehensive Plan, which speaks to the Jackson Gateway being an economic driver for the County in the future, noting uses such as "high end office parks and campus settings with Class A office space". Light and heavy industrial uses are also appropriate in the Employment Center "with careful consideration of their location and transition to adjoining properties". Despite the efforts to minimize and mitigate the impact of the use, the project has the potential for long lasting negative impacts to the surrounding properties due to noise associated with the use and the potential safety hazard to residential uses down range. The site fronts on the southern gateway into the County which is an emerging area of development and redevelopment driven by infrastructure improvements at the Exit 118 Interchange, planned improvements to Mudd Tavern Road, and planned expansion of public water and sewer infrastructure. On balance, Staff finds the proposed rezoning inconsistent with the Comprehensive Plan. Based on the reasons noted in the staff report and the findings against, Staff recommends denial of R17-0005.

Spotsylvania County Government

Appendix A

Comprehensive Plan Analysis

Spotsylvania County Comprehensive Plan Analysis

Overview

The Spotsylvania County Comprehensive Plan presents a long-range land use vision for the County. The Comprehensive Plan sets forth principles, goals, policies, and implementation techniques that will guide the development activity within the County and promote, preserve, and protect the health, safety, and general welfare of its citizens. Specifically, the Plan provides data and analysis on land use, transportation, housing, natural and historic resources, and public facilities and utilities. The purpose of this document is not to regulate, but rather guide land use, transportation, and infrastructure decisions. This guidance seeks to ensure continued economic and community vitality while ensuring necessary policies and infrastructure are in place to provide for the continuation of quality services to Spotsylvania's residents and businesses.

The proposal is located within the Primary Development Boundary. The Primary Development Boundary defines the area within which public water and sewer utilities will be provided. The Primary Development Boundary is shown on the Future Land Use Map of the Comprehensive Plan. Land within the boundary is intended to develop with higher residential densities and more intensive non- residential uses than outside of the boundary. By maintaining a Primary Development Boundary, the County encourages the most efficient use of the land while preserving the rural character.

The project area has an employment center designation per the Future Land Use Element of the Comprehensive Plan. As per the Future Land Use Element, "*the employment center land use area is envisioned to be the primary location for new office and industrial development within the County, with the focus on larger scale office complexes, industrial users, and business parks. In the interests of maintaining a balanced economic base, industrial development within the County is also desired. Both light and heavy industrial uses are appropriate and should be encouraged within the Employment Center category with the careful consideration of their location and transition to adjoining properties. Light industrial uses are usually more consumer-oriented than business-oriented and are manufacturing activities that use moderate amounts of partially processed materials to produce items of relatively high value per unit. Examples include, but are not limited to, the manufacturing of: clothes, shoes, furniture, consumer electronics and home appliances. Processing, assembly or disassembly operations could also fall into this category. Typically, these uses cause little pollution. Heavy industrial uses tend to be larger in scale and often can have pollution impacts (noise, smell, etc.) on the surrounding area. While these impacts should be minimized, there is the recognition that not all negative effects can be completely mitigated. The location of these users within industrial parks, both new and existing, should be encouraged to help ensure appropriate transitions that minimize any pollution impacts on neighboring properties. Examples of heavy industrial uses include but are not limited to: mining operations; refineries, power plants; and the fabrication and assembly of large items."* Considerate of the applicant's rezoning request, Industrial zoning generally is an appropriate zoning designation within the employment center land use area however consideration of the use proposed and ability to mitigate impacts is integral to the proposed use; special use. Given the envisioned mix of land uses in the area, consideration of the intensity of zoning district and/or restricting allowable industrial uses to those that would complement the surrounding land uses and development patterns has value.

Use specific considerations must be made as it relates to the requested use proposed. To reiterate, as per the Future Land Use Element, "*both light and heavy industrial uses are appropriate and*

should be encouraged within the Employment Center category with the careful consideration of their location and transition to adjoining properties." Staff also notes that the future land use element of the Comprehensive Plan states that *"The Map is not intended to be parcel specific, but rather provides a flexible guide for the County's desired future development patterns."* Considering this, the immediate surrounding parcels include mixed use and commercial land use designations and from a land use standpoint this site could potentially "go either way" in terms of land use potential with a variety of supported zoning district designations. Considering the corresponding use proposed, staff is concerned about potential impacts to existing and envisioned land uses in proximity to the project. As an example staff notes adjacent land to the immediate west of the proposed project has been designated as a mixed use area that "opens the door" to potential high density residential, commercial, office land uses, including potential multi-story proposals surrounding the site. Within the last few years' staff has seen several prospective mixed residential projects considered within a short distance of this site, including sites downrange and adjacent.

The project has been designed with range controls meant to manage risk and contain projectiles/bullets fired by weapons with enough power/range to shoot past the limits of the project boundary. Under "worst case scenario's" a carelessly or mistakenly fired bullet beyond the project boundary at present has range to potentially impact existing or future landowners and housing. Though the likelihood of this may be minimal, staff believes consideration of existing housing located offsite and downrange of the proposes project and the prospect of additional development in proximity to this site as supported by the Comprehensive Plan introduces additional land use conflicts with this proposal based on its location and size. The provided Range Report notes *"the primary bullet containment concept of the shooting range industry, as promulgated by NRA, is all bullets fired on the firing ranges should not leave the property owned or controlled by the shooting range facility."* As per the provided Range Report, engineered solutions to ensure bullet containment have been met or exceeded with this project. However, the report also acknowledges that engineered solutions for range safety must go hand in hand with administrative controls. The report says that *"often when incidents of bullet escapement have occurred, they are the result of a properly designed and maintained shooting range being utilized improperly."* This ultimately results in necessary rules and regulations, site monitoring and enforcement, and a reliance that range control will be able to constantly control for somewhat unpredictable actions or human error. To some degree the proposal requires a degree of faith that operators, equipment, and a variety of users who come and go from the site will never error, be careless, or reckless. With a wide variety of users coming and going from the site it's difficult to have complete confidence that firearms and all users will be human error free at all times and circumstances. The applicants Acoustical Assessment notes *"Crucible's typical client base is comprised of employees of the U.S. Government, Non-governmental organizations (NGOs), and multi-national corporations whose employees live and work in dangerous and austere locations worldwide."*

Staff believes the frequency of activity and pure volume of users combined with location and proximity to existing and future uses in proximity to the project introduces a degree of uncertainty and resulting risk. This has been raised as a concern levied by against the project by community members who may live downrange and off the project property and within range of the firearms used at the facility should a critical error result in breakdown of administrative controls. Staff acknowledges numerous range controls and engineered solutions have been included as a means

to mitigate potential risk of a regularly used range including: target location restrictions for height and location against range backstops; backstop bullet catchers; directed firing below firing positions; perimeter protections against trespass from the outside upon the range via fencing and anti-climb wire, "no trespassing" signage; caliber limitations for weapons fired on the property; limits on hours of operation; extensive berm construction for containment and noise attenuation features; undisturbed tree preservation areas; and additional noise control. As an outdoor facility, if approved, staff recommends maximizing range protections through physical engineered means. As part of their proposal, the applicant has addressed all range layout and considerations features for outdoor ranges as outlined by the National Rifle Association's (NRA) Range Source Book: A Guide to Planning and Construction, except for physical design based solutions for "up and out" risk minimization overhead outdoor baffles. As per the Range Source Book, *"Overhead baffles are used to contain the flight of bullets to a specified area within the range. These overhead baffles are useful in areas where space is limited."* Since the potential range of bullets fired exceed that of the project area, staff has taken the position to consider this site as constrained or limited in size. As a result, staff has recommended outdoor range baffles be included as a precautionary means to physically control for "up and out" risk.

As an outdoor range, the project also introduces potential noise impacts on the surroundings. Regarding Outdoor Ranges, the NRA's Range Source Book states *"no set distance eliminates complaints entirely. However, studies conducted for the Environmental Protection Agency (EPA) indicate noise complaints are likely when inhabited dwellings exist less than one half (1/2) mile from the facility. Beyond that distance, the chance of generating noise complaints is reduced."* This is a concern given the County's land use vision for the area that includes nearby Mixed Use. A summary of the existing land use designations is above and staff notes the draft Comprehensive Plan considers higher intensity commercial heavy mixed- use (that includes support for secondary of subordinate residential development) for this area going forward on the west side of the Route 1 corridor.

The applicant has provided an acoustical assessment of the proposed project tied to the rezoning and corresponding special use permit request, entitled "Crucible Spotsylvania Acoustical Assessment." The findings of the Assessment include compliance with the County Noise Ordinance based on hours of operation, and that if approved, the proposed use would be exempt from noise ordinance limits during such hours of operation. The exemption referenced specifically is located in County Code Sect. 14-52(a)(3) Noise emitted by a commercial or industrial establishment which noise is customarily emitted by such commercial establishments or industries. This exemption applies during the hours of 6 am and 10 pm. Proffered limits on hours' operation for firing activities do provide predictability regarding noise generation from the site. This operation will have the ability to operate seven days a week.

Staff recognizes that noise mitigation has been proposed and included within project proffers (associated with the corresponding rezoning) including earthen berms, caliber limits, vegetative screening, with limitations on range activities within specified times of day. The Acoustical Assessment identified numerous noise mitigating features included in the project design "to specifically address noise concerns raised by the immediate neighbors by voluntarily implementing a variety of noise mitigation measures into their new facility design." However, depending on the success of the facility, project limitations considerate of noise impacts for range activities and simulated IED scenarios could still result in seven (7) days a week activities regardless of season including winter months when deciduous vegetation has lost their leaves and

vegetative sound buffering is reduced. Project proffers limit live and blank nighttime firing range training Monday through Friday to no less than two (2) hours after darkness, which is defined as "astronomical twilight as recorded by the United States Naval Observatory" ("USNO") or 10:00pm, whichever is earlier. Firing range training will end no later than 5:00pm on Saturday and 4:00pm on Sunday. Further, the Applicant and owner agree to limit hours of firing range training to commence no earlier than 8:00am Monday through Friday, 9:00am on Saturday, and 10am on Sunday. IED scenarios per proffer include limit simulated IED scenario training activities to commence after 8:00 am Monday through Friday, and after 9:00am on Saturday and after 10:00am on Sunday. All simulated IED activity will end prior to astronomical twilight as recorded by the USNO. High explosives will be prohibited per project proffer. Staff notes a provided acoustical assessment (Rev 2) suggests the project will equip rifles with a sound suppressor as the default condition for all rifle use however this does not appear a project commitment.

Given existing and future development potential near this project, staff has raised concern that noise generation from this site will introduce a noise generating operation that will inevitably present impacts upon the surroundings up to seven days a week throughout the year. Simply, staff believes this may not be the best location to introduce a commercial or industrial use with the expected noise generation customarily emitted by such a use. As support for the project in its location concerning noise, the Assessment observes that the area surrounding Crucible's site is *"sparsely populated and may be categorized as rural land-use. While there are some residential and commercial properties to the east along Jefferson Davis Highway, there are very few noise-sensitive receptors westerly of the site."* Staff agrees with the assessment as it relates to current conditions however from a long range planning perspective, the immediate surrounding parcels include mixed use and commercial land use designations and from a land use standpoint this site could potentially "go either way" in terms of land use potential with a variety of supported zoning district designations. Considering the use proposed, staff is concerned about potential impacts to envisioned land uses near the project. Neither the land use designations in the area or the location within the County designated Primary Development Boundary suggest a County vision of continued rural land uses in this area for many years to come. Staff notes there has been development interest within the immediate area (including actively under review proposals) within the past few years aimed at a mixed-use including a mix of housing types including higher density residential and consumer driven commercial development.

On balance, staff does not believe the proposed zoning and corresponding use satisfactorily meets the intent of the Comprehensive Plan.

After conducting an analysis of applicable Comprehensive Plan Goals, staff has identified application strengths, deficiencies, and policy concerns worthy of consideration as outlined in the Comprehensive Plan policy analysis below:

Introduction and Vision:

Guiding Principles and Policies A. Spotsylvania County is a "business friendly" community and local job creation is a priority. Guiding Principles and Policies A.1. Encourage business investment in the County and promote the relocation of federal and state agencies to the County, providing more opportunities for Spotsylvania County residents to work in the County. Guiding Principles and Policies A.3. Encourage the rezoning of land to industrial/ office uses in areas designated for Employment Center uses and the revitalization of older, underperforming commercial, office, and industrial developments. The proposed special use

that corresponds with the Industrial zoning request does provide employment as a commercial training/ firing range facility and is expected to be fiscally positive with spin-off benefits for local retail, food, service, hospitality services in the area considering the operation envisioned is expected to draw clients from inside and outside of the County as a training destination. As noted in their narrative, the project is partnered with a number of federal, state, local agencies, and private security firms and this project would ultimately provide greater exposure to the County for these workers and their associated spin-off economic benefits in proximity to the facility. Considerate of the applicant's rezoning request, Industrial zoning generally is an appropriate zoning designation within the employment center land use area however consideration of the use proposed and ability to mitigate impacts is integral to the proposed use; special use.

Guiding Principles and Policies B. Spotsylvania County is fiscally sustainable. Guiding Principles and Policies B.1. Achieve a 70/30 mix of residential to commercial/industrial development (based on assessed value), and the annual growth of the industrial and commercial tax base at a rate greater than 2%. Guiding Principles and Policies B.1.c. Diversify the non-residential tax base by encouraging a wide variety of businesses to locate in the County. The proposed use supports establishment of a unique establishment within the County and is expected to result in positive fiscal impacts though question has been raised about its about its impacts to the surroundings. The corresponding special use requested is a unique use supportive of business diversification goals. This proposed project (enabled via rezoning and special use) is also expected to result in positive spin-off impacts for some commercial uses including retail, food, service, hospitality industries due to its function as a destination training center.

Guiding Principles and Policies B.2. Development projects seeking increased residential density and/ or non-residential intensity should address impacts that are specifically attributable to the proposed development. Staff has raised concern regarding the physical impacts of the proposed use having a negative impact upon surrounding properties and their development potential for Comprehensive Plan supported uses (especially residential). As noted in the summary above as this site is in close proximity to County designated mixed use areas where a number of development plans have been discussed over the past few years the particular land use proposed may negatively impact future development plans or the long term enjoyment of the surroundings.

Out of concern for surrounding land uses staff recognizes that the Industrial 2 zoning designation includes a number of heavy industrial uses. From the Comprehensive Plan, "*heavy industrial uses* (in the employment center land use) *tend to be larger in scale and often can have pollution impacts (noise, smell, etc.) on the surrounding area. While these impacts should be minimized, there is the recognition that not all negative effects can be completely mitigated. The location of these users within industrial parks, both new and existing, should be encouraged to help ensure appropriate transitions that minimize any pollution impacts on neighboring properties."* Staff believes the proposed training facility envisioned for this site presents a number of concerns that would "best fit" such a use within a bona fide industrial park setting (like a heavy industrial user) or in a rural setting with extensive screening, buffering, setback distances and few residential neighbors nearby now and in the future. This site is neither. Staff believes any use proposal that exposes residential or other offsite uses to risk of offsite bullet flight may be a hindrance to attracting such uses within the area of risk; economic development attraction counterproductive. Staff notes that the applicant

has expressed in the project narrative their belief that the impacts of this project be that of a "medium intense" development.

Guiding Principles and Policies B.3. Development projects seeking increased residential density and/or non-residential intensity should address its impacts on the infrastructure of the county. Overall this project is expected to result in minimal impact to County public facilities. No impacts are expected considering demands upon schools, parks and recreation and most other public facility categories. Transportation staff has sought to mitigate transportation impacts along the Route 1 corridor considerate of this projects potential impacts. Overall this project is expected to have little impact on the Route 1 corridor and is not expected to degrade Transportation Levels of Service. Full frontage improvements including the addition of sidewalks have been depicted within the GDP. Staff notes that sidewalk implementation is tied via proffer to implementation of Phase II of the project as depicted on the GDP.

This project is not expected to negatively impact transportation level of service. Traffic generation from the project is low and does not warrant a Traffic Impact Analysis (TIA) or VDOT 527 Analysis as noted in the project narrative. As per the County Transportation Engineer, based on the Travel Model, Route 1 (where Crucible intends to locate) carries approximately 11,500 vehicles-per-day and is operating at a LoS A during both AM & PM peak periods. VDOT count data shows a higher volume of 15,000 vehicles-per-day from 2017 but it is based on a growth projection from an earlier count taken a few years ago. The LoS would likely be a "B". It is safe to say the LoS is either an A or a B during the peak periods, either of which are very good conditions.

For Fire and Rescue, first responders, Sheriff's Office via community engagement proffer access to the firing range facilities would be provided subject to an agreement between Spotsylvania County and the applicant and owner. The project narrative speaks to annual internal fire inspections and coordination with County Fire and Rescue to develop an emergency management plan for the site however there is no commitment in place.

Guiding Principles and Policies B.3.a. The County should support alternative onsite transportation alternatives and recreational options such as transit, pedestrian and bicycle facilities that are able to, or will, connect to neighboring properties. Considering the project has frontage along the Route 1 corridor, amongst a variety of existing and planned land uses, the applicant has included frontage sidewalks within their GDP. This is a positive improvement along the Route 1 corridor. Such infrastructure is complementary to the employment center, commercial, mixed land uses in the immediate area as well as the intent of the Primary Development Boundary where development is envisioned to occur. Staff notes that sidewalk implementation is tied via proffer to timing of the Phase II portion of the project.

Guiding Principles and Policies B.4. Preserve significant natural, historic, and cultural resources of the County to ensure the continued allure of the County as a tourism destination.

Guiding Principles and Policies E.1. Protect environmental quality by promoting a comprehensive approach to air and water quality management. Examples of approaches to accomplish this could include: green space and tree preservation, stream restoration, and low impact development (LID). Staff consulted the Virginia Department of Historic Resources Virginia Cultural Resources Information Service, the County Cemetery Inventory, and Handbook of Historic Sites in Spotsylvania County. Staff notes a cemetery is located onsite. The cemetery is depicted on the GDP and the project narrative notes the applicant has already taken measures (including fencing the cemetery area) to ensure that the cemetery is not disturbed during the

proposed build out as well as once operations begin. The cemetery will remain buffered and access will be allowed in accordance with applicable State law.

Though the proposed use associated with this rezoning request is not a traditional tourism business per se, the use does have the effect of acting as a destination to bring out of town, state, country clients into the County in support of the operation and associated spin-off economic benefits not unlike those generated by tourism.

Provided proper environmental controls are followed this request is not expected to negatively impact sensitive environmental resources. Section E of the project proffers consider environmental impacts associated with firing ranges and lead projectiles. Project development will be subject to regulatory protections concerning environmental quality. A number of environmental controls have been proffered specific to the project proposed onsite including range design consistent with the Environmental Protection Agency Best Management Practices for Lead at Outdoor Shooting Ranges. Development and implementation of an Environmental Stewardship Plan has also been proffered to commit to site monitoring and reclamation for mitigation of risk of lead migration from the range. Proffers commit to annually accounting for all fired rounds onsite to ensure complete lead reclamation onsite. Additional proffer commitments seek to maintain soil ph. levels, slow rainwater runoff and erosion risk, stormwater management commitments, range slope, backstops and bullet catchers, sand traps to mitigate ricochet risk or "lost rounds" from a lead mitigation and accounting standpoint. The applicant has exhibited a commitment to be a "good neighbor" through lead reclamation and mitigation from site design, planning, implementation efforts. Low Impact Development (LID) methods are proposed to address surface water and stormwater management as per the project narrative and exhibited within the generalized development plan. Wetland and RPA areas are generally outside of any areas of disturbance except for internal road crossing locations. Any wetland or RPA encroachments will be subject to the appropriate environmental review, permitting. Large open space areas are proposed. Open space provided is well in excess of the 10% minimum required under Industrial 2 zoning. Upon completion of Phase II of the project as per the project GDP over 88% of the property will be maintained as open space including stormwater management facilities, buffering and natural areas. Staff notes 35' transitional screening buffers along the project periphery meant to help shield and buffer the use from neighbors. Project proffers commit to preservation of existing vegetation within the 35' perimeter buffers with exclusions for installation of perimeter security fencing and road access. The applicant has expressed interest in tree preservation to the maximum extent possible. Limits of disturbance have been clearly delineated in the GDP.

Staff raises concern that environmental quality and site redevelopment prospects could be compromised if the project were to cease operations and/or proper lead protocols not be followed. Under that scenario, the project would conflict with environmental and economic development goals.

Land Use:

Future Land Use Map Designation. Land Use Policies Applicable to All Land Uses 8. Redevelopment and investment in existing developed areas should be encouraged provided that the development does not adversely impact adjoining properties. The proposal is located within the Primary Development Boundary. The Primary Development Boundary defines the area within which public water and sewer utilities will be provided. The Primary Development Boundary is shown on the Future Land Use Map of the Comprehensive Plan. Land within the boundary is intended to develop with higher residential densities and more intensive non-

residential uses than outside of the boundary. By maintaining a Primary Development Boundary, the County encourages the most efficient use of the land while preserving the rural character. The property is presently zoned Agriculture 2 (A-2) that is most prevalent in, and whose use types are more consistent with land outside of the Primary Development Boundary. Staff agrees that the existing Agricultural Zoning at this location is now inconsistent with the land use vision for the area going forward considering land use designation, the intent of the Primary Development Boundary, and recent development trends in the area.

The project area has an employment center designation per the Future Land Use Element of the Comprehensive Plan. As per the Future Land Use Element, "*the employment center land use area is envisioned to be the primary location for new office and industrial development within the County, with the focus on larger scale office complexes, industrial users, and business parks. In the interests of maintaining a balanced economic base, industrial development within the County is also desired. Both light and heavy industrial uses are appropriate and should be encouraged within the Employment Center category with the careful consideration of their location and transition to adjoining properties. Light industrial uses are usually more consumer-oriented than business-oriented and are manufacturing activities that use moderate amounts of partially processed materials to produce items of relatively high value per unit. Examples include, but are not limited to, the manufacturing of: clothes, shoes, furniture, consumer electronics and home appliances. Processing, assembly or disassembly operations could also fall into this category. Typically, these uses cause little pollution. Heavy industrial uses tend to be larger in scale and often can have pollution impacts (noise, smell, etc.) on the surrounding area. While these impacts should be minimized, there is the recognition that not all negative effects can be completely mitigated. The location of these users within industrial parks, both new and existing, should be encouraged to help ensure appropriate transitions that minimize any pollution impacts on neighboring properties. Examples of heavy industrial uses include but are not limited to: mining operations; refineries, power plants; and the fabrication and assembly of large items."* Considerate of the applicant's rezoning request, Industrial zoning generally is an appropriate zoning designation within the employment center land use area however consideration of the use proposed and ability to mitigate impacts is integral to the proposed use; special use.

Use specific considerations must be made as it relates to the requested use proposed. To reiterate, as per the Future Land Use Element, "*both light and heavy industrial uses are appropriate and should be encouraged within the Employment Center category with the careful consideration of their location and transition to adjoining properties*." Staff also notes that the future land use element of the Comprehensive Plan states that *"The Map is not intended to be parcel specific, but rather provides a flexible guide for the County's desired future development patterns."* Considering this, the immediate surrounding parcels include mixed use and commercial land use designations and from a land use standpoint this site could potentially "go either way" in terms of land use potential with a variety of supported zoning district designations. Considering the use proposed, staff is concerned about potential impacts to existing and envisioned land uses in proximity to the project. As an example staff notes adjacent land to the immediate west of the proposed project has been designated as a mixed use area that "opens the door" to potential high density residential, commercial, office land uses, including potential multi-story proposals surrounding the site. Within the last few years' staff has seen a number of prospective mixed residential projects considered within a short distance of this site, including sites downrange and adjacent.

The project has been designed with range controls meant to manage risk and contain projectiles/bullets fired by weapons with enough power/range to shoot past the limits of the project boundary. Under "worst case scenario's" a carelessly or mistakenly fired bullet beyond the project boundary at present has range to potentially impact existing or future landowners and housing. Though the likelihood of this may be minimal, staff believes consideration of existing housing located offsite and downrange of the proposes project and the prospect of additional development in proximity to this site as supported by the Comprehensive Plan introduces additional land use conflicts with this proposal based on its location and size. The provided Range Report notes *"the primary bullet containment concept of the shooting range industry, as promulgated by NRA, is all bullets fired on the firing ranges should not leave the property owned or controlled by the shooting range facility."* As per the provided Range Report, engineered solutions to ensure bullet containment have been met or exceeded with this project. However, the report also acknowledges that engineered solutions for range safety must go hand in hand with administrative controls. The report says that *"often when incidents of bullet escapement have occurred, they are the result of a properly designed and maintained shooting range being utilized improperly."* This ultimately results in necessary rules and regulations, site monitoring and enforcement, and a reliance that range control will be able to constantly control for somewhat unpredictable actions or human error. To some degree the proposal requires a degree of faith that operators, equipment, and a variety of users who come and go from the site will never error, be careless, or reckless. With a wide variety of users coming and going from the site it's difficult to have complete confidence that firearms and all users will be human error free at all times and circumstances. The applicants Acoustical Assessment notes *"Crucible's typical client base is comprised of employees of the U.S. Government, Non-governmental organizations (NGOs), and multi-national corporations whose employees live and work in dangerous and austere locations worldwide."*

Staff believes the frequency of activity and pure volume of users combined with location and proximity introduces a degree of uncertainty and resulting risk considering the surrounding community. This appears to be the basis for many of the concerns levied against the project by concerned community members who may live downrange and off the project property and within range of the firearms used at the facility should a critical error result in breakdown of administrative controls. Staff acknowledges numerous range controls and engineered solutions have been included as a means to mitigate potential risk of a regularly used range including: target location restrictions for height and location against range backstops; backstop bullet catchers; directed firing below firing positions; perimeter protections against trespass from the outside upon the range via fencing and anti-climb wire, "no trespassing" signage; caliber limitations for weapons fired on the property; limits on hours of operation; extensive berm construction for containment and noise attenuation features; undisturbed tree preservation areas; and additional noise control. As an outdoor facility, if approved, staff recommends maximizing range protections through physical engineered means. As part of their proposal, the applicant has addressed all range layout and considerations features for outdoor ranges as outlined by the National Rifle Association's (NRA) Range Source Book: A Guide to Planning and Construction, except for physical design based solutions for "up and out" risk minimization overhead outdoor baffles. As per the Range Source Book, *"Overhead baffles are used to contain the flight of bullets to a specified area within the range. These overhead baffles are useful in areas where space is limited."* Since the potential range of bullets fired exceed that of the project area, staff has taken the position

to consider this site as constrained or limited in size. As a result, staff has recommended outdoor range baffles be included as a precautionary means to physically control for "up and out" risk.
As an outdoor range, the project also introduces the potential noise impacts on the surroundings. In regard to Outdoor Ranges, the NRA's Range Source Book states *"no set distance eliminates complaints entirely. However, studies conducted for the Environmental Protection Agency (EPA) indicate noise complaints are likely when inhabited dwellings exist less than one half (1/2) mile from the facility. Beyond that distance, the chance of generating noise complaints is reduced."* This is a concern given the County's land use vision for the area that includes nearby Mixed Use. A summary of the existing land use designations is above and staff notes the draft Comprehensive Plan considers higher intensity commercial heavy mixed- use (that includes support for residential development) for this area going forward on the west side of the Route 1 corridor.
The applicant has provided an acoustical assessment of the proposed project entitled "Crucible Spotsylvania Acoustical Assessment." The findings of the Assessment include compliance with the County Noise Ordinance based on hours of operation, and that if approved, the proposed use would be exempt from noise ordinance limits during such hours of operation. The exemption referenced specifically is located in County Code Sect. 14-52(a)(3) Noise emitted by a commercial or industrial establishment which noise is customarily emitted by such commercial establishments or industries. This exemption applies during the hours of 6 am and 10 pm. Proffered limits on hours' operation for firing activities do provide predictability regarding noise generation from the site. This operation will have the ability to operate seven days a week.
Staff recognizes that noise mitigation has been proposed and included within project proffers including earthen berms, caliber limits, vegetative screening, with limitations on range activities within specified times of day. The Acoustical Assessment identified numerous noise mitigating features included in the project design "to specifically address noise concerns raised by the immediate neighbors by voluntarily implementing a variety of noise mitigation measures into their new facility design." However, depending on the success of the facility, project limitations considerate of noise impacts for range activities and simulated IED scenarios could still result in seven (7) days a week activities regardless of season including winter months when deciduous vegetation has lost their leaves and vegetative sound buffering is reduced. Project proffers limit live and blank nighttime firing range training Monday through Friday to no less than two (2) hours after darkness, which is defined as "astronomical twilight as recorded by the United States Naval Observatory" ("USNO") or 10:00pm, whichever is earlier. Firing range training will end no later than 5:00pm on Saturday and 4:00pm on Sunday. Further, the Applicant and owner agree to limit hours of firing range training to commence no earlier than 8:00am Monday through Friday, 9:00am on Saturday, and 10am on Sunday. IED scenarios per proffer include limit simulated IED scenario training activities to commence after 8:00 am Monday through Friday, and after 9:00am on Saturday and after 10:00am on Sunday. All simulated IED activity will end prior to astronomical twilight as recorded by the USNO. High explosives will be prohibited per project proffer. Staff notes a provided acoustical assessment (Rev 2) suggests the project will equip rifles with a sound suppressor as the default condition for all rifle use however this does not appear a project commitment.
Given existing and future development potential near this project, staff has raised concern that noise generation from this site will introduce a noise generating operation that will inevitably present impacts upon the surroundings up to seven days a week throughout the year. Simply, staff believes this may not be the best location to introduce a commercial or industrial use with the

expected noise generation customarily emitted by such a use. As support for the project in its location concerning noise, the Assessment observes that the area surrounding Crucible's site is *"sparsely populated and may be categorized as rural land-use. While there are some residential and commercial properties to the east along Jefferson Davis Highway, there are very few noise-sensitive receptors westerly of the site."* Staff agrees with the assessment as it relates to current conditions however from a long range planning perspective, the immediate surrounding parcels include mixed use and commercial land use designations and from a land use standpoint this site could potentially "go either way" in terms of land use potential with a variety of supported zoning district designations. Considering the use proposed, staff is concerned about potential impacts to envisioned land uses near the project. Neither the land use designations in the area or the location within the County designated Primary Development Boundary suggest a County vision of continued rural land uses in this area for many years to come. Staff notes there has been development interest within the immediate area within the past few years aimed at a mixed-use including a mix of housing types including higher density residential and consumer driven commercial development.

Land Use Policies Applicable to All Land Uses 1. Rezoning proposals should address impacts that are specifically attributable to the development. Overall this project is expected to result in minimal impact to County public facilities. No impacts are expected considering demands upon schools or parks and recreation facilities. Transportation staff has sought to mitigate transportation impacts along the Route 1 corridor considerate of this projects potential impacts. Overall this project is expected to have little impact on the Route 1 corridor and is not expected to degrade Transportation Levels of Service. Full frontage improvements including the addition of sidewalks have been depicted within the GDP. Staff notes that sidewalk implementation is tied via proffer to timing of the Phase II portion of the project.

This project will include addition of a deceleration and acceleration lane to and from the site to accommodate the use and reduce potential conflict along the Route 1 corridor. As noted in the project narrative, traffic generation from the special use proposed (use subject to this rezoning request) is expected to result in minimal impacts. For Fire and Rescue the site has been designed to accommodate access to all developed areas of the facility. The project narrative speaks to annual internal fire inspections and coordination with County Fire and Rescue to develop an emergency management plan for the site.

Staff has also raised concern over: the lack of outdoor range baffles to minimize "up and out risk" to existing and future development offsite; lack of commitments to annual internal fire inspections and coordination with County Fire and Rescue to develop an emergency management plan; introducing a source of noise generation in proximity to existing and future development opportunities in the area; environmental quality and site redevelopment prospects could be compromised if the project were to cease operations and proper lead protocols not be followed. Under that scenario, the project would conflict with environmental and economic development goals.

Land Use Policies Applicable to All Land Uses 3. Wherever possible, existing trees and tree buffers should be preserved rather than replacing mature vegetation with new plantings. As per the GDP upon completion of Phase II over 88% of the property will be maintained as open space including stormwater management facilities, buffering and natural areas. This is well above the minimum 10% open space requirement established for the Industrial 2 zoning district by County code. Staff notes 35' transitional screening buffers along the project periphery meant to

help shield and buffer the use from neighbors. This is greatly expanded upon via additional areas left undisturbed. Project proffers commit to preservation of existing vegetation within the 35' perimeter buffers with exclusions for installation of perimeter security fencing and road access. The applicant has expressed interest in tree preservation to the maximum extent possible. Limits of disturbance have been clearly delineated in the GDP.

Employment Center Land Use Policies 4: New development should provide interparcel connections to adjoining properties where appropriate. No interparcel connectors are depicted on the GDP as part of this proposal. Given the nature of the use proposed and intent as a secured facility not widely open for public access, staff does not find interparcel connectivity warranted for the project proposed whose footprint is depicted on the rezoning GDP.

Employment Center Land Use Policies 10: Encourage job creation that provides sufficient income for employees to be able to afford housing within the County. Employment Center Land Use Policies 11. Encourage the retention and expansion of existing business operations as well as the attraction of new businesses and investment. This proposal is complementary of business retention, expansion, and attraction goals. However, staff believes any use proposal that exposes residential or commercial/office/industrial uses to risk of offsite bullet flight and regular noise generation from the site that may be a hindrance to attracting such uses within the area of risk; economic development attraction counterproductive. Site redevelopment prospects could be compromised if the project were to cease operations and proper lead protocols not be followed. Under that scenario, the project would conflict with environmental and economic development goals

Transportation:

Transportation Policy 1, Strategy 1. Achieve no less than a "D" Peak Hour Level of Service on the VDOT Primary Street System. Transportation Policy #2. Ensure that new development does not degrade Levels of Service and mitigates its impact on the transportation network. This project is not expected to negatively impact level of service. Traffic generation from the project is low and does not warrant a Traffic Impact Analysis (TIA) or VDOT 527 Analysis as noted in the project narrative. As per the County Transportation Engineer, based on the Travel Model, Route 1 (where Crucible intends to locate) carries approximately 11,500 vehicles-per-day and is operating at a LoS A during both AM & PM peak periods. VDOT count data shows a higher volume of 15,000 vehicles-per-day from 2017 but it is based on a growth projection from an earlier count taken a few years ago. The LoS would likely be a "B". It is safe to say the LoS is either an A or a B during the peak periods, either of which are very good conditions.

Transportation Policy 2, Strategy 5. The County should support alternative onsite transportation alternatives and recreational options such as transit, pedestrian and bicycle facilities that are able to, or will, connect to neighboring properties. Transportation Policy #3. Promote alternative modes of transportation and multi-modal facilities to more effectively address demands on the transportation network. Considering the project has frontage along the Route 1 corridor, amongst a variety of existing and planned land uses, the applicant has included frontage sidewalks within their GDP. This is a positive improvement along the Route 1 corridor. Such infrastructure is complementary to the employment center, commercial, mixed land uses in the immediate area as well as the intent of the Primary Development Boundary

where development is envisioned to occur. Staff notes that sidewalk implementation is tied via proffer to timing of the Phase II portion of the project.

Historic Resources:

Historic Resources Policy 1. Encourage and promote the voluntary protection and preservation of scenic, historic, cultural, architectural, and archaeological resources. Historic Resources Policy 1, Strategy 2. Support the preservation of resources with local, state, or national significance. Historic Resources Policy 4. Enhance public understanding and appreciation of the unique nature of Spotsylvania County's history, culture and character. Staff consulted the Virginia Department of Historic Resources Virginia Cultural Resources Information Service, and Handbook of Historic Sites in Spotsylvania County. The project narrative states the property does not have any cultural resources. A cemetery is located on the property however and as depicted on the generalized development plan has been avoided by the development footprint. This cemetery is not well documented at this time. As part of project review, staff requested the applicant consider providing some documentation and/or imagery to help inventory the cemetery onsite and update the County Cemetery Inventory for historical/ archival/ project review sake. The County Cemetery Project is supported by the Comprehensive Plan in Historic Resources Policy 1 and Policy 4. Positively the applicant has reported they have further protected the cemetery through installation of fencing around the area and buffering around the site in order to avoid any conflict with State Code concerning cemeteries. Provision of accessibility to the cemetery for historians, family members, genealogists, etc. will be regulated by the Code of Virginia also.

Natural Resources:

Natural Resources Policy 1. Balance the protection of environmental resources and natural wildlife habitats with development. Natural Resources Policy 1, Strategy 1. The County should support the mitigation of impacts upon unique and/ or endangered resources including rare species and their habitats. As summarized in the applicant narrative and depicted within the generalized development plan, "the project's design will minimize the impact to the natural topography and vegetation located on the property. While there are both wetlands and RPAs on the site, they are limited in area, and applicant intends to utilize low impact development methods to address surface water and storm water management matters to the extent reasonably practical and feasible." Wetlands disturbances resulting from necessary road crossings have been minimized. Such disturbances will be subject to applicable environmental regulations and mitigations. Mitigation for the potential of lead pollution resulting from the collection of bullets has been proposed. The applicant narrative speaks to intended development of *"an Environmental Stewardship Plan prepared by a recognized expert in the field according to Environmental Protection Agency (EPA) guidelines."* The applicant also states that range facilities will be designed to follow Best Management Practices for Lead Outdoor Shooting Ranges. Physical protections including natural clay soils, sand traps with clay base, range floor liming, range design, and accounting for each round fired through collection are all critical protections identified by the applicant. The applicant has incorporated said lead related protections and the development of an Environmental Stewardship Plan within project proffers. These proffers positively contribute to the application. This site has been partially cleared in the past and large areas of natural vegetation are to remain in open space areas. Staff consulted the Virginia Department of Conservation and Recreation's Natural Heritage Data Explorer (NHDE) and notes no predictive models within the site that would suggest presence of threatened or endangered species onsite. The US Fish and

Wildlife Service Information for Planning and Consultation system includes a probability of presence summary for geographic areas. The IPaC system identifies potential presence or habitat for bald eagle, prairie warbler, red-headed woodpecker, wood thrush in and around this location. Endangered species identified include the northern long-eared bat and yellow lance (a mussel). Such species are considered potentially affected by activities in this location. It's based on predictive models of expected ranges of each species.

VOLUNTARY PROFFER STATEMENT

Applicant:	Team Crucible, LLC ("Applicant") 60 Jack Ellington Road, Fredericksburg, VA 22406
Owner:	Radio Reconnaissance Technologies, Inc. ("Owner") (hereafter and for purposes of this Proffer Statement, the Applicant and Owner shall collectively be referred to as the "Applicant")
Representative:	Charles W. Payne, Jr., Hirschler Fleischer, 725 Jackson Street, Suite 200, Fredericksburg, VA, 22401, Phone: (540) 604-2108 Fax (540) 604-2101; Email: cpayne@hirschlerlaw.com
Project Name:	"Team - Crucible Training Complex" ("Project")
Property:	Spotsylvania County Tax Parcel 76-A-2, known as 6116 Jefferson Davis Hwy, consisting of approximately 69.9846 acres (collectively, the "Property")
Date:	August 14, 2020
GDP:	Generalized Development Plan, entitled "Team - Crucible Training Complex," prepared by W W Webb & Associates, PLLC, originally dated March 27, 2017, as last revised May 10, 2020, which plan is attached hereto and marked as Exhibit A (the "GDP")
Rezoning Request:	From A-2 to I-2
Rezoning File No.:	R17-0005

I. General Information

The Applicant and Owner, and their respective successors and assigns, hereby agree that the development of the Property will be in conformance with the GDP and the following proffered conditions (the "Proffers") pursuant to Sections 15.2-2303, et seq. of the Code of Virginia (1950) as amended, and Section 23-4.6.3 of the Zoning Ordinance of Spotsylvania County (1995) as amended. The Proffers are the only conditions offered in this rezoning application. This rezoning application R17-0005 and the Proffers will be effective only upon Spotsylvania County's (the "County") full and final approval of said rezoning application and approval of accompanying special use permit application SUP17-0003, all submitted by the Applicant and Owner to allow for the development and operations of a security training facility and related activities. Upon said approvals, any prior proffers affecting the Property, whether by

prior proffer (recorded or unrecorded), are hereby superseded by the Proffers, and are thus void and of no further force and effect.

II. Land Use:

A. General Development. The Property will be developed in conformance with the GDP. Notwithstanding the foregoing, all parcel lines, parcel and lot sizes, building envelopes, building or unit sizes, public road locations, private driveway and travelway locations, waste facilities, parking areas, utility locations, drainfields, storm water management facilities, amenities, and dimensions of undeveloped areas shown on the GDP may be reasonably adjusted for purposes of the final site or subdivision plans to allow the Applicant and Owner to be fully compliant with the requirements of state and federal agency regulations including, but not limited to, DHR, VDOT, DEQ, DCR, Army Corps., etc., and the County's Zoning Ordinance, Subdivision Ordinance, and Design Standards Manual. Notwithstanding the foregoing, any material adjustments to the GDP shall be subject to the approval of the County's Zoning Administrator, and in no event shall approved adjustments to the GDP relieve the Applicant and Owner from providing any of the Proffers.

B. GDP Phasing. The Project will be developed in two (2) phases, as reflected on the GDP, and described as follows:

1. For purposes of Phase 1 of the Project, the following shall be constructed and installed on the Property:

(i) a perimeter eight foot (8') tall security fence, to include a single strand anti-climb barbed wire along the top of the fence, all in the areas shown on sheet 3 of the GDP;

(ii) a twelve foot (12') tall earthen berm and plantings to be located at the toe of the berm along the property line shared with adjoining Tax Map Parcels 63-A-37B, 63-A-37A and 76-A-2A, all as shown on sheet 3 of the GDP. The height of the said berm is measured at any point along the linear line that is formed by the highest points of the berm to a point down true vertical (plumb) to the pre-existing terrain, as shown on the GDP; and

(iii) a firing range, which shall include a twenty foot (20') high perimeter earthen berm with at least eighteen inches (18") of sand capture material in the range impact area, and a horizontal bullet catcher, all as generally depicted on the GDP. The toe of the range berm will follow the edge of the range floor, as depicted on the GDP, and is defined as that point where the existing terrain's slope begins to climb at a constructed slope to the top of the range berm.

2. For purposes of Phase 2 of the Project, the following improvements shall be provided:

(i) a commercial entrance with a two hundred foot (200') taper, as shown on sheet 4 of the GDP; and

(ii) the construction and installation of sidewalks along Route 1, which will be completed upon construction of the one and two-story office buildings, as identified on the GDP.

3. Public water and sewer utilities will be extended to the Property prior to the completion of fifty-five thousand three hundred square feet (55,300 SF) of overall office space on the Property.

4. The Applicant and Owner will dedicate ten feet (10') of right-of-way along Route 1, all as shown on the GDP.

C. Noise Mitigation. The Applicant and Owner will undertake the following measures onsite prior to any training or shooting activity for purposes of mitigating noise:

1. Construct minimum twenty foot (20') high earthen berms which will surround the outside of the firing range, all as generally depicted on the GDP.

2. Maintain in place all natural vegetation and trees to the extent reasonably possible and said natural vegetation and trees that must be removed for purposes of developing the Property (in accordance with the GDP and applicable governmental requirements) will be replanted in the areas generally shown on the GDP. All existing vegetation will remain undisturbed in the designated perimeter buffer areas shown on the GDP except: (i) the area where the road nears the southern parcel boundary; and (ii) the area needed to install and maintain the perimeter fence.

3. Limit live and blank nighttime firing range training Monday through Friday to no later than two (2) hours after darkness, which is defined as "astronomical twilight as recorded by the United States Naval Observatory" ("USNO") or 10:00 p.m., whichever is earlier. Firing range training will end no later than 5:00 p.m. on Saturday and 4:00 p.m. on Sunday. Further, the Applicant and Owner agree to limit hours of firing range training to commence no earlier than: 8:00 a.m. Monday through Friday, 9:00 a.m. on Saturday, and 10:00 a.m. on Sunday.

4. Limit simulated IED scenario training activities to commence after 8:00 a.m. Monday through Friday, and after 9:00 a.m. on Saturday and after 10:00 a.m. on Sunday. All simulated IED activity will end prior to astronomical twilight as recorded by the USNO. Simulated IEDs will be created using one ounce of Pyrodex RS, or other similar black powder, buried below the surface of the ground, as detailed on page 6 in The Crucible Spotsylvania Acoustical Assessment, dated November 18, 2019.

5. Prohibit use of any high explosives. "High explosive" means that the explosive detonates and the shock front passes through the material at a supersonic speed.

6. There will be no live weapons firing in the scenario areas shown on the GDP, but simulated IEDs will be utilized pursuant to training requirements within said areas.

D. Range Controls. The Applicant and Owner will undertake the following firing-range controls prior to any shooting or training activity on the Property:

1. All firing training targets shall be located against range backstops, as shown on the GDP, and target height shall not be any higher than eight feet (8') tall as measured from the range floor.

2. All backstops shall have horizontal bullet catchers consistent with NRA Range Source Book 2012, pages I-1-27 through I-1-28, page II-2-13, and Appendix A10.

3. All target firing activity shall be directed below firing positions at a grade not to exceed three percent (3%) to ensure fired rounds containment.

4. Include visible "No Trespassing" (in English and Spanish) signs which shall be spaced no more than one hundred feet (100') from one another around the perimeter of the Property. The signs will be 8.5" x 11", or larger, and affixed to the security fence.

5. Limit the caliber of weapons fired on the Property to the following:

(i) handguns (pistols/revolvers) up to and including .45 caliber;

(ii) shotguns (up to and including 12 gauge);

(iii) routine use of rifles/carbines, no larger than .300 Blackout.

E. Environmental Controls. The Applicant and Owner will undertake the following environmental controls prior to any shooting or training activity on the Property:

1. All range facilities will be designed to follow *Environmental Protection Agency ("EPA")* Best Management Practices for Lead at Outdoor Shooting Ranges (EPA-902-B-01-001), as revised June 2005 ("EPA Manual"), to mitigate lead contamination;

2. For purposes of mitigating lead migration from the range, develop and implement an Environmental Stewardship Plan ("ESP"), in accordance with the EPA Manual, and include as part of the Stormwater Pollution Prevention Plan ("SWPPP"), which will be submitted to the County during the initial site plan submission for the Project;

3. Disburse and locate lime on range floors based on periodic measurements (intervals of measurements are based on soil content, to be determined after construction) for purposes of keeping pH levels within the firing range above 6.5;

4. Locate grass in swales and install limestone check dams, as provided for in the EPA Manual, and as generally shown on the GDP, which will be finalized at site plan stage. A

"limestone check dam" is defined in the EPA Manual Chapter III - Page III-6 as a small dam constructed across a swale, drainage ditch, or waterway to counteract erosion by reducing water flow velocity;

5. Install water retention structures (infiltration or evaporation—based on geotechnical engineer report at site plan stage) in the general areas shown on the GDP;

6. On an annual basis, account for accumulated fired rounds for purposes of determining lead reclamation activities based on round count and soil measurement procedures, according to the thresholds for remediation as set forth in Applicant and Owner's ESP, as may thereafter be updated or amended; and

7. Keep record of fired rounds onsite, as provided in the ESP. The Applicant and Owner will make available to the County the fired rounds records upon request, and as part of the SWPPP review and monitoring process.

F. Community Engagement.

1. Upon obtaining the initial certificate of occupancy permit (final) for the Project, Applicant and Owner agree to appoint a contact representative and to provide contact information for such person to both the County and the public, in order to address any community concerns or questions about the ongoing operations of the facility. An appointed contact representative will remain in place in perpetuity as long as the facility operates or exists.

2. Upon obtaining the initial certificate of occupancy permit (final) for the Project, Applicant and Owner agree to provide Spotsylvania County first responders and public safety personnel with access to the Applicant and Owner's firing range facilities, pursuant to a subsequent agreement between Spotsylvania County and the Applicant and Owner.

3. Upon obtaining the initial certificate of occupancy permit (final) for the Project, Applicant and Owner agree to provide Spotsylvania County Sheriff's Office access to the Applicant and Owner's facilities pursuant to a subsequent agreement between Spotsylvania County Sheriff's Office and the Applicant and Owner.

[AUTHORIZED SIGNATURES TO FOLLOW]

The Applicant and Owner make these proffers voluntarily, in support of their rezoning application.

WITNESS the following signature:

APPLICANT:

TEAM CRUCIBLE, LLC, a
Virginia limited liability company

By: _____
John R. Garman, President

Date: 14 Aug 2020

COMMONWEALTH OF VIRGINIA
CITY/~~COUNTY~~ OF Fredericksburg

The foregoing was subscribed, sworn to and acknowledged before me this 14th day of August, 2020, by John R. Garman, President of Team Crucible, LLC, a Virginia limited liability company, on behalf of said company.

_____
Notary Public

Print Name: Betty J. Miller
My Commission Expires: 8/31/2022
Registration No. 4060695
[SEAL]

BETTY J. MILLER
NOTARY PUBLIC
REG # 4060695
MY COMMISSION EXPIRES
08/31/2022
COMMONWEALTH OF VIRGINIA

OWNER:

RADIO RECONNAISSANCE TECHNOLOGIES, INC., a Virginia corporation

By: _____
Nicholas E. Hoben, President

Date: 14 Aug 2020

COMMONWEALTH OF VIRGINIA
CITY/COUNTY OF Fredericksburg

The foregoing was subscribed, sworn to and acknowledged before me this 14th day of August, 2020, by Nicholas E. Hoben, President of Radio Reconnaissance Technologies, Inc., a Virginia corporation, on behalf of said company.

_____
Notary Public

Print Name: Kathryn Lynn Nix-Khurshid
My Commission Expires: 08/31/2024
Registration No. 7883487
[SEAL]

KATHRYN LYNN NIX-KHURSHID
NOTARY PUBLIC
REG # 7883487
MY COMMISSION EXPIRES
8/31/2024
COMMONWEALTH OF VIRGINIA

EXHIBIT A

Generalized Development Plan

GENERALIZED DEVELOPMENT PLAN
TEAM CRUCIBLE TRAINING COMPLEX
REZONING AND SPECIAL USE

BERKELEY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

EXISTING ZONING: A-2
PROPOSED ZONING: I-2 W/ SPECIAL USE
TAX MAP NUMBERS: 76-A-2 (REZONING & SPECIAL USE)
VOTING DISTRICT: BERKELEY
STREET ADDRESSES: 6116 JEFFERSON DAVIS HWY.

OWNER:
RADIO RECONNAISSANCE TECHNOLOGIES, INC
2326 BOURBON STREET
FREDERICKSBURG, VA 22408
ATTN: NICHOLAS HOBEN
(540) 752-7448

APPLICANT:
TEAM CRUCIBLE, LLC
80 JACK ELLINGTON ROAD
FREDERICKSBURG, VA 22406
ATTN: JOHN CHAMAN
(540) 752-2800

SITE STATISTICS:
1.) TAX MAP: 76-A-2
2.) PARCEL ACREAGE: 69.9984 ACRES
DISTURBED AREA(S): 45.5042 ACRES
3.) EXISTING ZONING: A-2
PROPOSED ZONING: I-2 W/ SPECIAL USE
4.) GROSS FLOOR AREA: 66,794 SQ FT
5.) OVERLAY DISTRICT: EBR
6.) EXISTING USE: AGRICULTURAL
PROPOSED USE: BUILDING OFFICES, OUTDOOR TACTICAL TRAINING, OUTDOOR SHOOTING RANGES
7.) MAXIMUM BUILDING HEIGHTS: NOT TO EXCEED 50'
NUMBER OF BUILDING: TWO STORIES PROPOSED
EXISTING SETBACKS: 50' FRONT YARD, 50' SIDE YARD, 50' REAR YARD
PROPOSED SETBACKS: 40' FRONT YARD, 0' SIDE YARD, 0' REAR YARD
(ALL EXISTING AND PROPOSED BUILDING WELL WITHIN BOTH LIMITS)
8.) TRIP GENERATIONS
INITIAL BUILDOUT: 44 VPD (TRAINING FACILITY)
FINAL BUILDING: 571 VPD (ULTIMATE TRAINING FACILITY + SECTION 715 SINGLE TENANT OFFICE)
9.) NO EVIDENCE OF CIVIL WAR TRENCHES OR HISTORICAL BUILDINGS, STRUCTURES OR SITES ON PROPERTY.
10.) SURVEY FOUND PLACES OF BURIAL AND LOCATED ALL FOUND STONES PERIPHERALLY AND ANY OTHER EVIDENCE. OWNER ESTABLISHED AND FENCED THE 6,500 SQ FT. CEMETERY WITH GATE TO PROTECT IT
11.) PROPERTY WITHIN ZONE "X" PER FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 510308 0101C & 0115C DATED 2/18/1998
RESOURCE PROTECTION AREAS SHOWN ON PLAN, WERE SURVEYED AND STAKED FROM FIELD DATA DELINEATION ON 5/22/2006
12.) WETLANDS WITHIN 200' OF SITE: KNOWN ON PLAN AS DELINEATED
13.) WETLANDS PERMIT REQUIRED: YES
14.) RPA ON SITE: ENTIRE SITE
15.) RPA ON SITE: SHOWN ON PLAN AS DELINEATED
16.) THIS PROPERTY WILL BE SERVICED BY PRIVATE WELL AND SEPTIC SYSTEMS UNDER INITIAL BUILDOUT. ONCE EXPANSION OF THE SITE IS MET DED WITH NEW OFFICE BUILDINGS, DEVELOPER WILL EXTEND PUBLIC WATER AND SEWER TO THE SITE FOR USE
17.) SOLID WASTE: LARGE OUTSIDE COMMERCIAL CONTAINERS WILL BE LOCATED ON THE SITE. SOLID WASTE WILL BE COLLECTED BY A PRIVATE REFUSE COMPANY AND DISPOSED OF AT A COUNTY APPROVED DISPOSAL SITE

PARKING TABULATION:

PHASE 1 MAX BUILDOUT

USE TYPE	REQUIREMENT	CALCULATION	REQUIREMENT	CALCULATION
INDUSTRY TYPES I, II, III	1 SP PER 1,000 SQ FT. GFA PLUS 1 SP PER 400 SQ FT. OF ACCESSORY OFFICE AREA OR 1 SP PER 2 EMPLOYEES ON THE LARGEST SHIFT WHICHEVER IS LESS	2,224 SP + 11 SP = 235 SP	1 SPACE FOR THE FIRST 2,000 SQ FT. OF GROSS FLOOR AREA, PLUS 1 SPACE FOR EACH ADDITIONAL 50,000 SQ FT. OR MAJOR FRACTION THEREOF	66,794 (1,000) = 1 SPACE 46,794 (50,000) = 0 SPACE
	TOTAL REQUIRED	235 SP	TOTAL REQUIRED	1 SPACE
	TOTAL PROVIDED	241 SP	TOTAL PROVIDED	1 SPACE

PHASE 2 MAX BUILDOUT

USE TYPE	REQUIREMENT	CALCULATION	REQUIREMENT	CALCULATION
INDUSTRY TYPES I, II, III	1 SP PER 1,000 SQ FT. GFA PLUS 1 SP PER 400 SQ FT. OF ACCESSORY OFFICE AREA OR 1 SP PER 2 EMPLOYEES ON THE LARGEST SHIFT WHICHEVER IS LESS	93,300 (400) = 233 SP 8,794 (400) = 22 SP	1 SPACE FOR THE FIRST 5,000 SQ FT. OF GROSS FLOOR AREA, PLUS 1 SPACE FOR EACH ADDITIONAL 25,000 SQ FT. OR MAJOR FRACTION THEREOF	66,794 (5,000) = 1 SPACE 66,794 (25,000) = 2 SPACES
	TOTAL REQUIRED	255 SP	TOTAL REQUIRED	3 SPACES
	TOTAL PROVIDED	274 SP	TOTAL PROVIDED	3 SPACES

LOADING TABULATION:

IMPERVIOUS CALCS:

PHASE 1

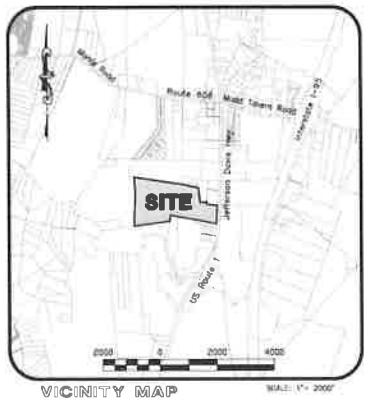
BUILDINGS	66,794 SQ FT
ROADS & PARKING	205,479 SQ FT
RATIO	244,273 (244,273+ 4,794) = 98.0%

OPEN SPACE: 91.39%

PHASE 2

BUILDINGS	66,794 SQ FT
ROADS & PARKING	309,111 SQ FT
RATIO	375,905 (3,048,528) = 11.87%

OPEN SPACE: 88.13%



VICINITY MAP
SCALE: 1" = 2000'

STORMWATER MANAGEMENT NARRATIVE:
STORMWATER MANAGEMENT SHALL BE ADDRESSED AT TIME OF SITE PLAN SUBMITTAL. ON-SITE DETENTION FACILITIES, POROUS PAVEMENT OR OTHER SUITABLE BMP'S WILL BE UTILIZED IN ACCORDANCE WITH THE SPOTSYLVANIA COUNTY DESIGN STANDARDS MANUAL. STORMWATER RUNOFF WILL BE COLLECTED IN MUTIPLE POND FACILITIES AT ALL OUTFALLS AS SHOWN ON PLANS AND RELEASED INTO ON SITE EXISTING STREAMS ALL FLOWING IN A SOURTHERN DIRECTION. A CONTROL STRUCTURE WILL BE UTILIZED TO REGULATE THE DISCHARGE RATE. PONDS RECEIVING WATER FROM THE GUN RANGES WILL GO THROUGH A SERIES OF LIMESTONE CHECK DAMS BEFORE ENTERING THE POND FACILITIES TIIAT WILL BE LINED WITH LIMESTONE CORRES.

EROSION AND SEDIMENT CONTROL NARRATIVE:
EROSION AND SEDIMENT CONTROL WILL BE ADDRESSED AT TIME OF SITE PLAN SUBMITTAL. SUITABLE CONTROL MEASURES WILL BE UTILIZED IN ACCORDANCE WITH THE SPOTSYLVANIA COUNTY DESIGN STANDARDS MANUAL AND THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.

LANDSCAPING NARRATIVE:
ALL ON-SITE LANDSCAPING TO BE IN CONFORMANCE WITH ARTICLE 6- LANDSCAPING AND SCREENING OF THE COUNTY'S DESIGN STANDARDS MANUAL AND ARTICLE 5, DIVISION 5 OF THE ZONING ORDINANCE. EXISTING VEGETATION WILL BE UTILIZED WHERE APPLICABLE TO MAINTAIN MATURE GROWTH AND REQUIRED TREES WILL BE PLANTED IN ANY OPEN AREAS OF THE STREET BUFFER AND TRANSITIONAL SCREENING AREAS AS NEEDED.

SOUND MITIGATION:
REFER TO THE ACOUSTICAL ASSESSMENT BOOKLET PREPARED BY WSP USA, INC. FOR NOISE MODELING, NOISE EMISSION MEASUREMENTS, ACOUSTICAL DIRECTIVITY PATTERN, LOUDNESS ISOPLETH LINES AND LOUDNESS ISOPLETH ZONES MAPPING AND SMALL ARMS RANGE NOISE ASSESSMENT MODLE WITH SUPPORTING DATA.

INDEX TO DRAWINGS:

1.) COVER SHEET
2.) EXISTING CONDITIONS PLAN
3.) GDP PHASE-1 MAX BUILDOUT
4.) GDP PHASE-2 MAX BUILDOUT
5.) RANGE CROSS SECTION
6.) ENTRANCE PLAN

W W WEBB & ASSOCIATES, PLLC
ENGINEERING - SURVEYING - LAND PLANNING
11903 BOWMAN DRIVE, SUITE 106, FREDERICKSBURG, VA 22408
OFFICE (540)371-1209 - FAX (540)371-4650

REVISION BLOCK

DATE	DESCRIPTION	BY
3/27/17	PER INC. COMMENTS	DWR
5/2/17	PER COUNTY COMMENTS	DWR
6/5/17	PER OWNER MODIFICATIONS	DWR
11/20/19	PER COUNTY COMMENTS	DWR
2/28/20		DWR

DANIEL C. WEBB LICENSE NO. 026518 2-28-20

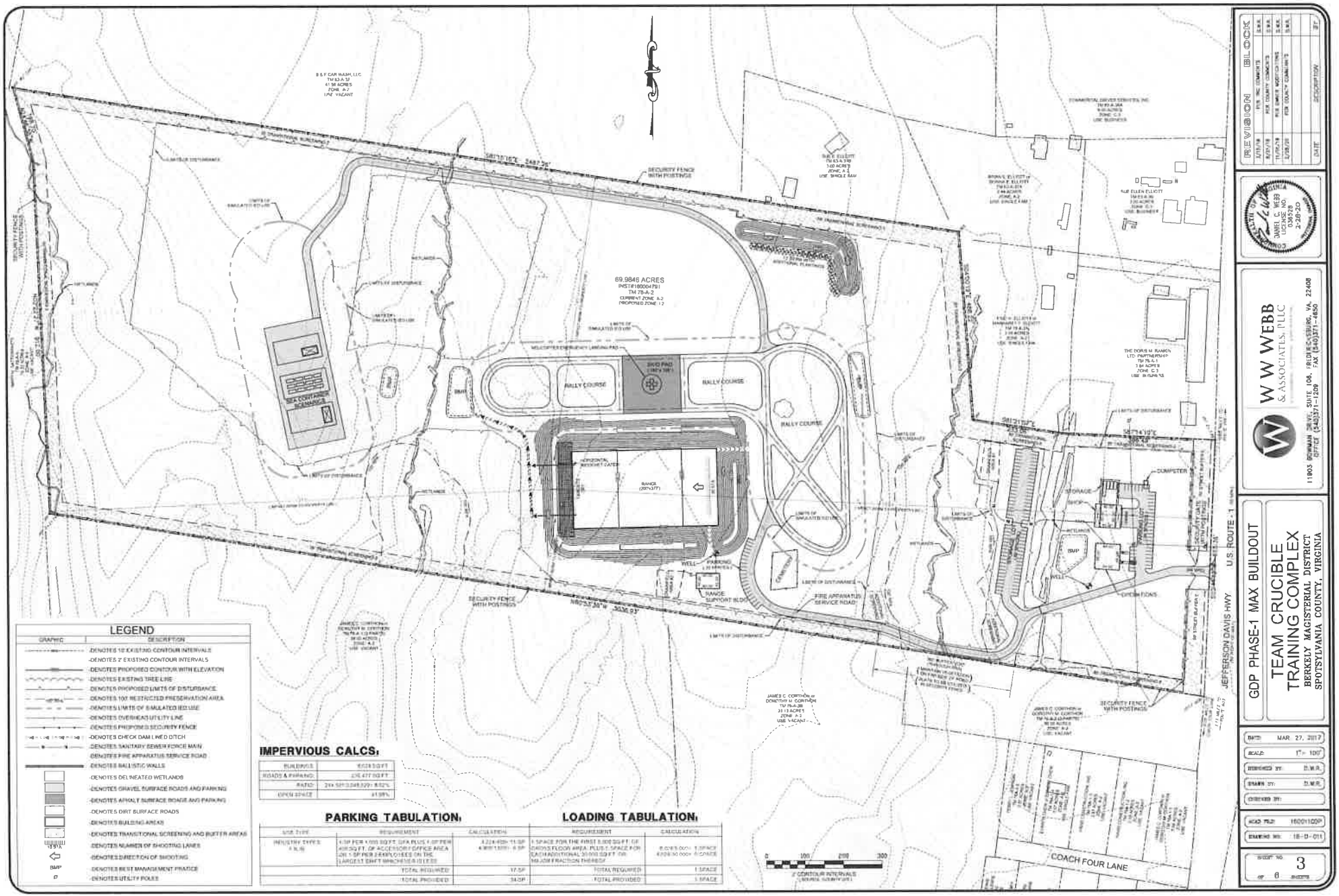
W W WEBB & ASSOCIATES, PLLC
11903 BOWMAN DRIVE, SUITE 106, FREDERICKSBURG, VA 22408
OFFICE (540)371-1209 FAX (540)371-4650

GENERALIZED DEVELOPMENT PLAN

TEAM CRUCIBLE TRAINING COMPLEX
BERKELEY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

DATE: MAR. 27, 2017
SCALE: 1" = 100'
DESIGNED BY: D.W.R.
DRAWN BY: D.W.R.
CHECKED BY:
ACAD FILE: 16001GDP
DRAWING NO: 16-0-001
SHEET NO. 1 OF 6 SHEETS

EXISTING CONDITIONS
TEAM CRUCIBLE
TRAINING COMPLEX
BERKELEY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA
W W WEBB
& ASSOCIATES, PLLC
11903 SOUTHAN DRIVE, SUITE 106, FREDERICKSBURG, VA. 22408
OFFICE (540)371-1209 FAX (540)371-4650
DANIEL C. WEBB
LICENSE No.
053528
2-28-20
COMMONWEALTH OF VIRGINIA
REVISION BLOCK
DATE DESCRIPTION BY
2/28/20 PER COUNTY COMMENTS D.W.B.
11/20/19 PER COUNTY COMMENTS D.W.B.
8/9/19 PER COUNTY COMMENTS D.W.B.
4/19/19 PER TAC COMMENTS D.W.B.
2/19/19 PER COUNTY COMMENTS D.W.B.
DATE: MAR 27, 2017
SCALE: 1" = 100'
DESIGNED BY: D.W.B.
DRAWN BY: D.W.B.
CHECKED BY:
JOB NO.: 16S01(02)P
DRAWING NO.: 16-01-01S
SHEET NO. 2 OF 6 SHEETS
JEFFERSON DAVIS HWY
U.S. ROUTE - 1
COACH FOUR LANE
CEMETERY
WELL
69.0848 ACRES
ZONED A-1
TM 78-A-2
OVERLAY ZONE A-1
PROPOSED ZONE A-1
LEGEND
GRAPHIC DESCRIPTION
DENOTES 10' EXISTING CONTOUR INTERVALS
DENOTES 2' EXISTING CONTOUR INTERVALS
DENOTES PROPOSED CONTOUR WITH ELEVATION
DENOTES EXISTING TREE LINE
DENOTES PROPOSED LIMITS OF DISTURBANCE
DENOTES 100' RESTRICTED PRESERVATION AREA
DENOTES LIMITS OF SIMULATED MG USE
DENOTES OVERHEAD UTILITY LINE
DENOTES PROPOSED SECURITY FENCE
DENOTES CHECK DAM LINED DITCH
DENOTES SANITARY SEWER FORCE MAIN
DENOTES FIRE APPARATUS SERVICE ROAD
DENOTES BALLISTIC WALLS
DENOTES DELINEATED WETLANDS
DENOTES GRAVEL SURFACE ROADS AND PARKING
DENOTES ASPHALT SURFACE ROADS AND PARKING
DENOTES DIRT SURFACE ROADS
DENOTES BUILDING AREAS
DENOTES TRANSITIONAL SCREENING AND BUFFER AREAS
DENOTES NUMBER OF SHOOTING PLANES
DENOTES DIRECTION OF SHOOTING
DENOTES BEST MANAGEMENT PRATICE
DENOTES UTILITY POLES



LEGEND

GRAPHIC	DESCRIPTION
	DENOTES 10' EXISTING CONTOUR INTERVALS
	DENOTES 2' EXISTING CONTOUR INTERVALS
	DENOTES PROPOSED CONTOUR WITH ELEVATION
	DENOTES EXISTING TREE LINE
	DENOTES PROPOSED LIMITS OF DISTURBANCE
	DENOTES 100' RESTRICTED PRESERVATION AREA
	DENOTES LIMITS OF SIMULATED IED USE
	DENOTES OVERHEAD UTILITY LINE
	DENOTES PROPOSED SECURITY FENCE
	DENOTES CHECK DAM LINED DITCH
	DENOTES SANITARY SEWER FORCE MAIN
	DENOTES FIRE APPARATUS SERVICE ROAD
	DENOTES BALLISTIC WALLS
	DENOTES DELINEATED WETLANDS
	DENOTES GRAVEL SURFACE ROADS AND PARKING
	DENOTES ASPHALT SURFACE ROADS AND PARKING
	DENOTES DIRT SURFACE ROADS
	DENOTES BUILDING AREAS
	DENOTES TRANSITIONAL SCREENING AND BUFFER AREAS
18 M 9	DENOTES NUMBER OF SHOOTING LANES
	DENOTES DIRECTION OF SHOOTING
BMP	DENOTES BEST MANAGEMENT PRATICE
	DENOTES UTILITY POLES

IMPERVIOUS CALCS.

BUILDINGS	8,028 SQ FT
ROADS & PARKING	236,477 SQ FT
RATIO	244,505 / 3,048,329 = 8.02%
OPEN SPACE	91.98%

PARKING TABULATION.

USE TYPE	REQUIREMENT	CALCULATION
INDUSTRY TYPES (I-1 & I-2)	1 SP PER 1,000 SQ FT GFA PLUS 1 SP PER 400 SQ FT. OF ACCESSORY OFFICE AREA OR 1 SP PER 2 EMPLOYEES ON THE LARGEST SHIFT WHICHEVER IS LESS	4,224 GFA / 1,000 = 11 SP 4,800 / 1,000 = 6 SP
	TOTAL REQUIRED	17 SP
	TOTAL PROVIDED	343 SP

LOADING TABULATION.

REQUIREMENT	CALCULATION
1 SPACE FOR THE FIRST 5,000 SQ FT. OF GROSS FLOOR AREA, PLUS 1 SPACE FOR EACH ADDITIONAL 20,000 SQ FT. OR MAJOR FRACTION THEREOF	8,028 / 5,000 = 1 SPACE 8,028 / 20,000 = 0 SPACE
TOTAL REQUIRED	1 SPACE
TOTAL PROVIDED	1 SPACE

REVISION BLOCK			
DATE	DESCRIPTION	BY	
12/28/16	PER WC COMMENTS	S.W.K.	
3/23/17	PER COUNTY COMMENTS	S.W.K.	
5/23/17	PER SWMP MODIFICATIONS	S.W.K.	
7/19/17	PER COUNTY COMMENTS	S.W.K.	
12/28/20			

COMMONWEALTH OF VIRGINIA
DANIEL C. WEBB
LICENSED
LIC. NO. 036528
2-28-20

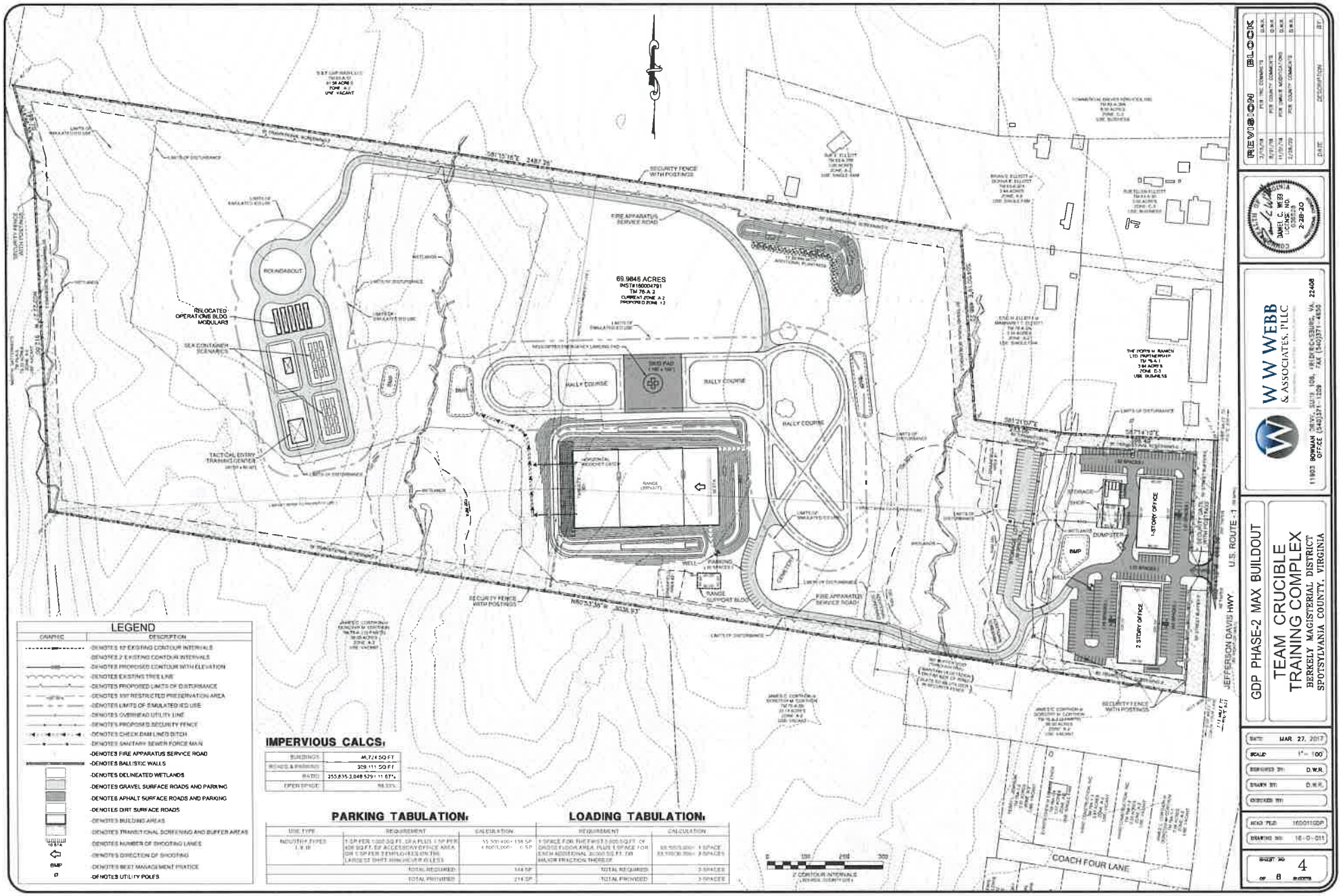
W W WEBB & ASSOCIATES, PLLC
11903 BOWMAN DRIVE, SUITE 106, FREDERICKSBURG, VA. 22408
OFFICE (540)371-1209 FAX (540)371-4650

GDP PHASE-1 MAX BUILDOUT

TEAM CRUCIBLE TRAINING COMPLEX

BERKELY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

DATE:	MAR. 27, 2017
SCALE:	1" = 100'
DESIGNED BY:	D.W.R.
DRAWN BY:	D.W.R.
CHECKED BY:	
ACAD FILE:	1600110GP
DRAWING NO:	16-D-011
SHEET NO.	3
OF	6 SHEETS



LEGEND

GRAPHIC	DESCRIPTION
	-DENOTES 10' EXISTING CONTOUR INTERVALS
	-DENOTES 2' EXISTING CONTOUR INTERVALS
	-DENOTES PROPOSED CONTOUR WITH ELEVATION
	-DENOTES EXISTING TREE LINE
	-DENOTES PROPOSED LIMITS OF DISTURBANCE
	-DENOTES 100' RESTRICTED PRESERVATION AREA
	-DENOTES LIMITS OF SIMULATED IED USE
	-DENOTES OVERHEAD UTILITY LINE
	-DENOTES PROPOSED SECURITY FENCE
	-DENOTES CHECK DAM LINED DITCH
	-DENOTES SANITARY SEWER FORCE MAIN
	-DENOTES FIRE APPARATUS SERVICE ROAD
	-DENOTES BALLISTIC WALLS
	-DENOTES DELINEATED WETLANDS
	-DENOTES GRAVEL SURFACE ROADS AND PARKING
	-DENOTES APHALT SURFACE ROADS AND PARKING
	-DENOTES DIRT SURFACE ROADS
	-DENOTES BUILDING AREAS
	-DENOTES TRANSITIONAL SCREENING AND BUFFER AREAS
10 STA	-DENOTES NUMBER OF SHOOTING LANES
	-DENOTES DIRECTION OF SHOOTING
BMP	-DENOTES BEST MANAGEMENT PRATICE
	-DENOTES UTILITY POLES

IMPERVIOUS CALCS:

BUILDINGS	46,714 SQ FT
ROADS & PARKING	309,111 SQ FT
RATIO	355,835/3,048,529 = 11.67%
OPEN SPACE	88.33%

PARKING TABULATION:

USE TYPE	REQUIREMENT	CALCULATION	REQUIREMENT	CALCULATION
INDUSTRY TYPES I, II, III	1 SP PER 1,000 SQ FT. GFA PLUS 1 SP PER 400 SQ FT. GF ACCESSORY OFFICE AREA OR 1 SP PER 2 EMPLOYEES ON THE LARGEST SHIFT WHICHEVER IS LESS	55,300/400= 138 SP 4,800/1,000= 6 SP	1 SPACE FOR THE FIRST 2,000 SQ FT. OF GROSS FLOOR AREA, PLUS 1 SPACE FOR EACH ADDITIONAL 20,000 SQ FT. OR MAJOR FRACTION THEREOF	55,300/20,000= 3 SPACES
	TOTAL REQUIRED	144 SP	TOTAL REQUIRED	3 SPACES
	TOTAL PROVIDED	214 SP	TOTAL PROVIDED	3 SPACES

LOADING TABULATION:

REQUIREMENT	CALCULATION
1 SPACE FOR THE FIRST 2,000 SQ FT. OF GROSS FLOOR AREA, PLUS 1 SPACE FOR EACH ADDITIONAL 20,000 SQ FT. OR MAJOR FRACTION THEREOF	55,300/20,000= 3 SPACES
TOTAL REQUIRED	3 SPACES
TOTAL PROVIDED	3 SPACES

REVISION BLOCK			
DATE	DESCRIPTION	BY	
3/15/18	PER TAC COMMENTS	D.W.R.	
8/31/18	PER COUNTY COMMENTS	D.W.R.	
11/19/18	PER CMMLR MODIFICATIONS	D.W.R.	
2/28/20	PER COUNTY COMMENTS	D.W.R.	

DANIEL C. WEBB LICENSED 2-28-20

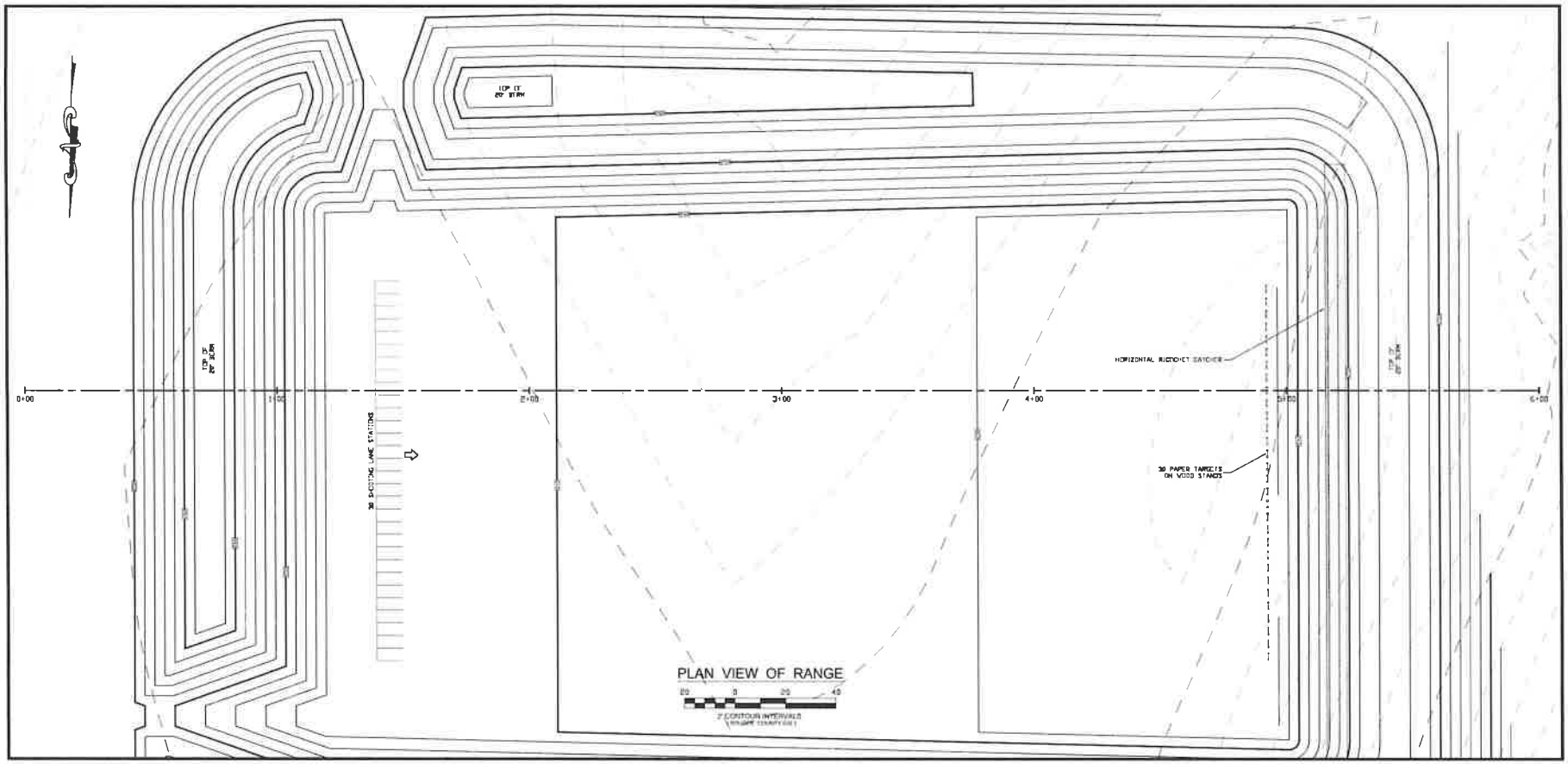
W W WEBB & ASSOCIATES, PLLC
11903 BOWMAN DRIVE, SUITE 101, FREDERICKSBURG, VA 22408
OFFICE (540)371-1555 FAX (540)371-4555

GDP PHASE-2 MAX BUILDOUT

TEAM CRUCIBLE TRAINING COMPLEX

BERKELY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

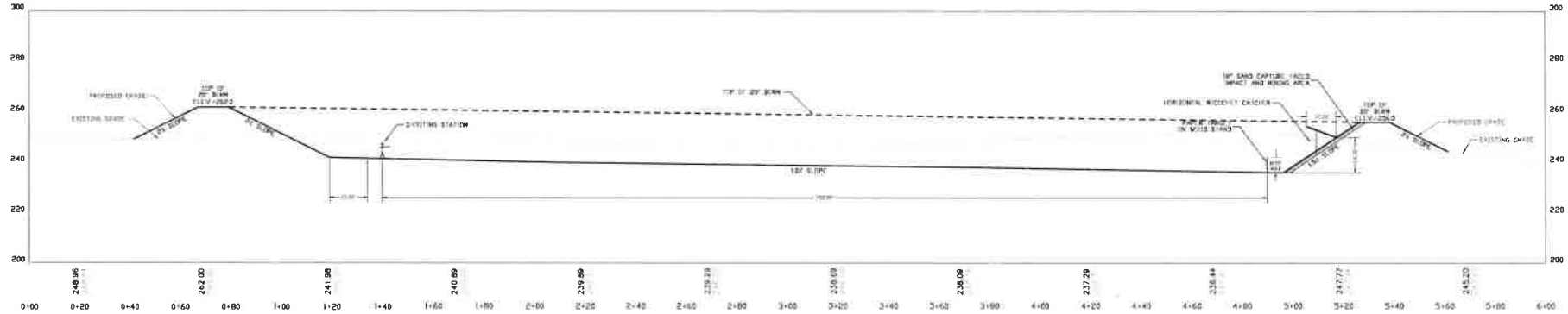
DATE:	MAR. 27, 2017
SCALE:	1" = 100'
DESIGNED BY:	D.W.R.
DRAWN BY:	D.W.R.
CHECKED BY:	
WEBB FILE:	160011GDP
DRAWING NO:	16-0-011
SHEET NO OF	4 OF 8 SHEETS



PLAN VIEW OF RANGE

20 0 20 40

2' CONTOUR INTERVALS



PROFILE VIEW OF RANGE

20 0 20 40

REVISION BLOCK

DATE	DESCRIPTION	BY
3/15/16	PER TAC COMMENTS	D.W.R.
9/2/16	PER COUNTY COMMENTS	D.W.R.
11/7/16	PER OWNER REQUESTIONS	D.W.R.
2/15/17	PER COUNTY COMMENTS	D.W.R.

COMMONWEALTH OF VIRGINIA
DANIEL C. WEBB
LICENSE NO. 036528
2-28-20

W W WEBB & ASSOCIATES, PLLC
11803 BOWMAN DRIVE, SUITE 100, FREDERICKSBURG, VA. 22408
OFFICE (540)371-7269 FAX (540)371-4650

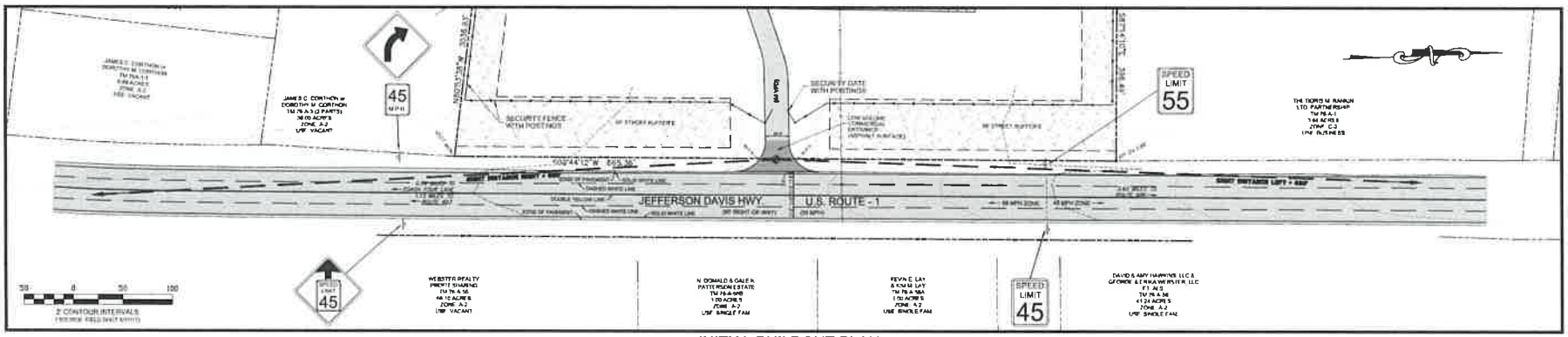
RANGE CROSS SECTION

TEAM - CRUCIBLE TRAINING COMPLEX

BERKELY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

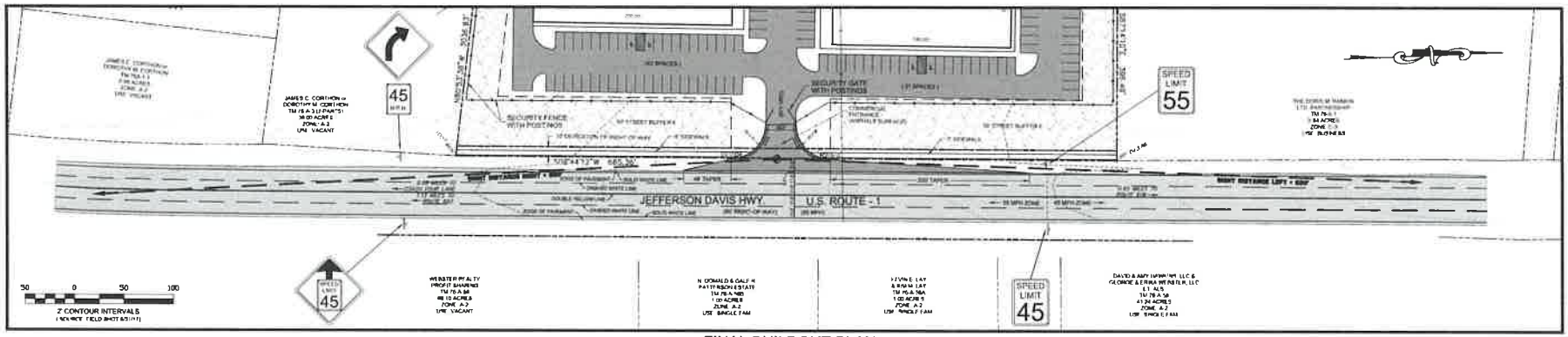
DATE:	MAR. 27, 2017
SCALE:	1"= 100'
RECORDED BY:	D.W.R.
DRAWN BY:	D.W.R.
CHECKED BY:	
ACAD FILE:	16001100R
DRAWING NO:	16-0-011

SHEET NO. 5 OF 6 SHEETS



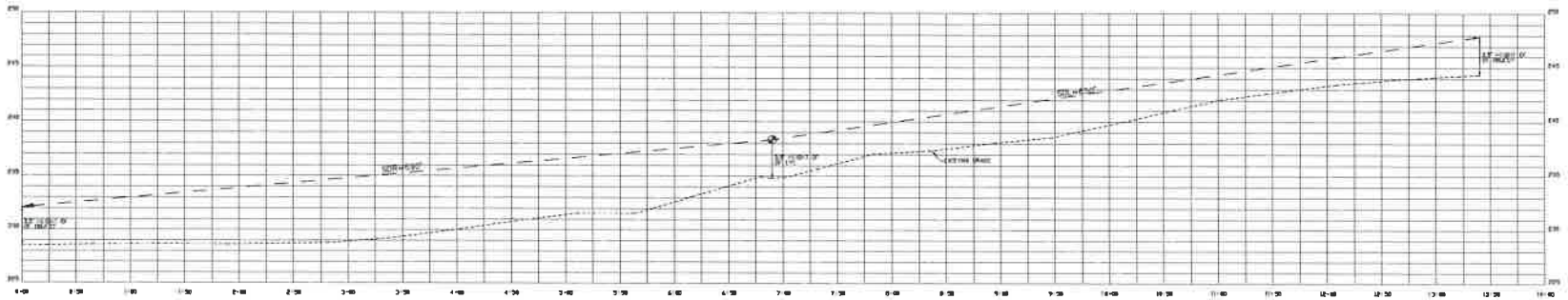
INITIAL BUILDOUT PLAN

SCALE 1"=50'



FINAL BUILDOUT PLAN

SCALE 1"=50'



ROAD PROFILE

SCALE 1"=5'(VERTICAL)
SCALE 1"=50'(HORIZONTAL)

REVISION BLOCK			
DATE	DESCRIPTION	BY
2/15/18	PER TAC COMMENTS	D.W.R.
8/22/18	PER COUNTY COMMENTS	D.W.R.
11/20/18	PER ZONING MODIFICATIONS	D.W.R.
12/28/18	PER COUNTY COMMENTS	D.W.R.

DANIEL C. WEBB
LICENSE NO. 043151
2-28-20

W W WEBB & ASSOCIATES PLLC

11903 BOWMAN DRIVE, SUITE 106, FREDERICKSBURG, VA 22408
OFFICE (540)371-1208 FAX (540)371-4650

ENTRANCE PLAN

TEAM - CRUCIBLE TRAINING COMPLEX

BERKELY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

DATE:	MAR. 27, 2017
SCALE:	1" = 100'
DESIGNED BY:	D.W.R.
DRAWN BY:	D.W.R.
CHECKED BY:	
ROAD FILE:	ENTRANCE
DRAWING NO:	16-D-011

SHEET NO. 6 OF 6 SHEETS

GENERALIZED DEVELOPMENT PLAN – NARRATIVE
REZONING & SPECIAL USE PERMIT APPLICATIONS

Applicant:	Team Crucible, LLC ("Applicant") 60 Jack Ellington Road, Fredericksburg, VA 22406
Owner:	Radio Reconnaissance Technologies, Inc. ("Owner") (hereafter the Applicant and Owner shall collectively be known as the "Applicant")
Representative:	Charles W. Payne, Jr., Hirschler Fleischer 725 Jackson Street, Suite 200, Fredericksburg, VA, 22401 Phone: (540) 604-2108; Fax (540) 604-2101; Email: cpayne@hirschlerlaw.com
Project Name:	"Team - Crucible Training Complex"
Property:	Spotsylvania County Tax Parcel 76-A-2, consisting of approximately 69.9846 acres (collectively, the "Property")
Date:	May 11, 2020
GDP:	Generalized Development Plan, entitled "Team - Crucible Training Complex", prepared by W W Webb & Associates, PLLC, originally dated March 27, 2017, as last revised May 10, 2020, attached hereto and marked as Exhibit A (the "GDP")
Rezoning Request:	From A-2 to I-2
Special Use Permit Request:	Allow the operation of a security training facility Pursuant to §23-6.22.4 (12)
Rezoning File No.:	R17-0005 & SUP17-0003

I. Project Overview

The Applicant is requesting both a rezoning request from the Agricultural 2 District ("A-2") to the Industrial 2 District ("I-2"), and a special use permit for purposes of developing and operating a high-level security training facility for both governmental and private organizations on the Property. The Applicant desires to relocate its current facility from Stafford, Virginia, where it has been operating for over 18 years, to Spotsylvania County. During the aforesaid 18 year period, the Applicant has trained over 25,000 persons for a variety of security clients, including

without limitation U.S. agencies such as: the Department of State, Justice Department, and Department of Defense; several large U.S. private companies; foreign companies; and State and local government agencies. Corporations trained include those holding contracts with the agencies listed above and those employing professionals traveling to high-risk areas. Applicant does not permit "open classes" for attendance by the general public or host competitions. Clients attending training programs learn basic and advanced skills in tactical medicine, vehicle operation, small arms tactics, and individual protective measures. A representative sample of teaching topics is provided below:

Tactical Medicine
- Hemorrhage control
- Airway management
- Self aid / Buddy aid
- Tourniquet use
- Pressure dressings
- Needle decompression
- Treatment of sucking chest wound
- Treatment of burn and blast injuries
- Patient carries

Small Arms Tactics
- Weapons manipulations
- Weapon qualification
- Electronic sites
- Use of barricades
- Shooting in depth
- Team movement
- Reactions to contact
- Known distance firing
- Weapon concealment
- Close confrontational shooting

Vehicle operation
- Hard surface driving
- Broken and unimproved roadway
- Off road driving
- Threshold breaking
- Traction control
- Vehicle weight transfer
- Swerve to avoid
- Line theory
- Traction transition
- Barricade breaching
- Convoy operations

Individual Protective Measures
- Hand to hand combat
- Route analysis
- Surveillance detection
- Attack recognition
- Hostage survival
- Communication
- Use of night vision goggles
- Land navigation
- Conduct of personal security details

The Applicant's Project includes the use of the Property (as described herein) totaling approximately 69.9846 acres of land. The Property is situated in a mostly rural and undeveloped area located in the Berkeley magisterial and voting districts. It is further located along Jefferson Davis Highway, north of the intersection of Coach Four Lane and Route 1, and south of the intersection of Morris Road and Route 1. The Property is bordered on the West by vacant agricultural land. There is a residence and Route 1 bordering the property to the East. Further, there is vacant land and the "Matta River Estates" located to the West of the Project, and vacant agricultural land and a residence is located to the immediate North of the property. There are also commercial uses, such as the CDS Tractor Trailer Training center, an auto body shop, numerous auto sales facilities, and a strip mall containing Food Lion, Family Dollar and other retail uses located along Route 1 to the North of the aforesaid adjacent parcels.

Section 23-6.22.1 of the County's Zoning Ordinance states that the purpose of the I-2 zoning district is to "provide locations for medium and heavy industrial uses." The Applicant anticipates that the Project will initially be a "medium intense" development plan and generally include a modular office with parking area, maintenance buildings and an existing one story metal building to support the training activities, all which are generally shown and depicted on the GDP. Phase-1 Max build-out of the Project will also include one (1) firing range, a rally track, and a scenario area, all as generally shown on the GDP. The firing range will include a minimum of 20 foot high earthen berms or HESCO[1] like barriers for the entire perimeter of the range, all as generally shown on the GDP. Additionally, the impact area, identified on the GDP, will include a layer of impact sand for bullet capture. Further description of the range design is found in Section XIII. The rally track will consist of dirt and unimproved surfaces and will be utilized for security training scenarios. The Applicant will also contract with Dominion Raceway for additional driver training activities. The outdoor operations operating hours for the facility are proposed as from 8:00 am to 10:00 pm, Monday through Friday; and 9:00 am to 5:00 pm on Saturday; and 10:00 am to 4:00pm on Sunday, including certain other limitations all as provided more particularly in the attached proffer statement.

The Phase-2 Max build-out of the Project will include generally the construction of a training/office facility; another office building; a partially enclosed Tactical Entry Training Facility; the relocated operations building modular; and an additional scenario training area, all as shown on the GDP. None of the buildings will exceed 50' in height. Commencement of build out is dependent on market situations and government requirements. The two existing one-story metal buildings currently on the Property will remain and be used for training, maintenance and storage spaces.

The Phase-1 Max build-out will support current operations and provide for a daily load of 50 students per day. The Phase-2 Max build-out will support a daily load of 90 students per day. Further description of student throughput and operational examples can be found in Exhibit B.

The GDP reflects approximately 61.82 acres of open space accounting for 88.33% of the Property. This exceeds the 10% open space minimum required by the I-2 district. Applicant will maintain natural areas where reasonably possible, and vegetation and trees that must be removed in order to develop the Property will be replanted in the areas shown on the GDP. All existing vegetation will remain undisturbed in the designated perimeter buffer areas shown on the GDP, except (1) the area where the road nears the southern parcel boundary; and (2) the area needed to install and maintain the perimeter fence.

The Project also includes significant buffering areas, including large sections of wooded areas along the southern, western and northern borders of the Property. In addition, plantings for sound and visual screening will be specifically located along the property lines adjacent to Parcels 63-A-37B, 63-A-37A and 76-A-2A, all as generally shown on the GDP.

[1] HESCO is made of a collapsible wire mesh container and heavy duty fabric liner, and used as a blast wall against explosions or small-arms.

Adjacent properties consist of a combination of agriculturally zoned properties with residences and vacant properties. The Applicant's proposal will be compatible with existing uses in the area, including the commercial and agricultural uses. The Project will also include appropriate buffering, including extended 50 foot buffers along the portion of the Property fronting Jefferson Davis Highway (Route 1); 50 foot buffers along adjacent properties 63-A-37B, 63-A-37A and 76-A-2A; and buffers along additional portions of the Property's perimeter, as shown on the GDP.

As described below, the Applicant's proposal conforms to the policies established by the County's Comprehensive Plan (the "Comp Plan"). As noted above, the Project will be a medium intense industrial use with traffic patterns not occurring during peak AM or PM hours, and will include extensive buffering, safety and noise mitigation measures. Furthermore, the proposal will result in minimal impacts on public facilities and services, including no impacts to schools and parks, and minimal impacts to the immediate transportation network.

In addition, the Project will generate positive economic development opportunities, including new jobs, lodgings, food, real estate and sales tax revenues. In this regard, the Applicant retained distinguished economist Stephen S. Fuller, Ph.D., who is a University professor and the Director of the Stephen S. Fuller Institute and the Dwight Schar Faculty Chair in the Schar School of Public and Government at George Mason University in Arlington, Virginia. Dr. Fuller's report, dated July 2017, and titled "The Economic and Fiscal Impact of the Proposed Team Crucible Training Complex on Spotsylvania County, Virginia", a copy of which is provided with this application ("Economic & Fiscal Report", attached as Exhibit F), states, in relevant part, the following:

- The proposed Team Crucible Training Complex in its initial phase would generate both positive economic and fiscal benefits for Spotsylvania County. These benefits will be generated by the construction spending required to prepare the site for initial operations and by future construction spending to buildout the site for expanded operations by Team Crucible and to provide office space for other federal security contractors at a future time and be measured by increased job and income growth to the benefit of residents and businesses located in Spotsylvania County.

- The initial construction spending of $1.1 million would contribute a total of $1.7 million to the County's economy during the construction period, generate $341,000 in new wage income for workers residing in the County and support a total of 7.3 full-time, year-round equivalent jobs locally and elsewhere. These economic benefits would be achieved exclusively during the construction period.

- These positive construction impacts are complemented by the annual operating outlays by Team Crucible and by the per diem spending of trainees enrolled in security training programs on-site. In its initial stage, Team Crucible estimates an annual operating budget totaling $940,000. This budget provides for four full-time, regular on-site employees supplemented by 20 contract trainers. This level of operations would support 2,650 daily visits (trainee days) annually on-site generating per diem local spending for accommodations and meals totaling $363,000. At this initial scale, the total impact of

operations outlays, including trainee expenditures, would contribute $1.9 million to the County's economy each year, generate $538,000 in new local labor income for workers residing in the County and support a total of 12.5 full-time, year-round equivalent jobs beyond those employed at the Training Complex.

- The buildout proposal for this site provides for the expansion of Team Crucible's Training Complex by 12,000 square feet and the addition of 40,000 square feet of office space that would be available to other federal security contractors. This added capacity for Team Crucible would accommodate up to 10,000 daily visits (trainee days) annually and requires annual operating outlays totaling $5.3 million. This scale of operation would include 15 full-time regular employees on-site with up to an additional 75 contract trainers. Inclusive of the annual flow of trainees and their spending for accommodations and meals (not including other personal outlays for retail and incidentals), the buildout proposal would generate $6.7 million in annual (recurring) spending directly to the benefit of the local economy. This direct spending, reflecting a composite multiplier of 1.511, would contribute a total of $10.1 million to the County's economy, generate $2.2 million in new wage income for County residents working within the County, and support a total of 65 jobs of which 39 full-time, year round equivalent jobs would be held by County residents.

- Complementing the positive income and employment benefits that would accrue to Spotsylvania County, its resident workers and businesses, Team Crucible's proposed Training Complex has been shown to generate a positive fiscal benefit to the County in its initial stage of operation (+$15,823.40) with its net fiscal benefit increasing at the full buildout scale of operations (+$63,681.50).

- The net fiscal benefit of Team Crucible's proposal is conservative as its revenue impacts are underestimated by design (they reflect non-residential revenue flows that incorporate tax exempt uses) and they reflect non-residential public expenditure demand (for County provided services) that assume access to services that would not be required to support Team Crucible's daily functions. These economic and fiscal benefits are summarized in the following table.

Economic and Fiscal Impacts of the Proposed Team Crucible Training Complex on Spotsylvania County (in millions of 2016 dollars)

Phases	Direct Outlays	Total Output	Personal Earnings	Jobs Supported
Initial proposal				
Construction	$1.100	$1.687	$0.341	7.3
Operations	$0.904	$1.375	$0.291	8.5
Trainee Spending	0.363	0.538	0.110	4.0
Total Operations	$1.267	$1.913	$0.401	12.5
Buildout				
Construction	$5.500	$8.436	$1.704	36.3

Operations	$5.319	$8.087	$1.709	49.8
Trainee Spending	1.370	2.023	0.413	15.3
Total Operations	$6.689	$10.11	$2.122	65.1

Fiscal Impacts

Jobs	Revenues	- Expenditures	= Fiscal Impact
Initial			
24	$31,805.96	$15,982.56	$15,823.40
Buildout			
90	$88,778.60	$59,934.60	$28,844.00
295	$260,136.80	$196,455.30	$63,681.50

Dr. Fuller also provided the following additional information in response to County comments:

- The economic impact analysis in the report describes how the spending by Team Crucible would enlarge the County's economy. The beneficiaries of this economic activity would depend on what businesses are in a position to capture this new business and then actively market for it. Hotels and restaurants that want this business and reach out to welcome this business will be more successful than ones that wait to see if this new business will come to them.

- In the economic analysis, the spending of trainees was included up to their per diem level. What was excluded from the analysis was potential spending beyond the per diem levels that would take place for necessity goods, retail and recreation services, and transportation services. The limitation of trainee spending to per diem only results in the likely under-estimation of these economic benefits on local businesses. This is a conservative analysis.

- If adjacent properties were rezoned for commercial use, their value would be enhanced by the presence of the proposed facility. If adjacent properties remain as zoned agricultural with residential houses, property values would not be affected by the proposed project. See Exhibit H letter regarding Crucible's effect on property by Christian P. Kaila, MAI, SRA.

- If the market in the County is strong for development, the values of vacant land will rise; market pressures and zoning would have a much greater impact than adjacent land use.

II. Comprehensive Plan

Future Land Use Map

This rezoning and SUP application is consistent with the goals and guidance provided in the County's Comprehensive Plan ("Plan"). The Plan's Future Land Use Map classifies the Property as part of the "Employment Centers" designation. The Employment Centers Land Use category is intended to encourage "new office and industrial development within the County, with the focus on larger scale office complexes, industrial users, and business parks." The Comp Plan also encourages the rezoning of land to industrial/office uses in areas designated for Employment Center uses, consistent with this Project. According to the Comp Plan, "both light and heavy industrial uses are appropriate and should be encouraged within the Employment Center category with the careful consideration of their location and transition to adjoining properties."

From a transportation improvements perspective, the Project will improve Jefferson Davis Highway (Route 1) in this area. The Applicant is proposing to make improvements accessing the site from Route 1, including deceleration and acceleration tapers into and out of the Property, all as shown on the GDP.

This Project furthers multiple objectives of the Comp Plan, including achieving residential/commercial tax rate goals and creating local jobs. Projects that generate new jobs and positive tax revenues as compared to County costs are encouraged under the Comp Plan, and further assist the County in meeting its 70% (residential) to 30% (commercial) mix tax revenue goals. Accordingly, the Project is in line with the County's tax revenue goals as it will generate additional tax revenues and local jobs.

This Project addresses the following Guiding Principles and Policies as outlined in Chapter 1 of the Comp Plan:

A. Spotsylvania County is a "business friendly" community and local job creation is a priority.

1. Encourage business investment in the County and promote the relocation of federal and state agencies to the County, providing more opportunities for Spotsylvania County residents to work in the County.

3. Encourage the rezoning of land to industrial/office uses in areas designated for Employment Center uses and the revitalization of older, underperforming commercial, office, and industrial developments.

B. Spotsylvania County is fiscally sustainable.

1. Achieve a 70/30 mix of residential to commercial/industrial development (based on assessed value), and the annual growth of the industrial and commercial tax base at a rate greater than 2%.

b. Consider proactively rezoning certain areas to promote business development.

c. Diversify the non-residential tax base by encouraging a wide variety of businesses to locate in the County.

2. Development projects seeking increased residential density and/or non-residential intensity should address impacts that are specifically attributable to the proposed development.

a. Each development proposal should include sufficient information to fully evaluate its impacts.

This Project also addresses the following Employment Center Land Use Policies, as outlined in Chapter 2 of the Comp Plan:

11. Encourage the retention and expansion of existing business operations as well as the attraction of new businesses and investment; and

12. Encourage a balance of uses within the Employment Center category to include light industry, heavy industry and office uses.

Primary Development Boundary

The Comp Plan's Future Land Use Map establishes a Primary Development Boundary (the "PDB"). The Comp Plan states that public water and sewer will be provided to properties within the PDB, and denser development will also be permitted in such locations. The Property is located within the PDB, supporting the proposed density and the Property's utilization of public utilities.

Notwithstanding the foregoing, public water and sewer is approximately 2,000 feet away from the site, and thus it is not feasible (at this point), to extend utilities to the site. Thus, during Phase-1 Max buildout of the Project, the Project will be served by well and septic systems, all as noted on the GDP. The Applicant will extend public water and sewer utilities prior to the construction of 55,300 square feet of overall office space and other facilities, as shown on the GDP.

III. **Land Use**

As noted above, the Applicant proposes rezoning the Property from A-2 to I-2. As required by the County's rezoning application packet, please note the following features:

a) Uses. The Property is currently undeveloped. As noted above, the Applicant will use the Property as a security training facility, which is considered "Industry - Type III" and is permitted with a SUP under Section 23-6.22.4 (12) of the County Ordinance.

b) Maximum Lot Coverage and Floor Area Ratio (FAR). The total area tabulation of the Property is 3,048,529 square feet. The maximum FAR is 1.5 and the proposed square footage for the facility at final buildout is 46,724 square feet or 0.015 FAR.

c) Buffering from Adjoining Properties, Access Plan, Landscaping and Screening. All landscaping, access and buffering for the site will be in conformance with the requirements of the applicable sections of the Ordinance regarding the proposed use, all as depicted on the GDP. The project will be accessed via Jefferson Davis Highway (Route 1).

d) Maximum Height of Buildings. The maximum height of any building on the Property shall not exceed applicable County Ordinance requirement for I-2 uses. The proposed building height for this use will be within County Ordinance limits, and no higher than 50 feet, as depicted on the GDP.

e) Special Amenities. Approximately 88.33% of the Property will be maintained as open space. The open space will be used for storm water management facilities, buffering and natural areas, as shown on the GDP.

f) By Right: The Property is currently zoned A-2 and potentially has access to public utilities. Thus, the Property could yield ten (10) single family detached dwelling units, creating higher demand on schools, emergency services, and road infrastructure.

IV. Cultural Resources

Based on review of the Comp Plan and information from the Virginia Department of Historic Resources and the United States Department of the Interior, the Property does not have any cultural resources. However, upon survey of the Property after purchase, it was noted that a cemetery does exist. The Applicant has already taken measures (including fencing the cemetery area) to ensure that the cemetery is not disturbed during the proposed build out as well as once operations begin. The cemetery will remain buffered and access will be allowed in accordance with applicable State law. Additionally, the Property is not located in the County's Historic Overlay District.

V. Fire and Rescue

The proposal will have minimal impact on the County's fire and rescue facilities. Thornburg Fire and Rescue Station 8, located less than one mile north of this site, will provide the Property with quick access to emergency services. The Applicant conducts annual internal fire inspections to confirm all fire safety practices and preparation measures. Further, the Applicant coordinates with local fire and rescue to familiarize County emergency response resources with Applicant's facilities and practices. These annual inspections and coordination with County services bolsters our organic fire response mechanisms while creating a stronger transition capability should fire and rescue resources be required.

Applicant met with the Emergency Management Division Chief and other Fire, Rescue and Emergency Management ("FREM") officials on August 9, 2017. Applicant discussed the design characteristics and activities proposed for the facility. Roads are designed to provide FREM response vehicles access to all developed areas of the facility (as shown on GDP). Applicant agrees that coordination with local FREM is always a good practice for the safety of our clients and employees and the safety of any responding FREM personnel. Applicant expects to continue the dialog and provide an emergency management plan for their comment and documentation. Applicant further expects to hold annual review/training sessions to prepare for a response should the FREM be amenable and available.

VI. Schools

This project will have no impacts on schools.

VII. Parks and Open Space

This project will have no impacts on County park services and the open space percentage for the site is 88.33%, all in accordance with applicable County ordinances.

VIII. Housing

Impacts on existing residences in the vicinity of the Property will be mitigated through appropriate buffering design, operations safety and sound mitigation measures, as discussed in more detail below. The open space areas will provide buffering along some property lines. Furthermore, as depicted on the GDP, transitional screening areas will buffer the proposed development from existing residential uses, including 50 foot buffers along adjacent properties 63-A-37B, 63-A-37A and 76-A-2A, and other areas as depicted on the GDP.

Additionally, Applicant retained a professional and local real estate appraisal firm known as the Appraisal Group of Fredericksburg. Professional appraiser, Christian P. Kaila, MAI, SRA prepared a value impact analysis of the properties adjacent to the Applicant's current site in Stafford County. Mr. Kaila's task was to identify any loss of property value on the subject properties that may be attributed to Applicant's operations or presence in Stafford County over the past 16 years. Mr. Kaila concluded that the proposed facility in Spotsylvania County, like in Stafford County, would not have any effect on surrounding or nearby property values in a negative (or a positive) manner. In fact, his conclusions were that the Applicant's proposed facility would simply be a non-factor as to value impacts, and the greater factor to property values is typically location. Meaning the more rural a property, typically the lower the value, whether close to the proposed facility or beyond a mile away from the facility. We have included his report with this application and is attached hereto and marked as Exhibit H for your review.

IX. Water and Sewer

As noted above, the Property is located within the PDB, but given the distance of existing utilities, it is not feasible during the Phase 1 Max build-out of the Project to extend public utilities to the said site. Thus, the Applicant plans to utilize well and septic systems for the Phase 1 Max build-out of the Project. The Applicant will extend public water and sewer utilities prior to the construction of 55,300 square feet of overall office space and other facilities as shown on the GDP.

X. Environment

The Project's design will minimize the impact to the natural topography and vegetation located on the Property. While there are both wetlands and RPAs on the site, they are limited in area, and Applicant intends to utilize low impact development methods to address surface water and storm water management matters to the extent reasonably practical and feasible. The general lay of the Property has three topographic highs where the development will be implemented and two topographic lows between them. When the Property was purchased, the low area nearest the front portion of the Property had a culvert pipe lying adjacent to the crossing and a gravel ford was

in use for passing. The owner replaced the existing pipe and stabilized the crossing to minimize future erosion that had been present in the condition when purchased. Going from the next topographic high to the back portion of the Property will have one proposed crossing to access the buildout to the scenario area. This crossing is placed in a location that minimize any wetland disturbance and is at the furthest point on the property outside of the RPA limits to reduce impacts.

XI. Lead Mitigation

Understandably, the potential for lead migration from the range needs to be addressed. To address this issue, the Applicant plans on developing and implementing an Environmental Stewardship Plan ("ESP") prepared by a recognized expert in this field according to Environmental Protection Agency ("EPA") guidelines. A Stormwater Pollution Prevention Plan will be confirmed at the site plan stage in order to ensure conformance to the ESP, both of which will be reviewed and validated by the County. Additionally, the high concentration of clay soil in this portion of Virginia and on the Property makes this an ideal location for the proposed activity because the clay protects the groundwater and makes reclamation a less intrusive process. Sand traps with a clay base ensure that bullet containment is handled appropriately. The Applicant's plans for using lime on the range floor maintains an EPA recommended pH level that further mitigates any possibility of lead migration to areas other than planned, as demonstrated in Best Management Practices for Lead Outdoor Shooting Ranges, EPA-902-B-01-001, Revised June 2005. A well-designed range will slow runoff ensuring water and particulates are maintained in check dams, as shown in the GDP. The Applicant will continue its long held practice of recording the number of rounds expended to support planned reclamation efforts. Specifically, the Applicant will annually account for accumulated fired rounds for purposes of determining lead reclamation activities based on round count and soil measurement procedures as set forth in its ESP, as may thereafter be updated or amended. This round count will be available to the County on request. The Applicant's activities are regulated by local and State authorities and are subject to review/audit from time to time.

The range will be designed to follow Best Management Practices for Lead Outdoor Shooting Ranges, EPA-902-B-01-001, Revised June 2005 ("EPA Manual"), to mitigate lead migration. Applicant hired Metals Treatment Technologies, LLC (MT2) to review their plans and conformance to the EPA Manual. MT2 has provided an environmental impact letter, attached hereto as Exhibit C, detailing key design features, which the Applicant will provide. These design features include:

- Application of lime on range floor and other areas, based on periodic measurements keep pH levels above 6.5, thus reducing the potential for lead to leach into the environment
- Designed grading to promote sheet flow to slow water leaving range directed to drainage swales;
- Maintaining grass in drainage swales and installing granular limestone check dams;
- Water retention structures designed to either enhance infiltration, which will be lined with limestone cobbles, or evaporation based on a professional engineer's design; and;
- Regular accounting of accumulated bullets to assist in determining timing of periodic lead reclamation activities.

The partially enclosed Tactical Entry Training Facility will be covered to prevent precipitation from entering it and thus prevent migration of lead particulates. Lead decontamination techniques will also be implemented in the Tactical Entry Training Facility to reduce environmental and health impacts. These techniques include the use of bullet traps to capture projectiles and periodic cleaning using High-Efficiency Particulate Air (HEPA) vacuums and wet wipe cleaning of walls and flat surfaces.

For purposes of Proffers to address environmental matters, please see attached Proffer Statement.

XII. Sound Mitigation

Applicant has retained Institute of Noise Control Engineering (INCE) Board Certified, National Technical Specialist for Acoustics and Vibration sound expert Erich Thalheimer of WSP USA, Inc. to verify that the proposed design will minimize the effects of noise. Mr. Thalheimer has been a part of the project design since inception and noise mitigation efforts of the Applicant since 2012. His study, entitled "Crucible Spotsylvania Acoustical Assessment" and dated November 18, 2019, is attached hereto as Exhibit D. Sound mitigation will include 20 foot high earthen berms around the perimeter of the range. Based on the berm height of 20 feet, line of site to any neighbors is impossible. This provides for additional measures of safety as well as greatly limits noise. Finally, the range will be limited to Handguns, Shotguns carbines of .300 Blackout caliber or less. Rifles will be equipped with suppressors, unless specifically directed by contracting authorities to not use suppressors for training or otherwise. In the event Applicant must train without suppressors on the rifles, or is directed by the government to train with rifles without suppressors, it will notify the Spotsylvania Sheriff's Office and the County's Zoning Office at least 24 hours prior to such training. Scenarios involving loud noise outside of the range will be limited to daylight hours without exception, to commence only after 8:00 a.m. Monday through Friday, and after 9:00 a.m. Saturday and 10:00 a.m. on Sunday. Simulated IED locations are confined to scenario areas defined on the GDP and will be buried to direct sound in an upward direction. Additional measures to mitigate noise include vegetation on earthen berms, weekend/night time cut off, caliber limitation, burying IEDs, and prohibition of high explosives.

XIII. Range Design & Safety

Weapons will be stored onsite. Weapon storage meets Department of Defense Manual Number 5100.76 "Physical Security of Sensitive Conventional Arms, Ammunition, and Explosives" ("DOD Manual"). Located in a separate controlled area, ammunition storage will also meet requirements defined in the DOD Manual. Applicant's proposed security plan was briefed to the federal government and preliminarily approved March 7, 2017. Spotsylvania FREM also reviewed Applicant's current ammunition storage and location and plans for our proposed site.

The range design follows the protocols in the National Rifle Association 2012 Range Source Book. Physical safety design measures include 20 foot perimeter earthen berms, grading the range floor toward the impact area, but not to exceed 3 percent, storm drain drop inlets, and

signs. The impact area will be lined with sand and topped with horizontal bullet catchers. The entire property line will be protected by a minimum eight-foot tall chain link fence with single strand anti-climb barbed wire along the top of the fence, with "No Trespassing" signs spaced no more than every 100 feet. Operational safety design features include a complete range safety operations and procedures manual. Among the procedures for range operations are a one instructor to four students ratio maintained on the range, all targets placed against backstop, and a prohibition of backward falling steel plates. Targets used will include wood target stands, pneumatic turning targets, steel targets, and mechanized moving targets, not to exceed 8 feet to top of target from range floor. All target firing activity shall be directed below firing positions not to exceed 3 percent grade to ensure fired rounds containment. Applicant will enforce this protocol through controlled training courses.

The proposed Tactical Entry Training Facility location is identified on the GDP. Currently there is no requirement for this facility in the Applicant's operations plan. Because Applicant's clients have had the need in the past, Applicant may have the opportunity to provide that training to a client. Should that opportunity present, Applicant will design and construct a Tactical Entry Training Facility to meet those stated requirements. Known design characteristics include: capable of 5.56mm, 9mm, .40 cal, .45cal, and similar assault team shoulder fire weapons and pistols; 60 feet by 40 Feet, one story (includes viewing platform); open air (the overhead cover will not be connected to the walls to allow for ventilation but covered to protect against rain); and provide 360 degree ballistic protection. As with Applicant's flat ranges, building design will be to allow access for lead reclamation and periodic cleaning.

Scenarios will incorporate simulated attacks on trained students, to include pyrotechnic and/or pneumatic improvised explosive device simulators, blank fire weapons, and marker rounds (non-lethal training force on force rounds). Scenario areas are limited to the indicated areas on the GDP. There will be no live fire in scenario areas.

We have provided a Range Safety Review analysis, which is attached hereto and marked as Exhibit E.

The design of the range is a result of collaboration from the following individuals:

- Ernie L. Gillespie, USMC retired: Founder and Co-Owner of Radio Reconnaissance Technologies, Inc., a veteran owned small business specializing in tactical Signals Intelligence training and equipment and parent company of Team-Crucible LLC. Mr. Gillespie retired from the United States Marine Corps in 1990 as a Major having held Enlisted, Warrant Officer, Limited Duty Officer and Commissioned Officer ranks. During his time in the Marine Corps, Mr. Gillespie participated and led many range operations, to include controlled live fire exercises with 2nd Tank Battalion firing 90mm main guns, .50cal M2 machine guns and .30cal coaxial guns. As a plank holder of the Joint Special Operations Command (JSOC), Mr. Gillespie participated in dynamic range operations at the highest level. He then put those skills to practice as the Special Operations Officer of 2nd Radio Battalion where Mr. Gillespie provided guidance and assistance to Fleet Marine Forces Atlantic (FMFLant) and the 2nd Marine Expeditionary Force (MEF) during the establishment of the Maritime Special Purpose Force's (MSPF) range operations. In addition to range operations, Mr. Gillespie is familiar with the actual

implementation of range designs having served as the Assistant Officer in Charge of a USMC Mobile Training Team (MTT) responsible for the site selection and construction management of the primary known distance range and live fire range for the Mauritania Naval Security Force, Mauritania, West Africa. Mr. Gillespie has owned and operated wheeled and tracked heavy equipment for over 20 years, including; excavators, track loaders, and bulldozers. Mr. Gillespie has the following relevant certifications: 2005 NRA certified Range Safety Officer; 2000 NRA certified Law Enforcement Firearms Instructor; 2000 NRA certified Law Enforcement Handgun Instructor; 2000 NRA certified Law Enforcement Shotgun Instructor; 2001 NRA certified Law Enforcement Patrol Rifle Instructor; Member, International Association of Law Enforcement Firearms Instructors, Inc. (IALEFI).

- John Garman, CPP: Team-Crucible President; 2003 NRA certified Law Enforcement Firearms Instructor for Tactical Handgun; 2003 Diplomatic Security Service Protective Security Operations Instructor 2003, Certified Protection Professional ASIS International 2007.

- Erich Thalheimer: WSP Mr. Thalheimer a degreed mechanical engineer who has spent his entire 30+ year career in the field of acoustics, noise and vibration control. Mr. Thalheimer is Board Certified by the Institute of Noise Control Engineering (INCE). He currently serves as the National Technical Specialist for Acoustics and Vibration for the engineering giant WSP USA, Inc. (formerly known as Parsons Brinckerhoff). Mr. Thalheimer has performed many hundreds of environmental, transportation, infrastructure and site development projects. Over two dozen of those projects have involved shooting ranges and firearms noise control including several appearances as an expert witness in related legal proceedings. Mr. Thalheimer lectures extensively, has published over two dozen technical papers, and is a recognized leader in the greater acoustics industry.

- Jacob Poling, INCE – WSP: Mr. Poling is an acoustics and noise control consultant based in WSP's Minneapolis, Minnesota office. Mr. Poling graduated from Columbia College Chicago with a B.A. in Acoustics and has 7 years of experience conducting noise and vibration assessments for a wide variety of highway, transit and rail, power generation, and construction projects. Mr. Poling is a certified advanced user of the FHWA's Traffic Noise Model and Datakustik's Cadna-A Noise Model.

- Rob Greene, INCE Bd. Cert. – WSP: Mr. Greene is a Vice President and Senior Engineering Manager in WSP's range, California office. Rob serves the Transportation Research Board's Noise and Vibration Committee, and committees for Historic Preservation and Intercity Rail. Rob has substantial experience in federal and state courts as an expert witness in acoustics, including cases involving small arms sound impacts and hearing protection. He is professionally recognized for his contributions to environmental acoustics and community noise solutions. He is Board Certified by the Institute of Noise Control Engineering and is a licensed Acoustical Consultant by the County of Orange, California. Rob holds a bachelor's degree in Environmental Science and has over four decades of experience in acoustics, environmental impact analysis, and acoustic measurement systems.

- Doug Anderson, PhD – WSP: Dr. Anderson is a PhD geophysicist with almost 50 years' experience, 37 of which is in assessing and controlling the vibration and air overpressure effects of explosive use. He is based in WSP's Philadelphia, Pennsylvania office. In the mid-1980s, he originated and developed the mine/quarry blast vibration control method known as "signature hole" or "seed wave", which reduces vibration using destructive interference. He is now heavily involved in analysis of blasting for tunneling and shaft sinking as well as demolition and implosions. He is internationally recognized for his research, and has over 30 refereed publications.

- David Andrews, M2T: Mr. Andrews has over 30-years' experience providing a wide range of environmental services including site assessment and remediation, feasibility studies, permitting, strategic planning, project management, and regulatory interaction. He has been with MT2, LLC since 2008 and has managed a wide variety of firing range projects, including design and implementation of EPA BPMs, writing Environmental Stewardship Plans, completing Safety evaluations, and performing reclamation/recycling efforts, soils stabilization, and remediation/closures. Since joining MT2, he has completed evaluations and construction on over 500 outdoor and indoor firing ranges for Federal, State and Municipal agencies as well as numerous club and privately owned facilities. Mr. Andrews holds a PhD in Engineering Geology from Syracuse University, a MS in Geology from Boston College, BS in Biology, with a minor in Geology from St. Lawrence University.

- Lorin Kramer, Kramer One: Mr. Kramer is a nationally recognized expert in shooting range design. He has designed firing ranges in twenty-eight states. Mr. Kramer was a guest speaker for the National Rifle Association's Range Development & Operations Conferences from 1993 through 2009, participating in sixty-three conferences throughout the nation. He was a Range Technical Team Advisor and the Western Regional Supervisor for the National Rifle Association from 1991 through 2009. Mr. Kramer is an architect licensed to practice in Virginia. He has been qualified as an expert witness in shooting range design and safety.

- David Richardson: Civil Engineer, Webb and Associates

XIV. Transportation

The Property abuts Jefferson Davis Highway, which is a four-lane public road classified as a major collector road. Access to the Property will be provided from Jefferson Davis Highway. Roads constructed within the project will be private and will be maintained by the Applicant.

The project will generate 506 VPD of overall trips on a daily basis, including 85 during a.m. peak hours and 78 during p.m. peak hours. Neither a County traffic impact analysis nor VDOT 527 analysis is required for this project as it is projected to generate minimal impacts based on VDOT traffic generating models.

Per the "Rt 1 Entrance Analysis" dated January 9, 2017 conducted by Webb and Associates, a left turn lane is not required. Per Applicant's discussions with VDOT, a 200' Taper

for deceleration and a 48' Taper for acceleration will be required and constructed during the complete build out of the project.

XV. Economic Development

As noted above, the proposed project will generate a positive economic development and tax revenue return. Dr. Fuller's report is attached and marked as Exhibit F.

XVI. Community Meeting

Pursuant to County requirements, the Applicant and its representatives held a community meeting on January 17, 2017 at Dominion Raceway to introduce and discuss the project with surrounding property owners. We addressed questions from members of our community and incorporated those comments into this revised narrative, GDP and Proffer Statement. Exhibit G attached hereto provides a list of attendees.

Since the community meeting, Applicant has also held numerous meetings with neighbors to address their concerns.

EXHIBIT A

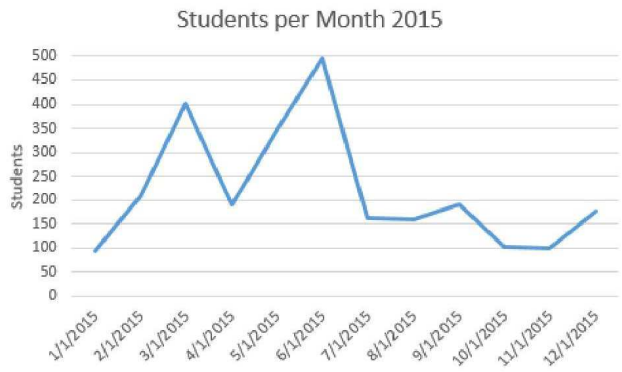
Generalized Development Plan

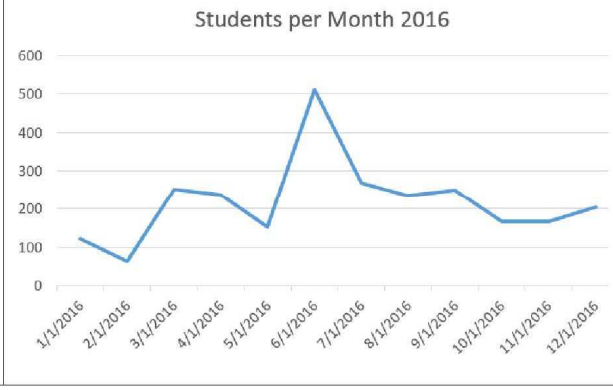
EXHIBIT B

Operations Density and Exemplary Information
(7 pages to follow)

Annual Statistic Analysis of Crucible Student numbers and activity 2015 and 2016

2015		2016	
Average Student per day (when students present)	14.90909	Average Student per day (when students present)	13.66146
Days present in 2015	176	Days present in 2016	192
Total Weekend days Firing 2015	6	Total Weekend days Firing 2016	4
Weeks with training	42	Weeks with training	45
Average trainees per week	62.47619	Average trainees per week	58.28889
Average trainees per Month	218.6667	Average trainees per Month	218.5833





April 2015

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
March 30	31	1 10x combative Scenarios	2 10 x Scenarios in town	3 10x Scenarios in town 1x pistol	4 1x rifle	5 1x med
6	7	8 2x rifle/pistol 20x rifle/pistol	9 2x rifle pistol 20x rifle/pistol	10 2x med	11	12
13 3x lecture 10x rifle/pistol	14 3x lecture 10x rifle/pistol(night)	15 3 x med 10x rifle/pistol(night)	16 3x rifle pistol 10x rifle/pistol(night))	17 10x scenario	18	19
20 14x rifle/pistol	21 14x rifle/pistol(night)	22 14x rifle/pistol(night)	23 14x rifle/pistol(night)	24 14x scenario	25	26
27	28 20x rifle pistol	29	30	May 1 1x rifle pistol	2	3

CRUCIBLE ACTIVITY BY DAY

Numbers given are students present for training

Med = Medical training inside
Rifle/pistol = live fire lecture & training
Scenario = "paint ball" and pyrotechnics
Scenario in town e benign walk around

April 2016

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
March 28 4x Lecture 4x rifle pistol &med	4x Lecture	4x Lecture	4x Driving	1 4x Driving	2 4x Scenario in town	3
4 10x rifle/pistol	5 10x rifle/pistol(night)	6 10x rifle/pistol(night)	7 10x rifle/pistol(night)	8 10x scenario 4x rifle	9	10
11 10x Combatives	12 10x Combatives	13 10x Combatives 4x rifle	14 10x pistol 4x rifle	15 10x rifle pistol	16 10x rifle pistol	17 10x rifle pistol
18 4x rifle/pistol	19 1x lecture 4x rifle/pistol(night)	20 1x combatives 4x rifle/pistol(night) 20x rifle pistol 4x rifle	21 1x rifle 4x rifle/pistol(night) 20x rifle pistol	22 4x scenario 4x rifle	23	24
25 4x rifle	26 4x rifle	27 4x rifle	28 4x rifle	29 4x rifle	30	May 1

CRUCIBLE ACTIVITY BY DAY

Numbers given are students present for training

Med = Medical training inside
Rifle/pistol = live fire lecture & training
Scenario = "paint ball" and pyrotechnics
Scenario in town benign walk around

April 2017

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
March 27	28	29 4x rifle	30 4x rifle 4xrifle	31 4xrifle	1	2
3 10x rifle/pistol 1x pistol	4 10x rifle/pistol(night) 1x machine gun 20x rifle pistol	5 10x rifle/pistol(night) 1x rifle 20x rifle pistol	6 10x rifle/pistol(night) 1x shotgun 20x rifle pistol	7 10x scenario	8	9
10	11 10x med & rifle pistol	12	13	14	15	16
17	18 4x rifle	19	20 4x rifle	21 4x rifle	22 4x rifle	23
24	25	26 4x pistol	27 4xrifle	28 4x rifle	29	30
May 1 10x driving	2 10x driving	3 10x driving	4 10x driving	5 10x driving scenario	6	7

CRUCIBLE ACTIVITY BY DAY

Numbers given are students present for training

Med = Medical training inside
Rifle/pistol = live fire lecture & training
Scenario = "paint ball" and pyrotechnics
Scenario in town benign walk around

Fictitious Training -April 2018

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
						1
2	3 20x rifle / pistol	4 20x rifle / pistol	5 20x rifle / pistol	6	7	8
9 10x driving	10 10x driving	11 10x driving 4x rifle	12 10x driving 4s rifle	13 10x driving scenario	14	15
16	17	18	19	20	21	22
23 10x rifle/pistol	24 10x rifle/pistol(night) 20x rifle pistol	25 10x rifle/pistol(night) 20x rifle pistol	26 10x rifle/pistol(night) 20x rifle pistol	27 10x scenario	28	29
30						

CRUCIBLE FUTURE FORECAST

Numbers given are students present for training

Med = Medical training inside
Rifle/pistol = live fire lecture & training
Scenario = "paint ball" and pyrotechnics
Scenario in town benign walk around

With no way to predict the future, Crucible expects 2018 to follow the pattern set by 2015 – 2017. Activity represented above is fictional, based on past events.

Current Operations Descriptions Initial Build

Looking backward from 2015 to 2017 and projecting it forward, Crucible expects to see similar business activity based on current contract awards and option years. Provided is a best guess based on conversations with contracting officers.

Students typically arrive the night before training in their personal vehicles and lodge in a nearby hotel. Each day they arrive 30 minutes prior to training to prepare for the day. Students are given a one hour lunch to go out into town and eat or are welcome to "brown bag" in the classroom. On days when low light training is required, the day is shifted to a later start to allow for training to continue as the sun sets. Most low light training takes about 2 hours to execute. Students typically return home after the final day of training. Below is a short narrative of a typical day of training.

Each day begins at 8:00am with lecture in the classroom preparing the student for the day ahead. New equipment is issued and any equipment used the day before is inspected and prepared for the day. A lecture covering the day's learning objectives is presented and students move to the practical portion of their training. Medical students move to the patient assessment areas, drivers move to the driving surface, and weapons students move to the range.

After the base lecture is presented, students are then taught in their respective practical application areas each technique required to meet the government statement of work. After this presentation by the instructors, students are then provided time to practice the techniques under the supervision of the instructors. Instructors provide feedback to the students and once students show comprehension of the techniques, the instructor moves to the next presentation, and so on. Students are provided breaks for water and lunch throughout the day.

Around 4:30pm, practical exercises are concluded, students return to the classroom and return their equipment, clean up from the day. The instructors review the day's activities and prepare the students to return the next day or provide paperwork to conclude the training.

Operations Descriptions Ultimate Buildout

Phase two follows the training model above. It is our experience that larger throughput numbers can be a result of larger deployments of our forces. This can lead to more consecutive days of training (Initial Build training is 3 to 10 days consecutive) and more consistent numbers in each class in order to meet deployment requirements. Requirements can include, immunizations, medical records review, weapon qualifications, physical fitness testing, identification badging, etc. Also, increased troop deployment means our current contracted efforts can see increase in frequency. Below is a fictitious month of training that our phase two operations could support.

Fictitious Phase two Schedule April 20XX

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1 12x drive 4x Lecture 2x Lecture	2 12xdrive 4xLecture 2x Lecture 20x rifle pistol	3 12x drive 4x Lecture 2x Rifle / Pistol 20x rifle pistol	4 12x rifle / pistol 4x Driving 20x rifle pistol	5 12x rifle / pistol 4x Driving	6 12x Lecture 4X Scenario in town	7 7x Lecture
8 12x rifle / pistol 7x pistol 15X Driving 15x off road 15x pistol	9 12x rifle / pistol 7x rifle 15X Driving 15x rifle 15x off road	10 12x rifle pistol (night) 7x rifle / pistol 15X Driving 15x off road 15x pistol	11 12x scenario 7x Medical 15X Driving 15x rifle 15x off road	12 7x Medical 45X scenario	13 7x Medical	14 7x Medical
15 10X Driving 10x rifle 10x pistol 10x pistol 10Xoffroad 15x pistol	16 10X Driving 10x rifle 10x pistol 10x pistol 10Xoffroad 15x rifle	17 10X Driving 10x rifle 10x pistol 10x pistol 10Xoffroad 15x rifle/pistol	18 10X Driving 10x rifle 10x pistol 10x pistol 10Xoffroad 15xrifle/pistol	19 10X Driving 10x rifle 10x pistol 10x pistol 10Xoffroad 15x rifle/pistol	20 15x lecture	21
22 15x driving 10x pistol	23 15x driving 10x rifle	24 15x driving 10x rifle/pistol	25 15x scenarios 10x rifle/pistol	26 10x Scenarios	27	28
29 15x driving	30 15x driving	15x driving	15x lecture	15x lecture	15x pistol	

Counts above represent a month of training that includes 966 student days

Med = Medical training inside
Rifle/pistol = live fire lecture & training
Scenario = "paint ball" and pyrotechnics
Scenario in town e benign walk around

With no way to predict the future, Crucible can only offer historical numbers when student throughput was high Activity represented above is fictional, based on past events.

EXHIBIT C

Environmental Impact Letter

EXHIBIT D

Sound Analysis

EXHIBIT E

Range Safety Review

EXHIBIT F

Fiscal Impact Analysis entitled "The Economic and Fiscal Impact of the Proposed Team Crucible Training Complex on Spotsylvania County, Virginia", dated July 2017, prepared by Stephen S. Fuller, Ph.D.

EXHIBIT G

List of community meeting attendees

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EXHIBIT H

Real Estate appraisal of properties adjunct to the Applicant's current operations.

Analysis of Property Loss References regarding the proposed Crucible Property in Spotsylvania County

The article published by Realtor.com, *The Neighborhood Features That Drag Down Your Home Value-Ranked,* by Yuging Pan, March 28, 2016, stated that living near a shooting range decreased home sale prices by 3.7%. This conclusion is based on the analysis of the median sale price of homes within the area code that the shooting range was located compared to the median sale price of all homes in the same county. However, the author cautioned the reader to "Keep in mind the difference between causation and correlation: Does having a cemetery or shooting range in the neighborhood cause home prices to drop? Or are these businesses drawn to the area because of cheap real estate?" Shooting ranges are typically developed in less populated areas that would have lower property values than other more populated areas within a county. This could easily explain why their analysis indicated the properties near a shooting range sold for 3.7% less than the median sale price of homes for the entire county. The proximity to a shooting range was not the likely cause of the lower home sale prices, but its location within a less populated area is the likely cause. This would be the result for the Crucible facility in Stafford County if this methodology is utilized. The Crucible facility is located in one of the most rural areas of Stafford County which is the greatest distance of any area in Stafford County from the employment markets of the Washington DC metropolitan area. This results in the zip code containing the Crucible facility having lower sale prices than other zip codes in Stafford County because these other areas have more convenient access to the Washington DC metropolitan employment markets. Our analysis compared the sale prices of residential lot sales and home sales within 1 mile of the Crucible facility with residential lot sales and home sales beyond 1 mile but in the same area code as the Crucible facility. This minimized any effect on sale prices resulting from location because all of the sales were from southern Stafford County with all of the properties utilizing Warrenton Road (U. S. Route 17) to access Interstate 95. Our analysis showed the residential lots and homes that sold within 1 mile of the Crucible facility sold for the same price as comparable properties beyond 1 mile of the facility.

The article published by the Brighton News, *Waterford Gun Club noise hurts property values, county rules,* by Gail Geraghty, June 28, 2012, stated that a professional real estate appraiser hired by the neighbors of a gun range had "performed a statistical analysis resulting in a 7.5% loss of property value for the Howes' (the neighbor) 175-acre property and any other property within a 1.5-mile radius". However, there is no explanation of the statistical analysis methodology to determine if the conclusions are creditable. The only discussion of what the appraiser had done to form his opinion of value loss stated "the appraiser experienced the gunfire noise on several occasions and the intermittent gunfire is definitely a distraction and minimizes the peace and quiet enjoyment of the subject property." If the appraiser's opinion of the diminution of value for properties within 1.5 miles is based on these property visits and the appraiser's "gut opinion", this conclusion is unsubstantiated. The article included significant discussion of the real estate assessments within the county. The appraiser's analysis would not be creditable if it is based on the county's real estate assessments because tax assessments are not reliable indications of market value for individual properties. In fact, the article states that the result of the tax appeal by the Howes was the town of Waterford would likely reassess all real estate because it was currently significantly below market value and therefore don't meet state

valuation requirements. The last time a real estate reassessment had been conducted was 2001: eleven years before this tax appeal.

The Property Value Impact section of Appendix D from the Virginia Department of Environmental Quality Environmental Impact Review of the proposed firing range on Old River Trail in Powhatan County was prepared by the residents surrounding the proposed firing range site. They estimated a possible 25% diminution of value if the proposed firing range is constructed. However, this is their unsubstantiated opinion that is not based on any statistical analysis, just their arbitrary opinion.

The last article was published in the Daily Progress, *Gun range proponents: it's a safe place to shoot; opponents: It'll lower home values*, by Pat Fitzgerald, August 13, 2015. In the article, a neighbor of the proposed gun range in Greene County, Virginia states that "the proposed gun range would lower property values by 30 percent." As above, this is an unsubstantiated opinion that is not based on any statistical analysis, just this individual's arbitrary opinion.

By:
Christian P. Kaila, MAI, SRA
General Certified Real Estate Appraiser
6320 Five Mile Centre Park, Suite 323
Fredericksburg, Virginia 22407
(Spotsylvania County)
August 16, 2017

Effect of Crucible's Stafford Facility on Property Values for Adjoining Property Owners

For: Spotsylvania County Board of Supervisors Public Hearing and Crucible

My name is Chris Kaila. I live on Teal Wing Cove in Spotsylvania County, where I have lived since 1979. I am a licensed General Certified Real Estate Appraiser and Real Estate Broker. I have practiced real estate brokerage and appraising in the Fredericksburg area for over 30 years. I am the principal appraiser of my firm which employs 5 residential and 5 commercial appraisers. I hold the MAI and SRA designations from the Appraisal Institute and a Masters Degree in Real Estate from VCU. I am a past President of the Fredericksburg Area Association of Realtors and past REALTOR of the year.

It is my opinion the proposed Crucible facility in Spotsylvania County would not affect property values in a negative (or a positive) manner to adjoining property owners. This opinion is based on analysis of residential land sales and improved residential sales within a mile of the existing Crucible facility in southern Stafford County compared to sales beyond a mile. My opinion is also based on the continued residential development that is occurring within close proximity to the existing Crucible facility.

The current Crucible facility is located at 60 Jack Ellington Road, Fredericksburg, Virginia 22406 in Stafford County. Agricultural zoned land sales from within 1 mile of the subject were analyzed and compared to agricultural zoned land sales from surrounding Stafford County beyond 1 mile. This identified 15 arm's length land sales within 1 mile of the Crucible facility since 1999. However, 9 of these sales occurred during the housing bubble and subsequent financial crisis in the mid to late 2000s that resulted in volatile property value escalations followed by decreases which makes comparisons during this period difficult. Furthermore, most of these sales occurred prior to Crucible's full expansion of the Stafford facility. The six remaining land sales from April 2013 through May 2015 were identified as creditable sales for comparison. They range in size from 3.00 acres (3 sales) to 13.40 acres.

These 6 land sales were compared to 18 sales in southern Stafford County beyond 1 mile of the Crucible facility. These ranged in size from 1.00 acres to 21.37 acres, which brackets the sales within 1 mile. These comparable sales occurred from June 2012 to January 2017, which also brackets the time period for the sales within 1 mile, and is a period of relatively stable land values in the immediate area. This analysis showed no significant decreased (or increased) value for land sales within 1 mile of the Crucible facility compared to land sales beyond 1 mile. The attached Graph 1 illustrates the support for this conclusion because the data points for the sales within 1 mile of the Crucible facility (red dots) fall within the range of data points for the sales beyond 1 mile (blue dots) based upon the sale price per square foot of each sale. If the Crucible facility affected land values, the data points within 1 mile (red dots) would have been significantly below the data points beyond 1 mile (blue dots), which they were not.

One of the land sales within 1 mile of the Crucible facility actually adjoins the Crucible facility. It contained 9.61 acres and sold for a price per acre that is comparable to similar sized parcels beyond a mile to spite having inferior access to public roads via a private access easement. Two of the 3.00 acre parcels within 1 mile of the Crucible facility adjoined this 9.61 acre parcel and

sold for a price per acre that is comparable to similar sized parcels beyond a mile to spite their close proximity to the Crucible facility.

Recent improved residential sales within 1 mile of the Stafford County Crucible facility were also compared to sales from southern Stafford County beyond 1 mile of the Crucible facility. Research identified 14 arm's length sales within 1 mile of the subject; however, their improvements varied significantly in style and age. The most abundant age and style was new or recently built colonial style homes with a full basement and attached garage (8 sales). These ranged in age from new to 18 years old, on sites from 3.00 acres to 4.21 acres, and occurred from June 2013 to May 2017, a period of relatively stable property values in the immediate area. These were compared to 14 sales from south Stafford County beyond 1 mile of the Crucible facility. They were all colonial style homes on full basements with attached garages and ranged in age from new to 6 years old, on sites from 3.00 acres to 4.25 acres, and occurred from July 2013 to July 2017. Therefore, all of the properties were very similar except for their proximity to the existing Crucible facility. This analysis showed no decrease (or increase) in improved residential property values within 1 mile of the Crucible facility compared to improved sales beyond 1 mile of the Crucible facility. The attached Graph 2 illustrates the support for this conclusion because the data points for the sales within 1 mile of the Crucible facility (blue dots) fall within the range of data points for the sales beyond 1 mile (red dots) based upon the sale price per square foot of above grade gross living area for each sale. If the Crucible facility affected improved values, the data points within 1 mile (blue dots) would have been significantly below the data points beyond 1 mile (red dots), which they were not. Furthermore, the average sale price per square foot of gross living area for both the sales within 1 mile and beyond 1 mile of the Crucible facility were $145 per square foot.

The recent development that is occurring within a mile of the existing Crucible facility in south Stafford County provides additional support that this facility does not adversely affect the desirability of residential properties. New home construction and sales have continued in several subdivisions within a mile of the subject, most of these sales being directly down range of the rifle range on the Crucible facility. A new ranch style home was built and sold in 2016 on a 3.00 acre parcel that is almost adjacent to the Crucible facility. It sold after being listed for two months for $170.83 per square foot of above grade gross living area, which is higher than several similar ranch style homes that sold in south Stafford County beyond a mile of Crucible.

In conclusion, the mass analysis of sale prices of residential land sales and improved residential sales in south Stafford County within 1 mile and beyond 1 mile of the existing Crucible facility indicates this facility has not decreased (or increased) property values within its immediate neighborhood. The conclusion of this statistical analysis is supported by antidotal evidence that the Crucible facility has not affected residential development within the immediate neighborhood as new residential properties that sell for comparable prices as similar properties elsewhere in south Stafford County continue to be built, some almost adjacent to the Crucible facility and others directly down range of the facility's rifle range. Stafford and Spotsylvania Counties are similar markets for real estate and the conclusion concerning the effect on market values would also apply to a location in Spotsylvania County. I have examined the proposed location at 6116 Jefferson Davis Highway to confirm this conclusion. Therefore, based on my market research, if

a Crucible facility were located at 6116 Jefferson Davis Highway in Spotsylvania County, real estate value would not be affected either in a negative or positive manner.

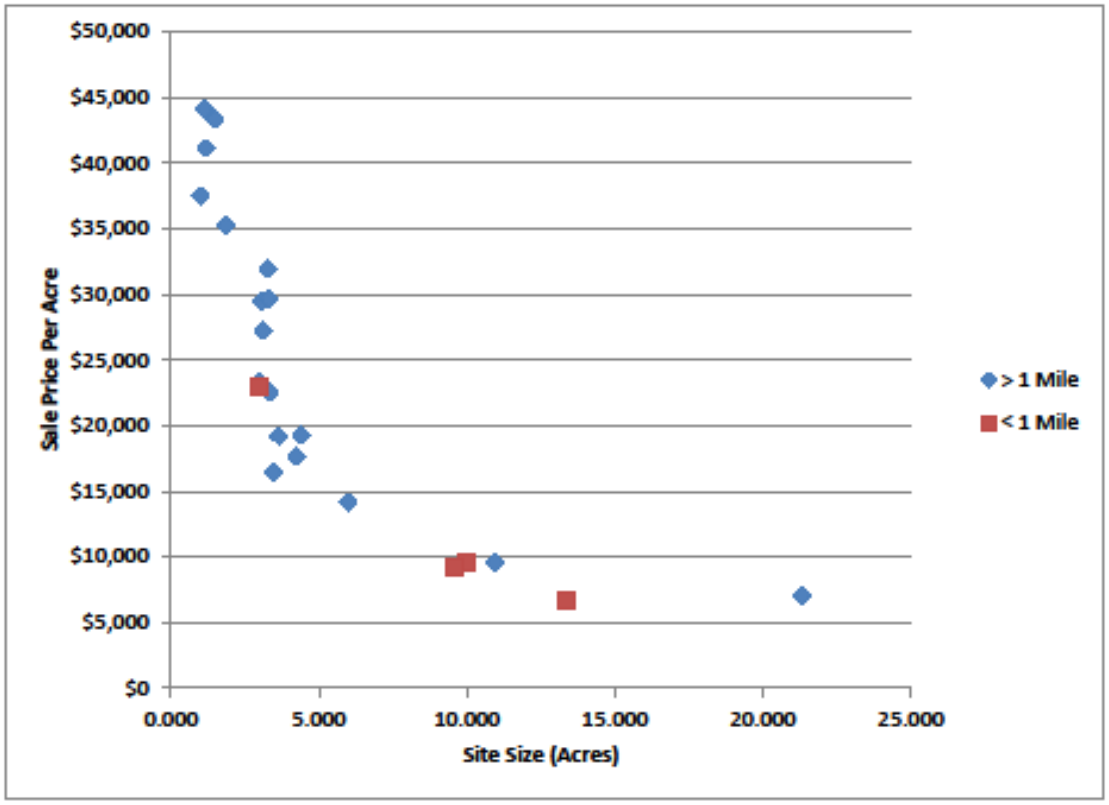
The appraiser also interviewed several agents who have extensive experience in selling properties in the areas around the Stafford Crucible facility. The following is a summary of interviews.

1. Chris Burns. Chris is the Sales Manager for Atlantic Builders. He has sold approximately 60 new homes in Stafford County, with several subdivisions with a few miles of the Crucible facility. According to Chris, the Crucible facility has not been mentioned as a consideration. Home sale prices in that area have been consistently increasing in the area with no negative influence.

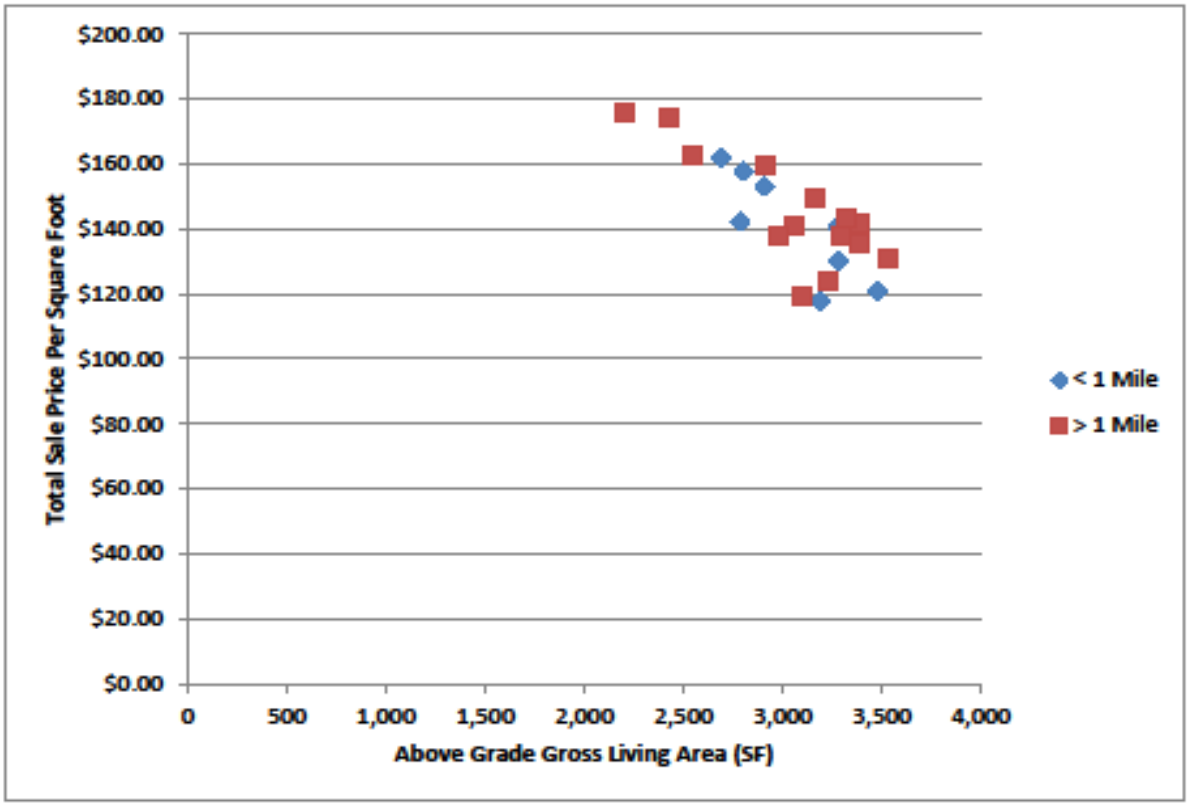
2. Beverly Sala. Beverly has been selling homes in Stafford County for 30 years and has only recently retired in the last couple of months. She has represented builders and developers in the Crucible facility areas – specifically in Sherwood, Wateredge Estates, and others. Beverly stated that the Crucible facility has never come up. There has been no negative influence. No one even seems to know it exists there.

3. Sherry Bailey. Sherry is another experienced agent who has sold properties in Stafford County for over 30 years. Sherry is also a member of the Planning Commission for Stafford County. Sherry stated no one has ever brought up the Crucible facility as a negative factor in buying or selling real estate in the Crucible area. Sherry stated that more people were concerned about the lack of FIOS internet service in that area, and the Crucible facility was never even mentioned.

Graph 1: Sale Price per Acre vs. Site Size (Acres) for land sales within 1 mile (red dots) and more than 1 mile (blue dots) of Crucible Facility



Graph 2: Sale Price per Square Foot of Above Grade Gross Living Area vs. Above Grade Gross Living Area (SF) for Improved Residential Sales within 1 mile (blue dots) and more than 1 mile (red dots) of Crucible Facility



12309768.1 041791.00001

GENERALIZED DEVELOPMENT PLAN
TEAM CRUCIBLE TRAINING COMPLEX
REZONING AND SPECIAL USE

BERKELEY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

EXISTING ZONING: A-2
PROPOSED ZONING: I-2 W/ SPECIAL USE
TAX MAP NUMBERS: 76-A-2 (REZONING & SPECIAL USE)
VOTING DISTRICT: BERKELEY
STREET ADDRESSES: 6116 JEFFERSON DAVIS HWY.

OWNER:
RADIO RECONNAISSANCE TECHNOLOGIES, INC.
3328 BOURBON STREET
FREDERICKSBURG, VA. 22408
ATTN: NICHOLAS HOBEN
(540) 752-7448

APPLICANT:
TEAM CRUCIBLE, LLC.
60 JACK ELLINGTON ROAD
FREDERICKSBURG, VA. 22406
ATTN: JOHN GARMAN
(540) 752-2800

SITE STATISTICS:

1.) TAX MAP: 76-A-2
2.) PARCEL ACREAGE: 69.9846 ACRES
DISTURBED ACREAGE: 43.50+/- ACRES
3.) EXISTING ZONING: A-2
PROPOSED ZONING: I-2 W/ SPECIAL USE
4.) GROSS FLOOR AREA: 66,724 SQ.FT.
5.) OVERLAY DISTRICT: CBPA
6.) EXISTING USE: AGRICULTURAL
PROPOSED USE: BUSINESS OFFICES, OUTDOOR TACTICAL TRAINING
OUTDOOR SHOOTING RANGES
7.) MAXIMUM BUILDING HEIGHTS: NOT TO EXCEED 50'
NUMBER OF FLOORS: TWO STORIES PROPOSED
EXISTING SETBACKS: 30' FRONT YARD, 10' SIDE YARD, 35' REAR YARD
PROPOSED SETBACKS: 40' FRONT YARD, 0' SIDE YARD, 0' REAR YARD
(ALL EXISTING AND PROPOSED BUILDING WELL WITHIN BOTH LISTED)
8.) TRIP GENERATIONS:
INITIAL BUILDOUT: 44 VPD (TRAINING FACILITY)
FINAL BUILDING: 571 VPD (ULTIMATE TRAINING FACILITY + SECTION 715-SINGLE TENANT OFFICE)
9.) NO EVIDENCE OF CIVIL WAR TRENCHES OR HISTORICAL BUILDINGS, STRUCTURES OR SITES ON PROPERTY.
10.) SURVEY FOUND PLACES OF BURIAL AND LOCATED ALL FOUND STONES, PERIWINKLE AREA AND ANY OTHER EVENDENCE. OWNER ESTABLISHED AND FENCED THE 6,500 SQ.FT. CEMETERY WITH GATE TO PROTECT IT.
11.) PROPERTY WITHIN ZONE "X" PER FLOOD INSURNCE RATE MAP, COMMUNITY-PANEL NO. 510308 200 C & 325 C; DATED 2/18/1998. RESOURCE PROTECTION AREAS SHOWN ON PLAN WERE SURVEY LOCATED FROM ENVIRON DATA DELINEATION ON 5/12/2016.
12.) WETLANDS WITHIN 100' OF SITE: SHOWN ON PLAN AS DELINEATED
13.) WETLANDS PERMIT REQUIRED: YES
14.) RMA ON SITE: ENTIRE SITE
15.) RPA ON SITE: SHOWN ON PLAN AS DELINEATED
16.) THIS PROPERTY WILL BE SERVICED BY PRIVATE WELL AND SEPTIC SYSTEMS UNDER INITIAL BUILDOUT. ONCE EXPANSION OF THE SITE IS NEEDED WITH NEW OFFICE BUILDINGS, DEVELOPER WILL EXTEND PUBLIC WATER AND SEWER TO THE SITE FOR USE.
17.) SOLID WASTE: LARGE, OUTSIDE COMMERCIAL CONTAINERS WILL BE LOCATED ON THE SITE. SOLID WASTE WILL BE COLLECTED BY A PRIVATE REFUSE COMPANY AND DISPOSED OF AT A COUNTY-APPROVED DISPOSAL SITE.

PARKING TABULATION:

	USE TYPE	REQUIREMENT	CALCULATION
PHASE-1 MAX BUILDOUT	INDUSTRY TYPES I, II, III	1-SP PER 1,000 SQ.FT. GFA PLUS 1-SP PER 400 SQ.FT. OF ACCESSORY OFFICE AREA OR 1-SP PER 2 EMPLOYEES ON THE LARGEST SHIFT WHICHEVER IS LESS	4,224/400= 11-SP 4,800/1,000= 6-SP
		TOTAL REQUIRED:	17-SP
		TOTAL PROVIDED:	34-SP

LOADING TABULATION:

	REQUIREMENT	CALCULATION
PHASE-1 MAX BUILDOUT	1-SPACE FOR THE FIRST 5,000 SQ.FT. OF GROSS FLOOR AREA, PLUS 1-SPACE FOR EACH ADDITIONAL 30,000 SQ.FT. OR MAJOR FRACTION THEREOF.	9,024/5,000= 1-SPACE 4,024/30,000= 0-SPACE
	TOTAL REQUIRED:	1-SPACE
	TOTAL PROVIDED:	1-SPACE

	USE TYPE	REQUIREMENT	CALCULATION
PHASE-2 MAX BUILDOUT	INDUSTRY TYPES I, II, III	1-SP PER 1,000 SQ.FT. GFA PLUS 1-SP PER 400 SQ.FT. OF ACCESSORY OFFICE AREA OR 1-SP PER 2 EMPLOYEES ON THE LARGEST SHIFT WHICHEVER IS LESS	55,300/400= 138-SP 4,800/1,000= 6-SP
		TOTAL REQUIRED:	144-SP
		TOTAL PROVIDED:	214-SP

	REQUIREMENT	CALCULATION
PHASE-2 MAX BUILDOUT	1-SPACE FOR THE FIRST 5,000 SQ.FT. OF GROSS FLOOR AREA, PLUS 1-SPACE FOR EACH ADDITIONAL 30,000 SQ.FT. OR MAJOR FRACTION THEREOF.	60,100/5,000= 1-SPACE 55,100/30,000= 2-SPACES
	TOTAL REQUIRED:	3-SPACES
	TOTAL PROVIDED:	3-SPACES

IMPERVIOUS CALCS:

PHASE-1

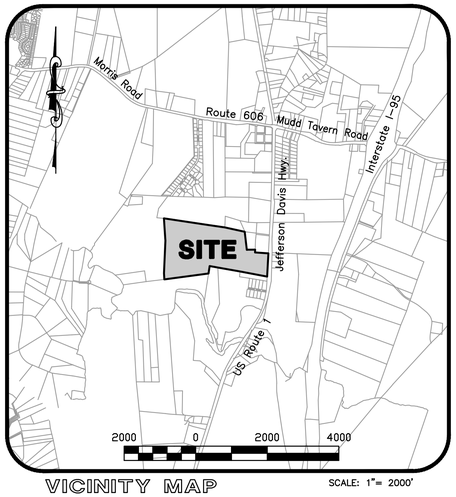
BUILDINGS:	9,024 SQ.FT.
ROADS & PARKING:	235,477 SQ.FT.
RATIO:	244,501/3,048,529= 8.02%

OPEN SPACE: 91.98%

PHASE-2

BUILDINGS:	46,724 SQ.FT.
ROADS & PARKING:	309,111 SQ.FT.
RATIO:	355,835/3,048,529= 11.67%

OPEN SPACE: 88.33%



VICINITY MAP
SCALE: 1"= 2000'

STORMWATER MANAGEMENT NARRATIVE:
STORMWATER MANAGEMENT SHALL BE ADDRESSED AT TIME OF SITE PLAN SUBMITTAL. ON-SITE DETENTION FACILITIES, POROUS PAVEMENT OR OTHER SUITABLE BMP'S WILL BE UTILIZED IN ACCORDANCE WITH THE SPOTSYLVANIA COUNTY DESIGN STANDARDS MANUAL. STORMWATER RUNOFF WILL BE COLLECTED IN MUTIPLE POND FACILITIES AT ALL OUTFALLS AS SHOWN ON PLANS AND RELEASED INTO ON-SITE EXISTING STREAMS ALL FLOWING IN A SOURTHERN DIRECTION. A CONTROL STRUCTURE WILL BE UTILIZED TO REGULATE THE DISCHARGE RATE. PONDS RECEIVING WATER FROM THE GUN RANGES WILL GO THROUGH A SERIES OF LIMESTONE CHECK DAMS BEFORE ENTERING THE POND FACILITIES THAT WILL BE LINED WITH LIMESTONE COBBELS.

EROSION AND SEDIMENT CONTROL NARRATIVE:
EROSION AND SEDIMENT CONTROL WILL BE ADDRESSED AT TIME OF SITE PLAN SUBMITTAL. SUITABLE CONTROL MEASURES WILL BE UTILIZED IN ACCORDANCE WITH THE SPOTSYLVANIA COUNTY DESIGN STANDARDS MANUAL AND THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.

LANDSCAPING NARRATIVE:
ALL ON-SITE LANDSCAPING TO BE IN CONFORMANCE WITH ARTICLE 6- LANDSCAPING AND SCREENING OF THE COUNTY'S DESIGN STANDARDS MANUAL AND ARTICLE 5, DIVISION 5 OF THE ZONING ORDINANCE. EXISTING VEGETATION WILL BE UTILIZED WHERE APPLICABLE TO MAINTAIN MATURE GROWTH AND REQUIRED TREES WILL BE PLANTED IN ANY OPEN AREAS OF THE STREET BUFFER AND TRANSITIONAL SCREENING AREAS AS NEEDED.

SOUND MITIGATION:
REFER TO THE ACOUSTICAL ASSESSMENT BOOKLET PREPARED BY WSP USA, INC. FOR NOISE MODELING, NOISE EMISSION MEASUREMENTS, ACOUSTICAL DIRECTIVITY PATTERN, LOUDNESS ISOPLETH LINES AND LOUDNESS ISOPLETH ZONES MAPPING AND SMALL ARMS RANGE NOISE ASSESSMENT MODLE WITH SUPPORTING DATA.

INDEX TO DRAWINGS:

1.) COVER SHEET
2.) EXISTING CONDITIONS PLAN
3.) GDP PHASE-1 MAX BUILDOUT
4.) GDP PHASE-2 MAX BUILDOUT
5.) RANGE CROSS SECTION
6.) ENTRANCE PLAN

W W WEBB & ASSOCIATES, PLLC
ENGINEERING - SURVEYING - LAND PLANNING
11903 BOWMAN DRIVE, SUITE 106, FREDERICKSBURG, VA. 22408
OFFICE (540)371-1209 - FAX (540)371-4650

REVISION BLOCK

DATE	DESCRIPTION	BY
3/15/18	PER TRC COMMENTS	D.W.R.
8/21/18	PER COUNTY COMMENTS	D.W.R.
11/01/19	PER OWNER MODIFICATIONS	D.W.R.
2/28/20	PER COUNTY COMMENTS	D.W.R.
5/10/20	PER COUNTY COMMENTS	D.W.R.

COMMONWEALTH OF VIRGINIA
DANIEL C. WEBB
LICENSE NO. 036528
5/10-20
PROFESSIONAL ENGINEER

W W WEBB & ASSOCIATES, PLLC
ENGINEERING - SURVEYING - LAND PLANNING
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GENERALIZED DEVELOPMENT PLAN

TEAM CRUCIBLE TRAINING COMPLEX
BERKELY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

DATE: MAR. 27, 2017
SCALE: 1"= 100'
DESIGNED BY: D.W.R.
DRAWN BY: D.W.R.
CHECKED BY:

ACAD FILE: 16D011GDP
DRAWING NO: 16-D-011

SHEET NO. 1 OF 6 SHEETS

S & F CAR WASH, LLC
TM 63-A-37
41.56 ACRES
ZONE: A-2
USE: VACANT

N14°46'56"W 1918.10'

S81°15'16"E 2487.26'

COMMERCIAL DRIVER SERVICES, INC.
TM 63-A-38A
9.00 ACRES
ZONE: C-3
USE: BUSINESS

SUE E. ELLIOTT
TM 63-A-37B
3.00 ACRES
ZONE: A-2
USE: SINGLE FAM.

BRIAN E. ELLIOTT or
DONNA E. ELLIOTT
TM 63-A-37A
2.44 ACRES
ZONE: A-2
USE: SINGLE FAM.

SUE ELLEN ELLIOTT
TM 63-A-39
3.00 ACRES
ZONE: C-3
USE: BUSINESS

69.9846 ACRES
INST#160004791
TM 76-A-2
CURRENT ZONE: A-2
PROPOSED ZONE: I-2

S01°40'19"E 498.22'

ERIC H. ELLIOTT or
MARHARET I. ELLIOTT
TM 76A-2A
3.16 ACRES
ZONE: A-2
USE: SINGLE FAM.

THE DORIS M. RANKIN
LTD. PARTNERSHIP
TM 76-A-1
3.84 ACRES
ZONE: C-3
USE: BUSINESS

MARY H. SATTERWHITE
TM 76-A-5
72.32 ACRES
ZONE: A-2
USE: VACANT

N02°22'27"W 912.00'

S81°21'07"E 233.06'

S87°14'10"E 396.49'

1-STORY
METAL BLDG.

CONC. PAD

WELL

CEMETERY

N80°53'38"W 3036.93'

S02°44'12"W 665.36'

JAMES C. CORTHON or
DOROTHY M. CORTHON
TM 76-A-3 (2-PARTS)
36.00 ACRES
ZONE: A-2
USE: VACANT

JAMES C. CORTHON or
DOROTHY M. CORTHON
TM 76-A-3B
33.13 ACRES
ZONE: A-2
USE: VACANT

JAMES C. CORTHON or
DOROTHY M. CORTHON
TM 76A-2 (2-PARTS)
36.00 ACRES
ZONE: A-2
USE: VACANT

TERRY L. JEMISON
TM 76A-1-7
0.57 ACRES
ZONE: A-2
USE: VACANT

EVANTE CHEW or ERNEST CHEW
TM 76A-1-6
0.57 ACRES
ZONE: A-2
USE: SINGLE FAM.

HAND CONSTRUCTION, INC
TM 76A-1-5
0.57 ACRES
ZONE: A-2
USE: VACANT

HAND CONSTRUCTION, INC
TM 76A-1-2
1.14 ACRES
ZONE: A-2
USE: VACANT

JAMES C. CORTHON or
DOROTHY M. CORTHON
TM 76A-1-1
0.86 ACRES
ZONE: A-2
USE: VACANT

COACH FOUR LANE

JEFFERSON DAVIS HWY.
(80' RIGHT-OF-WAY)
U.S. ROUTE - 1
(55 MPH)

VDOT MON.

2.09 MILES TO COACH FOUR LANE
1.13 MILES TO ROUTE 603

TREE LINE
WETLANDS
100' RPA
(IMPACT BERM TO PROPERTY LINE)
FREE STANDING TREE
1-STORY METAL BLDG.

LEGEND

GRAPHIC	DESCRIPTION
688	-DENOTES 10' EXISTING CONTOUR INTERVALS
	-DENOTES 2' EXISTING CONTOUR INTERVALS
688	-DENOTES PROPOSED CONTOUR WITH ELEVATION
	-DENOTES EXISTING TREE LINE
	-DENOTES PROPOSED LIMITS OF DISTURBANCE
100' RPA	-DENOTES 100' RESTRICTED PRESERVATION AREA
	-DENOTES LIMITS OF SIMULATED IED USE
	-DENOTES OVERHEAD UTILITY LINE
	-DENOTES PROPOSED SECURITY FENCE
	-DENOTES CHECK DAM LINED DITCH
	-DENOTES SANITARY SEWER FORCE MAIN
	-DENOTES FIRE APPARATUS SERVICE ROAD
	-DENOTES BALLISTIC WALLS
	-DENOTES DELINEATED WETLANDS
	-DENOTES GRAVEL SURFACE ROADS AND PARKING
	-DENOTES APHALT SURFACE ROADS AND PARKING
	-DENOTES DIRT SURFACE ROADS
	-DENOTES BUILDING AREAS
	-DENOTES TRANSITIONAL SCREENING AND BUFFER AREAS
10 STA.	-DENOTES NUMBER OF SHOOTING LANES
	-DENOTES DIRECTION OF SHOOTING
BMP	-DENOTES BEST MANAGEMENT PRATICE
	-DENOTES UTILITY POLES

0 100 200 300
2' CONTOUR INTERVALS
(SOURCE: COUNTY GIS)

REVISION BLOCK

DESCRIPTION	DATE	BY
PER TRC COMMENTS	3/15/18	D.W.R.
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LICENSE NO.
036528
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EXISTING CONDITIONS

TEAM CRUCIBLE TRAINING COMPLEX

BERKELY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

DATE:	MAR. 27, 2017
SCALE:	1"= 100'
DESIGNED BY:	D.W.R.
DRAWN BY:	D.W.R.
CHECKED BY:	
ACAD FILE:	16D011GDP
DRAWING NO:	16-D-011
SHEET NO.	2
OF	6 SHEETS

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ZONE: A-2
USE: VACANT

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9.00 ACRES
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USE: SINGLE FAM.

HAND CONSTRUCTION, INC
TM 76A-1-3
0.66 ACRES
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JAMES C. CORTHON or
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S87°14'10"E 396.49'

S02°44'12"W 665.35'

N80°53'38"W 3036.93'

35' TRANSITIONAL SCREENING-2

50' TRANSITIONAL SCREENING-3

SECURITY FENCE WITH POSTINGS

LIMITS OF DISTURBANCE

LIMITS OF SIMULATED IED USE

WETLANDS

12' BERM WITH ADDITIONAL PLANTINGS
(18 - 5 gal. NELLIE STEVENS HOLLIES
2 - 5 gal. EDWARD STEVENS HOLLIES)

(IMPACT BERM TO PROPERTY LINE)

HELICOPTER EMERGENCY LANDING PAD

SKID PAD
(150' x 150')

RALLY COURSE

BMP

SEA CONTAINER SCENARICS

HORIZONTAL RICOCHET CATCH

TARGETS (30)

RANGE (200'x377')

30 STA.

WELL

PARKING
(20 SPACES)

DRAINFIELD AREA #2

RANGE SUPPORT BLDG

CEMETERY

FIRE APPARATUS SERVICE ROAD

ADDITIONAL SCREENING

100' RPA

DRAINFIELD AREA #1

STORAGE LOT
(30 SPACES)

STORAGE

SHOP

DUMPSTER

PARKING LOT
(34 SPACES)

OPERATIONS

BMP

WELL

SECURITY GATE WITH POSTINGS

50' STREET BUFFER

(44 VPD)

(65 MPH)

JEFFERSON DAVIS HWY.
(80' RIGHT-OF-WAY)

U.S. ROUTE - 1

360' BUFFER VOID
(THROUGH RPA)
(MAINTAIN VEGETATION
ON FAR SIDE OF ROAD
SLATS TO BE UTILIZED
IN SECURITY FENCE)

COACH FOUR LANE

1000' MONUMENT SIGN

2' CONTOUR INTERVALS
(SOURCE: COUNTY GIS)

0 100 200 300

LEGEND

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	-DENOTES OVERHEAD UTILITY LINE
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	-DENOTES CHECK DAM LINED DITCH
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	-DENOTES DELINEATED WETLANDS
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	-DENOTES APHALT SURFACE ROADS AND PARKING
	-DENOTES DIRT SURFACE ROADS
	-DENOTES BUILDING AREAS
	-DENOTES TRANSITIONAL SCREENING AND BUFFER AREAS
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	-DENOTES DIRECTION OF SHOOTING
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	-DENOTES UTILITY POLES

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PARKING TABULATION:

USE TYPE	REQUIREMENT	CALCULATION
INDUSTRY TYPES I, II, III	1-SP PER 1,000 SQ.FT. GFA PLUS 1-SP PER 400 SQ.FT. OF ACCESSORY OFFICE AREA OR 1-SP PER 2 EMPLOYEES ON THE LARGEST SHIFT WHICHEVER IS LESS	4,224/400= 11-SP 4,800/1,000= 6-SP
	TOTAL REQUIRED:	17-SP
	TOTAL PROVIDED:	34-SP

LOADING TABULATION:

REQUIREMENT	CALCULATION
1-SPACE FOR THE FIRST 5,000 SQ.FT. OF GROSS FLOOR AREA, PLUS 1-SPACE FOR EACH ADDITIONAL 30,000 SQ.FT. OR MAJOR FRACTION THEREOF.	9,024/5,000= 1-SPACE 4,024/30,000= 0-SPACE
TOTAL REQUIRED:	1-SPACE
TOTAL PROVIDED:	1-SPACE

REVISION BLOCK

DATE	DESCRIPTION	BY
3/15/18	PER TRC COMMENTS	D.W.R.
8/21/18	PER COUNTY COMMENTS	D.W.R.
11/01/19	PER OWNER MODIFICATIONS	D.W.R.
2/28/20	PER COUNTY COMMENTS	D.W.R.
5/10/20	PER COUNTY COMMENTS	D.W.R.

COMMONWEALTH OF VIRGINIA
DANIEL C. WEBB
LICENSE NO.
036528
5-10-20
PROFESSIONAL ENGINEER

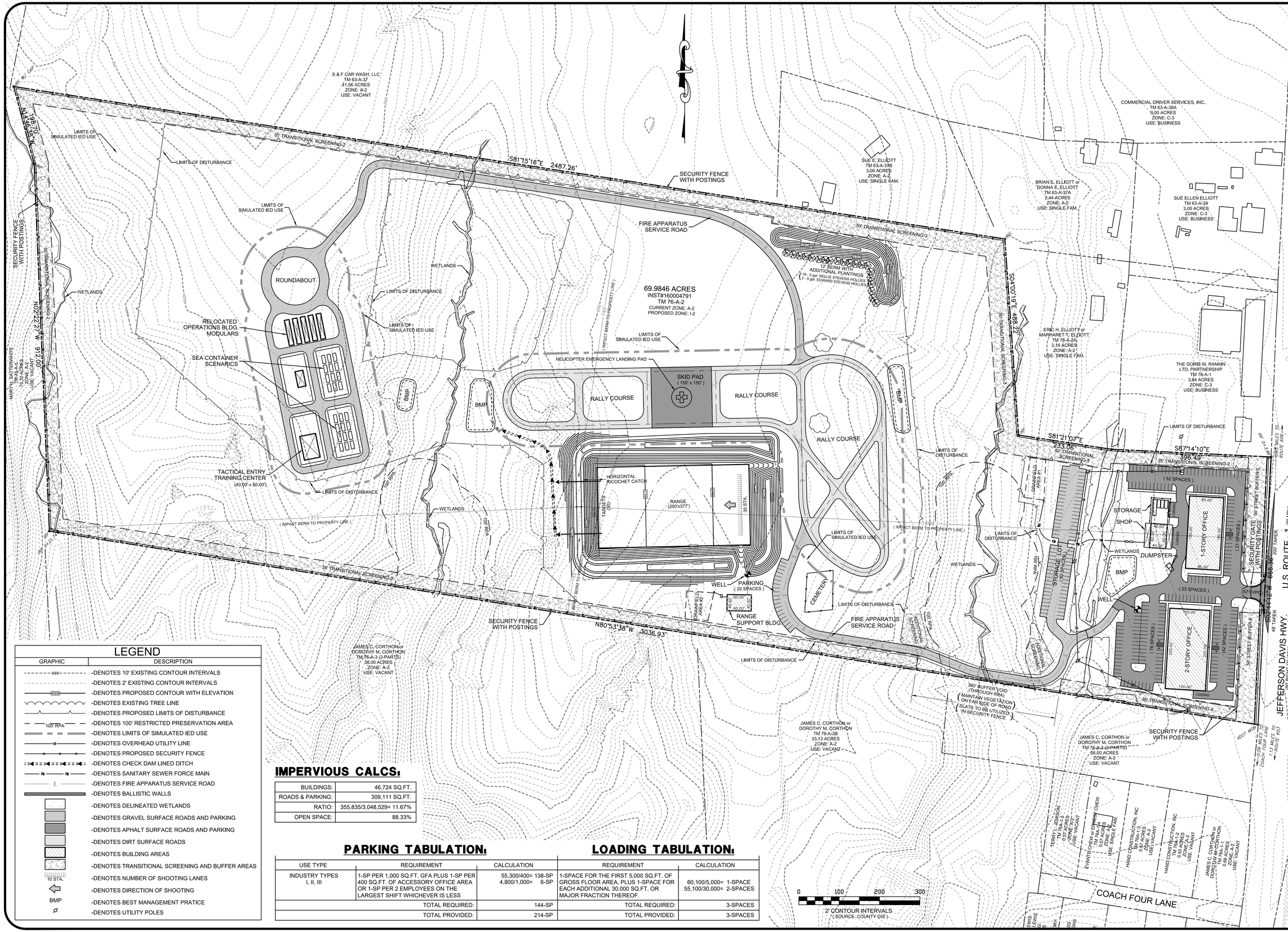
W W WEBB & ASSOCIATES, PLLC
ENGINEERING - SURVEYING - LAND PLANNING
11903 BOWMAN DRIVE, SUITE 106, FREDERICKSBURG, VA. 22408
OFFICE (540)371-1209 FAX (540)371-4650

GDP PHASE-1 MAX BUILDOUT

TEAM CRUCIBLE TRAINING COMPLEX

BERKELY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

DATE:	MAR. 27, 2017
SCALE:	1"= 100'
DESIGNED BY:	D.W.R.
DRAWN BY:	D.W.R.
CHECKED BY:	
ACAD FILE:	16D011GDP
DRAWING NO:	16-D-011
SHEET NO.	3
OF	6 SHEETS



LEGEND

GRAPHIC	DESCRIPTION
688	-DENOTES 10' EXISTING CONTOUR INTERVALS
	-DENOTES 2' EXISTING CONTOUR INTERVALS
688	-DENOTES PROPOSED CONTOUR WITH ELEVATION
	-DENOTES EXISTING TREE LINE
	-DENOTES PROPOSED LIMITS OF DISTURBANCE
100' RPA	-DENOTES 100' RESTRICTED PRESERVATION AREA
	-DENOTES LIMITS OF SIMULATED IED USE
	-DENOTES OVERHEAD UTILITY LINE
	-DENOTES PROPOSED SECURITY FENCE
	-DENOTES CHECK DAM LINED DITCH
FM FM	-DENOTES SANITARY SEWER FORCE MAIN
	-DENOTES FIRE APPARATUS SERVICE ROAD
	-DENOTES BALLISTIC WALLS
	-DENOTES DELINEATED WETLANDS
	-DENOTES GRAVEL SURFACE ROADS AND PARKING
	-DENOTES APHALT SURFACE ROADS AND PARKING
	-DENOTES DIRT SURFACE ROADS
	-DENOTES BUILDING AREAS
	-DENOTES TRANSITIONAL SCREENING AND BUFFER AREAS
10 STA.	-DENOTES NUMBER OF SHOOTING LANES
	-DENOTES DIRECTION OF SHOOTING
BMP	-DENOTES BEST MANAGEMENT PRATICE
	-DENOTES UTILITY POLES

IMPERVIOUS CALCS:

BUILDINGS:	46,724 SQ.FT.
ROADS & PARKING:	309,111 SQ.FT.
RATIO:	355,835/3,048,529= 11.67%
OPEN SPACE:	88.33%

PARKING TABULATION:

USE TYPE	REQUIREMENT	CALCULATION
INDUSTRY TYPES I, II, III	1-SP PER 1,000 SQ.FT. GFA PLUS 1-SP PER 400 SQ.FT. OF ACCESSORY OFFICE AREA OR 1-SP PER 2 EMPLOYEES ON THE LARGEST SHIFT WHICHEVER IS LESS	55,300/400= 138-SP 4,800/1,000= 6-SP
	TOTAL REQUIRED:	144-SP
	TOTAL PROVIDED:	214-SP

LOADING TABULATION:

REQUIREMENT	CALCULATION
1-SPACE FOR THE FIRST 5,000 SQ.FT. OF GROSS FLOOR AREA, PLUS 1-SPACE FOR EACH ADDITIONAL 30,000 SQ.FT. OR MAJOR FRACTION THEREOF.	60,100/5,000= 1-SPACE 55,100/30,000= 2-SPACES
TOTAL REQUIRED:	3-SPACES
TOTAL PROVIDED:	3-SPACES

REVISION BLOCK

DATE	DESCRIPTION	BY
3/15/18	PER TRC COMMETS	D.W.R.
8/21/18	PER COUNTY COMMENTS	D.W.R.
11/01/19	PER OWNER MODIFICATIONS	D.W.R.
2/28/20	PER COUNTY COMMENTS	D.W.R.
5/10/20	PER COUNTY COMMENTS	D.W.R.

COMMONWEALTH OF VIRGINIA
DANIEL C. WEBB
LICENSE NO.
036528
5-10-20
PROFESSIONAL ENGINEER

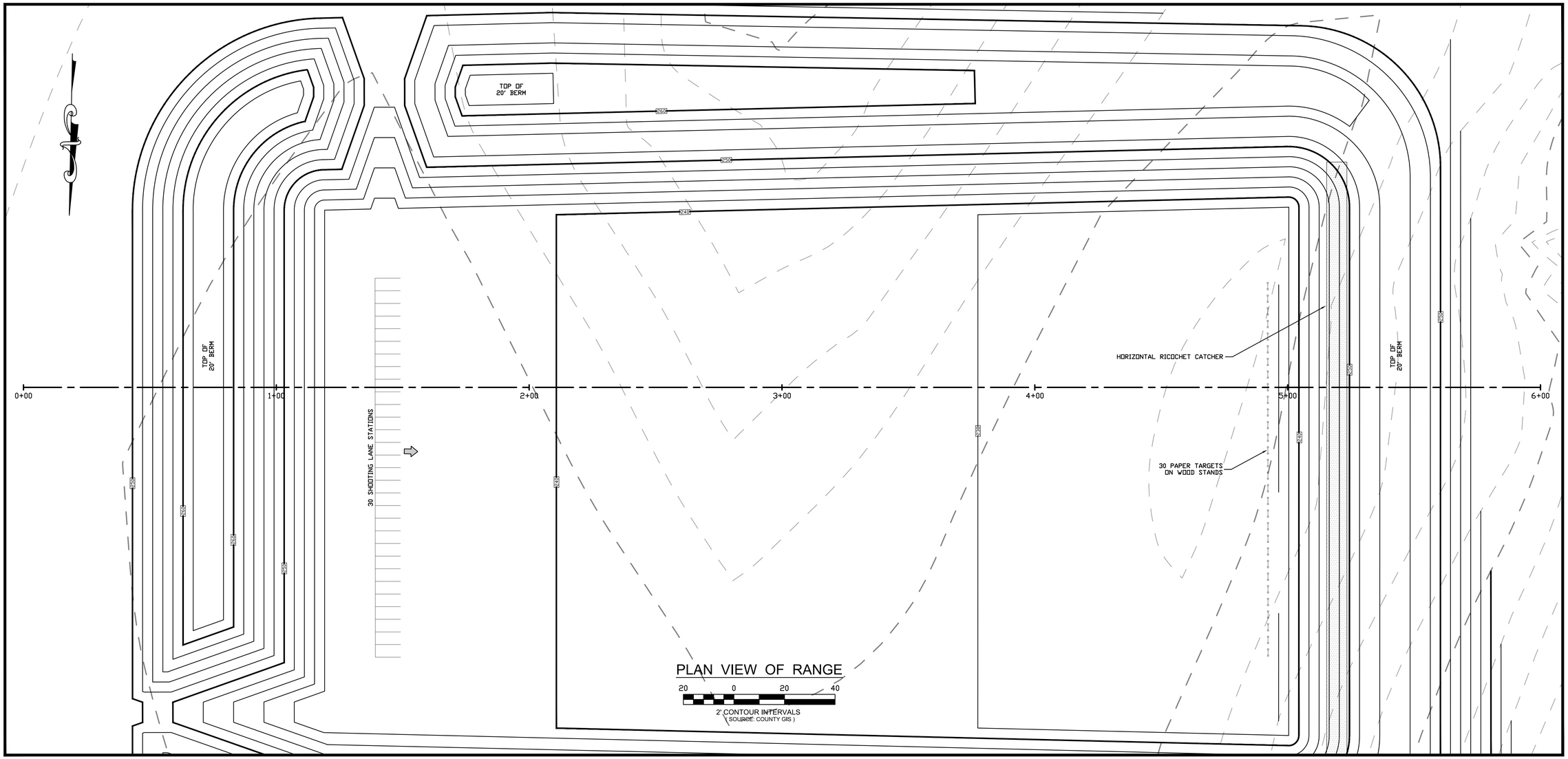
W W WEBB & ASSOCIATES, PLLC
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11903 BOWMAN DRIVE, SUITE 106, FREDERICKSBURG, VA. 22408
OFFICE (540)371-1209 FAX (540)371-4650

GDP PHASE-2 MAX BUILDOUT

TEAM CRUCIBLE TRAINING COMPLEX

BERKELY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

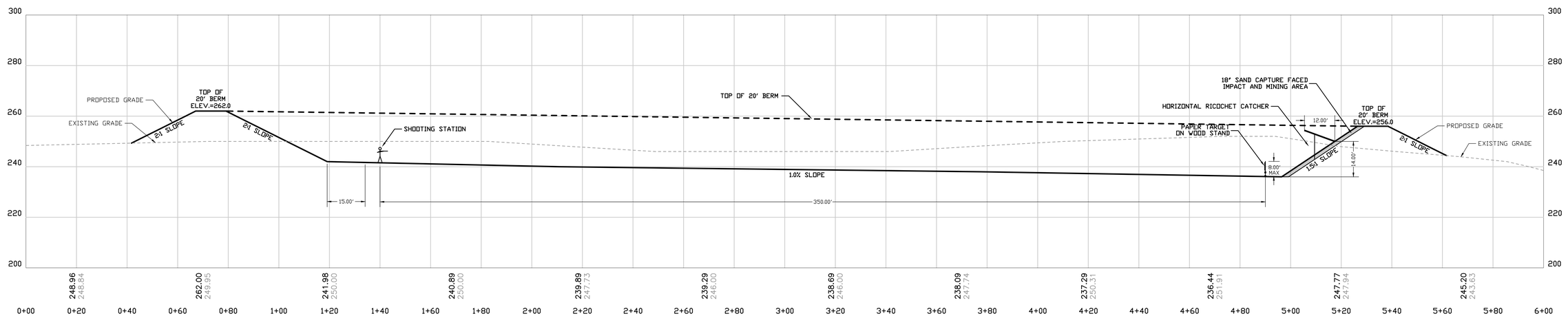
DATE:	MAR. 27, 2017
SCALE:	1"= 100'
DESIGNED BY:	D.W.R.
DRAWN BY:	D.W.R.
CHECKED BY:	
ACAD FILE:	16D011GDP
DRAWING NO:	16-D-011
SHEET NO.	4
OF	6 SHEETS



PLAN VIEW OF RANGE

20 0 20 40

2' CONTOUR INTERVALS
(SOURCE: COUNTY GIS)



PROFILE VIEW OF RANGE

20 0 20 40

REVISION BLOCK

DATE	DESCRIPTION	BY
3/15/18	PER TRC COMMETS	D.W.R.
8/21/18	PER COUNTY COMMENTS	D.W.R.
11/01/19	PER OWNER MODIFICATIONS	D.W.R.
2/28/20	PER COUNTY COMMENTS	D.W.R.
5/10/20	PER COUNTY COMMENTS	D.W.R.

COMMONWEALTH OF VIRGINIA
DANIEL C. WEBB
LICENSE NO.
036528
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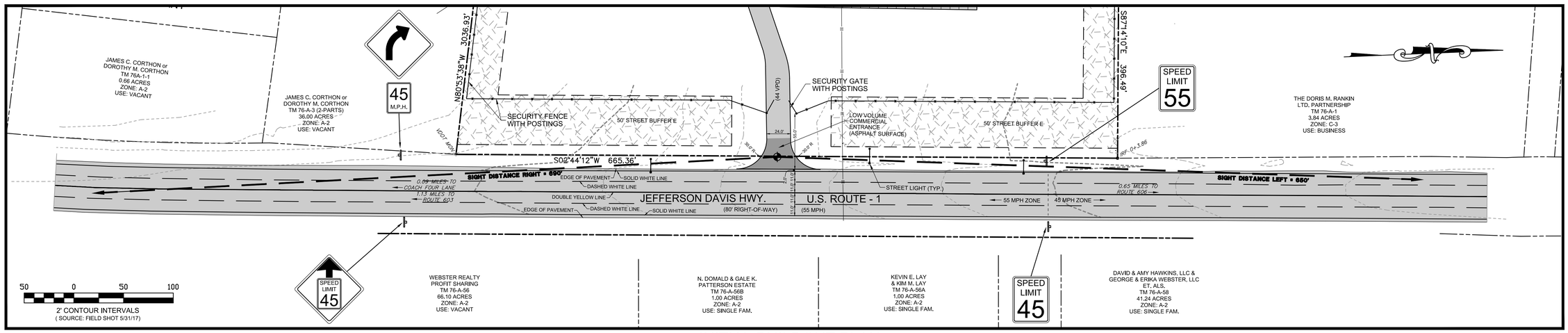
RANGE CROSS SECTION

TEAM - CRUCIBLE TRAINING COMPLEX

BERKELY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

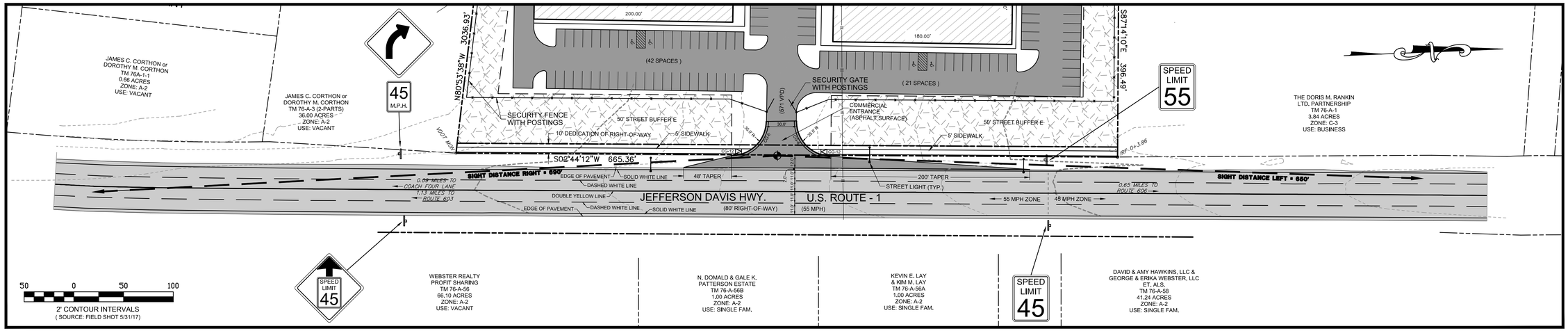
DATE:	MAR. 27, 2017
SCALE:	1"= 100'
DESIGNED BY:	D.W.R.
DRAWN BY:	D.W.R.
CHECKED BY:	
ACAD FILE:	16D011GDP
DRAWING NO:	16-D-011

SHEET NO. 5
OF 6 SHEETS



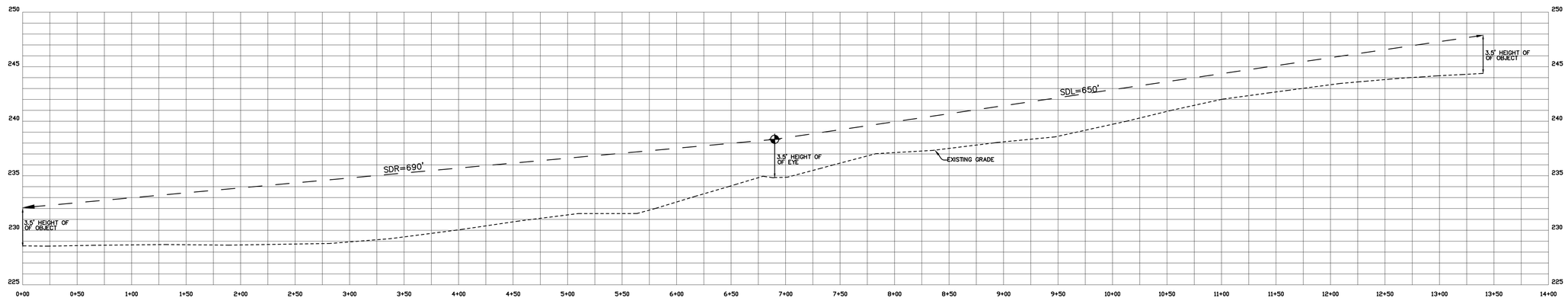
INITIAL BUILDOUT PLAN

SCALE: 1"=50'



FINAL BUILDOUT PLAN

SCALE: 1"=50'



ROAD PROFILE

SCALE: 1"=5'(VERTICAL)
SCALE: 1"=50'(HORIZONTAL)

REVISION BLOCK

DESCRIPTION	DATE	BY
PER TRC COMMENTS	3/15/18	D.W.R.
PER COUNTY COMMENTS	8/21/18	D.W.R.
PER OWNER MODIFICATIONS	11/01/19	D.W.R.
PER COUNTY COMMENTS	2/28/20	D.W.R.
PER COUNTY COMMENTS	5/10/20	D.W.R.

COMMONWEALTH OF VIRGINIA
DANIEL C. WEBB
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5-10-20
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OFFICE (540)371-1209 FAX (540)371-4650

ENTRANCE PLAN

TEAM - CRUCIBLE TRAINING COMPLEX

BERKELY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

DATE:	MAR. 27, 2017
SCALE:	1"= 100'
DESIGNED BY:	D.W.R.
DRAWN BY:	D.W.R.
CHECKED BY:	
ACAD FILE:	ENTRANCE
DRAWING NO:	16-D-011

SHEET NO. 6 OF 6 SHEETS

Crucible Spotsylvania

Acoustical Assessment (Rev.2)



Prepared For:

Team Crucible
60 Jack Ellington Road
Fredericksburg, VA 22406

Prepared By:

WSP USA, Inc.
75 Arlington Street
Boston, MA 02116

Version Date:

18 November 2019

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Executive Summary

An updated acoustical study was performed to assess the potential consequences of noise that may be produced by Crucible's revised proposed facilities and operations at their new location in Spotsylvania, Virginia. This report will describe the current study's goals, methodology, relevant noise criteria, technical assumptions, noise modeling and measurements, findings, conclusions and recommendations; and compare the significant results with the previous study dated 3/22/18.

Crucible, currently located and operating in Stafford County, Virginia since 1998, is proposing to build and operate a new facility in Spotsylvania County, Virginia. Continuing to provide their original services, the new facility would feature personal defense training, firearms classes and live-fire exercises, evasive driving techniques, bodyguard and protective services training, and para-military training. Crucible's typical client base is comprised of employees of the U.S. Government, Non-governmental organizations (NGOs), and multi-national corporations whose employees live and work in dangerous and austere locations worldwide.

In brief summary, the findings of this updated acoustical study indicate that the future full build-out (Phase 2) noise levels produced during the daytime from Crucible's use of firearms, vehicles, and simulated IEDs would comply with guidelines and criteria limits contained in the Spotsylvania County Noise Ordinance (Chapter 14, Article II) at all noise-sensitive receptors within the communities proximal to Crucible's new facility. Operations are not proposed to occur at night.

If the proposed project is approved, it is understood that Crucible, being a commercial establishment from which noise due to the above activities is customarily emitted, would be exempt during certain times of each day from the legal requirement to comply with the noise ordinance. Notwithstanding the exemption, Crucible will attempt to reduce potential noise emissions to specifically address noise concerns raised by their immediate neighbors by voluntarily implementing a variety of noise mitigation measures into their new facility design; the more significant of which include:

- A willingness to take all reasonable and feasible steps necessary to voluntarily comply with the noise limits contained in the Spotsylvania County noise ordinance.
- Retaining the services of an acoustical expert with specific expertise in evaluating firing range noise emissions to perform a comprehensive noise study.
- Reducing their original design from four shooting ranges down to only one shooting range.
- Constructing 20-foot-tall earthen berms to completely surround the proposed shooting range.
- Equipping rifles with a sound suppressor as the default condition for all rifle use.
- Limiting themselves to using only buried, simulated Improvised Explosive Devices (IED).
- Orienting the entire facility so that the downrange direction points towards the west.
- Prohibiting the use of high explosives and rifle calibers larger than .300 Blackout due to community concerns over noise and safety.
- Willingly limiting their live fire operations to 8:00 AM to 10:00 PM, Monday through Friday; 9:00 AM to 5:00 PM on Saturday; and 10:00 AM to 4:00 PM on Sunday, and all firing range training will be limited to occur no later than two (2) hours after USNO astronomical twilight.

Based on the acoustical findings of this updated study and its proactive commitments to noise control, it is *concluded that the new Crucible facility would be a noise-compatible land-use within its proposed location in Spotsylvania, Virginia.*

The following report contains more detailed information supporting this conclusion and recommendation. A summary of acoustical terms is contained in **Appendix A**, and evidence of the principle investigator's professional acoustical qualifications may be found in **Appendix B**.

Project Description

Crucible operates a high level personal and professional defense and security training facility currently located in Stafford County, Virginia. For a variety of reasons, Crucible intends to completely relocate its facilities and operations to a more suitable space located off Jefferson Davis Highway (Route 1) in Spotsylvania County, Virginia.

Crucible intends to complete their new site development over a period of time based on contract activity, which will include an initial smaller-scale build-out (referenced collectively herein as "Phase 1") and eventually a full build-out scenario (referenced collectively herein as "Phase 2"). The site location, surrounding area, noise receptor locations (denoted as R-#), and a layout drawing of the full build-out scenario are shown in **Figure 1**.

The area surrounding Crucible's site is sparsely populated and may be categorized as rural land-use. While there are some residential and commercial properties to the east along Jefferson Davis Highway, there are very few noise-sensitive receptors westerly of the site.

Once completed, Crucible's revised facility design will include, amongst other things, a single 125-yard shooting range and a professional evasive-driving training course including simulated IED explosions. Again, as noted above and limited via Crucible's proposed proffers, Crucible's intended hours of operation will be 8:00 AM to 10:00 PM, Monday through Friday; and 9:00 AM to 5:00 PM on Saturday; and 10:00 AM to 4:00 PM on Sunday.

Figure 1. Crucible Spotsylvania Revised Full Build-Out (Phase 2) Development



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Spotsylvania Noise Ordinance

Noise emissions within Spotsylvania, Virginia, are governed by the Spotsylvania County Ordinance (CH 14, Article II: Noise). Section 14-51 contains noise limits at receptor locations for various land-uses based on time of day or night. While not explicitly mentioned, by professional critical evaluation of other sections of the ordinance it may be reasonably assumed that the noise limits are expressed in units of maximum (Lmax), A-weighted sound levels (dBA), using a root-mean-square (RMS) 'slow' sound meter response time. The ordinance also stipulates that if the noise source under question is "of an impulsive character" (such as firearms) then the noise limits for residential, office, and commercial receptors are to be reduced by 5 decibels. **Table 1** summarizes the ordinance's noise limits both with and without the impulsive noise penalty.

Table 1. Spotsylvania County Noise Ordinance Limits

Receiving Receptor Zoning Land-Use	Receptor Noise Limit dBA Lmax 'slow'	
	Daytime 6:00 AM to 10:00 PM	Nighttime 10:00 PM to 6:00 AM
Residential	65 60 (impulsive)	60 55 (impulsive)
Commercial	70 65 (impulsive)	65 60 (impulsive)
Office	65 60 (impulsive)	60 55 (impulsive)
Industrial	79	75

The ordinance also contains language in Section 14-52 defining certain exemptions from the noise limits. Particularly noteworthy exemptions include Items (a)(3) and (b)(8) which exempts the noise produced from firearms (and other noise producing devices) if they are used as a customary part of an established commercial business. The ordinance's relevant verbatim language is reproduced below for convenience

(a) The following matters are exempt during the daytime (6:00 a.m. to 10:00 p.m.) from this article:

(3) Noise emitted by a commercial or industrial establishment which noise is customarily emitted by such commercial establishments or industries.

(b) The following activities or sources of noise shall be exempt during all hours from this article, except to the extent as herein limited:

(8) The use of firearms (which use is governed by other provisions of federal, state and county law).

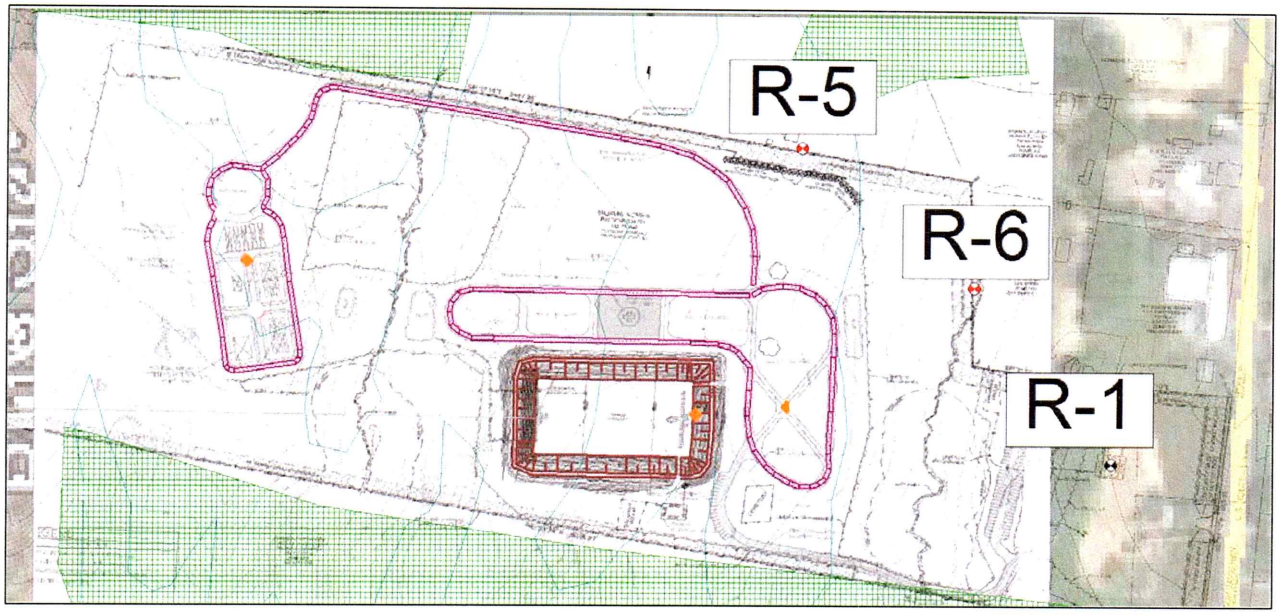
Consequently, because Crucible's established business operations involve the use of firearms, Crucible's new facility and business operations at their Spotsylvania site will be exempt from the County Noise Ordinance between 6:00 AM and 10:00 PM to the extent noted above. Any attempt or willingness on Crucible's part to try to comply with the ordinance's noise limits would be done solely on a voluntary basis.

Cadna-A Noise Model

Because Crucible's new Spotsylvania facilities have not yet been built, this noise assessment was analytically based on the revised expected site layout, type and number of shooting activities, use of simulated IEDs, and use of the evasive driving training course. To analyze the new facility's noise emissions, the Cadna-A® noise model was used to predict the noise levels associated with the expected types of activities. Cadna-A is a comprehensive commercially-available acoustical model developed by DataKustik GmbH to satisfy International and USA standards.

Compliance or exceedance with the noise ordinance was evaluated from the perspective of receptor locations in the community surrounding Crucible's proposed site. The final configuration of the Cadna-A model, as used for this project, is shown in **Figure 2**. In the figure, orange crosses identify locations of noise sources, brown lines represent range berms and backstops, the purple lines represent the intended driving course, and the "R-#" sites indicate community receptors where noise levels were evaluated.

Figure 2. Cadna-A Noise Model Configuration



Cadna-A is a powerful, three-dimensional, ray-tracing acoustical model that implements International Standards Organization (ISO) Standard 9613 for the prediction and propagation of outdoor sound. Cadna-A and ISO 9613 are used by the acoustics industry on a worldwide basis. Noise sources are entered into the Cadna-A model in the form of point, line and/or area components; with each source emitting sound power levels (PWL) in octave bands or broadband A-weighted format. Distance attenuation, elevation differences, ground absorption, wind effects, foliage, building shielding, and attenuation from barriers and berms are computed in the Cadna-A model. The resulting sound pressure levels (SPL) are predicted at any receptor location ofinterest.

The Cadna-A model for this project was configured by first importing a GoogleEarth® base map of the area. In this manner, the positions of structures, street locations, receptor locations and distances could be modeled to a high degree of accuracy. A scale layout and design of Crucible's revised new facilities was then superimposed over the base map. The final model preparation step involved entering ground terrain elevation data which was obtained from USGS topographical maps. The model was then populated with hypothetical rifle and pistol source locations occurring on the 125 yard range; simulated buried IED explosions; and up to five automobiles making use of the driving course.

Firearms included in the model include a 9 mm handgun, an AK-47 style rifle chambered in 7.62x39 mm, an AR-15 style rifle chambered in .223/5.56 Remington, and an AR-10 style rifle chambered in .308/7.62 Winchester. The rifles were modeled with and without suppressors. Noise emission data for the firearms were sourced from a database of previously measured gunfire noise levels and from representative noise emission levels from several of the firearms that Crucible intends to use that were measured in July 2017. The results of those noise tests are explained further below.

Another significant change in the newly proposed shooting range is that Crucible will be making use of suppressors (silencers) as the default condition for all rifles used on the range. Extensive first-hand acoustical tests performed on a wide variety of manufacturers suppressors indicates that a good quality suppressor can provide approximately 30 decibels of reduction. In subjective terms, a reduction of 30 decibels would sound only 1/8th as loud as the unmuffled sound source. However, not all users of the range will be able to use suppressors due to their respective department's qualifications procedures. Thus, the revised noise model assesses the use of both suppressed and unsuppressed rifles on the new range.



In general, the unsuppressed rifles emit a sound power level (PWL)[1] of 137 to 138 dBA Lmax 'slow' PWL. The 9 mm handguns was slightly quieter, producing approximately 134 dBA Lmax 'slow' PWL. Noise emission levels for the IED were computed using the ConWep model developed by the US Army Corps of Engineers. For example, a 1-ounce charge of black powder (Pyrodex RS) is expected to produce 137 dBA Lmax 'slow' PWL. The same charge buried slightly underground produces approximately 10 to 15 decibels less noise. Lastly, vehicles using the evasive driving training course were assumed to be driving at an average speed of 40 mph.

The earthen berms that Crucible intends to construct around their shooting range were entered into the model at their respective height of 20-feet tall. The majority of lands surrounding Crucible's new site are fully developed forested areas, thus trees of 25-foot nominal height were also entered into the Cadna-A model where these forested areas exist. However, areas with only sparse tree density were not included in the model. The ground surface was assumed to be acoustically absorptive.

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[1] While decibel values of sound power (PWL) and sound pressure (SPL) may be compared to other sound power levels and sound pressure levels, respectively, the two are wholly different quantities and should not be misconstrued as meaning the same thing. See **Appendix A** for further definition of PWL and SPL.

Seven noise receptor locations, as shown in **Figure 1** and summarized in **Table 2**, were selected for assessment in this study and entered into the Cadna-A model. Except for receptor R-1 which is located at Crucible's future office location, all the receptors are residential land-uses selected due to their relative proximity to Crucible's proposed site.

With the Cadna-A model fully configured and populated with source and terrain data, the resulting noise levels expected from Crucible's use of firearms, IEDs and the driving course were then computed at the exterior of each receptor location. The noise levels were computed at the exterior of the receptors using the metric *Lmax dBA 'slow'* because that is where and how the Spotsylvania County Noise Ordinance specifies its limits. If desired, interior noise levels could be estimated at each receptor location by subtracting 10 decibels from the exterior noise level if the receptor's windows are open, or subtracting 25 decibels if the windows are closed.

Table 2. Selected Noise Receptors

Site No.	Receptor Location	Receptor Land-Use	Approximate Compass Direction*	Approximate Distance* (Feet)
R-1	Crucible Office	Commercial	East Southeast	1,540
R-2	5661 Bear Lane	Residential	South Southwest	3,650
R-3	5808 Red Fox Dive	Residential	Southwest	6,140
R-4	6111 Taverneer Lane	Residential	North Northwest	1,920
R-5	6148 Jefferson Davis Highway	Residential	Northeast	920
R-6	6144 Jefferson Davis Highway	Residential	East Northeast	1,110
R-7	6020 Harts Run	Residential	West Southwest	4,210

Note: (*) Direction and distance relative to the approximate geometric center of Crucible's proposed site.

Rifle Noise Emission Measurements

As mentioned above, noise emission levels from two of the firearms that Crucible intends to use were measured in July 2017. They included an AK-47 style rifle chambered in 7.62 x 39 mm, and an AR-10 style rifle chambered in 7.62 x 51 mm (otherwise known as .308 Winchester).



Photo 1. AK-47 Style Rifle



Photo 2. AR-10 Style Rifle

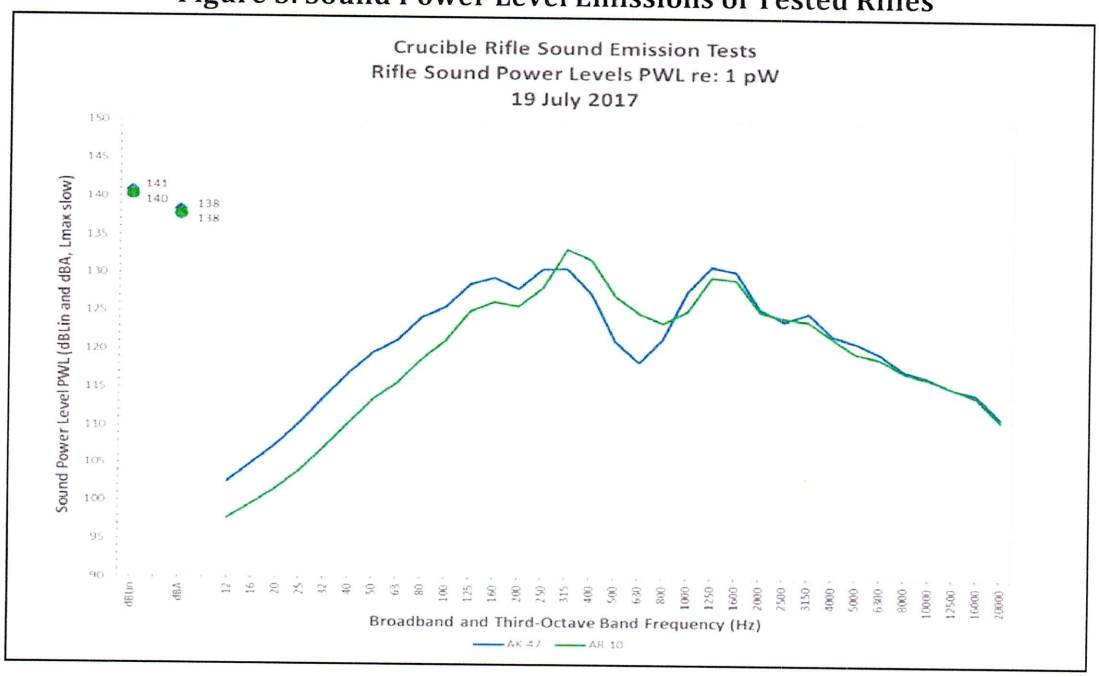
Noise measurements were performed at a distance of 50 feet from both the right and left waysides of each rifle. The rifles were fired at an outdoor shooting range, one shot at a time, using standard factory ammunition until the sound emission levels from a total of 10 rounds (five from the left side and five from the right side) had been measured for each rifle. **Photos 1 and 2** show the AK-47 and AR-10 style rifles, respectively, that were tested.

All sound level measurement instrumentation used in this study complied with ANSI Standard S1.4 for Type 1 precisions and accuracy. The instrumentation consisted of a CEL Instruments Model 593 Sound Level Analyzer equipped with a Bruel & Kjaer Model 4189 Microphone. The CEL 593 was programmed to measure and record maximum (Lmax) broadband A-weighted (dBA) and unweighted third-octave band sound pressure levels using an RMS 'fast' time response. Equivalent RMS 'slow' sound pressure levels were then computed by subtracting 9 decibels from the RMS 'fast' results based on the relative difference between 'fast' and 'slow' rise time constants of 0.125 seconds and 1 second, respectively, if applied to an impulsive noise source.

The calibration level of the CEL 593 was confirmed in the field using a Bruel & Kjaer Model 4231 Acoustical Calibrator, a 3½-inch diameter windscreen was used to reduce wind noise affecting the microphone, and the CEL 593 was mounted on a tripod to minimize operator interference. Weather conditions that day (7/19/17) were perfectly acceptable for performing sound level measurements.

After being measured and digitally downloaded from the CEL 593, the measured sound pressure levels (SPL) were converted into sound power levels (PWL) by taking the distance of 50 feet into account and by assuming that the rifles radiated noise into a hemispherical, free-field acoustical space. The final A-weighted (dBA) and unweighted (dBLin) broadband and third-octave band sound power levels can be seen graphically in **Figure 3**. The third-octave band sound power levels were then summed into full octave band levels and entered into the Cadna-A model as point sources to represent AK-47 and AR-10 rifles.

Figure 3. Sound Power Level Emissions of Tested Rifles



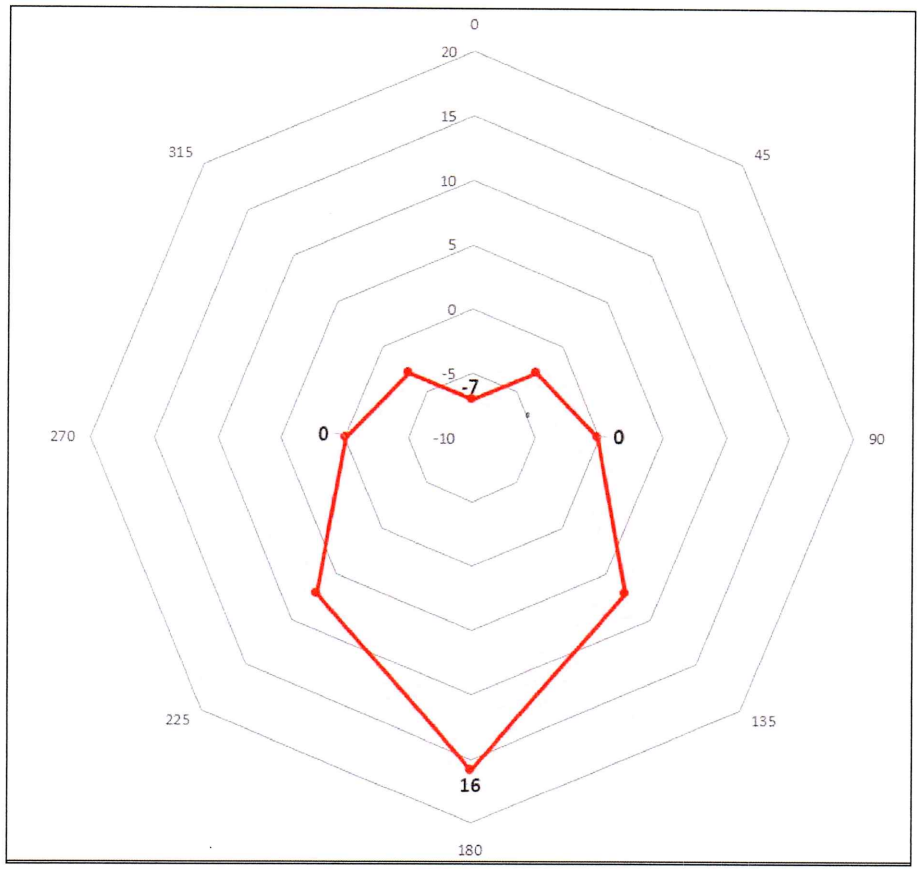
Firearm Acoustical Directivity

Another important aspect of firearms noise emissions is their acoustical directivity. Firearms are not perfect omnidirectional point sources because they radiate noise with varying intensities in different directions.

Most of a firearm's acoustical energy is directed downrange in-line with the muzzle. Less noise radiates to the sides, and the least amount of noise radiates backwards behind the shooter. Previous measurements completed for other gun range noise projects indicate that shooting noise levels can be 16 decibels louder in a downrange direction (180°) as compared to equivalent distances wayside of the firearm (90° and 270°), and that firearm noise levels behind the shooter (0°) can be an additional 7 decibels quieter than the wayside levels due to the shooter's body acting as a partial sound barrier. Thus, noise levels at equivalent distances can be a total of 23 decibels quieter towards the rear of the shooter than they are straight downrange.

The directivity pattern shown in **Figure 4** was entered into the Cadna-A noise model and applied to all gunshots. In Crucible's case, downrange was defined as heading in a westerly direction.

Figure 4. Firearm Acoustical Directivity Pattern



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Noise Prediction Results

The results of the current and original Cadna-A noise model predictions are summarized in **Table 3** for the seven community receptor locations included in this study. The results are separated into the noise contribution expected to be caused by each of the three different types of noise sources, namely from gunfire, IEDs and driving. The table also shows the daytime and nighttime noise limits at each receptor contained in the Spotsylvania County Noise Ordinance for impulsive-type noise sources. Again, Crucible is exempt from the noise ordinance so the limits are shown here only for informational comparison only. All decibel levels are expressed as maximum single event A-weighted sound levels using an RMS 'slow' time response (i.e. dBA Lmax 'slow').

As can be seen in the table, noise levels due to Crucible's shooting activities and simulated IEDs are expected to comply with the ordinance's daytime noise limits at all receptor locations included in this study. Noise levels expected from Crucible's evasive driving training course were found to likely be inaudible at the receptor locations, and thus not relevant.

Daytime and nighttime noise ordinance limits are shown in **Table 3** for comparison along with the original predicted noise levels from the Crucible Spotsylvania acoustical study dated 3/22/18, which are shown in brackets. Crucible's proffers prohibit firearm and simulated IED use during nighttime hours. Therefore, Crucible is expected to be compliant with Spotsylvania Noise Ordinance limits during all daytime and nighttime hours.

Table 3. Predicted Crucible Noise Levels at Receptor Locations

Site No.	Receptor Location	Receptor Land-Use	Spotsylvania County Noise Ordinance Limit* (dBA Lmax 'slow')		Crucible Noise Loudest Single Event (dBA Lmax 'slow')		
			Daytime 6AM–10PM	Nighttime 10PM–6AM	Firearms	IEDs	Driving
R-1	Crucible Office	Commercial	65	60	41 [54]	56 [57]	17 [13]
R-2	5661 Bear Lane	Residential	60	55	40 [58]	42 [40]	9 [0]
R-3	5808 Red Fox Dive	Residential	60	55	37 [51]	32 [32]	3 [-5]
R-4	6111 Taverneer Lane	Residential	60	55	44 [60]	46 [46]	12 [5]
R-5	6148 Jefferson Davis Highway	Residential	60	55	51 [57]	58 [55]	25 [17]
R-6	6144 Jefferson Davis Highway	Residential	60	55	46 [50]	60 [59]	20 [20]
R-7	6020 Harts Run	Residential	60	55	48 [60]	38 [38]	5 [-2]

Notes: (*) Noise ordinance limits for "impulsive" noises.
[##] Noise levels predicted in original Crucible Spotsylvania Phase 2 acoustical study dated 3/22/18.

With regards to shooting and IED noise, the table above summarizes the loudest individual gunshot/explosion expected from each type of firearm/IED at each receptor location so that a direct comparison to the noise limits in the Spotsylvania Noise Ordinance can be made. This is because the Lmax sound level for impulsive noise sources of such short duration as gunshots will generally not occur simultaneously. However, in the extremely rare event that two sound sources of equal loudness were to occur at the exact same instant in time then the Lmax sound level at the receptors

would only increase by 3 decibels. It would require four gunshots at the exact same time to get a rise of 6 decibels, and eight simultaneous gunshots to get a rise of 9 decibels, etc. This is due to the logarithmic nature of decibel addition.

It is also worth mentioning that the sound level results in **Table 3** represent worst-case conditions using unsuppressed firearms. The use of suppressors on the rifles, whenever possible, will render them essentially inaudible in the community.

In addition to computing noise levels at discrete points, the Cadna-A model can also compute isopleth contours of equal loudness. In this manner, one can visually interpret how noise from a given set of noise sources and terrain conditions would propagate in all directions.

Figures 5A, 6A and 7A show the current analysis sound level isopleth contours expected for Crucible's use of firearms, IEDs and the driving course, respectively. The isopleth lines are shown in 1-decibel increments, and the colored zones are in 5-decibel increments. All sound levels are A-weighted decibels (dBA). For direct comparison, **Figures 5B, 6B and 7B** show the originally predicted sound level isopleth contours for firearms, IEDs and the driving course, respectively.

The plotted results of **Figures 5 – 7** may not match up perfectly with the predicted noise level results shown in **Table 3** because the plots assume that all noise sources of a given type (i.e. firearms, IEDs or driving vehicles) are emitting noise at their maximum (Lmax) levels at the *exact same moment in time*. This is an unrealistically conservative assumption because Lmax sound levels are not additive in that manner. However, the isopleth plots serve to show how sound might radiate away from Crucible's facility in any given direction with the sources emitting sound from anywhere they might be located.

As can be seen in **Figure 5A**, the majority of shooting noise radiates in a westerly direction due to the acoustical directivity of the firearms. The 20-foot tall earthen berms surrounding the 125-yard long shooting range are shown in brown, and the firearms were modeled in the center of the shooting line as shown in orange.

As can be seen in **Figure 6A**, noise from simulated IED explosions, shown in the figure as orange point sources, will radiate in more of an omnidirectional spherical pattern because they are modeled as point sources without dominant acoustical directivity. However, their omnidirectional spreading is affected by local terrain, berms and foliage areas, resulting in more efficient propagation towards the east and west due to less dense foliage.

Lastly, as shown in **Figure 7A**, noise emissions from vehicles using the defensive driving course also tend to radiate omnidirectionally as a moving point source. Again, it is assumed that no more than five vehicles would be using the driving course at any given time. However, the noise levels produced from the driving course are so low that they can be considered as negligible in this case.

Figure 5A. Crucible Firearms Noise Isopleth Contours (Current Study)

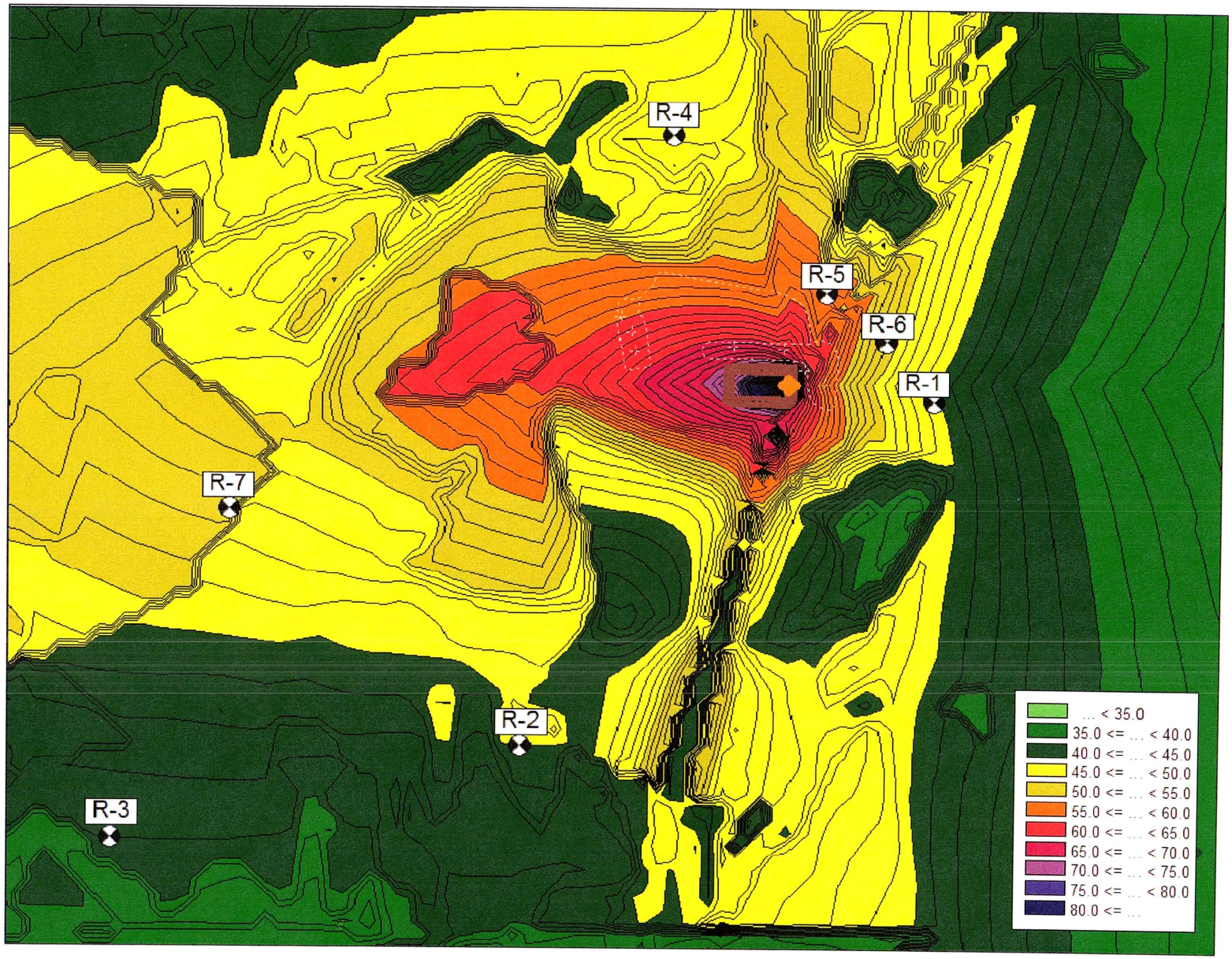


Figure 5B. Crucible Firearms Noise Isopleth Contours (Original Study 3/22/18)

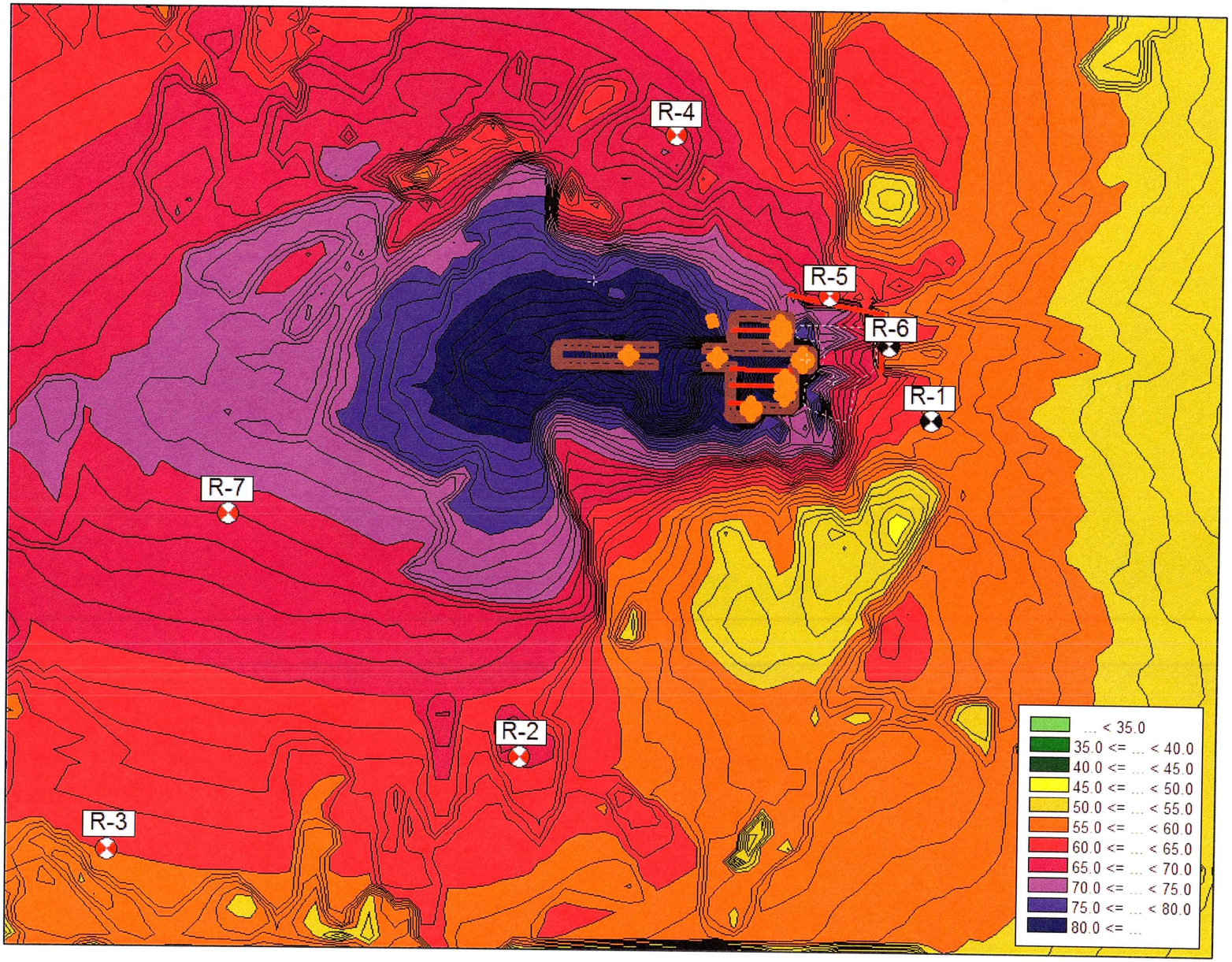


Figure 6A. Crucible IEDs Noise Isopleth Contours (Current Study)

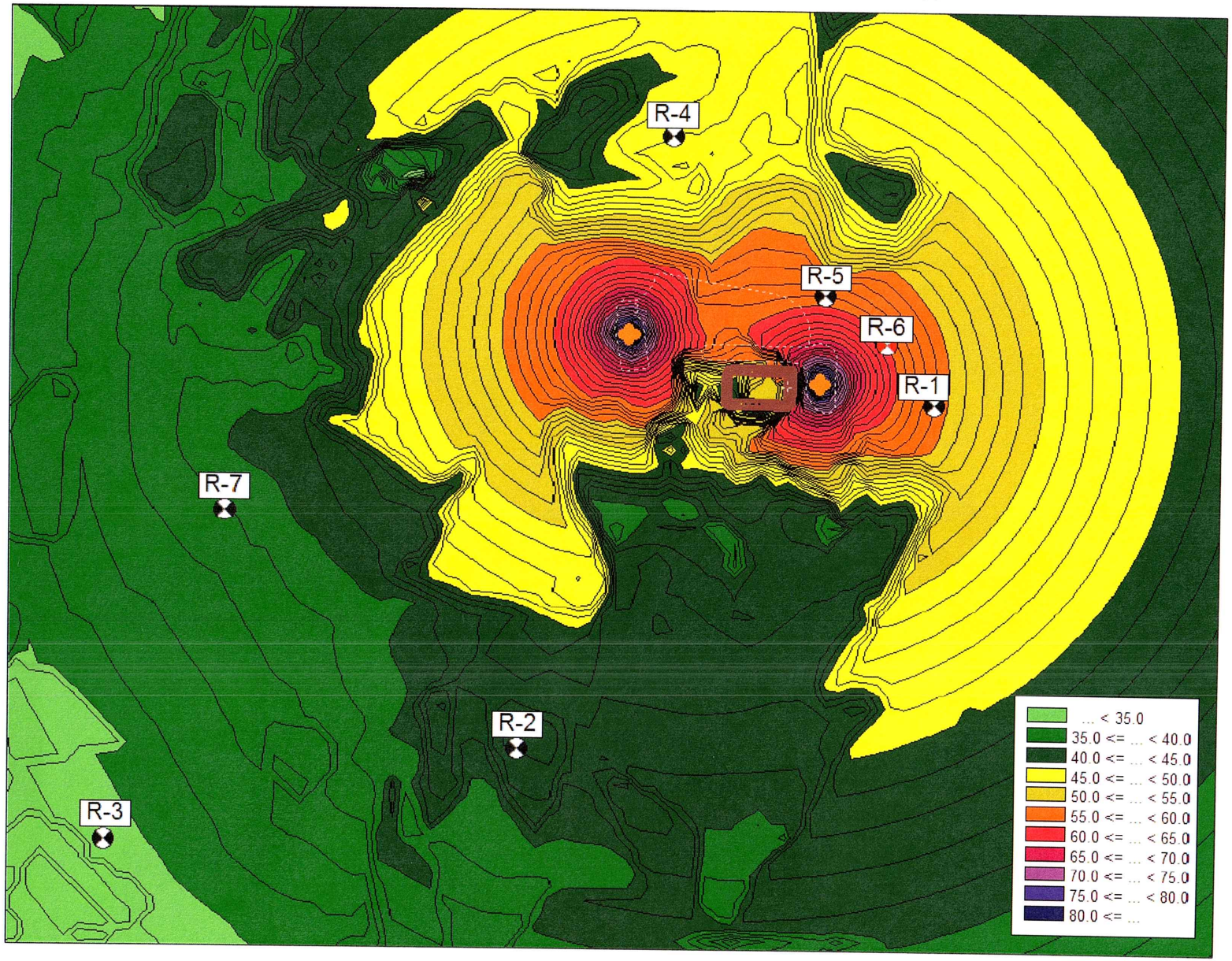


Figure 6B. Crucible IEDs Noise Isopleth Contours (Original Study 3/22/18)

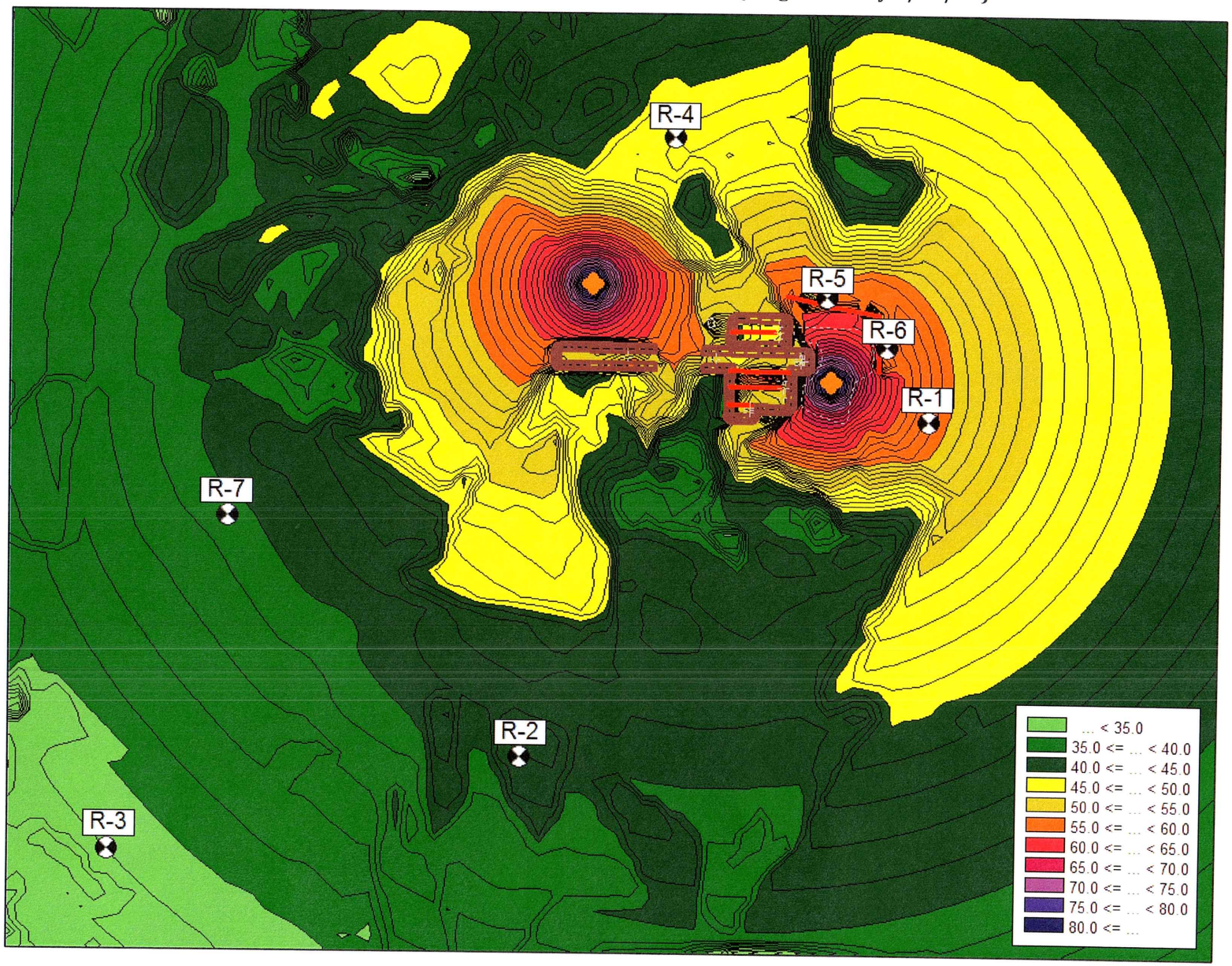


Figure 7A. Crucible Driving Course Noise Isopleth Contours (Current Study)

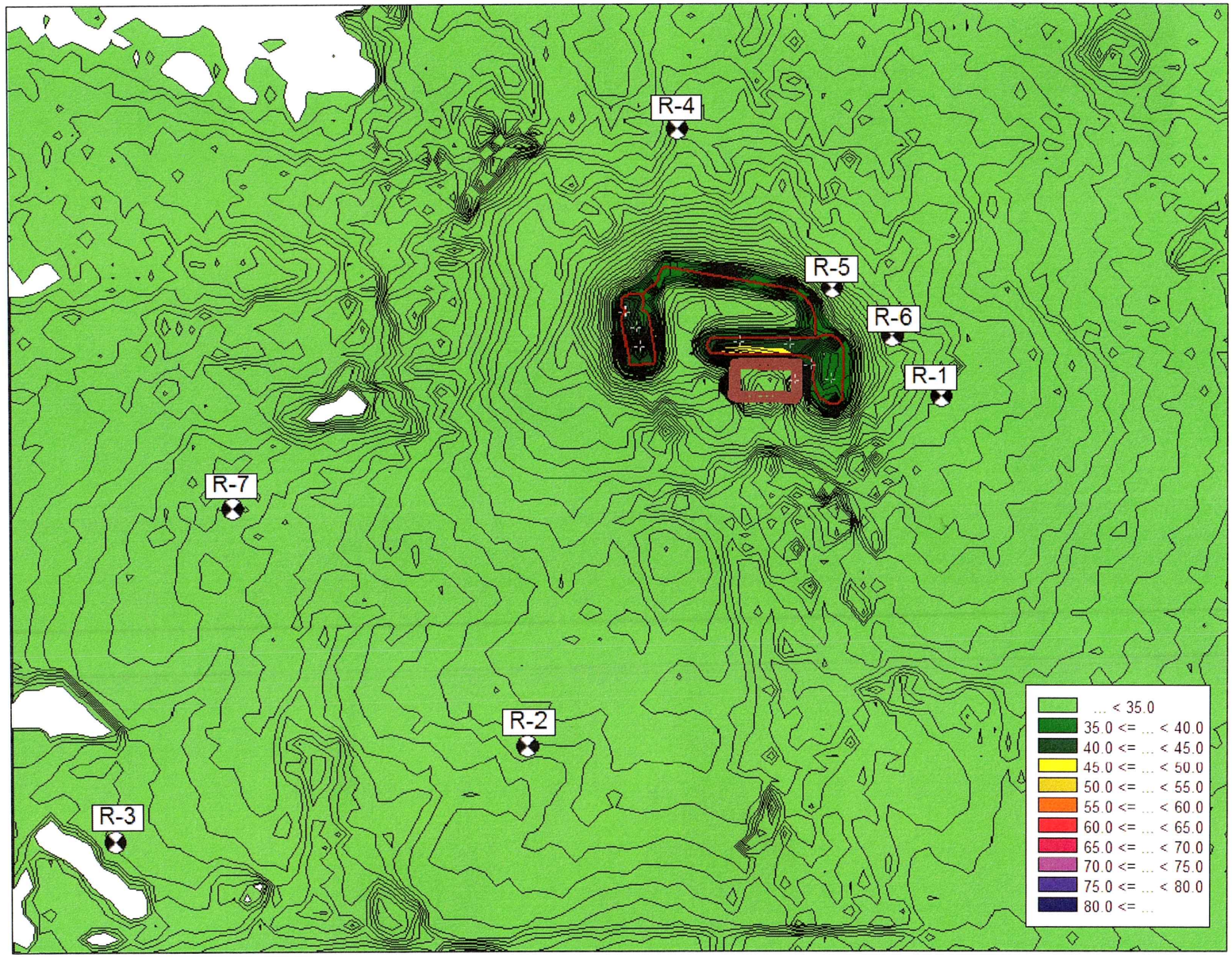
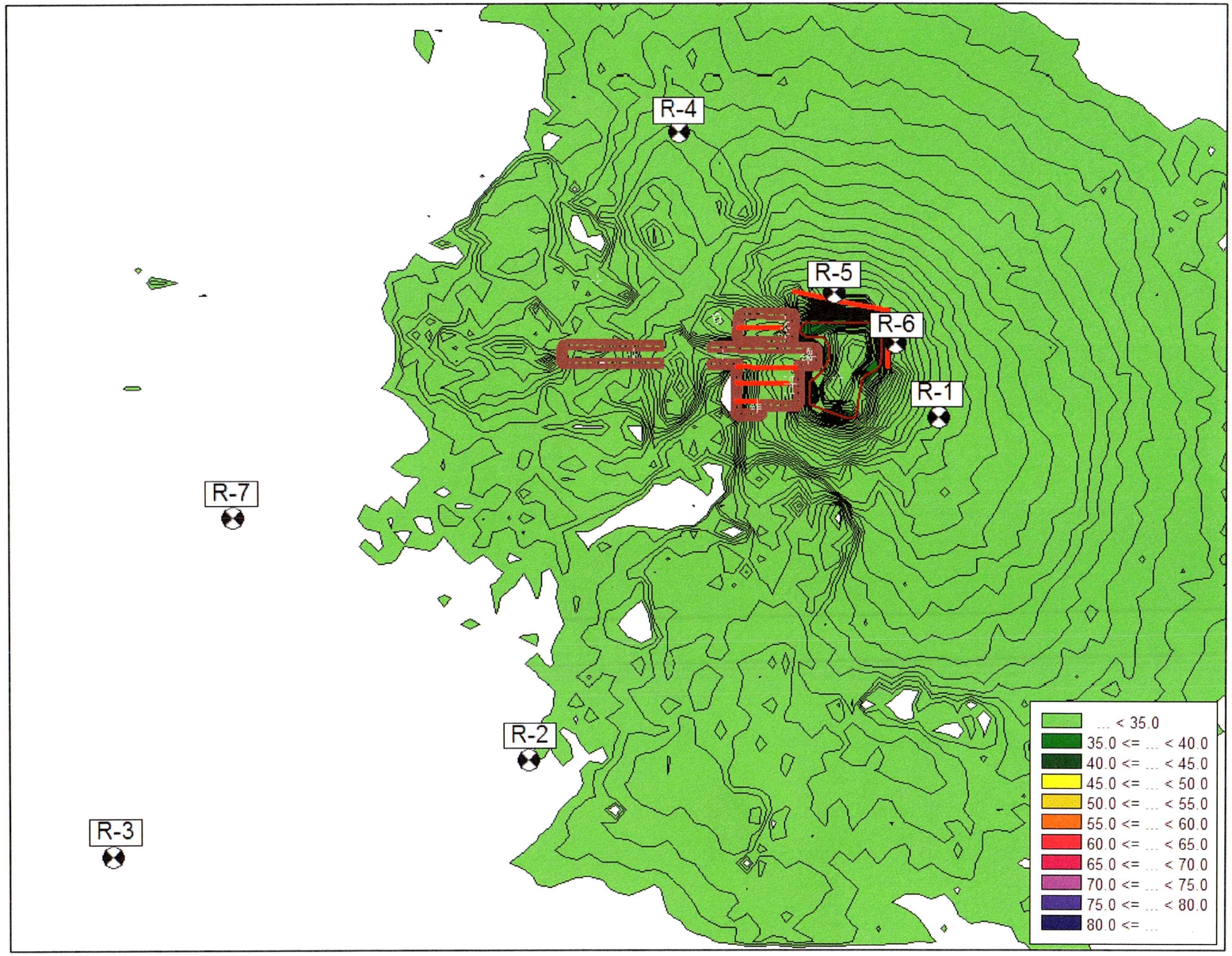


Figure 7B. Crucible Driving Course Noise Isopleth Contours (Original Study 3/22/18)

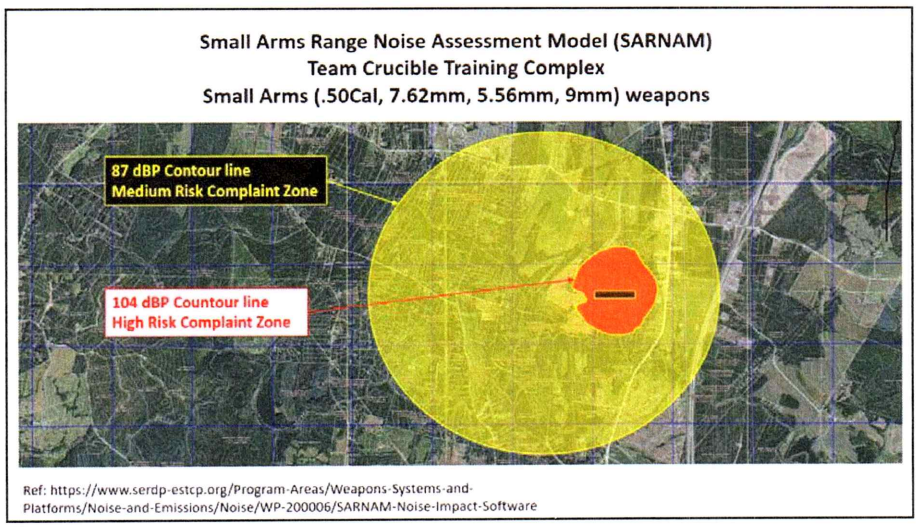


Cadna-A vs. SARNAM

Some members of the public, opposed to Crucible developing and operating their new facility in Spotsylvania, have presented their opinions and alleged noise-related facts in this case to Spotsylvania County officials. Unfortunately, this presentation was fraught with misunderstanding, misapplication and misleading information.

In that presentation, the person(s) addressing those officials and the public attempted to calculate and characterize the potential noise generated by Crucible's proposed new facility by making use of the *Small Arms Range Noise Assessment Model* (SARNAM). Their results, shown graphically in **Figure 6** as sound level isopleth zones surrounding Crucible's facility, indicated that noise from firearms (including 50 BMG rifles that will not be used) could be as loud as 104 dB SPL Peak at a distance of 2,200 feet, and as loud as 87 dB SPL Peak as far away as 10,500 feet. Attempts were then made to explain how these decibel results would significantly exceed the Spotsylvania County Noise Ordinance limits, which again is an inaccurate and misleading conclusion for the reasons below.

Figure 6. Opposition's SARNAM Noise Model Results



SARNAM was developed in the 1990s by a group of researchers working at the US Army's Construction Engineering Research Laboratory (CERL). The main purpose of SARNAM was to aid the Army in land-use planning in and around military bases. The developers of SARNAM chose to characterize noise emission levels from firearms using the "dB Peak" sound level, and limit the output of the SARNAM model to only compute dB Peak, Sound Exposure Level (SEL), Annual Equivalent Sound Level (ALeq) and Annual Day-Night Sound level (ADNL). *However, none of these sound metrics are comparable to the noise limits set forth in the Spotsylvania County Noise Ordinance.*

First and most importantly, a decibel level expressed as dB Peak is not at all the same as one expressed as dBA Lmax 'slow' as specified in the Spotsylvania County Noise Ordinance (see definitions in **Appendix A**). Both metrics describe sound level in a quantitative manner, but they are wholly different in their derivations and their values are not directly comparable. A good conceptual analogy would be that of thermal temperature. While all temperature levels are expressed in units of "degrees", the given scale (i.e. Fahrenheit, Celsius, Kelvin, Rankin, etc.) must also be stated for the absolute value or comparisons of the numeric degree quantity to make sense.

The problems with using SARNAM in this case include the facts that dB Peak is not a frequency-weighted metric (vs. A-weighted), the sound has not been measured with an RMS detector (vs. Lmax), and the sound measurement has a rise time constant of approximately 10 to 100 micro-seconds (vs. 1 second for 'slow'). Consequently, the sound level of an acoustical signal such as a gunshot expressed in dB Peak must by definition have a much higher numeric value than one expressed in dBA Lmax 'slow' for the same acoustical signal (i.e. the same gunshot). For a near perfect sound impulse, the numeric difference could be as much as 47 decibels! Thus, if one were to try to evaluate the opposition's SARNAM results with respect to the limits in the Spotsylvania County Noise Ordinance, the results would roughly be the following:

- 104 dB Peak would become *57 dBA Lmax 'slow'*, where the daytime limit is 60 dBA Lmax 'slow'.
- 87 dB Peak would become *40 dBA Lmax 'slow'*, where the daytime limit is 60 dBA Lmax 'slow'.

Conversely, the Cadna-A noise model, as described previously, is ideally suited for predicting and evaluating noise levels in accordance with the Spotsylvania noise ordinance. Cadna-A incorporates the algorithms and recommended practices contained in ISO Standard 9613 for outdoor sound propagation. And most importantly in this case, Cadna-A can predict sound levels in units of dBA Lmax 'slow' in a manner consistent with the Spotsylvania noise ordinance, allowing for an "apples-to-apples" comparison.

Proper Acoustical Measurements (Smartphones)

In cases such as this one involving contested sound levels and the legal application and enforcement of noise limits, it is crucial to understand how sound levels are measured properly. The old adage of "garbage in, garbage out" certainly applies to sound measurement data and results.

Sound level meters are certified for proper performance and measurement accuracy in accordance with the test procedures and tolerances described in American National Standards Institute (ANSI) Standard S1.4 and corresponding International Electrotechnical Commission (IEC) Standard 61672. Specifications are provided with respect to a sound meter's amplitude dynamic range, frequency response and weighing filters (e.g. A-weighting), linearity, time response (e.g. RMS 'impulse', 'fast', 'slow'), measurable noise floor, temperature and humidity stability, data collection and display rate, and calibration accuracy. And of course, the sound meter must be able to correctly measure the metrics customarily used in the acoustics profession (e.g. SPL, Lmax, Lmin, Leq, SEL, Ln%, Lave and Peak).

Depending on how well a sound level meter can pass these tests, it will be certified as meeting either Type 0, Type 1 or Type 2 requirements. Type 0 is the highest level of accuracy, nominally +/- 0.5 dB, and is reserved for "laboratory-grade" acoustical instrumentation. Type 1 sound meters are nominally accurate to within +/- 1.0 dB and are used for "precision-grade" sound measurements. Lastly, Type 2 sound meters of nominal accuracy of +/- 2.0 dB are considered acceptable for "general-purpose" community noise surveys and OSHA-type hearing conservation dose monitoring.

If a sound level meter is <u>not</u> certified as being compliant with one of these ANSI S1.4 Type requirements then it should <u>not</u> be used for important sound measurement applications, especially if the results have legal consequences associated with them.

To illustrate, some people have mistakenly thought that performing sound measurements with today's sophisticated smartphones could produce reliable decibel results. However, even though most smartphones have a "sound meter app" in them, they are not, and in fact could not be, certified as meeting one of the Type level requirements described in ANSI Standard S1.4. This is because the microphones and preamps found in smartphones are wholly inadequate for performing accurate sound measurements. Their dynamic and frequency ranges are too small to measure noise sources such as firearms and vehicles because they are intended to only transduce voice and speech. Thus, they only work within a small portion of the audible frequency spectrum, and do so with a non-linear dynamic response. There is also great inconsistency in how these apps define the various metrics used in acoustics.

But the biggest problem is that smartphone "sound meter apps" cannot be properly calibrated with a higher-order more accurate calibration source. Thus, any sound level data collected with a smartphone, and in fact any sound meter not certified as meeting one of ANSI S1.4 Type requirements, cannot and should not be relied upon for dependable and defendable results.

Conclusions

The results of this updated acoustical study support the expectation and conclusion that Crucible will be able to successfully manage noise emissions associated with their new facility in Spotsylvania County, Virginia. And in fact, noise levels affecting the surrounding community are expected to be notably reduced with Crucible's current facility design layout compared to their original design assessed on 3/22/18.

Noise propagating to the surrounding community from Crucible's use of firearms, simulated IEDs and evasive driving course are expected to comply with the daytime impulsive noise criteria limits contained in the Spotsylvania County Noise Ordinance; which Crucible has voluntarily put forth as their goal.

As evidence of their willingness to control noise to the fullest extent reasonably practicable, Crucible has proactively committed to certain physical noise control enhancements to their facility design. Most notable is their plan to build unusually tall 20-foot-high earthen berms to completely surround their now-single shooting range. Moreover, the default operating condition for rifles on the shooting range will be to equip them with effective sound suppressors. Further, Crucible is voluntarily willing to limit their operational hours to daytime hours only.

In conclusion, given these proactive noise mitigation measures and the quantitative results of this acoustical study, *the new Crucible facility would be a noise-compatible land-use within its proposed location in Spotsylvania, Virginia.*

Appendix A

Acoustical Terms and Definitions

Acoustical Terms and Definitions

As with any field of science, it is critical to understand and make proper use of technical terms and definitions that are used in the acoustical industry. Noise can be quantified in many different manners depending on its temporal/time, tonal/frequency, or magnitude/loudness properties.

Noise magnitude is expressed in units of *decibels (dB)* which is a logarithmic quantity comparing fluctuating air pressure to that of a standardized reference static air pressure of 20 micro-pascals (i.e. dB re: 20 µPa). For this reason the noise levels that humans hear are called *sound pressure levels*. Noise is expressed as a logarithmic quantity because humans are sensitive to relative changes in noise levels. To illustrate, humans can just barely perceive a change in noise levels of +/- 1 decibel, can likely perceive a change of +/- 3 decibels, can easily perceive a change of +/- 5 decibels, and will generally describe a change of +/- 10 decibels as a doubling or halving in noise levels.

With respect to tonal qualities (frequency), a frequency weighting adjustment has been standardized to account for the human auditory response over the audible frequency range of approximately 20 Hz to 20,000 Hz. Humans are less capable of hearing low frequency noise, exhibit a maximum sensitivity to tones in mid-frequency ranges, and are slightly less sensitive to high frequency sound as well. This frequency weighted adjustment is referred to as "A-weighting", with results expressed as *A-weighted decibels, or dBA.* Illustrative examples of A-weighted decibel levels for common outdoor and indoor noise sources is provided in **Figure A-1**.

Another common practice is to separate a sample of noise into its spectral components by using frequency filters of known shape and bandwidth. This approach provides insights into the source and transmission characteristics of the noise and allows for identification of frequency ranges that contain the most acoustical energy. *Octave band and third-octave band* filters are typically used for this purpose because their bandwidths are a constant percentage of their center frequencies, and are better for mimicking how humans perceive discrete frequencies by providing finer resolution at lower frequencies.

Numerous metrics and indices have been developed to quantify the temporal characteristics (changes over time) of environmental noise include the following:

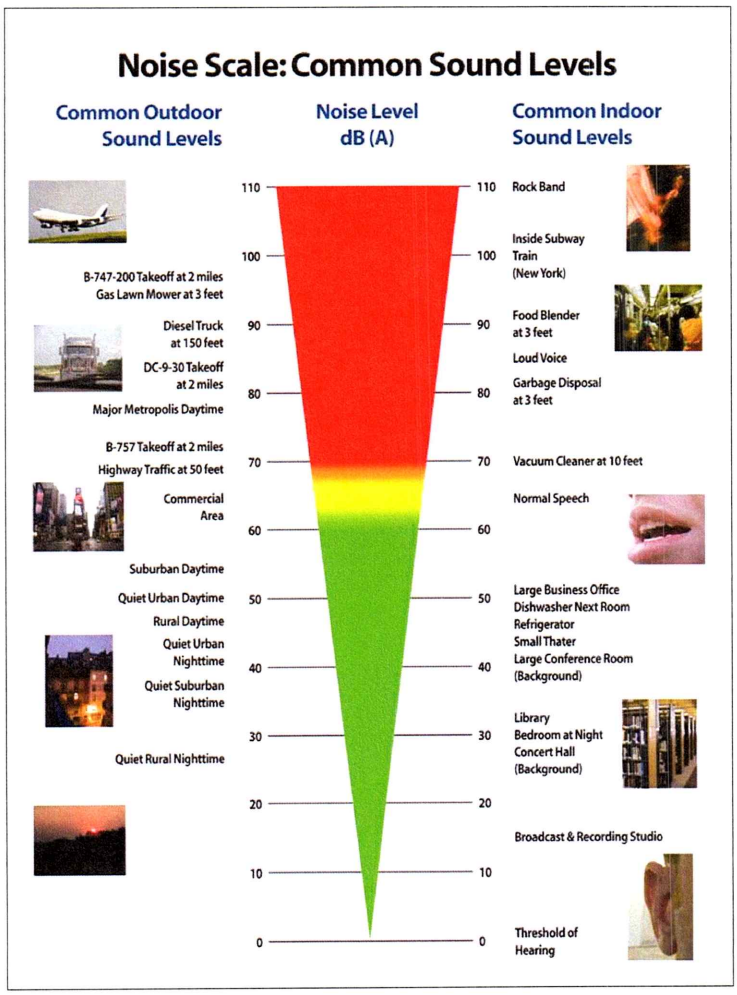
The *Equivalent Sound Level, or Leq*, is the energy-averaged single noise level that represents the same acoustic energy that was contained in the fluctuating noise level over a defined period of time. The Leq is useful for describing the "average" noise level over time, and is expressed in dBA.

The *Maximum and Minimum Sound Levels, or Lmax and Lmin*, are the loudest and quietest instant sound level occurring during a period of time. The Lmax is particularly useful for evaluating loud, impulsive noise events such as gunshots. Lmax and Lmin levels are expressed in dBA, however the root-mean-square (RMS) time constant of the sound level meter's detector has a significant effect on the measured levels. By International agreement, a sound level meter with an RMS response set to "slow" has a rise time constant of 1 second, where a setting of "fast" is about 8x faster with a rise time constant of only 0.125 seconds.

The *Peak Sound Level, or Peak*, is a measure of the highest unweighted raw air pressure level in an acoustical signal. Peak levels have not been rectified through a root-mean-square detector before being measured, and thus should not be confused with Lmax sound levels. Human auditory perception is not related to Peak sound levels. Rather, Peak levels are used for evaluating the potential effects of high intensity air pressure impulses affecting physical structures or damage to people's eardrums.

The *Percentile Level, or Ln*, expressed in dBA is a statistical representation of changing noise levels indicating that the fluctuating noise level was equal to, or greater than, the stated level for "n" percent of the time. For example, the L1, L10, L50, and L90 represent the noise levels exceeded 1%, 10%, 50%, and 90% of the time. The L10 is often used to identify impacts of transportation or construction noise sources, while the L90 is considered to represent steady background noise.

Figure A-1. Common A-Weighted Decibel (dBA) Sound Levels



The *sound power level (PWL)* of a noise source is the strength or intensity of noise that the source produces/emits regardless of the environment in which it is placed. Sound power is a property of the source, and therefore is independent of distance. The radiating sound power then produces a *sound pressure level (SPL)* at any given point of interest which human beings perceive as audible sound. The sound pressure level is dependent on its environment (absorption, reflections, etc.) and its distance from the noise source. And even though both sound power and sound pressure are expressed in decibels (dB), they are not the same thing and should not be confused. Decibel levels of sound power are referenced to a power level of 1 pW, while decibel levels of sound pressure have a pressure reference level of 20 µPa.

Appendix B

Professional Certifications

The following acoustical professional was the principle investigator for this project.



INCE

The Institute of Noise Control Engineering
of the United States of America, Inc.

in recognition of
professional standing and contributions
attests that

ERICH THALHEIMER

a Member of the Institute
is
Board Certified
in Noise Control Engineering

For the Board of Directors

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2001 June

Shooting Range Design & Safety Evaluation
of the
Team Crucible
Training Complex
Spotsylvania, Virginia

16 April 2018

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1 Background and Scope of Work

Team Crucible wishes to construct and operate a shooting range facility in Spotsylvania County, Virginia. Kramer One, Inc. was retained by Team Crucible to evaluate their proposal to construct and operate this shooting range facility.

Kramer One, Inc. is an architecture and planning firm nationally recognized for shooting range design. The firm is located in Scottsdale, Arizona, and has designed shooting ranges in thirty states, including Virginia.

The Team Crucible Training Complex was not designed by Kramer One, Inc. Our role is limited to the review of the shooting range safety systems for this proposed facility and make recommendations where appropriate. Team Crucible has incorporated all of the additional engineering and administrative controls we requested.

Prior to writing this report, we reviewed the following documents.

- Drawings 1-6 by W W Webb & Associates, PLLC, revision dated March 15, 2018
- Generalized Development Plan – Narrative – Rezoning & Special Use Permit Applications
- Letter to Leon Hughes, dated March 22, 2018
- Voluntary Proffer Statement

2 Shooting Range Safety Standards

The industry standard recommendations for the design and operation of facilities like the Team Crucible Training Complex come from the National Rifle Association (NRA) and the National Shooting Sports Foundation (NSSF). The primary document is the NRA Range Source Book. The latest edition is dated 2012. We have used the 2012 NRA Range Source Book for reference in preparing this report.

The primary bullet containment concept of the shooting range industry, as promulgated by NRA, is all bullets fired on the firing ranges should not leave the property owned or controlled by the shooting range facility.[1] The methods to controlling the bullets fired may include engineering controls, administrative controls, or a combination of administrative and engineering controls. From a practical standpoint, both engineering controls and administrative controls are necessary. The best engineering controls can be defeated by a lack of administrative controls. No engineering controls would be equally undesirable.

We understand military standards, to include Surface Danger Zones (SDZ), has been suggested as the applicable standard for the Team Crucible Training Complex. We disagree. The United States Armed Services publishes standards for various weapons facilities, including small arms[2] firing ranges. These standards have specific applicability to facilities operated by various branches of the United States Armed Services, but have no applicability to other firearms facilities, such as private, public, law enforcement and security firing ranges. The Team Crucible Training Complex is not operated by any branch of the United States Armed Services, nor does it exclusively use ammunition for which SDZs are published.

In the next two chapters of this report we will discuss engineering controls and administrative controls.

[1] Exception: Bullets being removed for recycling or disposal.
[2] "Small arms" is defined as firearms that may be both carried and discharged by one person. Pistol, rifles and shotguns are all examples of small arms.

3 Engineering Controls

The engineering controls shown on the Team Crucible Training Complex documents include earth backstops with ricochet catchers, and side berms. Additionally, the types of targets and their locations are restricted. Details of these engineering control may be found in the following sections of this chapter.

Backstops

Backstops are the primary device intended to stop bullets fired on shooting ranges.

The NRA Range Source Book recommends earth backstops be constructed with a minimum height of 20 feet, a minimum slope on the shooting face of 1.5:1 (1.5 units horizontal to 1 unit vertical), and the material in the shooting face have no rocks greater than ¾ inch in diameter to a minimum depth of 24 inches.[3] The Team Crucible Training Complex will be designed to meet these standards.

Berms/Walls

Side berms or walls may be used to separate shooting ranges from one another. They may also be used as an engineering control for added protection of areas adjacent to a shooting range.

The NRA Range Source Book's recommendation for side berms is similar to their recommendation for earth backstops, except the minimum height is reduced to 8 feet.

The NRA Range Source Book describes an option to side berms where the material is an impenetrable vertical wall or barrier, rather than sloped earth. The minimum height recommendation remains 8 feet.

The Team Crucible Training Complex will have perimeter side berms much greater than 8 feet for sound control reasons. Internal walls will be a minimum of 10 feet high, exceeding the NRA recommendation of 8 feet. All side berms and walls will exceed the minimum standards identified in the NRA Range Source Book.

Ricochet Catchers

When ricochet catchers are constructed, the NRA Range Source Book recommends constructing a barrier embedded into the earth backstop and extending outward at least 6 feet.

[3] The NRA Range Source Book is inconsistent regarding maximum rock size. Both ¾ inch and 1 ½ inch are stated. This report uses the more restrictive size.

The NRA Range Source Book does not adequately address under what conditions a ricochet catcher should be utilized. However, in our professional opinion the Team Crucible Training Complex could experience backstop deflected bullets leaving their property without ricochet catchers be constructed on all of the earth backstops. Team Crucible has agreed to construct these devices. Be aware that the addition of ricochet catchers exceeds the minimum standards identified in the NRA Range Source Book.

Targets

When steel targets are used, the NRA Range Source Book recommends the minimum distance from shooter to target be 10 yards (30 feet) to prevent bullet splatter from injuring shooters. Paper and cardboard targets have no such recommendation, as the bullets travel through the targets into the backstop. However, the NRA Range Source Book also recommends shooters not shoot closer than 10 yards (30 feet) from the earth backstop they are shooting into. For paper and cardboard targets, the targets should be placed to prevent the distance from the shooter to the earth backstop from being less than 10 yards. The Team Crucible Training Complex will use steel targets, as well as paper and cardboard targets. Administrative controls will be in place to maintain appropriate distances.

The use of backward falling steel plate targets can result in deflected bullets leaving an outdoor shooting range property. Team Crucible will not be using this these types of steel targets.

Ground Surfaces

To control ground deflected bullets, the shooting range industry recommends locating targets such that bullets do not strike the ground surface, rather the bullets strike the impact area of the backstop. The Team Crucible Training Complex will be designed and operated to meet this standard.

4 Administrative Controls

Range safety is not a function of design alone. Often when incidents of bullet escapement have occurred, they are the result of a properly designed and maintained shooting range being utilized improperly. The solution is supervision of the shooting activities.

Shooting range supervision can be accomplished by active or passive means. An example of passive means of shooting range supervision would be posting shooting range rules on the shooting range. An example of active means of shooting range supervision would be the presence of a range safety officer.

An industry accepted method, and one of the most common methods, of controlling direct fire bullets is through active administrative controls. Administrative controls could include educating the range users about safe gun handling rules and enforcing those rules through shooting range supervision by range safety officers.

Safe gun handling rules include, but are not limited to:

1. Keep firearm muzzles pointed in a safe direction. The safe direction on a shooting range is toward the impact area of the backstop.
2. Keep fingers off the trigger until the firearm sights are aligned with the target.

For a firearm to be discharged over the earth backstop, both of these fundamental rules would need to be simultaneously violated. Teaching the safe gun handling rules makes the shooters aware of their responsibility and the consequences of violating the rules. On a supervised shooting range, range safety officers police the shooting activities to enforce the safe gun handling rules.

The Team Crucible Training Complex is an actively supervised shooting facility. No firearms training will be conducted without qualified range safety officers being present and in charge during all firing activities. This meets the highest level of care for the shooting range industry. Team Crucible has an existing record of operating a supervised outdoor shooting range facility, and without a single incident of bullet escapement being alleged at that facility. This indicates an understanding of proper education and enforcement by Team Crucible staff.

5 Conclusion

The Team Crucible Training Complex as proposed would meet current industry standards for shooting range safety. The commercial shooting range industry has an exemplary safety record and Team Crucible has had no reported incidents of bullet escapement on their existing facility, which has been in operation for nineteen years.

The industry standards for this type of facility are as published by the National Rifle Association and the National Shooting Sports Foundation. Specific engineering and administrative controls proposed for the Team Crucible Training Complex meet or exceed those industry standards.

Maintaining safety for shooting range users and the surrounding neighborhood involves a combination of appropriate design and construction, attention to maintenance, and proper operation. The Team Crucible approach to these factors appears to be consistent with a facility being operated at a high level of care. All shooting operations are conducted under the supervision of qualified range safety officers. All shooting range users will be educated about safe gun handling rules and those rules will be enforced by the range safety officers. Engineering controls meet or exceed the recommendations of the industry.



Lorin D. Kramer
President
Kramer One, Inc.

January 18, 2018

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Fredericksburg, VA 22406

jgarman@team-crucible.com

RE: MT2 REVIEW AND PREPARATION OF DOCUMENTS FOR LEAD MITIGATION TEAM–CRUCIBLE TRAINING COMPLEX, SPOTSYLVANIA COUNTY, VA

Dear Mr. Garman:

Team Crucible, LLC (Team Crucible) is in the process of applying to the County for the building of its new training facility in Spotsylvania County, Virginia. Metals Treatment Technologies, LLC (MT2) understands that Team Crucible, as part of its design and permitting process, is committed to developing and implementing a lead mitigation plan that protects the environment and its business interests.

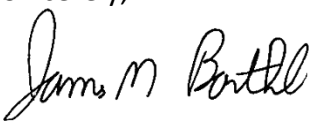
Throughout the last seven months, MT2 has reviewed various plans and supporting documents developed by Team Crucible and has provided comments and recommendations to align the design with United States Environmental Protection Agency (USEPA) Best Management Practices (EPA-902-B-01-001, Revised June 2005). Some of the key design elements include:

- Commitment to develop and implement an Environmental Stewardship Plan (ESP), which will include management actions, such as monitoring and reclamation actions, that will mitigate lead migration from the ranges.
- Construction of range backstops using horizontal bullet catchers and sand traps to mitigate ricochets and augment lead reclamation
- Permanently install and maintain wired silt fencing in areas where the ranges cross small drainage courses or abut Resource Management Areas (RMA)
- Construction of the ranges with engineered surface grading to allow for sheet flow to reduce erosion and water velocities, and direct surface waters to grassed drainage swales
- Install and maintain limestone check dams within the drainage swales
- Install and maintain water retention structures that collect surface waters from the drainage swales. These structures will be lined with limestone cobbles to allow for infiltration or they will be evaporation basins based on a Professional Engineer's design.
- Maintain grass in the swales to reduce erosion and lead migration
- Periodic monitoring of the pH of range floors and other selected areas; the results of which will be used to determine lime application to maintain pH levels above 6.5

- Regular accounting of accumulated bullets for purposes of determining when lead reclamation activities will be considered
- Implementing periodic lead reclamation, which includes the recycling of collected bullets and larger lead fragments.

If you have any questions or require further assistance, please contact me at 303-456-6977 or David Andrews at 203-803-0554.

Sincerely,



James M. Barthel, CEO; MT2, LLC

The Economic and Fiscal Impact of the Proposed Team Crucible Training Complex on Spotsylvania County, Virginia

By

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Prepared for

Team Crucible, LLC
Fredericksburg, Virginia

July 2017

Executive Summary

The proposed Team Crucible Training Complex in its initial phase would generate both positive economic and fiscal benefits for Spotsylvania County. These benefits will be generated by the construction spending required to prepare the site for initial operations and by future construction spending to buildout the site for expanded operations by Team Crucible and to provide office space for other federal security contractors at a future time and be measured by increased job and income growth to the benefit of residents and businesses located ion Spotsylvania County.

The initial construction spending of $1.1 million would contribute a total of $1.7 million to the County's economy during the construction period, generate $341,000 in new wage income for workers residing in the County and support a total of 7.3 full-time, year-round equivalent jobs locally and elsewhere. These economic benefits would be achieved exclusively during the construction period.

These positive construction impacts are complemented by the annual operating outlays by Team Crucible and by the per diem spending of trainees enrolled in security training programs on-site. In its initial stage, Team Crucible's estimate annual operating budget totaled $940,000. This budget provides for four full-time, regular on-site employees supplemented by 20 contract trainers. This level of operations would support 2,650 daily visits (trainee days) annually on-site generating per diem local spending for accommodations and meals totaling $363,000. At this initial scale, the total impact of operations outlays, including trainee expenditures, would contribute $1.9 million to the County's economy each year, generate $538,000 in new local labor income for workers residing in the County and support a total of 12.5 full-time, year-round equivalent jobs beyond those employed at the Training Complex.

The buildout proposal for this site provides for the expansion of Team Crucible's Training Complex by 12,000 square feet and the addition of 40,000 square of office space that would be available to other federal security contractors. This added capacity for Team Crucible would accommodate up to 10,000 daily visits (trainee days) annually and requires annual operating outlays totaling $5.3 million. This scale of operation would include 15 full-time regular employees on-site with up to an additional 75 contract trainers. Inclusive of the annual flow of trainees and their spending for accommodations and meals (not including other personal outlays for retail and incidentals), the buildout proposal would generate $6.7 million in annual (recurring) spending directly to the benefit of the local economy. This direct spending, reflecting a composite multiplier of 1.511, would contribute a total of $10.1 million to the County's economy, generate $2.2 million in new wage income for County residents working within the County, and support a total of 65 jobs of which 39 full-time, year round equivalent jobs would be held by County residents.

Complementing the positive income and employment benefits that would accrue to Spotsylvania County, its resident workers and businesses, Team Crucible's proposed Training Complex has been shown to generate a positive fiscal benefit to the County in

its initial stage of operation (+$15,823.40) with its net fiscal benefit increasing at the full buildout scale of operations (+$63,681.50).

The net fiscal benefit of Team Crucible's proposal is conservative as its revenue impacts are underestimated by design (they reflect non-residential revenue flows that incorporate tax exempt uses) and they reflect non-residential public expenditure demand (for County provided services) that assume access to services that would not be required to support Team Crucible's daily functions. These economic and fiscal benefits are summarized in the following table.

Economic and Fiscal Impacts of the Proposed Team Crucible Training Complex on Spotsylvania County
(in millions of 2016 dollars)

Phases	Direct Outlays	Total Output	Personal Earnings	Jobs Supported
Initial proposal				
Construction	$1.100	$1.687	$0.341	7.3
Operations	$0.904	$1.375	$0.291	8.5
Trainee Spending[1]	0.363	0.538	0.110	4.0
Total Operations	$1.267	$1.913	$0.401	12.5
Buildout				
Construction	$5.500	$8.436	$1.704	36.3
Operations	$5.319	$8.087	$1.709	49.8
Trainee Spending[1]	1.370	2.023	0.413	15.3
Total Operations	$6.689	$10.11	$2.122	65.1

Fiscal Impacts

Jobs	Revenues	- Expenditures	= Fiscal Impact
Initial			
24[2]	$31,805.96	$15,982.56	$15,823.40
Buildout			
90[3]	$88,778.60	$59,934.60	$28,844.00
295[4]	$260,136.80	$196,455.30	$63,681.50

Source: The Stephen S. Fuller Institute at the Schar School, GMU
[1]includes per diem allowances of $91 and $46 for hotel and food per trainee
[2]includes 4 fulltime regular jobs and 20 contract jobs at Crucible
[3]includes 15 fulltime regular jobs and 75 contract jobs at Crucible
[4]includes 90 Team Crucible jobs plus 205 jobs in the proposed 40,000 square foot office building

Introduction

The objective of this analysis is to estimate the economic and fiscal impacts on the Spotsylvania County of the proposed Team Crucible development and operations of a new Training Complex to be located on a 70-acre site, currently zoned A-2, with access directly to U.S. Route 1. Two levels of economic and fiscal impact analysis are reported: the initial phase and buildout that includes expansion capacity for Team Crucible and the co-location of other federal contractors in office space on the site.

The economic impacts generated by the construction, operation and local spending by trainees of Team Crucible's proposed training complex reflect the direct expenditures associated during the construction phase, both soft and hard costs, and the continuing annual outlays to operate the on-site training programs as well as the new spending for overnight accommodations and meals by the trainees enrolled in Team Crucible's training programs. As this new spending circulates within the County's economy it will generate additional business transactions and support the payroll of local workers. And, with this re-spending of these new monies additional income and additional employment will be generated. These economic effects are measured using "multipliers" calculated by the U.S. Bureau of Economic Analysis for Spotsylvania County. These multipliers will be used to derive the total contribution of this new spending to Spotsylvania County's economy, the new personal earnings generated to the benefit of workers residing in Spotsylvania County and the total jobs this new spending will support annually locally and elsewhere in the region and state.

The County's FY 2016 Comprehensive Annual Financial Analysis (CAFR) will provide the basis for the fiscal impact analysis as its audited expenditures and revenues provide the best available information on the distribution of public services and their beneficiaries and the sources of the County's revenues. The full fiscal analysis methodology is outlined in the appendix.

Project Description

Team Crucible has proposed a training complex to be sited on a 70-acre parcel with direct access from U.S. Route 1. The initially development phase would involve $1.1 million in capital outlays (including $100,000 in soft costs) to prepare the site and support facilities designed to support a total of 2,650 daily visits (trainee days) annually over the first year of operation. Trainees typically attend a five-day program spending five nights in local hotels/motels and receive a per diem government allowance of $91 per night for accommodations and $46 per day for meals. This initial training program would have four fulltime, regular employees on-site supported by 20 contract employees for a total workforce of 24. Annual operating outlays for this initial stage of operation are estimated at $904,284 inclusive of payroll. Trainee spending for accommodations and meals, based on 2,650 total daily visits in the first year, would total $363,000. This trainee spending only includes lodging and meals; additional spending for recreation, retail purchases, transportation and incidental consumer services would be expected.

The buildout scenario includes the construction of a 40,000 square foot office building and an additional 12,000 square feet of training space to accommodate Team Crucible's expanded security training programs. These expanded facilities would result in new construction outlays of $5.5 million, increased training capacity for 10,000 daily visits (trainee days) annually with trainee per diem spending of $1.7 million for accommodations and meals, annual operating outlays for Team Crucible totaling $5.319 million, and staffing of 15 full-time regular employees supplemented by 75 contract trainers for a total of 90 jobs within the Team Crucible Training Complex. The additional office building space, designed to accommodate other federal security-related contractors, is projected to accommodate up to 205 employees, based on an industry occupancy norm of 195 gross square feet per worker. These design parameters are the drivers of the proposal's economic and fiscal impacts on Spotsylvania County that are reflected in the following analyses.

Economic Impact Analysis

The construction (hard and soft costs) and operation of the proposed Team Crucible Training Complex represent an important new economic development in Spotsylvania County. The economic impacts of the initial training facilities and programs, for construction and site preparations and the facility's operating outlay and spending by trainees are summarized in Table 1.

Table 1

Initial Impact of the Proposed Team Crucible Training Complex
on the Spotsylvania County Economy
(in millions of 2016 dollars)

Sources	Direct Outlays	Total Output[1]	Personal Earnings[2]	Jobs Supported[3]
Construction Outlays*	$1.100	$1.687	$0.341	7.3
Operating Outlays	$0.904	$1.375	$0.291	8.5
Trainee Spending**	0.363	0.538	0.110	4.0
Total Annual Outlays	$1.267	$1.913	$0.401	12.5
Combined Impacts	$2.367	$3.600	$0.742	19.8

Sources: Team Crucible, LLC; The Stephen S. Fuller Institute at the Schar School, GMU.
*hard and soft costs, **spending by trainees for hotels and meals.

[1]the total value of goods and services generated directly and indirectly as a result of construction spending and annual operating outlays and local occupant spending in the Spotsylvania County economy; [2]the additional earnings generated within the Spotsylvania County economy from outlays for initial construction and subsequent annual operating outlays and resident spending; [3]the total full-time, year-round equivalent jobs supported locally and elsewhere by the spending and re-spending of direct expenditures for construction and operation of the Training Complex.

Table 2

Buildout Impact of the Proposed Team Crucible Training Complex
on the Spotsylvania County Economy
(in millions of 2016 dollars)

Sources	Direct Outlays	Total Output[1]	Personal Earnings[2]	Jobs Supported[3]
Construction Outlays*	$5.500	$8.436	$1.704	36.3
Operating Outlays	$5.319	$8.087	$1.709	49.8
Trainee Spending**	1.370	2.023	0.413	15.3
Total Annual Outlays	$6.689	$10.110	$2.122	65.1
Combined Impacts	$12.189	$19.546	$3.826	101.4

Sources: Team Crucible, LLC; The Stephen S. Fuller Institute at the Schar School, GMU.
*See Table 1 for notes.

The initial development of Team Crucible's Training Complex will contribute $1.1 million in new construction spending into the Spotsylvania County economy. This new spending will generate a total of $1.7 million in direct and indirect impacts reflecting a construction multiplier of 1.53. Additionally, this one-time construction spending will generate $0.341 million in personal earnings (labor income) for residents of Spotsylvania County (representing approximately annual earnings for 6 full-time employees) and support as many as 7.3 full-time, year-round equivalent jobs in the County, region, state and elsewhere. These economic benefits will accrue to the County during the initial construction period.

Buildout plans call for the development of a 40,000 square foot office building and the addition of 12,000 square feet of training space to be occupied by Team Crucible. The projected cost for this additional office and operating space is $5.5. As shown in Table 2, the economic impacts of these construction outlays are: $8.4 million total contribution to the County's economy over the construction period; the addition of $1.7 million in new wages and salaries accruing to workers residing in the County (the equivalent of 31 full-time, year-round local jobs); and a total of 36.3 full-time, year-round equivalent local and non-local jobs being supported by these construction outlays.

Following construction, the operation of the proposed facility will generate annual benefits from outlays by Team Crucible to support on-site annual operations and additional annual economic impacts will be generated by the spending of the estimated 2,650 daily visits (trainee days) annually to the Training Complex over the course of its first full year of operation. Annual operation outlays are estimated to total $904,284 including payroll of approximately $391,000 to support 4 full-time

regular employees and 20 contract trainers. These operating outlays will recur annually and would be expected to grow proportionally with the number of trainees.

With the proposed buildout of the facility, an operating budget totaling $5.3 is projected including 15 full-time regular positions and 75 contract employees. The economic impact of these operational outlays is shown to total $8.1 million to the benefit of Spotsylvania County. Additionally, $1.7 million in new personal earnings will be generated annually upon buildout to the benefit of workers residing in Spotsylvania County, the equivalent payroll of 31 full-time, year-round jobs; and altogether, these outlays would support a total of 49.8 full-time, year-round equivalent jobs locally and elsewhere.

Beyond the spending to build and operate the proposed Training Complex, the trainees represent a major source of continuing spending potential to the benefit of local businesses. Each trainee—2,650 projected training (person) days in the first year and up to 10,000 daily visits (trainee days) annually at buildout—will receive a per diem of $91 for accommodations and $46 for meals (in today's dollars). This spending alone will total $363,000 at the initial stage of operations and increase to $1.4 million at buildout. This trainee spending only includes lodging and meals; additional spending for recreation, retail purchases, transportation and incidental consumer services would be expected. Given the site location, businesses located in Spotsylvania County would be the principal beneficiaries of these trainee expenditures. This spending has been shown to generate beneficial impact on: the County's economy, the resident workforce in the form of new labor income, and the local and regional employment base.

Summarizing the total economic benefits from the initial development phase, the direct spending for construction and operations, including trainee per diem spending of $2.367 million, would generate total benefits of: $3.600 million in new economic growth, $742,000 in new personal earnings to the benefit of an estimated 13.5 full-time, year-round equivalent workers residing in the County, and support a total of 18.3 full-time, year-round equivalent jobs locally and elsewhere not including the jobs located on site.

The economic benefits flowing from the proposed buildout of these facilities, including 40,000 in office space for use by other federal security contractors (but excluding those contractors' operating outlays from the impact calculations), would increase Team Crucible's training capacity to 10,000 daily visits (trainee days) annually and support total direct spending $12.2 million (including $5.5 million in capital construction). This spending in Spotsylvania County would generate a total of $19.5 million to the County's economy, support $3.8 million in new personal earnings to the benefit of workers residing in the County (estimated 69.6 full-time, year-round equivalent jobs) and support a total of 101.4 jobs locally and elsewhere in addition to the jobs generated on site. These post-construction benefits will recur annually over the lifetime of Team Crucible's Training Complex.

Fiscal Impact Analysis: Countywide

This analysis is based on the expenditure and revenue data presented in the most current Spotsylvania County Comprehensive Annual Financial Report (CAFR), for FY 2016. The first step in this fiscal analysis is to divide the County's expenditures and revenues into those that serve or are generated by the residents of the County (its population) and those that are related to or generated by the County's non-residential functions with these being assigned it the workers who work within the County. This assignment of expenditures (demands for County services) and revenues is expressed for the County's 131,305 residents in 2016 on a per capita basis and for the County's non-residential functions based on its 34,186 at-place jobs across all sectors on a per employee basis.

In 2016, an analysis of the County's revenues, including all taxes, fees, permits, fines, user charges, and intergovernmental transfers, found that these were divided between residential and non-residential functions, respectively, on an 80.9% and 19.1% basis. An analysis of the County's expenses (demand for services) in 2016 found that these were distributed between residential and non-residential functions, respectively, on a 90.8% and 9.2% basis. As the County's expenditures reflected capital project outlays, the County's revenues and expenditures were not initially balanced and required bond sales, transfers, and other adjustments that ultimately generated a revenue surplus of $6.2 million that was added to the County's Fund Balance. As this fiscal impact analysis assumes a balanced budget, this fund transfer and other adjustments were assigned to residents and non-resident revenues reflecting the overall split across all revenue sources between residential and non-residential revenue sources. The results of these analyses are presented in Table 3.

On average, each resident of Spotsylvania County cost the County $1,711.25 for the services provided during fiscal year 2016, inclusive of education. This value represents the cost of making county-funded services available to its residents whether they actually used these services or not during the year. The largest single source of county expenditure was for public education, totaling $118.8 million in 2016. While on a per capita basis this education cost (which is all assigned to the city's population as they are the direct beneficiaries of these services) was $905.11 per capita, for the 23,678 students enrolled in the County's public schools in 2016 the County's per student cost of education was $5,019.26. With each Spotsylvania County resident accounting for $1,711.25 in County expenditures but only generating $1,524.05 in County revenues in 2016, each resident represented a fiscal cost of $187.19.

Offsetting these residentially based fiscal costs in Spotsylvania County are the fiscal surpluses generated on average by the County's taxable non-residential land uses. In 2016, all non-residential land uses (including non-taxable uses) generated a total expenditure demand on the County of $665.94 on average per at-place job in the County and generated revenues averaging $1,384.95 on average per at-place job. This surplus of revenues in excess of public expenditure demand totaled $719.01 per job and provided the revenue surplus to support the fiscal costs of residential land uses.

Table 3

Expenditures and Revenues Associated With
Residential and Non-Residential Uses in Spotsylvania County, FY 2016
(in 2016 dollars)

Source	Per capita[1]	Per Job[2]
Expenditures:		
County-wide average	$1,711.25	$665.94
County-wide average less Schools	806.14	
Education Only	905.11	
Revenues:		
Countywide average	$1,524.05	$1,384.95
Countywide average less real property tax revenue	786.38	670.04
Real property	737.67	714.91
Net Fiscal Impact	- $187.19	+ $719.01

Source: The Stephen S. Fuller Institute at the Schar School, GMU
[1]the County's population in 2016 was estimated to at 131,305 (CAFR).
[2]the County's at place employment in 2016 was estimated at 34,186 (BEA).

Fiscal Impact Analysis: Team Crucible Proposal

The fiscal impact of Team Crucible's Training Complex is a function of the local tax revenues it will generate and the local public expenditure demand its activities and employment base will represent. Employing the fiscal impact methodology outlined above and in the Appendix, and (1) basing the initial phase analysis on a total employment base of 24 full-time, year-round employees (this includes 20 contract trainers who are not all likely to be on site every training day) and (2) estimating the real estate value of the proposed Training Complex based on the land purchase value for the 70-acre site plus the capital improvements associated with only this initial development stage, the fiscal analysis shows that if the proposed Training Complex has existing during FY 2016 it would have generated a surplus of revenues over expenditures of $15,823.40 or $659.31 net fiscal benefit per on-site job. These fiscal flows are shown in Table 4 on page 9. In fact, the estimate revenues associated with Team Crucible's Training Complex are shown to be almost double the estimate cost of providing County services to the Training Complex.

A similar fiscal analysis for the buildout scenario, as outlined on page 4, reflecting the potential expansion of Team Crucible's scale of operations to 10,000 daily visits (trainee days) annually and the addition of 12,000 square feet of building space, with

a total of 90 full-time regular and contract trainers generates a fiscal benefit for Spotsylvania County totaling $28,844.00. These results are presented in Table 5.

Table 4

Fiscal Impact of Team Crucible's Initial Phase Training Complex on Spotsylvania County in 2016 (in 2016 dollars)

Source	Per Job[1]	Fiscal Impact
Revenues		
Less Real Estate	$670.04	$16,080.95
Real Estate Revenue	655.21	15,725.00
Total Revenues	$1,325.25	$31,805.96
Expenditures	$665.94	$15,982.55
Net Fiscal Impact	$659.31	$15,823.40

Source: The Stephen S. Fuller Institute at the Schar School, GMU
[1]based on 4 full-time regular and 20 contract jobs on-site

Table 5

Fiscal Impact of Team Crucible's Buildout Training Complex on Spotsylvania County in 2016 (in 2016 dollars)

Source	Per Job[1]	Fiscal Impact
Revenues		
Less Real Estate	$670.04	$60,303.60
Real Estate Revenue	316.39	$28,475.00
Total Revenues	$986.43	$88,778.60
Expenditures	$665.94	$59,934.60
Net Fiscal Impact	$320.49	$28,844.00

Source: The Stephen S. Fuller Institute at the Schar School, GMU
[1]based on 15 full-time regular and 75 contract jobs on-site

The buildout scenario also includes the construction of a 40,000 square foot office building to house other federal contractors compatible with Team Crucible's services that may seek to co-locate to this site from other locations in the Washington region. The inclusion of the office building (@$4 million construction cost) and the loading of this building with workers (full occupancy at 195 gross square feet per worker) would add 205 jobs to the site. Adding the fiscal impacts of these additional jobs and the related increase in real estate value to the buildout scenario, exclusive to Team Crucible as presented on Table 5, shows the full buildout proposal to generate a net fiscal benefit of $63,681.50.

Table 6

Fiscal Impact of Team Crucible's Buildout Training Complex
With Office Building on Spotsylvania County in 2016
(in 2016 dollars)

Source	Per Job[1]	Fiscal Impact
Revenues		
Less Real Estate	$670.04	$197,661.80
Real Estate Revenue	211.78	$62,475.00
Total Revenues	$881.82	$260,136.80
Expenditures	$665.94	$196,455.30
Net Fiscal Impact	$215.87	$63,681.50

Source: The Stephen S. Fuller Institute at the Schar School, GMU
[1]based on 90 Team Crucible employees and 205 office jobs housed in the proposed 40,000 square foot office building.

The site proposed for the Team Crucible Training Complex, as currently zoned, would accommodate 10 single-family detached residential units. If these 10 residential units had been built on this site, their fiscal impact would have generated $39,831.35 in revenues during 2016 to the benefit of Spotsylvania County. However, they also would have placed a demand on County services totaling $53,065.42 including educational costs of $28,609.78 for 5.7 school-age children generated by these units. The net fiscal impact of developing this site under its by-right zoning would result in a cost to the County of $13,234.07. However, by-right development of this site would cost the County not only $13,234.07 but also the foregone fiscal benefits totaling $15,823.40 that would have been generated has the site been used as proposed by Team Crucible. Consequently, by-right development would represent a total fiscal cost to the County of $29,056.47. This fiscal cost would only increase under the build out proposal shown in Tables 5 and 6.

Summary of Findings

The proposed Team Crucible Training Complex has been shown to generate continuing and important economic activity to the benefit of Spotsylvania County, its workforce and business base, and a net fiscal surplus to Spotsylvania County's budget as shown in Table 7.

Table 7

Economic and Fiscal Impacts of the Proposed Team Crucible Training Complex on Spotsylvania County
(in millions of 2016 dollars)

Phases	Direct Outlays	Total Output	Personal Earnings	Jobs Supported
Initial Proposal				
Construction	$1.100	$1.687	$0.341	7.3
Operations	$0.904	$1.375	$0.291	8.5
Trainee Spending[1]	0.363	0.538	0.110	4.0
Total Operations	$1.267	$1.913	$0.401	12.5
Buildout				
Construction	$5.500	$8.436	$1.704	36.3
Operations	$5.319	$8.087	$1.709	49.8
Trainee Spending[1]	1.370	2.023	0.413	15.3
Total Operations	$6.689	$10.11	$2.122	65.1

Fiscal Impacts

Jobs	Revenues	- Expenditures	= Fiscal Impact
Initial			
24[2]	$31,805.96	$15,982.56	$15,823.40
Buildout			
90[3]	$88,778.60	$59,934.60	$28,844.00
295[4]	$260,136.80	$196,455.30	$63,681.50

Source: The Stephen S. Fuller Institute at the Schar School, GMU

[1]includes per diem allowances of $91 and $46 for hotel and food per trainee

[2]includes 4 fulltime regular jobs and 20 contract jobs at Crucible

[3]includes 15 fulltime regular jobs and 75 contract jobs at Crucible

[4]includes 90 Team Crucible jobs plus 205 jobs in the proposed 40,000 square foot office building

These positive economic and fiscal impacts reflect the Team Crucible Training Complex's large and continuing annual operating outlays and expenditures by trainees enrolled at the Training Complex. The Complex's positive fiscal impacts reflect its lower demand for County-provided services compared to its generation of revenues. These economic and fiscal benefits will occur in the first year of operations and are shown to expand with the growth in the level of training services provided at the Complex in future years. These economic and the fiscal benefits will recur annually and accumulate over the lifetime of the Training Complex

Appendix: Fiscal Impact Calculation

Spotsylvania County's FY 2016 Comprehensive Annual Financial Analysis (CAFR) will provide the basis for this fiscal impact analysis as its audited expenditures and revenues provide the best publicly available information on the distribution of County expenditures and the sources of the County's revenues. These fiscal data cannot be accurately projected into the future as both the future patterns of public service demands and the levels of revenues are subject to change: as the population grows and its spending patterns change, as the local economy slows downs or accelerates, as levels of local public services vary, and as the magnitudes of intergovernmental transfers change. Given these uncertainties, the best practice for assessing fiscal impact is to insert the proposed project into the most recent budget year and calculate the budgetary impact it would have had, had it existed at that time, contributing revenues and placing demands on public services similar to those of other residents and businesses in the County during that year.

This analysis distinguishes between the revenues and expenditure demands placed on the County budget by its residential and non-residential functions; that is, its residents and its business activities and their associated employment base. This allocation of fiscal flows between residents and non-residential functions assigns revenues and expenditures as averages although it is recognized that some residents and some businesses demand more services from Spotsylvania County than other residents and businesses and, similarly, some residents generate more revenues than others as do some businesses, while others may be largely exempt from taxes (e.g., publicly owned properties and churches). Calculating the average per capita cost of providing services to the County's residents or its employment base and the per capita or per worker revenues generated by residents or in-county workers permits the potential fiscal impact of any proposed residential or commercial project to be compared to the County's current expenditure and revenue structure across its entire residential and non-residential base.

This analysis will show that not all residential or commercial projects will have the same fiscal impact. It will show where these fiscal impacts are positive or negative as well as the magnitudes of these fiscal impacts. Where specific revenue and expenditure determinations for a proposed project cannot be differentiated from the countywide averages (e.g., cost of General Government), countywide averages can be used in the equation. But where a specific expenditure or revenue flow can be estimated for a proposed project (e.g., real estate tax revenues and public school costs), the actual values can be substituted for average costs to reflect the differences between the proposed project and countywide averages.

The result of this fiscal analysis will provide the answer to the question: would the proposed development as proposed be a fiscal burden or a fiscal asset to Spotsylvania County?

REZONING APPLICATION
(Please type or print)

Date: 4-28-17 Case: R17-0005

110-0000-316-16-08 (395)	Mailing	$ 21.58
110-0000-316-16-08 (395)	Planning	$ 14,349.31
110-0000-316-16-10 (334)	GIS	$ 670.00
260-0000-313-03-45	Zoning	$ 620.00
260-0000-318-99-14	Intake	$ 57.50
	Process.Fee	
	Total Filing Fee:	15,718.39

Team Crucible, LLC
Applicant's Name

60 Jack Ellington Road
Applicant's Address

Fredericksburg, VA 22406
City, State, Zip Code

jgarman@team-crucible.com
Applicant's E-mail Address

540-752-2800
Applicant's Telephone No.

Charles W. Payne, Jr.
Agent's Name (Point of Contact for Application)

725 Jackson Street, Suite 200
Agent's Address

Fredericksburg, VA 22401
City, State, Zip Code

cpayne@hf-law.com
Agent's E-mail Address

540-604-2108
Agent's Telephone No.

Property Owner Information:

Radio Reconnaissance Technologies, Inc.
Name

If Applicant is not the owner, attach documentation of owner's consent

3328 Bourbon Street | Fredericksburg, VA 22408 | 540-752-7448
Address | City, State, Zip Code | Telephone No.

Parcel Location: 6116 Jefferson Davis Hwy

Tax Map Parcel Number: 76-A-2 Acreage: 69.9846 acres

Current Zoning: A-2 Acreage in Request 69.9846 acres

Proposed Zoning: I-2 Overlay District: n/a

Proposed Use: Develop a security training facility.

To: The Board of Supervisors of Spotsylvania County, Virginia. The above named Applicant(s) hereby petition(s) for the approval indicated above for the described property and as shown on the attached plan made a part of this Application and certifies that the information provided is correct.

Radio Reconnaissance Technologies, Inc.

By: _____ 28 April 2017 Nicholas E. Hoben, President
Signature of Owner (or Agent with POA*) Date Print Name

_____
Signature of Owner (or Agent with POA*) Date Print Name

I have read this Application, understand its intent and freely consent to its filing. Futhermore, I have the power to authorize and hereby grant permission for Spotsylvania County Officials and other authorized government agents on official business to enter the property to process this Application.

Voting District:_____ Census Tract:_____ Traffic Analysis Zone:_____
(To be completed by the Planning Department after submission)

SPECIAL POWER OF ATTORNEY AFFIDAVIT

COMMONWEALTH OF VIRGINIA
COUNTY OF SPOTSYLVANIA

This 28th day of April, 2017, I, John R. Garman, President, of Team Crucible, LLC, the Applicant of Tax Map 76-A-2 (describe land by tax map number) make, constitute, and appoint Charles W. Payne, Jr., my true and lawful attorney-in-fact, and in my name, place and stead giving unto said Charles W. Payne, Jr. full power and authority to do and perform all acts and make all representation necessary, without any limitation whatsoever, to make Application for said Rezoning Application. This includes the authority to execute and amend proffers and to sign the Notice of Conditional Zoning.

The right, powers, and authority of said attorney-in-fact herein granted shall commence and be in full force and effect on 28 April, 2017, and shall remain in full force and effect thereafter until actual notice, by certified mail, return receipt requested is received by the Planning Department of Spotsylvania County stating that the terms of this power have been revoked or modified.

Given under our hands this 28th day of April 2017.

Owner/Contract Purchaser/Authorized Agent (Circle One)

COMMONWEALTH OF Virginia
CITY/~~COUNTY~~ OF SPOTSYLVANIA, to wit:

The foregoing instrument was acknowledged before me by John R. Garman, President, of Team Crucible, LLC, the Applicant of said property, this 28th day of April, 2017.

My commission expires: June 30th 2018

Notary Public

Ronald Craig Childress
NOTARY PUBLIC
Commonwealth of Virginia
Reg. # 7601258
My Commission Expires June 30, 2018

7601258 Registration Number

OFFICE USE ONLY

File/Case Number : _____ Date Accepted: _____, 20____

Surface Danger Zone and No Blue Sky Concept



The concept of the Surface Danger Zone (SDZ) comes from WWI when troops were sent in the f

Baffles, Berms, and Backstops

Pursuant to prior range industry paper on this subject, one specifically by my good friend Dave Luke and shown in the proceeding of the 3rd National Range Symposium of 1996, this peer

review paper is undertaken to document more recent design standards for ranges, solidifying the "No Blue Sky" concept and "Ballistic Sand" 1:1 suggested slopes, design of manger traps,

etc., detailed and specific civilian range minimum design specifications were last presented in the 1999 "NRA Source Book."
To properly evaluate bullet containment, which is what Baffles, Berms and Backstop do, it is necessary that we evaluate the process of planning range design, construction and operations

problem by considering 4 E's, of Range Design.

1. The Business Plan and Range Master Plan:
Developing the Business Plan is essential to determine if the range is viable or not and is the Basis of the Range Master Plan.
The Master Plan focuses on the how, what, when, why and whom of the range. These documents are developed during the Master Planning phase and well prior to the design and construction

phases of a range complex. Subsequent, Safety and Long Range Plans are the living document of a range that must be continually reviewed and updated.
If planning is left to the end or a range is not planned, the facility owner/operator will find some undesirable surprises as he prepares to open for business and some of these surprises

may shut him down. The Safety and Long Range Plans are an important part of the Master Plan.

2. The 4-Es of Range Design
The 4-Es must be used at every step of developing a shooting range. The 4-Es are: Evaluate, Engineer, Educate and Enforcement.

2.1. Evaluate: The range owner/planner design must evaluate the needs of the prospective user presented in the business plan and identify the specific shooting disciplines to be

conducted on the facility. Evaluate how many shooting activities can be conducted on the same ranges, not simultaneously. Review schedules for the various activities to ensure there are

no conflicts in range design and subsequently range usage result. This is an important consideration. While there are a few different shooting activities that can be compatible and lend

themselves to simultaneous range use, most are not.

2.2. Engineer: Each range or range complex must be engineered to accommodate the specific disciplines and activities which have been evaluated on their own as appropriate and are to be

conducted on the same piece of ground/range. Intimate knowledge by the Engineer/Designer of each shooting discipline and their rule book or curriculum specifying the detailed

requirements (if applicable) of each activity static or dynamic is essential. Each discipline's requirements will have to be considered in detail to ensure no conflicts in firing line

design, target line location, target placement and target set up operation, etc. Time efficiency is also an important consideration when switching from one activity to another. While it

is possible to conduct multiple shooting activities on the same range, single purpose ranges are best and it will require deliberate thought and careful consideration to ensure possible

conflicts are insignificant and kept to a minimum. Once the design criteria have been established and constructed, it will be important for the owner/operator to truly understand that

there will be very little room for change in use without returning to the evaluation phase with additional engineering to retrofit the range to accommodate the new activity.

2.3. Educate: The operators and those who will be using the facility (users) must be educated in the specific Courses of Fire that are acceptable at said range and which firearms,

firearm calibers, positions that can be used (standing, sitting/kneeling, prone), types of firing (slow fire only, rapid fire, etc.) Static and Dynamic are but a few topics that should

be taken into consideration from inception as to how the range will or may be used.
Briefings on the etiquette of firearms safety, how and when to approach the firing line, how and when to change targets, commands that will be used-and their meanings, range officer

authority, etc. Careful explanation in this area will reasonably ensure that the facility will not be used outside of its design capability and thereby cause problems for the range.

2.4. Enforcement: This is the final phase of the 4-Es and ultimately is the glue that will hold all these considerations together into one cohesive package. You are giving instructions

to be obeyed. You are not giving advice. Enforcement solidifies the Planning and Safety Plan. The owner/operator must consider the specific range rules methods and actions that will be

employed to ensure the range is always used well within the design limits. Ultimately, it will be the responsibility of the owners/operators to determine the range use, assuring

adherence to the rules and regulations established.

3. Purpose of backstops, baffle berms and baffles:
Erecting baffle berms and backstops are a necessary and a minimum requirement for range owners/operators who do not control 1.5 miles downrange for pistol or 3.5 miles downrange for high

powered rifle, with appropriate 5 degree left and right safety zones.
I believe and all of us would readily agree that the full surface danger zone (SDZ) ranges are the exception rather than the rule. They are a concept of the past. Therefore, the primary

purpose of the construction of backstops, berms and baffles is to protect against the injury of people, damage to property or both, when a full Surface danger Zone (SDZ) can not be

provided. A secondary benefit is to permit the periodic recovery of lead projectiles, a recoverable and recyclable metal resource that can contribute to the positive cash flow of a range

facility.

4. Projectile/bullet containment.
It is the ultimate responsibility of the range owners/operators to ensure that the projectiles fired on their range are contained within the range property boundaries. While it is

entirely possible for an existing range facility to be grandfathered against noise complaints, it is totally unlikely that any governmental body would make the same concession concerning

safety. Therefore, it is paramount that shooting range owners/operators continually evaluate the shooting activities permitted and the requirements necessary to ensure those activities

can be conducted with projectile/bullet containment within the property as the result. The level of requirement necessary for the projectile/bullet containment on the property of a

shooting range facility will dictate the extent of the baffle construction. Side berms and backstop shall always stop the bullets. Baffles shall manage the bullets and its flight

characteristic so it remains on the property.

5. Shooting safety fan.
It is important to frequently remember that while specific range safety fans are indicated in numerous design manuals, these safety fans presume a free and open range. As more and more controls and barriers are added to the design (both administrative and physical), the range SDZ becomes smaller until eventually the range SDZ equals the exterior edges

of the barriers of the backstop and side berms. This point is not specifically made in the "NRA Source Book" and also is not a logical conclusion by those not familiar with range design,

construction and civilian operation. These same regulatory folks seize on a specification and fail to understand that by adding controls or barriers, the range SDZ is changed and

significantly reduced. Backstops and side berms alone do not remove the requirement of an analysis of the SDZ. Baffles, berms and backstops can limit the SDZ to the range property lines.

6. Backstops
The backstop provides the primary impact area for the bullets being fired and to terminate their kinetic energy under normal conditions. They also prevent the bullet from leaving the

range property. The backstop also serves as the storage device for bullets until they are recycled. Refer to prior peer review papers on Ballistic Sand. An important point to remember is

the construction of a proper backstop will not eliminate the requirement to provide a downrange safety fan beyond the backstop for the design type of firearm or caliber allowed to be

fired without baffles.
It shall always terminate the bullet at the property line. The probability of an accidental (firearm malfunction) or unintentional discharge where the bullet escapes the range without

first impacting the backstop must be evaluated and considered as the range design proceeds. This must be evaluated in the context that the surrounding land use changes and encroachments

by development will result.

A major consideration in initial design is to provide sufficient space behind backstop for ease of backstop repair and lead recovery of skips, ricochets and tidily-wings. All too often,

ranges are constructed allowing for the maximum number of firing points and distances to targets in the shortest acceptable width and distance to property lines but with insufficient

space to allow regular maintenance or heavy equipment access all around the range and to the range firing or target line. If insufficient space is not provided, problems will result.

Special consideration is to be provided to interior access and sufficient space, 30 feet minimum behind fixed target lines, for maneuverability of heavy equipment between the target line

and the backstop.

The best outdoor backstop is a manmade earth embankment with a 10 foot high ballistic sand projectile containment face or a natural hill of appropriate size and shape that meets the

specific requirements of the particular range.

Alternative backstops may be used when appropriate earthworks are not available. Preferred backstops include: 1) prepared naturally occurring hills or mountainsides (shaping the slope

will likely be required), 2) earthen backstops constructed from clean fill, 3) earthen backstops constructed from broken material (concrete or asphalt cores) and covered with clean fill

dirt, 4) earthen backstops constructed from clean fill and stabilized internally, and 5) fabricated backstops using steel, concrete, or wooden cribs.

Backstop heights can vary according to the site and use. General dimensions are as follows:

A. Height. A minimum height of a constructed earth backstop is 20 feet. The minimum is acceptable, but 25 feet is now also being recommended. This height is the compacted or settled

height. Height should also be consistent with other barriers that will be incorporated into the range design.
A backstop, ricochet catcher, ricochet baffle or "manger trap" can be installed to reduce the number of bullets escaping the range by tidily winks or sliding up the face of the backstop.

The manger trap is effective in retaining those ricochets that occur off the face of the backstop. While the distance traveled by such a ricochet would be a nominal 50 to 100 yards, this

factor needs to be included in the design calculations, if insufficient distance to the property line is not available. This device is installed parallel to the floor and into the

backstop face and extends to the toe of the slope. The ricochet catcher is typically 15 to 18 feet above the range floor, measured vertically from the ground surface at the target line.

This prevents direct bullet impact into the catcher. The ricochet catcher must be impenetrable to ricochets and should extend completely from side to side and connect the sidewalls or as

substantiated by the design. If overhead baffles are employed, the top of the backstop need only be 2 feet higher than the ricochet catcher. Specific construction details of the ricochet

catcher will dictate the amount of material needed to ensure that the catcher is held securely in place.

B. Width. The width of the backstop should extend at least 5 feet beyond the intersection of the 5° ricochet line from the outside targets/firing position. If the range has high side

berms that closely match the height of the backstop then this requirement need not apply. Keep in mind that earthmoving repair equipment needs adequate area to maneuver and access to

work behind the target line. Therefore, this allowance may need to be greater.

C. Slopes. The backstop side slope (side facing the shooter) ballistically must be as steep as close as possible to 45° (1:1) and not less than 2:1. If a soil analysis determines that

the soil will not support 3:2 slopes to maintain the minimum required slope angle, it will be more economical to remove the poor soils and replace them with more suitable material.

Special techniques may be required to stabilize the backstop above and behind the ballistic sand impact zone.

In poor soil areas, structurally designed soils may be used on the offside of the backstop to stabilize the soil material.

Sandbags, yes; never automobile tires, may be incorporated to maintain the bullet impact side of the slope. There are many other materials and methods that can be used to stabilize the

slope until vegetation can be established. Special netting material is especially useful to establish plants. Heavy vegetation such as large plants or trees should not be permitted on

the range side of the backstops.

Steel backstops are also an acceptable but more expensive alternative when soils are inadequate. The primary drawback is the initial cost. However, if the quantity of shooting is

substantial, the ease of recovering lead may quickly offset the initial cost. Basic maintenance costs also will be lower. Concrete foundation will be required to set and support this

type of backstop. Because these backstops are constructed to the same specifications as indoor range backstops, the 20 feet earthen barrier behind them will be needed.

7. Side berms and walls
These protective barriers may be constructed from earth, precast concrete panels, concrete wall masonry walls, "wooden cribs", wooden box-type structures filled with pea-gravel, crushed

rocks, chopped rubber tires filled with soil and/or poured concrete walls or panels. The specific type of structure will depend on available space, type of range being built and the

relative initial cost. A major consideration that should be evaluated during the initial planning process is the long-term maintenance cost of the barrier being considered. Most times it

is far more cost-effective to select the construction material that will provide the longest life while requiring the least maintenance. Wood crib baffle require maintenance and if

constant hit, they last only 10 to 18 years.

Exposed tires present problems such as bullet bounce-back that must be addressed before they are used and make recycling of projectiles impossible. If earthen side berms are selected,

the construction methods will be the same as that used for the construction of the backstop. If concrete panels are selected, then site work will be required to build their foundations.

Concrete panels can be tipped into place or set into place using a crane. If masonry walls are selected, skilled masons should be used. Foundations will be required to prevent settling

or major damage caused by ground shifting. Structural engineers should design and licensed concrete companies should be employed to erect concrete structures, especially in earthquake-

prone areas. If concrete walls (precast or poured-in-place panels) are selected, the specifications cited in the "NRA Source Book" should be strictly adhered to. If crib walls are used,

they have to be tested in accordance with the Source Book.

Generally, earthmoving equipment will be used to construct the earthen backstops. If earthen side berms are the choice, then doing earthwork all at once while the equipment is onsite to

construct the side berms is the most cost effective. Side berms generally vary in dimensions according to the specific need. If a side berm is to be used also as a backstop, as some

shooting activities may require, the safety fan rotates and the 180° rule comes into effect. When this instance occurs, the side berm is considered to be part of the backstop and should

conform to the same specifications as the backstop.

In this situation, the overall height of the side berm, for at least that portion that is used as a backstop, shall be the same as the backstop. It is important to remind all range

owners/operators to carefully evaluate the shooting activities to be allowed in their range facility and include them in the master plan.

7.1 Side berm, walls or barrier specifications are as follows:

7.1.1. Height. Generally, side berms, walls or barriers are suggested to be a minimum of 8 feet high, with 10 to 12 feet recommended if the range is going to be subsequently baffled.

Side berms may be used on all ranges and on ranges that go a distance of 1,000 yards. Side berms, walls or barriers stop bullets and are used to allow shooters and range personnel to use

adjacent ranges simultaneously. Another reminder: backstops, side berms, walls or barriers in and of themselves may not eliminate the requirement for a safety fan area.

7.1.2. Length. Except as indicated above, side berms may be the same height and the full length of the range-from the backstop back to 5ft behind the most distant firing line.

7.1.3. Slope. The range side (the side facing the shooter) of the side berm should be as steep as is possible or as flat as desired. These specifications are the same as those for the

backstop.

Masonry walls are an alternative construction method, as are precast panels. The repair work for damaged masonry walls is labor intensive and precast panel sections, if damaged, may not

be repairable on site and have to be removed and replaced. Initially, an additional number of the precast panels can be purchased. Masonry walls using concrete block shall be fully

grouted and filled with concrete to add strength and impenetrability to the structure. Masonry walls should be reasonably protected against bullet strikes and shall not be placed

immediately adjacent to a firing lane.

Wooden crib side baffles filled with selected materials may be used and are easy to construct if properly designed, but are not easily repaired or maintained.

Obviously, the designs for side baffles will depend upon local site conditions and available materials cost. A point to be emphasized about wooden box side baffles is that they must be

tested before being built to ensure that they will stop the bullet for the designed caliber used in the design. It is the rare exception that will require this type of structure to be

more than 3 inches thick consisting of two sheets of ¾ plywood and 3 ½ rock. A structure made to the total thickness of 6 inches will stop all bullets from normally accepted sporting

arms and individual infantry military small arms.

For legal purposes, when wood rock crib baffles are used, construct a test panel and conduct the appropriate U.L. tests before committing to any major construction expense. Test twice

before building once. Refer to the "NRA Source Book" for dimensions and drawings on how to construct the test panel.

Precast concrete panels set at angles on each side of a static range can economically prevent bullets, regardless of the angle fired laterally, from escaping the range. Panels can be

manufactured onsite and tipped into place. These 4" barriers withstand most bullet strikes without major damage. Stringent range rules will prevent shooters from inadvertently firing

into the barriers. Shooters must demonstrate the appropriate skill necessary not to cause damage to range equipment.

8. Safety baffles
The term safety baffle or overhead safety baffle defines the structure which is used to restrict fired bullets over to backstop and side berms to smaller areas than would otherwise be

possible without them.

Safety baffles differ significantly from sound baffles, which are designed to absorb or redirect sound waves.

Safety baffles are designed to redirect and limit the bullet travel no further than the property line.

The basic design concept is the "No Blue Sky" concept. This means that baffles are erected so that the shooter, from the shooting position allowed (or permitted), cannot see any sky

downrange, either over the top of the backstop or to the sides of the range. The baffles ballistic material then contains the bullet.

Safety baffles may be overhead, on the ground, on top of the backstop, in the roof of the firing line cover up to a 30° elevation, in the form of an elongated box, or as a completed

enclosed tunnel.

The principle behind the design is to equip a range with baffles so that if a fired bullet leaves the confines of the range proper, it will fall to earth within a smaller, more

predictable area that is acceptable within the range property, to protect the people or property and adjacent ranges.

If overhead safety baffles are not designed and installed properly, they can cause problems. They may redirect the fired bullet in the wrong direction, back to the shooter, may not

absorb the fired bullet as intended, or there may be gaps that will permit a bullet to escape the range. For any range on which overhead baffles are planned, carefully analyze the

application beforehand and seek a professional design.

8.1 General specifications say that safety baffles must:

8.1.1. Be impenetrable or defeat and limit travel or design calibers to be used on the facility.

8.1.2. Be a minimum of 4-feet-tall for vertical baffles.

8.1.3. Be relatively maintenance-free.

8.1.4. If using concrete must be designed to provide maximum spans l. Span length between columns is a product of lane width.

The specific design and number of baffles that will be needed to protect a given area will be dictated by the amount of free space around a particular range facility that the range can

limit access to.

Overhead baffles are a standard vertical 4 feet high with the bottom edge set 7 to 7.5 feet above the horizontal surface of the range. The width dimensions are the width of the range so

no side light is seen or as properly designed.

For baffles constructed from plywood and filled with high-density material, use 3/4-inch marine plywood on the firing line side, 5/8-inch on the downrange side, and built into a box with

an inside dimension equal to the minimum width of a standard 2×4-inch piece of lumber. Again, the baffle must be tested before use.

Baffles may be built by laminated wood and steel or by a special concrete panel design. Laminating baffles using plywood and 10-gauge steel requires a lamination thickness of three

sheets of plywood with two sheets of steel sandwiched between. Nominally the lamination thickness is 2.5 inches.
Slanted overhead baffles for dynamic ranges are 12 to 24 feet wide and set at a 25-degree angle to the ground as measured from the front edge (the firing line edge being higher than the

rear edge). The slanted overhead baffles are a minimum of 3-inches-thick, prestressed concrete slabs, and must pass 3,000-pound, 28-day, compressive strength test.

9. Ground Baffle
It also is important to keep in mind that it may be necessary to incorporate a series of ground baffles within the overall design. Ground baffles reduce the ground surface area that a

bullet might strike. When properly designed and installed, ground baffles do reduce ricochets, but do not totally eliminate them. When the downrange area is viewed from the firing line,

the shooter will see overhead baffles, ground baffles and the target and backstop immediately behind the target. No blue sky will be visible, nor will any of the horizontal ground

surfaces of the range.

9.1 Generally, ground baffles must be:

9.1.1. Impenetrable.

9.1.2. Minimum height to correspond with the placement and horizontal surface area to be masked. Multiple ground baffles may be required for a 50 or 100 yard range. The goal is to mask

the range floor beyond the first baffle.

9.1.3. Relatively maintenance free. Ground baffles are designed to meet the needs of a particular facility.

The dimensions for ground baffles are a minimum of 3 inches thick, if made of plywood, and may be backed up by an earthen berm. If a wooden top cap is used, particular attention should

be paid to the direction of the wood grain. It should always curve downward and the top cap is cut at 45° angle side down range

Materials for ground baffles may be concrete (firing line side surfaces should be covered by 1" wood stock covered to prevent bullets from being redirected toward the firing line,

pressure-treated wood, steel (firing line side surface covered to prevent bullets from being redirected toward the firing line, or earth or a combination.

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EDITORIAL: Crucible tests Spotsy's vision for fut 0 comments

https://fredericksburg.com/opinion/editorials/editorial-crucible-tests-spotsy-s-vision-for-future/article_15277ad5-5cad-5035-9398-e65edc7668ab.html

EDITORIAL: Crucible tests Spotsy's vision for future

BY THE EDITORIAL PAGE STAFF OF THE FREE LANCE-STAR
Sep 12, 2018

A large influx of new residents and businesses has made the Fredericksburg region the fastest-growing area in Virginia in recent years, so growing pains are common.

For example, long-time residents want the closer-in jobs and urban-like amenities that more density brings, but not the traffic congestion and crowded schools that are part of the package.

Public officials salivate at expanding the tax base, but balk when new developments require more, not less, public expenditures for infrastructure.

And certain businesses that were previously tolerated by their neighbors suddenly find themselves the subject of citizen opposition.

Such is the case with Crucible, a private firm that hires military and law enforcement veterans to provide specialized military and counterterrorism training to service members, civilian contractors, and members of non-governmental organizations who work in some of the world's most dangerous hotspots.

Crucible has operated in Stafford County for 16 years without incident except for a handful of noise complaints over the years about its outside shooting range, according to the company's attorney.

Ordinarily, that would qualify the company as a good neighbor.

EDITORIAL: Crucible tests Spotsy's vision for fut 0 comments

But now that Crucible is seeking to move from its current location in Ha[illegible] 78-acre site near Jefferson Davis Highway about a mile south of Dominion Raceway, the company is being portrayed as a danger to the surrounding community instead of an asset.

To facilitate the move, Crucible has asked Spotsylvania County to rezone the property from agricultural to industrial.

A county ordinance that governs industrial and commercial facilities would exempt its five proposed shooting ranges from ordinary noise restrictions between 6 a.m. and 10 p.m.

But Crucible says it would voluntarily limit operations to daytime hours only.

The company conducted an acoustical study of the area, and said it is also willing to proactively build 12-foot noise barriers along the northeast part of the property and 20-foot berms topped with sandbags to make sure any stray bullets never leave the property.

However, a group calling itself Stop Crucible still opposes the rezoning despite these assurances, arguing that Spotsylvania is the "wrong spot" for it.

"Such a facility would physically threaten our homes, families and property, degrade our property values, be a noise nuisance, and this type of business has no place in such close proximity to our homes and businesses," the group maintains.

Their first claim is unconvincing, since there were no instances of stray bullets from the company's facility threatening any persons or property in Stafford.

The noise of gunfire from the firing ranges and explosions from its training activities, however muted, would undoubtedly make some people uncomfortable.

This might in turn affect nearby residents' property values, so that's a valid concern that should be carefully weighed by county officials.

EDITORIAL: Crucible tests Spotsy's vision for fut 0 comments

However, the bigger question before the Spotsylvania Board of Supervis[illegible] the county wants to remain more rural and agricultural, or whether it wants to convert a larger percentage of its farmland to commercial and industrial uses.

There's a case to be made both ways, so this will not be an easy decision.

Would local residents prefer a new residential development or an industrial plant there instead, which would create more stress on their roads and infrastructure than Crucible, whose proposed training facility would remain largely open space?

Or should the zoning remain agricultural only?

There will always be some tension between residents who want the county to remain the same as when they were born or moved there and newcomers who want to come in and change things.

It's important that public officials find a balance between these competing interests.

Not allowing any new development eventually leads to economic stagnation.

But too much irrevocably changes the character of the community they were elected to lead.

The bigger question is whether the county wants to remain more rural and agricultural, or whether it wants to convert more of its farmland to commercial and industrial uses.

ION

iling couple stay in U.S.

nse. that. Sometimes, though, rules need
ella bending to achieve justice. Henry
een David Thoreau wrote: "Any fool can
unty make a rule and any fool will mind it."
d of When two people come to the Unit-
eper ed States legally and by invitation and
also are allowed to build lives here, raise a
ligh family and become welcome additions
to their community, they should not
aw- be thrown out. There is no doubt that
sing there is a native-born American out
n of there somewhere who can do what Leo
are and Gaby are doing, although perhaps
not quite as well. But is that reason
and enough to kick out two people who
have followed all the rules and want
ina more than anything to be part of this
ear country?
net We don't think so. We are a nation
ove of immigrants. We are stronger be-
sas cause of that. The United States is get-
tay ting older. By 2030, 20 percent of us
ally will be over 65. Also, we aren't making
ney babies as fast as we used to. Without
oor immigration, we could find ourselves
d a in the same boat as Germany and Italy,
J.S. where populations will drop over the
next few decades. We need workers
ere who do the jobs most Americans don't
can seem to want to do, and we need mid-
do, dle-class immigrants like the Legoras
ney who make our communities better.
es- The Legoras have written to their
nat senators, Mark Warner and Tim
As Kaine, and to their representative,
ave Dave Brat, in the hope that common
em sense will still carry the day. We wish
eir them well, not just for them, but for
ow us, too.



LETTERS TO THE EDITOR

Crucible zoning request could be nightmare for some

Picture this: You are married with one child and you have worked hard to recover from financial difficulties. Now you are thinking about your future and the future of your child.

The search begins for a safe, quiet subdivision with good area schools. Finally, a lot is found and you build a home that suits your needs and that you will be able to retire in. Time goes by and you have been in your home about 20 years. Now you are retired and living on Social Security and a small retirement benefit. Life has been nice and you have been blessed with good family, friends and neighbors.

Everyone can picture this; it is pretty typical and describes the life of many people.

Now imagine this: You are greeted outside your home by a gentleman asking you to attend a meeting because your neighborhood is at risk. We attended that meeting in the spring. Our lives have been changed and now we live in fear.

A private military training facility is moving in behind our neighborhood. If the zoning request is approved by the Spotsylvania County Board of Supervisors, our neighborhood will hear guns shooting all day, every day, from morning till night. We will also experience improvised explosive device explosions and the possibility of stray bullets in our backyards.

Can you picture that? No Spotsylvania resident should have to live in fear or move from the home they love. Please put yourselves in our position and help us stand against Crucible. We never in our wildest dreams thought this would happen to us, but it has. If it can happen to us, it can happen to others. Contact the Spotsylvania County Board of Supervisors and tell them to vote NO on Crucible's rezoning request.

Shirley Brady
Spotsylvania

Stafford thanked for and disabled children. These students and

Charles Tatum
6924 Roxbury Mill Ct.
540-287-5615
wizard1073@gmail.com

Is I-2 the appropriate zoning, or should it be commercial?

Source:
https://library.municode.com/va/spotsylvania_county/codes/code_of_ordinances?nodeId=COCO_CH23ZO_ART2DERUCO_S23-2.1.4DE

Sec. 23-2.1.4. - Definitions. (Spotsylvania Code, excerpted)

Indoor, commercial recreation/athletic facility means an indoor sports building or activity facility in which are conducted recreational, therapeutic or athletic activities, whether or not under instruction. These include, but are not limited to, the following: roller or ice skating rink, batting cages, bowling alley, miniature golf, golf driving range, shooting ranges, tennis and other court games, swimming, aerobics and weight lifting, canine, feline, companion animal sporting event or exhibition, excluding livestock or *equestrian event facility* , but does not include *billiard hall* , bingo or dance hall.

Industrial/flex means any structure occupied by two (2) or more of the following uses: contractor's offices and shops; establishments for production, processing, assembly, manufacturing, compounding, preparation, cleaning, servicing, testing, or repair of materials, goods or products; warehousing establishments; wholesale trade establishments; and offices; provided however that the combined area of all office, both as a principal use and as an accessory use, shall not exceed thirty-five (35) percent of the total gross floor area of the structure. For the purpose of this chapter, when any of the above uses are permitted by right in the applicable zoning district, such uses may be combined within a single structure in accordance with the provisions of that district, and shall not be deemed industrial/flex.

Industry, type I means enterprises engaged in the processing, manufacturing, compounding, assembly, packaging, treatment or fabrication of materials and products, from processed or previously manufactured materials. Included are assembly of electrical appliances, bottling and printing plants, brewery, winery, cidery, distillery, and the manufacturing of paint, oils, pharmaceuticals, cosmetics, solvents and other chemical production of items made of stone, metal or concrete.

Industry, type II means enterprises in which goods are generally mass produced from raw materials on a large scale through use of an assembly line or similar process, usually for sale to wholesalers or other industrial or manufacturing uses. Included in this use type are industries involved in processing and/or refining raw materials such as chemicals, rubber, wood or wood pulp, forging, casting, melting, refining, extruding, rolling, drawing, and/or alloying ferrous metals, and the production of large durable goods such as automobiles, manufactured homes, or other motor vehicles.

Industry, type III means an establishment which has the potential to be dangerous or extremely obnoxious. Included are those in which explosives are stored, petroleum is refined, natural and liquid gas and other petroleum derivatives are stored and/or distributed in bulk, radioactive materials are compounded, pesticides and certain acids are manufactured, and hazardous waste is treated or stored as the establishment's principal activity.

Outdoor sports and recreation, commercial means a commercial sports or activity establishment open to the general public in an open or partially enclosed or screened facility; these include but are not limited to: batting and pitching cages, hard and soft courts, swimming pools, water slides, go-carts, pony rides, and ice skating rinks, canine, feline, companion animal sporting event or

exhibition, excluding livestock or equestrian event facility, competitive racing facilities, shootingranges, paintball or similar game fields.

Is Crucible considered a "sport shooting range" under state code? Are "sport shooting" design standards appropriate for the intended use as a military and paramilitary weapons training facility? Would the special use permit be legally enforceable and modifiable by county government if this statute applies? Since the applicant is volunteering a "best effort" to meet the noise limits in the current noise ordinance, regardless of time of day or week, is there any legal enforcement mechanism if they do not follow through? Is there a way for county government to monitor and enforce compliance of any of the provisions of the special use permit?

Source: https://law.lis.virginia.gov/vacode/title15.2/chapter9/section15.2-917/

§ 15.2-917. Applicability of local noise ordinances to certain sport shooting ranges.

A. No local ordinance regulating any noise shall subject a sport shooting range to noise control standards more stringent than those in effect at its effective date. The operation or use of a sport shooting range shall not be enjoined on the basis of noise, nor shall any person be subject to action for nuisance or criminal prosecution in any matter relating to noise resulting from the operation of the range, if the range is in compliance with all ordinances relating to noise in effect at the time construction or operation of the range was approved, or at the time any application was submitted for the construction or operation of the range.

B. Any sport shooting range operating or approved for construction within the Commonwealth, which has been condemned through an eminent domain proceeding by any condemning entity, and which relocates to another site within the same locality within two years of the final condemnation order, shall not be subjected to any noise control standard more stringent than those in effect at the effective date of such sport shooting range.

C. For purposes of this section, "sport shooting range" means an area or structure designed for the use of rifles, shotguns, pistols, silhouettes, skeet, trap, black powder, or any other similar sport shooting.

For purposes of this section, "effective date" means the time the construction or operation of the sports shooting range initially was approved, or at the time any application was submitted for the construction or operation of the sports shooting range, whichever is earliest.

1990, cc. 541, 577, § 15.1-29.20; 1997, c. 587; 2005, c. 544; 2006, c. 704.

What are the limitations of the CADNA-A sound propagation model? Does CADNA-A model refraction? What would be the expected effect in a positive refraction (downward bending) environment, and how significant would this effect be compared to the Line of Sight and diffraction calculations performed by CADNA-A? Under what conditions would positive refraction occur, and are these conditions likely at the Crucible site? Will the conditions favorable to positive refraction vary with time of day or season? Is it fair to say that the predictions are not maximums? What are the uncertainty measures for the numbers provided?

Source: http://www.windaction.org/posts/32217-the-lie-behind-turbine-noise-models#.W-WvuJNKiUk

CADNA/A and the ISO 9613-2 standard

Acousticians hired by the wind industry insist the ISO standard is an appropriate method for modeling wind turbine sound provided the correct input parameters are used. But what they do not admit is that the ISO 9613-2 standard, on which CADNA/A is based, *was never* validated for wind turbine noise. In fact, the standard is mainly applicable to situations concerning road or rail traffic, industrial noise sources, construction activities, and many ground-based noise sources. It does not apply to sound from aircraft in flight, to blast waves from mining, military, or other similar operations. And it was not designed to predict turbine noise.

The ISO Standard limits use of its methods to noise sources that are close to the ground (approximately 30 meter difference between the source and receiver height) and within 1 kilometer of the receiving location. A wind turbine with a hub height of 80+ meters exceeds the ISO height limit by 50 meters. Meteorological conditions are also limited to wind speeds of approximately 1 meter/second and 5 meters/second when measured at a height of 3 meters to 11 meters above the ground.

Only when all of these constraints are met by the situation being modeled can the predicted noise levels be assumed to be accurate within a +/- 3 dB range.

The constraints placed on the ISO standard having to do with wind speed, direction and weather conditions indicate just how limited the models are for anything other than simple weather conditions -- NOT the types of conditions that wind turbines need to operate.

The way sound spreads outdoors can be affected by temperature differences in different layers of the wind that cause sound waves to bend up or down at the boundaries just like water bends light. If a noise source is above a boundary then sound that would have gone down to the ground surface might bend up and dissipate. If the noise source is below a boundary layer then sound that might have dissipated upwards is bent down and added to the sounds that would normally be directed downwards. The current science of meteorology does not have precise ways to know what is happening right near any particular turbine.

Heinrich A. Metzen of DataKustik GmbH[3], maker of CADNA/A confirmed this fact in an e-mail where he stated:

"long range propagation including atmospheric refraction is not part of the standards used for (normal, "standard") noise calculations. It is known that atmospheric refraction may cause sound to be refracted downwards again and contributing strongly to the level at long distances. The atmosphere in the standards existing is just homogeneous above height."

Since there are no accepted algorithms to predict these refractions, sound propagation models cannot evaluate conditions that have vertical or horizontal turbulence even though we know they

can add significant sound at the receiving location when present. As a result, predicted sound levels are understated.

Countries in the European Union are developing their own models for predicting turbine noise propagation because of their concerns with limitations of the ISO standard. Unlike the ISO 9613-2 standard, these newer models have been validated for turbine noise by peer-reviewed independent studies.

Here is some information on the impact of meteorological effects on sound propagation and the limited state of the art in making accurate predictions.

Source: (Book) Prediction Outdoor Sound, by Attenborough, Li, and Horoshenkov (2007)

9.8.1 Meteorological effects In the barrier diffraction models described earlier, atmospheric conditions have been assumed to be steady and uniform. However, meteorological effects, such as temperature and wind velocity gradients, play a very important role in determining the acoustic performance of barriers. As a result of atmospheric refraction, barrier effectiveness is expected to be reduced in the downwind direction but enhanced in the upwind direction. By means of full-scale measurements conducted in the 1970s, Scholes et al. [45] demonstrated such wind effects on the acoustic performance of a noise barrier. Salomons [46] was among the first to study the effect of an absorbing barrier in a refracting medium by using a Parabolic Equation (PE) formulation. He assumed an absorbing barrier in his PE model and set the pressure at the grid points representing the barrier to zero. Thus, the part of the sound that falls on the barrier is stopped. A minor conflict appears in his method. The enforced zero pressure on grid implies that the normal velocity on barrier is zero too. This is the boundary condition for rigid surface. On the other hand the PE, which assumes only forward propagation from source to receiver, does not allow any backscattering of waves by the barrier. Thus, the reflection from the barrier is ignored when computing the total diffracted field. Rasmussen [47] studied the diffraction of barrier over an absorbing ground and in an upwind condition both theoretically and experimentally. He used an approach rather similar to the fast field formulation to estimate effective distances from source to the barrier edge and from the barrier edge to receiver in an upwind condition. Then the uniform theory of diffraction [48] was used to compute the diffracted sound field in the shadow zone. It is questionable whether the barrier diffraction can be 'de-coupled' from the wind gradient effects in this way. Nevertheless, Rasmussen's numerical results agreed reasonably well with his 1:25 scale

[Predicting the performance of outdoor noise barriers page 297]

model experiments. Muradali and Fyfe [49] have proposed a heuristic method for modelling barrier performance in the presence of a linear sound speed profile. Their model combines the effects of the sound refracted over a barrier and the sound diffracted by a barrier. Geometrical ray theory is used to determine the ray paths and the diffracted wave effect is incorporated by using the modified Hadden-Pierce formula. Li and Wang [50] have proposed a novel method to simulate the effects of a noise barrier in a refracting atmosphere. They mapped the wave equation in a medium where the speed of sound varies exponentially with height above a flat boundary to that for a neutral fluid above a curved surface. The barrier problem in an upward-refracting medium is then solved by applying the standard Boundary Element Method over a curved surface in a homogeneous medium. Recently, Taherzadeh et

al. [51] developed a hybrid scheme for predicting barrier in a downwind condition. Their numerical scheme is based on a combination of the boundary integral and FFP techniques in which the Green's function required in the boundary integral equations is evaluated by using the FFP formulation. Atmospheric turbulence is an important factor in barrier performance since it causes scattering of sound into the shadow zone. Although experimental studies of the effects of atmospheric turbulence on the acoustic performance of the barrier are rare, theoretical studies have been conducted by Daigle [52], Forssén and Ogren [53] and others quoted in these references. Some progress in modelling the acoustic performance of barriers in a turbulent atmosphere using a substitute sources method has been reported by Forssén [54, 55]. Hybrid models have been proposed, involving combinations of the BEM with the PE, that enable effects of barriers, range-dependent impedance and turbulence to be taken into account [56, 57]. Rasmussen and Arranz [58] have applied the Gilbert et al. [59] approach, assuming weak atmospheric turbulence with a simple Gaussian distribution in the fluctuating velocity field, in a PE formulation to predict the sound field behind a thin screen in a scale model experiment. The indoor experiments based upon a 1:25 scaling ratio were conducted in a wind tunnel in which the agreement of numerical results and experimental measurements was very good. They concluded that the flow pattern associated with a specific noise barrier could be an important design parameter for improving the acoustic performance of barriers. Improvements in computational speeds and resources have encouraged wider use of time domain models in acoustics. Recent work has been devoted to combining calculations employing time-dependent computational fluid dynamics with PE-based frequency domain calculations [60]. However, there are few studies to measure or predict the velocity profiles and their associated turbulence accurately in the region close to a barrier on the ground and it remains a challenge to combine fluid dynamics and diffraction models to establish an accurate scheme for predicting the acoustic effectiveness of screens under the influence of wind.

Can we get the property data used by Chris Kaila in order to perform our own statistical analysis of Crucible's financial impact on properties around their current facility?

Can the offic of Real Estate Assessment offer an opinion?

Comments:

Ref Proffer and county Questions and Applicant answers:

Original Proffer:

- Section B. Para 1. (iii) and Section C. Para 4: The purpose of the 12-foot Berm along the property line shared with adjoining tax map parcels 63-A-37B, 63-A-37A and 76-A-2A is noise abatement according to the Applicants submission. The applicant provides a noise study which shows (in accordance with their own study) that all property owners on all sides of this range will have excessive noise at the property line. If the owners of the above properties require a berm, then all property owners have the same rights at their property lines. Therefor using the logic applied by the applicant there must be a 12-foot berm on all sides of their property in order to preserve the rights of ALL adjacent owners for todays use and future development. The applicant has by their application demonstrated the need for this berm. This necessitates a new route for the proposed road along the southern side and a berm on the front side of the property facing Route 1. Lack of this berm on all sides will adversely affect current and future use of adjacent properties.

- Section B Para 2. (ii): Connection to public water and sewer are county requirements. This should not be delayed for phase 2 of this construction which may never occur. By allowing the applicant to delay this installation to a phase of construction that is not mandated, the county is allowing applicant to simply not install the required infrastructure. This proffer in fact ties this to a specific building constructed in phase 2. If that building is not built and the rest of phase 2 is completed then the infrastructure need not be installed.

- Section C Para 8: the applicant proffers to not use "high Explosives" for the simulated IEDs. This section of the proffer is wholly insufficient and meaningless. If the rationale for this proffer is safety or noise or environmental, restricting simulated IEDs to non-HIGH Explosives does none of this.
    - Explosives are separated into three categories by:
        - (a)High explosives. Explosive materials which can be caused to detonate by means of a blasting cap when unconfined, (for example, dynamite, flash powders, and bulk salutes). See also § 555.201(e).
        - (b)Low explosives. Explosive materials which can be caused to deflagrate when confined (for example, black powder, safety fuses, igniters, igniter cords, fuse lighters, and "display fireworks" classified as UN0333, UN0334, or UN0335 by the U.S. Department of Transportation regulations at 49 CFR 172.101, except for bulk salutes).
        - (c)Blasting agents. (For example, ammonium nitrate-fuel oil and certain water-gels (see also § 555.11).
    - Explosives defined:
        - High explosives consist of materials that typically combine the reacting elements in the same molecule. This allows them to react much faster, and they

"detonate." Detonation involves supersonic shock waves that pass through the material, causing chemistry that happens quite a bit faster than burning. High explosives do not need to be contained to make their bang. Nitroglycerine, trinitrotoluene, and RDX are high explosives.

- Low explosives are mixtures of chemicals that burn very rapidly, but sub-sonically (as opposed to supersonically), meaning that they "deflagrate." They consist typically of fuel and an oxidizer. The black powder used in fireworks is one example of a low explosive. Black powder burns very quickly, but to get it to go bang, we have to contain it. Fireworks hold black powder inside a cardboard or paper tube so that once the powder has burned, the gases burst the container noisily. This is not unlike the action of popcorn, whose steam bursts its kernel.

- This proffer does nothing to limit noise or effect safety or environmental concerns. Under this proffer the applicant can set off a IED simulator made of 100 lbs of black powder or 1000 lbs of ammonium nitrate – fuel oil which obviously would be loud and potentially unsafe. Storage of all of these items will require significant safety measures for theft, fire or accidental explosion. --- see requirement for public water for fire suppression.
- What mechanism does Spotsylvania have in place for inspection of simulated IED explosion material, charges etc to ensure they are in accordance with the proffers intent?

- Section E, Para 2: Applicant proffers that they will develop an Environmental Stewardship Plan at a future date. Applicant should provide the Environmental Stewardship Plan as a part of the application package. How else can the county assess the potential impact to the local environment. In addition, said property is a part of the Chesapeake Bay Watershed and this facility should comport to all EPA and USDA regulations and guidelines for discharge of lead and other environmental due to IED and vehicular operations.

- Section E, Para X (not incl): Shoothouse should be considered an indoor range as the GDP states it is covered to prevent precipitation. As such the facility should comport to all federal regulations and guidelines for an indoor range. Applicant should provide the full plan to mitigate environmental effects for included shoothouse.

Agency	Mandate	What is Covered
Environmental Protection Agency (EPA)	Protect human and environmental health.	Anything that is exhausted to the outdoor environment.
Occupational Safety and Health Administration (OSHA)	Assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance.	Anything that reaches the respiratory zone and may expose employees or shooters.

National Institute for Occupational Safety and Health (NIOSH)	Conduct research and make recommendations for the prevention of work-related injury and illness.	Detailed design criteria for indoor shooting ranges.

Applicant Letter Reponses dated AUG 28, 2018:

- Question 5 Applicant response: Applicant states that the shoothouse design is not baffled but designed to avoid bullet escape. In the GDP the shoothouse is "covered to protect from precipitation".
    - Request the specific design details of the shoothouse inclusive of the roof and all of the indoor shooting range environmental controls in order to determine how the precipitation shield and walls will "avoid bullet escape" and protect occupants from ricochet.
    - Request specific calibers to be used in shoothouse and how the design will meet the requested caliber to ensure bullet capture inclusive of roof.

  See NRA Range Source Book for indoor facilities:
    - 4.03.12: Ceiling Material: Ceiling material should be designed to reduce noise, protect lighting devices, reflect light and be impenetrable. Typically ceilings include, 10 gauge cold roll steel baffles (pistol rated), 2 x 4 foot white acoustic panels and clear light panels. For baffles where rifle calibers are used, NRA recommends contacting the manufacture of the range equipment.

- Question 10 Applicant response: Applicant states that the engineering controls will NOT contain all overshoots of the range. Specifically, applicant states that a combination of engineering and operational controls must be used. Last bullet of operational controls states "students not adhering to instructor commands or standards are removed from the range" - This shows that operational controls cannot ensure students do not carry or operate weapons in a 100% safe manner at all times during firing. This is the rationale for all standards including the NRA range safety book stating the applicant must control the impact area outside of the berms. For Example: students are required to keep firearm on safe and directed muzzle down during movement between firing tables. Student "does not adhere to instructor command" and the fire arm is discharged accidentally. In this instance in accordance with operational controls the student is re-trained (but the bullet has left the weapon and possibly the range itself).

  See NRA Range Source Book 2012:

    - 3.04.5 Backstop/Bullet Impact Berm
      Various factors can affect the course, travel, deflection, bounce-back and ricochet of bullets or shot. The distances and measurements stated below are to be considered as guidelines only. **This Source Book does not represent or guarantee that a particular bullet or shot may not deflect, bounce-back or ricochet, even if the guidelines below are met. You may be held responsible for personal injury or property damage caused from any bullet or shot that escapes the shooting range or that deflects, bounces back**

or ricochets, no matter how well your backstop, sideberms or baffles may be constructed.

- 2.06 Safety Baffles
  - The term safety baffle defines a structure used to restrict bullets to a smaller area than would be possible without them. Safety baffles differ from sound baffles, which are designed to absorb or redirect sound waves, in that safety baffles are more or less impenetrable. **The basic concept is based on a Blue sky gap, meaning that baffles are set up so that the shooter, regardless of shooting position, cannot see any blue sky down range.** These fixtures may be overhead, on the ground, on top of the backstop, in the roof of a firing line cover, in the form of an elongated box or as a completely enclosed tunnel. The principle behind the design is to equip a range with baffles so that a bullet may leave its confines, but will fall to earth within a smaller, more predictable area.

- 3.04.6.1.1 Overhead baffles are used to contain the flight of bullets to a specified area within the range. These overhead baffles are useful in areas where space is limited. **(this GDP does not include Overhead baffles as prescribed by the NRA RSB.)**

- 3.02.1 Projectile Containment
- 3.02.1.1 Projectile containment will vary in size and design based upon terrain features, range structures, and the chosen shooting activity. Various range enhancements have proven to be significantly effective in limiting bullet containment to the confines of a specific property boundary. Techniques for limiting projectiles to range property include: backstops, sideberms and sidewalls, **baffles**, target placement, **mountains or rolling hills,** sloping floor of the range, and utilizing the range for its intended purpose.
- 3.02.1.2 The distance a bullet will travel varies according to several factors: ballistic coefficient, bullet weight, muzzle velocity, caliber, bullet shape, angle of muzzle elevation, and to a lesser degree, wind speed, wind direction and relative humidity. Muzzle elevation to achieve the maximum range of a given firearm and ammunition combination will vary, but can be calculated by using Ingalls' Ballistic Tables (Hatcher's Notebook, pages 584-625). The ballistic coefficient and muzzle velocity are the two most important factors in determining the distance a bullet will travel. The following ballistics table has been modified for use in this source book and is used with permission. Additional cartridges and newer projectiles have been added to the chart. The new cartridge data was derived by using Sierra Infinity v6ii. This chart should be used only as a quick reference to check comparative data for various calibers using specific bullet weights and velocities for planning purposes. The 30-06 (boattail) bullet, weight of 172 grains, muzzle velocity of 2,600 feet per second has been added to the chart and is shown to have a range of 5,500 yards or 3.12 miles and does not mean that you have to own or control 3.12 miles of downrange area. Various factors can affect the maximum distance that a bullet or shot may travel. The tables below are to be considered as guidelines only. **This source book does not represent or guarantee that a particular bullet or shot may not travel further than the below state distances. Remember that you will most likely be held responsible for the damage or injury caused from any bullet or shot that escapes the shooting range, no matter what the distance that the bullet or shot traveled.**

- Question 21 Applicant's Response: The applicant states that "because bond values are determined by estimated reclamation, it is not possible to determine whether a bond is necessary or what the value would be." The GDP includes an fiscal projection and projected range usage. Applicant should proffer a reclamation/remediation bond that covers at a minimum their maximum usage as stated in their fiscal assessment. This should not be a bond issued after approval based upon the applicant's future assessment. If the fiscal projection data is sound, then that should be used to create the bond.

Code of Virginia
Title 15.2. Counties, Cities and Towns
Chapter 9. General Powers of Local Governments

§ 15.2-917. Applicability of local noise ordinances to certain sport shooting ranges.

A. No local ordinance regulating any noise shall subject a sport shooting range to noise control standards more stringent than those in effect at its effective date. The operation or use of a sport shooting range shall not be enjoined on the basis of noise, nor shall any person be subject to action for nuisance or criminal prosecution in any matter relating to noise resulting from the operation of the range, if the range is in compliance with all ordinances relating to noise in effect at the time construction or operation of the range was approved, or at the time any application was submitted for the construction or operation of the range.

B. Any sport shooting range operating or approved for construction within the Commonwealth, which has been condemned through an eminent domain proceeding by any condemning entity, and which relocates to another site within the same locality within two years of the final condemnation order, shall not be subjected to any noise control standard more stringent than those in effect at the effective date of such sport shooting range.

C. For purposes of this section, "sport shooting range" means an area or structure designed for the use of rifles, shotguns, pistols, silhouettes, skeet, trap, black powder, or any other similar sport shooting.

For purposes of this section, "effective date" means the time the construction or operation of the sports shooting range initially was approved, or at the time any application was submitted for the construction or operation of the sports shooting range, whichever is earliest.

1990, cc. 541, 577, § 15.1-29.20; 1997, c. 587; 2005, c. 544; 2006, c. 704.

The chapters of the acts of assembly referenced in the historical citation at the end of this section may not constitute a comprehensive list of such chapters and may exclude chapters whose provisions have expired.

11/30/2018

SENT TO LEON HUGHES 11/29

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Peter Larson <pelarson62@gmail.com>

...' shooting facilities in Va., once established, ...

Stephan Picard <sjpicard@gmail.com>
To: Peter Larson <pelarson62@gmail.com>

Tue, May 9, 2017 at 8:29 AM

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Subtitle II. Powers of Local Government
Chapter 9. General Powers of Local Governments (Refs & Annos)
Art
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§ 15.2
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917. Applicability of local noise ordinances to certain sport shooting ranges
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sp
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construction or operation of the sports shooting range, whichever is earliest.

[Quoted text hidden]

SIEBEIN ASSOCIATES, INC.
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December 11, 2015

Mr. Dan Lord
Facilities, Operations and Support Systems Manager
Finances and Operations Division
Department of Natural Resources
525 West Allegan
P.O. Box 30028
Lansing, Michigan 48933

Dear Dan:

Enclosed please find one bound and one loose copy of our *Environmental Acoustic Assessment of 3 Sites for a Proposed Firing Range* report for the proposed Shooting Ranges in Grand Traverse County, Michigan. The report contains a summary of baseline ambient sound level measurements made at the 3 sites; a summary of sound levels measured during shooting exercises at each site with 3 weapons; a 0.40 caliber handgun, a 12 gauge shotgun and a 0.308 rifle; and sound levels calculated at locations within two miles of the approximate center of the 3 proposed sites for a firing range with berms on 3 sides and a canopy over the firing line; and several noise mitigation options for the ranges. Rank ordering of the relative magnitude of potential noise impacts for the base range locations; orientation of the direction of fire of the range; and a variety of noise mitigation options for each range location are also presented.

The report contains an executive summary of the results, background information relevant to the acoustical analysis; a description of the methods used to conduct the measurements and analysis; aerial maps showing the measurements and results of the computer analysis; and rank ordering of the relative magnitude of potential noise impacts for the range location, orientation and design alternatives considered.

Please do not hesitate to contact us if you have any questions regarding the findings of our analysis or if we can be of additional assistance in this regard.

Sincerely,
SIEBEIN ASSOCIATES, INC.



Gary W. Siebein, FAIA, FASA
Senior Principal Consultant

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Appendix A: Summary of Existing Ambient Sound Levels Measured at 2 Locations Near Each of the 3 Proposed Range Sites

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EXECUTIVE SUMMARY

Three options for the location of a new firing range in Grand Traverse County, Michigan were investigated. Site 1 is located in Whitewater Township north of Diagonal Road at T27N R9W Section 33. Site 2 is located in Union Township south of Jackpine Road at T26N R9W Section 13. Site 3 is located in Fife Lake Township southeast of Bowen Road at T25N R9W Section 27.

1. Existing ambient sound levels were measured at 2 locations near potential noise sensitive receivers located near each proposed range site from September 1-7, 2015. Existing ambient sound levels at the sites varied from 16 to 82 dBA with average Day-Night Sound Levels (LDN) of 39 to 61 dBA.

2. Experiments were conducted at each proposed range site on September 1-2, 2015. A Conservation Officer fired 3 shots in succession from a 0.40 caliber handgun; a 12 gauge shotgun; and a 0.308 rifle. Acoustical measurements were made at 10 feet or approximately 3 meters from the sound source as well as at 16 locations around the proposed range site. There were 4 measurement locations, one in each cardinal direction (i.e., north, east, south, and west) at successive distances of ¼ mile, ½ mile, 1 mile and 2 miles from the firing location at the 3 prospective sites for the firing range.

3. The sound levels measured at 10 feet from the source were approximately 7 to 8 dB louder in the direction of fire than to the sides and 16 dB louder in the direction of fire than behind the shooter for the 0.40 caliber handgun; approximately 11 dB louder in the direction of fire than to the sides and 17 dB louder in the direction of fire than behind the shooter for the 12 gauge shotgun; and approximately 12 dB louder in the direction of fire than to the sides and 23 dB louder in the direction of fire than behind the shooter for the 0.308 rifle.

4. At 42% of the measurement locations at distances of 1 to 2 miles from the proposed range site the sounds of the gun shots could not be measured above the ambient sound levels. Average LAeq, maximum LA max and peak LA peak sound levels were measured at the 16 locations around each of the proposed range sites. The LA max levels were on average 3 to 4 dB louder than the LAeq levels. The LA peak levels were 17 to 19 dB louder than the LAeq levels.

5. Measured sound levels were approximately 10 dB louder in the direction of fire compared to the same distances at the sides of the shooter and 20 dB louder in the direction of fire than behind the shooter at distances of ¼ and ½ mile from the proposed range location.

6. The average sound decay with distance measured from the proposed range sites was 6 to 17 dB per doubling of distance from the sound source. This was affected by distance and localized conditions of wind, topography, ground cover and vegetation at each site.

7. Computer models of each of the proposed range sites were constructed in CADNA Software including topography, roads, ground cover, coniferous vegetation with the 10 ft. tall berms on 3 sides of the ranges and an open structure over the firing line for a standard day with 50°F and 70% relative humidity with typical wind speed and direction.

8. Noise contours were plotted for a "typical day" with 3 shooters firing within a 1 second time period and a "busy day" with 6 shooters firing within a 1 second time period for the base range conditions.

9. A point scale was used to assess potential noise impacts that accounted for the sound pressure at each house within a 2 mile radius of each of the proposed range sites and the number of dwellings impacted by the sounds. The sound pressure derived from the average sound level calculated in the noise modeling software was multiplied by the number of dwelling units within each 5 dB group of noise contour lines. For example, if 20 dwellings were located between the 30 and 35 dBA noise contours the points were calculated by the following method. The average sound level in this contour range is 32.5 dBA. The sound pressure associated with this value is 10^(32.5/10). This value was multiplied by the number of dwellings identified in GIS software by DNR staff to arrive at a linear pressure score for these contours. The linear pressure was divided by 100,000 to arrive at a scale that ranged from 0.4 to 46.5 for the alternatives studied. The values for each of the 5 dB groups of noise contours were added together to reach the cumulative linear pressure score for the scenario. Scenarios with lower numbers of points have lower cumulative noise impacts for the scenario.

10. Three sites and range orientations were initially selected for analysis. Site 1: Whitewater Township with the range oriented towards the north; Site 2: Union Township with the range oriented towards the east; and Site 3: Fife Lake with the range oriented towards the southwest. The computer model analysis of these sites is summarized in Appendix F for the "typical day" and "busy day" scenarios with 10 ft. tall berms on the 3 down range sides of the range. Site 1 had the lowest linear pressure score followed by Site 2 with Site 3 a distant third with a linear pressure score that was 4 times the Site 1 score for both scenarios.

11. The "typical day" scenario had approximately ½ of the linear pressure score or 3 dB less than the scores for the "busy day" scenario.

12. The ranking of the initial 3 sites and range orientations remained consistent for the "busy day" scenario when alternate berm heights of 20 ft. and 30 ft. were modeled. The scores for sites 1 and 2 were mixed for the "typical day" scenario.

13. Alternate orientations were selected for each range to reduce potential noise impacts to residential properties within 2 miles of each proposed range site. The alternate range orientation to minimize potential noise impacts to residential and noise sensitive receivers was to the northwest for Site 1: Whitewater Township; towards the northeast for Site 2: Union Township; and towards the northwest for Site 3: Fife Lake Township.

14. Site 1 oriented towards the northwest had the lowest linear pressure score of the 6 alternatives followed closely by Site 1 oriented towards the north and the 2 orientations for Site 2 for the base range design with the 10 ft. berm on the 3 down range sides of the range. Both options for the base range design at Site 3 were scored at almost twice to 4 times the scores for the other sites. There was a slightly different ranking for the "typical day" scenarios than for the "busy day" scenarios.

15. Models were tested using 20 ft. tall and 30 ft. tall berms in addition to the 10 ft. tall berms for each of the range sites and orientations. These studies are reported in Appendix G. The lowest scores for a given range and orientation were generally received by the scheme with the tallest berm height. The relative ranking of sites was similar to those previously discussed with Site 1 oriented to the northwest; Site 2 oriented to the northeast and Site 1 oriented to the north receiving the lowest scores. The highest scores for these tests were for all berm heights and orientations at Site 3: Fife Lake for both the "typical day" and "busy day" scenarios.

16. Studies with alternate air temperatures and relative humidities (Appendix H); alternate wind conditions (Appendix I); and the addition of the existing stands of coniferous trees (Appendix J) on the sites verified that the assumptions made in the model studies represented a conservative approach to the noise contour mapping for the proposed range. This means that the mapped noise contours represent a worst case condition in terms of the effects of temperature, humidity, wind and vegetation on the modeled noise contours.

17. Experiments were conducted in computer models of noise mitigation options that could be considered for the ranges if needed in the future. Order of magnitude costs for the mitigation options were also presented in Appendix T. The noise mitigation options studied included raising the height of the down range berms to 20 ft. tall and 30 ft. tall at cost increases of approximately $223,600 for the 20 ft. tall berm compared to the 10 ft. tall berm; and approximately $641,300 for the 30 ft. tall berm compared to the 10 ft. tall berm. These studies are summarized in Appendices F and G.

18. A U-shaped berm built around the rear of the range to reduce sounds spilling to the rear and sides of the range was investigated in computer model studies summarized in Appendix K. The linear pressure score was reduced by 50% to 60% by adding these U-shaped berms that were 20 ft. tall and 30 ft. tall at an incremental cost increase of approximately $300,400 for the 20 ft. berm scheme and $1,078,100 for the 30 ft. tall berm scheme.

19. Adding solid dividers between each lane in the range building and lining the walls and ceiling of each lane with sound absorbent panels such as Troy Acoustics Troy Board will reduce the linear pressure score at Site 2 by almost 50% and by approximately 11% at Site 1 at a cost of approximately $83,500 as summarized in Appendix L.

20. Additional mitigation options studied included adding solid walls at the sides and rear of the range building lined with the sound absorbent panels; extending the roof of the range building 40 ft. downrange from the firing line and adding a sound absorbent inner lining to the roof; building a U-shaped berm around the rear of the range and raising the height of the berms on all sides to 20 ft. and 30 ft. respectively. These options reduced the linear pressure score between 50% and 75% compared to the base range with the 10 ft. tall berm on 3 sides of the range and the open range structure depending upon the combination of options selected. Incremental costs for these options varied from approximately $150,500 for adding the side and rear walls of the range building; approximately $296,600 for adding the 40 ft. roof extension; approximately $31,200 for adding the 10 ft. tall U-shaped berm at the rear of the range; approximately $108,000 for adding the 20 ft. tall U-shaped berm at the rear of the range; approximately $468,000 for adding the 30 ft. tall U-shaped berm at the rear of the range; and approximately $1,525,200 for the combination of all of these options.

21. The use of the noise mitigation options should be carefully considered for a given site because there are site specific limitations on how much reduction in linear pressure score can be obtained at any given site for a specific mitigation scheme.

SOUND LEVELS AND DECIBELS

Sound is defined as a pressure disturbance in the air caused by a vibrating body that is capable of being heard or detected by the human ear. In the case of gun shots, the muzzle blast of the weapon creates the pressure disturbance in the air as an impulsive type of sound. There is a high amplitude peak pressure from the shot followed by an under pressure that propagates away from the gun. The peak sound pressure level is measured at the highest point of the impulsive sound. The average sound pressure level or equivalent continuous sound level (LAeq) of a time-varying sound is defined as the level of an equivalent steady sound at a specific location for the same measurement duration has the same A-weighted sound energy as the time-varying sound. The LAeq is usually 15 to 20 dB less than the peak pressure level for a gun shot. The maximum A-weighted sound level or LAmax is the greatest sound level measured on a sound level meter using fast time averaging during a designated time duration and an A-weighted filter. The Sound Exposure Level (SEL or LAE) over a stated time period or event is equal to 10 times the logarithm to the base 10 of the ratio of the time integral of squared A-weighted sound pressure to the product of the reference sound pressure and the reference duration of 1 second.

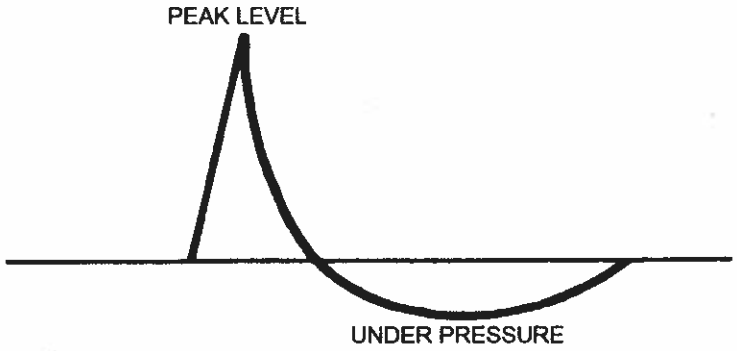


Figure 1. Amplitude or loudness plotted vs time for a typical gunshot.

Sounds are typically measured in decibels. A decibel is 10 times the logarithm to the base 10 of the pressure disturbance in the air compared to the pressure at the threshold of human hearing. Decibels cannot be added directly because they are logarithmic ratios. For example, 2 sounds of 50 decibels each added together result in a sound of 53 dB, not 100 dB. A summary of the way that sounds of different levels are added together is shown in Table 1.

Table 1. Examples of the addition of different sound levels (dBA).

Sound level 1	Sound level 2	Combined sound level	Explanation
50 dBA	50 dBA	53 dBA	When two sounds of equal level are combined, the result is a 3 dB increase in sound level
50 dBA	52 dBA	54 dBA	When one sound is combined with another sound that is 2-3 dB louder than first sound, the combined sound level is 2 dB louder than the louder sound
50 dBA	55 dBA	56 dBA	When one sound is combined with another sound that is 4-7 dB louder than the first sound, the combined sound level is 1 dB louder than the louder sound
50 dBA	60 dBA	60 dBA	When one sound is 10 dB louder than another, the combined sound level is approximately equal to the louder sound level

The differences in sound levels are not perceived by people linearly either. One sound must be 10 dB louder than another sound for it to be heard as approximately twice as loud as the first sound. A sound that is 0 to 1 dB louder than another sound is heard as approximately the same loudness as the first sound. A sound that is 2 to 3 dB louder than another sound is heard as barely louder than the first sound. A sound that is 5 to 6 dB louder than another sound is heard as noticeably louder, but not twice as loud as the first sound. A summary of the perception of the relative loudness of two sounds is shown in Table 2. An acoustic thermometer showing the sound levels associated with different sounds is shown in figure 2. The sound levels are measured in A-weighted decibels or dBA. An A-weighted decibel is one that has been adjusted so it corresponds to the relative loudness of middle level sounds as they are heard by human listeners. The low frequency or bass sounds are reduced by the A-weighting process and the higher pitch sounds that human ears are more sensitive to are increased slightly by the A-weighting process.

Table 2. Perception of the relative loudness of 2 sounds.

Difference in sound level between two sounds	The louder sound is perceived as ____ the quieter sound
0 to 1 dB	Not noticeably louder than
2-3 dB	Barely noticeably louder than
5-6 dB	Noticeably louder than, but not twice as loud as
10-12 dB	Approximately twice as loud as
15 dB	Approximately three times as loud as
20 dB	Approximately four times as loud as

In general terms, sound levels of 30 to 40 dBA are usually perceived by people as being relatively quiet. Normal conversation measured at approximately 3 feet from the person speaking is 60 to 65 dBA. Cars passing on a street or a residential air-conditioning unit are approximately 65 to 75 dBA. Loud night clubs and amplified music at concerts are often played at levels of 100 to 110 dBA. Peak sound levels from gunshots measured at 10 feet from the source in the direction of fire will be 150 to 165 dBA depending upon the weapon type and ammunition used.

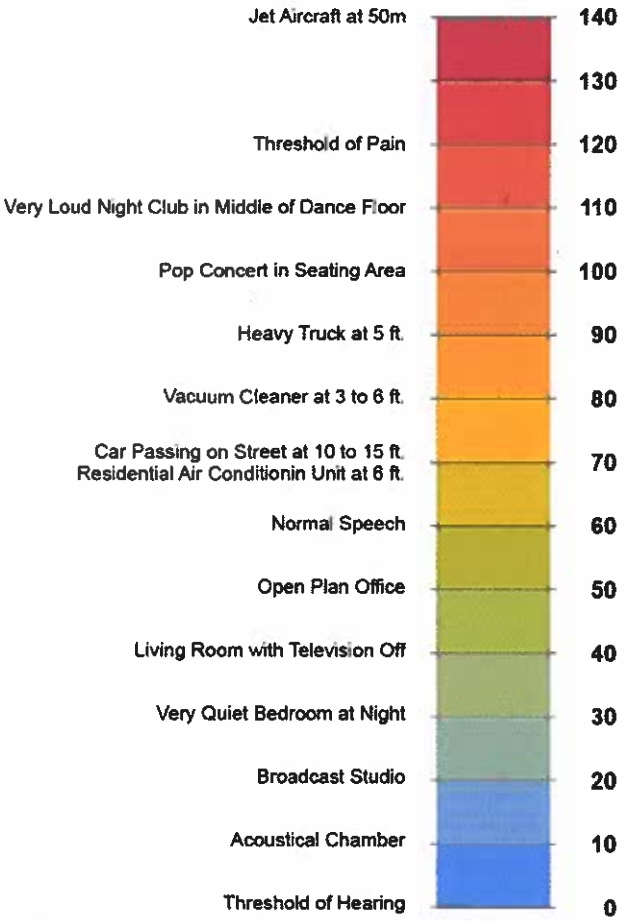


Figure 2. Acoustical thermometer showing the relative loudness in dBA of various sounds.

ACOUSTICAL MEASUREMENTS

Two types of acoustical measurements were taken. Short term measurements of the sounds produced by firearms at the location of the shooter and at distances away from the shooter were conducted at each of the 3 sites. Long term measurements of base line ambient sounds were also made at 2 locations at each of the 3 sites for approximately 1 week at each of the six locations.

Short Term Measurements

Short term acoustical measurements of overall-A-weighted, C-weighted and Z-weighted peak, average and maximum sound levels as well as flat-weighted octave band and 1/3 octave band sound levels produced by firearms discharges were recorded at the 3 proposed firing range sites. Measurements were also made at 16 receiver locations located at distances of ¼ mile, ½ mile, 1 mile and 2 miles from the proposed range sites at locations around the range sites at which the gunshots were audible above the background noise levels and able to be measured. These locations are shown in Appendix A. GPS coordinates of the measurement locations are shown in Appendix S. Sound levels measured at each of the receiving locations are shown on aerial photographs of each site in Appendix A and in graph form in Appendix V.

The measurements were recorded at the location of the shooter and at 16 locations at increasing distances and varying directions from the site. A summary of sound levels measured at 10 feet from the shooter at each site is contained in Appendix B. Table summaries and aerial photographs of each proposed site and its surroundings showing the sound levels measured at distances away from the range sites are contained in Appendices C, D and E. Graphs showing average and peak sound levels for each of the measurements are contained in Appendix U. A Larson Davis Model 831 and a Cesva SC 310 Sound Level Meter were used as the basic instrumentation for the acoustical measurements. The meters meet ANSI Standard S1.4 requirements for Type 1 sound level meters.

The 2 Larson Davis 831 meters were set to measure LAeq, LAmax and flat-weighted octave band sound level data averaged every 1 second during the measurements in addition to LA peak and other metrics. The Cesva SC 310 recorded data every 1 second and every 125 milliseconds. The Larson Davis meters were equipped with standard ½" diameter measurement microphones. The Cesva was equipped with a Gras HD 40 1/4" microphone and associated preamplifier so it could measure high sound pressure levels (up to 190 dB) because it was located close to the guns that were fired during the experiments.

The Larson Davis meters were calibrated with a Larson Davis CAL 200 calibrator prior to testing and tested to within 0.1 dB of calibration after the measurements were complete. The Cesva SC 310 was calibrated with a Norsonic 1251 calibrator prior to testing and tested to within 0.1 dB of calibration after the measurements were complete. The meters were mounted on a tripod at approximately 5 ft. above the ground at each measurement location. A windscreen was attached to the microphones for all measurements. The data were stored on the hard drives of the meters and downloaded to computers in our office and analyzed.

Weather readings including dry bulb temperature (° F), relative humidity (%), barometric pressure (inches of mercury (Hg) and wind speed (m.p.h.) and direction were made with a Kestrel 4000 Pocket Wind Meter from Nielsen Kellerman at each measurement location. These readings are included in Appendix R of this report.

Three rounds in succession were fired from a Sig Sauer P229 0.40 caliber handgun with Smith and Wesson 180 grain full metal jacket bullets; a Remington 870 12 gauge shotgun using LE 133 ¾" buckshot; and a Ruger 77 rifle using 0.308 Win 150 grain full metal jacket boat tail ammunition at each of the 3 proposed range locations while sound levels were recorded with the Cesva meter near the source and with the 2 Larson Davis 831 meters at the 16 receiver locations located at distances away from each of the proposed range sites. The sequence of firing was repeated at each of the receiver locations and then repeated at each of the 3 sites.

Long Term Measurements of Base Line Ambient Sound Levels

Long term measurements of existing ambient sound levels were made for a 1 week time period at 2 locations near each of the proposed range sites with 6 Rion NL-32 integrating sound level meters. The Rion equipment meets ANSI requirements for type 1 sound level meters. The meters were set to the fast, A-weighted mode to acquire data. The Rion NL-32 meters were calibrated with a Larson Davis Cal 200 calibrator prior to and after testing. The calibration levels were within ±0.1 dB from the beginning of the measurement period to the end. The microphones were covered with a wind screen

and positioned atop an extension rod approximately 5 ft 6 inches (the height of a standing person) above ground level attached to secure, weather resistant environmental cases. The environmental cases were strapped to a tree at each measurement location. The meters logged acoustical measurement data for approximately 7 days recording sound levels every 1/8 second. The 1/8 second levels were averaged over a 1 minute time period to yield a 1 minute A-weighted Continuous Equivalent Sound Level (LAeq). Graphs illustrating the 1 minute continuous equivalent sound level (LAeq) and fast maximum A-weighted sound level (LAF max) plotted vs. time for each 7 day time period are shown in Appendix V. A tabular summary of the data is provided in Appendix A along with aerial photographs of the 3 proposed range sites showing the measurement locations and the range of average sound levels (LAeq's) and the LDN during the measurement period. Data were downloaded from the meters to a laptop computer after the measurement time for subsequent analysis.

The Day-Night Average Sound Level (LDN) was calculated from the LAeq data for each day during the measurement period. The LDN is the average of the measurements taken during day time hours from 7:00 a.m. until 10:00 p.m. and the measurements taken during night time hours from 10:00 p.m. until 7:00 a.m. with a 10 dB added to sound levels recorded during the night time hours to reflect a greater sensitivity to sounds made during this time period as potentially interfering with people sleeping.

The sound level meter also recorded A-weighted maximum and minimum sound levels, as well as other statistical acoustical data (L05, L10, L50, L90 L95 and SEL). These data are available for review if desired. The L05 is the sound level exceeded for 5% of the measurement time. The L10 is the sound level exceeded for 10% of the measurement time. The L50, L90 and L95 are defined similarly for 50%, 90% and 95% of the measurement time respectively. The SEL is the sound exposure level.

MEASUREMENT RESULTS

Existing Ambient Sound Levels

Existing ambient sound levels were measured at 2 locations near each of the proposed range sites at distances near potential noise sensitive receivers from September 1-7, 2015. Figures A-1, A-2 and A-3 in Appendix A show an aerial photograph of the area around each proposed range site with the ambient sound level measurement locations indicated on the site plan. The sound level meters were left unattended during the measurement time period. A summary of the measured data is presented in Table A-1 in Appendix A. The data are presented as a range of average sound levels or A-weighted Equivalent Average Sound Levels (LAeq's) and Day Night Average Sound Levels (LDN's). LDN's are usually used as metrics to classify lands for planning purposes. The LAeq's for the ambient sound levels can be compared to the range of sounds produced by firearms discharge in the experiments conducted on site as well as in the computer model studies to determine if the sound levels produced by the firearms are louder than the existing ambient sound levels at locations of interest. Graphs of sound pressure level in dBA plotted vs. time for each day during the measurement period at each site are shown in Appendix V.

1. Existing ambient sound levels at Range Site 1 in Whitewater Township varied from 18 to 72 dBA with average Day-Night Sound Levels (LDN) of 39 to 59 dBA. The ambient sound levels at Site 1 consisted of light to moderate traffic on Supply Road, Williamsburg Rd, and Broomhead Road; logging operations and logging trucks traveling near the site; occasional vehicles traveling on the dirt and gravel roads near the site; the breeze blowing through the trees; birds chirping; and the sounds of insects.

2. Existing ambient sound levels at Range Site 2 in Union Township varied from 16 to 77 dBA with average Day-Night Sound Levels (LDN) of 39 to 61 dBA. The ambient sound levels at Site 2 consisted of light to moderate traffic on Supply Road and Fife Lake Road; occasional vehicles traveling on the dirt and gravel roads near the site; occasional recreational motorized bikes and 4-wheelers traveling on the dirt roads near the site; the breeze blowing through the trees and grasses; birds chirping; and the sounds of insects.

3. Existing ambient sound levels at Range Site 3 in Fife Lake varied from 16 to 81 dBA with average Day-Night Sound Levels (LDN) of 48 to 56 dBA. The ambient sound levels at Site 3 consisted of traffic with trucks on Routes U.S. 131 and County Road 113 in the distance; wind blowing through the trees; birds calling; and the sounds of insects.

MEASURED SOUND LEVELS OF FIREARMS

Experiments were conducted at each proposed range site on September 1-2, 2015. A Conservation Officer fired 3 shots in succession from a 0.40 caliber handgun; a 12 gauge shotgun; and a 0.308 rifle. Acoustical measurements were made at 10 feet or approximately 3 meters from the sound source as well as at 16 locations around the proposed range site. A summary of sound levels of gun shots measured at 10 feet from the person shooting during the experiments at each proposed range site is presented in tabular and diagrammatic formats in Appendix B.

There were also 16 measurement locations, one in each cardinal direction (i.e., north, east, south, and west) at successive distances of ¼ mile, ½ mile, 1 mile and 2 miles from the firing location at the 3 prospective sites for the firing range. A summary of LAeq average and LA peak sound levels of gun shots measured at distances away from the 3 proposed range sites is presented in tabular and graphic formats in Appendix C for Site 1: Whitewater Township; Appendix D for Site 2: Union Township; and Appendix E for Site 3: Fife Lake. Graphs of the average and peak sound levels recorded for each measurement are presented in Appendix U.

Summary of Measurements Made at the Source Locations

1. The sound levels measured at 10 feet from the source were approximately 7 to 8 dB louder in the direction of fire than to the sides of the shooter and 16 dB louder in the direction of fire than behind the shooter for the 0.40 caliber handgun; approximately 11 dB louder in the direction of fire than to the sides of the shooter and 17 dB louder in the direction of fire than behind the shooter for the 12 gauge shotgun; and approximately 12 dB louder in the direction of fire than to the sides of the shooter and 23 dB louder in the direction of fire than behind the shooter for the 0.308 rifle.

2. The global average difference in LA peak sound levels for all firearms measured at 10 feet from the shooter was 10 dB less to the sides of the shooter and 19 dB less to the rear of the shooter compared to levels measured in the direction of fire.

3. LA peak sound levels of the 0.40 caliber handgun were measured at 153 dBA to 158 dBA at 10 feet in front of the shooter approximately 10° off the axis of firing. The measured peak sound levels varied from 144 to 150 dBA to the sides of the shooter and 137-141 dBA behind the shooter.

4. LA peak sound levels of the 12 gauge shotgun were measured at 157 dBA to 160 dBA at 10 feet in front of the shooter approximately 10° off the axis of firing. The measured peak sound levels varied from 144 to 149 dBA to the sides of the shooter and 140-142 dBA behind the shooter.

5. LA peak sound levels of the 0.308 rifle were measured at 163 dBA to 165 dBA at 10 feet in front of the shooter approximately 10° off the axis of firing. The measured peak sound levels varied from 148 to 155 dBA to the sides of the shooter and 140-143 dBA behind the shooter.

6. The LAeq or average sound levels measured at 10 feet from the source were approximately 8 to 9 dB louder in the direction of fire than to the sides and 16 dB louder in the direction of fire than behind the shooter for the 0.40 caliber handgun; approximately 10 dB louder in the direction of fire than to the sides and 16 dB louder in the direction of fire than behind the shooter for the 12 gauge shotgun; and approximately 12 dB louder in the direction of fire than to the sides and 19 dB louder in the direction of fire than behind the shooter for the 0.308 rifle.

7. The global average difference in LAeq average sound levels for all firearms measured at 10 feet from the shooter was 10 dB less to the sides and 17 dB less to the rear compared to levels measured in the direction of fire.

8. LAeq average sound levels of the 0.40 caliber handgun were measured at 129 dBA to 130 dBA at 10 feet in front of the shooter approximately 10° off the axis of firing. The measured LAeq sound levels varied from 117 to 123 dBA to the sides of the shooter and 111-114 dBA behind the shooter.

9. LAeq average sound levels of the 12 gauge shotgun were measured at 129 dBA to 132 dBA at 10 feet in front of the shooter approximately 10° off the axis of firing. The measured LAeq sound levels varied from 116 to 121 dBA to the sides of the shooter and 118-121 dBA behind the shooter.

10. LAeq average sound levels of the 0.308 rifle were measured at 135 dBA to 137 dBA at 10 feet in front of the shooter approximately 10° off the axis of firing. The measured LAeq sound levels varied from 121 to 126 dBA to the sides of the shooter and 115-118 dBA behind the shooter.

11. Therefore, the orientation of the direction of fire for the range will have a significant effect on sounds propagated away from the range site. The approximate 10 dB difference between sound levels propagated in the direction of fire compared to the sides of the shooter would be heard as ½ as loud by people of normal sensitivities. The 17 to 19 dB difference in sound levels between the direction of fire compared to the rear of the shooter would be heard as almost ¼ as loud by people of normal sensitivities.

Summary of Measurements Made at 1/4 mile, 1/2 mile, 1 mile and 2 miles from the Three (3) Proposed Range Sites

1. At Site 1 in Whitewater Township average (LAeq) and peak (LA peak) sound levels measured for the 0.40 caliber handgun at ¼ mile from the proposed range site varied from 48-52 dBA LAeq and 62 to 80 dBA LA Peak; 33 to 52 dBA LAeq and 33 to 76 dBA LA peak at ½ mile from the proposed range site; 33 to 41 dBA LAeq and 57 to 70 dBA LA peak at 1 mile from the proposed range site; and 31 to 40 dBA LAeq and 56 to 58 dBA LA peak at 2 miles from the proposed range site.

2. At Site 1 in Whitewater Township average (LAeq) and peak (LA peak) sound levels measured for the 12 gauge shotgun at ¼ mile from the proposed range site varied from 44-59 dBA LAeq and 58 to 79 dBA LA Peak; 34 to 50 dBA LAeq and 56 to 72 dBA LA peak at ½ mile from the proposed range site; 33 to 44 dBA LAeq and 57 to 65 dBA LA peak at 1 mile from the proposed range site; and 29 to 40 dBA LAeq at 2 miles from the proposed range site.

3. At Site 1 in Whitewater Township average (LAeq) and peak (LA peak) sound levels measured for the 0.308 rifle at ¼ mile from the proposed range site varied from 49-61 dBA LAeq and 63 to 85 dBA LA Peak; 35 to 57 dBA LAeq and 56 to 84 dBA LA peak at ½ mile from the proposed range site; 32 to 51 dBA LAeq and 57 to 76 dBA LA peak at 1 mile from the proposed range site; and 33 to 40 dBA LAeq and 60 to 63 dBA LA peak at 2 miles from the proposed range site.

4. At Site 2 in Union Township average (LAeq) and peak (LA peak) sound levels measured for the 0.40 caliber handgun at ¼ mile from the proposed range site varied from 47-67 dBA LAeq and 61 to 99 dBA LA Peak; 35 to 58 dBA LAeq and 57 to 84 dBA LA peak at ½ mile from the proposed range site; 41 to 50 dBA LAeq and 57 to 68 dBA LA peak at 1 mile from the proposed range site; and 29 to 34 dBA LAeq at 2 miles from the proposed range site.

5. At Site 2 in Union Township average (LAeq) and peak (LA peak) sound levels measured for the 12 gauge shotgun at ¼ mile from the proposed range site varied from 41-71 dBA LAeq and 60 to 101 dBA LA Peak; 36 to 56 dBA LAeq and 56 to 82 dBA LA peak at ½ mile from the proposed range site; 43 to 48 dBA LAeq and 56 to 72 dBA LA peak at 1 mile from the proposed range site; and 31 to 38 dBA LAeq at 2 miles from the proposed range site.

6. At Site 2 in Union Township average (LAeq) and peak (LA peak) sound levels measured for the 0.308 rifle at ¼ mile from the proposed range site varied from 48-76 dBA LAeq and 66 to 105 dBA LA Peak; 37 to 60 dBA LAeq and 58 to 86 dBA LA peak at ½ mile from the proposed range site; 32 to 47 dBA LAeq and 58 to 73 dBA LA peak at 1 mile from the proposed range site; and 33 to 34 dBA LAeq at 2 miles from the proposed range site.

7. At Site 3 in Fife Lake Township average (LAeq) and peak (LA peak) sound levels measured for the 0.40 caliber handgun at ¼ mile from the proposed range site varied from 53-62 dBA LAeq and 73 to 85 dBA LA Peak; 41 to 49 dBA LAeq and 56 to 64 dBA LA peak at ½ mile from the proposed range site; 34 to 43 dBA LAeq and 56 to 61 dBA LA peak at 1 mile from the proposed range site; and 41 to 42 dBA LAeq and 60 to 62 dBA LA peak at 2 miles from the proposed range site.

8. At Site 3 in Fife Lake Township average (LAeq) and peak (LA peak) sound levels measured for the 12 gauge shotgun at ¼ mile from the proposed range site varied from 50-59 dBA LAeq and 70 to 82 dBA LA Peak; 40 to 49 dBA LAeq and 56 to 73 dBA LA peak at ½ mile from the proposed range site; 36 to 42 dBA LAeq and 57 to 69 dBA LA peak at 1 mile from the proposed range site; and 41 to 43 dBA LAeq and 56 to 61 dBA LA peak at 2 miles from the proposed range site.

9. At Site 3 in Fife Lake Township average (LAeq) and peak (LA peak) sound levels measured for the 0.308 rifle at ¼ mile from the proposed range site varied from 55-63 dBA LAeq and 77 to 83 dBA LA Peak; 45 to 48 dBA LAeq and 58 to 64 dBA LA peak at ½ mile from the proposed range site; 33 to 46 dBA LAeq and 56 to 68 dBA LA peak at 1 mile from the proposed range site; and 43 to 44 dBA LAeq and 57 to 62 dBA LA peak at 2 miles from the proposed range site.

10. At 42% of the measurement locations at distances of 1 to 2 miles from the proposed range site the sounds of the gun shots could not be measured above the ambient sound levels. These measurements are indicated by an "x" in Table C-1 for Site 1; Table D-1 for Site 2 and Table E-1 for Site 3. The measurements are indicated by a N/A on the aerial photographs showing the measured sound levels in Appendices C, D and E.

11. Average LAeq, maximum LA max and peak LA peak sound levels were measured at the 16 locations around each of the 3 proposed range sites. The LA max levels were on average 2 to 5 dB louder than the LAeq levels. The LA peak levels were 16 to 24 dB louder than the LAeq levels for all sites, all locations and all weapon types.

12. The measurements at Sites 1 and 3 showed a 3 dB average difference between the LA max and LAeq with a range of 0 to 6 dB and 18 dB average difference between the LA peak and LAeq measurements with a range of 11 to 37 dB.

13. The measurements at Site 2 showed a 5 dB average difference between the LA max and LAeq sound levels with a 0 to 6 dB range and a 22 dB difference between the LA peak and LAeq sound levels with a range of 13 to 32 dB.

14. Measurements at Site 3 showed a 6 dB difference between LA max and LAeq levels for handguns to the front of the shooter, and a 3 to 4 dB difference between LA max and LAeq levels to the sides and rear of the shooter for the handgun.

15. There was a 24 dB difference between LA peak and LAeq levels for the handgun to the front of the shooter, a 16 dB difference between LA peak and LAeq levels to the rear of the shooter for the handgun, and an 18 dB difference at the sides.

16. Measurements at Site 3 showed a 4 dB difference between LA max and LAeq levels for shotguns to the front and rear of the shooter, and a 1.5 to 3 dB difference between LA max and LAeq levels to the sides of the shooter for the shotgun.

17. There was a 22 dB difference between LA peak and LAeq levels for the shotgun to the front of the shooter, a 21 dB difference between LA peak and LAeq levels to the rear of the shooter for the shotgun, and a 17 dB difference at the sides.

18. Measurements at Site 3 showed a 2 to 3.5 dB difference between LA max and LAeq levels for the .308 rifle to the front of the shooter, and a 3 to 4 dB difference between LA max and LAeq levels to the sides and rear of the shooter with the .308 rifle.

19. There was a 19 dB difference between LA peak and LAeq levels for the .308 rifle to the front of the shooter, a 16 dB difference between LA peak and LAeq levels to the rear of the shooter for the 0.308 rifle, and a 17 dB difference at the sides.

20. Measured LA peak sound levels at Site 1 were approximately 11 to 12 dB louder in the direction of fire compared to the same distances at the sides of the shooter; 11 to 16 dB louder compared to the back side of the shooter; and 15 to 19 dB louder compared to the rear of the shooter at ¼ mile. The LA peak levels were 16 to 17 dB louder in the direction of fire compared to the side and 16 to 23 dB louder compared to the rear at ½ mile from the proposed range location.

21. Measured LAeq sound levels at Site 1 were approximately 5 to 7 dB louder in the direction of fire compared to the same distances at the side of the shooter; 8 to 13 dB louder compared to the back side of the shooter; and 10 to 13 dB louder compared to the rear of the shooter at ¼ mile. The LAeq sound levels were 13 to 14 dB louder in the direction of fire compared to the side of the shooter and 6 to 15 dB louder compared to the rear of the shooter at ½ mile from the proposed range location. The differences were 3 to 8 dB louder in the direction of fire than to the sides of the shooter and 4 to 13 dB louder in the direction of fire compared to the rear of the shooter at 1 mile from the proposed range location.

22. Measured LA peak sound levels at Site 2 were approximately 0 to 12 dB louder in the direction of fire compared to the same distances at the side of the shooter; 0 to 12 dB louder compared to the back side of the shooter; and 1 to 6 dB louder compared to the rear of the shooter at ¼ mile.

23. Measured LAeq sound levels at Site 2 were approximately 18 to 27 dB louder in the direction of fire compared to the same distances at the side of the shooter; -1 to 12 dB louder compared to the back side of the shooter; and 16 to 25 dB louder compared to the rear of the shooter at ¼ to ½ mile distance.

24. The average sound decay per doubling of distance from the source was measured at 6 dB for LA peak values at Site 1 and 7 dB for LAeq values at Site 1.

25. The average sound decay for each doubling of distance from the sound source for the LA peak values was 13 dB with 11 dB decay per doubling of distance for the LAeq values at Site 2.

26. The average sound decay for each doubling of distance from the sound source for the LA peak values was 15 dB with 17 dB decay per doubling of distance for the LAeq values at Site 3.

THE COMPUTER MODEL STUDIES

Introduction

A series of computer model studies were designed and executed to study the propagation of sounds from the proposed range sites at each of the 3 locations at distances away from the proposed ranges. The models were constructed in the CADNA-A software package using topographic information from USGS maps and the GIS data base. A series of experiments were conducted to understand the relative differences between a number of variables including the location and orientation of the range, the height of berms, the number of people firing simultaneously (in the same 1 second time period), the configuration of the range structure, the addition of acoustical treatment to the range structure, the effects of different temperatures, wind and coniferous trees and combinations of these variables. The experiments are described in Appendices F through P. Noise contour plots for each of the options studied are also included in the appendices describing the experiment. The proposed base range design consists of 25 yard, 50 yard and 100 yard ranges surrounded by a berm. The ranges have approximately 10 ft. high berms on three sides (downrange and the two sides). There is an open structure that covers the firing line that has a wood roof/ceiling. The base range design selected by DNR was based on recent Michigan DNR range construction projects and recommendations of range layout from the National Rifle Association. A diagram of the base range design is shown in figure 3.

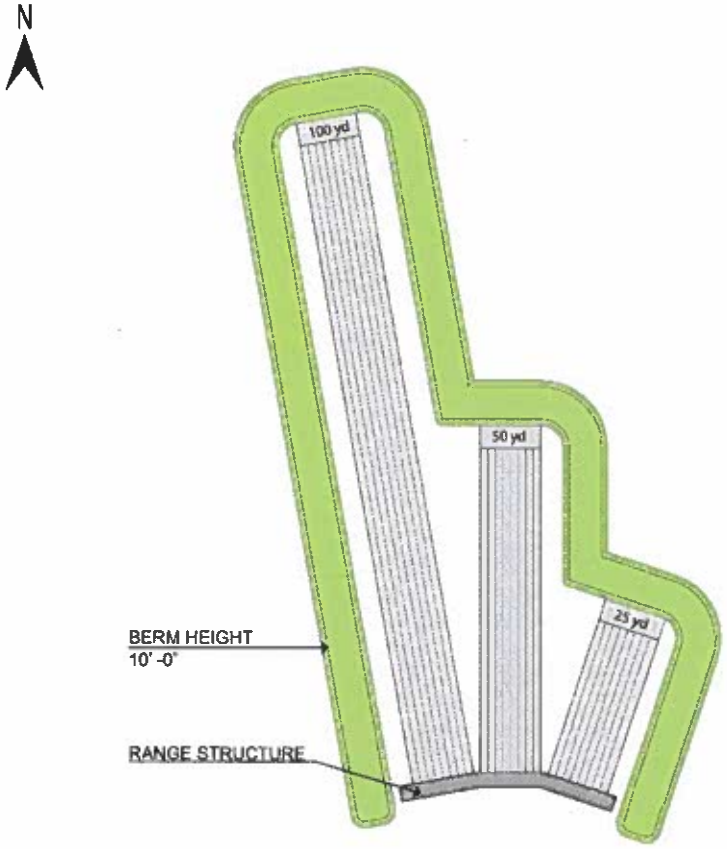


Figure 3. Concept diagram of the base range design.

Method

1. The analysis assumed two typical operating conditions: 1. a "typical day" where 3 people fired their weapons within a 1 second time period with possibly up to 3 additional people on the range getting ready to fire, loading their weapons or talking with each other; and; and 2. a "busy day" where 6 people fired their weapons within a 1 second time period and perhaps 6 other people were also on the range waiting to fire, loading their weapons or talking with each other.

2. The "typical" day had 1 shooter firing a .223 caliber rifle on the 100 yard range; 1 shooter firing a 12 gauge Remington shotgun on the 50 yard range; and 1 shooter firing a 0.40 caliber handgun on the 25 yard range within a 1 second time period. The 3 other people on the range were assumed to be either watching, loading their weapons to get ready to fire or pausing in their firing during the 1 second time period studied. Octave band sound pressure level data for the firearms were obtained from a report entitled "*Field Measurement of Sound Pressure Levels of Various Firearms,*" published by the Architectural Acoustics Research Group at the University of Florida in 1993 for the National Rifle Association, which includes data for an M-16 rifle with .223 Remington 55 grain power-locked hollow point ammunition; a Remington 12 gauge shotgun; and a 0.40 caliber handgun. A summary of the octave band sound exposure level data for the firearms used in the models is included in Appendix Q.

3. The "busy" day had 2 shooters firing .223 caliber rifles on the 100 yard range; 2 shooters firing 12 gauge Remington shotguns on the 50 yard range; and 2 shooters firing 0.40 caliber handguns on the 25 yard range within a 1 second time period. The 6 other people on the range were assumed to be either watching, loading their weapons to get ready to fire or pausing in their firing during the 1 second time period studied. Octave band sound data for the firearms were obtained from the report cited in item 2 above.

4. The 1 second LAeq data shown in the noise contour maps can be converted to LA max or LA peak data. On average across all field measurements made in the study, the LA max was approximately 3 to 4 dB higher than the LAeq with a range of 2 to 5 dB and the LA peak was 17 dB higher than the LAeq with a range of 16 to 24 dB.

5. Three dimensional computer models of the 3 proposed sites were constructed using AutoCAD software by drawing topographical ground elevations of the three sites extending approximately 2 miles from the approximate center of the firing ranges. The AutoCAD model was imported into CADNA-A software which is a state-of-the-art noise propagation modeling software.

6. The octave band sound pressure level data for the .223 rifles described above was used as the sound source for shooters on the 100 yard range. The octave band sound pressure level data for the 12 gauge Remington shotguns described above was used as the sound source for shooters on the 50 yard range. The octave band sound pressure level data for the 0.40 caliber handguns described above was used as the sound source for shooters on the 25 yard range. The computer sound propagation model was used to estimate the LAeq sound levels from the gunfire in all directions from the range with the following conditions taken into account.

    A. Number of shooters: "Typical day" (1 on each of the 100, 50 and 25 yard ranges)
       "Busy day" (2 on each of the 100, 50 and 25 yard ranges)
    B. Direction of fire relative to the receiver.
    C. The ranges have approximately 10 ft. tall berms on three sides (downrange and the two sides). Subsequent modeling was completed with 20 ft. tall and 30 ft. tall berms in addition to the 10 ft. tall berms. These experiments are described in Appendix F for the original sites and range orientations and in Appendix G for the alternate range orientations.
    D. Molecular sound absorption for a standard day (50° F, 70%R.H.). Separate experiments were conducted with computer model runs using 70° F and 50% R.H.; 50°F and 50% R.H.; 32° F and 50% R.H.; and 0 F and 50% R.H. values to document the range of sound levels that would occur during different seasons of the year. The 50° F and 70% Relative Humidity condition resulted in the highest sound levels at distances away from the ranges in the series of experiments described above, so this was used as the base condition for the computer models. These experiments are described in Appendix H.
    E. Anomalous excess attenuation (from small scale differences in wind, temperature, and humidity in the air).
    F. The topographic features of the 3 sites were developed using contour maps obtained from the United States Geological Survey.

G. CADNA-A assumes a downwind condition with wind velocity of 1 – 11 mph. An experiment was also conducted with a 6 m.p.h. wind speed from the southwest which is the yearly average wind speed and direction for the area. This experiment is described in Appendix I.
H. Vegetation (trees) was not included in the analysis. Areas of coniferous trees were added in Experiment 5 described in Appendix J.
I. Ground cover was modeled as pavement for paved roads, water in the lakes and grass for terrain covered with vegetation.
J. Deciduous trees were not included in the models because the loss of leaves during the Fall and Winter months significantly reduces the insertion loss of stands of deciduous trees.
K. Separate computer model runs were conducted with the stands of coniferous trees included in the model and not included in the model to document the change in sound levels calculated at receiver locations due to the effects of coniferous trees. This experiment is described in Appendix J.
L. Noise mitigation options described in the Noise Mitigation section of the report were also modeled. The noise mitigation experiments are described in Appendices K through P.

7. The resulting sound levels for each of the three proposed sites were plotted on scaled maps/aerial photographs of the sites identifying the "typical day" and "busy day" scenarios for the 3 proposed sites with the initial range orientations as well as for alternate range orientations to the northwest for Site 1, to the northeast for Site 2 and to the northwest for Site 3 in Appendices F and G.

8. A scaled map of the modeled configuration for the base range is shown in Figure 3.

9. The noise mitigation options studied include the following items.
   A. Alternate range orientations to the northwest for Site 1, to the northeast for Site 2 and to the northwest for Site 3 in Appendix G. Concept plans for these arrangements are shown in Figure 4. This experiment is described in Appendix G.
   B. A U-shaped berm was added at the rear of the range at Sites 1 and 2 with the alternate range orientation of northwest for Site 1 and northeast for Site 2 as shown in Figure 5 for the busy day scenario. The berm around the perimeter of the range and the U shaped berm had heights of 10 ft., 20 ft. and 30 ft. tall and enclosed the back and part of the sides of the range. There is a passage on both sides of the range between the U-shaped berm and the berm protecting the main range that allows people to enter and leave the range. This experiment is described in Appendix K. This experiment was not conducted for Site 3 because the initial analysis indicated that Site 3 had greater potential noise impacts for the base range design than Sites 1 and 2.
   C. A sound absorbent, acoustical lining was added to the inside of the range structure on the underside of the roof and on the sides of partitions built between the lanes inside the range. A concept plan for this experiment is shown in Figure 6. The experiment was conducted for the ranges with the alternate orientations at sites 1 and 2 for the busy day scenario with a 10 ft. berm height. The experiment is described in Appendix L.

D. Rear and side walls were added to the range structure at Sites 1 and 2 for the alternate range orientations for the busy day scenario. The inside facing of the walls was with a sound absorbent liner. The berm height was 10 ft. A concept plan for this experiment is shown in Figure 7. The experiment is described in Appendix M.
E. A 40 ft. deep extension was added to the roof of the range extending from the firing line down range towards the target area at Sites 1 and 2 for the alternate range orientation with the busy day scenario and a 10 ft. berm height. The underside of the roof extension is covered with a sound absorbent lining. A concept plan for this experiment is shown in Figure 8. The experiment is described in Appendix N.
F. A 30 ft. tall U-shaped berm is added to the rear of the range with the 40 ft. deep extension was added to the roof of the range extending from the firing line down range towards the target area at Sites 1 and 2 for the alternate range orientation with the busy day scenario and a 30 ft. berm height. The underside of the roof extension is covered with a sound absorbent lining. A concept plan for this experiment is shown in Figure 9. The experiment is described in Appendix O.
G. The 30 ft. tall U-shaped berm and 40 ft. deep roof extension is added to the original and alternate range orientations at Sites 1, 2 and 3 for the typical day and busy day scenarios with 10 ft., 20 ft. and 30 ft. tall berms. The concept plan for this experiment is shown in Figure 9. The experiment is described in Appendix P.

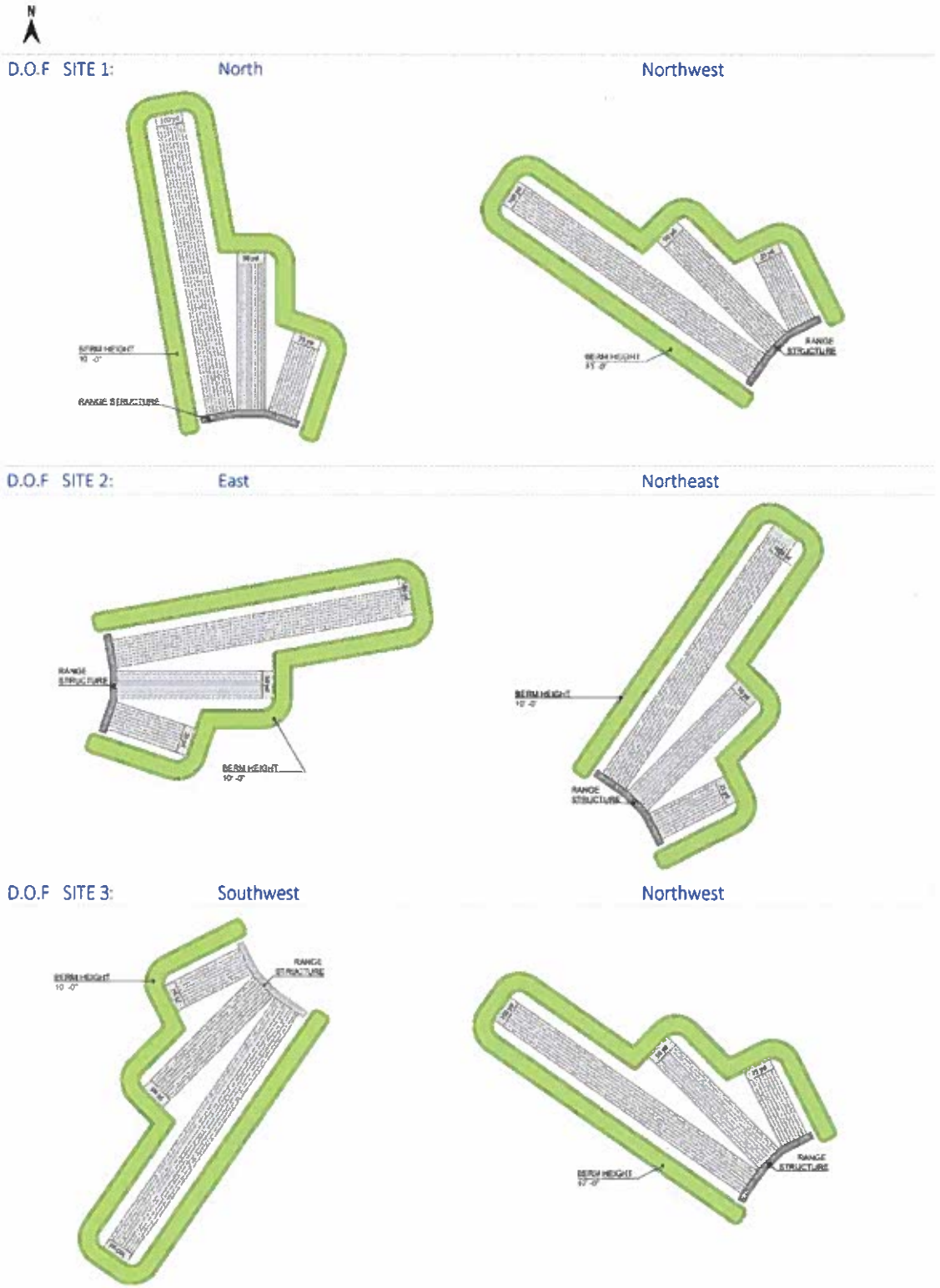


Figure 4. Concept plans showing the original and alternate range orientations for the 3 range sites.

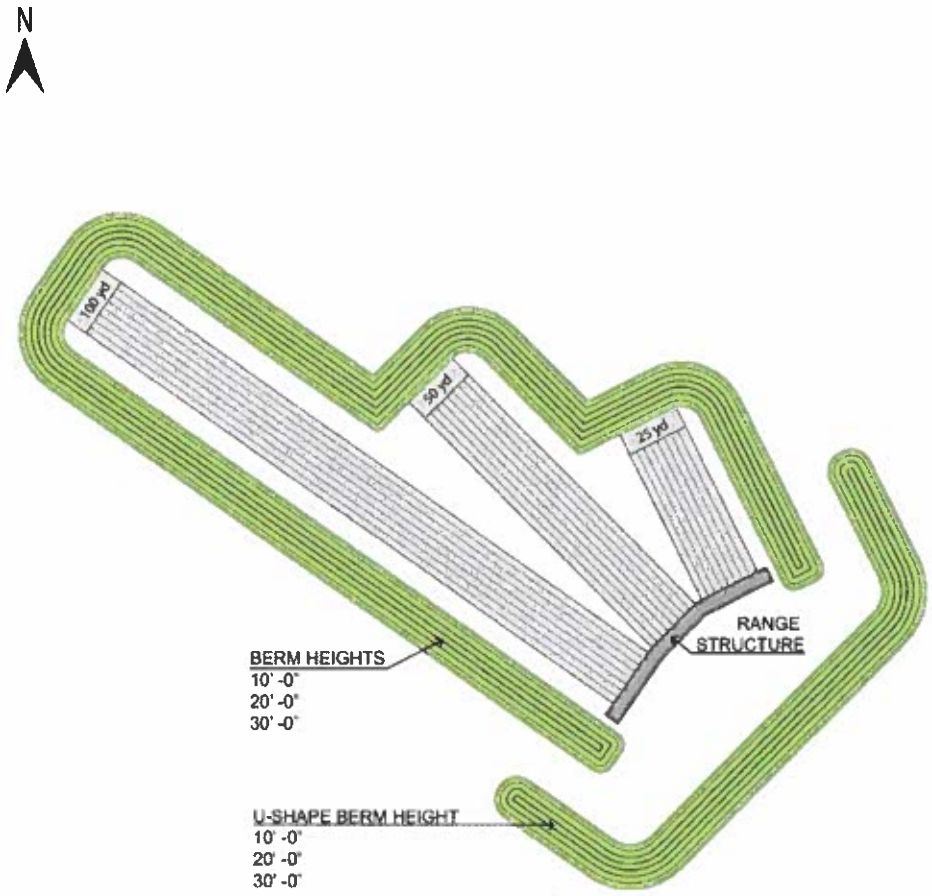


Figure 5. Concept plan showing the U-shaped berm configuration for the range described in Appendix K.

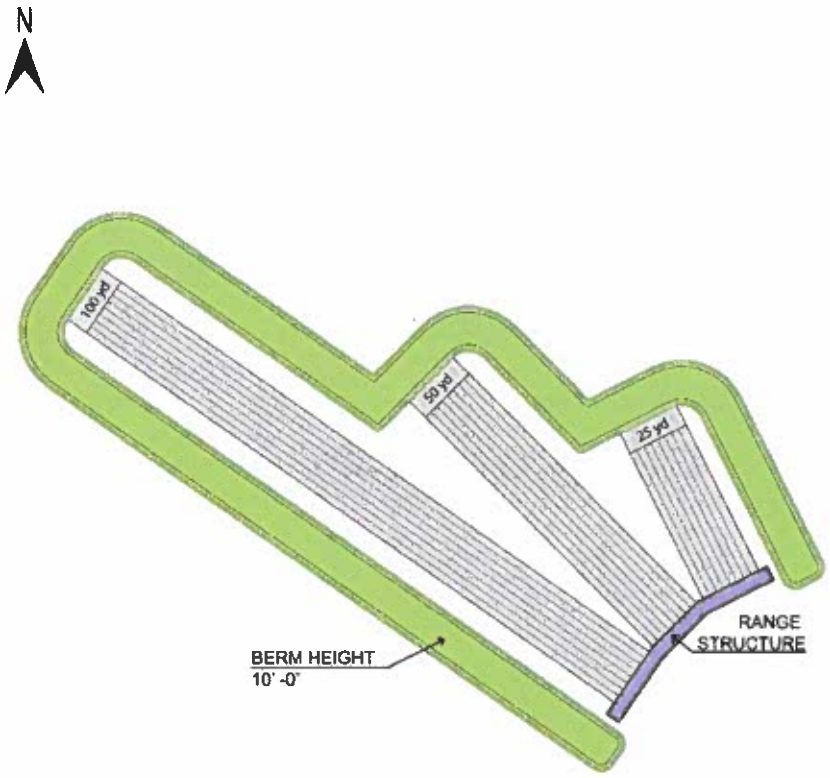


Figure 6. Concept plan for the range structure with interior sound absorbent lining described in Appendix L.

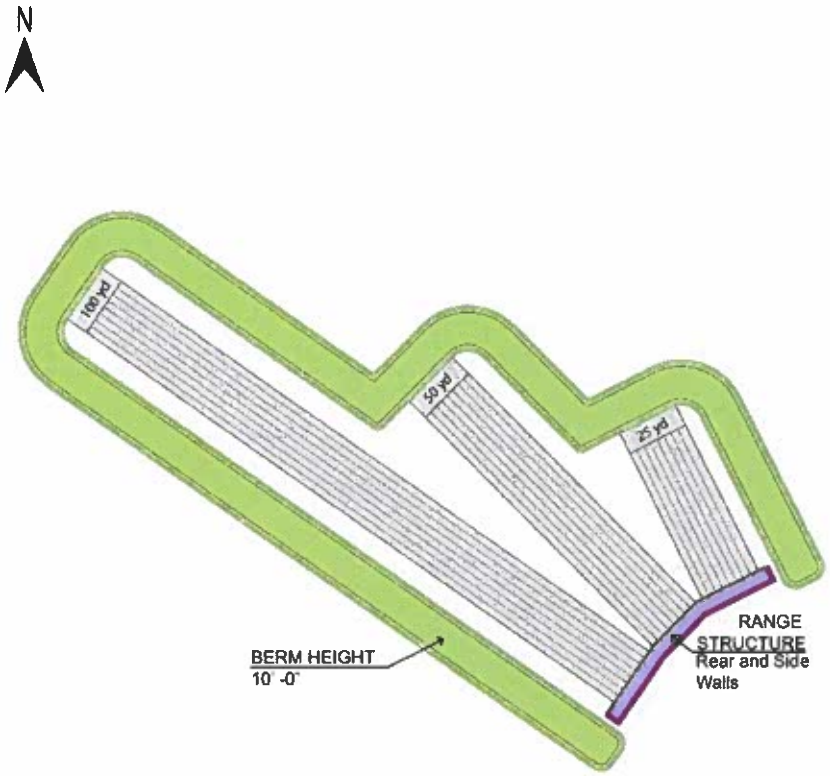


Figure 7. Concept plan for the range structure with the rear and side walls added with the interior sound absorbent lining described in Appendix M.

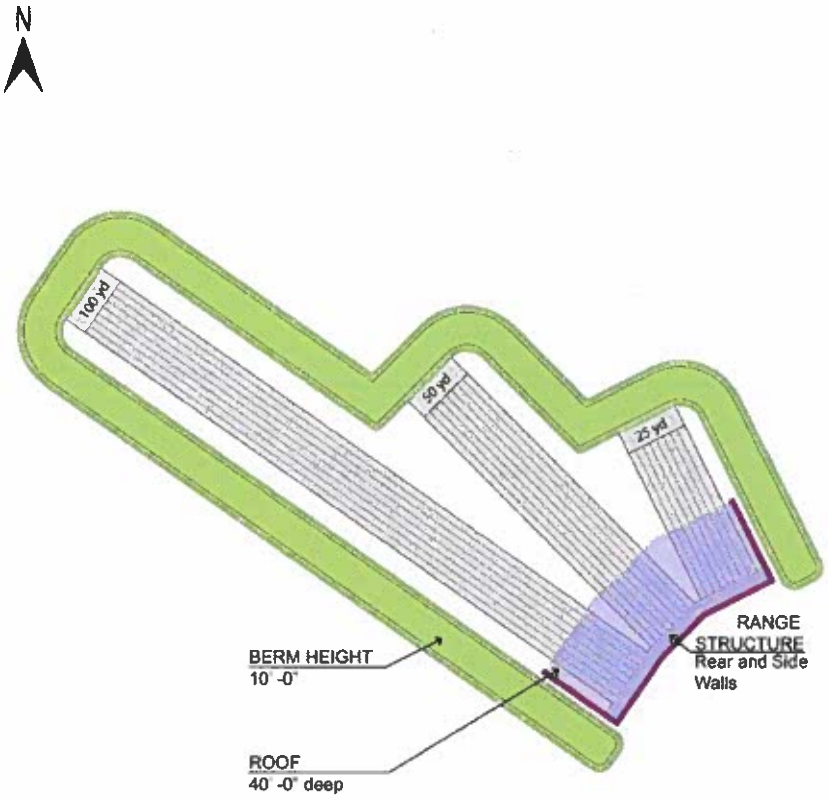


Figure 8. Concept plan for the range structure with the 40 ft. extension of the roof with the rear and side walls added and the interior sound absorbent lining described in Appendix N.

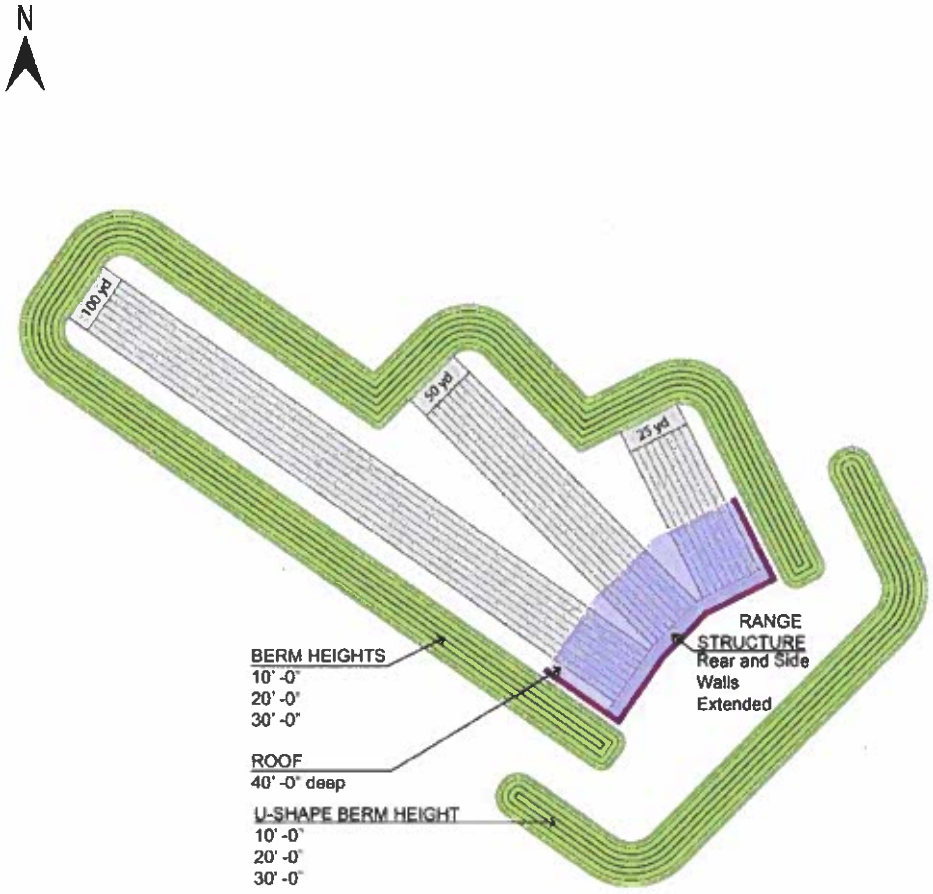


Figure 9. Concept plan showing the range structure with the 40 ft. extension of the roof with the rear and side walls added and the interior sound absorbent lining and a 30 ft. tall U-shaped berm around the rear of the range described in Appendices O and Appendix P.

RESULTS OF THE COMPUTER MODEL STUDIES

Appendices F through P contain scaled maps/aerials of the 3 proposed sites and surrounding areas with calculated sound levels at specific locations included for each of the experiments described above. The maps also show the 2 "Ambient" locations at each of the 3 sites where long term ambient sound levels were measured.

The sound levels shown on the noise contours in the figures represent the sound exposure level (SEL) or 1 second equivalent continuous sound pressure level (LAeq) at receiver locations around the proposed range sites for the "typical day" and "busy day" scenarios. The sound levels could increase by 10 to 20 dB for receivers downwind of the source and when temperature inversions (warmer air aloft) occur. An experiment was conducted to study the effects of wind speed and direction on the propagation of sounds.

Due to the complexity of the data and the number of options studied, a point system was developed to rank order the various schemes based on the sound pressure and the number of dwellings and other sensitive properties that fell within the noise contours produced by the range. A GIS data base was used by DNR to count the number of dwellings within each of the 5 dB noise contour increments. A sound pressure was calculated for the center of the contour group. For example, 32.5 dBA was the center of the 30 to 35 dBA noise contours. The dB level was converted to a sound pressure by taking 10^(32.5/10). The resulting sound pressure was multiplied by the number of dwelling units located between the 5 dB contour lines. This process was repeated for each of the 5 dB increments of contour lines in the vicinity of the proposed range sites. The total for all of the sound pressures x number of dwellings was then added together for the experiment and divided by 100,000 to reach the total number of points for the scheme on a scale from 0.4 to 46.5. Scenarios with lower numbers of points have lower cumulative noise impacts for the scenario. The results of the different experiments are described in Appendices F through P with tabular summaries of the schemes studied and the linear pressure points for each scheme.

Three sites and range orientations were initially selected for analysis. Site 1: Whitewater Township with the range oriented towards the north; Site 2: Union Township with the range oriented towards the east; and Site 3: Fife Lake with the range oriented towards the southwest. The computer model analysis of these sites is summarized in Appendix F for the "typical day" and "busy day" scenarios with 10 ft. tall berms on the 3 down range sides of the range. Site 1 had the lowest linear pressure score followed by Site 2 with Site 3 a distant third with a linear pressure score that was 4 times the Site 1 score for both scenarios.

The sound levels for the busy day scenario were generally 3 dB higher than the sound levels for the typical day scenario due to the increase in the number of shooters for each weapon type on the range. The "typical day" scenario had approximately ½ of the linear pressure score or 3 dB less than the scores for the "busy day" scenario.

The ranking of the initial 3 sites and range orientations remained consistent for the "busy day" scenario when alternate berm heights of 20 ft. and 30 ft. were modeled. The scores for sites 1 and 2 were mixed for the "typical day" scenario.

Alternate orientations were selected for each range to reduce potential noise impacts to the largest number of residential properties and noise sensitive receivers within 2 miles of each proposed range once the patterns of sound propagation were identified in the computer models. A northwest orientation was considered to orient the range away from homes to the southwest and north at Site 1 as well as away from the quiet area to the northeast. A northeast orientation was considered to orient the range away from homes to the northwest and southeast at Site 2. A northwest orientation was considered to orient the range away from homes to the southwest at Site 3.

Site 1 oriented towards the northwest had the lowest linear pressure score of the 6 alternatives followed closely by Site 1 oriented towards the north and the 2 orientations for Site 2 for the base range design with the 10 ft. berm on the 3 down range sides of the range. Both options for the base range design at Site 3 were scored at almost twice to 4 times the scores for the other sites. There was a slightly different ranking for the "typical day" scenarios than for the "busy day" scenarios.

Experiments were conducted in computer models of noise mitigation options that could be considered for the ranges if needed in the future. Order of magnitude costs for the mitigation options were also presented in Appendix T. The noise mitigation options studied included raising the height of the down range berms to 20 ft. tall and 30 ft. tall at cost increases of approximately $223,600 for the 20 ft. tall berm compared to the 10 ft. tall berm; and approximately $641,300 for the 30 ft. tall berm compared to the 10 ft. tall berm. These studies are summarized in Appendices F and G.

Models were tested using 20 ft. tall and 30 ft. tall berms in addition to the 10 ft. tall berms for each of the range sites and orientations. These studies are reported in Appendix G. The lowest scores for a given range and orientation were generally received by the scheme with the tallest berm height. The relative ranking of sites was similar to those previously discussed with Site 1 oriented to the northwest; Site 2 oriented to the northeast and Site 1 oriented to the north receiving the lowest scores. The highest scores for these tests were for all berm heights and orientations at Site 3: Fife Lake for both the "typical day" and "busy day" scenarios.

On average across all models and all scenarios tested, the average decrease in sound level was approximately 5 dB for the 20 ft. tall berm compared to the 10 ft. tall berm and an additional 5 dB for the 30 ft. tall berm compared to the 20 ft. tall berm at distances up to approximately ½ to 1 mile from the range.

The levels to the rear of the range stay relatively consistent from one scenario to the next with the berms only to the sides and down range from the firing line because there is no noise mitigating structure present in the base schemes in that direction. The U-shaped berm option was selected to reduce sounds propagating to the sides and rear of the ranges. This was considered to reduce sounds propagating towards homes to the southwest and southeast at Site 1 and the quiet area to the northeast; homes to the northwest and southeast at Site 2; and homes to the northeast at Site 3. A U-shaped berm built around the rear of the range to reduce sounds spilling to the rear and sides of the range was investigated in computer model studies summarized in Appendix K. The linear pressure score was reduced by 50% to 60% by adding these U-shaped berms that were 20 ft. tall and 30 ft. tall at an incremental cost increase of approximately $300,400 for the 20 ft. berm scheme and $1,078,100 for the 30 ft. tall berm scheme. Please note that the incremental costs include raising the height of the downrange berms to the same height as the U-shaped berm at the rear of the range.

A second option to reduce sounds propagating to the sides and rear of the ranges was to add solid side walls and a rear wall to the range structure which reduced sound levels by approximately -2 to -5 dB at distances of 1 to 2 miles from the range.

The typical day modeled with an air temperature of 50° F and a 70% relative humidity resulted in 1 to 14 dB higher sound levels at distances away from the ranges than the other temperature and humidity conditions tested; so this condition was used as the base temperature and relative humidity condition for the computer model studies. Studies with alternate air temperatures and relative humidities (Appendix H); alternate wind conditions (Appendix I); and the addition of the existing stands of coniferous trees on the sites (Appendix J) verified that the assumptions made in the model studies represented a conservative approach to the noise contour mapping for the proposed range. This means that the mapped noise contours represent a worst case condition in terms of the effects of temperature, humidity, wind and vegetation on the modeled noise contours. The linear pressure scores for the sites tested all decreased when these alternate conditions were used in the models.

There was also an additional 5 dB decrease in sound level on average attributed to the extended roof on the range structure and the U-shaped berm behind the shooters at similar distances towards the front of the range. There was a 5 to 10 decrease with several instances of almost a 20 dB decrease in sound level towards the rear of the range when the U-shaped berm at the rear of the range and the extended roof on the range structure were included in the design.

The acoustical lining on the inside surfaces of the range structure and the use of partitions to divide the range structure into individual lanes and lining the dividing walls would reduce sound levels inside the range structure for shooters as well as decrease sound levels by 0 to 8 dB propagating away from the range at distances of 1 to 2 miles from the range. Adding solid dividers between each lane in the range building and lining the walls and ceiling of each lane with sound absorbent panels such as Troy Acoustics Troy Board will reduce the linear pressure score at Site 2 by almost 50% and by approximately 11% at Site 1 at a cost of approximately $83,500 as summarized in Appendix L.

Additional mitigation options studied included adding solid walls at the sides and rear of the range building lined with the sound absorbent panels; extending the roof of the range building 40 ft. downrange from the firing line and adding a sound absorbent inner lining to the roof; building a U-shaped berm around the rear of the range and raising the height of the berms on all sides to 20 ft. and 30 ft. respectively. These options reduced the linear pressure score between 50% and 75% compared to the linear pressure score of the base range with the 10 ft. tall berm on 3 sides depending upon the combination of options selected. Incremental costs for these options varied from approximately $150,500 for adding the side and rear walls of the range building; approximately $296,600 for adding the 40 ft. roof extension; approximately $31,200 for adding the 10 ft. tall U-shaped berm at the rear of the range; approximately $108,000 for adding the 20 ft. tall U-shaped berm at the rear of the range; approximately $468,000 for adding the 30 ft. tall U-shaped berm at the rear of the range; and approximately $1,525,200 for the combination of all of these options. The 40 ft. deep extension of the range structure roof would reduce sound propagation in the direction of fire as a possible alternative to raising the height of the berms in the direction of fire if used in conjunction with raising the height of the berms to reduce sound levels in the direction of fire by approximately 2 to 5 dB at distances of 1 to 2 miles from the range.

The use of the noise mitigation options should be carefully considered for a given site because there are site specific limitations on how much reduction in linear pressure score can be obtained at any given site for a specific mitigation scheme. For example, the increases in berm height and in the roof overhang of the range structure did not reduce sounds as much at 1 to 2 mile distances from the range structure as they did at distances closer to the ranges.

Noise ordinances for Whitewater Township; Union Township; and Fife Lake Township do not include quantitative sound level limits or sound measurement methods for determining the acceptability of sounds of various types and levels. In the absence of a local noise ordinance with quantitative sound level limits, an analysis of the noise contour maps for each of the design alternatives was undertaken relative to criteria based on sound level limits contained in typical community noise ordinances. Many noise ordinances have sound level limits of 55 to 60 dBA during daytime hours and 50 to 55 dBA during nighttime hours. No residential properties are located within the 55 to 60 LAeq noise contours for any of the range locations and configurations studied. No residential properties were located in the 50 to 55 dBA contours for the base range designs at Sites 1 and 2. One to eleven homes were located in the 50 to 55 dB LAeq noise contours at Site 3.

The Noise Ordinance for Township of Whitewater, Grand Traverse County is included in Ordinance Number 39 of the Whitewater Township Ordinances. Ordinance 39 prohibits any noise disturbances, which by reason of its volume, intensity, location, or time of day impairs the health, welfare, or peace of another person of normal human sensibilities.

The Anti-Noise and Anti Nuisance Ordinance is included in Part 60 of the Union Charter Township, MI Code of Ordinances. Section 3.0 of Part 60 of the Union Charter Township, Michigan Code of Ordinances states that excessive noises and nuisances in the Township starting at 11:00 p.m. on Sunday through Thursday night and starting at 11:30 p.m. on Friday and Saturday night until 5:00 a.m. the following mornings are in violation of the Ordinance.

Grand Traverse County does not have a noise ordinance. According to County staff, noise is regulated at the level of the individual townships.

CONCLUSIONS

Three options for the location of a new firing range in Grand Traverse County, Michigan were investigated. Site 1 is located in Whitewater Township north of Diagonal Road, with the shooters facing north. Site 2 is located in Union Township south of Jackpine Road, with the shooters facing east. Site 3 is located in Fife Lake Township southeast of Bowen Road, with the shooters facing southwest.

1. Existing ambient sound levels were measured at 2 locations near potential noise sensitive receivers located near each proposed range site from September 1-7, 2015. Existing ambient sound levels (LAeq) at the sites varied from 16 to 82 dBA with average Day-Night Sound Levels (LDN) of 39 to 61 dBA. The lower end of this range of sound levels is typical of relatively quiet sites in natural settings with little anthropocentric sounds. The middle to upper end of the range of measured sound levels are indicative of louder suburban sites or sites with some transportation or commercial activity nearby.

2. Experiments were set up at each proposed range site on September 1-2, 2015. A Conservation Officer fired 3 shots in succession from a 0.40 caliber handgun; a 12 gauge shotgun; and a 0.308 rifle. Acoustical measurements were made at 10 feet or approximately 3 meters from the sound source as well as at 16 locations around the proposed range site. There were 4 measurement locations, one in each cardinal direction (i.e., north, east, south, and west) at successive distances of ¼ mile, ½ mile, 1 mile and 2 miles from the firing location at the 3 prospective sites for the firing range.

3. The sound levels measured at 10 feet from the source were approximately 7 to 8 dB louder in the direction of fire than to the sides and 16 dB louder in the direction of fire than behind the shooter for the 0.40 caliber handgun; approximately 11 dB louder in the direction of fire than to the sides and 17 dB louder in the direction of fire than behind the shooter for the 12 gauge shotgun; and approximately 12 dB louder in the direction of fire than to the sides and 23 dB louder in the direction of fire than behind the shooter for the 0.308 rifle.

4. At 42% of the measurement locations at distances of 1 to 2 miles from the proposed range site the sounds of the gun shots could not be measured above the ambient sound levels. This means that when only a few shooters will be using the proposed range, that sounds may not be heard at many of the residential locations at these distances in the vicinity of all 3 of the proposed range sites.

5. Average LAeq, maximum LA max and peak LA peak sound levels were measured at the 16 locations around each of the proposed range sites. The LA max levels were on average 3 to 4 dB louder than the LAeq levels. The LA peak levels were 17 to 19 dB louder than the LAeq levels.

5. Measured sound levels were approximately 10 dB louder in the direction of fire compared to the same distances at the sides and 20 dB louder in the direction of fire than behind at distances of ¼ and ½ mile from the proposed range location. This means that the orientation of the direction of fire of the range is an important decision.

6. The average sound decay with distance measured from the proposed range sites was 6 to 17 dB per doubling of distance from the sound source. This was affected by distance and localized conditions of wind, topography, ground cover and vegetation at each site.

7. Computer models of each of the proposed range sites were constructed in CADNA Software including topography, roads, ground cover, coniferous vegetation with the 10 ft. tall berms on 3 sides of the ranges and an open structure over the firing line for a standard day with 50° F and 70% relative humidity with typical wind speed and direction.

8. Noise contours were plotted for a "typical day" with 3 shooters firing within a 1 second time period and a "busy day" with 6 shooters firing within a 1 second time period for the base range conditions.

9. A point scale was used to assess potential noise impacts that accounted for the sound pressure at each house within a 2 mile radius of each of the proposed range sites and the number of

dwellings impacted by the sounds. The sound pressure derived from the average sound level calculated in the noise modeling software was multiplied by the number of dwelling units within each 5 dB group of noise contour lines. For example, if 20 dwellings were located between the 30 and 35 dBA noise contours the points were calculated by the following method. The average sound level in this contour range is 32.5 dBA. The sound pressure associated with this value is 10^(32.5/10). This value was multiplied by the number of dwellings identified in GIS software by DNR staff to arrive at a linear pressure score for these contours. The linear pressure was divided by 100,000 to arrive at a scale that ranged from 0.4 to 46.5 for the alternatives studied. The values for each of the 5 dB groups of noise contours were added together to reach the cumulative linear pressure score for the scenario. Scenarios with lower numbers of points have lower cumulative noise impacts for the scenario.

10. Three sites and range orientations were initially selected for analysis. Site 1: Whitewater Township with the range oriented towards the north; Site 2: Union Township with the range oriented towards the east; and Site 3: Fife Lake Township with the range oriented towards the southwest. The computer model analysis of these sites is summarized in Appendix F for the "typical day" and "busy day" scenarios with 10 ft. tall berms on the 3 down range sides of the range. Site 1 had the lowest linear pressure score followed by Site 2 with Site 3 a distant third with a linear pressure score that was 4 times the Site 1 score for both scenarios.

11. The "typical day" scenario had approximately ½ of the linear pressure score or 3 dB less than the scores for the "busy day" scenario. This means that off-site sound levels will be higher when more people fire their weapons in the same 1 second periods of time.

12. The ranking of the initial 3 sites and range orientations remained consistent for the "busy day" scenario when alternate berm heights of 20 ft. and 30 ft. were modeled. The scores for sites 1 and 2 were mixed for the "typical day" scenario.

13. Alternate orientations were selected for each range to reduce potential noise impacts to residential properties within 2 miles of each proposed range site. The alternate range orientation to minimize potential noise impacts to residential and noise sensitive receivers was to the northwest for Site 1: Whitewater Township; towards the northeast for Site 2: Union Township; and towards the northwest for Site 3: Fife Lake Township.

14. Site 1 oriented towards the northwest had the lowest linear pressure score of the 6 alternatives followed closely by Site 1 oriented towards the north and the 2 orientations for Site 2 for the base range design with the 10 ft. berm on the 3 down range sides of the range. Both options for the base range design at Site 3 were scored at almost twice to 4 times the scores for the other sites. There was a slightly different ranking for the "typical day" scenarios than for the "busy day" scenarios.

15. Models were tested using 20 ft. tall and 30 ft. tall berms in addition to the 10 ft. tall berms for each of the range sites and orientations. These studies are reported in Appendix G. The lowest scores for a given range and orientation were generally received by the scheme with the tallest berm height. The relative ranking of sites was similar to those previously discussed with Site 1 oriented to the northwest; Site 2 oriented to the northeast and site 1 oriented to the north

receiving the lowest scores. The highest scores for these tests were for all berm heights and orientations at Site 3: Fife Lake for both the "typical day" and "busy day" scenarios.

16. Studies with alternate air temperatures and relative humidities (Appendix H); alternate wind conditions (Appendix I); and the addition of the existing stands of coniferous trees on the sites verified that the assumptions made in the model studies represented a conservative approach to the noise contour mapping for the proposed range. This means that the mapped noise contours represent a worst case condition in terms of the effects of temperature, humidity, wind and vegetation on the modeled noise contours.

17. Experiments were conducted in computer models of noise mitigation options that could be considered for the ranges if needed in the future. Order of magnitude costs for the mitigation options were also presented in Appendix T. The noise mitigation options studied included raising the height of the down range berms to 20 ft. tall and 30 ft. tall at cost increases of approximately $223,600 for the 20 ft. tall berm compared to the 10 ft. tall berm; and approximately $641,300 for the 30 ft. tall berm compared to the 10 ft. tall berm. These studies are summarized in Appendices F and G.

18. A U-shaped berm built around the rear of the range to reduce sounds spilling to the rear and sides of the range was investigated in computer model studies summarized in Appendix K. The linear pressure score was reduced by 50% to 60% by adding these U-shaped berms that were 20 ft. tall and 30 ft. tall at an incremental cost increase of approximately $300,400 for the 20 ft. berm scheme and $1,078,100 for the 30 ft. tall berm scheme.

19. Adding solid dividers between each lane in the range building and lining the walls and ceiling of each lane with sound absorbent panels such as Troy Acoustics Troy Board will reduce the linear pressure score at Site 2 by almost 50% and by approximately 11% at Site 1 at a cost of approximately $83,500 as summarized in Appendix L.

20. Additional mitigation options studied included adding solid walls at the sides and rear of the range building lined with the sound absorbent panels; extending the roof of the range building 40 ft. downrange from the firing line and adding a sound absorbent inner lining to the roof; building a U-shaped berm around the rear of the range and raising the height of the berms on all sides to 20 ft. and 30 ft. respectively. These options reduced the linear pressure score between 50% and 75% compared to the base range with the 10 ft. tall berm on 3 sides depending upon the combination of options selected. Incremental costs for these options varied from approximately $150,500 for adding the side and rear walls of the range building; approximately $296,600 for adding the 40 ft. roof extension; approximately $31,200 for adding the 10 ft. tall U-shaped berm at the rear of the range; approximately $108,000 for adding the 20 ft. tall U-shaped berm at the rear of the range; approximately $468,000 for adding the 30 ft. tall U-shaped berm at the rear of the range; and approximately $1,525,200 for the combination of all of these options.

21. The use of the noise mitigation options should be carefully considered for a given site because there are site specific limitations on how much reduction in linear pressure score can be obtained at any given site for a specific mitigation scheme.

AT THE HEART OF THE MISSION
NDIA
1919 2019
2101 Wilson Boulevard, Suite 700, Arlington, VA 22201-3060 • (703) 522-1820 • (703) 522-1885 Fax • NDIA.org

June 20, 2019

Mr. John R. Garman
60 Jack Ellington Road
Fredericksburg, VA 22406

Dear Mr. Garman,

Thank you for your support of the 2019 Armament Systems Forum and Technology Demonstration.

With your support, and access to Crucible, we were able to bring together government agencies and industry to showcase their innovative, advanced technologies and products that will benefit the capabilities of the warfighter.

The NDIA team really appreciated the professionalism and ease of working with you and your team to execute a successful demonstration, a vital component to the Armament Systems Forum.

Not only would NDIA like to thank the Crucible for providing space to facilitate the Forum's Technology Demonstration, but for all the hard work that goes into providing a full-service training facility allowing soldiers to become more effective in their mission.

Sincerely,

James C. Boozer
Major General, USA (Ret)
Executive Vice President

RECEIVED
SEP 24 2018
SPOTSYLVANIA COUNTY
PLANNING DEPARTMENT

Kevin E. Lay
6117 Jefferson Davis Hwy.
Woodford, VA 22580

Sept. 21, 2018

Spotsylvania County Planning Commission
Mr. Leon Hughes
9019 Old Battlefield Blvd.
Spotsylvania, VA 22553

Members of the Planning Commission,

My wife and I have lived directly across the street from the proposed Crucible site for 24 years and my wife has been a Spotsylvania County resident for 42 years. We attended the public meeting at the racetrack to learn about Crucible and their proposal. Unfortunately, many of the people attending had preconceived opinions based on inaccurate information that, Crucible was stifled from educating the local residents about their business. Such close mindedness toward a company that has already existed for many years in another county can not be beneficial to Spotsylvania county. The unwillingness of residents and businesses to learn what Crucible is all about has opened the door for a lot of misconception and false information, which has been posted to social media, resulting in a lot of misinformed people. Everyone is entitled to their own opinion, but opinions should not be based on hearsay.

From what we have observed the property has been improved and well kept. They have done a great job in preserving a cemetery that was previously unrecognizable as such. We have personally met the owners of Crucible and believe them to be men of honor and integrity. The improvements to the property were done almost solely by the hard work of one of the owners. I have a lot of respect for anyone displaying that level of work ethic. We see their operation as a valuable resource for the government in this country's war on terror as well as a potential training resource for local law enforcement.

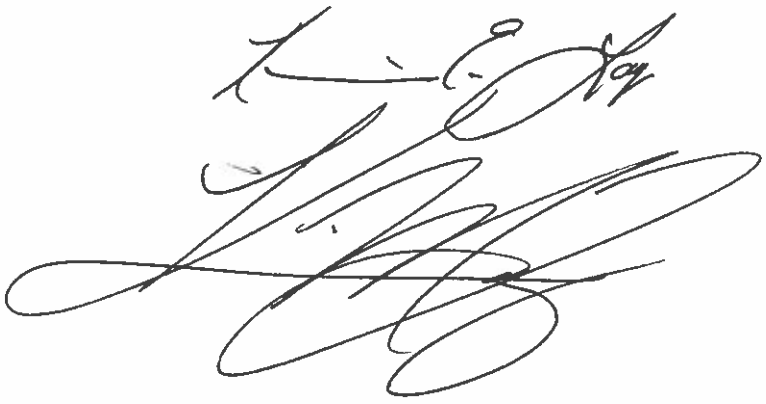
Residents have voiced concerns about stray bullets but, on most any given weekend and a lot of weekdays we hear rapid gun fire from people living in the area. This seems to be a much greater safety concern. Who is firing the guns, what training do they have, what safety precautions have they taken to see that there are no stray bullets endangering local citizens. I am all for our 2nd amendment rights and for all law abiding citizens to be well armed, but we don't know where these bullets are going or whether the guns are being used in a safe manner. On the other hand, any gun fire that would take place at Crucible would be controlled by trained professionals with proper safety barriers. The gunfire that we hear on a regular basis has been blamed on Crucible which is ridiculous. This was going on long before they were here and they have not fired any weapons on the property. All this is hypocritical and coming from misinformed people.

Living directly across the street we've had the opportunity to observed what is going on. It

appears to us that the owner of this property has been harassed by unfounded accusations. Illegal drones have been launched over the property. People have trespassed on the property. Someone even made an issue of the removal of a tree stump. Unlike the owner of the property, these people are hypocrites with no integrity and need to figure out something to do in their life that is more constructive. If people treated me like that on my own property I would be extremely angry as I'm sure the other residents of this county would be if someone did these things to them on their properties. I have heard concerns of property value loss. Allowing the number of unsightly used car dealers in this area is a much greater concern to property value loss. The legitimacy of these businesses is questionable; The local populations' need for used cars could not possibly support so many dealers. It raises the question of what else might be going on to keep these businesses going.

There have been people coming onto our property to have petitions signed against Crucible. They give exaggerated and incorrect consequences associated with the training facility. On one occasion a prospective politician came to my house and asked me what I thought of Crucible coming in. I responded that I had no problem with them. Immediately she told me she had nothing to talk to me about and promptly (and rudely) left. What a poor excuse for someone wanting to be a representative of the residents of Spotsylvania County, who is unwilling to listen to the opinions of all her constituents. I was also warned against placing a sign supporting Crucible in my yard because someone might hurt me.

In conclusion, we see Crucible as a professional operation providing valuable services to our government. It is run by men with integrity who are planning all the necessary safety and environmental precautions. If the residents of Spotsylvania County would take the time to learn facts and not rely on social media for their education then they might have a different opinion. My wife and I feel no safety threat to our family, property or property value from Crucible and think they would be as good a neighbor to Spotsylvania residents as they have been in Stafford.



OUR PURPOSE. YOUR MISSION.

January 5, 2017

To Whom It May Concern,

ADS, Inc. provides equipment and logistic solutions to the US Government. Located in Virginia Beach, VA, ADS holds more than 50 Indefinite Delivery, Indefinite Quantity (IDIQ) contracts and Blanket Purchase Agreements (BPAs) and has grown to be a top DLA Supplier and Top 50 Federal Government Contractor.

Each year ADS hosts a one day exposition for government purchasers to review the newest equipment available at Team Crucible's existing site in Stafford County.

We look forward to working with Team Crucible in their new location in Spotsylvania County and many future opportunities to bring government purchasers to the new location.

Respectfully,

Brendan Drury
Federal Sales Manager
ADS, Inc.
757-352-2536
bdrury@adsinc.com

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September 4, 2017

Planning Commission
9019 Old Battlefield Blvd.
Spotsylvania, VA. 22553

To Members of the Planning Commission and Staff,

I urge you to support the application presented to you by Crucible to build a new training facility in Spotsylvania County. I have been living next to their Stafford facility for years and often forget the facility even exists. I have been impressed with how professional and courteous they have been to us in the neighborhood.

I certainly wish them well and hope you will work with them to relocate their corporate headquarters there.

Regards,

Thomas L Rodgers

E. Rodgers
94 Arnett Way
Fredericksburg, VA 22406

RICHMOND VA 230
02 SEP 2017 PM 5 L

Planning Commission
9019 Old Battlefield Blvd.
Spotsylvania, VA 22553

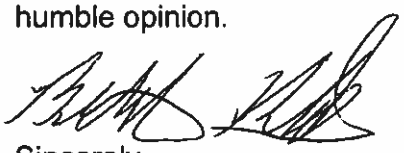
22553-203995

September 5, 2017

Planning Commission
Spotsylvania County
9019 Old Battlefield Blvd.
Spotsylvania, Va. 22553

Dear Planning Commission Members & Staff,

I would urge you to support the proposed Crucible project in your County. I am one of the closest homes to their current location and this company has respected and worked to ensure all the safety and noise concerns are addressed by those in the community. I have made friends of the staff and certainly enjoyed them as our neighbors and hope you will allow them to build a world-class facility in Spotsylvania County. The training they provide should be encouraged in my humble opinion.



Sincerely,
Britton Dovel & Family
540 940 9622

24 September 2017

From: Johnny and Anne Wolfe
140 Gold Mine Road
Fredericksburg, VA 22406

To: Planning Commission
Spotsylvania County
9019 Old Battlefield Blvd
Spotsylvania, VA 22553

Subj: Letter of Reference for The Crucible

To Planning Commission Members and Staff,

We have lived at our residence since 2006 and The Crucible has been our neighbors the entire time. We have never had any issues with them and they continue to be very respectful of the neighbor and are good neighbors.

We live on a small farm and have quite a few animals to include horses and donkeys. The Crucible has had no adverse impact to them what so ever. In fact, we are believers that desensitizing animals of common sounds in our area is actually a good thing. We believe that it provides for a calmer animal, particularly horses that are ridden, so that when they encounter such things out of their pasture environment when being ridden it is safer for the rider.

Knowing what we know about The Crucible and how they operate, there should be no concern about them being located in your county. I am positive that they will be good neighbors there as they are now in Stafford County and in our local neighborhood.

We would urge you to support their application to build a new training facility in Spotsylvania County. We wish them well and hope that you will see the benefits of allowing them to relocate their corporate headquarters there.

Sincerely,

Johnny and Anne Wolfe

From: Kelly Shannon (kshannon) <kshannon@umw.edu>
Sent: Thursday, October 05, 2017 10:17 AM
To: John Garman
Subject: FW: Crucible-SOAR meeting

Hi John,
I apologize for the delay! Here are some words from Erin, who was with the group the duration of the trip.

Thanks!

Kelly L. Shannon, MSEd, ACSM EP-C
Director, Campus Recreation
University of Mary Washington

From: "Erin Hill (ehill3)" <ehill3@umw.edu>
Date: Tuesday, October 3, 2017 at 2:13 PM
To: Kelly Shannon <kshannon@umw.edu>
Subject: Re: Crucible-SOAR meeting

To the Spotsylvania Planning Commission:
We would like to take this opportunity to speak on the character of Crucible and the company practices. As neighbors to the University of Mary Washington's Eagle Lake Outpost, they have been welcoming and helpful when it comes to events and needs. Their practices have not disturbed our patrons, events or grounds. They are peaceful neighbors and we would like to take this opportunity to state our support for their plans in Spotsylvania County.

Best,

Erin Hill
Graduate Assistant of Fitness and Wellness
University of Mary Washington
540-654-1197

8/23
2:43 pm

Dear members of the Spotsylvania County Board of Supervisors,

I am a resident of Spotsylvania County, and I support Team-Crucible.

Team Crucible provides those who protect our freedom with the training they need to operate effectively and return home safely.

This training is highly supervised and provided by a team of experts with special skills developed from past careers in the military, law enforcement, or as first responders.

Team-Crucible has operated in Stafford County for years without any issues or negative impacts on the surrounding community, and they are already working to address concerns voiced in Spotsylvania County.

I am confident Team-Crucible will make a good neighbor. Please approve the rezoning request required for their training facility in Spotsylvania County.

Sincerely,
Karin DeRemer
4000 Fountain Bridge Court
Fredericksburg, VA 22408

9/7
7:04pm

Dear members of the Spotsylvania County Board of Supervisors.

I am a resident of Spotsylvania County, and I support Team-Crucible.

There are so many reasons to support the Crucible facility in the County. But I am supportive because they are adding so many new safety features that exceed the requirements. There are so many ranges in our area, or hunt clubs that do not have any of these protections at all. These folks are professionals who want nothing more than to run a safe business to help our most important men and women in uniform. I am also glad to know that they will work with our local law enforcement to assist them in additional training that will benefit us all.

I am confident Team-Crucible will make a good neighbor. Please approve the rezoning request required for their training facility in Spotsylvania County.

Sincerely,
Frank Conway
13103 Beckman Ct
Fredericksburg, Va 22408

9/9
1:38PM

Dear members of the Spotsylvania County Board of Supervisors,

I am a resident of Spotsylvania County, and I support Team-Crucible.

After learning about the new proposal presented by Crucible, there is no question that they should be allowed to build their state-of-the-art facility here in Spotsylvania. This company is not A.P. Hill or Quantico. It is a small private company that provides very specialized training that is not provided by the U.S. government for over 20 years. They have a proven safety track record by working with our government and they have gone above and beyond to address our concerns. I welcome them here and hope you will vote to allow them to continue to provide their special services to our men and women abroad.

I am confident Team-Crucible will make a good neighbor. Please approve the rezoning request required for their training facility in Spotsylvania County.

Sincerely,
Kathy Hutchesonalabamagirl22127@gmail.com
7709 Courthouse Road
Spotsylvania, Virginia 22551

9/9
8:25 am

Dear members of the Spotsylvania County Board of Supervisors,

I am a resident of Spotsylvania County, and I support Team-Crucible.

After learning about the new proposal presented by Crucible, there is no question that they should be allowed to build their state-of-the-art facility here in Spotsylvania. This company is not A.P. Hill or Quantico. It is a small private company that provides very specialized training that is not provided by the U.S. government for over 20 years. They have a proven safety track record by working with our government and they have gone above and beyond to address our concerns. I welcome them here and hope you will vote to allow them to continue to provide their special services to our men and women abroad.

I am confident Team-Crucible will make a good neighbor. Please approve the rezoning request required for their training facility in Spotsylvania County.

Sincerely,
David Goosman
9509 Quail Meadows Dr
Spotsylvania, Va 22551

9/11
4:45 pm

Dear members of the Spotsylvania County Board of Supervisors,

I am a resident of Spotsylvania County, and I support Team-Crucible.

I have been very impressed by the new Crucible proposed facility plan before the County for consideration. It seems to me that this company took the time to listen to the community concerns and has done all they can do to address every issue. They have shown a real interest in working with us and I hope you will see fit to support their application.

I am confident Team-Crucible will make a good neighbor. Please approve the rezoning request required for their training facility in Spotsylvania County.

Sincerely,
Joshua Maida
12814 Lake Wilderness Ln
Spotsylvania, VA 21551

Leon Hughes

From: Clay Mihoulides <Clay@chrismarr.com>
Sent: Tuesday, January 26, 2021 5:14 PM
To: Barry Jett; Deborah H. Frazier; Timothy J. McLaughlin; David Ross; Chris Yakabouski; Gary Skinner
Cc: Aimee Mann; Kevin Marshall; Amit Parbadia; Kirit Parbadia; Leon Hughes
Subject: [EXTERNAL]: Crucible Rezoning & CUP Application

CAUTION: This email originated from an external source. Do not click on any links or open attachments unless you recognize the sender and know the content is safe.

Dear Members of the Board,

Thank you for your time and effort in working to make Spotsylvania County a prosperous and safe community for all its residents. My name is Clay Mihoulides and I represent Amit and Kirit Parbadia the owners of 59 acres of land off of Morris Rd. (SR 606) adjacent to the Taverneer subdivision (Tax Parcels: 63-A-35 & 63-A-35C). We have submitted a rezoning application for a future residential subdivision to be developed on this property called Thornburg Commons. This prospective subdivision, which falls within the Counties growth area, will provide much needed housing that in turn will help lead to additional commercial growth and prosperity for the Thornburg area.

We are extremely concerned about the Crucible project and the potential detrimental effects it would have on our property and the other surrounding properties. I am intimately aware of the Crucible's operations, having visited their existing facility off of Jack Ellington Rd. in the Hartwood area of Stafford County on multiple occasions over the years. While they provide a much needed service in their contracts with the Federal Government, they are a consistent nuisance to their existing neighbors and the surrounding property owners of that area. This most assuredly will be the case should you vote to approve their rezoning and special use permit application to construct a facility off US 1 in the heart of the growth area of Thornburg. The level of noise created by the Crucible's day to day operations does not fit with the County's comprehensive land use plan for this area, and for this reason alone I encourage you to vote against approving their application.

Please feel free to call or email me with any questions you might have about our prospective project. I wish you and your families the best and again thank you for your time.

Sincerely,

Clay Mihoulides
Licensed VA Real Estate Broker
If you like our service please leave us a favorable review on Google*

CHRISMARR PROPERTIES

O:540-373-6189
C:540-424-1664
F:540-479-1855
180 Chatham Heights Rd.
Fredericksburg, VA 22405

--
This email was Malware checked by Sophos http://www.sophos.com

3 Jan 2020

Spotsylvania Board of Supervisors
Attn: Kevin Marshall
CC: Leon Hughes
CC: Jennifer Maddox

Re: Letter of Concern regarding Crucible re-zoning request

Sir,

The Matta River Woods Homeowner's Association has several ongoing objections to the Crucible's modified request for rezoning and special use permit. Their latest proposal would allow them to conduct operations with almost no additional restrictions from their previous requests. If approved as written, our neighborhood and surrounding communities would incur a safety risk, a noise irritant, and potential adverse property value impact. In addition, Spotsylvania County, and the Thornburg area in particular, would see a detrimental impact on future development of land in the area.

The first concern we would like to address is the safety risk to our entire neighborhood. All homes in our development lie within an area where rounds that clear the berm or ricochet would likely impact. Even with the best intentions, the Crucible operators and instructors cannot guarantee that a round will never leave the range. When a round leaves the range, it will most likely land in our neighborhood and put everyone living there at risk.

The second concern we would like to address is the limitation of handguns, shotguns, and rifles or carbines of .300 Blackout caliber or less equipped with suppressors addressed on page 12 of the Generalized Development Plan from both a noise and safety perspective. The twelve gauge shotguns and handguns will generate a tremendous amount of noise and will likely not be suppressed according to page 4 of the Voluntary Proffer Statement which reads "Conduct routine use of sound suppressors for all rifle fire by defaulting to suppressor use unless specifically directed by contracting authorities to not use suppressors for training or parts thereof."

Research on the .300 Blackout caliber states that cartridge is available in both super-sonic and sub-sonic velocities. Sub-sonic velocity rounds are substantially quieter than super-sonic rounds and of shorter range, but the Crucible nowhere states that they will employ only sub-sonic rounds but do include verbiage to permit super-sonic rounds. If approved, the door will be open for the Crucible to fire the much louder super-sonic rounds

throughout the period of operations with no real incentive nor restrictions to fire the sub-sonic rounds.

As an HOA we object to the authority to operate Improvised Explosive Device (IED) simulators. Please see our previously submitted analysis regarding noise impact for properties within our subdivision and surrounding neighborhoods that will receive noise levels that exceed the county noise restrictions. While the simulators contain no high explosive, the compressed air devices are designed to produce a blast noise signature that replicates a true IED. This noise would be heard by every property in our subdivision and contribute to the Crucible being an obnoxious neighbor.

Another concern with the noise involves the enforcement of any voluntary restrictions. The Crucible in their "Voluntary Proffers" are not obligated to adhere to those restrictions for any length of time. If, after beginning operations, they find that the restrictions inhibit their ability to operate profitably, there is nothing to prevent them from changing the "Voluntary Proffers". The county must have a means of monitoring the noise generated by the Crucible as well as a means to enforce any and all proffers. Also, we feel that before the "Voluntary Proffers" can be modified, the Spotsylvania County Board of Supervisors must be consulted and agree to any and all changes that would affect noise generation.

In addition to the noise concerns, there is still a significant safety risk to our neighborhood if the range is approved as outlined in the development plan. While the Crucible has reduced the number of ranges requested and limited the firing range to 350 feet, the potential ranges of the weapons fired approaches the ranges of the previous analysis for 7.62mm weapons and creates the same safety hazard for down-range areas as in their initial request. A supersonic round that clears the berm still has the ability to travel several miles, and while not densely populated, the land is not vacant as stated on page two of the Generalized Development Plan. The Matta River Woods neighborhood alone has 34 family-occupied homes that are directly downrange from the proposed range and could be impacted by any round leaving the range. This potential safety risk is unacceptable from our neighborhood's and Spotsylvania County's perspective.

The residents of Matta River Woods are also concerned about an adverse impact on property values if the Crucible plans are approved. Our previous analysis provides sufficient examples of property values being impacted by nearby shooting ranges. The Crucible is not just a shooting range but a military training facility that will generate significantly more noise and risk to the area than other types of firing ranges. Their analysis of the impact on property values for Stafford County does not transfer to the properties downrange in Spotsylvania County. The Crucible's analysis did not provide all of their assumptions used in the analysis nor the specific geometry of the property

locations in relation to the firing ranges. A careful examination of all the factors would most likely show a very different picture than their simplified analysis.

From a development perspective, there are several reasons that Spotsylvania County should reject the Crucible's Rezoning and Special Use Permit Request. These reasons include the adverse impact on other types of development and the overly optimistic economic projections of the Crucible's economic statement.

A change of zoning from A2 to I 2 with special usages (12) Industry, type 111, would allow an establishment which has the potential to be dangerous or extremely obnoxious. If approved, this zoning allowance would convey with a property sale or transfer should Crucible decide to vacate. Spotsylvania County Code states that businesses should be in harmony with the neighborhoods and in compliance with the County Comprehensive Plan which states that "the plan sets forth principles, goals, policies, and implementation techniques that will guide the development activity within the County and promote, preserve, and protect the health, safety and general welfare of its citizens". This rezoning request is clearly in conflict with that policy.

The Board of Supervisors Decision Criteria (Sec 23-24.5.7) states that the planning commission shall not recommend, nor shall the Board of Supervisors approve, the proposed special use unless it satisfies the following standards:

> 3) "that the proposal use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof".

The Thornburg area has tremendous development potential and a rezoning would not enhance but hinder development and reduce overall land values in this part of the county. Other potential developers have indicated they would like to create a mixed residential-commercial complex adjacent to the Food Lion property at the corner of Morris Road and Jefferson Davis Highway but would not pursue the opportunity if the Crucible receives rezoning and the requested special use permit. A mixed commercial-residential complex would encourage the type of development that would enhance property values throughout the Thornburg area and provide long-term economic growth for the county.

In addition to the Crucible's presence discouraging other potential developers for the Thornburg area, the economic projections of the Crucible's plan should be taken with a grain of salt. Page five of the Generalized Development Plan states that "Team Crucible would accommodate up to 10,000 daily visits (trainee days) annually". Their long-term economic projections are based upon this number of trainee days. According to Exhibit B of the Generalized Development Plan, the Crucible had 2,624 trainee days in 2015 and 2,623 trainee days for 2016. The exhibit also provided more details for the month of April for years, 2015, 2016, and 2017. The number of trainee days for those months was 231, 251, and 152 respectively. They also state on page 24 of the Generalized

development Plan that "It is our experience that larger numbers can be a result of larger deployments or our forces." The decreased numbers for the month of April 2017 may be the beginning of a trend of decreased trainee days for the Crucible.

The Crucible already conducts operations in Stafford County and has full time and part time employees. If they relocate operations to Spotsylvania County, will they ensure all their employees move to Spotsylvania or will those employees choose to retain their current residences and conduct the relatively easy commute from Stafford to Spotsylvania? Perhaps their number of full-time job equivalents provided by the Crucible is overstated.

As an HOA that represents 40 properties, we see nothing in the Crucible's modified proposal that justifies approving the request. Our homes and families would incur a significant safety risk and noise irritant as well as see a reduction in home values. It would also undermine an area of the county that, as both I-95 and the new passenger rail developments begin to be felt, will become a potentially valuable mixed-use development site for the county's economic growth.

Stevie Larson
President, Matta River Woods HOA

Wayne Breakfield
Vice President, Matta River Woods HOA

1/3/2020

TO: Berkley District Supervisor Attn: Kevin Marshall
CC: Leon Hughes
CC: Jennifer Maddox

Re: Letter of Concern regarding Crucible re-zoning request

This letter represents the collective position of the Plantation Estates at Matta River HOA and the residents of the neighborhood.

We are opposed to the re-zoning request from Team Crucible LLC to include the latest modified proposal. Crucible is requesting rezoning for Agricultural 2 (A-2) to Industrial 2, specifically rezoning under Sec. 23-6.22.4 Special uses, (12) Industry, type III.

Definition: Industry, type III means an establishment which has the potential to be **dangerous or extremely obnoxious**. Included are those in which explosives are stored, petroleum is refined, natural and liquid gas and other petroleum derivatives are stored and/or distribution in bulk, radioactive material are compounded, pesticides and certain acids are manufactured, and hazardous waste is treated or stored as the establishment's principal activity.

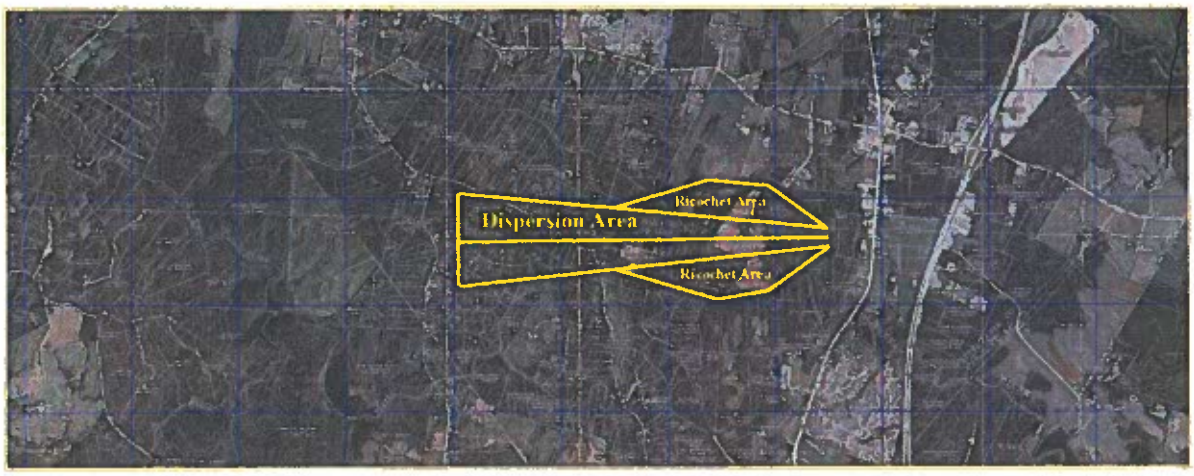
Additional: under Sec. 14-52 Exemptions for noise, the applicant feels they meet paragraph 14-52-a-3 "Noise emitted by a commercial or industrial establishment which noise customarily emitted by such establishment or industries." would be exempt from noise pollution sound levels from 6:00a.m. to 10:00 p.m. daily.

Our specific concerns:

1. This modified proposal includes an open-air range that allow for bullets to fly unimpeded from the range if there were an accident, misfire, malfunction or careless act. It is important to note that the range with the berms presents a severe risk to the inhabitants located within the range of any ammunition used. All law enforcement and military ranges own and control all land within the potential impact area for bullets shot on any of their ranges to eliminate risk. This range must do the same or enclose the range with no "blue-sky" so that the risk to the surrounding area is eliminated. It is common sense that nobody would stand on top of the firing berm while the training is underway, therefore, no resident down range is safe either. The application does not include any range safety fans that would depict danger areas and bullet impact areas. This is a must and should be completed by the county through an independent expert in accordance with federal

and state standards. The proffers to limit ammunition to .300 and below which still includes .223 ammunition and many others that create danger for miles outside the range. See below as a portion of our original brief:

Surface Danger Zone
5.56mm M855 Ball
Distance X: 3,437M Angle P: 34.2 deg (earth/water)



Ref USMC Range Safety Pocket Guide p32

This depicts the range danger areas if the range safety fan were to be created using current federal range standards and .223 ammunition. This model is very conservative and based on the old range design. The new design would likely have a much wider fan.

2. The applicant proposes limitations on ammunition that the county has no mechanism to enforce. We as a county do not have a way to inspect the firing line at the range to ensure that the applicant does not use ammunition not stipulated in the proposal. The Spotsylvania County Sheriff's department is not an ammunition inspector. Therefore, with the safety of the county residents who may be injured or killed by a bullet leaving the property in mind, the county must err on the side of large ammunition types that Crucibles clients use and train on. Recommend using the bullet types in the original submission.
3. The proposal asks for unlimited noise generation but offers to build berms to limit the noise. The applicant disagreed with the SARNAM and provided their own noise study which ignored all accepted models used by Federal agencies and which were accepted by Spotsylvania as a valid noise model in the AP Hill study. The applicant offers to reduce to subsonic ammunition (at times) to limit noise. This all leads to support the models that show this range complex will far exceed the noise levels allowed on adjacent properties. If you follow the logic on the

zoning and noise restrictions; an adjacent property could have a party with loud music shut down while Crucible was firing unabated and far exceeding the noise limits placed on that same adjacent neighbor's music noise. If we are held to a noise limit **on our property**, Crucible should be held to the same noise limit **on our property. In accordance with county code for noise**: maximum permissible sound pressure levels: Residential 65 daytime, 60 night. For repetitive noise reduce by 5 dBA (except in industrial zone). Therefore the repetitive sound of gunfire from Crucible must not exceed 60 dBA or 55 dBA at anyone's property line in the surrounding area.

4. This proposal radically changes the layout of the facility and likely invalidates all of the applicant's economic analysis and noise studies. The economic analysis is based upon student throughput and the new layout is drastically different, therefore logic would dictate the throughput must be different. The noise study was based upon the old range design and no longer holds. Those artifacts should be removed from the package and re-submitted. We suggest that the county should have these analyses done by an independent party using accepted best practices for the gun range industry. An analysis done by those for or opposed to this development is likely not independent. Lacking independent data, the supervisors should vote "no" to protect the surrounding community.
5. This proposal does not address the additional costs to the county for life/safety issues including additional EMS, fire and law enforcement that would occur due to this facility operating. In their plan they have an emergency helipad for medical emergencies, recognizing the danger of their operations. In addition, they do not address the need for ammunition and firearms storage and the resulting hazards to the community.
6. This proposal does not address the requirement for hooking up to the counties water and sewer as required by code.
7. Spotsylvania County Code states that businesses should be in harmony with the neighborhoods and in compliance with the County Comprehensive Plan which states that "the plan sets forth principles, goals, policies, and implementation techniques that will guide the development activity within the County and promote, preserve, and protect the health, safety and general welfare of its citizens". This rezoning request is clearly in conflict with that policy.
    a. The Board of Supervisors Decision Criteria (Sec 23-24.5.7) states that the planning commission shall not recommend, nor shall the Board of Supervisors approve, the proposed special use unless it satisfies the following standards: "that the proposal use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof". Discussions at the public meeting with developers of the potential adjacent housing and town center development demonstrated that

if Crucible is approved this zoning change and plan, it would drastically curtail development.

b. The Spotsylvania (Thornburg area) comprehensive plan does not call for this type of zoning and if approved, this will have a severe negative impact on development of the area as depicted in the comprehensive plan.
c. Thornburg is a Tourism Zone. This type facility is in direct contradiction to a portion of the country that is attempting to attract tourist type businesses like museums, hotels, other public type services.
d. Since this rezoning request does not comport with the existing zoning nor the comprehensive plan it may be deemed "spot zoning" defined as "the process of singling out a small parcel of land for a use classification totally different from that of the surrounding area for the benefit of the owner of such property and to the detriment of other owners." Spot zoning is illegal under Virginia Statute and the rezoning will likely face immediate legal challenges from the surrounding landowners if approved due to this fact.

Respectfully,

Stephan Picard
HOA President, Plantation Estates at Matta River

Leon Hughes

From: Charles Tatum <wizard1073@gmail.com>
Sent: Sunday, January 5, 2020 4:49 PM
To: Kevin Marshall; Leon Hughes; Jennifer Maddox
Cc: Wayne Breakfield; stevielarson; Stephan Picard
Subject: [EXTERNAL]: RE: Team Crucible Zoning & Use resubmission; County's response to resubmission

Mr. Marshall, Ms. Maddox and Mr. Hughes,

We recently learned that Team Crucible resubmitted their zoning and use application with revisions to many of their application artifacts. Although I have not been able to find these updated artifacts on the county website, I have been provided them for review. We want to share with you our thoughts on the application, and better prepare you to ask questions of Team Crucible in your formal responses to them.

Speaking generally of zoning, it is our understanding that the intent is to allow compatible uses of adjacent land to co-locate and have standing approval for entire classes of activity. Things that are generally approved, within certain limits prescribed by ordinance, are de facto not nuisances among neighbors within a zone. Difficulties arise at the boundary of properties with different, and perhaps incompatible, uses and zones. For example, if a pig or chicken farm were allowed to open adjacent to a pre-existing residential property, a nuisance would result due to the odors and other factors from the pig farm.

During the sPower hearings, some of the Supervisors voiced support for private landowners being free to develop their own property, as a matter of principle. We generally agree with this principle, subject to the ancient common law of nuisance that the development right is limited to quiet enjoyment of one's own property, and that no right exists to harm the quiet enjoyment by your neighbor of his property. Twice now, with Dominion Raceway and with sPower, we have seen this law abandoned despite clear opposition from affected neighbors. Because it is the county government that abandons this law, the neighbors have little if any recourse in a court of law, and then only at great personal expense. Therefore, we expect citizens to place yet again extreme pressure upon the county government, the Planning Commission, and the Board of Supervisors.

Take our pig farmer example from above: Should the Board of Supervisors approve a re-zoning and permit new use of land as a pig farm adjacent to a residence? Should it matter if it is one residence or a neighborhood of 400 residences? Does it matter if it is only odor that offends the residential senses, or what if it is sounds or lighting or tremors, or affects the well water or erosion, or has physical items blowing or tossed across the property boundary? All of these can be nuisances, if not outright safety issues. It is our belief that a re-zoning decision must take into account all forms of nuisance as well as all forms of safety issues. The general principle is and should be that new use does not cause harm of any kind to existing use.

Now specifically Team Crucible's re-zoning and use request: They are requesting a spot-zoning that is incompatible with the vision captured in the comprehensive plan. The challengers to this re-zoning request do so from legitimate nuisance and safety concerns, as well as economic concerns.

The primary nuisances that Team Crucible will cause are sounds from firearms and supersonic bullet shockwaves (which are not limited to point of origin, but travel with the bullet downrange), IED simulators, and tactical vehicle training; lights from buildings, parking, and road areas; tremors in the ground and from expanding shockwaves from explosions of many kinds, ranging from fired bullets to IED simulators; and

perhaps odors from explosives used to fire bullets and simulate IEDs. The re-zoning would open the door to an even larger list of nuisances according to the allowed uses of I-2 Type 3.

The primary safety issues that Team Crucible will cause are from stray bullets that leave the firing area, and contamination of well water and ground waterways from metals leaching into the soil from spent bullets and cartridges and explosive residue. In all of their submissions, Team Crucible has increased the mitigation of these safety issues, but have not yet adopted a No Blue Sky approach to the shooting range. The re-zoning would open the door to an even larger list of safety issues according to the allowed uses of I-2 Type 3.

From the zoning ordinance: "Industry, type III means an establishment which has the potential to be dangerous or extremely obnoxious. Included are those in which explosives are stored, petroleum is refined, natural and liquid gas and other petroleum derivatives are stored and/or distributed in bulk, radioactive materials are compounded, pesticides and certain acids are manufactured, and hazardous waste is treated or stored as the establishment's principal activity."

It is a fact that many industrial sites that store hazardous materials have unexpectedly caught fire or suffered mechanical issues leading to explosions and/or releases of hazardous gases and liquids into the surrounding area endangering residents near and far. Within a large industrial area, the risk to residential zones is lessened, and other co-located industrial uses are more expectant of this infrequent but consequential type of disaster, especially if they themselves work with hazardous materials in any significant quantity. Team Crucible is asking for a spot zoning that is not surrounded by other industrial uses, and therefore opens the door irrevocably to lasting harm to the incompatible residential and agricultural uses pre-existing in the immediate surrounding area.

The question of opportunity cost must also be included in any economic analysis. Team Crucible's analysis of opportunity cost appears to be limited to By-Right development of residences, yet this is not the only opportunity cost present. We have argued that Team Crucible will have an adverse impact to all of its neighbors, both present occupants and future, over a large area surrounding their land. While we have focused on the present occupants of neighboring land in our discussions above and elsewhere, we have evidence that future occupants are either sitting on the fence waiting to see what happens with Team Crucible's re-zoning, or else walking away completely and investing in commercial and residential developments elsewhere due to the un-quantified risks inherent in Team Crucible's use of their land. These new uses by future occupants would not be protected under the common law of nuisance (as expected), but would be subject to all of the safety issues mentioned above, because spot-zoning I-2 Type 3 amid residential, agricultural, and commercial zones (present and future) will not provide sufficient buffer to protect these other uses. The value of the future uses that have already walked away, even accounting for expenses that the county would take on for schools and public safety, are likely to net more jobs, economic activity, and tax revenue than Team Crucible will provide, since it is the County's general policy to make residential development pay for itself.

All of this leads to several questions that we believe the planning department, planning commissioners, and supervisors should ask Team Crucible.

1) The sound study performed is limited to using Cadna-A which implements ISO 9613, which is based on ray tracing. This approach computes only limited diffraction effects, and completely ignores refractive effects. As evidence, we submit statements from the maker of the model as included in a methodology study concerning wind turbines:

"Heinrich A. Metzen of DataKustik GmbH[3], maker of CADNA/A confirmed this fact in an e-mail where he stated:

"long range propagation including atmospheric refraction is not part of the standards used for (normal, "standard") noise calculations. It is known that atmospheric refraction may cause sound to be refracted downwards again and contributing strongly to the level at long distances. The atmosphere in the standards existing is just homogeneous above height."

"Since there are no accepted algorithms to predict these refractions, sound propagation models cannot evaluate conditions that have vertical or horizontal turbulence even though we know they can add significant sound at the receiving location when present. As a result, predicted sound levels are understated."

Furthermore, "the standard [ISO 9613] is mainly applicable to situations concerning road or rail traffic, industrial noise sources, construction activities, and many ground-based noise sources. **It does not apply to sound from** aircraft in flight, to **blast waves from** mining, **military, or other similar operations.**" [Emphasis mine]

(Source: http://www.windaction.org/posts/32217-the-lie-behind-turbine-noise-models#.W-WvuJNKiUk)

Questions to Ask Team Crucible regarding their sound analysis:

What are the limitations of the CADNA-A sound propagation model? Does CADNA-A model refraction? What would be the expected effect in a positive refraction (downward bending) environment, and how significant would this effect be compared to the Line of Sight and diffraction calculations performed by CADNA-A? Under what conditions would positive refraction occur, and are these conditions likely at the Team Crucible site? Will the conditions favorable to positive refraction vary with time of day or season or specific environmental conditions such as clear days or storms? Is it fair to say that the predictions are not maximums? What are the uncertainty measures for the numbers provided?

2) The scope of the development plan has changed significantly, including revisions to the size of the firing range. How and to what extent does this affect the economic analysis submitted with the earlier development plan? How and to what extent does this affect the safety and noise studies submitted with the earlier development plan? Would you trust your own life to the additional safety precautions if you were standing atop any of the berms during live fire events?

3) The military has developed upgraded ammunition that can fly farther and faster similar to bullets fired from larger weapons. Given evidence of this technological path forward, and deducing that the noise and safety materials submitted for planning review might be invalidated by this new ammunition, how will Team Crucible's potential use of newer ammunition in general remain within the letter and spirit of the anticipated special use permit?

4) Based on the investment interest of other developers in the Thornburg area, and recognizing that re-zoning is a long-term decision, will your use and future allowed uses under I-2 Type 3 be compatible with new residential and commercial developments that will inevitably locate on land near Team Crucible's land?

Finally, questions for the government:

1) How will you enforce any or all provisions of the zoning and of the Special Use Permit? What evidentiary standard do you require for events that are difficult to quantify due to their irregularity? How will anyone prove that a bullet did leave the firing zone, or that a shockwave caused property damaged?

2) Will you amend the noise ordinance to allow actual limits to be enforced on commercial and industrial property? (The looseness of the noise ordinance is a stated reason for Team Crucible's initial interest in Spotsylvania County, and it is mentioned in the sound study as a license to make any noise by Team Crucible,

subject only to voluntary restrictions.) Will you force sound studies presented to be more representative of actual environmental factors, including diffraction and refraction, and exclude studies from evidence that do not use appropriate methods? (For example, using models like CADNA-A beyond their accredited use?)

3) Would any of you be willing to stand atop Team Crucible's berms during a live fire event?

Thank you for your time and effort working on Team Crucible's re-zoning application, and for taking so much time over the last several years to meet with us citizens and showing us the appropriate ways to channel information and concerns to you. We look forward to a full and fair and open process of formal consideration of Team Crucible's application.

Charles Tatum
Spotsylvania Residents First
(facebook.com/SpotsylvaniaResidentsFirst)

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Leon Hughes

From: Peter Dechat <pdechat1@reagan.com>
Sent: Monday, January 6, 2020 10:39 AM
To: Leon Hughes; Kevin Marshall
Subject: [EXTERNAL]: Crucible questions

I understand that the Crucible discussion has come back up.

As you are most certainly aware the Crucible project has direct negative consequences for the neighborhood Plantation Estates at the Matte River, where I reside, as well as all the surrounding properties.

In order for Crucible to successfully operate as it intends, it will either need written exemption from the county for the noise ordinance, or a blind eye from law enforcement. Which does the county plan to offer?

If this is a serious consideration by the county, can you help us to understand what is in it for the county, and specifically us the residents? Where can we see the projected tax revenues, proffers, or other benefits Crucible will bring to the county?

With the increased war zone like noise, and potential- no matter how small- that a stray bullet could leave the compound, I would imagine a substantial depreciation of the surrounding residential property values. Since they also have a Stafford county, where have you compiled data reflecting what happened to the property values there, and will you then reduce the property taxes for affected property owners here to reflect that?

I am firmly opposed to Crucible operating here, but some danger and noise mitigation can be put in place to reduce impact on ours and surrounding neighborhoods:

Large berms completely encompassing training areas (approximately 35ft high) will reduce any danger from stray rounds to almost zero. This would also defend surrounding areas from the noise pollution.

One final point: what possible pollutants can be released into the environment, making its way into our ground water- poisoning all of us. It is impossible to believe that this will be a pollution neutral operation, and many of us have wells and will be drinking any mess they make.

Thank you for taking the time to read and respond to my inquiries.

May God keep you and bless you,
Pete

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Leon Hughes

From: Stephan Picard <sjpicard@gmail.com>
Sent: Monday, January 6, 2020 11:03 AM
To: Kevin Marshall
Cc: Leon Hughes; stevielarson; Charles Tatum; Wayne Breakfield; Michael Galati
Subject: Re: [EXTERNAL]: Citizens letter of concern reference Team Crucible re-submission

Thank you Sir! I was thinking that the county should talk to this neighborhood in Texas. I bet they wished that the county had not approved the range near them!

https://www.khou.com/article/news/local/league-city-neighbors-say-action-at-nearby-gun-range-is-leaving-bullet-holes-in-their-homes/285-f0a8e30c-e54c-43d2-810e-264d7e3c9dca

https://www.click2houston.com/news/2019/01/19/residents-concerned-about-gun-range-say-bullets-are-hitting-homes/

Stephan

On Mon, Jan 6, 2020 at 10:35 AM Kevin Marshall <KMarshall@spotsylvania.va.us> wrote:

> Stephan.
>
> Thank you for the information.
>
> Kevin W. Marshall
>
> Supervisor Berkeley District
>
> (540) 507-7010
>
> (540) 755-6087

From: Stephan Picard <sjpicard@gmail.com>
Sent: Friday, January 3, 2020 12:38 PM
To: Kevin Marshall <KMarshall@spotsylvania.va.us>; Leon Hughes <LHughes@spotsylvania.va.us>; Jennifer Maddox <JMaddox@spotsylvania.va.us>
Cc: Wayne Breakfield <breakfieldteam@gmail.com>; stevielarson <stevielarson@aol.com>; Charles Tatum <wizard1073@gmail.com>
Subject: [EXTERNAL]: Citizens letter of concern reference Team Crucible re-submission

Mr. Marshall, Ms. Maddox and Mr. Hughes,

Please find attached a letter that lays out our position and concerns regarding on the possible rezoning of the Team Crucible site in Thornburg and the company's recent re-submitted plan.

Thank you

Stephan Picard

HOA President, Plantation Estates at Matta River (Berkeley District)

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This email was Malware checked by UTM 9. http://www.sophos.com

LOCAL

League City neighbors say action at nearby gun range is leaving bullet holes in their homes

One round shattered someone's back door. Another landed on a sidewalk. Others hit walls, even pierced someone's front door.

Neighbors: Gun range bullets hit homes in League City

Author: Larry Seward
Published: 11:16 PM CST January 18, 2019
Updated: 11:17 PM CST January 18, 2019

LEAGUE CITY, Texas — The mayor and League City Police chief plan to meet with homeowners worried about stray bullets hitting homes in the Hidden Lakes subdivision.

"I feel like even when we're in our homes we're not safe," neighbor Karen Nelson said.

In two years, neighbors count 14 homes hit. They mapped each and posted on a neighborhood website.

One round shattered someone's back door. Another landed on a sidewalk. Others hit walls, even pierced someone's front door.

"We've just been finding bullets everywhere," a homeowner who did not want to be identified said. "I'm just worried for my children's safety. I'm just terrified."

Developers built the subdivision with homes still under construction down range from the four-decades-old, outdoor Clear Creek Shooting Range.

The owner, through staff members, asked KHOU 11 News to leave his property and did not return calls or messages for comment. However, he did allow the NRA to perform an inspection of the facility in 2017, according to League City police.

The range passed. Still, its owner took steps to better insulate neighbors from bullets fired at the range.

Stray bullets remain a problem in the neighborhood, though.

"We just don't know what we can do," Nelson said.

Another mom cried while describing how a bullet landed in the roof above her 8-month-old's room.

Police labeled criminal mischief in their report. They have not found anyone to hold responsible.

"All they've told us is they can take the report but nothing can be done, basically until it actually hits a person," the woman said.

Mayor Pat Hallisey said the city held up development around the range for 20 years. Now, state law prevents city staff from passing law to protect homeowners from range bullets.

"It would be easy to say we could pull their permit," Hallisey said. "But it's not that easy. It's still private property. We can't force them to sell it."

City officials plan to push state lawmakers into changing the law protecting the range. At the same time, the mayor and police chief hope range owners make changes on their own.

"I want someone to take responsibility," Nelson said. "I'm very upset. I'm not saying it's the gun range's fault. We're not against the gun range. They were here first. We're all for the gun range. We're just all for our safety."

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NEWS

Residents concerned about gun range, say bullets are hitting homes

Joel Eisenbaum, Investigative Reporter

Published: **January 18, 2019, 6:42 pm**

Tags: **News, Local**

LEAGUE CITY, Texas – Some residents of a League City neighborhood are concerned after claiming bullets -- most likely from a nearby gun range -- have hit doors, windows and roofs of their homes.

This section of the Hidden Lakes subdivision, along or close to Palo Duro Canyon Lane, is lined with newly constructed houses.

"We would have never moved here if we knew the extent going on over here," said resident Sydney Castro.

Castro claimed that over the last several months, 14 bullets and bullet holes have been discovered in the neighborhood and four houses have been hit.

The mother of three said that on Thursday, a bullet hit her roof and damaged her house, another homeowner had a window broken and another had a bullet hit his front door.

But the overriding concern is the safety of children in the neighborhood.

"We don't let them go into the (front) room during the day," Castro said.

The Range predates the subdivision by decades. The shooting booths at Clear Creek Gun Range, sit about 1/2 mile from the edge of the neighborhood.

Friday, a manager at the gun range said "no comment" when asked about the situation.

Also Friday, a League City council member said that his staff will look into the situation.

"Certainly I'm going to address with staff -- see what actions we can do," Councilman Larry Millican said.

Millican, who has shot at the range, said management at the business had already done some work to better keep bullets within property lines.

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[EXTERNAL]: Fwd: [Non-DoD Source] Fwd: Revived noise ordinance petition

Sent: January 10, 2020 10:02 AM

From: Peter Dechat

To: Kevin Marshall; Leon Hughes;

This is the type of scenario I'm wanting to avoid. The people living there are dealing with cancerous toxins from decades ago.

At least they have city water, we are on wells here and OUR HEALTH IS AT RISK.

Please stop Crucible.

May God keep you and bless you,
Pete

Begin forwarded message:

From: Middle Way <middlewaytcm@gmail.com>
Date: January 9, 2020 at 7:44:16 PM EST
To: Peter Dechat <pdechat1@reagan.com>
Subject: Re: Fwd: [Non-DoD Source] Fwd: Revived noise ordinance petition

https://response.epa.gov/site/site_profile.aspx?site_id=9177

Best,
Paul
--
Dr. Paul F. Ryan DACM, L.Ac.
East-West Integrated Wellness
middlewaytcm@gmail.com
On Jan 6, 2020, 11:02 AM -0500, Peter Dechat <pdechat1@reagan.com>, wrote:

> This is something that is trying to be pushed through a mile from my house, and we have been fighting it.
>
> Ana shared about the airport in the 70's dumping poisonous fluids then and they are still showing up in your ground water today. Can you ask her what report that was and is it available for me to get a copy of. I would love to use it as an example at the board meeting about it.
>
> I'm concerned that blowing up vehicles, etc will leach oil, antifreeze, gas etc into the ground eventually getting into my well water.
>
> May God keep you and bless you,
> Pete
>
> Begin forwarded message:

From: Stephan Picard <sjpicard@gmail.com>
Date: January 6, 2020 at 9:32:30 AM EST
To: Dallas CIV George M <george.dallas@usmc.mil>
Cc: "Pete Dechat (judy)" <pdechat1@reagan.com>, Mark Brinkman <mark.brinkman@mac.com>, Mike McDaniel <mcdanielm06@yahoo.com>, Mike Schooley <hrt119@hotmail.com>, Craig and Cheryl Dufficy <caduffiey@verizon.net>, Wendy Picard <wlpicard@gmail.com>, Wendy Luttrell <bcdboys@aol.com>
Subject: Re: [Non-DoD Source] Fwd: Revived noise ordinance petition

Thank you for asking! Although I am sending HOA letters, I suggest that anyone that is opposed send an email to the supervisor Kevin Marshall and also to the county zoning official Leon Hughes. These people I think are in our corner, and every email/letter gives them more ammo.

lhughes@spotsylvania.va.us
kmarshall@spotsylvania.va.us

I think the three biggest issues for us are 1. Safety - its an open range and a bullet can go over a dirt berm. 2. Sound - same as #1.... its going to be hell here in Plantation Estates every day they are shooting. they want to be exempt from all limits on noise. They are also doing a road course with IED simulators so there will be lots of explosion noise as well. 3. Property values - this will certainly depress our home/land values.

VR
Stephan

On Mon, Jan 6, 2020 at 9:24 AM Dallas CIV George M <george.dallas@usmc.mil> wrote:

> Thank you Stephan. How can I help?
>
> -----Original Message-----
> From: Stephan Picard [mailto:sjpicard@gmail.com]
> Sent: Sunday, January 05, 2020 6:23 PM
> To: Pete Dechat (judy) <pdechat1@reagan.com>; Mark Brinkman <mark.brinkman@mac.com>; Mike McDaniel <mcdanielm06@yahoo.com>; Mike Schooley <hrt119@hotmail.com>; Dallas CIV George M <george.dallas@usmc.mil>; Craig and Cheryl Dufficy <caduffiey@verizon.net>; Wendy Picard <wlpicard@gmail.com>; Wendy Luttrell <bcdboys@aol.com>
> Subject: [Non-DoD Source] Fwd: Revived noise ordinance petition
>
> All,
> I've resubmitted another 3 page letter to the county against the Crucible. They have resubmitted a new plan, it's better... But still had a large open range which has all the same problems.
>
> Check out the petition below. The issue with the noise ordinance in spotsy is business get a pass based on their business. So they can make whatever noise their business generates and if next door... Well that's then the neighbors problem and nothing you can do about it.

---------- Forwarded message ---------
From: Charles Tatum <wizard1073@gmail.com <mailto:wizard1073@gmail.com> >
Date: Sun, Jan 5, 2020, 5:55 PM
Subject: Revived noise ordinance petition
To: stevielarson <stevielarson@aol.com <mailto:stevielarson@aol.com> >, "pelarson62@gmail.com <mailto:pelarson62@gmail.com> " <pelarson62@gmail.com <mailto:pelarson62@gmail.com> >, Wayne Breakfield <breakfieldteam@gmail.com <mailto:breakfieldteam@gmail.com> >
Cc: Stephan Picard <sjpicard@gmail.com <mailto:sjpicard@gmail.com> >

https://www.change.org/p/spotsylvania-county-board-of-supervisors-change-spotsylvania-county-noise-ordinance-to-protect-residents

Posted to SRF's facebook page. Please share widely. It pre-dates the Crucible and sPower efforts, but is revived to work another campaign.

Charles

--
This email was Malware checked by UTM 9. http://www.sophos.com

(No subject)

Sent: January 17, 2019 3:06 PM

From: Paul Benson

To: Leon Hughes;

STOP CRUCIBLE,
yes my names paul and im a home owner that will be effected if you approve crucible.
one question, would you want them beside you ,this is not the place for them and we will do what we have to to stop them, our property values will drop, safety the noise they bring ,if you want to put something in thornburg how about a new high school , ours so over crowded, i no thornburg going to grow,but if you let them in, business and growth will pass us by and go to the next county.
i do not want to here the noise 7 days a week that going to make,i dont want to walk outside and have to worry about a stray bullet passing by and killing one of my kids playing. do not approve them
WE DONT WANT CRUCIBLE HERE IN THORNBORG

--
This email was Malware checked by UTM 9. http://www.sophos.com

June 4, 2018

To: Mr. Hughes

From: Shirley Brady

It was a pleasure to speak with you on May 30, 2018. Thank you for answering my questions regarding Crucible.

When you said I could also send my concerns in writing, I felt you may not have been aware of my 2017 written correspondence. I have enclosed the following copies for you: letters to the Board of Supervisors + Planning Commission, letters to Virginia officials, petition from my subdivision, and "letters to the editor" published in The Washington Post and The Free Lance Star. No return correspondence was received from any County member.

Thank you again for your time and thoughtful consideration regarding this very important issue.

Shirley Brady

Could it happen here? Crucible...

Sent: July 29, 2018 7:50 PM

From: Stephan Picard

To: Aimee Mann;

CC: Leon Hughes; Wanda Parrish; Branscome, Jeffrey (Jeff);

Good evening gentlemen. Much to do has been made about Crucible and the changes to the range. I will be the first to tell you that if every bullet fired hits the target in the berm as it's designed, then we are likely safe.... But... Have you ever heard of a misfire or have you ever seen a person discharge a weapon and not hit the target? Please take 3 minutes to watch this video. This is what the citizens are concerned about.

https://m.youtube.com/watch?v=3uBBWY-an-c&feature=youtu.be

What if the trainee from the Mexican police (or other crucible client) while moving on his/her target squeezes the trigger a second early or if his/her weapon malfunctions and a round is loosed. As you can see here a 20 ft berm will NOT stop that bullet from departing their range and endangering nearby citizens.

Now you may say... come on Stephan... Seriously stop being an alarmist. That never happens. I'm willing to bet your life and all the local citizens lives when I vote yes.

But it does happen. It happens a lot.

https://www.google.com/amp/www.seacoastonline.com/news/20180419/kensington-shooting-range-still-shut-down%3ftemplate=ampart

http://www.nhpr.org/post/sig-sauer-shooting-ranges-shut-down-now-after-bullet-windshield#stream/0

Just a couple recent examples...

Crucible will tell you that surface danger zones don't apply to them.

I will tell you that physics does apply. Bullets go up and Newton tells us they come down. That's why every reputable range controla their SDZ.

Before you vote yes... Consider the consequences to that one unlucky person on that one unlucky day.

The lot is too small, it's in the wrong place and if you wouldn't stand side by side with your children on top of the berm while they fired at the target 15 feet below you.... Then please don't make us. If a bullet leaves the range by even an inch, we are the ones in danger.

Stephan Picard
HOA President
Plantation Estates at Matta River.

--
This email was Malware checked by UTM 9. http://www.sophos.com

Search results for 'crucible' | fredericksburg.com

Sent: August 6, 2018 11:51 AM

From: Stevielarson

To: Aimee Mann; Jeffrey (Jeff) Branscome; Leon Hughes; Wanda Parrish;

https://www.fredericksburg.com/search/

Fellow Spotsylvanians,
I have a serious concern as to the application of rezoning by Team Crucible. My neighborhood is down range from this property and I have petition signatures from all property owners objecting to this rezoning request on the grounds of safety, noise, environmental questions and property devaluation. I am appalled that the Board of Supervisors and Planning Commission would even entertain the prospect of rezoning for this purpose. We have a better vision in mind for Thornburg. See Brian Mercer proposal for Thornburg.

Thank you,
Stevie Larson
President, Matta River Woods Lot Owners Association
stevielarson@aol.com
540-538-6358

Sent from my Verizon, Samsung Galaxy smartphone

--
This email was Malware checked by UTM 9. http://www.sophos.com

Revised SARNAM (Crucible)

Sent: August 20, 2018 8:10 PM

From: Stephan Picard

To: Leon Hughes; Wanda Parrish;

CC: Wayne Breakfield; Bill Blevins; Michael Galati; Mark Brinkman;

1 Attachments

revised Crucible SARNAM.pptx (1 MB);

Sir,
Please find attached a revised SARNAM for the new Crucible Proposal. As .338 Lapua (new sniper round) is not a currently supported bullet for the SARNAM, we had to just eliminate it. This SARNAM then uses the remaining ammunition types such as 7.62mm, 5.56mm, 9mm and .300 WINMAG.

You can see the contours without the .50 CAL has indeed reduced BUT it is still significant and there are still a hundred homes or so inside the 87 decibel line and some including businesses along Rte 1 are inside the 104 decibel line.

Our position stands. Using the counties accepted model, this range is not acceptable for noise.

We would be happy to come sit side by side and run the model if you would like to see how it works and verify the data. I did have my work checked by another person for accuracy

Thanks!
Stephan

--
This email was Malware checked by UTM 9. http://www.sophos.com

Revised SARNAM based upon the revised Crucible Proposal

Revised SARNAM Model without .50Cal --- Model does not have .338 Lapua* (which is much louder than this model unless suppressed.)

*Note – For surface Danger Zone, .338 max range is only 50 yards less than .50 Cal (NRA)

SARNAM - Activity

Activity Overview | Assign Activity Details

New | Copy | Edit | Cancel | Save | Help

Delete | Activity Overview | Exit

Activity Name: CRUCIBLE WITHOUT 50 CAL

Range Name: ALPHA

Weapon for Range: MG M2 .50 cal / M2 710 gr — Find

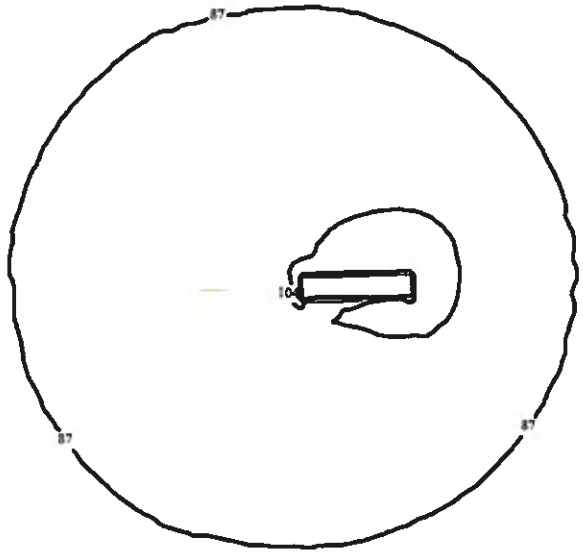
Day Rounds: 0 — % Day Rapid Fire: 10 %

Night Rounds: 0 — % Night Rapid Fire: 10 %

Comment (optional):

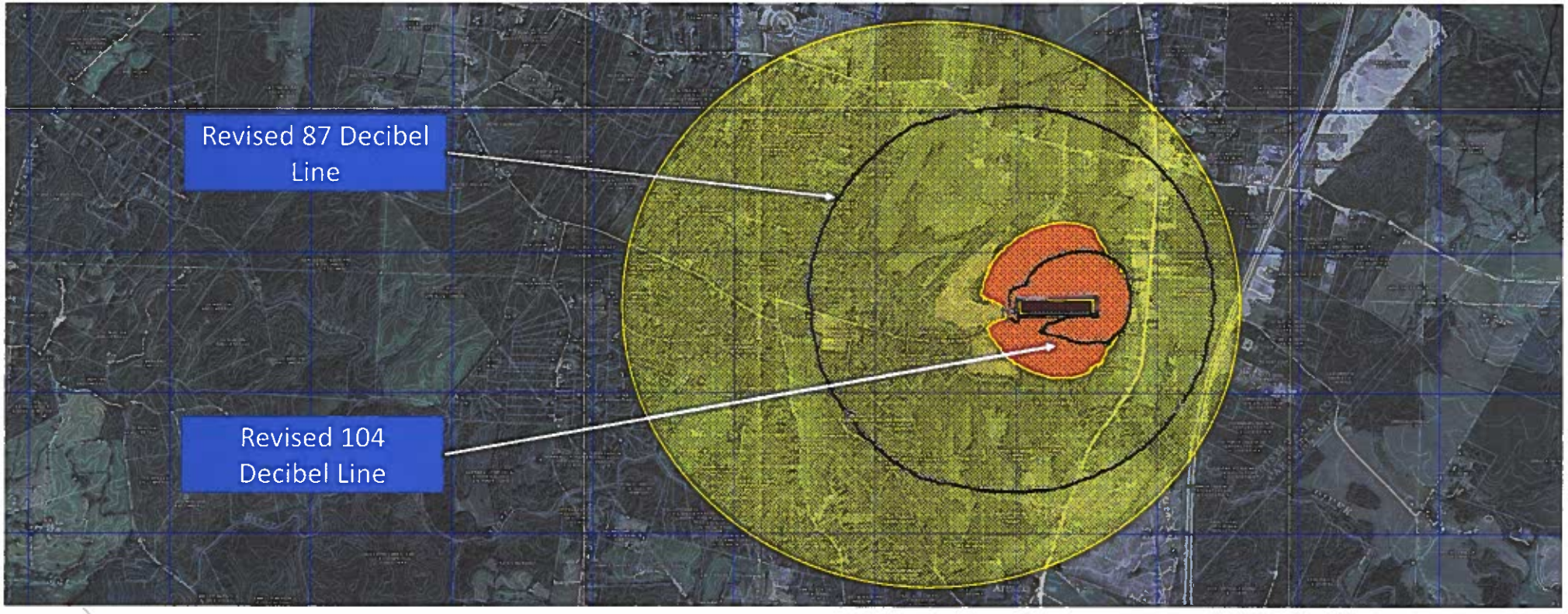
Act. Detail Date (opt.): — Created: 20 Aug 2018 — Last Modified: 20 Aug 2018

Range Name	Weapon Name	# Day Rounds	# Night Rounds	% I Rap
ALPHA	MG M2 .50 cal / M2 710 gr	0	0	
ALPHA	MG M60 7.62 mm / M80 147 gr	1000	100	
ALPHA	Pistol M9 9mm / 115 gr	10000	2000	
ALPHA	Rifle .223 Rem. AL / 55 gr	5000	500	
ALPHA	Rifle .300 Win Mag / 200 gr	200	20	



Inside the 104 decibel circle it is inhabitable, At the 87 decibel line is where noise complaints occur frequently. Inside of the 87 decibel line to the 104 decibel line the sound increases as you get closer

Revised Small Arms Range Noise Assessment Model (SARNAM) Team Crucible Training Complex
Small Arms (7.62mm, 5.56mm, 9mm, .300 WINMAG) weapons
(Yellow and orange are previous model for reference)



Ref: https://www.serdp-estcp.org/Program-Areas/Weapons-Systems-and-Platforms/Noise-and-Emissions/Noise/WP-200006/SARNAM-Noise-Impact-Software

Leon Hughes

From: Stephan Picard <sjpicard@gmail.com>
Sent: Tuesday, August 21, 2018 7:03 PM
To: Wayne Breakfield; Leon Hughes
Cc: Wanda Parrish; Bill Blevins; Michael Galati; Mark Brinkman; Peter Larson; stevielarson
Subject: Re: Revised SARNAM (Crucible)

Thank you Wayne!
Sir,
I would like to make sure that the county prepares for and funds the ammunition inspection team if this is approved. (a bit of a joke but it must be considered). As requested they want no noise level limitations but promise certain caliber ammunition. What is the counties enforcement mechanism for ammunition types? If there is none, perhaps that proffer is fairly worthless in effect. I believe this is worth noting as there is no mechanism in place to enforce if they want to shoot .50 caliber once approved or artillery. The zoning request provides no noise limit. What's the probable cause to call the sheriff?

In response to your question on buffers/baffles and vegetation etc. The answer is yes and no.

This SARNAM is only one firing point on one range. The SARNAM is limited in mitigation measures you can include so we only did a single range and not the range complex. This model is the 500M range with a 20 foot berm all the way around it which the actual range doesn't have (it would be louder in reality in some areas) The planned crucible mitigation does not include any sound mitigation from point of trigger pull to target here on this range except the berm. For example firing through a sound dampening concrete culvert tube (which I have fired through) is not in the plan.

To be clear, this model does not include all the other firing points to include the pistol ranges and combat movement ranges. This is a conservative model as those other firing points even with the mitigation discussed in the resubmission would add to the sound of this single point.

Best practice does not consider vegetation as it's effect is drastically limited in January when foliage is gone.

As a side note, realize this range is due west. From the afternoon into sunset it will be very unsafe as the shooter will have the sun directly in their eyes. This is a huge no no in range design for any civilian and defense range.

Sir may I recommend the county ask the Army Corps of engineers to run the model if at all in doubt? They are very very helpful and I would be happy to put you in touch. We have worked with them on this.

One last observation. All of us knew the day Crucible did their sound analysis. It was loud as heck. A real racket. We all knew the weapons fire came from there and it was very very loud.

At your service Sir.

Stephan Picard

On Tue, Aug 21, 2018, 6:19 PM Wayne Breakfield <breakfieldteam@gmail.com> wrote:
Leon & Stephan,

I have been looking to find specific information on the noise level of the .338 lapua. I have not been able to find hard numbers but the anecdotal comments indicate it is very close to the .50 caliber round in noise. I think an interpolation 80% of the way between the .300 WINMAG and the .50 caliber would be a very close estimate. There is one other thing I would like to point out about the Crucible's sound assessment. It is based on an AR-10 (.223) and the AK-47 (7.62 by 39). Both of these rounds are on the quiet side of what they intend to shoot. If they say this is how noisy they will be, then they shouldn't fire anything louder than an AR-10 (.223 caliber). They offer a machine gun course that fires the M-240, a belt-fed, medium machine gun. It would be interesting to see what their model would show if the .338 Lapua were put it into it. I am sure many more homes would be inside the 70 isopleth curve.
Wayne

On Tue, Aug 21, 2018 at 3:45 PM, Leon Hughes <LHughes@spotsylvania.va.us> wrote:

Mr. Picard,

You note this is for the new Crucible proposal; does this analysis consider the interior ballistic walls, berms around the shooting stations , perimeter berms, landscape screening and the buildings proposed in phase II ?

From: Stephan Picard [mailto:sjpicard@gmail.com]
Sent: Monday, August 20, 2018 8:10 PM
To: Leon Hughes; Wanda Parrish
Cc: Wayne Breakfield; Bill Blevins; Michael Galati; Mark Brinkman
Subject: Revised SARNAM (Crucible)

Sir,

Please find attached a revised SARNAM for the new Crucible Proposal. As .338 Lapua (new sniper round) is not a currently supported bullet for the SARNAM, we had to just eliminate it. This SARNAM then uses the remaining ammunition types such as 7.62mm, 5.56mm, 9mm and .300 WINMAG.

You can see the contours without the .50 CAL has indeed reduced BUT it is still significant and there are still a hundred homes or so inside the 87 decibel line and some including businesses along Rte 1 are inside the 104 decibel line.

Our position stands. Using the counties accepted model, this range is not acceptable for noise.

We would be happy to come sit side by side and run the model if you would like to see how it works and verify the data. I did have my work checked by another person for accuracy

Hello, Lisa Bowling,
Thank you so much for your letter of clarification. I am an alumnus of Mary Washington's class of 1968. Yes, we just had our 50th reunion this June and 80+ classmates showed up from around the country for our celebration. Many of us were in the biology/chemistry field and were introduced to environmental activism in the '60's. How we would have enjoyed Eagle Lake Outpost. Perhaps we can plan a field trip there for a future reunion.
I taught life/environmental science for Fredericksburg City Schools for 25 years, and a Regional Governor's School Wetlands program for about 20 years. I also taught a graduate class for about 7 years for Mary Washington's James Monroe Center for science career switchers earning a Masters in Education to move into teaching. Our environment is a subject of passion for me. My husband and I live on 10 deeply wooded acres on the Matta River in Spotsylvania. The fact that Crucible has proposed rezoning land near our neighborhood for 6 military-style training ranges is objectional for reasons of safety, noise pollution, property devaluation and threats to our environment here on the Matta, which is a part of the Chesapeake Bay Watershed. I was aghast to read that my college was supporting this project and was so very relieved by your clarification that UMW has no official position on Crucible's plans for rezoning land in Thornburg.
Thank you for your research and inquiry into this situation and your diligent and quick response to us.
Best wishes and keep cool this weekend,
Stevie Larson

Sent from my Verizon, Samsung Galaxy smartphone

null
——— Original message ———
From: "Lisa Bowling (lbowling)" <lbowling@umw.edu>
Date: 8/29/18 12:12 PM (GMT-05:00)
To: Michael Galati <mgalati07@gmail.com>
Cc: Bill Blevins <bill@plantsmap.com>, stevielarson <stevielarson@aol.com>
Subject: RE: Crucible Corp.

Hello, Mr. Galati, Mr. Blevins, and Ms. Larson.

Good morning, all. I hope this finds you someplace safe from this heat wave we are experiencing. After I received the email from Mr. Galati, I began looking into this situation and rather than ask you to wait for a meeting, perhaps I can bring clarification to the conversation now.

Your communication was surprising because UMW would not normally take a position on zoning when it doesn't have a direct financial or educational interest in that space. In inquiring further, I learned that Ms. Hill was a graduate assistant and had a role working with one of our Stafford-based summer programs for UMW students. Her email represents her personal experience, but it should not be construed as endorsement by UMW.

Crucible has been a good neighbor in Stafford, and the University is appreciative of its efforts to accommodate our students and needs. The company has been responsive to and respectful of our educational mission. That

said, UMW has no official position on its Spotsylvania County plans.

I hope you can find a positive resolution for all involved in the Thornburg discussion.

My best,

Lisa Bowling

From: Michael Galati <mgalati07@gmail.com>
Sent: Sunday, August 26, 2018 8:14 PM
To: Lisa Bowling (lbowling) <lbowling@umw.edu>
Cc: Bill Blevins <bill@plantsmap.com>; stevielarson <stevielarson@aol.com>
Subject: Re: Crucible Corp.

Dear Ms. Bowling,

Thank you for your quick response. Sept. 6 will be fine if that works for you. Set a time that's convenient for you and we will make it work. I work on the Railroad so I won't be available in the morning but two other neighbors who have been active in our efforts out here in Thornburg are available to meet at any time that morning. Mr. Bill Blevins and Ms. Stevie Larson. I'm CC'ing them in this note.

Best Wishes

Mike Galati

On Sat, Aug 25, 2018 at 8:27 AM Lisa Bowling (lbowling) <lbowling@umw.edu> wrote:

> Dear Mr. Malati,
>
> Thank you for your email and for reaching out to discuss your concern. I will be happy to meet with you and learn more about the situation.
>
> I travel frequently in my role, so my availability varies greatly from week to week. Would you like to set a time to meet on the morning of September 6 or 11?
>
> My best,
> Lisa Bowling

Sent from my iPhone

On Aug 23, 2018, at 10:39 AM, Michael Galati <mgalati07@gmail.com> wrote:

Lisa Bowling
VP Advancement/Univ Relations
University of Mary Washington

Dear Ms. Bowling,

I am a resident of Thronburgm VA in Spotsylvania county, and one of a number of home owners and businesses who have been organizing to oppose the Crucible's company's attempt to build a military training facility here. They are asking Spotsylvania county for a zoning variance to allow them to operate with no noise restrictions from 6:00 am until 10:00 pm, seven days a week. Obviously, this proposal has met with outrage by those of us who live and work in this area.

We understand that Mary Washington University's Eagle Lake property is near the current location of Crucible's facility in Stafford county. We were however, surprised and disappointed to see that Crucible has filed a public document with Spotsylvania county officials that implies that the University supports the plans of Crucible to locate here in Thornburg, despite the objections of the area residents, who have real concerns for their family's safety and well being. We would like the opportunity to address representatives from the University about why we think this proposal for Crucible to be allowed to build and operate a military training facility in our neighborhood is bad both for those of us who live here, and for the county's future development.

We are available to sit down and talk to you or a representative of the University at your convenience. You can also go to our web sit: StopCrucible.com to see some of the information that we have put together on the dangers such a facility would pose for those of us living nearby. I'm also including the letter from a representative of the university that Crucible has submitted to the county planning board. It's is attached.

I look forward to hearing from you about setting up a time to meet and discuss this.

Sincerely,

Mike Galati
Thornburg VA
<M-W support for Crucible.docx>

Straying from Spotsylvania land use plan harms all residents

stopcrucible.com/straying-from-spotsylvania-land-use-plan-harms-all-residents

Stop Crucible

July 17, 2018

If Crucible were approved my experience tells me there will be some effect on residential property values, but my concern goes beyond the immediate impact to home values. Whether or not this proposed re-zoning has an effect on current values is not my biggest concern, although this would affect me personally.

As a local real estate agent, I completed 50 transactions last year and I am on pace to do so again this year. I sell in all counties surrounding Fredericksburg, but I live about 3/4 mile from Route 1 on Morris Rd and my family loves it here.

When the Crucible request for rezoning first came out, I did not really care one way or another what happened. However, I began to oppose it when I realized that it will be an impediment to future "quality" development with easy access to I-95.

This is something that should be important not only to Spotsylvania County residents but to all residents of the Fredericksburg area who travel south on Interstate 95.

My recommendation to both the Board of Supervisors and the Planning Commission would be to not stray from the "Land Use Alternative Plan for Thornburg, Virginia (Spring 2014)" that was presented to them, as doing so harms the county as a whole. The proposed plan aimed to keep the rural character of Thornburg but also understands that this area is a critical location for the county's future economic development to occur.

Granting Crucible's wishes could keep a more quality development from occurring in Crucible's place (meaning on that physical land). But I believe more than that, it will also give pause to future developers of contiguous land.

Will good developers of both residential and commercial property want to sink money into a high-quality development next to a mercenary training ground?

From both an economic and practical standpoint, granting this re-zoning request would prevent the highest value of land use in this part of Spotsylvania.

Robert Cooper
Spotsylvania, Virginia
July 18, 2018

Leon Hughes

From: Wanda Parrish
Sent: Wednesday, December 5, 2018 9:26 AM
To: Leon Hughes
Subject: FW: CRUCIBLE MERCENARY TRAINING CENTER

Follow Up Flag: Flag for follow up
Flag Status: Flagged

From: Koechlin, Mike [mailto:mkoechlin@hitt-gc.com]
Sent: Wednesday, December 5, 2018 8:01 AM
To: Wanda Parrish <WParrish@spotsylvania.va.us>
Subject: CRUCIBLE MERCENARY TRAINING CENTER

To Mrs. Parrish,

I would first like to state that as a longtime resident of Thornburg I am appalled at the county's total disregard for this area in the past ten years or so.
This Crucible deal is dirty from the start. Proven by bypassing all the residents and doing just the minimum to push this project through without any local debate.
This Crucible group has been deceptive and downright lied to the whole of Stafford county board and community for years!
As to its citizens they have been totally disrespectful. Now they are getting kicked out of Stafford for good reason!
They have already shown their colors by building an illegal building and draining into the river.
But the again the county again just gives them a permit?! Who got paid for this deal?

If we only had a real county planning board! Put a live high caliber outdoor range and explosive training center next to the town center(Food Lion)?? A board would never approve this for such a location.
Allow someone to blast the area from 7am until 10pm daily? Sunday Sabbath with AR .338 fire in the background. Does that sound like a community?
Not only does the county push through plans to move the Manassas speedway here.
Which I was willing to bend on for economic reasons for the area after they said that they were going to build the stands to protect us from the noise.
Well the race way was allowed to cut the trees they were supposed to leave.
Then there is the rotation of the stands. No noise protection at all!! All passing county inspections.
Now we here gear gamming up and down for hour and hours on end when it is our weekend and just want to live in peace. Worse thing is this noise can be herd indoors.

Thanks to county planners we have two dollar stores, a pawn shop, a vaping center, and a liquors store. This would never be allowed on the North end of the county!
How can I forget to mention the tremendous amount of Heroin and other drug deals that are now so..... common at the 7/11.
This and the rape at the Laundry mat took it over the top and had me instruct my family to never go there again.

I pled with you to use all of your resources to oppose this CRUCIBLE project as it is detrimental to the area and especially the town of Thornburg.

There are hundreds of appropriate locations that are better suited for this type of operation.

Respectfully, Michael Koechlin

--
This email was Malware checked by UTM 9. http://www.sophos.com

Leon Hughes

From: Ruth Nebbia <ruth.nebbia@gmail.com>
Sent: Friday, December 7, 2018 7:53 PM
To: Wanda Parrish
Cc: Leon Hughes
Subject: Stop Crucible in Thornburg

Dear Wanda Parrish,

I would like for you to carefully consider the concerns of many of the area residents who are opposed to the Crucible Military Training facility in Thornburg. I realize that there may be many people writing in favor of the facility, Radio Reconnaissance, Crucible's parent company, has been setting up tables asking residents of Spotsylvania for their support.

But I ask: How many of the direct neighbors of the proposed Crucible facility are sending support letters? From the number of signs popping up on Morris Road, Hams Ford, Rt. 1, and other roads surrounding the proposed facility, I would say few. There is a growing number of us who believe that the safety, as well as the peace and quiet we enjoy in this area, would suffer considerably if this permit is granted. We have many children in direct line of any stray bullet that may leave the facility, elderly, veterans, regular folks, and many farms with farm animals. All it takes is that first misfire to take one of those lives.

Yes, you say many of us hunt and do target practice, but none of my neighbors start at 6 am and continue until dusk, 7 days a week.

This type of facility belongs in a bigger piece of land away from so many homes and businesses. So I would urge you vote against the proposal and in favor of the residents of the area.

Thank you,

Ruth Nebbia
6011 Red Fox Drive

--
This email was Malware checked by UTM 9. http://www.sophos.com

COMMENTARY: Crucible is the wrong business for Thornburg

stopcrucible.com/commentary-crucible-is-the-wrong-business-for-thornburg

Stop Crucible September 19, 2018

The Spotsylvania County Board of Supervisors should deny the Crucible's rezoning request. This type of facility in the proposed location is not in the best interests of Spotsylvania County, and certainly not in the best interests of the residents of the Berkeley District.

Regardless of whether the county supervisors want to preserve the rural nature of the county or seek commercial/industrial development, the Crucible is the wrong type of business for Thornburg due to safety, noise, and economic concerns.

Safety is a legitimate concern of the nearby residents, regardless of The Free Lance-Star's assertion to the contrary ("Crucible tests Spotsy's vision for the future," Sept. 12, 2018). Bullets are controlled by the laws of physics, not by county, state or even federal safety zone requirements.

From the proposed 500-yard range, an aiming error of only one degree in elevation will enable a bullet to clear the 20-foot berm and potentially travel almost three miles! With homes a mere mile away, the consequences of missing the 20-foot berm are potentially catastrophic.

Furthermore, the noise will be a lot more than "uncomfortable." The sound study submitted by the Crucible significantly understated the noise impact on the surrounding area.

First, the sound study was based on single shots from 7.62 mm weapons. These rifles are considerably quieter than simultaneous firings of multiple weapons, machine guns, and the .338 Lapua that they plan to fire.

Secondly, the noise generated can be aggravating from as early as 6 a.m. until 10 p.m. in the summer and 6 a.m. to 8:30 p.m. in December, not only during daylight hours as the FLS asserted. Although the management has stated they will not commence firings before 8 a.m., the rezoning would allow noise from 6 a.m.

Once approved, there is no legal recourse for the residents of the county if the Crucible decides it no longer wishes to voluntarily restrict its firing hours.

Finally, the Board of Supervisors should consider the financial impact of allowing the rezoning due to the possibility of decreased property values, litigation, and loss of other commercial development.

Multiple articles have been written about property devaluation when a new sports firing range opens nearby, let alone a military-type facility. For an example of how a firing range can impact property values see: http://www.bridgton.com/waterford-gun-club-noise-hurts-property-values-county-rules/.

Spotsylvania County could lose thousands in tax revenue as residents lose tens of thousands in property value.

There is also the possibility of litigation should the county allow the rezoning. Stafford County (the location of the Crucible's current facility) has been involved in multiple litigations with the Crucible since 2005, eventually reaching the Virginia Supreme Court.

Stafford County prevailed at the Supreme Court, but at what financial cost?

Because of the actions by residents and the county government, the Crucible gave up on their plans to build a new facility in Stafford County. They now want to build that facility here.

Do we want the Crucible conducting those same activities here in Spotsylvania County? Does our county want a repeat of Stafford's experience?

Another financial consequence of allowing the Crucible's rezoning request is that other, advantageous businesses may not consider the Thornburg area due to the presence of the Crucible. Very few entrepreneurs will find a noisy neighbor such as this desirable for establishing a new business.

There are less dangerous, intrusive, and controversial industries and commercial businesses that could develop this land and be compatible with the rural nature of Thornburg.

If the rezoning request is granted, the existing residents and businesses in Thornburg will be asked to pay an unreasonable price in increased personal danger, noise pollution, and financial loss so that a private, for-profit company can benefit.

Preserving the rural nature of Thornburg is a far more desirable outcome for the county than bringing in the wrong type of business and forever destroying the peace, quiet and well-being that Thornburg residents have sought and long enjoyed.

Wayne Breakfield, a retired U. S. Marine and long-term Spotsylvania County resident, lives in the Berkeley District.

Crucible: An unsecured compound with easy access

stopcrucible.com/crucible-an-unsecured-compound-with-easy-access

Stop Crucible

August 26, 2018

My wife and I put our house on the market in 2007. We got a contract on it within a couple of months. Everything was fine until I got a call from the buyer. He asked about the Crucible. This was the first that we had heard about it. The buyer backed out of the sale and we eventually had to take it off of the market.

I went to the existing facility on Jack Ellington Rd. What I found was an unsecured compound with easy access.

I worked at the Lowe's on Rt. 17 just a few miles from there. I talked to several of their neighbors that were not happy with the facility. After a day of "school", the students would speed out of there so fast that the residents were fearful for their children's safety.

Mike Stakem
Stafford, Virginia

Crucible would be detrimental to Spotsylvania

stopcrucible.com/crucible-would-be-detrimental-to-spotsylvania

Stop Crucible

November 3, 2017



While I was happy to see your paper [The Free Lance–Star] devote some space to the story regarding the request by Team Crucible for a zoning variance to build a military training facility in Thornburg, I was disappointed that many of the facts regarding what type of facility Crucible wants to have out here were omitted.

Crucible has submitted a proposal to the Spotsylvania County Planning Department to build six outdoor rifle ranges that could accommodate up to .50-caliber rifles (which can fire bullets up to 4 miles), and a simulated urban neighborhood for house-to-house live fire training—including the use of grenades and an auto track that would allow training in avoidance of explosive charges—that it has said it would use dynamite to simulate.

Team Crucible is asking for a zoning variance that would allow it to operate this facility free of any noise restrictions from 6 a.m. until 10 p.m., seven days a week.

This is why Crucible's zoning proposal has been met with such overwhelming opposition from the hundreds of households and small businesses that would be affected by it here in Thornburg.

We are asking all people of good will to help us in this fight to defend our families, our neighbors, and our homes. We are calling on the Board of Supervisors to reject Crucible's request for a zoning variance. And lastly, we are still waiting for the editors of the Free Lance-Star to raise their voices in helping us to protect our neighborhood.

Mike Galati
Spotsylvania, Virginia
Nov 4, 2017

NOTE: Mike Galati's letter was published in The Free** Lance–Star **on November 4,** 2017 **was also sent in to be cross-posted on StopCrucible.com. Click here to read the letter on Fredericksburg.com.

LETTER: Crucible could be disaster for Spotsylvania

stopcrucible.com/letter-crucible-could-be-a-disaster-for-spotsylvania

Stop Crucible

October 2, 2018



I have talked with a lot of people in Spotsylvania, I find the ones not concerned about our laid back country ways think we are not informed about our area. They just do not understand our way of life. Many of us farm and raise a lot of our own food and we don't want industrial growth that would endanger our farms.

Crucible trains people from all over the world. They also talk about the contracts they have with our government, but if that's true, why not ask the government for space to do their training at AP Hill, where it will not cause any problems.

Stafford County has decided to stop Crucible from expanding there after the residents got tired of these people telling them one thing but doing another.

I checked their property here in Spotsylvania, they have built 2 buildings with no permits, violated the Chesapeake Bay Act on the property by disturbing 40 plus acres without any erosion control or silt fences.

They have little support among the people who live in this area, and I wonder how much lead will be left in the ground by their training, or have they come up with a way to recover it? This alone could end up a disaster, with an enormous cost to clean up as well as the residue that could never be safe to live or work around.

Marion Marshall
Thornburg, VA

LETTER: Crucible doesn't belong in such close proximity to houses

stopcrucible.com/letter-crucible-doesnt-belong-in-such-close-proximity-to-houses

Stop Crucible

September 24, 2018

Crucible is a unique business. It is an extremely noisy business. It does not belong in close proximity to the amount of residential neighborhoods it will affect.

People shoot guns around here on a fairly regular basis. One guy down the road shoots off a really loud gun. The thing is, he quits shooting after an hour or so. It's not something I have to listen to all day every day.

I have no problem with industry coming to the Thornburg area (as long as it's not another used car lot) but I'd rather have the used car lot than the noise that will be generated by Crucible.

I have nothing against what Crucible does, I just don't believe it belongs in such close proximity to houses.

Karen C. Bohn
Spotsylvania, VA

Letter: Crucible plan creates very real safety, noise, and financial concerns

stopcrucible.com/crucible-plan-creates-very-real-safety-noise-and-financial-concerns

Stop Crucible

September 14, 2018

The editors of the Free Lance–Star minimized residents' legitimate concerns regarding the Crucible's request to operate a military-style training facility near Thornburg because they feel the main issue is whether or not Spotsylvania County should convert more of its farmland to commercial and industrial uses. The existing residents near Thornburg have spoken quite loudly that they do not want the Crucible operating in the county because of very real safety, noise, and financial concerns.

Saying that unease about stray bullets is unconvincing because there have been no recorded incidents in Stafford over a 16-year period ignores the laws of physics. At 500 yards, an aiming error of 1 degree in elevation will clear the Crucible's proposed 20-foot berm not to mention the risk of ricochets. The maximum range of some of the weapons they propose to fire is nearly 7,000 yards (almost 4 miles). There is a neighborhood within one-half mile of the Crucible's range.

The noise created by the Crucible will not just make some residents uncomfortable; it will produce sound levels on surrounding properties that will be aggravating from as early as 6:00 AM until 10:00 PM. They have stated that they will cease firing operations 2 hours after the end of nautical twilight (8:30 PM in December) not limit operations to daylight hours. The sound study submitted by the Crucible failed to use the County's accepted Small Arms Range Noise Assessment Model for evaluating sound and only used smaller caliber weapons in the analysis.

There are many other reasons that the Board of Supervisors should reject the Crucible's rezoning request, but space constraints [of the Free Lance–Star letter policy] prevent further elaboration in this letter.

Wayne Breakfield
Spotsylvania, VA

LETTER: Crucible, you are not welcomed in Spotsylvania

stopcrucible.com/letter-crucible-you-are-not-welcomed-in-spotsylvania

Stop Crucible

October 2, 2018

Do you believe that Crucible is the future for Thornburg? The Free Lance-Star wrote recently that some residents may be uncomfortable with the noise and that some residential property values may be affected. Of course, our property values will be affected!

The growth of Thornburg will be ruined if Crucible is allowed to come here because other businesses will go elsewhere. Yes, I do like the rural farmland and I also know changes are heading our way, so Thornburg's vision should be to keep Crucible out.

Crucible doesn't care about the neighbors. The people [in Spotsylvania] have the right to know how this came about.

Crucible should have applied for a rezoning with the public knowing what they wanted to do before buying the land. Instead, they bought the land and then sent letters to residents with in 2000 feet of the property telling us their plans for the site.

Little did they know we going to stand up against them and stop them from coming.

So again, Thornburg's vision is clear: Crucible, you are not welcomed here.

Paul Benson
Woodford, VA

LETTER: If shooting stresses K-9 police dogs, what about kids?

stopcrucible.com/letter-if-shooting-stresses-k-9-police-dogs-what-about-kids

Stop Crucible October 2, 2018



Columbia, South Carolina, Master Police Officer David Hurt is seen with his police dog Turbo in an undated photo. Turbo died after being left in a hot car for 6 hours / Columbia Police Department Handout

I'm writing to let people know my opinions and I am sure contacting people in Spotsylvania who make decisions. I was at the Salem Church Library meeting [about Crucible] and have the same concerns as others on this site regarding decreasing home values, stray bullets, etc.

However, my focus was on the effect on the nearby schools. The man at the meeting representing Crucible claimed there have been no reported problems at another Crucible site near a school.

I ask you to read: Police dog dies after being left in hot car for more than 6 hours

> "Hurt was at a high school getting active shooter training on July 26, and did not take the dog inside because of the loud noises and crowd."

This story was national news a few weeks ago. The article says how this office, as well as other police dog handlers who were at the firing range, left their dogs in the car that day and this is the regular practice to do so.

The reason officers left their dogs in the cars was because of the shooting stressing their dogs out. These are dogs stressed by repeated firing.

Think of those 5 and 6-year-old's at school every day until they are 13 or 14-years-old when they leave the middle school and go to the high school.

This is just another an indicator to me the Crucible should not be located where it is currently proposed near two schools in Spotsylvania County.

Richard Lee
Spotsylvania, VA

Letter: It's either no Crucible or a new Board of Supervisors

stopcrucible.com/letter-no-crucible-or-new-board-of-supervisors

Stop Crucible

July 27, 2018

To the editors,

It's very simple! The Crucible comes then the current crop of supervisors must go.

Joseph Cagnina
Spotsylvania, Virginia

LETTER: Spotsylvania residents are tired of politicians going behind our backs

stopcrucible.com/letter-spotsylvania-residents-are-tired-of-politicians-going-behind-our-backs

Stop Crucible

September 17, 2018

To The Editor [of The Free Lance–Star]:

Your recent editorial concerning Crucible was disappointing on a number of accounts.

You claim that Crucible has been a good neighbor in Stafford for 16 years. Your source for this information is the company's attorney. But you didn't bother to go out and interview some of Crucible's Stafford neighbors and let them speak for themselves.

If you had gone back and looked at the record of your own paper's coverage of Crucible's time in Stafford, you would see a very different picture.

You claim that the question behind the controversy over Crucible is whether the county will encourage commercial and industrial development or not. No one denies the need for development, the question is: how are these decisions made.

In the case of Crucible: while county officials worked with Crucible for almost a year to bring them to Thornburg, they never once raised this with any of us who live and work here. They sought neither our opinion nor our input.

Crucible began construction on the property without having a building permit and continues building to this day, even though the county has not yet voted to grant them the special use permit.

Working people in Spotsylvania are tired of politicians and companies going behind our backs on these questions. We're tired of it in Thornburg and it seems they are also tired of it in Fawn Lake.

People in Thornburg have many ideas on how to develop our area, but for most they don't include having a for-profit Military training facility with 6 outdoor rifle ranges, an urban warfare training zone that uses simulated IED's and grenade launchers, setting up shop right on Rt. 1. Nor do they include going behind the backs of those who will be most directly affected by these proposals.

Michael Galati
Spotsylvania, Virginia

LETTER: This is our Vision for Thornburg's Future

stopcrucible.com/letter-this-is-our-vision-for-thornburgs-future

Stop Crucible September 16, 2018

Re: "Crucible Tests Spotsy's vision for the future" to the Free Lance–Star editorial published 9/12/18

It is not a question of "not allowing any new development" but what type of development to attract. Thornburg does not need more used car lots, vape parlors, pawn shops or a military-style training facility to anchor its future development.

Review Brian Mercer's "Land Use Alternative Plan for Thornburg, Va" 2014 to envision Thornburg as an attractive center of commerce and family-friendly space.

What about a much needed medical complex including office space and a pharmacy? How about open space for a farmer's market, picnic tables, and outdoor events? (think Hurkamp Park in Fredericksburg or Spotsy's Courthouse center).

This is our Vision for Thornburg's Future, not a military-style training range which would only discourage the aforementioned development and discourage residential confidence and entrepreneurial positivity.

The rezoning of Crucible's property directly goes against the county's adopted Comprehensive Plan goal to develop "activity within the County and promote, preserve and protect the health, safety, and general welfare of its citizens".

This plan has been adopted by County Supervisors. These Supervisors need to listen to their constituent's concerns, follow the County's Comprehensive Plan and have our backs in this contest for the Berkeley District's visions for future development.

Stevie and Peter Larson
Matta River Woods
Berkeley District, Spotsylvania, VA

Nothing's Patriotic in Training Private Security Companies

stopcrucible.com/nothings-patriotic-in-training-private-security-companies

Stop Crucible July 24, 2018



To the editors,

There is nothing patriotic about supporting a private for-profit company that trains security personnel for private companies.

I find it disrespectful to my neighbors, many who have served in the US military and also oppose Crucible's relocation to Thornburg, to suggest my neighbors are not patriots.

According to their website: Crucible provides high-risk environment training and global security solutions to employees of the U.S. Government, NGOs, and multinational corporations who live and work in dangerous and austere locations worldwide.

They don't state they train the US military, that's what the Army and our other United States armed forces do.

They train security personnel to make money, not out of patriotic duty.

In "Crucible Spotsylvania Acoustical Assesment" they say that they will limit their hours. Yet they are explicitly stating on p. 5 of the application: "Consequently, Crucible's new facility and business operations at their Spotsylvania site will be exempt from the County Noise Ordinance between 6:00 AM and 10:00 PM to the extent noted above."

Once a permit is granted that means Crucible would be able to change their hours of operation whenever they want.

The land proposed for the relocation is surrounded by residences, farms and other businesses which will be down range of the shooting ranges and next door to the urban warfare training facility.

I am opposed to building this facility in Spotsylvania, so close to residences, farms, schools, and businesses.

Ruth Nebbia
Spotsylvania, Virginia

Open letter to Spotsylvania residents opposing Crucible

stopcrucible.com/open-letter-to-spotsylvania-residents-opposing-crucible

Stop Crucible

October 2, 2018

Dear Neighbor,

Recently Team-Crucible, a private military training outfit currently located in Stafford, requested that the Spotsylvania County supervisors rezone a 70-acre parcel behind D'Marie's, off Rt. 1 in Thornburg, to allow them to build and operate a private military training center on the property.

If approved the plan would eventually include 6 outdoor shooting ranges, a simulated urban warfare area, a track to train vehicles using simulated improvised explosive devices (IED's), as well as other facilities.

The live fire training could include high caliber military assault rifles, grenade launchers, machine guns, and perhaps other heavy caliber weapons. The rezoning would allow them to operate from 6:00 am until 10:00 pm, seven days a week, without any noise restrictions at all.

A .50 caliber bullet can carry up to 4 miles. There are over 800 houses that would be affected by the noise and 280 within the surface danger zone of this proposed facility, presenting a real danger to our families, friends, pets and farm animals. And the noise levels would disrupt outdoor activities and drive down property values.

No government military facility like this would be permitted to operate on such a small parcel and with so many homes and businesses nearby.

We are a group of neighbors and business owners who believe this type of facility has no place in Thornburg. We are outraged that certain county officials worked with Crucible for over a year before any word of this project was communicated to us. And we are alarmed that Crucible has already constructed buildings and cleared land for a project that the county supervisors have yet to formally vote to approve.

We are asking for your support in our efforts. Please use this link to submit a letter that we can post on the StopCrucible.com website calling on the Spotsylvania supervisors to deny the rezoning request and for Crucible to not build such a facility here. Consider sharing this post on your Facebook page and letting your neighbors and friends know about this post.

Together we can stop this facility from being built.

StopCrucible.com Neighbors
Spotsylvania, VA

Stafford taxpayers have spent a small fortune fighting Crucible

stopcrucible.com/stafford-taxpayers-have-spent-a-small-fortune-fighting-crucible

Stop Crucible July 27, 2018

Over the years, Crucible has become very familiar with the inside of Stafford's Courthouse and Stafford taxpayers have no doubt footed hundreds of thousands of dollars in legal bills as a result of Crucible. You can also bet that the Stafford Board of Supervisors and Zoning Department have spent countless hours discussing Crucible too, taking time away from other more important work.

It would be interesting to know the dollars and time Stafford County has spent fighting Crucible.

By our count, Stafford was involved in some way in at least seven cases involving Crucible, mostly as a defendant. One case listed below ended up in the Virginia Supreme Court and at least one case where Stafford is being sued is apparently still ongoing and potentially headed for an appeal as we speak.

Our point isn't to get into detail about the cases but only to pose the question to the Spotsylvania Board of Supervisors to see if they are really up for the challenge of not repeating Stafford County's mistakes.

Not being sued by Crucible would be good for the county legal expense budget that ultimately would fall on all taxpayers in Spotsylvania to pay.

STAFFORD COUNTY CIRCUIT COURT

Case Number: CL05000481-00
Date Filed: 09/28/05
Plaintiff: CRUCIBLE, INC.
Defendant: BOARD OF ZONING APPEALS OF STAFFORD

Case Number: CL05000482-00
Date Filed: 09/28/05
Plaintiff: CRUCIBLE, INC.
Defendant: BOARD OF ZONING APPEALS OF STAFFORD

Case Number: CH05000508-00
Date Filed: 09/22/05
Plaintiff: CRUCIBLE INC
Defendant 1: BOARD OF SUPERVISORS OF STAFFORD COUNTY
Defendant 2: STAFFORD COUNTY VIRGINIA

Case Number: CL07001037-00
Date Filed: 09/07/07
Plaintiff: CRUCIBLE INC.
Defendant 1: BOARD OF SUPERVISORS OF STAFFORD COUNTY
Defendant 2: STAFFORD COUNTY VIRGINIA

Case Number: CL07001139-00
Date Filed: 10/04/07
Plaintiff: CRUCIBLE INC
Defendant 1: BOARD OF SUPERVISORS OF STAFFORD COUNTY
Defendant 2: STAFFORD COUNTY VIRGINIA

Case Number: CL08000060-00
Date Filed: 01/17/08
Plaintiff: CRUCIBLE INC.
Defendant 1: BOARD OF SUPERVISORS OF STAFFORD COUNTY
Defendant 2: STAFFORD COUNTY VIRGINIA

Case Number: CL14001244-00

Date Filed: 10/23/14
Plaintiff: WESTLAKE DEVELOPMENT, LLC
Defendant 1: BOARD OF SUPERVISORS OF STAFFORD COUNTY
Defendant 2: CRUCIBLE PROPERTIES II, LLC

We didn't list cases involving Crucible if they were not suing Stafford or getting sued by Stafford.

You can read more about all of the cases here:

http://ewsocis1.courts.state.va.us/CJISWeb/circuit.jsp

Re: LOUD noise Alert - Fort A P Hill

Sent: November 19, 2018 2:16 PM

From: Stephan Picard

To: Leon Hughes;

CC: Wanda Parrish;

Thank you for asking! Let me poll the group. I think for sure but want to ask them as I am but one person.

On Mon, Nov 19, 2018, 2:09 PM Leon Hughes <LHughes@spotsylvania.va.us wrote:

> Mr. Picard,
>
> Thanks for your email. It has been awhile since we have corresponded and I believe in our last email exchange we were looking for time for you and a few others to come by and review the materials of the case. Is this you are still interested in doing?
>
> **From:** Stephan Picard [mailto:sjpicard@gmail.com]
> **Sent:** Monday, November 19, 2018 1:40 PM
> **To:** Leon Hughes
> **Cc:** Aimee Mann; Peter Larson; Michael Galati; Wanda Parrish; Wendy Picard; Bill Blevins
> **Subject:** Fwd: LOUD noise Alert - Fort A P Hill
>
> Good Morning Mr. Hughes,
>
> I hope this email finds you well. I received this alert this morning (see below) and due to the nature of the Crucible operation I could not help wondering..... If AP Hill can be heard from my home (it is 15 miles away) during low cloud cover, was the Crucible noise analysis (submitted by Crucible) done during low cloud cover? I cannot imagine what the noise from the Crucible ranges would be like on a day like today. If we can hear AP Hill, I just cannot imagine what it would sound like in Taverneer or at Dollar General / Food Lion / Elliot's Auto or at my subdivision of Plantation Estates at Matta River. I thought I would pass this on as I know your team is doing their due diligence on the issue and certainly it provides food for thought. I think that is why the SARNAM is so valuable as it takes that type thing into account within the millions of data points.
>
> I know I am repeating myself, but for the sake of the BOS CC'd - 100% of the residents of my subdivision do not support this development.
>
> Stephan Picard
>
> HOA President, Plantation Estates at Matta River

---------- Forwarded message ---------
From: **Spotsy Alert** <noreply@everbridge.net>
Date: Mon, Nov 19, 2018 at 11:48 AM
Subject: LOUD noise Alert - Fort A P Hill
To: wlpicard@gmail.com <wlpicard@gmail.com>

This is an important message from Spotsy ALERT:

U.S. Army Garrison Fort A.P. Hill is issuing a Noise Alert for ordinance demolitions. Residents may experience increased noise as result of ordnance demolition November 19 & 20 , 2018, until 4 p.m.. Low cloud cover may cause higher noise and vibrations. For concerns, call the Public Affairs Office at (804) 633-8120 during regular business hours.

If you would like to edit the way you receive these messages, please LOGIN to your account to manage your information

Fwd: Zoning variance application

Sent: December 5, 2018 5:29 PM

From: Wanda Parrish

To: Leon Hughes;

Sent from my iPhone

Begin forwarded message:

From: stevielarson <stevielarson@aol.com>
Date: December 5, 2018 at 5:15:16 PM EST
To: Wanda Parrish <WParrish@spotsylvania.va.us>
Subject: Fwd: Zoning variance application

Sent from my Verizon, Samsung Galaxy smartphone

Sent from my Verizon, Samsung Galaxy smartphone

Dear Wanda Parrish,
We have lived in Matta River Woods for 20 years. We moved here to enjoy a peaceful life in the woods alongside the Matta River. Our property is in Crucible's range for noise, safety, environmental concerns and property depreciation. We want to protect our children, grandchildren, pets and property from this objectionable training facility operating here. We have a vision for the development of Thornburg which includes businesses such as pharmacies and physicians' offices, new school sites (high school needed) and open green spaces. Brian Mercer's plan for the development of Thornburg (intern master's thesis) shows how this might be accomplished Much community support for our position has been demonstrated by informative meetings, petition signatures, local voting demonstrations, signs on properties and letters published. We need your support now to oppose the Crucible's military training facility being located in Thornburg. Don't let what happened in Stafford be repeated here. Forewarned is forearmed.

Sincerely,
Stevie and Peter Larson
5808 Red Fox Drive
Spotsylvania, Va. 22551
540-538-6358

(Stevie Larson is the President of Matta River Woods Lot Owners Association)

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This email was Malware checked by UTM 9. http://www.sophos.com

Mr. Koechlin,
On behalf of Mrs. Parrish and myself, thank you for your thoughts and participation in the process. The Crucible applications have not been set for a public hearing to date and thus have not received any approval to operate in Spotsylvania County. Staff is currently reviewing Crucible's responses to comments on their proffer document and narrative. I have been in contact with a citizen group from Thornburg for many months hearing concerns and reviewing information provided by the group. I will add your message to our citizen comment file to be presented t the Planning Commission and Board members when they receive their packet of information on the case. If you ha additional questions, please do not hesitate to contact me.

With Regards

From: Koechlin, Mike [mailto:mkoechlin@hitt-gc.com]
Sent: Wednesday, December 05, 2018 8:03 AM
To: Leon Hughes
Subject: STOP CRUCIBLE MERCENARY TRAINING CENTER

Subject: STOP CRUCIBLE MERCENARY TRAINING CENTER

To Mr. Hughes,

I would first like to state that as a longtime resident of Thornburg I am appalled at the county's total disregard for th area in the past ten years or so.
This Crucible deal is dirty from the start. Proven by bypassing all the residents and doing just the minimum to push this project through without any local debate.
This Crucible group has been deceptive and downright lied to the whole of Stafford county board and community f years!
As to its citizens they have been totally disrespectful. Now they are getting kicked out of Stafford for good reason!
They have already shown their colors by building an illegal building and draining into the river.
But the again the county again just gives them a permit?! Who got paid for this deal?

If we only had a real county planning board! Put a live high caliber outdoor range and explosive training center ne to the town center(Food Lion)?? A board would never approve this for such a location.
Allow someone to blast the area from 7am until 10pm daily? Sunday Sabbath with AR .338 fire in the background.
Does that sound like a community?
Not only does the county push through plans to move the Manassas speedway here.
Which I was willing to bend on for economic reasons for the area after they said that they were going to build the stands to protect us from the noise.
Well the race way was allowed to cut the trees they were supposed to leave.
Then there is the rotation of the stands. No noise protection at all!! All passing county inspections.
Now we here gear gamming up and down for hour and hours on end when it is our weekend and just want to live ir peace. Worse thing is this noise can be herd indoors.

Thanks to county planners we have two dollar stores, a pawn shop, a vaping center, and a liquors store. This would never be allowed on the North end of the county!
How can I forget to mention the tremendous amount of Heroin and other drug deals that are now so..... common a the 7/11.
This and the rape at the Laundry mat took it over the top and had me instruct my family to never go there again.

I pled with you to use all of your resources to oppose this CRUCIBLE project as it is detrimental to the area and

Respectfully, Michael Koechlin

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safety and site inconsistencies

Sent: December 6, 2018 5:05 PM

From: Stephan Picard

To: Leon Hughes; Wanda Parrish;

1 Attachments

NRA standards inconsistencies.docx (19 KB);

Sir,
Prior to our meeting next week I wanted to send to you a document that one of the individuals in our group created for your and the planning board's use.

In the Crucible Plan including their safety plan, they repeatedly state that they are not bound by range safety regulations of the federal government. This is actually not the case as they are a federal government contractor and for federal officials to use the range it has to meet federal regulations including safety.

That we imagine is not an argument that Spotsylvania County would want to get into the middle of.

BUT they do state that they follow the NRA Range Source Book. In fact the safety plan is all about this NRA reference.

The document attached then shows the specific sections of the NRA Range Source Book where our group feels the current Crucible plan does not comport. There are multiple sections from site selection, range direction (Crucible shoots due west into the sun), baffles, Berms, projectile containment, sound, surrounding real estate value considerations etc. We thought this would make an easy reference for the county team rather than simply relying on the fact that the Crucible plan comports to best practice because they assert it does.

Thank you
Stephan

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Inconsitencies compared to:

2012 National Rifle Association The Range source Book A Guide to Planning and construction

Article 2. Planning Overview

2.04.1 – Remember, do not attempt to **force a facility onto a site**. Rather, find, evaluate and select a site that will accommodate the required facility. In many cases, a parcel of land is purchased with visions of the ultimate range facility, only to find during the planning phases that the parcel is inadequate.

2.04.1.2.d.5 – Property values should also be considered, especially in areas where urban growth is aggressive. Escalating property values often make it unwise to locate in a particular area.

2.04.1.2.e – Select the site that meets of exceeds acceptable **standards for safety, sufficient space**, ease of access, **acceptable zoning**, community acceptance, construction cost, acquisition of land, and **future land values.**

2.01 Community Relations

2.07.1 To develop a successful community relations program, cultivate goodwill with neighboring residents and landowners.

Article 3. Outdoor Ranges

3.02 Site Selection

a.Size – **an area large enough to accommodate the appropriate disciplines and projectile containment as modified by existing topographical features, and/or additional range features.**

3.01.1 Projectile Containment

3.02.1.1 Projectile containment will vary in size and design based upon terrain features, range structures, and the chosen shooting activity. **Various range enhancements have proven to be significantly effective in limiting bullet containment to the confines of a specific property boundary. Techniques for limiting projectiles to range property include: backstops, sideberms and sidewalls, baffles, target placement, mountains or rolling hills, sloping floor of the range, and utilizing the range for its intended purpose**

3.02.2 Sound Transmission

3.02.2.1 No set distance eliminates noise complaints entirely. However, studies conducted for the Environmental Protection Agency (EPA) indicate noise complaints are likely when inhabited dwellings exist less than one half (2) mile from the facility

3.02.3 Range Orientation (Direction)

3.02.3.1 After all safety and other site requirements are satisfied, consider the compass orientation of the range. Within the constraints of safety and along with other site considerations, such as, terrain, **the ideal orientation is with firing conducted from south to north.** This provides the earliest and latest natural target illumination and **the least interference from natural light in the shooters' eyes**.

However, safety takes priority over convenience and the range may be oriented in any direction that provides the greatest level of safety to neighbors.

3.04 Range Layout and Considerations

3.04.6 Baffles and Other Safety Barriers

3.04.6.1 Overhead Baffles

3.04.6.1.1 Overhead baffles are used to contain the flight of bullets to a specified area within the range. These overhead baffles are useful in areas where space is limited. Baffles are also described in sections on particular shooting activities (See drawings A-11, A-12, A-13, and A-14). Other designs may be acceptable.

g. Size: Overhead baffles must extend the entire width of the firing line and connect to either a side wall or side berm.* Recommend concrete slabs be a minimum of 4 feet wide, 6 to 8 inches thick and 16 to 40 feet in length, and have a 5,500 psi rating. Lengths up to 40 feet of pre-stressed concrete will increase the effectiveness of the range design and give a larger open area without obstruction from support structures. Build wood/steel laminated panels 16 feet long and 4 feet wide. Thickness depends on laminations required for a specific range. Do not forget to design baffles taking snow and/or wind loads into consideration.

- There are times when the earthen sideberms need to be accessible, or a road runs down range parallel to the side berm, for maintenance. In this case, the overhead baffle assemblies may not extend all the way to the side berm. The proper procedure is to construct a side baffle that attaches to the baffles and runs parallel to the side berm or perpendicular to the existing baffle assembly. In this situation, **it should be designed so you cannot see blue sky from the shooting position.**

Section I Chapter 3 Planning and Design

2.03.5 Site Selection Process

One of the most important criteria to control construction cost is to **select a proper site. There must be sufficient distance behind the backstop so that sound does not affect the neighbors.** You don't want neighbors to complain. Also, **if a round or a ricochet gets out, it should fall within the range's non accessible fenced property.**

If you build in a populated area, your range should consider baffles as an option to keep rounds on site so that the range owner can demonstrate the highest level of care. Ranges are very expensive to construct...

2.05.2 Pay attention to legal restrictions, such as zoning laws. Parcels zoned incorrectly may require rezoning or an application for special exception called a variance. Evaluate whether sites with complications should be eliminated.

2.09 Permit Review

2.09.1 Generally, before any construction permits are issued, a formal site plan or drawings of the facility should be presented to the local or county permit authorities for review and approval.

3.03 Design Specifications

3.03.1 Design specifications for a shooting range must be based on factors governing the safety of: (1) personnel who use the facility; (2) property surrounding the facility; and (3) inhabitants of the immediate area. Safety also depends upon proper operating procedures and strictly enforced rules and regulations.

Section I Chapter 6 Sound Abatement on Shooting Ranges

1.02.3 Shooting ranges produce high levels of sound. Sound waves often travel beyond the boundaries of the range property. Escaping sound waves may be perceived as unwanted community noise by neighboring property owners. It is important for range owners and operators to work with the local zoning board. **Shooting ranges should be highlighted as noise parks. This designation should make the ranges visible to zoning planners and developers prior to developing neighboring properties.**

Section II Chapter 2 Outdoor Range Design Criteria

2.06 Safety Baffles

2.06.1 The term safety baffle defines a structure used to restrict bullets to a smaller area than would be possible without them. Safety baffles differ from sound baffles, which are designed to absorb or redirect sound waves, in that safety baffles are more or less impenetrable. The basic concept is based on a Ablue sky gap,≅ meaning that **baffles are set up so that the shooter, regardless of shooting position, cannot see any blue sky down range**. These fixtures may be overhead, on the ground, on top of the backstop, in the roof of a firing line cover, in the form of an elongated box or as a completely enclosed tunnel. **The principle behind the design is to equip a range with baffles so that a bullet may leave its confines, but will fall to earth within a smaller, more predictable area.**

2.06.3 Horizontal Bullet Catcher

2.06.3.1 Horizontal bullet catchers are sometimes used on backstops to contain ricochets. The horizontal bullet catcher is designed to retain only those ricochets that occur on the face of the backstop.

Section II Chapter 7 Outdoor Highpower Rifle

3.01.7.3 Baffles (Overhead, Ground and Side)

3.01.7.3.1 Overhead, ground and side baffles are barriers used to **keep errant bullets confined to a restricted area of the range property.** These devices are often made necessary due to encroachment or the building of residential areas, commercial parks and other land development inside or very near the range. Adding these barriers is often expensive, but properly installed they can reduce acreage requirements. Baffling ranges over 300 meters in length is not practical.

Section II Chapter 18 Outdoor Law Enforcement

3.01 Technical Considerations

3.01.1.2.3 Police training includes firing at multiple targets, increasing the angle at which the shooter may fire. The size of the required **direct fire zone and impact area** will vary accordingly.

3.01.3 Projectile Containment

3.01.3.1 Projectile containment for a law enforcement range must be adequate to **contain all ammunition authorized for use on the facility.** Shotguns, for example, will be fired using both small shot (7 to 9) and large shot up to 00 buck, as well as slugs. It is suggested that for a multipurpose law enforcement training range, **the longest range ammunition authorized for planned activities be the controlling factor used in site selection**. Projectile containment requirements should be calculated according to future needs. ***All projectiles must be contained within the property site by use of berms, baffles, barriers, backstops and other range features***.

Leon Hughes

From: jaruedi@aol.com
Sent: Thursday, December 6, 2018 4:03 PM
To: Leon Hughes; Wanda Parrish
Subject: Crucible project

Ms. Parrish & Mr. Hughes,

I can only feel that the construction of the Crucible training facility in Thornburg will stifle growth there. What business will want to locate next to firing ranges that will be open during normal business hours? Or near them? What subdivisions will want to build next to one? Not only on account of noise, but also safety? Twenty foot safety berms sound good, especially standing next to a mark twenty foot up a wall. But when you move out 50', 100', or 200 feet, suddenly there is not much margin for error. That twenty foot height seems to melt away.

I wish you could visit me any weekend KOUPOW!! my neighbor is present when he KOUPOW!! is shooting. He lives several hundred yards KOUPOW!! away, both firing away from us and on the other side of his house, yet it sounds like he is next to us. And I am a shooter. But I sure wish he wasn't!

His firing does not make for a relaxing day outside. And he is just one guy, with a single shot rifle. Nor does he shoot from seven a.m. to ten p.m. as Crucible has proposed.

If you wish this facility in Spotsylvania, I'd suggest locating it further out to the western portions of the county.

Thank you,
Joe Ruedi,

5953 Partlow Rd, Spotsylvania Va

540 582 2208

jaruedi@aol.com

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Stop Crucible in Thornburg

Sent: December 7, 2018 7:52 PM

From: Ruth Nebbia

To: Wanda Parrish;

CC: Leon Hughes;

Dear Wanda Parrish,

I would like for you to carefully consider the concerns of many of the area residents who are opposed to the Crucible Military Training facility in Thornburg. I realize that there may be many people writing in favor of the facility, Radio Reconnaissance, Crucible's parent company, has been setting up tables asking residents of Spotsylvania for their support.

But I ask: How many of the direct neighbors of the proposed Crucible facility are sending support letters? From the number of signs popping up on Morris Road, Hams Ford, Rt. 1, and other roads surrounding the proposed facility, I would say few. There is a growing number of us who believe that the safety, as well as the peace and quiet we enjoy in this area, would suffer considerably if this permit is granted. We have many children in direct line of any stray bullet that may leave the facility, elderly, veterans, regular folks, and many farms with farm animals. All it takes is that first misfire to take one of those lives.

Yes, you say many of us hunt and do target practice, but none of my neighbors start at 6 am and continue until dusk, 7 days a week.

This type of facility belongs in a bigger piece of land away from so many homes and businesses. So I would urge you vote against the proposal and in favor of the residents of the area.

Thank you,

Ruth Nebbia
6011 Red Fox Drive

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Re: Crucible request for zoning variance

Sent: December 10, 2018 11:11 AM

From: Michael Galati

To: Wanda Parrish;

CC: Leon Hughes;

Dear Ms. Parrish,

As a county resident I am writing to ask that the planning board vote against the upcoming zoning variance requested by Crucible company in Thornburg. As you probably know, Crucible wants to build a privately-operated military training facility that would include at least 9 rifle ranges, as well as a track that will use simulated IED's explosives and ultimately a mock urban neighborhood where grenades will be used to train. The heart of their zoning variance request is to allow them to escape any noise restrictions from 6 am until 10 pm, seven nights a week.

Such a facility, it's extreme noise and potential for stray ordinance would be seriously detrimental to the health, well-being, and property values of Hundreds of homes and businesses in this area. It would be a betrayal of those of us who have lived and worked in this area for years --- decades for some --- and paid our taxes to support the county.

The fact that this proposal was set in motion behind the backs of those of us who would be the most affected by it speaks to a continuing problem with how projects like this are driven forward here in Spotsylvania --- as we've again seen with the controversy surrounding the SPower solar "farm" proposal. Here is Thornburg, even before the Board of Supervisors have voted on the request, Crucible has built 2 buildings and cleared acres of land for their rifle ranges. It is this attitude of entitlement and disregard for the local residents, that caused so much conflict between Crucible, Stafford County, and the its residents over their 16 years there, and it is why Stafford ultimately refused to allow them to expand their operations in that county.

Finally, the area that Crucible is proposing to build its facility in is one that is potentially very valuable in terms of future development for the county. Less than a mile from the interchange between Rt. 1 and I-95. With a new, expanded interchange currently under construction, this area holds great promise for development for both residential and businesses properties, including offices, light industrial, and perhaps even state and federal offices. All of which will provide the county with much more tax revenue then Crucible's facility. But none of this will happen if Crucible is allowed to open up an outdoor training facility with live fire, high powered rifle ranges, explosives, and grenades at all hours of the day and into the evening.

I ask that you consider all of the ramifications of this proposal for the residents of the Thornburg and the county as a whole. Crucible admits that it will employ less than 10 full time positions, hardly an economic driver for the county. As far as its claim of being able to bring other "defense" related business to the Thornburg area, in over seventeen years in Stafford, they brought not one additional business to that area of the county. I urge the planning board to recommend against granting Crucible the requested zoning variance.

Thank you for your time in this matter.

Sincerely,

Mike Galati
6011 Red Fox Dr.
Spotsylvania, VA 22551

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Debbie Curcie
FOR BERKELEY SUPERVISOR

Pledge to Berkeley Residents: Opposing Crucible

To Berkeley Residents:

As a demonstration of my commitment to you and the issues facing our community, I formally write to pledge my opposition to the Crucible firing range development. Should I be elected your Supervisor, I will vote against this development, and I will use every available tool to ensure that it is never built in Berkeley.

There are many reasons why this irresponsibly conceived and hazardous range is not in the best interest of our community. First among them is the safety and quality of life of our residents. Spotsylvania citizens deserve to know that their children are safe from stray bullets, they can enjoy an outdoor event without the sound of gunfire, and their community is environmentally sound. Secondly, our homes are the most important asset we have. Citizens should know that elected representatives are here to protect their homes and families. Adding a private para-military range to our community is not the way to make our community a better place to live, work, and play. These reasons only scratch the surface.

In politics, we have seen countless individuals who are elected and immediately forget their principles and, most importantly, the people they serve. That is why we need new leadership in Berkeley. We need a candidate with real life business experience that will lead the fight to protect what matters most. We need accountability, transparency, and fiscal responsibility. That is why I also fought against a publicly funded baseball stadium, which was clearly not in the taxpayer's best interest either.

Over thirty years ago, I started my own business in the computer components industry from scratch. With years of dedicated effort and fiscally responsible management, the business successfully grew. What Berkeley needs is common sense community leadership. I know how to properly manage money and a bad deal for our community when I see one. I want to use this experience and knowledge to give back to and protect the community we love.

Pledged on this day of April 23, 2017 to the citizens of Berkeley District, I am

Deborah Curcie

Deborah Curcie
Candidate
Berkeley District Supervisor.

Please visit www.DebbieForBerkeley.com or call me at (540) 369-8731 with any questions or thoughts.

Paid for and Authorized by Friends of Deborah Curcie

Leon Hughes

From: Wanda Parrish
Sent: Tuesday, April 25, 2017 4:11 PM
To: Leon Hughes
Subject: FW: Crucible Re-zoning request Safety
Attachments: Air Force Range Design Criteria.pdf

-----Original Message-----
From: Brinkman Col Mark T [mailto:mark.brinkman@usmc.mil]
Sent: Monday, January 09, 2017 8:07 AM
To: Stephan Picard; Branscome, Jeffrey (Jeff); Greg Cebula
Cc: Wanda Parrish
Subject: Crucible Re-zoning request Safety

All,
I want to continue to follow up on the Crucible initiative. While I have multiple concerns, above all is safety so I thought I would start the week with this topic. More to follow on noise and economic impacts.

Since Mr. Cebula was Air Force, I thought I would check out their small arms range regulations to verify they we in line with the Marine Corps, Army and Department of Energy. Attached is their document, or it can be found at http://www.shooting-academy.com/media/Air%20Force%20Range%20Design%20Criteria.pdf
Of particular note is page 6 paragraph 6.2 where it states:
"Surface Danger Zone (SDZ): The portions of the range in the horizontal plane that are endangered by firing a particular weapon. The SDZ includes the area between the firing line and the target line, an impact area, a ricochet trajectory area, and a secondary danger area. The SDZ may also include a weapon back-blast area.
The SDZ must be located completely within the boundaries of U.S. government owned or -leased properties. A fully contained range which is incapable of allowing a fired projectile to escape its limits does not have an exterior SDZ."

Also to understand the ranges, Table 1 on Page 8 describes the minimum safe range for small arms weapons.

So, if the Board of supervisors were to allow the re-zoning, and wanted to maintain the same safety standards used by the US Army, US Marine Corps, US Air Force, and the Department of Energy, the ranges at the Crucible facility would require 100% side and overhead baffling since lot 76-A-2 is not large enough to fully contain the SDZ of most small arms. Anything other than this would not comply with Sec. 23-4.5.7. Standards of review line (a) (4), "That the proposed use will not adversely affect the health or safety of persons residing or working in the neighborhood of the proposed use;"

Accepting anything less than this, in my mind would be putting the citizens at unacceptable levels of risk.

Page 8 Para 7.1.1.2 described the Air Force requirements for a Fully contained range when the required minimum SDZ requirements are not available because of lack of land.

Mark Brinkman

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE CIVIL ENGINEER SUPPORT AGENCY

20 OCT 2008

FROM: HQ AFCESA/CEO
139 Barnes Drive, Suite 1
Tyndall AFB, FL 32403-5319

SUBJECT: **Engineering Technical Letter (ETL) 08-11: Small Arms Range Design and Construction**

1. Purpose. This ETL provides criteria for the design and construction of Air Force small arms ranges, and applies to both new construction and major renovations. Additionally, this document should be used as a guide for any ranges purchased as equipment items. The intent of this ETL is to provide the minimum design criteria necessary for achieving a safe range design. This ETL assumes users have a formal engineering education and background, or access to local engineering expertise. This ETL does not establish the number of firing points, target distance, targetry, or type of range. A planning team composed of major command (MAJCOM) and installation-level combat arms (CA), civil engineering (CE), bioenvironmental engineer (BE), and safety (SE) personnel will jointly establish the number of firing points, the target distance, and the type of range based on mission, training requirements, and available real estate.

This ETL is directive in accordance with Air Force instruction (AFI) 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects*, and AFI 36-2226, *Combat Arms Program*, and must be used by a range designer when designing a new range or renovating an existing range. The range designer ultimately has the responsibility to ensure the minimum criteria presented in this ETL are used to provide a safe range design. This ETL may not cover all site-specific concerns and it is the designer's responsibility to adapt the intent of the ETL criteria to ensure the range is operationally safe. This ETL is not a specification or a prescriptive checklist and is not intended to replace professional judgment by a competent licensed professional engineer, after coordination with the end-user or installation CA section. Additionally, nothing in this ETL should preclude consideration and use of emerging technologies and commercially available products if these can be proven to result in a safe and otherwise satisfactory range design.

This ETL supersedes ETL 06-11, *Small Arms Range Design and Construction*.

Note: The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this ETL does not imply endorsement by the Air Force.

2. Summary of Revisions. This ETL is substantially revised and must be completely reviewed. It updates requirements and standards consistent with current technology and lessons learned. Editorial updates were performed to improve clarity and organization. This ETL also includes critical improvement to bullet traps that eliminated any blunt surface that would cause ricochet. This ETL incorporates the common general building

requirements in accordance with Unified Facilities Criteria (UFC) 1-200-01, *General Building Requirements*. Because these salient safety, health, and environmental features of permanent ranges apply to expeditionary or portable ranges, these ETL standards should apply toward portable ranges purchased as equipment.

3. Application: All Air Force installations.

- The criteria in this ETL shall apply to all small arms ranges where the design phase is 35 percent complete or less on the effective date of this ETL.
- New partially contained ranges will not be designed or constructed. If planned major range or component repairs of an existing range will cost more than 50 percent of the estimated range replacement cost (plant replacement value), the entire facility must be upgraded to comply with this ETL.
- After MAJCOM approval, HQ AFSFC/SFXW may approve deviations from the criteria in this ETL. MAJCOMs will submit requests for deviation to HQ AFSFC/SFXW, who will coordinate with HQ AFCESA for review.

3.1. Authority: Air Force policy directive (AFPD) 32-10, *Installations and Facilities*.

3.2. Effective date: Immediately.

3.3. Intended Users: MAJCOM functional managers; base civil engineers (BCE); bioenvironmental engineers; combat arms (CA), and range designers for the Air Force.

3.4. Coordination: MAJCOM functional managers and HQ AFSFC/SFXW.

4. Referenced Publications. In some instances, the references listed in paragraphs 4.1 through 4.8 may advocate procedures that seem to contradict those in this ETL. In these cases, the information in this ETL supersedes any other design and construction source and policy guidance on range operation and maintenance contained in AFI 36-2226 takes precedence over other sources.

4.1. Public Law:

- Title 29 Code of Federal Regulations (CFR) 1910.1025, *Lead*, available at http://www.gpoaccess.gov/cfr/index.html

4.2. Department of Defense (DOD):

- DOD Directive 5100.76-M, *Physical Security of Sensitive Conventional Arms, Ammunition, and Explosives*, available at http://www.dtic.mil/whs/directives/corres/html/510076m.htm
- Military Handbook (MIL-HDBK) 1027/3B, *Range Facilities and Miscellaneous Training Facilities Other Than Buildings*, available at http://www.wbdg.org/ccb/browse_cat.php?o=30&c=80
- MIL-HDBK 1013/1A, *Design Guidelines for Physical Security of Facilities*, available at http://www.wbdg.org/ccb/browse_cat.php?o=30&c=80

- UFC 1-200-01, *General Building Requirements*, available at http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4
- UFC 3-120-01, *Air Force Sign Standard*, available at http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4
- UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings,* available at http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4
- UFC 4-020-01FA, *Security Engineering: Project Development* (FOUO), available at http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4

4.3. Air Force:

- AFI 31-101, *The Air Force Installation Security Program* (FOUO), available at http://www.e-publishing.af.mil
- AFPD 32-10, *Installations and Facilities*, available at http://www.e-publishing.af.mil
- AFI 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects*, available at http://www.e-publishing.af.mil
- Air Force handbook (AFH) 32-1084, *Facility Requirements*, available at http://www.e-publishing.af.mil
- AFI 36-2226, *Combat Arms Program*, available at http://www.e-publishing.af.mil
- AFI 90-901, *Operational Risk Management*, available at http://www.e-publishing.af.mil
- Air Force pamphlet (AFPAM) 90-902, *Operational Risk Management (ORM) Guidelines and Tools*, available at http://www.e-publishing.af.mil
- Air Force Occupational Safety & Health (AFOSH) Standard 161-2, *Industrial Ventilation*, available at http://www.e-publishing.af.mil (hardcopy only)

4.4. Navy:

- Navy and Marine Corps Public Health Center Technical Manual (NMCPHC-TM) IH 6290.10, *Indoor Firing Ranges Industrial Hygiene Technical Guide*, available at http://www-nehc.med.navy.mil/od/CDRomtoc.htm

4.5. Army:

- Army Pamphlet (PAM) 385-63, *Range Safety*, available at http://www.apd.army.mil/series_range_pubs.asp?range=385
- Training Circular (TC) 25-8, *Training Ranges*
- NGB-AVS-SG, *Policy and Responsibilities for Inspection, Evaluation and Operation of Army National Guard Indoor Firing Ranges*

4.6. Environmental Protection Agency (EPA):

- *Best Management Practices for Lead at Outdoor Shooting Ranges*, available at http://www.epa.gov/region02/waste/leadshot/

4.7. Industry:

- American Welding Society (AWS) D1.1, *Structural Welding Code – Steel*, https://www.awspubs.com
- ASTM A514/A514M, *Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding*, http://www.astm.org
- ASTM C76, *Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe*, http://www.astm.org
- ASTM C136, *Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates*, http://www.astm.org
- Illuminating Engineering Society of North America (IESNA) Lighting Handbook, http://www.iesna.org/
- National Rifle Association (NRA) of America, *The NRA Range Source Book*, latest edition, available at http://www.nrahq.org/shootingrange/sourcebook.asp

5. Acronyms and Symbols.

AFCESA	- Air Force Civil Engineer Support Agency
AFH	- Air Force handbook
AFI	- Air Force instruction
AFOSH	- Air Force Occupational Safety & Health
AFPAM	- Air Force pamphlet
AFPD	- Air Force policy directive
AR	- Abrasion Resistant (i.e. AR500 plate)
AR	- Army Regulation
ASTM	- American Society for Testing and Materials
AWS	- American Welding Society
BCE	- base civil engineer
BHN	- Brinnell Hardness Number
BMP	- Best Management Practices
CA	- combat arms
cal.	- caliber
CE	- civil engineering
CFR	- Code of Federal Regulations
CMU	- concrete masonry unit
CONUS	- continental United States
dBA	- decibels ("A" scale)
DOD	- Department of Defense
DRMO	- Defense Reutilization Management Office
EOD	- explosive ordnance disposal
EPA	- Environmental Protection Agency
ETL	- Engineering Technical Letter
FOUO	- For Official Use Only
ft	- foot
HEPA	- high-efficiency particulate air (filter)

HMMWV	- high-mobility multi-purpose wheeled vehicle
HQ AFCESA/CEOA	- Headquarters Air Force Civil Engineer Support Agency, Engineer Support Division
HQ AFSFC/SFXW	- Headquarters, Air Force Security Forces Center, Combat Arms
HVAC	- heating, ventilation, and air conditioning
IESNA	- Illuminating Engineering Society of North America
in	- inch
LAW	- light anti-tank weapon
LFA	- lead-free ammunition
LR	- long rifle
m	- meter
MAJCOM	- major command
MIL SPEC	- military specification
MIL-HDBK	- military handbook
mm	- millimeter
mpm	- meters per minute
NCOIC	- noncommissioned officer in charge
NMCPHC	- Navy and Marine Corps Public Health Center
NSN	- National Stock Number
O&M	- operation and maintenance
ORM	- Operational Risk Management
OSHA	- Occupational Safety and Health Administration
PEL	- permissible exposure limit
pH	- symbol for logarithm of reciprocal of hydrogen ion concentration in gram atoms per liter
PPBE	- planning, programming, budgeting, and execution
psi	- pound per square inch
RCP	- reinforced concrete pipe
RH	- relative humidity
RKT-HEAT	- rocket - high-explosive anti-tank
SDZ	- surface danger zone
SE	- safety
SGPB	- bioenvironmental engineer
TACOM-ARDEC	- U.S. Army Tank-Automotive and Armaments Command – Armament Research Development and Engineering Center
TBD	- to be determined
TC	- Training Circular
UFC	- Unified Facilities Criteria
VDZ	- vertical danger zone

6. Definitions.

6.1. *Small Arms Range*: A live-fire training facility for training and certifying personnel in the use of handguns, shotguns, rifles up to 7.62mm, rifles or machine guns up to .50 caliber, and the MK-19 40mm machine gun. A small arms range may

include special ranges for 40mm grenade launchers, light anti-tank weapons (LAW), and 81mm mortars. Equipment items such as fully (self-) contained portable or expeditionary ranges fall into this category.

6.2. *Surface Danger Zone (SDZ)*: The portions of the range in the horizontal plane that are endangered by firing a particular weapon. The SDZ includes the area between the firing line and the target line, an impact area, a ricochet trajectory area, and a secondary danger area. The SDZ may also include a weapon back-blast area. The SDZ must be located completely within the boundaries of U.S. government-owned or -leased properties. A fully contained range which is incapable of allowing a fired projectile to escape its limits does not have an exterior SDZ.

6.3. *Vertical Danger Zone (VDZ)*: For non-contained and partially contained ranges, the VDZ is the volume of airspace above the SDZ between the ground surface and the maximum ordinate of a direct-fired or ricochet round. The height of the VDZ varies with the weapon and ammunition fired (see Attachment 1). For fully contained ranges, the VDZ is the area between the SDZ and the upper limits of containment.

6.4. *Non-contained Range (Impact Range)*: A non-contained range is an outdoor/open range. The firing line may be covered or uncovered. Direct-fire rounds and ricochets are unimpeded and may fall anywhere within the SDZ. The non-contained range requires an SDZ equal to 100 percent of the maximum range of the most powerful round to be used on the range. This type of range requires the largest amount of real estate to satisfy the SDZ requirements.

6.5. *Partially Contained Range*: This range has a covered firing line, side containment, overhead baffles, and a bullet backstop. Direct fire is totally contained by the firing line canopy, side containment, baffles and bullet trap (no "blue sky" observed from firing positions). Ricochets are not totally contained, but reduced by the baffles and side containment. A partially contained range requires an SDZ length equal to 50 percent of the maximum range of the most powerful round to be used on the range. A partially contained range will not permit lateral movement along the firing line or movement toward the target line unless the range has the additional baffles required to stop direct fire at the downrange firing lines.

6.6. *Fully Contained Range*: Range in which direct fire and ricochets are totally contained within the limits of the range. There is no SDZ requirement outside the limits of the containment.

7. Design Criteria. Range design is based on providing facilities that meet the needs of the training courses of fire specified by HQ AFSFC/SFXW and MAJCOMs based on mission needs. Future range designs must consider courses of fire that may differ from traditional "line-up-and-shoot" courses of fire: certain courses of fire may require the shooter to advance downrange toward the target; other scenarios may include driving a vehicle (HMMWV ["Hummvee"] without pedestal-mounted weapon) into the range to practice vehicle dismount, cover techniques, and target engagement. It is imperative

that a range designer fully understand what types of training and courses of fire will take place on the range and design the range accordingly. The designer should also consider design flexibility that allows for changing courses of fire in the future. Facility design and construction must comply with UFC 1-200-01.

Air Force ranges will not be designed or constructed to only accommodate frangible ammunition. To ensure operational range safety is not compromised, existing ranges that do not have the required SDZ may restrict the range to frangible ammunition only. However, this must be a temporary work-around and the owning organization must program corrective action to permit firing of ball ammunition.

The goal of the new Air Force small arms training philosophy is to increase the current 25-meter standard target distance and expand the diversity of training that can be accomplished on the range. Ranges should be designed to allow the greatest target distance possible within the available land at the site (e.g., 50 meters, 100 meters, 300 meters, 1000 meters). The desired target distance is at or as close as possible to the sight zero distance for the weapon.

CA, CE, bioenvironmental engineering, and safety offices at the base and MAJCOM will jointly develop site-specific designs using the minimum criteria outlined in this ETL. MAJCOMs may submit designs that deviate from the requirements of this ETL to HQ AFSFC/SFXW for review. HQ AFSFC/SFXW will coordinate with HQ AFCESA/CEOA, Engineer Support Division, for review. Submit designs to HQ AFSFC only after MAJCOM approval. Individual MAJCOMs may establish design criteria exceeding the minimums specified in this ETL.

7.1. Range Types, Combination Ranges, Range Configuration, Site Selection, and Range Geometric Design.

7.1.1. Range Types.

7.1.1.1. Non-contained Range (Impact Range). The non-contained range accommodates the controlled and supervised discharge of weapons and has sufficient land area to ensure the discharged projectile does not exit the SDZ. The trajectory of the projectile is along the line of fire (orientation of the range) and the impact of the projectile is designed to be within the limits of the impact area. The firing line may be covered or uncovered. Typically there are no overhead baffles, but surface barriers or sidewalls may be provided to partially limit projectile trajectory. A non-contained range must have the land area to accommodate both the full SDZ and the full VDZ. Ammunition used on the range will establish the required length of the SDZ and the required height of the VDZ. SDZ length must be equal to the longest distance equal to 100 percent of the extreme range for the types of ammunition used on the range. The required SDZ must equal or exceed the minimum SDZ lengths listed in Table 1. For minimum VDZ height requirements, see Attachment 1.

Table 1. Minimum SDZ Distance Requirements for Small Arms Ammunition — Non-contained Range

Weapon/Caliber	Ammunition	Minimum SDZ Length Meters (Feet)
Handgun, 9mm pistol Submachine gun, 9mm	M882	1840 (6036)
Handgun, 9mm pistol	Frangible, lead-free, Winchester	1375 (4511)
Handgun, .44 magnum	Commercial local purchase	2290 (7513)
Shotgun, 12 gauge	00 buckshot	600 (1968)
Rifle, 5.56mm	Ball M193; tracer M196	3100 (10,170)
Rifle, 5.56mm	Ball M855; tracer M856	3600 (11,811)
Rifle, 5.56mm	M862 (plastic)	250 (820)
Rifle, 5.56mm	Frangible, lead-free, Federal Cartridge BC556NT1, PSPCL	2750 (9022)
Rifle/machine gun, 7.62mm	Ball M80; tracer M81	4300 (14,107)
Rifle/machine gun, 7.62mm	Match, M118	4800 (15,748)
Machine gun, .50 caliber	Ball M2 and M33/tracer M17/M8 API/M20 APIT	6700 (21,981)
M79, M203, 40mm low-velocity	M781/M407A1/M406/ M433/M381/M386/M441	500 (1640) 100* (328*)
MK-19, 40mm high-velocity	M918/M383/M430	2650 (8694) 350* (1148*)
M72 LAW, 35mm sub-caliber	M73	1300 (4265) 100* (328*)
M72 LAW, 66mm RKT HEAT	M72	1250 (4101) 250* (820*)
AT-4, 84mm RKT HEAT	M136	2600 (8530) 200* (656*)

*Additional standoff distance that must be added to minimum SDZ length to allow for EOD make-safe procedure.

7.1.1.2. Fully Contained Range (Indoor or Outdoor). A fully contained range is designed to prevent 100 percent of the direct-fired rounds and 100 percent of the ricochets from leaving the limits of the range. This type of range is used when the required minimum SDZ requirements are not available because of lack of land area or compatible land use. These ranges have an overhead containment structure (ballistic safety baffles) and sidewalls. If the range is located in a building (indoor range), the building envelope is typically not

designed to prevent projectile penetration unless it is part of the containment. The structure elements and materials used for the building roof may vary depending upon the type and configuration of interior overhead containment, type of backstop, and method used to trap bullets. The fully contained range design must preclude escape of both direct-fired projectiles and ricochets. No "blue sky" should be visible from any firing position and as one travels downrange towards the target. Construct the overhead baffles with a minimum of 150 millimeters (6 inches) of horizontal overlap between the trailing edge of any baffle and the leading edge of the next baffle downrange (see Figure 8). The range design must also address noise control and environmental hazards resulting from the use of ammunition containing lead and residue resulting from non-lead frangible ammunition. Ammunition residue may contain unburned propellant. Excess build-up of this residue has caused flammable hazards within ranges. This flammability hazard may be controlled using a combination of facility and operational procedures to eliminate the risk of fire. Range personnel must work with local agencies to determine the required frequencies and procedures for removing unburned propellant from the range.

7.1.1.3. Partially Contained Range.

7.1.1.3.1. Partially contained ranges are not permitted for new construction unless specifically approved by HQ AFSFC and HQ AFCESA. There are many existing partially contained ranges in the Air Force inventory.

7.1.1.3.2. All existing partially contained ranges that do not have the required SDZ must be programmed for upgrade or replacement to meet either full-distance, non-contained range criteria, fully contained range criteria, or the footprint of existing deficient SDZ must be increased to meet the 50 percent SDZ requirement for a partially contained range. Existing partially contained ranges and other facilities designed in accordance with previously published criteria may continue to operate if range safety can be verified.

- Verify range safety using the operational risk management (ORM) analysis in accordance with AFI 90-901, *Operational Risk Management*. See Attachment 2 for an ORM example.
- Range computer modeling and simulation is a proven technique for analyzing range safety and identifying necessary improvements.

Range safety violations and unsafe operating conditions must be addressed and corrected as soon as they are identified.

7.1.2. Combination Ranges. Range designs may be configured to accommodate a variety of weapons and courses of fire. The appropriate configuration must be determined by the types and sequence of weapons used.

7.1.2.1. Multi-purpose Ranges. The multi-purpose range provides for simultaneously firing more than one type of weapon. The complex consists of adjacent baffled and/or impact bays. A sidewall separates the two range types to prevent bullets from one range from entering the adjacent range.

7.1.2.2. Superimposed Ranges. A superimposed range accommodates different types of weapons and may be either a non-contained (impact) range or a fully contained (baffled) range; however, only one type of weapon may be fired at one time. The superimposed range allows for the maximum use of land area and is usually the least expensive since there are no sidewalls between firing positions.

7.1.2.3. Special Ranges. Typically, special ranges are non-contained ranges designed to accommodate multiple target lines or arrays and set up for special types of weapons or unique courses of fire. Certain special ranges may exceed the scope of this ETL. Contact HQ AFSFC and HQ AFCESA for additional guidance.

7.1.3. Range Configuration. The range type, size, and configuration is based upon the installation mission, land availability, Air Force and MAJCOM policy, installation population, annual training requirements, and weapon-specific training requirements. Base CA personnel will submit their requirements for ranges through the chain of command to the MAJCOM functional manager. Once the MAJCOM has validated the need, the BCE will begin a feasibility study for the proposed range. Programming and budgeting for range construction must occur within the framework of the normal planning, programming, budgeting and execution (PPBE) process.

7.1.4. Site Selection.

7.1.4.1. BCE. The BCE will identify the available real estate for the site of a small arms range facility that is consistent with the installation's master plan. The installation master plan will indicate the range location, orientation, SDZ, and VDZ.

7.1.4.2. Planning. A project team composed of the CA non-commissioned officer in charge (NCOIC), a land use planner, a BCE representative, and a ground safety representative should collectively review the proposed range usage and location for land use compatibility. Safety is the primary concern when determining the site for a small arms range. Orient the SDZ and VDZ to minimize the effect of range operations on populated areas, aircraft ground and air operations, and land uses within the travel distance of the

ammunition. Where full-containment enclosures have not been provided, the project team should assume that ricochets would land in all portions of the SDZ. The BCE is responsible for plotting the SDZ and the VDZ on the base master plan. Mitigate any conflicts of land use or airspace operations with the SDZ or the VDZ as part of the PPBE process.

7.1.4.3. Real Estate Acquisition. When government-owned property suitable for a small arms range is not available, and where land acquisition is feasible, the BCE will prepare the documents required for purchase or lease.

7.1.4.4. Geographical, Environmental, and Climatic Effects.

7.1.4.4.1. If possible, an outdoor range should be oriented north-to-south to minimize glare. To minimize residue from being blown back to the shooter, site an outdoor range with the prevailing wind blowing from the shooter's back toward the target line. Supplemental ventilation will be required to maintain the recommended air flow across the firing line. Avoid locating the range upwind of residential or populated areas. Site outdoor ranges and their impact areas to minimize projectiles and projectile residue falling in wetlands or waterways.

7.1.4.4.2. Regions subject to snow accumulation and extended periods of continuous sub-freezing temperatures should have indoor ranges. When this is not possible, the outdoor range should be located to minimize drifting snow, ice buildup, and excess water and to facilitate snow removal inside the range periphery.

7.1.4.4.3. Range sites must consider environmental concerns such as storm water management, protection of wetlands, ground and surface waters, historical or archaeological features, previously contaminated sites, and other concerns as may be determined by federal, state, and local environmental laws.

7.1.5. Range Geometric Design. The layout and dimensions of the facility must satisfy safety requirements and user needs. The following criteria are minimums:

7.1.5.1. SDZ Geometry. The range danger zone includes the projectile impact area, the SDZ, and a VDZ. Refer to Figures 1 through 6 for the typical geometry of the SDZ. The VDZ reflects the geometry of the SDZ extended to the VDZ height.

7.1.5.2. Limits of Fire. The limits of fire are imaginary lines drawn from the outermost edges of the endmost firing positions, extended downrange through the target line and terminating at the SDZ limit. The limits of fire may be perpendicular to the firing line or they may depart the firing line at a

designated angle. The range configuration and use determines the departure angle of the limits of fire.

7.1.5.3. Projectile Impact Area or Direct Fire Zone. The projectile impact area is bounded by the left and right limits of fire, the firing line, and extends to the minimum SDZ arc length for the ammunition and range type (Table 1). When the target line and the firing line are the same width, the impact area forms a rectangle (Figure 1). When the target line is wider than the firing line, the impact area becomes a pie-shaped area formed by the limits of fire and the arc of the minimum SDZ length (Figure 2).

7.1.5.4. Ricochet Danger Area. The ricochet danger area is the area between the impact area and the secondary danger area. The ricochet area typically is determined by extending a line drawn at a 10 degree angle off the left and right limits of fire, beginning at the firing line and extending to the minimum SDZ arc (Figures 1, 2, and 3). For a LAW range (Figure 4), the ricochet area is drawn at a 13 degree angle.

7.1.5.5. Secondary Danger Areas. Secondary danger areas are provided to catch fragments from exploding ammunition or ricochets from rounds that impact at the outer edge of the ricochet danger area. A line beginning at the intersection of the firing line and the firing limits is drawn departing from the line of fire at an angle of 40 degrees, extending outward for 1,000 meters (3,280 feet). From the 1,000-meter point, a second line extends to a point on the minimum SDZ arc 100 meters (328 feet) outside the ricochet area limits.

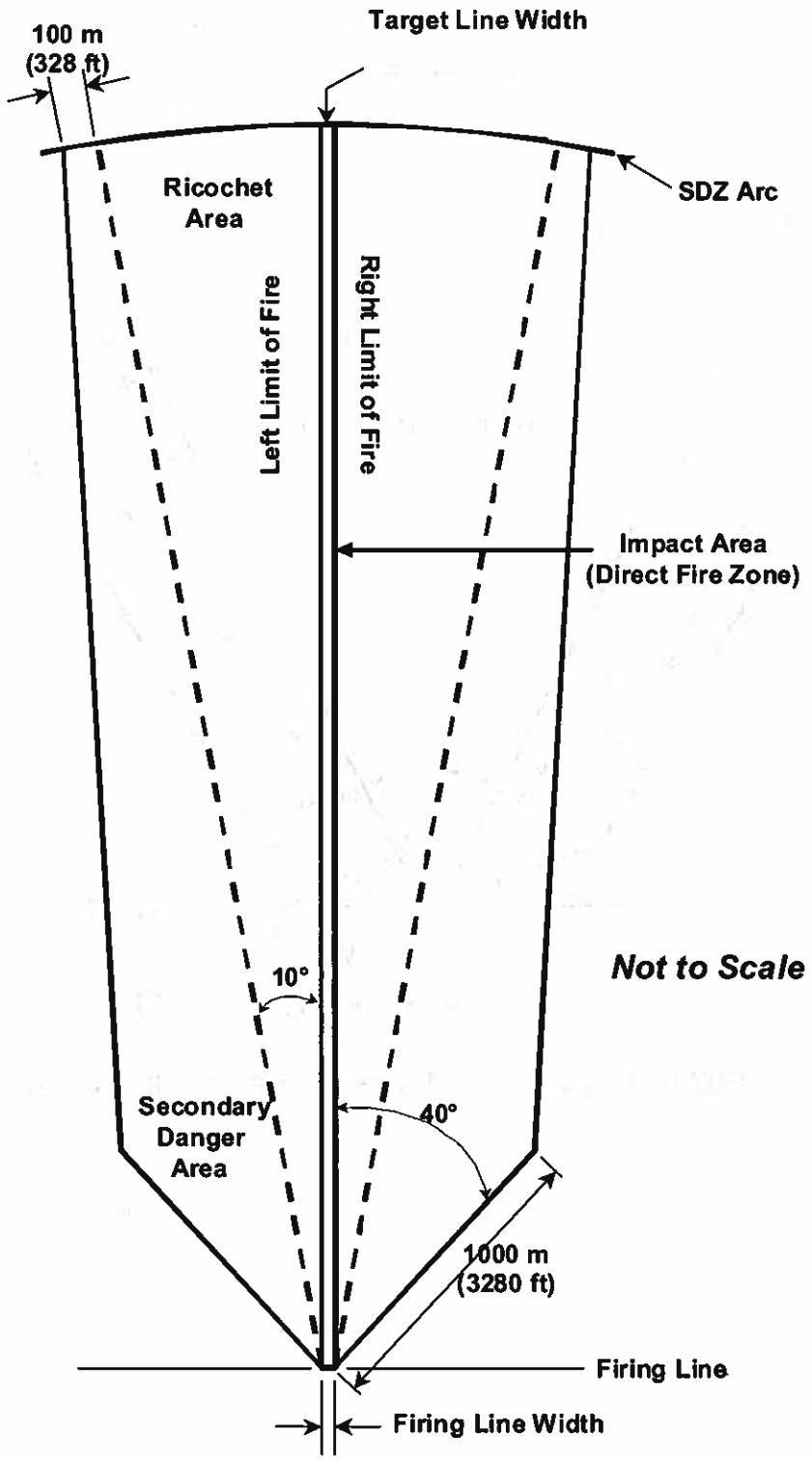


Figure 1. SDZ Configuration — Firing Line Width Equal to Target Line Width

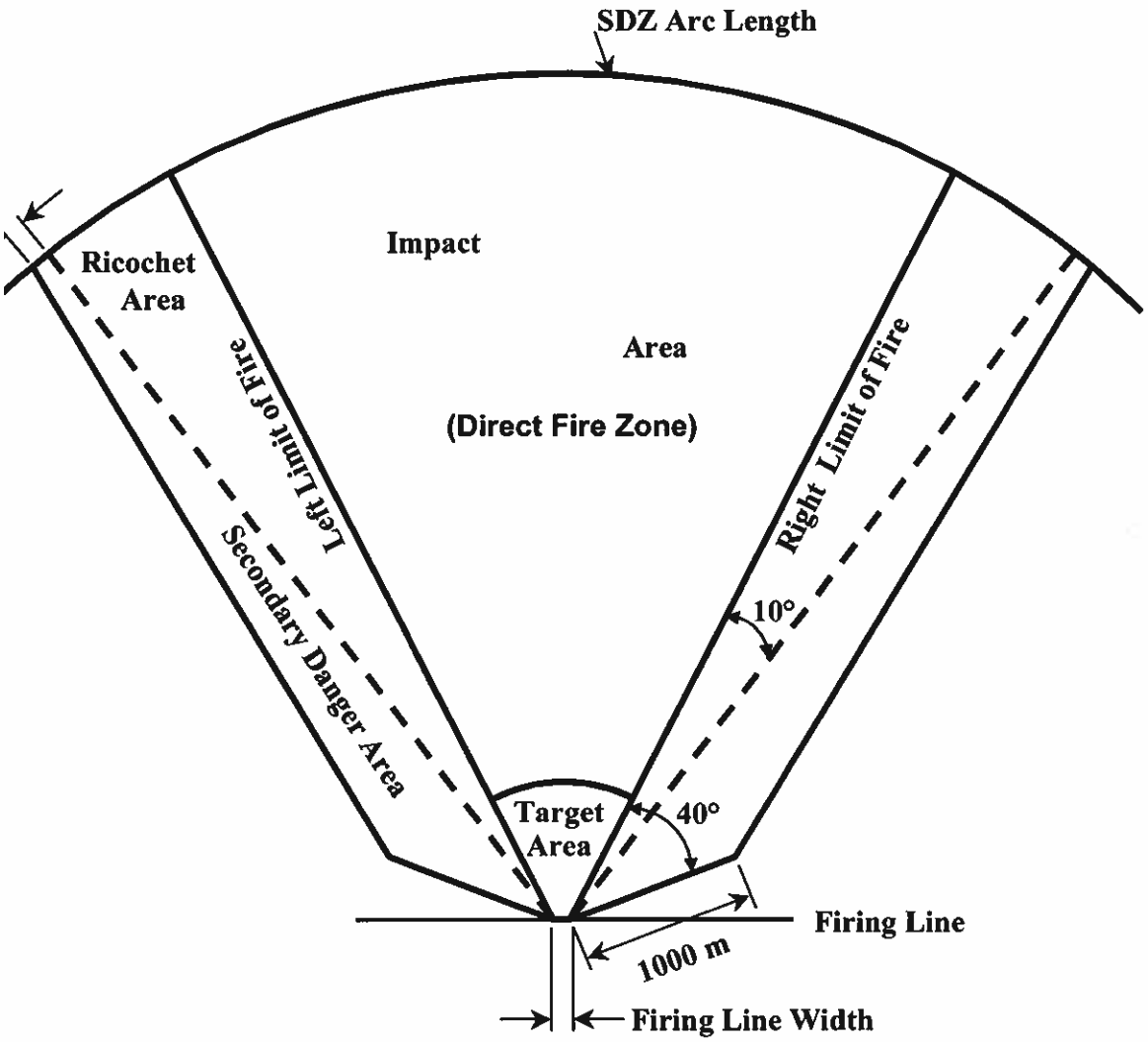
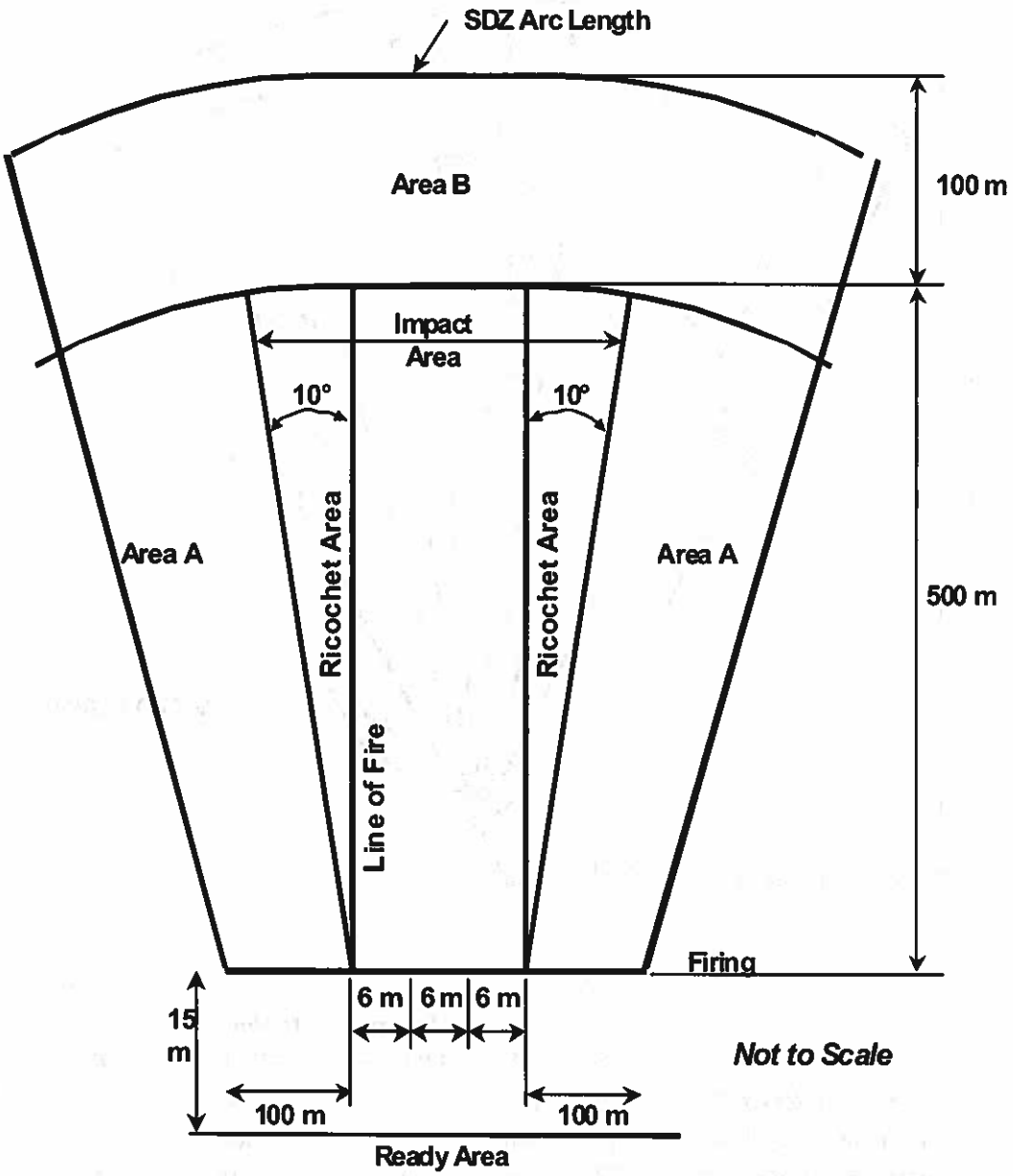


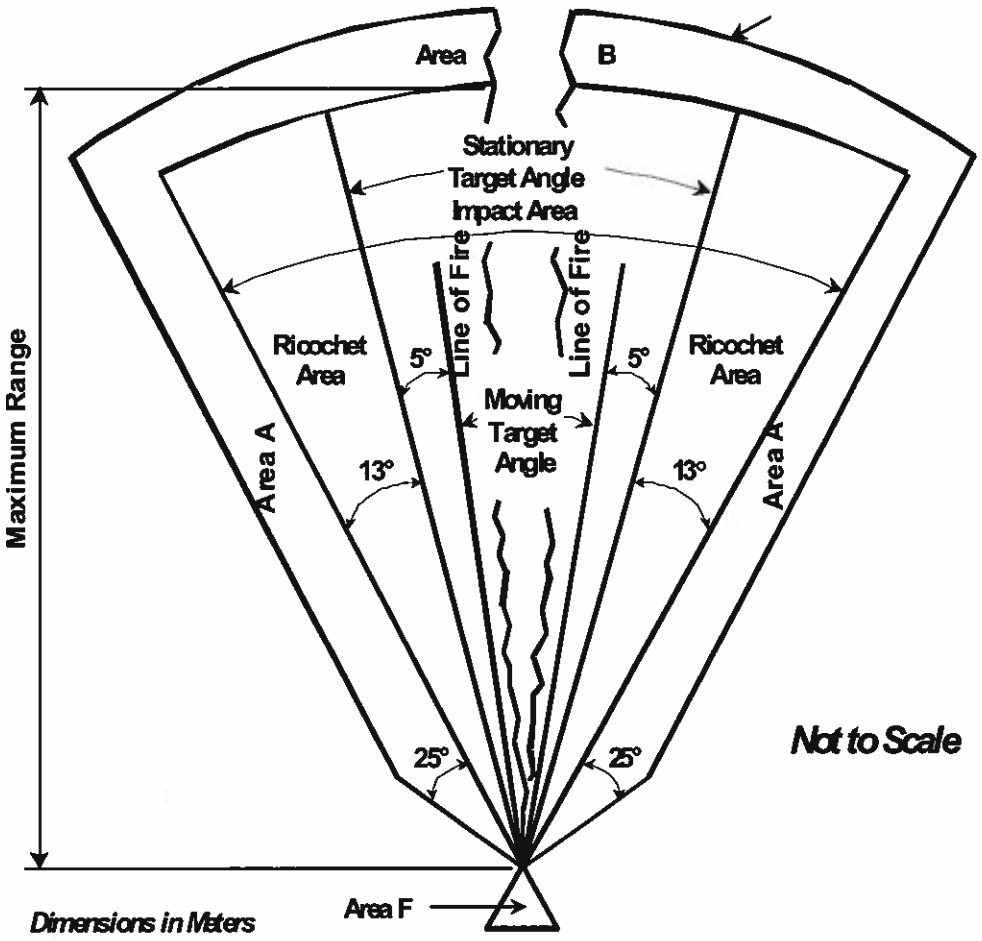
Figure 2. SDZ Configuration — Target Line Wider Than Firing Line



NOTES

1. Additional firing positions may be added provided minimum of 6 m (19 ft) is maintained.
2. Provide a 100-m (328-ft) clear zone (Areas A and B) around the perimeter of the range for EOD disposal of dud rounds with explosive type projectiles.
3. Ranges only certified for use of M781 or other inert projectile rounds are not required to include the 100-m (328-ft) space (Area A) to the left and right of the firing positions.

Figure 3. SDZ Configuration — M79 and M203 Grenade Launcher Range



	Area		Minimum Range to Impact	Maximum Range	Area F	
	A	B			Depth	Base
66mm HEAT Rocket, M72	250	250	75	1250	40	25
35mm Subcaliber, M73	100	100	50	1300	40	25
84mm HEAT Rocket, M136	227	448	50	2100	95	190

Figure 4. SDZ Configuration — Light Anti-Tank Weapons (LAW) Range

7.1.5.6. SDZ for Frangible Ammunition. On existing ranges that do not have the required SDZ, the use of frangible ammunition may mitigate the lack of SDZ and allow the range to continue to operate safely. This may only be used as a temporary measure and the owning unit must program for corrective action to allow firing of full-power ball ammunition. The SDZ depicted in Figures 5 and 6 are based on firing from the firing line only; down-range firing training operations shall not be used unless a projectile trajectory analysis is performed.

7.1.5.6.1. For an existing 25-meter (82-foot) partially contained range with earth side berms and an earth backstop, the required SDZ when using frangible ammunition is 300 yards (274 meters). See Figure 5.

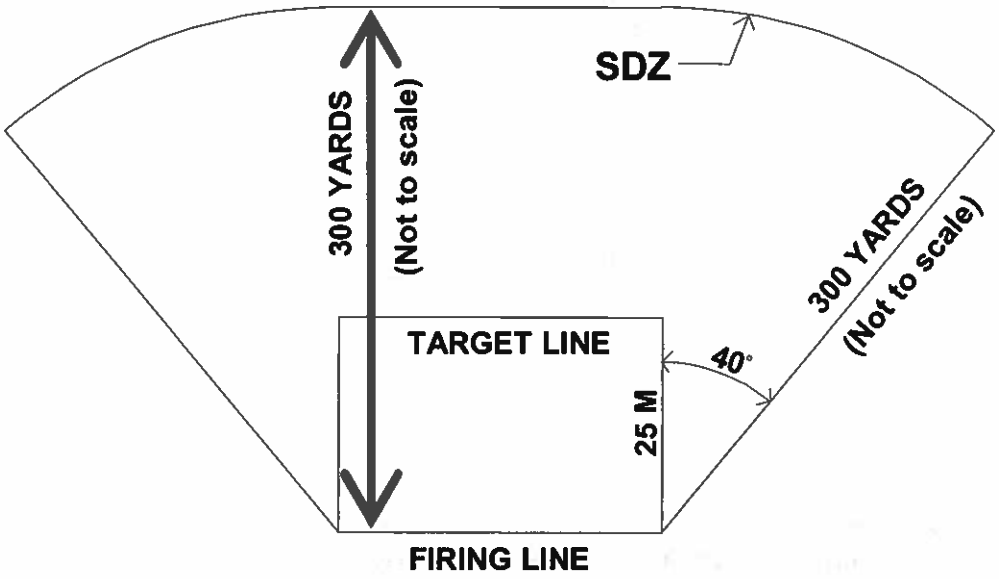


Figure 5. SDZ Requirement for Frangible Ammunition on a 25-Meter (82-Foot) Partially Contained Range with Earth Side Berms and Earth Backstop

7.1.5.6.2. For an existing 25-meter (82-foot) partially contained range with sidewalls of concrete or concrete block, overhead ballistic baffles (angled or vertical), and a bullet trap, the required SDZ when using frangible ammunition is 100 meters (328 feet). See Figure 6.

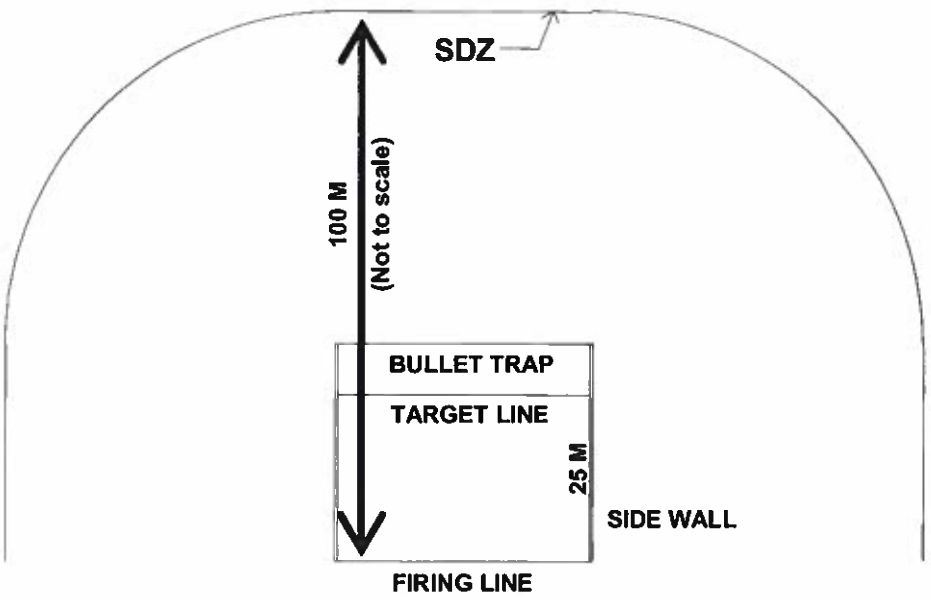


Figure 6. SDZ Requirements for Frangible Ammunition on a 25-Meter (82-Foot) Partially Contained Range with Sidewalls and Bullet Trap

7.1.5.7. Firing Line Positions/Platforms. The number of firing positions establishes the width of the firing line. All small arms (rifle, pistol, and shotgun) ranges must have a minimum of fourteen positions on the firing line. Add additional positions in increments of seven firing positions. The width of the firing positions must be at least 1.52 meters (5 feet) center-to-center. The firing line must be located on a stable horizontal surface that is at least 4.3 meters (14 feet) wide, clear distance, for the length of the firing line. For most ranges, the firing platform is a concrete slab on grade. For non-contained ranges that have fighting positions dug in the ground, sandbags, or other definite structures to identify the firing line, the firing platform can be an earth surface. For special weapons, CA personnel will specify the number of firing positions and the widths of each position based upon training requirements.

7.1.5.7.1. Position Numbering. Each firing position will be numbered beginning from the left when facing the target line. The numbers must be at least 200 millimeters (8 inches) tall and displayed on rectangular backgrounds attached to the position barricade or other location that is clearly visible to all shooters and range officials. Odd-numbered positions will be marked with white numbers on a black background; even-numbered positions will be marked with black numbers on a white background.

7.1.5.7.2. Position Barricades. A wooden barricade in the form of a cross (+) must be installed at the left edge of each firing position. The minimum

nominal dimensions of the wood must be 50 millimeters (2 inches) by 150 millimeters (6 inches). The top surface of the horizontal member must be 1220 millimeters (48 inches) above the platform.

7.1.5.7.3. Firing Line. Paint a red line a minimum of 100 millimeters (4 inches) wide on the leading edge of the firing platform on the target side. For non-contained ranges without concrete firing line platforms, a firing line will be marked definitively in red on the downrange side of the firing positions; examples would include treated timber imbedded along the firing line and painted red or a line of safety cones. This is the stationary firing line and must be continuous for the full length of all the firing positions. For move-and-shoot courses of fire, the firing line is relocated down range as appropriate for the training scenario.

7.1.5.8. Ready Line. Paint a yellow line 100 millimeters (4 inches) wide on the firing line platform at least 2.4 meters (8 feet) behind the firing line (towards the rear of the firing platform). The line must be continuous for the length of the firing platform. This line is designated the ready line.

7.1.5.9. Target Line. Targets are placed along the target line, which runs parallel to the firing line. Targets are placed opposite and aligned with each firing position.

7.1.5.10. Target Line Configuration.

7.1.5.10.1. The distance from the firing line to the target line must be the same for all firing positions. Targets may be placed on turning, pop-up, or stationary mechanisms, or target retrieval systems along the target line. Ensure that the line of sight from the firing line to the target line is clear and structural members, baffles, walls, or improper lighting do not obstruct the shooter's sight picture from any firing position the shooters will use (e.g., prone, kneeling, left barricade, right barricade). Number each target location the same as its corresponding firing position. On non-contained ranges, the target line may be fixed and several firing lines constructed to permit firing at reduced distances. When this option is used, only the rear-most firing line will incorporate a firing platform. If the range has an earthen backstop, ensure there is sufficient distance between the closest firing line and the earthen backstop to eliminate the possibility of backspatter and ricochets affecting the shooter.

7.1.5.10.2. The center of the target must be located between the upper limit of fire (standing position), which is 1500 millimeters (60 inches) above the firing line, and the lower limit of fire (prone position), which is 150 millimeters (6 inches) above the firing platform. The entire target face must be fully displayed to the firing position when exposed to the shooter for engagement.

7.2. Criteria Applicable to All Ranges. Design all range components (including ballistic safety structures and deflector plates) to satisfy the requirements for the weapon and ball ammunition used on the range. Except for non-contained ranges, ballistic safety structures are required for firing ranges. Ballistic safety structures include baffles, side containment, and backstops. Baffles are safety structures classified as canopy baffles or overhead baffles. Side containment is provided by sidewalls, berms, or discontinuous side baffles. A backstop is an impact berm or bullet trap designed to stop direct-fired rounds. See paragraph 7.5 for more detailed descriptions of ballistic safety structures.

7.2.1. Construction Materials. The materials selected for range construction must achieve the longest life-cycle possible considering frequency of use, budget constraints, or other concerns. The desired life expectancy of permanent small arms range construction is 20 years. Permanent construction does not include protective construction, baffles, or sacrificial materials intended to capture projectiles. Evaluate alternative range design options using a life-cycle cost comprised of the initial costs plus all operation and maintenance (O&M) costs for the first five years of range operation. Using the proper materials for sidewalls, baffles, overhead containment, bullet traps, and other areas where a projectile could impact will ensure that the bullet is deflected downrange and not towards the firing line. Ricochet control must be considered when positioning brackets used for baffles, locating bolt heads, and selecting protective construction.

7.2.2. Horizontal and Vertical Control. Establish vertical control by assuming the firing platform surface is equal to elevation 0.0 meter. The firing line is the baseline for horizontal control.

7.2.3. Drains. On outdoor ranges, use positive grading to direct water away from the firing line and toward the target line. When the length of the slope or the natural terrain requires using drains between the target and the firing line, a trench drain should be located at the forward edge of the bullet trap. If a trench drain is installed, the bullet trap should extend into the trench drain to eliminate any exposed edges that may cause unpredictable ricochets. Use grade breaks to prevent exposing vertical surfaces to the firing line. Do not route storm water runoff from any range floor to a stream, pond, or other body of surface water. In some circumstances, if the range is located near a surface water body, it may be necessary to incorporate detention basins or flow-through sand or peat filters to prevent particulate heavy metals that may be present in storm water runoff from reaching surface water bodies. Indoor ranges will not have floor drains downrange of the firing line. See EPA *Best Management Practices for Lead at Outdoor Shooting Ranges* for additional guidance.

7.2.4. Range Occupational Health Standards. All ranges should be designed to allow the use of service ammunition which contains lead and other contaminants. Design the range to control heavy metals and/or dust produced at both the

muzzle, ejection port of the weapon, bullet trap, and from the ventilation exhaust to ensure compliance with local, state, and federal regulations. Review NMCPHC-TM 6290.10, *Indoor Firing Ranges Industrial Hygiene Technical Guide*, and the EPA's *Best Management Practices for Lead at Outdoor Shooting Ranges*. Additionally, the designer should coordinate with the base safety and bioenvironmental engineering health offices for additional requirements and review AFOSH standards to ensure compliance with current policy, including, but not limited to, AFOSH Standard 161.2, *Industrial Ventilation*.

7.2.5. Floor Surfaces. Fully contained indoor ranges must have a smooth, steel-trowel-finished concrete floor extending from the firing line to the bullet trap. Fully contained outdoor ranges may have a concrete floor with a broom finish parallel with the firing direction to prevent a slipping hazard. The concrete floor should not be painted and must be protected with a waterproof sealant. The outdoor range floor should slope from the firing line toward the target line. In special circumstances, hardened steel plate of a thickness sufficient to prevent penetration of the projectile may be used for the range floor if the designer provides design criteria, supporting data, and supporting calculations for approval. No protrusions from the floor that could be struck by bullets are permissible. Fully contained range floors should be cleaned using approved "dry" methods, such as HEPA-filtered vacuuming or damp mopping. Water wash-down or dry sweeping is not permitted. Design the range floor as a pavement to support anticipated vehicular loads (training or service vehicles). Design and locate floor slab joints to minimize the potential for unpredictable ricochets. Sawed control joints are permitted. Locate longitudinal floor joints between firing lanes. Traditional chamfered construction joints are not permitted.

7.2.6. Wall Surfaces. Construct wall surfaces for fully contained ranges of reinforced concrete, fully grouted reinforced masonry, or hardened steel plate of a thickness sufficient to prevent penetration by any projectiles fired on the range. If hardened steel plate walls are used, submit data and supporting calculations to the MAJCOM for approval. Steel plate wall designs must address noise abatement in the design and must not have exposed bolts or anchors. If concrete or masonry walls are used, they must remain unpainted to preserve their inherent sound-absorbing properties. Walls should have a continuous smooth surface, with no projections above the wall surface from bolt or rivet heads or the leading edge of deflector plates. Wall expansion/contraction joints should be designed with care to ensure a smooth wall surface is maintained. The typical 19-millimeter (0.75-inch) chamfered wall joint detail is not permitted unless baffle/deflection plates are incorporated in the joint design to span the chamfer. To eliminate erratic ricochets, install baffle/deflection plates to protect any range features attached to the wall. The deflector plates should be recessed into the wall surface to eliminate exposed edges.

7.2.7. Openings. If an existing building is converted for use as a range, all openings downrange of the firing line must be filled in with ballistic safety

structures. All heating, ventilation, and air conditioning (HVAC) equipment downrange of the firing line must be located behind baffles or the backstop. In new buildings, conceal pipes and conduits in the walls, above the ceiling baffles, or behind protective baffles. In converted buildings, relocate exposed pipes or provide protective construction. When doors are required downrange, they must be constructed of ballistic-resistant materials and equipped with hardware to allow opening only from the range side. Protect downrange doors with baffles and provide them with a visual and audible alarm.

7.2.8. Ventilation. The ventilation system must control exposure to lead and heavy metals in accordance with 29 CFR 1910.1025, *Lead*. The supply and exhaust air system is critical to the safe operation of a fully contained indoor or outdoor range and to the health of range inhabitants.

7.2.8.1. Airflow. The ventilation system should provide laminar airflow across the firing line toward the bullet trap. At the firing line, the air velocity should be 23 meters per minute (mpm) (75 feet per minute), ±5 percent. Airflow should be evenly distributed across the firing line. Noise from the ventilation system will not exceed 85 decibels (dBA) behind the firing line.

7.2.8.2. Air Distribution. To ensure contaminants are ventilated from the firing line, install a perforated air distribution plenum or other distribution fixture along the rear wall to provide unidirectional airflow across the firing line and continuing downrange. The distance from the firing line to the perforated rear wall or plenum will be a minimum of 5 meters (16.4 feet).

7.2.8.3. For an indoor range, the ventilation design must include a positive exhaust system for removing airborne contaminants. Maintain a slight negative air pressure on the range, achieved by exhausting 3 to 7 percent more air than is supplied. Supply and exhaust fan systems must have control interlocks to ensure simultaneous operation. All doors into the negative pressure area must have air locks. Re-circulation of range air is not permitted.

7.2.8.4. Exhaust Intakes. Do not locate exhaust intakes near the firing line, and particularly not above the firing line. To ensure proper airflow, locate exhaust intakes at or behind the bullet trap.

7.2.8.5. Exhaust Air Discharge. Exhaust air discharged from the range and bullet traps must meet local, state, and federal requirements and be separated from the supply air intake to prevent cross-contamination of heavy metal-laden air. If the range is part of a larger building, do not discharge exhaust air at locations which would cause cross-contamination of overall building air.

7.2.8.6. Heavy Metal Dust at Ranges. Clean, hazard-free air is essential for a firing range. The Occupational Safety and Health Administration (OSHA) has

established the permissible exposure limit (PEL) for airborne heavy metal dust at 50 micrograms per cubic meter per hour average for an eight-hour day (total daily exposure may not exceed 400 micrograms). Fully contained ranges (indoor and outdoor) must have ventilation systems designed to control exposure from the use of heavy-metal-containing ammunition. Lead-free ammunition (LFA) is now available and may be used to eliminate the lead contamination concern with older existing ventilation systems.

WARNING

Exposure to heavy metal dust is a severe health hazard associated with the operation of a small arms range.

7.2.9. Noise Reduction. Noise reduction in the range and noise transmission out of the range are different design considerations. Mass and limpness are two desirable attributes for sound absorption. Unpainted heavy masonry walls provide mass. Absorptive acoustical surfacing will reduce the noise level in the range but have little effect on transmission outside the range. Ambient noise levels at the firing line should not exceed 85 dBA, and should be considerably less to improve communication between shooters and the range official. Short-duration noise such as gunfire will exceed the 85 dBA level and may be as high as 160 dBA. The range design must prevent the reflection of these higher noise levels by using sound-absorbing materials where possible. Hearing protection for shooters will provide protection against this noise.

7.2.9.1. Use acoustical treatment on surfaces behind the firing line. Floor areas behind the firing line may be covered with acoustic material (rubber mats) if it will not impede heavy metal dust removal.

7.2.9.2. Do not paint downrange walls or acoustic tile, since paint significantly degrades the sound-absorbing qualities of the materials. Existing ranges may continue using painted surfaces. Special sound-absorbing concrete blocks are available that reduce the noise in the range.

7.2.9.3. Acoustic panels no larger than 1200 millimeters (47 inches) wide may be installed on walls and ceilings in the firing line area. Blown-on acoustic material and carpeting are not permitted due to the difficulty of cleaning accumulated heavy metal dust.

7.2.10. Infrastructure.

7.2.10.1. Range Control Booth. The control booth is a control center from where the chief range officer can observe and control the entire range. All range types should have a control booth. The following criteria apply to the design and construction of control booths.

7.2.10.1.1. Locate the control booth behind the ready line. Place the booth to permit an unrestricted view of all firing positions. The booth location and design must not impede ventilation airflow.

7.2.10.1.2. The minimum size for the control booth platform is 1.5 meters by 3 meters (5 feet by 10 feet). Align the long side parallel to the firing line.

7.2.10.1.3. The booth must be high enough (0.6 meter [2 feet] minimum above the floor) to permit the range official an unrestricted view of the entire firing line and the projectile impact area, including all range entry points. Also, windows and doors within the booth must not restrict or distort the range official's view. Closed-circuit television monitors may be used to enhance, but will not replace, this requirement.

7.2.10.1.4. Provide a worktable or counter at least 0.8 meter by 1.2 meters (2.5 feet by 4 feet) to accommodate reference materials, and provide at least one electrical outlet in the worktable/counter area. Provide red and white lighting for night/limited visibility operations.

7.2.10.2. Communication Systems. The range communication system must support communications between the control booth, the firing line, range control, range support buildings, and emergency response personnel. A permanent, hard-wired public address system is required. On a multiple-range complex, the system must also support communications between individual ranges. If it is not practical to install landlines, or if a break in landline service occurs, radio or cellular communications may be used. The control booth should be wired with connections to the base local area computer network.

7.2.10.3. Lighting. Design downrange lighting (both red and white light) in accordance with the IESNA Lighting Handbook to provide for safety and housekeeping operations as well as general range illumination. Light intensity at the target face should be 914 to 1076 lux (85 to 100 foot-candles) measured 1200 millimeters (47 inches) above the range surface at the target face. Provide approximately 322 lux (30 foot-candles) for white light general range illumination and approximately 107 lux (10 foot-candles) for red lights. Provide controls to vary lighting intensity throughout the range to accommodate subdued-light training requirements. Controls for all lighting will be operated from the control booth. Also provide flashing red and blue lights at the firing line and downrange to simulate emergency situations.

7.2.11. Barriers, Fences, and Signs. Secure the range and SDZ areas to prevent unauthorized entry. Use barriers to block roads, walkways, or paths.

7.2.11.1. Fully contained ranges require barriers in the form of key-operated, locked doors or electrically locked doors to prevent entry while firing is in progress.

7.2.11.2. Non-contained (impact) ranges require a number of barriers and signs to make the range safe. The number of barriers required depends on the number of roads, walkways, and paths that lead into the SDZ. Attach reflective warning signs to barriers.

7.2.11.3. Use fencing to prevent people, animals, and vehicles from entering range SDZs. A chain-link fence around the complete range complex, including the SDZ, is preferred. Use barriers or gates to block access paths. On baffled ranges with earth side berms and an earth/metal backstop, as a minimum, install a 1.82-meter (6-foot) chain-link fence along the sides of the SDZ and on the downrange side of the impact area, incorporating the berms. Install the fence no closer than 5 meters (16 feet) from the toe of the berms and backstop. For fully contained ranges with concrete containment walls and an earth/metal backstop, as a minimum, install the fence from one wall, around the backstop, to the opposite wall when range components are exposed. For example, if the back side of the bullet trap and spent round retrieval system is exposed, erect a fence to restrict access by unauthorized personnel. Provide a locked access gate for maintenance equipment.

7.2.11.4. Typical range signs are shown in Figure 7. Warning signs, and flashing red warning lights for night operations, should be positioned on the approaches to the range and along the perimeter of the SDZ if access is not otherwise restricted. Place red flags and/or rotating/flashing red lights at appropriate locations to signal when the range is in use. Place signs along the normal boundaries of the range. Post the signs no further apart than 100 meters (328 feet) along the range perimeter, parallel to roads or paths. Based on local topography, place signs close enough to give reasonable warning along other areas of the SDZ. Refer to Table 2 for proper location of warning signs. Signs must be bilingual where English is not the national language or multilingual where needed. Post bilingual signs on continental United States (CONUS) ranges located near foreign borders. Consult the installation legal office for local policy on bilingual signs. Construct warning signs in compliance with UFC 3-120-01, *Air Force Sign Standard*. The warning signs should have standard red letters on a white background.

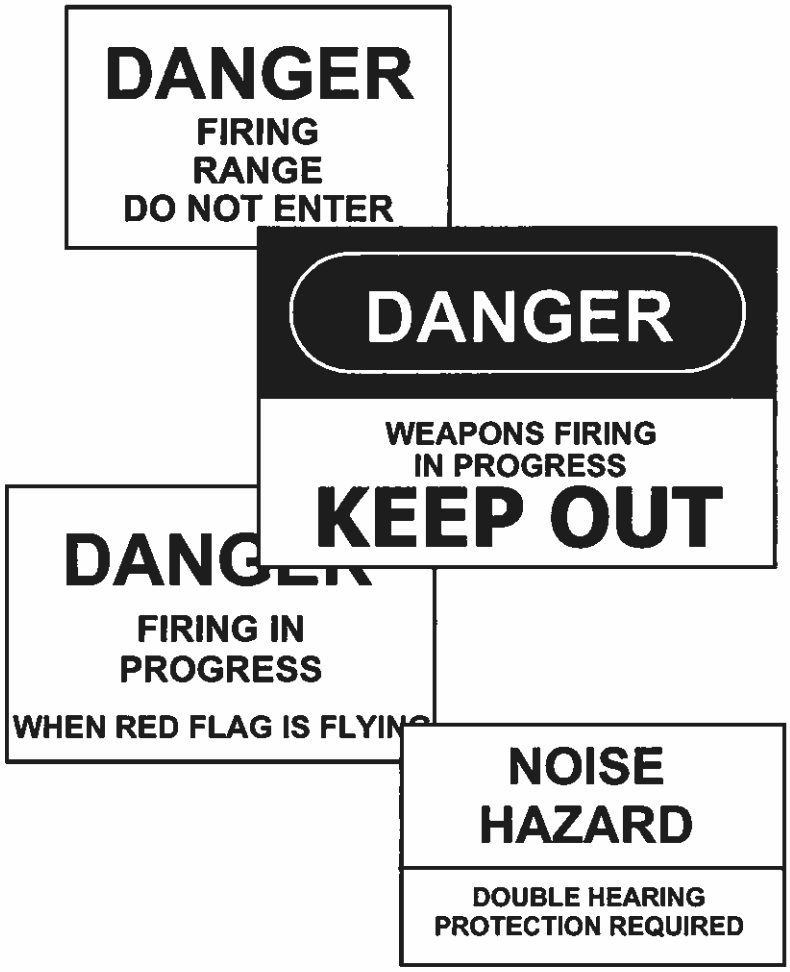


Figure 7. Typical Range Signs

Table 2. Locations of Warning Signs

Warning Sign	Location
Danger Firing in Progress When Red Flag is Flying	Approach roads
Danger Firing Range Do Not Enter	Fencing and barriers
Danger Weapons Firing in Progress Keep Out	Entry road
Noise Hazard Double Hearing Protection Required	Firing line

7.2.12. Utilities. Install utilities to prevent damage from normal firing range operations. Do not place any aboveground utilities in the impact zone or the ricochet zone. When utilities are directly behind backstops or berms, provide access for a maintenance vehicle. Underground utilities with proper cover may be placed anywhere on the range complex if maintenance and repair easements are provided.

7.2.12.1. Water and Sanitation. Water must be available for drinking, sanitation, and safety equipment. The required latrine size will be determined using conventional planning criteria and based on the number of people (instructors and trainees) supported.

7.2.12.2. Electrical Power. Provide electrical power for lighting, maintenance equipment, public address systems, HVAC, bullet trap dust collection system, and target-turning mechanisms.

7.2.12.3. HVAC. Heat and/or air conditioning is not recommended. Because re-circulated air within a range is prohibited, heating or cooling a range is costly. Some outdoor ranges in colder climates will require radiant heat or a heated air curtain on the firing line. Outdoor ranges must be oriented so the prevailing wind is at the shooters' backs.

7.2.13. Roads and Parking. Design roads and parking for access by passenger vehicles and light or medium trucks. Provide surfaced all-weather roads for

connector roads from public roads to the range complex. Parking and roadway standoff must comply with UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*.

7.2.13.1. Range access roads must approach the range complex from behind the firing line and outside the SDZ footprint.

7.2.13.2. Locate parking areas to the rear of the firing platform. On fully contained ranges, the parking area may be beside the range side containment walls. Typically, one parking space per firing position plus an allowance for range personnel is sufficient. Ranges with heavy training loads occasionally require two spaces per firing position. When feasible, surface parking lots for all-weather operation.

7.2.14. Storm Water Runoff and Drainage. Design storm water control structures to prevent storm water erosion of impact berms. Divert surface water runoff within the range (including the SDZ) using best management practices (BMP) for heavy metal management that may include filtration, vegetated detention or retention basin, or other engineered structure to prevent direct discharge to a surface water body. Discharge of effluent to water bodies must meet all requirements of federal, state, and local laws.

7.2.15. Contaminant Monitoring. A contaminant monitoring program provides early indications of heavy metal and contaminant movement. A comprehensive monitoring program should sample the surface soil, surface water, and ground water for soluble lead, dissolved lead, total lead, and nitrates. The frequency of sampling is dependent on how often the range is used and site hydrological conditions. Consult with the installation CE and bioenvironmental engineering personnel to determine if a contaminant monitoring program is required.

7.3. Additional Criteria for Non-contained Ranges.

7.3.1. Siting Considerations. Take advantage of natural geologic formations for use as backstops. Trees are allowed downrange of the impact berm, but not between the firing line and the target line. Take advantage of natural drainage. Where terrain permits, slope the range floor toward the backstop. Flowing watercourses (streams, ditches) in the impact area or near a berm should be avoided. Avoid establishing range impact areas in wetlands or in locations subject to frequent flooding. The non-contained range line of fire should not be in the direction of residential areas or upwind of residential areas.

7.3.2. Provide maintenance vehicle access to all range areas, including the backstop, side earth berm areas, and impact areas.

7.3.3. Soils. Do not use pea gravel to surface or edge the impact area of the range or the area between the firing line and the target line. Naturally occurring

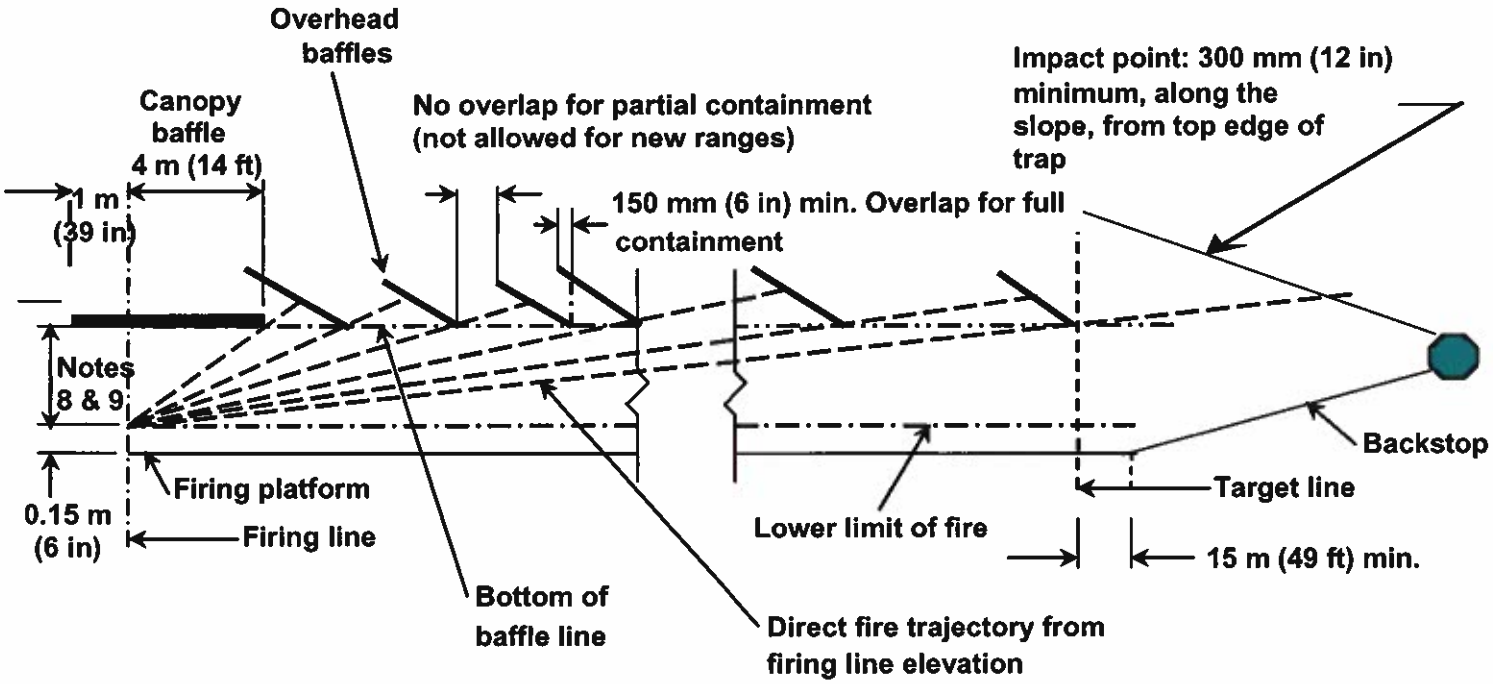
soils that are not excessively rocky may be used between the firing line and the target line. Typically these will be clays, clayey sands, sands, silts, and silty sands that are mostly free of rocks and debris, with no more than 15 percent of the material gradation retained on a 24-millimeter (1-inch) sieve.

7.3.3.1. Soil Amendments. BCE environmental management must test soils within the impact areas for pH levels every two years. The desired pH ranges from 7 to 8. Test soil additives to ensure that they will not cause cementing or hardening of the soil surface. Do not use lime as an additive or soil conditioner when the natural soil gradation includes more than 30 percent passing the #200 sieve, American Society for Testing and Materials (ASTM) C136, *Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates*, and/or the natural soil Plasticity Index is higher than 12.

7.3.3.2. Vegetation. Maintain vegetation on berms and drainage-ways when possible. Plant grass on impact areas. Turf grasses do an especially good job of retaining water and sediment onsite. Choose a grass variety that is native to the area and will require minimal water and fertilizer.

7.3.3.3. Reclamation and Recycling. Remove lead from the impact face of earth berm backstops when there is evidence of lead mass buildup. This will typically require that soil be excavated to a depth of 0.6 to 0.9 meter (2 to 3 feet) and screened using a 4-millimeter (#5) wire screen. Personnel certified in lead reclamation and wearing proper personal protection may sift the lead from the soil by screening onsite after consulting with bioenvironmental engineering personnel and satisfying all environmental requirements. Reclaimed lead must be disposed of or recycled in accordance with federal, state, and local laws and regulations. Consult BCE environmental management, bioenvironmental management, and the Defense Reutilization Management Office (DRMO) about reclaiming, recycling, or disposing of lead. Lead removed from bullet traps and earth berms is not considered a hazardous waste if recycled for metal recovery.

7.4. Additional Criteria for Fully Contained Ranges. Construct fully contained ranges to preclude any bullets from leaving the limits of containment. This requires additional attention to detail so no gaps, openings, or other paths for bullet escape are present. Use ballistic safety structures to provide the containment. For fully contained ranges, construct overhead baffles with a minimum of 150 millimeters (6 inches) of horizontal overlap between the trailing edge of any baffle and the leading edge of the next baffle downrange. This arrangement will provide containment such that a vertical line perpendicular to the range floor and projected upwards does not encounter any "blue sky" space. Figure 8 shows a baffle arrangement for full containment.



NOTES

1. This profile is based on a level range and a fixed firing line.
2. The target distance is established by CA to satisfy the intended training or courses of fire.
3. A tactical, fully contained range will allow shooters to move laterally along the firing line and downrange.
4. Overhead baffles must be angled from 12° to 32° from the horizontal.
5. Fully contained ranges require a 150-mm (6 in) minimum baffle overlap.
6. For existing partially contained ranges, baffles are spaced as required to bring the bullet into the baffle at a point not less than 300 mm (12 in) below the top of the following baffle as measured along its slope.
7. The bullet impact point on the bullet trap is not less than 300 mm (12 in) below the top edge of the trap as measured along the slope.
8. If vehicle access is not required, locate the bottom of the baffles at least 2.45 m (8 ft) above the firing platform.
9. If vehicle access without machine gun pedestal, locate the bottom of the baffles at least 3.68 m (12 ft) above the platform.
10. The canopy baffle may be sloped up to 30 degrees from the horizontal. If sloped, the high point of the canopy is closest to the target line.

Figure 8. Typical Overhead Baffle Configuration

7.4.1. Construct ballistic safety structures for fully contained ranges with attention to the quality of the fabricated parts. Baffle plates with butt joints must fit together closely to prevent any gaps more than 1.6 millimeters (0.0625 inch) wide. Modern plate-cutting techniques can provide precise dimensions, but particular care must be taken in erecting the baffles to ensure a precision fit of parts. The development of construction/erection details that use overlapping joints and joint-closure plates may provide a better, more economical solution than precise fabrication and also may simplify the erection procedures.

7.4.2. Good examples of fully contained ranges are at the Federal Law Enforcement Training Center in Glynco, Georgia. These ranges are considered fully contained and have a track record of millions of rounds fired without a single documented case of a bullet leaving the containment limits.

7.4.3. Additional Criteria for Vehicle Access. New training scenarios will use vehicles for practicing vehicle dismount, cover, and engagement of targets from the vehicle. The design vehicle for range design purposes is a HMMWV ("Humvee") without a pedestal-mounted weapon. Vehicle access requires consideration of higher clearance from range floor to baffles and vehicle paths into the range. See Figure 8.

7.5. Ballistic Safety Structures.

7.5.1. Canopy Baffles. A canopy baffle is an angled or horizontal baffle attached to and directly above the firing platform, extending downrange from the firing line. It prevents direct-fired rounds from escaping the range between the firing line and the first overhead baffle. The bottom of the canopy baffle must be at least 2.45 meters (8 feet) above the level of the firing platform if vehicle access is not required. The canopy will begin at least 1 meter (3.2 feet) behind the firing line and extend at least 4 meters (14 feet) forward of the firing line toward the target line. The canopy baffle must block line-of-sight daylight from any possible firing position. A canopy baffle may be used to provide a covered firing line position. A canopy baffle may be used on a non-contained range without either overhead baffles or side containment. Face the portion of the canopy baffle directly over the firing positions with plywood or lumber of sufficient thickness to capture the ricochet from a round fired directly over the shooters.

7.5.2. Overhead Baffles. An overhead baffle is an angled baffle (vertical baffles are not authorized for new range projects) installed downrange to deflect and contain direct-fired rounds. Install overhead baffles downrange beyond the firing line to prevent line-of-sight daylight when sighting downrange from any firing position. A shallow angle deflects bullets more easily and there is less metal fatigue and denting in the surface of the plate. A fully contained range requires a 150-millimeter (6-inch) minimum overlap of baffles. The overlapping baffles will allow shooter movement throughout the range and will prevent projectiles from leaving the range even if the weapon is accidentally fired straight up. Line-of-

sight analysis shall consider rounds fired from any angle and any training position forward of the firing line. Angled overhead baffles redirect projectiles downrange. Install angled overhead baffles with the bottom edge further downrange than the top edge. Install overhead baffles parallel to the firing line. Under no circumstances may any "blue sky" be visible forward of the firing line from any firing position. Refer to Figure 8 for a typical configuration. Install angled overhead baffles for new ranges and baffle replacement projects.

7.5.3. Ground Baffles. Ground baffles are not permitted on Air Force ranges.

7.5.4. Baffle Construction. As a minimum, use materials specified in Table 3. These materials may also be used for protective construction. For angled steel plate baffles, install plywood facing to prevent "splash-back" ricochets on baffles located within 5 meters (16.4 feet) of the expected position of the shooter. If shooters move downrange and fire, the splash-back protection will be required for baffles at the downrange locations as well. **Note:** Install acoustic materials to canopy baffles to reduce noise. **Note:** The Brinnell Hardness Number (BHN) measures steel hardness. The higher the BHN, the harder the steel.

Table 3. Construction Materials for Canopy and Overhead Baffles

Weapons	Ammunition	Construction*
Handguns	.22 LR, .38 cal., .45 cal., .357 cal., 9mm, .44 cal.	6 mm (0.25 in) steel plate with a nominal 440 BHN or higher, covered with one sheet of 19 mm (0.75 in) and one sheet of 11 mm (0.4375 in) plywood
Rifle, carbine, machine gun	5.56mm, 7.62mm, .30 cal.	10 mm (0.375 in) steel plate with a nominal 500 BHN, covered with one sheet of 19 mm (0.75 in) and one sheet of 11 mm (0.4375 in) plywood

***Notes:**

1. On steel plate baffles, install plywood facing on overhead baffles located within 5 meters (16.4 feet) of the shooter to mitigate the risk of "splash-back" ricochets. Attach the 19-millimeter (0.75-inch) sheathing to the steel using flathead countersunk screws. Attach the 11-millimeter (0.4375-inch) plywood to the 19-millimeter (0.75-inch) sheathing using #8 flathead screws at 300-millimeter (11.8-inch) spacing.

2. Nominal AR500 ballistic plate manufactured to BHN 500 may have BHN values ranging from 480 to 530.

7.5.5. Side Containment or Sidewalls. Sidewalls are required to prevent direct fire from exiting the range. Finished elevation of a sidewall must be above the top edge of the highest overhead baffles. Each sidewall must be at least 1.52 meters (5 feet) from the outside edge of the firing position limits of fire and extend at

least 1 meter (3.2 feet) to the rear of the firing line. Sidewalls may be made of earth, fully grouted reinforced masonry block (CMU), reinforced concrete, or hardened steel.

7.5.5.1. Continuous Walls. Vertical smooth-faced walls constructed of reinforced concrete, CMU with fully filled cores, or hardened steel may be used for sidewalls. Table 4 lists minimum wall thicknesses. Design these walls for all dead and live loads, including lateral forces. See paragraph 7.2.9 for noise reduction requirements. Walls will extend 1 meter (3.2 feet) behind the firing line to prevent a bullet fired parallel to the firing line from leaving the range.

Table 4. Sidewall Minimum Thickness

Material	Caliber			
	.45/9mm	5.56mm	7.62mm	.50
3500 psi concrete	150 mm (6 in)	150 mm (6 in)	200 mm (8 in)	300 mm (12 in)
Grout-filled CMU	200 mm (8 in) CMU	300 mm (12 in) CMU	300 mm (12 in) CMU	600 mm (24 in) CMU

7.5.5.2. Discontinuous Sidewall Baffles. Side baffles are similar to overhead baffles, except they provide discontinuous protection to each side of the range outside the entire length of the line of fire. They are set between 15 and 45 degrees relative to the line of fire and provide an advantage over continuous walls whenever cross-range ventilation is needed.

7.5.5.3. Earth Berms. The slope of earth berms must not exceed a 2:3 vertical-to-horizontal ratio unless materials are stabilized. If native soil characteristics will not produce a stable slope at this angle, use fabric reinforcement in the fill. The soil may require conditioning to achieve satisfactory soil pH levels to prevent lead decomposition. Typical angles of repose for natural soils in loose or least-dense state are shown in Table 5. Use Table 5 only as a guide, since mechanical stabilization may increase the angle of repose. The width of the top of the berm must be at least 3 meters (9.8 feet). Construct the outer layer (2 meters [6.5 feet] thick) of the impact face with sands, silty sands, or clayey sands, free of rocks, and with 100 percent passing the #4 sieve, ASTM C136. Soil with more than 40 percent clay-size particles passing the #200 sieve is not acceptable for the outer 2-meter (6.5-foot) layer of the impact face. Clay may be used for the core. For erosion control, plant a vegetative cover on the faces and tops of berms.

Irrigation devices may be used on the faces and tops of berms not subject to direct fire. Ensure access for maintenance vehicles.

Table 5. Natural Angles of Repose (Internal Friction) for Naturally Occurring Soils

Soil Types	Angle of Repose/ (Internal Friction)
Silty sand/fine sand/clayey sand	30
Coarse sand	35
Silts	25
Gravel/sandy gravel/gravelly sand	34

7.5.6. Backstops. A backstop is used behind the target line. It must stop a direct-fire bullet by media capture or deflect the bullet into a trap.

7.5.6.1. Earth Backstops. Earth backstops are the most common backstop for outdoor ranges. As an example, for a 25-meter (82-foot) outdoor range, locate the backstop so the longitudinal centerline of the berm (backstop) is at least 50 meters (164 feet) from the firing line. The toe of the slope must be located at least 9 meters (29.5 feet) from the target line nearest the backstop. The top of the backstop must be high enough so that a line drawn from the firing line and under the last overhead baffle will intersect the backstop at least 2 meters (6.5 feet) below its top. The impact face of the earth backstop must be soil with 100 percent passing the #4 sieve, ASTM C136, for a depth of 2 meters (6.5 feet). The slopes should be stabilized with grass vegetation with access locations provided for maintenance and repair equipment. Incorporate a steel deflector plate (eyebrow) into the backstop if a higher degree of confidence is required to prevent direct-fired rounds from leaving the impact area of the backstop. Soil with more than 40 percent clay-size particles passing the #200 sieve is not acceptable for use in the impact area face of the backstop. If required, soil should be conditioned to achieve suitable pH levels as indicated in paragraph 7.3.3.1.

7.5.6.2. Metal Backstops. Metal backstops are large plates installed behind the target line to stop direct fire and ricochets. Metal backstops are not approved for new construction. They are typically found on older existing partially contained or fully contained ranges but may be found on non-contained ranges. A metal backstop is not a bullet trap. See paragraph 7.5.6.4 for a discussion of bullet trap requirements. The metal backstop should be located a minimum of 15 meters (49 feet) beyond the target line to allow target and backstop maintenance and to minimize the possibility of splashback ricochets or lead exposure to the shooters executing a

downrange course of fire. Additionally, provide sufficient vehicle access to maintain the backstop. The required direct fire and ricochet containment must not be compromised when providing vehicle access. On outdoor ranges, provide corrosion protection for a metal backstop. Painting does not provide adequate protection. Consider adding an overhead cover to provide protection.

CAUTION

Do not use armor-piercing or incendiary rounds with metal backstops or bullet traps unless the backstops or traps have been designed to accommodate these rounds. If commercially designed range components are used, ensure that the products satisfy the design requirements for the ammunition used on the range.

7.5.6.3. Backstop Deflector Plates (Eyebrows). A deflector plate is not a bullet trap. See paragraph 7.5.6.4 for a discussion of bullet trap requirements. A backstop deflector is typically installed on top of an earth backstop to provided added containment safety. Install the backstop deflector plate at an angle between 30 and 42 degrees from horizontal. Angles other than these are permissible if test data and calculations support the design. Set the highest edge of the deflector plate nearest the firing line. The shallow angle deflects bullets more easily and there is less metal fatigue and denting in the surface of the plate. Anchor steel plates supported by concrete or masonry with flush countersunk heads. Eliminate exposed edges which may produce erratic ricochets. Ensure edges of steel plates are milled at all joints and joints are butted flush and smooth. Plates must be free from buckle or wave. Exposed edges must be chamfered to a 45-degree angle to a fillet approximately 4 millimeters (0.16 inch) wide. Exposed structural members supporting deflector plates are not permitted. Welding must conform to American Welding Society (AWS) D1.1, *Structural Welding Code – Steel*, latest edition. Position steel plates so welds are no closer than 450 millimeters (17.7 inches) from the center of a target position. Steel plate jointed at and supported on structural steel supports must be spot-welded. (See Figure 11.)

7.5.6.4. Bullet Traps. Only commercially designed and constructed bullet traps are permitted. Sand, media or water traps (recycled lubricating water excepted) are not permitted in new construction. Bullet traps are typically used on contained ranges and placed in front of the backstop or rear wall of the range. They are total systems that deflect, stop, trap and contain direct-fired rounds, and may incorporate vacuum or other dust-management systems to capture projectile particles. Bullet traps installed at indoor ranges must have a dust-management system installed to provide heavy metal particle removal from the range environment. The bullet trap must be

designed to accommodate the ammunition/weapon to be fired as well as the expected quantity of ammunition fired (annual rate of fire). The bullet trap should extend the entire width of the firing line. The trap shall not present any blunt surface exposure that would create a ricochet hazard internal to the equipment or at the connection to the sidewalls and floor. All future purchases of bullet traps must incorporate trap designs with a continuous, non-partitioned, and unbroken slot or bullet path into the deceleration chamber. Typical designs have in the past had fabrication details with vertical bulkhead plates in the deceleration chambers. These plates create vertical blunt edges that cause back-splash-type ricochets of the steel penetrator tips of the M855 5.56mm round. There have been documented cases of the steel penetrator tips ricocheting back to the firing line and endangering the shooters. The trap must have the capability to be cleaned of accumulated deposits of bullets and fragments while minimizing lead exposure to the maintainer.

Note: Only trained personnel wearing proper personal protection will remove lead, and only after consulting with bioenvironmental engineering personnel and following the trap manufacturer's recommended procedures.

The space directly behind the bullet trap must be easily accessible for maintenance and repair of the bullet trap and backstop. The bullet trap metal thickness and hardness must meet the minimums listed in Table 6 for each type of ammunition to be fired on the range. If lesser thicknesses are proposed, the range component designer must provide test data and calculations supporting a lesser thickness. Angles of the metal plates must conform to those directed by the manufacturer to handle the munitions fired from varying shooter positions, target distances, and target positions. Design all traps for tracer rounds if a tracer round can be used in the weapon operated on the range.

7.5.6.4.1. Qualifications for Commercial Trap Manufacturers. Commercial bullet trap and range component manufacturers must demonstrate at least five years of continuous component manufacturing and submit a minimum of five examples of similar range components installed by the manufacturer, with customer references.

Table 6. Minimum Steel Plate Thickness for Metal Backstops, Deflector Plates, and Bullet Traps

Max Angle	Ammunition	Armor Plate/ 300 BHN	440 BHN	500 BHN
42	.22 LR rim fire	6 mm	6 mm	6 mm
42	.38 cal. ball	10 mm	6 mm	6 mm
42	.45 cal./.357 cal.	10 mm	6 mm	6 mm
42	9mm pistol	10 mm	6 mm	6 mm
42	.44 cal. magnum	12 mm	10 mm	10 mm
30	5.56mm, 7.62mm	12 mm	Not recommended	10 mm
30	.30 cal. carbine	12 mm	Not recommended	10 mm

Note: 0.25-inch and 0.375-inch plate may be substituted for 6-mm and 10-mm plate, respectively.

7.5.7. Metal Backstop, Deflector Plates, and Bullet Trap Material.

7.5.7.1. Construct metal backstops, deflector plates, and bullet traps with the minimum metal thickness and hardness listed in Table 6. Small variations of BHN (less than 5 percent lower than the nominal number) are acceptable.

The design/specification must reference the applicable ASTM standard or MIL SPEC, the grade of steel required, and the hardness. To ensure that the correct grade of steel is installed (all steel plate looks the same), require a certificate of compliance. The plate thickness tests were conducted for the plate angles listed; however, a flatter plate angle is desired (the flatter the angle of the plate, the better). A shallow angle deflects bullets more easily, and there is less metal fatigue and denting on the surface of the plate.

7.5.7.2. Do not use mild structural steel, carbon steel plate, or low-alloy steel conforming to ASTM A36/A36M, *Standard Specification for Carbon Structural Steel*, ASTM A242/A242M, *Standard Specification for High-Strength, Low-Alloy Structural Steel*, or A572/A572M, *Standard Specification for High-Strength, Low-Alloy Columbium-Vanadium Structural Steel*; they lack adequate pitting resistance and deteriorate rapidly on small arms ranges.

7.6. Range Support Facilities. Range support facilities include the CA building and munitions storage room/building (Category Code 171-476), a building for the storage of range supplies and equipment (Category Code 171-472), and a building for target storage and repair (Category Code 171-473).

7.6.1. CA Building. The CA building provides a temperature-controlled environment for the CA section. The building houses classrooms, administrative offices, weapons maintenance areas, space for the cleaning and degreasing of

weapons, an alarmed weapons and munitions storage room, sanitary facilities, a student weapons cleaning room, and miscellaneous storage. Figure 9 presents an example of a typical floor plan. A small arms range with more than 21 firing points or an installation with more than one range or type of range requires proportionately larger facilities. Give consideration for space to accommodate weapons simulator training as mission needs dictate.

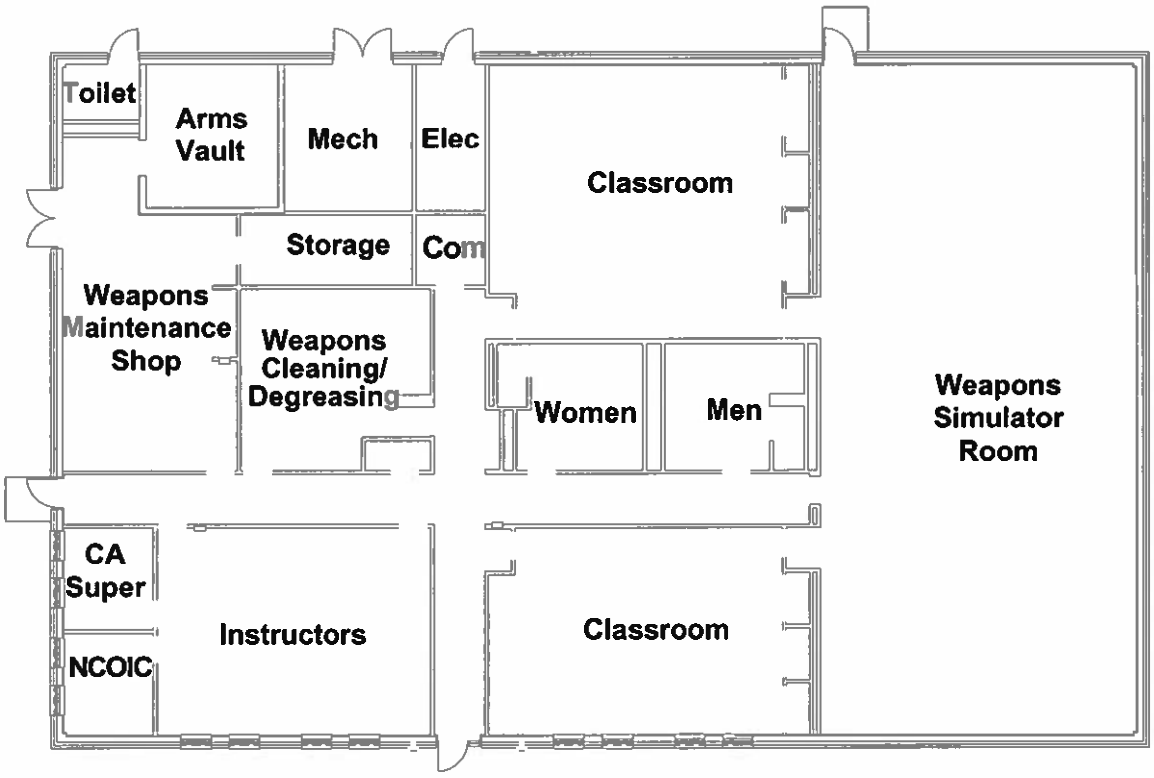


Figure 9. A Typical CA Building Configuration

7.6.1.1. Classrooms. Classrooms must be large enough to provide each student receiving handgun, rifle, shotgun, or submachine gun training a chair and a table work surface of at least 610 by 915 millimeters (24 by 36 inches). Provide space for each student receiving machine gun or LAW training to accommodate a work surface of at least 865 by 1145 millimeters (34 by 45 inches). The classroom will include a raised instructor's platform, aisle space for instructor access to individual tables, and sufficient space and connections for audiovisual equipment and computers.

7.6.1.2. Administrative Space. This area (typically about 13 square meters [140 square feet]) contains offices for program administrators and CA personnel such as the NCOIC and several instructors.

7.6.1.3. Weapons Simulator Room. This room is specifically designed for commercially purchased projection-based weapons simulators. A five-lane system requires a room approximately 10.7 meters by 5.3 meters (35 feet by 17.5 feet). A ten-lane system requires approximately 10.7 meters by 10.7 meters (35 feet by 35 feet). The room should have at least a 2.7-meter (9-foot) ceiling height and no windows. The room must have dimmable lighting, HVAC, and a minimum of four 110-volt and/or 220-volt dedicated power outlets to operate air compressors, projectors, and computers. Two dedicated telephone lines are required for operating the system and for remote diagnostic support.

7.6.1.4. Weapons Maintenance Shop. The weapons maintenance shop must have space for workbenches, hand tools, power tools, equipment, and spare parts storage. A range that supports less than 5,000 weapons requires a 28-square-meter (300-square-foot) shop. An installation that supports over 5,000 weapons will require 37 square meters (400 square feet). Provide a lavatory with potable water in the immediate area. An emergency eyewash station is also required. Provide additional ventilation as required. Maintain relative humidity (RH) below 65 percent.

7.6.1.5. Weapons Cleaning/Degreasing Room. This room accommodates workbenches, degreasing tanks, and spray hoods. Special design requirements include exhaust and ventilation air, vapor-proof electrical fixtures, compressed air service, and solvent-resistant wall and ceiling finishes. The minimum space requirement is typically about 12 square meters (130 square feet). A lavatory with potable water should be in the immediate area. An emergency eyewash station is also required. The installation safety office and bioenvironmental engineering may have additional design requirements. Exhaust make-up air can be transferred from the administrative and classroom area as long as sufficient ventilation air is provided in those areas to prevent negative air pressure in relation to the outside.

7.6.1.6. Weapons and Ammunition Storage. The vault provides secure storage for all weapons for which the CA section is responsible and a less-than-30-day supply of each type of ammunition used on the range. A gross floor area of 14 square meters (151 square feet) is usually adequate. Room construction must satisfy the requirements of AFI 31-101, *The Air Force Installation Security Program* (FOUO), and UFC 4-020-01, *Security Engineering: Project Development* (FOUO), for construction materials and specifications. Additionally, requirements of DOD 5100.76-M, *Physical Security of Sensitive Conventional Arms, Ammunition, and Explosives*, must be satisfied. In general, vault construction must provide a minimum ten minutes of forced entry delay. Typical vault construction features walls, floors, and roof of 200-millimeter (7.9-inch) concrete reinforced with two layers of number 4 rebar on 225-millimeter (9-inch) centers, fitted with a class V door. Maintain RH below 65 percent.

7.6.1.7. Latrines (Sanitary Facilities). Provide facilities for both men and women. Provide additional cold water hand-washing stations at the entrance to the CA building and at the firing range. The size of sanitary facilities depends upon the class size at that particular installation. Typically, the women's latrine need only accommodate about one-fourth the number of people as the men's latrine. Because instructors have daily contact with lead/heavy metals and may transfer these contaminants by casual contact, hand-washing stations, showers, changing areas, laundry facilities, and lockers should be provided for instructors to remove lead contamination. Use of these facilities will prevent recurring casual contamination and potential health concerns away from the range facilities. Cold water should be used for body washing to prevent lead absorption; do not use hot water since it opens the pores of the skin and permits easier absorption.

7.6.1.8. Student Weapons Cleaning Area/Room. Students must clean their weapons after completing firing. The cleaning area may be outside as long as it is covered; in cold climates, provide a room large enough to accommodate cleaning tables/benches and cleaning materials. Ensure the room is well ventilated and contains an emergency eye wash station.

7.6.1.9. Miscellaneous Storage. A storage area is required for administrative supplies, training aids, tools, and miscellaneous items. The size of this area is directly related to the type and quantity of training accomplished by the CA section.

7.6.2. Range Supplies and Equipment Storage. This building provides secure storage for miscellaneous range supplies, tools, and equipment. Use prefabricated metal, reinforced concrete, reinforced masonry, or wooden construction. Depending on location, type, and value of items stored, this facility may be combined with the target storage and repair building.

7.6.3. Range Target Storage and Repair Building. This facility provides space for repairing and storing targets and related equipment items, including target mechanisms and construction and repair material. Use prefabricated metal, reinforced concrete, masonry, or wooden construction. The repair space contains tables and workbenches. An electrical power source for operating power tools is required.

7.7. Specialty Weapons Ranges.

7.7.1. 40mm Grenade Launcher Range (Figure 3). The range supports firing of 40mm low-velocity grenades fired from M79 and M203 grenade launchers. The entire surface of the impact area must be cleared of vegetation or clipped extremely close during mowing so grenades will readily detonate on impact and EOD personnel can easily locate dud high-explosive rounds for disposal.

Construct targets using lumber, steel, or concrete. Terrain features, course of fire, and weather conditions determine if a spotting tower may be needed for observing the impact area (to note point of impact for adjustment of fire and for safety). Range personnel must be able to spot and mark dud rounds as they occur. A central tower high enough to permit observation of the entire range may be required. The range must have electrical power and lighting for the night-fire course.

7.7.2. LAW Range (Figure 4). The LAW range is set up for firing the M72 66mm rocket, the M73 35mm sub-caliber training device, and the AT-4. The danger zone to the rear of the launcher (Area F) must be clear of personnel, material, and vegetation. Arrange firing points so individual back-blast areas do not overlap.

7.7.3. Ten-Meter Machine Gun Range. If a non-contained machine gun range is not available, the machine gun must be fired on either a 10-meter tube range or on a fully contained range designed to accommodate the firing of the automatic weapon. Ten-meter machine gun ranges must incorporate range tubes as described in paragraphs 7.7.3.1 through 7.7.3.3. Range tubes function as baffles, thereby reducing the SDZ requirements. When the machine gun tube range is constructed in accordance with Figures 10 and 11, the SDZ length requirement is 700 meters measured downrange from the firing line. Range tubes are not required on a fully contained range designed for firing automatic weapons which has ballistic safety structures (baffles, traps, berms) designed to prevent penetration of the containment based on the ammunition being fired. Range tubes also are not required for a non-contained range with sufficient real estate to accommodate the full SDZ. The machine gun tube range is acceptable for M60/M240B/M249 machine guns.

7.7.3.1. Machine Gun Tubes.

7.7.3.1.1. If a non-contained machine gun range is not available, the 10-meter machine gun range tubes must measure at least 1.52 meters (5 feet) inside diameter by 7.3 meters (24 feet) in length. The tubes may be constructed of sectional pieces as long as the spigot end of the bell-spigot joint is pointed downrange. Tubes may be made of reinforced concrete pipe and must meet ASTM C76, *Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe*, Class V reinforced concrete pipe (RCP) requirements, or may be steel pipe of suitable thickness fabricated from rolled plates. The interior of the tubes must have a smooth continuous surface. Repair any lifting lugs or holes so the tube interior is smooth and does not produce erratic ricochets.

7.7.3.1.2. For drainage, slope the tubes approximately 150 millimeters (6 inches) toward the target line. Firing positions must be at least 3.7 meters (12 feet) apart, measured center-to-center. The end of the tube toward the

shooter should touch the firing line. When firing, the muzzle of the machine gun will be at least 150 millimeters (6 inches) inside the tube (see Figures 10 and 11).

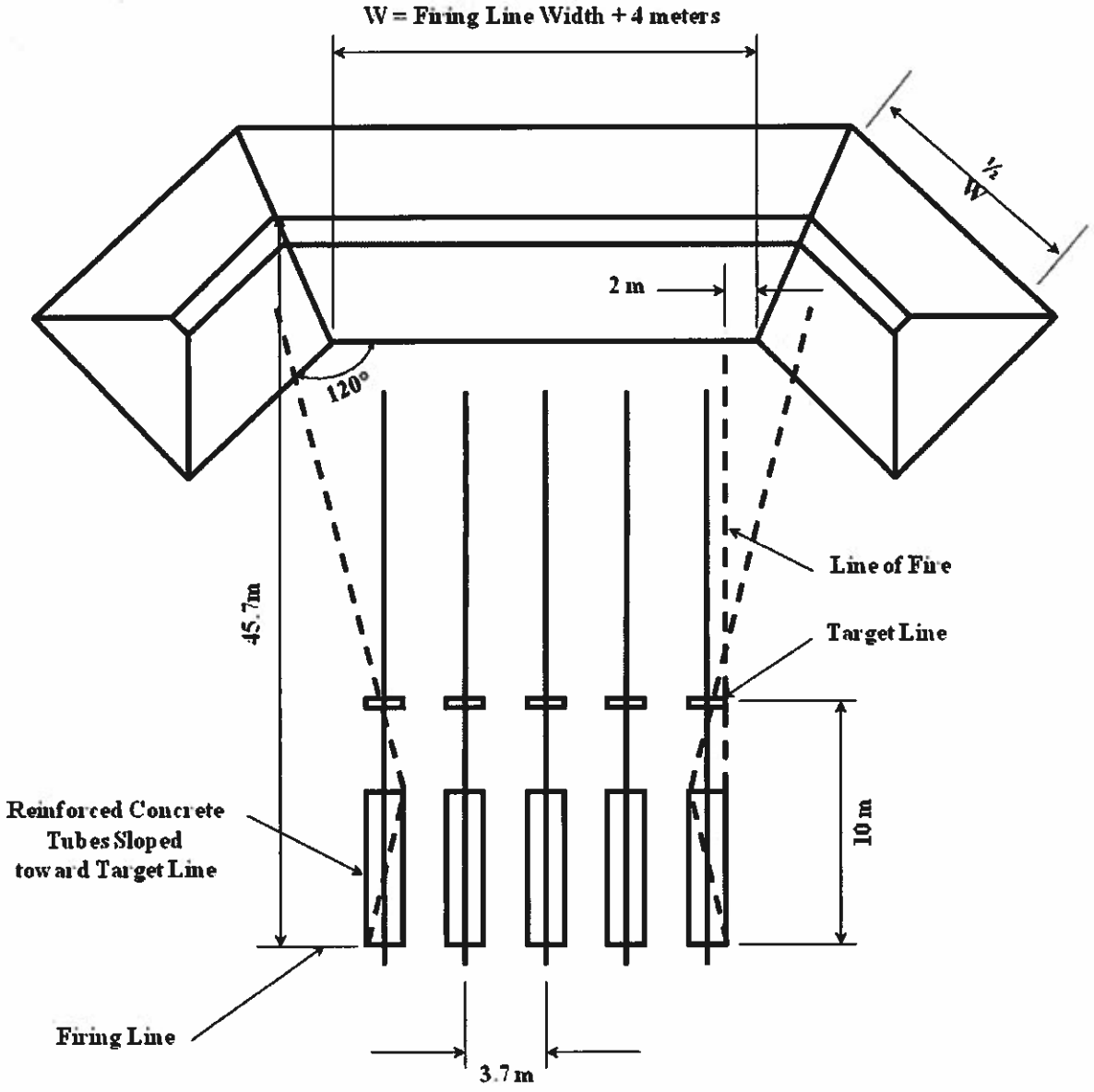


Figure 10. Machine Gun, 10-Meter Tube Range Typical Range Configuration

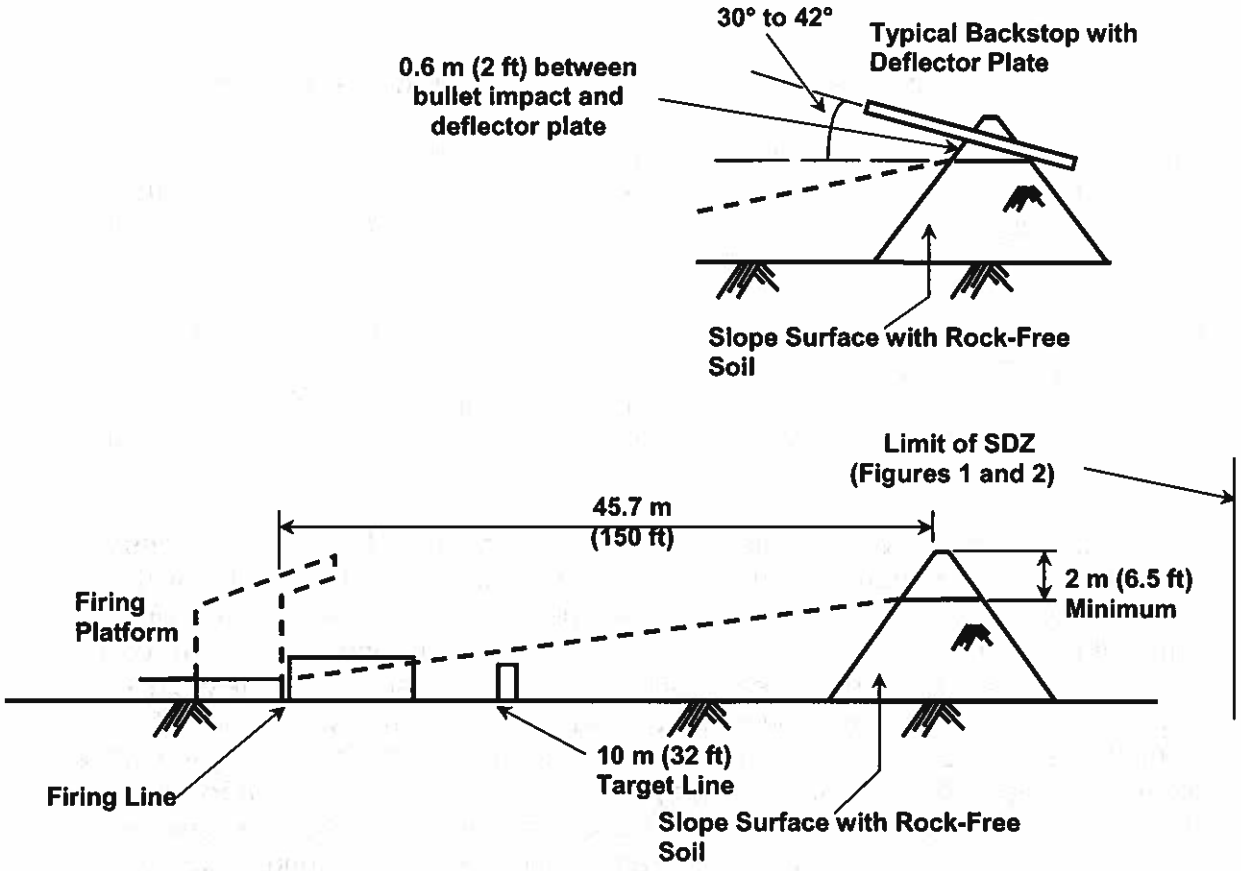


Figure 11. Machine Gun, 10-Meter Tube Range Typical Cross-Section

7.7.3.2. Firing Platform. Ensure that the firing tube placement and the firing platform height will place the muzzle of the machine gun at the approximate center of the tube diameter and at least 150 millimeters (6 inches) inside the tube. A recess in the platform may be needed, about 76 millimeters (3 inches) deep and large enough to accept a tripod.

7.7.3.3. Backstop/Deflector Plate/Bullet Trap. For berm backstops, locate the berm no more than 45.7 meters (150 feet) from the firing line to the centerline of the berm. The minimum height of the backstop is established by determining where a line drawn from the firing line to the backstop, and intersecting the highest point that a bullet could exit the target end of the tube, intersects the berm. This line must intersect the berm not less than 2 meters (6.5 feet) from the top. When a deflector plate is used, locate the deflector plate at least 0.6 meter (2 feet) above the bullet impact point on the berm. For metal trap backstops, locate the trap at least 25 meters (82 feet) away from the firing point. The line drawn from the firing point to trap shall intersect the top plate of the trap not less than 300 millimeters (12 inches) from the top, measured along the slope of the trap.

8. Design Review, Construction Inspection, Test Firing, and Trial Operation.

8.1. Design Approval. The design agent will submit a set of prefinal drawings and project specifications to the respective MAJCOM representatives of combat arms (CA), civil engineering (CE), safety (SE), and bioenvironmental engineering (SGPB) for review to ensure compliance with this ETL.

After MAJCOM approval is complete, HQ AFSFC/SFXW must approve all new range designs and major renovations (changes to the type or function of the range). This approval also applies to portable or trailer type ranges. HQ AFSFC/SFXW is the approval authority for deviations or waivers from design criteria and will coordinate requests with HQ AFCESA/CEOA.

8.2. Baffle Test Before Construction. For baffles which differ from the weapons and construction recommended in Table 3, construct baffle test blocks/cells using the baffle materials and construction details specified in the design documents. Completion of this test is required before construction and installation of the overhead baffles. From a protected position, a shooter will engage the test block/cell with direct fire from the most powerful round authorized for the range. The baffle test should have secondary containment to stop the round if it penetrates the test baffle. Do not test the baffle blocks/cells using tracers. Do not test baffles after they are installed in their overhead position. Conducting direct-fire tests following construction could be very unsafe and costly if the baffles fail to stop the round. Machine gun range tubes do not have to be tested if they meet the material requirements listed in paragraph 7.7.3.1.1.

8.3. Construction Inspection. The BCE will validate that the proper materials have been used and construction complies with the specifications and drawings. The range and its support facilities, when completed, must satisfy or exceed the requirements of this ETL. The materials, distances, and angles are critical to safety. Distances from the firing lines to target lines are critical and must be measured during construction and on completion of the range. On fully contained ranges, visually check baffles to make sure they overlap the required 150 millimeters (6 inches), there is no "blue sky" observed from any firing position or as one travels downrange toward the targets, and the HVAC system has been fully tested and commissioned.

8.4. Test Fire Requirements. After construction or rehabilitation, and before conducting training and qualification operations, CA personnel must accomplish controlled test-firing using tracer ammunition. If tracer ammunition cannot be safely fired on the range, CA personnel will fire ball ammunition with witness screens to conduct the test fire. Representatives of ground safety and CE will act as observers. The CA instructor will use the most powerful ammunition authorized for use on the range for the test. Remove all fire hazards from the range and areas surrounding the range. Make sure firefighting equipment is immediately available when conducting range tests using tracer ammunition. Provide sandbags or other protection for the

shooter during test firing. Hang witness screens of paper when firing non-tracer rounds to see if splash-back ricochets are occurring at the bullet trap when using the M855 round.

8.4.1. Non-contained Ranges. A test-fire is not required for a non-contained range. After the construction inspection confirms that the full SDZ land is available and all barriers, fences and signs are erected, proceed to trial operations.

8.4.2. Fully Contained Ranges. Do not test baffles with direct fire. Test baffles for direct-fired round containment before construction, as described in paragraph 8.2. To test for ricochet containment, the shooter first must fire service ammunition (non-tracer) from the prone position into the backstop and then at the floor. A test screen (witness) may be used to test the ricochet potential of the range floor. A test screen may be constructed from Celotex (National Stock Number [NSN] 5640-00-073-2803) or cardboard material, fashioned into a 1.2-meter by 1.2-meter (3.9-foot by 3.9-foot) four-sided cube. Place the test screen at different locations on the range floor. Fire into the range floor in front of the test screen at various angles from the firing line. To determine if ricochets would have left the range, sight along a small-diameter dowel placed through ricochet holes in the screen material. Take corrective measures if the angle of departure and the sighting verifies that the bullet left the range. To determine ricochet patterns, conduct tracer tests using the same caliber of ammunition to be used on the range. Using tracer ammunition is the fastest and most efficient method of determining ricochet patterns and hazard potential.

8.5. Trial Operations. Trial operation of a new or rehabilitated range is mandatory. The CA NCOIC and installation ground safety representative will be present during trial operations. Document the results of the trial operations in a range trial operation report. One copy of the trial operations report must be included in the construction acceptance documentation. The CA section will retain an additional copy on file for the life of the range. Include the following items in the report:

- Date of construction completion.
- Date of trial operation.
- Course of fire.
- Type of weapon, caliber, and ammunition used for the trial. (This must be the most powerful ammunition intended for use on the range.)
- Target system functioning (may be mechanical or fixed).
- Number of shooters who fired.
- Firing points used.
- Damage incurred or improperly functioning items.

9. Point of Contact. Recommendations for improvements to this ETL are encouraged and should be furnished to the Small Arms Range Program Manager, HQ AFCESA/CEOA, DSN 523-6332, commercial (850) 283-6332, e-mail AFCESAReachbackCenter@tyndall.af.mil

LESLIE C. MARTIN, Colonel, USAF
Director, Operations and Programs Support

3 Atchs
1. Minimum VDZ Height Requirements for Small Arms Ammunition for Non-contained Ranges
2. Operational Risk Management (ORM) Evaluation of Existing Range Facilities
3. Distribution List

MINIMUM VDZ HEIGHT REQUIREMENTS FOR SMALL ARMS AMMUNITION FOR NON-CONTAINED RANGES

Weapon/Caliber	Ammunition	Maximum Ordinate of Ammunition at 30° VDZ Meters (Feet)	Safety Factor Meters (Feet)	VDZ Height in Meters (Feet)
.22 long rifle		500 (1640)	175 (575)	675 (2215)
Handgun, .38 cal.	Ball, M41, PGU-12/B	500 (1640)	175 (575)	675 (2215)
Handgun, .45 cal. pistol		400 (1312)	160 (525)	560 (1837)
Submachine gun, .45 cal.		400 (1312)	160 (525)	560 (1837)
Handgun, .357 magnum		TBD	TBD	TBD
Handgun, 9mm pistol		500 (1640)	175 (575)	675 (2215)
Submachine gun, 9mm		TBD	TBD	TBD
Handgun, .44 magnum		TBD	TBD	TBD
Shotgun, 12 gauge	00 buckshot	200 (656)	130 (427)	330 (1083)
Rifle/machine gun, .30 caliber	Ball and M21	TBD	TBD	TBD
Carbine, .30 caliber		TBD	TBD	TBD
Rifle, 5.56mm	Ball, M193; tracer, M196	800 (2625)	220 (722)	1020 (3347)

Weapon/Caliber	Ammunition	Maximum Ordinate of Ammunition at 30° VDZ Meters (Feet)	Safety Factor Meters (Feet)	VDZ Height in Meters (Feet)
Rifle, 5.56mm	Ball M855; tracer, M856	900 (2953)	220 (722)	1120 (3675)
Rifle, 5.56mm	M862	TBD	TBD	TBD
Rifle/machine gun, 7.62mm	Ball, M80	1100 (3609)	265 (869)	1365 (4478)
Rifle/machine gun, 7.62mm	Match, M118	1200 (3937)	280 (919)	1480 (4856)
Machine gun, .50 cal.	Ball, M2 and M33/Tracer M17/M8 API/M20 APIT	1600 (5248)	340 (1115)	1940 (6365)
M79 and M203, 40mm low-velocity	M781/M407A1/M406/ M433/M381/M386/ M441	100 (328)	115 (377)	215 (705)
MK-19, 40mm high-velocity	M918/280M383/M430	500 (1640)	175 (575)	675 (2215)
M72 LAW, 35mm subcaliber	M73	300 (984)	145 (475)	445 (1460)
M72 Law, 66mm RKT HEAT	M72, 66 mm RKT HEAT	200 (656)	280 (919)	480 (1575)
AT4, 84mm RKT HEAT	M136	TBD	TBD	TBD

Notes:

1. VDZ in excess of 61 meters (200 feet) in height requires coordination with the local airfield manager.
2. Use a VDZ of 500 meters (1640 feet) for partially contained (baffled) ranges.

OPERATIONAL RISK MANAGEMENT (ORM) EVALUATION OF EXISTING RANGE FACILITIES

A2.1. Overview. Operational Risk Management (ORM) is a tool used to assess the risks associated with continued use of existing firing ranges that do not satisfy the minimum criteria outlined in this ETL. For further information on ORM, refer to AFI 90-901, *Operational Risk Management*, and AFPAM 90-902, *Operational Risk Management (ORM) Guidelines and Tools*. This attachment gives an example of how the ORM process can be applied to a safety evaluation of an existing range. Briefly, the ORM process can be considered to be a six-step process:

1. Identify the hazard
2. Assess the risk
3. Analyze risk control measures
4. Make control decisions
5. Implement risk controls
6. Supervise and review

A2.2. Action Items. The six steps of the process can be broken down into several sub-steps called "actions." A discussion of each action follows.

A2.2.1. Identify the Hazard. This step has three actions:

- Mission/task analysis (e.g., training personnel to fire weapons)
- Listing the hazards (e.g., fired rounds leaving the range)
- Listing the causes (e.g., baffles are of insufficient thickness)

Listing the causes of the hazards is the action where deficiencies or discrepancies are items that are found to not satisfy the ETL criteria. A tabular method for recording these actions and steps is presented in the following paragraphs.

A2.2.2. Assess the Risk. This step has three actions:

A2.2.2.1. Assess hazard severity category:

- I Catastrophic (i.e., mission failure, death, system loss)
- II Critical (i.e., major mission impact, severe injury, or major system loss)
- III Moderate (i.e., minor mission impact, injury, or system damage)
- IV Negligible (i.e., little mission impact, minor injury, or damage)

A2.2.2.2. Assess the mishap probability:

- A – Frequent, daily, often, 10^{-1} to 10^{-4}
- B – Likely, three weeks, occurs several times, 10^{-2} to 10^{-4}
- C – Occasional, six months, will occur, 10^{-3} to 10^{-5}
- D – Seldom, five years, could occur, 10^{-4} to 10^{-6}
- E – Unlikely, past five years has not occurred, rarely, 10^{-5} to 10^{-7}

A2.2.2.3. Assign a numerical rating based on the combination of steps A2.2.2.1 and A2.2.2.2. See Table A2.1 for the numerical value to assign to the risk.

Table A2.1. Mishap Probability

Severity		Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic	I	1	2	6	8	12
Critical	II	3	4	7	11	15
Moderate	III	5	9	10	14	16
Negligible	IV	13	17	18	19	20

Note: Lower numbers indicate the highest risk.

A2.2.3. Analyze Risk-Control Measures. This step has three actions:

A2.2.3.1. Identify risk control options: Measures taken to mitigate the risk.

A2.2.3.2. Determine control effects: Select the control options desired for consideration.

A2.2.3.3. Determine the residual risk: Prioritize the control measures and re-score the risk based on the implemented control measures using the same procedures in paragraph A2.2.2.3.

A2.2.4. Make Control Decisions. This step has two actions:

A2.2.4.1. Select the risk control measures to implement.

A2.2.4.2. Decide whether the residual risk level is acceptable or not.

A2.2.5. Implement Risk Controls. This step has three actions:

A2.2.5.1. Make the implementation clear to all parties.

A2.2.5.2. Establish accountability and responsibility for implementing risk-control measures.

A2.2.5.3. Provide support to those tasked to implement the control measures.

A2.2.6. Supervise and Review. There are two actions in this step:

A2.2.6.1. Supervise the implementation of the control measures.

A2.2.6.2. Review the effectiveness of the control measures.

A2.3. Example. The following example shows a tabular method for performing the operational risk assessment for existing firing ranges. The example shows discrepancies taken from an actual assessment made at a real world Air Force base.

BASE "X" FIRING RANGE
OPERATIONAL RISK EVALUATION

Discrepancy	ORM STEP 1	ORM STEP 2			ORM STEP 3		ORM STEP 4	ORM STEP 5	ORM STEP 6
	Hazard	Severity	Probability	Risk	Control Options	Residual Risk	Decision	Implementation	Results
Baffle materials do not meet ETL guidelines	Shoot through the baffle and bullets leave the range containment	I	C	6	Add additional thickness to baffles, or replace with correct material	Repair or replace will yield I,E=12	12	Make repairs	Compare as-built repairs with ETL guidelines
Baffle materials or slopes do not meet ETL guidelines	Ricochet	II	C	7	Install plywood facing on two baffles nearest the shooter, frangible ammunition	Install plywood facing is II,D=11. Frangible ammunition is III,E=16	16	Buy frangible ammunition	Verify ammunition performs as advertised
Baffle materials or slopes do not meet ETL guidelines	Lead pollution, outside of containment	II	C	7	Lead-free ammunition, frangible ammunition	Lead Free is IV,E=20. Frangible ammo is III, D= 14	20	Buy lead-free ammunition	Verify that lead ammunition is no longer being used
Side wall berm has an opening that is visible to some firing positions	Bullets leave the range containment	I	A	1	Fill in the opening or establish a procedure to not use those firing positions	Fill opening is IV,D=19. Procedure is II,E=15	19	Fill in opening	Re-inspect to verify opening has been closed
Side wall berm has an opening that is visible to some firing positions	Lead pollution, outside of containment	II	A	3	Fill in the opening or establish a procedure to not use those firing positions; lead monitoring program; lead-free ammunition	Fill opening is IV,D=19. Procedure is II,E=15. Lead Monitoring is II,E=15, Lead Free Ammo is IV,E=20	19	Fill in opening	Re-inspect to verify opening has been closed
Surface water runoff can leave the range	Lead pollution, outside of containment	II	C	7	Water monitoring program, including surface water samples and groundwater monitoring wells	Monitoring program is II,E=15	15	Install monitoring wells and hire environmental testing firm	Regular reports documenting monitoring results

DISTRIBUTION LIST

DEPARTMENT OF DEFENSE

Defense Commissary Agency (1)
Design and Construction Division
2250 Foulois St., Suite 2
Lackland AFB, TX 78236

AAFES (1)
ATTN: RE-C
PO Box 660202
Dallas, TX 75266-0202

SPECIAL INTEREST ORGANIZATIONS

Information Handling Services (1)
15 Inverness Way East
Englewood, CO 80150

Construction Criteria Base (1)
National Institute of Bldg Sciences
Washington, DC 20005

Leon Hughes

From: Wanda Parrish
Sent: Tuesday, April 25, 2017 4:12 PM
To: Leon Hughes
Subject: FW: Crucible Re-zoning request
Attachments: 284 homes.jpg

From: Stephan Picard [mailto:sjpicard@gmail.com]
Sent: Tuesday, February 07, 2017 2:15 PM
To: Wanda Parrish
Cc: Aimee Mann; Mark Brinkman; Dallas CIV George M
Subject: Crucible Re-zoning request

Good Afternoon Ms Parrish,

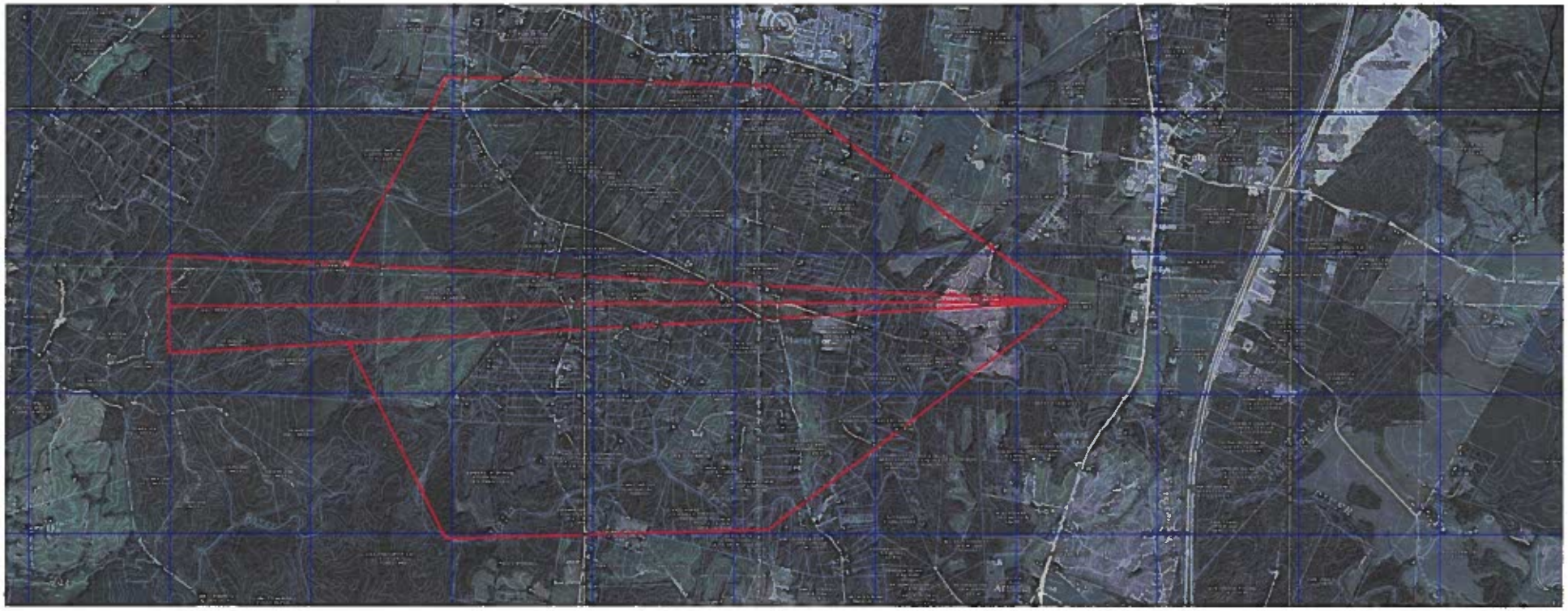
I was hoping that you might provide an update as to if the county had received the re-zoning request? As you know we in that area are very very concerned about both the physical danger of errant rounds, but also the exemption for Noise abatement.

Our group overlayed the Surface Danger Zone for 50 caliber ammunition (which is considered small arms) over the map of our county and we show that there are 284 homes in the Surface Danger Zone. I am hopeful that as a part of this process the county asks the developer to provide this information for each caliber weapon to be used? I think that this is a serious liability for the county if approved and somehow the supervisors would need to assure all those homeowners they are not in danger. I cannot imagine how you would resell a home that is inside a SDZ so this is a critical planning factor. I have included an example here and a number of us have decades of range experience and would be happy to discuss if you like.

thank you,
Stephan Picard

--
This email was Malware checked by UTM 9. http://www.sophos.com

Surface Danger Zone
.50 Cal M2 ball
Distance X: 6,500M
284 properties within the SDZ



Ref USMC Range Safety Pocket Guide p32

Leon Hughes

From: Wanda Parrish
Sent: Tuesday, April 25, 2017 4:11 PM
To: Leon Hughes
Subject: FW: Noise

-----Original Message-----
From: Brinkman Col Mark T [mailto:mark.brinkman@usmc.mil]
Sent: Wednesday, January 18, 2017 9:44 AM
To: Gary Skinner; Wanda Parrish
Subject: Noise

Mr. Skinner and Ms. Parrish,

I have been doing lots of reading on noise from small arms. The below link is one of the many source documents my statements were based on last night. What I like about this document is that it gives a good understanding of noise issues in a very short concise length. If you have time I would recommend opening the document and reading section 2.4.1 and 2.4.2 starting on pg 11, and section 2.4.4 starting on pg 15. 3 pages total of reading and this document uses the same source information I used in the graphics on the handouts I gave you.

http://vko.va.ngb.army.mil/virginiaguard/environmental/VAARNG%20SONMP%20Final%20July%202005.pdf

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This email was Malware checked by UTM 9. http://www.sophos.com

Thomas and Shirley Brady
6109 Taverneer Lane
Spotsylvania, Va 22551

May 12, 2017

Re: Team-Crucible Rezoning Request

To: Tim Kaine, Terry McAuliffe, and "Buddy" Fowler, Jr.

I am sending you a copy of the letter that I sent to ALL of the Spotsylvania County Board of Supervisors and Planning Commission Members. If there is any way you could advise or help us, as well as our neighbors in Taverneer Subdivision and surrounding subdivisions in the Berkeley District, we would appreciate it very much. Shown below is the letter sent and for your information, a note was added about this facility.
****

We attended a Public Meeting on Wednesday, May 10, 2017, regarding Team-Crucible, a private military training outfit that has requested the county supervisors to rezone a 70 acre parcel located just behind D'Marie's off Rt. 1.

PLEASE Vote NO on this rezoning request. We live in Taverneer Subdivision, the danger zone area, and are at great risk from this proposed facility. This type of facility should never be near any residential housing.

We moved to this area over twenty-five (25) years ago and had our home built in Taverneer Subdivision over nineteen (19) years ago. I am a retired Spotsylvania County Public School teacher and my husband was retired from a Fredericksburg church. We felt this was a good area to raise our daughter and intended to stay in the home we had built through our lifetime. We were shocked to think that Spotsylvania County would even consider such a dangerous facility, so near any residential area. At this point, we feel Spotsylvania County Supervisors no longer care for our safety and well-being and fear the worst is yet to come.

Based on your own Code of Ethics, which puts citizen safety above revenue, we feel you have no other choice than to **DENY** the rezoning request made by Team-Crucible.

From: Very Supremely Concerned Citizens,

Thomas and Shirley Brady

NOTE: Team- Crucible is a private military training outfit currently located in Stafford, VA. They have requested Spotsylvania County Supervisors to rezone a 70 acre parcel just behind D'Marie's off Rt. 1, south of Morris Road, to allow them to build and operate a private military training center on the property. The approved plan would eventually include 6 outdoor shooting ranges, a simulated urban warfare area, a track to train vehicles using simulated improvised explosive devices (IED's), as well as other facilities. The facility would conduct training from 6am to 10pm, 7 days a week with NO noise level restrictions. There are over 800 houses down-range and 280 within the danger zone of this proposed facility presenting a real danger to our families and the noise levels would disrupt activities and drive down property values.

Thomas and Shirley Brady
6109 Taverneer Lane
Spotsylvania, Va 22551

May 12, 2017

Re: Team-Crucible Rezoning Request

To: ALL of the Spotsylvania County Board of Supervisors and Planning Commission Members

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From: Very Supremely Concerned Citizens,

Thomas and Shirley Brady

Thomas and Shirley Brady

FW: Precedence

Sent: May 17, 2017 4:18 PM

From: Wanda Parrish

To: Leon Hughes;

1 Attachments

Green county.pdf (782 KB);

FYI re Green Co case...it appears the NRA may have provided some input...

-----Original Message-----
From: Brinkman Col Mark T [mailto:mark.brinkman@usmc.mil]
Sent: Tuesday, February 21, 2017 12:55 PM
To: Wanda Parrish
Cc: Stephan Picard; mgalati07@gmail.com; Greg Cebula
Subject: Precedence

Wanda,
I assume the official package has still not been submitted, but Crucible continues to build buildings in accordance with the plan they showed us at the Speedway. The only difference is they got a zoning approval on 20 Jan (meeting on 17 Jan, zoning approval for 2 pole barns submitted on 18th, approved on 20th....pretty fast compared to how long my garage permit took). They are just claiming these buildings are "Pole Barns". Kind of funny considering I talked to the owner of the company and he told me if he does not get the re-zoning approved, he will have to sell the land. I hope the County clearly documents that the intended purpose for the 2 building they are building is for agricultural use. In the Stafford SUP case they pleaded that they had already invest significant amount of money in the facility. If they try to use this in this case, it should be noted that there is zero investment in the property to date because all investment is into agricultural use. I'm sure code Compliance will be all over them if the re-zoning is approved and these "Pole Barns" are used for something else.

I wanted to provide the attached document as another document to go in the file. This is a similar decision faced by a nearby county. The major differences in this decision are:
1) Green County was in need of a shooting range Spotsylvania County is not.
2) The Green County range would be available to the public, the Crucible is a company to generate profit.
3) The proposal for the Green County range was fully baffled (side and overhead baffles with "No Blue Sky"), the Crucible Range does not have any baffling.
4) The Green county range included acoustic baffling, the Crucible plan to date has not shown investment in acoustic materials, just moving dirt and using trees.
5) The applicant in Green county was respected in the community, Crucible has a reputation with Stafford County, and with the building of 2 "Pole Barns" on the Crucible facility when the expressed intended use for the land is the Re-Zoning to a training facility is certainly reason to question the Crucible as an upstanding citizen.
6) Green County request was to re-zone 2 acres of 105.37 acre piece of land, Crucible wants to re-zone the entire 69 acres.

The decision in Green County was NO. They did not approve the SUP.

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October 13, 2015

County of Greene, Virginia

THE GREENE COUNTY BOARD OF SUPERVISORS MET ON TUESDAY, OCTOBER 13, 2015 AT 6:30 P.M. AT THE PERFORMING ARTS CENTER AT WILLAM MONROE HIGH SCHOOL.

Present were: David Cox, Chairman
Jim Frydl, Vice Chairman
Eddie Deane, Member
Davis Lamb, Member
Bill Martin, Member
John C. Barkley, County Administrator
Ray Clarke, County Attorney
Patti Vogt, Deputy Clerk

RE: PUBLIC HEARING – PHILLIPS FAMILY PROPERTIES III, LLC/HAROLD PHILLIPS – REZONE

Mr. Bart Svoboda, Zoning Administrator, reviewed the request from Phillips Family Properties, III, LLC/Harold Phillips to rezone approximately 1.4 acres of 5.36 acres zoned B-2, Business, and M-1, Industrial, to M-2, Industrial, with the remaining acreage remaining as M-1, Industrial, zoning designation located at 56 Commerce Drive and identified on County Tax Maps as 60C-(6)-A1. (RZ#15-002) Property currently has four (4) structures. Applicant is requesting the rezone so the current structures could be leased to a multitude of businesses that are currently not available under the business zoning districts.

Planning Commission recommended approval of rezoning RZ15-002 to rezone the B-2 area of the parcel to the M-1 (Industrial, General) Zoning District as recommended by staff. The applicant was amenable to the recommendations for the application and felt that M-1 zoning would enable him to meet his goals for the property.

Mr. Harold Phillips, applicant, spoke briefly on his request.

The Chairman opened and closed the public hearing with no public comments.

Mr. Lamb questioned the specific building. Mr. Svoboda said the parcel does not cross the street.

Mr. Martin said it looks like staff and Planning Commission has done their homework. Applicant has a good plan and everything seems in order with ordinances.

Mr. Deane reiterated staff has done homework and agreed with support.

Mr. Lamb said he is ok with it.

Mr. Frydl supported the rezone saying it supports business opportunities in that area. Does not change the area. Same pattern of development.

Mr. Cox agreed saying this is in the growth area.

Upon motion by Bill Martin and unanimous vote, the Board approved rezoning RZ#15-002 to rezone the B-2 area of the parcel to M-1 (Industrial, General) Zoning District as recommended by the Planning Commission.

Recorded vote:	David Cox	-	Yes
	Jim Frydl	-	Yes
	Eddie Deane	-	Yes
	Davis Lamb	-	Yes
	Bill Martin	-	Yes

Motion carried.

RE: RECESS

The Chairman called a five minute recess.

RE: PUBLIC HEARING – ELLIS LYLE ii AND TAMMY DURRER/ELLIS AND VIRGINIA DURRER – SPECIAL USE PERMIT

Mr. Svoboda reviewed the request from Ellis Lyle II and Tammy Durrer/Ellis and Virginia Durrer for a Special Use Permit for an outdoor shooting range on approximately 2.0 acres of a 105.37 acre tract, zoned A-1, Agricultural, located near 15337 Spotswood Trail and identified on County Tax Maps as 61-(A)-6. (SUP#15-001)

The proposed site is zoned A-1and is currently a working cattle farm with existing residence and barns. This property is adjacent to growth area and is approximately 1.2 miles from the intersection of Route 29 and Route 33.

The Board of Supervisors has the ability to place conditions on a Special Use Permit to mitigate impacts by that use if the use is deemed appropriate, would not change the character and established pattern of development of area, and would be in harmony with the uses permitted .

Planning Commission recommended denial for the following reason having to do with Article 16-2:

- It would tend to change the character and established pattern of the development of the area or community in which it wishes to locate.

Lyle and Tammy Durrer, applicants, reviewed a power point presentation regarding their request. Contacted by EDA in September, 2014 if he would be interested in getting shooting range. Residents have to go to other counties to shoot. There is a need for classes in Greene for those who want to be taught safety and concealed carry laws/rules.

Mr. Durrer said they started looking into it to find out what was involved and found this to be a feasible option at this location. Met with neighbors who were willing to meet.

Factors considered were safety, noise, lead, design, traffic and benefits.

Bullet traps are self-contained and capture 99% of lead dust, stop ricochets and are bi-directional. Baffles used down range are there for safety. When looking down range, cannot see blue sky, can't hit blue sky. Have ballistic acoustical rubber to stop ricochets and help mitigate sound as it escapes Shooting stalls are 8 inches of concrete on sides and 6 inches overhead.

Standard Operating Procedure is a living document and can be revised as necessary. A Range Safety Officer will be on duty at all times during operational hours. There will be

cameras in each stall for safety. Check-in will be required at the entrance and again with the RSO. Also have to check out when done. There will be a safety and rules briefing before using the range and a document that will need signature indicating the safety rules at this range were read and understood.

Natural terrain at site was recommended by NRA. VDOT has already approved entrance and traffic.

Three different acoustical studies were conducted. One by Sheriff's Department, one self-conducted, and one by professional company which included a 24 hour study. Troy Acoustics needed to know what the ambient noise level was during operational hours. If noise level is not louder than what is being heard everyday then there can be no noise nuisance.

EPA has manual for lead management. Range will follow recommendations to control and contain lead. Lead mitigation is not that difficult. Location has clay soil which helps in mitigation. The traps capture and contain 99% of lead. Shooting stalls will be wiped down with a product that bonds to lead in between opening and closing. Traps have round counter per lane. Once maximum count is reached a company will come in to clean everything. Have to document and keep records of lead

Mr. Durrer reviewed the key design components which included concrete construction, overhead baffles, acoustic material, safety measures and ballistic rubber backstop. Also reviewed preliminary design of range, lane elevations and details, and shooting stall detail.

Mr. Durrer said the design was arrived at by conferring with accredited professionals in the industry, and the NRA. All agreed that this design is above and beyond what is required. This design will cost more but is what he thought should be done.

Benefits include having a range for local law enforcement to use, bring business to the County, and tax revenue.

In regards to property values, property assessments and tax rates are established to meet the budget of the County. Market conditions drive assessments not neighboring properties. Referred to letter from Commissioner of Revenue stating, in the last 28 years, he does not recall anything being built in the County that would cause property values to decrease.

Mr. Durrer gave Lafayette Gun Club located in Yorktown, VA as an example of a range within a growth area. Within ½ mile of the range, there exists an elementary school, county school system building, and houses that are within 150 feet of this range. This range did not stop growth be it residential or commercial. The range was built in 1948 and the school was built in 1965.

NRA has helped with design, location and acoustics, but will not endorse a range.

Mr. Durrer said he has done everything asked by the County. A legal and regulated gun range is consistent with the Zoning Ordinance and allowed by Special Use Permit. This will turn a by-right activity into a business. Use is compatible with character of surrounding development because there is no discernably established pattern at this time at this location. Will not infringe on neighboring properties because all activities will be contained within the facility and lawfully compile with all state and federal regulations. Mr. Durrer challenged anyone to demonstrate a use that would be discontinued or impossible to engage in as a result of a lawfully managed gun range. Real estate data and experience clearly show that legally compliant ranges do not impair the value of surrounding land. This will bring in much needed revenue to the County, will be good for economic growth, and does not cost the County anything. Will promote tourism, recreational venture and bring in money to other local businesses also. Land is appropriate for

shooting range and use is appropriate. Mr. Durrer said he has already invested considerable time, money and energy in this project to come up with absolute safest plan possible and provided documentation for qualified accredited professionals.

Asked that this decision not be made on emotion, not in my backyard or falsehoods, but on facts and the need for this range. Thanked all who has supported him in this endeavor. Finally asked for all in favor of the range to please stand.

The Chairman opened the floor for public comment.

Noel Guarino – 308 Kenwood Lane. Read statement on behalf of husband, retired U.S. Army Colonel, with lots of expertise in range design and management. He would not allow this range to be built on a military installation.

Michael Laukitis – Hunter, member of NRA, NRA Certified Firearms Instructor, concealed carry permit holder. Would welcome properly designed and appropriately located range in Greene. Design does not eliminate all risk. More than 70 homes within the surface safety zone which is the land around range that is at risk for escaped bullets.

Daniel Held – lives ½ mile from Big Iron and former military officer, gun owner. Would be enthusiastic about gun range if in right location. Site is not suited for gun range. No blue sky is misleading. Estimated revenue will not offset loss in property values.

Louie Deane – Entire family has been in police work. . Spoke about range in Nokesville. Questioned bullets deflected from range and hitting a person/building. Having safe place to train would be essential. Range will not require infrastructure like housing development.

Gloria Gore – Has concealed carry and shoots at ranges. This is big property rights issue. Durrer ancestors have been here since 1700's. Range has been certified by several people as being safe. Felt people who are worried have gotten information that isn't necessarily correct.

Peter Griffith – Extensive background with guns and shooting. Spoke on real estate values of surrounding homes, two of which have been on market from 200 to over 300 days. Did not feel the gun range would affect sale of property.

Suzan Hiller – Read letter from Sarah Conrad, practicing and licensed Audiologist, who also lives in Ruckersville. Noise from the proposed gun range will adversely affect the quality of life for neighbors. People will detect gun fire over ambient noise.

Mary Saunders – Son is fully disabled combat vet and suffers from traumatic brain injury, PTSD, chronic fatigue syndrome, neck/spinal problems and hearing loss. He can't handle what they are dealing with now coming from Durrer property. Continued with letter from Sarah Conrad.

Eleanor Mower - Ruckersville. Some neighbors are refugees from war-torn countries and can't be expected to not be bothered by the sound of constant gun fire. Not fair to impose this level of stress on neighbors. Strongly advised an independent noise study.

Dwight Webster – Ruckersville. Retired Army Lt. Colonel who has been in war zone. Predicts there will be a ricochet wounding within first month at this range. Expressed his concern for children in the area.

Renee Birchell – Speaking on behalf of her father Steven Birchell. Has developed commercial and residential properties in Greene. This will affect the sale of the remaining lots in Hancock Farms, their ability to receive income, and property values.

Cathy Whitebread – Godalming Subdivision. Sound is big factor. Siebein Assoc., leading acoustical consulting firm, found numerous inconsistencies in Polysonics study. Read from report. Copy included in information.

Stephanie Herring – Ruckersville . Continued with summary of Siebein analysis of noise study submitted by Big Iron. Recommended applicant be required to conduct noise study with specific criteria.

Michael Derdeyn – Attorney representing Greene County Neighbors, LLC . The issue for Board of Supervisors has to do with Zoning Ordinance. Outdoor shooting range is not appropriate use in residential area and only allowed in A-1 zone by Special Use Permit.

Beth Luellen – Ruckersville. Stay-at-home mom. Any given weekend and some week days there is barrage of gun fire from Durrer property. Noise and thought of stray bullet is absolutely disturbing. Durrer has been noncompliant with current Special Use Permit.

Anthony Herring – Ruckersville. Former member of Planning Commission. Planning Commission voted 3 to 2 to deny. Majority stated facts for their decision. As a whole, opposition is in favor of right to bear arms and an indoor range at the right location per current ordinances.

Eric Hensley – Stanardsville. Lives within ¼ mile of active hunting preserve on Route 621 where unmitigated gun fire is the norm. Can't hear within home and outside is no nuisance at all. Ambient noise is much louder. Range would provide safe controlled shooting environment.

Lance Pickett – Godalming. Want range but not at this location in middle of densely populated residential area. Did not think every safety aspect can be fully mitigated. Not in accordance with Zoning Ordinance.

Bill Saunders – He requested deferral previously to allow Durrers to address many problems in application. Provide full design, identify surface danger zone, standard operating procedure, etc. Nothing has changed. Asked Board to consider an ordinance to give clear criteria for this use.

Mark Norman – Hancock Farms. Added support for previous comments. Chose to live in Ruckersville for tranquility and peacefulness. Lives 1.6 miles from proposed range. Can clearly hear each and every shot from site when outside. Property values will decrease.

Carolyn Politis – Godalming. Half mile from propose range. Applicant does not have right to do whatever he wants on his land. Make right decision for community. Referred to several other Special Use Permits that were denied. Planning Commission recommended denial.

Kristine Norman – Hancock Farms. Reviewed past SUP's either denied or approved with conditions due to noise concerns. Noise can be considered pollution and can constitute a nuisance which is an unreasonable interference with a person's use and enjoyment of their property. Homes were there first.

Eleni Politis – Godalming. Please don't let gun range move near our homes. Hear every single day when riding bike, playing soccer, playing volleyball, frisbee or having friend over. Gets headaches because of banging sound and her dog goes crazy. Fears stray bullets.

John Glass – Hancock Farms. Chose to move to Greene because of really nice property, close to his work, and most importantly the property tax structure was so much less than neighboring Albemarle. Low taxes may be lost. Not against a range. Opposed to this location.

Tammy Laukitis – Hancock Farms. Can't believe this is even under consideration. One main concern is safety aspect. Nearest property line is 30 feet. Children won't be able to play outside. Noise another big concern. Doesn't belong in this area.

Deanna Wills – Ruckersville. Located here because of family friendly atmosphere, conservative values and serene landscape. Gun owner and believes in 2nd amendment. Proposed

site is wrong location adjacent to residential area. Misinformation that Sheriff will be able to use this range.

Wesley Wills – Member of Department of Defense. Deals with science and technology at work. In court of law, an expert will look at facts, science, physics of this range and available material. What did Board do to verify independent facts? Not on firm ground when determining scientific facts. Not comfortable with 99% containment.

Harold Bare – Purchased land from applicant's family for business investment. Mr. Snow's letter is worth nothing in this situation. Durrer can't shoot anytime he wants. All are subject to ordinances of County. No record of EDA approaching applicant. Applicant did not talk with everyone. County needs to bring schools up a notch and have better water and sewer infrastructure.

The Chairman called five minute recess.

Mike Collins – Godalming. Pro 2nd Amendment, gun owners, NRA members. This is wrong design and wrong location. Ambient noise is existing background noise level characteristic for the current environment. Constant gun fire is not ambient noise. Safety issue

Luke Whitebread – Godalming. Speaking on behalf of Frank Stoner, Milestone Investment Group. About to begin a multi-million dollar redevelopment project on south east corner at intersection of Route 29 and 33. Not this design at this location. Impact on surrounding area.

Kenneth Chase – Godalming. Read letter from Fraidoon Hovazi, J6 Developers, LLC. (planned unit development property on East View Road) Have potential buyer for property. Proposed range can potentially kill the deal and destroy potential development for elderly.

James Oliver – 27 year veteran United States Navy. Firm believer in 2nd Amendment. Has completed plans, policy and programming centered on operational risk management. Understand every single activity has risk associated with it. Standard operating procedures are pretty good start but needs to be better.

Ronald Padley – Ruckersville. Would not have settled here if he had known about this. Does not want to hear a constant barrage of gun fire. Moved here for peace and quiet. Gun owner. Prefers a totally enclosed facility which would be much safer.

Thomas Wharton – Should make decision mathematically. Acoustical measurement study. Hi powered rifle will produce 168 decibels in sound. Houses in close proximity. Impossible to reduce from 168 to 65 decibels. This range will not meet sound requirements.

Tilahun Goshu – Godalming. He and family are naturalized citizens originally from Ethiopia. After eight years, he has master's degree in public health and currently working on doctorate. Terrified for safety of his family. Children suffer from PTSD.

Meseret Workelul – Godalming . She and her husband work fulltime and he goes to school also. Have four children. Came to USA for safety. Left country and family. Worried about what will happen. Children panic at hearing gun shots.

Jerry Gore – Provided Mr. Durrer assistance in understanding acoustic challenges with this project. Forty year Navy career in acoustic engineering and 10 years as consultant. Was on site for sound testing. Noise measured will be no higher than ambient level measured at those locations. Well within criteria for this County and far safer than shooting in open field.

Ronnie Davis – Taxpayers have funded the Regional Jail which has private law enforcement range 25 minutes from here. Standard law enforcement training requires qualifying

from 7 and 15 yard line. The is not suitable for law enforcement training. Spoke on training requirements. Sheriff's Department does not need this range.

Frank Morris – Family owns several properties within vicinity of site. No problems. Great local business and lots of opportunity for stores/restaurants. Thinks this is great location and feels this does not change the character of the area.

Scott Hiller – Godalming. Owns small contracting business. This is not proper location. Over 300 homes within mile radius. Clients are putting outdoor projects on hold until decision is made on gun range. Concerned about potential 30% drop in home value.

Ramona Goff – Range safety officer and NRA certified instructor. Does not live in Greene. Impressed with plans for proposed range. First and foremost is safety. Accidents won't happen unless someone is irresponsible. Would bring in more revenue for County.

Cynthia Hash – Realtor for 16 years. Lives in Albemarle County. Concerned that this is not indoor range and it will affect property values. Possible 30% reduction within ½ mile and 25% within mile. Decreased property values equals decreased tax revenue.

Edward Wagamon - Preddy Creek. Concerned about lead mitigation. Build facsimile and test for noise levels. Doesn't think children will be frightened by gun shots. Get range design that everyone can agree on. Can't agree on this, get one somewhere else in Greene.

Temnasera McKonnen – Godalming. Has memories of living in Ethiopia and house being shot at. She and her brother were both frightened by gun fire recently. Please vote no.

Jenny Strain – Deer Lake Estates. Board's job is to uphold and enforce ordinances of County and make decisions that do not conflict with Comprehensive Plan. Will violate noise ordinance and affect home values.

Laila Bare – Why at this location? Understands applicant owns property that would be better alternative. Be prepared to defend decision made tonight. Will not be able to improve school ranking without increased, sustained revenue.

Autumn Hiller – Ruckersville. Lots of children live in surrounding neighborhoods. Dogs panic at gun fire. Gun shots this past Saturday caused her to go inside.

Claude Cooper – Registered professional engineer. Project manager for outdoor range baffle project in Prince William County, VA. Outdoor baffle design proposed is a proven technique. Acoustical treatment is also proven technique. Possible for range to be good neighbor if designed properly.

Marie Durrer – Son is applicant. Shooting this past Saturday was not on their property. . Own property and have right to shoot on property. Range is designed to be safe, controlled, state-of-art facility. Provide additional revenue for County. Will continue to shoot on property.

Steve Smith – Sheriff's Office needs range in Greene County. He's looking out for safety of deputies and citizens. Orange County wants to charge for use of range. Range here would be a lot easier for scheduling. There are no ordinances in Greene about shooting firearms on agricultural land.

Anita Schwartz - Spoke on behalf of owner at 578 Moore Road. Property line is 30 to 50 feet from range location. Owner opposes site mostly for safety and noise reasons. Would this increase appeal of Ruckersville? Opposed to range at this location.

Bill Stump – Ruckersville. County needs gun range. People need instruction on how to use guns properly. Hears lots of shooting during hunting season.

Jeff Newby – Monroe District. Lots of thing being completely distorted about this request. Venue will provide place to learn safe handling of firearms. Design is beyond state-of-the-art. Thinks this will be good for the County.

Jeff Morgan – Respect views of opposition but thought it shameful court action has been threatened if Board approves the request. Worst case scenarios described will never come true. Shooting is dangerous and a place is needed to do this in safe way.

Mark Pulczinski– Opposition has no ill will to proponents of range. Asked Board to look at facts and make comprehensive decision based on ordinances. Many residences in community. Consideration has to be for the many over the one.

Chris Findley – Ruckersville. Would welcome well designed range to County but is opposed to this design at proposed location. Information submitted by applicant demonstrates an ever-changing design that is incomplete, inconsistent and contains errors. Deny permit.

Hugh Wright – Property values. Has property on market that was active until plan was announced for gun range. This will hurt property values and sale of homes. Liked tranquility and views from his property. Deny request.

Mark Luellen – Godalming. No one contacted him. If EDA wanted Durrer to do this, why haven't we heard from them? What happens when he no longer owns property? Why is his investment more important than mine? This is business. Read quote about Lafayette Gun Club.

Darryl Mesaros –Lives in Earlysville. Rents and doesn't have place to shoot. This would be convenient, local and safe place to shoot. Urged Board to support.

Julie Kuhl – Lives within ½ mile of proposed gun range. Local realtor. This will devalue property. Citizens have shared concerns about water fees and pending property tax rate increase. Can the County afford to approve gun range in the middle of Ruckersville?

Drew Taylor – Lives in Orange County which has two gun ranges. Four essential elements for value of real estate are demand, utility, scarcity and transferability. Reviewed approaches for determining property value and recent property sales near or adjacent to gun ranges.

Chris Politis – Ruckersville. Readings not taken on western or southern boundaries of subject property. Analyzed all 114 ranges listed by the National Shooting Sports Foundation. All, with few exceptions, were in remote locations, obscured by trees or hilly terrain, few or no homes nearby, and nowhere near city center.

Heping Zheng – Godalming. Agreed with comments by neighbors. He has three children who will grow up here. Would like to have a place to shoot in the county but at another location. Has another location even been considered?

The public hearing was closed.

Mr. Cox thanked everyone for their comments and conduct during the public portion of the meeting.

Mr. and Mrs. Durrer addressed issues brought up during the hearing.

Mr. Durrer noted he is not the only person in Ruckersville who owns and shoots guns.

The acoustical engineer placed equipment where deemed appropriate.

Farm is in A-1 zone. Godalming subdivision is also in A-1 zone.

Does not own this land at this time. Special Use Permit for gun shop said no shooting range on his land. Won't own the land until this is approved.

Hours of operation of shop have changed. Notified in early spring that the SUP was never filed. Has been filed now and hours have been changed.

Mr. Durrer said he didn't knock on doors in Godalming. He met with Anthony and Stephanie Herring to explain what he was doing. He asked Anthony if he would email everyone in subdivision. Doesn't know if he did.

NRA has worked with them but does not endorse ranges. Help on location, give suggestions on how to build and connect with professionals in industry to help with process.

Mrs. Durrer asked the Board to listen to the facts that were presented. Gone above and beyond and spent many hours on this project. Done our homework and we know what we're doing. Please approve request.

Mr. Martin asked about major players. Mr. Durrer said NRA put him in touch with Range Systems, Mid-West Tactical Application Group, and Troy Acoustics. Mid-West Tactical Application did range design. Troy Acoustics did acoustical design and will apply acoustical treatments. Range Systems did the granulated trap system and overhead baffles. A concrete contractor will do all concrete work. Mr. Durrer said he would be in charge of the project as the primary contractor. He has a Class A contractor's license.

Mr. Martin asked if there are letters of support or endorsement from these three companies. Something about the engineering design and industry standards. Mr. Durrer said information should be in packet. Three companies have worked together on this design.

Mr. Martin said it is noted in the letter from Troy Acoustics that the purpose of the acoustical material inside the range is really for the convenience of the shooter. Mr. Durrer said it does help the shooter and also has an 85% co-efficient of reducing noise.

Mr. Durrer said he referred to the book from the NSSF (National Shooting Sports Foundation). The NSSF will rate a range after it is in operation.

Mr. Martin asked about a surface danger zone analysis. Mr. Durrer said this design is a bullet containment range. SDZ applies more to military type shooting ranges. Mr. Martin asked if he would provide an analysis if requested. Mr. Durrer said he could contact NRA to see if they tell him anything different.

In response to a question by Mr. Martin regarding stray rounds or ricochets leaving range as designed, Mr. Durrer said anyone saying they can build a range and guarantee 100% that nothing will come out of it would be lying. Mr. Durrer said he would not say that.

Mr. Martin asked what kind of insurance company provides comprehensive liability insurance for the owner. Mr. Durrer said insurance would be though NRA same as for his gun shop.

Mr. Martin felt it would have been useful for a representative from NRA or NSSF to have been present to address the Board. He asked where this type range is located in North America. Mr. Durrer said a range of this design is currently under construction in California.

Mr. Martin asked how far proposed range is from property line of Big Iron Gun Shop. Mr. Durrer said the range would meet setback for property and would probably be 40 to 50 yards from the shop.

Mr. Martin referred to the approval of the Special Use Permit for the gun shop in 2011. Planning Commission and Board of Supervisors were in full agreement about approval. Mr. Durrer stated at that time that he would conduct test firing of guns from time to time but it would not be anything obnoxious. Must have stayed true to this because he hasn't heard complaints about test fire. Mr. Martin said the condition on the SUP prohibiting a gun range on the subject parcel was because of a real concern at that time that it could become an issue.

Mr. Lamb asked if the representative from the NRA realized how many houses were nearby. Mr. Durrer said NRA knew there are 340 houses within a mile. Mr. Lamb said the NRA Resource Book said that one (1) bullet equal one (1) week of hazardous occupational noise exposure. An avid target shooter can be exposed to an entire year's worth of hazardous occupational noise within a few minutes. (NRA 1999) Mr. Durrer said that's true if you don't wear hearing protection, which will be required in addition to eye protection..

Mr. Deane questioned the acoustical product used and the distance from the bench to the outside opening which would be 12 feet.

Mr. Cox said thanks for hospitality by the Durrers for visit on short notice. He said he is familiar with the property as he worked on it for a time. Biggest thing is R-1 and A-1 zones adjoining.

Mr. Lamb noted indoor ranges are allowed in the A-1 district by Special Use Permit.

Mr. Deane thanked everyone for emails and phone call. The Board is concerned about each citizen and property values. Visited Mr. Pickett's house to look from that side of the fence.. Spoke with a representative of Troy Acoustics today who said the treatments and concrete walls would reduce noise to 70 decibels and gunfire would not be intrusive in the homes or backyard activities. Mr. Deane said he did not see a problem with safety as much as noise. Noise is his main issue. This will be a hi-tech gun range.

Mr. Martin said he spent time pouring over hundreds of pages of information, emails, etc. One thing is clear, we do need a gun range in Greene County. Sheriff Smith had told him that when he was a new member of the Board. The question is location. Mr. Martin pledged to help find a suitable site for a gun range in Greene County if this request is not approved.

Mr. Martin noted the Board recently rejected an application for a bed and breakfast because it was convinced by the community, data and ordinances that it did not fit with prevailing practices or within local ordinances. He believes that using a range would be a safer situation than what is happening around the county. That doesn't mean this proposed location is optimal given legitimate safety, acoustical and quality of life concerns. Finds lack of surface danger zone map a serious flaw in application. He said rounds will escape from the range and due diligence demands the applicant show that this fact has been considered. Finds the letters and comments from developers compelling. J6 Developers, Birchell, Hiller, Mile Stone Partners have expressed concern for their investments for things we have approved and have had plans to develop well before this proposal came up. Those plans are in concert with our Comprehensive Plan and Zoning Ordinance.

Mr. Martin said he is not convinced that neighbor's concerns regarding safety, noise and quality of life are adequately factored in to proposed plans. Many people have life investment in their homes and chose to live in this area without any idea that this proposal might come to fruition. Recent Boards have carefully considered concerns of neighbors prior to granting a Special Use Permit.

Mr. Martin said he understands why the Durrers want this near their home and gun shop but could not let their convenience trump local ordinance, Comprehensive Plan, or perceived safety and quality of life for neighbors. This Board has to be consistent in consideration of Special Use Permits. How could we take a position against a B&B in residential community and then support a gun range when there is clearly a higher impact, clearly safety and quality of life issues.

Despite the Planning Commission requesting Mr. Martin said he still does not see a design that convinces him that safety and quality of life issues of neighbors have been addressed. Plan still seems to be evolving. Disappointed that representative from NRA, NSSF or MTAG can't take position on this. In his opinion, no one on this Board is qualified to make technical judgements required for the safety and acoustical issues raised. So the Board counts on assurances from experts which he does not see. Personally has high level of uncertainty of much of data he has seen with this application. Sees risks associated much, much greater than potential returns. The burden is not on the County to tell applicant what is needed. Not up to the County to make this safe and in harmony with the community. Burden is on applicant to provide information so the Board feels comfortable.

Mr. Martin said this is a nation based on the rule of law. Provisions in Article 16-2 is all we have to go by. Can't make judgements outside of this. A lot of discussion tonight was outside of this. Believes the proposed use would change the character and established pattern of development in this community. Proposed use is not in harmony with the pattern of development in this area and would adversely affect the neighboring properties. Based on letters and comments from developers, it seems like there is a risk that the proposed use would discourage developers from moving ahead with approved plans. Mr. Martin is a licensed realtor and is absolutely and totally convinced that the sales of residential real estate in this area will slow dramatically because many buyers are going to be affected in their purchasing decision. Demand will decrease and ultimately the price and value will be affected. The proposed use on land zoned A-1 is fine but this parcel is surrounded by residential communities that may well be, perhaps will be, in harm's way. He is unconvinced that an active 20 lane gun range will produce noise that stays at or under the ambient noise level. Tests were done with single shots. This would affect the quality of life of families who have already made significant investments in the community. Mr. Martin said he finds this particular A-1 parcel to be inappropriate for the proposed use. No option but to vote to deny because it doesn't comply with our zoning ordinances and to approve it would be inconsistent with decisions this Board and prior Boards have made.

Mr. Frydl clarified that outdoor shooting is a use allowed as a special use under the C-1 district. A-1 district includes uses allowed in C-1 district. So it is allowed in the district. Why would this get this far? It's supposed to get this far. Applicant has right to request a special use permit and should be respected for exercising that right. To the comment, if you own property, you should be able to do whatever you want on that property. Mr. Frydl said he did not think I even those who say that truly believe it. Don't think many people here would approve of a smoke stack factory up top of the Blue Ridge Mountains. There are things that are suitable and things that are not suitable. The ordinance requires the Board to review requests. The purpose of ordinance is spelled out in State Code and includes health, safety, welfare, mitigating danger, congestion, affects upon light and movement of air. SUPs are considered to have greater impact. These permits are for the piece of property not for an individual. Durrers have done a lot of great work to have concept that is a really nice quality gun range. Mr. Frydl said he truly believes that the Durrers will do everything possible to build a safe range, to build a range that mitigates sound. The SUP is not about the Durrers. The SUP travels forever with that piece of property. Without guarantee that it is the Durrers, Mr. Frydl said he does not have the same confidence.

Mr. Frydl noted a citizen comment that a range would be a wonderful thing if designed and operated properly. He said, other than the fact that he truly believes the Durrers, there is

nothing that ties that to the land. Nothing that allows him to approve this and know that forever those conditions will be met. Proposal and restrictions don't specifically spell out mitigation of impacts. Mr. Frydl said he believes that it would change the character of development in the area and negatively impact property values. Have hard time getting past that. Doesn't see enough specifics to overturn Planning Commission decision.

Mr. Deane asked Mr. Martin if he would be pleased if the range had a roof. Mr. Martin said he did not have that plan in front of him but would love to see a plan with a roof. He would consider a range under roof much more favorably.

Mr. Deane noted the residents on Larchmont Circle now have Tractor Supply in their backyard . This changed the character of their neighborhood. Referred to the Lafayette range asking how this Board could think our law supersedes what happened there. That gun range was there first and a school was built in 1965 within a quarter mile. That ranges does not have concrete walls and baffling the Durrer range will have. Can't lean upon the law of 16-2 meaning we can't do this when a legal and regulatory compliant gun range is consistent with zoning. This SUP is simply commercializing an existing by-right activity. Gun range is compatible with character of surrounding development which has no discernable established pattern. Located adjacent to a mixed use zoning a mile from Route 29. Does not feel a range of this type will infringe on the use of neighboring properties in anyway. All commercial activities at the range will be contained within the facility lawfully compliant with State and Federal regulations. If property is sold, still under regulation. What we're doing is backwards from Lafayette. That range was built and then growth happened. Can't agree with Mr. Martin or Mr. Frydl because there is going to be shooting on this property regardless and he would rather the shooting be done within the realms of legal regulation and SUP zoning restrictions. Would rather shooting be done with us, not without us. Mr. Deane felt he would be doing a disservice to the community if he didn't vote for this range.

Mr. Lamb agreed with Mr. Martin and Mr. Frydl noting the Lafayette range is probably grandfathered. Changes will have to be made at that range when people start complaining just like at shooting range in Glenmore.

Mr. Cox said he was highly upset when he received emails with pictures a couple weeks ago. He is a farmer and proud to be one. Things happen on a farm that cannot be controlled. We all have buildings that will go downhill. Don't be making fun of a farmer's property when you don't want a gun range on 2 acres of it. Not fair to the farmer. He received phone calls, returned phone calls, had over 550 emails as of 3:30 this afternoon. Read every one of them and understand concerns. Talking about using 2 acres the furthest away from subdivisions discussed. Noted Mr. Durrer could put in a turkey house or hog operation by right. Mr. Cox said his neighbors shoot constantly at a target nailed to a cedar tree. He felt a professionally designed gun range would be safer. Safety is number one with him. Supports range as designed on 2 acres of A-1 land.

Mr. Frydl said he appreciates Mr. Dean's point that he doesn't feel like it will change the character noting the gun ranges that exists in other communities. Our ordinance is the law of Greene County and not the law of other communities. Our laws do not apply to those areas. .

Upon motion by Davis Lamb and affirmative vote, the Board denied the request for SUP#15-001 based on the following points:

Article 1 - Authority, Intent, and Enactment

1-1 Whereas, by of the General Assembly of Virginia as provided in Chapter 28, Article 8, Section 15.2-2280, Code of Virginia and amendments thereto, the governing body of any county may, by ordinance, divide the territory under its jurisdiction into districts of such number, shape and area as it may deem best suited to carry out the purpose of this article, and in each district it may regulate, restrict, permit, prohibit, and determine the following:

a. The use of land, building, structures, and other premises for agricultural, commercial, industrial, residential, floodplain and other specific uses;

1-3 Now, therefore, be it ordained by the governing body of Greene County, Virginia, for the purpose of promoting the health, safety, or general welfare of the public and of further accomplishing the objectives of Section 15.2-2283, that the following be adopted as the Zoning Ordinance of Greene County, Virginia, together with the accompanying map. This ordinance has been designed:

(1) to provide for adequate light, air, convenience of access, and safety from fire, flood and other dangers;

(3) to facilitate the creation of a convenient, attractive and harmonious community;

(6) to protect against one or more of the following: overcrowding of land, undue density of population in relation to the community facilities existing or available, obstruction of light and air, danger and congestion in travel and transportation, or loss of life, health, or property from fire, flood, panic or other dangers;

16-2 SPECIAL USE PERMITS

After review by the Planning Commission, the Board of Supervisors shall hold a public hearing and decide applications for Special Use Permits. The Board, in its decision to grant, to grant conditionally or to deny shall consider the following guidelines and standards:

a. The use shall not tend to change the character and established pattern of development of the area or community in which it wishes to locate.

b. The use shall be in harmony with the uses permitted by right under a Zoning Permit in the zoning district and shall not affect adversely the use of neighboring property.

c. The requested or related conditions shall be such that the use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof.

d. Due consideration shall be given to the suitability of the property for the use applied for with respect to trends of growth or change; the effect of the proposed use upon the community; requirements for transportation, school, parks, playgrounds, recreational areas; conservation of natural resources, preservation of flood-plains, and encouraging the most appropriate use of the land.

Recorded vote:	David Cox	-	No
	Jim Frydl	-	Yes
	Eddie Deane	-	No
	Davis Lamb	-	Yes
	Bill Martin	-	Yes

Motion carried.

Mr. Lamb thanked both applicant proponents and opposition for hard work in gathering information for members to use in making their decision. Know it has been stressful for all involved and hoped a more suitable location can be found in Greene County in the future.

RE: EXECUTIVE SESSION

Upon motion by Davis Lamb and unanimous vote, the Board entered into Executive Session to discuss legal and personnel matters pursuant to Section 2.2-3711 Subsection (a, 1-7) of the Code of Virginia.

INSERT

Recorded vote:	David Cox	-	Yes
	Jim Frydl	-	Yes
	Eddie Deane	-	Yes
	Davis Lamb	-	Yes
	Bill Martin	-	Yes

Motion carried.

Upon motion by Davis Lamb and unanimous vote, the Board returned to Open Session.

Recorded vote:	David Cox	-	Yes
	Jim Frydl	-	Yes
	Eddie Deane	-	Yes
	Davis Lamb	-	Yes
	Bill Martin	-	Yes

Motion carried.

By unanimous vote, all members certified that only public business matters lawfully exempted from the Open Meeting requirement and only such matters as identified by the motion to enter into Executive Session were discussed.

Recorded vote:	David Cox	-	Yes
	Jim Frydl	-	Yes
	Eddie Deane	-	Yes
	Davis Lamb	-	Yes
	Bill Martin	-	Yes

Motion carried.

RE: ADJOURN MEETING

The meeting was adjourned at 12:09 a.m.

David L. Cox, Chairman
Greene County Board of Supervisors

Residents of Taverneer Subdivision Petition Spotsylvania County, VA to **Vote NO** on Team-Crucible, a private military training outfit that has requested the county supervisors **to rezone** a 70 + acre parcel located just behind D'Marie's off Rt. 1.

	Printed Name	Signature	Address	Date
1)	Thomas Brady	Thomas Brady	6109 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
2)	Shirley Brady	Shirley Brady	6109 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
3)	Dorothy Harman	Dorothy Harman	6105 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
4)	John Johnson		6100 Taverneer Lane, Spotsylvania, VA 22551	5-25 2017
5)	Elizabeth Vickers	Elizabeth Vickers	6102 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
6)	Lester Vickers		6102 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
7)	Lester Vickers III		6102 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
8)	Chase Grymes		6106 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
9)	Ann Ison		6112 Taverneer Lane, Spotsylvania, VA 22551	5-25 2017
10)	James Ison Jr		6112 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
11)	Joyce Minor	Joyce E Minor	6116 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
12)	Cynthia Minor		6116 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
13)	Robert Robes		6114 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
14)	Tonia Robes		6114 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
15)	Wendy Laster	Wendy Laster	6114 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
16)	Edward Osborne	Colleen O Osborne	6113 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
17)	Lauren Paul		6118 Taverneer Lane, Spotsylvania, VA 22551	5-26- 2017
18)	Nicodemus Lydell Tyler Jr.		6212 Taverneer Lane, Spotsylvania, VA 22551	5-26- 2017
19)	Larry Purtell	Larry Purtell	6215 Taverneer Lane, Spotsylvania, VA 22551	5-26- 2017
20)	Sharon Reedy	Sharon A Reedy	6310 Taverneer Lane, Spotsylvania, VA 22551	5-26- 2017
21)	Carmen Rocciolo		6301 Taverneer Lane, Spotsylvania, VA 22551	2017
~~22)~~	~~[redacted]~~	(Next 19)	Taverneer Lane, Spotsylvania, VA 22551	2017
23)	Frank Ayers		6111 Taverneer Lane, Spotsylvania, VA 22551	6-2- 2017
24)	Wallen Harman		6105 Taverneer Lane, Spotsylvania, VA 22551	

Residents of Taverneer Subdivision Petition Spotsylvania County, VA to **Vote NO** on Team-Crucible, a private military training outfit that has requested the county supervisors **to rezone** a 70 + acre parcel located just behind D'Marie's off Rt. 1. (Page 2)

	Printed Name	Signature	Address	Date
24)	David W Saunders		6108 Taverneer Lane, Spotsylvania, VA 22551	6-2-2017
25)	Michelle Spina		6101 Taverneer Lane, Spotsylvania, VA 22551	6-8-2017
26)	GARY Spina		6101 Taverneer Lane, Spotsylvania, VA 22551	6-8-2017
27)	Bryan Juniors		6110 Taverneer Lane, Spotsylvania, VA 22551	6-9-2017
28)	JOEY Lewis		6110 Taverneer Lane, Spotsylvania, VA 22551	6-9-2017
29)	Deborah D Armstrong		5708 East Point Ct., Spotsylvania, VA 22551	5-26-2017
30)	Delma Armstrong		5708 East Point Ct., Spotsylvania, VA 22551	5-26-2017
31)	RAYMOND POSTON		5706 East Point Ct., Spotsylvania, VA 22551	5-26-2017
32)	Alicia Herrera		5700 East Point Ct., Spotsylvania, VA 22551	5-26-2017

	Printed Name	Signature	Address	Date
33)	Daniel Newton		5703 South Ct, Spotsylvania, VA 22551	5-26-17 2017
34)	Pamela Vaira		5702 South Ct, Spotsylvania, VA 22551	6-2-2017
35)	Mark Schmitz		5702 South Ct, Spotsylvania, VA 22551	6-2-2017
36)	Fred Allen IV		5701 South Ct, Spotsylvania, VA 22551	6-2-2017

PLEASE Vote NO on this rezoning request

Petition to Stop the Rezoning of Lot 76-A-2

228
151
379
33
412
453

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

261
192
453

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Ed Johnson	Ed	6010 Red Fox Dr Spotsylvania VA 22551	4/
Tony Hafner	Tony H	5900 Red Fox Dr. Spotsy Va.	4-28-17
Mary Stewart	Mary Stewart	5800 Red Fox Dr. Spotsy Va	4-28-17

Petition to Stop the Rezoning of Lot 76-A-2

Petition summary and background	The residents of Thornburg are opposed to this re-zoning change unless the county ensures the following: 1. Safety: 100% of the Surface Danger Zone must reside within the property lines or the range must use overhead and side baffling consistent with the National Shooting Sport Foundation and National Rifle Association "No Blue Sky" concept. 2. Noise Pollution: Transmission of unconstrained noise pollution will have an adverse affect on quality of life and property value. Spotsylvania County must restrict noise pollution that extends beyond property lines. 3. Require full environmental impact study to include noise, water and air pollutants. 4. Require the company to post sufficient bond to clean up the lead and other residues from operations should they go out of business or abandon the site. 5. Proper notification: Any re-submissions from Team-Crucible should require positive notification of any resident or business that lives in an affected area. Based on this submission, it would include al those within the 87dBP contour, or reside in a Surface Danger Zone.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now to stop the rezoning of lot 76-A-2 to Industrial II special uses Industry Type III

Printed Name	Signature	Address	Date
Robert Kibes	Robert Kibes	6114 Tavernier lane, Spotsylvania	5/10/17
Kathy Tatum	K Tatum	6924 Roxbury Mill Ct. Spotsylvania VA 22551	5-10-17
Charles Tatum	Charles Tatum	6924 Roxbury Mill Ct. Spotsylvania VA 22551	5-10-17
Thomas Lewis	Thomas Lewis	5506 Coach Four Ln Woodford VA 22580	5/10/17
Toni Lewis	Toni Lewis	5506 Coach Four Ln Woodford VA 22580	5/10/17
Maxine Frazier	Maxine Frazier	6147 Jeff Davis Hwy Woodford VA 22580	5/10/17
Sue Ellen Elliott	Sue Ellen Elliott	6148 Jeff Davis Hwy, Woodford Va 22580	5/10/17
Wayne Brookfield	Wayne Brookfield	5920 Red Fox Dr. Spotsylvania, VA 22551	10 May 2017

Printed Name	Signature	Address	Date
Bill Blevins		6904 Cloudy Way Spotsy. VA 22551	5-10-17
Michele Harlow		1304 Heatherbrook Ct 22407	5-10-17
Peter Larson		5808 Red fox Dr Spotsy 22551	5/10/17
Melissa Bronz		6016 Harts Run Spotsy 22551	5/10/17
Stephanie Larson		5808 Red Fox Drive Spotsy 22551	5/10/17

Petition to Stop the Rezoning of Lot 76-A-2

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Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now to stop the rezoning of lot 76-A-2 to Industrial II special uses Industry Type III

Printed Name	Signature	Address	Date
Mary Wyche	Mary Wyche	6011 Black Snake Ct Spotsylvania, VA	
Brian Elliott		6160 Jeff Davis Hwy	5-10-12

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Susan Matlock		5805 Red Fox Dr. Spotsylvania, VA 22551	7/4/17
Gary Smith		5832 Red Fox Dr. Spotsylvania, VA 22551	7/23/17
Sheilla Smith		5832 Red Fox Dr. Spotsylvania, VA 22551	7/23/17
Mark A. Smith		5832 Red Fox Dr. Spotsylvania, VA 22551	7/23/17
Mark A. Walsh		5801 Red Fox Dr Spotsylvania VA 22551	7/22/17
Gary Duckworth		6021 Harts Run Rd Spotsy 22551	4/29/18
Tom Hilderbrake		6000 Harts Run Spotsy, 22551	4/29/18
Karen Bohn		6101 Harts Run Spotsy 22551	4/23/18
Sandra Johnson		6010 Red Fox Dr. Spotsylvania VA 22551	4/28/18

Petition to Stop the Rezoning of Lot 76-A-2

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Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now to stop the rezoning of lot 76-A-2 to Industrial II special uses Industry Type III

Printed Name	Signature	Address	Date
Cindy L Picard	Cindy L Picard	5820 Plantation Estates Way Woodford, VA 22580	5/10/17
Stephanie S bed	Stephanie S bed	6113 Tavernier Ln Spotsy, VA 22580	5/10/17
GARY DUCKWORTH	Gary Duckworth	6021 HARTS RUN SPOTSY VA 22551	5-10-17
PATRICIA HARDING	Patricia Harding	" " SAME	5-10-2017
Rhonda Graber	Rhonda Graber	6030 Harts Run Spotsylvania VA 22551	5-10-2017
Daniel Wyche	D. Wyche	6011 Black Snake Ct. Spts, Va 22551	
ERIC ELLIOTT	Eric Elliott	6144 Jefferson Davis Hwy Woodford VA 22580	5-10-17
Melissa Schooley	Melissa Schooley	5804 Plantation Estates Way Woodford, VA 22580	5-10-17

Printed Name	Signature	Address	Date
Pamela Viera	Pamela Viera	5702 South Ct. Spotsy. VA	05/10/2017
MARK SCHULTZ	[illegible]	5[illegible] SOUTH CT [illegible]SYLVANIA	05/10/2017
Freedman Partners	[illegible]	6118 Tallwood Ln 22551	5/10/17
Donna Elliott	Donna A. Elliott	6160 Jeff Davis Hwy Woodford VA 22580	5/10/17
Nelson Gentry	[illegible]	8701 Lake Anna Pkwy Spotsy. VA 22551	5/10/17

Residents of Taverneer Subdivision Petition Spotsylvania County, VA to **Vote NO** on Team-Crucible, a private military training outfit that has requested the county supervisors **to rezone** a 70 + acre parcel located just behind D'Marie's off Rt. 1.

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1)	Thomas Brady	Thomas J Brady	6109 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
2)	Shirley Brady	Shirley Brady	6109 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
3)	Dorothy Harman	Dorothy Harman	6105 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
4)	John Johnson		6100 Taverneer Lane, Spotsylvania, VA 22551	5-25 2017
5)	ELIZABETH VICKERS	Elizabeth Vickers	6102 Taverneer Lane, Spotsylvania, VA 22551	5 25 2017
6)	LESTER VICKERS		6102 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
7)	LESTER T VICKERS III		6102 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
8)	Chase Grymes		6106 Taverneer Lane, Spotsylvania, VA 22551	5.25-2017
9)	[illegible] ISON		6113 Taverneer Lane, Spotsylvania, VA 22551	5-25 2017
10)	JAMES ISON JR		6112 Taverneer Lane, Spotsylvania, VA 22551	5-25 2017
11)	Joyce Minor	Joyce E Minor	6116 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
12)	CYNTHIA Minor		6116 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
13)	Robert Kobes		6114 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
14)	Jane Kobes		6114 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
15)	Wendy Laster	Wendy Laster	6114 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
16)	[illegible]	Colleen O'Bannon	6113 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
17)	Lauren Paul	Lauren Paul	6118 Taverneer Lane, Spotsylvania, VA 22551	5-26-2017
18)	Nicholas Lyell Tyler Jr.	Nicholas Lyell Tyler Jr.	6212 Taverneer Lane, Spotsylvania, VA 22551	5-26-2017
19)	LARRY PURTELL	Larry Purtell	6215 Taverneer Lane, Spotsylvania, VA 22551	5-26-2017
20)	SHARON KEEDY	Sharon M Keedy	6310 Taverneer Lane, Spotsylvania, VA 22551	5-26-2017
21)	Carmen Rocciolo		6301 Taverneer Lane, Spotsylvania, VA 22551	5-26-2017
~~22)~~	~~[illegible]~~	(Next Pg)	Taverneer Lane, Spotsylvania, VA 22551	2017
23)	Frank Ayers		6111 Taverneer Lane, Spotsylvania, VA 22551	2017
24)	WARREN HARMAN		6105 Taverneer Lane, Spotsylvania, VA 22551	6-2-2017

Petition Spotsylvania County, VA to **Vote NO** on Team-Crucible, a private military training outfit that has requested the county supervisors **to rezone** a 70 + acre parcel located just behind D'Marie's off Rt. 1. (Page 2)

	Printed Name	Signature	Address	Date
24)	David W Saunders		6108 Taverneer Lane, Spotsylvania, VA 22551	6-2 – 2017
25)	Michelle Spina		6101 Taverneer Lane, Spotsylvania, VA 22551	6-8 – 2017
26)	GARY SPINA		6101 Taverneer Lane, Spotsylvania, VA 22551	6-8 – 2017
27)	Bryan Junious		6110 Taverneer Lane, Spotsylvania, VA 22551	6-9- 2017
28)	JOEL LEWIS		6110 Taverneer Lane, Spotsylvania, VA 22551	6-9- 2017
29)	Debra D. Hamstead		5708 East Point Ct., Spotsylvania, VA 22551	5-26- 2017
30)	Velma Armstead		5708 East Point Ct., Spotsylvania, VA 22551	5-26- 2017
31)	RAYMOND FOSTON		5706 East Point Ct., Spotsylvania, VA 22551	5-26- 2017
32)	Alicia Herrera		5700 East Point Ct., Spotsylvania, VA 22551	5-26- 2017

	Printed Name	Signature	Address	Date
33)	Daniel Newton		5703	
	↓		↓ South Ct, Spotsylvania, VA 22551	5-26-17 2017
34)	Pamela Vaia	Pamela Vaia	5702 South Ct, Spotsylvania, VA 22551	6-2 – 2017
35)	Mark Schultz		5702 South Ct, Spotsylvania, VA 22551	6-2 – 2017
36)	Fred Allen IV		5701 South Ct, Spotsylvania, VA 22551	6-2 – 2017

PLEASE Vote NO on this rezoning request

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Susie Sallinger	Susie Sallinger	9423 Laurel OAK Dr Fredericksburg VA 22407	31-MAY 17
Patricia Burke	Patricia Burke	6817 Violet Dr Fred. VA 22407	5-31-17
Linda Stimpson	Linda L Stimpson	96 Gerber Dr. Spotsylvania VA 22408	5-31-17

Petition to Stop the Rezoning of Lot 76-A-2

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Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Richard S. Hitt	Richard S Hitt	310 Belle Grove Lane Spotsylvania VA 22551	2 June 2017
Jennifer Hitt	Jennifer Hitt	310 Belle Grove Lane Spotsylvania VA 22551	2 June 2017
Carl V Taylor	Carl V Taylor	110 Matta Way Spotsylvania VA 22551	2 June 2017
Cheri L Taylor	Cheri L Taylor	110 Matta Way Spotsylvania VA 22551	2 June 2017
Charlene Taylor	Charlene Taylor	110 Matta Way Spotsylvania Va 22551	2 June 2017
DALE BENWARE	Dale Benware	101 MATTA SPOTSYLVANIA VA 22551	2 June 2017
Linda Benware	Linda Benware	101 Matta Way Spotsylvania 22551	June 2, 2017
Teresa Cornwell	T Cornwell	97 Matta Way, Spotsy. VA 22553	June 2, 2017
Andrea Henry	Andrea Henry	302 Bellegrove Ln, Spotsy VA 22551	June 4, 2017

Petition to Stop the Rezoning of Lot 76-A-2

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Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
JOSEPH CAGNINA	J.W Cagnina	113 MATTA WAY SPOTSYLVANIA VA	1 JUNE 17
MYRNA CAgnina	Myrna Cagnina	113 Matta Way Spotsylvania VA	1 Jun 17
Robert Osborne	Robert Osborne	309 Bellgrove Lane Spotsylvania VA 22551	1 Jun 17
Marilyn Osborne	Marilyn Osborne	309 Bellgrove Lane Spotsylvania VA 22551	1 JUNE 17
Kurt Nordstrom	Kurt Nordstrom	306 Bell Grove Lane, Spotsylvania VA 22551	6/1/2017
Ruth Amunzi	Ruth Amunzi	307 Bell Grove Lane	6/1/17
MARK AMUNZEN	Mark Amunzen	307 BELL GROVE LN. SPOTSYLVANIA, VA. 22551	6/1/17
Mara Hernandez	Mara Hernandez	302 Bellgrove Ln Spotsylvania VA 22551	6/1/17
JAMES SPIVEY	J.W Spivey	112 MATTA WAY SPTSY 22551	6/1/17

Petition to Stop the Rezoning of Lot 76-A-2

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Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
John Kanary	John Kanary	109 Matta Way Spotsylvania VA	6-04-2017
Claire Kanary	Claire Kanary	109 Matta Way Spotsylvania Va 22551	6/4/17
Tony Barb	Tony Barb	304 Belle Grove Ln. Spotsy. VA.	6/4/17
Teresa Barb	Teresa Barb	304 Belle Grove La, Spotsy VA	6/4/17
MONICA DIBELLA	M DiBella	305 Bell Grove Lane, Spotsylvania VA	6/5/17
LARRY Stanley	Larry Stanley	108 matta WAY	6/11/17
TAWANNA Kelly	Tawanna Kelly	6049 STANFIELD RD. Spotsylvania	6-19-17

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Michael Elliott	Michael Elliott	6146. Jefferson Davis Hwy, Woodford, VA. 22580	6, June 2017
Donna A Elliott	Donna A Elliott	6160 Jefferson Davis Hwy Woodford, VA 22580	6, June 2017
Sue Ellen Elliott	Sue Ellen Elliott	6148 Jeff. Davis Hwy. Woodford, Va, 22580	6, June 2017
Marine Grasser	Marine Grasser	6148 Jeff Davis Hwy Woodford, VA 22580	6, June 2017
Brian Elliott	[illegible]	6160 Jeff Davis Hwy Woodford VA 22580	6-7-17
~~Caroline Hayden~~	~~Caroline Hayden~~	~~4911 Guinea Station Rd Fred 22407~~	~~6-8-17~~
~~CARROLL HAYDEN~~	~~[illegible]~~	~~4911 Guinea Station Rd Fred 22407~~	~~6-08-17~~
Douglas Taylor	[illegible]	10003 Law Place Fredericksburg, Va 22407	6/8/17
Lou Ambrosini	[illegible]	12803 West Catharpin Rd Spotsylvania 22551	6/9/17
Michael Johnson	[illegible]	3670 Shanley's Hill Rd Partlow VA 22534	6/9/17
William D Strickland	[illegible]	11421 Catharpin Rd Spotsy 22553	6/14/17
Allen Faulconer	[illegible]	8627 Brock Rd Spotsy 22553	6/14/17

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Barbara S Grogan	Barbara S Grogan	6016 Morris Rd Spotsy Va 22551	9 June 2017
Autumn Jewell			
Lynn Marie Lunsford	Lynn Lunsford	9217 Saint Andrews Lane, Fred. Va. 22408	June 13 2017
Sarah Vekos	Sarah Vekos	9416 Old Mill Lane, Spotsy VA 22551	7 July 2017
Meagan Carter	Meagan Carter	15 Briarwood Drive Fredericksburg VA 22405	14 July 2017
Katie Engel	Katie Engel	5410 S. Branch Rd Fredericksburg VA 22407	14 July 2017

Petition to Stop the Rezoning of Lot 76-A-2

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Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
WARREN HARMAN	Warren Harman	6105 TAVERNEER LN. SPOTSYLVANIA, VA.	6-21-17
Dorothy Harman	Dorothy Harman	6105 Taverneer LN. Spotsylvan, Va.	6-21-17
James J. Kelly Jr	James J. Kelly	6106 Taverneer Ln. Spot. VA.	6-21-17
Ishmael Paz	I Paz	6112 Taverneer Ln Spot. VA	6-21-17
Christina Armstrox		5706 East Pt Ln. Spotsy VA 22551	6-21-17
Deborah Armstr	Robert D. Armstr	5708 East Pointer Spotsylvania 22551	6-21-17
RAYMOND W BOSTON	Ray J Boston	5706 EAST POINTER, SPOTSY 22551	6-21-17
Ed CLARK	Ed Clark	5704 E. Point Cir	6-21-17
Brenda Wirt	BRENDA WIRT	5701 E. POINT CIRCLE	6-21-17

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Beverly Endicott	Beverly Endicott	6214 main street, Thorn Burg VA 22551	21, MAY 2017
MAthew CRASCO	Mathew Crasco	6214 main street, thorn burg 22551	21, MAY 2017
ELIZABeth Endicott	Elizabeth Endicott	6214 main street, thornsburge VA 22551	21- MAY 2017
Robert Kobes		6114 Taverneer lane Spotsylvania VA 22551	21-6-17
Linda Kobes		6114 Taverneer Lane Spotsylvania VA 22551	6-21-17
Wendy Laster		6114 Taverneer Ln Spotsylvania VA 22551	6/21/17
Claire Mon		6116 Taoneer Lane Spot. VA 22551	6/21/17
Joyce Minor	Joyce E. Minor	6116 TAVerneer lane Spotsylvania Va. 22551	6/21/17
Tom Vickers		602 TAVERNEER LANE SPOTSYLVANIA VA 22551	6-21-17

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
ELVIA RATLIFF	Elvia Ratliff	105 Matta Way, spotsy va 22551	6.29.17
GERALD WILLIAMSON	[illegible]	102 SAINT SULIAN Ct SPOTS VA 22551	6.29.17
James A. Strat	[illegible]	508 Santee DR. Spotsy 22551	6-29-17
Stephen strat	[illegible]	508 Santee dr spotsylvania va 22551	6-29.17
DorcThy Ford	[illegible]	504 Santee Dr Spotsylvania 22551	6-30-17

Petition to Stop the Rezoning of Lot 76-A-2

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Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Travis Urda		7635 Po River Dr. Spotsylvania, VA 22551	04 July 2017
Amy Philbrick		11819 Duck Circle Spotsylvania VA 22553	7/11/17
PAM CRISP		105 Creek Ln. Flaurg VA 22407	7-12-17
Dwayne Crisp		105 Creek Ln Fburg VA 22407	7-12-17
Julia Lookabill		6907 Marble Hills Dr. Spotsy VA 22551	7-12-17
Ronnie Lookabill		6907 Marble Hills Dr. Spotsy VA 22551	7-12-17
Michael Killian		4 Shetland Ct., Spotsylvania VA 22551	7-12-17
Charles Andrews		11300 Enchanted Woods Way Fredericksburg 22407	7-12-17
Stephanie Andrews		11300 Enchanted Woods Way Fredericksburg 22407	7-12-17

Petition to Stop the Rezoning of Lot 76-A-2

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Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Tom Lee	Tom Lee	6040 Harms Ct. P.O. 709 Woodford 22565 Thornburg	7-9-17
James Wade	James Wade	15093 CRUSP LN WOODFORD VA 22580	9-9-17
Robert Lefler	Robert Lefler	11330 Jackson Trail Spts. VA 22553	9-9-17
Denise Craig	Denise R Craig	6544 Lanes Corner Rd Spts VA 22551	9-9-17
Laura Smith	L. Smith	11669 Eastham Rd Bumpass VA 23024	7-9-17
Todd Leake	Michael Leake	7315 Clover Hill Rd Spotsy. VA 22551	7-10-17
Jose RAMIREZ		6851 Harris RD Spotsylvania VA 22551	7/10/17
Antonio Rivas		5414 Mudd tavern RD Thornburg VA	7/10/17
Mariana Ramirez		5414 Mudd tavern RD Thornburg VA	7/10/17

Petition to Stop the Rezoning of Lot 76-A-2

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Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Claudia Garcia		5851 MORRIS RD SPOTSYLVANIA VA 22551	7 10 17
MARSIA MARCUS		5414 MUD TAVERN RD THORNBURG VA 22580	7 10 17
MARCO BIANCO		5851 MORRIS RD SPOTSYLVANIA VA 22551	
Don Reedy		6411 Adamson Rd, Woodford, VA	7-10-17
ANTONIO LARA		5851 MORRIS RD SPOTSYLVANIA VA 22551	7-10-17
ELISEO GARCIA		6411 ADAMSON RD WOODFUD VA 22551	7-10-17
Tristan Feduccia		6900 in the woods way VA 22551	7-10-17
Paula Feduccia		6900 In the woods Way Spotsy VA 22551	7/10/17
Nubia Montano		424 land Or drive, Rther Glen, VA	7/11/17

Petition to Stop the Rezoning of Lot 76-A-2

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
PETER LARSON	PE LARSON	5808 RED FOX DR, THORNBURG, 22551	31 MAY '17
Greg Jeffers	Greg Jeffers	507 Redground Dr, Ruther Glen, VA 22546	15 Jun 17
Charles Hall	Charles Hall	3616 shirleys Hill road partlow VA 22534	7-15-17
Jimmy Guevara	Jimmy Guevara	11708 virginia Pine Dr. Germantown MD	7/15/17
Andrew Iannone	Andrew Iannone	5309 Sovereign Place Frederick MD	7/15/17
Lea Handlesheit	Lea Handlesheit	638 fewers lane, WOODFORD VA 22580	7/15/17
BRANDIE HANDLESHEIT	BHandlesheit	404 S. BROOKS DR FBURG VA 22408	7/15/17
Evan Pere	Evan Pere	637 charlotte Rd Richmond VA 23222	7/15/17
ROSA LOPEZ	Rosa Lopez	5414 mud tavern Rd	7/15/17
Mike Evans	Mike Evans	4530 MORRIS Rd Spotsy 22551	5/16/17
Jacqueline Tiller	Jacqueline Tiller	3609 Partlow Rd., Partlow, VA 22534	7/16/17
Angela Rose Mastrovito	Angela Rose Mastrovito	5751 Partlow Rd Partlow 22534	7.16.17
Amanda Saffelle	Amanda Saffelle	8600 Sleepy Hollow Ln, Partlow VA 22534	7-16-17

Petition to Stop the Rezoning of Lot 76-A-2

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Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Jon D Kimmel		118A Lone OAK Rd Partlow VA 22534	7-8-17
Jon D Kimmel II		118A lone oak RD. partlow VA. 22534	7-8-17
Jessica Hawkins		118A Lone Oak Rd Partlow Va 22534	7-8-17
Marcy Specht	Marcy Specht	7903 lakeanna Pkwy Spotsy VA 22551	7-8-17
Todd Lanoue		10201 Tamington Way Spotsy 22551	7-8-17
Timothy Specht		7903 lake anna parkway spots. 22551	7-8-17
Lisa Leichsenring		10078 Gdansk Rd.	7/8/17
Tina Stoker		15390 Union Church Rd 23015	7/8/17
Linda Lee	Linda Lee	6040 Hamp Ct. P.O. Box 709 Woodford, Va 22565 Thornburg	7-9-17

Petition to Stop the Rezoning of Lot 76-A-2

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Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
KAREN BOHN	Karen Bohn	6101 HARTS RUN SPOTSYLVANIA VA	7/10/2017
CAROL REEDY	Carol Reedy	6411 ADAMSON Rd, WOODFORD, VA	7/10/2017
BERNER JOHNSON	Berner Johnson	8804 MILLWOOD DR, SPOTSYLVANIA, VA	7/10/2017
KAY ANN JOHNSON	Kay Ann Johnson	8804 MILLWOOD DR, SPOTSYLVANIA, VA.	10 July '17
BILL ISON	Bill Ison	MILLSTREAM, Spotsylvania	7/10/17
Linda Ison	Linda Ison	Millstream Spotsylvania	7/10/17
Bob Brown	Bob Brown	8808 MILLWOOD - SPOTSY	7/10/17
MARIANO RAMIREZ	MR	5414 Mudd TAVERN Rd VA 22580	07.10.17
MESINA MARIANO	RM	5851 MORRIS RD SPOTSYLVANIA VA 22551	7.10.17

Petition to Stop the Rezoning of Lot 76-A-2

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Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Andrea L. Arthur	Andrea Arthur	5931 Marye Rd Woodford VA 22580	7-2-17
James Atwell	James R Att	5931 MARYE RD Woodford VA 22550	7-2-17
Bobbie Cauthorn	Bobbie Cauthorn	14059 Stonewall Jackson rd, Woodford VA 22580	7-6-17
Bill Blevins	Bill Blevins	6904 CloudyWAY Spotsy 22551	7-6-17
TRACY BLEVINS	TBlevins	6904 Cloudy Way Spotsy 22551	7/6/17
Elizabeth Berry	E Berry	4010 Claiborne Plantation Fred 22408	7-6-17
Jeanette Irgang	Jeanette Irgang	6 50 L Prospect Fred 22407	7-7-17
James Bowling	J Bowling	4433 Fairview Drive Woodford VA 22580	7-7-17
James Bryant	James Bryant	6701 Hook Ct Spotsylvania	7-7-17

Petition to Stop the Rezoning of Lot 76-A-2

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Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
CRISTIAN [redacted]	[redacted]	5851 MORRIS RD SPOTSYVANIA VA 22551	7-14-17
Tamara v Mark Mullick	Tamara Mullick	6304 Grace Hill, Spotsylvania VA 22551	7/14/17
Mark Mullick	Mark Mullick	6304 GRACE HILL SPOTSYLVANIA VA 22551	7-14-17
Alicia Adams	AAdam	4704 Colonnade Way 22408	7/15/17
CynthiaAckerman	CyRA	12124 Shotleaf Rd 22546	7/15/17
Melissa Reyes	MaissaR	835 campers lane 22546 Ruther Glen	7/15/17
Jalissa Reyes	JalissaR	835 campers lane 22546	7/15/17
ENSO MORENO	EHM	5851 MORRIS RD SPOTSYVANIA VA 22551	7-17-17
ALISSON REMIAS	AR	5158 MORRIS RD SPOTSYVANIA VA 22551	7 17 17

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Idelma Reyes		5231 magnolia Pl Fredericksburg VA 22407	7/16/2017
Malissa Reyes		835 campers lane ruther Glen VA 22546	16 July 17
Hana Chahan		8410 Shepherds Way, Partlow VA 22534	07/16/17
Will Yarbrough		123 Main street thornburg VA 22551	07/17/17
Eric Crook		123 Main Street thornburg VA 22551	07/17/17
Kevin collins		1209 SUNKEN Rock	7/17/17
JACOB LOHR		5817 MORRIS RD SPOTSYLVANIA VA 22551	7/19/17
Jane Prout		3301 Riverbend Ct Bumpass VA 23024	7/19/17
Joseph L Bongiovi		3233 CAVALRY RIDGE RD Fd. VA	7/19/17

Petition to Stop the Rezoning of Lot 76-A-2

9

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
ABE 2 SOH		5703 South ct Spotsylvania	8-4-18
BRIAN HACKETT		5700 SOUTH CT SPOTSYLVANIA	8-4-18
Frank S. Ayers		6111 Tavern Rd Spotsylvania	8-4-18
Mary Smart	Mary Smart	we live in Spotsy 5641 Bear Lane Woodford 22580	8-5-18
Jim Smart	Jim Smart	5641 Bear Lane Woodford 22580	8-5-18
Patricia L Chew	Patricia Chew	6884 South Roxbury Mill Rd 22565	8-10-18
BRANDI PARRISH	Brandi Parrish	11115 Stoneade Dr. Spotsylvania	8-11-18
Matt Burkett		5919 Cascade Dr Fbg 22407	8-12-18
ANDREW VALENCIA		613 LANCASTER ST, F'BURG 22405	8-12-18

Petition to Stop the Rezoning of Lot 76-A-2

6

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
B. Scott Cook	B Scott Cook	10818 Catharpin Rd Spotsy VA 22553	8-13-18
Jacqueline Williams	Jacqueline Williams	9410 Everette Ct Spotsy VA 22553	8-13-18
Quander Kay	Quander Kay	6205 Taverneer Ln, Spotsy, 22551	8-15-18
Mary Newton	Mary Newton	7204 Courthouse Rd Spotsy 22551	10/6/18
Cliff Newton	Cliff C Newton	7204 Courthouse Rd Spotsy 22551	10/6/18
Tonya Newton	Tonya Newton	7457 Courthouse Rd Spotsy VA 22551	10/6/18

Petition to Stop the Rezoning of Lot 76-A-2

9

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Kate Valencia		613 Lancaster St Fburg VA 22405	8/12/18
Kate Powers	Kate Powers	6533 Venison Dr Fredericksburg VA 22407	8/13/18
Ruth Freeman	Ruth Freeman	5798 First Landing Way Spfld VA	8/13/18
Rose O Davis	Rose O. Davis	411 Polk Dr. Spotsylvania, VA 22551	8/13/18
ROBERT D. DAVIS	Robert D. Davis	411 POLK DR. SPOTSYLVANIA, VA 22551	8/13/18
Tim Henderson		1150 Rogers Dr F'burg 22408	8/13/18
NORA ELDRIDGE	Nora Eldridge	10003 MOORGATE AVE #104 SPOTSY. VA 22553	8/13/18
AUDREY GARDINER	Audrey Gardiner	12725 Banner Plantation Dr. Fredericksburg VA 22407	8-13-18
Rabih Abousmaid	Rabih Abousmaid	5821 Jackson Rd. Fredericksburg VA 22407	8-13-18

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Jerry Spillman		5818 Morris Rd Spotsy	9-12-17
michael J. Galati		6011 Rd Fox Dr. Spotsy 22551	10-14-17
Marlena Bittner		6331 Heronedam way Spotsy 22551	10-19-17
Martha Ayres	Martha Ayres	5949 Partlow Rd Spotsy 22551	7-29-18
Beverly Rueda		5953 Partlow Rd Spotsy 22551	7-29-18
TODD WOOLLAM		3co MORNINGSIDE DR FRED 22401	8-2-18
William D. McClain		11415 Wytheville Ct F'burg 22407	8-2-18
Benjamin Wright		6001 OAKTON BRANCH LN FREDERICKSBURG VA	8-2-18
Christopher Bare		205 Hawke St APT B Fbg VA 22401	8-2-18

ipetitions
YOUR VOICE COUNTS

This petition has collected
192 signatures
using the online tools at ipetitions.com

Printed on 2018-12-10

Demand the Board of Supervisors deny the Crucible re-zoning request

About this petition

We, the residents of Spotsylvania call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a mercenary training facility.

Such a facility would physically threaten our homes, families and property, degrade our property values, be a noise nuisance, and this type of business has no place in such close proximity to our homes and businesses.

We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility.

Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

THANK YOU.

http://StopCrucible.com

Signatures

1. Name: Katie Skelly on 2017-05-30 14:28:25
Please provide your zip code: 22580
Please enter your street address: 6401 Adamson Ln

---

2. Name: Heather Wheeler on 2017-05-30 14:31:34
Please provide your zip code: 22551
Please enter your street address: 7400 courthouse road Spotsylvania va 22551

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3. Name: Thomas vickers on 2017-05-30 15:07:13
Please provide your zip code: 22551
Please enter your street address: 6102 Taverneeer LN

---

4. Name: Eadee Foley on 2017-05-30 20:08:03
Please provide your zip code: 22580
Please enter your street address: 5409 Hams Ford Rd. Woodford Va 22580

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5. Name: Patricia Antosh on 2017-05-30 21:48:05
Please provide your zip code: 22407
Please enter your street address: 20 Twin Springs Dr
Fredericksburg, VA

---

6. Name: Michael Schooley on 2017-05-30 23:42:13
Please provide your zip code: 22580
Please enter your street address: 5809 plantation estates way

---

7. Name: Wally Hunt on 2017-05-31 01:51:51
Please provide your zip code: 22408
Please enter your street address: 7731 Riparian Ct

---

8. Name: Faith Carr on 2017-05-31 02:39:52
Please provide your zip code: 22580
Please enter your street address: 5917 Jefferson Davis highway
Woodford va 22580

---

9. Name: Lisa Diskin on 2017-05-31 14:12:38
Please provide your zip code: 22551
Please enter your street address: 8021 Fox Trail

---

10. Name: Gregory Combs on 2017-06-01 01:24:25
Please provide your zip code: 22408
Please enter your street address: 3602 East Glen Dower Drive

---

11. Name: Cynthia Combs on 2017-06-01 01:32:34
Please provide your zip code: 22408
Please enter your street address: 3602 East Glen Dower Dr

---

12. Name: lea dodge on 2017-06-01 01:59:25
Please provide your zip code: 22408
Please enter your street address: 8909 ridge crest court Fredericksburg va

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13. Name: Jonathan Colp on 2017-06-01 02:34:53
Please provide your zip code: 22551
Please enter your street address: 5805 Red Fox Dr
Spotsylvania, Va

---

14. Name: Jay Pennington on 2017-06-01 02:43:21
Please provide your zip code: 22551
Please enter your street address: 7923 kerrydale court spotsylvania virgina 22551

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15. Name: Danielle Beach on 2017-06-01 11:50:50
Please provide your zip code: 22407
Please enter your street address: 11509 Ashby dr. Fburg va

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16. Name: James perry on 2017-06-01 11:57:21
Please provide your zip code: 22534
Please enter your street address: 4412 shepherds hollow

---

17. Name: Malinda Willis on 2017-06-01 12:01:49
Please provide your zip code: 22408
Please enter your street address: 725 Olde Greenwich Cir.

---

18. Name: Robert Young on 2017-06-01 14:48:40
Please provide your zip code: 22408
Please enter your street address: 10810 Samantha Place

---

19. Name: Monika Brinkman on 2017-06-01 16:29:09
Please provide your zip code: 22580
Please enter your street address: 5821 Plantation Estates Way

---

20. Name: Cindy Pedigo on 2017-06-02 10:03:01
Please provide your zip code: 22553
Please enter your street address: 10108 Brookrun Ct., Spotsylvania, VA

---

21. Name: Angela Rose Mastrovito on 2017-06-11 03:17:53
Please provide your zip code: 22534
Please enter your street address: 5751 Partlow Rd.

22. Name: Sharon Breakfield on 2017-06-12 01:07:07
Please provide your zip code: 22551
Please enter your street address: 5920 Red Fox Drive

23. Name: Brian Hill on 2017-06-13 23:51:00
Please provide your zip code: 22553
Please enter your street address: 10522 Ni River Dr

24. Name: Carol A Albright on 2017-06-18 02:00:22
Please provide your zip code: 22408
Please enter your street address: 4301 Bridlepath Court

25. Name: Judy Rogers on 2017-06-18 14:06:03
Please provide your zip code: 23015
Please enter your street address: 2709 Partlow Rd

26. Name: Cherie L Taylor on 2017-06-21 22:29:55
Please provide your zip code: 22551-2820
Please enter your street address: 110 Matta Way
Spotsylvania VA 22551

27. Name: Carl Taylor on 2017-06-21 22:31:08
Please provide your zip code: 22551
Please enter your street address: 110 Matta Way

28. Name: Charlene Butler on 2017-06-21 22:31:34
Please provide your zip code: 22551
Please enter your street address: 110 Matta Way

29. Name: Crystal Taylor on 2017-06-21 22:32:14
Please provide your zip code: 22551
Please enter your street address: 110 Matta Way

30. Name: Yvonne Lee on 2017-06-21 23:07:40
Please provide your zip code: 22546
Please enter your street address: 17261 Library Blvd
Ruther Glen VA

31. Name: Elizabeth Fincham on 2017-06-23 23:03:11
Please provide your zip code: 22551
Please enter your street address: 6002 Jennifer Rd

32. Name: Richard Fincham on 2017-06-23 23:13:06

Please provide your zip code: 22551
Please enter your street address: 6002 Jennifer Rd

---

33. Name: Shawndi Mills on 2017-06-24 02:22:49
Please provide your zip code: 22534
Please enter your street address: 5000 GREENBRANCH ST

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34. Name: Roger Mills on 2017-06-24 02:26:53
Please provide your zip code: 22534
Please enter your street address: 5000Greenbranch St Partlow Va

---

35. Name: Kenneth Nestor on 2017-06-24 23:05:42
Please provide your zip code: 22534
Please enter your street address: 8338 Marye Rd
Partlow Va
22534

---

36. Name: Jerome Tavik on 2017-06-29 21:49:14
Please provide your zip code: 22551
Please enter your street address: 6308 Tree Haven Ln

---

37. Name: Sandra Tavik on 2017-06-29 21:51:06
Please provide your zip code: 22551
Please enter your street address: 6308 Tree Haven Ln

---

38. Name: Barbara Dailey on 2017-06-29 21:55:29
Please provide your zip code: 22551
Please enter your street address: 6308 Tree Haven Ln

---

39. Name: joseph Cagnina on 2017-06-30 14:48:55
Please provide your zip code: 22551
Please enter your street address: 113 Matta Wat

---

40. Name: Nicole Howdyshell on 2017-06-30 21:52:42
Please provide your zip code: 22580
Please enter your street address: 13412 countyline church road

---

41. Name: Chris Howdyshell on 2017-06-30 22:02:02
Please provide your zip code: 22408
Please enter your street address: 3604 Alberta Drive

---

42. Name: Linda and Tom Lee on 2017-07-01 14:23:12
Please provide your zip code: 22565
Please enter your street address: 6040 Hams Court

43. Name: Chris on 2017-07-01 17:44:37
Please provide your zip code: 22546
Please enter your street address: 12124 Shortleaf Rd Ruther Glen VA 22546

---

44. Name: Tami Turner on 2017-07-05 13:33:27
Please provide your zip code: 22407
Please enter your street address: 9511 Secca Drive

---

45. Name: Leslie Bird on 2017-07-05 22:33:30
Please provide your zip code: 22534
Please enter your street address: 5721 Partlow Road
Partlow, VA

---

46. Name: D King on 2017-07-06 13:56:15
Please provide your zip code: 22551
Please enter your street address: 12700 Post Oal Rd

---

47. Name: Suzanne Christopher on 2017-07-07 14:23:43
Please provide your zip code: 22551
Please enter your street address: 6035 Harts Run

---

48. Name: Noemi Mcdaniel on 2017-07-07 21:27:54
Please provide your zip code: 22580
Please enter your street address: 5810 Plantation Estates Way, Woodford, Virginia 22580

---

49. Name: Marion Marshall on 2017-07-08 17:13:29
Please provide your zip code: 22551
Please enter your street address: 5139 stanfield road spotsylvania

---

50. Name: Jacob Breeden on 2017-07-08 18:31:28
Please provide your zip code: 22553
Please enter your street address: 6607 Plantation Forest Drive

---

51. Name: Andrea Kenny on 2017-07-08 21:49:46
Please provide your zip code: 22551
Please enter your street address: We own land near Berkeley Elementary School but have not built yet.

---

52. Name: James Rivera on 2017-07-08 22:58:53
Please provide your zip code: 22551
Please enter your street address: 407 Marc Dr.
Spotsylvania Va. 22551

53. Name: Frank DuBois on 2017-07-09 13:24:13
Please provide your zip code: 22551
Please enter your street address: 509 Santee Drive
Spotsylvania, VA 22551

54. Name: Jeremy Symonds on 2017-07-09 15:15:24
Please provide your zip code: 22551
Please enter your street address: 6647 courthouse rd
Spotsylvania va 22551

55. Name: Janice Feagan on 2017-07-09 18:06:32
Please provide your zip code: 22551
Please enter your street address: 3306 Danbury Circle
Spotsylvania, VA

56. Name: Malysa Rhodes on 2017-07-11 15:52:17
Please provide your zip code: 22534
Please enter your street address: 8708 marye rd
Partlow va

57. Name: Tiffany Garland on 2017-07-11 22:46:34
Please provide your zip code: 22546
Please enter your street address: 6280 Mt Airy Dr

58. Name: Danny Hale on 2017-07-13 20:56:43
Please provide your zip code: 22551
Please enter your street address: 5700 Stanfield Road

59. Name: Candice glover on 2017-07-13 23:24:15
Please provide your zip code: 22551
Please enter your street address: 6913 aspen ln spotsylvania va

60. Name: julie cline on 2017-07-16 23:26:33
Please provide your zip code: 22551
Please enter your street address: 6011 harts run

61. Name: Sharon reedy on 2017-07-17 16:37:20
Please provide your zip code: 22551
Please enter your street address: 6310 taverneer ln

62. Name: Rebecca Glass on 2017-07-18 15:03:50
Please provide your zip code: 22580
Please enter your street address: 6431 Adamson Lane

63. Name: Pamela Viera on 2017-07-18 20:26:55
Please provide your zip code: 22551
Please enter your street address: 5702 South Ct

64. Name: Richard Lee on 2017-07-19 00:03:34
Please provide your zip code: 22580
Please enter your street address: 6427Adamson Lane

65. Name: Emma Gazaway on 2017-07-19 23:14:56
Please provide your zip code: 22580
Please enter your street address: 6160 Gatewood Rd

66. Name: Mike Resnick on 2017-07-20 00:16:11
Please provide your zip code: 22407
Please enter your street address: 6001 Fox Point Road
Fredericksburg Va 22407

67. Name: Kyle Martin on 2017-07-20 18:48:43
Please provide your zip code: 22551
Please enter your street address: 6326 Grace HL
Spotsylvania VA 22551

68. Name: Noelle Beeler on 2017-07-20 23:26:55
Please provide your zip code: 22551
Please enter your street address: 7604 cross creek lane Spotsylvania va 22551

69. Name: Mark DiFilippo on 2017-07-22 17:24:14
Please provide your zip code: 22534
Please enter your street address: 5901 Block House Road

70. Name: Robert Pettit on 2017-07-22 18:45:05
Please provide your zip code: 22553
Please enter your street address: 10221 Shawnee Ln

71. Name: Wayne Dowdy on 2017-07-24 17:40:51
Please provide your zip code: 22551
Please enter your street address: 8302 Quicks Way Spotsylvania va

72. Name: Lauren Simpson on 2017-07-26 17:49:32
Please provide your zip code: 22551
Please enter your street address: 14520 Woolfolk rd

73. Name: Patrick Riley on 2017-07-28 12:14:19

Please provide your zip code: 22407
Please enter your street address: 6515 Prospect St
Fredericksburg, VA 22407

---

74. Name: Alexandria Carrier on 2017-07-29 16:01:54
Please provide your zip code: 22534
Please enter your street address: 3610 Shirley's Hill Rd, Partlow VA

---

75. Name: Tammy Elmore on 2017-07-30 04:57:06
Please provide your zip code: 22534
Please enter your street address: P.o. box 284

---

76. Name: Dorothy Harman on 2017-07-30 12:20:37
Please provide your zip code: 22551
Please enter your street address: 6105 Taverneer lane spotsylvania VA

---

77. Name: Sarah Newton on 2017-08-01 20:05:00
Please provide your zip code: 22553
Please enter your street address: 9001 John Myer St.

---

78. Name: Sarah Dye on 2017-08-04 16:43:39
Please provide your zip code: 22551
Please enter your street address: 15 Berkshire Lane

---

79. Name: Jake on 2017-08-05 04:00:52
Please provide your zip code: 22534
Please enter your street address: 5341 Wilton Lane

---

80. Name: Shawn Bennett on 2017-08-06 18:17:08
Please provide your zip code: 22408
Please enter your street address: 7209 Cumberland Dr

---

81. Name: Sarah Eckenrode on 2017-08-07 14:26:45
Please provide your zip code: 22551
Please enter your street address: 7937 Dowd Farm Rd
Spotsylvania VA

---

82. Name: Christopher Eckenrode on 2017-08-07 14:28:17
Please provide your zip code: 22551
Please enter your street address: 7937 Dowd Farm Rd
Spotsylvania VA

---

83. Name: abeni gold on 2017-08-10 02:35:43
Please provide your zip code: 22546

Please enter your street address: 2506 quail oak dr
Ruther glen va 22546

---

84. Name: Brandy Bradley on 2017-08-10 02:45:35
Please provide your zip code: 22401
Please enter your street address: 220 Green Arbor Dr

---

85. Name: Emily Rose on 2017-08-10 02:56:17
Please provide your zip code: 22546
Please enter your street address: 310 Land or Dr.

---

86. Name: Shirley Mathis on 2017-08-10 10:01:35
Please provide your zip code: 22546
Please enter your street address: 2506 Quail Oak Dr

---

87. Name: derrick Jones on 2017-08-11 18:30:05
Please provide your zip code: 22546
Please enter your street address: 2606 meadow lane,ruther glen va 22546

---

88. Name: Joe Ruedi on 2017-08-14 12:11:46
Please provide your zip code: 22551
Please enter your street address: 5953 Partlow Rd Spotsy VA 22551

---

89. Name: Michaela Doyle on 2017-08-20 20:23:36
Please provide your zip code: 28443
Please enter your street address: 128 holiday dr

---

90. Name: Al Darcangelo on 2017-08-26 18:47:51
Please provide your zip code: 22408
Please enter your street address: 4109 Corbin Hall 22408 - do not give out our address to anyone!

---

91. Name: Jane Darcangelo on 2017-08-26 18:49:25
Please provide your zip code: 22408
Please enter your street address: 4109 Corbin Hall 22408 Do not give out our address to others.

---

92. Name: Manda Maddox on 2017-08-27 12:59:48
Please provide your zip code: 22408
Please enter your street address: 608 Olde Greenwich Circle

---

93. Name: Danielle Richards on 2017-08-28 09:02:41
Please provide your zip code: 22551
Please enter your street address: 4206 French Acors Rd

94. Name: Elizabeth Newsome on 2017-08-28 14:06:15
Please provide your zip code: 22551
Please enter your street address: 4201 French Acors Rd Spotsylvania

95. Name: Jill Greene on 2017-08-28 14:20:05
Please provide your zip code: 22551
Please enter your street address: 4206 French acors rd
Spotsylvania

96. Name: Adam burton on 2017-08-28 17:51:26
Please provide your zip code: 23015
Please enter your street address: 1411 log cabin road beaverdam

97. Name: Brandie Howdershelt on 2017-09-02 01:53:41
Please provide your zip code: 22408
Please enter your street address: 404 S Brooks Dr
Fredericksburg, VA 22408

98. Name: angel ours on 2017-09-02 16:31:07
Please provide your zip code: 22408
Please enter your street address: 4229 mine Rd

99. Name: Patrick Herbst on 2017-09-05 02:28:53
Please provide your zip code: 22551
Please enter your street address: 6307 taverneer lane

100. Name: Mark Delahanty on 2017-09-16 12:48:27
Please provide your zip code: 22534
Please enter your street address: 4118 Jasper Ln
Partlow Va. 22534

101. Name: Susan Wood on 2017-09-29 02:19:14
Please provide your zip code: 22534
Please enter your street address: 8427 Marye Road

102. Name: Dustin gayle on 2017-09-29 21:43:07
Please provide your zip code: 22553
Please enter your street address: 10405 Daniels court

103. Name: Katie Brown on 2017-09-29 21:44:30
Please provide your zip code: 22407
Please enter your street address: 809 Barkley Drive

Fredericksburg VA 22407

---

104. Name: Adam Caldwell on 2017-09-29 21:47:19
Please provide your zip code: 22551
Please enter your street address: 6717 timberbrook lane

---

105. Name: Lisa on 2017-09-29 23:24:39
Please provide your zip code: 22551
Please enter your street address: 6404 Newell Ln. Spotsylvania Va 22551

---

106. Name: Karen Bohn on 2017-09-29 23:40:47
Please provide your zip code: 22551
Please enter your street address: 6101 Harts Run
Spotsylvania, VA

---

107. Name: Michelle Harrison on 2017-09-30 00:08:19
Please provide your zip code: 22551
Please enter your street address: 6813 Morris Rd..

---

108. Name: Robert Parker on 2017-09-30 00:15:31
Please provide your zip code: 22534
Please enter your street address: 5500 Enterprise Court

---

109. Name: Barry Christopher on 2017-09-30 00:49:18
Please provide your zip code: 22551
Please enter your street address: 6035 Harts Run

---

110. Name: Angelia Shook on 2017-09-30 01:00:52
Please provide your zip code: 22580
Please enter your street address: 13441 county line church rd

---

111. Name: Karissa roberson on 2017-09-30 03:07:19
Please provide your zip code: 22551
Please enter your street address: 8720 old mill

---

112. Name: Nancy Parke on 2017-09-30 10:53:50
Please provide your zip code: 22534
Please enter your street address: 4132 Partlow Rd Partlow, VA

---

113. Name: John Parke on 2017-09-30 10:55:31
Please provide your zip code: 22534
Please enter your street address: 4132 Partlow Rd Partlow

---

114. Name: Heather Sullivan on 2017-09-30 14:55:05

Please provide your zip code: 22551
Please enter your street address: 6814 Morris Rd spotsylvania va

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115. Name: charles w estes on 2017-09-30 18:37:49
Please provide your zip code: 22551
Please enter your street address: 6501 s roxbury mill rd

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116. Name: Dale shelton on 2017-10-01 03:10:44
Please provide your zip code: 22534
Please enter your street address: 4720 partlow road

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117. Name: Caroline Hayden on 2017-10-01 03:13:22
Please provide your zip code: 22407
Please enter your street address: 4911 Guinea Station
Fred Va22407

---

118. Name: Joshua Blum on 2017-10-01 13:35:56
Please provide your zip code: 23551
Please enter your street address: Morris Road,
Spotsylvania, Va

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119. Name: Mary Wyche on 2017-10-01 15:59:50
Please provide your zip code: 22551
Please enter your street address: Marta River Woods

---

120. Name: Ana on 2017-10-02 17:54:40
Please provide your zip code: 22407
Please enter your street address: 111 Green Arbor Dr

---

121. Name: Beverly Ruedi on 2017-10-03 02:12:19
Please provide your zip code: 22551
Please enter your street address: 5953 Partlow Road

---

122. Name: Martha Ayres on 2017-10-03 12:46:35
Please provide your zip code: 22551-3071
Please enter your street address: 5949 PARTLOW RD

---

123. Name: Jennifer Ruiz on 2017-10-04 03:00:45
Please provide your zip code: 22551
Please enter your street address: Taverneer Ln

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124. Name: Nicole on 2017-10-13 00:49:37
Please provide your zip code: 22407
Please enter your street address: 9304 Laurel Oak Drive

125. Name: Anthony Fiesel on 2017-10-13 20:40:42
Please provide your zip code: 22551
Please enter your street address: 5709 East Point Circle

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126. Name: Milo on 2017-10-15 23:47:00
Please provide your zip code: 22553
Please enter your street address: 10006 Crystal Palace Ln

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127. Name: Nick Ignacio on 2017-10-16 16:27:12
Please provide your zip code: 22553
Please enter your street address: 10602 chesterwood dr

---

128. Name: Judith ledbetter on 2017-10-17 11:59:01
Please provide your zip code: 22580
Please enter your street address: 5500 Coach Four La
Woodford,va

---

129. Name: Britney Buskirk on 2017-10-18 12:57:05
Please provide your zip code: 22551
Please enter your street address: 503 Santee dr

---

130. Name: Kelsey Whitacre on 2017-10-20 20:30:39
Please provide your zip code: 22551
Please enter your street address: Stop Crucible!

---

131. Name: Aaron Whitacre on 2017-10-20 20:48:33
Please provide your zip code: 22551
Please enter your street address: 4801 BLAYDES CORNER RD

---

132. Name: Joshua Barton on 2017-10-26 02:41:51
Please provide your zip code: 22534
Please enter your street address: 4221 shepherds rd parlow va

---

133. Name: Charles Barton on 2017-10-26 02:44:10
Please provide your zip code: 22534
Please enter your street address: 4221 Shepherds Rd

---

134. Name: Julie Barton on 2017-10-26 02:45:47
Please provide your zip code: 22534
Please enter your street address: 4221 shepherds rd

---

135. Name: Twila dew on 2017-10-27 21:59:01
Please provide your zip code: 22551

Please enter your street address: 8101 Waterford drive

---

136. Name: Nick dougherty on 2017-10-27 22:03:54
Please provide your zip code: 22551
Please enter your street address: 8107 Waterford drive

---

137. Name: Jose inglacias on 2017-10-27 22:06:31
Please provide your zip code: 22551
Please enter your street address: 6309 taverneer lane

---

138. Name: John munson on 2017-10-27 22:08:38
Please provide your zip code: 22551
Please enter your street address: 6310 taverneer lane

---

139. Name: Susan fleer on 2017-10-27 22:11:10
Please provide your zip code: 22551
Please enter your street address: 6301 taverneer lane

---

140. Name: Jim sturgis on 2017-10-27 22:12:11
Please provide your zip code: 22551
Please enter your street address: 6305 taverneer lane

---

141. Name: Sherly mckinley on 2017-10-27 22:14:26
Please provide your zip code: 22551
Please enter your street address: 6300 taverneer lane

---

142. Name: Gerald hoots on 2017-10-27 22:15:31
Please provide your zip code: 22551
Please enter your street address: 6315 taverneer lane

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143. Name: James teiner on 2017-10-27 22:17:03
Please provide your zip code: 22551
Please enter your street address: 8109 Waterford drive

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144. Name: Judy meister on 2017-10-27 22:19:45
Please provide your zip code: 22551
Please enter your street address: 8100 Waterford drive

---

145. Name: Ron speegler on 2017-10-27 22:20:53
Please provide your zip code: 22551
Please enter your street address: 6317 taverneer lane

---

146. Name: Jeff bloom on 2017-10-27 22:21:58
Please provide your zip code: 22551

Please enter your street address: 6314 taverneer lane

---

147. Name: Tammy mcallister on 2017-10-27 22:23:34
Please provide your zip code: 22551
Please enter your street address: 8112 Waterford drive

---

148. Name: Justin beere on 2017-10-27 22:25:36
Please provide your zip code: 22551
Please enter your street address: 6320 taverneer lane

---

149. Name: Berniece Vermilyea on 2017-10-31 13:14:16
Please provide your zip code: 22551
Please enter your street address: 6415 HamsFord Road

---

150. Name: Victoria Breakfield on 2017-11-08 15:10:08
Please provide your zip code: 22551
Please enter your street address: 6106 Hart's Run

---

151. Name: Taikneka on 2017-11-15 14:51:56
Please provide your zip code: 22546
Please enter your street address: 25470 Zion rd.

---

152. Name: Kevin Northridge on 2017-12-08 16:51:14
Please provide your zip code: 22407
Please enter your street address: 9903 Box Oak Court
Fredericksburg VA 22407

---

153. Name: Deborah Hayes on 2017-12-24 22:38:27
Please provide your zip code: 22553
Please enter your street address: 215Woodfield Dr

---

154. Name: Ben Brady on 2017-12-25 21:25:52
Please provide your zip code: 22408
Please enter your street address: 16 English Oak Circle

---

155. Name: Woodie Dillman on 2017-12-28 16:50:20
Please provide your zip code: 23015
Please enter your street address: 1921 WIGGLESWORTH RD

---

156. Name: Aimee Dillman on 2017-12-28 16:52:05
Please provide your zip code: 23015
Please enter your street address: 1921 Wigglesworth Rd

---

157. Name: Robert Cooper on 2018-01-17 16:34:06

Please provide your zip code: 22551
Please enter your street address: I live at 5923 Morris RD and would like the Thornburg area developed in a way that promotes benfits for the whole community. This project would scare away the type of good development that we want to occur.

---

158. Name: Brooke on 2018-02-15 15:55:57
Please provide your zip code: 22546
Please enter your street address: 18431 countyline church rd

---

159. Name: Margaret on 2018-07-24 02:27:42
Please provide your zip code: 22551
Please enter your street address: 5825 morris rd

---

160. Name: Jessica TaVIK on 2018-07-26 18:36:23
Please provide your zip code: 22408
Please enter your street address: 9603 Coventry Creek Dr.

---

161. Name: Tracy Dowdy on 2018-07-27 18:12:27
Please provide your zip code: 22580
Please enter your street address: 5655 Bear Ln
Woodford VA 22580

---

162. Name: Paul benson on 2018-07-27 19:19:08
Please provide your zip code: 22580
Please enter your street address: 5661 bear ln

---

163. Name: Kari Christaldi on 2018-07-28 13:02:18
Please provide your zip code: 22655
Please enter your street address: We purchased property at Indian Acres and my understanding is that the site is less than a mile through the woods to the campground. Safety is a huge concern.

---

164. Name: Samuel W Browne on 2018-07-28 18:39:39
Please provide your zip code: 22407
Please enter your street address: 6819 Resground Rd

---

165. Name: Mary Heck on 2018-07-28 21:03:49
Please provide your zip code: 22551
Please enter your street address: 5901 Red Fox Drive

---

166. Name: Jennifer Cline on 2018-07-28 23:30:19
Please provide your zip code: 22551
Please enter your street address: 6011 Harts run

---

167. Name: Debbie Wolfe on 2018-07-29 23:21:59
Please provide your zip code: 22534
Please enter your street address: 8111 wade st

---

168. Name: Jeremiah Lloyd on 2018-07-31 21:47:33
Please provide your zip code: 22553
Please enter your street address: P.o. box 1300

---

169. Name: walter w hoeffer on 2018-08-09 01:03:55
Please provide your zip code: 22580
Please enter your street address: 5925 jeff davis hwy

---

170. Name: Bill Van Stone on 2018-08-11 23:52:32
Please provide your zip code: 22534
Please enter your street address: 9230 Thurston Lane

---

171. Name: Peggy VanStone on 2018-08-11 23:58:05
Please provide your zip code: 22534
Please enter your street address: 9230 Thurston Lane

---

172. Name: David Becker on 2018-08-14 23:31:23
Please provide your zip code: 22407
Please enter your street address: 6535 Venison Drive

---

173. Name: Sonya Sparks on 2018-08-18 15:54:58
Please provide your zip code: 22551
Please enter your street address: 5714 Blue Star Ln

---

174. Name: Robin Williams on 2018-08-31 15:51:48
Please provide your zip code: 22534
Please enter your street address: 5711 Partlow Road

---

175. Name: cindy gutshall on 2018-09-10 18:45:09
Please provide your zip code: 22408
Please enter your street address: 12122 kingswood blvd

---

176. Name: Isis neumann on 2018-09-20 18:32:04
Please provide your zip code: 22406
Please enter your street address: 491 holly corner road, fredericksburg Va 22406

---

177. Name: Anne Fantini on 2018-09-23 17:36:59
Please provide your zip code: 23034
Please enter your street address: 2903 Peaceful court
Bumpass , VA

178. Name: Mike Fantini on 2018-09-23 17:40:12
Please provide your zip code: 23043
Please enter your street address: 2903 Peaceful court
Bumpass, Va

179. Name: Michelle Brady on 2018-10-12 15:47:21
Please provide your zip code: 22534
Please enter your street address: 9700 Edenton Road

180. Name: Vanwarden Stanard Jr on 2018-10-16 21:41:38
Please provide your zip code: 22408
Please enter your street address: 2919 Cahill Street

181. Name: Teresa Catoe on 2018-10-20 01:03:20
Please provide your zip code: 22485
Please enter your street address: 7314 Columbia Dr

182. Name: Katherine Henriquez on 2018-10-30 16:11:44
Please provide your zip code: 22534
Please enter your street address: Oak crest Dr

183. Name: Catrin Jones on 2018-10-31 18:56:28
Please provide your zip code: 23024
Please enter your street address: 11405 piney forest rd.

184. Name: brandon williams on 2018-11-08 23:00:15
Please provide your zip code: 22551
Please enter your street address: 6011 harts run

185. Name: Carter Cline on 2018-11-08 23:01:10
Please provide your zip code: 22551
Please enter your street address: 6010 Morris Road

186. Name: Zachaeus bush on 2018-11-08 23:14:57
Please provide your zip code: 22551
Please enter your street address: 6322 grace hill

187. Name: Adil Elassali on 2018-11-13 16:25:41
Please provide your zip code: 22551
Please enter your street address: 6035 Partlow rd

188. Name: Judy hawkins on 2018-11-13 18:26:46
Please provide your zip code: 22551

Please enter your street address: 4300 french acors rd

---

189. Name: Kayla Spinola on 2018-11-26 03:44:28
Please provide your zip code: 22551
Please enter your street address: 5401 Stonebridge Court

---

190. Name: kayla vega on 2018-12-02 18:12:13
Please provide your zip code: 22407
Please enter your street address: 10723 rolling wood dr

---

191. Name: JUAN VEGA on 2018-12-02 18:12:48
Please provide your zip code: 22407
Please enter your street address: 10723 rolling wood dr

---

192. Name: bygbg fesfhj on 2018-12-07 21:01:30
Please provide your zip code: 22554
Please enter your street address: Trffccff

To: Attn: Paulette Mann, Commission Secretary
Rezoning: R17-0005 Radio Reconnaissance Technologies, Inc. (Team Crucible, LLC)
Special Use: SUP17-0003 Radio Reconnaissance Technologies, Inc. (Team Crucible, LLC)
From: Shirley and Thomas Brady Jan. 26, 2021
Voting District: Berkeley District #Seven(7)

Since early 2017, we have let our concerns be known that behind a subdivision and shopping area is NOT the right location for Team Crucible. We feel a security training facility would be better located on one hundred (100) plus acres away from family residences and public shopping. In our efforts to get our message across, we have mailed letters to all members of the Spotsylvania County Board of Supervisors and Planning Commission, written "Letters to the Editor" of The Free Lance Star and The Washington Post newspapers, collected a Tavernew Subdivision petition against the location of Team Crucible, and went on Channel 4 television station. Now, here we are again in 2021, during a Covid 19 Pandemic, and Team Crucible is still trying to get rezoning and special use of 69.96 acres of land right behind our subdivision.

We have lived in Tavernew Subdivision for about twenty thru (23) years. During this time, we have been productive citizens working and supporting Spotsylvania County. According to the three(3) recent letters and based on tax records, we have become property owners within three thousand (3 feet of Team Crucible's project. Property owners in a danger zone and noise pollution zone.

Is there anyone in Spotsylvania County that would like to have Team Crucible move into their back yard? If so, "Please Volunteer Now"! We do not believe there would be any neighborhood that would want Team Crucible in their back yard. If what we believe is correct, HOW can the Planning Commission and Board of Supervisors believe this will be good for Tavernew Subdivision?

(Continued on back)

Do we mean so little to Spotsylvania County?
Why here? Why now? We will find out soon.

Our prayer is that the County will please stand by their own Code of Ethics, which puts citizen safety above revenue, and deny the rezoning and special use requests made by Team Crucible.

Thank you,
Shirley and Thomas Brady

Paulette Mann

From: Elizabeth Fincham <efincham621@gmail.com>
Sent: Wednesday, January 27, 2021 10:29 PM
To: Paulette Mann
Subject: [EXTERNAL]: Stop Crucible

CAUTION: This email originated from an external source. Do not click on any links or open attachments unless you recognize the sender and know the content is safe.

To Spotsylvania Planning Commission,

My name is Richard Fincham I've been a resident on Jennifer Rd in the Berkeley district since 1983. I am addressing, the Crucible matter in my opinion this is not good for the residence's in this area. It will effect people's health and well being as some have PTSD and other health conditions including anxiety and autism. Also, people's pets have health issues with loud sounds as does one of our pets.

My dog name is Pebbles and she has seizures when she hears loud noises, gunshots, and explosions. She has to take Diazepam, Phenobarbital, or Trazodone. These seizures could well end her life. At one meeting at Salem library, I explained this to the group about Pebbles and a Crucible member said its just an animal. But that's not true she's a family member. These are just some concerns.

Also allowing foreign groups in for military training may not be safe, who's vetting them remember 9/11 also we have a nuclear electric plant not far away. Our property values could go down. We already have noise inside our homes from the race track. I'm very worried to imagine what Crucible would do or sound like. Please help us by not allowing Crucible to establish a military training facility in this area. They should consider moving to another county example Essex county where they could purchase 1000 acre track for safety.

Thank you
Richard Fincham
Barkley District Resident

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This email was Malware checked by Sophos http://www.sophos.com

Paulette Mann

From: Leon Hughes
Sent: Wednesday, January 27, 2021 7:25 PM
To: Paulette Mann
Subject: FW: [EXTERNAL]: Crucible Rezoning & CUP Application

To be read

B. Leon Hughes
B. Leon Hughes, AICP
Director of Planning and Zoning
Spotsylvania County
Office(540)507-7434
Direct (540)507-7220
lhughes@spotsylvania.va.us

From: Clay Mihoulides [mailto:Clay@chrismarr.com]
Sent: Tuesday, January 26, 2021 5:14 PM
To: Barry Jett <BJett@spotsylvania.va.us>; Deborah H. Frazier <DHFrazier@spotsylvania.va.us>; Timothy J. McLaughlin <McLaughlinTJ@Spotsylvania.va.us>; David Ross <David.Ross@Spotsylvania.va.us>; Chris Yakabouski <CYakabouski@spotsylvania.va.us>; Gary Skinner <GSkinner@spotsylvania.va.us>
Cc: Aimee Mann <AMann@spotsylvania.va.us>; Kevin Marshall <KMarshall@spotsylvania.va.us>; Amit Parbadia <amit@sonahomes.com>; Kirit Parbadia <kirit@sonahomes.com>; Leon Hughes <LHughes@spotsylvania.va.us>
Subject: [EXTERNAL]: Crucible Rezoning & CUP Application

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Dear Members of the Board,

Thank you for your time and effort in working to make Spotsylvania County a prosperous and safe community for all its residents. My name is Clay Mihoulides and I represent Amit and Kirit Parbadia the owners of 59 acres of land off of Morris Rd. (SR 606) adjacent to the Taverneer subdivision (Tax Parcels: 63-A-35 & 63-A-35C). We have submitted a rezoning application for a future residential subdivision to be developed on this property called Thornburg Commons. This prospective subdivision, which falls within the Counties growth area, will provide much needed housing that in turn will help lead to additional commercial growth and prosperity for the Thornburg area.

We are extremely concerned about the Crucible project and the potential detrimental effects it would have on our property and the other surrounding properties. I am intimately aware of the Crucible's operations, having visited their existing facility off of Jack Ellington Rd. in the Hartwood area of Stafford County on multiple occasions over the years. While they provide a much needed service in their contracts with the Federal Government, they are a consistent nuisance to their existing neighbors and the surrounding property owners of that area. This most assuredly will be the case should you vote to approve their rezoning and special use permit application to construct a facility off US 1 in the heart of the growth area of Thornburg. The level of noise created by the Crucible's day to day operations does not fit with the County's comprehensive land use plan for this area, and for this reason alone I encourage you to vote against approving their application.

Please feel free to call or email me with any questions you might have about our prospective project. I wish you and your families the best and again thank you for your time.

Sincerely,

Clay Mihoulides
Licensed VA Real Estate Broker
If you like our service please leave us a favorable review on Google*

CHRISMAR PROPERTIES
O:540-373-6189
C:540-424-1664
F:540-479-1855
180 Chatham Heights Rd.
Fredericksburg, VA 22405

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This email was Malware checked by Sophos http://www.sophos.com

Jan. 16, 2021

Spotsylvania Planning Commission

9019 Old Battlefield Blvd

Spotsylvania Va 22553

RE. CRUCIBLE OPPOSITION

To whom it may concern,

I wish to add my voice to the opposition of the Crucible Project at the present location near Thornburg Va.

I believe it will have a major negative impact to the homes and businesses located nearby.

I believe neighboring property values will suffer greatly due to the excessive noise and safety concerns due to the firing ranges. The berms will not stop sound, nor stop the occasional stray round.

Joseph Ruedi

5953 Partlow Rd.,

Spotsylvania, Va 22553

Paulette Mann

From: Koechlin, Mike <mkoechlin@hitt-gc.com>
Sent: Wednesday, January 27, 2021 2:13 PM
To: pann@spotsylvania.va.us
Subject: Crucible

Sir, and Spotsylvania Planners

I as a longtime resident of the town of Thornburg. I find it quite distressing the idea of any County member allowing a Mercenary Training Camp to the area!!

Even if it were only a shooting range,
the location in the Town Center next to the Grocery store is appalling.

First, look at the need. None!!

Second, per DOD guideline #1 for selecting a location for a shooting range(more or less a Mercenary training facility). A remote area!!

Third, Look at Crubuical past record in Stafford VA. Piss poor and that is why they forced them out!

Fourth, you see 90% of the effected area has a yard sign to say No!

Thornburg in the next 20 years is positioned to gain a lot of growth potential. And I mean real Qualty growth.
We have put up with the county's limited growth (liquor store, pawn shop, vaping shop, two dollar stores, and unlimited amount of flood damaged car lots.
We took one for the team In allowing the Mannassas race track move.
Which I could see as being positive for the whole County if managed properly!?!
Even though I hear the gear jamming all day long (through closed Anderson widows)on my weekends(this was not supposed to happen by the way!!) 2.5 miles away too.....

If you allow this reckless site you will kill my home value, our social value, and any chance of future investment in Thornburg.

So what say you?
Are you for the majority of tax paying citizens? Or are you for sale?
I not only ask for you to do the right thing and vote No To Crubuical.
But, I beg you!!
As I do not want Thornburg now or in the future to be Beirut!

Sincerely, Mike Koechlin, Kathy Koechlin, and or Whole Community.

Paulette Mann

From: Stephan Picard <sjpicard@gmail.com>
Sent: Friday, January 8, 2021 3:38 PM
To: Aimee Mann; Paulette Mann
Cc: Wendy Picard; Mark Brinkman; Michael Galati; stevielarson; Wayne Breakfield; Mike Schooley; Mike McDaniel; Kathleen Dallas; Peter Dechat; Wendy Luttrell

Subject: [EXTERNAL]: Crucible rezoning request

CAUTION: This email originated from an external source. Do not click on any links or open attachments unless you recognize the sender and know the content is safe.

Good Afternoon,
I am writing to you today as a resident of Berkeley and as the HOA president for Plantation Estates at Matta River representing the residents.

Please bear with me to allow me to explain my familiarity with weapons and gun ranges.

I am a retired Army Infantry Colonel. I served 27 years in the military and during that time I commanded the following:

- Infantry Platoon
- Anti Tank Missile platoon,
- Mortar platoon,
- Infantry company,
- Military Police company

I have designed and run the following weapons ranges:

- M16 and M4 rifle,
- Pistol,
- M60 machine Gun,
- 50 caliber machine gun,
- 81 MM mortar and
- Anti-tank missile ranges.

I was qualified as expert in the following weapons:

- Rifle and
- Pistol

I am a combat veteran from OIF 06-08 where I was the deputy commander of an aviation brigade of more than 3500 soldiers.

I lay these things out to simply show that I know weapons, their effects and weapons ranges of all kinds. I truly understand what the range Crucible is requesting will be and how it will affect all the surrounding area.

The time has finally come for you to vote and every citizen in my HOA is opposed to this zoning change.

Bottom Line:
Placing this facility with the current design on Lot 76-A-2 will:

- Impact 810 properties via noise pollution, safety, or both.
- Render 206 acres with 75 close in homes in Taverneer Subdivision and adjacent to the property uninhabitable due to excessive noise
- Ruin the quality of life for an additional 3005 acres containing 444 properties in the surrounding area due to excessive noise.
- Create a Surface Danger Zone that encompasses many many homes where all range design best practices state there is a reasonable chance of a projectile from a potentially unsafe range causing death, injury or destruction of property – The county incurs shared liability should it approve this design.
- Reduce tax revenue by reducing $143M assessed values of the 811 affected properties, negatively impacting the $1.215M annual tax revenue an estimated* $107K per year. Combined with the 3.7% retarded growth of real estate next to a range and this decision could result in $2.2M tax loss over a 20 year period.
- Create an immediate loss of more than $12.5M in property value as those properties in the affected area will NOT sell for a comparable price as an identical property not exposed to danger and constant weapons fire noise.
- Create long lasting equity loss as those properties in the affected area appreciate 3.7% slower than identical properties not exposed to danger and constant weapons fire noise.

The Board of Supervisors has 8 specific decision criteria they must follow to approve a special use permit. In accordance with Sec 23-4.5.7 they are the following:

1. That the proposed use is in accordance with the comprehensive plan and other official plans adopted by the county;
2. That the proposed use or development of the land will be in harmony with the scale, bulk, coverage, density, and character of the area or neighborhood in which it is located;
3. That the proposed use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof;
4. That the proposed use will not adversely affect the health or safety of persons residing or working in the neighborhood of the proposed use;
5. That the proposed use will not be detrimental to the public welfare or injurious to property or improvements within the neighborhood.
6. That the proposed use is appropriately located with respect to transportation facilities, water supply, wastewater treatment, fire and police protection, waste disposal, and similar facilities
7. That the proposed use will not cause undue traffic congestion or create a traffic hazard;
8. That the proposed use will have no unduly adverse impact on environmental or natural resources.

The rezoning and special use request that you are considering does not meet any of the 8 criteria.

1. The request does not comport with the comprehensive plan for the area and in fact it is very destructive to the tourist zone designation.
2. This request is not in harmony with the neighborhood in any way. It is unprotected so that accidents or misfires can harm or kill residents and the noise of constant gunfire will destroy the quality of life in the surrounding area.
3. This request will hinder future development. Who would build an office park or town center next to a range where there is excessive noise and bullets that may hit them?

4. I recommend that we convene the BOS meeting and vote on a 20 foot berm that I will construct while 20 people fire weapons at the base of the berm. Yes this sounds ludicrous, but it is because it's common sense that accidents happen and nobody would stand on top of a berm while people are shooting at it. You can easily see that if we would not stand on the berm, then the homes on the downrange side are in danger. this adversely affects the citizens' safety for sure!
5. Same argument as above. Add to this ammunition storage, weapons storage, fire hazards, traffic issues etc.
6. This plan does not hook to public sewer and water as required. Also there is no additional police coverage provided nor additional fire and ambulance services provided.
7. This is an unknown
8. There is a long record of many places such as this ruining groundwater or runoff. There should be sufficient bond posted if approved to do a site cleanup should the business fail.

Some things to consider in your decision:
1. Team Crucible and their parent company, have a long history of court cases and lawsuits in Stafford county due to zoning issues.
2. Team Crucible began construction without permits and assumed spotsylvania would just roll over and blanket approve this.
3. NO military or NRA range would be built in this fashion with no protection for down range. They always own the land where the bullets can land "just in case"
4. Team Crucible refused to do SARNAM analysis of the sound issues and used a so-called paid expert. But they ignored atmospherics and many other variables needed to calculate sound. have you ever received the email from the county: due to low cloud cover you may hear the explosions from AP Hill?) It very much matters.
5. Team Crucible states they will fire only certain ammunition --- BUT Spotsylvania has no ammunition inspection nor ability to control this. Imagine the Sheriff having to do spot checks? What size bullet is in that gun today?
6. Once the special use permit is approved they no longer have ANY sound restrictions no matter what they say. That specific permit use allows for sound customary to the industry. Guns are loud.

thank you,

Stephan Picard, COL (r), President, Plantation Estates at Matta River HOA
5820 Plantation Estates Way
Woodford, VA 22580 (Spotsylvania County)

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Citizen's Revised Impact Analysis
Team Crucible Zoning Request

January 2021

Agenda

- Bottom Line up Front
- Summary
- Crucible Layout
- Resident top 3 issues
  - Noise Pollution/Quality of Life
  - Safety
  - Economic Impact
- County Decision Criteria
- Current Status
- Conclusion and Questions

Bottom Line:

The Planning Commission should recommend disapproval of this request

Bottom Line:

The Planning Commission should recommend disapproval of this request

- The surrounding community is nearly 100% against this proposal
  - We have more than 450 signatures from surrounding residents who oppose this rezoning
  - This will create a black hole for any development in the center of one of the most promising areas in the county
- This is a clear case of SPOT ZONING
  - Rezoning of this property as requested does NOT support the Spotsylvania Comprehensive Plan will have a severe negative impact on future development in the Thornburg area.
  - 6 of 8 Board of Supervisor Decision Criteria (Sec. 23-4.5.7) do not support approval.
  - Rezoning of this property as requested severely impacts 810 property owners
- The revised Crucible submission invalidates their economic analysis. – less ranges means less training days
- Although Crucible proffers ammunition sizes, there is no enforcement capability in Spotsylvania so the residents will never feel safe
- Crucible refused to do a SARNAM sound analysis and their analysis does not take in to account any environmental factors. It is a “best case” analysis and is not accurate for what the citizens will suffer.
- Once approved, the county can never go back and this will forever change and destroy harmonious and positive development of the area
- Proffer to use sound suppressors “when approved by customers” is ridiculous on its face. There is no enforcement nor any incentive to use a suppressor which increases wear and tear on weapons and provides unrealistic training depending on the scenario

Summary:

- Placing this facility with the current design on Lot 76-A-2 will do the following:
  - **Impact 810 properties via noise pollution, safety, or both**.
  - 206 acres including Taverneer Subdivision and those along Rte 1 adjacent to the property will be virtually uninhabitable (noise levels in excess of 104 dB peak)
  - 3005 acres containing 437 residential and commercial properties in the surrounding area will have their quality of life ruined (noise levels from 87 dB to 104 dB)
  - 617 properties including 3 Subdivisions will be inside the Surface Danger Zone where all range design best practices state there is a reasonable chance of a projectile from a potentially unsafe range causing death, injury or destruction of property – The county incurs shared liability should it approve this design.
  - **The average property owner will lose at least $97,588 in household equity over a 20 year period.***
  - **Spotsylvania will lose at least $ 7,601,667 ($ 101,747 in the first year) in property tax revenues over 20 years due to devalued property.***

* Estimate based on 15% reduction for properties in high complaint noise and dispersion area of SDZ and 7% reduction for homes in moderate noise and ricochets area of SDZ

Specifics of Request

- Lot 76-A-2 is requesting rezoning for Agricultural 2 (A-2) to Industrial 2, specifically rezoning under Sec. 23-6.22.4 Special uses, (12) Industry, type III.
- Definition: Industry, type III means an establishment which has the **potential to be dangerous or extremely obnoxious.** Included are those in which explosives are stored, petroleum is refined, natural and liquid gas and other petroleum derivatives are stored and/or distribution in bulk, radioactive material are compounded, pesticides and certain acids are manufactured, and hazardous waste is treated or stored as the establishment's principal activity.
- Additional: under Sec. 14-52 Exemptions for noise, the applicant feels they meet paragraph 14-52-a-3 "Noise emitted by a commercial or industrial establishment which noise customarily emitted by such establishment or industries." **would be exempt from noise pollution sound levels from 6:00a.m. to 10:00 p.m. daily.**

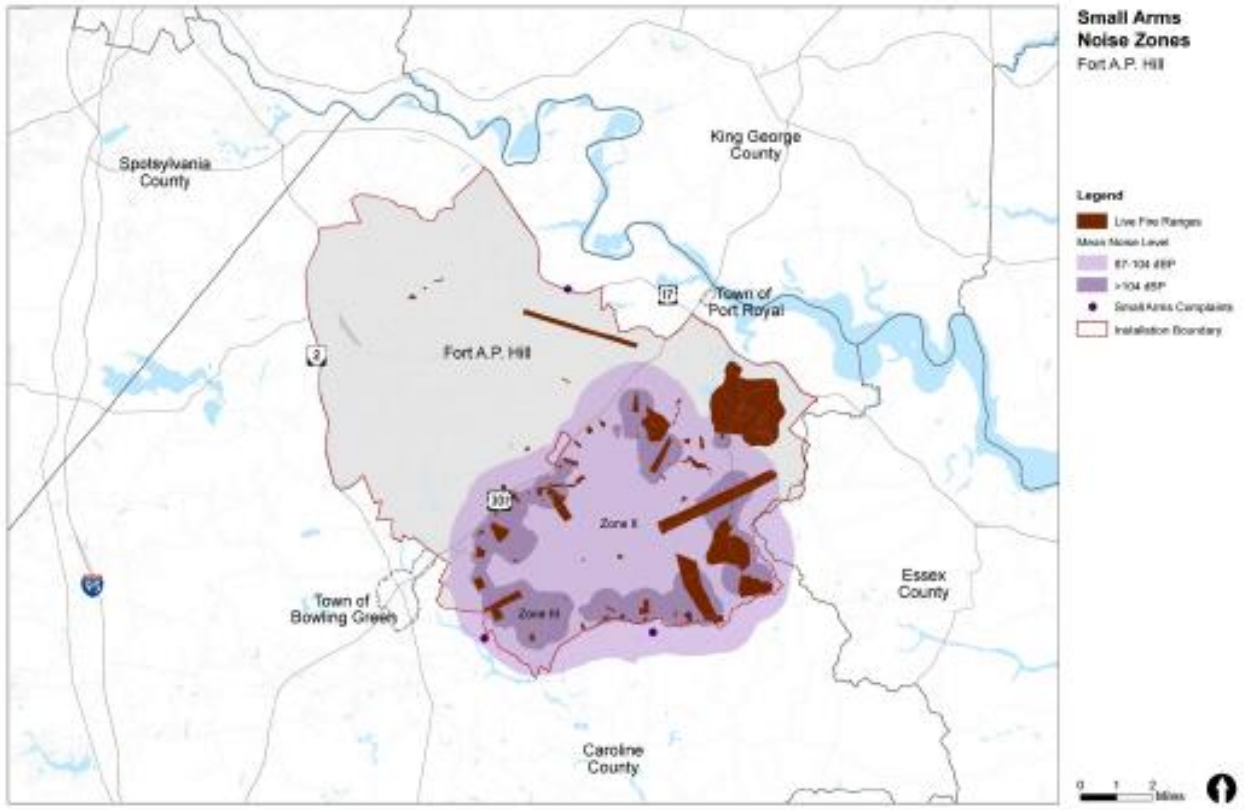
Once approved the County can never go back!

- Statute: VA Code Ann. § 15.2-917
- No local ordinance regulating any noise shall subject a sport shooting range to noise control standards more stringent than those in effect at its effective date. **The operation or use of a sport shooting range shall not be enjoined on the basis of noise,** nor shall any person be subject to action for nuisance or criminal prosecution in any matter relating to noise resulting from the operation of the range, if the range is in compliance with all ordinances relating to noise in effect at the time construction or operation of the range was approved, or at the time any application was submitted for the construction or operation of the range
- For purposes of this section, “effective date” means the time the construction or operation of the sports shooting range initially was approved, or at the time any application was submitted for the construction or operation of the sports shooting range, whichever is earliest.

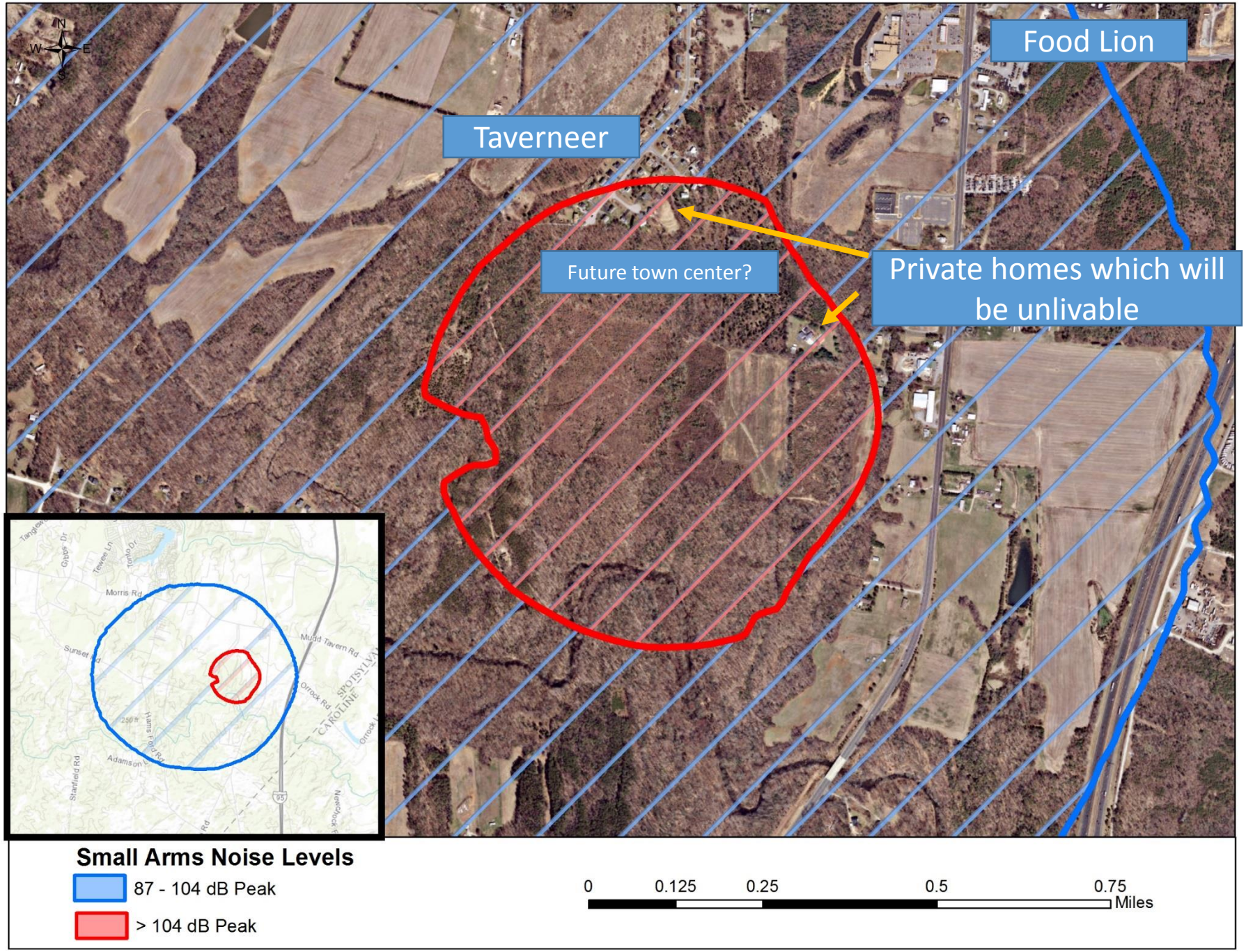
Quality of Life

- Unconstrained Environmental Pollution (Noise) will adversely impact quality of life for current residents and impact future development in the effected area.
- The following 2 slides depict the areas that will be negatively impacted by the noise pollution.
  - The yellow area depicts the areas that will be annoyed to the level of taking actions like complaints, or real estate decisions. DoD recommends no future development in this area without significant risk of conflict
  - Red represents the High Complaint area. DoD recommends no habitation in this area.
- Noise sensitive land uses are discouraged in areas where dBP from small arms weapons is between 87 and 104 dB with medium risk of complaints. Noise sensitive land uses are strongly discouraged in areas where dBP from small arms weapons is equal to or greater than 104 dB with high risk of noise complaints.

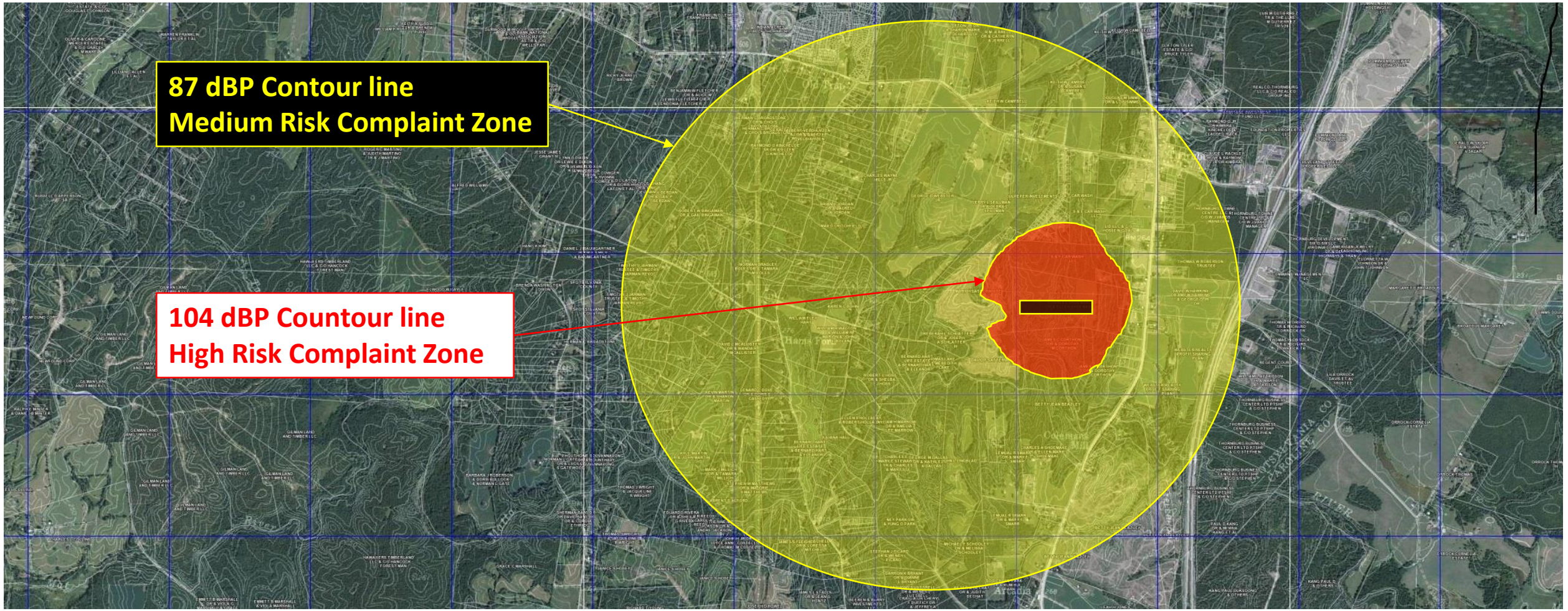
Ref: AIRCRAFT, ORDNANCE, AND SMALL ARMS NOISE STUDY FOR NAVAL WEAPONS SYSTEM TRAINING FACILITY BOARDMAN, OREGON (Aug 2012)



SARNAM Model for FT. AP Hill, Fort A.P. Hill Joint Land Use Study - December 2014

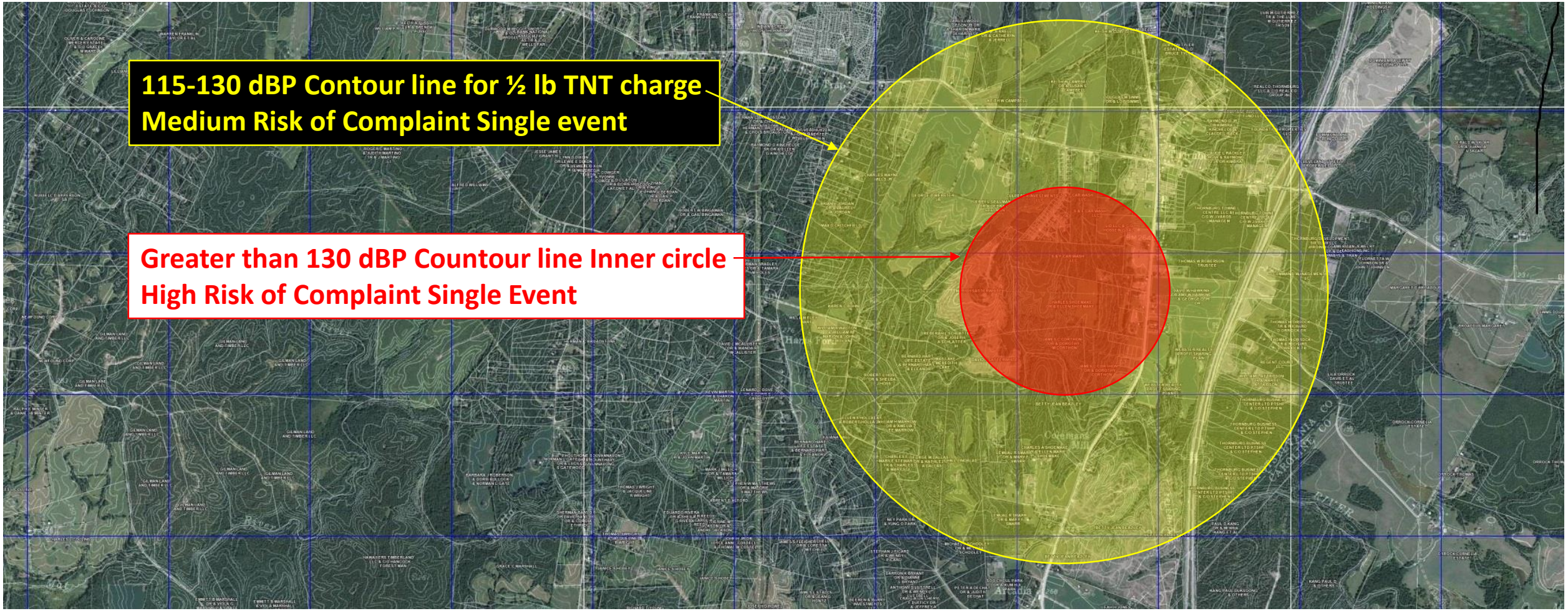

Food Lion
Taverneer
Future town center?
Private homes which will be unlivable
Small Arms Noise Levels
87 - 104 dB Peak
> 104 dB Peak
0
0.125
0.25
0.5
0.75
Miles

Small Arms Range Noise Assessment Model (SARNAM)
Team Crucible Training Complex
Small Arms (.308, 5.56mm, 9mm) weapons



Ref: https://www.serdp-estcp.org/Program-Areas/Weapons-Systems-and-Platforms/Noise-and-Emissions/Noise/WP-200006/SARNAM-Noise-Impact-Software

Small Arms Range Noise Assessment Model (SARNAM)
Team Crucible Training Complex
½ Pound TNT



Ref: https://www.serdp-estcp.org/Program-Areas/Weapons-Systems-and-Platforms/Noise-and-Emissions/Noise/WP-200006/SARNAM-Noise-Impact-Software

dBA	Example	Home & Yard Appliances	Workshop & Construction
0	healthy hearing threshold		
10	a pin dropping		
20	rustling leaves		
30	whisper		
40	babbling brook	computer	
50	light traffic	refrigerator	
60	conversational speech	air conditioner	
70	shower	dishwasher	
75	toilet flushing	vacuum cleaner	
80	alarm clock	garbage disposal	
85	passing diesel truck	snow blower	
90	squeeze toy	lawn mower	arc welder
95	inside subway car	food processor	belt sander
100	motorcycle (riding)		handheld drill
105	sporting event		table saw
110	rock band		jackhammer
115	emergency vehicle siren		riveter
120	thunderclap		oxygen torch
125	balloon popping		
130	peak stadium crowd noise		
135	air raid siren		
140	jet engine at takeoff		
145	firecracker		
150	fighter jet launch		
155	cap gun		
160	shotgun		
165	.357 magnum revolver		
170	safety airbag		
175	howitzer cannon		
180	rocket launch		

Safety

- The Team-Crucible range is an **“OPEN RANGE” -** bullets **WILL** overshoot and cross the Lot 76-A-2 property line - it is just a matter of probability and time. (Plan and concerns were reviewed by C. Vargas, PE – Range design)
- The Following slides depict the Surface Danger Zones for some of the small arms weapons Crucible is requesting to shoot. *depending on final range layout on the ground the angles of the areas may change but not the size of the areas.
- Anyone within the Surface Danger Zone depicted in yellow is at risk of loss of life when the range is in operation.
- This position is consistent with Department of Defense, Department of Energy, National Shooting Sports Foundation, and the National Rifle Association.

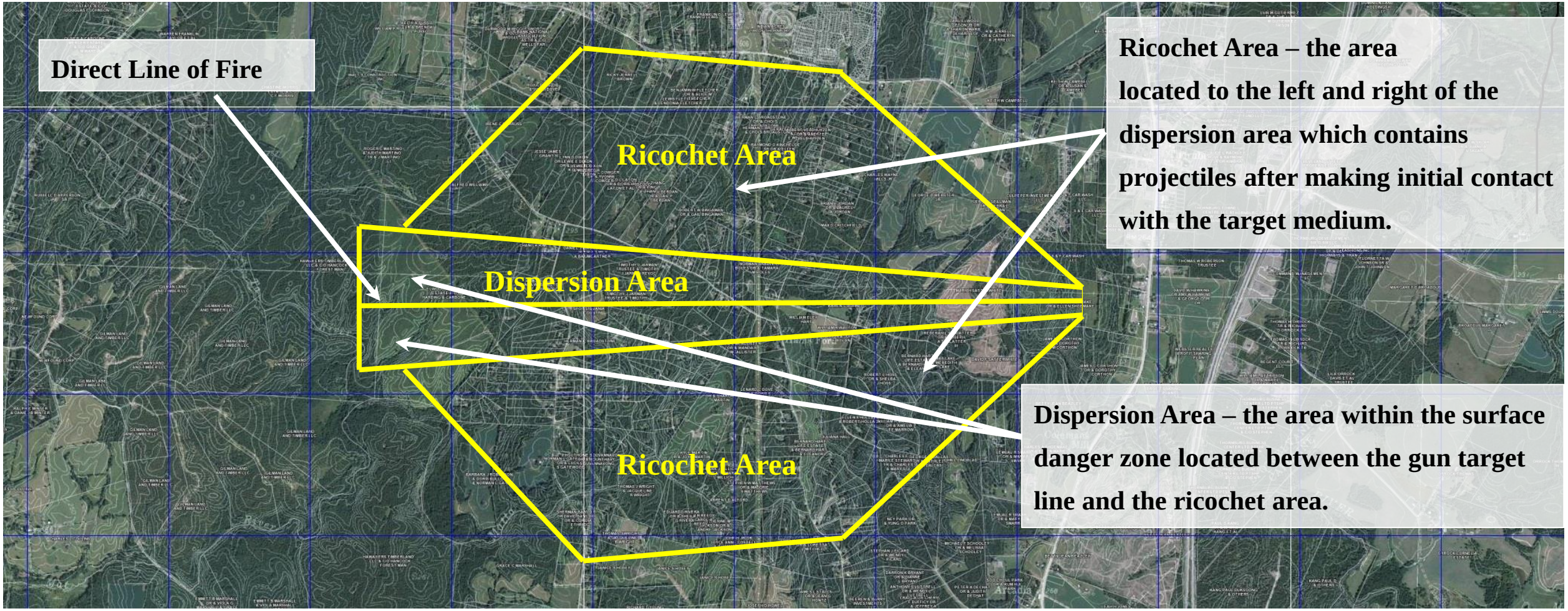
“*A designer develops the impact sector area by first imagining a person who is firing at ground level at a surface target being able to deviate 10 degrees each side of a center line of fire and allowing him to raise the rifle or the pistol at a 30- to 35-degree angle. These are the angles that will give a maximum trajectory. You now have the maximum distance of impact and a description of the area that is impacted by a range.” Design Criteria for Shooting Ranges, Clark Vargas NSSF* http://www.nssf.org/ranges/rangeresources/library/detail.cfm?filename=facility_mngmnt/design/design_criteria.htm&CAT=Facility%20Management

“*If you build in a populated area, your range must be totally baffled so that the range owner can demonstrate to a judge that a round cannot escape.*” C. Vargas 1996 Third National Shooting Range Symposium, www.nssf.org/ranges/rangesources

“*safety baffles defines a structure which is used to restrict fired bullets to smaller areas than would otherwise be possible without them...baffles are erected so that the shooter, regardless of the shooting position used (or permitted) cannot see any sky downrange, either over the top of the backstop or to the side of the range…The overall responsibility of the range owner/operator is to stop fired bullets before they exit the property*” David Luke, Range Technical Advisor, National Rifle Association, 1996 Third National Shooting Range Symposium, www.nssf.org/ranges/rangesources

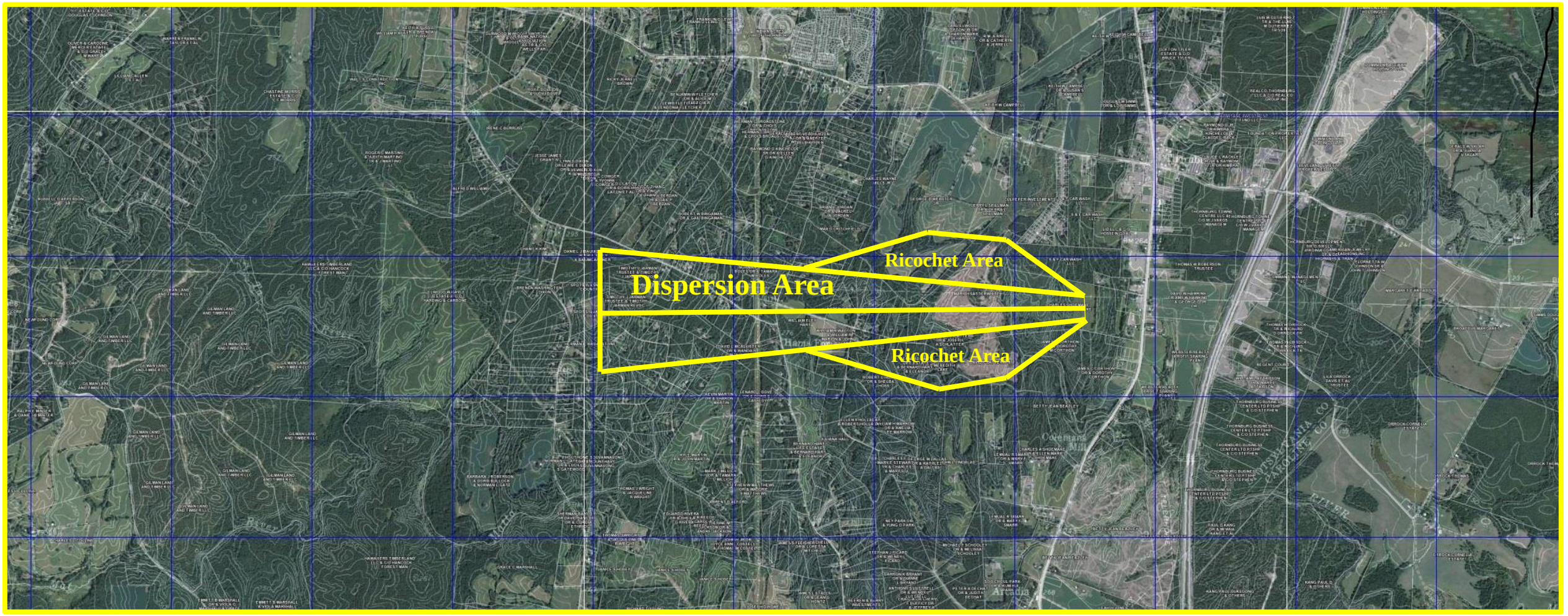
*The Surface Danger Zone (SDZ) is a depiction of the mathematically predicted area a projectile **will** impact upon return to earth, either by direct fire or ricochet. The SDZ is the area extending from a firing point to a distance downrange based on the projectiles fired. This area has specific dimensions for the expected caliber of the weapon(s) being fired so that all projectile fragments will be contained in this area. These dimensions are found in DA PAM 385-63 - Range Safety.*

Surface Danger Zone
.308
Distance X: 5,288M Angle P: 43.18 deg (earth/water)



Ref USMC Range Safety Pocket Guide p32

Surface Danger Zone
5.56mm M855 Ball
Distance X: 3,437M Angle P: 34.2 deg (earth/water)



Ref USMC Range Safety Pocket Guide p32

Ranges with “No Blue Sky” Overhead Baffles

http://www.cvaltd.com/2011/06/nssf-video-berms-baffles-and-backstops/



This is NOT what is proposed, but would be required in this area





Economic Impact

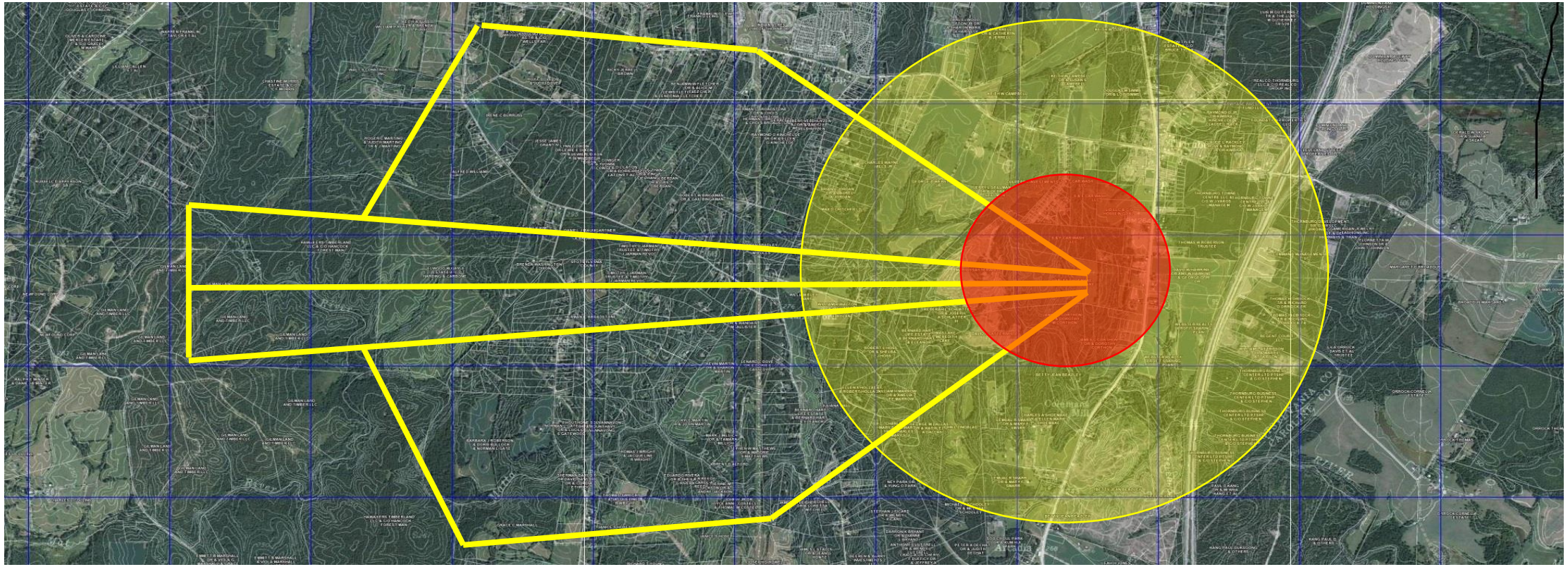
- If the rezoning is granted, the average property owner will **lose at least $97,588** in equity over a 20 year period.
- If the rezoning is granted, the projected total loss in property tax revenues for Spotsylvania county over 20 years is **$ 7,601,667 with $ 101,747 being lost in the first year**.

- 810 Properties economically impacted due to noise pollution, safety, or a combination of both.
- Unconstrained Environments Pollution (Noise) will adversely impact quality of life, future development, and impair values for 437 residential and commercial properties.
- The threat of loss of life or injury due to working or living within the surface danger zone of a live fire range will negatively impact the value of at least 617 properties.
- Studies have shown loss of value amounts vary from 7.5 % to 25%.
- The following graphs assume a 7% or 15% initial loss depending on proximity to the range locations and Surface Danger Zone
- Property Values for 2015 were taken from the GIS Mapping Page on the Spotsylvania County Website

Property Loss References

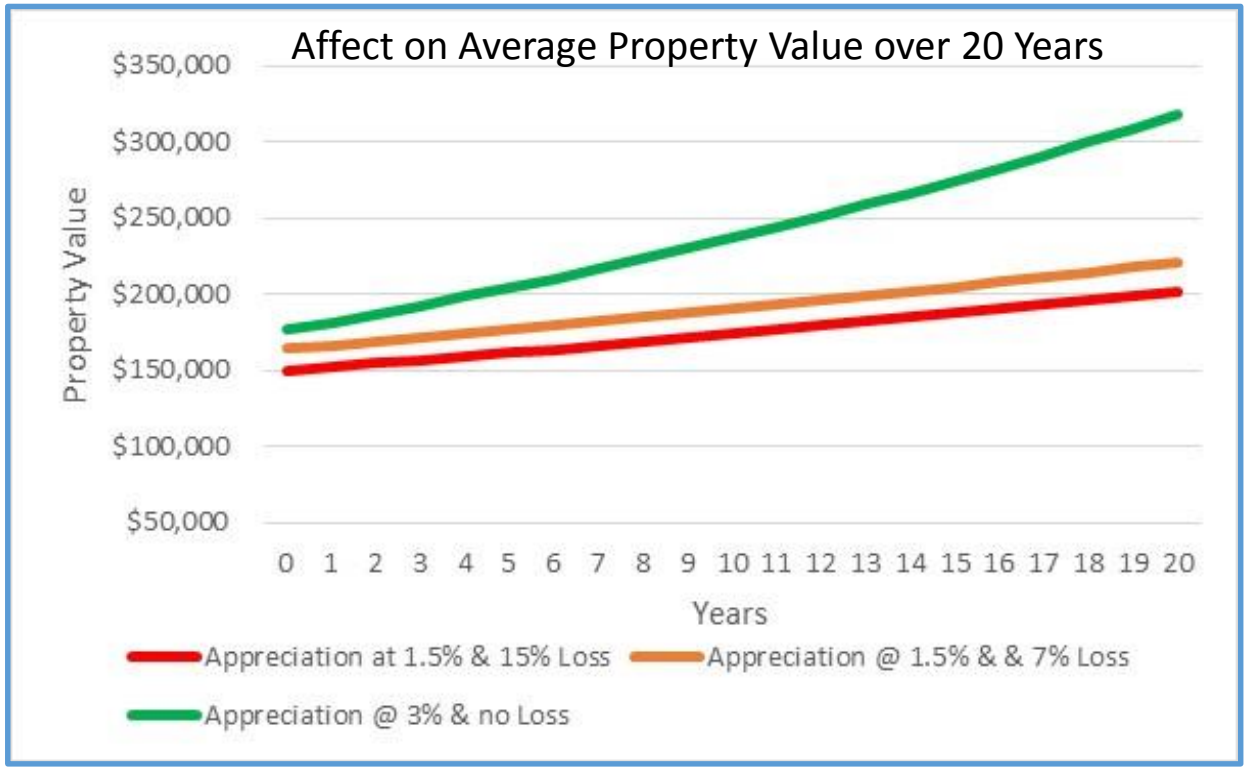
- Appreciation Impact Value: Realtor.com identifies being located next to a shooting range as #4 on a ranked list of neighborhood features that drag down your home value. Being in the proximity of a rifle range drags the appreciation of property by 3.7%
  - http://www.realtor.com/news/things-that-affect-your-property-value/
- Maine professional real estate appraiser performed statistical analysis resulting in a 7.5% loss of property value resulting form a 175 acre parcel being located within 1.5 mile radius of a rifle range.
  - http://www.bridgton.com/waterford-gun-club-noise-hurts-property-values-county-rules/
- Appendix D reports possible property losses of 25 %
  - http://www.deq.virginia.gov/Portals/0/DEQ/EnvironmentalImpactReview/10.017Sappendixd.PDF
- Green county Record reports possible property losses of 30%
  - http://www.dailyprogress.com/greenenews/news/gun-range-proponents-it-s-a-safe-place-to-shoot/article_cecc95ba-41d2-11e5-a678-83dc0f3c372e.html
- Numerous other articles available on the internet

Properties Evaluated



- **Properties in the Extreme Area depicted by the red circle depreciated at 15%.**
- **Properties in the Moderate Noise Area depreciated by the yellow circle7%**
- **Properties in the center portion of the Surface danger Zone (SDZ) depreciated by 15%**
- **Properties in the ricochet area of the SDZ depreciated by 7%**
- **No properties double counted (in both the noise area and SDZ)**

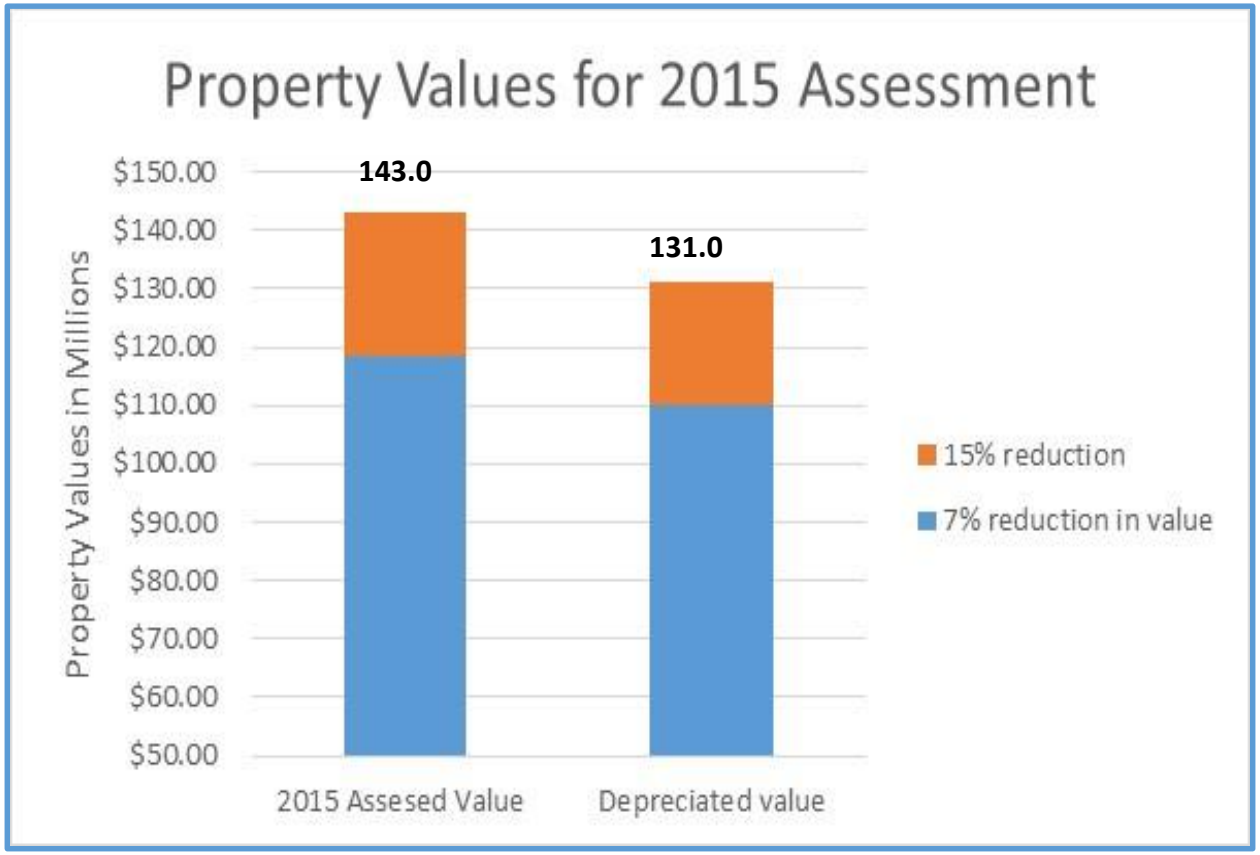
Property Value Impact

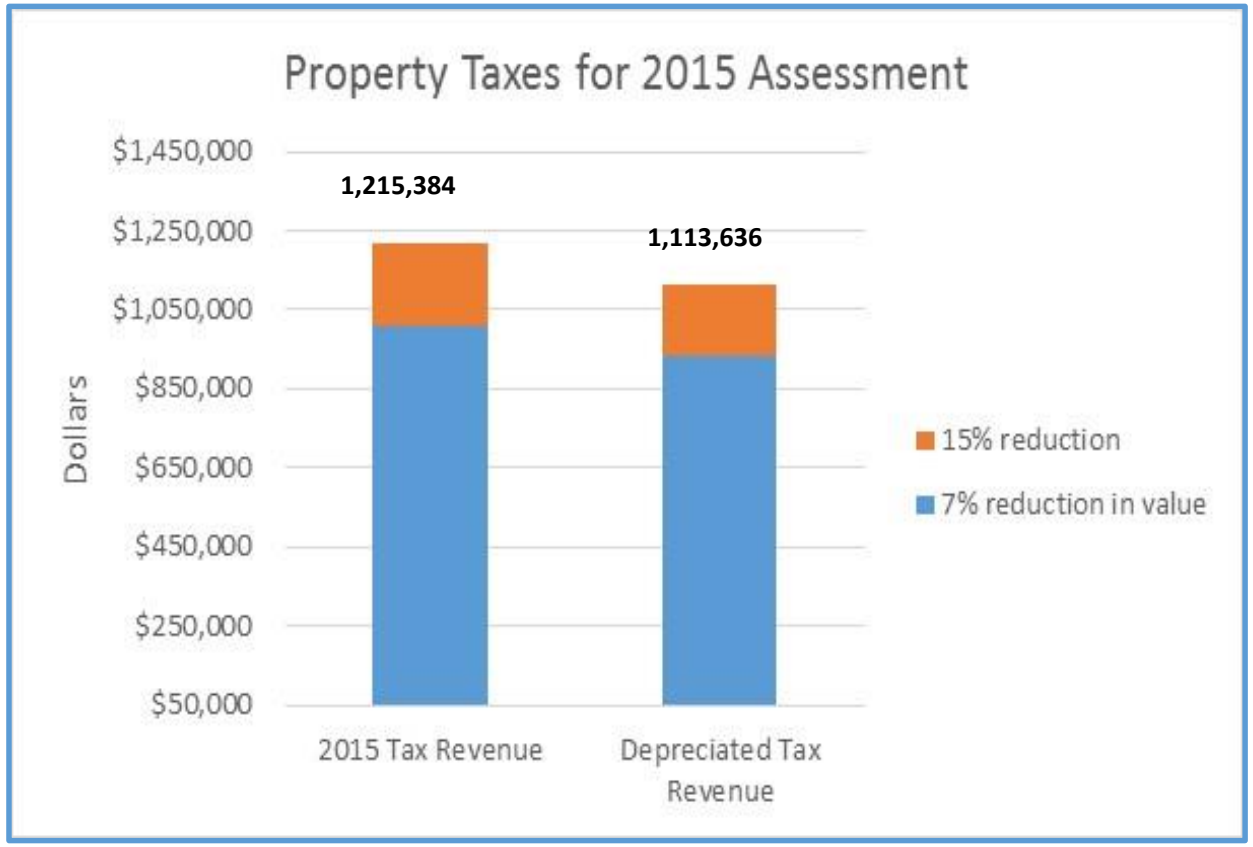


- The average property value in the affected area is $176,300.00 based on 2015 assessments.
- The red line shows average property value after an initial 15% loss and decreased appreciation of 1.5%. Property value after 20 years is $201,833.00 or a loss of $116,584.00.
- The orange area shows average property value after an initial 7% loss and decreased appreciation of 1.5%. Property value after 20 years is $220,829.00 or a loss of $97,588.00.
- The green line shows no property value loss and appreciation of 3%. (The rezoning is not granted) The property value appreciates to $318,417.00.

If the rezoning is granted, the average property owner will be forced to give up at least $97,588.00 in equity over a 20 year period.

Property Value & Tax losses





Property Values decrease from 143.0 Million to 131.0 Million resulting in property tax losses to the county of $101,747.00 the first year.

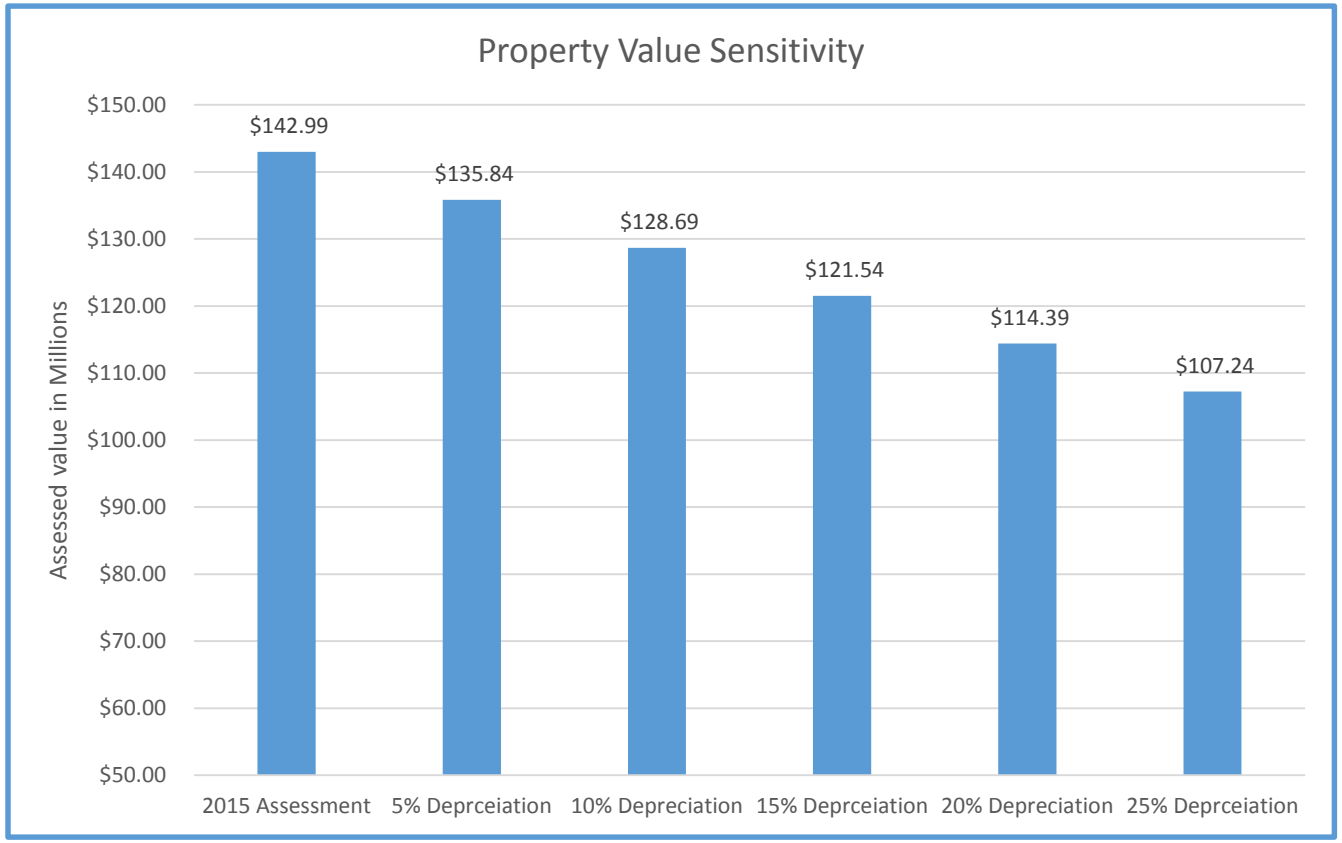
Tax Revenue Losses over Time



- The blue line shows the property taxes collected for the 2015 assessed value for properties in the surface danger zone and noise impact areas with a 3% appreciation for 20 years.
- The orange line shows the property taxes collected with an initial depreciation of 7% or 15% based upon their location in the noise area or surface danger zone with a 1.5% appreciation for 20 years.

The projected total loss in property tax revenues for Spotsylvania county over 20 years is $7,601,667 with $101,747 being lost in the first year.

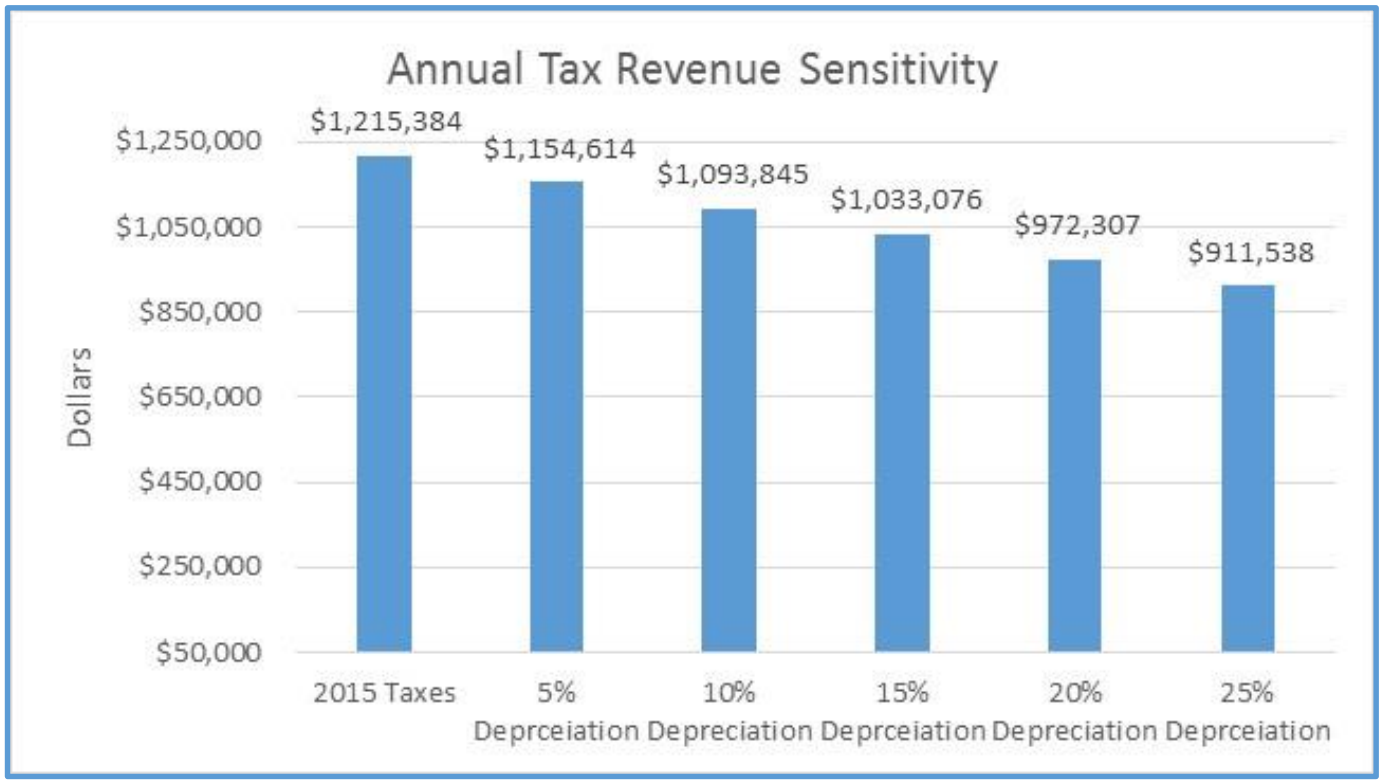
Property Value Loss Sensitivity



- The total property value in the affected area is nearly $143 million dollars based on 2015 assessments for 810 properties.
- This graph shows the total property values for 2015 and the impact of depreciated property values from -5% to -25% at 5% intervals.
- If property value losses exceed the assumed values, property value losses could increase substantially.

If the property values decline at a greater rate than 7 & 15 percent, resident property value losses could increase substantially.

Tax Revenue Loss Sensitivity



- The average property value in the affected area is $176,300.00 based on 2015 assessments for 810 properties.
- This graph shows the annual property taxes for 2015 and the impact of depreciated property values from -5% to -25% at 5% intervals.
- If property value losses exceed the assumed values, property tax losses could increase substantially.

If the property values decline at a greater rate than 7 & 15 percent, tax revenue loss could increase substantially.

Board of Supervisor Decision Criteria (Sec. 23-4.5.7)

- The planning commission shall not recommend, nor shall the board of supervisors approve, the proposed special use unless it satisfies the following standards:
  1. That the proposed use is in accordance with the comprehensive plan and other official plans adopted by the county;
  2. That the proposed use or development of the land will be in harmony with the scale, bulk, coverage, density, and character of the area or neighborhood in which it is located;
  3. That the proposed use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof;
  4. That the proposed use will not adversely affect the health or safety of persons residing or working in the neighborhood of the proposed use;

Satisfied
Partially or Unknown
Not Satisfied

Board of Supervisor Decision Criteria (Cont)

5. That the proposed use will not be detrimental to the public welfare or injurious to property or improvements within the neighborhood;
6. That the proposed use is appropriately located with respect to transportation facilities, water supply, wastewater treatment, fire and police protection, waste disposal, and similar facilities;
7. That the proposed use will not cause undue traffic congestion or create a traffic hazard;
8. That the proposed use will have no unduly adverse impact on environmental or natural resources.

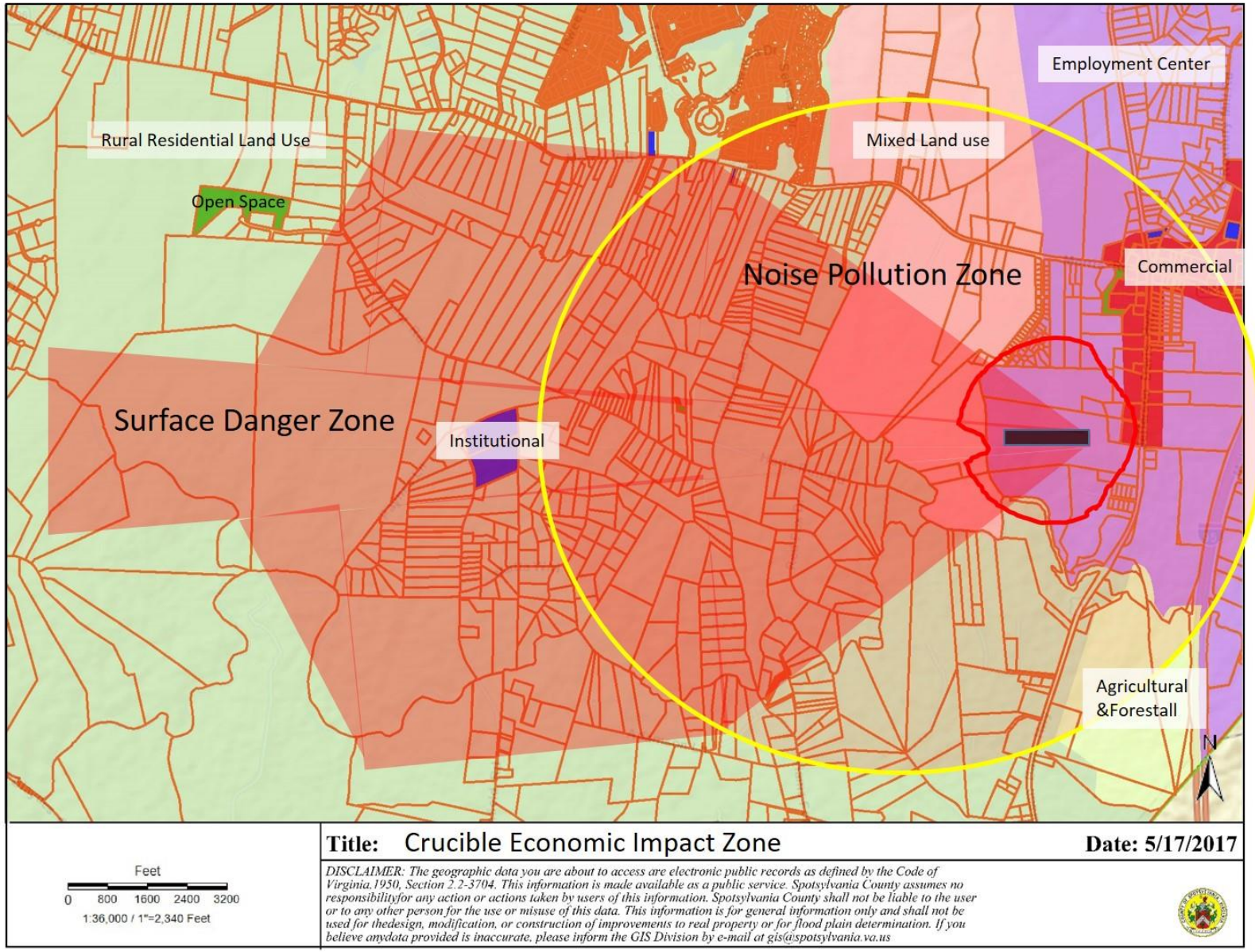
Satisfied
Partially or Unknown
Not Satisfied

1. That the proposed use is in accordance with the comprehensive plan and other official plans adopted by the county;

- Lot 76-A-2 is identified as an “Employment Center” in the 2016 Comprehensive plan.
  - “The employment center land use area is envisioned to be the primary location for new office and industrial development within the County, with the focus on larger scale office complexes, industrial users, and business parks….Heavy industrial uses tend to be larger in scale and often can have pollution on the surrounding area. While these impacts should be minimized, there is the recognition that not all negative effects can be completely mitigated. The location of these users within industrial parks, both new and existing, should be encouraged…”
- Fort A.P. Hill Joint Land Use Study, December 2014
  - Spotsylvania county recognizes that noise levels approaching 80 dBA* “generate undesirable noise levels on current and future development”
  - Recommends
    - “real estate disclosures for prospective buyers or renters of real estate transactions for properties within the influence area as part of subdivision plats.”
    - “Encourage sound attenuation for new construction of residences, schools, hospitals, nursing homes, churches and other public building within public gathering spaces.”

Crucible will have a large negative impact on the comprehensive plan

- Requires re-zoning of all areas inside the effected sound area to commercial as each property will be exposed to commercial sound levels.
- More than 44 Mixed Use properties in the Noise Pollution Zone including all of Taverneer Subdivision
- 6 Mixed Use properties inside the SDZ
- More than 50 Employment Center properties inside the Noise Pollution Zone
- 3 Employment Center Properties inside the SDZ
- Most of the Thornburg Commercial District inside the Noise Pollution Zone.
- County Landfill directly down range, with approval Spotsylvania accepts and condones the risk of residents being hit by projectiles at the landfill.



2. That the proposed use or development of the land will be in harmony with the scale, bulk, coverage, density, and character of the area or neighborhood in which it is located;

- There are no less than 4 subdivisions, 617 parcels of land, within the SDZ and noise pollution area of this proposed range complex.
- This proposed complex will destroy the “harmony and character” of all residents within the effected noise pollution area and SDZ.
- All residents contacted within the effected area oppose this re-zoning change and the construction of this facility without extensive mitigation for both noise pollution and safety
- The proposed development of a town center WILL NOT HAPPEN IF THIS IS APPROVED

This request is not in harmony with the scale, bulk, coverage, density, and character of the Taverneer, Plantation Estates at Matta River, Finney Estates and Matta River Woods Subdivisions

Who will ever develop here down range?



3. That the proposed use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof

- **Safety:** Surface Danger Zones depict the impact area for a given weapon system. Approving a SUP for a live fire facility puts the lives of anyone inside the surface danger zone at risk of loss of life.
- **Sound:** Unconstrained Environments Pollution (Noise) will adversely impact development, use of adjacent land, and impair values thereof. If any re-zoning is approved, appropriate noise mitigation language must be established.
- **Value:** Realtor.com identifies being located next to a shooting range as #4 on a ranked list of neighborhood features that drag down your home value.
  - If the rezoning is granted, the average property owner will lose at least $97,588 in equity over a 20 year period.
  - If the rezoning is granted, the projected total loss in property tax revenues for Spotsylvania county over 20 years is $7,601,667 with $101,747 being lost in the first year.

4. That the proposed use will not adversely affect the health or safety of persons residing or working in the neighborhood of the proposed use;

- Safety - A range must control 100% of the Surface Danger Zone, or employ overhead and side baffling to guarantee a projectile will remain never leave the facility.
- Environmental – Environmental impact not addressed in request.
  - This facility if it is approved must comport with two EPA regulations (the Resource Conservation and Recovery Act and Clean Water Act). Neither of these is addressed in the submission
    - Impact to Well water and the Mattaponi River – Lead, Oil/Fuel spill, explosives residue
  - Guarantee/Bond to ensure land can be cleaned of all hazardous material in the event Crucible exits the property.
    - The U.S. Department of Agriculture (USDA) Forest Service expects to pay $980,000 to remove contaminated soil where the former Prescott Sportsmen's Club Shooting Range (PSC) site existed off Iron Springs and North Granite Basin roads near the Wildwood Estates subdivision. https://www.dcourier.com/news/2017/jan/05/shooting-range-cleanup-cost-forest-service-nearly-/ (JAN 2017)

5. That the proposed use will not be detrimental to the public welfare or injurious to property or improvements within the neighborhood;

- Safety - A range must control 100% of the Surface Danger Zone, or employ overhead and side baffling to guarantee a projectile will remain never leave the facility.
  - The submission does not address safety in the “shoot house” – No berms and no overhead cover

- In the Fort A.P. Hill Joint Land Use Study in paragraph 7.3.1 Spotsylvania County characterized noise levels above 80dBA as “undesirable noise levels on current and future development.”

6. That the proposed use is appropriately located with respect to transportation facilities, water supply, wastewater treatment, fire and police protection, waste disposal, and similar facilities;

- Proposal states: “ The Property is located within the PDB, but given the distance of existing utilities, it is not feasible during the initial phases of the Project to extend public utilities to the said site.”
- Spotsylvania County Code Section 22-5(a) states: ”Where a public water main or sanitary sewer is available to a new subdivision or development, the developer of any new subdivision intended for residential or commercial use or any combination thereof, or the developer of any industrial site shall construct all sanitary sewers and domestic freshwater distribution lines within his subdivision or development at his own expense. Immediately upon completion and acceptance of the construction work, the sanitary sewer and water facilities with necessary easement shall become the property of the county”

7. That the proposed use will not cause undue traffic congestion or create a traffic hazard;

- Proposal address traffic flow, but does not address if impulse noises exceeding 98 dBP for small arms and 130 dBP for ½ lb TNT along Route 1 will create distractions to vehicle operators resulting in accidents.

8. That the proposed use will have no unduly adverse impact on environmental or natural resources.

- Noise as stated in earlier slides with respect to residents.
- Environmental Mitigations talks to lead migration, but does not address Petroleum Oil and Lubricant containment that would be consistent with a “Rally Course” used as a driving training facility.
- EPA regulations and law not addressed as recommended in the EPA best practices guide (Resource Conservation and Recovery Act and Clean Water Act).
- Noise impact to livestock has not been assessed. Cattle and horses are very sensitive to loud noises and will impact their behavior.
    - Ref: Powhatan County Farm Bureau, 28 May 2010



Before Purchase



Today*

*Crucible built two pole barns and two wells without a permit

We the People of Berkeley Position

The residents of Thornburg are opposed to this re-zoning change unless the county ensures the following:

- Safety: 100% of the Surface Danger Zone must reside within the property lines or the range must use overhead and side baffling consistent with the National Shooting Sport Foundation and National Rifle Association “No Blue Sky” concept.
- Noise Pollution: Transmission of unconstrained noise pollution will have an adverse affect on quality of life and property value. Spotsylvania County must disapprove special use request and restrict noise pollution that extends beyond property lines.
- Require full environmental impact study to include noise, water and air pollutants.
- Require the company to post sufficient bond to clean up the lead and other residues from operations should they go out of business or abandon the site.
- Proper notification: Any re-submissions from Team-Crucible should require positive notification of any resident or business that lives in an affected area. Based on this submission, it would include al those within the 87dBP contour, or reside in a Surface Danger Zone.

Bottom Line:

- Placing this facility with the current design on Lot 76-A-2 will:
  - **Impact 810 properties via noise pollution, safety, or both**.
  - **If the rezoning is granted as requested, our analysis shows the average property owner will lose at least $97,588 in equity over a 20 year period.**
  - **If the rezoning is granted as requested, our analysis shows the projected total loss in property tax revenues for Spotsylvania county over 20 years is $7,601,667 with $101,747 being lost in the first year.**
  - **Now that the county is aware that this is an unsafe range, if approved and when a round goes over the berm and hurts or kills a citizen, the damages awarded following a lawsuit will be magnified significantly**

Planning must recommend disapproval -
Once granted and approved, the County can NEVER go back. It's State law.

Questions?

Paulette Mann

From: Elizabeth Fincham <efincham621@gmail.com>
Sent: Wednesday, January 27, 2021 10:29 PM
To: Paulette Mann
Subject: [EXTERNAL]: Stop Crucible

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To Spotsylvania Planning Commission,

My name is Richard Fincham I've been a resident on Jennifer Rd in the Berkeley district since 1983. I am addressing, the Crucible matter in my opinion this is not good for the residence's in this area. It will effect people's health and well being as some have PTSD and other health conditions including anxiety and autism. Also, people's pets have health issues with loud sounds as does one of our pets.

My dog name is Pebbles and she has seizures when she hears loud noises, gunshots, and explosions. She has to take Diazepam, Phenobarbital, or Trazodone. These seizures could well end her life. At one meeting at Salem library, I explained this to the group about Pebbles and a Crucible member said its just an animal. But that's not true she's a family member. These are just some concerns.

Also allowing foreign groups in for military training may not be safe, who's vetting them remember 9/11 also we have a nuclear electric plant not far away. Our property values could go down. We already have noise inside our homes from the race track. I'm very worried to imagine what Crucible would do or sound like. Please help us by not allowing Crucible to establish a military training facility in this area. They should consider moving to another county example Essex county where they could purchase 1000 acre track for safety.

Thank you
Richard Fincham
Barkley District Resident

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January 28, 2021

VIA ELECTRONIC DELIVERY

Mr. Leon Hughes
Planning Director, Spotsylvania County
9019 Old Battlefield Blvd., Suite 320
Spotsylvania, VA 22553

RE: Crucible Project – Opposition

Dear Mr. Hughes,

It is usually not in our interest as a developer to write about another development project except in extremely unusual circumstances. This particular situation unfortunately warrants that. LID, LLC purchased the land for Thornburg Village in 2014 and began working with a local attorney and engineer to bring the project for rezoning. Because of our commitment to work with the County, our formal filing was delayed as changes were made to the proposal in response to comments from County officials. As a result, the plans went through several iterations prior to the formal filing of the application to your office on October 19, 2020. During the course of our being responsive to the community, even before filing the application for rezoning, we discovered that the purchase of adjacent land was negotiated for the Crucible project. We believe that the Crucible and its component activities are incompatible with office, retail and residential uses and that its proposal at the present location, just one-half mile south of Mudd Tavern Road, and 1.5 miles from the I-95 interchange, is detrimental to the value of the Thornburg Village proposal, but also to all of the surrounding properties.

We have submitted the necessary documents to begin the rezoning process for Thornburg Village mixed use development. After much community feedback, our project was amended prior to filing to take into account community concerns and suggestions. It is our understanding that the Crucible activities will include a firing range, the use of "simulated IED's" and other activities simulating combat and violent situations. This type of activity abutting Thornburg Village residential lots would be detrimental to the future homeowners' peaceful enjoyment of the property, and frankly will directly impact project economics of all of the surrounding properties. The zoning ordinance states that rezoning and use permits must take into account the impact on future development of adjacent properties and unfortunately the Crucible project will not only impact our project but several others that would be along the Route 1 corridor that the County has planned as an employment center.

Having an industrial facility in the heart of a development corridor will stunt future development and negatively impact current slated projects. For that reason, we urge County Staff and Supervisors to turn down the Crucible project. Thank you for your consideration.

Sincerely,

Saif Rahman

Saif Rahman, Managing Partner

Thornburg Village Development

Paulette Mann

From: Albert Clark <aareptiles38@gmail.com>
Sent: Wednesday, February 3, 2021 8:53 AM
To: Paulette Mann
Subject: [EXTERNAL]: Stop Crucible

CAUTION: This email originated from an external source. Do not click on any links or open attachments unless you recognize the sender and know the content is safe.

Hello neighbors, my name is Albert Presly Clark Jr. My voting district is the Berkeley district. As a retired NYC paramedic, parent, and a new resident in the Taverneer Lane subdivision since 2018 I join my residential neighbors in opposition to the rezoning plan. Many of the homeowners here in the Taverneer subdivision are retirees who enjoy the safety and quietness of our community. We courteously are against any establishment of any military or paramilitary types of training facilities that would bring a risk of bodily harm and injuries to all of us. Not to mention the extra loud noise from weapons , live ammunition and explosives and the like. Please reconsider the location and be advised that we strongly oppose this industrial rezoning. Thank you! Respectfully, Albert Presly Clark Jr.

Sent from my iPhone
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This email was Malware checked by Sophos http://www.sophos.com

WARREN C. KISHPAUGH
6308 HAMS FORD ROAD, SPOTSYLVANIA, VA. 22551
540-582-2452
January 29, 2021

Spotsylvania Planning Commission
VIA – E-MAIL – pmann@Spotsylvania.va.us

RE: Team Crucible rezoning – Wednesday February 3, 2021

I am a resident of Berkeley District, Spotsylvania County and wish to inform you my family and I are **opposed** to this rezoning request to establish a military type training facility on their land near Thornburg from agriculture to industrial 2. Their proposal which includes a live-fire range and improvised explosive device training would adversely impact local residents from a noise and safety perspective from 6 a.m. to 10 p.m. 7 days a week without any noise restrictions at all. The range of their military caliber weapons far exceeds their property boundaries and places me and my family at risk when a round leaves their range. As I live about one mile away, I am concerned about the distance the ammo travels. Once the special use permit is approved, they no longer have any sound restrictions or restrictions on the building of additional live-fire rifle ranges. I am also concerned about a decline in property values in this area for which we won't be compensated.

If approved, I believe Team Crucible's training facility with its on-going noise will discourage other more desirable development from occurring in the Thornburg area. I understand other developers have been looking at nearby properties with the desire to develop mixed business and residential opportunities as well as recreational facilities. If the Team Crucible request is approved, many of the developers will look elsewhere to invest their money.

I'm an avid outdoors man, love hunting and shooting! I would totally support this in the County on other large land areas away from residents and businesses! I don't think it is a good fit for the Thornburg area. **How would you like a shooting range beside or in front of your house? Be honest - I URGE YOU TO VOTE AGAINST THIS PROPOSAL!!**

Respectfully,

S/ Warren C. Kishpaugh

Cc: Board of Supervisors

Paulette Mann

From: Aviv Goldsmith <precursors@aol.com>
Sent: Sunday, January 31, 2021 12:23 PM
To: Jennifer Maddox
Cc: Paulette Mann
Subject: [EXTERNAL]: Crucible

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Dear Ms. Maddox:

I am writing to urge you to vote against the Crucible development as my Berkeley District rep on the Planning Commission. I am hoping that the County will respect the rights and property values of existing landowners and not approve incompatible uses.

If the Thornburg area is to be developed responsibly into a commercial center we shouldn't approve an incompatible land use. The rights of all in the area to quiet and safe enjoyment of their land should also be respected.

Thank you for your consideration for the Berkeley District.

Peace,

Aviv Goldsmith
6147 Hickory Ridge Rd
22551

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This email was Malware checked by Sophos http://www.sophos.com

Paulette Mann

From: Laurel Jordan <laurel96@hotmail.com>
Sent: Monday, February 1, 2021 12:32 PM
To: Paulette Mann
Subject: [EXTERNAL]: Proposed rezoning

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Dear members of the Planning Commission,

I am writing to advise you that I am opposed to the Crucible's request to rezone land in the Berkeley district from agricultural to industrial 2. I believe that the Crucible does important work. However, I strongly believe that my backyard and those of my neighbors are not the appropriate place to do it. My concerns are the same as those voiced by my many others. Most of us moved to the Thornburg area to enjoy the rural setting and the generally quiet atmosphere it provides. In their updated proposal the Crucible states it will attempt to keep noise to a minimum by firing suppressed weapons. The same document also states that if the customer desires to fire unsuppressed weapons, then they will provide what the customer wants. I am also very concerned about safety. I understand that the Crucible's safety record in Stafford has been good; however, it only takes a single stray bullet to injure or kill someone. You can understand how that would concern those of us who live downrange of the proposed site. Additionally, I believe that the Crucible's presence, if allowed, would lower the property values of homes in the surrounding area, including mine. Not only is this unfair to me, but is the county willing to sacrifice tax revenue to gain this business?
Team Crucible has amended their proposal in hopes of showing intent to be a 'good neighbor'. I feel that if that were a priority for the Crucible they would work things out with their current county. Instead, they have been engaged in multiple lawsuits with Stafford over the years. I sincerely hope that Spotsylvania County can find a more suitable neighbor for us. Thank you for your consideration of this matter.

Laurel Jordan
Berkeley District resident

Paulette Mann

From: Delma Armstrong
Sent: Monday, February 1, 2021 1:40 PM
To: Paulette Mann
Subject: Stop Crucible

Hello, my name is Delma W. Armstrong Jr. I live in the Berkley Voting District. I am a resident of Taverneer Subdivision. I have been a lifetime resident of Spotsylvania County and have worked for Spotsylvania County for 35 years.
My concern with the Crucible is the noise. The people of Thornburg are already putting up with the noise from the Dominion Raceway. Now there's a chance that there will be more noise if this so called training facility is approved. When is it going to stop. If civilian people want to get military type training then they should join the military. There are other parcels in this same are that are proposed for single family homes. It's like adding oil to water. It just doesn't mix. I would hope that the planning commission and the Board of Supervisors will feel the same and turn down this re-zoning.
Thank You.

Paulette Mann

From: Terry Jemison <terry.jemison@gmail.com>
Sent: Tuesday, February 2, 2021 6:44 PM
To: Paulette Mann
Subject: [EXTERNAL]: Fwd: Comment for 2/3/21 Hearing - Radio Reconnaissance Technologies

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Ms. Mann,
Greetings. I see that the email address for providing testimony (PC or BOS) given at https://www.spotsylvania.va.us/738/Public-Hearings is different from the instruction in the postal-mailed notice of the PC hearing. Thus, I am re-sending this to you per the instructions in that postal-mailed letter. Sorry for any confusion. If the first mail has alredy been appropriately handled, please disregard this followup.
Thank you,
Terry Jemison

---------- Forwarded message ---------
From: **Terry Jemison** <terry.jemison@gmail.com>
Date: Tue, Feb 2, 2021 at 12:51 PM
Subject: Comment for 2/3/21 Hearing - Radio Reconnaissance Technologies
To: <planning@spotsylvania.va>

Members of the Planning Commission,

I urge your support of the thoughtful staff recommendation and testify in opposition to the Crucible proposal. In particular, my concerns include both the simulated IEDs and outdoor range discharges of 12 gauge shotguns and other firearms until approximately 10 p.m. weekdays. I own a half-acre residential lot at 5509 Coach Four Lane (76A 1 - 5). This is in the small Parcel N in the staff report (p. 6), south of Crucible's proposed complex. My parcel at the northwest corner of the subdivision is the closest of the Coach Four Lane owners to the prospective outdoor range. I have read the applicant's acoustic study, but can't believe that in the relatively quiet hours of darkness, particularly in cold weather when soundwaves travel further (footnote 1) and the wave bends back toward the ground, neighbors would not hear the steady cadence of gunfire and explosions when class is in session. Its contractor's conclusion at page 20 of the acoustic report that "noise levels affecting the surrounding community are expected to be notably reduced…compared to their original design…" is not enough.

Thornburg is blossoming with new potential given impending projects of others nearby that would foster economic growth and broaden the tax base. But this proposal before the Commission weighs against this progress. Firearms and security training is a necessity that I applaud, but Radio Reconnaissance Technologies' contribution must be at a more remote site **at least for the outdoor shooting portion of its curriculum.**

Thank you for your consideration of community concerns and what is in the interest of Thornburg today and its healthy future growth.

Terry Jemison

(1) Ref. https://www.discovery.com/science/Sound-Carries-Farther-Cold-Days

Paulette Mann

From: jean Hoss <bjh634@msn.com>
Sent: Tuesday, February 2, 2021 11:05 PM
To: Paulette Mann
Subject: [EXTERNAL]: Fw: Request Rezoning of Crucible R17-0005 be denied.

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From: jean Hoss
Sent: Tuesday, February 2, 2021 10:52 PM
To: pmann@spotsyvania.va.us <pmann@spotsyvania.va.us>
Subject: Request Rezoning of Crucible R17-0005 be denied.

We are opposed to the proposed rezoning of 69.96 acres from agriculture to industrial to accommodate Team Crucible R17-0005. We have had land in the subdivision of Matta River Woods for over 40 years. It is part of our retirement. I am 86 years and legally blind. My wife is 84 and has many major health problems. No one wants to buy residential property backed up to a shooting range such as our property . Why would they put a firing range in a populated subdivision 3,000 feet from our lot, as well as being near other occupied lots? Since there is much open space elsewhere, why put a shooting range in a populated area at this location? We hope the County Planning Commission takes into consideration the danger of building Crucible in a populated community such as Matta River and other nearby subdivisions.

We ask your support in voting "NO" to Crucible R17-0005.

Robert L. and Shelba Jean Hoss

(Lot 13, Matta River Woods Subdivision)

Telephone No. 304 754-7112,

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Paulette Mann

From: jaruedi@aol.com
Sent: Wednesday, February 3, 2021 11:44 AM
To: Paulette Mann
Subject: [EXTERNAL]: Stop Crucible

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Mr Mann, this is to be read into the record

I'm raising my voice against Crucible. Admittedly I live outside the directly affected area, still against it in this part of the county.

Reasons I'm against it is Safety concerns, Noise pollution, and Property values.

Range berms are great, but still the odd occasional round can still go over them and you have established communities in the surrounding areas. One wrong round in the wrong spot can be an unneeded tragedy.

Reducing the number of ranges is great as is the reduction in range hours. And I do love to shoot my muzzleloaders. But virtually any time I go outside (I live between Partlow and Snell) I'm treated to a 'symphony' of gunfire. Automatic gunfire, pistols, rifles and "WTF was THAT?" going off just about any day or time I go outside. And this is just from private citizenry, at their homes. I would not want to think of living near a constantly used range.
And I would never live nor set up a business near one.

Crucible is already in Stafford, and apparently not a good neighbor. I only know this from a business owner that had customers that were neighbors of the Stafford operation, and they were not happy with Crucible. Neighbors could neither enjoy or sell their properties.

J A Ruedi
Partlow Rd
Spotsylvania 22553

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Citizen's Revised Impact Analysis
Team Crucible Zoning Request

January 2021

Agenda

- Bottom Line up Front
- Summary
- Crucible Layout
- Resident top 3 issues
  - Noise Pollution/Quality of Life
  - Safety
  - Economic Impact
- County Decision Criteria
- Current Status
- Conclusion and Questions

Bottom Line:

The Planning Commission should recommend disapproval of this request

Bottom Line:

The Planning Commission should recommend disapproval of this request

- The surrounding community is nearly 100% against this proposal
  - We have more than 450 signatures from surrounding residents who oppose this rezoning
  - This will create a black hole for any development in the center of one of the most promising areas in the county
- This is a clear case of SPOT ZONING
  - Rezoning of this property as requested does NOT support the Spotsylvania Comprehensive Plan will have a severe negative impact on future development in the Thornburg area.
  - 6 of 8 Board of Supervisor Decision Criteria (Sec. 23-4.5.7) do not support approval.
  - Rezoning of this property as requested severely impacts 810 property owners
- The revised Crucible submission invalidates their economic analysis. – less ranges means less training days
- Although Crucible proffers ammunition sizes, there is no enforcement capability in Spotsylvania so the residents will never feel safe
- Crucible refused to do a SARNAM sound analysis and their analysis does not take in to account any environmental factors. It is a "best case" analysis and is not accurate for what the citizens will suffer.
- Once approved, the county can never go back and this will forever change and destroy harmonious and positive development of the area
- Proffer to use sound suppressors "when approved by customers" is ridiculous on its face. There is no enforcement nor any incentive to use a suppressor which increases wear and tear on weapons and provides unrealistic training depending on the scenario

Summary:

- Placing this facility with the current design on Lot 76-A-2 will do the following:
  - **Impact 810 properties via noise pollution, safety, or both.**
  - 206 acres including Taverneer Subdivision and those along Rte 1 adjacent to the property will be virtually uninhabitable (noise levels in excess of 104 dB peak)
  - 3005 acres containing 437 residential and commercial properties in the surrounding area will have their quality of life ruined (noise levels from 87 dB to 104 dB)
  - 617 properties including 3 Subdivisions will be inside the Surface Danger Zone where all range design best practices state there is a reasonable chance of a projectile from a potentially unsafe range causing death, injury or destruction of property – The county incurs shared liability should it approve this design.
  - **The average property owner will lose at least $97,588 in household equity over a 20 year period.***
  - **Spotsylvania will lose at least $ 7,601,667 ($ 101,747 in the first year) in property tax revenues over 20 years due to devalued property.***

* Estimate based on 15% reduction for properties in high complaint noise and dispersion area of SDZ and 7% reduction for homes in moderate noise and ricochets area of SDZ

Specifics of Request

- Lot 76-A-2 is requesting rezoning for Agricultural 2 (A-2) to Industrial 2, specifically rezoning under Sec. 23-6.22.4 Special uses, (12) Industry, type III.
- Definition: Industry, type III means an establishment which has the **potential to be dangerous or extremely obnoxious.** Included are those in which explosives are stored, petroleum is refined, natural and liquid gas and other petroleum derivatives are stored and/or distribution in bulk, radioactive material are compounded, pesticides and certain acids are manufactured, and hazardous waste is treated or stored as the establishment's principal activity.
- Additional: under Sec. 14-52 Exemptions for noise, the applicant feels they meet paragraph 14-52-a-3 "Noise emitted by a commercial or industrial establishment which noise customarily emitted by such establishment or industries." **would be exempt from noise pollution sound levels from 6:00a.m. to 10:00 p.m. daily.**

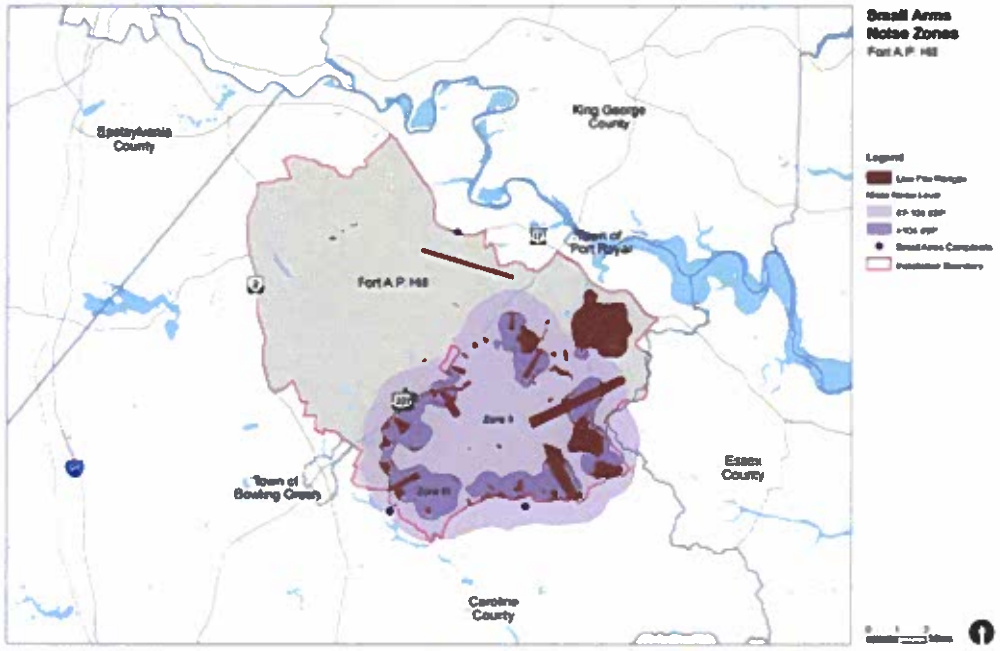
Once approved the County can never go back!

- Statute: VA Code Ann. § 15.2-917
- No local ordinance regulating any noise shall subject a sport shooting range to noise control standards more stringent than those in effect at its effective date. **The operation or use of a sport shooting range shall not be enjoined on the basis of noise,** nor shall any person be subject to action for nuisance or criminal prosecution in any matter relating to noise resulting from the operation of the range, if the range is in compliance with all ordinances relating to noise in effect at the time construction or operation of the range was approved, or at the time any application was submitted for the construction or operation of the range
- For purposes of this section, "effective date" means the time the construction or operation of the sports shooting range initially was approved, or at the time any application was submitted for the construction or operation of the sports shooting range, whichever is earliest.

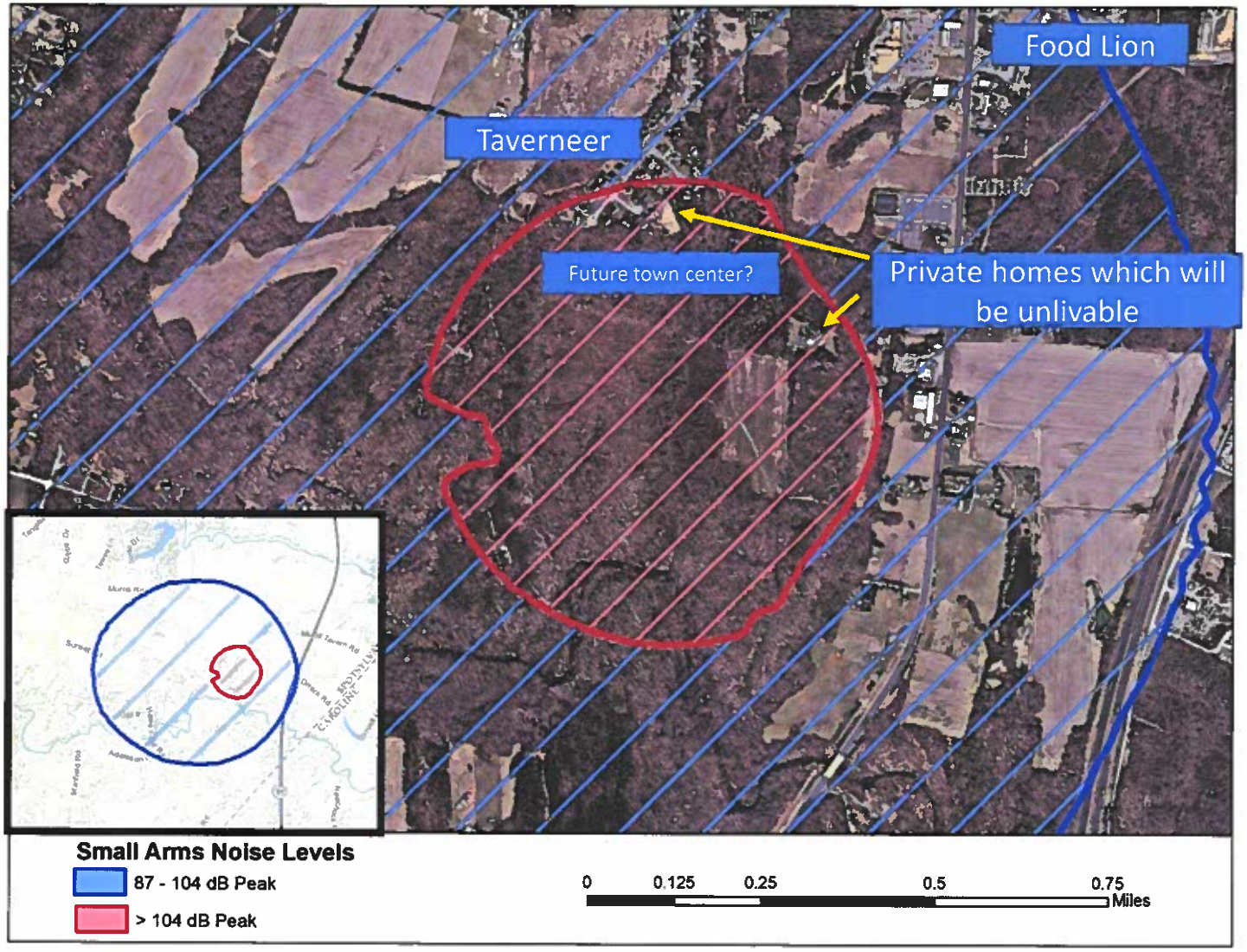
Quality of Life

- Unconstrained Environmental Pollution (Noise) will adversely impact quality of life for current residents and impact future development in the effected area.
- The following 2 slides depict the areas that will be negatively impacted by the noise pollution.
  - The yellow area depicts the areas that will be annoyed to the level of taking actions like complaints, or real estate decisions. DoD recommends no future development in this area without significant risk of conflict
  - Red represents the High Complaint area. DoD recommends no habitation in this area.
- Noise sensitive land uses are discouraged in areas where dBP from small arms weapons is between 87 and 104 dB with medium risk of complaints. Noise sensitive land uses are strongly discouraged in areas where dBP from small arms weapons is equal to or greater than 104 dB with high risk of noise complaints.

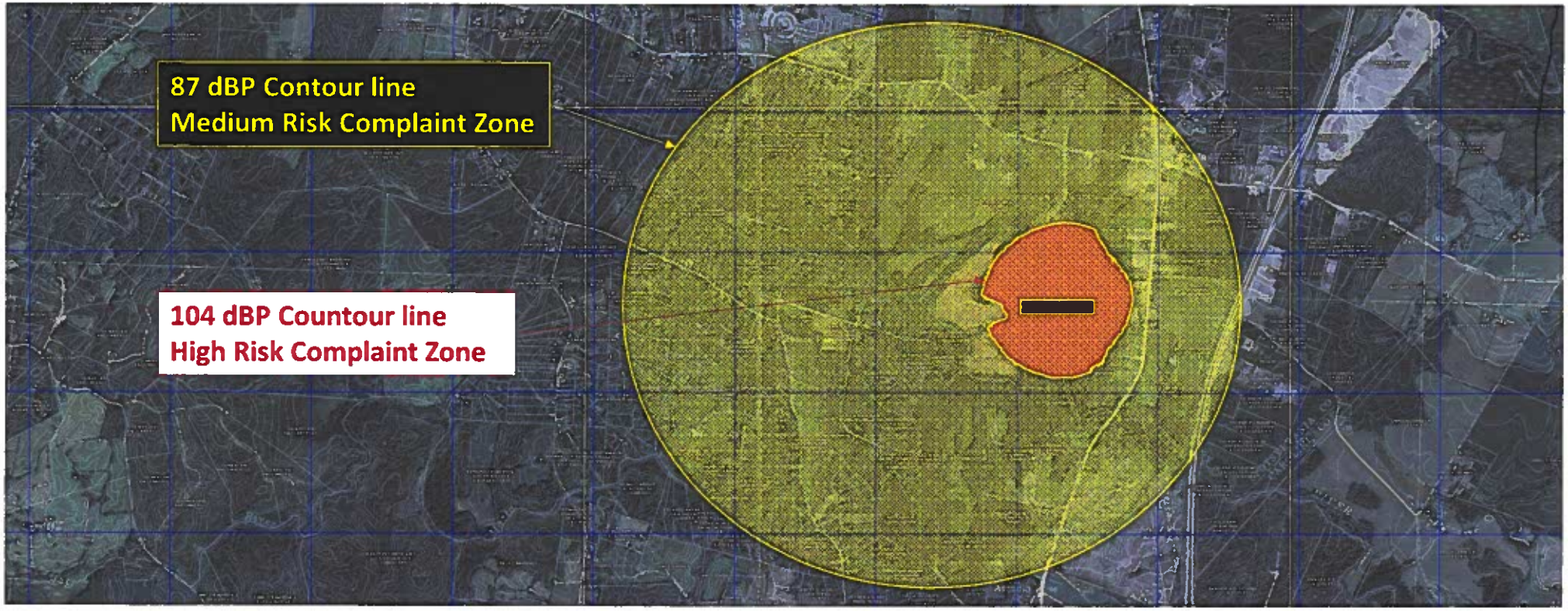
Ref: AIRCRAFT, ORDNANCE, AND SMALL ARMS NOISE STUDY FOR NAVAL WEAPONS SYSTEM TRAINING FACILITY BOARDMAN, OREGON (Aug 2012)



SARNAM Model for FT. AP Hill, Fort A.P. Hill Joint Land Use Study - December 2014

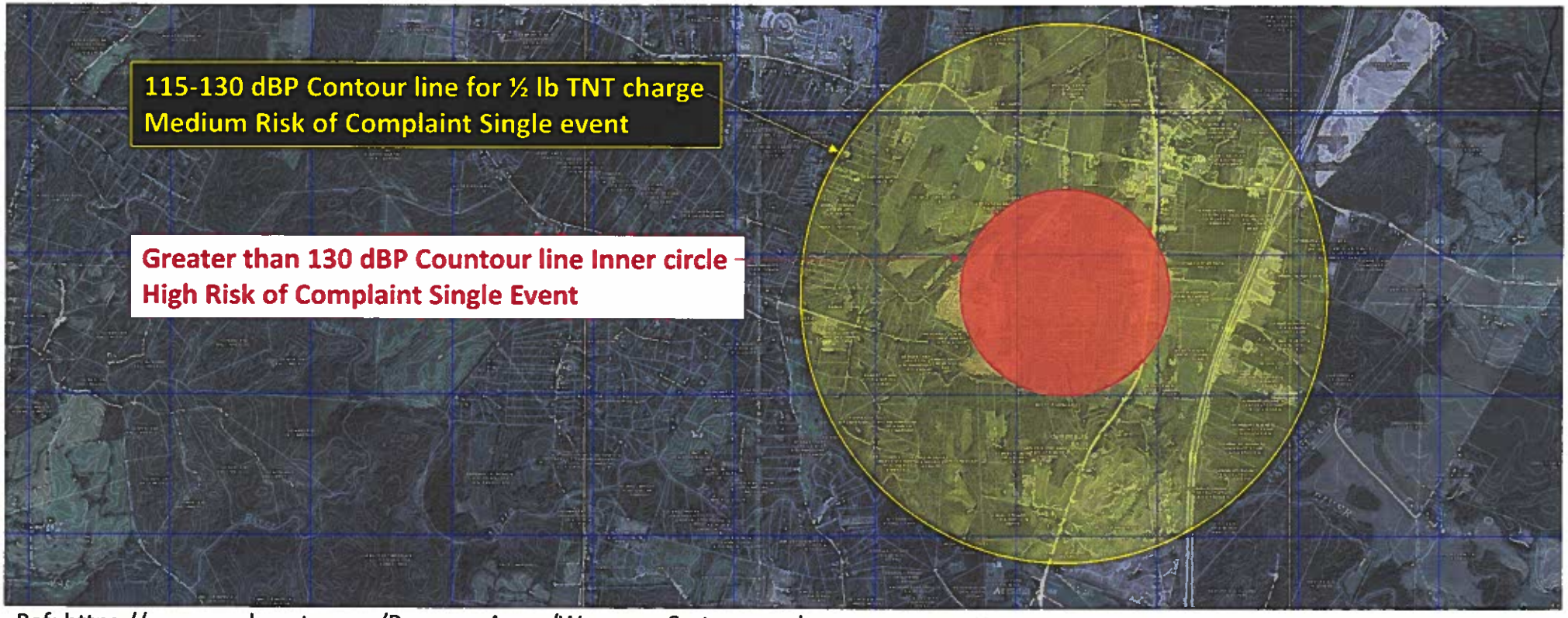

Food Lion
Taverneer
Future town center?
Private homes which will be unlivable
Small Arms Noise Levels
87 - 104 dB Peak
> 104 dB Peak
0
0.125
0.25
0.5
0.75
Miles

Small Arms Range Noise Assessment Model (SARNAM)
Team Crucible Training Complex
Small Arms (.308, 5.56mm, 9mm) weapons



Ref: https://www.serdp-estcp.org/Program-Areas/Weapons-Systems-and-Platforms/Noise-and-Emissions/Noise/WP-200006/SARNAM-Noise-Impact-Software

Small Arms Range Noise Assessment Model (SARNAM)
Team Crucible Training Complex
½ Pound TNT



Ref: https://www.serdp-estcp.org/Program-Areas/Weapons-Systems-and-Platforms/Noise-and-Emissions/Noise/WP-200006/SARNAM-Noise-Impact-Software

dBA	Example	Home & Yard Appliances	Workshop & Construction
0	healthy hearing threshold		
10	a pin dropping		
20	rustling leaves		
30	whisper		
40	babbling brook	computer	
50	light traffic	refrigerator	
60	conversational speech	air conditioner	
70	shower	dishwasher	
75	toilet flushing	vacuum cleaner	
80	alarm clock	garbage disposal	
85	passing diesel truck	snow blower	
90	squeeze toy	lawn mower	arc welder
95	inside subway car	food processor	belt sander
100	motorcycle (riding)		handheld drill
105	sporting event		table saw
110	rock band		jackhammer
115	emergency vehicle siren		riveter
120	thunderclap		oxygen torch
125	balloon popping		
130	peak stadium crowd noise		
135	air raid siren		
140	jet engine at takeoff		
145	firecracker		
150	fighter jet launch		
155	cap gun		
160	shotgun		
165	.357 magnum revolver		
170	safety airbag		
175	howitzer cannon		
180	rocket launch		

Safety

- The Team-Crucible range is an **"OPEN RANGE" -** bullets **WILL** overshoot and cross the Lot 76-A-2 property line - it is just a matter of probability and time. (Plan and concerns were reviewed by C. Vargas, PE – Range design)
- The Following slides depict the Surface Danger Zones for some of the small arms weapons Crucible is requesting to shoot. *depending on final range layout on the ground the angles of the areas may change but not the size of the areas.
- Anyone within the Surface Danger Zone depicted in yellow is at risk of loss of life when the range is in operation.
- This position is consistent with Department of Defense, Department of Energy, National Shooting Sports Foundation, and the National Rifle Association.

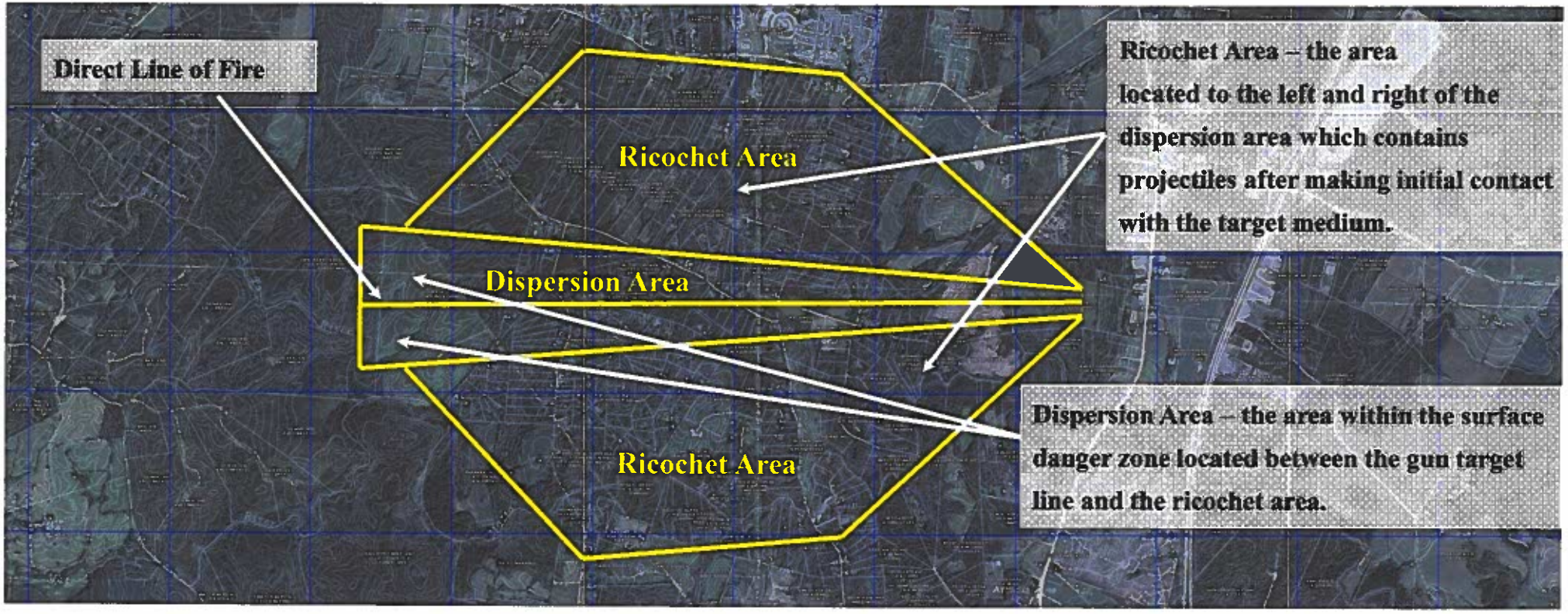
"A designer develops the impact sector area by first imagining a person who is firing at ground level at a surface target being able to deviate 10 degrees each side of a center line of fire and allowing him to raise the rifle or the pistol at a 30- to 35-degree angle. These are the angles that will give a maximum trajectory. You now have the maximum distance of impact and a description of the area that is impacted by a range." Design Criteria for Shooting Ranges, Clark Vargas NSSF http://www.nssf.org/ranges/rangeresources/library/detail.cfm?filename=facility_mngmnt/design/design_criteria.htm&CAT=Facility%20Management

"If you build in a populated area, your range must be totally baffled so that the range owner can demonstrate to a judge that a round cannot escape." C. Vargas 1996 Third National Shooting Range Symposium, www.nssf.org/ranges/rangesources

"safety baffles defines a structure which is used to restrict fired bullets to smaller areas than would otherwise be possible without them...baffles are erected so that the shooter, regardless of the shooting position used (or permitted) cannot see any sky downrange, either over the top of the backstop or to the side of the range...The overall responsibility of the range owner/operator is to stop fired bullets before they exit the property" David Luke, Range Technical Advisor, National Rifle Association, 1996 Third National Shooting Range Symposium, www.nssf.org/ranges/rangesources

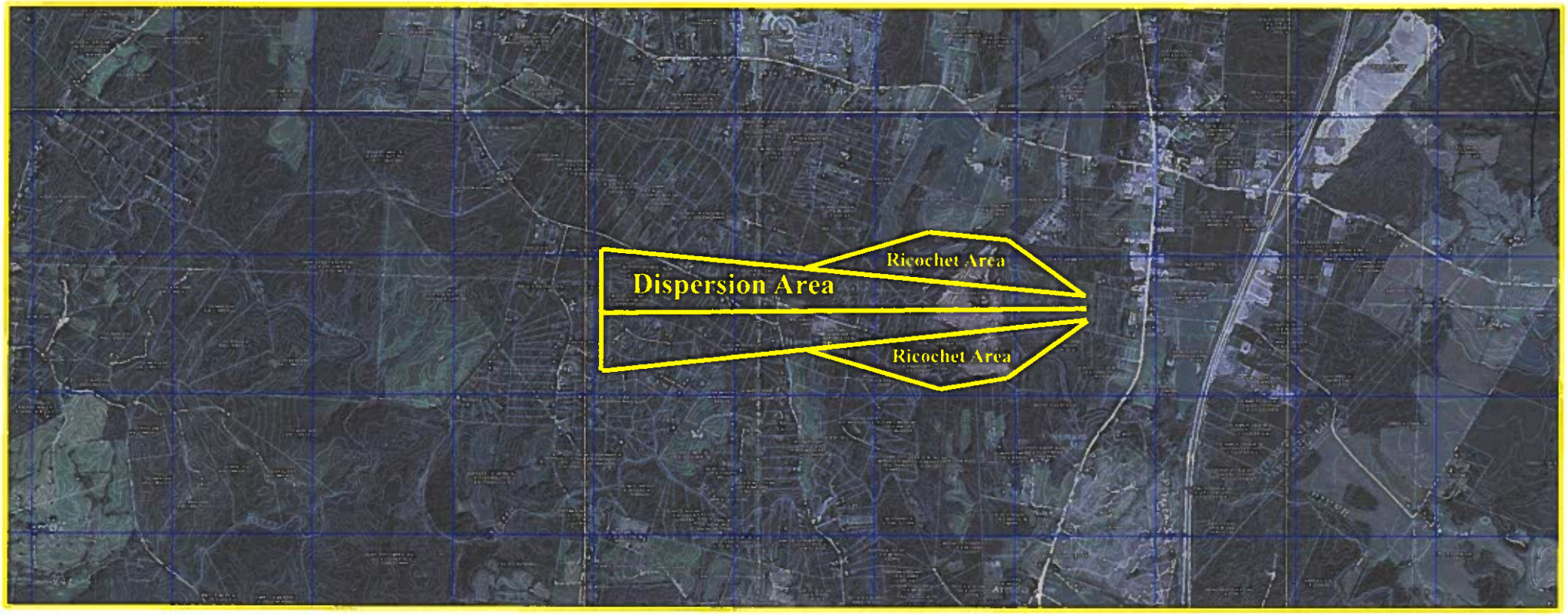
*The Surface Danger Zone (SDZ) is a depiction of the mathematically predicted area a projectile **will** impact upon return to earth, either by direct fire or ricochet. The SDZ is the area extending from a firing point to a distance downrange based on the projectiles fired. This area has specific dimensions for the expected caliber of the weapon(s) being fired so that all projectile fragments will be contained in this area. These dimensions are found in DA PAM 385-63 - Range Safety.*

Surface Danger Zone
.308
Distance X: 5,288M Angle P: 43.18 deg (earth/water)



Ref USMC Range Safety Pocket Guide p32

Surface Danger Zone
5.56mm M855 Ball
Distance X: 3,437M Angle P: 34.2 deg (earth/water)



Ref USMC Range Safety Pocket Guide p32

Ranges with "No Blue Sky" Overhead Baffles

http://www.cvaltd.com/2011/06/nssf-video-berms-baffles-and-backstops/





This is NOT what is proposed, but would be required in this area



Economic Impact

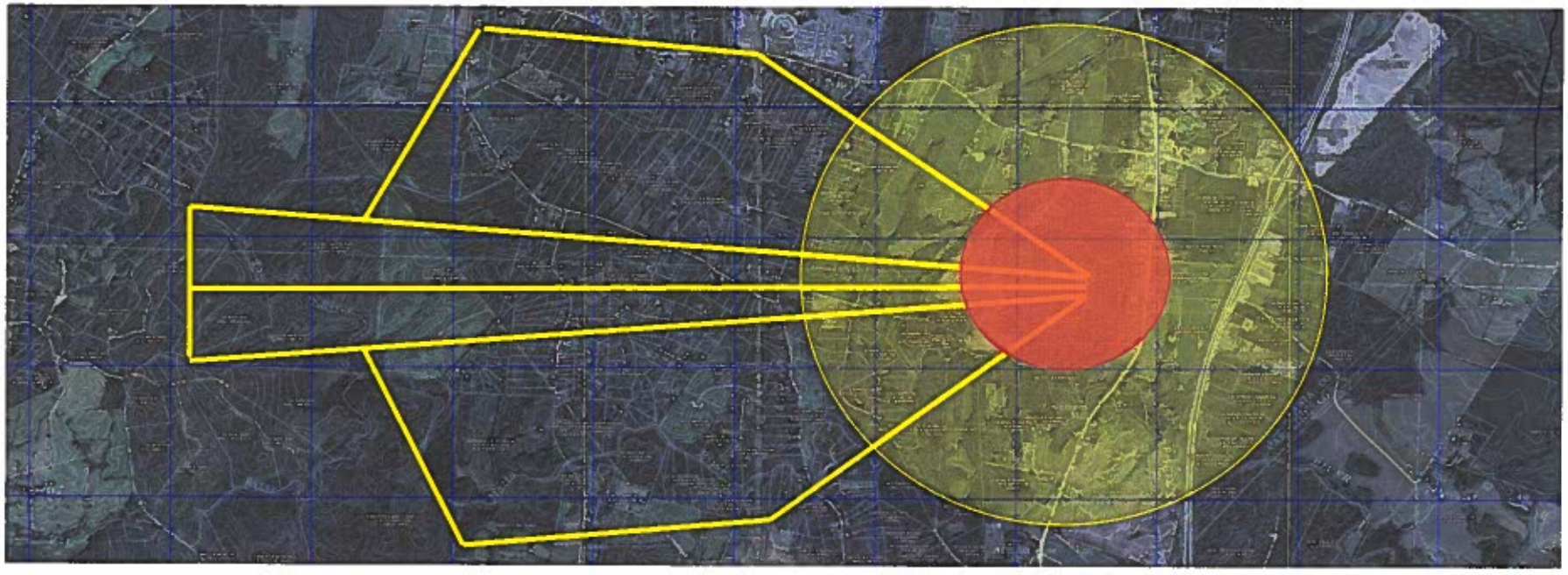
- If the rezoning is granted, the average property owner will **lose at least $97,588** in equity over a 20 year period.
- If the rezoning is granted, the projected total loss in property tax revenues for Spotsylvania county over 20 years is **$ 7,601,667 with $ 101,747 being lost in the first year**.

- 810 Properties economically impacted due to noise pollution, safety, or a combination of both.
- Unconstrained Environments Pollution (Noise) will adversely impact quality of life, future development, and impair values for 437 residential and commercial properties.
- The threat of loss of life or injury due to working or living within the surface danger zone of a live fire range will negatively impact the value of at least 617 properties.
- Studies have shown loss of value amounts vary from 7.5 % to 25%.
- The following graphs assume a 7% or 15% initial loss depending on proximity to the range locations and Surface Danger Zone
- Property Values for 2015 were taken from the GIS Mapping Page on the Spotsylvania County Website

Property Loss References

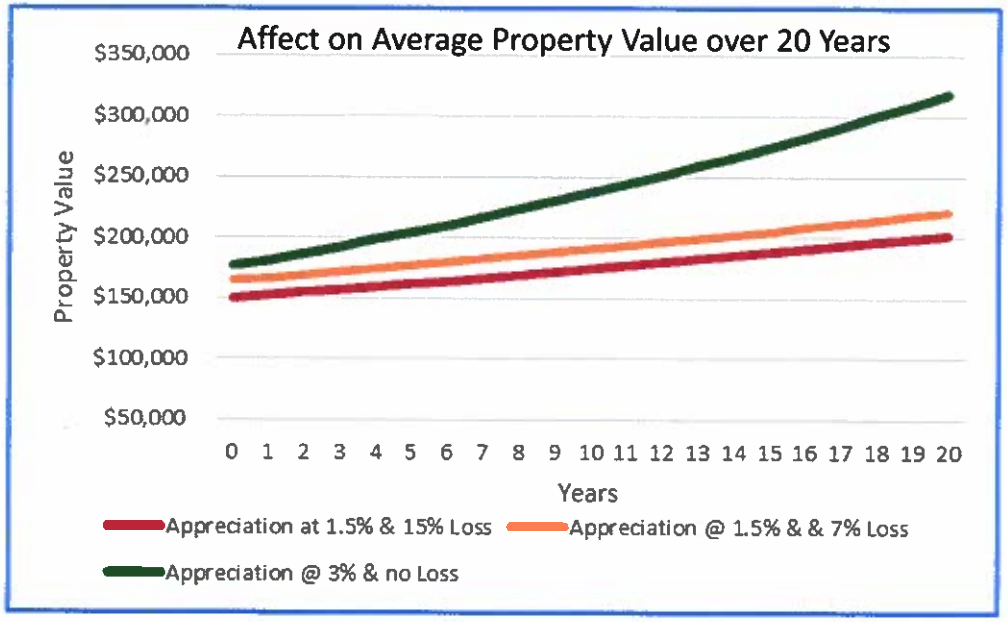
- Appreciation Impact Value: Realtor.com identifies being located next to a shooting range as #4 on a ranked list of neighborhood features that drag down your home value. Being in the proximity of a rifle range drags the appreciation of property by 3.7%
  - http://www.realtor.com/news/things-that-affect-your-property-value/
- Maine professional real estate appraiser performed statistical analysis resulting in a 7.5% loss of property value resulting form a 175 acre parcel being located within 1.5 mile radius of a rifle range.
  - http://www.bridgton.com/waterford-gun-club-noise-hurts-property-values-county-rules/
- Appendix D reports possible property losses of 25 %
  - http://www.deq.virginia.gov/Portals/0/DEQ/EnvironmentalImpactReview/10.017Sappendixd.PDF
- Green county Record reports possible property losses of 30%
  - http://www.dailyprogress.com/greenenews/news/gun-range-proponents-it-s-a-safe-place-to-shoot/article_cecc95ba-41d2-11e5-a678-83dc0f3c372e.html
- Numerous other articles available on the internet

Properties Evaluated



- **Properties in the Extreme Area depicted by the red circle depreciated at 15%.**
- **Properties in the Moderate Noise Area depreciated by the yellow circle7%**
- **Properties in the center portion of the Surface danger Zone (SDZ) depreciated by 15%**
- **Properties in the ricochet area of the SDZ depreciated by 7%**
- **No properties double counted (in both the noise area and SDZ)**

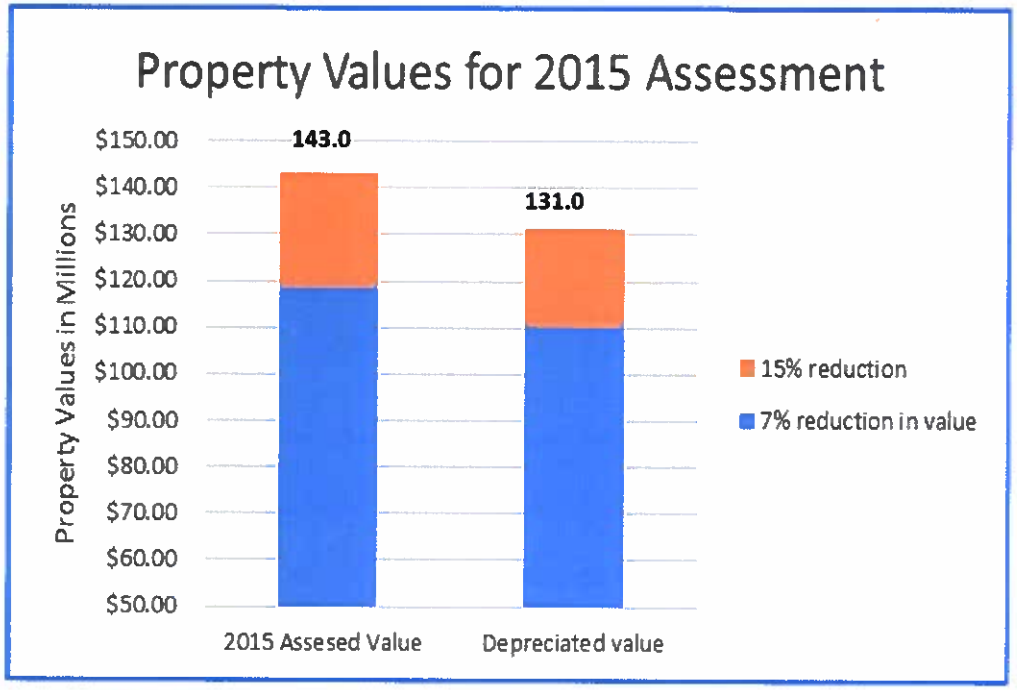
Property Value Impact

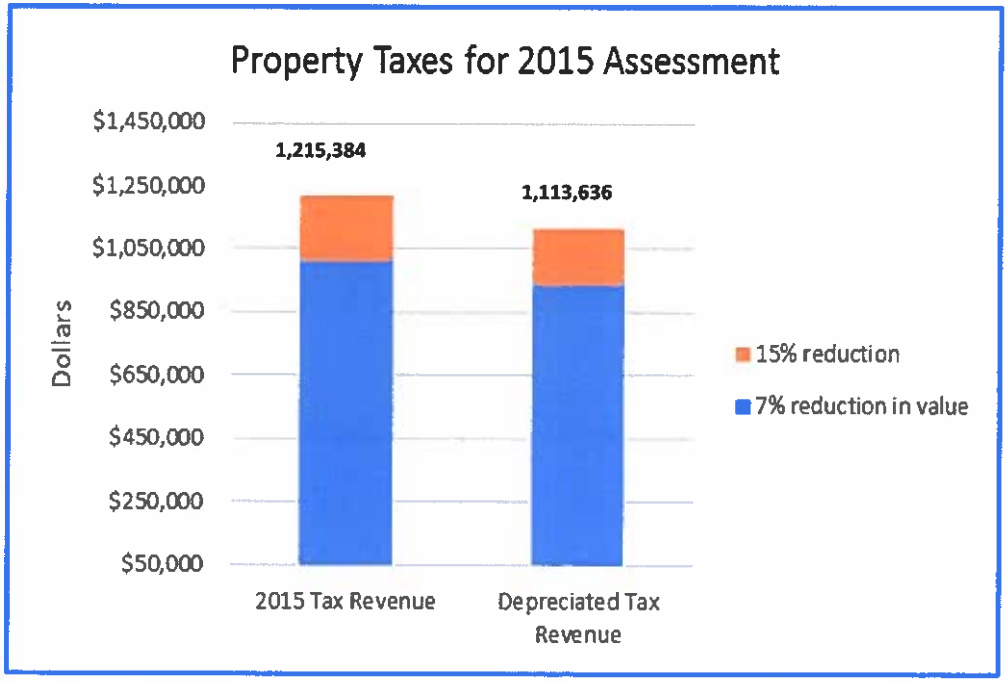


- The average property value in the affected area is $176,300.00 based on 2015 assessments.
- The red line shows average property value after an initial 15% loss and decreased appreciation of 1.5%. Property value after 20 years is $201,833.00 or a loss of $116,584.00.
- The orange area shows average property value after an initial 7% loss and decreased appreciation of 1.5%. Property value after 20 years is $220,829.00 or a loss of $97,588.00.
- The green line shows no property value loss and appreciation of 3%. (The rezoning is not granted) The property value appreciates to $318,417.00.

If the rezoning is granted, the average property owner will be forced to give up at least $97,588.00 in equity over a 20 year period.

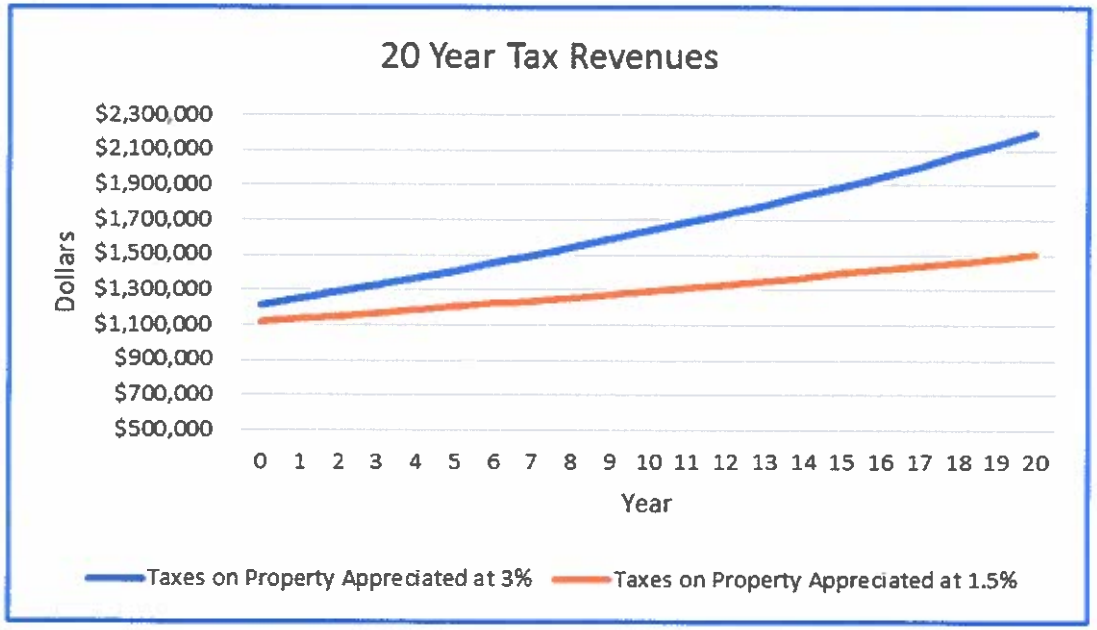
Property Value & Tax losses





Property Values decrease from 143.0 Million to 131.0 Million resulting in property tax losses to the county of $101,747.00 the first year.

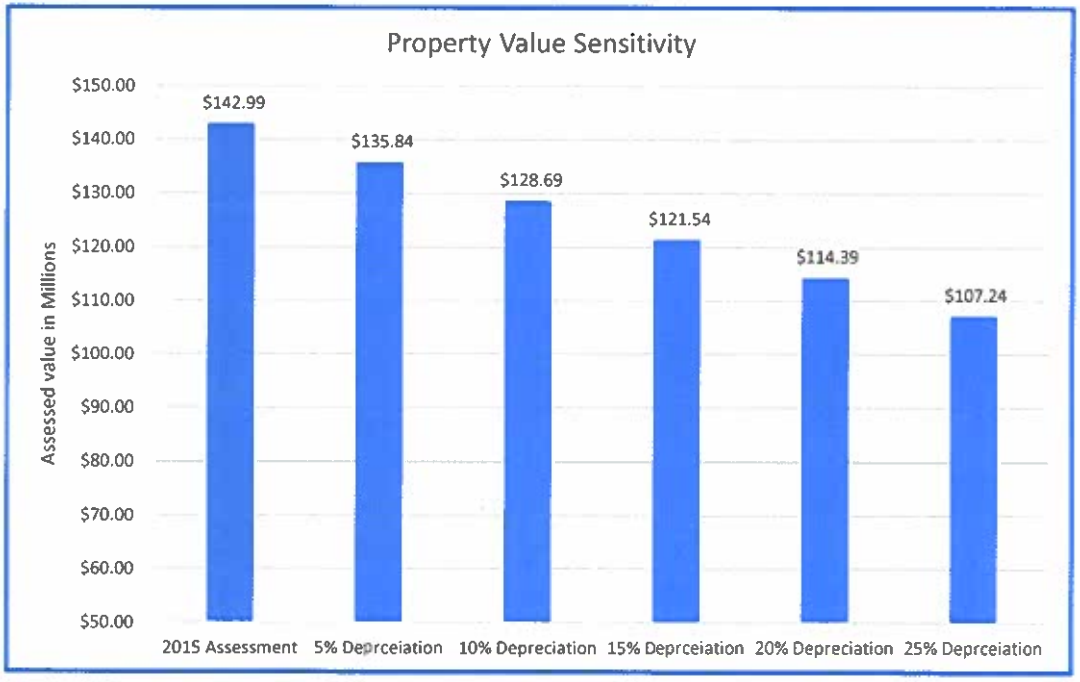
Tax Revenue Losses over Time



- The blue line shows the property taxes collected for the 2015 assessed value for properties in the surface danger zone and noise impact areas with a 3% appreciation for 20 years.
- The orange line shows the property taxes collected with an initial depreciation of 7% or 15% based upon their location in the noise area or surface danger zone with a 1.5% appreciation for 20 years.

The projected total loss in property tax revenues for Spotsylvania county over 20 years is $7,601,667 with $101,747 being lost in the first year.

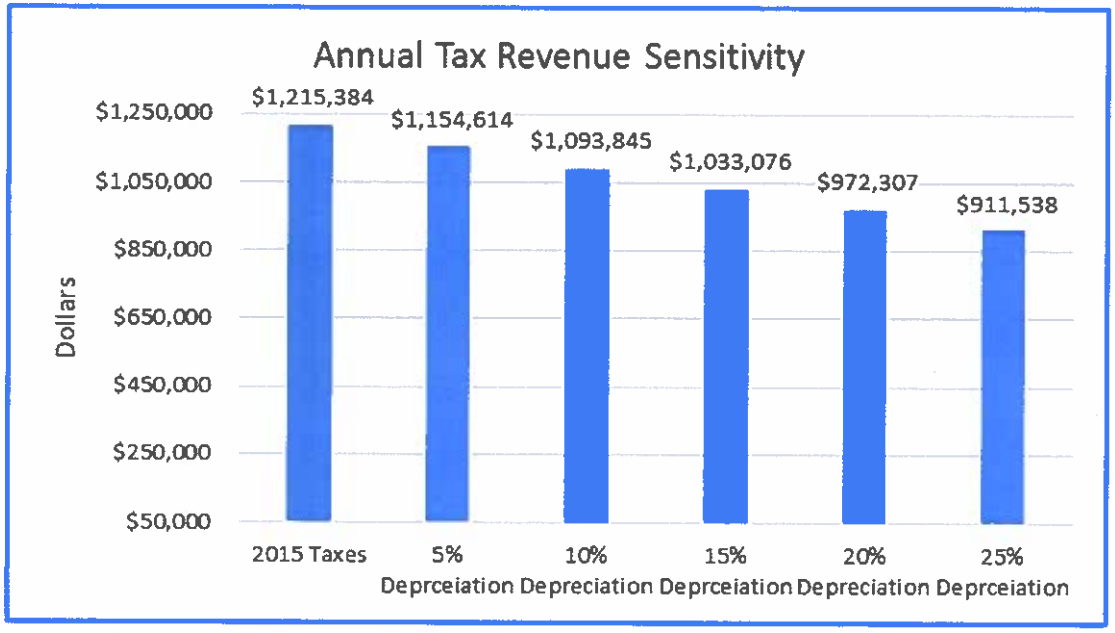
Property Value Loss Sensitivity



- The total property value in the affected area is nearly $143 million dollars based on 2015 assessments for 810 properties.
- This graph shows the total property values for 2015 and the impact of depreciated property values from -5% to -25% at 5% intervals.
- If property value losses exceed the assumed values, property value losses could increase substantially.

If the property values decline at a greater rate than 7 & 15 percent, resident property value losses could increase substantially.

Tax Revenue Loss Sensitivity



- The average property value in the affected area is $176,300.00 based on 2015 assessments for 810 properties.
- This graph shows the annual property taxes for 2015 and the impact of depreciated property values from -5% to -25% at 5% intervals.
- If property value losses exceed the assumed values, property tax losses could increase substantially.

If the property values decline at a greater rate than 7 & 15 percent, tax revenue loss could increase substantially.

Board of Supervisor Decision Criteria (Sec. 23-4.5.7)

- The planning commission shall not recommend, nor shall the board of supervisors approve, the proposed special use unless it satisfies the following standards:
  1. That the proposed use is in accordance with the comprehensive plan and other official plans adopted by the county;
  2. That the proposed use or development of the land will be in harmony with the scale, bulk, coverage, density, and character of the area or neighborhood in which it is located;
  3. That the proposed use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof;
  4. That the proposed use will not adversely affect the health or safety of persons residing or working in the neighborhood of the proposed use;

Satisfied
Partially or Unknown
Not Satisfied

Board of Supervisor Decision Criteria (Cont)

5. That the proposed use will not be detrimental to the public welfare or injurious to property or improvements within the neighborhood;
6. That the proposed use is appropriately located with respect to transportation facilities, water supply, wastewater treatment, fire and police protection, waste disposal, and similar facilities;
7. That the proposed use will not cause undue traffic congestion or create a traffic hazard;
8. That the proposed use will have no unduly adverse impact on environmental or natural resources.

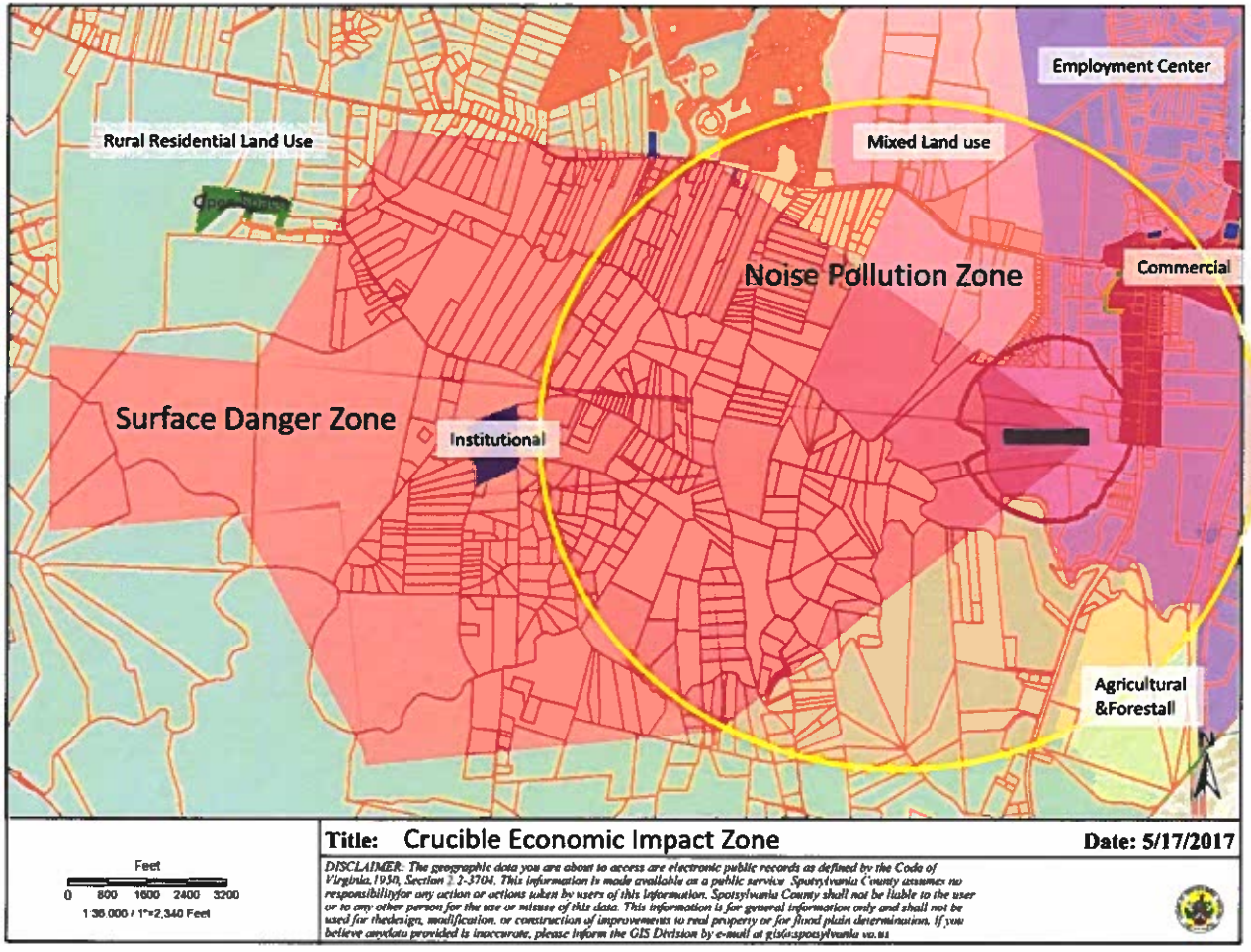
Satisfied
Partially or Unknown
Not Satisfied

1. That the proposed use is in accordance with the comprehensive plan and other official plans adopted by the county;

- Lot 76-A-2 is identified as an "Employment Center" in the 2016 Comprehensive plan.
  - "The employment center land use area is envisioned to be the primary location for new office and industrial development within the County, with the focus on larger scale office complexes, industrial users, and business parks....Heavy industrial uses tend to be larger in scale and often can have pollution on the surrounding area. While these impacts should be minimized, there is the recognition that not all negative effects can be completely mitigated. The location of these users within industrial parks, both new and existing, should be encouraged..."
- Fort A.P. Hill Joint Land Use Study, December 2014
  - Spotsylvania county recognizes that noise levels approaching 80 dBA* "generate undesirable noise levels on current and future development"
  - Recommends
    - "real estate disclosures for prospective buyers or renters of real estate transactions for properties within the influence area as part of subdivision plats."
    - "Encourage sound attenuation for new construction of residences, schools, hospitals, nursing homes, churches and other public building within public gathering spaces."

Crucible will have a large negative impact on the comprehensive plan

- Requires re-zoning of all areas inside the effected sound area to commercial as each property will be exposed to commercial sound levels.
- More than 44 Mixed Use properties in the Noise Pollution Zone including all of Taverneer Subdivision
- 6 Mixed Use properties inside the SDZ
- More than 50 Employment Center properties inside the Noise Pollution Zone
- 3 Employment Center Properties inside the SDZ
- Most of the Thornburg Commercial District inside the Noise Pollution Zone.
- County Landfill directly down range, with approval Spotsylvania accepts and condones the risk of residents being hit by projectiles at the landfill.



2. That the proposed use or development of the land will be in harmony with the scale, bulk, coverage, density, and character of the area or neighborhood in which it is located;

- There are no less than 4 subdivisions, 617 parcels of land, within the SDZ and noise pollution area of this proposed range complex.
- This proposed complex will destroy the "harmony and character" of all residents within the effected noise pollution area and SDZ.
- All residents contacted within the effected area oppose this re-zoning change and the construction of this facility without extensive mitigation for both noise pollution and safety
- The proposed development of a town center WILL NOT HAPPEN IF THIS IS APPROVED

This request is not in harmony with the scale, bulk, coverage, density, and character of the Taverneer, Plantation Estates at Matta River, Finney Estates and Matta River Woods Subdivisions

Who will ever develop here down range?



3. That the proposed use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof

- **Safety:** Surface Danger Zones depict the impact area for a given weapon system. Approving a SUP for a live fire facility puts the lives of anyone inside the surface danger zone at risk of loss of life.
- **Sound:** Unconstrained Environments Pollution (Noise) will adversely impact development, use of adjacent land, and impair values thereof. If any re-zoning is approved, appropriate noise mitigation language must be established.
- **Value:** Realtor.com identifies being located next to a shooting range as #4 on a ranked list of neighborhood features that drag down your home value.
  - If the rezoning is granted, the average property owner will lose at least $97,588 in equity over a 20 year period.
  - If the rezoning is granted, the projected total loss in property tax revenues for Spotsylvania county over 20 years is $7,601,667 with $101,747 being lost in the first year.

4. That the proposed use will not adversely affect the health or safety of persons residing or working in the neighborhood of the proposed use;

- Safety - A range must control 100% of the Surface Danger Zone, or employ overhead and side baffling to guarantee a projectile will remain never leave the facility.
- Environmental – Environmental impact not addressed in request.
  - This facility if it is approved must comport with two EPA regulations (the Resource Conservation and Recovery Act and Clean Water Act). Neither of these is addressed in the submission
    - Impact to Well water and the Mattaponi River – Lead, Oil/Fuel spill, explosives residue
  - Guarantee/Bond to ensure land can be cleaned of all hazardous material in the event Crucible exits the property.
    - The U.S. Department of Agriculture (USDA) Forest Service expects to pay $980,000 to remove contaminated soil where the former Prescott Sportsmen's Club Shooting Range (PSC) site existed off Iron Springs and North Granite Basin roads near the Wildwood Estates subdivision. https://www.dcourier.com/news/2017/jan/05/shooting-range-cleanup-cost-forest-service-nearly-/ (JAN 2017)

5. That the proposed use will not be detrimental to the public welfare or injurious to property or improvements within the neighborhood;

- Safety - A range must control 100% of the Surface Danger Zone, or employ overhead and side baffling to guarantee a projectile will remain never leave the facility.
  - The submission does not address safety in the "shoot house" – No berms and no overhead cover

- In the Fort A.P. Hill Joint Land Use Study in paragraph 7.3.1 Spotsylvania County characterized noise levels above 80dBA as "undesirable noise levels on current and future development."

6. That the proposed use is appropriately located with respect to transportation facilities, water supply, wastewater treatment, fire and police protection, waste disposal, and similar facilities;

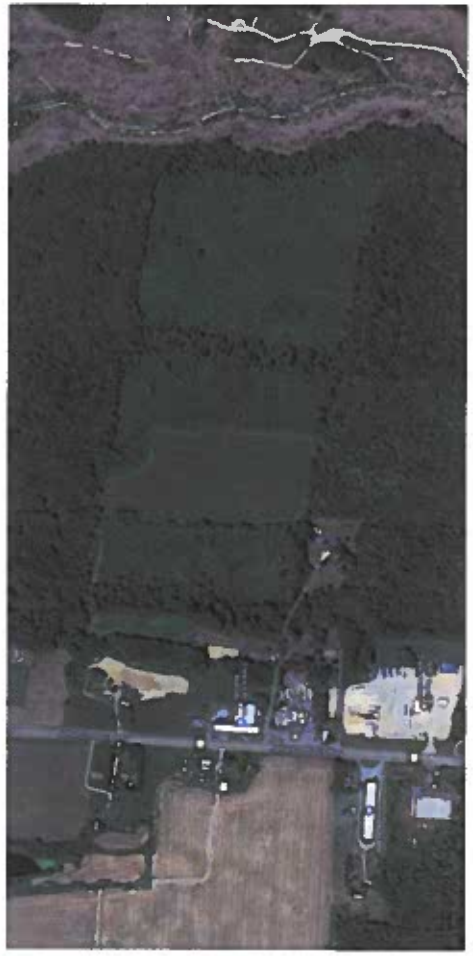
- Proposal states: " The Property is located within the PDB, but given the distance of existing utilities, it is not feasible during the initial phases of the Project to extend public utilities to the said site."
- Spotsylvania County Code Section 22-5(a) states: "Where a public water main or sanitary sewer is available to a new subdivision or development, the developer of any new subdivision intended for residential or commercial use or any combination thereof, or the developer of any industrial site shall construct all sanitary sewers and domestic freshwater distribution lines within his subdivision or development at his own expense. Immediately upon completion and acceptance of the construction work, the sanitary sewer and water facilities with necessary easement shall become the property of the county"

7. That the proposed use will not cause undue traffic congestion or create a traffic hazard;

- Proposal address traffic flow, but does not address if impulse noises exceeding 98 dBP for small arms and 130 dBP for ½ lb TNT along Route 1 will create distractions to vehicle operators resulting in accidents.

8. That the proposed use will have no unduly adverse impact on environmental or natural resources.

- Noise as stated in earlier slides with respect to residents.
- Environmental Mitigations talks to lead migration, but does not address Petroleum Oil and Lubricant containment that would be consistent with a "Rally Course" used as a driving training facility.
- EPA regulations and law not addressed as recommended in the EPA best practices guide (Resource Conservation and Recovery Act and Clean Water Act).
- Noise impact to livestock has not been assessed. Cattle and horses are very sensitive to loud noises and will impact their behavior.
    - Ref: Powhatan County Farm Bureau, 28 May 2010



Before Purchase



Today*

*Crucible built two pole barns and two wells without a permit

We the People of Berkeley Position

The residents of Thornburg are opposed to this re-zoning change unless the county ensures the following:

- Safety: 100% of the Surface Danger Zone must reside within the property lines or the range must use overhead and side baffling consistent with the National Shooting Sport Foundation and National Rifle Association "No Blue Sky" concept.
- Noise Pollution: Transmission of unconstrained noise pollution will have an adverse affect on quality of life and property value. Spotsylvania County must disapprove special use request and restrict noise pollution that extends beyond property lines.
- Require full environmental impact study to include noise, water and air pollutants.
- Require the company to post sufficient bond to clean up the lead and other residues from operations should they go out of business or abandon the site.
- Proper notification: Any re-submissions from Team-Crucible should require positive notification of any resident or business that lives in an affected area. Based on this submission, it would include al those within the 87dBP contour, or reside in a Surface Danger Zone.

Bottom Line:

- Placing this facility with the current design on Lot 76-A-2 will:
  - **Impact 810 properties via noise pollution, safety, or both.**
  - **If the rezoning is granted as requested, our analysis shows the average property owner will lose at least $97,588 in equity over a 20 year period.**
  - **If the rezoning is granted as requested, our analysis shows the projected total loss in property tax revenues for Spotsylvania county over 20 years is $7,601,667 with $101,747 being lost in the first year.**
  - **Now that the county is aware that this is an unsafe range, if approved and when a round goes over the berm and hurts or kills a citizen, the damages awarded following a lawsuit will be magnified significantly**

Planning must recommend disapproval -
Once granted and approved, the County can NEVER go back. It's State law.

Questions?

Spotsylvania County
Planning Commission
Executive Summary

Print

Meeting Date:	February 3, 2021
Title:	SUP17-0003 Radio Reconnaissance Technologies, Inc. (Team Crucible, LLC) Berkeley District
Type:	
Agenda Title:	SUP17-0003 Radio Reconnaissance Technologies, Inc. (Team Crucible, LLC) Berkeley District
Recommendation:	Staff Recommends Denial of SUP17-0003.
Summary:	Request for a special use permit for Industry Type III on approximately 69.96 acres in an Industrial 2 (I-2) zoning district for the operation of a security training facility that teaches security techniques utilizing firearms and simulated IEDs. The complex will include two office buildings totaling approximately 55,300 square feet, a firing range, an outdoor rally course, an outdoor sea container scenario area, a tactical entry training center, and an emergency helicopter landing pad. This is a companion case to R17-0005. The property is addressed as 6116 Jefferson Davis Hwy approximately 3,500 feet south of Mudd Tavern Road (Route 606). The property is located in the Primary Development Boundary. The property is in an area identified as Employment Center on the Future Land Use Map of the Comprehensive Plan. Tax Parcel 76-A-2. Berkeley Voting District.
Committee/Commission Summary:	
Review Date:	Status:
Financial Impact:	The applicant has submitted an FIA which notes the project will have positive fiscal impact for the County.
Staff Contacts:	B. Leon Hughes, AICP, Director of Planning and Zoning Jacob Pastwik, AICP, Planner III
Legal Counsel:	Alexandra Spaulding, Esq. Senior Assistnat County Attorney
Additional Background/Other Considerations:	Companion Case to R17-0005 Radio Reconnaissance Technologies, Inc. (Team Crucible, LLC)
Consequence of Denial/Inaction:	The use will not be allowed on the subject parcel.

ATTACHMENTS:		
Name:	Description:	Type:
CLEAN_UPDATED_Conditions_From_PC_Staff_Report_2-3-2021.pdf	Clean Copy of Updated Conditions	Backup Material
REDLINE_UPDATED_Conditions_From_PC_Staff_Report_2-3-2021.pdf	Redline Updated Conditions	Backup Material
Final_PC_Staff_Report_SUP17-0003_Crucible.pdf	Staff Report	Staff Report
2020-05-11_-Final_Crucible_GDP.pdf	Applicant's GDP	GDP
Revised_Application.pdf	Application	Backup Material
Revised_May_2020_GDP_Narrative.docx	Applicant's GDP Narrative	Backup Material
Accoustic_Assessment_(Rev_2).pdf	Applicant's Accoustic Assessment	Backup Material
Design_and_Safety_Evaluation_Report.pdf	Applicant's Design Safety Report	Backup Material
Economic_and_Fiscal_Impacts.pdf	Applicant's Economic and Fiscal Impact Report	Backup Material
Lead_Mitigation_Letter.pdf	Lead Mitigation Report	Backup Material
Citizen_Reference_Documents.pdf	Citizen Submitted Reference Documents	Backup Material
Letters_of_Opposition.pdf	Letters of Opposition	Backup Material
Letters_of_Support.pdf	Letters of Support	Backup Material
Citizen_Petitions.pdf	Citizen Petitions	Backup Material
Letters_to_be_read_into_the_record.pdf	Letters to be read into the record	Backup Material
Citizen_PowerPoint_presentation_crucible_1.2021.pptx	Citizen PowerPoint	Backup Material
Citizen_comments_Crucible.pdf	Letters to be read into the record (second batch)	Backup Material
Letters_to_be_read_into_the_record_(3rd_batch).pdf	Letters to be read into the record (third batch)	Backup Material

Based on the reasons noted in the staff report and the findings against, Staff recommends denial of SUP17-0003. Should the Commission deem this application appropriate for approval, Staff recommends the following conditions:

1. The security training facility ("Facility") to be developed on Tax Parcel 76-A-2 ("Property") pursuant to special use permit SUP17-0003 ("SUP"), must be developed in conformance with the Generalized Development Plan titled "Generalized Development Plan, Team Crucible Training Complex, Rezoning and Special Use", dated March 27, 2017, as last revised May 10, 2020 ("GDP") which is attached hereto and incorporated herein by reference. To the extent that the conditions herein are contrary to the GDP, the conditions herein will supersede the GDP and control. The verbs "will" and "must" as used throughout this Special Use Permit denote a mandatory act or requirement. SUP17-0003 constitutes the Team – Crucible Training Complex ("Facility").
2. These conditions will bind the applicant, any and all owners, occupants, and users of the Property, jointly and severally, who will be referred to collectively as the "Operator".
3. The shooting range must be designed to exceed the minimum standards established by, and in accordance with, the NRA Range Source Book 2012, for outdoor ranges, to include but not limited to the range floor, shooting area, target area, backstop, bullet catcher, side berms and bullet containment. The design must specifically incorporate all design elements identified in the NRA Range Source Book 2012, Section 1, Chapter 1, Article 3 Outdoor Ranges and Section 2 Chapter 2 Outdoor Range Design.
4. Every day, Monday-Friday, the Facility is open, all outdoor training activities may commence no earlier than 8:00 a.m. and must end no later than 8:00 p.m. eastern standard time. Every day, Saturday-Sunday, the Facility is open, all outdoor training activities may commence no earlier than 10:00 a.m. and must end no later than 8:00 p.m. eastern standard time.
5. Any and all discharging of rifles and shotguns must be done using suppressors at all times.
6. The Operator must maintain all berms on the Property to a minimum 20' height from the lowest point of their base exclusive of any plantings on the top of any berms. At Operator's expense, all berms will be surveyed annually to confirm the minimum required height is being maintained. Within 30 days prior to the anniversary date of the Zoning Use Permit issuance. The Operator will engage a Virginia-licensed, professional surveyor, to survey all berms on the Property and create a survey report of the height conditions. This includes, but is not limited to, the berm shown adjacent to tax parcel 63-A-37B. The survey report must be provided to the Zoning Administrator annually on the anniversary date of Zoning Use Permit issuance and within ten (10) days of completion, whichever is earlier. The Zoning Use Permit ("Zoning Use Permit") is the administrative permit which allows for the commercial operation of the Facility.
7. The Operator is responsible for the maintenance of all planted trees and shrubs. Operator must have an arborist certified by the International Society of Arboriculture inspect all plantings biennially in August to determine which, if any, trees and shrubs require replacement. Operator must replace such trees and shrubs as indicated by the Arborist

and must submit to the Zoning Administrator by December 31st of that year a report of the arborist's findings and the replacement plantings installed, if any.

8. A clay or poly liner must be installed in the entire range prior to issuance of the Zoning Use Permit
9. Prior to the issuance of any land disturbance permit, soil testing must be performed in the shooting range area to establish the baseline level of soil pH and metal composition, and a report must be created with the results. The soil testing report must be submitted to the Zoning Administrator, and must include a summary of the results, prior to the issuance of any land disturbance permit and then biennially thereafter.
10. Lead remediation must be done in compliance with and utilizing the entirety of practices applicable as found in the EPA Best Management Practices for Lead at Outdoor Shooting Ranges, Revised 2005, and any updates that may be published.
11. Prior to issuance of any land disturbance permit, the Operator must conduct water testing to establish a baseline for any contaminants to determine water quality and a report must be created showing the findings. The water testing report must be submitted to the Zoning Administrator prior to issuance of any land disturbance permit and then biennially thereafter on the anniversary date of the Zoning Use Permit issuance.
12. Prior to the issuance of any land disturbance permit, the Operator must install monitoring wells along the site's southern and western boundaries, and within 100 feet of either side of any water course, waters of the U.S., or other environmentally sensitive area on the Property to monitor for leaching of lead or other hazardous materials from the site. The location, number and spacing of the wells on the Property will be determined by a Virginia's Environmental Laboratory Accreditation Program (VELAP) certified professional hired by the Operator. Semi-annual or (twice a year) monitoring and testing of the wells will be conducted by the licensed professional hired by the Operator. Reports of the findings created must submitted to the Zoning Administrator within 15 days of the testing date. The intervals between testing must be no less than five (5) months and no greater than seven (7) months chronologically, and two tests are to be completed within each calendar year.
13. If leaching of hazardous material is discovered, the Operator must cease all operations of the Facility until the Operator provides a plan of correction to remediate the hazards as approved by the Department of Environmental Quality (DEQ) or other State or Federal agencies, as applicable, and the County. With appropriate guidance from DEQ or other State or Federal agencies, the Zoning Administrator will determine when reopening is appropriate after remediation is complete and the hazard removed.
14. Annually, on each anniversary date of the Zoning Use Permit issuance, the Operator must submit a report to the Zoning Administrator indicating the number and type of rounds that were discharged at any time the Facility was utilized. Prior to submission to the Zoning Administrator, the reports will be reviewed by a Virginia's Environmental Laboratory Accreditation Program (VELAP) certified professional, hired by the Operator, who will create, in the least, a summary of the report created by the Operator and will determine if and when lead remediation must occur. If the Operator fails to submit the report, including the licensed professional's review summary and

determination on lead remediation, within 30 days from the annual reporting date, after written notification from the County all operations at the Facility must cease until the report is submitted to the Zoning Administrator.

15. If the licensed professional determines lead remediation is needed, s/he will create a remediation plan. The Operator will immediately, within seven (7) days from the date of the report, implement and undertake all steps indicated in the remediation plan and, submit a copy of the remediation plan to the Zoning Administrator. The Operator must hire a professional lead reclamation company that is in good standing in the state which it is incorporated and included in the EPA's list of lead reclaimers and remediators to perform any lead remediation or reclamation as determined appropriate by the licensed professional through to completion. If the Operator fails to immediately implement the required lead remediation plan, as required, after written notification from the County, all operations at the Facility must cease until such implementation is undertaken.
16. Even without a third party's determination, lead remediation and reclamation must be done no less than once every five (5) years calculated from the date of issuance of the Zoning Use Permit. If the Operator's licensed professional determines lead remediation is required at any time period during the five-year increment, the five-year increment will begin again from the date full completion of the remediation plan is determined by the reclamation/remediation professional.
17. No more than three (3) sea containers may be stacked on top of each other.
18. No more than a total of twenty-four (24) sea containers are allowed on the Property.
19. Prior to final site plan approval, emergency access easements must be granted to Fire, Rescue, and Emergency Services, which access easements are to be reviewed and approved by the County's Department of Fire, Rescue, and Emergency Management.
20. The use of the Facility must be in accordance with these special use permit conditions, the approved proffers in case R17-0005, the Ordinances of Spotsylvania County, and Code of Virginia, the EPA Best Management Practices for Lead at Outdoor Shooting Ranges, 2005, and any updates thereto, and the NRA Range Source Book 2012. If there is a conflict between these special use permit conditions and the proffers, the more restrictive provision will apply.
21. The Operator will reimburse the County within 30 days from the date of the invoice for any expenses incurred by the County resulting from consulting services required, the verification of conditions, enforcement of conditions, or review of plans or studies to improve or modify the range. Should modifications be determined necessary, the Operator must provide a plan for approval and complete the modifications within six (6) months of written notification from the County.
22. The Operator, throughout the use of the Property, must guarantee the lead remediation of the Property. The Operator must provide and maintain for the County's benefit surety for performance of the required lead remediation as set forth herein. Such surety must be irrevocable and must be maintained in full as set forth herein for the lifetime of the operation of the Facility. The surety amount must be based on the highest total estimated cost calculated by the Operator to complete a full lead abatement of the Property.

23. The Operator must secure and at all times maintain public liability insurance for personal injuries, death, and property damage, and umbrella insurance coverage, for the duration of the Special Use Permit in the minimum amounts set forth below, and must include the County as additional insured:
    a. Commercial General Liability covering personal injuries, death and property damage: $1,000,000 per occurrence/$2,000,000aggregate;
    b. Umbrella or Excess Liability: $10,000,000;
    c. Workers Compensation and Employers Liability Insurance in accordance with applicable statutory amounts.
    d. The Operator's Commercial General liability insurance policy and excess liability policy must specifically include the County and its officers, boards, employees, volunteers, attorneys, agents, and consultants as additional insureds.
    e. The Operator's insurance policies must be issued by an insurance company licensed to do business in the State and with an AM Best's rating of at least A.
24. The Operator must provide the Zoning Administrator Certificates of Insurance annually, and the amounts of required insurance will be reviewed every two years for adequacy of coverage by the County's insurance carrier. As determined solely by the County's insurance carrier, Operator's insurance coverage will be increased at the Operator's sole expense when necessary to protect the County.
25. The Operator's insurance policies must contain an endorsement obligating the Operator's insurance company to furnish the Zoning Administrator with at least thirty (30) days prior written notice in advance of the cancellation of the insurance.
26. The Operator's insurance renewal or replacement policies and certificates must be delivered to the Zoning Administrator at least fifteen (15) days before the expiration of the former insurance policies.
27. Prior to the issuance of a Zoning Use Permit, the holder of the Special Use Permit must deliver to the Zoning Administrator a copy of each of the policies or certificates representing the insurance in the required amounts.
28. Access to the Property and the Facility for inspections or monitoring by the County, including its employees, agents, and representatives, must be provided to any of these parties within twenty-four (24) hours of the date and time written notice is provided to the Operator.
29. The Operator must fully comply with all local, state and federal laws and regulations that apply to the construction or maintenance of the Project or use of the Property.
30. Improvised Explosive Device ("IED") training must be conducted with simulated IEDs on the Property.

Based on the reasons noted in the staff report and the findings against, Staff recommends denial of SUP17-0003. Should the Commission deem this application appropriate for approval, Staff recommends the following conditions:

1. The security training facility ("Facility") to be developed on Tax Parcel 76-A-2 ("Property") pursuant to special use permit SUP17-0003 ("SUP"), ~~shall~~ must be developed in conformance with the Generalized Development Plan titled "Generalized Development Plan, Team Crucible Training Complex, Rezoning and Special Use", dated March 27, 2017, as last revised May 10, 2020 ("GDP") which is attached hereto and incorporated herein by reference. To the extent that the conditions herein are contrary to the GDP, the conditions herein ~~shall~~ will supersede the GDP and control. The verbs "will" and "must" as used throughout this Special Use Permit denote a mandatory act or requirement. SUP17-0003 constitutes the Team – Crucible Training Complex ("Facility").
2. These conditions will bind the applicant, any and all owners, occupants, and users of the Property, jointly and severally, who will be referred to collectively as the "Operator".
3. The shooting range must be designed to exceed the minimum standards established by, and in accordance with, the NRA Range Source Book 2012, for outdoor ranges, to include but not limited to the range floor, shooting area, target area, backstop, bullet catcher, side berms and bullet containment. The design must specifically incorporate all design elements identified in the NRA Range Source Book 2012, Section 1, Chapter 1, Article 3 Outdoor Ranges and Section 2 Chapter 2 Outdoor Range Design.
4. Every day, Monday-Friday, the Facility is open, all outdoor training activities may commence no earlier than 8:00 a.m. and must end no later than 8:00 p.m. eastern standard time. Every day, Saturday-Sunday, the Facility is open, all outdoor training activities may commence no earlier than 10:00 a.m. and must end no later than 8:00 p.m. eastern standard time.
5. Any and all discharging of rifles and shotguns must be done using suppressors at all times.
6. The Operator must maintain all berms on the Property to a minimum 20' height from the lowest point of their base exclusive of any plantings on the top of any berms. At Operator's expense, all berms will be surveyed annually to confirm the minimum required height is being maintained. Within 30 days prior to the anniversary date of the Zoning ~~u~~Use ~~p~~Permit issuance. The Operator will engage a Virginia-licensed, professional surveyor, to survey all berms on the Property and create a survey report of the height conditions. This includes, but is not limited to, the berm shown adjacent to tax parcel 63-A-37B. The survey report must be provided to the Zoning Administrator annually on the anniversary date of Zoning Use Permit issuance and within ten (10) days of completion, whichever is earlier. The Zoning Use Permit ("Zoning Use Permit") is the administrative permit which allows for the commercial operation of the Facility.
7. The Operator is responsible for the maintenance of all planted trees and shrubs. Operator must have an arborist certified by the International Society of Arboriculture inspect all plantings biennially in August to determine which, if any, trees and shrubs require replacement. Operator must replace such trees and shrubs as indicated by the Arborist

and must submit to the Zoning Administrator by December 31st of that year a report of the arborist's findings and the replacement plantings installed, if any.

8. A clay or poly liner must be installed in the entire range prior to issuance of the Zoning ~~u~~Use P~~p~~ermit
9. Prior to the issuance of any land disturbance permit, soil testing must be performed in the shooting range area to establish the baseline level of soil pH and metal composition, and a report must be created with the results. The soil testing report must be submitted to the Zoning Administrator, and must include a summary of the results, prior to the issuance of any land disturbance permit and then biennially thereafter.
10. Lead remediation must be done in compliance with and utilizing the entirety of practices applicable as found in the EPA Best Management Practices for Lead at Outdoor Shooting Ranges, Revised 2005, and any updates that may be published.
11. Prior to issuance of any land disturbance permit, the Operator must conduct water testing to establish a baseline for any contaminants to determine water quality and a report must be created showing the findings. The water testing report must be submitted to the Zoning Administrator prior to issuance of any land disturbance permit and then biennially thereafter on the anniversary date of the Zoning ~~u~~Use ~~p~~Permit issuance.
12. Prior to the issuance of any land disturbance permit, the Operator must install monitoring wells along the site's southern and western boundaries, and within 100 feet of either side of any water course, waters of the U.S., or other environmentally sensitive area on the Property to monitor for leaching of lead or other hazardous materials from the site. The location, number and spacing of the wells on the Property will be determined by a Virginia's Environmental Laboratory Accreditation Program (VELAP) certified professional hired by the Operator. Semi-annual or (twice a year) monitoring and testing of the wells will be conducted by the licensed professional hired by the Operator. Reports of the findings created must submitted to the Zoning Administrator within 15 days of the testing date. The intervals between testing must be no less than five (5) months and no greater than seven (7) months chronologically, and two tests are to be completed within each calendar year.
13. If leaching of hazardous material is discovered, the Operator must cease all operations of the Facility until the Operator provides a plan of correction to remediate the hazards ~~that~~ a~~i~~s approved by the Department of Environmental Quality (DEQ)~~,~~ or other State or Federal agencies, as applicable, and the County.~~to remediate the hazards~~. ~~The~~ With appropriate guidance from DEQ or other State or Federal agencies, the Zoning Administrator ~~shall~~ will determine ~~deem~~ when reopening is appropriate after remediation is complete and the hazard removed.
14. Annually, on each anniversary date of the Zoning ~~u~~Use ~~p~~Permit issuance, the Operator must submit a report to the Zoning Administrator indicating the number and type of rounds that were discharged at any time ~~during each training session on every day~~ the Facility was ~~open~~utilized. Prior to submission to the Zoning Administrator, the reports will be reviewed by a Virginia's Environmental Laboratory Accreditation Program (VELAP) certified professional, hired by the Operator, who will create, in the least, a summary of the report created by the Operator and will determine if and when lead

remediation must occur. If the Operator fails to submit the report, including the licensed professional's review summary and determination on lead remediation, within 30 days from the annual reporting date, after written notification from the County all operations at the Facility must cease until the report is submitted to the Zoning Administrator.

15. If the licensed professional determines lead remediation is needed, s/he will create a remediation plan. The Operator will immediately, within seven (7) days from the date of the report, implement and undertake all steps indicated in the remediation plan and, submit a copy of the remediation plan to the Zoning Administrator. The Operator must hire a professional lead reclamation company that is in good standing in the state which it is incorporated and included in the EPA's list of lead reclaimers and remediators to perform any lead remediation or reclamation as determined appropriate by the licensed professional through to completion. If the Operator fails to immediately implement the required lead remediation plan, as required, after written notification from the County, all operations at the Facility must cease until such implementation is undertaken.
16. Even without a third party's determination, lead remediation and reclamation must be done no less than once every five (5) years calculated from the date of issuance of the Zoning ~~u~~Use ~~p~~Permit. If the Operator's licensed professional determines lead remediation is required at any time period during the five-year increment, the five-year increment will ~~shall~~ begin again from the date full completion of the remediation plan is determined by the reclamation/remediation professional.
17. No more than three (3) sea containers may be stacked on top of each other.
18. No more than a total of twenty-four (24) sea containers are allowed on the Property.
19. Prior to final site plan approval, emergency access easements must be granted to Fire, Rescue, and Emergency Services, which access easements are to be reviewed and approved by the County's Department of Fire, Rescue, and Emergency Management.
20. The use of the Facility must be in accordance with these special use permit conditions, the approved proffers in case R17-0005, the Ordinances of Spotsylvania County, and Code of Virginia, the EPA Best Management Practices for Lead at Outdoor Shooting Ranges, 2005, and any updates thereto, and the NRA Range Source Book 2012. If there is a conflict between these special use permit conditions and the proffers, the more restrictive provision ~~shall~~ will apply.
21. The Operator will reimburse the County within 30 days ~~of receipt~~from the date of the invoice ~~of an invoice~~ for any expenses incurred by the County resulting from consulting services required, the verification of conditions, enforcement of conditions, or review of plans or studies to improve or modify the range. Should modifications be determined necessary, the Operator ~~will~~ must provide a plan for approval and complete the modifications within six (6) months of written notification from the County.
~~21.~~22. The Operator, throughout the use of the Property, must~~shall~~ guarantee the lead remediation of the Property. The Operator must~~shall~~ provide and maintain for the County's benefit surety for performance of the required lead remediation as set forth herein. Such surety must be irrevocable and must be maintained in full as set forth herein for the lifetime of the operation of the Facility. The surety amount must be based on the

highest total estimated cost calculated by the Operator to complete a full lead abatement of the Property.

~~22.~~23. The Operator must~~shall~~ secure and at all times maintain public liability insurance for personal injuries, death, and property damage, and umbrella insurance coverage, for the duration of the Special Use Permit in the minimum amounts set forth below, and ~~shall~~ must include the County as ~~co-insured~~additional insured:

a. Commercial General Liability covering personal injuries, death and property damage: $~~ XXX~~ 1,000,000 per occurrence/ $2,000,000~~ XXX~~ aggregate;
b. ~~Automobile Coverage: $ XXX per occurrence~~;
c. Umbrella or Excess Liability: $~~ XXX~~10,000,000~~-~~;
d. Workers Compensation and Employers Liability Insurance in accordance with applicable statutory amounts.
e. The Operator's Commercial General liability insurance policy and excess liability policy ~~shall~~ must specifically include the County and its officers, boards, employees, volunteers, attorneys, agents, and consultants as additional insureds.
f. The Operator's insurance policies ~~shall~~ must be issued by an insurance company licensed to do business in the State and with an AM Best's rating of at least A.

~~23.~~24. The Operator ~~shall~~ must provide the Zoning Administrator Certificates of Insurance annually, and the amounts of required insurance ~~shall~~ will be reviewed every two years for adequacy of coverage by the County's insurance carrier. As determined solely by the County's insurance carrier, Operator's insurance ~~premiums or~~ coverage ~~shall~~ will be increased at the Operator's sole expense when necessary to protect the County.

~~24.~~25. The Operator's insurance policies ~~shall~~ must contain an endorsement obligating the Operator's insurance company to furnish the ~~County~~ Zoning Administrator with at least thirty (30) days prior written notice in advance of the cancellation of the insurance.

~~25.~~26. The Operator's insurance renewal or replacement policies ~~or~~ and certificates ~~shall~~ must be delivered to the Zoning Administrator at least fifteen (15) days before the expiration of the former insurance policies~~that such policies are to renew or replace~~.

~~26.~~27. Prior to the issuance of a ~~land-disturbing~~ Zoning Use ~~p~~Permit, the holder of the Special Use Permit ~~shall~~ must deliver to the Zoning Administrator a copy of each of the policies or certificates representing the insurance in the required amounts.

~~27.~~28. Access to the Property and the Facility for inspections or monitoring by the County, including its employees, agents, and representatives, ~~shall~~ must be provided to any of these parties within twenty-four (24) hours of the date and time written notice is provided to the Operator.

~~28.~~29. The Operator ~~shall~~ must fully comply with all local, state and federal laws and regulations that apply to the construction or maintenance of the Project or use of the Property.

~~29.~~30. Improvised Explosive Device ("IED") training must be conducted with simulated IEDs on the Property.

~~30. The Operator's failure to be in compliance with any of these conditions will be cause for revoking the SUPSpecial Use Permit.~~

County of Spotsylvania
Department of Planning

Staff Report
Special Use #SUP17-0003
(Berkeley Voting District)

Planning Commission
February 3, 2021

Staff Recommendation:	Denial
Project:	SUP17-0003 "Crucible"
Owner/Applicant:	Radio Reconnaissance Technologies, Inc.
Request:	Industry Type III - Operation of a security training facility which teaches security techniques, the use fire arms, driver training and scenario training with an outdoor shooting range and training areas.
Tax Map Parcels:	76-A-2
Location:	The properties are located at 6116 Jefferson Davis Hwy on the approximately 3,500 feet south of the Mudd Tavern Road (Rt. 606).
Zoning Overlay:	None
Future Land Use Designation:	Employment Center
Historic Resources:	The applicant acknowledges a cemetery on the site.
Date Application Deemed Complete:	The application was deemed complete on May 5, 2017.
Community Meeting	A community meeting was held on January 17, 2017. Citizens at the community meeting raised concerns about potential negative impacts on residential and commercial property values, negative impacts from consistent noise from the use, the safety of residents living down range of the site and compatibility of the use with the surrounding uses.

Figure 1: Zoning Map

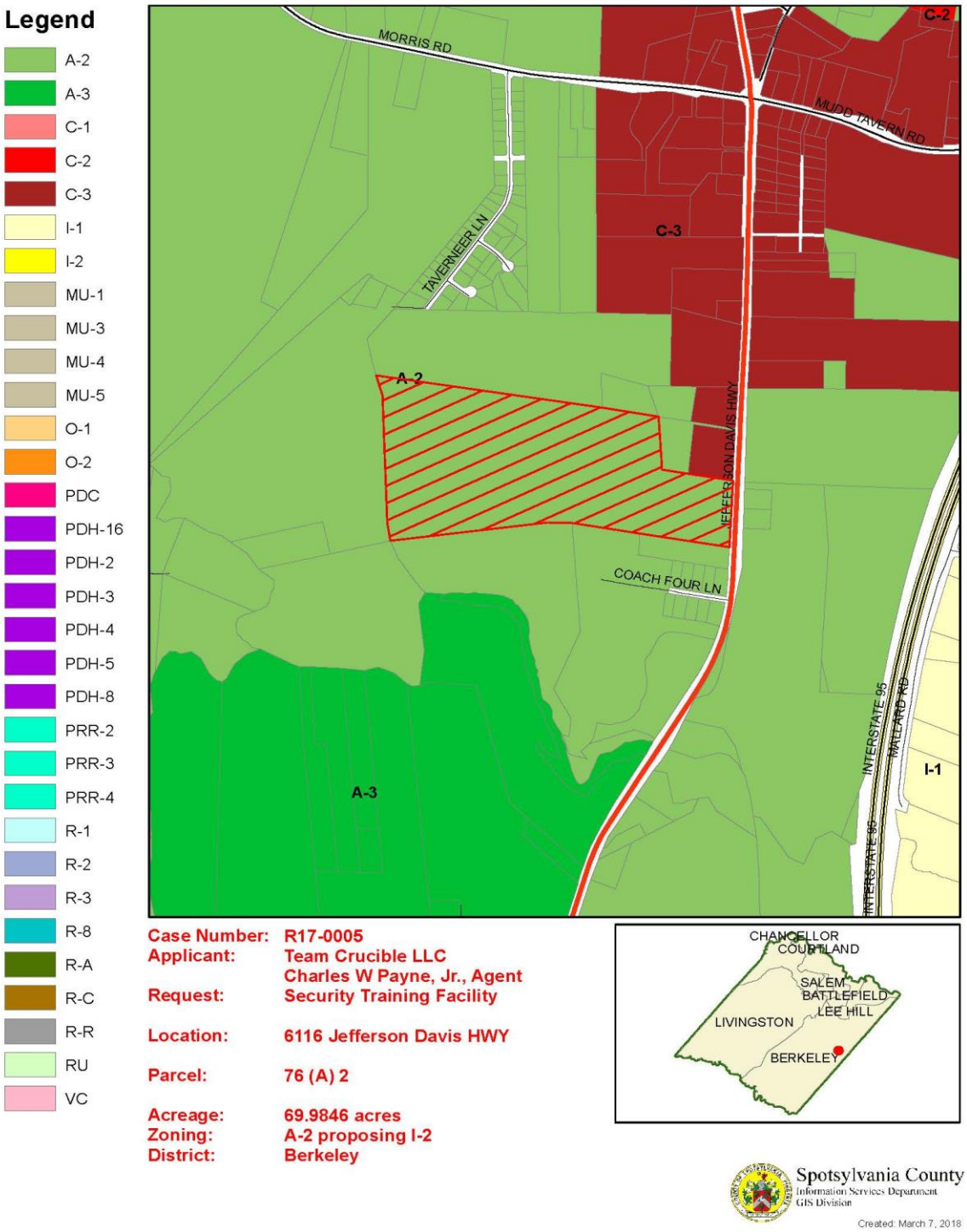


Figure 2: Aerial Map



Legend

Case Number: R17-0005
Applicant: Team Crucible LLC
Charles W Payne, Jr., Agent
Request: Security Training Facility

Location: 6116 Jefferson Davis HWY

Parcel: 76 (A) 2

Acreage: 69.9846 acres
Zoning: A-2 proposing I-2
District: Berkeley



Spotsylvania County
Information Services Department
GIS Division

Created: March 7, 2018

I. Analysis

The application is for Special Use approval to construct and operate a security training facility which teaches security techniques, the use fire arms, driver training and scenario training with outdoor training areas. The property is addressed as 6116 Jefferson Davis Hwy. identified as Tax Parcel 76-A-2 approximately 3,500 south of Mudd Tavern Road (Route 606). The property is located in the Primary Development Boundary. The property is in an area identified as Employment Center on the Future Land Use Map of the Comprehensive Plan. The proposed use as noted is not a use that is appropriate on a greenfield site along a vibrant commercial corridor with an emerging development pattern that includes a mix of residential types, commercial/office, light industrial and consumer service uses and potentially destination use establishments.

The applicant's GDP Narrative describes the proposed use as "a high-level security training facility for both governmental and private organizations that has trained over 25,000 persons for a variety of security clients, including without limitation U.S. agencies such as the Department of State, Justice Department, and Department of Defense; several large U.S. private companies; foreign companies; and State and local government agencies." The applicant's narrative notes the "Applicant does not permit "open classes" for attendance by the general public or host competitions. Clients attending training programs learn basic and advanced skills in tactical medicine, vehicle operation, small arms tactics, and individual protective measures" while listing a representative sample of teaching topics as Tactical Medicine, Small Arms Tactics, Vehicle operation, and Individual Protective Measures.

The narrative indicates the use will have two phases of build out and operation. "The Applicant anticipates that the Project will initially be a "medium intense" development plan and generally include a modular office with parking area, maintenance buildings and an existing one story metal building to support the training activities, all which are generally shown and depicted on the GDP." "Phase-1 Max build-out of the Project will also include:

- one (1) firing range,
- a rally track
- a scenario area

all as generally shown on the GDP. The firing range will include a minimum of 20 foot high earthen berms or HESCO[1] like barriers for the entire perimeter of the range, all as generally shown on the GDP."

"The Phase-2 Max build-out of the Project will include the construction of:

- a training/office facility
- a second another office building
- a partially enclosed Tactical Entry Training Facility
- the relocated operations building modular

[1] HESCO is made of a collapsible wire mesh container and heavy duty fabric liner, and used as a blast wall against explosions or small-arms.

- an additional scenario training area

all as shown on the GDP. None of the buildings will exceed 50' in height. Commencement of build out is dependent on market situations and government requirements. The two existing one-story metal buildings currently on the Property will remain and be used for training, maintenance and storage spaces."

"The Phase-1 Max build-out will support current operations and provide for a daily load of 50 students per day. The Phase-2 Max build-out will support a daily load of 90 students per day". Exhibit B in the Narrative notes that in 2016 there were 45 weeks or training with an average of 58 trainees per week. The applicant's narrative indicates that they expect business activity to be similar to the levels experienced from 2015-2017 depending on market variables. The narrative also describes the Phase One daily schedule for trainees:

- Each day begins at 8:00am with lecture in the classroom.
- Students are then taught in their respective practical application areas
- Around 4:30pm practical exercises are concluded
- Students return to the classroom and return their equipment.
- The instructors review the day's activities

The applicant's narrative indicates that Phase Two or Ultimate Buildout operations would follow the Phase One model and that the number of trainees could be impacted by deployment of forces which would lead to more consecutive days of training. The narrative notes in Phase One consecutive days of training is 3 to 10 days. The applicant's narrative included a hypothetical month of training that would include 17 days of range activity.

Given the anticipated number of training days and the ambient noises associated with the types of training offered, this use would not be in harmony with the current development pattern in the area and more specifically will have a negative impact on the adjacent residential uses. The NRA Range Source Book 2012 notes on page I-1-18 that noise complaints are likely when inhabited dwellings are less than one half mile from a facility. The closets residential dwelling is approximately 710 feet from the range measured from the toe of the berm and there are approximately an additional 63 residential dwellings within one half mile of the range. In addition to the negative impact from noise, the proposed range is an open air outdoor range. This presents a serious safety concern for staff because as noted in the companion case staff report there are several residential subdivisions less than one mile down range of the target area and the caliber of weapons noted by the applicant have the ability to travel beyond one mile. The applicant notes the range is designed in accordance with the NRA Range Source Book 2012, however the proffers submitted with the companion rezoning case only commit to the minimum recommended 20' height for the berms, range controls, the installation of a horizontal bullet catcher on the backstop, the slope of the range floor. The NRA Range Source Book notes these additional minimum design measures should be included; identified materials for shooting positions, material of the range floor to reduce ricochet, firing line cover for protection of shooters, range covers to prevent bullet escape, and bullet catchers. This not an exhaustive list as the NRA Source Book offers a number recommendations depending on the intended use of the range. As noted the proposed use is not a use that would customarily be considered appropriate development on a greenfield site with the location characteristics of the immediate area. There are significant implications if this parcel is rezoned to the most intense Industrial zoning classification.

Although the request comes with proffers that will require an alternative development proposal to be approved via a public hearing process. The Industrial 2 zoning will not be compatible with the envisioned development pattern along the corridor or in the immediate area. This is an additional constraint on the property burdens the marketing of the property.

II. Comprehensive Plan Analysis

The proposal is located within the Primary Development Boundary. The Primary Development Boundary defines the area within which public water and sewer utilities will be provided. The Primary Development Boundary is shown on the Future Land Use Map of the Comprehensive Plan. Land within the boundary is intended to develop with higher residential densities and more intensive non- residential uses than outside of the boundary. By maintaining a Primary Development Boundary, the County encourages the most efficient use of the land while preserving the rural character. The proposed use, requiring a special use permit under Industrial 2 (I-2) Zoning (if rezoning R17-0005 approved) is consistent with the intent of the Primary Development Boundary, however could also be appropriate outside of the Primary Development Boundary with fewer development pressures nearby and less density. Staff notes as per County Code Sect. 23-4.5.1. *Uses that are designated as "special uses" are generally compatible with other land uses permitted in a zoning district but which, because of their unique characteristics or potential impacts on the surrounding neighborhood and the county as a whole, require individual consideration of their design, configuration, and/or operation at the particular location proposed. Such individual consideration may also call for the imposition of individualized conditions in order to ensure that the use is appropriate at a particular location.* The project area has an employment center designation as per the Future Land Use Element of the Comprehensive Plan. As per the Future Land Use Element, "*the employment center land use area is envisioned to be the primary location for new office and industrial development within the County, with the focus on larger scale office complexes, industrial users, and business parks. In the interests of maintaining a balanced economic base, industrial development within the County is also desired. Both light and heavy industrial uses are appropriate and should be encouraged within the Employment Center category with the careful consideration of their location and transition to adjoining properties. Light industrial uses are usually more consumer-oriented than business-oriented and are manufacturing activities that use moderate amounts of partially processed materials to produce items of relatively high value per unit. Examples include, but are not limited to, the manufacturing of: clothes, shoes, furniture, consumer electronics and home appliances. Processing, assembly or disassembly operations could also fall into this category. Typically, these uses cause little pollution. Heavy industrial uses tend to be larger in scale and often can have pollution impacts (noise, smell, etc.) on the surrounding area. While these impacts should be minimized, there is the recognition that not all negative effects can be completely mitigated. The location of these users within industrial parks, both new and existing, should be encouraged to help ensure appropriate transitions that minimize any pollution impacts on neighboring properties. Examples of heavy industrial uses include, but are not limited to: mining operations; refineries, power plants; and the fabrication and assembly of large items."* Considerate of the applicant's parallel rezoning request, Industrial zoning as proposed is an appropriate zoning designation within the employment center land use area.

Use specific considerations must be made as it relates to the requested use proposed. To reiterate, as per the Future Land Use Element, "*both light and heavy industrial uses are*

appropriate and should be encouraged within the Employment Center category with the careful consideration of their location and transition to adjoining properties." Staff also notes that the future land use element of the Comprehensive Plan states that *"The Map is not intended to be parcel specific, but rather provides a flexible guide for the County's desired future development patterns."* Considering this, the immediate surrounding parcels include mixed use and commercial land use designations and from a land use standpoint this site could potentially "go either way" in terms of land use potential with a variety of supported zoning district designations. Considering the use proposed, staff is concerned about potential impacts to existing and envisioned land uses in proximity to the project. As an example staff notes adjacent land to the immediate west of the proposed project has been designated as a mixed use area that "opens the door" to potential high density residential, commercial, office land uses, including potential multi-story proposals surrounding the site. The project has been designed with a number of range controls meant to manage risk and contain projectiles/bullets fired by weapons with enough power/range to shoot past the limits of the project boundary. Under "worst case scenarios" a carelessly or mistakenly fired bullet beyond the project boundary at present has range to impact existing landowners and housing. consideration of existing housing located offsite and downrange of the proposes project and the prospect of additional development in proximity to this site as supported by the Comprehensive Plan introduces additional land use conflicts with this proposal based on its location and size. The provided NRA Range Source Book 2012 notes *"the primary bullet containment concept of the shooting range industry, as promulgated by NRA, is all bullets fired on the firing ranges should not leave the property owned or controlled by the shooting range facility."* As per the provided NRA Range Source Book 2012, engineered solutions to ensure bullet containment have been met or exceeded with this project. However, the report also acknowledges that engineered solutions for range safety must go hand in hand with administrative controls. The report says that *"often when incidents of bullet escapement have occurred, they are the result of a properly designed and maintained shooting range being utilized improperly."* This ultimately results in necessary rules and regulations, site monitoring and enforcement, and a reliance that range control will be able to constantly control for somewhat unpredictable actions or human error. To some degree the proposal requires a degree of "faith" that operators and a variety of users who come and go from the site will never error or be careless. With a wide variety of users coming and going from the site it's difficult to have complete confidence that all users will be human error free at all times and circumstances. believes the frequency of activity and pure volume of users combined with location and proximity introduces a degree of uncertainty and resulting risk considering the surrounding community. This appears to be the basis for many of the concerns levied against the project by concerned community members who may live downrange and off the project property and within range of the firearms used at the facility.

Staff acknowledges numerous range controls and engineered solutions have been included as a means to mitigate potential risk of a regularly used range including: target location restrictions for height and location against range backstops; backstop bullet catchers; directed firing below firing positions; perimeter protections against trespass from the outside upon the range via fencing and anti-climb wire, "no trespassing" signage; caliber limitations for weapons fired on the property; limits on hours of operation; extensive berm construction for containment and noise attenuation features; undisturbed tree preservation areas; and additional noise control. the project also introduces the potential noise impacts on the surroundings. In regard to Outdoor Ranges, the NRA's Range Source Book states *"no set distance eliminates complaints entirely. However, studies conducted for the Environmental Protection Agency (EPA) indicate noise complaints are likely when inhabited dwellings exist less than one half (1/2) mile from the*

facility. Beyond that distance, the chance of generating noise complaints is reduced." This is a concern given the County's land use vision for the area that includes Mixed Use. A summary of the existing land use designations is above and staff notes the draft Comprehensive Plan considers higher intensity commercial heavy mixed- use (that includes support for residential development) for this area going forward on the west side of the Route 1 corridor. The applicant has provided an acoustical assessment of the proposed project tied to the rezoning and corresponding special use permit request, entitled "Crucible Spotsylvania Acoustical Assessment." The findings of the Assessment include compliance with the County Noise Ordinance based on hours of operation, and that if approved, the proposed use would be exempt from noise ordinance limits during such hours of operation. The exemption referenced specifically is located in County Code Sect. 14-52(a)(3) Noise emitted by a commercial or industrial establishment which noise is customarily emitted by such commercial establishments or industries. This exemption applies during the hours of 6 am and 10 pm. Proffered limits on hours operation for firing activities do provide predictability in regard to noise generation from the site. This operation will have the ability to operate seven days a week.

Staff recognizes that noise mitigation has been proposed and included within project proffers (associated with the corresponding rezoning) including earthen berms, caliber limits, vegetative screening, with limitations on range activities within specified times of day. The Acoustical Assessment identified numerous noise mitigating features included in the project design "to specifically address noise concerns raised by the immediate neighbors by voluntarily implementing a variety of noise mitigation measures into their new facility design." However, depending on the success of the facility, project limitations considerate of noise impacts for range activities and simulated IED scenarios could still result in seven (7) days a week activities regardless of season including winter months when deciduous vegetation has lost their leaves and sound buffering is reduced. Project proffers limit live and blank nighttime firing range training Monday through Friday to no less than two (2) hours after darkness, which is defined as "astronomical twilight as recorded by the United States Naval Observatory" ("USNO") or 10:00pm, whichever is earlier. Firing range training will end no later than 5:00pm on Saturday and 4:00pm on Sunday. Further, the Applicant and owner agree to limit hours of firing range training to commence no earlier than 8:00am Monday through Friday, 9:00am on Saturday, and 10am on Sunday. IED scenarios per proffer include limit simulated IED scenario training activities to commence after 8:00 am Monday through Friday, and after 9:00am on Saturday and after 10:00am on Sunday. All simulated IED activity will end prior to astronomical twilight as recorded by the USNO. High explosives will be prohibited per project proffer. Staff notes a provided acoustical assessment (Rev 2) suggests the project will equip rifles with a sound suppressor as the default condition for all rifle use however this does not appear in proffers.

III. Special Use Standards of Review

Section 23-4.5.7 of the County Zoning Ordinance outlines eight standards that shall be met by an application for consideration of approval. The following table details those standards with staff comments.

STANDARDS OF REVIEW FOR SPECIAL USE APPROVAL	
STANDARD	**STAFF COMMENT**
1. Proposed use is in accord with the comprehensive plan and other official plans adopted by the county.	The security training facility conforms only in the most general sense to the intent of the Employment Center Land Use in that it is a non-residential use that will generate tax revenues and jobs. The security training center is inconsistent with and potentially detrimental to envisioned development patterns and economic development in the Thornburg area. The property is located along a primary transportation route in the County's designated growth boundary. The area is planned for development at a higher intensity and density supported by public water and sewer infrastructure.
2. Proposed use or development of the land will be in harmony with the scale, bulk, coverage, density, and character of the area.	The proposed use will not be in harmony with the character of the area. The proposed site is located at the southern gateway into the County along a segment of the corridor that is experiencing new commercial and residential growth that is not compatible with consistent noise from weapons and simulated explosions.
3. Proposed use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof.	The proposed training facility envisioned for this site presents a number of concerns that would "best fit" such a use within a bona fide industrial park setting (like a heavy industrial user) or in a rural setting with extensive screening, buffering, setback distances and few residential neighbors nearby, this site is neither. Any use proposal that exposes residential or commercial/office/industrial uses to risk of offsite bullet flight may be a hindrance to attracting such uses within the area of risk; economic development attraction counterproductive.
4. Proposed use will not adversely affect the health or safety of persons residing or working in the neighborhood.	The applicant is proposing an open air range with residential properties down range and within distances capable of being reached by the weapons being used on the range.

5. Proposed use will not be detrimental to the public welfare or injurious to property or improvements within the neighborhood.	The applicant is proposing an open air range with residential properties down range and within distances capable of being reached by the weapons being used on the range. The proposed use may hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof.
6. Proposed use is appropriately located with respect to transportation facilities, water supply, wastewater treatment, fire and police protection, waste disposal, and similar facilities.	The proposed use is appropriately sited with respect to the availability of these facilities.
7. Proposed use will not cause undue traffic congestion or create a traffic hazard.	There is little traffic impact projected from the proposed use. The proposed use will not cause any significant additional congestion or hazards to the existing road network.
8. Proposed use will have no unduly adverse impact on environmental or natural resources.	The use does have the potential to have negative impacts on the environment from possible lead leaching into the ground water if not properly remediated.

IV. Key Findings

In Favor:

1. Positive fiscal benefit of a new business and the associated benefits to businesses in the area that will support the use.

2. Increased Employment in the County.

Against:

1. A security training facility is a niche use and, as proposed, is not an appropriate use on a greenfield site along a vibrant commercial corridor with an emerging development pattern and in close proximity to residential dwellings.
2. There is insufficient commitment to minimum range design criteria identified in the NRA Source Book 2012.
3. There are potential negative impacts on surrounding residential and commercial properties because of consistent ambient noise from the use operations.
4. The potential of projectiles not being contained within the bounds of the range or property and have the capability of reaching residential structures down range.
5. The proposed use may hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof.
6. The use does not meet six of the eight standards outlined for approval of a Special Use request.
7. The Thornburg area is designated as a tourism zone which is an area designated to foster the development and expansion of tourism businesses in the county. The allowance of this use may negatively impact efforts to attract tourist driven business to this area.

V. Recommendation

The applicant proposes a security training facility that includes an open air 30-station shooting range, rally driving course, partially enclosed scenario training areas, and areas for simulated IED detonation along with office and other support buildings. The facility would include a 20-foot tall berm around the -1% grade shooting range with backstops and a second 12-foot berm adjacent to the closest residential structure, transitional screening around the perimeter of 35' to 50' in width, and the proffers include in the rezoning case places limitations on the caliber of firearms permitted and hours of operation, among other measures to mitigate negative impacts of the project. Nonetheless, the design and characteristics of the security training facility results in the potential for regular detrimental impacts on abutting properties, including but not limited to the repetitive noise impacts of the outdoor activities and the opportunity for bullets to travel beyond the berms resulting in the potential for injury to persons and property. The security training facility conforms only in the most general sense to the intent of the Employment Center Land Use in that it is a non-residential use that will generate tax revenues and jobs. The security training center is inconsistent with and potentially detrimental to envisioned development patterns and economic development in the Thornburg area. The property is located along a primary transportation route in the County's designated growth boundary. The area is planned for development at a higher intensity and density supported by public water and sewer infrastructure. While the facility requires Industrial zoning, the character of the security training facility is inconsistent with the adopted Comprehensive Plan, which speaks to the Jackson Gateway being an economic driver for the County in the future, noting uses such as "high end office parks and campus settings with Class A office space". Light and heavy industrial uses are also appropriate in the Employment Center "with careful consideration of their location and transition to adjoining properties". Despite the efforts to minimize and mitigate the impact of the use, the project has the potential for long lasting negative impacts to the surrounding properties due to noise associated with the use and the potential safety hazard to residential uses down range. The site fronts on the southern gateway into the County which is an emerging area of development and redevelopment driven by infrastructure improvements at the Exit 118 Interchange, planned improvements to Mudd Tavern Road, and planned expansion of public water and sewer infrastructure. In addition, Thornburg is designated as a Tourism Zone, which is an area designated to foster the development and expansion of tourism businesses in the county. The allowance of a business that will consistently produce ambient noise introduces a potential obstacle when marketing the area for tourism uses. On balance, Staff finds the proposed Special Use Permit request inconsistent with the Comprehensive Plan.

Based on the reasons noted in the staff report and the findings against, Staff recommends denial of SUP17-0003. Should the Commission deem this application appropriate for approval, Staff recommends the following conditions:

1. The security training facility ("Facility") to be developed on Tax Parcel 76-A-2 ("Property") pursuant to special use permit SUP17-0003 ("SUP"), shall be developed in conformance with the Generalized Development Plan titled "Generalized Development Plan, Team Crucible Training Complex, Rezoning and Special Use", dated March 27, 2017, as last revised May 10, 2020 ("GDP") which is attached hereto and incorporated herein by reference. To the extent that the conditions herein are

contrary to the GDP, the conditions herein shall supersede the GDP and control. The verbs "will" and "must" as used throughout this Special Use Permit denote a mandatory act or requirement. SUP17-0003 constitutes the Team – Crucible Training Complex ("Facility").

2. These conditions will bind the applicant, any and all owners, occupants, and users of the Property, jointly and severally, who will be referred to collectively as the "Operator".
3. The shooting range must be designed to exceed the minimum standards established by, and in accordance with, the NRA Range Source Book 2012, for outdoor ranges, to include but not limited to the range floor, shooting area, target area, backstop, bullet catcher, side berms and bullet containment. The design must specifically incorporate all design elements identified in the NRA Range Source Book 2012, Section 1, Chapter 1, Article 3 Outdoor Ranges and Section 2 Chapter 2 Outdoor Range Design.
4. Every day, Monday-Friday, the Facility is open, all outdoor training activities may commence no earlier than 8:00 a.m. and must end no later than 8:00 p.m. eastern standard time. Every day, Saturday-Sunday, the Facility is open, all outdoor training activities may commence no earlier than 10:00 a.m. and must end no later than 8:00 p.m. eastern standard time.
5. Any and all discharging of rifles and shotguns must be done using suppressors at all times.
6. The Operator must maintain all berms on the Property to a minimum 20' height from the lowest point of their base exclusive of any plantings on the top of any berms. At Operator's expense, all berms will be surveyed annually to confirm the minimum required height is being maintained. Within 30 days prior to the anniversary date of the use permit issuance. The Operator will engage a Virginia-licensed, professional surveyor, to survey all berms on the Property and create a survey report of the height conditions. This includes, but is not limited to, the berm shown adjacent to tax parcel 63-A-37B. The survey report must be provided to the Zoning Administrator annually on the anniversary date of Zoning Use Permit issuance and within ten (10) days of completion, whichever is earlier.
7. The Operator is responsible for the maintenance of all planted trees and shrubs. Operator must have an arborist certified by the International Society of Arboriculture inspect all plantings biennially in August to determine which, if any, trees and shrubs require replacement. Operator must replace such trees and shrubs as indicated by the Arborist and must submit to the Zoning Administrator by December 31st of that year a report of the arborist's findings and the replacement plantings installed, if any.
8. A clay or poly liner must be installed in the entire range prior to issuance of the use permit
9. Prior to the issuance of any land disturbance permit, soil testing must be performed in the shooting range area to establish the baseline level of soil pH and metal composition, and a report must be created with the results. The soil testing report must be submitted to the Zoning Administrator, and must include a summary of the results, prior to the issuance of any land disturbance permit and then biennially thereafter.

10. Lead remediation must be done in compliance with and utilizing the entirety of practices found in the EPA Best Management Practices for Lead at Outdoor Shooting Ranges, Revised 2005, and any updates that may be published.
11. Prior to issuance of any land disturbance permit, the Operator must conduct water testing to establish a baseline for any contaminants to determine water quality and a report must be created showing the findings. The water testing report must be submitted to the Zoning Administrator prior to issuance of any land disturbance permit and then biennially thereafter on the anniversary date of the use permit issuance.
12. Prior to the issuance of any land disturbance permit, the Operator must install monitoring wells along the site's southern and western boundaries, and within 100 feet of either side of any water course, waters of the U.S., or other environmentally sensitive area on the Property to monitor for leaching of lead or other hazardous materials from the site. The location, number and spacing of the wells on the Property will be determined by a Virginia's Environmental Laboratory Accreditation Program (VELAP) certified professional hired by the Operator. Semi-annual or (twice a year) monitoring and testing of the wells will be conducted by the licensed professional hired by the Operator. Reports of the findings created must submitted to the Zoning Administrator within 15 days of the testing date. The intervals between testing must be no less than five (5) months and no greater than seven (7) months chronologically, and two test are to be completed within each calendar year.
13. If leaching of hazardous material is discovered, the Operator must cease all operations of the Facility until the Operator provides a plan of correction that is approved by the Department of Environmental Quality (DEQ), or other State or Federal agencies, as applicable, to remediate the hazards. The Zoning Administrator shall deem reopening is appropriate after remediation is complete and the hazard removed.
14. Annually, on each anniversary date of the use permit issuance, the Operator must submit a report to the Zoning Administrator indicating the number and type of rounds that were discharged during each training session on every day the Facility was open. Prior to submission to the Zoning Administrator, the reports will be reviewed by a Virginia's Environmental Laboratory Accreditation Program (VELAP) certified professional, hired by the Operator, who will create, in the least, a summary of the report created by the Operator and will determine if and when lead remediation must occur. If the Operator fails to submit the report, including the licensed professional's review summary and determination on lead remediation, within 30 days from the annual reporting date, after written notification from the County all operations at the Facility must cease until the report is submitted to the Zoning Administrator.
15. If the licensed professional determines lead remediation is needed, s/he will create a remediation plan. The Operator will immediately, within seven (7) days from the date of the report, implement and undertake all steps indicated in the remediation plan and, submit a copy of the remediation plan to the Zoning Administrator. The Operator must hire a professional lead reclamation company that is in good standing in the state which it is incorporated and included in the EPA's list of lead reclaimers and remediators to perform any lead remediation or reclamation as determined appropriate by the licensed professional through to completion. If the Operator fails to

immediately implement the required lead remediation plan, as required, after written notification from the County, all operations at the Facility must cease until such implementation is undertaken.

16. Even without a third party's determination, lead remediation and reclamation must be done no less than once every five (5) years calculated from the date of issuance of the use permit. If the Operator's licensed professional determines lead remediation is required at any time period during the five-year increment, the five-year increment shall begin again from the date full completion of the remediation plan is determined by the reclamation/remediation professional.
17. No more than three (3) sea containers may be stacked on top of each other.
18. No more than a total of twenty-four (24) sea containers are allowed on the Property.
19. Prior to final site plan approval, emergency access easements must be granted to Fire, Rescue, and Emergency Services, which access easements are to be reviewed and approved by the County's Department of Fire, Rescue, and Emergency Management.
20. The use of the Facility must be in accordance with these special use permit conditions, the approved proffers in case R17-0005, the Ordinances of Spotsylvania County, and Code of Virginia, the EPA Best Management Practices for Lead at Outdoor Shooting Ranges, 2005, and any updates thereto, and the NRA Range Source Book 2012. If there is a conflict between these special use permit conditions and the proffers, the more restrictive provision shall apply.
21. The Operator will reimburse the County within 30 days of receipt of an invoice for any expenses incurred by the County resulting from consulting services required, the verification of conditions, enforcement of conditions, or review of plans or studies to improve or modify the range. Should modifications be determined necessary, the Operator will provide a plan for approval and complete the modifications within six (6) months of written notification from the County. The Operator, throughout the use of the Property, shall guarantee the lead remediation of the Property. The Operator shall provide and maintain for the County's benefit surety for performance of the required lead remediation as set forth herein. Such surety must be irrevocable and must be maintained in full as set forth herein for the lifetime of the operation of the Facility. The surety amount must be based on the highest total estimated cost calculated by the Operator to complete a full lead abatement of the Property.
22. The Operator shall secure and at all times maintain public liability insurance for personal injuries, death, and property damage, and umbrella insurance coverage, for the duration of the Special Use Permit in the minimum amounts set forth below, and shall include the County as co-insured:
    a. Commercial General Liability covering personal injuries, death and property damage: $ XXX per occurrence/ $ XXX aggregate;
    b. Automobile Coverage: $ XXX per occurrence;
    c. Excess Liability: $ XXX ;
    d. Workers Compensation and Employers Liability Insurance in accordance with applicable statutory amounts.

e. The Operator's Commercial General liability insurance policy and excess liability policy shall specifically include the County and its officers, boards, employees, volunteers, attorneys, agents, and consultants as additional insureds.
f. The Operator's insurance policies shall be issued by an insurance company licensed to do business in the State and with an AM Best's rating of at least A.

23. The Operator shall provide the Zoning Administrator Certificates of Insurance annually, and the amounts of required insurance shall be reviewed every two years for adequacy of coverage by the County's carrier. As determined solely by the County's insurance carrier, insurance premiums or coverage shall be increased when necessary to protect the County.
24. The Operator's insurance policies shall contain an endorsement obligating the insurance company to furnish the County with at least thirty (30) days prior written notice in advance of the cancellation of the insurance.
25. The Operator's insurance renewal or replacement policies or certificates shall be delivered to the Zoning Administrator at least fifteen (15) days before the expiration of the insurance that such policies are to renew or replace.
26. Prior to the issuance of a land-disturbing permit, the holder of the Special Use Permit shall deliver to the Zoning Administrator a copy of each of the policies or certificates representing the insurance in the required amounts.
27. Access to the Property and the Facility for inspections or monitoring by the County, including its employees, agents and representatives, shall be provided to any of these parties within twenty-four (24) hours of the date and time written notice is provided to the Operator.
28. The Operator shall fully comply with all state and federal laws and regulations that apply to the construction or maintenance of the Project or use of the Property.
29. Improvised Explosive Device ("IED") training must be conducted with simulated IEDs on the Property.
30. The Operator's failure to be in compliance with any of these conditions will be cause for revoking the SUP.

Spotsylvania County Government

Appendix A

Comprehensive Plan Analysis

Spotsylvania County Comprehensive Plan Analysis

Overview

The Spotsylvania County Comprehensive Plan presents a long-range land use vision for the County. The Comprehensive Plan sets forth principles, goals, policies, and implementation techniques that will guide the development activity within the County and promote, preserve, and protect the health, safety, and general welfare of its citizens. Specifically, the Plan provides data and analysis on land use, transportation, housing, natural and historic resources, and public facilities and utilities. The purpose of this document is not to regulate, but rather guide land use, transportation, and infrastructure decisions. This guidance seeks to ensure continued economic and community vitality while ensuring necessary policies and infrastructure are in place to provide for the continuation of quality services to Spotsylvania's residents and businesses.

The proposal is located within the Primary Development Boundary. The Primary Development Boundary defines the area within which public water and sewer utilities will be provided. The Primary Development Boundary is shown on the Future Land Use Map of the Comprehensive Plan. Land within the boundary is intended to develop with higher residential densities and more intensive non-residential uses than outside of the boundary. By maintaining a Primary Development Boundary, the County encourages the most efficient use of the land while preserving the rural character. The proposed use, requiring a special use permit under Industrial 2 (I-2) Zoning (if rezoning R17-0005 approved) is consistent with the intent of the Primary Development Boundary, however is likely more appropriate outside of the Primary Development Boundary with fewer development pressures, fewer potential conflicting land uses nearby, and less density. Staff notes as per County Code Sect. 23-4.5.1. *Uses that are designated as "special uses" are generally compatible with other land uses permitted in a zoning district but which, because of their unique characteristics or potential impacts on the surrounding neighborhood and the county as a whole, require individual consideration of their design, configuration, and/or operation at the particular location proposed. Such individual consideration may also call for the imposition of individualized conditions in order to ensure that the use is appropriate at a particular location.* The purpose and applicability of Special Uses as described above pairs with direction given within the future land use element of the Comprehensive Plan as follows:

The project area has an employment center designation per the Future Land Use Element of the Comprehensive Plan. As per the Future Land Use Element, "*the employment center land use area is envisioned to be the primary location for new office and industrial development within the County, with the focus on larger scale office complexes, industrial users, and business parks. In the interests of maintaining a balanced economic base, industrial development within the County is also desired. Both light and heavy industrial uses are appropriate and should be encouraged within the Employment Center category with the careful consideration of their location and transition to adjoining properties. Light industrial uses are usually more consumer-oriented than business-oriented and are manufacturing activities that use moderate amounts of partially processed materials to produce items of relatively high value per unit. Examples include, but are not limited to, the manufacturing of: clothes, shoes, furniture, consumer electronics and home appliances. Processing, assembly or disassembly*

operations could also fall into this category. Typically, these uses cause little pollution. Heavy industrial uses tend to be larger in scale and often can have pollution impacts (noise, smell, etc.) on the surrounding area. While these impacts should be minimized, there is the recognition that not all negative effects can be completely mitigated. The location of these users within industrial parks, both new and existing, should be encouraged to help ensure appropriate transitions that minimize any pollution impacts on neighboring properties. Examples of heavy industrial uses include but are not limited to: mining operations; refineries, power plants; and the fabrication and assembly of large items." Considerate of the applicant's rezoning request, Industrial zoning generally is an appropriate zoning designation within the employment center land use area however consideration of the use proposed and ability to mitigate impacts is integral to the proposed use; special use. Given the envisioned mix of land uses in the area, consideration of the intensity of the proposed zoning district including restricting allowable industrial uses to those that would complement the surrounding land uses and development patterns has value.

Use specific considerations must be made as it relates to the requested use proposed. To reiterate, as per the Future Land Use Element, "*both light and heavy industrial uses are appropriate and should be encouraged within the Employment Center category with the careful consideration of their location and transition to adjoining properties*." Staff also notes that the future land use element of the Comprehensive Plan states that *"The Map is not intended to be parcel specific, but rather provides a flexible guide for the County's desired future development patterns."* Considering this, the immediate surrounding parcels include mixed use and commercial land use designations and from a land use standpoint this site could potentially "go either way" in terms of land use potential with a variety of supported zoning district designations. Considering the use proposed, staff is concerned about potential impacts to existing and envisioned land uses in proximity to the project. As an example staff notes adjacent land to the immediate west of the proposed project has been designated as a mixed use area that could include single family attached, detached, multi-family residential, commercial, office land uses, including potential multi-story proposals surrounding the site. Within the last few years staff has seen prospective mixed residential projects considered within a short distance of this site, including sites downrange and adjacent.

The project has been designed with range controls meant to manage risk and contain projectiles/bullets fired by weapons with enough power/range to shoot past the limits of the project boundary. Under "worst case scenario's" a carelessly or mistakenly fired bullet beyond the project boundary at present has range to potentially impact existing or future land uses, landowners and housing. Though the likelihood of this may be minimal, staff believes consideration of existing and future development, including residential development located offsite and downrange of the proposed project is warranted. The prospect of additional development in proximity to this site as supported by the Comprehensive Plan introduces additional land use conflicts with this proposal based on its location and size. The provided Range Report notes *"the primary bullet containment concept of the shooting range industry, as promulgated by NRA, is all bullets fired on the firing ranges should not leave the property owned or controlled by the shooting range facility."* As per the provided Range Report, engineered solutions to ensure bullet containment have been met or exceeded with this project. However, the report also acknowledges that engineered solutions for range safety must go hand in hand with administrative controls. The report says that *"often when incidents of bullet escapement have occurred, they are the result of a properly designed and maintained shooting range being utilized improperly."* This ultimately results in necessary rules and regulations, site monitoring and enforcement, and a reliance that range control will be able to constantly control for somewhat unpredictable actions or human error. To some degree the proposal requires a degree of faith that

operators, equipment, and a variety of users who come and go from the site will never error, be careless, or reckless. With a wide variety of users coming and going from the site it's difficult to have complete confidence that firearms and all users will be human error free at all times and circumstances. The applicants Acoustical Assessment notes *"Crucible's typical client base is comprised of employees of the U.S. Government, Non-governmental organizations (NGOs), and multi-national corporations whose employees live and work in dangerous and austere locations worldwide."*

Staff believes the frequency of activity and pure volume of users combined with location and proximity to existing and future uses in proximity to the project introduces a degree of uncertainty and resulting risk. This has been raised as a concern levied against the project by community members who may live downrange and off the project property and within range of the firearms used at the facility should a critical error result in breakdown of administrative controls. Staff acknowledges numerous range controls and engineered solutions have been included as a means to mitigate potential risk of a regularly used range including: target location restrictions for height and location against range backstops; backstop bullet catchers; directed firing below firing positions; perimeter protections against trespass from the outside upon the range via fencing and anti-climb wire, "no trespassing" signage; caliber limitations for weapons fired on the property; limits on hours of operation; extensive berm construction for containment and noise attenuation features; undisturbed tree preservation areas; and additional noise control. As an outdoor facility, if approved, staff recommends maximizing range protections through physical engineered means. As part of their proposal, the applicant has addressed range layout and considerations features for outdoor ranges as outlined by the National Rifle Association's (NRA) Range Source Book: A Guide to Planning and Construction, except for physical design based solutions for "up and out" risk minimization overhead outdoor baffles. As per the Range Source Book, *"Overhead baffles are used to contain the flight of bullets to a specified area within the range. These overhead baffles are useful in areas where space is limited."* Since the potential range of bullets fired exceed that of the project area, staff has taken the position to consider this site as constrained or limited in size. As a result, staff has recommended outdoor range baffles be included as a precautionary means to physically control for "up and out" risk.

As an outdoor range, the project also introduces potential noise impacts on the surroundings. Regarding Outdoor Ranges, the NRA's Range Source Book states *"no set distance eliminates complaints entirely. However, studies conducted for the Environmental Protection Agency (EPA) indicate noise complaints are likely when inhabited dwellings exist less than one half (1/2) mile from the facility. Beyond that distance, the chance of generating noise complaints is reduced."* This is a concern given the County's land use vision for the area that includes nearby Mixed Use. For reference, the staff report provides a map and text description of existing residential development in the area. A summary of the existing land use designations is outlined above. Staff notes the draft Comprehensive Plan considers higher intensity commercial heavy mixed- use (that includes support for secondary of subordinate residential development) for this area going forward on the west side of the Route 1 corridor.

The applicant has provided an acoustical assessment of the proposed project tied to the rezoning and corresponding special use permit request, entitled "Crucible Spotsylvania Acoustical Assessment." The findings of the Assessment include compliance with the County Noise Ordinance based on hours of operation, and that if approved, the proposed use would be exempt from noise ordinance limits during

such hours of operation. The exemption referenced specifically is located in County Code Sect. 14-52(a)(3) Noise emitted by a commercial or industrial establishment which noise is customarily emitted by such commercial establishments or industries. This exemption applies during the hours of 6 am and 10 pm. Proffered limits on hours operation for firing activities do provide predictability regarding noise generation from the site. This operation will have the ability to operate seven days a week.

Staff recognizes that noise mitigation has been proposed and included within project commitments to include earthen berms, caliber limits, vegetative screening, maintenance of forested areas to varying degrees, limitations on range activities within specified times of day. The Acoustical Assessment identified numerous noise mitigating features included in the project design "to specifically address noise concerns raised by the immediate neighbors by voluntarily implementing a variety of noise mitigation measures into their new facility design." However, depending on the success of the facility, project limitations considerate of noise impacts for range activities, driving track and simulated IED scenarios could still result in seven (7) days a week activities regardless of season including winter months when deciduous vegetation has lost their leaves and vegetative sound buffering is reduced. Project proffers limit live and blank nighttime firing range training Monday through Friday to no less than two (2) hours after darkness, which is defined as "astronomical twilight as recorded by the United States Naval Observatory" ("USNO") or 10:00pm, whichever is earlier. Firing range training will end no later than 5:00pm on Saturday and 4:00pm on Sunday. Further, the Applicant and owner agree to limit hours of firing range training to commence no earlier than 8:00am Monday through Friday, 9:00am on Saturday, and 10am on Sunday. IED scenarios per proffer include limit simulated IED scenario training activities to commence after 8:00 am Monday through Friday, and after 9:00am on Saturday and after 10:00am on Sunday. All simulated IED activity will end prior to astronomical twilight as recorded by the USNO. High explosives will be prohibited per project proffer. As noted in the staff report, there are concerns about the enforceability of a project commitment limiting noise generation based on astronomical twilight. Additionally, a provided acoustical assessment (Rev 2) suggests the project will equip rifles with a sound suppressor as the default condition for all rifle use however this does not appear a project commitment.

Given existing and future development potential near this project, staff has raised concern that noise generation from this site will introduce a noise generating operation that will inevitably present impacts upon the surroundings up to seven days a week throughout the year. This may not be the best location to introduce the proposed a high-level security training facility with the expected noise generation customarily emitted by such a use. The Assessment observes that the area surrounding Crucible's site is *"sparsely populated and may be categorized as rural land-use. While there are some residential and commercial properties to the east along Jefferson Davis Highway, there are very few noise-sensitive receptors westerly of the site."* Staff agrees with the assessment as it relates to current conditions. However, from a long range planning perspective, the immediate surrounding parcels include mixed use and commercial land use designations and from a land use standpoint this site could potentially "go either way" in terms of land use potential with a variety of supported zoning district designations. Considering the use proposed, staff is concerned about potential impacts to envisioned land uses near the project. Neither the land use designations in the area or the location within the County designated Primary Development Boundary suggest a County vision of continued rural land

uses in this area for many years to come. Staff notes there has been development interest within the immediate area (including actively under review proposals) within the past few years aimed at mixed-use including a mix of housing types including higher density residential and consumer driven commercial development.

Considering Special Use Permit Standards of Review as outlined in County Code Sect. 23-4.5.7, staff has identified potential conflicts related to Sect. 23-4.5.7(a)(3) *That the proposed use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof; Sect. 23-4.5.7(a)(4) That the proposed use will not adversely affect the health or safety of persons residing or working in the neighborhood of the proposed use; Sect. 23-4.5.7(a)(5) That the proposed use will not be detrimental to the public welfare or injurious to property or improvements within the neighborhood.* Due to the identified Standards of Review issues identified above, staff does not believe the proposed use satisfactorily addresses Special Use Purpose and Applicability Sect. 23-4.5.1. as referenced above and therefore does not effectively address location and transition to adjoining properties as advocated for within the Employment Center Land Use category of the Comprehensive Plan. For these reasons staff has also identified Sect. 23-4.5.7(a)(1) *That the proposed use is in accord with the comprehensive plan and other official plans adopted by the county,* as also problematic.

After conducting an analysis of applicable Comprehensive Plan Goals, staff has identified application strengths, deficiencies, and policy concerns worthy of consideration as outlined in the Comprehensive Plan policy analysis below:

Introduction and Vision:

Guiding Principles and Policies A. Spotsylvania County is a "business friendly" community and local job creation is a priority. Guiding Principles and Policies A.1. Encourage business investment in the County and promote the relocation of federal and state agencies to the County, providing more opportunities for Spotsylvania County residents to work in the County. Guiding Principles and Policies A.3. Encourage the rezoning of land to industrial/ office uses in areas designated for Employment Center uses and the revitalization of older, underperforming commercial, office, and industrial developments. The proposed special use that corresponds with the Industrial zoning request does provide employment as a commercial training/ firing range facility and is expected to be fiscally positive with spin-off benefits for local retail, food, service, hospitality services in the area considering the operation envisioned is expected to draw clients from inside and outside of the County as a training destination. As noted in their narrative, the project is partnered with a number of federal, state, local agencies, and private security firms and this project would ultimately provide greater exposure to the County for these workers and their associated spin-off economic benefits in proximity to the facility. Considerate of the applicant's rezoning request, Industrial zoning generally is an appropriate zoning designation within the employment center land use area however consideration of the use proposed and ability to mitigate impacts is integral to the proposed use; special use.

Guiding Principles and Policies B. Spotsylvania County is fiscally sustainable. Guiding Principles and Policies B.1. Achieve a 70/30 mix of residential to commercial/industrial development (based on

assessed value), and the annual growth of the industrial and commercial tax base at a rate greater than 2%. Guiding Principles and Policies B.1.c. Diversify the non-residential tax base by encouraging a wide variety of businesses to locate in the County. The proposed use supports establishment of a unique establishment within the County and is expected to result in positive fiscal impacts though question has been raised about its about its impacts to the surroundings. The special use requested is a unique use supportive of business diversification goals. This proposed project (tied to a rezoning request) is also expected to result in positive spin-off impacts for some commercial uses including retail, food, service, hospitality industries due to its function as a destination training center.

Guiding Principles and Policies B.2. Development projects seeking increased residential density and/ or non-residential intensity should address impacts that are specifically attributable to the proposed development. Staff has raised concern regarding the physical impacts of the proposed use having a negative impact upon surrounding properties and their development potential for Comprehensive Plan supported uses. As noted in the summary above, this site is in close proximity to County designated mixed use areas where a number of development plans have been discussed over the past few years. The use proposed may negatively impact future development plans or the long term enjoyment of the surroundings.

Out of concern for surrounding land uses staff recognizes that the Industrial 2 zoning designation includes a number of heavy industrial uses. From the Comprehensive Plan, "*heavy industrial uses* (in the employment center land use) *tend to be larger in scale and often can have pollution impacts (noise, smell, etc.) on the surrounding area. While these impacts should be minimized, there is the recognition that not all negative effects can be completely mitigated*. *The location of these users within industrial parks, both new and existing, should be encouraged to help ensure appropriate transitions that minimize any pollution impacts on neighboring properties."* Staff believes the proposed training facility envisioned for this site presents a number of concerns that would "best fit" such a use within a bona fide industrial park setting (like a heavy industrial user) or in a rural setting with extensive screening, buffering, setback distances and few residential neighbors nearby now and in the future. Staff believes any use proposal that exposes residential or other offsite uses to risk of offsite bullet flight may be a hindrance to attracting such uses within the area of risk; economic development attraction counterproductive. Staff notes that the applicant has expressed in the project narrative their belief that the impacts of this project be that of a "medium intense" development.

Guiding Principles and Policies B.3. Development projects seeking increased residential density and/or non-residential intensity should address its impacts on the infrastructure of the county. Overall this project is expected to result in minimal impact to County public facilities. No impacts are expected considering demands upon schools, parks and recreation and most other public facility categories. Transportation staff has sought to mitigate transportation impacts along the Route 1 corridor considerate of this projects potential impacts. Overall this project is expected to have little impact on the Route 1 corridor and is not expected to degrade Transportation Levels of Service. Full frontage improvements including the addition of sidewalks have been depicted within the GDP. Staff notes that sidewalk implementation is tied via proffer to implementation of Phase II of the project as depicted on the GDP.

This project is not expected to negatively impact transportation level of service. Traffic generation from the project is low and does not warrant a Traffic Impact Analysis (TIA) or VDOT 527 Analysis as noted in the project narrative. As per the County Transportation Engineer, based on the Travel Model, Route 1 (where Crucible intends to locate) carries approximately 11,500 vehicles-per-day and is operating at a LoS A during both AM & PM peak periods. VDOT count data shows a higher volume of 15,000 vehicles-per-day from 2017 but it is based on a growth projection from an earlier count taken a few years ago. The LoS would likely be a "B". It is safe to say the LoS is either an A or a B during the peak periods, either of which are very good conditions.

For Fire and Rescue, first responders, Sheriff's Office via community engagement proffer access to the firing range facilities would be provided subject to an agreement between Spotsylvania County and the applicant and owner. The project narrative speaks to annual internal fire inspections and coordination with County Fire and Rescue to develop an emergency management plan for the site however there is no commitment in place. Staff recommends these items be conditioned as part of the special use permit process.

Guiding Principles and Policies B.3.a. The County should support alternative onsite transportation alternatives and recreational options such as transit, pedestrian and bicycle facilities that are able to, or will, connect to neighboring properties. Considering the project has frontage along the Route 1 corridor, amongst a variety of existing and planned land uses, the applicant has included frontage sidewalks within their GDP. This is a positive improvement along the Route 1 corridor. Such infrastructure is complementary to the employment center, commercial, mixed land uses in the immediate area as well as the intent of the Primary Development Boundary where development is envisioned to occur. Staff notes that sidewalk implementation is tied via proffer to timing of the Phase II portion of the project.

Guiding Principles and Policies B.4. Preserve significant natural, historic, and cultural resources of the County to ensure the continued allure of the County as a tourism destination. Guiding Principles and Policies E.1. Protect environmental quality by promoting a comprehensive approach to air and water quality management. Examples of approaches to accomplish this could include: green space and tree preservation, stream restoration, and low impact development (LID). Staff consulted the Virginia Department of Historic Resources Virginia Cultural Resources Information Service, the County Cemetery Inventory, and Handbook of Historic Sites in Spotsylvania County. Staff notes a cemetery is located onsite. The cemetery is depicted on the GDP and the project narrative notes the applicant has already taken measures (including fencing the cemetery area) to ensure that the cemetery is not disturbed during the proposed build out as well as once operations begin. The cemetery will remain buffered and access will be allowed in accordance with applicable State law.

Though the proposed special use request is not a traditional tourism business per se, the use does have the effect of acting as a destination to bring out of town, state, country clients into the County in support of the operation and associated spin-off economic benefits not unlike those generated by tourism.

Provided proper environmental controls are followed this request is not expected to negatively impact sensitive environmental resources. Section E of the project proffers consider environmental impacts associated with firing ranges and lead projectiles. Project development will be subject to regulatory protections concerning environmental quality. A number of environmental controls have been proffered specific to the special use proposed onsite including range design consistent with the Environmental Protection Agency Best Management Practices for Lead at Outdoor Shooting Ranges. Development and implementation of an Environmental Stewardship Plan has also been proffered to commit to site monitoring and reclamation for mitigation of risk of lead migration from the range. Proffers commit to annually accounting for all fired rounds onsite to ensure complete lead reclamation onsite. Additional proffer commitments seek to maintain soil ph. levels, slow rainwater runoff and erosion risk, stormwater management commitments, range slope, backstops and bullet catchers, sand traps to mitigate ricochet risk or "lost rounds" from a lead mitigation and accounting standpoint. The applicant has exhibited a commitment to be a "good neighbor" through lead reclamation and mitigation from site design, planning, implementation efforts. Low Impact Development (LID) methods are proposed to address surface water and stormwater management as per the project narrative and exhibited within the generalized development plan. Wetland and RPA areas are generally outside of any areas of disturbance except for internal road crossing locations. Any wetland or RPA encroachments will be subject to the appropriate environmental review, permitting. Large open space areas are proposed. Open space provided is well in excess of the 10% minimum required under Industrial 2 zoning. Upon completion of Phase II of the project per the project GDP over 88% of the property will be maintained as open space including stormwater management facilities, buffering and natural areas. Staff notes 35' transitional screening buffers along the project periphery meant to help shield and buffer the use from neighbors. Other previously cleared areas will reforest in time. Project proffers commit to preservation of existing vegetation within the 35' perimeter buffers with exclusions for installation of perimeter security fencing and road access. The applicant has expressed interest in tree preservation to the maximum extent possible. Limits of disturbance have been clearly delineated in the GDP.

Staff raises concern that environmental quality and site redevelopment prospects could be compromised if the project were to cease operations and/or proper lead protocols not be followed. Under that scenario, the project would conflict with environmental and economic development goals. Staff has identified a number of additional environmental related project condition recommendations as part of the staff report.

Land Use:

Future Land Use Map Designation. Land Use Policies Applicable to All Land Uses 8. Redevelopment and investment in existing developed areas should be encouraged provided that the development does not adversely impact adjoining properties. An analysis of the project as it relates to the Primary Development Boundary and Future Land Use map have been provided in the project overview above.

Land Use Policies Applicable to All Land Uses 1. Rezoning proposals should address impacts that are specifically attributable to the development. Overall this project is expected to result in minimal impact to County public facilities. No impacts are expected considering demands upon schools or parks

and recreation facilities. Transportation staff has sought to mitigate transportation impacts along the Route 1 corridor considerate of this projects potential impacts. Overall this project is expected to have little impact on the Route 1 corridor and is not expected to degrade Transportation Levels of Service. Full frontage improvements including the addition of sidewalks have been depicted within the GDP. Staff notes that sidewalk implementation is tied via proffer to timing of the Phase II portion of the project.

This project will include addition of a deceleration and acceleration lane to and from the site to accommodate the use and reduce potential conflict along the Route 1 corridor. As noted in the project narrative, traffic generation from the special use proposed (use subject to this rezoning request) is expected to result in minimal impacts. For Fire and Rescue the site has been designed to accommodate access to all developed areas of the facility. The project narrative speaks to annual internal fire inspections and coordination with County Fire and Rescue to develop an emergency management plan for the site. Staff recommends these items be conditioned as part of the special use permit process.

Staff has also raised concern over: the lack of outdoor range baffles to minimize "up and out risk" to existing and future development offsite; lack of commitments to annual internal fire inspections and coordination with County Fire and Rescue to develop an emergency management plan; introducing a source of noise generation in proximity to existing and future development opportunities in the area; environmental quality and site redevelopment prospects could be compromised if the project were to cease operations and proper lead protocols not be followed. Under that scenario, the project would conflict with environmental and economic development goals.

Land Use Policies Applicable to All Land Uses 3. Wherever possible, existing trees and tree buffers should be preserved rather than replacing mature vegetation with new plantings. As per the GDP upon completion of Phase II over 88% of the property will be maintained as open space including stormwater management facilities, buffering and natural areas. This is well above the minimum 10% open space requirement established for the Industrial 2 zoning district by County code. Staff notes 35' transitional screening buffers along the project periphery meant to help shield and buffer the use from neighbors. This is greatly expanded upon via additional areas left undisturbed. Project proffers commit to preservation of existing vegetation within the 35' perimeter buffers with exclusions for installation of perimeter security fencing and road access. The applicant has expressed interest in tree preservation to the maximum extent possible. Limits of disturbance have been clearly delineated in the GDP.

Employment Center Land Use Policies 4: New development should provide interparcel connections to adjoining properties where appropriate. No interparcel connectors are depicted on the GDP as part of this proposal. Given the nature of the use proposed and intent as a secured facility not widely open for public access, staff does not find interparcel connectivity warranted for the special use proposed whose footprint is depicted on the rezoning GDP.

Employment Center Land Use Policies 10: Encourage job creation that provides sufficient income for employees to be able to afford housing within the County. Employment Center Land Use Policies 11. Encourage the retention and expansion of existing business operations as well as the attraction of new businesses and investment. This proposal is complementary of business retention, expansion,

and attraction goals. However, staff believes any use proposal that exposes residential or commercial/office/industrial uses to risk of offsite bullet flight and regular noise generation from the site that may be a hindrance to attracting such uses within the area of risk; economic development attraction counterproductive. Site redevelopment prospects could be compromised if the project were to cease operations and proper lead protocols not be followed. Under that scenario, the project would conflict with environmental and economic development goals

Transportation:

Transportation Policy 1, Strategy 1. Achieve no less than a "D" Peak Hour Level of Service on the VDOT Primary Street System. Transportation Policy #2. Ensure that new development does not degrade Levels of Service and mitigates its impact on the transportation network. This project is not expected to negatively impact level of service. Traffic generation from the project is low and does not warrant a Traffic Impact Analysis (TIA) or VDOT 527 Analysis as noted in the project narrative. As per the County Transportation Engineer, based on the Travel Model, Route 1 (where Crucible intends to locate) carries approximately 11,500 vehicles-per-day and is operating at a LoS A during both AM & PM peak periods. VDOT count data shows a higher volume of 15,000 vehicles-per-day from 2017 but it is based on a growth projection from an earlier count taken a few years ago. The LoS would likely be a "B". It is safe to say the LoS is either an A or a B during the peak periods, either of which are very good conditions.

Transportation Policy 2, Strategy 5. The County should support alternative onsite transportation alternatives and recreational options such as transit, pedestrian and bicycle facilities that are able to, or will, connect to neighboring properties. Transportation Policy #3. Promote alternative modes of transportation and multi-modal facilities to more effectively address demands on the transportation network. Considering the project has frontage along the Route 1 corridor, amongst a variety of existing and planned land uses, the applicant has included frontage sidewalks within their GDP. This is a positive improvement along the Route 1 corridor. Such infrastructure is complementary to the employment center, commercial, mixed land uses in the immediate area as well as the intent of the Primary Development Boundary where development is envisioned to occur. Staff notes that sidewalk implementation is tied via proffer to timing of the Phase II portion of the project.

Historic Resources:

Historic Resources Policy 1. Encourage and promote the voluntary protection and preservation of scenic, historic, cultural, architectural, and archaeological resources. Historic Resources Policy 1, Strategy 2. Support the preservation of resources with local, state, or national significance. Historic Resources Policy 4. Enhance public understanding and appreciation of the unique nature of Spotsylvania County's history, culture and character. Staff consulted the Virginia Department of Historic Resources Virginia Cultural Resources Information Service, and Handbook of Historic Sites in Spotsylvania County. The project narrative states the property does not have any cultural resources. A cemetery is located on the property however and as depicted on the generalized development plan has been avoided by the development footprint. This cemetery is not well documented at this time. As part of project review, staff requested the applicant consider providing some documentation and/or

imagery to help inventory the cemetery onsite and update the County Cemetery Inventory for historical/ archival/ project review sake. The County Cemetery Project is supported by the Comprehensive Plan in Historic Resources Policy 1 and Policy 4. Positively the applicant has reported they have further protected the cemetery through installation of fencing around the area and buffering around the site in order to avoid any conflict with State Code concerning cemeteries. Provision of accessibility to the cemetery for historians, family members, genealogists, etc. will be regulated by the Code of Virginia also.

Natural Resources:

Natural Resources Policy 1. Balance the protection of environmental resources and natural wildlife habitats with development. Natural Resources Policy 1, Strategy 1. The County should support the mitigation of impacts upon unique and/ or endangered resources including rare species and their habitats. As summarized in the applicant narrative and depicted within the generalized development plan, "the project's design will minimize the impact to the natural topography and vegetation located on the property. While there are both wetlands and RPAs on the site, they are limited in area, and applicant intends to utilize low impact development methods to address surface water and storm water management matters to the extent reasonably practical and feasible." Wetlands disturbances resulting from necessary road crossings have been minimized. Such disturbances will be subject to applicable environmental regulations and mitigations. Mitigation for the potential of lead pollution resulting from the collection of bullets has been proposed. The applicant narrative speaks to intended development of *"an Environmental Stewardship Plan prepared by a recognized expert in the field according to Environmental Protection Agency (EPA) guidelines."* The applicant also states that range facilities will be designed to follow Best Management Practices for Lead Outdoor Shooting Ranges. Physical protections including natural clay soils, sand traps with clay base, range floor liming, range design, and accounting for each round fired through collection are all critical protections identified by the applicant. The applicant has incorporated said lead related protections and the development of an Environmental Stewardship Plan within project proffers. These proffers positively contribute to the application. This site has been partially cleared in the past and large areas of natural vegetation are to remain in open space areas. Staff consulted the Virginia Department of Conservation and Recreation's Natural Heritage Data Explorer (NHDE) and notes no predictive models within the site that would suggest presence of threatened or endangered species onsite. The US Fish and Wildlife Service Information for Planning and Consultation system includes a probability of presence summary for geographic areas. The IPaC system identifies potential presence or habitat for bald eagle, prairie warbler, red-headed woodpecker, wood thrush in and around this location. Endangered species identified include the northern long-eared bat and yellow lance (a mussel). Such species are considered potentially affected by activities in this location. It's based on predictive models of expected ranges of each species.

GENERALIZED DEVELOPMENT PLAN
TEAM CRUCIBLE TRAINING COMPLEX
REZONING AND SPECIAL USE

BERKELEY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

EXISTING ZONING: A-2
PROPOSED ZONING: I-2 W/ SPECIAL USE
TAX MAP NUMBERS: 76-A-2 (REZONING & SPECIAL USE)
VOTING DISTRICT: BERKELEY
STREET ADDRESSES: 6116 JEFFERSON DAVIS HWY.

OWNER:
RADIO RECONNAISSANCE TECHNOLOGIES, INC.
3328 BOURBON STREET
FREDERICKSBURG, VA. 22408
ATTN: NICHOLAS HOBEN
(540) 752-7448

APPLICANT:
TEAM CRUCIBLE, LLC.
60 JACK ELLINGTON ROAD
FREDERICKSBURG, VA. 22406
ATTN: JOHN GARMAN
(540) 752-2800

SITE STATISTICS:

1.) TAX MAP: 76-A-2
2.) PARCEL ACREAGE: 69.9846 ACRES
DISTURBED ACREAGE: 43.50+/- ACRES
3.) EXISTING ZONING: A-2
PROPOSED ZONING: I-2 W/ SPECIAL USE
4.) GROSS FLOOR AREA: 66,724 SQ.FT.
5.) OVERLAY DISTRICT: CBPA
6.) EXISTING USE: AGRICULTURAL
PROPOSED USE: BUSINESS OFFICES, OUTDOOR TACTICAL TRAINING
OUTDOOR SHOOTING RANGES
7.) MAXIMUM BUILDING HEIGHTS: NOT TO EXCEED 50'
NUMBER OF FLOORS: TWO STORIES PROPOSED
EXISTING SETBACKS: 30' FRONT YARD, 10' SIDE YARD, 35' REAR YARD
PROPOSED SETBACKS: 40' FRONT YARD, 0' SIDE YARD, 0' REAR YARD
(ALL EXISTING AND PROPOSED BUILDING WELL WITHIN BOTH LISTED)
8.) TRIP GENERATIONS:
INITIAL BUILDOUT: 44 VPD (TRAINING FACILITY)
FINAL BUILDING: 571 VPD (ULTIMATE TRAINING FACILITY + SECTION 715-SINGLE TENANT OFFICE)
9.) NO EVIDENCE OF CIVIL WAR TRENCHES OR HISTORICAL BUILDINGS, STRUCTURES OR SITES ON PROPERTY.
10.) SURVEY FOUND PLACES OF BURIAL AND LOCATED ALL FOUND STONES, PERIWINKLE AREA AND ANY OTHER EVENDENCE. OWNER ESTABLISHED AND FENCED THE 6,500 SQ.FT. CEMETERY WITH GATE TO PROTECT IT.
11.) PROPERTY WITHIN ZONE "X" PER FLOOD INSURNCE RATE MAP, COMMUNITY-PANEL NO. 510308 200 C & 325 C; DATED 2/18/1998. RESOURCE PROTECTION AREAS SHOWN ON PLAN WERE SURVEY LOCATED FROM ENVIRON DATA DELINEATION ON 5/12/2016.
12.) WETLANDS WITHIN 100' OF SITE: SHOWN ON PLAN AS DELINEATED
13.) WETLANDS PERMIT REQUIRED: YES
14.) RMA ON SITE: ENTIRE SITE
15.) RPA ON SITE: SHOWN ON PLAN AS DELINEATED
16.) THIS PROPERTY WILL BE SERVICED BY PRIVATE WELL AND SEPTIC SYSTEMS UNDER INITIAL BUILDOUT. ONCE EXPANSION OF THE SITE IS NEEDED WITH NEW OFFICE BUILDINGS, DEVELOPER WILL EXTEND PUBLIC WATER AND SEWER TO THE SITE FOR USE.
17.) SOLID WASTE: LARGE, OUTSIDE COMMERCIAL CONTAINERS WILL BE LOCATED ON THE SITE. SOLID WASTE WILL BE COLLECTED BY A PRIVATE REFUSE COMPANY AND DISPOSED OF AT A COUNTY-APPROVED DISPOSAL SITE.

PARKING TABULATION:

	USE TYPE	REQUIREMENT	CALCULATION
PHASE-1 MAX BUILDOUT	INDUSTRY TYPES I, II, III	1-SP PER 1,000 SQ.FT. GFA PLUS 1-SP PER 400 SQ.FT. OF ACCESSORY OFFICE AREA OR 1-SP PER 2 EMPLOYEES ON THE LARGEST SHIFT WHICHEVER IS LESS	4,224/400= 11-SP 4,800/1,000= 6-SP
		TOTAL REQUIRED:	17-SP
		TOTAL PROVIDED:	34-SP

LOADING TABULATION:

	REQUIREMENT	CALCULATION
PHASE-1 MAX BUILDOUT	1-SPACE FOR THE FIRST 5,000 SQ.FT. OF GROSS FLOOR AREA, PLUS 1-SPACE FOR EACH ADDITIONAL 30,000 SQ.FT. OR MAJOR FRACTION THEREOF.	9,024/5,000= 1-SPACE 4,024/30,000= 0-SPACE
	TOTAL REQUIRED:	1-SPACE
	TOTAL PROVIDED:	1-SPACE

	USE TYPE	REQUIREMENT	CALCULATION
PHASE-2 MAX BUILDOUT	INDUSTRY TYPES I, II, III	1-SP PER 1,000 SQ.FT. GFA PLUS 1-SP PER 400 SQ.FT. OF ACCESSORY OFFICE AREA OR 1-SP PER 2 EMPLOYEES ON THE LARGEST SHIFT WHICHEVER IS LESS	55,300/400= 138-SP 4,800/1,000= 6-SP
		TOTAL REQUIRED:	144-SP
		TOTAL PROVIDED:	214-SP

	REQUIREMENT	CALCULATION
PHASE-2 MAX BUILDOUT	1-SPACE FOR THE FIRST 5,000 SQ.FT. OF GROSS FLOOR AREA, PLUS 1-SPACE FOR EACH ADDITIONAL 30,000 SQ.FT. OR MAJOR FRACTION THEREOF.	60,100/5,000= 1-SPACE 55,100/30,000= 2-SPACES
	TOTAL REQUIRED:	3-SPACES
	TOTAL PROVIDED:	3-SPACES

IMPERVIOUS CALCS:

PHASE-1

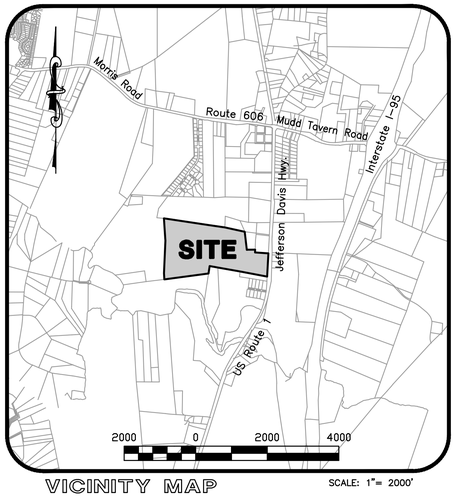
BUILDINGS:	9,024 SQ.FT.
ROADS & PARKING:	235,477 SQ.FT.
RATIO:	244,501/3,048,529= 8.02%

OPEN SPACE: 91.98%

PHASE-2

BUILDINGS:	46,724 SQ.FT.
ROADS & PARKING:	309,111 SQ.FT.
RATIO:	355,835/3,048,529= 11.67%

OPEN SPACE: 88.33%



VICINITY MAP
SCALE: 1"= 2000'

STORMWATER MANAGEMENT NARRATIVE:
STORMWATER MANAGEMENT SHALL BE ADDRESSED AT TIME OF SITE PLAN SUBMITTAL. ON-SITE DETENTION FACILITIES, POROUS PAVEMENT OR OTHER SUITABLE BMP'S WILL BE UTILIZED IN ACCORDANCE WITH THE SPOTSYLVANIA COUNTY DESIGN STANDARDS MANUAL. STORMWATER RUNOFF WILL BE COLLECTED IN MUTIPLE POND FACILITIES AT ALL OUTFALLS AS SHOWN ON PLANS AND RELEASED INTO ON-SITE EXISTING STREAMS ALL FLOWING IN A SOURTHERN DIRECTION. A CONTROL STRUCTURE WILL BE UTILIZED TO REGULATE THE DISCHARGE RATE. PONDS RECEIVING WATER FROM THE GUN RANGES WILL GO THROUGH A SERIES OF LIMESTONE CHECK DAMS BEFORE ENTERING THE POND FACILITIES THAT WILL BE LINED WITH LIMESTONE COBBELS.

EROSION AND SEDIMENT CONTROL NARRATIVE:
EROSION AND SEDIMENT CONTROL WILL BE ADDRESSED AT TIME OF SITE PLAN SUBMITTAL. SUITABLE CONTROL MEASURES WILL BE UTILIZED IN ACCORDANCE WITH THE SPOTSYLVANIA COUNTY DESIGN STANDARDS MANUAL AND THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK.

LANDSCAPING NARRATIVE:
ALL ON-SITE LANDSCAPING TO BE IN CONFORMANCE WITH ARTICLE 6- LANDSCAPING AND SCREENING OF THE COUNTY'S DESIGN STANDARDS MANUAL AND ARTICLE 5, DIVISION 5 OF THE ZONING ORDINANCE. EXISTING VEGETATION WILL BE UTILIZED WHERE APPLICABLE TO MAINTAIN MATURE GROWTH AND REQUIRED TREES WILL BE PLANTED IN ANY OPEN AREAS OF THE STREET BUFFER AND TRANSITIONAL SCREENING AREAS AS NEEDED.

SOUND MITIGATION:
REFER TO THE ACOUSTICAL ASSESSMENT BOOKLET PREPARED BY WSP USA, INC. FOR NOISE MODELING, NOISE EMISSION MEASUREMENTS, ACOUSTICAL DIRECTIVITY PATTERN, LOUDNESS ISOPLETH LINES AND LOUDNESS ISOPLETH ZONES MAPPING AND SMALL ARMS RANGE NOISE ASSESSMENT MODLE WITH SUPPORTING DATA.

INDEX TO DRAWINGS:

1.) COVER SHEET
2.) EXISTING CONDITIONS PLAN
3.) GDP PHASE-1 MAX BUILDOUT
4.) GDP PHASE-2 MAX BUILDOUT
5.) RANGE CROSS SECTION
6.) ENTRANCE PLAN

W W WEBB & ASSOCIATES, PLLC
ENGINEERING - SURVEYING - LAND PLANNING
11903 BOWMAN DRIVE, SUITE 106, FREDERICKSBURG, VA. 22408
OFFICE (540)371-1209 - FAX (540)371-4650

REVISION BLOCK

DATE	DESCRIPTION	BY
3/15/18	PER TRC COMMENTS	D.W.R.
8/21/18	PER COUNTY COMMENTS	D.W.R.
11/01/19	PER OWNER MODIFICATIONS	D.W.R.
2/28/20	PER COUNTY COMMENTS	D.W.R.
5/10/20	PER COUNTY COMMENTS	D.W.R.

COMMONWEALTH OF VIRGINIA
DANIEL C. WEBB
LICENSE NO. 036528
5/10-20
PROFESSIONAL ENGINEER

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GENERALIZED DEVELOPMENT PLAN

TEAM CRUCIBLE TRAINING COMPLEX
BERKELY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

DATE: MAR. 27, 2017
SCALE: 1"= 100'
DESIGNED BY: D.W.R.
DRAWN BY: D.W.R.
CHECKED BY:

ACAD FILE: 16D011GDP
DRAWING NO: 16-D-011

SHEET NO. 1 OF 6 SHEETS

S & F CAR WASH, LLC
TM 63-A-37
41.56 ACRES
ZONE: A-2
USE: VACANT

N14°46'56"W 1918.10'

S81°15'16"E 2487.26'

COMMERCIAL DRIVER SERVICES, INC.
TM 63-A-38A
9.00 ACRES
ZONE: C-3
USE: BUSINESS

SUE E. ELLIOTT
TM 63-A-37B
3.00 ACRES
ZONE: A-2
USE: SINGLE FAM.

BRIAN E. ELLIOTT or
DONNA E. ELLIOTT
TM 63-A-37A
2.44 ACRES
ZONE: A-2
USE: SINGLE FAM.

SUE ELLEN ELLIOTT
TM 63-A-39
3.00 ACRES
ZONE: C-3
USE: BUSINESS

69.9846 ACRES
INST#160004791
TM 76-A-2
CURRENT ZONE: A-2
PROPOSED ZONE: I-2

S01°40'19"E 498.22'

ERIC H. ELLIOTT or
MARHARET I. ELLIOTT
TM 76A-2A
3.16 ACRES
ZONE: A-2
USE: SINGLE FAM.

THE DORIS M. RANKIN
LTD. PARTNERSHIP
TM 76-A-1
3.84 ACRES
ZONE: C-3
USE: BUSINESS

MARY H. SATTERWHITE
TM 76-A-5
72.32 ACRES
ZONE: A-2
USE: VACANT

N02°22'27"W 912.00'

S81°21'07"E 233.06'

S87°14'10"E 396.49'

1-STORY
METAL BLDG.

CONC. PAD

WELL

CEMETERY

N80°53'38"W 3036.93'

S02°44'12"W 665.36'

JAMES C. CORTHON or
DOROTHY M. CORTHON
TM 76-A-3 (2-PARTS)
36.00 ACRES
ZONE: A-2
USE: VACANT

JAMES C. CORTHON or
DOROTHY M. CORTHON
TM 76-A-3B
33.13 ACRES
ZONE: A-2
USE: VACANT

JAMES C. CORTHON or
DOROTHY M. CORTHON
TM 76A-2 (2-PARTS)
36.00 ACRES
ZONE: A-2
USE: VACANT

TERRY L. JEMISON
TM 76A-1-7
0.57 ACRES
ZONE: A-2
USE: VACANT

EVANTE CHEW or ERNEST CHEW
TM 76A-1-6
0.57 ACRES
ZONE: A-2
USE: SINGLE FAM.

HAND CONSTRUCTION, INC
TM 76A-1-5
0.57 ACRES
ZONE: A-2
USE: VACANT

HAND CONSTRUCTION, INC
TM 76A-1-2
1.14 ACRES
ZONE: A-2
USE: VACANT

JAMES C. CORTHON or
DOROTHY M. CORTHON
TM 76A-1-1
0.86 ACRES
ZONE: A-2
USE: VACANT

COACH FOUR LANE

JEFFERSON DAVIS HWY.
(80' RIGHT-OF-WAY)
U.S. ROUTE - 1
(55 MPH)

VDOT MON.

2.09 MILES TO COACH FOUR LANE
1.13 MILES TO ROUTE 603

TREE LINE
WETLANDS
100' RPA
(IMPACT BERM TO PROPERTY LINE)
FREE STANDING TREE
1-STORY METAL BLDG.

LEGEND

GRAPHIC	DESCRIPTION
688	-DENOTES 10' EXISTING CONTOUR INTERVALS
	-DENOTES 2' EXISTING CONTOUR INTERVALS
688	-DENOTES PROPOSED CONTOUR WITH ELEVATION
	-DENOTES EXISTING TREE LINE
	-DENOTES PROPOSED LIMITS OF DISTURBANCE
100' RPA	-DENOTES 100' RESTRICTED PRESERVATION AREA
	-DENOTES LIMITS OF SIMULATED IED USE
	-DENOTES OVERHEAD UTILITY LINE
	-DENOTES PROPOSED SECURITY FENCE
	-DENOTES CHECK DAM LINED DITCH
	-DENOTES SANITARY SEWER FORCE MAIN
	-DENOTES FIRE APPARATUS SERVICE ROAD
	-DENOTES BALLISTIC WALLS
	-DENOTES DELINEATED WETLANDS
	-DENOTES GRAVEL SURFACE ROADS AND PARKING
	-DENOTES APHALT SURFACE ROADS AND PARKING
	-DENOTES DIRT SURFACE ROADS
	-DENOTES BUILDING AREAS
	-DENOTES TRANSITIONAL SCREENING AND BUFFER AREAS
10 STA.	-DENOTES NUMBER OF SHOOTING LANES
	-DENOTES DIRECTION OF SHOOTING
BMP	-DENOTES BEST MANAGEMENT PRATICE
	-DENOTES UTILITY POLES

0 100 200 300
2' CONTOUR INTERVALS
(SOURCE: COUNTY GIS)

REVISION BLOCK

DESCRIPTION	DATE	BY
PER TRC COMMENTS	3/15/18	D.W.R.
PER COUNTY COMMENTS	8/21/18	D.W.R.
PER OWNER MODIFICATIONS	11/01/19	D.W.R.
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COMMONWEALTH OF VIRGINIA
DANIEL C. WEBB
LICENSE NO.
036528
5-10-20
PROFESSIONAL ENGINEER

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EXISTING CONDITIONS

TEAM CRUCIBLE TRAINING COMPLEX

BERKELY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

DATE:	MAR. 27, 2017
SCALE:	1"= 100'
DESIGNED BY:	D.W.R.
DRAWN BY:	D.W.R.
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ACAD FILE:	16D011GDP
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SHEET NO.	2
OF	6 SHEETS

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ERIC H. ELLIOTT or
MARHARET T. ELLIOTT
TM 76-A-2A
3.16 ACRES
ZONE: A-2
USE: SINGLE FAM.

THE DORIS M. RANKIN
LTD. PARTNERSHIP
TM 76-A-1
3.84 ACRES
ZONE: C-3
USE: BUSINESS

MARY H. SATTERWHITE
TM 76-A-5
72.32 ACRES
ZONE: A-2
USE: VACANT

JAMES C. CORTHON or
DOROTHY M. CORTHON
TM 76-A-3 (2-PARTS)
36.00 ACRES
ZONE: A-2
USE: VACANT

JAMES C. CORTHON or
DOROTHY M. CORTHON
TM 76-A-3B
33.13 ACRES
ZONE: A-2
USE: VACANT

TERRY D. JEMISON
TM 76A-1-1
0.57 ACRES
ZONE: A-2
USE: VACANT

EVANTCHEV or ERNEST CHEW
TM 76A-1-2
1.00 ACRES
ZONE: A-2
USE: SINGLE FAM.

HAND CONSTRUCTION, INC
TM 76A-1-3
0.66 ACRES
ZONE: A-2
USE: VACANT

HAND CONSTRUCTION, INC
TM 76A-1-2
0.66 ACRES
ZONE: A-2
USE: VACANT

JAMES C. CORTHON or
DOROTHY M. CORTHON
TM 76A-1-1
0.66 ACRES
ZONE: A-2
USE: VACANT

69.9846 ACRES
INST#160004791
TM 76-A-2
CURRENT ZONE: A-2
PROPOSED ZONE: I-2

N14°59'56"W 198.70'

S81°15'16"E 2487.26'

N04°22'27"W 912.00'

S04°00'19"E 498.22'

S81°21'07"E 233.06'

S87°14'10"E 396.49'

S02°44'12"W 665.35'

N80°53'38"W 3036.93'

35' TRANSITIONAL SCREENING-2

50' TRANSITIONAL SCREENING-3

SECURITY FENCE WITH POSTINGS

LIMITS OF DISTURBANCE

LIMITS OF SIMULATED IED USE

WETLANDS

12' BERM WITH ADDITIONAL PLANTINGS
(18 - 5 gal. NELLIE STEVENS HOLLIES
2 - 5 gal. EDWARD STEVENS HOLLIES)

(IMPACT BERM TO PROPERTY LINE)

HELICOPTER EMERGENCY LANDING PAD

SKID PAD
(150' x 150')

RALLY COURSE

BMP

SEA CONTAINER SCENARICS

HORIZONTAL RICOCHET CATCH

TARGETS (30)

RANGE (200'x377')

30 STA.

WELL

PARKING
(20 SPACES)

DRAINFIELD AREA #2

RANGE SUPPORT BLDG

CEMETERY

FIRE APPARATUS SERVICE ROAD

ADDITIONAL SCREENING

100' RPA

DRAINFIELD AREA #1

STORAGE LOT
(30 SPACES)

STORAGE

SHOP

DUMPSTER

PARKING LOT
(34 SPACES)

OPERATIONS

BMP

WELL

SECURITY GATE WITH POSTINGS

50' STREET BUFFER

(44 VPD)

(65 MPH)

JEFFERSON DAVIS HWY.
(80' RIGHT-OF-WAY)

U.S. ROUTE - 1

360' BUFFER VOID
(THROUGH RPA)
(MAINTAIN VEGETATION
ON FAR SIDE OF ROAD
SLATS TO BE UTILIZED
IN SECURITY FENCE)

COACH FOUR LANE

1000' MONUMENT SIGN

2' CONTOUR INTERVALS
(SOURCE: COUNTY GIS)

0 100 200 300

LEGEND

GRAPHIC	DESCRIPTION
688	-DENOTES 10' EXISTING CONTOUR INTERVALS
	-DENOTES 2' EXISTING CONTOUR INTERVALS
688	-DENOTES PROPOSED CONTOUR WITH ELEVATION
	-DENOTES EXISTING TREE LINE
	-DENOTES PROPOSED LIMITS OF DISTURBANCE
100' RPA	-DENOTES 100' RESTRICTED PRESERVATION AREA
	-DENOTES LIMITS OF SIMULATED IED USE
	-DENOTES OVERHEAD UTILITY LINE
	-DENOTES PROPOSED SECURITY FENCE
	-DENOTES CHECK DAM LINED DITCH
FM FM	-DENOTES SANITARY SEWER FORCE MAIN
	-DENOTES FIRE APPARATUS SERVICE ROAD
	-DENOTES BALLISTIC WALLS
	-DENOTES DELINEATED WETLANDS
	-DENOTES GRAVEL SURFACE ROADS AND PARKING
	-DENOTES APHALT SURFACE ROADS AND PARKING
	-DENOTES DIRT SURFACE ROADS
	-DENOTES BUILDING AREAS
	-DENOTES TRANSITIONAL SCREENING AND BUFFER AREAS
10 STA.	-DENOTES NUMBER OF SHOOTING LANES
	-DENOTES DIRECTION OF SHOOTING
BMP	-DENOTES BEST MANAGEMENT PRATICE
	-DENOTES UTILITY POLES

IMPERVIOUS CALCS:

BUILDINGS:	9,024 SQ.FT.
ROADS & PARKING:	235,477 SQ.FT.
RATIO:	244,501/3,048,529= 8.02%
OPEN SPACE:	91.98%

PARKING TABULATION:

USE TYPE	REQUIREMENT	CALCULATION
INDUSTRY TYPES I, II, III	1-SP PER 1,000 SQ.FT. GFA PLUS 1-SP PER 400 SQ.FT. OF ACCESSORY OFFICE AREA OR 1-SP PER 2 EMPLOYEES ON THE LARGEST SHIFT WHICHEVER IS LESS	4,224/400= 11-SP 4,800/1,000= 6-SP
	TOTAL REQUIRED:	17-SP
	TOTAL PROVIDED:	34-SP

LOADING TABULATION:

REQUIREMENT	CALCULATION
1-SPACE FOR THE FIRST 5,000 SQ.FT. OF GROSS FLOOR AREA, PLUS 1-SPACE FOR EACH ADDITIONAL 30,000 SQ.FT. OR MAJOR FRACTION THEREOF.	9,024/5,000= 1-SPACE 4,024/30,000= 0-SPACE
TOTAL REQUIRED:	1-SPACE
TOTAL PROVIDED:	1-SPACE

REVISION BLOCK

DATE	DESCRIPTION	BY
3/15/18	PER TRC COMMENTS	D.W.R.
8/21/18	PER COUNTY COMMENTS	D.W.R.
11/01/19	PER OWNER MODIFICATIONS	D.W.R.
2/28/20	PER COUNTY COMMENTS	D.W.R.
5/10/20	PER COUNTY COMMENTS	D.W.R.

COMMONWEALTH OF VIRGINIA
DANIEL C. WEBB
LICENSE NO.
036528
5-10-20
PROFESSIONAL ENGINEER

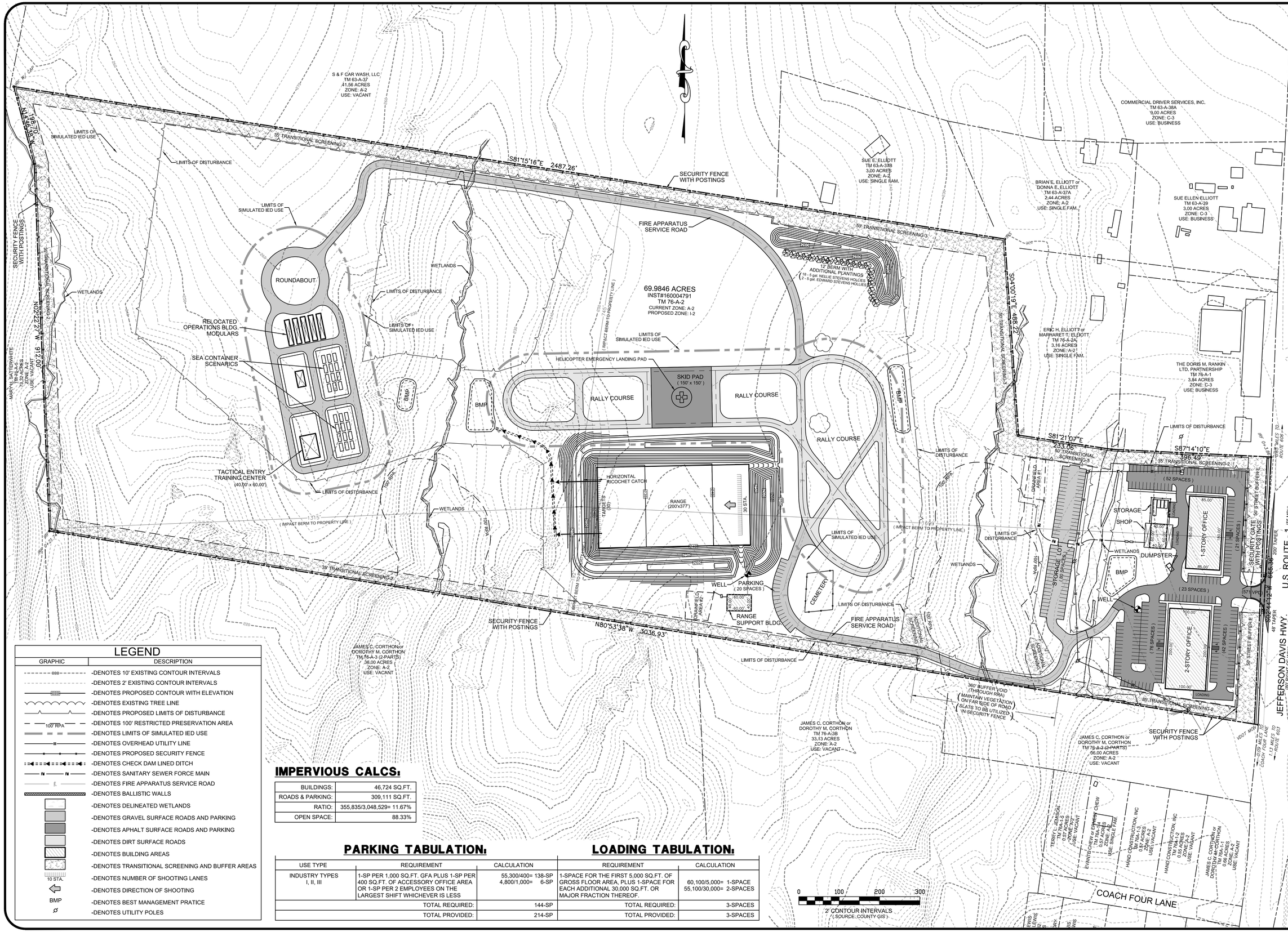
W W WEBB & ASSOCIATES, PLLC
ENGINEERING - SURVEYING - LAND PLANNING
11903 BOWMAN DRIVE, SUITE 106, FREDERICKSBURG, VA. 22408
OFFICE (540)371-1209 FAX (540)371-4650

GDP PHASE-1 MAX BUILDOUT

TEAM CRUCIBLE TRAINING COMPLEX

BERKELY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

DATE:	MAR. 27, 2017
SCALE:	1"= 100'
DESIGNED BY:	D.W.R.
DRAWN BY:	D.W.R.
CHECKED BY:	
ACAD FILE:	16D011GDP
DRAWING NO:	16-D-011
SHEET NO.	3
OF	6 SHEETS



LEGEND

GRAPHIC	DESCRIPTION
688	-DENOTES 10' EXISTING CONTOUR INTERVALS
	-DENOTES 2' EXISTING CONTOUR INTERVALS
688	-DENOTES PROPOSED CONTOUR WITH ELEVATION
	-DENOTES EXISTING TREE LINE
	-DENOTES PROPOSED LIMITS OF DISTURBANCE
100' RPA	-DENOTES 100' RESTRICTED PRESERVATION AREA
	-DENOTES LIMITS OF SIMULATED IED USE
	-DENOTES OVERHEAD UTILITY LINE
	-DENOTES PROPOSED SECURITY FENCE
	-DENOTES CHECK DAM LINED DITCH
FM FM	-DENOTES SANITARY SEWER FORCE MAIN
	-DENOTES FIRE APPARATUS SERVICE ROAD
	-DENOTES BALLISTIC WALLS
	-DENOTES DELINEATED WETLANDS
	-DENOTES GRAVEL SURFACE ROADS AND PARKING
	-DENOTES APHALT SURFACE ROADS AND PARKING
	-DENOTES DIRT SURFACE ROADS
	-DENOTES BUILDING AREAS
	-DENOTES TRANSITIONAL SCREENING AND BUFFER AREAS
10 STA.	-DENOTES NUMBER OF SHOOTING LANES
	-DENOTES DIRECTION OF SHOOTING
BMP	-DENOTES BEST MANAGEMENT PRATICE
	-DENOTES UTILITY POLES

IMPERVIOUS CALCS:

BUILDINGS:	46,724 SQ.FT.
ROADS & PARKING:	309,111 SQ.FT.
RATIO:	355,835/3,048,529= 11.67%
OPEN SPACE:	88.33%

PARKING TABULATION:

USE TYPE	REQUIREMENT	CALCULATION
INDUSTRY TYPES I, II, III	1-SP PER 1,000 SQ.FT. GFA PLUS 1-SP PER 400 SQ.FT. OF ACCESSORY OFFICE AREA OR 1-SP PER 2 EMPLOYEES ON THE LARGEST SHIFT WHICHEVER IS LESS	55,300/400= 138-SP 4,800/1,000= 6-SP
	TOTAL REQUIRED:	144-SP
	TOTAL PROVIDED:	214-SP

LOADING TABULATION:

REQUIREMENT	CALCULATION
1-SPACE FOR THE FIRST 5,000 SQ.FT. OF GROSS FLOOR AREA, PLUS 1-SPACE FOR EACH ADDITIONAL 30,000 SQ.FT. OR MAJOR FRACTION THEREOF.	60,100/5,000= 1-SPACE 55,100/30,000= 2-SPACES
TOTAL REQUIRED:	3-SPACES
TOTAL PROVIDED:	3-SPACES

REVISION BLOCK

DATE	DESCRIPTION	BY
3/15/18	PER TRC COMMETS	D.W.R.
8/21/18	PER COUNTY COMMENTS	D.W.R.
11/01/19	PER OWNER MODIFICATIONS	D.W.R.
2/28/20	PER COUNTY COMMENTS	D.W.R.
5/10/20	PER COUNTY COMMENTS	D.W.R.

COMMONWEALTH OF VIRGINIA
DANIEL C. WEBB
LICENSE NO.
036528
5-10-20
PROFESSIONAL ENGINEER

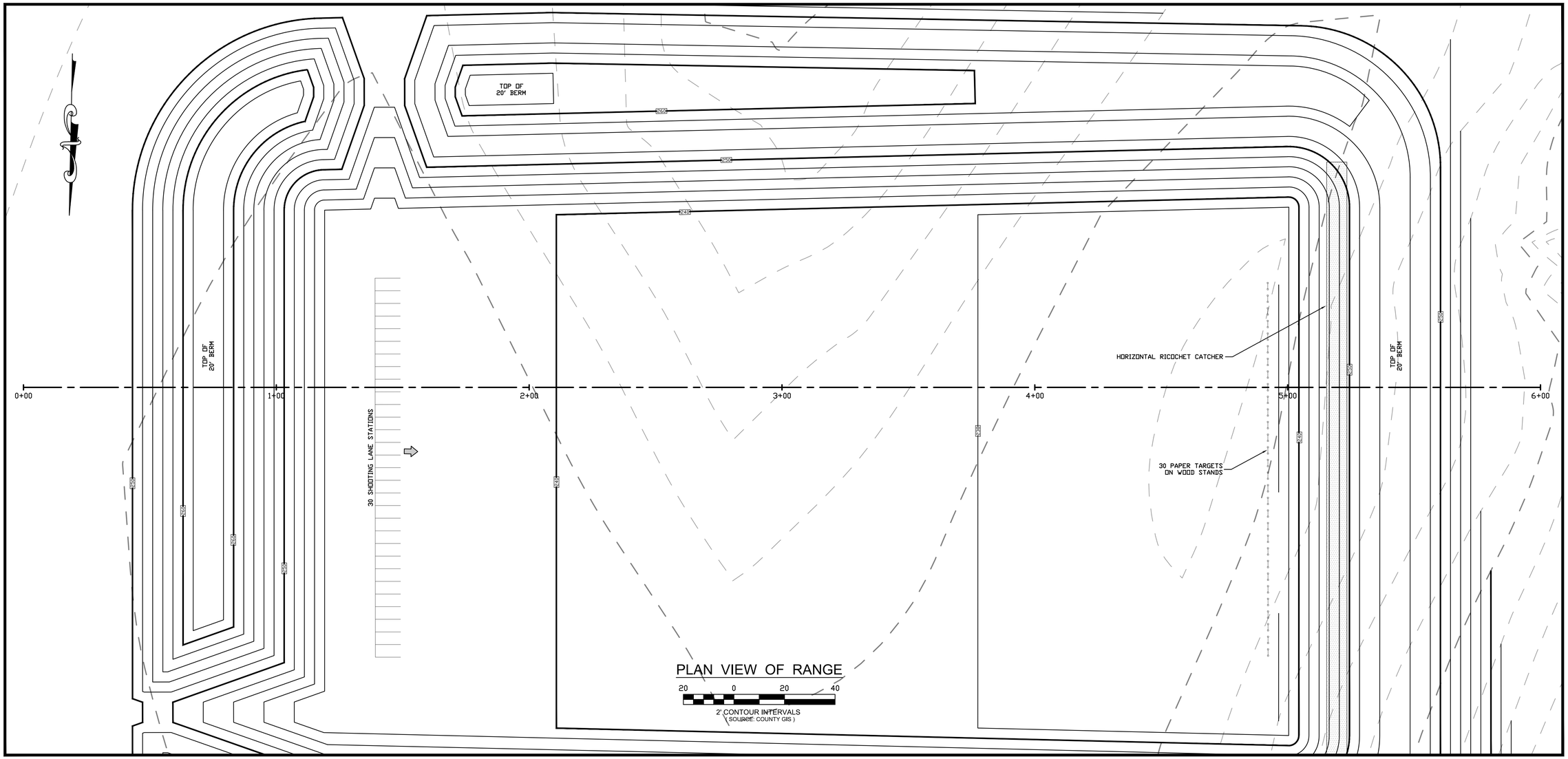
W W WEBB & ASSOCIATES, PLLC
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11903 BOWMAN DRIVE, SUITE 106, FREDERICKSBURG, VA. 22408
OFFICE (540)371-1209 FAX (540)371-4650

GDP PHASE-2 MAX BUILDOUT

TEAM CRUCIBLE TRAINING COMPLEX

BERKELY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

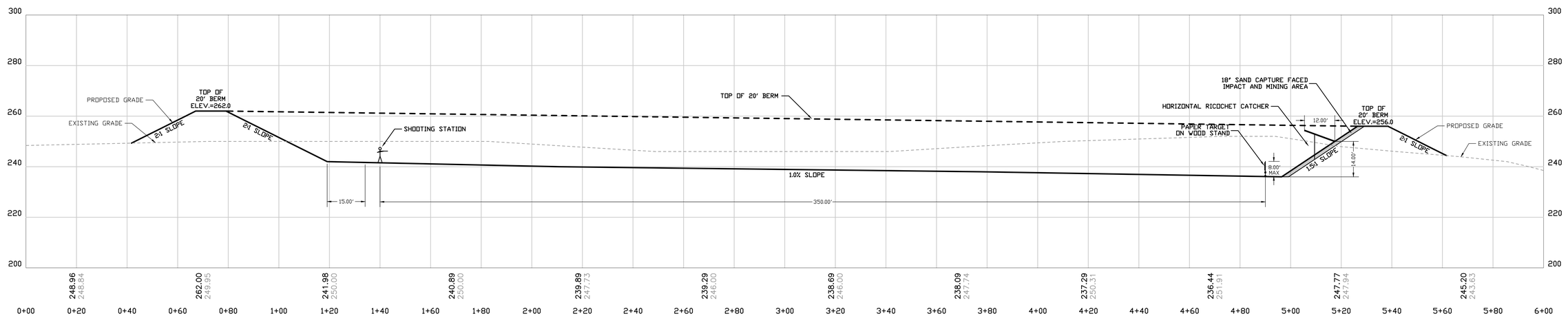
DATE:	MAR. 27, 2017
SCALE:	1"= 100'
DESIGNED BY:	D.W.R.
DRAWN BY:	D.W.R.
CHECKED BY:	
ACAD FILE:	16D011GDP
DRAWING NO:	16-D-011
SHEET NO.	4
OF	6 SHEETS



PLAN VIEW OF RANGE

20 0 20 40

2' CONTOUR INTERVALS
(SOURCE: COUNTY GIS)



PROFILE VIEW OF RANGE

20 0 20 40

REVISION BLOCK

DESCRIPTION	DATE	BY
PER TRC COMMENTS	3/15/18	D.W.R.
PER COUNTY COMMENTS	8/21/18	D.W.R.
PER OWNER MODIFICATIONS	11/01/19	D.W.R.
PER COUNTY COMMENTS	2/28/20	D.W.R.
PER COUNTY COMMENTS	5/10/20	D.W.R.

COMMONWEALTH OF VIRGINIA
DANIEL C. WEBB
LICENSE NO. 036528
5-20-20
PROFESSIONAL ENGINEER

W W WEBB & ASSOCIATES, PLLC
ENGINEERING · SURVEYING · LAND PLANNING
11903 BOWMAN DRIVE, SUITE 106, FREDERICKSBURG, VA. 22408
OFFICE (540)371-1209 FAX (540)371-4650

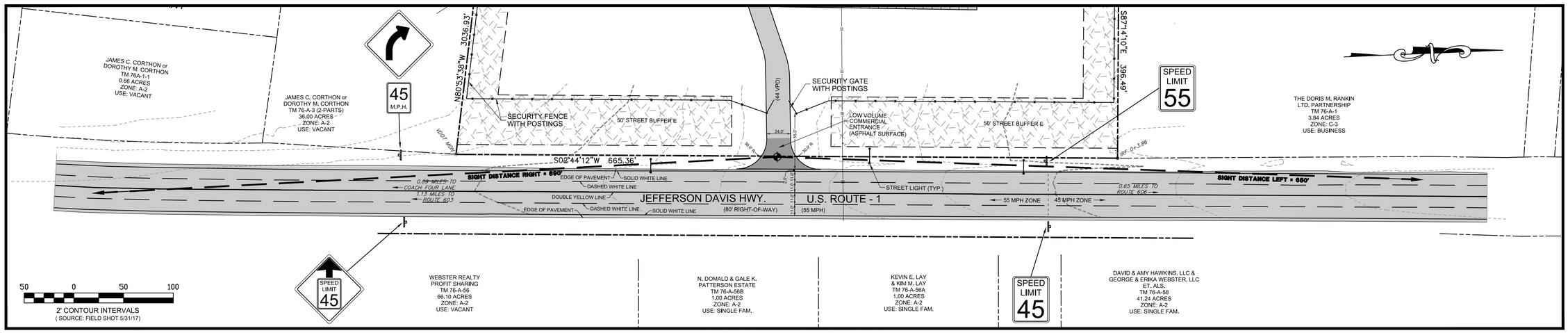
RANGE CROSS SECTION

TEAM - CRUCIBLE TRAINING COMPLEX

BERKELY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

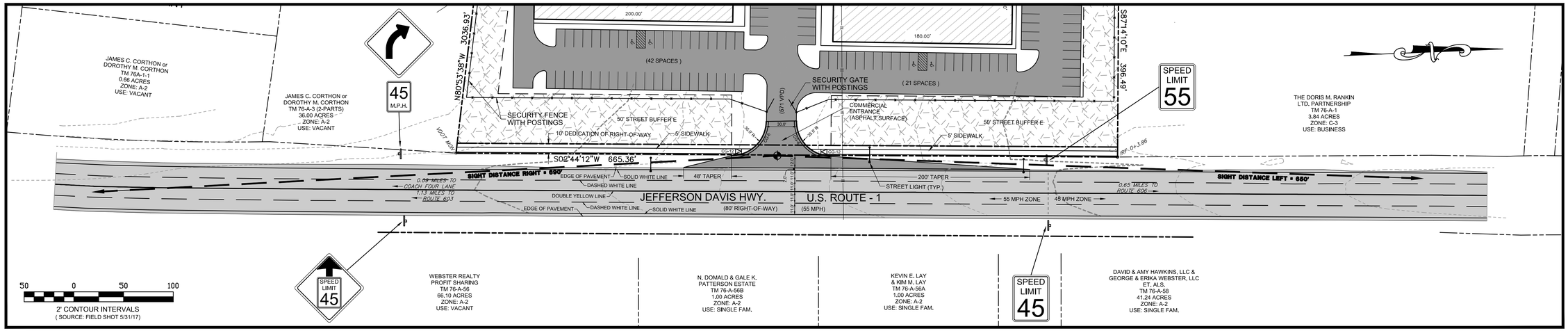
DATE:	MAR. 27, 2017
SCALE:	1"= 100'
DESIGNED BY:	D.W.R.
DRAWN BY:	D.W.R.
CHECKED BY:	
ACAD FILE:	16D011GDP
DRAWING NO:	16-D-011

SHEET NO. 5
OF 6 SHEETS



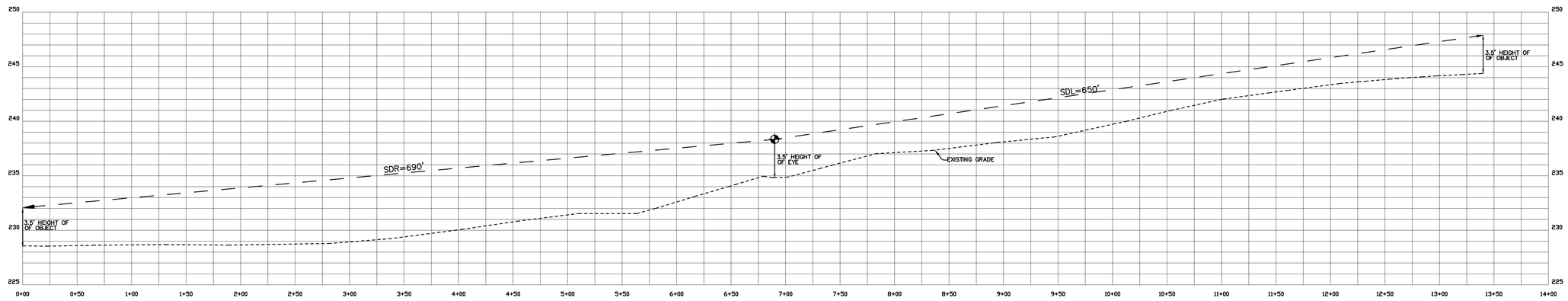
INITIAL BUILDOUT PLAN

SCALE: 1"=50'



FINAL BUILDOUT PLAN

SCALE: 1"=50'



ROAD PROFILE

SCALE: 1"=5'(VERTICAL)
SCALE: 1"=50'(HORIZONTAL)

REVISION BLOCK

DESCRIPTION	DATE	BY
PER TRC COMMENTS	3/15/18	D.W.R.
PER COUNTY COMMENTS	8/21/18	D.W.R.
PER OWNER MODIFICATIONS	11/01/19	D.W.R.
PER COUNTY COMMENTS	2/28/20	D.W.R.
PER COUNTY COMMENTS	5/10/20	D.W.R.

COMMONWEALTH OF VIRGINIA
DANIEL C. WEBB
LICENSE NO.
036528
5-10-20
PROFESSIONAL ENGINEER

W W WEBB & ASSOCIATES, PLLC
ENGINEERING - SURVEYING - LAND PLANNING
11903 BOWMAN DRIVE, SUITE 106, FREDERICKSBURG, VA. 22408
OFFICE (540)371-1209 FAX (540)371-4650

ENTRANCE PLAN

TEAM - CRUCIBLE TRAINING COMPLEX

BERKELY MAGISTERIAL DISTRICT
SPOTSYLVANIA COUNTY, VIRGINIA

DATE:	MAR. 27, 2017
SCALE:	1"= 100'
DESIGNED BY:	D.W.R.
DRAWN BY:	D.W.R.
CHECKED BY:	
ACAD FILE:	ENTRANCE
DRAWING NO:	16-D-011

SHEET NO. 6 OF 6 SHEETS

SPECIAL USE APPLICATION
(Please type or print)

07/01/2016

Date: 4-28-17 Case: SUP17-0003

110-0000-316-16-08 (395)	Mailing	$ 21.58
260-0000-318-99-14	Intake Process. Fee	$ 57.50
110-0000-316-16-08 (395)	Planning	$ 2,385.00
110-0000-316-16-10 (334)	GIS	$ 241.75
260-0000-313-03-45	Zoning	$ 483.50
	Total Filing Fee:	$3,189.33

Team Crucible, LLC
Applicant's Name

60 Jack Ellington Road
Applicant's Address

Fredericksburg, VA 22406
City, State, Zip Code

jgarman@team-crucible.com
Applicant's E-mail Address

540-752-2800
Applicant's Telephone No.

Charles W. Payne, Jr.
Agent's Name (Point of Contact for Application)

725 Jackson Street, Suite 200
Agent's Address

Fredericksburg, VA 22401
City, State, Zip Code

cpayne@hf-law.com
Agent's E-mail Address

540-604-2108
Agent's Telephone No.

Property Owner Information:

If Applicant is not the owner, attach documentation of owner's consent

Radio Reconnaissance Technologies, Inc.
Name

3328 Bourbon Street | Fredericksburg, VA 22408 | 540-752-7448
Address | City, State, Zip Code | Telephone No.

Parcel Location: 6116 Jefferson Davis Hwy

Tax Map Parcel Number: 76-A-2 Acreage: 69.9846 acres

Zoning District: A-2 Overlay District: n/a

Proposed Use: Develop a security training facility (Industry, Type III) in coordination with rezoning application request to I-2.

To: The Board of Supervisors of Spotsylvania County, Virginia. The above named applicant(s) hereby petition(s) for the approval indicated above for the described property and as shown on the attached plan made a part of this Application and certifies that the information provided is correct.

Radio Reconnaissance Technologies, Inc.

By: _____ 28 April 2017 Nicholas E. Hoben, President
Signature of Owner (or Agent with POA*) Date Print Name

_____
Signature of Owner (or Agent with POA*) Date Print Name

*I have read this Application, understand its intent and freely consent to its filing. Futhermore, I have the power to authorize and hereby grant permission for Spotsylvania County Officials and other authorized government agents on official business to enter the property to process this Application.

Voting District:_____ Census Tract:_____ Traffic Analysis Zone:_____
(To be completed by the Planning Department after submission)

SPECIAL POWER OF ATTORNEY AFFIDAVIT

COMMONWEALTH OF VIRGINIA
COUNTY OF SPOTSYLVANIA

This 28th day of April, 20 17, I, John R. Garman, President, of Team Crucible, LLC, the Applicant (circle one) of Tax Map 76-A-2 (describe land by tax map number) make, constitute, and appoint Charles W. Payne, Jr., my true and lawful attorney-in-fact, and in my name, place and stead giving unto said Charles W. Payne, Jr. full power and authority to do and perform all acts and make all representation necessary, without any limitation whatsoever, to make Application for said Special Use Application.

The right, powers, and authority of said attorney-in-fact herein granted shall commence and be in full force and effect on 28 April, 20 17, and shall remain in full force and effect thereafter until actual notice, by certified mail, return receipt requested is received by the Planning Department of Spotsylvania County stating that the terms of this power have been revoked or modified.

Given under our hands this 28th day of April 20 17.

Owner/Contract Purchaser/Authorized Agent (Circle One)

COMMONWEALTH OF Virginia

CITY/~~COUNTY~~ OF SPOTSYLVANIA, to wit:

The foregoing instrument was acknowledged before me by John R. Garman, President, of Team Crucible, LLC, the Applicant, of said property, this 28th day of April, 20 17.

My commission expires: June 30th, 2018

Notary Public

7601258

Registration Number

Ronald Gene Childress
NOTARY PUBLIC
Commonwealth of Virginia
My Commission Expires June 30, 2018

OFFICE USE ONLY

File/Case Number _____ Date Accepted _____, 20____

GENERALIZED DEVELOPMENT PLAN – NARRATIVE
REZONING & SPECIAL USE PERMIT APPLICATIONS

Applicant:	Team Crucible, LLC ("Applicant") 60 Jack Ellington Road, Fredericksburg, VA 22406
Owner:	Radio Reconnaissance Technologies, Inc. ("Owner") (hereafter the Applicant and Owner shall collectively be known as the "Applicant")
Representative:	Charles W. Payne, Jr., Hirschler Fleischer 725 Jackson Street, Suite 200, Fredericksburg, VA, 22401 Phone: (540) 604-2108; Fax (540) 604-2101; Email: cpayne@hirschlerlaw.com
Project Name:	"Team - Crucible Training Complex"
Property:	Spotsylvania County Tax Parcel 76-A-2, consisting of approximately 69.9846 acres (collectively, the "Property")
Date:	May 11, 2020
GDP:	Generalized Development Plan, entitled "Team - Crucible Training Complex", prepared by W W Webb & Associates, PLLC, originally dated March 27, 2017, as last revised May 10, 2020, attached hereto and marked as Exhibit A (the "GDP")
Rezoning Request:	From A-2 to I-2
Special Use Permit Request:	Allow the operation of a security training facility Pursuant to §23-6.22.4 (12)
Rezoning File No.:	R17-0005 & SUP17-0003

I. Project Overview

The Applicant is requesting both a rezoning request from the Agricultural 2 District ("A-2") to the Industrial 2 District ("I-2"), and a special use permit for purposes of developing and operating a high-level security training facility for both governmental and private organizations on the Property. The Applicant desires to relocate its current facility from Stafford, Virginia, where it has been operating for over 18 years, to Spotsylvania County. During the aforesaid 18 year period, the Applicant has trained over 25,000 persons for a variety of security clients, including

without limitation U.S. agencies such as: the Department of State, Justice Department, and Department of Defense; several large U.S. private companies; foreign companies; and State and local government agencies. Corporations trained include those holding contracts with the agencies listed above and those employing professionals traveling to high-risk areas. Applicant does not permit "open classes" for attendance by the general public or host competitions. Clients attending training programs learn basic and advanced skills in tactical medicine, vehicle operation, small arms tactics, and individual protective measures. A representative sample of teaching topics is provided below:

Tactical Medicine
- Hemorrhage control
- Airway management
- Self aid / Buddy aid
- Tourniquet use
- Pressure dressings
- Needle decompression
- Treatment of sucking chest wound
- Treatment of burn and blast injuries
- Patient carries

Small Arms Tactics
- Weapons manipulations
- Weapon qualification
- Electronic sites
- Use of barricades
- Shooting in depth
- Team movement
- Reactions to contact
- Known distance firing
- Weapon concealment
- Close confrontational shooting

Vehicle operation
- Hard surface driving
- Broken and unimproved roadway
- Off road driving
- Threshold breaking
- Traction control
- Vehicle weight transfer
- Swerve to avoid
- Line theory
- Traction transition
- Barricade breaching
- Convoy operations

Individual Protective Measures
- Hand to hand combat
- Route analysis
- Surveillance detection
- Attack recognition
- Hostage survival
- Communication
- Use of night vision goggles
- Land navigation
- Conduct of personal security details

The Applicant's Project includes the use of the Property (as described herein) totaling approximately 69.9846 acres of land. The Property is situated in a mostly rural and undeveloped area located in the Berkeley magisterial and voting districts. It is further located along Jefferson Davis Highway, north of the intersection of Coach Four Lane and Route 1, and south of the intersection of Morris Road and Route 1. The Property is bordered on the West by vacant agricultural land. There is a residence and Route 1 bordering the property to the East. Further, there is vacant land and the "Matta River Estates" located to the West of the Project, and vacant agricultural land and a residence is located to the immediate North of the property. There are also commercial uses, such as the CDS Tractor Trailer Training center, an auto body shop, numerous auto sales facilities, and a strip mall containing Food Lion, Family Dollar and other retail uses located along Route 1 to the North of the aforesaid adjacent parcels.

Section 23-6.22.1 of the County's Zoning Ordinance states that the purpose of the I-2 zoning district is to "provide locations for medium and heavy industrial uses." The Applicant anticipates that the Project will initially be a "medium intense" development plan and generally include a modular office with parking area, maintenance buildings and an existing one story metal building to support the training activities, all which are generally shown and depicted on the GDP. Phase-1 Max build-out of the Project will also include one (1) firing range, a rally track, and a scenario area, all as generally shown on the GDP. The firing range will include a minimum of 20 foot high earthen berms or HESCO[1] like barriers for the entire perimeter of the range, all as generally shown on the GDP. Additionally, the impact area, identified on the GDP, will include a layer of impact sand for bullet capture. Further description of the range design is found in Section XIII. The rally track will consist of dirt and unimproved surfaces and will be utilized for security training scenarios. The Applicant will also contract with Dominion Raceway for additional driver training activities. The outdoor operations operating hours for the facility are proposed as from 8:00 am to 10:00 pm, Monday through Friday; and 9:00 am to 5:00 pm on Saturday; and 10:00 am to 4:00pm on Sunday, including certain other limitations all as provided more particularly in the attached proffer statement.

The Phase-2 Max build-out of the Project will include generally the construction of a training/office facility; another office building; a partially enclosed Tactical Entry Training Facility; the relocated operations building modular; and an additional scenario training area, all as shown on the GDP. None of the buildings will exceed 50' in height. Commencement of build out is dependent on market situations and government requirements. The two existing one-story metal buildings currently on the Property will remain and be used for training, maintenance and storage spaces.

The Phase-1 Max build-out will support current operations and provide for a daily load of 50 students per day. The Phase-2 Max build-out will support a daily load of 90 students per day. Further description of student throughput and operational examples can be found in Exhibit B.

The GDP reflects approximately 61.82 acres of open space accounting for 88.33% of the Property. This exceeds the 10% open space minimum required by the I-2 district. Applicant will maintain natural areas where reasonably possible, and vegetation and trees that must be removed in order to develop the Property will be replanted in the areas shown on the GDP. All existing vegetation will remain undisturbed in the designated perimeter buffer areas shown on the GDP, except (1) the area where the road nears the southern parcel boundary; and (2) the area needed to install and maintain the perimeter fence.

The Project also includes significant buffering areas, including large sections of wooded areas along the southern, western and northern borders of the Property. In addition, plantings for sound and visual screening will be specifically located along the property lines adjacent to Parcels 63-A-37B, 63-A-37A and 76-A-2A, all as generally shown on the GDP.

[1] HESCO is made of a collapsible wire mesh container and heavy duty fabric liner, and used as a blast wall against explosions or small-arms.

Adjacent properties consist of a combination of agriculturally zoned properties with residences and vacant properties. The Applicant's proposal will be compatible with existing uses in the area, including the commercial and agricultural uses. The Project will also include appropriate buffering, including extended 50 foot buffers along the portion of the Property fronting Jefferson Davis Highway (Route 1); 50 foot buffers along adjacent properties 63-A-37B, 63-A-37A and 76-A-2A; and buffers along additional portions of the Property's perimeter, as shown on the GDP.

As described below, the Applicant's proposal conforms to the policies established by the County's Comprehensive Plan (the "Comp Plan"). As noted above, the Project will be a medium intense industrial use with traffic patterns not occurring during peak AM or PM hours, and will include extensive buffering, safety and noise mitigation measures. Furthermore, the proposal will result in minimal impacts on public facilities and services, including no impacts to schools and parks, and minimal impacts to the immediate transportation network.

In addition, the Project will generate positive economic development opportunities, including new jobs, lodgings, food, real estate and sales tax revenues. In this regard, the Applicant retained distinguished economist Stephen S. Fuller, Ph.D., who is a University professor and the Director of the Stephen S. Fuller Institute and the Dwight Schar Faculty Chair in the Schar School of Public and Government at George Mason University in Arlington, Virginia. Dr. Fuller's report, dated July 2017, and titled "The Economic and Fiscal Impact of the Proposed Team Crucible Training Complex on Spotsylvania County, Virginia", a copy of which is provided with this application ("Economic & Fiscal Report", attached as Exhibit F), states, in relevant part, the following:

- The proposed Team Crucible Training Complex in its initial phase would generate both positive economic and fiscal benefits for Spotsylvania County. These benefits will be generated by the construction spending required to prepare the site for initial operations and by future construction spending to buildout the site for expanded operations by Team Crucible and to provide office space for other federal security contractors at a future time and be measured by increased job and income growth to the benefit of residents and businesses located in Spotsylvania County.

- The initial construction spending of $1.1 million would contribute a total of $1.7 million to the County's economy during the construction period, generate $341,000 in new wage income for workers residing in the County and support a total of 7.3 full-time, year-round equivalent jobs locally and elsewhere. These economic benefits would be achieved exclusively during the construction period.

- These positive construction impacts are complemented by the annual operating outlays by Team Crucible and by the per diem spending of trainees enrolled in security training programs on-site. In its initial stage, Team Crucible estimates an annual operating budget totaling $940,000. This budget provides for four full-time, regular on-site employees supplemented by 20 contract trainers. This level of operations would support 2,650 daily visits (trainee days) annually on-site generating per diem local spending for accommodations and meals totaling $363,000. At this initial scale, the total impact of

operations outlays, including trainee expenditures, would contribute $1.9 million to the County's economy each year, generate $538,000 in new local labor income for workers residing in the County and support a total of 12.5 full-time, year-round equivalent jobs beyond those employed at the Training Complex.

- The buildout proposal for this site provides for the expansion of Team Crucible's Training Complex by 12,000 square feet and the addition of 40,000 square feet of office space that would be available to other federal security contractors. This added capacity for Team Crucible would accommodate up to 10,000 daily visits (trainee days) annually and requires annual operating outlays totaling $5.3 million. This scale of operation would include 15 full-time regular employees on-site with up to an additional 75 contract trainers. Inclusive of the annual flow of trainees and their spending for accommodations and meals (not including other personal outlays for retail and incidentals), the buildout proposal would generate $6.7 million in annual (recurring) spending directly to the benefit of the local economy. This direct spending, reflecting a composite multiplier of 1.511, would contribute a total of $10.1 million to the County's economy, generate $2.2 million in new wage income for County residents working within the County, and support a total of 65 jobs of which 39 full-time, year round equivalent jobs would be held by County residents.

- Complementing the positive income and employment benefits that would accrue to Spotsylvania County, its resident workers and businesses, Team Crucible's proposed Training Complex has been shown to generate a positive fiscal benefit to the County in its initial stage of operation (+$15,823.40) with its net fiscal benefit increasing at the full buildout scale of operations (+$63,681.50).

- The net fiscal benefit of Team Crucible's proposal is conservative as its revenue impacts are underestimated by design (they reflect non-residential revenue flows that incorporate tax exempt uses) and they reflect non-residential public expenditure demand (for County provided services) that assume access to services that would not be required to support Team Crucible's daily functions. These economic and fiscal benefits are summarized in the following table.

Economic and Fiscal Impacts of the Proposed Team Crucible Training Complex on Spotsylvania County (in millions of 2016 dollars)

Phases	Direct Outlays	Total Output	Personal Earnings	Jobs Supported
Initial proposal				
Construction	$1.100	$1.687	$0.341	7.3
Operations	$0.904	$1.375	$0.291	8.5
Trainee Spending	0.363	0.538	0.110	4.0
Total Operations	$1.267	$1.913	$0.401	12.5
Buildout				
Construction	$5.500	$8.436	$1.704	36.3

Operations	$5.319	$8.087	$1.709	49.8
Trainee Spending	1.370	2.023	0.413	15.3
Total Operations	$6.689	$10.11	$2.122	65.1

Fiscal Impacts

Jobs	Revenues	- Expenditures	= Fiscal Impact
Initial			
24	$31,805.96	$15,982.56	$15,823.40
Buildout			
90	$88,778.60	$59,934.60	$28,844.00
295	$260,136.80	$196,455.30	$63,681.50

Dr. Fuller also provided the following additional information in response to County comments:

- The economic impact analysis in the report describes how the spending by Team Crucible would enlarge the County's economy. The beneficiaries of this economic activity would depend on what businesses are in a position to capture this new business and then actively market for it. Hotels and restaurants that want this business and reach out to welcome this business will be more successful than ones that wait to see if this new business will come to them.

- In the economic analysis, the spending of trainees was included up to their per diem level. What was excluded from the analysis was potential spending beyond the per diem levels that would take place for necessity goods, retail and recreation services, and transportation services. The limitation of trainee spending to per diem only results in the likely under-estimation of these economic benefits on local businesses. This is a conservative analysis.

- If adjacent properties were rezoned for commercial use, their value would be enhanced by the presence of the proposed facility. If adjacent properties remain as zoned agricultural with residential houses, property values would not be affected by the proposed project. See Exhibit H letter regarding Crucible's effect on property by Christian P. Kaila, MAI, SRA.

- If the market in the County is strong for development, the values of vacant land will rise; market pressures and zoning would have a much greater impact than adjacent land use.

II. Comprehensive Plan

Future Land Use Map

This rezoning and SUP application is consistent with the goals and guidance provided in the County's Comprehensive Plan ("Plan"). The Plan's Future Land Use Map classifies the Property as part of the "Employment Centers" designation. The Employment Centers Land Use category is intended to encourage "new office and industrial development within the County, with the focus on larger scale office complexes, industrial users, and business parks." The Comp Plan also encourages the rezoning of land to industrial/office uses in areas designated for Employment Center uses, consistent with this Project. According to the Comp Plan, "both light and heavy industrial uses are appropriate and should be encouraged within the Employment Center category with the careful consideration of their location and transition to adjoining properties."

From a transportation improvements perspective, the Project will improve Jefferson Davis Highway (Route 1) in this area. The Applicant is proposing to make improvements accessing the site from Route 1, including deceleration and acceleration tapers into and out of the Property, all as shown on the GDP.

This Project furthers multiple objectives of the Comp Plan, including achieving residential/commercial tax rate goals and creating local jobs. Projects that generate new jobs and positive tax revenues as compared to County costs are encouraged under the Comp Plan, and further assist the County in meeting its 70% (residential) to 30% (commercial) mix tax revenue goals. Accordingly, the Project is in line with the County's tax revenue goals as it will generate additional tax revenues and local jobs.

This Project addresses the following Guiding Principles and Policies as outlined in Chapter 1 of the Comp Plan:

A. Spotsylvania County is a "business friendly" community and local job creation is a priority.

1. Encourage business investment in the County and promote the relocation of federal and state agencies to the County, providing more opportunities for Spotsylvania County residents to work in the County.

3. Encourage the rezoning of land to industrial/office uses in areas designated for Employment Center uses and the revitalization of older, underperforming commercial, office, and industrial developments.

B. Spotsylvania County is fiscally sustainable.

1. Achieve a 70/30 mix of residential to commercial/industrial development (based on assessed value), and the annual growth of the industrial and commercial tax base at a rate greater than 2%.

b. Consider proactively rezoning certain areas to promote business development.

c. Diversify the non-residential tax base by encouraging a wide variety of businesses to locate in the County.

2. Development projects seeking increased residential density and/or non-residential intensity should address impacts that are specifically attributable to the proposed development.

a. Each development proposal should include sufficient information to fully evaluate its impacts.

This Project also addresses the following Employment Center Land Use Policies, as outlined in Chapter 2 of the Comp Plan:

11. Encourage the retention and expansion of existing business operations as well as the attraction of new businesses and investment; and

12. Encourage a balance of uses within the Employment Center category to include light industry, heavy industry and office uses.

Primary Development Boundary

The Comp Plan's Future Land Use Map establishes a Primary Development Boundary (the "PDB"). The Comp Plan states that public water and sewer will be provided to properties within the PDB, and denser development will also be permitted in such locations. The Property is located within the PDB, supporting the proposed density and the Property's utilization of public utilities.

Notwithstanding the foregoing, public water and sewer is approximately 2,000 feet away from the site, and thus it is not feasible (at this point), to extend utilities to the site. Thus, during Phase-1 Max buildout of the Project, the Project will be served by well and septic systems, all as noted on the GDP. The Applicant will extend public water and sewer utilities prior to the construction of 55,300 square feet of overall office space and other facilities, as shown on the GDP.

III. **Land Use**

As noted above, the Applicant proposes rezoning the Property from A-2 to I-2. As required by the County's rezoning application packet, please note the following features:

a) Uses. The Property is currently undeveloped. As noted above, the Applicant will use the Property as a security training facility, which is considered "Industry - Type III" and is permitted with a SUP under Section 23-6.22.4 (12) of the County Ordinance.

b) Maximum Lot Coverage and Floor Area Ratio (FAR). The total area tabulation of the Property is 3,048,529 square feet. The maximum FAR is 1.5 and the proposed square footage for the facility at final buildout is 46,724 square feet or 0.015 FAR.

c) Buffering from Adjoining Properties, Access Plan, Landscaping and Screening. All landscaping, access and buffering for the site will be in conformance with the requirements of the applicable sections of the Ordinance regarding the proposed use, all as depicted on the GDP. The project will be accessed via Jefferson Davis Highway (Route 1).

d) Maximum Height of Buildings. The maximum height of any building on the Property shall not exceed applicable County Ordinance requirement for I-2 uses. The proposed building height for this use will be within County Ordinance limits, and no higher than 50 feet, as depicted on the GDP.

e) Special Amenities. Approximately 88.33% of the Property will be maintained as open space. The open space will be used for storm water management facilities, buffering and natural areas, as shown on the GDP.

f) By Right: The Property is currently zoned A-2 and potentially has access to public utilities. Thus, the Property could yield ten (10) single family detached dwelling units, creating higher demand on schools, emergency services, and road infrastructure.

IV. Cultural Resources

Based on review of the Comp Plan and information from the Virginia Department of Historic Resources and the United States Department of the Interior, the Property does not have any cultural resources. However, upon survey of the Property after purchase, it was noted that a cemetery does exist. The Applicant has already taken measures (including fencing the cemetery area) to ensure that the cemetery is not disturbed during the proposed build out as well as once operations begin. The cemetery will remain buffered and access will be allowed in accordance with applicable State law. Additionally, the Property is not located in the County's Historic Overlay District.

V. Fire and Rescue

The proposal will have minimal impact on the County's fire and rescue facilities. Thornburg Fire and Rescue Station 8, located less than one mile north of this site, will provide the Property with quick access to emergency services. The Applicant conducts annual internal fire inspections to confirm all fire safety practices and preparation measures. Further, the Applicant coordinates with local fire and rescue to familiarize County emergency response resources with Applicant's facilities and practices. These annual inspections and coordination with County services bolsters our organic fire response mechanisms while creating a stronger transition capability should fire and rescue resources be required.

Applicant met with the Emergency Management Division Chief and other Fire, Rescue and Emergency Management ("FREM") officials on August 9, 2017. Applicant discussed the design characteristics and activities proposed for the facility. Roads are designed to provide FREM response vehicles access to all developed areas of the facility (as shown on GDP). Applicant agrees that coordination with local FREM is always a good practice for the safety of our clients and employees and the safety of any responding FREM personnel. Applicant expects to continue the dialog and provide an emergency management plan for their comment and documentation. Applicant further expects to hold annual review/training sessions to prepare for a response should the FREM be amenable and available.

VI. Schools

This project will have no impacts on schools.

VII. Parks and Open Space

This project will have no impacts on County park services and the open space percentage for the site is 88.33%, all in accordance with applicable County ordinances.

VIII. Housing

Impacts on existing residences in the vicinity of the Property will be mitigated through appropriate buffering design, operations safety and sound mitigation measures, as discussed in more detail below. The open space areas will provide buffering along some property lines. Furthermore, as depicted on the GDP, transitional screening areas will buffer the proposed development from existing residential uses, including 50 foot buffers along adjacent properties 63-A-37B, 63-A-37A and 76-A-2A, and other areas as depicted on the GDP.

Additionally, Applicant retained a professional and local real estate appraisal firm known as the Appraisal Group of Fredericksburg. Professional appraiser, Christian P. Kaila, MAI, SRA prepared a value impact analysis of the properties adjacent to the Applicant's current site in Stafford County. Mr. Kaila's task was to identify any loss of property value on the subject properties that may be attributed to Applicant's operations or presence in Stafford County over the past 16 years. Mr. Kaila concluded that the proposed facility in Spotsylvania County, like in Stafford County, would not have any effect on surrounding or nearby property values in a negative (or a positive) manner. In fact, his conclusions were that the Applicant's proposed facility would simply be a non-factor as to value impacts, and the greater factor to property values is typically location. Meaning the more rural a property, typically the lower the value, whether close to the proposed facility or beyond a mile away from the facility. We have included his report with this application and is attached hereto and marked as Exhibit H for your review.

IX. Water and Sewer

As noted above, the Property is located within the PDB, but given the distance of existing utilities, it is not feasible during the Phase 1 Max build-out of the Project to extend public utilities to the said site. Thus, the Applicant plans to utilize well and septic systems for the Phase 1 Max build-out of the Project. The Applicant will extend public water and sewer utilities prior to the construction of 55,300 square feet of overall office space and other facilities as shown on the GDP.

X. Environment

The Project's design will minimize the impact to the natural topography and vegetation located on the Property. While there are both wetlands and RPAs on the site, they are limited in area, and Applicant intends to utilize low impact development methods to address surface water and storm water management matters to the extent reasonably practical and feasible. The general lay of the Property has three topographic highs where the development will be implemented and two topographic lows between them. When the Property was purchased, the low area nearest the front portion of the Property had a culvert pipe lying adjacent to the crossing and a gravel ford was

in use for passing. The owner replaced the existing pipe and stabilized the crossing to minimize future erosion that had been present in the condition when purchased. Going from the next topographic high to the back portion of the Property will have one proposed crossing to access the buildout to the scenario area. This crossing is placed in a location that minimize any wetland disturbance and is at the furthest point on the property outside of the RPA limits to reduce impacts.

XI. Lead Mitigation

Understandably, the potential for lead migration from the range needs to be addressed. To address this issue, the Applicant plans on developing and implementing an Environmental Stewardship Plan ("ESP") prepared by a recognized expert in this field according to Environmental Protection Agency ("EPA") guidelines. A Stormwater Pollution Prevention Plan will be confirmed at the site plan stage in order to ensure conformance to the ESP, both of which will be reviewed and validated by the County. Additionally, the high concentration of clay soil in this portion of Virginia and on the Property makes this an ideal location for the proposed activity because the clay protects the groundwater and makes reclamation a less intrusive process. Sand traps with a clay base ensure that bullet containment is handled appropriately. The Applicant's plans for using lime on the range floor maintains an EPA recommended pH level that further mitigates any possibility of lead migration to areas other than planned, as demonstrated in Best Management Practices for Lead Outdoor Shooting Ranges, EPA-902-B-01-001, Revised June 2005. A well-designed range will slow runoff ensuring water and particulates are maintained in check dams, as shown in the GDP. The Applicant will continue its long held practice of recording the number of rounds expended to support planned reclamation efforts. Specifically, the Applicant will annually account for accumulated fired rounds for purposes of determining lead reclamation activities based on round count and soil measurement procedures as set forth in its ESP, as may thereafter be updated or amended. This round count will be available to the County on request. The Applicant's activities are regulated by local and State authorities and are subject to review/audit from time to time.

The range will be designed to follow Best Management Practices for Lead Outdoor Shooting Ranges, EPA-902-B-01-001, Revised June 2005 ("EPA Manual"), to mitigate lead migration. Applicant hired Metals Treatment Technologies, LLC (MT2) to review their plans and conformance to the EPA Manual. MT2 has provided an environmental impact letter, attached hereto as Exhibit C, detailing key design features, which the Applicant will provide. These design features include:

- Application of lime on range floor and other areas, based on periodic measurements keep pH levels above 6.5, thus reducing the potential for lead to leach into the environment
- Designed grading to promote sheet flow to slow water leaving range directed to drainage swales;
- Maintaining grass in drainage swales and installing granular limestone check dams;
- Water retention structures designed to either enhance infiltration, which will be lined with limestone cobbles, or evaporation based on a professional engineer's design; and;
- Regular accounting of accumulated bullets to assist in determining timing of periodic lead reclamation activities.

The partially enclosed Tactical Entry Training Facility will be covered to prevent precipitation from entering it and thus prevent migration of lead particulates. Lead decontamination techniques will also be implemented in the Tactical Entry Training Facility to reduce environmental and health impacts. These techniques include the use of bullet traps to capture projectiles and periodic cleaning using High-Efficiency Particulate Air (HEPA) vacuums and wet wipe cleaning of walls and flat surfaces.

For purposes of Proffers to address environmental matters, please see attached Proffer Statement.

XII. Sound Mitigation

Applicant has retained Institute of Noise Control Engineering (INCE) Board Certified, National Technical Specialist for Acoustics and Vibration sound expert Erich Thalheimer of WSP USA, Inc. to verify that the proposed design will minimize the effects of noise. Mr. Thalheimer has been a part of the project design since inception and noise mitigation efforts of the Applicant since 2012. His study, entitled "Crucible Spotsylvania Acoustical Assessment" and dated November 18, 2019, is attached hereto as Exhibit D. Sound mitigation will include 20 foot high earthen berms around the perimeter of the range. Based on the berm height of 20 feet, line of site to any neighbors is impossible. This provides for additional measures of safety as well as greatly limits noise. Finally, the range will be limited to Handguns, Shotguns carbines of .300 Blackout caliber or less. Rifles will be equipped with suppressors, unless specifically directed by contracting authorities to not use suppressors for training or otherwise. In the event Applicant must train without suppressors on the rifles, or is directed by the government to train with rifles without suppressors, it will notify the Spotsylvania Sheriff's Office and the County's Zoning Office at least 24 hours prior to such training. Scenarios involving loud noise outside of the range will be limited to daylight hours without exception, to commence only after 8:00 a.m. Monday through Friday, and after 9:00 a.m. Saturday and 10:00 a.m. on Sunday. Simulated IED locations are confined to scenario areas defined on the GDP and will be buried to direct sound in an upward direction. Additional measures to mitigate noise include vegetation on earthen berms, weekend/night time cut off, caliber limitation, burying IEDs, and prohibition of high explosives.

XIII. Range Design & Safety

Weapons will be stored onsite. Weapon storage meets Department of Defense Manual Number 5100.76 "Physical Security of Sensitive Conventional Arms, Ammunition, and Explosives" ("DOD Manual"). Located in a separate controlled area, ammunition storage will also meet requirements defined in the DOD Manual. Applicant's proposed security plan was briefed to the federal government and preliminarily approved March 7, 2017. Spotsylvania FREM also reviewed Applicant's current ammunition storage and location and plans for our proposed site.

The range design follows the protocols in the National Rifle Association 2012 Range Source Book. Physical safety design measures include 20 foot perimeter earthen berms, grading the range floor toward the impact area, but not to exceed 3 percent, storm drain drop inlets, and

signs. The impact area will be lined with sand and topped with horizontal bullet catchers. The entire property line will be protected by a minimum eight-foot tall chain link fence with single strand anti-climb barbed wire along the top of the fence, with "No Trespassing" signs spaced no more than every 100 feet. Operational safety design features include a complete range safety operations and procedures manual. Among the procedures for range operations are a one instructor to four students ratio maintained on the range, all targets placed against backstop, and a prohibition of backward falling steel plates. Targets used will include wood target stands, pneumatic turning targets, steel targets, and mechanized moving targets, not to exceed 8 feet to top of target from range floor. All target firing activity shall be directed below firing positions not to exceed 3 percent grade to ensure fired rounds containment. Applicant will enforce this protocol through controlled training courses.

The proposed Tactical Entry Training Facility location is identified on the GDP. Currently there is no requirement for this facility in the Applicant's operations plan. Because Applicant's clients have had the need in the past, Applicant may have the opportunity to provide that training to a client. Should that opportunity present, Applicant will design and construct a Tactical Entry Training Facility to meet those stated requirements. Known design characteristics include: capable of 5.56mm, 9mm, .40 cal, .45cal, and similar assault team shoulder fire weapons and pistols; 60 feet by 40 Feet, one story (includes viewing platform); open air (the overhead cover will not be connected to the walls to allow for ventilation but covered to protect against rain); and provide 360 degree ballistic protection. As with Applicant's flat ranges, building design will be to allow access for lead reclamation and periodic cleaning.

Scenarios will incorporate simulated attacks on trained students, to include pyrotechnic and/or pneumatic improvised explosive device simulators, blank fire weapons, and marker rounds (non-lethal training force on force rounds). Scenario areas are limited to the indicated areas on the GDP. There will be no live fire in scenario areas.

We have provided a Range Safety Review analysis, which is attached hereto and marked as Exhibit E.

The design of the range is a result of collaboration from the following individuals:

- Ernie L. Gillespie, USMC retired: Founder and Co-Owner of Radio Reconnaissance Technologies, Inc., a veteran owned small business specializing in tactical Signals Intelligence training and equipment and parent company of Team-Crucible LLC. Mr. Gillespie retired from the United States Marine Corps in 1990 as a Major having held Enlisted, Warrant Officer, Limited Duty Officer and Commissioned Officer ranks. During his time in the Marine Corps, Mr. Gillespie participated and led many range operations, to include controlled live fire exercises with 2nd Tank Battalion firing 90mm main guns, .50cal M2 machine guns and .30cal coaxial guns. As a plank holder of the Joint Special Operations Command (JSOC), Mr. Gillespie participated in dynamic range operations at the highest level. He then put those skills to practice as the Special Operations Officer of 2nd Radio Battalion where Mr. Gillespie provided guidance and assistance to Fleet Marine Forces Atlantic (FMFLant) and the 2nd Marine Expeditionary Force (MEF) during the establishment of the Maritime Special Purpose Force's (MSPF) range operations. In addition to range operations, Mr. Gillespie is familiar with the actual

implementation of range designs having served as the Assistant Officer in Charge of a USMC Mobile Training Team (MTT) responsible for the site selection and construction management of the primary known distance range and live fire range for the Mauritania Naval Security Force, Mauritania, West Africa. Mr. Gillespie has owned and operated wheeled and tracked heavy equipment for over 20 years, including; excavators, track loaders, and bulldozers. Mr. Gillespie has the following relevant certifications: 2005 NRA certified Range Safety Officer; 2000 NRA certified Law Enforcement Firearms Instructor; 2000 NRA certified Law Enforcement Handgun Instructor; 2000 NRA certified Law Enforcement Shotgun Instructor; 2001 NRA certified Law Enforcement Patrol Rifle Instructor; Member, International Association of Law Enforcement Firearms Instructors, Inc. (IALEFI).

- John Garman, CPP: Team-Crucible President; 2003 NRA certified Law Enforcement Firearms Instructor for Tactical Handgun; 2003 Diplomatic Security Service Protective Security Operations Instructor 2003, Certified Protection Professional ASIS International 2007.

- Erich Thalheimer: WSP Mr. Thalheimer a degreed mechanical engineer who has spent his entire 30+ year career in the field of acoustics, noise and vibration control. Mr. Thalheimer is Board Certified by the Institute of Noise Control Engineering (INCE). He currently serves as the National Technical Specialist for Acoustics and Vibration for the engineering giant WSP USA, Inc. (formerly known as Parsons Brinckerhoff). Mr. Thalheimer has performed many hundreds of environmental, transportation, infrastructure and site development projects. Over two dozen of those projects have involved shooting ranges and firearms noise control including several appearances as an expert witness in related legal proceedings. Mr. Thalheimer lectures extensively, has published over two dozen technical papers, and is a recognized leader in the greater acoustics industry.

- Jacob Poling, INCE – WSP: Mr. Poling is an acoustics and noise control consultant based in WSP's Minneapolis, Minnesota office. Mr. Poling graduated from Columbia College Chicago with a B.A. in Acoustics and has 7 years of experience conducting noise and vibration assessments for a wide variety of highway, transit and rail, power generation, and construction projects. Mr. Poling is a certified advanced user of the FHWA's Traffic Noise Model and Datakustik's Cadna-A Noise Model.

- Rob Greene, INCE Bd. Cert. – WSP: Mr. Greene is a Vice President and Senior Engineering Manager in WSP's range, California office. Rob serves the Transportation Research Board's Noise and Vibration Committee, and committees for Historic Preservation and Intercity Rail. Rob has substantial experience in federal and state courts as an expert witness in acoustics, including cases involving small arms sound impacts and hearing protection. He is professionally recognized for his contributions to environmental acoustics and community noise solutions. He is Board Certified by the Institute of Noise Control Engineering and is a licensed Acoustical Consultant by the County of Orange, California. Rob holds a bachelor's degree in Environmental Science and has over four decades of experience in acoustics, environmental impact analysis, and acoustic measurement systems.

- Doug Anderson, PhD – WSP: Dr. Anderson is a PhD geophysicist with almost 50 years' experience, 37 of which is in assessing and controlling the vibration and air overpressure effects of explosive use. He is based in WSP's Philadelphia, Pennsylvania office. In the mid-1980s, he originated and developed the mine/quarry blast vibration control method known as "signature hole" or "seed wave", which reduces vibration using destructive interference. He is now heavily involved in analysis of blasting for tunneling and shaft sinking as well as demolition and implosions. He is internationally recognized for his research, and has over 30 refereed publications.

- David Andrews, M2T: Mr. Andrews has over 30-years' experience providing a wide range of environmental services including site assessment and remediation, feasibility studies, permitting, strategic planning, project management, and regulatory interaction. He has been with MT2, LLC since 2008 and has managed a wide variety of firing range projects, including design and implementation of EPA BPMs, writing Environmental Stewardship Plans, completing Safety evaluations, and performing reclamation/recycling efforts, soils stabilization, and remediation/closures. Since joining MT2, he has completed evaluations and construction on over 500 outdoor and indoor firing ranges for Federal, State and Municipal agencies as well as numerous club and privately owned facilities. Mr. Andrews holds a PhD in Engineering Geology from Syracuse University, a MS in Geology from Boston College, BS in Biology, with a minor in Geology from St. Lawrence University.

- Lorin Kramer, Kramer One: Mr. Kramer is a nationally recognized expert in shooting range design. He has designed firing ranges in twenty-eight states. Mr. Kramer was a guest speaker for the National Rifle Association's Range Development & Operations Conferences from 1993 through 2009, participating in sixty-three conferences throughout the nation. He was a Range Technical Team Advisor and the Western Regional Supervisor for the National Rifle Association from 1991 through 2009. Mr. Kramer is an architect licensed to practice in Virginia. He has been qualified as an expert witness in shooting range design and safety.

- David Richardson: Civil Engineer, Webb and Associates

XIV. Transportation

The Property abuts Jefferson Davis Highway, which is a four-lane public road classified as a major collector road. Access to the Property will be provided from Jefferson Davis Highway. Roads constructed within the project will be private and will be maintained by the Applicant.

The project will generate 506 VPD of overall trips on a daily basis, including 85 during a.m. peak hours and 78 during p.m. peak hours. Neither a County traffic impact analysis nor VDOT 527 analysis is required for this project as it is projected to generate minimal impacts based on VDOT traffic generating models.

Per the "Rt 1 Entrance Analysis" dated January 9, 2017 conducted by Webb and Associates, a left turn lane is not required. Per Applicant's discussions with VDOT, a 200' Taper

for deceleration and a 48' Taper for acceleration will be required and constructed during the complete build out of the project.

XV. Economic Development

As noted above, the proposed project will generate a positive economic development and tax revenue return. Dr. Fuller's report is attached and marked as Exhibit F.

XVI. Community Meeting

Pursuant to County requirements, the Applicant and its representatives held a community meeting on January 17, 2017 at Dominion Raceway to introduce and discuss the project with surrounding property owners. We addressed questions from members of our community and incorporated those comments into this revised narrative, GDP and Proffer Statement. Exhibit G attached hereto provides a list of attendees.

Since the community meeting, Applicant has also held numerous meetings with neighbors to address their concerns.

EXHIBIT A

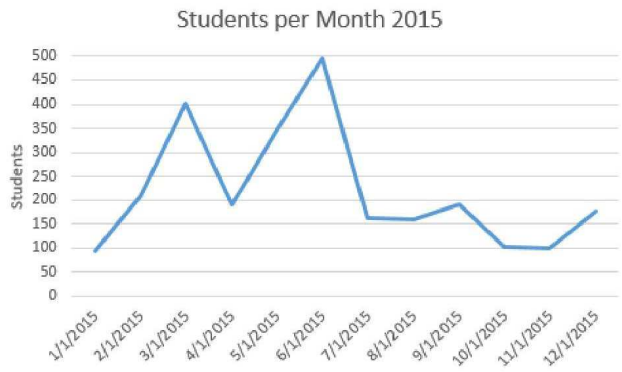
Generalized Development Plan

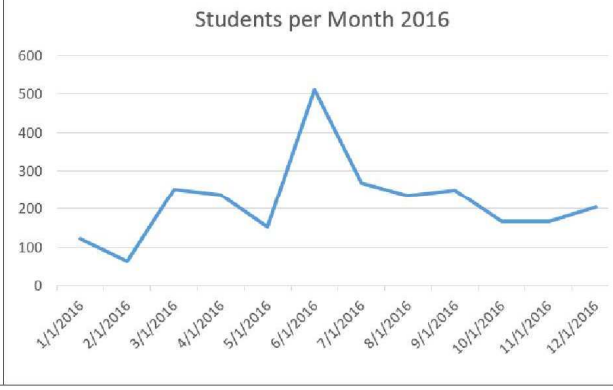
EXHIBIT B

Operations Density and Exemplary Information
(7 pages to follow)

Annual Statistic Analysis of Crucible Student numbers and activity 2015 and 2016

2015		2016	
Average Student per day (when students present)	14.90909	Average Student per day (when students present)	13.66146
Days present in 2015	176	Days present in 2016	192
Total Weekend days Firing 2015	6	Total Weekend days Firing 2016	4
Weeks with training	42	Weeks with training	45
Average trainees per week	62.47619	Average trainees per week	58.28889
Average trainees per Month	218.6667	Average trainees per Month	218.5833





April 2015

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
March 30	31	1 10x combative Scenarios	2 10 x Scenarios in town	3 10x Scenarios in town 1x pistol	4 1x rifle	5 1x med
6	7	8 2x rifle/pistol 20x rifle/pistol	9 2x rifle pistol 20x rifle/pistol	10 2x med	11	12
13 3x lecture 10x rifle/pistol	14 3x lecture 10x rifle/pistol(night)	15 3 x med 10x rifle/pistol(night)	16 3x rifle pistol 10x rifle/pistol(night))	17 10x scenario	18	19
20 14x rifle/pistol	21 14x rifle/pistol(night)	22 14x rifle/pistol(night)	23 14x rifle/pistol(night)	24 14x scenario	25	26
27	28 20x rifle pistol	29	30	May 1 1x rifle pistol	2	3

CRUCIBLE ACTIVITY BY DAY

Numbers given are students present for training

Med = Medical training inside
Rifle/pistol = live fire lecture & training
Scenario = "paint ball" and pyrotechnics
Scenario in town e benign walk around

April 2016

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
March 28 4x Lecture 4x rifle pistol &med	4x Lecture	4x Lecture	4x Driving	1 4x Driving	2 4x Scenario in town	3
4 10x rifle/pistol	5 10x rifle/pistol(night)	6 10x rifle/pistol(night)	7 10x rifle/pistol(night)	8 10x scenario 4x rifle	9	10
11 10x Combatives	12 10x Combatives	13 10x Combatives 4x rifle	14 10x pistol 4x rifle	15 10x rifle pistol	16 10x rifle pistol	17 10x rifle pistol
18 4x rifle/pistol	19 1x lecture 4x rifle/pistol(night)	20 1x combatives 4x rifle/pistol(night) 20x rifle pistol 4x rifle	21 1x rifle 4x rifle/pistol(night) 20x rifle pistol	22 4x scenario 4x rifle	23	24
25 4x rifle	26 4x rifle	27 4x rifle	28 4x rifle	29 4x rifle	30	May 1

CRUCIBLE ACTIVITY BY DAY

Numbers given are students present for training

Med = Medical training inside
Rifle/pistol = live fire lecture & training
Scenario = "paint ball" and pyrotechnics
Scenario in town benign walk around

April 2017

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
March 27	28	29 4x rifle	30 4x rifle 4xrifle	31 4xrifle	1	2
3 10x rifle/pistol 1x pistol	4 10x rifle/pistol(night) 1x machine gun 20x rifle pistol	5 10x rifle/pistol(night) 1x rifle 20x rifle pistol	6 10x rifle/pistol(night) 1x shotgun 20x rifle pistol	7 10x scenario	8	9
10	11 10x med & rifle pistol	12	13	14	15	16
17	18 4x rifle	19	20 4x rifle	21 4x rifle	22 4x rifle	23
24	25	26 4x pistol	27 4xrifle	28 4x rifle	29	30
May 1 10x driving	2 10x driving	3 10x driving	4 10x driving	5 10x driving scenario	6	7

CRUCIBLE ACTIVITY BY DAY

Numbers given are students present for training

Med = Medical training inside
Rifle/pistol = live fire lecture & training
Scenario = "paint ball" and pyrotechnics
Scenario in town benign walk around

Fictitious Training -April 2018

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
						1
2	3 20x rifle / pistol	4 20x rifle / pistol	5 20x rifle / pistol	6	7	8
9 10x driving	10 10x driving	11 10x driving 4x rifle	12 10x driving 4s rifle	13 10x driving scenario	14	15
16	17	18	19	20	21	22
23 10x rifle/pistol	24 10x rifle/pistol(night) 20x rifle pistol	25 10x rifle/pistol(night) 20x rifle pistol	26 10x rifle/pistol(night) 20x rifle pistol	27 10x scenario	28	29
30						

CRUCIBLE FUTURE FORECAST

Numbers given are students present for training

Med = Medical training inside
Rifle/pistol = live fire lecture & training
Scenario = "paint ball" and pyrotechnics
Scenario in town benign walk around

With no way to predict the future, Crucible expects 2018 to follow the pattern set by 2015 – 2017. Activity represented above is fictional, based on past events.

Current Operations Descriptions Initial Build

Looking backward from 2015 to 2017 and projecting it forward, Crucible expects to see similar business activity based on current contract awards and option years. Provided is a best guess based on conversations with contracting officers.

Students typically arrive the night before training in their personal vehicles and lodge in a nearby hotel. Each day they arrive 30 minutes prior to training to prepare for the day. Students are given a one hour lunch to go out into town and eat or are welcome to "brown bag" in the classroom. On days when low light training is required, the day is shifted to a later start to allow for training to continue as the sun sets. Most low light training takes about 2 hours to execute. Students typically return home after the final day of training. Below is a short narrative of a typical day of training.

Each day begins at 8:00am with lecture in the classroom preparing the student for the day ahead. New equipment is issued and any equipment used the day before is inspected and prepared for the day. A lecture covering the day's learning objectives is presented and students move to the practical portion of their training. Medical students move to the patient assessment areas, drivers move to the driving surface, and weapons students move to the range.

After the base lecture is presented, students are then taught in their respective practical application areas each technique required to meet the government statement of work. After this presentation by the instructors, students are then provided time to practice the techniques under the supervision of the instructors. Instructors provide feedback to the students and once students show comprehension of the techniques, the instructor moves to the next presentation, and so on. Students are provided breaks for water and lunch throughout the day.

Around 4:30pm, practical exercises are concluded, students return to the classroom and return their equipment, clean up from the day. The instructors review the day's activities and prepare the students to return the next day or provide paperwork to conclude the training.

Operations Descriptions Ultimate Buildout

Phase two follows the training model above. It is our experience that larger throughput numbers can be a result of larger deployments of our forces. This can lead to more consecutive days of training (Initial Build training is 3 to 10 days consecutive) and more consistent numbers in each class in order to meet deployment requirements. Requirements can include, immunizations, medical records review, weapon qualifications, physical fitness testing, identification badging, etc. Also, increased troop deployment means our current contracted efforts can see increase in frequency. Below is a fictitious month of training that our phase two operations could support.

Fictitious Phase two Schedule April 20XX

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1 12x drive 4x Lecture 2x Lecture	2 12xdrive 4xLecture 2x Lecture 20x rifle pistol	3 12x drive 4x Lecture 2x Rifle / Pistol 20x rifle pistol	4 12x rifle / pistol 4x Driving 20x rifle pistol	5 12x rifle / pistol 4x Driving	6 12x Lecture 4X Scenario in town	7 7x Lecture
8 12x rifle / pistol 7x pistol 15X Driving 15x off road 15x pistol	9 12x rifle / pistol 7x rifle 15X Driving 15x rifle 15x off road	10 12x rifle pistol (night) 7x rifle / pistol 15X Driving 15x off road 15x pistol	11 12x scenario 7x Medical 15X Driving 15x rifle 15x off road	12 7x Medical 45X scenario	13 7x Medical	14 7x Medical
15 10X Driving 10x rifle 10x pistol 10x pistol 10Xoffroad 15x pistol	16 10X Driving 10x rifle 10x pistol 10x pistol 10Xoffroad 15x rifle	17 10X Driving 10x rifle 10x pistol 10x pistol 10Xoffroad 15x rifle/pistol	18 10X Driving 10x rifle 10x pistol 10x pistol 10Xoffroad 15xrifle/pistol	19 10X Driving 10x rifle 10x pistol 10x pistol 10Xoffroad 15x rifle/pistol	20 15x lecture	21
22 15x driving 10x pistol	23 15x driving 10x rifle	24 15x driving 10x rifle/pistol	25 15x scenarios 10x rifle/pistol	26 10x Scenarios	27	28
29 15x driving	30 15x driving	15x driving	15x lecture	15x lecture	15x pistol	

Counts above represent a month of training that includes 966 student days

Med = Medical training inside
Rifle/pistol = live fire lecture & training
Scenario = "paint ball" and pyrotechnics
Scenario in town e benign walk around

With no way to predict the future, Crucible can only offer historical numbers when student throughput was high Activity represented above is fictional, based on past events.

EXHIBIT C

Environmental Impact Letter

EXHIBIT D

Sound Analysis

EXHIBIT E

Range Safety Review

EXHIBIT F

Fiscal Impact Analysis entitled "The Economic and Fiscal Impact of the Proposed Team Crucible Training Complex on Spotsylvania County, Virginia", dated July 2017, prepared by Stephen S. Fuller, Ph.D.

EXHIBIT G

List of community meeting attendees

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EXHIBIT H

Real Estate appraisal of properties adjunct to the Applicant's current operations.

Analysis of Property Loss References regarding the proposed Crucible Property in Spotsylvania County

The article published by Realtor.com, *The Neighborhood Features That Drag Down Your Home Value-Ranked,* by Yuging Pan, March 28, 2016, stated that living near a shooting range decreased home sale prices by 3.7%. This conclusion is based on the analysis of the median sale price of homes within the area code that the shooting range was located compared to the median sale price of all homes in the same county. However, the author cautioned the reader to "Keep in mind the difference between causation and correlation: Does having a cemetery or shooting range in the neighborhood cause home prices to drop? Or are these businesses drawn to the area because of cheap real estate?" Shooting ranges are typically developed in less populated areas that would have lower property values than other more populated areas within a county. This could easily explain why their analysis indicated the properties near a shooting range sold for 3.7% less than the median sale price of homes for the entire county. The proximity to a shooting range was not the likely cause of the lower home sale prices, but its location within a less populated area is the likely cause. This would be the result for the Crucible facility in Stafford County if this methodology is utilized. The Crucible facility is located in one of the most rural areas of Stafford County which is the greatest distance of any area in Stafford County from the employment markets of the Washington DC metropolitan area. This results in the zip code containing the Crucible facility having lower sale prices than other zip codes in Stafford County because these other areas have more convenient access to the Washington DC metropolitan employment markets. Our analysis compared the sale prices of residential lot sales and home sales within 1 mile of the Crucible facility with residential lot sales and home sales beyond 1 mile but in the same area code as the Crucible facility. This minimized any effect on sale prices resulting from location because all of the sales were from southern Stafford County with all of the properties utilizing Warrenton Road (U. S. Route 17) to access Interstate 95. Our analysis showed the residential lots and homes that sold within 1 mile of the Crucible facility sold for the same price as comparable properties beyond 1 mile of the facility.

The article published by the Brighton News, *Waterford Gun Club noise hurts property values, county rules,* by Gail Geraghty, June 28, 2012, stated that a professional real estate appraiser hired by the neighbors of a gun range had "performed a statistical analysis resulting in a 7.5% loss of property value for the Howes' (the neighbor) 175-acre property and any other property within a 1.5-mile radius". However, there is no explanation of the statistical analysis methodology to determine if the conclusions are creditable. The only discussion of what the appraiser had done to form his opinion of value loss stated "the appraiser experienced the gunfire noise on several occasions and the intermittent gunfire is definitely a distraction and minimizes the peace and quiet enjoyment of the subject property." If the appraiser's opinion of the diminution of value for properties within 1.5 miles is based on these property visits and the appraiser's "gut opinion", this conclusion is unsubstantiated. The article included significant discussion of the real estate assessments within the county. The appraiser's analysis would not be creditable if it is based on the county's real estate assessments because tax assessments are not reliable indications of market value for individual properties. In fact, the article states that the result of the tax appeal by the Howes was the town of Waterford would likely reassess all real estate because it was currently significantly below market value and therefore don't meet state

valuation requirements. The last time a real estate reassessment had been conducted was 2001: eleven years before this tax appeal.

The Property Value Impact section of Appendix D from the Virginia Department of Environmental Quality Environmental Impact Review of the proposed firing range on Old River Trail in Powhatan County was prepared by the residents surrounding the proposed firing range site. They estimated a possible 25% diminution of value if the proposed firing range is constructed. However, this is their unsubstantiated opinion that is not based on any statistical analysis, just their arbitrary opinion.

The last article was published in the Daily Progress, *Gun range proponents: it's a safe place to shoot; opponents: It'll lower home values*, by Pat Fitzgerald, August 13, 2015. In the article, a neighbor of the proposed gun range in Greene County, Virginia states that "the proposed gun range would lower property values by 30 percent." As above, this is an unsubstantiated opinion that is not based on any statistical analysis, just this individual's arbitrary opinion.

By:
Christian P. Kaila, MAI, SRA
General Certified Real Estate Appraiser
6320 Five Mile Centre Park, Suite 323
Fredericksburg, Virginia 22407
(Spotsylvania County)
August 16, 2017

Effect of Crucible's Stafford Facility on Property Values for Adjoining Property Owners

For: Spotsylvania County Board of Supervisors Public Hearing and Crucible

My name is Chris Kaila. I live on Teal Wing Cove in Spotsylvania County, where I have lived since 1979. I am a licensed General Certified Real Estate Appraiser and Real Estate Broker. I have practiced real estate brokerage and appraising in the Fredericksburg area for over 30 years. I am the principal appraiser of my firm which employs 5 residential and 5 commercial appraisers. I hold the MAI and SRA designations from the Appraisal Institute and a Masters Degree in Real Estate from VCU. I am a past President of the Fredericksburg Area Association of Realtors and past REALTOR of the year.

It is my opinion the proposed Crucible facility in Spotsylvania County would not affect property values in a negative (or a positive) manner to adjoining property owners. This opinion is based on analysis of residential land sales and improved residential sales within a mile of the existing Crucible facility in southern Stafford County compared to sales beyond a mile. My opinion is also based on the continued residential development that is occurring within close proximity to the existing Crucible facility.

The current Crucible facility is located at 60 Jack Ellington Road, Fredericksburg, Virginia 22406 in Stafford County. Agricultural zoned land sales from within 1 mile of the subject were analyzed and compared to agricultural zoned land sales from surrounding Stafford County beyond 1 mile. This identified 15 arm's length land sales within 1 mile of the Crucible facility since 1999. However, 9 of these sales occurred during the housing bubble and subsequent financial crisis in the mid to late 2000s that resulted in volatile property value escalations followed by decreases which makes comparisons during this period difficult. Furthermore, most of these sales occurred prior to Crucible's full expansion of the Stafford facility. The six remaining land sales from April 2013 through May 2015 were identified as creditable sales for comparison. They range in size from 3.00 acres (3 sales) to 13.40 acres.

These 6 land sales were compared to 18 sales in southern Stafford County beyond 1 mile of the Crucible facility. These ranged in size from 1.00 acres to 21.37 acres, which brackets the sales within 1 mile. These comparable sales occurred from June 2012 to January 2017, which also brackets the time period for the sales within 1 mile, and is a period of relatively stable land values in the immediate area. This analysis showed no significant decreased (or increased) value for land sales within 1 mile of the Crucible facility compared to land sales beyond 1 mile. The attached Graph 1 illustrates the support for this conclusion because the data points for the sales within 1 mile of the Crucible facility (red dots) fall within the range of data points for the sales beyond 1 mile (blue dots) based upon the sale price per square foot of each sale. If the Crucible facility affected land values, the data points within 1 mile (red dots) would have been significantly below the data points beyond 1 mile (blue dots), which they were not.

One of the land sales within 1 mile of the Crucible facility actually adjoins the Crucible facility. It contained 9.61 acres and sold for a price per acre that is comparable to similar sized parcels beyond a mile to spite having inferior access to public roads via a private access easement. Two of the 3.00 acre parcels within 1 mile of the Crucible facility adjoined this 9.61 acre parcel and

sold for a price per acre that is comparable to similar sized parcels beyond a mile to spite their close proximity to the Crucible facility.

Recent improved residential sales within 1 mile of the Stafford County Crucible facility were also compared to sales from southern Stafford County beyond 1 mile of the Crucible facility. Research identified 14 arm's length sales within 1 mile of the subject; however, their improvements varied significantly in style and age. The most abundant age and style was new or recently built colonial style homes with a full basement and attached garage (8 sales). These ranged in age from new to 18 years old, on sites from 3.00 acres to 4.21 acres, and occurred from June 2013 to May 2017, a period of relatively stable property values in the immediate area. These were compared to 14 sales from south Stafford County beyond 1 mile of the Crucible facility. They were all colonial style homes on full basements with attached garages and ranged in age from new to 6 years old, on sites from 3.00 acres to 4.25 acres, and occurred from July 2013 to July 2017. Therefore, all of the properties were very similar except for their proximity to the existing Crucible facility. This analysis showed no decrease (or increase) in improved residential property values within 1 mile of the Crucible facility compared to improved sales beyond 1 mile of the Crucible facility. The attached Graph 2 illustrates the support for this conclusion because the data points for the sales within 1 mile of the Crucible facility (blue dots) fall within the range of data points for the sales beyond 1 mile (red dots) based upon the sale price per square foot of above grade gross living area for each sale. If the Crucible facility affected improved values, the data points within 1 mile (blue dots) would have been significantly below the data points beyond 1 mile (red dots), which they were not. Furthermore, the average sale price per square foot of gross living area for both the sales within 1 mile and beyond 1 mile of the Crucible facility were $145 per square foot.

The recent development that is occurring within a mile of the existing Crucible facility in south Stafford County provides additional support that this facility does not adversely affect the desirability of residential properties. New home construction and sales have continued in several subdivisions within a mile of the subject, most of these sales being directly down range of the rifle range on the Crucible facility. A new ranch style home was built and sold in 2016 on a 3.00 acre parcel that is almost adjacent to the Crucible facility. It sold after being listed for two months for $170.83 per square foot of above grade gross living area, which is higher than several similar ranch style homes that sold in south Stafford County beyond a mile of Crucible.

In conclusion, the mass analysis of sale prices of residential land sales and improved residential sales in south Stafford County within 1 mile and beyond 1 mile of the existing Crucible facility indicates this facility has not decreased (or increased) property values within its immediate neighborhood. The conclusion of this statistical analysis is supported by antidotal evidence that the Crucible facility has not affected residential development within the immediate neighborhood as new residential properties that sell for comparable prices as similar properties elsewhere in south Stafford County continue to be built, some almost adjacent to the Crucible facility and others directly down range of the facility's rifle range. Stafford and Spotsylvania Counties are similar markets for real estate and the conclusion concerning the effect on market values would also apply to a location in Spotsylvania County. I have examined the proposed location at 6116 Jefferson Davis Highway to confirm this conclusion. Therefore, based on my market research, if

a Crucible facility were located at 6116 Jefferson Davis Highway in Spotsylvania County, real estate value would not be affected either in a negative or positive manner.

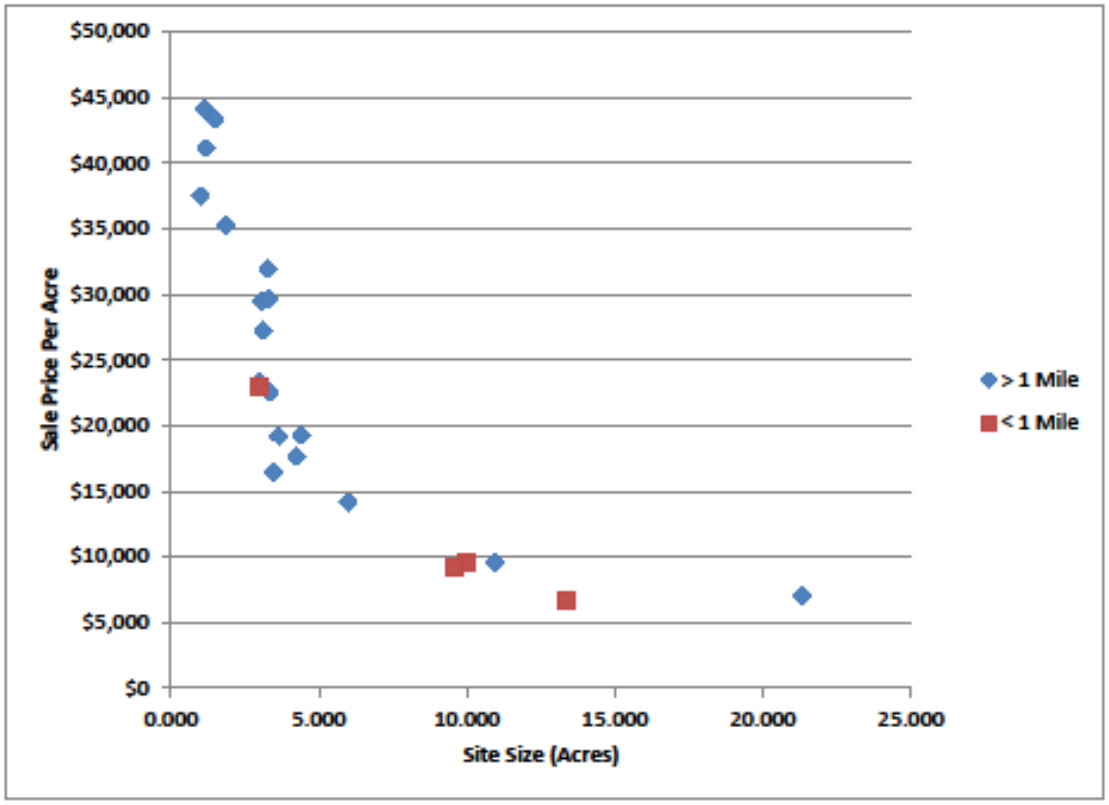
The appraiser also interviewed several agents who have extensive experience in selling properties in the areas around the Stafford Crucible facility. The following is a summary of interviews.

1. Chris Burns. Chris is the Sales Manager for Atlantic Builders. He has sold approximately 60 new homes in Stafford County, with several subdivisions with a few miles of the Crucible facility. According to Chris, the Crucible facility has not been mentioned as a consideration. Home sale prices in that area have been consistently increasing in the area with no negative influence.

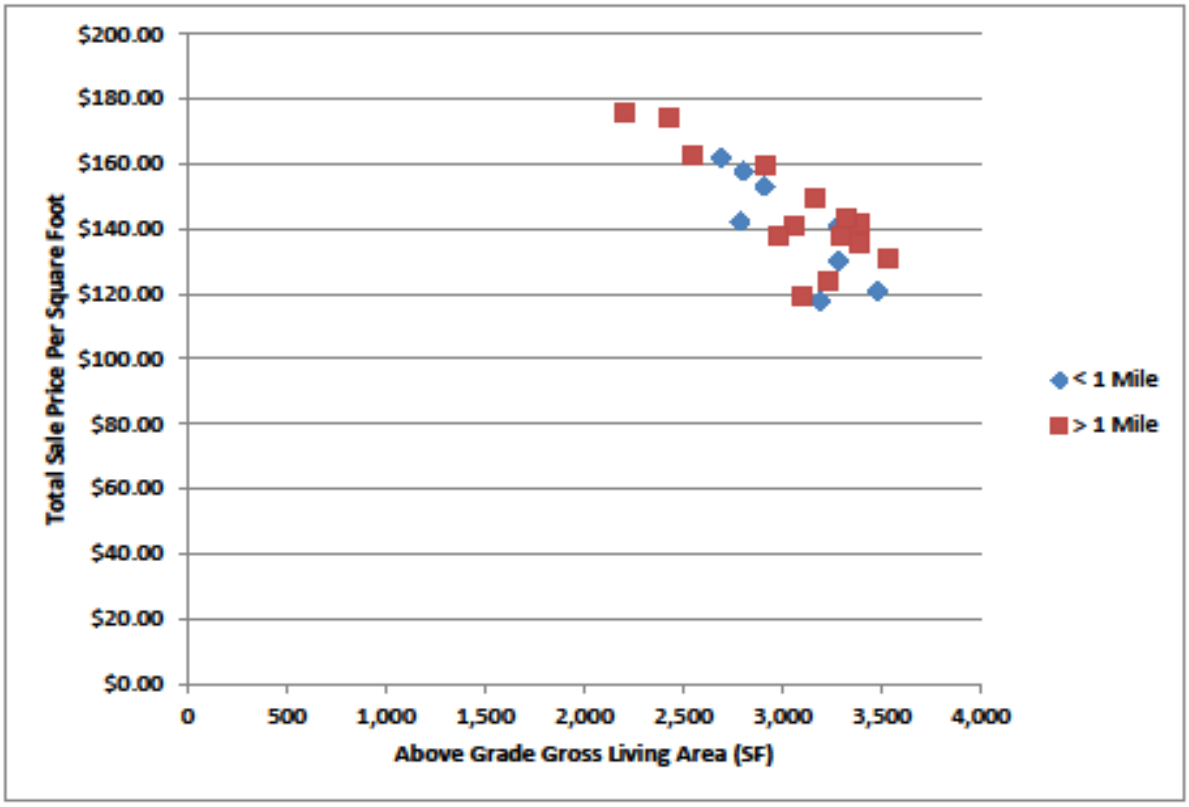
2. Beverly Sala. Beverly has been selling homes in Stafford County for 30 years and has only recently retired in the last couple of months. She has represented builders and developers in the Crucible facility areas – specifically in Sherwood, Wateredge Estates, and others. Beverly stated that the Crucible facility has never come up. There has been no negative influence. No one even seems to know it exists there.

3. Sherry Bailey. Sherry is another experienced agent who has sold properties in Stafford County for over 30 years. Sherry is also a member of the Planning Commission for Stafford County. Sherry stated no one has ever brought up the Crucible facility as a negative factor in buying or selling real estate in the Crucible area. Sherry stated that more people were concerned about the lack of FIOS internet service in that area, and the Crucible facility was never even mentioned.

Graph 1: Sale Price per Acre vs. Site Size (Acres) for land sales within 1 mile (red dots) and more than 1 mile (blue dots) of Crucible Facility



Graph 2: Sale Price per Square Foot of Above Grade Gross Living Area vs. Above Grade Gross Living Area (SF) for Improved Residential Sales within 1 mile (blue dots) and more than 1 mile (red dots) of Crucible Facility



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Crucible Spotsylvania

Acoustical Assessment (Rev.2)



Prepared For:

Team Crucible
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Prepared By:

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Version Date:

18 November 2019

wsp

Executive Summary

An updated acoustical study was performed to assess the potential consequences of noise that may be produced by Crucible's revised proposed facilities and operations at their new location in Spotsylvania, Virginia. This report will describe the current study's goals, methodology, relevant noise criteria, technical assumptions, noise modeling and measurements, findings, conclusions and recommendations; and compare the significant results with the previous study dated 3/22/18.

Crucible, currently located and operating in Stafford County, Virginia since 1998, is proposing to build and operate a new facility in Spotsylvania County, Virginia. Continuing to provide their original services, the new facility would feature personal defense training, firearms classes and live-fire exercises, evasive driving techniques, bodyguard and protective services training, and para-military training. Crucible's typical client base is comprised of employees of the U.S. Government, Non-governmental organizations (NGOs), and multi-national corporations whose employees live and work in dangerous and austere locations worldwide.

In brief summary, the findings of this updated acoustical study indicate that the future full build-out (Phase 2) noise levels produced during the daytime from Crucible's use of firearms, vehicles, and simulated IEDs would comply with guidelines and criteria limits contained in the Spotsylvania County Noise Ordinance (Chapter 14, Article II) at all noise-sensitive receptors within the communities proximal to Crucible's new facility. Operations are not proposed to occur at night.

If the proposed project is approved, it is understood that Crucible, being a commercial establishment from which noise due to the above activities is customarily emitted, would be exempt during certain times of each day from the legal requirement to comply with the noise ordinance. Notwithstanding the exemption, Crucible will attempt to reduce potential noise emissions to specifically address noise concerns raised by their immediate neighbors by voluntarily implementing a variety of noise mitigation measures into their new facility design; the more significant of which include:

- A willingness to take all reasonable and feasible steps necessary to voluntarily comply with the noise limits contained in the Spotsylvania County noise ordinance.
- Retaining the services of an acoustical expert with specific expertise in evaluating firing range noise emissions to perform a comprehensive noise study.
- Reducing their original design from four shooting ranges down to only one shooting range.
- Constructing 20-foot-tall earthen berms to completely surround the proposed shooting range.
- Equipping rifles with a sound suppressor as the default condition for all rifle use.
- Limiting themselves to using only buried, simulated Improvised Explosive Devices (IED).
- Orienting the entire facility so that the downrange direction points towards the west.
- Prohibiting the use of high explosives and rifle calibers larger than .300 Blackout due to community concerns over noise and safety.
- Willingly limiting their live fire operations to 8:00 AM to 10:00 PM, Monday through Friday; 9:00 AM to 5:00 PM on Saturday; and 10:00 AM to 4:00 PM on Sunday, and all firing range training will be limited to occur no later than two (2) hours after USNO astronomical twilight.

Based on the acoustical findings of this updated study and its proactive commitments to noise control, it is *concluded that the new Crucible facility would be a noise-compatible land-use within its proposed location in Spotsylvania, Virginia.*

The following report contains more detailed information supporting this conclusion and recommendation. A summary of acoustical terms is contained in **Appendix A**, and evidence of the principle investigator's professional acoustical qualifications may be found in **Appendix B**.

Project Description

Crucible operates a high level personal and professional defense and security training facility currently located in Stafford County, Virginia. For a variety of reasons, Crucible intends to completely relocate its facilities and operations to a more suitable space located off Jefferson Davis Highway (Route 1) in Spotsylvania County, Virginia.

Crucible intends to complete their new site development over a period of time based on contract activity, which will include an initial smaller-scale build-out (referenced collectively herein as "Phase 1") and eventually a full build-out scenario (referenced collectively herein as "Phase 2"). The site location, surrounding area, noise receptor locations (denoted as R-#), and a layout drawing of the full build-out scenario are shown in **Figure 1**.

The area surrounding Crucible's site is sparsely populated and may be categorized as rural land-use. While there are some residential and commercial properties to the east along Jefferson Davis Highway, there are very few noise-sensitive receptors westerly of the site.

Once completed, Crucible's revised facility design will include, amongst other things, a single 125-yard shooting range and a professional evasive-driving training course including simulated IED explosions. Again, as noted above and limited via Crucible's proposed proffers, Crucible's intended hours of operation will be 8:00 AM to 10:00 PM, Monday through Friday; and 9:00 AM to 5:00 PM on Saturday; and 10:00 AM to 4:00 PM on Sunday.

Figure 1. Crucible Spotsylvania Revised Full Build-Out (Phase 2) Development



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Spotsylvania Noise Ordinance

Noise emissions within Spotsylvania, Virginia, are governed by the Spotsylvania County Ordinance (CH 14, Article II: Noise). Section 14-51 contains noise limits at receptor locations for various land-uses based on time of day or night. While not explicitly mentioned, by professional critical evaluation of other sections of the ordinance it may be reasonably assumed that the noise limits are expressed in units of maximum (Lmax), A-weighted sound levels (dBA), using a root-mean-square (RMS) 'slow' sound meter response time. The ordinance also stipulates that if the noise source under question is "of an impulsive character" (such as firearms) then the noise limits for residential, office, and commercial receptors are to be reduced by 5 decibels. **Table 1** summarizes the ordinance's noise limits both with and without the impulsive noise penalty.

Table 1. Spotsylvania County Noise Ordinance Limits

Receiving Receptor Zoning Land-Use	Receptor Noise Limit dBA Lmax 'slow'	
	Daytime 6:00 AM to 10:00 PM	Nighttime 10:00 PM to 6:00 AM
Residential	65 60 (impulsive)	60 55 (impulsive)
Commercial	70 65 (impulsive)	65 60 (impulsive)
Office	65 60 (impulsive)	60 55 (impulsive)
Industrial	79	75

The ordinance also contains language in Section 14-52 defining certain exemptions from the noise limits. Particularly noteworthy exemptions include Items (a)(3) and (b)(8) which exempts the noise produced from firearms (and other noise producing devices) if they are used as a customary part of an established commercial business. The ordinance's relevant verbatim language is reproduced below for convenience

(a) The following matters are exempt during the daytime (6:00 a.m. to 10:00 p.m.) from this article:

(3) Noise emitted by a commercial or industrial establishment which noise is customarily emitted by such commercial establishments or industries.

(b) The following activities or sources of noise shall be exempt during all hours from this article, except to the extent as herein limited:

(8) The use of firearms (which use is governed by other provisions of federal, state and county law).

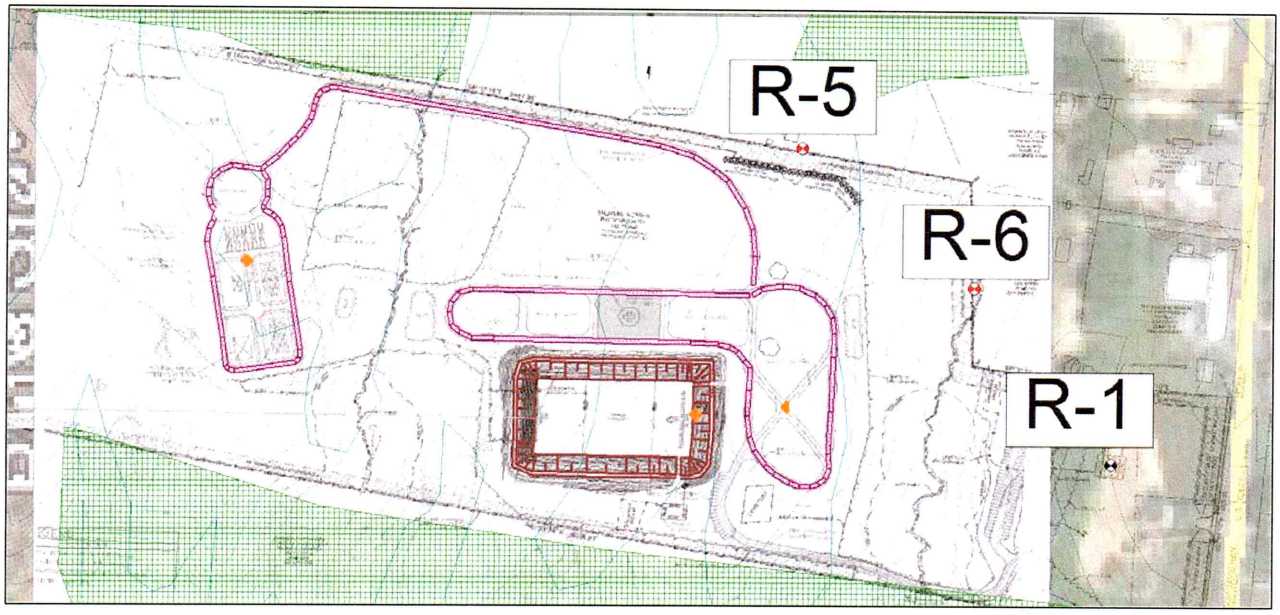
Consequently, because Crucible's established business operations involve the use of firearms, Crucible's new facility and business operations at their Spotsylvania site will be exempt from the County Noise Ordinance between 6:00 AM and 10:00 PM to the extent noted above. Any attempt or willingness on Crucible's part to try to comply with the ordinance's noise limits would be done solely on a voluntary basis.

Cadna-A Noise Model

Because Crucible's new Spotsylvania facilities have not yet been built, this noise assessment was analytically based on the revised expected site layout, type and number of shooting activities, use of simulated IEDs, and use of the evasive driving training course. To analyze the new facility's noise emissions, the Cadna-A® noise model was used to predict the noise levels associated with the expected types of activities. Cadna-A is a comprehensive commercially-available acoustical model developed by DataKustik GmbH to satisfy International and USA standards.

Compliance or exceedance with the noise ordinance was evaluated from the perspective of receptor locations in the community surrounding Crucible's proposed site. The final configuration of the Cadna-A model, as used for this project, is shown in **Figure 2**. In the figure, orange crosses identify locations of noise sources, brown lines represent range berms and backstops, the purple lines represent the intended driving course, and the "R-#" sites indicate community receptors where noise levels were evaluated.

Figure 2. Cadna-A Noise Model Configuration



Cadna-A is a powerful, three-dimensional, ray-tracing acoustical model that implements International Standards Organization (ISO) Standard 9613 for the prediction and propagation of outdoor sound. Cadna-A and ISO 9613 are used by the acoustics industry on a worldwide basis. Noise sources are entered into the Cadna-A model in the form of point, line and/or area components; with each source emitting sound power levels (PWL) in octave bands or broadband A-weighted format. Distance attenuation, elevation differences, ground absorption, wind effects, foliage, building shielding, and attenuation from barriers and berms are computed in the Cadna-A model. The resulting sound pressure levels (SPL) are predicted at any receptor location ofinterest.

The Cadna-A model for this project was configured by first importing a GoogleEarth® base map of the area. In this manner, the positions of structures, street locations, receptor locations and distances could be modeled to a high degree of accuracy. A scale layout and design of Crucible's revised new facilities was then superimposed over the base map. The final model preparation step involved entering ground terrain elevation data which was obtained from USGS topographical maps. The model was then populated with hypothetical rifle and pistol source locations occurring on the 125 yard range; simulated buried IED explosions; and up to five automobiles making use of the driving course.

Firearms included in the model include a 9 mm handgun, an AK-47 style rifle chambered in 7.62x39 mm, an AR-15 style rifle chambered in .223/5.56 Remington, and an AR-10 style rifle chambered in .308/7.62 Winchester. The rifles were modeled with and without suppressors. Noise emission data for the firearms were sourced from a database of previously measured gunfire noise levels and from representative noise emission levels from several of the firearms that Crucible intends to use that were measured in July 2017. The results of those noise tests are explained further below.

Another significant change in the newly proposed shooting range is that Crucible will be making use of suppressors (silencers) as the default condition for all rifles used on the range. Extensive first-hand acoustical tests performed on a wide variety of manufacturers suppressors indicates that a good quality suppressor can provide approximately 30 decibels of reduction. In subjective terms, a reduction of 30 decibels would sound only 1/8th as loud as the unmuffled sound source. However, not all users of the range will be able to use suppressors due to their respective department's qualifications procedures. Thus, the revised noise model assesses the use of both suppressed and unsuppressed rifles on the new range.



In general, the unsuppressed rifles emit a sound power level (PWL)[1] of 137 to 138 dBA Lmax 'slow' PWL. The 9 mm handguns was slightly quieter, producing approximately 134 dBA Lmax 'slow' PWL. Noise emission levels for the IED were computed using the ConWep model developed by the US Army Corps of Engineers. For example, a 1-ounce charge of black powder (Pyrodex RS) is expected to produce 137 dBA Lmax 'slow' PWL. The same charge buried slightly underground produces approximately 10 to 15 decibels less noise. Lastly, vehicles using the evasive driving training course were assumed to be driving at an average speed of 40 mph.

The earthen berms that Crucible intends to construct around their shooting range were entered into the model at their respective height of 20-feet tall. The majority of lands surrounding Crucible's new site are fully developed forested areas, thus trees of 25-foot nominal height were also entered into the Cadna-A model where these forested areas exist. However, areas with only sparse tree density were not included in the model. The ground surface was assumed to be acoustically absorptive.

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[1] While decibel values of sound power (PWL) and sound pressure (SPL) may be compared to other sound power levels and sound pressure levels, respectively, the two are wholly different quantities and should not be misconstrued as meaning the same thing. See **Appendix A** for further definition of PWL and SPL.

Seven noise receptor locations, as shown in **Figure 1** and summarized in **Table 2**, were selected for assessment in this study and entered into the Cadna-A model. Except for receptor R-1 which is located at Crucible's future office location, all the receptors are residential land-uses selected due to their relative proximity to Crucible's proposed site.

With the Cadna-A model fully configured and populated with source and terrain data, the resulting noise levels expected from Crucible's use of firearms, IEDs and the driving course were then computed at the exterior of each receptor location. The noise levels were computed at the exterior of the receptors using the metric *Lmax dBA 'slow'* because that is where and how the Spotsylvania County Noise Ordinance specifies its limits. If desired, interior noise levels could be estimated at each receptor location by subtracting 10 decibels from the exterior noise level if the receptor's windows are open, or subtracting 25 decibels if the windows are closed.

Table 2. Selected Noise Receptors

Site No.	Receptor Location	Receptor Land-Use	Approximate Compass Direction*	Approximate Distance* (Feet)
R-1	Crucible Office	Commercial	East Southeast	1,540
R-2	5661 Bear Lane	Residential	South Southwest	3,650
R-3	5808 Red Fox Dive	Residential	Southwest	6,140
R-4	6111 Taverneer Lane	Residential	North Northwest	1,920
R-5	6148 Jefferson Davis Highway	Residential	Northeast	920
R-6	6144 Jefferson Davis Highway	Residential	East Northeast	1,110
R-7	6020 Harts Run	Residential	West Southwest	4,210

Note: (*) Direction and distance relative to the approximate geometric center of Crucible's proposed site.

Rifle Noise Emission Measurements

As mentioned above, noise emission levels from two of the firearms that Crucible intends to use were measured in July 2017. They included an AK-47 style rifle chambered in 7.62 x 39 mm, and an AR-10 style rifle chambered in 7.62 x 51 mm (otherwise known as .308 Winchester).



Photo 1. AK-47 Style Rifle



Photo 2. AR-10 Style Rifle

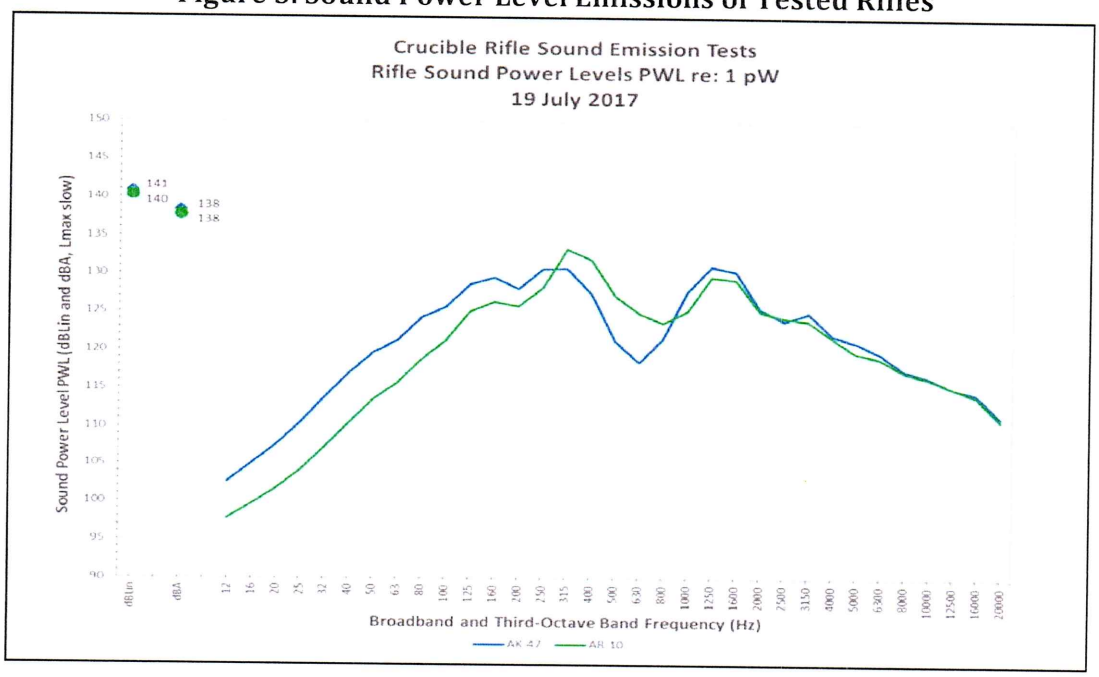
Noise measurements were performed at a distance of 50 feet from both the right and left waysides of each rifle. The rifles were fired at an outdoor shooting range, one shot at a time, using standard factory ammunition until the sound emission levels from a total of 10 rounds (five from the left side and five from the right side) had been measured for each rifle. **Photos 1 and 2** show the AK-47 and AR-10 style rifles, respectively, that were tested.

All sound level measurement instrumentation used in this study complied with ANSI Standard S1.4 for Type 1 precisions and accuracy. The instrumentation consisted of a CEL Instruments Model 593 Sound Level Analyzer equipped with a Bruel & Kjaer Model 4189 Microphone. The CEL 593 was programmed to measure and record maximum (Lmax) broadband A-weighted (dBA) and unweighted third-octave band sound pressure levels using an RMS 'fast' time response. Equivalent RMS 'slow' sound pressure levels were then computed by subtracting 9 decibels from the RMS 'fast' results based on the relative difference between 'fast' and 'slow' rise time constants of 0.125 seconds and 1 second, respectively, if applied to an impulsive noise source.

The calibration level of the CEL 593 was confirmed in the field using a Bruel & Kjaer Model 4231 Acoustical Calibrator, a 3½-inch diameter windscreen was used to reduce wind noise affecting the microphone, and the CEL 593 was mounted on a tripod to minimize operator interference. Weather conditions that day (7/19/17) were perfectly acceptable for performing sound level measurements.

After being measured and digitally downloaded from the CEL 593, the measured sound pressure levels (SPL) were converted into sound power levels (PWL) by taking the distance of 50 feet into account and by assuming that the rifles radiated noise into a hemispherical, free-field acoustical space. The final A-weighted (dBA) and unweighted (dBLin) broadband and third-octave band sound power levels can be seen graphically in **Figure 3**. The third-octave band sound power levels were then summed into full octave band levels and entered into the Cadna-A model as point sources to represent AK-47 and AR-10 rifles.

Figure 3. Sound Power Level Emissions of Tested Rifles



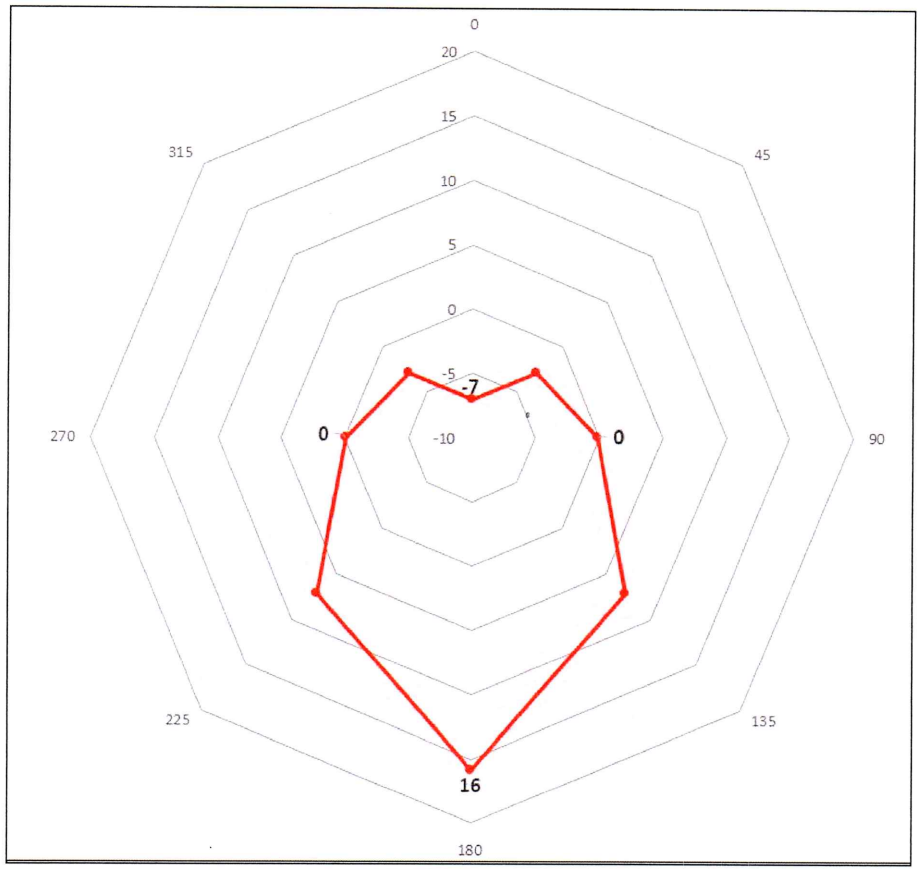
Firearm Acoustical Directivity

Another important aspect of firearms noise emissions is their acoustical directivity. Firearms are not perfect omnidirectional point sources because they radiate noise with varying intensities in different directions.

Most of a firearm's acoustical energy is directed downrange in-line with the muzzle. Less noise radiates to the sides, and the least amount of noise radiates backwards behind the shooter. Previous measurements completed for other gun range noise projects indicate that shooting noise levels can be 16 decibels louder in a downrange direction (180°) as compared to equivalent distances wayside of the firearm (90° and 270°), and that firearm noise levels behind the shooter (0°) can be an additional 7 decibels quieter than the wayside levels due to the shooter's body acting as a partial sound barrier. Thus, noise levels at equivalent distances can be a total of 23 decibels quieter towards the rear of the shooter than they are straight downrange.

The directivity pattern shown in **Figure 4** was entered into the Cadna-A noise model and applied to all gunshots. In Crucible's case, downrange was defined as heading in a westerly direction.

Figure 4. Firearm Acoustical Directivity Pattern



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Noise Prediction Results

The results of the current and original Cadna-A noise model predictions are summarized in **Table 3** for the seven community receptor locations included in this study. The results are separated into the noise contribution expected to be caused by each of the three different types of noise sources, namely from gunfire, IEDs and driving. The table also shows the daytime and nighttime noise limits at each receptor contained in the Spotsylvania County Noise Ordinance for impulsive-type noise sources. Again, Crucible is exempt from the noise ordinance so the limits are shown here only for informational comparison only. All decibel levels are expressed as maximum single event A-weighted sound levels using an RMS 'slow' time response (i.e. dBA Lmax 'slow').

As can be seen in the table, noise levels due to Crucible's shooting activities and simulated IEDs are expected to comply with the ordinance's daytime noise limits at all receptor locations included in this study. Noise levels expected from Crucible's evasive driving training course were found to likely be inaudible at the receptor locations, and thus not relevant.

Daytime and nighttime noise ordinance limits are shown in **Table 3** for comparison along with the original predicted noise levels from the Crucible Spotsylvania acoustical study dated 3/22/18, which are shown in brackets. Crucible's proffers prohibit firearm and simulated IED use during nighttime hours. Therefore, Crucible is expected to be compliant with Spotsylvania Noise Ordinance limits during all daytime and nighttime hours.

Table 3. Predicted Crucible Noise Levels at Receptor Locations

Site No.	Receptor Location	Receptor Land-Use	Spotsylvania County Noise Ordinance Limit* (dBA Lmax 'slow')		Crucible Noise Loudest Single Event (dBA Lmax 'slow')		
			Daytime 6AM–10PM	Nighttime 10PM–6AM	Firearms	IEDs	Driving
R-1	Crucible Office	Commercial	65	60	41 [54]	56 [57]	17 [13]
R-2	5661 Bear Lane	Residential	60	55	40 [58]	42 [40]	9 [0]
R-3	5808 Red Fox Dive	Residential	60	55	37 [51]	32 [32]	3 [-5]
R-4	6111 Taverneer Lane	Residential	60	55	44 [60]	46 [46]	12 [5]
R-5	6148 Jefferson Davis Highway	Residential	60	55	51 [57]	58 [55]	25 [17]
R-6	6144 Jefferson Davis Highway	Residential	60	55	46 [50]	60 [59]	20 [20]
R-7	6020 Harts Run	Residential	60	55	48 [60]	38 [38]	5 [-2]

Notes: (*) Noise ordinance limits for "impulsive" noises.
[##] Noise levels predicted in original Crucible Spotsylvania Phase 2 acoustical study dated 3/22/18.

With regards to shooting and IED noise, the table above summarizes the loudest individual gunshot/explosion expected from each type of firearm/IED at each receptor location so that a direct comparison to the noise limits in the Spotsylvania Noise Ordinance can be made. This is because the Lmax sound level for impulsive noise sources of such short duration as gunshots will generally not occur simultaneously. However, in the extremely rare event that two sound sources of equal loudness were to occur at the exact same instant in time then the Lmax sound level at the receptors

would only increase by 3 decibels. It would require four gunshots at the exact same time to get a rise of 6 decibels, and eight simultaneous gunshots to get a rise of 9 decibels, etc. This is due to the logarithmic nature of decibel addition.

It is also worth mentioning that the sound level results in **Table 3** represent worst-case conditions using unsuppressed firearms. The use of suppressors on the rifles, whenever possible, will render them essentially inaudible in the community.

In addition to computing noise levels at discrete points, the Cadna-A model can also compute isopleth contours of equal loudness. In this manner, one can visually interpret how noise from a given set of noise sources and terrain conditions would propagate in all directions.

Figures 5A, 6A and 7A show the current analysis sound level isopleth contours expected for Crucible's use of firearms, IEDs and the driving course, respectively. The isopleth lines are shown in 1-decibel increments, and the colored zones are in 5-decibel increments. All sound levels are A-weighted decibels (dBA). For direct comparison, **Figures 5B, 6B and 7B** show the originally predicted sound level isopleth contours for firearms, IEDs and the driving course, respectively.

The plotted results of **Figures 5 – 7** may not match up perfectly with the predicted noise level results shown in **Table 3** because the plots assume that all noise sources of a given type (i.e. firearms, IEDs or driving vehicles) are emitting noise at their maximum (Lmax) levels at the *exact same moment in time*. This is an unrealistically conservative assumption because Lmax sound levels are not additive in that manner. However, the isopleth plots serve to show how sound might radiate away from Crucible's facility in any given direction with the sources emitting sound from anywhere they might be located.

As can be seen in **Figure 5A**, the majority of shooting noise radiates in a westerly direction due to the acoustical directivity of the firearms. The 20-foot tall earthen berms surrounding the 125-yard long shooting range are shown in brown, and the firearms were modeled in the center of the shooting line as shown in orange.

As can be seen in **Figure 6A**, noise from simulated IED explosions, shown in the figure as orange point sources, will radiate in more of an omnidirectional spherical pattern because they are modeled as point sources without dominant acoustical directivity. However, their omnidirectional spreading is affected by local terrain, berms and foliage areas, resulting in more efficient propagation towards the east and west due to less dense foliage.

Lastly, as shown in **Figure 7A**, noise emissions from vehicles using the defensive driving course also tend to radiate omnidirectionally as a moving point source. Again, it is assumed that no more than five vehicles would be using the driving course at any given time. However, the noise levels produced from the driving course are so low that they can be considered as negligible in this case.

Figure 5A. Crucible Firearms Noise Isopleth Contours (Current Study)

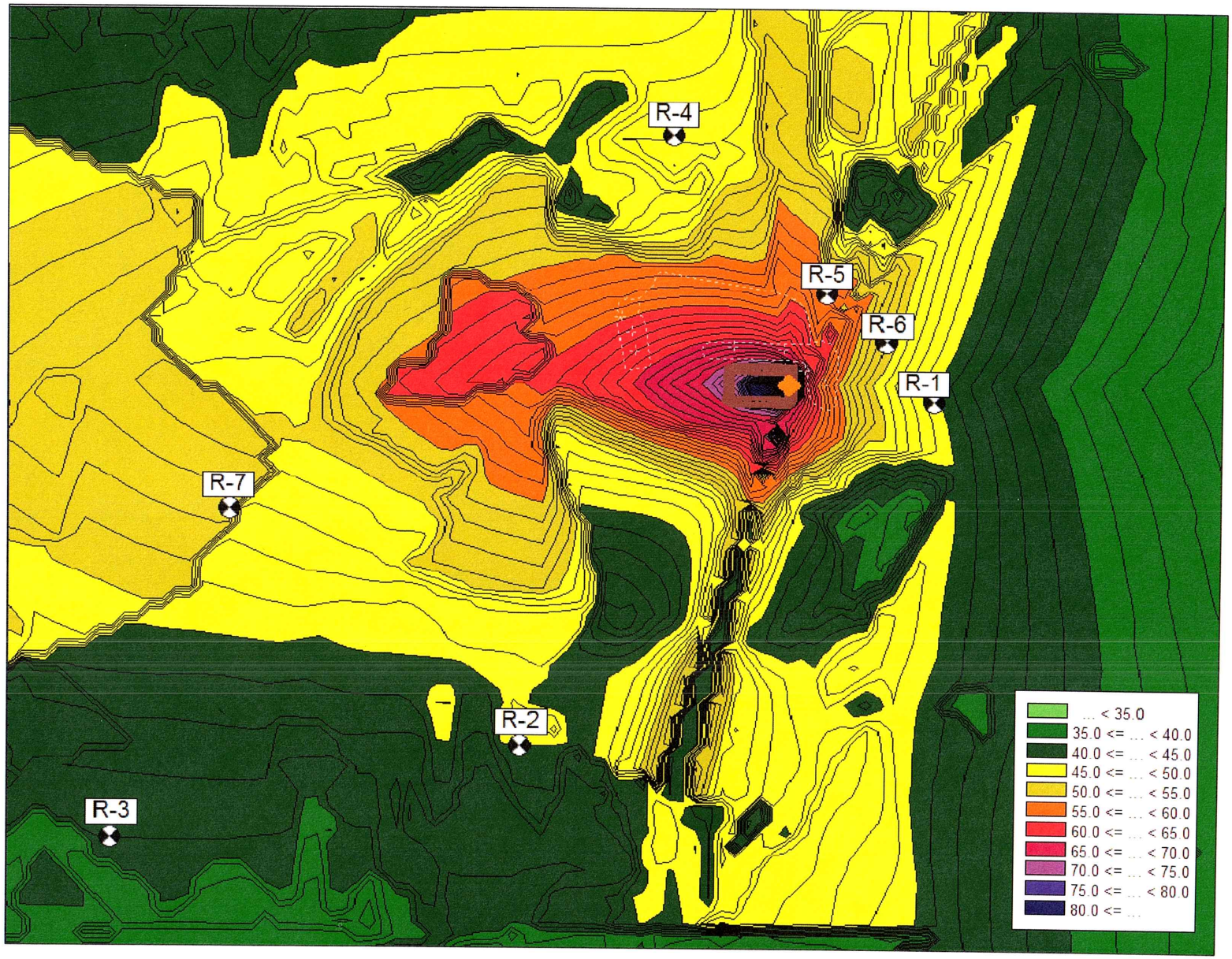


Figure 5B. Crucible Firearms Noise Isopleth Contours (Original Study 3/22/18)

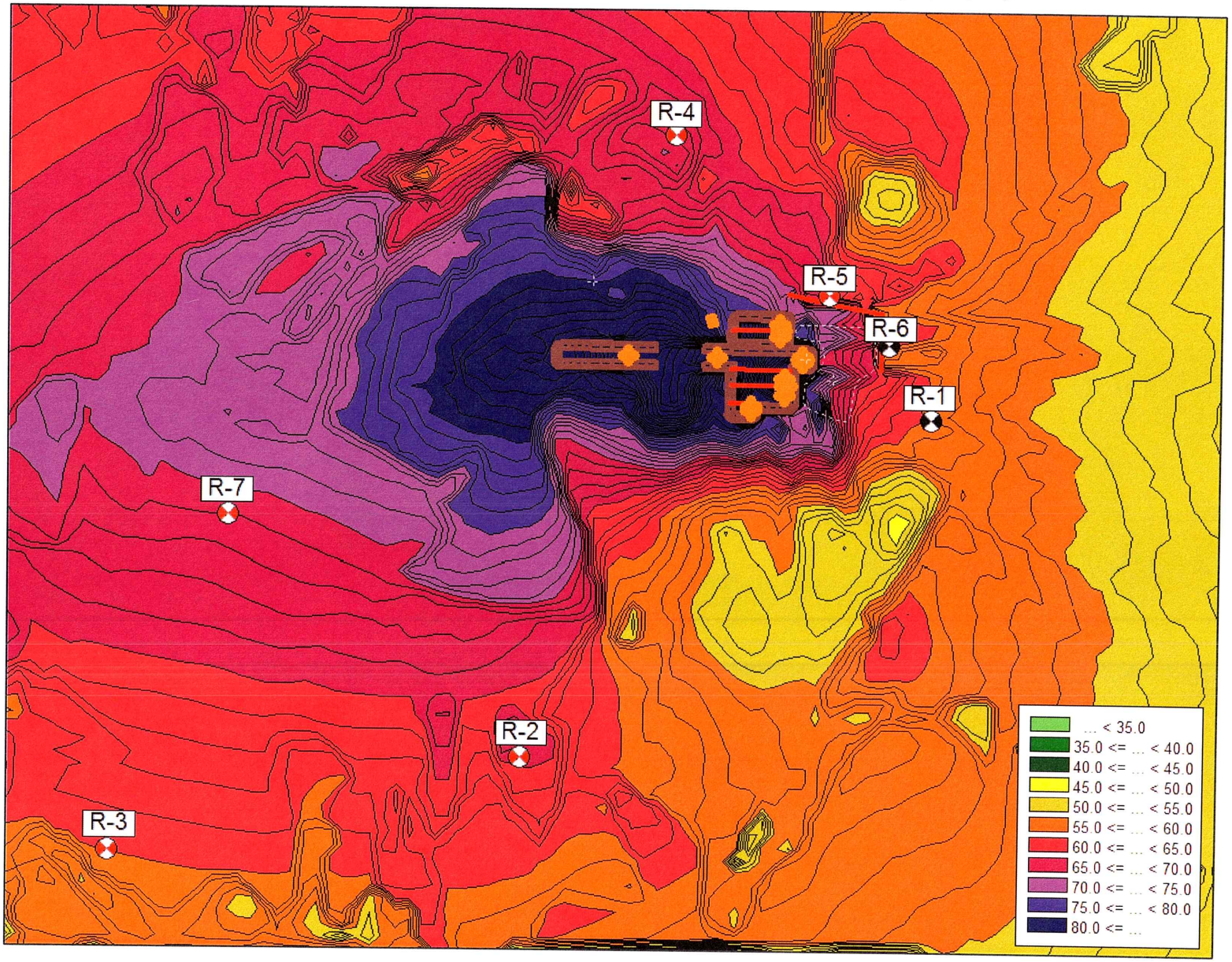


Figure 6A. Crucible IEDs Noise Isopleth Contours (Current Study)

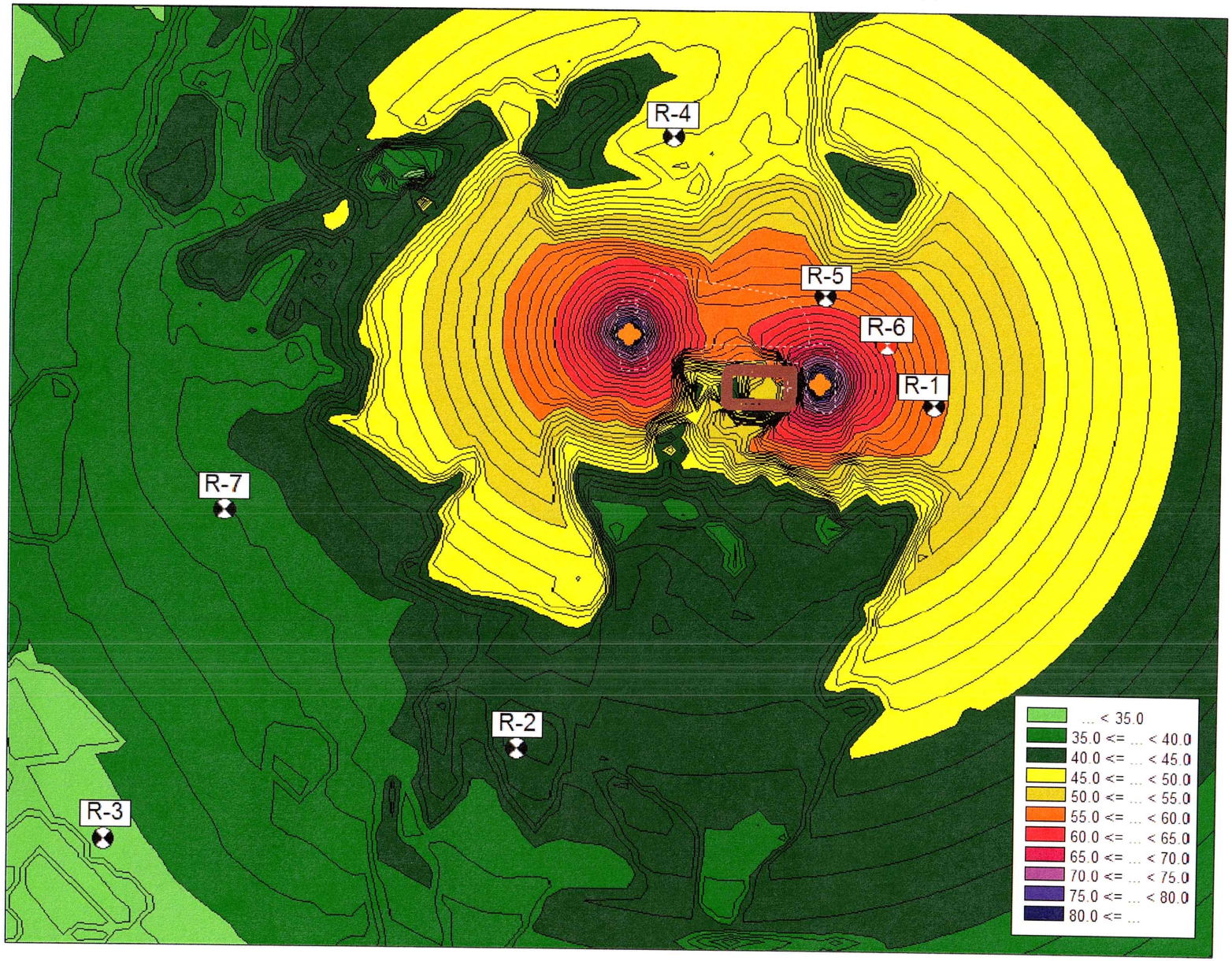


Figure 6B. Crucible IEDs Noise Isopleth Contours (Original Study 3/22/18)

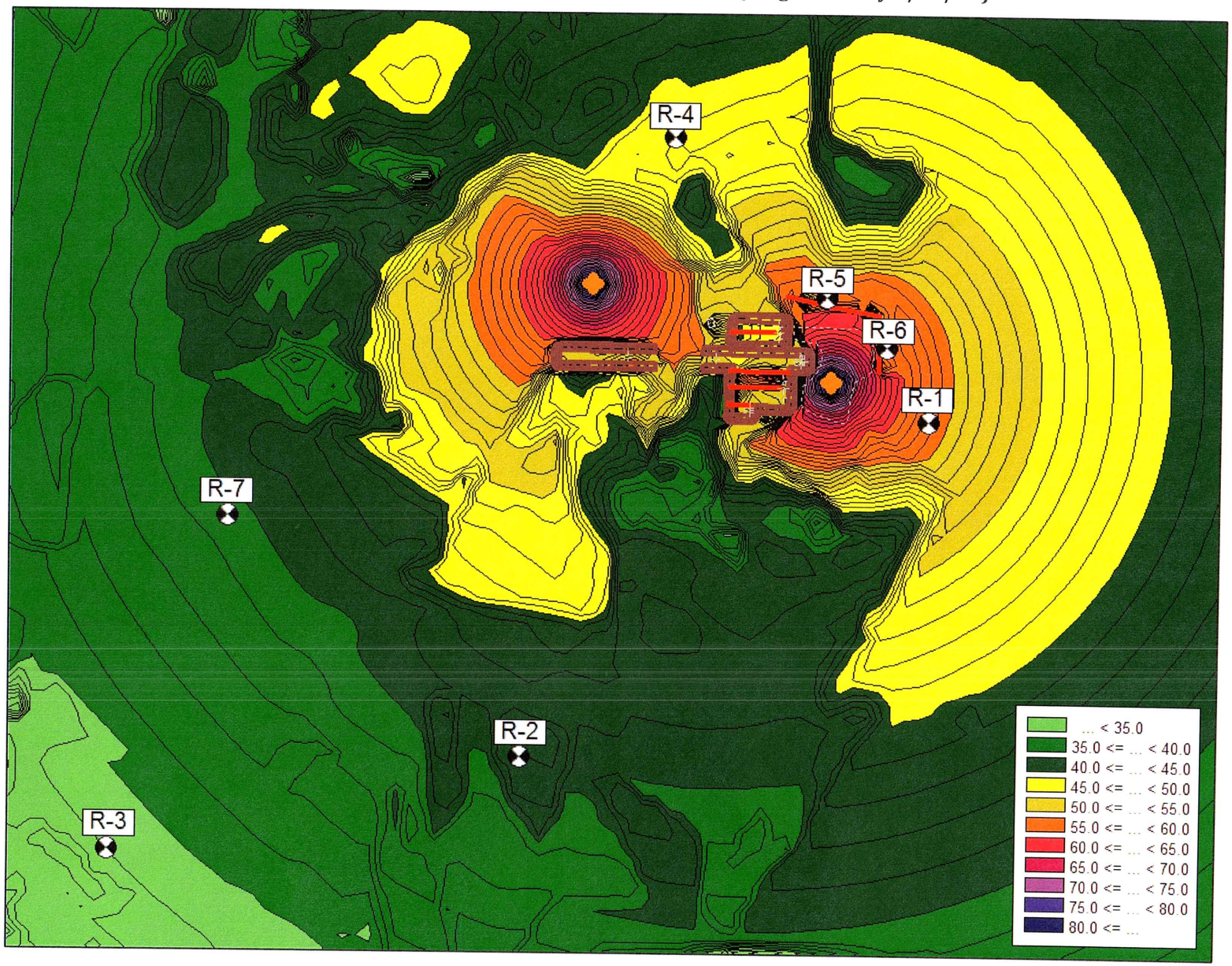


Figure 7A. Crucible Driving Course Noise Isopleth Contours (Current Study)

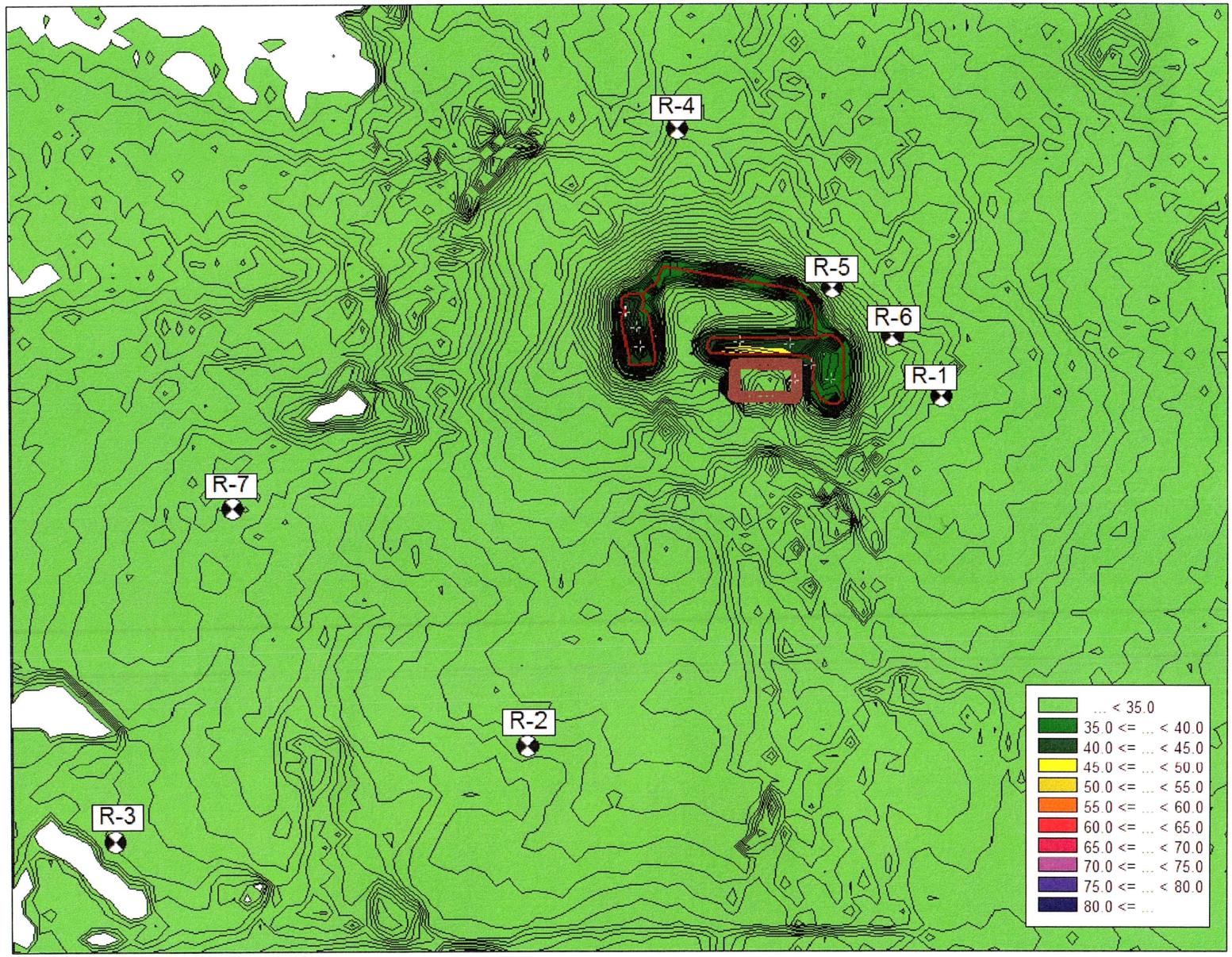
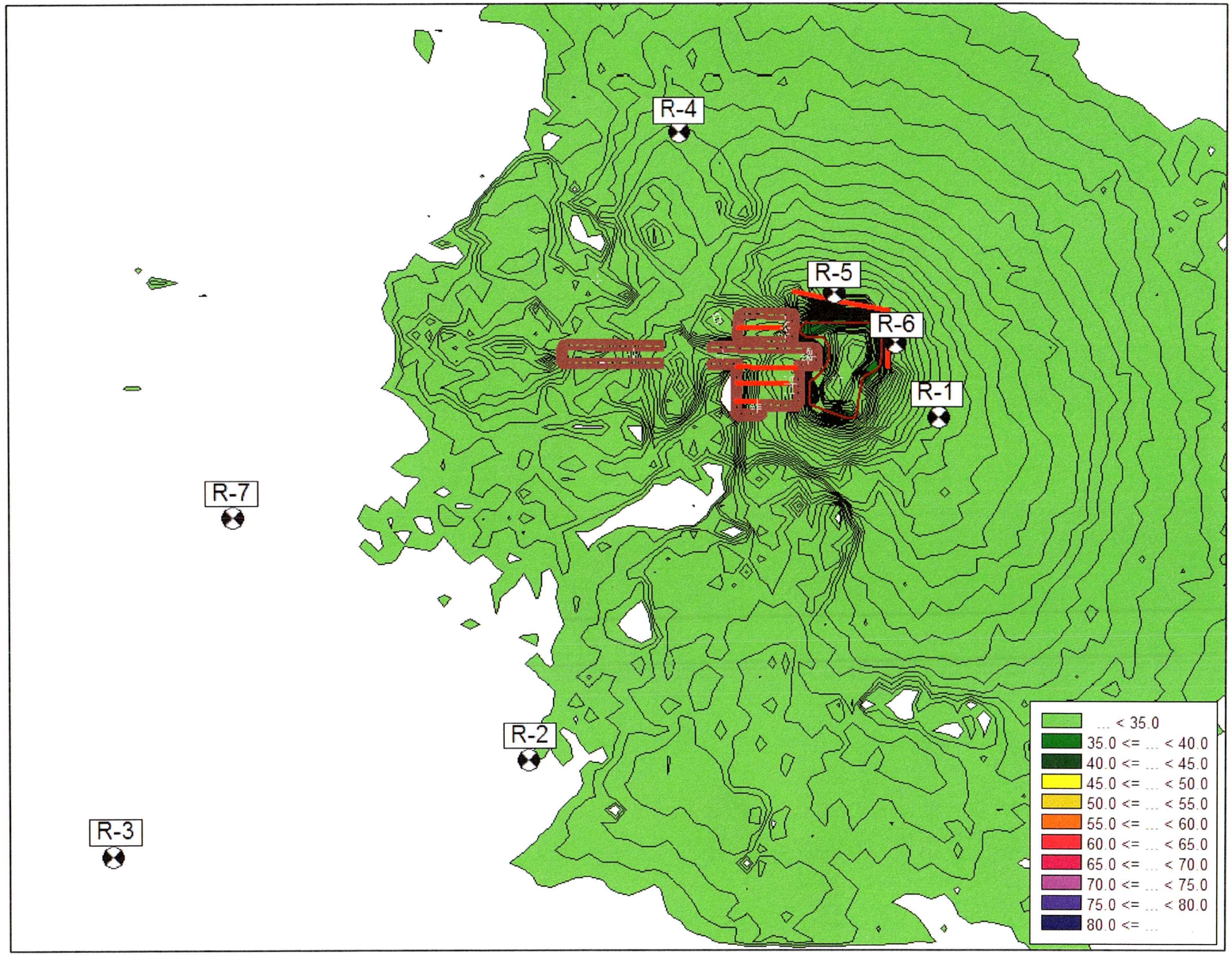


Figure 7B. Crucible Driving Course Noise Isopleth Contours (Original Study 3/22/18)

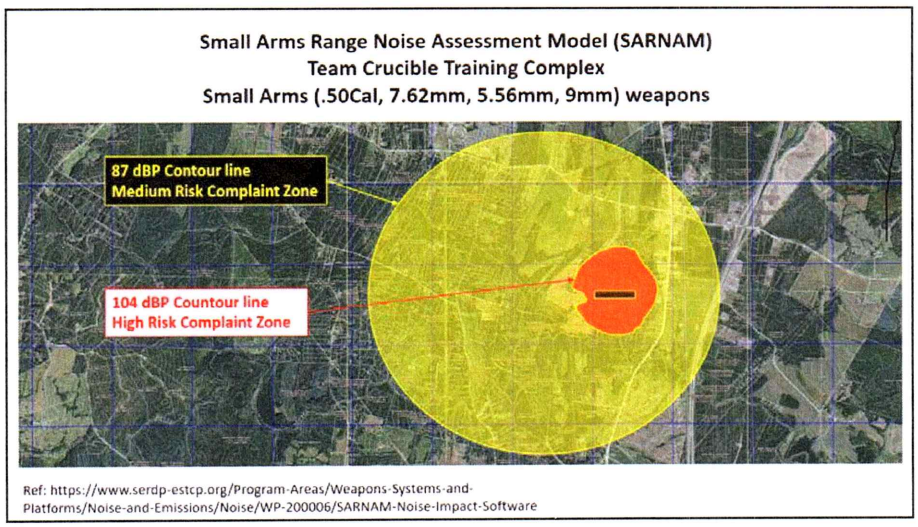


Cadna-A vs. SARNAM

Some members of the public, opposed to Crucible developing and operating their new facility in Spotsylvania, have presented their opinions and alleged noise-related facts in this case to Spotsylvania County officials. Unfortunately, this presentation was fraught with misunderstanding, misapplication and misleading information.

In that presentation, the person(s) addressing those officials and the public attempted to calculate and characterize the potential noise generated by Crucible's proposed new facility by making use of the *Small Arms Range Noise Assessment Model* (SARNAM). Their results, shown graphically in **Figure 6** as sound level isopleth zones surrounding Crucible's facility, indicated that noise from firearms (including 50 BMG rifles that will not be used) could be as loud as 104 dB SPL Peak at a distance of 2,200 feet, and as loud as 87 dB SPL Peak as far away as 10,500 feet. Attempts were then made to explain how these decibel results would significantly exceed the Spotsylvania County Noise Ordinance limits, which again is an inaccurate and misleading conclusion for the reasons below.

Figure 6. Opposition's SARNAM Noise Model Results



SARNAM was developed in the 1990s by a group of researchers working at the US Army's Construction Engineering Research Laboratory (CERL). The main purpose of SARNAM was to aid the Army in land-use planning in and around military bases. The developers of SARNAM chose to characterize noise emission levels from firearms using the "dB Peak" sound level, and limit the output of the SARNAM model to only compute dB Peak, Sound Exposure Level (SEL), Annual Equivalent Sound Level (ALeq) and Annual Day-Night Sound level (ADNL). *However, none of these sound metrics are comparable to the noise limits set forth in the Spotsylvania County Noise Ordinance.*

First and most importantly, a decibel level expressed as dB Peak is not at all the same as one expressed as dBA Lmax 'slow' as specified in the Spotsylvania County Noise Ordinance (see definitions in **Appendix A**). Both metrics describe sound level in a quantitative manner, but they are wholly different in their derivations and their values are not directly comparable. A good conceptual analogy would be that of thermal temperature. While all temperature levels are expressed in units of "degrees", the given scale (i.e. Fahrenheit, Celsius, Kelvin, Rankin, etc.) must also be stated for the absolute value or comparisons of the numeric degree quantity to make sense.

The problems with using SARNAM in this case include the facts that dB Peak is not a frequency-weighted metric (vs. A-weighted), the sound has not been measured with an RMS detector (vs. Lmax), and the sound measurement has a rise time constant of approximately 10 to 100 micro-seconds (vs. 1 second for 'slow'). Consequently, the sound level of an acoustical signal such as a gunshot expressed in dB Peak must by definition have a much higher numeric value than one expressed in dBA Lmax 'slow' for the same acoustical signal (i.e. the same gunshot). For a near perfect sound impulse, the numeric difference could be as much as 47 decibels! Thus, if one were to try to evaluate the opposition's SARNAM results with respect to the limits in the Spotsylvania County Noise Ordinance, the results would roughly be the following:

- 104 dB Peak would become *57 dBA Lmax 'slow'*, where the daytime limit is 60 dBA Lmax 'slow'.
- 87 dB Peak would become *40 dBA Lmax 'slow'*, where the daytime limit is 60 dBA Lmax 'slow'.

Conversely, the Cadna-A noise model, as described previously, is ideally suited for predicting and evaluating noise levels in accordance with the Spotsylvania noise ordinance. Cadna-A incorporates the algorithms and recommended practices contained in ISO Standard 9613 for outdoor sound propagation. And most importantly in this case, Cadna-A can predict sound levels in units of dBA Lmax 'slow' in a manner consistent with the Spotsylvania noise ordinance, allowing for an "apples-to-apples" comparison.

Proper Acoustical Measurements (Smartphones)

In cases such as this one involving contested sound levels and the legal application and enforcement of noise limits, it is crucial to understand how sound levels are measured properly. The old adage of "garbage in, garbage out" certainly applies to sound measurement data and results.

Sound level meters are certified for proper performance and measurement accuracy in accordance with the test procedures and tolerances described in American National Standards Institute (ANSI) Standard S1.4 and corresponding International Electrotechnical Commission (IEC) Standard 61672. Specifications are provided with respect to a sound meter's amplitude dynamic range, frequency response and weighing filters (e.g. A-weighting), linearity, time response (e.g. RMS 'impulse', 'fast', 'slow'), measurable noise floor, temperature and humidity stability, data collection and display rate, and calibration accuracy. And of course, the sound meter must be able to correctly measure the metrics customarily used in the acoustics profession (e.g. SPL, Lmax, Lmin, Leq, SEL, Ln%, Lave and Peak).

Depending on how well a sound level meter can pass these tests, it will be certified as meeting either Type 0, Type 1 or Type 2 requirements. Type 0 is the highest level of accuracy, nominally +/- 0.5 dB, and is reserved for "laboratory-grade" acoustical instrumentation. Type 1 sound meters are nominally accurate to within +/- 1.0 dB and are used for "precision-grade" sound measurements. Lastly, Type 2 sound meters of nominal accuracy of +/- 2.0 dB are considered acceptable for "general-purpose" community noise surveys and OSHA-type hearing conservation dose monitoring.

If a sound level meter is <u>not</u> certified as being compliant with one of these ANSI S1.4 Type requirements then it should <u>not</u> be used for important sound measurement applications, especially if the results have legal consequences associated with them.

To illustrate, some people have mistakenly thought that performing sound measurements with today's sophisticated smartphones could produce reliable decibel results. However, even though most smartphones have a "sound meter app" in them, they are not, and in fact could not be, certified as meeting one of the Type level requirements described in ANSI Standard S1.4. This is because the microphones and preamps found in smartphones are wholly inadequate for performing accurate sound measurements. Their dynamic and frequency ranges are too small to measure noise sources such as firearms and vehicles because they are intended to only transduce voice and speech. Thus, they only work within a small portion of the audible frequency spectrum, and do so with a non-linear dynamic response. There is also great inconsistency in how these apps define the various metrics used in acoustics.

But the biggest problem is that smartphone "sound meter apps" cannot be properly calibrated with a higher-order more accurate calibration source. Thus, any sound level data collected with a smartphone, and in fact any sound meter not certified as meeting one of ANSI S1.4 Type requirements, cannot and should not be relied upon for dependable and defendable results.

Conclusions

The results of this updated acoustical study support the expectation and conclusion that Crucible will be able to successfully manage noise emissions associated with their new facility in Spotsylvania County, Virginia. And in fact, noise levels affecting the surrounding community are expected to be notably reduced with Crucible's current facility design layout compared to their original design assessed on 3/22/18.

Noise propagating to the surrounding community from Crucible's use of firearms, simulated IEDs and evasive driving course are expected to comply with the daytime impulsive noise criteria limits contained in the Spotsylvania County Noise Ordinance; which Crucible has voluntarily put forth as their goal.

As evidence of their willingness to control noise to the fullest extent reasonably practicable, Crucible has proactively committed to certain physical noise control enhancements to their facility design. Most notable is their plan to build unusually tall 20-foot-high earthen berms to completely surround their now-single shooting range. Moreover, the default operating condition for rifles on the shooting range will be to equip them with effective sound suppressors. Further, Crucible is voluntarily willing to limit their operational hours to daytime hours only.

In conclusion, given these proactive noise mitigation measures and the quantitative results of this acoustical study, *the new Crucible facility would be a noise-compatible land-use within its proposed location in Spotsylvania, Virginia.*

Appendix A

Acoustical Terms and Definitions

Acoustical Terms and Definitions

As with any field of science, it is critical to understand and make proper use of technical terms and definitions that are used in the acoustical industry. Noise can be quantified in many different manners depending on its temporal/time, tonal/frequency, or magnitude/loudness properties.

Noise magnitude is expressed in units of *decibels (dB)* which is a logarithmic quantity comparing fluctuating air pressure to that of a standardized reference static air pressure of 20 micro-pascals (i.e. dB re: 20 µPa). For this reason the noise levels that humans hear are called *sound pressure levels*. Noise is expressed as a logarithmic quantity because humans are sensitive to relative changes in noise levels. To illustrate, humans can just barely perceive a change in noise levels of +/- 1 decibel, can likely perceive a change of +/- 3 decibels, can easily perceive a change of +/- 5 decibels, and will generally describe a change of +/- 10 decibels as a doubling or halving in noise levels.

With respect to tonal qualities (frequency), a frequency weighting adjustment has been standardized to account for the human auditory response over the audible frequency range of approximately 20 Hz to 20,000 Hz. Humans are less capable of hearing low frequency noise, exhibit a maximum sensitivity to tones in mid-frequency ranges, and are slightly less sensitive to high frequency sound as well. This frequency weighted adjustment is referred to as "A-weighting", with results expressed as *A-weighted decibels, or dBA.* Illustrative examples of A-weighted decibel levels for common outdoor and indoor noise sources is provided in **Figure A-1**.

Another common practice is to separate a sample of noise into its spectral components by using frequency filters of known shape and bandwidth. This approach provides insights into the source and transmission characteristics of the noise and allows for identification of frequency ranges that contain the most acoustical energy. *Octave band and third-octave band* filters are typically used for this purpose because their bandwidths are a constant percentage of their center frequencies, and are better for mimicking how humans perceive discrete frequencies by providing finer resolution at lower frequencies.

Numerous metrics and indices have been developed to quantify the temporal characteristics (changes over time) of environmental noise include the following:

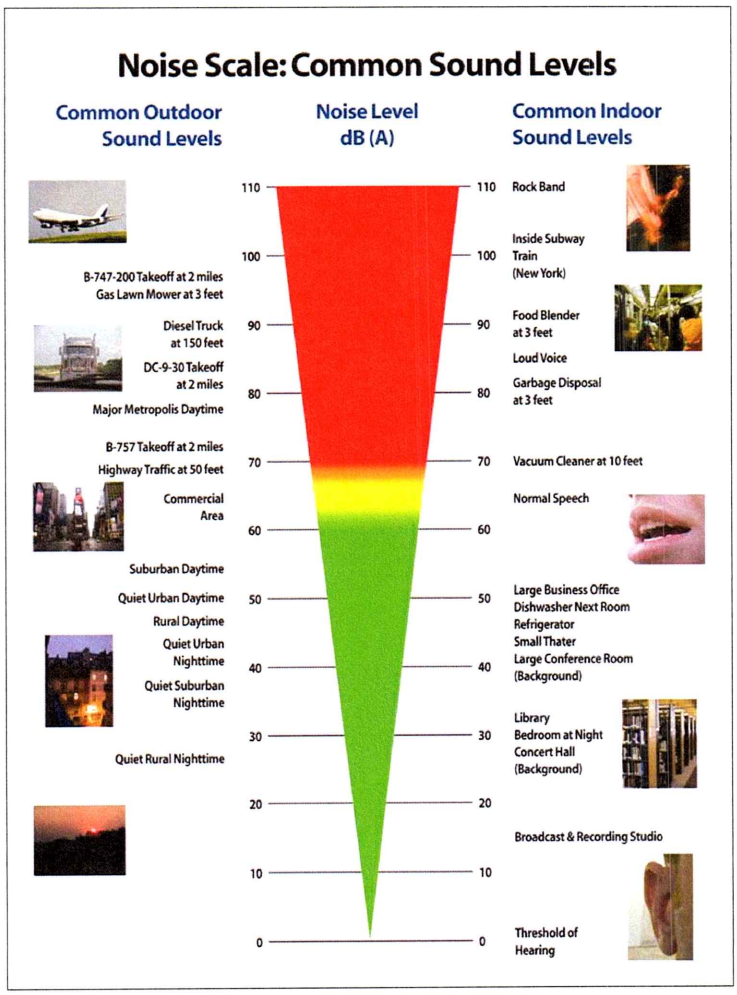
The *Equivalent Sound Level, or Leq*, is the energy-averaged single noise level that represents the same acoustic energy that was contained in the fluctuating noise level over a defined period of time. The Leq is useful for describing the "average" noise level over time, and is expressed in dBA.

The *Maximum and Minimum Sound Levels, or Lmax and Lmin*, are the loudest and quietest instant sound level occurring during a period of time. The Lmax is particularly useful for evaluating loud, impulsive noise events such as gunshots. Lmax and Lmin levels are expressed in dBA, however the root-mean-square (RMS) time constant of the sound level meter's detector has a significant effect on the measured levels. By International agreement, a sound level meter with an RMS response set to "slow" has a rise time constant of 1 second, where a setting of "fast" is about 8x faster with a rise time constant of only 0.125 seconds.

The *Peak Sound Level, or Peak*, is a measure of the highest unweighted raw air pressure level in an acoustical signal. Peak levels have not been rectified through a root-mean-square detector before being measured, and thus should not be confused with Lmax sound levels. Human auditory perception is not related to Peak sound levels. Rather, Peak levels are used for evaluating the potential effects of high intensity air pressure impulses affecting physical structures or damage to people's eardrums.

The *Percentile Level, or Ln*, expressed in dBA is a statistical representation of changing noise levels indicating that the fluctuating noise level was equal to, or greater than, the stated level for "n" percent of the time. For example, the L1, L10, L50, and L90 represent the noise levels exceeded 1%, 10%, 50%, and 90% of the time. The L10 is often used to identify impacts of transportation or construction noise sources, while the L90 is considered to represent steady background noise.

Figure A-1. Common A-Weighted Decibel (dBA) Sound Levels



The *sound power level (PWL)* of a noise source is the strength or intensity of noise that the source produces/emits regardless of the environment in which it is placed. Sound power is a property of the source, and therefore is independent of distance. The radiating sound power then produces a *sound pressure level (SPL)* at any given point of interest which human beings perceive as audible sound. The sound pressure level is dependent on its environment (absorption, reflections, etc.) and its distance from the noise source. And even though both sound power and sound pressure are expressed in decibels (dB), they are not the same thing and should not be confused. Decibel levels of sound power are referenced to a power level of 1 pW, while decibel levels of sound pressure have a pressure reference level of 20 µPa.

Appendix B

Professional Certifications

The following acoustical professional was the principle investigator for this project.



INCE

The Institute of Noise Control Engineering
of the United States of America, Inc.

in recognition of
professional standing and contributions
attests that

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2001 June

Shooting Range Design & Safety Evaluation
of the
Team Crucible
Training Complex
Spotsylvania, Virginia

16 April 2018

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kramer one inc.
ARCHITECTURE & PLANNING

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1 Background and Scope of Work

Team Crucible wishes to construct and operate a shooting range facility in Spotsylvania County, Virginia. Kramer One, Inc. was retained by Team Crucible to evaluate their proposal to construct and operate this shooting range facility.

Kramer One, Inc. is an architecture and planning firm nationally recognized for shooting range design. The firm is located in Scottsdale, Arizona, and has designed shooting ranges in thirty states, including Virginia.

The Team Crucible Training Complex was not designed by Kramer One, Inc. Our role is limited to the review of the shooting range safety systems for this proposed facility and make recommendations where appropriate. Team Crucible has incorporated all of the additional engineering and administrative controls we requested.

Prior to writing this report, we reviewed the following documents.

- Drawings 1-6 by W W Webb & Associates, PLLC, revision dated March 15, 2018
- Generalized Development Plan – Narrative – Rezoning & Special Use Permit Applications
- Letter to Leon Hughes, dated March 22, 2018
- Voluntary Proffer Statement

2 Shooting Range Safety Standards

The industry standard recommendations for the design and operation of facilities like the Team Crucible Training Complex come from the National Rifle Association (NRA) and the National Shooting Sports Foundation (NSSF). The primary document is the NRA Range Source Book. The latest edition is dated 2012. We have used the 2012 NRA Range Source Book for reference in preparing this report.

The primary bullet containment concept of the shooting range industry, as promulgated by NRA, is all bullets fired on the firing ranges should not leave the property owned or controlled by the shooting range facility.[1] The methods to controlling the bullets fired may include engineering controls, administrative controls, or a combination of administrative and engineering controls. From a practical standpoint, both engineering controls and administrative controls are necessary. The best engineering controls can be defeated by a lack of administrative controls. No engineering controls would be equally undesirable.

We understand military standards, to include Surface Danger Zones (SDZ), has been suggested as the applicable standard for the Team Crucible Training Complex. We disagree. The United States Armed Services publishes standards for various weapons facilities, including small arms[2] firing ranges. These standards have specific applicability to facilities operated by various branches of the United States Armed Services, but have no applicability to other firearms facilities, such as private, public, law enforcement and security firing ranges. The Team Crucible Training Complex is not operated by any branch of the United States Armed Services, nor does it exclusively use ammunition for which SDZs are published.

In the next two chapters of this report we will discuss engineering controls and administrative controls.

[1] Exception: Bullets being removed for recycling or disposal.
[2] "Small arms" is defined as firearms that may be both carried and discharged by one person. Pistol, rifles and shotguns are all examples of small arms.

3 Engineering Controls

The engineering controls shown on the Team Crucible Training Complex documents include earth backstops with ricochet catchers, and side berms. Additionally, the types of targets and their locations are restricted. Details of these engineering control may be found in the following sections of this chapter.

Backstops

Backstops are the primary device intended to stop bullets fired on shooting ranges.

The NRA Range Source Book recommends earth backstops be constructed with a minimum height of 20 feet, a minimum slope on the shooting face of 1.5:1 (1.5 units horizontal to 1 unit vertical), and the material in the shooting face have no rocks greater than ¾ inch in diameter to a minimum depth of 24 inches.[3] The Team Crucible Training Complex will be designed to meet these standards.

Berms/Walls

Side berms or walls may be used to separate shooting ranges from one another. They may also be used as an engineering control for added protection of areas adjacent to a shooting range.

The NRA Range Source Book's recommendation for side berms is similar to their recommendation for earth backstops, except the minimum height is reduced to 8 feet.

The NRA Range Source Book describes an option to side berms where the material is an impenetrable vertical wall or barrier, rather than sloped earth. The minimum height recommendation remains 8 feet.

The Team Crucible Training Complex will have perimeter side berms much greater than 8 feet for sound control reasons. Internal walls will be a minimum of 10 feet high, exceeding the NRA recommendation of 8 feet. All side berms and walls will exceed the minimum standards identified in the NRA Range Source Book.

Ricochet Catchers

When ricochet catchers are constructed, the NRA Range Source Book recommends constructing a barrier embedded into the earth backstop and extending outward at least 6 feet.

[3] The NRA Range Source Book is inconsistent regarding maximum rock size. Both ¾ inch and 1 ½ inch are stated. This report uses the more restrictive size.

The NRA Range Source Book does not adequately address under what conditions a ricochet catcher should be utilized. However, in our professional opinion the Team Crucible Training Complex could experience backstop deflected bullets leaving their property without ricochet catchers be constructed on all of the earth backstops. Team Crucible has agreed to construct these devices. Be aware that the addition of ricochet catchers exceeds the minimum standards identified in the NRA Range Source Book.

Targets

When steel targets are used, the NRA Range Source Book recommends the minimum distance from shooter to target be 10 yards (30 feet) to prevent bullet splatter from injuring shooters. Paper and cardboard targets have no such recommendation, as the bullets travel through the targets into the backstop. However, the NRA Range Source Book also recommends shooters not shoot closer than 10 yards (30 feet) from the earth backstop they are shooting into. For paper and cardboard targets, the targets should be placed to prevent the distance from the shooter to the earth backstop from being less than 10 yards. The Team Crucible Training Complex will use steel targets, as well as paper and cardboard targets. Administrative controls will be in place to maintain appropriate distances.

The use of backward falling steel plate targets can result in deflected bullets leaving an outdoor shooting range property. Team Crucible will not be using this these types of steel targets.

Ground Surfaces

To control ground deflected bullets, the shooting range industry recommends locating targets such that bullets do not strike the ground surface, rather the bullets strike the impact area of the backstop. The Team Crucible Training Complex will be designed and operated to meet this standard.

4 Administrative Controls

Range safety is not a function of design alone. Often when incidents of bullet escapement have occurred, they are the result of a properly designed and maintained shooting range being utilized improperly. The solution is supervision of the shooting activities.

Shooting range supervision can be accomplished by active or passive means. An example of passive means of shooting range supervision would be posting shooting range rules on the shooting range. An example of active means of shooting range supervision would be the presence of a range safety officer.

An industry accepted method, and one of the most common methods, of controlling direct fire bullets is through active administrative controls. Administrative controls could include educating the range users about safe gun handling rules and enforcing those rules through shooting range supervision by range safety officers.

Safe gun handling rules include, but are not limited to:

1. Keep firearm muzzles pointed in a safe direction. The safe direction on a shooting range is toward the impact area of the backstop.
2. Keep fingers off the trigger until the firearm sights are aligned with the target.

For a firearm to be discharged over the earth backstop, both of these fundamental rules would need to be simultaneously violated. Teaching the safe gun handling rules makes the shooters aware of their responsibility and the consequences of violating the rules. On a supervised shooting range, range safety officers police the shooting activities to enforce the safe gun handling rules.

The Team Crucible Training Complex is an actively supervised shooting facility. No firearms training will be conducted without qualified range safety officers being present and in charge during all firing activities. This meets the highest level of care for the shooting range industry. Team Crucible has an existing record of operating a supervised outdoor shooting range facility, and without a single incident of bullet escapement being alleged at that facility. This indicates an understanding of proper education and enforcement by Team Crucible staff.

5 Conclusion

The Team Crucible Training Complex as proposed would meet current industry standards for shooting range safety. The commercial shooting range industry has an exemplary safety record and Team Crucible has had no reported incidents of bullet escapement on their existing facility, which has been in operation for nineteen years.

The industry standards for this type of facility are as published by the National Rifle Association and the National Shooting Sports Foundation. Specific engineering and administrative controls proposed for the Team Crucible Training Complex meet or exceed those industry standards.

Maintaining safety for shooting range users and the surrounding neighborhood involves a combination of appropriate design and construction, attention to maintenance, and proper operation. The Team Crucible approach to these factors appears to be consistent with a facility being operated at a high level of care. All shooting operations are conducted under the supervision of qualified range safety officers. All shooting range users will be educated about safe gun handling rules and those rules will be enforced by the range safety officers. Engineering controls meet or exceed the recommendations of the industry.



Lorin D. Kramer
President
Kramer One, Inc.

The Economic and Fiscal Impact of the Proposed Team Crucible Training Complex on Spotsylvania County, Virginia

By

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Prepared for

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Fredericksburg, Virginia

July 2017

Executive Summary

The proposed Team Crucible Training Complex in its initial phase would generate both positive economic and fiscal benefits for Spotsylvania County. These benefits will be generated by the construction spending required to prepare the site for initial operations and by future construction spending to buildout the site for expanded operations by Team Crucible and to provide office space for other federal security contractors at a future time and be measured by increased job and income growth to the benefit of residents and businesses located ion Spotsylvania County.

The initial construction spending of $1.1 million would contribute a total of $1.7 million to the County's economy during the construction period, generate $341,000 in new wage income for workers residing in the County and support a total of 7.3 full-time, year-round equivalent jobs locally and elsewhere. These economic benefits would be achieved exclusively during the construction period.

These positive construction impacts are complemented by the annual operating outlays by Team Crucible and by the per diem spending of trainees enrolled in security training programs on-site. In its initial stage, Team Crucible's estimate annual operating budget totaled $940,000. This budget provides for four full-time, regular on-site employees supplemented by 20 contract trainers. This level of operations would support 2,650 daily visits (trainee days) annually on-site generating per diem local spending for accommodations and meals totaling $363,000. At this initial scale, the total impact of operations outlays, including trainee expenditures, would contribute $1.9 million to the County's economy each year, generate $538,000 in new local labor income for workers residing in the County and support a total of 12.5 full-time, year-round equivalent jobs beyond those employed at the Training Complex.

The buildout proposal for this site provides for the expansion of Team Crucible's Training Complex by 12,000 square feet and the addition of 40,000 square of office space that would be available to other federal security contractors. This added capacity for Team Crucible would accommodate up to 10,000 daily visits (trainee days) annually and requires annual operating outlays totaling $5.3 million. This scale of operation would include 15 full-time regular employees on-site with up to an additional 75 contract trainers. Inclusive of the annual flow of trainees and their spending for accommodations and meals (not including other personal outlays for retail and incidentals), the buildout proposal would generate $6.7 million in annual (recurring) spending directly to the benefit of the local economy. This direct spending, reflecting a composite multiplier of 1.511, would contribute a total of $10.1 million to the County's economy, generate $2.2 million in new wage income for County residents working within the County, and support a total of 65 jobs of which 39 full-time, year round equivalent jobs would be held by County residents.

Complementing the positive income and employment benefits that would accrue to Spotsylvania County, its resident workers and businesses, Team Crucible's proposed Training Complex has been shown to generate a positive fiscal benefit to the County in

its initial stage of operation (+$15,823.40) with its net fiscal benefit increasing at the full buildout scale of operations (+$63,681.50).

The net fiscal benefit of Team Crucible's proposal is conservative as its revenue impacts are underestimated by design (they reflect non-residential revenue flows that incorporate tax exempt uses) and they reflect non-residential public expenditure demand (for County provided services) that assume access to services that would not be required to support Team Crucible's daily functions. These economic and fiscal benefits are summarized in the following table.

Economic and Fiscal Impacts of the Proposed Team Crucible Training Complex on Spotsylvania County
(in millions of 2016 dollars)

Phases	Direct Outlays	Total Output	Personal Earnings	Jobs Supported
Initial proposal				
Construction	$1.100	$1.687	$0.341	7.3
Operations	$0.904	$1.375	$0.291	8.5
Trainee Spending[1]	0.363	0.538	0.110	4.0
Total Operations	$1.267	$1.913	$0.401	12.5
Buildout				
Construction	$5.500	$8.436	$1.704	36.3
Operations	$5.319	$8.087	$1.709	49.8
Trainee Spending[1]	1.370	2.023	0.413	15.3
Total Operations	$6.689	$10.11	$2.122	65.1

Fiscal Impacts

Jobs	Revenues	- Expenditures	= Fiscal Impact
Initial			
24[2]	$31,805.96	$15,982.56	$15,823.40
Buildout			
90[3]	$88,778.60	$59,934.60	$28,844.00
295[4]	$260,136.80	$196,455.30	$63,681.50

Source: The Stephen S. Fuller Institute at the Schar School, GMU
[1]includes per diem allowances of $91 and $46 for hotel and food per trainee
[2]includes 4 fulltime regular jobs and 20 contract jobs at Crucible
[3]includes 15 fulltime regular jobs and 75 contract jobs at Crucible
[4]includes 90 Team Crucible jobs plus 205 jobs in the proposed 40,000 square foot office building

Introduction

The objective of this analysis is to estimate the economic and fiscal impacts on the Spotsylvania County of the proposed Team Crucible development and operations of a new Training Complex to be located on a 70-acre site, currently zoned A-2, with access directly to U.S. Route 1. Two levels of economic and fiscal impact analysis are reported: the initial phase and buildout that includes expansion capacity for Team Crucible and the co-location of other federal contractors in office space on the site.

The economic impacts generated by the construction, operation and local spending by trainees of Team Crucible's proposed training complex reflect the direct expenditures associated during the construction phase, both soft and hard costs, and the continuing annual outlays to operate the on-site training programs as well as the new spending for overnight accommodations and meals by the trainees enrolled in Team Crucible's training programs. As this new spending circulates within the County's economy it will generate additional business transactions and support the payroll of local workers. And, with this re-spending of these new monies additional income and additional employment will be generated. These economic effects are measured using "multipliers" calculated by the U.S. Bureau of Economic Analysis for Spotsylvania County. These multipliers will be used to derive the total contribution of this new spending to Spotsylvania County's economy, the new personal earnings generated to the benefit of workers residing in Spotsylvania County and the total jobs this new spending will support annually locally and elsewhere in the region and state.

The County's FY 2016 Comprehensive Annual Financial Analysis (CAFR) will provide the basis for the fiscal impact analysis as its audited expenditures and revenues provide the best available information on the distribution of public services and their beneficiaries and the sources of the County's revenues. The full fiscal analysis methodology is outlined in the appendix.

Project Description

Team Crucible has proposed a training complex to be sited on a 70-acre parcel with direct access from U.S. Route 1. The initially development phase would involve $1.1 million in capital outlays (including $100,000 in soft costs) to prepare the site and support facilities designed to support a total of 2,650 daily visits (trainee days) annually over the first year of operation. Trainees typically attend a five-day program spending five nights in local hotels/motels and receive a per diem government allowance of $91 per night for accommodations and $46 per day for meals. This initial training program would have four fulltime, regular employees on-site supported by 20 contract employees for a total workforce of 24. Annual operating outlays for this initial stage of operation are estimated at $904,284 inclusive of payroll. Trainee spending for accommodations and meals, based on 2,650 total daily visits in the first year, would total $363,000. This trainee spending only includes lodging and meals; additional spending for recreation, retail purchases, transportation and incidental consumer services would be expected.

The buildout scenario includes the construction of a 40,000 square foot office building and an additional 12,000 square feet of training space to accommodate Team Crucible's expanded security training programs. These expanded facilities would result in new construction outlays of $5.5 million, increased training capacity for 10,000 daily visits (trainee days) annually with trainee per diem spending of $1.7 million for accommodations and meals, annual operating outlays for Team Crucible totaling $5.319 million, and staffing of 15 full-time regular employees supplemented by 75 contract trainers for a total of 90 jobs within the Team Crucible Training Complex. The additional office building space, designed to accommodate other federal security-related contractors, is projected to accommodate up to 205 employees, based on an industry occupancy norm of 195 gross square feet per worker. These design parameters are the drivers of the proposal's economic and fiscal impacts on Spotsylvania County that are reflected in the following analyses.

Economic Impact Analysis

The construction (hard and soft costs) and operation of the proposed Team Crucible Training Complex represent an important new economic development in Spotsylvania County. The economic impacts of the initial training facilities and programs, for construction and site preparations and the facility's operating outlay and spending by trainees are summarized in Table 1.

Table 1

Initial Impact of the Proposed Team Crucible Training Complex
on the Spotsylvania County Economy
(in millions of 2016 dollars)

Sources	Direct Outlays	Total Output[1]	Personal Earnings[2]	Jobs Supported[3]
Construction Outlays*	$1.100	$1.687	$0.341	7.3
Operating Outlays	$0.904	$1.375	$0.291	8.5
Trainee Spending**	0.363	0.538	0.110	4.0
Total Annual Outlays	$1.267	$1.913	$0.401	12.5
Combined Impacts	$2.367	$3.600	$0.742	19.8

Sources: Team Crucible, LLC; The Stephen S. Fuller Institute at the Schar School, GMU.
*hard and soft costs, **spending by trainees for hotels and meals.

[1]the total value of goods and services generated directly and indirectly as a result of construction spending and annual operating outlays and local occupant spending in the Spotsylvania County economy; [2]the additional earnings generated within the Spotsylvania County economy from outlays for initial construction and subsequent annual operating outlays and resident spending; [3]the total full-time, year-round equivalent jobs supported locally and elsewhere by the spending and re-spending of direct expenditures for construction and operation of the Training Complex.

Table 2

Buildout Impact of the Proposed Team Crucible Training Complex
on the Spotsylvania County Economy
(in millions of 2016 dollars)

Sources	Direct Outlays	Total Output[1]	Personal Earnings[2]	Jobs Supported[3]
Construction Outlays*	$5.500	$8.436	$1.704	36.3
Operating Outlays	$5.319	$8.087	$1.709	49.8
Trainee Spending**	1.370	2.023	0.413	15.3
Total Annual Outlays	$6.689	$10.110	$2.122	65.1
Combined Impacts	$12.189	$19.546	$3.826	101.4

Sources: Team Crucible, LLC; The Stephen S. Fuller Institute at the Schar School, GMU.
*See Table 1 for notes.

The initial development of Team Crucible's Training Complex will contribute $1.1 million in new construction spending into the Spotsylvania County economy. This new spending will generate a total of $1.7 million in direct and indirect impacts reflecting a construction multiplier of 1.53. Additionally, this one-time construction spending will generate $0.341 million in personal earnings (labor income) for residents of Spotsylvania County (representing approximately annual earnings for 6 full-time employees) and support as many as 7.3 full-time, year-round equivalent jobs in the County, region, state and elsewhere. These economic benefits will accrue to the County during the initial construction period.

Buildout plans call for the development of a 40,000 square foot office building and the addition of 12,000 square feet of training space to be occupied by Team Crucible. The projected cost for this additional office and operating space is $5.5. As shown in Table 2, the economic impacts of these construction outlays are: $8.4 million total contribution to the County's economy over the construction period; the addition of $1.7 million in new wages and salaries accruing to workers residing in the County (the equivalent of 31 full-time, year-round local jobs); and a total of 36.3 full-time, year-round equivalent local and non-local jobs being supported by these construction outlays.

Following construction, the operation of the proposed facility will generate annual benefits from outlays by Team Crucible to support on-site annual operations and additional annual economic impacts will be generated by the spending of the estimated 2,650 daily visits (trainee days) annually to the Training Complex over the course of its first full year of operation. Annual operation outlays are estimated to total $904,284 including payroll of approximately $391,000 to support 4 full-time

regular employees and 20 contract trainers. These operating outlays will recur annually and would be expected to grow proportionally with the number of trainees.

With the proposed buildout of the facility, an operating budget totaling $5.3 is projected including 15 full-time regular positions and 75 contract employees. The economic impact of these operational outlays is shown to total $8.1 million to the benefit of Spotsylvania County. Additionally, $1.7 million in new personal earnings will be generated annually upon buildout to the benefit of workers residing in Spotsylvania County, the equivalent payroll of 31 full-time, year-round jobs; and altogether, these outlays would support a total of 49.8 full-time, year-round equivalent jobs locally and elsewhere.

Beyond the spending to build and operate the proposed Training Complex, the trainees represent a major source of continuing spending potential to the benefit of local businesses. Each trainee—2,650 projected training (person) days in the first year and up to 10,000 daily visits (trainee days) annually at buildout—will receive a per diem of $91 for accommodations and $46 for meals (in today's dollars). This spending alone will total $363,000 at the initial stage of operations and increase to $1.4 million at buildout. This trainee spending only includes lodging and meals; additional spending for recreation, retail purchases, transportation and incidental consumer services would be expected. Given the site location, businesses located in Spotsylvania County would be the principal beneficiaries of these trainee expenditures. This spending has been shown to generate beneficial impact on: the County's economy, the resident workforce in the form of new labor income, and the local and regional employment base.

Summarizing the total economic benefits from the initial development phase, the direct spending for construction and operations, including trainee per diem spending of $2.367 million, would generate total benefits of: $3.600 million in new economic growth, $742,000 in new personal earnings to the benefit of an estimated 13.5 full-time, year-round equivalent workers residing in the County, and support a total of 18.3 full-time, year-round equivalent jobs locally and elsewhere not including the jobs located on site.

The economic benefits flowing from the proposed buildout of these facilities, including 40,000 in office space for use by other federal security contractors (but excluding those contractors' operating outlays from the impact calculations), would increase Team Crucible's training capacity to 10,000 daily visits (trainee days) annually and support total direct spending $12.2 million (including $5.5 million in capital construction). This spending in Spotsylvania County would generate a total of $19.5 million to the County's economy, support $3.8 million in new personal earnings to the benefit of workers residing in the County (estimated 69.6 full-time, year-round equivalent jobs) and support a total of 101.4 jobs locally and elsewhere in addition to the jobs generated on site. These post-construction benefits will recur annually over the lifetime of Team Crucible's Training Complex.

Fiscal Impact Analysis: Countywide

This analysis is based on the expenditure and revenue data presented in the most current Spotsylvania County Comprehensive Annual Financial Report (CAFR), for FY 2016. The first step in this fiscal analysis is to divide the County's expenditures and revenues into those that serve or are generated by the residents of the County (its population) and those that are related to or generated by the County's non-residential functions with these being assigned it the workers who work within the County. This assignment of expenditures (demands for County services) and revenues is expressed for the County's 131,305 residents in 2016 on a per capita basis and for the County's non-residential functions based on its 34,186 at-place jobs across all sectors on a per employee basis.

In 2016, an analysis of the County's revenues, including all taxes, fees, permits, fines, user charges, and intergovernmental transfers, found that these were divided between residential and non-residential functions, respectively, on an 80.9% and 19.1% basis. An analysis of the County's expenses (demand for services) in 2016 found that these were distributed between residential and non-residential functions, respectively, on a 90.8% and 9.2% basis. As the County's expenditures reflected capital project outlays, the County's revenues and expenditures were not initially balanced and required bond sales, transfers, and other adjustments that ultimately generated a revenue surplus of $6.2 million that was added to the County's Fund Balance. As this fiscal impact analysis assumes a balanced budget, this fund transfer and other adjustments were assigned to residents and non-resident revenues reflecting the overall split across all revenue sources between residential and non-residential revenue sources. The results of these analyses are presented in Table 3.

On average, each resident of Spotsylvania County cost the County $1,711.25 for the services provided during fiscal year 2016, inclusive of education. This value represents the cost of making county-funded services available to its residents whether they actually used these services or not during the year. The largest single source of county expenditure was for public education, totaling $118.8 million in 2016. While on a per capita basis this education cost (which is all assigned to the city's population as they are the direct beneficiaries of these services) was $905.11 per capita, for the 23,678 students enrolled in the County's public schools in 2016 the County's per student cost of education was $5,019.26. With each Spotsylvania County resident accounting for $1,711.25 in County expenditures but only generating $1,524.05 in County revenues in 2016, each resident represented a fiscal cost of $187.19.

Offsetting these residentially based fiscal costs in Spotsylvania County are the fiscal surpluses generated on average by the County's taxable non-residential land uses. In 2016, all non-residential land uses (including non-taxable uses) generated a total expenditure demand on the County of $665.94 on average per at-place job in the County and generated revenues averaging $1,384.95 on average per at-place job. This surplus of revenues in excess of public expenditure demand totaled $719.01 per job and provided the revenue surplus to support the fiscal costs of residential land uses.

Table 3

Expenditures and Revenues Associated With
Residential and Non-Residential Uses in Spotsylvania County, FY 2016
(in 2016 dollars)

Source	Per capita[1]	Per Job[2]
Expenditures:		
County-wide average	$1,711.25	$665.94
County-wide average less Schools	806.14	
Education Only	905.11	
Revenues:		
Countywide average	$1,524.05	$1,384.95
Countywide average less real property tax revenue	786.38	670.04
Real property	737.67	714.91
Net Fiscal Impact	- $187.19	+ $719.01

Source: The Stephen S. Fuller Institute at the Schar School, GMU
[1]the County's population in 2016 was estimated to at 131,305 (CAFR).
[2]the County's at place employment in 2016 was estimated at 34,186 (BEA).

Fiscal Impact Analysis: Team Crucible Proposal

The fiscal impact of Team Crucible's Training Complex is a function of the local tax revenues it will generate and the local public expenditure demand its activities and employment base will represent. Employing the fiscal impact methodology outlined above and in the Appendix, and (1) basing the initial phase analysis on a total employment base of 24 full-time, year-round employees (this includes 20 contract trainers who are not all likely to be on site every training day) and (2) estimating the real estate value of the proposed Training Complex based on the land purchase value for the 70-acre site plus the capital improvements associated with only this initial development stage, the fiscal analysis shows that if the proposed Training Complex has existing during FY 2016 it would have generated a surplus of revenues over expenditures of $15,823.40 or $659.31 net fiscal benefit per on-site job. These fiscal flows are shown in Table 4 on page 9. In fact, the estimate revenues associated with Team Crucible's Training Complex are shown to be almost double the estimate cost of providing County services to the Training Complex.

A similar fiscal analysis for the buildout scenario, as outlined on page 4, reflecting the potential expansion of Team Crucible's scale of operations to 10,000 daily visits (trainee days) annually and the addition of 12,000 square feet of building space, with

a total of 90 full-time regular and contract trainers generates a fiscal benefit for Spotsylvania County totaling $28,844.00. These results are presented in Table 5.

Table 4

Fiscal Impact of Team Crucible's Initial Phase Training Complex on Spotsylvania County in 2016 (in 2016 dollars)

Source	Per Job[1]	Fiscal Impact
Revenues		
Less Real Estate	$670.04	$16,080.95
Real Estate Revenue	655.21	15,725.00
Total Revenues	$1,325.25	$31,805.96
Expenditures	$665.94	$15,982.55
Net Fiscal Impact	$659.31	$15,823.40

Source: The Stephen S. Fuller Institute at the Schar School, GMU
[1]based on 4 full-time regular and 20 contract jobs on-site

Table 5

Fiscal Impact of Team Crucible's Buildout Training Complex on Spotsylvania County in 2016 (in 2016 dollars)

Source	Per Job[1]	Fiscal Impact
Revenues		
Less Real Estate	$670.04	$60,303.60
Real Estate Revenue	316.39	$28,475.00
Total Revenues	$986.43	$88,778.60
Expenditures	$665.94	$59,934.60
Net Fiscal Impact	$320.49	$28,844.00

Source: The Stephen S. Fuller Institute at the Schar School, GMU
[1]based on 15 full-time regular and 75 contract jobs on-site

The buildout scenario also includes the construction of a 40,000 square foot office building to house other federal contractors compatible with Team Crucible's services that may seek to co-locate to this site from other locations in the Washington region. The inclusion of the office building (@$4 million construction cost) and the loading of this building with workers (full occupancy at 195 gross square feet per worker) would add 205 jobs to the site. Adding the fiscal impacts of these additional jobs and the related increase in real estate value to the buildout scenario, exclusive to Team Crucible as presented on Table 5, shows the full buildout proposal to generate a net fiscal benefit of $63,681.50.

Table 6

Fiscal Impact of Team Crucible's Buildout Training Complex
With Office Building on Spotsylvania County in 2016
(in 2016 dollars)

Source	Per Job[1]	Fiscal Impact
Revenues		
Less Real Estate	$670.04	$197,661.80
Real Estate Revenue	211.78	$62,475.00
Total Revenues	$881.82	$260,136.80
Expenditures	$665.94	$196,455.30
Net Fiscal Impact	$215.87	$63,681.50

Source: The Stephen S. Fuller Institute at the Schar School, GMU
[1]based on 90 Team Crucible employees and 205 office jobs housed in the proposed 40,000 square foot office building.

The site proposed for the Team Crucible Training Complex, as currently zoned, would accommodate 10 single-family detached residential units. If these 10 residential units had been built on this site, their fiscal impact would have generated $39,831.35 in revenues during 2016 to the benefit of Spotsylvania County. However, they also would have placed a demand on County services totaling $53,065.42 including educational costs of $28,609.78 for 5.7 school-age children generated by these units. The net fiscal impact of developing this site under its by-right zoning would result in a cost to the County of $13,234.07. However, by-right development of this site would cost the County not only $13,234.07 but also the foregone fiscal benefits totaling $15,823.40 that would have been generated has the site been used as proposed by Team Crucible. Consequently, by-right development would represent a total fiscal cost to the County of $29,056.47. This fiscal cost would only increase under the build out proposal shown in Tables 5 and 6.

Summary of Findings

The proposed Team Crucible Training Complex has been shown to generate continuing and important economic activity to the benefit of Spotsylvania County, its workforce and business base, and a net fiscal surplus to Spotsylvania County's budget as shown in Table 7.

Table 7

Economic and Fiscal Impacts of the Proposed Team Crucible Training Complex on Spotsylvania County
(in millions of 2016 dollars)

Phases	Direct Outlays	Total Output	Personal Earnings	Jobs Supported
Initial Proposal				
Construction	$1.100	$1.687	$0.341	7.3
Operations	$0.904	$1.375	$0.291	8.5
Trainee Spending[1]	0.363	0.538	0.110	4.0
Total Operations	$1.267	$1.913	$0.401	12.5
Buildout				
Construction	$5.500	$8.436	$1.704	36.3
Operations	$5.319	$8.087	$1.709	49.8
Trainee Spending[1]	1.370	2.023	0.413	15.3
Total Operations	$6.689	$10.11	$2.122	65.1

Fiscal Impacts

Jobs	Revenues	- Expenditures	= Fiscal Impact
Initial			
24[2]	$31,805.96	$15,982.56	$15,823.40
Buildout			
90[3]	$88,778.60	$59,934.60	$28,844.00
295[4]	$260,136.80	$196,455.30	$63,681.50

Source: The Stephen S. Fuller Institute at the Schar School, GMU

[1]includes per diem allowances of $91 and $46 for hotel and food per trainee

[2]includes 4 fulltime regular jobs and 20 contract jobs at Crucible

[3]includes 15 fulltime regular jobs and 75 contract jobs at Crucible

[4]includes 90 Team Crucible jobs plus 205 jobs in the proposed 40,000 square foot office building

These positive economic and fiscal impacts reflect the Team Crucible Training Complex's large and continuing annual operating outlays and expenditures by trainees enrolled at the Training Complex. The Complex's positive fiscal impacts reflect its lower demand for County-provided services compared to its generation of revenues. These economic and fiscal benefits will occur in the first year of operations and are shown to expand with the growth in the level of training services provided at the Complex in future years. These economic and the fiscal benefits will recur annually and accumulate over the lifetime of the Training Complex

Appendix: Fiscal Impact Calculation

Spotsylvania County's FY 2016 Comprehensive Annual Financial Analysis (CAFR) will provide the basis for this fiscal impact analysis as its audited expenditures and revenues provide the best publicly available information on the distribution of County expenditures and the sources of the County's revenues. These fiscal data cannot be accurately projected into the future as both the future patterns of public service demands and the levels of revenues are subject to change: as the population grows and its spending patterns change, as the local economy slows downs or accelerates, as levels of local public services vary, and as the magnitudes of intergovernmental transfers change. Given these uncertainties, the best practice for assessing fiscal impact is to insert the proposed project into the most recent budget year and calculate the budgetary impact it would have had, had it existed at that time, contributing revenues and placing demands on public services similar to those of other residents and businesses in the County during that year.

This analysis distinguishes between the revenues and expenditure demands placed on the County budget by its residential and non-residential functions; that is, its residents and its business activities and their associated employment base. This allocation of fiscal flows between residents and non-residential functions assigns revenues and expenditures as averages although it is recognized that some residents and some businesses demand more services from Spotsylvania County than other residents and businesses and, similarly, some residents generate more revenues than others as do some businesses, while others may be largely exempt from taxes (e.g., publicly owned properties and churches). Calculating the average per capita cost of providing services to the County's residents or its employment base and the per capita or per worker revenues generated by residents or in-county workers permits the potential fiscal impact of any proposed residential or commercial project to be compared to the County's current expenditure and revenue structure across its entire residential and non-residential base.

This analysis will show that not all residential or commercial projects will have the same fiscal impact. It will show where these fiscal impacts are positive or negative as well as the magnitudes of these fiscal impacts. Where specific revenue and expenditure determinations for a proposed project cannot be differentiated from the countywide averages (e.g., cost of General Government), countywide averages can be used in the equation. But where a specific expenditure or revenue flow can be estimated for a proposed project (e.g., real estate tax revenues and public school costs), the actual values can be substituted for average costs to reflect the differences between the proposed project and countywide averages.

The result of this fiscal analysis will provide the answer to the question: would the proposed development as proposed be a fiscal burden or a fiscal asset to Spotsylvania County?

January 18, 2018

Mr. John R. Garman
Team Crucible, LLC
60 Jack Ellington Rd.
Fredericksburg, VA 22406

jgarman@team-crucible.com

RE: MT2 REVIEW AND PREPARATION OF DOCUMENTS FOR LEAD MITIGATION TEAM–CRUCIBLE TRAINING COMPLEX, SPOTSYLVANIA COUNTY, VA

Dear Mr. Garman:

Team Crucible, LLC (Team Crucible) is in the process of applying to the County for the building of its new training facility in Spotsylvania County, Virginia. Metals Treatment Technologies, LLC (MT2) understands that Team Crucible, as part of its design and permitting process, is committed to developing and implementing a lead mitigation plan that protects the environment and its business interests.

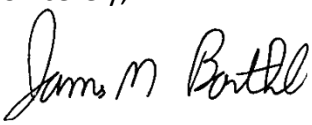
Throughout the last seven months, MT2 has reviewed various plans and supporting documents developed by Team Crucible and has provided comments and recommendations to align the design with United States Environmental Protection Agency (USEPA) Best Management Practices (EPA-902-B-01-001, Revised June 2005). Some of the key design elements include:

- Commitment to develop and implement an Environmental Stewardship Plan (ESP), which will include management actions, such as monitoring and reclamation actions, that will mitigate lead migration from the ranges.
- Construction of range backstops using horizontal bullet catchers and sand traps to mitigate ricochets and augment lead reclamation
- Permanently install and maintain wired silt fencing in areas where the ranges cross small drainage courses or abut Resource Management Areas (RMA)
- Construction of the ranges with engineered surface grading to allow for sheet flow to reduce erosion and water velocities, and direct surface waters to grassed drainage swales
- Install and maintain limestone check dams within the drainage swales
- Install and maintain water retention structures that collect surface waters from the drainage swales. These structures will be lined with limestone cobbles to allow for infiltration or they will be evaporation basins based on a Professional Engineer's design.
- Maintain grass in the swales to reduce erosion and lead migration
- Periodic monitoring of the pH of range floors and other selected areas; the results of which will be used to determine lime application to maintain pH levels above 6.5

- Regular accounting of accumulated bullets for purposes of determining when lead reclamation activities will be considered
- Implementing periodic lead reclamation, which includes the recycling of collected bullets and larger lead fragments.

If you have any questions or require further assistance, please contact me at 303-456-6977 or David Andrews at 203-803-0554.

Sincerely,



James M. Barthel, CEO; MT2, LLC

Surface Danger Zone and No Blue Sky Concept



The concept of the Surface Danger Zone (SDZ) comes from WWI when troops were sent in the f

Baffles, Berms, and Backstops

Pursuant to prior range industry paper on this subject, one specifically by my good friend Dave Luke and shown in the proceeding of the 3rd National Range Symposium of 1996, this peer

review paper is undertaken to document more recent design standards for ranges, solidifying the "No Blue Sky" concept and "Ballistic Sand" 1:1 suggested slopes, design of manger traps,

etc., detailed and specific civilian range minimum design specifications were last presented in the 1999 "NRA Source Book."
To properly evaluate bullet containment, which is what Baffles, Berms and Backstop do, it is necessary that we evaluate the process of planning range design, construction and operations

problem by considering 4 E's, of Range Design.

1. The Business Plan and Range Master Plan:
Developing the Business Plan is essential to determine if the range is viable or not and is the Basis of the Range Master Plan.
The Master Plan focuses on the how, what, when, why and whom of the range. These documents are developed during the Master Planning phase and well prior to the design and construction

phases of a range complex. Subsequent, Safety and Long Range Plans are the living document of a range that must be continually reviewed and updated.
If planning is left to the end or a range is not planned, the facility owner/operator will find some undesirable surprises as he prepares to open for business and some of these surprises

may shut him down. The Safety and Long Range Plans are an important part of the Master Plan.

2. The 4-Es of Range Design
The 4-Es must be used at every step of developing a shooting range. The 4-Es are: Evaluate, Engineer, Educate and Enforcement.

2.1. Evaluate: The range owner/planner design must evaluate the needs of the prospective user presented in the business plan and identify the specific shooting disciplines to be

conducted on the facility. Evaluate how many shooting activities can be conducted on the same ranges, not simultaneously. Review schedules for the various activities to ensure there are

no conflicts in range design and subsequently range usage result. This is an important consideration. While there are a few different shooting activities that can be compatible and lend

themselves to simultaneous range use, most are not.

2.2. Engineer: Each range or range complex must be engineered to accommodate the specific disciplines and activities which have been evaluated on their own as appropriate and are to be

conducted on the same piece of ground/range. Intimate knowledge by the Engineer/Designer of each shooting discipline and their rule book or curriculum specifying the detailed

requirements (if applicable) of each activity static or dynamic is essential. Each discipline's requirements will have to be considered in detail to ensure no conflicts in firing line

design, target line location, target placement and target set up operation, etc. Time efficiency is also an important consideration when switching from one activity to another. While it

is possible to conduct multiple shooting activities on the same range, single purpose ranges are best and it will require deliberate thought and careful consideration to ensure possible

conflicts are insignificant and kept to a minimum. Once the design criteria have been established and constructed, it will be important for the owner/operator to truly understand that

there will be very little room for change in use without returning to the evaluation phase with additional engineering to retrofit the range to accommodate the new activity.

2.3. Educate: The operators and those who will be using the facility (users) must be educated in the specific Courses of Fire that are acceptable at said range and which firearms,

firearm calibers, positions that can be used (standing, sitting/kneeling, prone), types of firing (slow fire only, rapid fire, etc.) Static and Dynamic are but a few topics that should

be taken into consideration from inception as to how the range will or may be used.
Briefings on the etiquette of firearms safety, how and when to approach the firing line, how and when to change targets, commands that will be used-and their meanings, range officer

authority, etc. Careful explanation in this area will reasonably ensure that the facility will not be used outside of its design capability and thereby cause problems for the range.

2.4. Enforcement: This is the final phase of the 4-Es and ultimately is the glue that will hold all these considerations together into one cohesive package. You are giving instructions

to be obeyed. You are not giving advice. Enforcement solidifies the Planning and Safety Plan. The owner/operator must consider the specific range rules methods and actions that will be

employed to ensure the range is always used well within the design limits. Ultimately, it will be the responsibility of the owners/operators to determine the range use, assuring

adherence to the rules and regulations established.

3. Purpose of backstops, baffle berms and baffles:
Erecting baffle berms and backstops are a necessary and a minimum requirement for range owners/operators who do not control 1.5 miles downrange for pistol or 3.5 miles downrange for high

powered rifle, with appropriate 5 degree left and right safety zones.
I believe and all of us would readily agree that the full surface danger zone (SDZ) ranges are the exception rather than the rule. They are a concept of the past. Therefore, the primary

purpose of the construction of backstops, berms and baffles is to protect against the injury of people, damage to property or both, when a full Surface danger Zone (SDZ) can not be

provided. A secondary benefit is to permit the periodic recovery of lead projectiles, a recoverable and recyclable metal resource that can contribute to the positive cash flow of a range

facility.

4. Projectile/bullet containment.
It is the ultimate responsibility of the range owners/operators to ensure that the projectiles fired on their range are contained within the range property boundaries. While it is

entirely possible for an existing range facility to be grandfathered against noise complaints, it is totally unlikely that any governmental body would make the same concession concerning

safety. Therefore, it is paramount that shooting range owners/operators continually evaluate the shooting activities permitted and the requirements necessary to ensure those activities

can be conducted with projectile/bullet containment within the property as the result. The level of requirement necessary for the projectile/bullet containment on the property of a

shooting range facility will dictate the extent of the baffle construction. Side berms and backstop shall always stop the bullets. Baffles shall manage the bullets and its flight

characteristic so it remains on the property.

5. Shooting safety fan.
It is important to frequently remember that while specific range safety fans are indicated in numerous design manuals, these safety fans presume a free and open range. As more and more controls and barriers are added to the design (both administrative and physical), the range SDZ becomes smaller until eventually the range SDZ equals the exterior edges

of the barriers of the backstop and side berms. This point is not specifically made in the "NRA Source Book" and also is not a logical conclusion by those not familiar with range design,

construction and civilian operation. These same regulatory folks seize on a specification and fail to understand that by adding controls or barriers, the range SDZ is changed and

significantly reduced. Backstops and side berms alone do not remove the requirement of an analysis of the SDZ. Baffles, berms and backstops can limit the SDZ to the range property lines.

6. Backstops
The backstop provides the primary impact area for the bullets being fired and to terminate their kinetic energy under normal conditions. They also prevent the bullet from leaving the

range property. The backstop also serves as the storage device for bullets until they are recycled. Refer to prior peer review papers on Ballistic Sand. An important point to remember is

the construction of a proper backstop will not eliminate the requirement to provide a downrange safety fan beyond the backstop for the design type of firearm or caliber allowed to be

fired without baffles.
It shall always terminate the bullet at the property line. The probability of an accidental (firearm malfunction) or unintentional discharge where the bullet escapes the range without

first impacting the backstop must be evaluated and considered as the range design proceeds. This must be evaluated in the context that the surrounding land use changes and encroachments

by development will result.

A major consideration in initial design is to provide sufficient space behind backstop for ease of backstop repair and lead recovery of skips, ricochets and tidily-wings. All too often,

ranges are constructed allowing for the maximum number of firing points and distances to targets in the shortest acceptable width and distance to property lines but with insufficient

space to allow regular maintenance or heavy equipment access all around the range and to the range firing or target line. If insufficient space is not provided, problems will result.

Special consideration is to be provided to interior access and sufficient space, 30 feet minimum behind fixed target lines, for maneuverability of heavy equipment between the target line

and the backstop.

The best outdoor backstop is a manmade earth embankment with a 10 foot high ballistic sand projectile containment face or a natural hill of appropriate size and shape that meets the

specific requirements of the particular range.

Alternative backstops may be used when appropriate earthworks are not available. Preferred backstops include: 1) prepared naturally occurring hills or mountainsides (shaping the slope

will likely be required), 2) earthen backstops constructed from clean fill, 3) earthen backstops constructed from broken material (concrete or asphalt cores) and covered with clean fill

dirt, 4) earthen backstops constructed from clean fill and stabilized internally, and 5) fabricated backstops using steel, concrete, or wooden cribs.

Backstop heights can vary according to the site and use. General dimensions are as follows:

A. Height. A minimum height of a constructed earth backstop is 20 feet. The minimum is acceptable, but 25 feet is now also being recommended. This height is the compacted or settled

height. Height should also be consistent with other barriers that will be incorporated into the range design.
A backstop, ricochet catcher, ricochet baffle or "manger trap" can be installed to reduce the number of bullets escaping the range by tidily winks or sliding up the face of the backstop.

The manger trap is effective in retaining those ricochets that occur off the face of the backstop. While the distance traveled by such a ricochet would be a nominal 50 to 100 yards, this

factor needs to be included in the design calculations, if insufficient distance to the property line is not available. This device is installed parallel to the floor and into the

backstop face and extends to the toe of the slope. The ricochet catcher is typically 15 to 18 feet above the range floor, measured vertically from the ground surface at the target line.

This prevents direct bullet impact into the catcher. The ricochet catcher must be impenetrable to ricochets and should extend completely from side to side and connect the sidewalls or as

substantiated by the design. If overhead baffles are employed, the top of the backstop need only be 2 feet higher than the ricochet catcher. Specific construction details of the ricochet

catcher will dictate the amount of material needed to ensure that the catcher is held securely in place.

B. Width. The width of the backstop should extend at least 5 feet beyond the intersection of the 5° ricochet line from the outside targets/firing position. If the range has high side

berms that closely match the height of the backstop then this requirement need not apply. Keep in mind that earthmoving repair equipment needs adequate area to maneuver and access to

work behind the target line. Therefore, this allowance may need to be greater.

C. Slopes. The backstop side slope (side facing the shooter) ballistically must be as steep as close as possible to 45° (1:1) and not less than 2:1. If a soil analysis determines that

the soil will not support 3:2 slopes to maintain the minimum required slope angle, it will be more economical to remove the poor soils and replace them with more suitable material.

Special techniques may be required to stabilize the backstop above and behind the ballistic sand impact zone.

In poor soil areas, structurally designed soils may be used on the offside of the backstop to stabilize the soil material.

Sandbags, yes; never automobile tires, may be incorporated to maintain the bullet impact side of the slope. There are many other materials and methods that can be used to stabilize the

slope until vegetation can be established. Special netting material is especially useful to establish plants. Heavy vegetation such as large plants or trees should not be permitted on

the range side of the backstops.

Steel backstops are also an acceptable but more expensive alternative when soils are inadequate. The primary drawback is the initial cost. However, if the quantity of shooting is

substantial, the ease of recovering lead may quickly offset the initial cost. Basic maintenance costs also will be lower. Concrete foundation will be required to set and support this

type of backstop. Because these backstops are constructed to the same specifications as indoor range backstops, the 20 feet earthen barrier behind them will be needed.

7. Side berms and walls
These protective barriers may be constructed from earth, precast concrete panels, concrete wall masonry walls, "wooden cribs", wooden box-type structures filled with pea-gravel, crushed

rocks, chopped rubber tires filled with soil and/or poured concrete walls or panels. The specific type of structure will depend on available space, type of range being built and the

relative initial cost. A major consideration that should be evaluated during the initial planning process is the long-term maintenance cost of the barrier being considered. Most times it

is far more cost-effective to select the construction material that will provide the longest life while requiring the least maintenance. Wood crib baffle require maintenance and if

constant hit, they last only 10 to 18 years.

Exposed tires present problems such as bullet bounce-back that must be addressed before they are used and make recycling of projectiles impossible. If earthen side berms are selected,

the construction methods will be the same as that used for the construction of the backstop. If concrete panels are selected, then site work will be required to build their foundations.

Concrete panels can be tipped into place or set into place using a crane. If masonry walls are selected, skilled masons should be used. Foundations will be required to prevent settling

or major damage caused by ground shifting. Structural engineers should design and licensed concrete companies should be employed to erect concrete structures, especially in earthquake-

prone areas. If concrete walls (precast or poured-in-place panels) are selected, the specifications cited in the "NRA Source Book" should be strictly adhered to. If crib walls are used,

they have to be tested in accordance with the Source Book.

Generally, earthmoving equipment will be used to construct the earthen backstops. If earthen side berms are the choice, then doing earthwork all at once while the equipment is onsite to

construct the side berms is the most cost effective. Side berms generally vary in dimensions according to the specific need. If a side berm is to be used also as a backstop, as some

shooting activities may require, the safety fan rotates and the 180° rule comes into effect. When this instance occurs, the side berm is considered to be part of the backstop and should

conform to the same specifications as the backstop.

In this situation, the overall height of the side berm, for at least that portion that is used as a backstop, shall be the same as the backstop. It is important to remind all range

owners/operators to carefully evaluate the shooting activities to be allowed in their range facility and include them in the master plan.

7.1 Side berm, walls or barrier specifications are as follows:

7.1.1. Height. Generally, side berms, walls or barriers are suggested to be a minimum of 8 feet high, with 10 to 12 feet recommended if the range is going to be subsequently baffled.

Side berms may be used on all ranges and on ranges that go a distance of 1,000 yards. Side berms, walls or barriers stop bullets and are used to allow shooters and range personnel to use

adjacent ranges simultaneously. Another reminder: backstops, side berms, walls or barriers in and of themselves may not eliminate the requirement for a safety fan area.

7.1.2. Length. Except as indicated above, side berms may be the same height and the full length of the range-from the backstop back to 5ft behind the most distant firing line.

7.1.3. Slope. The range side (the side facing the shooter) of the side berm should be as steep as is possible or as flat as desired. These specifications are the same as those for the

backstop.

Masonry walls are an alternative construction method, as are precast panels. The repair work for damaged masonry walls is labor intensive and precast panel sections, if damaged, may not

be repairable on site and have to be removed and replaced. Initially, an additional number of the precast panels can be purchased. Masonry walls using concrete block shall be fully

grouted and filled with concrete to add strength and impenetrability to the structure. Masonry walls should be reasonably protected against bullet strikes and shall not be placed

immediately adjacent to a firing lane.

Wooden crib side baffles filled with selected materials may be used and are easy to construct if properly designed, but are not easily repaired or maintained.

Obviously, the designs for side baffles will depend upon local site conditions and available materials cost. A point to be emphasized about wooden box side baffles is that they must be

tested before being built to ensure that they will stop the bullet for the designed caliber used in the design. It is the rare exception that will require this type of structure to be

more than 3 inches thick consisting of two sheets of ¾ plywood and 3 ½ rock. A structure made to the total thickness of 6 inches will stop all bullets from normally accepted sporting

arms and individual infantry military small arms.

For legal purposes, when wood rock crib baffles are used, construct a test panel and conduct the appropriate U.L. tests before committing to any major construction expense. Test twice

before building once. Refer to the "NRA Source Book" for dimensions and drawings on how to construct the test panel.

Precast concrete panels set at angles on each side of a static range can economically prevent bullets, regardless of the angle fired laterally, from escaping the range. Panels can be

manufactured onsite and tipped into place. These 4" barriers withstand most bullet strikes without major damage. Stringent range rules will prevent shooters from inadvertently firing

into the barriers. Shooters must demonstrate the appropriate skill necessary not to cause damage to range equipment.

8. Safety baffles
The term safety baffle or overhead safety baffle defines the structure which is used to restrict fired bullets over to backstop and side berms to smaller areas than would otherwise be

possible without them.

Safety baffles differ significantly from sound baffles, which are designed to absorb or redirect sound waves.

Safety baffles are designed to redirect and limit the bullet travel no further than the property line.

The basic design concept is the "No Blue Sky" concept. This means that baffles are erected so that the shooter, from the shooting position allowed (or permitted), cannot see any sky

downrange, either over the top of the backstop or to the sides of the range. The baffles ballistic material then contains the bullet.

Safety baffles may be overhead, on the ground, on top of the backstop, in the roof of the firing line cover up to a 30° elevation, in the form of an elongated box, or as a completed

enclosed tunnel.

The principle behind the design is to equip a range with baffles so that if a fired bullet leaves the confines of the range proper, it will fall to earth within a smaller, more

predictable area that is acceptable within the range property, to protect the people or property and adjacent ranges.

If overhead safety baffles are not designed and installed properly, they can cause problems. They may redirect the fired bullet in the wrong direction, back to the shooter, may not

absorb the fired bullet as intended, or there may be gaps that will permit a bullet to escape the range. For any range on which overhead baffles are planned, carefully analyze the

application beforehand and seek a professional design.

8.1 General specifications say that safety baffles must:

8.1.1. Be impenetrable or defeat and limit travel or design calibers to be used on the facility.

8.1.2. Be a minimum of 4-feet-tall for vertical baffles.

8.1.3. Be relatively maintenance-free.

8.1.4. If using concrete must be designed to provide maximum spans l. Span length between columns is a product of lane width.

The specific design and number of baffles that will be needed to protect a given area will be dictated by the amount of free space around a particular range facility that the range can

limit access to.

Overhead baffles are a standard vertical 4 feet high with the bottom edge set 7 to 7.5 feet above the horizontal surface of the range. The width dimensions are the width of the range so

no side light is seen or as properly designed.

For baffles constructed from plywood and filled with high-density material, use 3/4-inch marine plywood on the firing line side, 5/8-inch on the downrange side, and built into a box with

an inside dimension equal to the minimum width of a standard 2×4-inch piece of lumber. Again, the baffle must be tested before use.

Baffles may be built by laminated wood and steel or by a special concrete panel design. Laminating baffles using plywood and 10-gauge steel requires a lamination thickness of three

sheets of plywood with two sheets of steel sandwiched between. Nominally the lamination thickness is 2.5 inches.
Slanted overhead baffles for dynamic ranges are 12 to 24 feet wide and set at a 25-degree angle to the ground as measured from the front edge (the firing line edge being higher than the

rear edge). The slanted overhead baffles are a minimum of 3-inches-thick, prestressed concrete slabs, and must pass 3,000-pound, 28-day, compressive strength test.

9. Ground Baffle
It also is important to keep in mind that it may be necessary to incorporate a series of ground baffles within the overall design. Ground baffles reduce the ground surface area that a

bullet might strike. When properly designed and installed, ground baffles do reduce ricochets, but do not totally eliminate them. When the downrange area is viewed from the firing line,

the shooter will see overhead baffles, ground baffles and the target and backstop immediately behind the target. No blue sky will be visible, nor will any of the horizontal ground

surfaces of the range.

9.1 Generally, ground baffles must be:

9.1.1. Impenetrable.

9.1.2. Minimum height to correspond with the placement and horizontal surface area to be masked. Multiple ground baffles may be required for a 50 or 100 yard range. The goal is to mask

the range floor beyond the first baffle.

9.1.3. Relatively maintenance free. Ground baffles are designed to meet the needs of a particular facility.

The dimensions for ground baffles are a minimum of 3 inches thick, if made of plywood, and may be backed up by an earthen berm. If a wooden top cap is used, particular attention should

be paid to the direction of the wood grain. It should always curve downward and the top cap is cut at 45° angle side down range

Materials for ground baffles may be concrete (firing line side surfaces should be covered by 1" wood stock covered to prevent bullets from being redirected toward the firing line,

pressure-treated wood, steel (firing line side surface covered to prevent bullets from being redirected toward the firing line, or earth or a combination.

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EDITORIAL: Crucible tests Spotsy's vision for future

BY THE EDITORIAL PAGE STAFF OF THE FREE LANCE-STAR
Sep 12, 2018

A large influx of new residents and businesses has made the Fredericksburg region the fastest-growing area in Virginia in recent years, so growing pains are common.

For example, long-time residents want the closer-in jobs and urban-like amenities that more density brings, but not the traffic congestion and crowded schools that are part of the package.

Public officials salivate at expanding the tax base, but balk when new developments require more, not less, public expenditures for infrastructure.

And certain businesses that were previously tolerated by their neighbors suddenly find themselves the subject of citizen opposition.

Such is the case with Crucible, a private firm that hires military and law enforcement veterans to provide specialized military and counterterrorism training to service members, civilian contractors, and members of non-governmental organizations who work in some of the world's most dangerous hotspots.

Crucible has operated in Stafford County for 16 years without incident except for a handful of noise complaints over the years about its outside shooting range, according to the company's attorney.

Ordinarily, that would qualify the company as a good neighbor.

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But now that Crucible is seeking to move from its current location in Ha[illegible] 78-acre site near Jefferson Davis Highway about a mile south of Dominion Raceway, the company is being portrayed as a danger to the surrounding community instead of an asset.

To facilitate the move, Crucible has asked Spotsylvania County to rezone the property from agricultural to industrial.

A county ordinance that governs industrial and commercial facilities would exempt its five proposed shooting ranges from ordinary noise restrictions between 6 a.m. and 10 p.m.

But Crucible says it would voluntarily limit operations to daytime hours only.

The company conducted an acoustical study of the area, and said it is also willing to proactively build 12-foot noise barriers along the northeast part of the property and 20-foot berms topped with sandbags to make sure any stray bullets never leave the property.

However, a group calling itself Stop Crucible still opposes the rezoning despite these assurances, arguing that Spotsylvania is the "wrong spot" for it.

"Such a facility would physically threaten our homes, families and property, degrade our property values, be a noise nuisance, and this type of business has no place in such close proximity to our homes and businesses," the group maintains.

Their first claim is unconvincing, since there were no instances of stray bullets from the company's facility threatening any persons or property in Stafford.

The noise of gunfire from the firing ranges and explosions from its training activities, however muted, would undoubtedly make some people uncomfortable.

This might in turn affect nearby residents' property values, so that's a valid concern that should be carefully weighed by county officials.

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However, the bigger question before the Spotsylvania Board of Supervis[illegible] the county wants to remain more rural and agricultural, or whether it wants to convert a larger percentage of its farmland to commercial and industrial uses.

There's a case to be made both ways, so this will not be an easy decision.

Would local residents prefer a new residential development or an industrial plant there instead, which would create more stress on their roads and infrastructure than Crucible, whose proposed training facility would remain largely open space?

Or should the zoning remain agricultural only?

There will always be some tension between residents who want the county to remain the same as when they were born or moved there and newcomers who want to come in and change things.

It's important that public officials find a balance between these competing interests.

Not allowing any new development eventually leads to economic stagnation.

But too much irrevocably changes the character of the community they were elected to lead.

The bigger question is whether the county wants to remain more rural and agricultural, or whether it wants to convert more of its farmland to commercial and industrial uses.

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iling couple stay in U.S.

nse. that. Sometimes, though, rules need
ella bending to achieve justice. Henry
een David Thoreau wrote: "Any fool can
unty make a rule and any fool will mind it."
d of When two people come to the Unit-
eper ed States legally and by invitation and
also are allowed to build lives here, raise a
ligh family and become welcome additions
to their community, they should not
aw- be thrown out. There is no doubt that
sing there is a native-born American out
n of there somewhere who can do what Leo
are and Gaby are doing, although perhaps
not quite as well. But is that reason
and enough to kick out two people who
have followed all the rules and want
ina more than anything to be part of this
ear country?
net We don't think so. We are a nation
ove of immigrants. We are stronger be-
sas cause of that. The United States is get-
tay ting older. By 2030, 20 percent of us
ally will be over 65. Also, we aren't making
ney babies as fast as we used to. Without
oor immigration, we could find ourselves
d a in the same boat as Germany and Italy,
J.S. where populations will drop over the
next few decades. We need workers
ere who do the jobs most Americans don't
can seem to want to do, and we need mid-
do, dle-class immigrants like the Legoras
ney who make our communities better.
es- The Legoras have written to their
nat senators, Mark Warner and Tim
As Kaine, and to their representative,
ave Dave Brat, in the hope that common
em sense will still carry the day. We wish
eir them well, not just for them, but for
ow us, too.



LETTERS TO THE EDITOR

Crucible zoning request could be nightmare for some

Picture this: You are married with one child and you have worked hard to recover from financial difficulties. Now you are thinking about your future and the future of your child.

The search begins for a safe, quiet subdivision with good area schools. Finally, a lot is found and you build a home that suits your needs and that you will be able to retire in. Time goes by and you have been in your home about 20 years. Now you are retired and living on Social Security and a small retirement benefit. Life has been nice and you have been blessed with good family, friends and neighbors.

Everyone can picture this; it is pretty typical and describes the life of many people.

Now imagine this: You are greeted outside your home by a gentleman asking you to attend a meeting because your neighborhood is at risk. We attended that meeting in the spring. Our lives have been changed and now we live in fear.

A private military training facility is moving in behind our neighborhood. If the zoning request is approved by the Spotsylvania County Board of Supervisors, our neighborhood will hear guns shooting all day, every day, from morning till night. We will also experience improvised explosive device explosions and the possibility of stray bullets in our backyards.

Can you picture that? No Spotsylvania resident should have to live in fear or move from the home they love. Please put yourselves in our position and help us stand against Crucible. We never in our wildest dreams thought this would happen to us, but it has. If it can happen to us, it can happen to others. Contact the Spotsylvania County Board of Supervisors and tell them to vote NO on Crucible's rezoning request.

Shirley Brady
Spotsylvania

Stafford thanked for and disabled children. These students and

Charles Tatum
6924 Roxbury Mill Ct.
540-287-5615
wizard1073@gmail.com

Is I-2 the appropriate zoning, or should it be commercial?

Source:
https://library.municode.com/va/spotsylvania_county/codes/code_of_ordinances?nodeId=COCO_CH23ZO_ART2DERUCO_S23-2.1.4DE

Sec. 23-2.1.4. - Definitions. (Spotsylvania Code, excerpted)

Indoor, commercial recreation/athletic facility means an indoor sports building or activity facility in which are conducted recreational, therapeutic or athletic activities, whether or not under instruction. These include, but are not limited to, the following: roller or ice skating rink, batting cages, bowling alley, miniature golf, golf driving range, shooting ranges, tennis and other court games, swimming, aerobics and weight lifting, canine, feline, companion animal sporting event or exhibition, excluding livestock or *equestrian event facility* , but does not include *billiard hall* , bingo or dance hall.

Industrial/flex means any structure occupied by two (2) or more of the following uses: contractor's offices and shops; establishments for production, processing, assembly, manufacturing, compounding, preparation, cleaning, servicing, testing, or repair of materials, goods or products; warehousing establishments; wholesale trade establishments; and offices; provided however that the combined area of all office, both as a principal use and as an accessory use, shall not exceed thirty-five (35) percent of the total gross floor area of the structure. For the purpose of this chapter, when any of the above uses are permitted by right in the applicable zoning district, such uses may be combined within a single structure in accordance with the provisions of that district, and shall not be deemed industrial/flex.

Industry, type I means enterprises engaged in the processing, manufacturing, compounding, assembly, packaging, treatment or fabrication of materials and products, from processed or previously manufactured materials. Included are assembly of electrical appliances, bottling and printing plants, brewery, winery, cidery, distillery, and the manufacturing of paint, oils, pharmaceuticals, cosmetics, solvents and other chemical production of items made of stone, metal or concrete.

Industry, type II means enterprises in which goods are generally mass produced from raw materials on a large scale through use of an assembly line or similar process, usually for sale to wholesalers or other industrial or manufacturing uses. Included in this use type are industries involved in processing and/or refining raw materials such as chemicals, rubber, wood or wood pulp, forging, casting, melting, refining, extruding, rolling, drawing, and/or alloying ferrous metals, and the production of large durable goods such as automobiles, manufactured homes, or other motor vehicles.

Industry, type III means an establishment which has the potential to be dangerous or extremely obnoxious. Included are those in which explosives are stored, petroleum is refined, natural and liquid gas and other petroleum derivatives are stored and/or distributed in bulk, radioactive materials are compounded, pesticides and certain acids are manufactured, and hazardous waste is treated or stored as the establishment's principal activity.

Outdoor sports and recreation, commercial means a commercial sports or activity establishment open to the general public in an open or partially enclosed or screened facility; these include but are not limited to: batting and pitching cages, hard and soft courts, swimming pools, water slides, go-carts, pony rides, and ice skating rinks, canine, feline, companion animal sporting event or

exhibition, excluding livestock or equestrian event facility, competitive racing facilities, shootingranges, paintball or similar game fields.

Is Crucible considered a "sport shooting range" under state code? Are "sport shooting" design standards appropriate for the intended use as a military and paramilitary weapons training facility? Would the special use permit be legally enforceable and modifiable by county government if this statute applies? Since the applicant is volunteering a "best effort" to meet the noise limits in the current noise ordinance, regardless of time of day or week, is there any legal enforcement mechanism if they do not follow through? Is there a way for county government to monitor and enforce compliance of any of the provisions of the special use permit?

Source: https://law.lis.virginia.gov/vacode/title15.2/chapter9/section15.2-917/

§ 15.2-917. Applicability of local noise ordinances to certain sport shooting ranges.

A. No local ordinance regulating any noise shall subject a sport shooting range to noise control standards more stringent than those in effect at its effective date. The operation or use of a sport shooting range shall not be enjoined on the basis of noise, nor shall any person be subject to action for nuisance or criminal prosecution in any matter relating to noise resulting from the operation of the range, if the range is in compliance with all ordinances relating to noise in effect at the time construction or operation of the range was approved, or at the time any application was submitted for the construction or operation of the range.

B. Any sport shooting range operating or approved for construction within the Commonwealth, which has been condemned through an eminent domain proceeding by any condemning entity, and which relocates to another site within the same locality within two years of the final condemnation order, shall not be subjected to any noise control standard more stringent than those in effect at the effective date of such sport shooting range.

C. For purposes of this section, "sport shooting range" means an area or structure designed for the use of rifles, shotguns, pistols, silhouettes, skeet, trap, black powder, or any other similar sport shooting.

For purposes of this section, "effective date" means the time the construction or operation of the sports shooting range initially was approved, or at the time any application was submitted for the construction or operation of the sports shooting range, whichever is earliest.

1990, cc. 541, 577, § 15.1-29.20; 1997, c. 587; 2005, c. 544; 2006, c. 704.

What are the limitations of the CADNA-A sound propagation model? Does CADNA-A model refraction? What would be the expected effect in a positive refraction (downward bending) environment, and how significant would this effect be compared to the Line of Sight and diffraction calculations performed by CADNA-A? Under what conditions would positive refraction occur, and are these conditions likely at the Crucible site? Will the conditions favorable to positive refraction vary with time of day or season? Is it fair to say that the predictions are not maximums? What are the uncertainty measures for the numbers provided?

Source: http://www.windaction.org/posts/32217-the-lie-behind-turbine-noise-models#.W-WvuJNKiUk

CADNA/A and the ISO 9613-2 standard

Acousticians hired by the wind industry insist the ISO standard is an appropriate method for modeling wind turbine sound provided the correct input parameters are used. But what they do not admit is that the ISO 9613-2 standard, on which CADNA/A is based, *was never* validated for wind turbine noise. In fact, the standard is mainly applicable to situations concerning road or rail traffic, industrial noise sources, construction activities, and many ground-based noise sources. It does not apply to sound from aircraft in flight, to blast waves from mining, military, or other similar operations. And it was not designed to predict turbine noise.

The ISO Standard limits use of its methods to noise sources that are close to the ground (approximately 30 meter difference between the source and receiver height) and within 1 kilometer of the receiving location. A wind turbine with a hub height of 80+ meters exceeds the ISO height limit by 50 meters. Meteorological conditions are also limited to wind speeds of approximately 1 meter/second and 5 meters/second when measured at a height of 3 meters to 11 meters above the ground.

Only when all of these constraints are met by the situation being modeled can the predicted noise levels be assumed to be accurate within a +/- 3 dB range.

The constraints placed on the ISO standard having to do with wind speed, direction and weather conditions indicate just how limited the models are for anything other than simple weather conditions -- NOT the types of conditions that wind turbines need to operate.

The way sound spreads outdoors can be affected by temperature differences in different layers of the wind that cause sound waves to bend up or down at the boundaries just like water bends light. If a noise source is above a boundary then sound that would have gone down to the ground surface might bend up and dissipate. If the noise source is below a boundary layer then sound that might have dissipated upwards is bent down and added to the sounds that would normally be directed downwards. The current science of meteorology does not have precise ways to know what is happening right near any particular turbine.

Heinrich A. Metzen of DataKustik GmbH[3], maker of CADNA/A confirmed this fact in an e-mail where he stated:

"long range propagation including atmospheric refraction is not part of the standards used for (normal, "standard") noise calculations. It is known that atmospheric refraction may cause sound to be refracted downwards again and contributing strongly to the level at long distances. The atmosphere in the standards existing is just homogeneous above height."

Since there are no accepted algorithms to predict these refractions, sound propagation models cannot evaluate conditions that have vertical or horizontal turbulence even though we know they

can add significant sound at the receiving location when present. As a result, predicted sound levels are understated.

Countries in the European Union are developing their own models for predicting turbine noise propagation because of their concerns with limitations of the ISO standard. Unlike the ISO 9613-2 standard, these newer models have been validated for turbine noise by peer-reviewed independent studies.

Here is some information on the impact of meteorological effects on sound propagation and the limited state of the art in making accurate predictions.

Source: (Book) Prediction Outdoor Sound, by Attenborough, Li, and Horoshenkov (2007)

9.8.1 Meteorological effects In the barrier diffraction models described earlier, atmospheric conditions have been assumed to be steady and uniform. However, meteorological effects, such as temperature and wind velocity gradients, play a very important role in determining the acoustic performance of barriers. As a result of atmospheric refraction, barrier effectiveness is expected to be reduced in the downwind direction but enhanced in the upwind direction. By means of full-scale measurements conducted in the 1970s, Scholes et al. [45] demonstrated such wind effects on the acoustic performance of a noise barrier. Salomons [46] was among the first to study the effect of an absorbing barrier in a refracting medium by using a Parabolic Equation (PE) formulation. He assumed an absorbing barrier in his PE model and set the pressure at the grid points representing the barrier to zero. Thus, the part of the sound that falls on the barrier is stopped. A minor conflict appears in his method. The enforced zero pressure on grid implies that the normal velocity on barrier is zero too. This is the boundary condition for rigid surface. On the other hand the PE, which assumes only forward propagation from source to receiver, does not allow any backscattering of waves by the barrier. Thus, the reflection from the barrier is ignored when computing the total diffracted field. Rasmussen [47] studied the diffraction of barrier over an absorbing ground and in an upwind condition both theoretically and experimentally. He used an approach rather similar to the fast field formulation to estimate effective distances from source to the barrier edge and from the barrier edge to receiver in an upwind condition. Then the uniform theory of diffraction [48] was used to compute the diffracted sound field in the shadow zone. It is questionable whether the barrier diffraction can be 'de-coupled' from the wind gradient effects in this way. Nevertheless, Rasmussen's numerical results agreed reasonably well with his 1:25 scale

[Predicting the performance of outdoor noise barriers page 297]

model experiments. Muradali and Fyfe [49] have proposed a heuristic method for modelling barrier performance in the presence of a linear sound speed profile. Their model combines the effects of the sound refracted over a barrier and the sound diffracted by a barrier. Geometrical ray theory is used to determine the ray paths and the diffracted wave effect is incorporated by using the modified Hadden-Pierce formula. Li and Wang [50] have proposed a novel method to simulate the effects of a noise barrier in a refracting atmosphere. They mapped the wave equation in a medium where the speed of sound varies exponentially with height above a flat boundary to that for a neutral fluid above a curved surface. The barrier problem in an upward-refracting medium is then solved by applying the standard Boundary Element Method over a curved surface in a homogeneous medium. Recently, Taherzadeh et

al. [51] developed a hybrid scheme for predicting barrier in a downwind condition. Their numerical scheme is based on a combination of the boundary integral and FFP techniques in which the Green's function required in the boundary integral equations is evaluated by using the FFP formulation. Atmospheric turbulence is an important factor in barrier performance since it causes scattering of sound into the shadow zone. Although experimental studies of the effects of atmospheric turbulence on the acoustic performance of the barrier are rare, theoretical studies have been conducted by Daigle [52], Forssén and Ogren [53] and others quoted in these references. Some progress in modelling the acoustic performance of barriers in a turbulent atmosphere using a substitute sources method has been reported by Forssén [54, 55]. Hybrid models have been proposed, involving combinations of the BEM with the PE, that enable effects of barriers, range-dependent impedance and turbulence to be taken into account [56, 57]. Rasmussen and Arranz [58] have applied the Gilbert et al. [59] approach, assuming weak atmospheric turbulence with a simple Gaussian distribution in the fluctuating velocity field, in a PE formulation to predict the sound field behind a thin screen in a scale model experiment. The indoor experiments based upon a 1:25 scaling ratio were conducted in a wind tunnel in which the agreement of numerical results and experimental measurements was very good. They concluded that the flow pattern associated with a specific noise barrier could be an important design parameter for improving the acoustic performance of barriers. Improvements in computational speeds and resources have encouraged wider use of time domain models in acoustics. Recent work has been devoted to combining calculations employing time-dependent computational fluid dynamics with PE-based frequency domain calculations [60]. However, there are few studies to measure or predict the velocity profiles and their associated turbulence accurately in the region close to a barrier on the ground and it remains a challenge to combine fluid dynamics and diffraction models to establish an accurate scheme for predicting the acoustic effectiveness of screens under the influence of wind.

Can we get the property data used by Chris Kaila in order to perform our own statistical analysis of Crucible's financial impact on properties around their current facility?

Can the offic of Real Estate Assessment offer an opinion?

Comments:

Ref Proffer and county Questions and Applicant answers:

Original Proffer:

- Section B. Para 1. (iii) and Section C. Para 4: The purpose of the 12-foot Berm along the property line shared with adjoining tax map parcels 63-A-37B, 63-A-37A and 76-A-2A is noise abatement according to the Applicants submission. The applicant provides a noise study which shows (in accordance with their own study) that all property owners on all sides of this range will have excessive noise at the property line. If the owners of the above properties require a berm, then all property owners have the same rights at their property lines. Therefor using the logic applied by the applicant there must be a 12-foot berm on all sides of their property in order to preserve the rights of ALL adjacent owners for todays use and future development. The applicant has by their application demonstrated the need for this berm. This necessitates a new route for the proposed road along the southern side and a berm on the front side of the property facing Route 1. Lack of this berm on all sides will adversely affect current and future use of adjacent properties.

- Section B Para 2. (ii): Connection to public water and sewer are county requirements. This should not be delayed for phase 2 of this construction which may never occur. By allowing the applicant to delay this installation to a phase of construction that is not mandated, the county is allowing applicant to simply not install the required infrastructure. This proffer in fact ties this to a specific building constructed in phase 2. If that building is not built and the rest of phase 2 is completed then the infrastructure need not be installed.

- Section C Para 8: the applicant proffers to not use "high Explosives" for the simulated IEDs. This section of the proffer is wholly insufficient and meaningless. If the rationale for this proffer is safety or noise or environmental, restricting simulated IEDs to non-HIGH Explosives does none of this.
    - Explosives are separated into three categories by:
        - (a)High explosives. Explosive materials which can be caused to detonate by means of a blasting cap when unconfined, (for example, dynamite, flash powders, and bulk salutes). See also § 555.201(e).
        - (b)Low explosives. Explosive materials which can be caused to deflagrate when confined (for example, black powder, safety fuses, igniters, igniter cords, fuse lighters, and "display fireworks" classified as UN0333, UN0334, or UN0335 by the U.S. Department of Transportation regulations at 49 CFR 172.101, except for bulk salutes).
        - (c)Blasting agents. (For example, ammonium nitrate-fuel oil and certain water-gels (see also § 555.11).
    - Explosives defined:
        - High explosives consist of materials that typically combine the reacting elements in the same molecule. This allows them to react much faster, and they

"detonate." Detonation involves supersonic shock waves that pass through the material, causing chemistry that happens quite a bit faster than burning. High explosives do not need to be contained to make their bang. Nitroglycerine, trinitrotoluene, and RDX are high explosives.

- Low explosives are mixtures of chemicals that burn very rapidly, but sub-sonically (as opposed to supersonically), meaning that they "deflagrate." They consist typically of fuel and an oxidizer. The black powder used in fireworks is one example of a low explosive. Black powder burns very quickly, but to get it to go bang, we have to contain it. Fireworks hold black powder inside a cardboard or paper tube so that once the powder has burned, the gases burst the container noisily. This is not unlike the action of popcorn, whose steam bursts its kernel.

- This proffer does nothing to limit noise or effect safety or environmental concerns. Under this proffer the applicant can set off a IED simulator made of 100 lbs of black powder or 1000 lbs of ammonium nitrate – fuel oil which obviously would be loud and potentially unsafe. Storage of all of these items will require significant safety measures for theft, fire or accidental explosion. --- see requirement for public water for fire suppression.
- What mechanism does Spotsylvania have in place for inspection of simulated IED explosion material, charges etc to ensure they are in accordance with the proffers intent?

- Section E, Para 2: Applicant proffers that they will develop an Environmental Stewardship Plan at a future date. Applicant should provide the Environmental Stewardship Plan as a part of the application package. How else can the county assess the potential impact to the local environment. In addition, said property is a part of the Chesapeake Bay Watershed and this facility should comport to all EPA and USDA regulations and guidelines for discharge of lead and other environmental due to IED and vehicular operations.

- Section E, Para X (not incl): Shoothouse should be considered an indoor range as the GDP states it is covered to prevent precipitation. As such the facility should comport to all federal regulations and guidelines for an indoor range. Applicant should provide the full plan to mitigate environmental effects for included shoothouse.

Agency	Mandate	What is Covered
Environmental Protection Agency (EPA)	Protect human and environmental health.	Anything that is exhausted to the outdoor environment.
Occupational Safety and Health Administration (OSHA)	Assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance.	Anything that reaches the respiratory zone and may expose employees or shooters.

National Institute for Occupational Safety and Health (NIOSH)	Conduct research and make recommendations for the prevention of work-related injury and illness.	Detailed design criteria for indoor shooting ranges.

Applicant Letter Reponses dated AUG 28, 2018:

- Question 5 Applicant response: Applicant states that the shoothouse design is not baffled but designed to avoid bullet escape. In the GDP the shoothouse is "covered to protect from precipitation".
    - Request the specific design details of the shoothouse inclusive of the roof and all of the indoor shooting range environmental controls in order to determine how the precipitation shield and walls will "avoid bullet escape" and protect occupants from ricochet.
    - Request specific calibers to be used in shoothouse and how the design will meet the requested caliber to ensure bullet capture inclusive of roof.

  See NRA Range Source Book for indoor facilities:
    - 4.03.12: Ceiling Material: Ceiling material should be designed to reduce noise, protect lighting devices, reflect light and be impenetrable. Typically ceilings include, 10 gauge cold roll steel baffles (pistol rated), 2 x 4 foot white acoustic panels and clear light panels. For baffles where rifle calibers are used, NRA recommends contacting the manufacture of the range equipment.

- Question 10 Applicant response: Applicant states that the engineering controls will NOT contain all overshoots of the range. Specifically, applicant states that a combination of engineering and operational controls must be used. Last bullet of operational controls states "students not adhering to instructor commands or standards are removed from the range" - This shows that operational controls cannot ensure students do not carry or operate weapons in a 100% safe manner at all times during firing. This is the rationale for all standards including the NRA range safety book stating the applicant must control the impact area outside of the berms. For Example: students are required to keep firearm on safe and directed muzzle down during movement between firing tables. Student "does not adhere to instructor command" and the fire arm is discharged accidentally. In this instance in accordance with operational controls the student is re-trained (but the bullet has left the weapon and possibly the range itself).

  See NRA Range Source Book 2012:

    - 3.04.5 Backstop/Bullet Impact Berm
      Various factors can affect the course, travel, deflection, bounce-back and ricochet of bullets or shot. The distances and measurements stated below are to be considered as guidelines only. **This Source Book does not represent or guarantee that a particular bullet or shot may not deflect, bounce-back or ricochet, even if the guidelines below are met. You may be held responsible for personal injury or property damage caused from any bullet or shot that escapes the shooting range or that deflects, bounces back**

or ricochets, no matter how well your backstop, sideberms or baffles may be constructed.

- 2.06 Safety Baffles
  - The term safety baffle defines a structure used to restrict bullets to a smaller area than would be possible without them. Safety baffles differ from sound baffles, which are designed to absorb or redirect sound waves, in that safety baffles are more or less impenetrable. **The basic concept is based on a Blue sky gap, meaning that baffles are set up so that the shooter, regardless of shooting position, cannot see any blue sky down range.** These fixtures may be overhead, on the ground, on top of the backstop, in the roof of a firing line cover, in the form of an elongated box or as a completely enclosed tunnel. The principle behind the design is to equip a range with baffles so that a bullet may leave its confines, but will fall to earth within a smaller, more predictable area.

- 3.04.6.1.1 Overhead baffles are used to contain the flight of bullets to a specified area within the range. These overhead baffles are useful in areas where space is limited. **(this GDP does not include Overhead baffles as prescribed by the NRA RSB.)**

- 3.02.1 Projectile Containment
- 3.02.1.1 Projectile containment will vary in size and design based upon terrain features, range structures, and the chosen shooting activity. Various range enhancements have proven to be significantly effective in limiting bullet containment to the confines of a specific property boundary. Techniques for limiting projectiles to range property include: backstops, sideberms and sidewalls, **baffles**, target placement, **mountains or rolling hills,** sloping floor of the range, and utilizing the range for its intended purpose.
- 3.02.1.2 The distance a bullet will travel varies according to several factors: ballistic coefficient, bullet weight, muzzle velocity, caliber, bullet shape, angle of muzzle elevation, and to a lesser degree, wind speed, wind direction and relative humidity. Muzzle elevation to achieve the maximum range of a given firearm and ammunition combination will vary, but can be calculated by using Ingalls' Ballistic Tables (Hatcher's Notebook, pages 584-625). The ballistic coefficient and muzzle velocity are the two most important factors in determining the distance a bullet will travel. The following ballistics table has been modified for use in this source book and is used with permission. Additional cartridges and newer projectiles have been added to the chart. The new cartridge data was derived by using Sierra Infinity v6ii. This chart should be used only as a quick reference to check comparative data for various calibers using specific bullet weights and velocities for planning purposes. The 30-06 (boattail) bullet, weight of 172 grains, muzzle velocity of 2,600 feet per second has been added to the chart and is shown to have a range of 5,500 yards or 3.12 miles and does not mean that you have to own or control 3.12 miles of downrange area. Various factors can affect the maximum distance that a bullet or shot may travel. The tables below are to be considered as guidelines only. **This source book does not represent or guarantee that a particular bullet or shot may not travel further than the below state distances. Remember that you will most likely be held responsible for the damage or injury caused from any bullet or shot that escapes the shooting range, no matter what the distance that the bullet or shot traveled.**

- Question 21 Applicant's Response: The applicant states that "because bond values are determined by estimated reclamation, it is not possible to determine whether a bond is necessary or what the value would be." The GDP includes an fiscal projection and projected range usage. Applicant should proffer a reclamation/remediation bond that covers at a minimum their maximum usage as stated in their fiscal assessment. This should not be a bond issued after approval based upon the applicant's future assessment. If the fiscal projection data is sound, then that should be used to create the bond.

Code of Virginia
Title 15.2. Counties, Cities and Towns
Chapter 9. General Powers of Local Governments

§ 15.2-917. Applicability of local noise ordinances to certain sport shooting ranges.

A. No local ordinance regulating any noise shall subject a sport shooting range to noise control standards more stringent than those in effect at its effective date. The operation or use of a sport shooting range shall not be enjoined on the basis of noise, nor shall any person be subject to action for nuisance or criminal prosecution in any matter relating to noise resulting from the operation of the range, if the range is in compliance with all ordinances relating to noise in effect at the time construction or operation of the range was approved, or at the time any application was submitted for the construction or operation of the range.

B. Any sport shooting range operating or approved for construction within the Commonwealth, which has been condemned through an eminent domain proceeding by any condemning entity, and which relocates to another site within the same locality within two years of the final condemnation order, shall not be subjected to any noise control standard more stringent than those in effect at the effective date of such sport shooting range.

C. For purposes of this section, "sport shooting range" means an area or structure designed for the use of rifles, shotguns, pistols, silhouettes, skeet, trap, black powder, or any other similar sport shooting.

For purposes of this section, "effective date" means the time the construction or operation of the sports shooting range initially was approved, or at the time any application was submitted for the construction or operation of the sports shooting range, whichever is earliest.

1990, cc. 541, 577, § 15.1-29.20; 1997, c. 587; 2005, c. 544; 2006, c. 704.

The chapters of the acts of assembly referenced in the historical citation at the end of this section may not constitute a comprehensive list of such chapters and may exclude chapters whose provisions have expired.

11/30/2018

SENT TO LEON HUGHES 11/29

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Peter Larson <pelarson62@gmail.com>

...' shooting facilities in Va., once established, ...

Stephan Picard <sjpicard@gmail.com>
To: Peter Larson <pelarson62@gmail.com>

Tue, May 9, 2017 at 8:29 AM

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Statute:
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West's Annotated Code of Virginia Currentness
Title 15.2. Counties, Cities and Towns (Refs & Annos)
Subtitle II. Powers of Local Government
Chapter 9. General Powers of Local Governments (Refs & Annos)
Art
icle 1. Public Health and Safety; Nuisances (Refs & Annos)
§ 15.2
-
917. Applicability of local noise ordinances to certain sport shooting ranges
A. No local ordinance regulating any noise shall subject a sport shooting range to noise control
standards more
stringent than those in effect at its effective date. The operation or use of a sport
shooting range shall not be enjoined on the basis of noise, nor shall any person be subject to
action for nuisance or criminal prosecution in any matter relating to noise resulting from the
operation of the range, if the range is in compliance with all ordinances relating to noise in effect
at the time construction or operation of the range was approved, or at the time any application
was submitted for the construction or
operation of the range.

B. Any sport shooting range operating or approved for construction within the Commonwealth,
which has been condemned through an eminent domain proceeding by any condemning entity,
and which relocates to another site within the same
locality within two years of the final
condemnation order, shall not be subjected to any noise control standard more stringent than
those in effect at the effective date of such sport shooting range.
C. For purposes of this section, "sport shooting range"
means an area or structure designed for
the use of rifles, shotguns, pistols, silhouettes, skeet, trap, black powder, or any other similar
sport shooting.
For purposes of this section, "effective date" means the time the construction or operation of the
sp
orts shooting range initially was approved, or at the time any application was submitted for the
construction or operation of the sports shooting range, whichever is earliest.

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SIEBEIN ASSOCIATES, INC.
Consultants in Architectural & Environmental Acoustics
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December 11, 2015

Mr. Dan Lord
Facilities, Operations and Support Systems Manager
Finances and Operations Division
Department of Natural Resources
525 West Allegan
P.O. Box 30028
Lansing, Michigan 48933

Dear Dan:

Enclosed please find one bound and one loose copy of our *Environmental Acoustic Assessment of 3 Sites for a Proposed Firing Range* report for the proposed Shooting Ranges in Grand Traverse County, Michigan. The report contains a summary of baseline ambient sound level measurements made at the 3 sites; a summary of sound levels measured during shooting exercises at each site with 3 weapons; a 0.40 caliber handgun, a 12 gauge shotgun and a 0.308 rifle; and sound levels calculated at locations within two miles of the approximate center of the 3 proposed sites for a firing range with berms on 3 sides and a canopy over the firing line; and several noise mitigation options for the ranges. Rank ordering of the relative magnitude of potential noise impacts for the base range locations; orientation of the direction of fire of the range; and a variety of noise mitigation options for each range location are also presented.

The report contains an executive summary of the results, background information relevant to the acoustical analysis; a description of the methods used to conduct the measurements and analysis; aerial maps showing the measurements and results of the computer analysis; and rank ordering of the relative magnitude of potential noise impacts for the range location, orientation and design alternatives considered.

Please do not hesitate to contact us if you have any questions regarding the findings of our analysis or if we can be of additional assistance in this regard.

Sincerely,
SIEBEIN ASSOCIATES, INC.



Gary W. Siebein, FAIA, FASA
Senior Principal Consultant

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EXECUTIVE SUMMARY

Three options for the location of a new firing range in Grand Traverse County, Michigan were investigated. Site 1 is located in Whitewater Township north of Diagonal Road at T27N R9W Section 33. Site 2 is located in Union Township south of Jackpine Road at T26N R9W Section 13. Site 3 is located in Fife Lake Township southeast of Bowen Road at T25N R9W Section 27.

1. Existing ambient sound levels were measured at 2 locations near potential noise sensitive receivers located near each proposed range site from September 1-7, 2015. Existing ambient sound levels at the sites varied from 16 to 82 dBA with average Day-Night Sound Levels (LDN) of 39 to 61 dBA.

2. Experiments were conducted at each proposed range site on September 1-2, 2015. A Conservation Officer fired 3 shots in succession from a 0.40 caliber handgun; a 12 gauge shotgun; and a 0.308 rifle. Acoustical measurements were made at 10 feet or approximately 3 meters from the sound source as well as at 16 locations around the proposed range site. There were 4 measurement locations, one in each cardinal direction (i.e., north, east, south, and west) at successive distances of ¼ mile, ½ mile, 1 mile and 2 miles from the firing location at the 3 prospective sites for the firing range.

3. The sound levels measured at 10 feet from the source were approximately 7 to 8 dB louder in the direction of fire than to the sides and 16 dB louder in the direction of fire than behind the shooter for the 0.40 caliber handgun; approximately 11 dB louder in the direction of fire than to the sides and 17 dB louder in the direction of fire than behind the shooter for the 12 gauge shotgun; and approximately 12 dB louder in the direction of fire than to the sides and 23 dB louder in the direction of fire than behind the shooter for the 0.308 rifle.

4. At 42% of the measurement locations at distances of 1 to 2 miles from the proposed range site the sounds of the gun shots could not be measured above the ambient sound levels. Average LAeq, maximum LA max and peak LA peak sound levels were measured at the 16 locations around each of the proposed range sites. The LA max levels were on average 3 to 4 dB louder than the LAeq levels. The LA peak levels were 17 to 19 dB louder than the LAeq levels.

5. Measured sound levels were approximately 10 dB louder in the direction of fire compared to the same distances at the sides of the shooter and 20 dB louder in the direction of fire than behind the shooter at distances of ¼ and ½ mile from the proposed range location.

6. The average sound decay with distance measured from the proposed range sites was 6 to 17 dB per doubling of distance from the sound source. This was affected by distance and localized conditions of wind, topography, ground cover and vegetation at each site.

7. Computer models of each of the proposed range sites were constructed in CADNA Software including topography, roads, ground cover, coniferous vegetation with the 10 ft. tall berms on 3 sides of the ranges and an open structure over the firing line for a standard day with 50°F and 70% relative humidity with typical wind speed and direction.

8. Noise contours were plotted for a "typical day" with 3 shooters firing within a 1 second time period and a "busy day" with 6 shooters firing within a 1 second time period for the base range conditions.

9. A point scale was used to assess potential noise impacts that accounted for the sound pressure at each house within a 2 mile radius of each of the proposed range sites and the number of dwellings impacted by the sounds. The sound pressure derived from the average sound level calculated in the noise modeling software was multiplied by the number of dwelling units within each 5 dB group of noise contour lines. For example, if 20 dwellings were located between the 30 and 35 dBA noise contours the points were calculated by the following method. The average sound level in this contour range is 32.5 dBA. The sound pressure associated with this value is 10^(32.5/10). This value was multiplied by the number of dwellings identified in GIS software by DNR staff to arrive at a linear pressure score for these contours. The linear pressure was divided by 100,000 to arrive at a scale that ranged from 0.4 to 46.5 for the alternatives studied. The values for each of the 5 dB groups of noise contours were added together to reach the cumulative linear pressure score for the scenario. Scenarios with lower numbers of points have lower cumulative noise impacts for the scenario.

10. Three sites and range orientations were initially selected for analysis. Site 1: Whitewater Township with the range oriented towards the north; Site 2: Union Township with the range oriented towards the east; and Site 3: Fife Lake with the range oriented towards the southwest. The computer model analysis of these sites is summarized in Appendix F for the "typical day" and "busy day" scenarios with 10 ft. tall berms on the 3 down range sides of the range. Site 1 had the lowest linear pressure score followed by Site 2 with Site 3 a distant third with a linear pressure score that was 4 times the Site 1 score for both scenarios.

11. The "typical day" scenario had approximately ½ of the linear pressure score or 3 dB less than the scores for the "busy day" scenario.

12. The ranking of the initial 3 sites and range orientations remained consistent for the "busy day" scenario when alternate berm heights of 20 ft. and 30 ft. were modeled. The scores for sites 1 and 2 were mixed for the "typical day" scenario.

13. Alternate orientations were selected for each range to reduce potential noise impacts to residential properties within 2 miles of each proposed range site. The alternate range orientation to minimize potential noise impacts to residential and noise sensitive receivers was to the northwest for Site 1: Whitewater Township; towards the northeast for Site 2: Union Township; and towards the northwest for Site 3: Fife Lake Township.

14. Site 1 oriented towards the northwest had the lowest linear pressure score of the 6 alternatives followed closely by Site 1 oriented towards the north and the 2 orientations for Site 2 for the base range design with the 10 ft. berm on the 3 down range sides of the range. Both options for the base range design at Site 3 were scored at almost twice to 4 times the scores for the other sites. There was a slightly different ranking for the "typical day" scenarios than for the "busy day" scenarios.

15. Models were tested using 20 ft. tall and 30 ft. tall berms in addition to the 10 ft. tall berms for each of the range sites and orientations. These studies are reported in Appendix G. The lowest scores for a given range and orientation were generally received by the scheme with the tallest berm height. The relative ranking of sites was similar to those previously discussed with Site 1 oriented to the northwest; Site 2 oriented to the northeast and Site 1 oriented to the north receiving the lowest scores. The highest scores for these tests were for all berm heights and orientations at Site 3: Fife Lake for both the "typical day" and "busy day" scenarios.

16. Studies with alternate air temperatures and relative humidities (Appendix H); alternate wind conditions (Appendix I); and the addition of the existing stands of coniferous trees (Appendix J) on the sites verified that the assumptions made in the model studies represented a conservative approach to the noise contour mapping for the proposed range. This means that the mapped noise contours represent a worst case condition in terms of the effects of temperature, humidity, wind and vegetation on the modeled noise contours.

17. Experiments were conducted in computer models of noise mitigation options that could be considered for the ranges if needed in the future. Order of magnitude costs for the mitigation options were also presented in Appendix T. The noise mitigation options studied included raising the height of the down range berms to 20 ft. tall and 30 ft. tall at cost increases of approximately $223,600 for the 20 ft. tall berm compared to the 10 ft. tall berm; and approximately $641,300 for the 30 ft. tall berm compared to the 10 ft. tall berm. These studies are summarized in Appendices F and G.

18. A U-shaped berm built around the rear of the range to reduce sounds spilling to the rear and sides of the range was investigated in computer model studies summarized in Appendix K. The linear pressure score was reduced by 50% to 60% by adding these U-shaped berms that were 20 ft. tall and 30 ft. tall at an incremental cost increase of approximately $300,400 for the 20 ft. berm scheme and $1,078,100 for the 30 ft. tall berm scheme.

19. Adding solid dividers between each lane in the range building and lining the walls and ceiling of each lane with sound absorbent panels such as Troy Acoustics Troy Board will reduce the linear pressure score at Site 2 by almost 50% and by approximately 11% at Site 1 at a cost of approximately $83,500 as summarized in Appendix L.

20. Additional mitigation options studied included adding solid walls at the sides and rear of the range building lined with the sound absorbent panels; extending the roof of the range building 40 ft. downrange from the firing line and adding a sound absorbent inner lining to the roof; building a U-shaped berm around the rear of the range and raising the height of the berms on all sides to 20 ft. and 30 ft. respectively. These options reduced the linear pressure score between 50% and 75% compared to the base range with the 10 ft. tall berm on 3 sides of the range and the open range structure depending upon the combination of options selected. Incremental costs for these options varied from approximately $150,500 for adding the side and rear walls of the range building; approximately $296,600 for adding the 40 ft. roof extension; approximately $31,200 for adding the 10 ft. tall U-shaped berm at the rear of the range; approximately $108,000 for adding the 20 ft. tall U-shaped berm at the rear of the range; approximately $468,000 for adding the 30 ft. tall U-shaped berm at the rear of the range; and approximately $1,525,200 for the combination of all of these options.

21. The use of the noise mitigation options should be carefully considered for a given site because there are site specific limitations on how much reduction in linear pressure score can be obtained at any given site for a specific mitigation scheme.

SOUND LEVELS AND DECIBELS

Sound is defined as a pressure disturbance in the air caused by a vibrating body that is capable of being heard or detected by the human ear. In the case of gun shots, the muzzle blast of the weapon creates the pressure disturbance in the air as an impulsive type of sound. There is a high amplitude peak pressure from the shot followed by an under pressure that propagates away from the gun. The peak sound pressure level is measured at the highest point of the impulsive sound. The average sound pressure level or equivalent continuous sound level (LAeq) of a time-varying sound is defined as the level of an equivalent steady sound at a specific location for the same measurement duration has the same A-weighted sound energy as the time-varying sound. The LAeq is usually 15 to 20 dB less than the peak pressure level for a gun shot. The maximum A-weighted sound level or LAmax is the greatest sound level measured on a sound level meter using fast time averaging during a designated time duration and an A-weighted filter. The Sound Exposure Level (SEL or LAE) over a stated time period or event is equal to 10 times the logarithm to the base 10 of the ratio of the time integral of squared A-weighted sound pressure to the product of the reference sound pressure and the reference duration of 1 second.

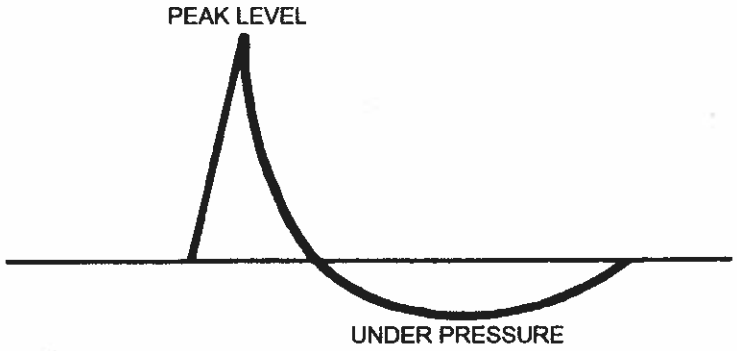


Figure 1. Amplitude or loudness plotted vs time for a typical gunshot.

Sounds are typically measured in decibels. A decibel is 10 times the logarithm to the base 10 of the pressure disturbance in the air compared to the pressure at the threshold of human hearing. Decibels cannot be added directly because they are logarithmic ratios. For example, 2 sounds of 50 decibels each added together result in a sound of 53 dB, not 100 dB. A summary of the way that sounds of different levels are added together is shown in Table 1.

Table 1. Examples of the addition of different sound levels (dBA).

Sound level 1	Sound level 2	Combined sound level	Explanation
50 dBA	50 dBA	53 dBA	When two sounds of equal level are combined, the result is a 3 dB increase in sound level
50 dBA	52 dBA	54 dBA	When one sound is combined with another sound that is 2-3 dB louder than first sound, the combined sound level is 2 dB louder than the louder sound
50 dBA	55 dBA	56 dBA	When one sound is combined with another sound that is 4-7 dB louder than the first sound, the combined sound level is 1 dB louder than the louder sound
50 dBA	60 dBA	60 dBA	When one sound is 10 dB louder than another, the combined sound level is approximately equal to the louder sound level

The differences in sound levels are not perceived by people linearly either. One sound must be 10 dB louder than another sound for it to be heard as approximately twice as loud as the first sound. A sound that is 0 to 1 dB louder than another sound is heard as approximately the same loudness as the first sound. A sound that is 2 to 3 dB louder than another sound is heard as barely louder than the first sound. A sound that is 5 to 6 dB louder than another sound is heard as noticeably louder, but not twice as loud as the first sound. A summary of the perception of the relative loudness of two sounds is shown in Table 2. An acoustic thermometer showing the sound levels associated with different sounds is shown in figure 2. The sound levels are measured in A-weighted decibels or dBA. An A-weighted decibel is one that has been adjusted so it corresponds to the relative loudness of middle level sounds as they are heard by human listeners. The low frequency or bass sounds are reduced by the A-weighting process and the higher pitch sounds that human ears are more sensitive to are increased slightly by the A-weighting process.

Table 2. Perception of the relative loudness of 2 sounds.

Difference in sound level between two sounds	The louder sound is perceived as ____ the quieter sound
0 to 1 dB	Not noticeably louder than
2-3 dB	Barely noticeably louder than
5-6 dB	Noticeably louder than, but not twice as loud as
10-12 dB	Approximately twice as loud as
15 dB	Approximately three times as loud as
20 dB	Approximately four times as loud as

In general terms, sound levels of 30 to 40 dBA are usually perceived by people as being relatively quiet. Normal conversation measured at approximately 3 feet from the person speaking is 60 to 65 dBA. Cars passing on a street or a residential air-conditioning unit are approximately 65 to 75 dBA. Loud night clubs and amplified music at concerts are often played at levels of 100 to 110 dBA. Peak sound levels from gunshots measured at 10 feet from the source in the direction of fire will be 150 to 165 dBA depending upon the weapon type and ammunition used.

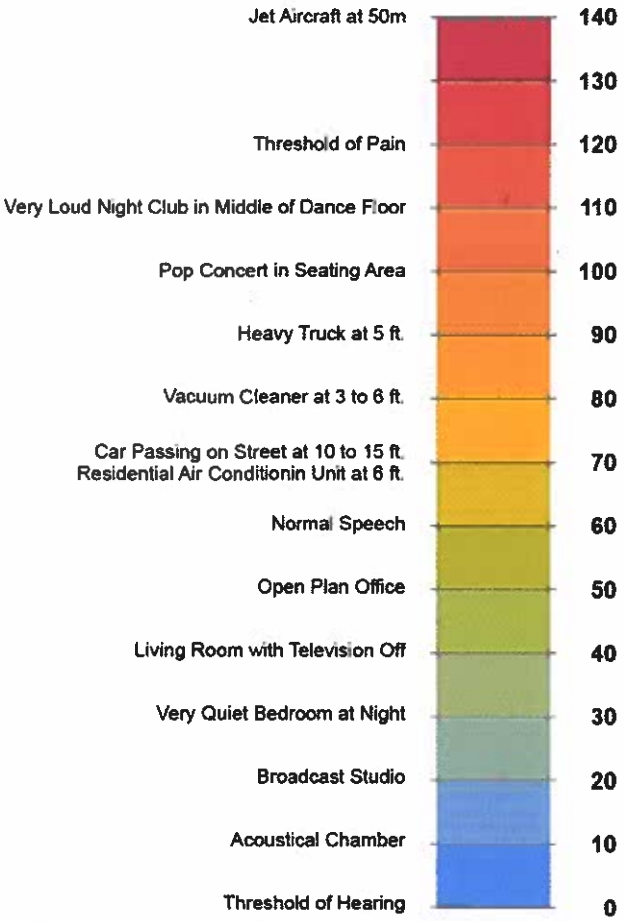


Figure 2. Acoustical thermometer showing the relative loudness in dBA of various sounds.

ACOUSTICAL MEASUREMENTS

Two types of acoustical measurements were taken. Short term measurements of the sounds produced by firearms at the location of the shooter and at distances away from the shooter were conducted at each of the 3 sites. Long term measurements of base line ambient sounds were also made at 2 locations at each of the 3 sites for approximately 1 week at each of the six locations.

Short Term Measurements

Short term acoustical measurements of overall-A-weighted, C-weighted and Z-weighted peak, average and maximum sound levels as well as flat-weighted octave band and 1/3 octave band sound levels produced by firearms discharges were recorded at the 3 proposed firing range sites. Measurements were also made at 16 receiver locations located at distances of ¼ mile, ½ mile, 1 mile and 2 miles from the proposed range sites at locations around the range sites at which the gunshots were audible above the background noise levels and able to be measured. These locations are shown in Appendix A. GPS coordinates of the measurement locations are shown in Appendix S. Sound levels measured at each of the receiving locations are shown on aerial photographs of each site in Appendix A and in graph form in Appendix V.

The measurements were recorded at the location of the shooter and at 16 locations at increasing distances and varying directions from the site. A summary of sound levels measured at 10 feet from the shooter at each site is contained in Appendix B. Table summaries and aerial photographs of each proposed site and its surroundings showing the sound levels measured at distances away from the range sites are contained in Appendices C, D and E. Graphs showing average and peak sound levels for each of the measurements are contained in Appendix U. A Larson Davis Model 831 and a Cesva SC 310 Sound Level Meter were used as the basic instrumentation for the acoustical measurements. The meters meet ANSI Standard S1.4 requirements for Type 1 sound level meters.

The 2 Larson Davis 831 meters were set to measure LAeq, LAmax and flat-weighted octave band sound level data averaged every 1 second during the measurements in addition to LA peak and other metrics. The Cesva SC 310 recorded data every 1 second and every 125 milliseconds. The Larson Davis meters were equipped with standard ½" diameter measurement microphones. The Cesva was equipped with a Gras HD 40 1/4" microphone and associated preamplifier so it could measure high sound pressure levels (up to 190 dB) because it was located close to the guns that were fired during the experiments.

The Larson Davis meters were calibrated with a Larson Davis CAL 200 calibrator prior to testing and tested to within 0.1 dB of calibration after the measurements were complete. The Cesva SC 310 was calibrated with a Norsonic 1251 calibrator prior to testing and tested to within 0.1 dB of calibration after the measurements were complete. The meters were mounted on a tripod at approximately 5 ft. above the ground at each measurement location. A windscreen was attached to the microphones for all measurements. The data were stored on the hard drives of the meters and downloaded to computers in our office and analyzed.

Weather readings including dry bulb temperature (° F), relative humidity (%), barometric pressure (inches of mercury (Hg) and wind speed (m.p.h.) and direction were made with a Kestrel 4000 Pocket Wind Meter from Nielsen Kellerman at each measurement location. These readings are included in Appendix R of this report.

Three rounds in succession were fired from a Sig Sauer P229 0.40 caliber handgun with Smith and Wesson 180 grain full metal jacket bullets; a Remington 870 12 gauge shotgun using LE 133 ¾" buckshot; and a Ruger 77 rifle using 0.308 Win 150 grain full metal jacket boat tail ammunition at each of the 3 proposed range locations while sound levels were recorded with the Cesva meter near the source and with the 2 Larson Davis 831 meters at the 16 receiver locations located at distances away from each of the proposed range sites. The sequence of firing was repeated at each of the receiver locations and then repeated at each of the 3 sites.

Long Term Measurements of Base Line Ambient Sound Levels

Long term measurements of existing ambient sound levels were made for a 1 week time period at 2 locations near each of the proposed range sites with 6 Rion NL-32 integrating sound level meters. The Rion equipment meets ANSI requirements for type 1 sound level meters. The meters were set to the fast, A-weighted mode to acquire data. The Rion NL-32 meters were calibrated with a Larson Davis Cal 200 calibrator prior to and after testing. The calibration levels were within ±0.1 dB from the beginning of the measurement period to the end. The microphones were covered with a wind screen

and positioned atop an extension rod approximately 5 ft 6 inches (the height of a standing person) above ground level attached to secure, weather resistant environmental cases. The environmental cases were strapped to a tree at each measurement location. The meters logged acoustical measurement data for approximately 7 days recording sound levels every 1/8 second. The 1/8 second levels were averaged over a 1 minute time period to yield a 1 minute A-weighted Continuous Equivalent Sound Level (LAeq). Graphs illustrating the 1 minute continuous equivalent sound level (LAeq) and fast maximum A-weighted sound level (LAF max) plotted vs. time for each 7 day time period are shown in Appendix V. A tabular summary of the data is provided in Appendix A along with aerial photographs of the 3 proposed range sites showing the measurement locations and the range of average sound levels (LAeq's) and the LDN during the measurement period. Data were downloaded from the meters to a laptop computer after the measurement time for subsequent analysis.

The Day-Night Average Sound Level (LDN) was calculated from the LAeq data for each day during the measurement period. The LDN is the average of the measurements taken during day time hours from 7:00 a.m. until 10:00 p.m. and the measurements taken during night time hours from 10:00 p.m. until 7:00 a.m. with a 10 dB added to sound levels recorded during the night time hours to reflect a greater sensitivity to sounds made during this time period as potentially interfering with people sleeping.

The sound level meter also recorded A-weighted maximum and minimum sound levels, as well as other statistical acoustical data (L05, L10, L50, L90 L95 and SEL). These data are available for review if desired. The L05 is the sound level exceeded for 5% of the measurement time. The L10 is the sound level exceeded for 10% of the measurement time. The L50, L90 and L95 are defined similarly for 50%, 90% and 95% of the measurement time respectively. The SEL is the sound exposure level.

MEASUREMENT RESULTS

Existing Ambient Sound Levels

Existing ambient sound levels were measured at 2 locations near each of the proposed range sites at distances near potential noise sensitive receivers from September 1-7, 2015. Figures A-1, A-2 and A-3 in Appendix A show an aerial photograph of the area around each proposed range site with the ambient sound level measurement locations indicated on the site plan. The sound level meters were left unattended during the measurement time period. A summary of the measured data is presented in Table A-1 in Appendix A. The data are presented as a range of average sound levels or A-weighted Equivalent Average Sound Levels (LAeq's) and Day Night Average Sound Levels (LDN's). LDN's are usually used as metrics to classify lands for planning purposes. The LAeq's for the ambient sound levels can be compared to the range of sounds produced by firearms discharge in the experiments conducted on site as well as in the computer model studies to determine if the sound levels produced by the firearms are louder than the existing ambient sound levels at locations of interest. Graphs of sound pressure level in dBA plotted vs. time for each day during the measurement period at each site are shown in Appendix V.

1. Existing ambient sound levels at Range Site 1 in Whitewater Township varied from 18 to 72 dBA with average Day-Night Sound Levels (LDN) of 39 to 59 dBA. The ambient sound levels at Site 1 consisted of light to moderate traffic on Supply Road, Williamsburg Rd, and Broomhead Road; logging operations and logging trucks traveling near the site; occasional vehicles traveling on the dirt and gravel roads near the site; the breeze blowing through the trees; birds chirping; and the sounds of insects.

2. Existing ambient sound levels at Range Site 2 in Union Township varied from 16 to 77 dBA with average Day-Night Sound Levels (LDN) of 39 to 61 dBA. The ambient sound levels at Site 2 consisted of light to moderate traffic on Supply Road and Fife Lake Road; occasional vehicles traveling on the dirt and gravel roads near the site; occasional recreational motorized bikes and 4-wheelers traveling on the dirt roads near the site; the breeze blowing through the trees and grasses; birds chirping; and the sounds of insects.

3. Existing ambient sound levels at Range Site 3 in Fife Lake varied from 16 to 81 dBA with average Day-Night Sound Levels (LDN) of 48 to 56 dBA. The ambient sound levels at Site 3 consisted of traffic with trucks on Routes U.S. 131 and County Road 113 in the distance; wind blowing through the trees; birds calling; and the sounds of insects.

MEASURED SOUND LEVELS OF FIREARMS

Experiments were conducted at each proposed range site on September 1-2, 2015. A Conservation Officer fired 3 shots in succession from a 0.40 caliber handgun; a 12 gauge shotgun; and a 0.308 rifle. Acoustical measurements were made at 10 feet or approximately 3 meters from the sound source as well as at 16 locations around the proposed range site. A summary of sound levels of gun shots measured at 10 feet from the person shooting during the experiments at each proposed range site is presented in tabular and diagrammatic formats in Appendix B.

There were also 16 measurement locations, one in each cardinal direction (i.e., north, east, south, and west) at successive distances of ¼ mile, ½ mile, 1 mile and 2 miles from the firing location at the 3 prospective sites for the firing range. A summary of LAeq average and LA peak sound levels of gun shots measured at distances away from the 3 proposed range sites is presented in tabular and graphic formats in Appendix C for Site 1: Whitewater Township; Appendix D for Site 2: Union Township; and Appendix E for Site 3: Fife Lake. Graphs of the average and peak sound levels recorded for each measurement are presented in Appendix U.

Summary of Measurements Made at the Source Locations

1. The sound levels measured at 10 feet from the source were approximately 7 to 8 dB louder in the direction of fire than to the sides of the shooter and 16 dB louder in the direction of fire than behind the shooter for the 0.40 caliber handgun; approximately 11 dB louder in the direction of fire than to the sides of the shooter and 17 dB louder in the direction of fire than behind the shooter for the 12 gauge shotgun; and approximately 12 dB louder in the direction of fire than to the sides of the shooter and 23 dB louder in the direction of fire than behind the shooter for the 0.308 rifle.

2. The global average difference in LA peak sound levels for all firearms measured at 10 feet from the shooter was 10 dB less to the sides of the shooter and 19 dB less to the rear of the shooter compared to levels measured in the direction of fire.

3. LA peak sound levels of the 0.40 caliber handgun were measured at 153 dBA to 158 dBA at 10 feet in front of the shooter approximately 10° off the axis of firing. The measured peak sound levels varied from 144 to 150 dBA to the sides of the shooter and 137-141 dBA behind the shooter.

4. LA peak sound levels of the 12 gauge shotgun were measured at 157 dBA to 160 dBA at 10 feet in front of the shooter approximately 10° off the axis of firing. The measured peak sound levels varied from 144 to 149 dBA to the sides of the shooter and 140-142 dBA behind the shooter.

5. LA peak sound levels of the 0.308 rifle were measured at 163 dBA to 165 dBA at 10 feet in front of the shooter approximately 10° off the axis of firing. The measured peak sound levels varied from 148 to 155 dBA to the sides of the shooter and 140-143 dBA behind the shooter.

6. The LAeq or average sound levels measured at 10 feet from the source were approximately 8 to 9 dB louder in the direction of fire than to the sides and 16 dB louder in the direction of fire than behind the shooter for the 0.40 caliber handgun; approximately 10 dB louder in the direction of fire than to the sides and 16 dB louder in the direction of fire than behind the shooter for the 12 gauge shotgun; and approximately 12 dB louder in the direction of fire than to the sides and 19 dB louder in the direction of fire than behind the shooter for the 0.308 rifle.

7. The global average difference in LAeq average sound levels for all firearms measured at 10 feet from the shooter was 10 dB less to the sides and 17 dB less to the rear compared to levels measured in the direction of fire.

8. LAeq average sound levels of the 0.40 caliber handgun were measured at 129 dBA to 130 dBA at 10 feet in front of the shooter approximately 10° off the axis of firing. The measured LAeq sound levels varied from 117 to 123 dBA to the sides of the shooter and 111-114 dBA behind the shooter.

9. LAeq average sound levels of the 12 gauge shotgun were measured at 129 dBA to 132 dBA at 10 feet in front of the shooter approximately 10° off the axis of firing. The measured LAeq sound levels varied from 116 to 121 dBA to the sides of the shooter and 118-121 dBA behind the shooter.

10. LAeq average sound levels of the 0.308 rifle were measured at 135 dBA to 137 dBA at 10 feet in front of the shooter approximately 10° off the axis of firing. The measured LAeq sound levels varied from 121 to 126 dBA to the sides of the shooter and 115-118 dBA behind the shooter.

11. Therefore, the orientation of the direction of fire for the range will have a significant effect on sounds propagated away from the range site. The approximate 10 dB difference between sound levels propagated in the direction of fire compared to the sides of the shooter would be heard as ½ as loud by people of normal sensitivities. The 17 to 19 dB difference in sound levels between the direction of fire compared to the rear of the shooter would be heard as almost ¼ as loud by people of normal sensitivities.

Summary of Measurements Made at 1/4 mile, 1/2 mile, 1 mile and 2 miles from the Three (3) Proposed Range Sites

1. At Site 1 in Whitewater Township average (LAeq) and peak (LA peak) sound levels measured for the 0.40 caliber handgun at ¼ mile from the proposed range site varied from 48-52 dBA LAeq and 62 to 80 dBA LA Peak; 33 to 52 dBA LAeq and 33 to 76 dBA LA peak at ½ mile from the proposed range site; 33 to 41 dBA LAeq and 57 to 70 dBA LA peak at 1 mile from the proposed range site; and 31 to 40 dBA LAeq and 56 to 58 dBA LA peak at 2 miles from the proposed range site.

2. At Site 1 in Whitewater Township average (LAeq) and peak (LA peak) sound levels measured for the 12 gauge shotgun at ¼ mile from the proposed range site varied from 44-59 dBA LAeq and 58 to 79 dBA LA Peak; 34 to 50 dBA LAeq and 56 to 72 dBA LA peak at ½ mile from the proposed range site; 33 to 44 dBA LAeq and 57 to 65 dBA LA peak at 1 mile from the proposed range site; and 29 to 40 dBA LAeq at 2 miles from the proposed range site.

3. At Site 1 in Whitewater Township average (LAeq) and peak (LA peak) sound levels measured for the 0.308 rifle at ¼ mile from the proposed range site varied from 49-61 dBA LAeq and 63 to 85 dBA LA Peak; 35 to 57 dBA LAeq and 56 to 84 dBA LA peak at ½ mile from the proposed range site; 32 to 51 dBA LAeq and 57 to 76 dBA LA peak at 1 mile from the proposed range site; and 33 to 40 dBA LAeq and 60 to 63 dBA LA peak at 2 miles from the proposed range site.

4. At Site 2 in Union Township average (LAeq) and peak (LA peak) sound levels measured for the 0.40 caliber handgun at ¼ mile from the proposed range site varied from 47-67 dBA LAeq and 61 to 99 dBA LA Peak; 35 to 58 dBA LAeq and 57 to 84 dBA LA peak at ½ mile from the proposed range site; 41 to 50 dBA LAeq and 57 to 68 dBA LA peak at 1 mile from the proposed range site; and 29 to 34 dBA LAeq at 2 miles from the proposed range site.

5. At Site 2 in Union Township average (LAeq) and peak (LA peak) sound levels measured for the 12 gauge shotgun at ¼ mile from the proposed range site varied from 41-71 dBA LAeq and 60 to 101 dBA LA Peak; 36 to 56 dBA LAeq and 56 to 82 dBA LA peak at ½ mile from the proposed range site; 43 to 48 dBA LAeq and 56 to 72 dBA LA peak at 1 mile from the proposed range site; and 31 to 38 dBA LAeq at 2 miles from the proposed range site.

6. At Site 2 in Union Township average (LAeq) and peak (LA peak) sound levels measured for the 0.308 rifle at ¼ mile from the proposed range site varied from 48-76 dBA LAeq and 66 to 105 dBA LA Peak; 37 to 60 dBA LAeq and 58 to 86 dBA LA peak at ½ mile from the proposed range site; 32 to 47 dBA LAeq and 58 to 73 dBA LA peak at 1 mile from the proposed range site; and 33 to 34 dBA LAeq at 2 miles from the proposed range site.

7. At Site 3 in Fife Lake Township average (LAeq) and peak (LA peak) sound levels measured for the 0.40 caliber handgun at ¼ mile from the proposed range site varied from 53-62 dBA LAeq and 73 to 85 dBA LA Peak; 41 to 49 dBA LAeq and 56 to 64 dBA LA peak at ½ mile from the proposed range site; 34 to 43 dBA LAeq and 56 to 61 dBA LA peak at 1 mile from the proposed range site; and 41 to 42 dBA LAeq and 60 to 62 dBA LA peak at 2 miles from the proposed range site.

8. At Site 3 in Fife Lake Township average (LAeq) and peak (LA peak) sound levels measured for the 12 gauge shotgun at ¼ mile from the proposed range site varied from 50-59 dBA LAeq and 70 to 82 dBA LA Peak; 40 to 49 dBA LAeq and 56 to 73 dBA LA peak at ½ mile from the proposed range site; 36 to 42 dBA LAeq and 57 to 69 dBA LA peak at 1 mile from the proposed range site; and 41 to 43 dBA LAeq and 56 to 61 dBA LA peak at 2 miles from the proposed range site.

9. At Site 3 in Fife Lake Township average (LAeq) and peak (LA peak) sound levels measured for the 0.308 rifle at ¼ mile from the proposed range site varied from 55-63 dBA LAeq and 77 to 83 dBA LA Peak; 45 to 48 dBA LAeq and 58 to 64 dBA LA peak at ½ mile from the proposed range site; 33 to 46 dBA LAeq and 56 to 68 dBA LA peak at 1 mile from the proposed range site; and 43 to 44 dBA LAeq and 57 to 62 dBA LA peak at 2 miles from the proposed range site.

10. At 42% of the measurement locations at distances of 1 to 2 miles from the proposed range site the sounds of the gun shots could not be measured above the ambient sound levels. These measurements are indicated by an "x" in Table C-1 for Site 1; Table D-1 for Site 2 and Table E-1 for Site 3. The measurements are indicated by a N/A on the aerial photographs showing the measured sound levels in Appendices C, D and E.

11. Average LAeq, maximum LA max and peak LA peak sound levels were measured at the 16 locations around each of the 3 proposed range sites. The LA max levels were on average 2 to 5 dB louder than the LAeq levels. The LA peak levels were 16 to 24 dB louder than the LAeq levels for all sites, all locations and all weapon types.

12. The measurements at Sites 1 and 3 showed a 3 dB average difference between the LA max and LAeq with a range of 0 to 6 dB and 18 dB average difference between the LA peak and LAeq measurements with a range of 11 to 37 dB.

13. The measurements at Site 2 showed a 5 dB average difference between the LA max and LAeq sound levels with a 0 to 6 dB range and a 22 dB difference between the LA peak and LAeq sound levels with a range of 13 to 32 dB.

14. Measurements at Site 3 showed a 6 dB difference between LA max and LAeq levels for handguns to the front of the shooter, and a 3 to 4 dB difference between LA max and LAeq levels to the sides and rear of the shooter for the handgun.

15. There was a 24 dB difference between LA peak and LAeq levels for the handgun to the front of the shooter, a 16 dB difference between LA peak and LAeq levels to the rear of the shooter for the handgun, and an 18 dB difference at the sides.

16. Measurements at Site 3 showed a 4 dB difference between LA max and LAeq levels for shotguns to the front and rear of the shooter, and a 1.5 to 3 dB difference between LA max and LAeq levels to the sides of the shooter for the shotgun.

17. There was a 22 dB difference between LA peak and LAeq levels for the shotgun to the front of the shooter, a 21 dB difference between LA peak and LAeq levels to the rear of the shooter for the shotgun, and a 17 dB difference at the sides.

18. Measurements at Site 3 showed a 2 to 3.5 dB difference between LA max and LAeq levels for the .308 rifle to the front of the shooter, and a 3 to 4 dB difference between LA max and LAeq levels to the sides and rear of the shooter with the .308 rifle.

19. There was a 19 dB difference between LA peak and LAeq levels for the .308 rifle to the front of the shooter, a 16 dB difference between LA peak and LAeq levels to the rear of the shooter for the 0.308 rifle, and a 17 dB difference at the sides.

20. Measured LA peak sound levels at Site 1 were approximately 11 to 12 dB louder in the direction of fire compared to the same distances at the sides of the shooter; 11 to 16 dB louder compared to the back side of the shooter; and 15 to 19 dB louder compared to the rear of the shooter at ¼ mile. The LA peak levels were 16 to 17 dB louder in the direction of fire compared to the side and 16 to 23 dB louder compared to the rear at ½ mile from the proposed range location.

21. Measured LAeq sound levels at Site 1 were approximately 5 to 7 dB louder in the direction of fire compared to the same distances at the side of the shooter; 8 to 13 dB louder compared to the back side of the shooter; and 10 to 13 dB louder compared to the rear of the shooter at ¼ mile. The LAeq sound levels were 13 to 14 dB louder in the direction of fire compared to the side of the shooter and 6 to 15 dB louder compared to the rear of the shooter at ½ mile from the proposed range location. The differences were 3 to 8 dB louder in the direction of fire than to the sides of the shooter and 4 to 13 dB louder in the direction of fire compared to the rear of the shooter at 1 mile from the proposed range location.

22. Measured LA peak sound levels at Site 2 were approximately 0 to 12 dB louder in the direction of fire compared to the same distances at the side of the shooter; 0 to 12 dB louder compared to the back side of the shooter; and 1 to 6 dB louder compared to the rear of the shooter at ¼ mile.

23. Measured LAeq sound levels at Site 2 were approximately 18 to 27 dB louder in the direction of fire compared to the same distances at the side of the shooter; -1 to 12 dB louder compared to the back side of the shooter; and 16 to 25 dB louder compared to the rear of the shooter at ¼ to ½ mile distance.

24. The average sound decay per doubling of distance from the source was measured at 6 dB for LA peak values at Site 1 and 7 dB for LAeq values at Site 1.

25. The average sound decay for each doubling of distance from the sound source for the LA peak values was 13 dB with 11 dB decay per doubling of distance for the LAeq values at Site 2.

26. The average sound decay for each doubling of distance from the sound source for the LA peak values was 15 dB with 17 dB decay per doubling of distance for the LAeq values at Site 3.

THE COMPUTER MODEL STUDIES

Introduction

A series of computer model studies were designed and executed to study the propagation of sounds from the proposed range sites at each of the 3 locations at distances away from the proposed ranges. The models were constructed in the CADNA-A software package using topographic information from USGS maps and the GIS data base. A series of experiments were conducted to understand the relative differences between a number of variables including the location and orientation of the range, the height of berms, the number of people firing simultaneously (in the same 1 second time period), the configuration of the range structure, the addition of acoustical treatment to the range structure, the effects of different temperatures, wind and coniferous trees and combinations of these variables. The experiments are described in Appendices F through P. Noise contour plots for each of the options studied are also included in the appendices describing the experiment. The proposed base range design consists of 25 yard, 50 yard and 100 yard ranges surrounded by a berm. The ranges have approximately 10 ft. high berms on three sides (downrange and the two sides). There is an open structure that covers the firing line that has a wood roof/ceiling. The base range design selected by DNR was based on recent Michigan DNR range construction projects and recommendations of range layout from the National Rifle Association. A diagram of the base range design is shown in figure 3.

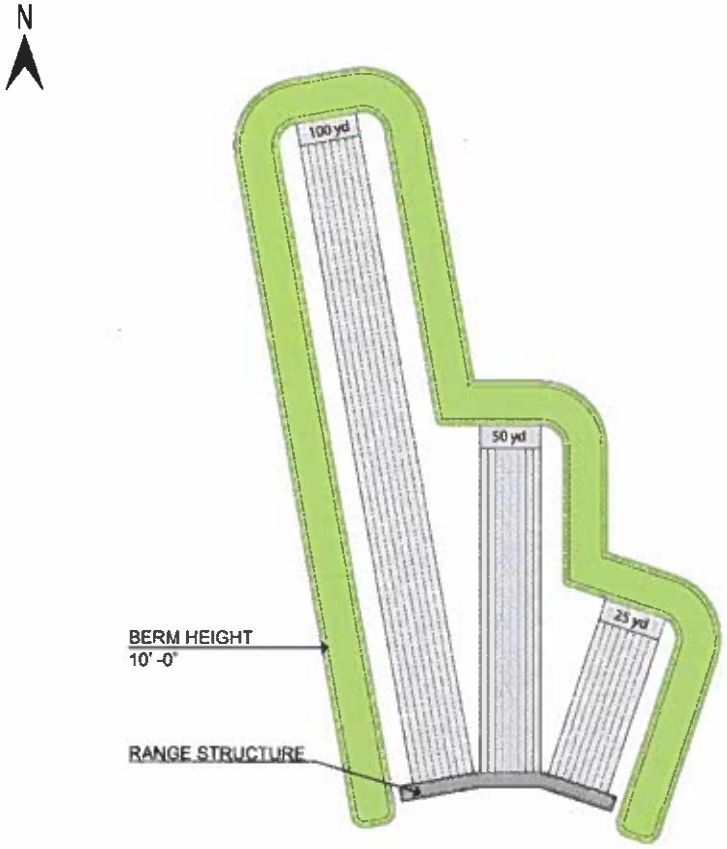


Figure 3. Concept diagram of the base range design.

Method

1. The analysis assumed two typical operating conditions: 1. a "typical day" where 3 people fired their weapons within a 1 second time period with possibly up to 3 additional people on the range getting ready to fire, loading their weapons or talking with each other; and; and 2. a "busy day" where 6 people fired their weapons within a 1 second time period and perhaps 6 other people were also on the range waiting to fire, loading their weapons or talking with each other.

2. The "typical" day had 1 shooter firing a .223 caliber rifle on the 100 yard range; 1 shooter firing a 12 gauge Remington shotgun on the 50 yard range; and 1 shooter firing a 0.40 caliber handgun on the 25 yard range within a 1 second time period. The 3 other people on the range were assumed to be either watching, loading their weapons to get ready to fire or pausing in their firing during the 1 second time period studied. Octave band sound pressure level data for the firearms were obtained from a report entitled "*Field Measurement of Sound Pressure Levels of Various Firearms,*" published by the Architectural Acoustics Research Group at the University of Florida in 1993 for the National Rifle Association, which includes data for an M-16 rifle with .223 Remington 55 grain power-locked hollow point ammunition; a Remington 12 gauge shotgun; and a 0.40 caliber handgun. A summary of the octave band sound exposure level data for the firearms used in the models is included in Appendix Q.

3. The "busy" day had 2 shooters firing .223 caliber rifles on the 100 yard range; 2 shooters firing 12 gauge Remington shotguns on the 50 yard range; and 2 shooters firing 0.40 caliber handguns on the 25 yard range within a 1 second time period. The 6 other people on the range were assumed to be either watching, loading their weapons to get ready to fire or pausing in their firing during the 1 second time period studied. Octave band sound data for the firearms were obtained from the report cited in item 2 above.

4. The 1 second LAeq data shown in the noise contour maps can be converted to LA max or LA peak data. On average across all field measurements made in the study, the LA max was approximately 3 to 4 dB higher than the LAeq with a range of 2 to 5 dB and the LA peak was 17 dB higher than the LAeq with a range of 16 to 24 dB.

5. Three dimensional computer models of the 3 proposed sites were constructed using AutoCAD software by drawing topographical ground elevations of the three sites extending approximately 2 miles from the approximate center of the firing ranges. The AutoCAD model was imported into CADNA-A software which is a state-of-the-art noise propagation modeling software.

6. The octave band sound pressure level data for the .223 rifles described above was used as the sound source for shooters on the 100 yard range. The octave band sound pressure level data for the 12 gauge Remington shotguns described above was used as the sound source for shooters on the 50 yard range. The octave band sound pressure level data for the 0.40 caliber handguns described above was used as the sound source for shooters on the 25 yard range. The computer sound propagation model was used to estimate the LAeq sound levels from the gunfire in all directions from the range with the following conditions taken into account.

    A. Number of shooters: "Typical day" (1 on each of the 100, 50 and 25 yard ranges)
       "Busy day" (2 on each of the 100, 50 and 25 yard ranges)
    B. Direction of fire relative to the receiver.
    C. The ranges have approximately 10 ft. tall berms on three sides (downrange and the two sides). Subsequent modeling was completed with 20 ft. tall and 30 ft. tall berms in addition to the 10 ft. tall berms. These experiments are described in Appendix F for the original sites and range orientations and in Appendix G for the alternate range orientations.
    D. Molecular sound absorption for a standard day (50° F, 70%R.H.). Separate experiments were conducted with computer model runs using 70° F and 50% R.H.; 50°F and 50% R.H.; 32° F and 50% R.H.; and 0 F and 50% R.H. values to document the range of sound levels that would occur during different seasons of the year. The 50° F and 70% Relative Humidity condition resulted in the highest sound levels at distances away from the ranges in the series of experiments described above, so this was used as the base condition for the computer models. These experiments are described in Appendix H.
    E. Anomalous excess attenuation (from small scale differences in wind, temperature, and humidity in the air).
    F. The topographic features of the 3 sites were developed using contour maps obtained from the United States Geological Survey.

G. CADNA-A assumes a downwind condition with wind velocity of 1 – 11 mph. An experiment was also conducted with a 6 m.p.h. wind speed from the southwest which is the yearly average wind speed and direction for the area. This experiment is described in Appendix I.
H. Vegetation (trees) was not included in the analysis. Areas of coniferous trees were added in Experiment 5 described in Appendix J.
I. Ground cover was modeled as pavement for paved roads, water in the lakes and grass for terrain covered with vegetation.
J. Deciduous trees were not included in the models because the loss of leaves during the Fall and Winter months significantly reduces the insertion loss of stands of deciduous trees.
K. Separate computer model runs were conducted with the stands of coniferous trees included in the model and not included in the model to document the change in sound levels calculated at receiver locations due to the effects of coniferous trees. This experiment is described in Appendix J.
L. Noise mitigation options described in the Noise Mitigation section of the report were also modeled. The noise mitigation experiments are described in Appendices K through P.

7. The resulting sound levels for each of the three proposed sites were plotted on scaled maps/aerial photographs of the sites identifying the "typical day" and "busy day" scenarios for the 3 proposed sites with the initial range orientations as well as for alternate range orientations to the northwest for Site 1, to the northeast for Site 2 and to the northwest for Site 3 in Appendices F and G.

8. A scaled map of the modeled configuration for the base range is shown in Figure 3.

9. The noise mitigation options studied include the following items.
   A. Alternate range orientations to the northwest for Site 1, to the northeast for Site 2 and to the northwest for Site 3 in Appendix G. Concept plans for these arrangements are shown in Figure 4. This experiment is described in Appendix G.
   B. A U-shaped berm was added at the rear of the range at Sites 1 and 2 with the alternate range orientation of northwest for Site 1 and northeast for Site 2 as shown in Figure 5 for the busy day scenario. The berm around the perimeter of the range and the U shaped berm had heights of 10 ft., 20 ft. and 30 ft. tall and enclosed the back and part of the sides of the range. There is a passage on both sides of the range between the U-shaped berm and the berm protecting the main range that allows people to enter and leave the range. This experiment is described in Appendix K. This experiment was not conducted for Site 3 because the initial analysis indicated that Site 3 had greater potential noise impacts for the base range design than Sites 1 and 2.
   C. A sound absorbent, acoustical lining was added to the inside of the range structure on the underside of the roof and on the sides of partitions built between the lanes inside the range. A concept plan for this experiment is shown in Figure 6. The experiment was conducted for the ranges with the alternate orientations at sites 1 and 2 for the busy day scenario with a 10 ft. berm height. The experiment is described in Appendix L.

D. Rear and side walls were added to the range structure at Sites 1 and 2 for the alternate range orientations for the busy day scenario. The inside facing of the walls was with a sound absorbent liner. The berm height was 10 ft. A concept plan for this experiment is shown in Figure 7. The experiment is described in Appendix M.
E. A 40 ft. deep extension was added to the roof of the range extending from the firing line down range towards the target area at Sites 1 and 2 for the alternate range orientation with the busy day scenario and a 10 ft. berm height. The underside of the roof extension is covered with a sound absorbent lining. A concept plan for this experiment is shown in Figure 8. The experiment is described in Appendix N.
F. A 30 ft. tall U-shaped berm is added to the rear of the range with the 40 ft. deep extension was added to the roof of the range extending from the firing line down range towards the target area at Sites 1 and 2 for the alternate range orientation with the busy day scenario and a 30 ft. berm height. The underside of the roof extension is covered with a sound absorbent lining. A concept plan for this experiment is shown in Figure 9. The experiment is described in Appendix O.
G. The 30 ft. tall U-shaped berm and 40 ft. deep roof extension is added to the original and alternate range orientations at Sites 1, 2 and 3 for the typical day and busy day scenarios with 10 ft., 20 ft. and 30 ft. tall berms. The concept plan for this experiment is shown in Figure 9. The experiment is described in Appendix P.

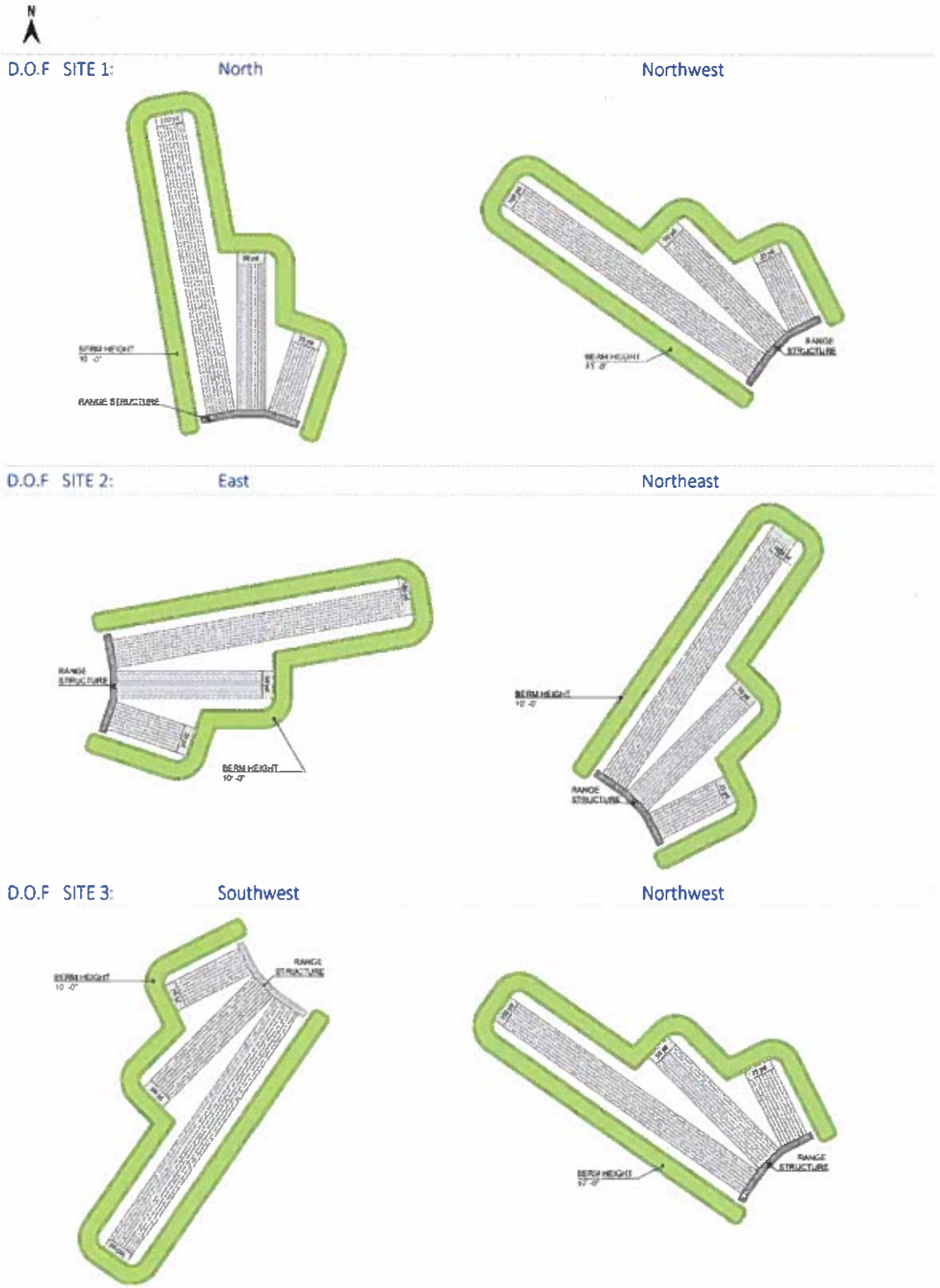


Figure 4. Concept plans showing the original and alternate range orientations for the 3 range sites.

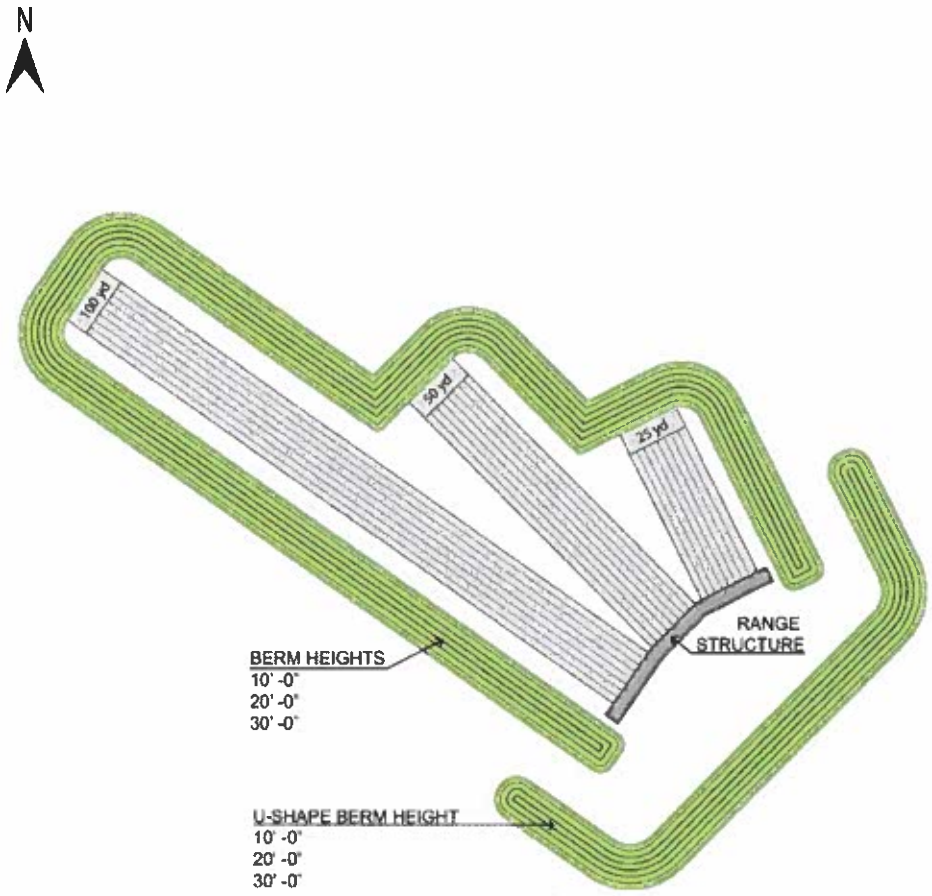


Figure 5. Concept plan showing the U-shaped berm configuration for the range described in Appendix K.

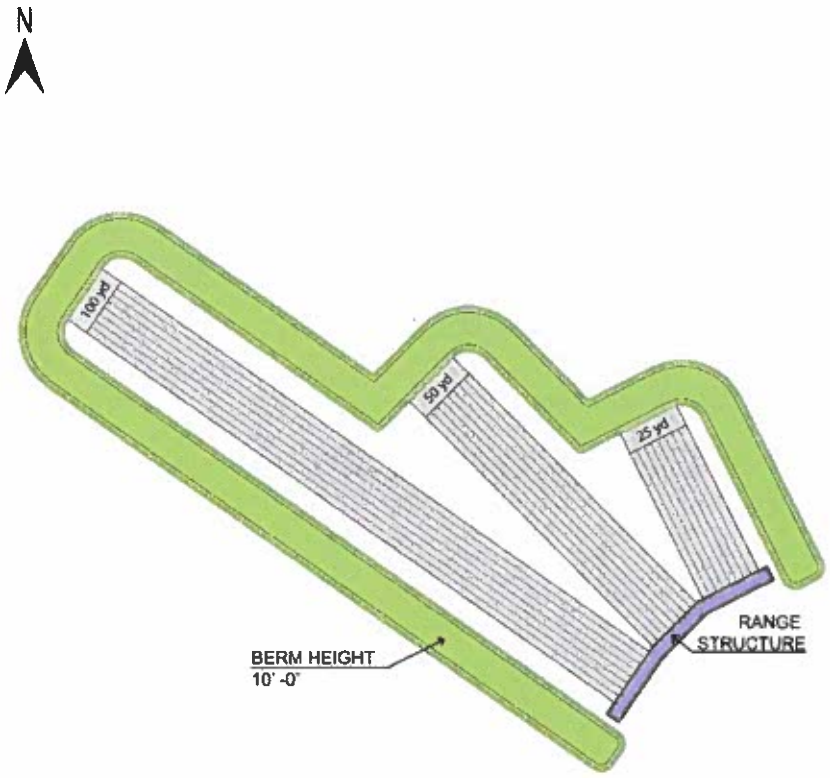


Figure 6. Concept plan for the range structure with interior sound absorbent lining described in Appendix L.

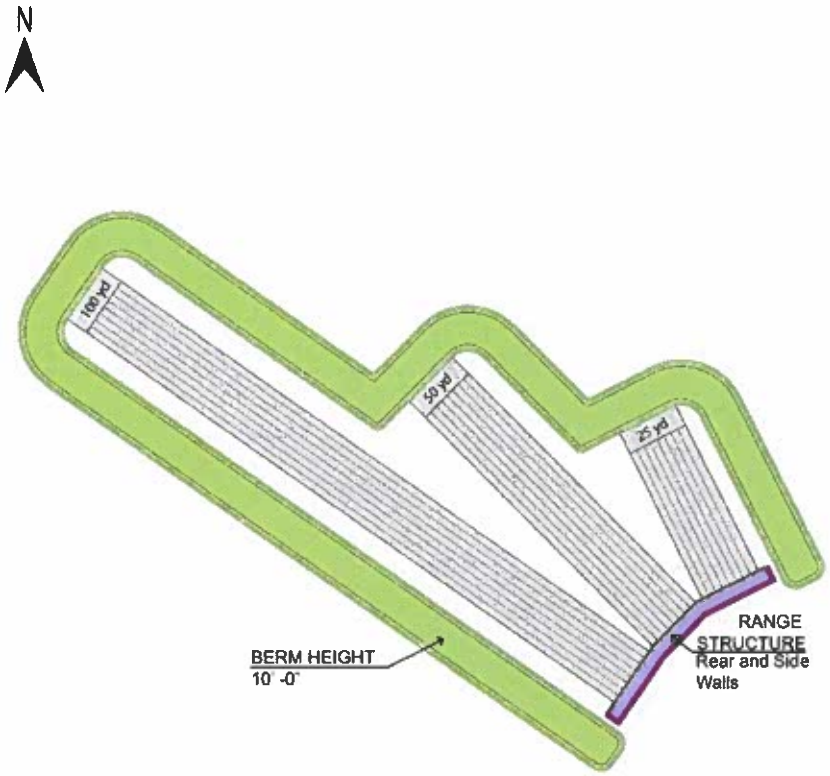


Figure 7. Concept plan for the range structure with the rear and side walls added with the interior sound absorbent lining described in Appendix M.

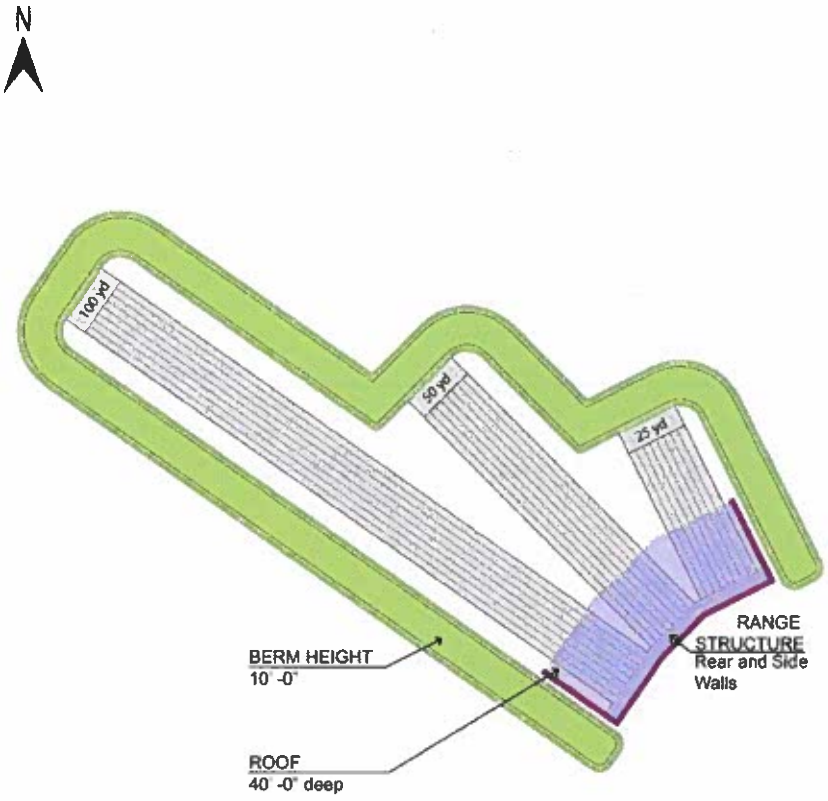


Figure 8. Concept plan for the range structure with the 40 ft. extension of the roof with the rear and side walls added and the interior sound absorbent lining described in Appendix N.

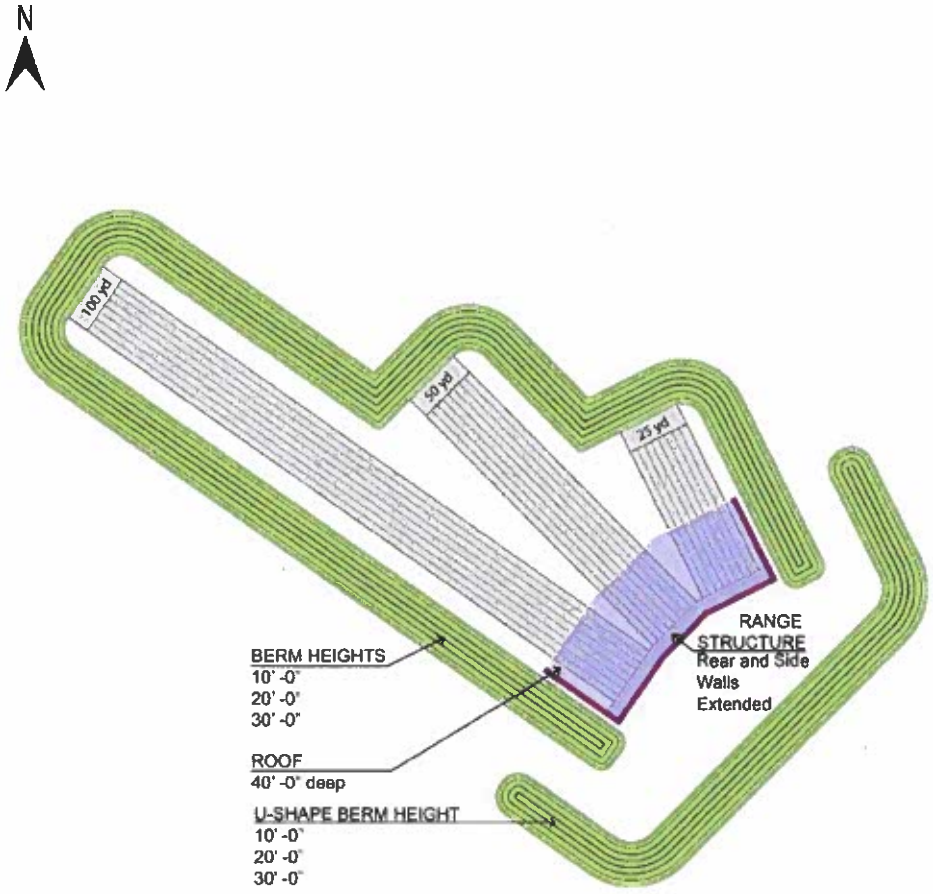


Figure 9. Concept plan showing the range structure with the 40 ft. extension of the roof with the rear and side walls added and the interior sound absorbent lining and a 30 ft. tall U-shaped berm around the rear of the range described in Appendices O and Appendix P.

RESULTS OF THE COMPUTER MODEL STUDIES

Appendices F through P contain scaled maps/aerials of the 3 proposed sites and surrounding areas with calculated sound levels at specific locations included for each of the experiments described above. The maps also show the 2 "Ambient" locations at each of the 3 sites where long term ambient sound levels were measured.

The sound levels shown on the noise contours in the figures represent the sound exposure level (SEL) or 1 second equivalent continuous sound pressure level (LAeq) at receiver locations around the proposed range sites for the "typical day" and "busy day" scenarios. The sound levels could increase by 10 to 20 dB for receivers downwind of the source and when temperature inversions (warmer air aloft) occur. An experiment was conducted to study the effects of wind speed and direction on the propagation of sounds.

Due to the complexity of the data and the number of options studied, a point system was developed to rank order the various schemes based on the sound pressure and the number of dwellings and other sensitive properties that fell within the noise contours produced by the range. A GIS data base was used by DNR to count the number of dwellings within each of the 5 dB noise contour increments. A sound pressure was calculated for the center of the contour group. For example, 32.5 dBA was the center of the 30 to 35 dBA noise contours. The dB level was converted to a sound pressure by taking 10^(32.5/10). The resulting sound pressure was multiplied by the number of dwelling units located between the 5 dB contour lines. This process was repeated for each of the 5 dB increments of contour lines in the vicinity of the proposed range sites. The total for all of the sound pressures x number of dwellings was then added together for the experiment and divided by 100,000 to reach the total number of points for the scheme on a scale from 0.4 to 46.5. Scenarios with lower numbers of points have lower cumulative noise impacts for the scenario. The results of the different experiments are described in Appendices F through P with tabular summaries of the schemes studied and the linear pressure points for each scheme.

Three sites and range orientations were initially selected for analysis. Site 1: Whitewater Township with the range oriented towards the north; Site 2: Union Township with the range oriented towards the east; and Site 3: Fife Lake with the range oriented towards the southwest. The computer model analysis of these sites is summarized in Appendix F for the "typical day" and "busy day" scenarios with 10 ft. tall berms on the 3 down range sides of the range. Site 1 had the lowest linear pressure score followed by Site 2 with Site 3 a distant third with a linear pressure score that was 4 times the Site 1 score for both scenarios.

The sound levels for the busy day scenario were generally 3 dB higher than the sound levels for the typical day scenario due to the increase in the number of shooters for each weapon type on the range. The "typical day" scenario had approximately ½ of the linear pressure score or 3 dB less than the scores for the "busy day" scenario.

The ranking of the initial 3 sites and range orientations remained consistent for the "busy day" scenario when alternate berm heights of 20 ft. and 30 ft. were modeled. The scores for sites 1 and 2 were mixed for the "typical day" scenario.

Alternate orientations were selected for each range to reduce potential noise impacts to the largest number of residential properties and noise sensitive receivers within 2 miles of each proposed range once the patterns of sound propagation were identified in the computer models. A northwest orientation was considered to orient the range away from homes to the southwest and north at Site 1 as well as away from the quiet area to the northeast. A northeast orientation was considered to orient the range away from homes to the northwest and southeast at Site 2. A northwest orientation was considered to orient the range away from homes to the southwest at Site 3.

Site 1 oriented towards the northwest had the lowest linear pressure score of the 6 alternatives followed closely by Site 1 oriented towards the north and the 2 orientations for Site 2 for the base range design with the 10 ft. berm on the 3 down range sides of the range. Both options for the base range design at Site 3 were scored at almost twice to 4 times the scores for the other sites. There was a slightly different ranking for the "typical day" scenarios than for the "busy day" scenarios.

Experiments were conducted in computer models of noise mitigation options that could be considered for the ranges if needed in the future. Order of magnitude costs for the mitigation options were also presented in Appendix T. The noise mitigation options studied included raising the height of the down range berms to 20 ft. tall and 30 ft. tall at cost increases of approximately $223,600 for the 20 ft. tall berm compared to the 10 ft. tall berm; and approximately $641,300 for the 30 ft. tall berm compared to the 10 ft. tall berm. These studies are summarized in Appendices F and G.

Models were tested using 20 ft. tall and 30 ft. tall berms in addition to the 10 ft. tall berms for each of the range sites and orientations. These studies are reported in Appendix G. The lowest scores for a given range and orientation were generally received by the scheme with the tallest berm height. The relative ranking of sites was similar to those previously discussed with Site 1 oriented to the northwest; Site 2 oriented to the northeast and Site 1 oriented to the north receiving the lowest scores. The highest scores for these tests were for all berm heights and orientations at Site 3: Fife Lake for both the "typical day" and "busy day" scenarios.

On average across all models and all scenarios tested, the average decrease in sound level was approximately 5 dB for the 20 ft. tall berm compared to the 10 ft. tall berm and an additional 5 dB for the 30 ft. tall berm compared to the 20 ft. tall berm at distances up to approximately ½ to 1 mile from the range.

The levels to the rear of the range stay relatively consistent from one scenario to the next with the berms only to the sides and down range from the firing line because there is no noise mitigating structure present in the base schemes in that direction. The U-shaped berm option was selected to reduce sounds propagating to the sides and rear of the ranges. This was considered to reduce sounds propagating towards homes to the southwest and southeast at Site 1 and the quiet area to the northeast; homes to the northwest and southeast at Site 2; and homes to the northeast at Site 3. A U-shaped berm built around the rear of the range to reduce sounds spilling to the rear and sides of the range was investigated in computer model studies summarized in Appendix K. The linear pressure score was reduced by 50% to 60% by adding these U-shaped berms that were 20 ft. tall and 30 ft. tall at an incremental cost increase of approximately $300,400 for the 20 ft. berm scheme and $1,078,100 for the 30 ft. tall berm scheme. Please note that the incremental costs include raising the height of the downrange berms to the same height as the U-shaped berm at the rear of the range.

A second option to reduce sounds propagating to the sides and rear of the ranges was to add solid side walls and a rear wall to the range structure which reduced sound levels by approximately -2 to -5 dB at distances of 1 to 2 miles from the range.

The typical day modeled with an air temperature of 50° F and a 70% relative humidity resulted in 1 to 14 dB higher sound levels at distances away from the ranges than the other temperature and humidity conditions tested; so this condition was used as the base temperature and relative humidity condition for the computer model studies. Studies with alternate air temperatures and relative humidities (Appendix H); alternate wind conditions (Appendix I); and the addition of the existing stands of coniferous trees on the sites (Appendix J) verified that the assumptions made in the model studies represented a conservative approach to the noise contour mapping for the proposed range. This means that the mapped noise contours represent a worst case condition in terms of the effects of temperature, humidity, wind and vegetation on the modeled noise contours. The linear pressure scores for the sites tested all decreased when these alternate conditions were used in the models.

There was also an additional 5 dB decrease in sound level on average attributed to the extended roof on the range structure and the U-shaped berm behind the shooters at similar distances towards the front of the range. There was a 5 to 10 decrease with several instances of almost a 20 dB decrease in sound level towards the rear of the range when the U-shaped berm at the rear of the range and the extended roof on the range structure were included in the design.

The acoustical lining on the inside surfaces of the range structure and the use of partitions to divide the range structure into individual lanes and lining the dividing walls would reduce sound levels inside the range structure for shooters as well as decrease sound levels by 0 to 8 dB propagating away from the range at distances of 1 to 2 miles from the range. Adding solid dividers between each lane in the range building and lining the walls and ceiling of each lane with sound absorbent panels such as Troy Acoustics Troy Board will reduce the linear pressure score at Site 2 by almost 50% and by approximately 11% at Site 1 at a cost of approximately $83,500 as summarized in Appendix L.

Additional mitigation options studied included adding solid walls at the sides and rear of the range building lined with the sound absorbent panels; extending the roof of the range building 40 ft. downrange from the firing line and adding a sound absorbent inner lining to the roof; building a U-shaped berm around the rear of the range and raising the height of the berms on all sides to 20 ft. and 30 ft. respectively. These options reduced the linear pressure score between 50% and 75% compared to the linear pressure score of the base range with the 10 ft. tall berm on 3 sides depending upon the combination of options selected. Incremental costs for these options varied from approximately $150,500 for adding the side and rear walls of the range building; approximately $296,600 for adding the 40 ft. roof extension; approximately $31,200 for adding the 10 ft. tall U-shaped berm at the rear of the range; approximately $108,000 for adding the 20 ft. tall U-shaped berm at the rear of the range; approximately $468,000 for adding the 30 ft. tall U-shaped berm at the rear of the range; and approximately $1,525,200 for the combination of all of these options. The 40 ft. deep extension of the range structure roof would reduce sound propagation in the direction of fire as a possible alternative to raising the height of the berms in the direction of fire if used in conjunction with raising the height of the berms to reduce sound levels in the direction of fire by approximately 2 to 5 dB at distances of 1 to 2 miles from the range.

The use of the noise mitigation options should be carefully considered for a given site because there are site specific limitations on how much reduction in linear pressure score can be obtained at any given site for a specific mitigation scheme. For example, the increases in berm height and in the roof overhang of the range structure did not reduce sounds as much at 1 to 2 mile distances from the range structure as they did at distances closer to the ranges.

Noise ordinances for Whitewater Township; Union Township; and Fife Lake Township do not include quantitative sound level limits or sound measurement methods for determining the acceptability of sounds of various types and levels. In the absence of a local noise ordinance with quantitative sound level limits, an analysis of the noise contour maps for each of the design alternatives was undertaken relative to criteria based on sound level limits contained in typical community noise ordinances. Many noise ordinances have sound level limits of 55 to 60 dBA during daytime hours and 50 to 55 dBA during nighttime hours. No residential properties are located within the 55 to 60 LAeq noise contours for any of the range locations and configurations studied. No residential properties were located in the 50 to 55 dBA contours for the base range designs at Sites 1 and 2. One to eleven homes were located in the 50 to 55 dB LAeq noise contours at Site 3.

The Noise Ordinance for Township of Whitewater, Grand Traverse County is included in Ordinance Number 39 of the Whitewater Township Ordinances. Ordinance 39 prohibits any noise disturbances, which by reason of its volume, intensity, location, or time of day impairs the health, welfare, or peace of another person of normal human sensibilities.

The Anti-Noise and Anti Nuisance Ordinance is included in Part 60 of the Union Charter Township, MI Code of Ordinances. Section 3.0 of Part 60 of the Union Charter Township, Michigan Code of Ordinances states that excessive noises and nuisances in the Township starting at 11:00 p.m. on Sunday through Thursday night and starting at 11:30 p.m. on Friday and Saturday night until 5:00 a.m. the following mornings are in violation of the Ordinance.

Grand Traverse County does not have a noise ordinance. According to County staff, noise is regulated at the level of the individual townships.

CONCLUSIONS

Three options for the location of a new firing range in Grand Traverse County, Michigan were investigated. Site 1 is located in Whitewater Township north of Diagonal Road, with the shooters facing north. Site 2 is located in Union Township south of Jackpine Road, with the shooters facing east. Site 3 is located in Fife Lake Township southeast of Bowen Road, with the shooters facing southwest.

1. Existing ambient sound levels were measured at 2 locations near potential noise sensitive receivers located near each proposed range site from September 1-7, 2015. Existing ambient sound levels (LAeq) at the sites varied from 16 to 82 dBA with average Day-Night Sound Levels (LDN) of 39 to 61 dBA. The lower end of this range of sound levels is typical of relatively quiet sites in natural settings with little anthropocentric sounds. The middle to upper end of the range of measured sound levels are indicative of louder suburban sites or sites with some transportation or commercial activity nearby.

2. Experiments were set up at each proposed range site on September 1-2, 2015. A Conservation Officer fired 3 shots in succession from a 0.40 caliber handgun; a 12 gauge shotgun; and a 0.308 rifle. Acoustical measurements were made at 10 feet or approximately 3 meters from the sound source as well as at 16 locations around the proposed range site. There were 4 measurement locations, one in each cardinal direction (i.e., north, east, south, and west) at successive distances of ¼ mile, ½ mile, 1 mile and 2 miles from the firing location at the 3 prospective sites for the firing range.

3. The sound levels measured at 10 feet from the source were approximately 7 to 8 dB louder in the direction of fire than to the sides and 16 dB louder in the direction of fire than behind the shooter for the 0.40 caliber handgun; approximately 11 dB louder in the direction of fire than to the sides and 17 dB louder in the direction of fire than behind the shooter for the 12 gauge shotgun; and approximately 12 dB louder in the direction of fire than to the sides and 23 dB louder in the direction of fire than behind the shooter for the 0.308 rifle.

4. At 42% of the measurement locations at distances of 1 to 2 miles from the proposed range site the sounds of the gun shots could not be measured above the ambient sound levels. This means that when only a few shooters will be using the proposed range, that sounds may not be heard at many of the residential locations at these distances in the vicinity of all 3 of the proposed range sites.

5. Average LAeq, maximum LA max and peak LA peak sound levels were measured at the 16 locations around each of the proposed range sites. The LA max levels were on average 3 to 4 dB louder than the LAeq levels. The LA peak levels were 17 to 19 dB louder than the LAeq levels.

5. Measured sound levels were approximately 10 dB louder in the direction of fire compared to the same distances at the sides and 20 dB louder in the direction of fire than behind at distances of ¼ and ½ mile from the proposed range location. This means that the orientation of the direction of fire of the range is an important decision.

6. The average sound decay with distance measured from the proposed range sites was 6 to 17 dB per doubling of distance from the sound source. This was affected by distance and localized conditions of wind, topography, ground cover and vegetation at each site.

7. Computer models of each of the proposed range sites were constructed in CADNA Software including topography, roads, ground cover, coniferous vegetation with the 10 ft. tall berms on 3 sides of the ranges and an open structure over the firing line for a standard day with 50° F and 70% relative humidity with typical wind speed and direction.

8. Noise contours were plotted for a "typical day" with 3 shooters firing within a 1 second time period and a "busy day" with 6 shooters firing within a 1 second time period for the base range conditions.

9. A point scale was used to assess potential noise impacts that accounted for the sound pressure at each house within a 2 mile radius of each of the proposed range sites and the number of

dwellings impacted by the sounds. The sound pressure derived from the average sound level calculated in the noise modeling software was multiplied by the number of dwelling units within each 5 dB group of noise contour lines. For example, if 20 dwellings were located between the 30 and 35 dBA noise contours the points were calculated by the following method. The average sound level in this contour range is 32.5 dBA. The sound pressure associated with this value is 10^(32.5/10). This value was multiplied by the number of dwellings identified in GIS software by DNR staff to arrive at a linear pressure score for these contours. The linear pressure was divided by 100,000 to arrive at a scale that ranged from 0.4 to 46.5 for the alternatives studied. The values for each of the 5 dB groups of noise contours were added together to reach the cumulative linear pressure score for the scenario. Scenarios with lower numbers of points have lower cumulative noise impacts for the scenario.

10. Three sites and range orientations were initially selected for analysis. Site 1: Whitewater Township with the range oriented towards the north; Site 2: Union Township with the range oriented towards the east; and Site 3: Fife Lake Township with the range oriented towards the southwest. The computer model analysis of these sites is summarized in Appendix F for the "typical day" and "busy day" scenarios with 10 ft. tall berms on the 3 down range sides of the range. Site 1 had the lowest linear pressure score followed by Site 2 with Site 3 a distant third with a linear pressure score that was 4 times the Site 1 score for both scenarios.

11. The "typical day" scenario had approximately ½ of the linear pressure score or 3 dB less than the scores for the "busy day" scenario. This means that off-site sound levels will be higher when more people fire their weapons in the same 1 second periods of time.

12. The ranking of the initial 3 sites and range orientations remained consistent for the "busy day" scenario when alternate berm heights of 20 ft. and 30 ft. were modeled. The scores for sites 1 and 2 were mixed for the "typical day" scenario.

13. Alternate orientations were selected for each range to reduce potential noise impacts to residential properties within 2 miles of each proposed range site. The alternate range orientation to minimize potential noise impacts to residential and noise sensitive receivers was to the northwest for Site 1: Whitewater Township; towards the northeast for Site 2: Union Township; and towards the northwest for Site 3: Fife Lake Township.

14. Site 1 oriented towards the northwest had the lowest linear pressure score of the 6 alternatives followed closely by Site 1 oriented towards the north and the 2 orientations for Site 2 for the base range design with the 10 ft. berm on the 3 down range sides of the range. Both options for the base range design at Site 3 were scored at almost twice to 4 times the scores for the other sites. There was a slightly different ranking for the "typical day" scenarios than for the "busy day" scenarios.

15. Models were tested using 20 ft. tall and 30 ft. tall berms in addition to the 10 ft. tall berms for each of the range sites and orientations. These studies are reported in Appendix G. The lowest scores for a given range and orientation were generally received by the scheme with the tallest berm height. The relative ranking of sites was similar to those previously discussed with Site 1 oriented to the northwest; Site 2 oriented to the northeast and site 1 oriented to the north

receiving the lowest scores. The highest scores for these tests were for all berm heights and orientations at Site 3: Fife Lake for both the "typical day" and "busy day" scenarios.

16. Studies with alternate air temperatures and relative humidities (Appendix H); alternate wind conditions (Appendix I); and the addition of the existing stands of coniferous trees on the sites verified that the assumptions made in the model studies represented a conservative approach to the noise contour mapping for the proposed range. This means that the mapped noise contours represent a worst case condition in terms of the effects of temperature, humidity, wind and vegetation on the modeled noise contours.

17. Experiments were conducted in computer models of noise mitigation options that could be considered for the ranges if needed in the future. Order of magnitude costs for the mitigation options were also presented in Appendix T. The noise mitigation options studied included raising the height of the down range berms to 20 ft. tall and 30 ft. tall at cost increases of approximately $223,600 for the 20 ft. tall berm compared to the 10 ft. tall berm; and approximately $641,300 for the 30 ft. tall berm compared to the 10 ft. tall berm. These studies are summarized in Appendices F and G.

18. A U-shaped berm built around the rear of the range to reduce sounds spilling to the rear and sides of the range was investigated in computer model studies summarized in Appendix K. The linear pressure score was reduced by 50% to 60% by adding these U-shaped berms that were 20 ft. tall and 30 ft. tall at an incremental cost increase of approximately $300,400 for the 20 ft. berm scheme and $1,078,100 for the 30 ft. tall berm scheme.

19. Adding solid dividers between each lane in the range building and lining the walls and ceiling of each lane with sound absorbent panels such as Troy Acoustics Troy Board will reduce the linear pressure score at Site 2 by almost 50% and by approximately 11% at Site 1 at a cost of approximately $83,500 as summarized in Appendix L.

20. Additional mitigation options studied included adding solid walls at the sides and rear of the range building lined with the sound absorbent panels; extending the roof of the range building 40 ft. downrange from the firing line and adding a sound absorbent inner lining to the roof; building a U-shaped berm around the rear of the range and raising the height of the berms on all sides to 20 ft. and 30 ft. respectively. These options reduced the linear pressure score between 50% and 75% compared to the base range with the 10 ft. tall berm on 3 sides depending upon the combination of options selected. Incremental costs for these options varied from approximately $150,500 for adding the side and rear walls of the range building; approximately $296,600 for adding the 40 ft. roof extension; approximately $31,200 for adding the 10 ft. tall U-shaped berm at the rear of the range; approximately $108,000 for adding the 20 ft. tall U-shaped berm at the rear of the range; approximately $468,000 for adding the 30 ft. tall U-shaped berm at the rear of the range; and approximately $1,525,200 for the combination of all of these options.

21. The use of the noise mitigation options should be carefully considered for a given site because there are site specific limitations on how much reduction in linear pressure score can be obtained at any given site for a specific mitigation scheme.

Leon Hughes

From: Clay Mihoulides <Clay@chrismarr.com>
Sent: Tuesday, January 26, 2021 5:14 PM
To: Barry Jett; Deborah H. Frazier; Timothy J. McLaughlin; David Ross; Chris Yakabouski; Gary Skinner
Cc: Aimee Mann; Kevin Marshall; Amit Parbadia; Kirit Parbadia; Leon Hughes
Subject: [EXTERNAL]: Crucible Rezoning & CUP Application

CAUTION: This email originated from an external source. Do not click on any links or open attachments unless you recognize the sender and know the content is safe.

Dear Members of the Board,

Thank you for your time and effort in working to make Spotsylvania County a prosperous and safe community for all its residents. My name is Clay Mihoulides and I represent Amit and Kirit Parbadia the owners of 59 acres of land off of Morris Rd. (SR 606) adjacent to the Taverneer subdivision (Tax Parcels: 63-A-35 & 63-A-35C). We have submitted a rezoning application for a future residential subdivision to be developed on this property called Thornburg Commons. This prospective subdivision, which falls within the Counties growth area, will provide much needed housing that in turn will help lead to additional commercial growth and prosperity for the Thornburg area.

We are extremely concerned about the Crucible project and the potential detrimental effects it would have on our property and the other surrounding properties. I am intimately aware of the Crucible's operations, having visited their existing facility off of Jack Ellington Rd. in the Hartwood area of Stafford County on multiple occasions over the years. While they provide a much needed service in their contracts with the Federal Government, they are a consistent nuisance to their existing neighbors and the surrounding property owners of that area. This most assuredly will be the case should you vote to approve their rezoning and special use permit application to construct a facility off US 1 in the heart of the growth area of Thornburg. The level of noise created by the Crucible's day to day operations does not fit with the County's comprehensive land use plan for this area, and for this reason alone I encourage you to vote against approving their application.

Please feel free to call or email me with any questions you might have about our prospective project. I wish you and your families the best and again thank you for your time.

Sincerely,

Clay Mihoulides
Licensed VA Real Estate Broker
If you like our service please leave us a favorable review on Google*

CHRISMARR PROPERTIES

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Fredericksburg, VA 22405

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This email was Malware checked by Sophos http://www.sophos.com

3 Jan 2020

Spotsylvania Board of Supervisors
Attn: Kevin Marshall
CC: Leon Hughes
CC: Jennifer Maddox

Re: Letter of Concern regarding Crucible re-zoning request

Sir,

The Matta River Woods Homeowner's Association has several ongoing objections to the Crucible's modified request for rezoning and special use permit. Their latest proposal would allow them to conduct operations with almost no additional restrictions from their previous requests. If approved as written, our neighborhood and surrounding communities would incur a safety risk, a noise irritant, and potential adverse property value impact. In addition, Spotsylvania County, and the Thornburg area in particular, would see a detrimental impact on future development of land in the area.

The first concern we would like to address is the safety risk to our entire neighborhood. All homes in our development lie within an area where rounds that clear the berm or ricochet would likely impact. Even with the best intentions, the Crucible operators and instructors cannot guarantee that a round will never leave the range. When a round leaves the range, it will most likely land in our neighborhood and put everyone living there at risk.

The second concern we would like to address is the limitation of handguns, shotguns, and rifles or carbines of .300 Blackout caliber or less equipped with suppressors addressed on page 12 of the Generalized Development Plan from both a noise and safety perspective. The twelve gauge shotguns and handguns will generate a tremendous amount of noise and will likely not be suppressed according to page 4 of the Voluntary Proffer Statement which reads "Conduct routine use of sound suppressors for all rifle fire by defaulting to suppressor use unless specifically directed by contracting authorities to not use suppressors for training or parts thereof."

Research on the .300 Blackout caliber states that cartridge is available in both super-sonic and sub-sonic velocities. Sub-sonic velocity rounds are substantially quieter than super-sonic rounds and of shorter range, but the Crucible nowhere states that they will employ only sub-sonic rounds but do include verbiage to permit super-sonic rounds. If approved, the door will be open for the Crucible to fire the much louder super-sonic rounds

throughout the period of operations with no real incentive nor restrictions to fire the sub-sonic rounds.

As an HOA we object to the authority to operate Improvised Explosive Device (IED) simulators. Please see our previously submitted analysis regarding noise impact for properties within our subdivision and surrounding neighborhoods that will receive noise levels that exceed the county noise restrictions. While the simulators contain no high explosive, the compressed air devices are designed to produce a blast noise signature that replicates a true IED. This noise would be heard by every property in our subdivision and contribute to the Crucible being an obnoxious neighbor.

Another concern with the noise involves the enforcement of any voluntary restrictions. The Crucible in their "Voluntary Proffers" are not obligated to adhere to those restrictions for any length of time. If, after beginning operations, they find that the restrictions inhibit their ability to operate profitably, there is nothing to prevent them from changing the "Voluntary Proffers". The county must have a means of monitoring the noise generated by the Crucible as well as a means to enforce any and all proffers. Also, we feel that before the "Voluntary Proffers" can be modified, the Spotsylvania County Board of Supervisors must be consulted and agree to any and all changes that would affect noise generation.

In addition to the noise concerns, there is still a significant safety risk to our neighborhood if the range is approved as outlined in the development plan. While the Crucible has reduced the number of ranges requested and limited the firing range to 350 feet, the potential ranges of the weapons fired approaches the ranges of the previous analysis for 7.62mm weapons and creates the same safety hazard for down-range areas as in their initial request. A supersonic round that clears the berm still has the ability to travel several miles, and while not densely populated, the land is not vacant as stated on page two of the Generalized Development Plan. The Matta River Woods neighborhood alone has 34 family-occupied homes that are directly downrange from the proposed range and could be impacted by any round leaving the range. This potential safety risk is unacceptable from our neighborhood's and Spotsylvania County's perspective.

The residents of Matta River Woods are also concerned about an adverse impact on property values if the Crucible plans are approved. Our previous analysis provides sufficient examples of property values being impacted by nearby shooting ranges. The Crucible is not just a shooting range but a military training facility that will generate significantly more noise and risk to the area than other types of firing ranges. Their analysis of the impact on property values for Stafford County does not transfer to the properties downrange in Spotsylvania County. The Crucible's analysis did not provide all of their assumptions used in the analysis nor the specific geometry of the property

locations in relation to the firing ranges. A careful examination of all the factors would most likely show a very different picture than their simplified analysis.

From a development perspective, there are several reasons that Spotsylvania County should reject the Crucible's Rezoning and Special Use Permit Request. These reasons include the adverse impact on other types of development and the overly optimistic economic projections of the Crucible's economic statement.

A change of zoning from A2 to I 2 with special usages (12) Industry, type 111, would allow an establishment which has the potential to be dangerous or extremely obnoxious. If approved, this zoning allowance would convey with a property sale or transfer should Crucible decide to vacate. Spotsylvania County Code states that businesses should be in harmony with the neighborhoods and in compliance with the County Comprehensive Plan which states that "the plan sets forth principles, goals, policies, and implementation techniques that will guide the development activity within the County and promote, preserve, and protect the health, safety and general welfare of its citizens". This rezoning request is clearly in conflict with that policy.

The Board of Supervisors Decision Criteria (Sec 23-24.5.7) states that the planning commission shall not recommend, nor shall the Board of Supervisors approve, the proposed special use unless it satisfies the following standards:

> 3) "that the proposal use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof".

The Thornburg area has tremendous development potential and a rezoning would not enhance but hinder development and reduce overall land values in this part of the county. Other potential developers have indicated they would like to create a mixed residential-commercial complex adjacent to the Food Lion property at the corner of Morris Road and Jefferson Davis Highway but would not pursue the opportunity if the Crucible receives rezoning and the requested special use permit. A mixed commercial-residential complex would encourage the type of development that would enhance property values throughout the Thornburg area and provide long-term economic growth for the county.

In addition to the Crucible's presence discouraging other potential developers for the Thornburg area, the economic projections of the Crucible's plan should be taken with a grain of salt. Page five of the Generalized Development Plan states that "Team Crucible would accommodate up to 10,000 daily visits (trainee days) annually". Their long-term economic projections are based upon this number of trainee days. According to Exhibit B of the Generalized Development Plan, the Crucible had 2,624 trainee days in 2015 and 2,623 trainee days for 2016. The exhibit also provided more details for the month of April for years, 2015, 2016, and 2017. The number of trainee days for those months was 231, 251, and 152 respectively. They also state on page 24 of the Generalized

development Plan that "It is our experience that larger numbers can be a result of larger deployments or our forces." The decreased numbers for the month of April 2017 may be the beginning of a trend of decreased trainee days for the Crucible.

The Crucible already conducts operations in Stafford County and has full time and part time employees. If they relocate operations to Spotsylvania County, will they ensure all their employees move to Spotsylvania or will those employees choose to retain their current residences and conduct the relatively easy commute from Stafford to Spotsylvania? Perhaps their number of full-time job equivalents provided by the Crucible is overstated.

As an HOA that represents 40 properties, we see nothing in the Crucible's modified proposal that justifies approving the request. Our homes and families would incur a significant safety risk and noise irritant as well as see a reduction in home values. It would also undermine an area of the county that, as both I-95 and the new passenger rail developments begin to be felt, will become a potentially valuable mixed-use development site for the county's economic growth.

Stevie Larson
President, Matta River Woods HOA

Wayne Breakfield
Vice President, Matta River Woods HOA

1/3/2020

TO: Berkley District Supervisor Attn: Kevin Marshall
CC: Leon Hughes
CC: Jennifer Maddox

Re: Letter of Concern regarding Crucible re-zoning request

This letter represents the collective position of the Plantation Estates at Matta River HOA and the residents of the neighborhood.

We are opposed to the re-zoning request from Team Crucible LLC to include the latest modified proposal. Crucible is requesting rezoning for Agricultural 2 (A-2) to Industrial 2, specifically rezoning under Sec. 23-6.22.4 Special uses, (12) Industry, type III.

Definition: Industry, type III means an establishment which has the potential to be **dangerous or extremely obnoxious**. Included are those in which explosives are stored, petroleum is refined, natural and liquid gas and other petroleum derivatives are stored and/or distribution in bulk, radioactive material are compounded, pesticides and certain acids are manufactured, and hazardous waste is treated or stored as the establishment's principal activity.

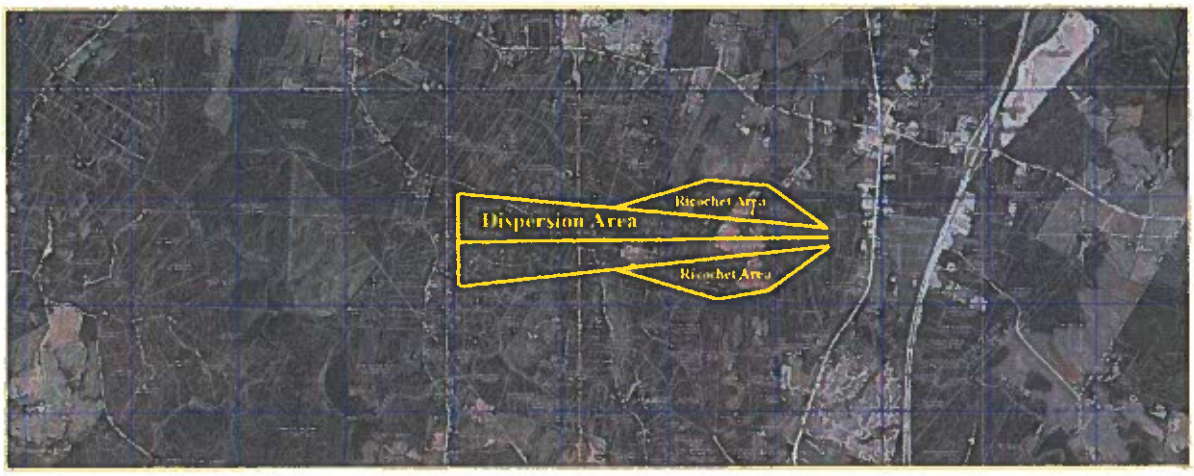
Additional: under Sec. 14-52 Exemptions for noise, the applicant feels they meet paragraph 14-52-a-3 "Noise emitted by a commercial or industrial establishment which noise customarily emitted by such establishment or industries." would be exempt from noise pollution sound levels from 6:00a.m. to 10:00 p.m. daily.

Our specific concerns:

1. This modified proposal includes an open-air range that allow for bullets to fly unimpeded from the range if there were an accident, misfire, malfunction or careless act. It is important to note that the range with the berms presents a severe risk to the inhabitants located within the range of any ammunition used. All law enforcement and military ranges own and control all land within the potential impact area for bullets shot on any of their ranges to eliminate risk. This range must do the same or enclose the range with no "blue-sky" so that the risk to the surrounding area is eliminated. It is common sense that nobody would stand on top of the firing berm while the training is underway, therefore, no resident down range is safe either. The application does not include any range safety fans that would depict danger areas and bullet impact areas. This is a must and should be completed by the county through an independent expert in accordance with federal

and state standards. The proffers to limit ammunition to .300 and below which still includes .223 ammunition and many others that create danger for miles outside the range. See below as a portion of our original brief:

Surface Danger Zone
5.56mm M855 Ball
Distance X: 3,437M Angle P: 34.2 deg (earth/water)



Ref USMC Range Safety Pocket Guide p32

This depicts the range danger areas if the range safety fan were to be created using current federal range standards and .223 ammunition. This model is very conservative and based on the old range design. The new design would likely have a much wider fan.

2. The applicant proposes limitations on ammunition that the county has no mechanism to enforce. We as a county do not have a way to inspect the firing line at the range to ensure that the applicant does not use ammunition not stipulated in the proposal. The Spotsylvania County Sheriff's department is not an ammunition inspector. Therefore, with the safety of the county residents who may be injured or killed by a bullet leaving the property in mind, the county must err on the side of large ammunition types that Crucibles clients use and train on. Recommend using the bullet types in the original submission.
3. The proposal asks for unlimited noise generation but offers to build berms to limit the noise. The applicant disagreed with the SARNAM and provided their own noise study which ignored all accepted models used by Federal agencies and which were accepted by Spotsylvania as a valid noise model in the AP Hill study. The applicant offers to reduce to subsonic ammunition (at times) to limit noise. This all leads to support the models that show this range complex will far exceed the noise levels allowed on adjacent properties. If you follow the logic on the

zoning and noise restrictions; an adjacent property could have a party with loud music shut down while Crucible was firing unabated and far exceeding the noise limits placed on that same adjacent neighbor's music noise. If we are held to a noise limit **on our property**, Crucible should be held to the same noise limit **on our property. In accordance with county code for noise**: maximum permissible sound pressure levels: Residential 65 daytime, 60 night. For repetitive noise reduce by 5 dBA (except in industrial zone). Therefore the repetitive sound of gunfire from Crucible must not exceed 60 dBA or 55 dBA at anyone's property line in the surrounding area.

4. This proposal radically changes the layout of the facility and likely invalidates all of the applicant's economic analysis and noise studies. The economic analysis is based upon student throughput and the new layout is drastically different, therefore logic would dictate the throughput must be different. The noise study was based upon the old range design and no longer holds. Those artifacts should be removed from the package and re-submitted. We suggest that the county should have these analyses done by an independent party using accepted best practices for the gun range industry. An analysis done by those for or opposed to this development is likely not independent. Lacking independent data, the supervisors should vote "no" to protect the surrounding community.
5. This proposal does not address the additional costs to the county for life/safety issues including additional EMS, fire and law enforcement that would occur due to this facility operating. In their plan they have an emergency helipad for medical emergencies, recognizing the danger of their operations. In addition, they do not address the need for ammunition and firearms storage and the resulting hazards to the community.
6. This proposal does not address the requirement for hooking up to the counties water and sewer as required by code.
7. Spotsylvania County Code states that businesses should be in harmony with the neighborhoods and in compliance with the County Comprehensive Plan which states that "the plan sets forth principles, goals, policies, and implementation techniques that will guide the development activity within the County and promote, preserve, and protect the health, safety and general welfare of its citizens". This rezoning request is clearly in conflict with that policy.
    a. The Board of Supervisors Decision Criteria (Sec 23-24.5.7) states that the planning commission shall not recommend, nor shall the Board of Supervisors approve, the proposed special use unless it satisfies the following standards: "that the proposal use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof". Discussions at the public meeting with developers of the potential adjacent housing and town center development demonstrated that

if Crucible is approved this zoning change and plan, it would drastically curtail development.

b. The Spotsylvania (Thornburg area) comprehensive plan does not call for this type of zoning and if approved, this will have a severe negative impact on development of the area as depicted in the comprehensive plan.
c. Thornburg is a Tourism Zone. This type facility is in direct contradiction to a portion of the country that is attempting to attract tourist type businesses like museums, hotels, other public type services.
d. Since this rezoning request does not comport with the existing zoning nor the comprehensive plan it may be deemed "spot zoning" defined as "the process of singling out a small parcel of land for a use classification totally different from that of the surrounding area for the benefit of the owner of such property and to the detriment of other owners." Spot zoning is illegal under Virginia Statute and the rezoning will likely face immediate legal challenges from the surrounding landowners if approved due to this fact.

Respectfully,

Stephan Picard
HOA President, Plantation Estates at Matta River

Leon Hughes

From: Charles Tatum <wizard1073@gmail.com>
Sent: Sunday, January 5, 2020 4:49 PM
To: Kevin Marshall; Leon Hughes; Jennifer Maddox
Cc: Wayne Breakfield; stevielarson; Stephan Picard
Subject: [EXTERNAL]: RE: Team Crucible Zoning & Use resubmission; County's response to resubmission

Mr. Marshall, Ms. Maddox and Mr. Hughes,

We recently learned that Team Crucible resubmitted their zoning and use application with revisions to many of their application artifacts. Although I have not been able to find these updated artifacts on the county website, I have been provided them for review. We want to share with you our thoughts on the application, and better prepare you to ask questions of Team Crucible in your formal responses to them.

Speaking generally of zoning, it is our understanding that the intent is to allow compatible uses of adjacent land to co-locate and have standing approval for entire classes of activity. Things that are generally approved, within certain limits prescribed by ordinance, are de facto not nuisances among neighbors within a zone. Difficulties arise at the boundary of properties with different, and perhaps incompatible, uses and zones. For example, if a pig or chicken farm were allowed to open adjacent to a pre-existing residential property, a nuisance would result due to the odors and other factors from the pig farm.

During the sPower hearings, some of the Supervisors voiced support for private landowners being free to develop their own property, as a matter of principle. We generally agree with this principle, subject to the ancient common law of nuisance that the development right is limited to quiet enjoyment of one's own property, and that no right exists to harm the quiet enjoyment by your neighbor of his property. Twice now, with Dominion Raceway and with sPower, we have seen this law abandoned despite clear opposition from affected neighbors. Because it is the county government that abandons this law, the neighbors have little if any recourse in a court of law, and then only at great personal expense. Therefore, we expect citizens to place yet again extreme pressure upon the county government, the Planning Commission, and the Board of Supervisors.

Take our pig farmer example from above: Should the Board of Supervisors approve a re-zoning and permit new use of land as a pig farm adjacent to a residence? Should it matter if it is one residence or a neighborhood of 400 residences? Does it matter if it is only odor that offends the residential senses, or what if it is sounds or lighting or tremors, or affects the well water or erosion, or has physical items blowing or tossed across the property boundary? All of these can be nuisances, if not outright safety issues. It is our belief that a re-zoning decision must take into account all forms of nuisance as well as all forms of safety issues. The general principle is and should be that new use does not cause harm of any kind to existing use.

Now specifically Team Crucible's re-zoning and use request: They are requesting a spot-zoning that is incompatible with the vision captured in the comprehensive plan. The challengers to this re-zoning request do so from legitimate nuisance and safety concerns, as well as economic concerns.

The primary nuisances that Team Crucible will cause are sounds from firearms and supersonic bullet shockwaves (which are not limited to point of origin, but travel with the bullet downrange), IED simulators, and tactical vehicle training; lights from buildings, parking, and road areas; tremors in the ground and from expanding shockwaves from explosions of many kinds, ranging from fired bullets to IED simulators; and

perhaps odors from explosives used to fire bullets and simulate IEDs. The re-zoning would open the door to an even larger list of nuisances according to the allowed uses of I-2 Type 3.

The primary safety issues that Team Crucible will cause are from stray bullets that leave the firing area, and contamination of well water and ground waterways from metals leaching into the soil from spent bullets and cartridges and explosive residue. In all of their submissions, Team Crucible has increased the mitigation of these safety issues, but have not yet adopted a No Blue Sky approach to the shooting range. The re-zoning would open the door to an even larger list of safety issues according to the allowed uses of I-2 Type 3.

From the zoning ordinance: "Industry, type III means an establishment which has the potential to be dangerous or extremely obnoxious. Included are those in which explosives are stored, petroleum is refined, natural and liquid gas and other petroleum derivatives are stored and/or distributed in bulk, radioactive materials are compounded, pesticides and certain acids are manufactured, and hazardous waste is treated or stored as the establishment's principal activity."

It is a fact that many industrial sites that store hazardous materials have unexpectedly caught fire or suffered mechanical issues leading to explosions and/or releases of hazardous gases and liquids into the surrounding area endangering residents near and far. Within a large industrial area, the risk to residential zones is lessened, and other co-located industrial uses are more expectant of this infrequent but consequential type of disaster, especially if they themselves work with hazardous materials in any significant quantity. Team Crucible is asking for a spot zoning that is not surrounded by other industrial uses, and therefore opens the door irrevocably to lasting harm to the incompatible residential and agricultural uses pre-existing in the immediate surrounding area.

The question of opportunity cost must also be included in any economic analysis. Team Crucible's analysis of opportunity cost appears to be limited to By-Right development of residences, yet this is not the only opportunity cost present. We have argued that Team Crucible will have an adverse impact to all of its neighbors, both present occupants and future, over a large area surrounding their land. While we have focused on the present occupants of neighboring land in our discussions above and elsewhere, we have evidence that future occupants are either sitting on the fence waiting to see what happens with Team Crucible's re-zoning, or else walking away completely and investing in commercial and residential developments elsewhere due to the un-quantified risks inherent in Team Crucible's use of their land. These new uses by future occupants would not be protected under the common law of nuisance (as expected), but would be subject to all of the safety issues mentioned above, because spot-zoning I-2 Type 3 amid residential, agricultural, and commercial zones (present and future) will not provide sufficient buffer to protect these other uses. The value of the future uses that have already walked away, even accounting for expenses that the county would take on for schools and public safety, are likely to net more jobs, economic activity, and tax revenue than Team Crucible will provide, since it is the County's general policy to make residential development pay for itself.

All of this leads to several questions that we believe the planning department, planning commissioners, and supervisors should ask Team Crucible.

1) The sound study performed is limited to using Cadna-A which implements ISO 9613, which is based on ray tracing. This approach computes only limited diffraction effects, and completely ignores refractive effects. As evidence, we submit statements from the maker of the model as included in a methodology study concerning wind turbines:

"Heinrich A. Metzen of DataKustik GmbH[3], maker of CADNA/A confirmed this fact in an e-mail where he stated:

"long range propagation including atmospheric refraction is not part of the standards used for (normal, "standard") noise calculations. It is known that atmospheric refraction may cause sound to be refracted downwards again and contributing strongly to the level at long distances. The atmosphere in the standards existing is just homogeneous above height."

"Since there are no accepted algorithms to predict these refractions, sound propagation models cannot evaluate conditions that have vertical or horizontal turbulence even though we know they can add significant sound at the receiving location when present. As a result, predicted sound levels are understated."

Furthermore, "the standard [ISO 9613] is mainly applicable to situations concerning road or rail traffic, industrial noise sources, construction activities, and many ground-based noise sources. **It does not apply to sound from** aircraft in flight, to **blast waves from** mining, **military, or other similar operations.**" [Emphasis mine]

(Source: http://www.windaction.org/posts/32217-the-lie-behind-turbine-noise-models#.W-WvuJNKiUk)

Questions to Ask Team Crucible regarding their sound analysis:

What are the limitations of the CADNA-A sound propagation model? Does CADNA-A model refraction? What would be the expected effect in a positive refraction (downward bending) environment, and how significant would this effect be compared to the Line of Sight and diffraction calculations performed by CADNA-A? Under what conditions would positive refraction occur, and are these conditions likely at the Team Crucible site? Will the conditions favorable to positive refraction vary with time of day or season or specific environmental conditions such as clear days or storms? Is it fair to say that the predictions are not maximums? What are the uncertainty measures for the numbers provided?

2) The scope of the development plan has changed significantly, including revisions to the size of the firing range. How and to what extent does this affect the economic analysis submitted with the earlier development plan? How and to what extent does this affect the safety and noise studies submitted with the earlier development plan? Would you trust your own life to the additional safety precautions if you were standing atop any of the berms during live fire events?

3) The military has developed upgraded ammunition that can fly farther and faster similar to bullets fired from larger weapons. Given evidence of this technological path forward, and deducing that the noise and safety materials submitted for planning review might be invalidated by this new ammunition, how will Team Crucible's potential use of newer ammunition in general remain within the letter and spirit of the anticipated special use permit?

4) Based on the investment interest of other developers in the Thornburg area, and recognizing that re-zoning is a long-term decision, will your use and future allowed uses under I-2 Type 3 be compatible with new residential and commercial developments that will inevitably locate on land near Team Crucible's land?

Finally, questions for the government:

1) How will you enforce any or all provisions of the zoning and of the Special Use Permit? What evidentiary standard do you require for events that are difficult to quantify due to their irregularity? How will anyone prove that a bullet did leave the firing zone, or that a shockwave caused property damaged?

2) Will you amend the noise ordinance to allow actual limits to be enforced on commercial and industrial property? (The looseness of the noise ordinance is a stated reason for Team Crucible's initial interest in Spotsylvania County, and it is mentioned in the sound study as a license to make any noise by Team Crucible,

subject only to voluntary restrictions.) Will you force sound studies presented to be more representative of actual environmental factors, including diffraction and refraction, and exclude studies from evidence that do not use appropriate methods? (For example, using models like CADNA-A beyond their accredited use?)

3) Would any of you be willing to stand atop Team Crucible's berms during a live fire event?

Thank you for your time and effort working on Team Crucible's re-zoning application, and for taking so much time over the last several years to meet with us citizens and showing us the appropriate ways to channel information and concerns to you. We look forward to a full and fair and open process of formal consideration of Team Crucible's application.

Charles Tatum
Spotsylvania Residents First
(facebook.com/SpotsylvaniaResidentsFirst)

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Leon Hughes

From: Peter Dechat <pdechat1@reagan.com>
Sent: Monday, January 6, 2020 10:39 AM
To: Leon Hughes; Kevin Marshall
Subject: [EXTERNAL]: Crucible questions

I understand that the Crucible discussion has come back up.

As you are most certainly aware the Crucible project has direct negative consequences for the neighborhood Plantation Estates at the Matte River, where I reside, as well as all the surrounding properties.

In order for Crucible to successfully operate as it intends, it will either need written exemption from the county for the noise ordinance, or a blind eye from law enforcement. Which does the county plan to offer?

If this is a serious consideration by the county, can you help us to understand what is in it for the county, and specifically us the residents? Where can we see the projected tax revenues, proffers, or other benefits Crucible will bring to the county?

With the increased war zone like noise, and potential- no matter how small- that a stray bullet could leave the compound, I would imagine a substantial depreciation of the surrounding residential property values. Since they also have a Stafford county, where have you compiled data reflecting what happened to the property values there, and will you then reduce the property taxes for affected property owners here to reflect that?

I am firmly opposed to Crucible operating here, but some danger and noise mitigation can be put in place to reduce impact on ours and surrounding neighborhoods:

Large berms completely encompassing training areas (approximately 35ft high) will reduce any danger from stray rounds to almost zero. This would also defend surrounding areas from the noise pollution.

One final point: what possible pollutants can be released into the environment, making its way into our ground water- poisoning all of us. It is impossible to believe that this will be a pollution neutral operation, and many of us have wells and will be drinking any mess they make.

Thank you for taking the time to read and respond to my inquiries.

May God keep you and bless you,
Pete

--
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Leon Hughes

From: Stephan Picard <sjpicard@gmail.com>
Sent: Monday, January 6, 2020 11:03 AM
To: Kevin Marshall
Cc: Leon Hughes; stevielarson; Charles Tatum; Wayne Breakfield; Michael Galati
Subject: Re: [EXTERNAL]: Citizens letter of concern reference Team Crucible re-submission

Thank you Sir! I was thinking that the county should talk to this neighborhood in Texas. I bet they wished that the county had not approved the range near them!

https://www.khou.com/article/news/local/league-city-neighbors-say-action-at-nearby-gun-range-is-leaving-bullet-holes-in-their-homes/285-f0a8e30c-e54c-43d2-810e-264d7e3c9dca

https://www.click2houston.com/news/2019/01/19/residents-concerned-about-gun-range-say-bullets-are-hitting-homes/

Stephan

On Mon, Jan 6, 2020 at 10:35 AM Kevin Marshall <KMarshall@spotsylvania.va.us> wrote:

> Stephan.
>
> Thank you for the information.
>
> Kevin W. Marshall
>
> Supervisor Berkeley District
>
> (540) 507-7010
>
> (540) 755-6087

From: Stephan Picard <sjpicard@gmail.com>
Sent: Friday, January 3, 2020 12:38 PM
To: Kevin Marshall <KMarshall@spotsylvania.va.us>; Leon Hughes <LHughes@spotsylvania.va.us>; Jennifer Maddox <JMaddox@spotsylvania.va.us>
Cc: Wayne Breakfield <breakfieldteam@gmail.com>; stevielarson <stevielarson@aol.com>; Charles Tatum <wizard1073@gmail.com>
Subject: [EXTERNAL]: Citizens letter of concern reference Team Crucible re-submission

Mr. Marshall, Ms. Maddox and Mr. Hughes,

Please find attached a letter that lays out our position and concerns regarding on the possible rezoning of the Team Crucible site in Thornburg and the company's recent re-submitted plan.

Thank you

Stephan Picard

HOA President, Plantation Estates at Matta River (Berkeley District)

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LOCAL

League City neighbors say action at nearby gun range is leaving bullet holes in their homes

One round shattered someone's back door. Another landed on a sidewalk. Others hit walls, even pierced someone's front door.

Neighbors: Gun range bullets hit homes in League City

Author: Larry Seward
Published: 11:16 PM CST January 18, 2019
Updated: 11:17 PM CST January 18, 2019

LEAGUE CITY, Texas — The mayor and League City Police chief plan to meet with homeowners worried about stray bullets hitting homes in the Hidden Lakes subdivision.

"I feel like even when we're in our homes we're not safe," neighbor Karen Nelson said.

In two years, neighbors count 14 homes hit. They mapped each and posted on a neighborhood website.

One round shattered someone's back door. Another landed on a sidewalk. Others hit walls, even pierced someone's front door.

"We've just been finding bullets everywhere," a homeowner who did not want to be identified said. "I'm just worried for my children's safety. I'm just terrified."

Developers built the subdivision with homes still under construction down range from the four-decades-old, outdoor Clear Creek Shooting Range.

The owner, through staff members, asked KHOU 11 News to leave his property and did not return calls or messages for comment. However, he did allow the NRA to perform an inspection of the facility in 2017, according to League City police.

The range passed. Still, its owner took steps to better insulate neighbors from bullets fired at the range.

Stray bullets remain a problem in the neighborhood, though.

"We just don't know what we can do," Nelson said.

Another mom cried while describing how a bullet landed in the roof above her 8-month-old's room.

Police labeled criminal mischief in their report. They have not found anyone to hold responsible.

"All they've told us is they can take the report but nothing can be done, basically until it actually hits a person," the woman said.

Mayor Pat Hallisey said the city held up development around the range for 20 years. Now, state law prevents city staff from passing law to protect homeowners from range bullets.

"It would be easy to say we could pull their permit," Hallisey said. "But it's not that easy. It's still private property. We can't force them to sell it."

City officials plan to push state lawmakers into changing the law protecting the range. At the same time, the mayor and police chief hope range owners make changes on their own.

"I want someone to take responsibility," Nelson said. "I'm very upset. I'm not saying it's the gun range's fault. We're not against the gun range. They were here first. We're all for the gun range. We're just all for our safety."

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NEWS

Residents concerned about gun range, say bullets are hitting homes

Joel Eisenbaum, Investigative Reporter

Published: **January 18, 2019, 6:42 pm**

Tags: **News, Local**

LEAGUE CITY, Texas – Some residents of a League City neighborhood are concerned after claiming bullets -- most likely from a nearby gun range -- have hit doors, windows and roofs of their homes.

This section of the Hidden Lakes subdivision, along or close to Palo Duro Canyon Lane, is lined with newly constructed houses.

"We would have never moved here if we knew the extent going on over here," said resident Sydney Castro.

Castro claimed that over the last several months, 14 bullets and bullet holes have been discovered in the neighborhood and four houses have been hit.

The mother of three said that on Thursday, a bullet hit her roof and damaged her house, another homeowner had a window broken and another had a bullet hit his front door.

But the overriding concern is the safety of children in the neighborhood.

"We don't let them go into the (front) room during the day," Castro said.

The Range predates the subdivision by decades. The shooting booths at Clear Creek Gun Range, sit about 1/2 mile from the edge of the neighborhood.

Friday, a manager at the gun range said "no comment" when asked about the situation.

Also Friday, a League City council member said that his staff will look into the situation.

"Certainly I'm going to address with staff -- see what actions we can do," Councilman Larry Millican said.

Millican, who has shot at the range, said management at the business had already done some work to better keep bullets within property lines.

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[EXTERNAL]: Fwd: [Non-DoD Source] Fwd: Revived noise ordinance petition

Sent: January 10, 2020 10:02 AM

From: Peter Dechat

To: Kevin Marshall; Leon Hughes;

This is the type of scenario I'm wanting to avoid. The people living there are dealing with cancerous toxins from decades ago.

At least they have city water, we are on wells here and OUR HEALTH IS AT RISK.

Please stop Crucible.

May God keep you and bless you,
Pete

Begin forwarded message:

From: Middle Way <middlewaytcm@gmail.com>
Date: January 9, 2020 at 7:44:16 PM EST
To: Peter Dechat <pdechat1@reagan.com>
Subject: Re: Fwd: [Non-DoD Source] Fwd: Revived noise ordinance petition

https://response.epa.gov/site/site_profile.aspx?site_id=9177

Best,
Paul
--
Dr. Paul F. Ryan DACM, L.Ac.
East-West Integrated Wellness
middlewaytcm@gmail.com
On Jan 6, 2020, 11:02 AM -0500, Peter Dechat <pdechat1@reagan.com>, wrote:

> This is something that is trying to be pushed through a mile from my house, and we have been fighting it.
>
> Ana shared about the airport in the 70's dumping poisonous fluids then and they are still showing up in your ground water today. Can you ask her what report that was and is it available for me to get a copy of. I would love to use it as an example at the board meeting about it.
>
> I'm concerned that blowing up vehicles, etc will leach oil, antifreeze, gas etc into the ground eventually getting into my well water.
>
> May God keep you and bless you,
> Pete
>
> Begin forwarded message:

From: Stephan Picard <sjpicard@gmail.com>
Date: January 6, 2020 at 9:32:30 AM EST
To: Dallas CIV George M <george.dallas@usmc.mil>
Cc: "Pete Dechat (judy)" <pdechat1@reagan.com>, Mark Brinkman <mark.brinkman@mac.com>, Mike McDaniel <mcdanielm06@yahoo.com>, Mike Schooley <hrt119@hotmail.com>, Craig and Cheryl Dufficy <caduffiey@verizon.net>, Wendy Picard <wlpicard@gmail.com>, Wendy Luttrell <bcdboys@aol.com>
Subject: Re: [Non-DoD Source] Fwd: Revived noise ordinance petition

Thank you for asking! Although I am sending HOA letters, I suggest that anyone that is opposed send an email to the supervisor Kevin Marshall and also to the county zoning official Leon Hughes. These people I think are in our corner, and every email/letter gives them more ammo.

lhughes@spotsylvania.va.us
kmarshall@spotsylvania.va.us

I think the three biggest issues for us are 1. Safety - its an open range and a bullet can go over a dirt berm. 2. Sound - same as #1.... its going to be hell here in Plantation Estates every day they are shooting. they want to be exempt from all limits on noise. They are also doing a road course with IED simulators so there will be lots of explosion noise as well. 3. Property values - this will certainly depress our home/land values.

VR
Stephan

On Mon, Jan 6, 2020 at 9:24 AM Dallas CIV George M <george.dallas@usmc.mil> wrote:

> Thank you Stephan. How can I help?
>
> -----Original Message-----
> From: Stephan Picard [mailto:sjpicard@gmail.com]
> Sent: Sunday, January 05, 2020 6:23 PM
> To: Pete Dechat (judy) <pdechat1@reagan.com>; Mark Brinkman <mark.brinkman@mac.com>; Mike McDaniel <mcdanielm06@yahoo.com>; Mike Schooley <hrt119@hotmail.com>; Dallas CIV George M <george.dallas@usmc.mil>; Craig and Cheryl Dufficy <caduffiey@verizon.net>; Wendy Picard <wlpicard@gmail.com>; Wendy Luttrell <bcdboys@aol.com>
> Subject: [Non-DoD Source] Fwd: Revived noise ordinance petition
>
> All,
> I've resubmitted another 3 page letter to the county against the Crucible. They have resubmitted a new plan, it's better... But still had a large open range which has all the same problems.
>
> Check out the petition below. The issue with the noise ordinance in spotsy is business get a pass based on their business. So they can make whatever noise their business generates and if next door... Well that's then the neighbors problem and nothing you can do about it.

---------- Forwarded message ---------
From: Charles Tatum <wizard1073@gmail.com <mailto:wizard1073@gmail.com> >
Date: Sun, Jan 5, 2020, 5:55 PM
Subject: Revived noise ordinance petition
To: stevielarson <stevielarson@aol.com <mailto:stevielarson@aol.com> >, "pelarson62@gmail.com <mailto:pelarson62@gmail.com> " <pelarson62@gmail.com <mailto:pelarson62@gmail.com> >, Wayne Breakfield <breakfieldteam@gmail.com <mailto:breakfieldteam@gmail.com> >
Cc: Stephan Picard <sjpicard@gmail.com <mailto:sjpicard@gmail.com> >

https://www.change.org/p/spotsylvania-county-board-of-supervisors-change-spotsylvania-county-noise-ordinance-to-protect-residents

Posted to SRF's facebook page. Please share widely. It pre-dates the Crucible and sPower efforts, but is revived to work another campaign.

Charles

--
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(No subject)

Sent: January 17, 2019 3:06 PM

From: Paul Benson

To: Leon Hughes;

STOP CRUCIBLE,
yes my names paul and im a home owner that will be effected if you approve crucible.
one question, would you want them beside you ,this is not the place for them and we will do what we have to to stop them, our property values will drop, safety the noise they bring ,if you want to put something in thornburg how about a new high school , ours so over crowded, i no thornburg going to grow,but if you let them in, business and growth will pass us by and go to the next county.
i do not want to here the noise 7 days a week that going to make,i dont want to walk outside and have to worry about a stray bullet passing by and killing one of my kids playing. do not approve them
WE DONT WANT CRUCIBLE HERE IN THORNBORG

--
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June 4, 2018

To: Mr. Hughes

From: Shirley Brady

It was a pleasure to speak with you on May 30, 2018. Thank you for answering my questions regarding Crucible.

When you said I could also send my concerns in writing, I felt you may not have been aware of my 2017 written correspondence. I have enclosed the following copies for you: letters to the Board of Supervisors + Planning Commission, letters to Virginia officials, petition from my subdivision, and "letters to the editor" published in The Washington Post and The Free Lance Star. No return correspondence was received from any County member.

Thank you again for your time and thoughtful consideration regarding this very important issue.

Shirley Brady

Could it happen here? Crucible...

Sent: July 29, 2018 7:50 PM

From: Stephan Picard

To: Aimee Mann;

CC: Leon Hughes; Wanda Parrish; Branscome, Jeffrey (Jeff);

Good evening gentlemen. Much to do has been made about Crucible and the changes to the range. I will be the first to tell you that if every bullet fired hits the target in the berm as it's designed, then we are likely safe.... But... Have you ever heard of a misfire or have you ever seen a person discharge a weapon and not hit the target? Please take 3 minutes to watch this video. This is what the citizens are concerned about.

https://m.youtube.com/watch?v=3uBBWY-an-c&feature=youtu.be

What if the trainee from the Mexican police (or other crucible client) while moving on his/her target squeezes the trigger a second early or if his/her weapon malfunctions and a round is loosed. As you can see here a 20 ft berm will NOT stop that bullet from departing their range and endangering nearby citizens.

Now you may say... come on Stephan... Seriously stop being an alarmist. That never happens. I'm willing to bet your life and all the local citizens lives when I vote yes.

But it does happen. It happens a lot.

https://www.google.com/amp/www.seacoastonline.com/news/20180419/kensington-shooting-range-still-shut-down%3ftemplate=ampart

http://www.nhpr.org/post/sig-sauer-shooting-ranges-shut-down-now-after-bullet-windshield#stream/0

Just a couple recent examples...

Crucible will tell you that surface danger zones don't apply to them.

I will tell you that physics does apply. Bullets go up and Newton tells us they come down. That's why every reputable range controla their SDZ.

Before you vote yes... Consider the consequences to that one unlucky person on that one unlucky day.

The lot is too small, it's in the wrong place and if you wouldn't stand side by side with your children on top of the berm while they fired at the target 15 feet below you.... Then please don't make us. If a bullet leaves the range by even an inch, we are the ones in danger.

Stephan Picard
HOA President
Plantation Estates at Matta River.

--
This email was Malware checked by UTM 9. http://www.sophos.com

Search results for 'crucible' | fredericksburg.com

Sent: August 6, 2018 11:51 AM

From: Stevielarson

To: Aimee Mann; Jeffrey (Jeff) Branscome; Leon Hughes; Wanda Parrish;

https://www.fredericksburg.com/search/

Fellow Spotsylvanians,
I have a serious concern as to the application of rezoning by Team Crucible. My neighborhood is down range from this property and I have petition signatures from all property owners objecting to this rezoning request on the grounds of safety, noise, environmental questions and property devaluation. I am appalled that the Board of Supervisors and Planning Commission would even entertain the prospect of rezoning for this purpose. We have a better vision in mind for Thornburg. See Brian Mercer proposal for Thornburg.

Thank you,
Stevie Larson
President, Matta River Woods Lot Owners Association
stevielarson@aol.com
540-538-6358

Sent from my Verizon, Samsung Galaxy smartphone

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This email was Malware checked by UTM 9. http://www.sophos.com

Revised SARNAM (Crucible)

Sent: August 20, 2018 8:10 PM

From: Stephan Picard

To: Leon Hughes; Wanda Parrish;

CC: Wayne Breakfield; Bill Blevins; Michael Galati; Mark Brinkman;

1 Attachments

revised Crucible SARNAM.pptx (1 MB);

Sir,
Please find attached a revised SARNAM for the new Crucible Proposal. As .338 Lapua (new sniper round) is not a currently supported bullet for the SARNAM, we had to just eliminate it. This SARNAM then uses the remaining ammunition types such as 7.62mm, 5.56mm, 9mm and .300 WINMAG.

You can see the contours without the .50 CAL has indeed reduced BUT it is still significant and there are still a hundred homes or so inside the 87 decibel line and some including businesses along Rte 1 are inside the 104 decibel line.

Our position stands. Using the counties accepted model, this range is not acceptable for noise.

We would be happy to come sit side by side and run the model if you would like to see how it works and verify the data. I did have my work checked by another person for accuracy

Thanks!
Stephan

--
This email was Malware checked by UTM 9. http://www.sophos.com

Revised SARNAM based upon the revised Crucible Proposal

Revised SARNAM Model without .50Cal --- Model does not have .338 Lapua* (which is much louder than this model unless suppressed.)

*Note – For surface Danger Zone, .338 max range is only 50 yards less than .50 Cal (NRA)

SARNAM - Activity

Activity Overview | Assign Activity Details

New | Copy | Edit | Cancel | Save | Help

Delete | Activity Overview | Exit

Activity Name: CRUCIBLE WITHOUT 50 CAL

Range Name: ALPHA

Weapon for Range: MG M2 .50 cal / M2 710 gr — Find

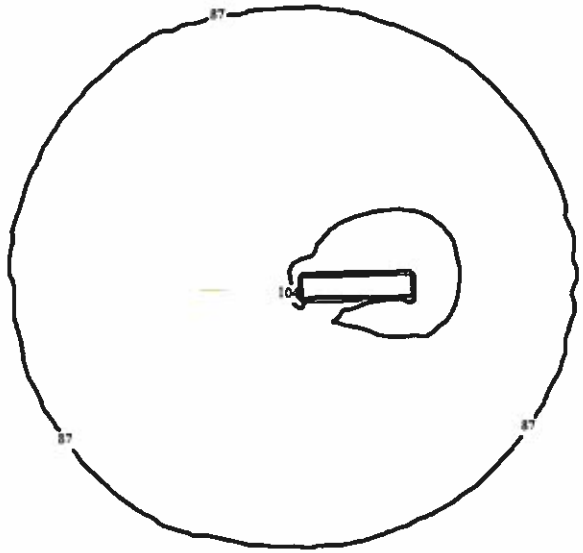
Day Rounds: 0 — % Day Rapid Fire: 10 %

Night Rounds: 0 — % Night Rapid Fire: 10 %

Comment (optional):

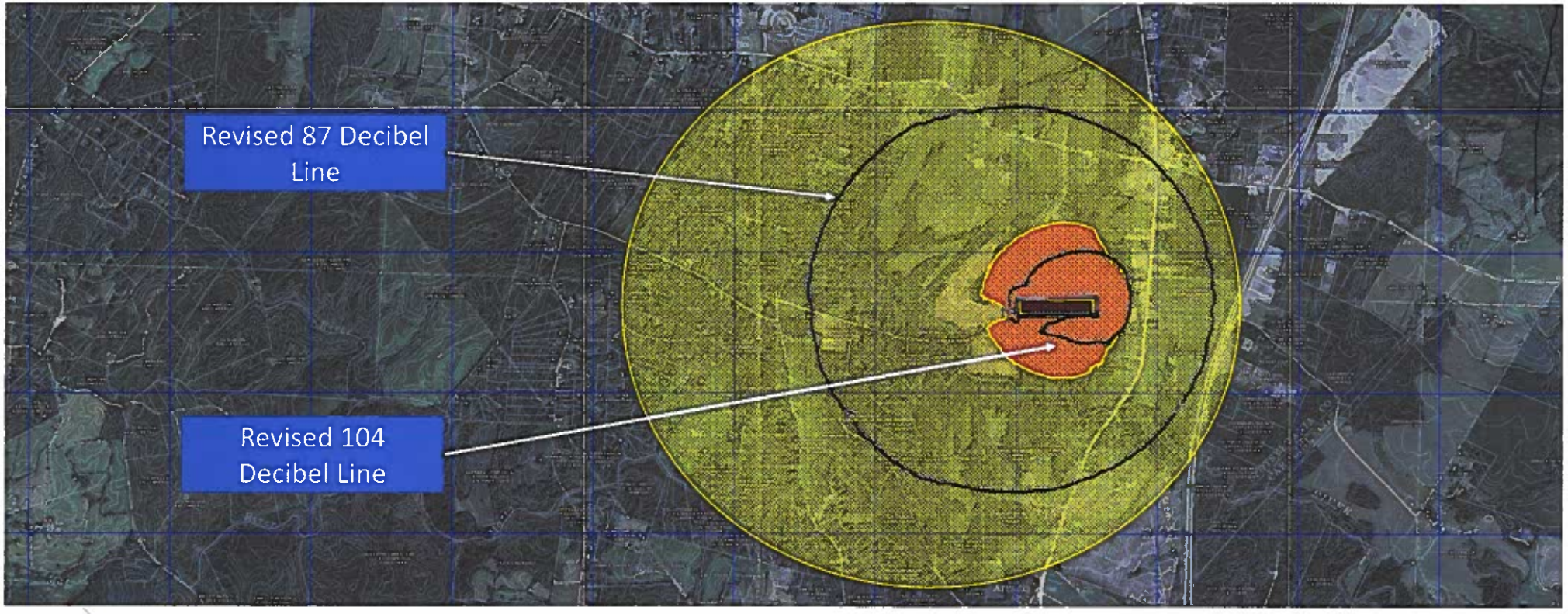
Act. Detail Date (opt.): — Created: 20 Aug 2018 — Last Modified: 20 Aug 2018

Range Name	Weapon Name	# Day Rounds	# Night Rounds	% I Rap
ALPHA	MG M2 .50 cal / M2 710 gr	0	0	
ALPHA	MG M60 7.62 mm / M80 147 gr	1000	100	
ALPHA	Pistol M9 9mm / 115 gr	10000	2000	
ALPHA	Rifle .223 Rem. AL / 55 gr	5000	500	
ALPHA	Rifle .300 Win Mag / 200 gr	200	20	



Inside the 104 decibel circle it is inhabitable, At the 87 decibel line is where noise complaints occur frequently. Inside of the 87 decibel line to the 104 decibel line the sound increases as you get closer

Revised Small Arms Range Noise Assessment Model (SARNAM) Team Crucible Training Complex
Small Arms (7.62mm, 5.56mm, 9mm, .300 WINMAG) weapons
(Yellow and orange are previous model for reference)



Ref: https://www.serdp-estcp.org/Program-Areas/Weapons-Systems-and-Platforms/Noise-and-Emissions/Noise/WP-200006/SARNAM-Noise-Impact-Software

Leon Hughes

From: Stephan Picard <sjpicard@gmail.com>
Sent: Tuesday, August 21, 2018 7:03 PM
To: Wayne Breakfield; Leon Hughes
Cc: Wanda Parrish; Bill Blevins; Michael Galati; Mark Brinkman; Peter Larson; stevielarson
Subject: Re: Revised SARNAM (Crucible)

Thank you Wayne!
Sir,
I would like to make sure that the county prepares for and funds the ammunition inspection team if this is approved. (a bit of a joke but it must be considered). As requested they want no noise level limitations but promise certain caliber ammunition. What is the counties enforcement mechanism for ammunition types? If there is none, perhaps that proffer is fairly worthless in effect. I believe this is worth noting as there is no mechanism in place to enforce if they want to shoot .50 caliber once approved or artillery. The zoning request provides no noise limit. What's the probable cause to call the sheriff?

In response to your question on buffers/baffles and vegetation etc. The answer is yes and no.

This SARNAM is only one firing point on one range. The SARNAM is limited in mitigation measures you can include so we only did a single range and not the range complex. This model is the 500M range with a 20 foot berm all the way around it which the actual range doesn't have (it would be louder in reality in some areas) The planned crucible mitigation does not include any sound mitigation from point of trigger pull to target here on this range except the berm. For example firing through a sound dampening concrete culvert tube (which I have fired through) is not in the plan.

To be clear, this model does not include all the other firing points to include the pistol ranges and combat movement ranges. This is a conservative model as those other firing points even with the mitigation discussed in the resubmission would add to the sound of this single point.

Best practice does not consider vegetation as it's effect is drastically limited in January when foliage is gone.

As a side note, realize this range is due west. From the afternoon into sunset it will be very unsafe as the shooter will have the sun directly in their eyes. This is a huge no no in range design for any civilian and defense range.

Sir may I recommend the county ask the Army Corps of engineers to run the model if at all in doubt? They are very very helpful and I would be happy to put you in touch. We have worked with them on this.

One last observation. All of us knew the day Crucible did their sound analysis. It was loud as heck. A real racket. We all knew the weapons fire came from there and it was very very loud.

At your service Sir.

Stephan Picard

On Tue, Aug 21, 2018, 6:19 PM Wayne Breakfield <breakfieldteam@gmail.com> wrote:
Leon & Stephan,

I have been looking to find specific information on the noise level of the .338 lapua. I have not been able to find hard numbers but the anecdotal comments indicate it is very close to the .50 caliber round in noise. I think an interpolation 80% of the way between the .300 WINMAG and the .50 caliber would be a very close estimate. There is one other thing I would like to point out about the Crucible's sound assessment. It is based on an AR-10 (.223) and the AK-47 (7.62 by 39). Both of these rounds are on the quiet side of what they intend to shoot. If they say this is how noisy they will be, then they shouldn't fire anything louder than an AR-10 (.223 caliber). They offer a machine gun course that fires the M-240, a belt-fed, medium machine gun. It would be interesting to see what their model would show if the .338 Lapua were put it into it. I am sure many more homes would be inside the 70 isopleth curve.
Wayne

On Tue, Aug 21, 2018 at 3:45 PM, Leon Hughes <LHughes@spotsylvania.va.us> wrote:

Mr. Picard,

You note this is for the new Crucible proposal; does this analysis consider the interior ballistic walls, berms around the shooting stations , perimeter berms, landscape screening and the buildings proposed in phase II ?

From: Stephan Picard [mailto:sjpicard@gmail.com]
Sent: Monday, August 20, 2018 8:10 PM
To: Leon Hughes; Wanda Parrish
Cc: Wayne Breakfield; Bill Blevins; Michael Galati; Mark Brinkman
Subject: Revised SARNAM (Crucible)

Sir,

Please find attached a revised SARNAM for the new Crucible Proposal. As .338 Lapua (new sniper round) is not a currently supported bullet for the SARNAM, we had to just eliminate it. This SARNAM then uses the remaining ammunition types such as 7.62mm, 5.56mm, 9mm and .300 WINMAG.

You can see the contours without the .50 CAL has indeed reduced BUT it is still significant and there are still a hundred homes or so inside the 87 decibel line and some including businesses along Rte 1 are inside the 104 decibel line.

Our position stands. Using the counties accepted model, this range is not acceptable for noise.

We would be happy to come sit side by side and run the model if you would like to see how it works and verify the data. I did have my work checked by another person for accuracy

Hello, Lisa Bowling,
Thank you so much for your letter of clarification. I am an alumnus of Mary Washington's class of 1968. Yes, we just had our 50th reunion this June and 80+ classmates showed up from around the country for our celebration. Many of us were in the biology/chemistry field and were introduced to environmental activism in the '60's. How we would have enjoyed Eagle Lake Outpost. Perhaps we can plan a field trip there for a future reunion.
I taught life/environmental science for Fredericksburg City Schools for 25 years, and a Regional Governor's School Wetlands program for about 20 years. I also taught a graduate class for about 7 years for Mary Washington's James Monroe Center for science career switchers earning a Masters in Education to move into teaching. Our environment is a subject of passion for me. My husband and I live on 10 deeply wooded acres on the Matta River in Spotsylvania. The fact that Crucible has proposed rezoning land near our neighborhood for 6 military-style training ranges is objectional for reasons of safety, noise pollution, property devaluation and threats to our environment here on the Matta, which is a part of the Chesapeake Bay Watershed. I was aghast to read that my college was supporting this project and was so very relieved by your clarification that UMW has no official position on Crucible's plans for rezoning land in Thornburg.
Thank you for your research and inquiry into this situation and your diligent and quick response to us.
Best wishes and keep cool this weekend,
Stevie Larson

Sent from my Verizon, Samsung Galaxy smartphone

null
——— Original message ———
From: "Lisa Bowling (lbowling)" <lbowling@umw.edu>
Date: 8/29/18 12:12 PM (GMT-05:00)
To: Michael Galati <mgalati07@gmail.com>
Cc: Bill Blevins <bill@plantsmap.com>, stevielarson <stevielarson@aol.com>
Subject: RE: Crucible Corp.

Hello, Mr. Galati, Mr. Blevins, and Ms. Larson.

Good morning, all. I hope this finds you someplace safe from this heat wave we are experiencing. After I received the email from Mr. Galati, I began looking into this situation and rather than ask you to wait for a meeting, perhaps I can bring clarification to the conversation now.

Your communication was surprising because UMW would not normally take a position on zoning when it doesn't have a direct financial or educational interest in that space. In inquiring further, I learned that Ms. Hill was a graduate assistant and had a role working with one of our Stafford-based summer programs for UMW students. Her email represents her personal experience, but it should not be construed as endorsement by UMW.

Crucible has been a good neighbor in Stafford, and the University is appreciative of its efforts to accommodate our students and needs. The company has been responsive to and respectful of our educational mission. That

said, UMW has no official position on its Spotsylvania County plans.

I hope you can find a positive resolution for all involved in the Thornburg discussion.

My best,

Lisa Bowling

From: Michael Galati <mgalati07@gmail.com>
Sent: Sunday, August 26, 2018 8:14 PM
To: Lisa Bowling (lbowling) <lbowling@umw.edu>
Cc: Bill Blevins <bill@plantsmap.com>; stevielarson <stevielarson@aol.com>
Subject: Re: Crucible Corp.

Dear Ms. Bowling,

Thank you for your quick response. Sept. 6 will be fine if that works for you. Set a time that's convenient for you and we will make it work. I work on the Railroad so I won't be available in the morning but two other neighbors who have been active in our efforts out here in Thornburg are available to meet at any time that morning. Mr. Bill Blevins and Ms. Stevie Larson. I'm CC'ing them in this note.

Best Wishes

Mike Galati

On Sat, Aug 25, 2018 at 8:27 AM Lisa Bowling (lbowling) <lbowling@umw.edu> wrote:

> Dear Mr. Malati,
>
> Thank you for your email and for reaching out to discuss your concern. I will be happy to meet with you and learn more about the situation.
>
> I travel frequently in my role, so my availability varies greatly from week to week. Would you like to set a time to meet on the morning of September 6 or 11?
>
> My best,
> Lisa Bowling

Sent from my iPhone

On Aug 23, 2018, at 10:39 AM, Michael Galati <mgalati07@gmail.com> wrote:

Lisa Bowling
VP Advancement/Univ Relations
University of Mary Washington

Dear Ms. Bowling,

I am a resident of Thronburgm VA in Spotsylvania county, and one of a number of home owners and businesses who have been organizing to oppose the Crucible's company's attempt to build a military training facility here. They are asking Spotsylvania county for a zoning variance to allow them to operate with no noise restrictions from 6:00 am until 10:00 pm, seven days a week. Obviously, this proposal has met with outrage by those of us who live and work in this area.

We understand that Mary Washington University's Eagle Lake property is near the current location of Crucible's facility in Stafford county. We were however, surprised and disappointed to see that Crucible has filed a public document with Spotsylvania county officials that implies that the University supports the plans of Crucible to locate here in Thornburg, despite the objections of the area residents, who have real concerns for their family's safety and well being. We would like the opportunity to address representatives from the University about why we think this proposal for Crucible to be allowed to build and operate a military training facility in our neighborhood is bad both for those of us who live here, and for the county's future development.

We are available to sit down and talk to you or a representative of the University at your convenience. You can also go to our web sit: StopCrucible.com to see some of the information that we have put together on the dangers such a facility would pose for those of us living nearby. I'm also including the letter from a representative of the university that Crucible has submitted to the county planning board. It's is attached.

I look forward to hearing from you about setting up a time to meet and discuss this.

Sincerely,

Mike Galati
Thornburg VA
<M-W support for Crucible.docx>

Straying from Spotsylvania land use plan harms all residents

stopcrucible.com/straying-from-spotsylvania-land-use-plan-harms-all-residents

Stop Crucible

July 17, 2018

If Crucible were approved my experience tells me there will be some effect on residential property values, but my concern goes beyond the immediate impact to home values. Whether or not this proposed re-zoning has an effect on current values is not my biggest concern, although this would affect me personally.

As a local real estate agent, I completed 50 transactions last year and I am on pace to do so again this year. I sell in all counties surrounding Fredericksburg, but I live about 3/4 mile from Route 1 on Morris Rd and my family loves it here.

When the Crucible request for rezoning first came out, I did not really care one way or another what happened. However, I began to oppose it when I realized that it will be an impediment to future "quality" development with easy access to I-95.

This is something that should be important not only to Spotsylvania County residents but to all residents of the Fredericksburg area who travel south on Interstate 95.

My recommendation to both the Board of Supervisors and the Planning Commission would be to not stray from the "Land Use Alternative Plan for Thornburg, Virginia (Spring 2014)" that was presented to them, as doing so harms the county as a whole. The proposed plan aimed to keep the rural character of Thornburg but also understands that this area is a critical location for the county's future economic development to occur.

Granting Crucible's wishes could keep a more quality development from occurring in Crucible's place (meaning on that physical land). But I believe more than that, it will also give pause to future developers of contiguous land.

Will good developers of both residential and commercial property want to sink money into a high-quality development next to a mercenary training ground?

From both an economic and practical standpoint, granting this re-zoning request would prevent the highest value of land use in this part of Spotsylvania.

Robert Cooper
Spotsylvania, Virginia
July 18, 2018

Leon Hughes

From: Wanda Parrish
Sent: Wednesday, December 5, 2018 9:26 AM
To: Leon Hughes
Subject: FW: CRUCIBLE MERCENARY TRAINING CENTER

Follow Up Flag: Flag for follow up
Flag Status: Flagged

From: Koechlin, Mike [mailto:mkoechlin@hitt-gc.com]
Sent: Wednesday, December 5, 2018 8:01 AM
To: Wanda Parrish <WParrish@spotsylvania.va.us>
Subject: CRUCIBLE MERCENARY TRAINING CENTER

To Mrs. Parrish,

I would first like to state that as a longtime resident of Thornburg I am appalled at the county's total disregard for this area in the past ten years or so.
This Crucible deal is dirty from the start. Proven by bypassing all the residents and doing just the minimum to push this project through without any local debate.
This Crucible group has been deceptive and downright lied to the whole of Stafford county board and community for years!
As to its citizens they have been totally disrespectful. Now they are getting kicked out of Stafford for good reason!
They have already shown their colors by building an illegal building and draining into the river.
But the again the county again just gives them a permit?! Who got paid for this deal?

If we only had a real county planning board! Put a live high caliber outdoor range and explosive training center next to the town center(Food Lion)?? A board would never approve this for such a location.
Allow someone to blast the area from 7am until 10pm daily? Sunday Sabbath with AR .338 fire in the background. Does that sound like a community?
Not only does the county push through plans to move the Manassas speedway here.
Which I was willing to bend on for economic reasons for the area after they said that they were going to build the stands to protect us from the noise.
Well the race way was allowed to cut the trees they were supposed to leave.
Then there is the rotation of the stands. No noise protection at all!! All passing county inspections.
Now we here gear gamming up and down for hour and hours on end when it is our weekend and just want to live in peace. Worse thing is this noise can be herd indoors.

Thanks to county planners we have two dollar stores, a pawn shop, a vaping center, and a liquors store. This would never be allowed on the North end of the county!
How can I forget to mention the tremendous amount of Heroin and other drug deals that are now so..... common at the 7/11.
This and the rape at the Laundry mat took it over the top and had me instruct my family to never go there again.

I pled with you to use all of your resources to oppose this CRUCIBLE project as it is detrimental to the area and especially the town of Thornburg.

There are hundreds of appropriate locations that are better suited for this type of operation.

Respectfully, Michael Koechlin

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This email was Malware checked by UTM 9. http://www.sophos.com

Leon Hughes

From: Ruth Nebbia <ruth.nebbia@gmail.com>
Sent: Friday, December 7, 2018 7:53 PM
To: Wanda Parrish
Cc: Leon Hughes
Subject: Stop Crucible in Thornburg

Dear Wanda Parrish,

I would like for you to carefully consider the concerns of many of the area residents who are opposed to the Crucible Military Training facility in Thornburg. I realize that there may be many people writing in favor of the facility, Radio Reconnaissance, Crucible's parent company, has been setting up tables asking residents of Spotsylvania for their support.

But I ask: How many of the direct neighbors of the proposed Crucible facility are sending support letters? From the number of signs popping up on Morris Road, Hams Ford, Rt. 1, and other roads surrounding the proposed facility, I would say few. There is a growing number of us who believe that the safety, as well as the peace and quiet we enjoy in this area, would suffer considerably if this permit is granted. We have many children in direct line of any stray bullet that may leave the facility, elderly, veterans, regular folks, and many farms with farm animals. All it takes is that first misfire to take one of those lives.

Yes, you say many of us hunt and do target practice, but none of my neighbors start at 6 am and continue until dusk, 7 days a week.

This type of facility belongs in a bigger piece of land away from so many homes and businesses. So I would urge you vote against the proposal and in favor of the residents of the area.

Thank you,

Ruth Nebbia
6011 Red Fox Drive

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This email was Malware checked by UTM 9. http://www.sophos.com

COMMENTARY: Crucible is the wrong business for Thornburg

stopcrucible.com/commentary-crucible-is-the-wrong-business-for-thornburg

Stop Crucible September 19, 2018

The Spotsylvania County Board of Supervisors should deny the Crucible's rezoning request. This type of facility in the proposed location is not in the best interests of Spotsylvania County, and certainly not in the best interests of the residents of the Berkeley District.

Regardless of whether the county supervisors want to preserve the rural nature of the county or seek commercial/industrial development, the Crucible is the wrong type of business for Thornburg due to safety, noise, and economic concerns.

Safety is a legitimate concern of the nearby residents, regardless of The Free Lance-Star's assertion to the contrary ("Crucible tests Spotsy's vision for the future," Sept. 12, 2018). Bullets are controlled by the laws of physics, not by county, state or even federal safety zone requirements.

From the proposed 500-yard range, an aiming error of only one degree in elevation will enable a bullet to clear the 20-foot berm and potentially travel almost three miles! With homes a mere mile away, the consequences of missing the 20-foot berm are potentially catastrophic.

Furthermore, the noise will be a lot more than "uncomfortable." The sound study submitted by the Crucible significantly understated the noise impact on the surrounding area.

First, the sound study was based on single shots from 7.62 mm weapons. These rifles are considerably quieter than simultaneous firings of multiple weapons, machine guns, and the .338 Lapua that they plan to fire.

Secondly, the noise generated can be aggravating from as early as 6 a.m. until 10 p.m. in the summer and 6 a.m. to 8:30 p.m. in December, not only during daylight hours as the FLS asserted. Although the management has stated they will not commence firings before 8 a.m., the rezoning would allow noise from 6 a.m.

Once approved, there is no legal recourse for the residents of the county if the Crucible decides it no longer wishes to voluntarily restrict its firing hours.

Finally, the Board of Supervisors should consider the financial impact of allowing the rezoning due to the possibility of decreased property values, litigation, and loss of other commercial development.

Multiple articles have been written about property devaluation when a new sports firing range opens nearby, let alone a military-type facility. For an example of how a firing range can impact property values see: http://www.bridgton.com/waterford-gun-club-noise-hurts-property-values-county-rules/.

Spotsylvania County could lose thousands in tax revenue as residents lose tens of thousands in property value.

There is also the possibility of litigation should the county allow the rezoning. Stafford County (the location of the Crucible's current facility) has been involved in multiple litigations with the Crucible since 2005, eventually reaching the Virginia Supreme Court.

Stafford County prevailed at the Supreme Court, but at what financial cost?

Because of the actions by residents and the county government, the Crucible gave up on their plans to build a new facility in Stafford County. They now want to build that facility here.

Do we want the Crucible conducting those same activities here in Spotsylvania County? Does our county want a repeat of Stafford's experience?

Another financial consequence of allowing the Crucible's rezoning request is that other, advantageous businesses may not consider the Thornburg area due to the presence of the Crucible. Very few entrepreneurs will find a noisy neighbor such as this desirable for establishing a new business.

There are less dangerous, intrusive, and controversial industries and commercial businesses that could develop this land and be compatible with the rural nature of Thornburg.

If the rezoning request is granted, the existing residents and businesses in Thornburg will be asked to pay an unreasonable price in increased personal danger, noise pollution, and financial loss so that a private, for-profit company can benefit.

Preserving the rural nature of Thornburg is a far more desirable outcome for the county than bringing in the wrong type of business and forever destroying the peace, quiet and well-being that Thornburg residents have sought and long enjoyed.

Wayne Breakfield, a retired U. S. Marine and long-term Spotsylvania County resident, lives in the Berkeley District.

Crucible: An unsecured compound with easy access

stopcrucible.com/crucible-an-unsecured-compound-with-easy-access

Stop Crucible

August 26, 2018

My wife and I put our house on the market in 2007. We got a contract on it within a couple of months. Everything was fine until I got a call from the buyer. He asked about the Crucible. This was the first that we had heard about it. The buyer backed out of the sale and we eventually had to take it off of the market.

I went to the existing facility on Jack Ellington Rd. What I found was an unsecured compound with easy access.

I worked at the Lowe's on Rt. 17 just a few miles from there. I talked to several of their neighbors that were not happy with the facility. After a day of "school", the students would speed out of there so fast that the residents were fearful for their children's safety.

Mike Stakem
Stafford, Virginia

Crucible would be detrimental to Spotsylvania

stopcrucible.com/crucible-would-be-detrimental-to-spotsylvania

Stop Crucible

November 3, 2017



While I was happy to see your paper [The Free Lance–Star] devote some space to the story regarding the request by Team Crucible for a zoning variance to build a military training facility in Thornburg, I was disappointed that many of the facts regarding what type of facility Crucible wants to have out here were omitted.

Crucible has submitted a proposal to the Spotsylvania County Planning Department to build six outdoor rifle ranges that could accommodate up to .50-caliber rifles (which can fire bullets up to 4 miles), and a simulated urban neighborhood for house-to-house live fire training—including the use of grenades and an auto track that would allow training in avoidance of explosive charges—that it has said it would use dynamite to simulate.

Team Crucible is asking for a zoning variance that would allow it to operate this facility free of any noise restrictions from 6 a.m. until 10 p.m., seven days a week.

This is why Crucible's zoning proposal has been met with such overwhelming opposition from the hundreds of households and small businesses that would be affected by it here in Thornburg.

We are asking all people of good will to help us in this fight to defend our families, our neighbors, and our homes. We are calling on the Board of Supervisors to reject Crucible's request for a zoning variance. And lastly, we are still waiting for the editors of the Free Lance-Star to raise their voices in helping us to protect our neighborhood.

Mike Galati
Spotsylvania, Virginia
Nov 4, 2017

NOTE: Mike Galati's letter was published in The Free** Lance–Star **on November 4,** 2017 **was also sent in to be cross-posted on StopCrucible.com. Click here to read the letter on Fredericksburg.com.

LETTER: Crucible could be disaster for Spotsylvania

stopcrucible.com/letter-crucible-could-be-a-disaster-for-spotsylvania

Stop Crucible

October 2, 2018



I have talked with a lot of people in Spotsylvania, I find the ones not concerned about our laid back country ways think we are not informed about our area. They just do not understand our way of life. Many of us farm and raise a lot of our own food and we don't want industrial growth that would endanger our farms.

Crucible trains people from all over the world. They also talk about the contracts they have with our government, but if that's true, why not ask the government for space to do their training at AP Hill, where it will not cause any problems.

Stafford County has decided to stop Crucible from expanding there after the residents got tired of these people telling them one thing but doing another.

I checked their property here in Spotsylvania, they have built 2 buildings with no permits, violated the Chesapeake Bay Act on the property by disturbing 40 plus acres without any erosion control or silt fences.

They have little support among the people who live in this area, and I wonder how much lead will be left in the ground by their training, or have they come up with a way to recover it? This alone could end up a disaster, with an enormous cost to clean up as well as the residue that could never be safe to live or work around.

Marion Marshall
Thornburg, VA

LETTER: Crucible doesn't belong in such close proximity to houses

stopcrucible.com/letter-crucible-doesnt-belong-in-such-close-proximity-to-houses

Stop Crucible

September 24, 2018

Crucible is a unique business. It is an extremely noisy business. It does not belong in close proximity to the amount of residential neighborhoods it will affect.

People shoot guns around here on a fairly regular basis. One guy down the road shoots off a really loud gun. The thing is, he quits shooting after an hour or so. It's not something I have to listen to all day every day.

I have no problem with industry coming to the Thornburg area (as long as it's not another used car lot) but I'd rather have the used car lot than the noise that will be generated by Crucible.

I have nothing against what Crucible does, I just don't believe it belongs in such close proximity to houses.

Karen C. Bohn
Spotsylvania, VA

Letter: Crucible plan creates very real safety, noise, and financial concerns

stopcrucible.com/crucible-plan-creates-very-real-safety-noise-and-financial-concerns

Stop Crucible

September 14, 2018

The editors of the Free Lance–Star minimized residents' legitimate concerns regarding the Crucible's request to operate a military-style training facility near Thornburg because they feel the main issue is whether or not Spotsylvania County should convert more of its farmland to commercial and industrial uses. The existing residents near Thornburg have spoken quite loudly that they do not want the Crucible operating in the county because of very real safety, noise, and financial concerns.

Saying that unease about stray bullets is unconvincing because there have been no recorded incidents in Stafford over a 16-year period ignores the laws of physics. At 500 yards, an aiming error of 1 degree in elevation will clear the Crucible's proposed 20-foot berm not to mention the risk of ricochets. The maximum range of some of the weapons they propose to fire is nearly 7,000 yards (almost 4 miles). There is a neighborhood within one-half mile of the Crucible's range.

The noise created by the Crucible will not just make some residents uncomfortable; it will produce sound levels on surrounding properties that will be aggravating from as early as 6:00 AM until 10:00 PM. They have stated that they will cease firing operations 2 hours after the end of nautical twilight (8:30 PM in December) not limit operations to daylight hours. The sound study submitted by the Crucible failed to use the County's accepted Small Arms Range Noise Assessment Model for evaluating sound and only used smaller caliber weapons in the analysis.

There are many other reasons that the Board of Supervisors should reject the Crucible's rezoning request, but space constraints [of the Free Lance–Star letter policy] prevent further elaboration in this letter.

Wayne Breakfield
Spotsylvania, VA

LETTER: Crucible, you are not welcomed in Spotsylvania

stopcrucible.com/letter-crucible-you-are-not-welcomed-in-spotsylvania

Stop Crucible

October 2, 2018

Do you believe that Crucible is the future for Thornburg? The Free Lance-Star wrote recently that some residents may be uncomfortable with the noise and that some residential property values may be affected. Of course, our property values will be affected!

The growth of Thornburg will be ruined if Crucible is allowed to come here because other businesses will go elsewhere. Yes, I do like the rural farmland and I also know changes are heading our way, so Thornburg's vision should be to keep Crucible out.

Crucible doesn't care about the neighbors. The people [in Spotsylvania] have the right to know how this came about.

Crucible should have applied for a rezoning with the public knowing what they wanted to do before buying the land. Instead, they bought the land and then sent letters to residents with in 2000 feet of the property telling us their plans for the site.

Little did they know we going to stand up against them and stop them from coming.

So again, Thornburg's vision is clear: Crucible, you are not welcomed here.

Paul Benson
Woodford, VA

LETTER: If shooting stresses K-9 police dogs, what about kids?

stopcrucible.com/letter-if-shooting-stresses-k-9-police-dogs-what-about-kids

Stop Crucible October 2, 2018



Columbia, South Carolina, Master Police Officer David Hurt is seen with his police dog Turbo in an undated photo. Turbo died after being left in a hot car for 6 hours / Columbia Police Department Handout

I'm writing to let people know my opinions and I am sure contacting people in Spotsylvania who make decisions. I was at the Salem Church Library meeting [about Crucible] and have the same concerns as others on this site regarding decreasing home values, stray bullets, etc.

However, my focus was on the effect on the nearby schools. The man at the meeting representing Crucible claimed there have been no reported problems at another Crucible site near a school.

I ask you to read: Police dog dies after being left in hot car for more than 6 hours

> "Hurt was at a high school getting active shooter training on July 26, and did not take the dog inside because of the loud noises and crowd."

This story was national news a few weeks ago. The article says how this office, as well as other police dog handlers who were at the firing range, left their dogs in the car that day and this is the regular practice to do so.

The reason officers left their dogs in the cars was because of the shooting stressing their dogs out. These are dogs stressed by repeated firing.

Think of those 5 and 6-year-old's at school every day until they are 13 or 14-years-old when they leave the middle school and go to the high school.

This is just another an indicator to me the Crucible should not be located where it is currently proposed near two schools in Spotsylvania County.

Richard Lee
Spotsylvania, VA

Letter: It's either no Crucible or a new Board of Supervisors

stopcrucible.com/letter-no-crucible-or-new-board-of-supervisors

Stop Crucible

July 27, 2018

To the editors,

It's very simple! The Crucible comes then the current crop of supervisors must go.

Joseph Cagnina
Spotsylvania, Virginia

LETTER: Spotsylvania residents are tired of politicians going behind our backs

stopcrucible.com/letter-spotsylvania-residents-are-tired-of-politicians-going-behind-our-backs

Stop Crucible

September 17, 2018

To The Editor [of The Free Lance–Star]:

Your recent editorial concerning Crucible was disappointing on a number of accounts.

You claim that Crucible has been a good neighbor in Stafford for 16 years. Your source for this information is the company's attorney. But you didn't bother to go out and interview some of Crucible's Stafford neighbors and let them speak for themselves.

If you had gone back and looked at the record of your own paper's coverage of Crucible's time in Stafford, you would see a very different picture.

You claim that the question behind the controversy over Crucible is whether the county will encourage commercial and industrial development or not. No one denies the need for development, the question is: how are these decisions made.

In the case of Crucible: while county officials worked with Crucible for almost a year to bring them to Thornburg, they never once raised this with any of us who live and work here. They sought neither our opinion nor our input.

Crucible began construction on the property without having a building permit and continues building to this day, even though the county has not yet voted to grant them the special use permit.

Working people in Spotsylvania are tired of politicians and companies going behind our backs on these questions. We're tired of it in Thornburg and it seems they are also tired of it in Fawn Lake.

People in Thornburg have many ideas on how to develop our area, but for most they don't include having a for-profit Military training facility with 6 outdoor rifle ranges, an urban warfare training zone that uses simulated IED's and grenade launchers, setting up shop right on Rt. 1. Nor do they include going behind the backs of those who will be most directly affected by these proposals.

Michael Galati
Spotsylvania, Virginia

LETTER: This is our Vision for Thornburg's Future

stopcrucible.com/letter-this-is-our-vision-for-thornburgs-future

Stop Crucible September 16, 2018

Re: "Crucible Tests Spotsy's vision for the future" to the Free Lance–Star editorial published 9/12/18

It is not a question of "not allowing any new development" but what type of development to attract. Thornburg does not need more used car lots, vape parlors, pawn shops or a military-style training facility to anchor its future development.

Review Brian Mercer's "Land Use Alternative Plan for Thornburg, Va" 2014 to envision Thornburg as an attractive center of commerce and family-friendly space.

What about a much needed medical complex including office space and a pharmacy? How about open space for a farmer's market, picnic tables, and outdoor events? (think Hurkamp Park in Fredericksburg or Spotsy's Courthouse center).

This is our Vision for Thornburg's Future, not a military-style training range which would only discourage the aforementioned development and discourage residential confidence and entrepreneurial positivity.

The rezoning of Crucible's property directly goes against the county's adopted Comprehensive Plan goal to develop "activity within the County and promote, preserve and protect the health, safety, and general welfare of its citizens".

This plan has been adopted by County Supervisors. These Supervisors need to listen to their constituent's concerns, follow the County's Comprehensive Plan and have our backs in this contest for the Berkeley District's visions for future development.

Stevie and Peter Larson
Matta River Woods
Berkeley District, Spotsylvania, VA

Nothing's Patriotic in Training Private Security Companies

stopcrucible.com/nothings-patriotic-in-training-private-security-companies

Stop Crucible July 24, 2018



To the editors,

There is nothing patriotic about supporting a private for-profit company that trains security personnel for private companies.

I find it disrespectful to my neighbors, many who have served in the US military and also oppose Crucible's relocation to Thornburg, to suggest my neighbors are not patriots.

According to their website: Crucible provides high-risk environment training and global security solutions to employees of the U.S. Government, NGOs, and multinational corporations who live and work in dangerous and austere locations worldwide.

They don't state they train the US military, that's what the Army and our other United States armed forces do.

They train security personnel to make money, not out of patriotic duty.

In "Crucible Spotsylvania Acoustical Assesment" they say that they will limit their hours. Yet they are explicitly stating on p. 5 of the application: "Consequently, Crucible's new facility and business operations at their Spotsylvania site will be exempt from the County Noise Ordinance between 6:00 AM and 10:00 PM to the extent noted above."

Once a permit is granted that means Crucible would be able to change their hours of operation whenever they want.

The land proposed for the relocation is surrounded by residences, farms and other businesses which will be down range of the shooting ranges and next door to the urban warfare training facility.

I am opposed to building this facility in Spotsylvania, so close to residences, farms, schools, and businesses.

Ruth Nebbia
Spotsylvania, Virginia

Open letter to Spotsylvania residents opposing Crucible

stopcrucible.com/open-letter-to-spotsylvania-residents-opposing-crucible

Stop Crucible

October 2, 2018

Dear Neighbor,

Recently Team-Crucible, a private military training outfit currently located in Stafford, requested that the Spotsylvania County supervisors rezone a 70-acre parcel behind D'Marie's, off Rt. 1 in Thornburg, to allow them to build and operate a private military training center on the property.

If approved the plan would eventually include 6 outdoor shooting ranges, a simulated urban warfare area, a track to train vehicles using simulated improvised explosive devices (IED's), as well as other facilities.

The live fire training could include high caliber military assault rifles, grenade launchers, machine guns, and perhaps other heavy caliber weapons. The rezoning would allow them to operate from 6:00 am until 10:00 pm, seven days a week, without any noise restrictions at all.

A .50 caliber bullet can carry up to 4 miles. There are over 800 houses that would be affected by the noise and 280 within the surface danger zone of this proposed facility, presenting a real danger to our families, friends, pets and farm animals. And the noise levels would disrupt outdoor activities and drive down property values.

No government military facility like this would be permitted to operate on such a small parcel and with so many homes and businesses nearby.

We are a group of neighbors and business owners who believe this type of facility has no place in Thornburg. We are outraged that certain county officials worked with Crucible for over a year before any word of this project was communicated to us. And we are alarmed that Crucible has already constructed buildings and cleared land for a project that the county supervisors have yet to formally vote to approve.

We are asking for your support in our efforts. Please use this link to submit a letter that we can post on the StopCrucible.com website calling on the Spotsylvania supervisors to deny the rezoning request and for Crucible to not build such a facility here. Consider sharing this post on your Facebook page and letting your neighbors and friends know about this post.

Together we can stop this facility from being built.

StopCrucible.com Neighbors
Spotsylvania, VA

Stafford taxpayers have spent a small fortune fighting Crucible

stopcrucible.com/stafford-taxpayers-have-spent-a-small-fortune-fighting-crucible

Stop Crucible July 27, 2018

Over the years, Crucible has become very familiar with the inside of Stafford's Courthouse and Stafford taxpayers have no doubt footed hundreds of thousands of dollars in legal bills as a result of Crucible. You can also bet that the Stafford Board of Supervisors and Zoning Department have spent countless hours discussing Crucible too, taking time away from other more important work.

It would be interesting to know the dollars and time Stafford County has spent fighting Crucible.

By our count, Stafford was involved in some way in at least seven cases involving Crucible, mostly as a defendant. One case listed below ended up in the Virginia Supreme Court and at least one case where Stafford is being sued is apparently still ongoing and potentially headed for an appeal as we speak.

Our point isn't to get into detail about the cases but only to pose the question to the Spotsylvania Board of Supervisors to see if they are really up for the challenge of not repeating Stafford County's mistakes.

Not being sued by Crucible would be good for the county legal expense budget that ultimately would fall on all taxpayers in Spotsylvania to pay.

STAFFORD COUNTY CIRCUIT COURT

Case Number: CL05000481-00
Date Filed: 09/28/05
Plaintiff: CRUCIBLE, INC.
Defendant: BOARD OF ZONING APPEALS OF STAFFORD

Case Number: CL05000482-00
Date Filed: 09/28/05
Plaintiff: CRUCIBLE, INC.
Defendant: BOARD OF ZONING APPEALS OF STAFFORD

Case Number: CH05000508-00
Date Filed: 09/22/05
Plaintiff: CRUCIBLE INC
Defendant 1: BOARD OF SUPERVISORS OF STAFFORD COUNTY
Defendant 2: STAFFORD COUNTY VIRGINIA

Case Number: CL07001037-00
Date Filed: 09/07/07
Plaintiff: CRUCIBLE INC.
Defendant 1: BOARD OF SUPERVISORS OF STAFFORD COUNTY
Defendant 2: STAFFORD COUNTY VIRGINIA

Case Number: CL07001139-00
Date Filed: 10/04/07
Plaintiff: CRUCIBLE INC
Defendant 1: BOARD OF SUPERVISORS OF STAFFORD COUNTY
Defendant 2: STAFFORD COUNTY VIRGINIA

Case Number: CL08000060-00
Date Filed: 01/17/08
Plaintiff: CRUCIBLE INC.
Defendant 1: BOARD OF SUPERVISORS OF STAFFORD COUNTY
Defendant 2: STAFFORD COUNTY VIRGINIA

Case Number: CL14001244-00

Date Filed: 10/23/14
Plaintiff: WESTLAKE DEVELOPMENT, LLC
Defendant 1: BOARD OF SUPERVISORS OF STAFFORD COUNTY
Defendant 2: CRUCIBLE PROPERTIES II, LLC

We didn't list cases involving Crucible if they were not suing Stafford or getting sued by Stafford.

You can read more about all of the cases here:

http://ewsocis1.courts.state.va.us/CJISWeb/circuit.jsp

Re: LOUD noise Alert - Fort A P Hill

Sent: November 19, 2018 2:16 PM

From: Stephan Picard

To: Leon Hughes;

CC: Wanda Parrish;

Thank you for asking! Let me poll the group. I think for sure but want to ask them as I am but one person.

On Mon, Nov 19, 2018, 2:09 PM Leon Hughes <LHughes@spotsylvania.va.us wrote:

> Mr. Picard,
>
> Thanks for your email. It has been awhile since we have corresponded and I believe in our last email exchange we were looking for time for you and a few others to come by and review the materials of the case. Is this you are still interested in doing?
>
> **From:** Stephan Picard [mailto:sjpicard@gmail.com]
> **Sent:** Monday, November 19, 2018 1:40 PM
> **To:** Leon Hughes
> **Cc:** Aimee Mann; Peter Larson; Michael Galati; Wanda Parrish; Wendy Picard; Bill Blevins
> **Subject:** Fwd: LOUD noise Alert - Fort A P Hill
>
> Good Morning Mr. Hughes,
>
> I hope this email finds you well. I received this alert this morning (see below) and due to the nature of the Crucible operation I could not help wondering..... If AP Hill can be heard from my home (it is 15 miles away) during low cloud cover, was the Crucible noise analysis (submitted by Crucible) done during low cloud cover? I cannot imagine what the noise from the Crucible ranges would be like on a day like today. If we can hear AP Hill, I just cannot imagine what it would sound like in Taverneer or at Dollar General / Food Lion / Elliot's Auto or at my subdivision of Plantation Estates at Matta River. I thought I would pass this on as I know your team is doing their due diligence on the issue and certainly it provides food for thought. I think that is why the SARNAM is so valuable as it takes that type thing into account within the millions of data points.
>
> I know I am repeating myself, but for the sake of the BOS CC'd - 100% of the residents of my subdivision do not support this development.
>
> Stephan Picard
>
> HOA President, Plantation Estates at Matta River

---------- Forwarded message ---------
From: **Spotsy Alert** <noreply@everbridge.net>
Date: Mon, Nov 19, 2018 at 11:48 AM
Subject: LOUD noise Alert - Fort A P Hill
To: wlpicard@gmail.com <wlpicard@gmail.com>

This is an important message from Spotsy ALERT:

U.S. Army Garrison Fort A.P. Hill is issuing a Noise Alert for ordinance demolitions. Residents may experience increased noise as result of ordnance demolition November 19 & 20 , 2018, until 4 p.m.. Low cloud cover may cause higher noise and vibrations. For concerns, call the Public Affairs Office at (804) 633-8120 during regular business hours.

If you would like to edit the way you receive these messages, please LOGIN to your account to manage your information

Fwd: Zoning variance application

Sent: December 5, 2018 5:29 PM

From: Wanda Parrish

To: Leon Hughes;

Sent from my iPhone

Begin forwarded message:

From: stevielarson <stevielarson@aol.com>
Date: December 5, 2018 at 5:15:16 PM EST
To: Wanda Parrish <WParrish@spotsylvania.va.us>
Subject: Fwd: Zoning variance application

Sent from my Verizon, Samsung Galaxy smartphone

Sent from my Verizon, Samsung Galaxy smartphone

Dear Wanda Parrish,
We have lived in Matta River Woods for 20 years. We moved here to enjoy a peaceful life in the woods alongside the Matta River. Our property is in Crucible's range for noise, safety, environmental concerns and property depreciation. We want to protect our children, grandchildren, pets and property from this objectionable training facility operating here. We have a vision for the development of Thornburg which includes businesses such as pharmacies and physicians' offices, new school sites (high school needed) and open green spaces. Brian Mercer's plan for the development of Thornburg (intern master's thesis) shows how this might be accomplished Much community support for our position has been demonstrated by informative meetings, petition signatures, local voting demonstrations, signs on properties and letters published. We need your support now to oppose the Crucible's military training facility being located in Thornburg. Don't let what happened in Stafford be repeated here. Forewarned is forearmed.

Sincerely,
Stevie and Peter Larson
5808 Red Fox Drive
Spotsylvania, Va. 22551
540-538-6358

(Stevie Larson is the President of Matta River Woods Lot Owners Association)

--
This email was Malware checked by UTM 9. http://www.sophos.com

Mr. Koechlin,
On behalf of Mrs. Parrish and myself, thank you for your thoughts and participation in the process. The Crucible applications have not been set for a public hearing to date and thus have not received any approval to operate in Spotsylvania County. Staff is currently reviewing Crucible's responses to comments on their proffer document and narrative. I have been in contact with a citizen group from Thornburg for many months hearing concerns and reviewing information provided by the group. I will add your message to our citizen comment file to be presented t the Planning Commission and Board members when they receive their packet of information on the case. If you ha additional questions, please do not hesitate to contact me.

With Regards

From: Koechlin, Mike [mailto:mkoechlin@hitt-gc.com]
Sent: Wednesday, December 05, 2018 8:03 AM
To: Leon Hughes
Subject: STOP CRUCIBLE MERCENARY TRAINING CENTER

Subject: STOP CRUCIBLE MERCENARY TRAINING CENTER

To Mr. Hughes,

I would first like to state that as a longtime resident of Thornburg I am appalled at the county's total disregard for th area in the past ten years or so.
This Crucible deal is dirty from the start. Proven by bypassing all the residents and doing just the minimum to push this project through without any local debate.
This Crucible group has been deceptive and downright lied to the whole of Stafford county board and community f years!
As to its citizens they have been totally disrespectful. Now they are getting kicked out of Stafford for good reason!
They have already shown their colors by building an illegal building and draining into the river.
But the again the county again just gives them a permit?! Who got paid for this deal?

If we only had a real county planning board! Put a live high caliber outdoor range and explosive training center ne to the town center(Food Lion)?? A board would never approve this for such a location.
Allow someone to blast the area from 7am until 10pm daily? Sunday Sabbath with AR .338 fire in the background.
Does that sound like a community?
Not only does the county push through plans to move the Manassas speedway here.
Which I was willing to bend on for economic reasons for the area after they said that they were going to build the stands to protect us from the noise.
Well the race way was allowed to cut the trees they were supposed to leave.
Then there is the rotation of the stands. No noise protection at all!! All passing county inspections.
Now we here gear gamming up and down for hour and hours on end when it is our weekend and just want to live ir peace. Worse thing is this noise can be herd indoors.

Thanks to county planners we have two dollar stores, a pawn shop, a vaping center, and a liquors store. This would never be allowed on the North end of the county!
How can I forget to mention the tremendous amount of Heroin and other drug deals that are now so..... common a the 7/11.
This and the rape at the Laundry mat took it over the top and had me instruct my family to never go there again.

I pled with you to use all of your resources to oppose this CRUCIBLE project as it is detrimental to the area and

Respectfully, Michael Koechlin

--
This email was Malware checked by UTM 9. http://www.sophos.com

safety and site inconsistencies

Sent: December 6, 2018 5:05 PM

From: Stephan Picard

To: Leon Hughes; Wanda Parrish;

1 Attachments

NRA standards inconsistencies.docx (19 KB);

Sir,
Prior to our meeting next week I wanted to send to you a document that one of the individuals in our group created for your and the planning board's use.

In the Crucible Plan including their safety plan, they repeatedly state that they are not bound by range safety regulations of the federal government. This is actually not the case as they are a federal government contractor and for federal officials to use the range it has to meet federal regulations including safety.

That we imagine is not an argument that Spotsylvania County would want to get into the middle of.

BUT they do state that they follow the NRA Range Source Book. In fact the safety plan is all about this NRA reference.

The document attached then shows the specific sections of the NRA Range Source Book where our group feels the current Crucible plan does not comport. There are multiple sections from site selection, range direction (Crucible shoots due west into the sun), baffles, Berms, projectile containment, sound, surrounding real estate value considerations etc. We thought this would make an easy reference for the county team rather than simply relying on the fact that the Crucible plan comports to best practice because they assert it does.

Thank you
Stephan

--
This email was Malware checked by UTM 9. http://www.sophos.com

Inconsitencies compared to:

2012 National Rifle Association The Range source Book A Guide to Planning and construction

Article 2. Planning Overview

2.04.1 – Remember, do not attempt to **force a facility onto a site**. Rather, find, evaluate and select a site that will accommodate the required facility. In many cases, a parcel of land is purchased with visions of the ultimate range facility, only to find during the planning phases that the parcel is inadequate.

2.04.1.2.d.5 – Property values should also be considered, especially in areas where urban growth is aggressive. Escalating property values often make it unwise to locate in a particular area.

2.04.1.2.e – Select the site that meets of exceeds acceptable **standards for safety, sufficient space**, ease of access, **acceptable zoning**, community acceptance, construction cost, acquisition of land, and **future land values.**

2.01 Community Relations

2.07.1 To develop a successful community relations program, cultivate goodwill with neighboring residents and landowners.

Article 3. Outdoor Ranges

3.02 Site Selection

a.Size – **an area large enough to accommodate the appropriate disciplines and projectile containment as modified by existing topographical features, and/or additional range features.**

3.01.1 Projectile Containment

3.02.1.1 Projectile containment will vary in size and design based upon terrain features, range structures, and the chosen shooting activity. **Various range enhancements have proven to be significantly effective in limiting bullet containment to the confines of a specific property boundary. Techniques for limiting projectiles to range property include: backstops, sideberms and sidewalls, baffles, target placement, mountains or rolling hills, sloping floor of the range, and utilizing the range for its intended purpose**

3.02.2 Sound Transmission

3.02.2.1 No set distance eliminates noise complaints entirely. However, studies conducted for the Environmental Protection Agency (EPA) indicate noise complaints are likely when inhabited dwellings exist less than one half (2) mile from the facility

3.02.3 Range Orientation (Direction)

3.02.3.1 After all safety and other site requirements are satisfied, consider the compass orientation of the range. Within the constraints of safety and along with other site considerations, such as, terrain, **the ideal orientation is with firing conducted from south to north.** This provides the earliest and latest natural target illumination and **the least interference from natural light in the shooters' eyes**.

However, safety takes priority over convenience and the range may be oriented in any direction that provides the greatest level of safety to neighbors.

3.04 Range Layout and Considerations

3.04.6 Baffles and Other Safety Barriers

3.04.6.1 Overhead Baffles

3.04.6.1.1 Overhead baffles are used to contain the flight of bullets to a specified area within the range. These overhead baffles are useful in areas where space is limited. Baffles are also described in sections on particular shooting activities (See drawings A-11, A-12, A-13, and A-14). Other designs may be acceptable.

g. Size: Overhead baffles must extend the entire width of the firing line and connect to either a side wall or side berm.* Recommend concrete slabs be a minimum of 4 feet wide, 6 to 8 inches thick and 16 to 40 feet in length, and have a 5,500 psi rating. Lengths up to 40 feet of pre-stressed concrete will increase the effectiveness of the range design and give a larger open area without obstruction from support structures. Build wood/steel laminated panels 16 feet long and 4 feet wide. Thickness depends on laminations required for a specific range. Do not forget to design baffles taking snow and/or wind loads into consideration.

- There are times when the earthen sideberms need to be accessible, or a road runs down range parallel to the side berm, for maintenance. In this case, the overhead baffle assemblies may not extend all the way to the side berm. The proper procedure is to construct a side baffle that attaches to the baffles and runs parallel to the side berm or perpendicular to the existing baffle assembly. In this situation, **it should be designed so you cannot see blue sky from the shooting position.**

Section I Chapter 3 Planning and Design

2.03.5 Site Selection Process

One of the most important criteria to control construction cost is to **select a proper site. There must be sufficient distance behind the backstop so that sound does not affect the neighbors.** You don't want neighbors to complain. Also, **if a round or a ricochet gets out, it should fall within the range's non accessible fenced property.**

If you build in a populated area, your range should consider baffles as an option to keep rounds on site so that the range owner can demonstrate the highest level of care. Ranges are very expensive to construct...

2.05.2 Pay attention to legal restrictions, such as zoning laws. Parcels zoned incorrectly may require rezoning or an application for special exception called a variance. Evaluate whether sites with complications should be eliminated.

2.09 Permit Review

2.09.1 Generally, before any construction permits are issued, a formal site plan or drawings of the facility should be presented to the local or county permit authorities for review and approval.

3.03 Design Specifications

3.03.1 Design specifications for a shooting range must be based on factors governing the safety of: (1) personnel who use the facility; (2) property surrounding the facility; and (3) inhabitants of the immediate area. Safety also depends upon proper operating procedures and strictly enforced rules and regulations.

Section I Chapter 6 Sound Abatement on Shooting Ranges

1.02.3 Shooting ranges produce high levels of sound. Sound waves often travel beyond the boundaries of the range property. Escaping sound waves may be perceived as unwanted community noise by neighboring property owners. It is important for range owners and operators to work with the local zoning board. **Shooting ranges should be highlighted as noise parks. This designation should make the ranges visible to zoning planners and developers prior to developing neighboring properties.**

Section II Chapter 2 Outdoor Range Design Criteria

2.06 Safety Baffles

2.06.1 The term safety baffle defines a structure used to restrict bullets to a smaller area than would be possible without them. Safety baffles differ from sound baffles, which are designed to absorb or redirect sound waves, in that safety baffles are more or less impenetrable. The basic concept is based on a Ablue sky gap,≅ meaning that **baffles are set up so that the shooter, regardless of shooting position, cannot see any blue sky down range**. These fixtures may be overhead, on the ground, on top of the backstop, in the roof of a firing line cover, in the form of an elongated box or as a completely enclosed tunnel. **The principle behind the design is to equip a range with baffles so that a bullet may leave its confines, but will fall to earth within a smaller, more predictable area.**

2.06.3 Horizontal Bullet Catcher

2.06.3.1 Horizontal bullet catchers are sometimes used on backstops to contain ricochets. The horizontal bullet catcher is designed to retain only those ricochets that occur on the face of the backstop.

Section II Chapter 7 Outdoor Highpower Rifle

3.01.7.3 Baffles (Overhead, Ground and Side)

3.01.7.3.1 Overhead, ground and side baffles are barriers used to **keep errant bullets confined to a restricted area of the range property.** These devices are often made necessary due to encroachment or the building of residential areas, commercial parks and other land development inside or very near the range. Adding these barriers is often expensive, but properly installed they can reduce acreage requirements. Baffling ranges over 300 meters in length is not practical.

Section II Chapter 18 Outdoor Law Enforcement

3.01 Technical Considerations

3.01.1.2.3 Police training includes firing at multiple targets, increasing the angle at which the shooter may fire. The size of the required **direct fire zone and impact area** will vary accordingly.

3.01.3 Projectile Containment

3.01.3.1 Projectile containment for a law enforcement range must be adequate to **contain all ammunition authorized for use on the facility.** Shotguns, for example, will be fired using both small shot (7 to 9) and large shot up to 00 buck, as well as slugs. It is suggested that for a multipurpose law enforcement training range, **the longest range ammunition authorized for planned activities be the controlling factor used in site selection**. Projectile containment requirements should be calculated according to future needs. ***All projectiles must be contained within the property site by use of berms, baffles, barriers, backstops and other range features***.

Leon Hughes

From: jaruedi@aol.com
Sent: Thursday, December 6, 2018 4:03 PM
To: Leon Hughes; Wanda Parrish
Subject: Crucible project

Ms. Parrish & Mr. Hughes,

I can only feel that the construction of the Crucible training facility in Thornburg will stifle growth there. What business will want to locate next to firing ranges that will be open during normal business hours? Or near them? What subdivisions will want to build next to one? Not only on account of noise, but also safety? Twenty foot safety berms sound good, especially standing next to a mark twenty foot up a wall. But when you move out 50', 100', or 200 feet, suddenly there is not much margin for error. That twenty foot height seems to melt away.

I wish you could visit me any weekend KOUPOW!! my neighbor is present when he KOUPOW!! is shooting. He lives several hundred yards KOUPOW!! away, both firing away from us and on the other side of his house, yet it sounds like he is next to us. And I am a shooter. But I sure wish he wasn't!

His firing does not make for a relaxing day outside. And he is just one guy, with a single shot rifle. Nor does he shoot from seven a.m. to ten p.m. as Crucible has proposed.

If you wish this facility in Spotsylvania, I'd suggest locating it further out to the western portions of the county.

Thank you,
Joe Ruedi,

5953 Partlow Rd, Spotsylvania Va

540 582 2208

jaruedi@aol.com

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Stop Crucible in Thornburg

Sent: December 7, 2018 7:52 PM

From: Ruth Nebbia

To: Wanda Parrish;

CC: Leon Hughes;

Dear Wanda Parrish,

I would like for you to carefully consider the concerns of many of the area residents who are opposed to the Crucible Military Training facility in Thornburg. I realize that there may be many people writing in favor of the facility, Radio Reconnaissance, Crucible's parent company, has been setting up tables asking residents of Spotsylvania for their support.

But I ask: How many of the direct neighbors of the proposed Crucible facility are sending support letters? From the number of signs popping up on Morris Road, Hams Ford, Rt. 1, and other roads surrounding the proposed facility, I would say few. There is a growing number of us who believe that the safety, as well as the peace and quiet we enjoy in this area, would suffer considerably if this permit is granted. We have many children in direct line of any stray bullet that may leave the facility, elderly, veterans, regular folks, and many farms with farm animals. All it takes is that first misfire to take one of those lives.

Yes, you say many of us hunt and do target practice, but none of my neighbors start at 6 am and continue until dusk, 7 days a week.

This type of facility belongs in a bigger piece of land away from so many homes and businesses. So I would urge you vote against the proposal and in favor of the residents of the area.

Thank you,

Ruth Nebbia
6011 Red Fox Drive

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Re: Crucible request for zoning variance

Sent: December 10, 2018 11:11 AM

From: Michael Galati

To: Wanda Parrish;

CC: Leon Hughes;

Dear Ms. Parrish,

As a county resident I am writing to ask that the planning board vote against the upcoming zoning variance requested by Crucible company in Thornburg. As you probably know, Crucible wants to build a privately-operated military training facility that would include at least 9 rifle ranges, as well as a track that will use simulated IED's explosives and ultimately a mock urban neighborhood where grenades will be used to train. The heart of their zoning variance request is to allow them to escape any noise restrictions from 6 am until 10 pm, seven nights a week.

Such a facility, it's extreme noise and potential for stray ordinance would be seriously detrimental to the health, well-being, and property values of Hundreds of homes and businesses in this area. It would be a betrayal of those of us who have lived and worked in this area for years --- decades for some --- and paid our taxes to support the county.

The fact that this proposal was set in motion behind the backs of those of us who would be the most affected by it speaks to a continuing problem with how projects like this are driven forward here in Spotsylvania --- as we've again seen with the controversy surrounding the SPower solar "farm" proposal. Here is Thornburg, even before the Board of Supervisors have voted on the request, Crucible has built 2 buildings and cleared acres of land for their rifle ranges. It is this attitude of entitlement and disregard for the local residents, that caused so much conflict between Crucible, Stafford County, and the its residents over their 16 years there, and it is why Stafford ultimately refused to allow them to expand their operations in that county.

Finally, the area that Crucible is proposing to build its facility in is one that is potentially very valuable in terms of future development for the county. Less than a mile from the interchange between Rt. 1 and I-95. With a new, expanded interchange currently under construction, this area holds great promise for development for both residential and businesses properties, including offices, light industrial, and perhaps even state and federal offices. All of which will provide the county with much more tax revenue then Crucible's facility. But none of this will happen if Crucible is allowed to open up an outdoor training facility with live fire, high powered rifle ranges, explosives, and grenades at all hours of the day and into the evening.

I ask that you consider all of the ramifications of this proposal for the residents of the Thornburg and the county as a whole. Crucible admits that it will employ less than 10 full time positions, hardly an economic driver for the county. As far as its claim of being able to bring other "defense" related business to the Thornburg area, in over seventeen years in Stafford, they brought not one additional business to that area of the county. I urge the planning board to recommend against granting Crucible the requested zoning variance.

Thank you for your time in this matter.

Sincerely,

Mike Galati
6011 Red Fox Dr.
Spotsylvania, VA 22551

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Debbie Curcie
FOR BERKELEY SUPERVISOR

Pledge to Berkeley Residents: Opposing Crucible

To Berkeley Residents:

As a demonstration of my commitment to you and the issues facing our community, I formally write to pledge my opposition to the Crucible firing range development. Should I be elected your Supervisor, I will vote against this development, and I will use every available tool to ensure that it is never built in Berkeley.

There are many reasons why this irresponsibly conceived and hazardous range is not in the best interest of our community. First among them is the safety and quality of life of our residents. Spotsylvania citizens deserve to know that their children are safe from stray bullets, they can enjoy an outdoor event without the sound of gunfire, and their community is environmentally sound. Secondly, our homes are the most important asset we have. Citizens should know that elected representatives are here to protect their homes and families. Adding a private para-military range to our community is not the way to make our community a better place to live, work, and play. These reasons only scratch the surface.

In politics, we have seen countless individuals who are elected and immediately forget their principles and, most importantly, the people they serve. That is why we need new leadership in Berkeley. We need a candidate with real life business experience that will lead the fight to protect what matters most. We need accountability, transparency, and fiscal responsibility. That is why I also fought against a publicly funded baseball stadium, which was clearly not in the taxpayer's best interest either.

Over thirty years ago, I started my own business in the computer components industry from scratch. With years of dedicated effort and fiscally responsible management, the business successfully grew. What Berkeley needs is common sense community leadership. I know how to properly manage money and a bad deal for our community when I see one. I want to use this experience and knowledge to give back to and protect the community we love.

Pledged on this day of April 23, 2017 to the citizens of Berkeley District, I am

Deborah Curcie

Deborah Curcie
Candidate
Berkeley District Supervisor.

Please visit www.DebbieForBerkeley.com or call me at (540) 369-8731 with any questions or thoughts.

Paid for and Authorized by Friends of Deborah Curcie

Leon Hughes

From: Wanda Parrish
Sent: Tuesday, April 25, 2017 4:11 PM
To: Leon Hughes
Subject: FW: Crucible Re-zoning request Safety
Attachments: Air Force Range Design Criteria.pdf

-----Original Message-----
From: Brinkman Col Mark T [mailto:mark.brinkman@usmc.mil]
Sent: Monday, January 09, 2017 8:07 AM
To: Stephan Picard; Branscome, Jeffrey (Jeff); Greg Cebula
Cc: Wanda Parrish
Subject: Crucible Re-zoning request Safety

All,
I want to continue to follow up on the Crucible initiative. While I have multiple concerns, above all is safety so I thought I would start the week with this topic. More to follow on noise and economic impacts.

Since Mr. Cebula was Air Force, I thought I would check out their small arms range regulations to verify they we in line with the Marine Corps, Army and Department of Energy. Attached is their document, or it can be found at http://www.shooting-academy.com/media/Air%20Force%20Range%20Design%20Criteria.pdf
Of particular note is page 6 paragraph 6.2 where it states:
"Surface Danger Zone (SDZ): The portions of the range in the horizontal plane that are endangered by firing a particular weapon. The SDZ includes the area between the firing line and the target line, an impact area, a ricochet trajectory area, and a secondary danger area. The SDZ may also include a weapon back-blast area.
The SDZ must be located completely within the boundaries of U.S. government owned or -leased properties. A fully contained range which is incapable of allowing a fired projectile to escape its limits does not have an exterior SDZ."

Also to understand the ranges, Table 1 on Page 8 describes the minimum safe range for small arms weapons.

So, if the Board of supervisors were to allow the re-zoning, and wanted to maintain the same safety standards used by the US Army, US Marine Corps, US Air Force, and the Department of Energy, the ranges at the Crucible facility would require 100% side and overhead baffling since lot 76-A-2 is not large enough to fully contain the SDZ of most small arms. Anything other than this would not comply with Sec. 23-4.5.7. Standards of review line (a) (4), "That the proposed use will not adversely affect the health or safety of persons residing or working in the neighborhood of the proposed use;"

Accepting anything less than this, in my mind would be putting the citizens at unacceptable levels of risk.

Page 8 Para 7.1.1.2 described the Air Force requirements for a Fully contained range when the required minimum SDZ requirements are not available because of lack of land.

Mark Brinkman

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE CIVIL ENGINEER SUPPORT AGENCY

20 OCT 2008

FROM: HQ AFCESA/CEO
139 Barnes Drive, Suite 1
Tyndall AFB, FL 32403-5319

SUBJECT: **Engineering Technical Letter (ETL) 08-11: Small Arms Range Design and Construction**

1. Purpose. This ETL provides criteria for the design and construction of Air Force small arms ranges, and applies to both new construction and major renovations. Additionally, this document should be used as a guide for any ranges purchased as equipment items. The intent of this ETL is to provide the minimum design criteria necessary for achieving a safe range design. This ETL assumes users have a formal engineering education and background, or access to local engineering expertise. This ETL does not establish the number of firing points, target distance, targetry, or type of range. A planning team composed of major command (MAJCOM) and installation-level combat arms (CA), civil engineering (CE), bioenvironmental engineer (BE), and safety (SE) personnel will jointly establish the number of firing points, the target distance, and the type of range based on mission, training requirements, and available real estate.

This ETL is directive in accordance with Air Force instruction (AFI) 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects*, and AFI 36-2226, *Combat Arms Program*, and must be used by a range designer when designing a new range or renovating an existing range. The range designer ultimately has the responsibility to ensure the minimum criteria presented in this ETL are used to provide a safe range design. This ETL may not cover all site-specific concerns and it is the designer's responsibility to adapt the intent of the ETL criteria to ensure the range is operationally safe. This ETL is not a specification or a prescriptive checklist and is not intended to replace professional judgment by a competent licensed professional engineer, after coordination with the end-user or installation CA section. Additionally, nothing in this ETL should preclude consideration and use of emerging technologies and commercially available products if these can be proven to result in a safe and otherwise satisfactory range design.

This ETL supersedes ETL 06-11, *Small Arms Range Design and Construction*.

Note: The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this ETL does not imply endorsement by the Air Force.

2. Summary of Revisions. This ETL is substantially revised and must be completely reviewed. It updates requirements and standards consistent with current technology and lessons learned. Editorial updates were performed to improve clarity and organization. This ETL also includes critical improvement to bullet traps that eliminated any blunt surface that would cause ricochet. This ETL incorporates the common general building

requirements in accordance with Unified Facilities Criteria (UFC) 1-200-01, *General Building Requirements*. Because these salient safety, health, and environmental features of permanent ranges apply to expeditionary or portable ranges, these ETL standards should apply toward portable ranges purchased as equipment.

3. Application: All Air Force installations.

- The criteria in this ETL shall apply to all small arms ranges where the design phase is 35 percent complete or less on the effective date of this ETL.
- New partially contained ranges will not be designed or constructed. If planned major range or component repairs of an existing range will cost more than 50 percent of the estimated range replacement cost (plant replacement value), the entire facility must be upgraded to comply with this ETL.
- After MAJCOM approval, HQ AFSFC/SFXW may approve deviations from the criteria in this ETL. MAJCOMs will submit requests for deviation to HQ AFSFC/SFXW, who will coordinate with HQ AFCESA for review.

3.1. Authority: Air Force policy directive (AFPD) 32-10, *Installations and Facilities*.

3.2. Effective date: Immediately.

3.3. Intended Users: MAJCOM functional managers; base civil engineers (BCE); bioenvironmental engineers; combat arms (CA), and range designers for the Air Force.

3.4. Coordination: MAJCOM functional managers and HQ AFSFC/SFXW.

4. Referenced Publications. In some instances, the references listed in paragraphs 4.1 through 4.8 may advocate procedures that seem to contradict those in this ETL. In these cases, the information in this ETL supersedes any other design and construction source and policy guidance on range operation and maintenance contained in AFI 36-2226 takes precedence over other sources.

4.1. Public Law:

- Title 29 Code of Federal Regulations (CFR) 1910.1025, *Lead*, available at http://www.gpoaccess.gov/cfr/index.html

4.2. Department of Defense (DOD):

- DOD Directive 5100.76-M, *Physical Security of Sensitive Conventional Arms, Ammunition, and Explosives*, available at http://www.dtic.mil/whs/directives/corres/html/510076m.htm
- Military Handbook (MIL-HDBK) 1027/3B, *Range Facilities and Miscellaneous Training Facilities Other Than Buildings*, available at http://www.wbdg.org/ccb/browse_cat.php?o=30&c=80
- MIL-HDBK 1013/1A, *Design Guidelines for Physical Security of Facilities*, available at http://www.wbdg.org/ccb/browse_cat.php?o=30&c=80

- UFC 1-200-01, *General Building Requirements*, available at http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4
- UFC 3-120-01, *Air Force Sign Standard*, available at http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4
- UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings,* available at http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4
- UFC 4-020-01FA, *Security Engineering: Project Development* (FOUO), available at http://www.wbdg.org/ccb/browse_cat.php?o=29&c=4

4.3. Air Force:

- AFI 31-101, *The Air Force Installation Security Program* (FOUO), available at http://www.e-publishing.af.mil
- AFPD 32-10, *Installations and Facilities*, available at http://www.e-publishing.af.mil
- AFI 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects*, available at http://www.e-publishing.af.mil
- Air Force handbook (AFH) 32-1084, *Facility Requirements*, available at http://www.e-publishing.af.mil
- AFI 36-2226, *Combat Arms Program*, available at http://www.e-publishing.af.mil
- AFI 90-901, *Operational Risk Management*, available at http://www.e-publishing.af.mil
- Air Force pamphlet (AFPAM) 90-902, *Operational Risk Management (ORM) Guidelines and Tools*, available at http://www.e-publishing.af.mil
- Air Force Occupational Safety & Health (AFOSH) Standard 161-2, *Industrial Ventilation*, available at http://www.e-publishing.af.mil (hardcopy only)

4.4. Navy:

- Navy and Marine Corps Public Health Center Technical Manual (NMCPHC-TM) IH 6290.10, *Indoor Firing Ranges Industrial Hygiene Technical Guide*, available at http://www-nehc.med.navy.mil/od/CDRomtoc.htm

4.5. Army:

- Army Pamphlet (PAM) 385-63, *Range Safety*, available at http://www.apd.army.mil/series_range_pubs.asp?range=385
- Training Circular (TC) 25-8, *Training Ranges*
- NGB-AVS-SG, *Policy and Responsibilities for Inspection, Evaluation and Operation of Army National Guard Indoor Firing Ranges*

4.6. Environmental Protection Agency (EPA):

- *Best Management Practices for Lead at Outdoor Shooting Ranges*, available at http://www.epa.gov/region02/waste/leadshot/

4.7. Industry:

- American Welding Society (AWS) D1.1, *Structural Welding Code – Steel*, https://www.awspubs.com
- ASTM A514/A514M, *Standard Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding*, http://www.astm.org
- ASTM C76, *Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe*, http://www.astm.org
- ASTM C136, *Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates*, http://www.astm.org
- Illuminating Engineering Society of North America (IESNA) Lighting Handbook, http://www.iesna.org/
- National Rifle Association (NRA) of America, *The NRA Range Source Book*, latest edition, available at http://www.nrahq.org/shootingrange/sourcebook.asp

5. Acronyms and Symbols.

AFCESA	- Air Force Civil Engineer Support Agency
AFH	- Air Force handbook
AFI	- Air Force instruction
AFOSH	- Air Force Occupational Safety & Health
AFPAM	- Air Force pamphlet
AFPD	- Air Force policy directive
AR	- Abrasion Resistant (i.e. AR500 plate)
AR	- Army Regulation
ASTM	- American Society for Testing and Materials
AWS	- American Welding Society
BCE	- base civil engineer
BHN	- Brinnell Hardness Number
BMP	- Best Management Practices
CA	- combat arms
cal.	- caliber
CE	- civil engineering
CFR	- Code of Federal Regulations
CMU	- concrete masonry unit
CONUS	- continental United States
dBA	- decibels ("A" scale)
DOD	- Department of Defense
DRMO	- Defense Reutilization Management Office
EOD	- explosive ordnance disposal
EPA	- Environmental Protection Agency
ETL	- Engineering Technical Letter
FOUO	- For Official Use Only
ft	- foot
HEPA	- high-efficiency particulate air (filter)

HMMWV	- high-mobility multi-purpose wheeled vehicle
HQ AFCESA/CEOA	- Headquarters Air Force Civil Engineer Support Agency, Engineer Support Division
HQ AFSFC/SFXW	- Headquarters, Air Force Security Forces Center, Combat Arms
HVAC	- heating, ventilation, and air conditioning
IESNA	- Illuminating Engineering Society of North America
in	- inch
LAW	- light anti-tank weapon
LFA	- lead-free ammunition
LR	- long rifle
m	- meter
MAJCOM	- major command
MIL SPEC	- military specification
MIL-HDBK	- military handbook
mm	- millimeter
mpm	- meters per minute
NCOIC	- noncommissioned officer in charge
NMCPHC	- Navy and Marine Corps Public Health Center
NSN	- National Stock Number
O&M	- operation and maintenance
ORM	- Operational Risk Management
OSHA	- Occupational Safety and Health Administration
PEL	- permissible exposure limit
pH	- symbol for logarithm of reciprocal of hydrogen ion concentration in gram atoms per liter
PPBE	- planning, programming, budgeting, and execution
psi	- pound per square inch
RCP	- reinforced concrete pipe
RH	- relative humidity
RKT-HEAT	- rocket - high-explosive anti-tank
SDZ	- surface danger zone
SE	- safety
SGPB	- bioenvironmental engineer
TACOM-ARDEC	- U.S. Army Tank-Automotive and Armaments Command – Armament Research Development and Engineering Center
TBD	- to be determined
TC	- Training Circular
UFC	- Unified Facilities Criteria
VDZ	- vertical danger zone

6. Definitions.

6.1. *Small Arms Range*: A live-fire training facility for training and certifying personnel in the use of handguns, shotguns, rifles up to 7.62mm, rifles or machine guns up to .50 caliber, and the MK-19 40mm machine gun. A small arms range may

include special ranges for 40mm grenade launchers, light anti-tank weapons (LAW), and 81mm mortars. Equipment items such as fully (self-) contained portable or expeditionary ranges fall into this category.

6.2. *Surface Danger Zone (SDZ)*: The portions of the range in the horizontal plane that are endangered by firing a particular weapon. The SDZ includes the area between the firing line and the target line, an impact area, a ricochet trajectory area, and a secondary danger area. The SDZ may also include a weapon back-blast area. The SDZ must be located completely within the boundaries of U.S. government-owned or -leased properties. A fully contained range which is incapable of allowing a fired projectile to escape its limits does not have an exterior SDZ.

6.3. *Vertical Danger Zone (VDZ)*: For non-contained and partially contained ranges, the VDZ is the volume of airspace above the SDZ between the ground surface and the maximum ordinate of a direct-fired or ricochet round. The height of the VDZ varies with the weapon and ammunition fired (see Attachment 1). For fully contained ranges, the VDZ is the area between the SDZ and the upper limits of containment.

6.4. *Non-contained Range (Impact Range)*: A non-contained range is an outdoor/open range. The firing line may be covered or uncovered. Direct-fire rounds and ricochets are unimpeded and may fall anywhere within the SDZ. The non-contained range requires an SDZ equal to 100 percent of the maximum range of the most powerful round to be used on the range. This type of range requires the largest amount of real estate to satisfy the SDZ requirements.

6.5. *Partially Contained Range*: This range has a covered firing line, side containment, overhead baffles, and a bullet backstop. Direct fire is totally contained by the firing line canopy, side containment, baffles and bullet trap (no "blue sky" observed from firing positions). Ricochets are not totally contained, but reduced by the baffles and side containment. A partially contained range requires an SDZ length equal to 50 percent of the maximum range of the most powerful round to be used on the range. A partially contained range will not permit lateral movement along the firing line or movement toward the target line unless the range has the additional baffles required to stop direct fire at the downrange firing lines.

6.6. *Fully Contained Range*: Range in which direct fire and ricochets are totally contained within the limits of the range. There is no SDZ requirement outside the limits of the containment.

7. Design Criteria. Range design is based on providing facilities that meet the needs of the training courses of fire specified by HQ AFSFC/SFXW and MAJCOMs based on mission needs. Future range designs must consider courses of fire that may differ from traditional "line-up-and-shoot" courses of fire: certain courses of fire may require the shooter to advance downrange toward the target; other scenarios may include driving a vehicle (HMMWV ["Hummvee"] without pedestal-mounted weapon) into the range to practice vehicle dismount, cover techniques, and target engagement. It is imperative

that a range designer fully understand what types of training and courses of fire will take place on the range and design the range accordingly. The designer should also consider design flexibility that allows for changing courses of fire in the future. Facility design and construction must comply with UFC 1-200-01.

Air Force ranges will not be designed or constructed to only accommodate frangible ammunition. To ensure operational range safety is not compromised, existing ranges that do not have the required SDZ may restrict the range to frangible ammunition only. However, this must be a temporary work-around and the owning organization must program corrective action to permit firing of ball ammunition.

The goal of the new Air Force small arms training philosophy is to increase the current 25-meter standard target distance and expand the diversity of training that can be accomplished on the range. Ranges should be designed to allow the greatest target distance possible within the available land at the site (e.g., 50 meters, 100 meters, 300 meters, 1000 meters). The desired target distance is at or as close as possible to the sight zero distance for the weapon.

CA, CE, bioenvironmental engineering, and safety offices at the base and MAJCOM will jointly develop site-specific designs using the minimum criteria outlined in this ETL. MAJCOMs may submit designs that deviate from the requirements of this ETL to HQ AFSFC/SFXW for review. HQ AFSFC/SFXW will coordinate with HQ AFCESA/CEOA, Engineer Support Division, for review. Submit designs to HQ AFSFC only after MAJCOM approval. Individual MAJCOMs may establish design criteria exceeding the minimums specified in this ETL.

7.1. Range Types, Combination Ranges, Range Configuration, Site Selection, and Range Geometric Design.

7.1.1. Range Types.

7.1.1.1. Non-contained Range (Impact Range). The non-contained range accommodates the controlled and supervised discharge of weapons and has sufficient land area to ensure the discharged projectile does not exit the SDZ. The trajectory of the projectile is along the line of fire (orientation of the range) and the impact of the projectile is designed to be within the limits of the impact area. The firing line may be covered or uncovered. Typically there are no overhead baffles, but surface barriers or sidewalls may be provided to partially limit projectile trajectory. A non-contained range must have the land area to accommodate both the full SDZ and the full VDZ. Ammunition used on the range will establish the required length of the SDZ and the required height of the VDZ. SDZ length must be equal to the longest distance equal to 100 percent of the extreme range for the types of ammunition used on the range. The required SDZ must equal or exceed the minimum SDZ lengths listed in Table 1. For minimum VDZ height requirements, see Attachment 1.

Table 1. Minimum SDZ Distance Requirements for Small Arms Ammunition — Non-contained Range

Weapon/Caliber	Ammunition	Minimum SDZ Length Meters (Feet)
Handgun, 9mm pistol Submachine gun, 9mm	M882	1840 (6036)
Handgun, 9mm pistol	Frangible, lead-free, Winchester	1375 (4511)
Handgun, .44 magnum	Commercial local purchase	2290 (7513)
Shotgun, 12 gauge	00 buckshot	600 (1968)
Rifle, 5.56mm	Ball M193; tracer M196	3100 (10,170)
Rifle, 5.56mm	Ball M855; tracer M856	3600 (11,811)
Rifle, 5.56mm	M862 (plastic)	250 (820)
Rifle, 5.56mm	Frangible, lead-free, Federal Cartridge BC556NT1, PSPCL	2750 (9022)
Rifle/machine gun, 7.62mm	Ball M80; tracer M81	4300 (14,107)
Rifle/machine gun, 7.62mm	Match, M118	4800 (15,748)
Machine gun, .50 caliber	Ball M2 and M33/tracer M17/M8 API/M20 APIT	6700 (21,981)
M79, M203, 40mm low-velocity	M781/M407A1/M406/ M433/M381/M386/M441	500 (1640) 100* (328*)
MK-19, 40mm high-velocity	M918/M383/M430	2650 (8694) 350* (1148*)
M72 LAW, 35mm sub-caliber	M73	1300 (4265) 100* (328*)
M72 LAW, 66mm RKT HEAT	M72	1250 (4101) 250* (820*)
AT-4, 84mm RKT HEAT	M136	2600 (8530) 200* (656*)

*Additional standoff distance that must be added to minimum SDZ length to allow for EOD make-safe procedure.

7.1.1.2. Fully Contained Range (Indoor or Outdoor). A fully contained range is designed to prevent 100 percent of the direct-fired rounds and 100 percent of the ricochets from leaving the limits of the range. This type of range is used when the required minimum SDZ requirements are not available because of lack of land area or compatible land use. These ranges have an overhead containment structure (ballistic safety baffles) and sidewalls. If the range is located in a building (indoor range), the building envelope is typically not

designed to prevent projectile penetration unless it is part of the containment. The structure elements and materials used for the building roof may vary depending upon the type and configuration of interior overhead containment, type of backstop, and method used to trap bullets. The fully contained range design must preclude escape of both direct-fired projectiles and ricochets. No "blue sky" should be visible from any firing position and as one travels downrange towards the target. Construct the overhead baffles with a minimum of 150 millimeters (6 inches) of horizontal overlap between the trailing edge of any baffle and the leading edge of the next baffle downrange (see Figure 8). The range design must also address noise control and environmental hazards resulting from the use of ammunition containing lead and residue resulting from non-lead frangible ammunition. Ammunition residue may contain unburned propellant. Excess build-up of this residue has caused flammable hazards within ranges. This flammability hazard may be controlled using a combination of facility and operational procedures to eliminate the risk of fire. Range personnel must work with local agencies to determine the required frequencies and procedures for removing unburned propellant from the range.

7.1.1.3. Partially Contained Range.

7.1.1.3.1. Partially contained ranges are not permitted for new construction unless specifically approved by HQ AFSFC and HQ AFCESA. There are many existing partially contained ranges in the Air Force inventory.

7.1.1.3.2. All existing partially contained ranges that do not have the required SDZ must be programmed for upgrade or replacement to meet either full-distance, non-contained range criteria, fully contained range criteria, or the footprint of existing deficient SDZ must be increased to meet the 50 percent SDZ requirement for a partially contained range. Existing partially contained ranges and other facilities designed in accordance with previously published criteria may continue to operate if range safety can be verified.

- Verify range safety using the operational risk management (ORM) analysis in accordance with AFI 90-901, *Operational Risk Management*. See Attachment 2 for an ORM example.
- Range computer modeling and simulation is a proven technique for analyzing range safety and identifying necessary improvements.

Range safety violations and unsafe operating conditions must be addressed and corrected as soon as they are identified.

7.1.2. Combination Ranges. Range designs may be configured to accommodate a variety of weapons and courses of fire. The appropriate configuration must be determined by the types and sequence of weapons used.

7.1.2.1. Multi-purpose Ranges. The multi-purpose range provides for simultaneously firing more than one type of weapon. The complex consists of adjacent baffled and/or impact bays. A sidewall separates the two range types to prevent bullets from one range from entering the adjacent range.

7.1.2.2. Superimposed Ranges. A superimposed range accommodates different types of weapons and may be either a non-contained (impact) range or a fully contained (baffled) range; however, only one type of weapon may be fired at one time. The superimposed range allows for the maximum use of land area and is usually the least expensive since there are no sidewalls between firing positions.

7.1.2.3. Special Ranges. Typically, special ranges are non-contained ranges designed to accommodate multiple target lines or arrays and set up for special types of weapons or unique courses of fire. Certain special ranges may exceed the scope of this ETL. Contact HQ AFSFC and HQ AFCESA for additional guidance.

7.1.3. Range Configuration. The range type, size, and configuration is based upon the installation mission, land availability, Air Force and MAJCOM policy, installation population, annual training requirements, and weapon-specific training requirements. Base CA personnel will submit their requirements for ranges through the chain of command to the MAJCOM functional manager. Once the MAJCOM has validated the need, the BCE will begin a feasibility study for the proposed range. Programming and budgeting for range construction must occur within the framework of the normal planning, programming, budgeting and execution (PPBE) process.

7.1.4. Site Selection.

7.1.4.1. BCE. The BCE will identify the available real estate for the site of a small arms range facility that is consistent with the installation's master plan. The installation master plan will indicate the range location, orientation, SDZ, and VDZ.

7.1.4.2. Planning. A project team composed of the CA non-commissioned officer in charge (NCOIC), a land use planner, a BCE representative, and a ground safety representative should collectively review the proposed range usage and location for land use compatibility. Safety is the primary concern when determining the site for a small arms range. Orient the SDZ and VDZ to minimize the effect of range operations on populated areas, aircraft ground and air operations, and land uses within the travel distance of the

ammunition. Where full-containment enclosures have not been provided, the project team should assume that ricochets would land in all portions of the SDZ. The BCE is responsible for plotting the SDZ and the VDZ on the base master plan. Mitigate any conflicts of land use or airspace operations with the SDZ or the VDZ as part of the PPBE process.

7.1.4.3. Real Estate Acquisition. When government-owned property suitable for a small arms range is not available, and where land acquisition is feasible, the BCE will prepare the documents required for purchase or lease.

7.1.4.4. Geographical, Environmental, and Climatic Effects.

7.1.4.4.1. If possible, an outdoor range should be oriented north-to-south to minimize glare. To minimize residue from being blown back to the shooter, site an outdoor range with the prevailing wind blowing from the shooter's back toward the target line. Supplemental ventilation will be required to maintain the recommended air flow across the firing line. Avoid locating the range upwind of residential or populated areas. Site outdoor ranges and their impact areas to minimize projectiles and projectile residue falling in wetlands or waterways.

7.1.4.4.2. Regions subject to snow accumulation and extended periods of continuous sub-freezing temperatures should have indoor ranges. When this is not possible, the outdoor range should be located to minimize drifting snow, ice buildup, and excess water and to facilitate snow removal inside the range periphery.

7.1.4.4.3. Range sites must consider environmental concerns such as storm water management, protection of wetlands, ground and surface waters, historical or archaeological features, previously contaminated sites, and other concerns as may be determined by federal, state, and local environmental laws.

7.1.5. Range Geometric Design. The layout and dimensions of the facility must satisfy safety requirements and user needs. The following criteria are minimums:

7.1.5.1. SDZ Geometry. The range danger zone includes the projectile impact area, the SDZ, and a VDZ. Refer to Figures 1 through 6 for the typical geometry of the SDZ. The VDZ reflects the geometry of the SDZ extended to the VDZ height.

7.1.5.2. Limits of Fire. The limits of fire are imaginary lines drawn from the outermost edges of the endmost firing positions, extended downrange through the target line and terminating at the SDZ limit. The limits of fire may be perpendicular to the firing line or they may depart the firing line at a

designated angle. The range configuration and use determines the departure angle of the limits of fire.

7.1.5.3. Projectile Impact Area or Direct Fire Zone. The projectile impact area is bounded by the left and right limits of fire, the firing line, and extends to the minimum SDZ arc length for the ammunition and range type (Table 1). When the target line and the firing line are the same width, the impact area forms a rectangle (Figure 1). When the target line is wider than the firing line, the impact area becomes a pie-shaped area formed by the limits of fire and the arc of the minimum SDZ length (Figure 2).

7.1.5.4. Ricochet Danger Area. The ricochet danger area is the area between the impact area and the secondary danger area. The ricochet area typically is determined by extending a line drawn at a 10 degree angle off the left and right limits of fire, beginning at the firing line and extending to the minimum SDZ arc (Figures 1, 2, and 3). For a LAW range (Figure 4), the ricochet area is drawn at a 13 degree angle.

7.1.5.5. Secondary Danger Areas. Secondary danger areas are provided to catch fragments from exploding ammunition or ricochets from rounds that impact at the outer edge of the ricochet danger area. A line beginning at the intersection of the firing line and the firing limits is drawn departing from the line of fire at an angle of 40 degrees, extending outward for 1,000 meters (3,280 feet). From the 1,000-meter point, a second line extends to a point on the minimum SDZ arc 100 meters (328 feet) outside the ricochet area limits.

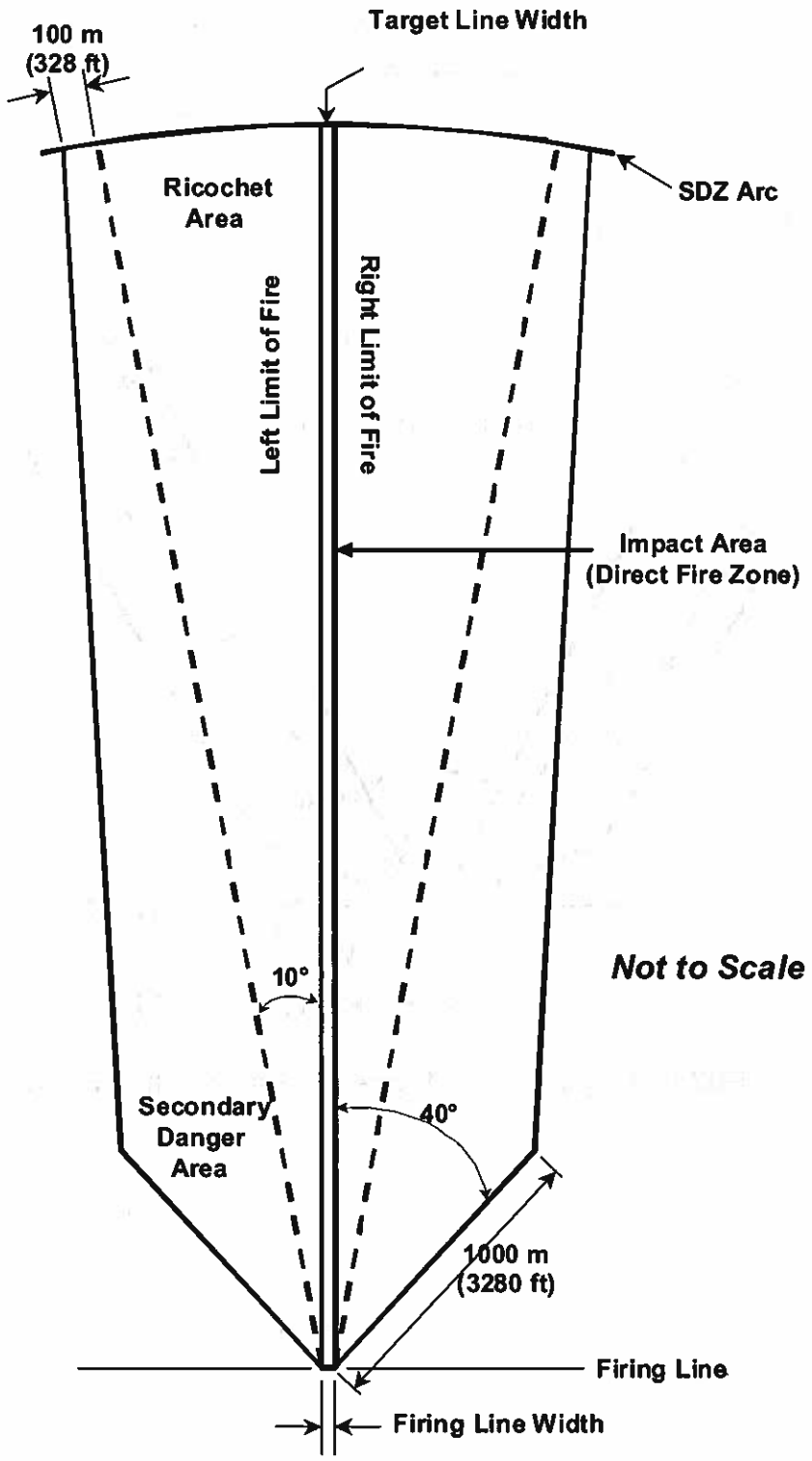


Figure 1. SDZ Configuration — Firing Line Width Equal to Target Line Width

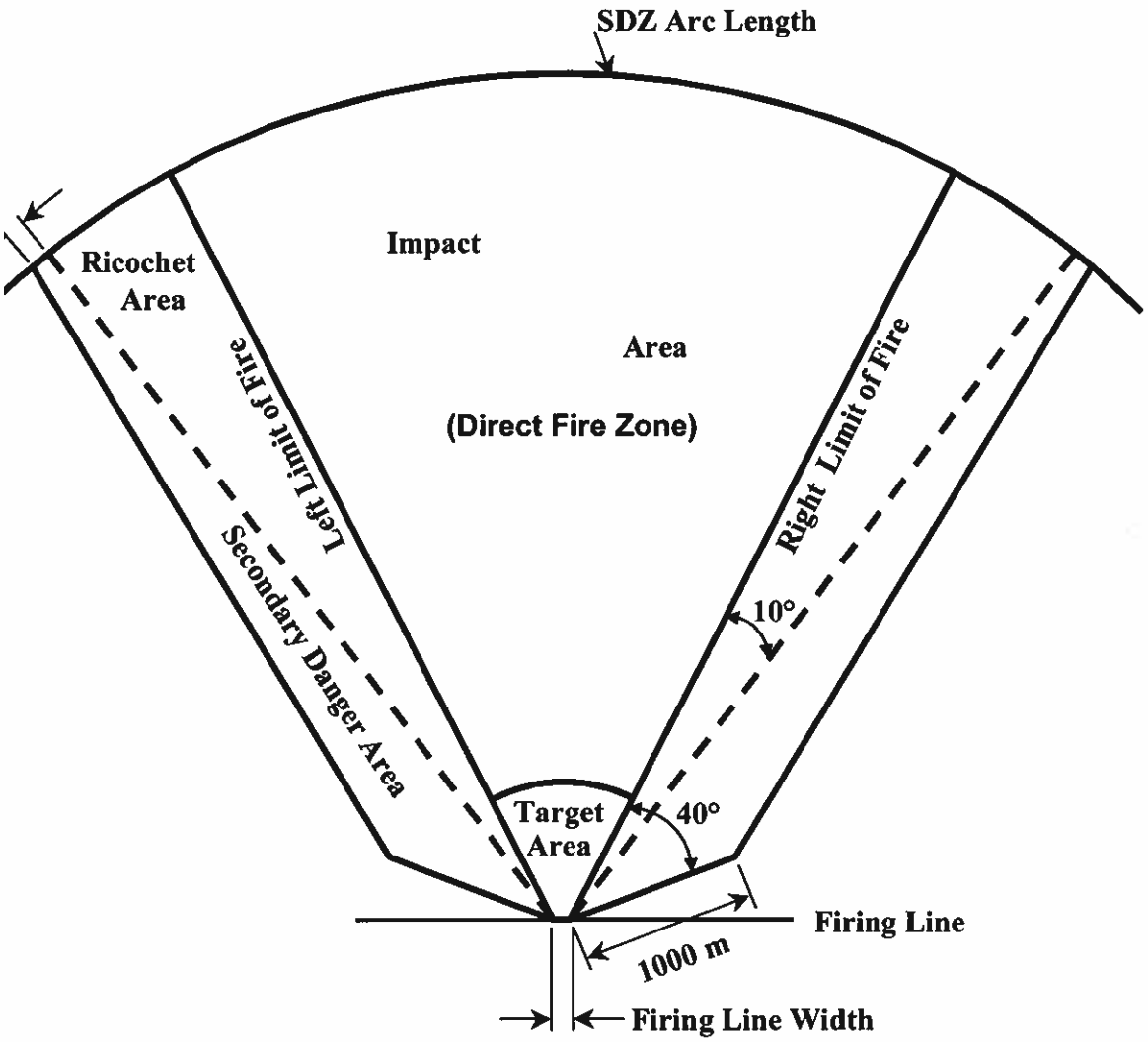
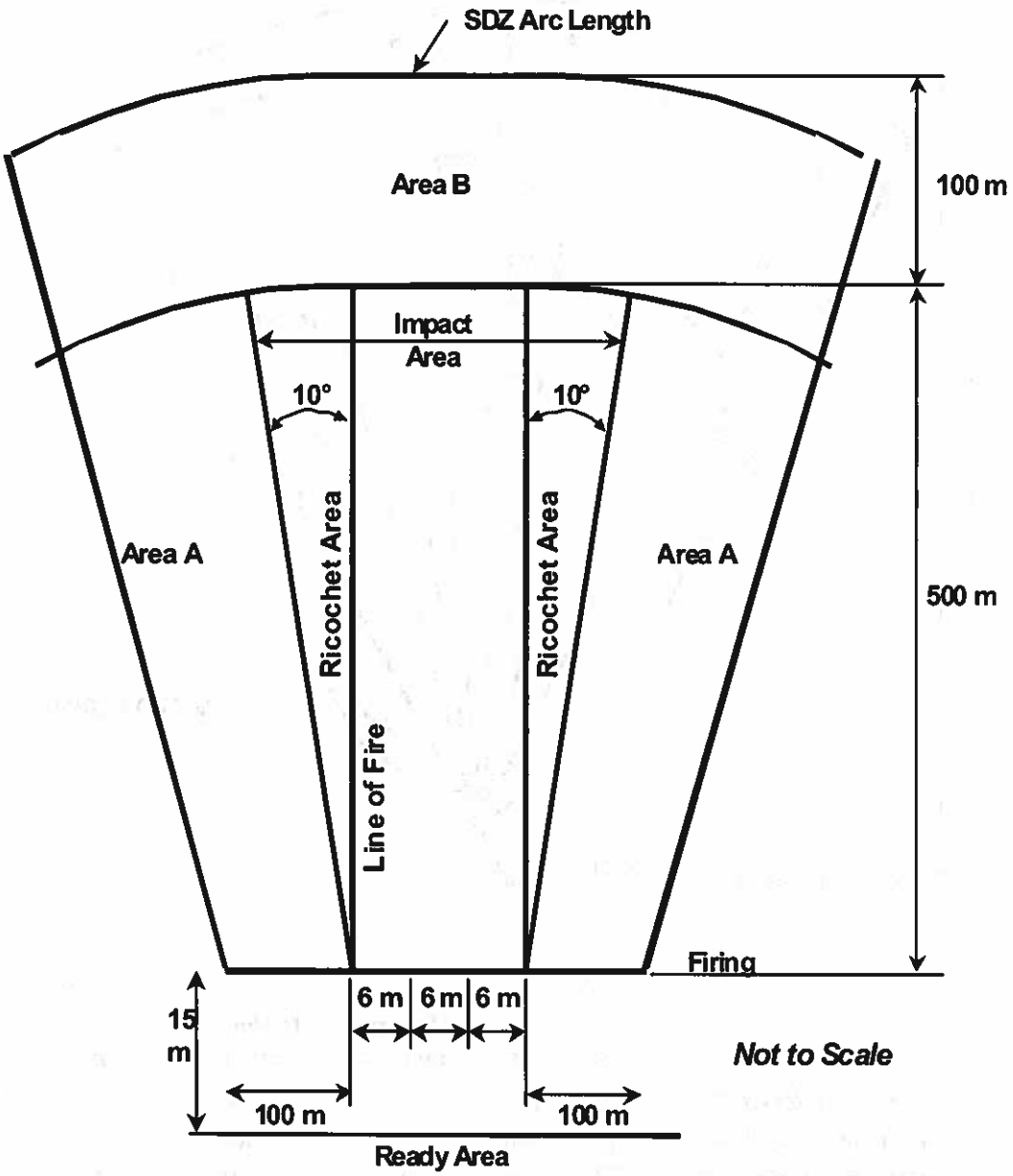


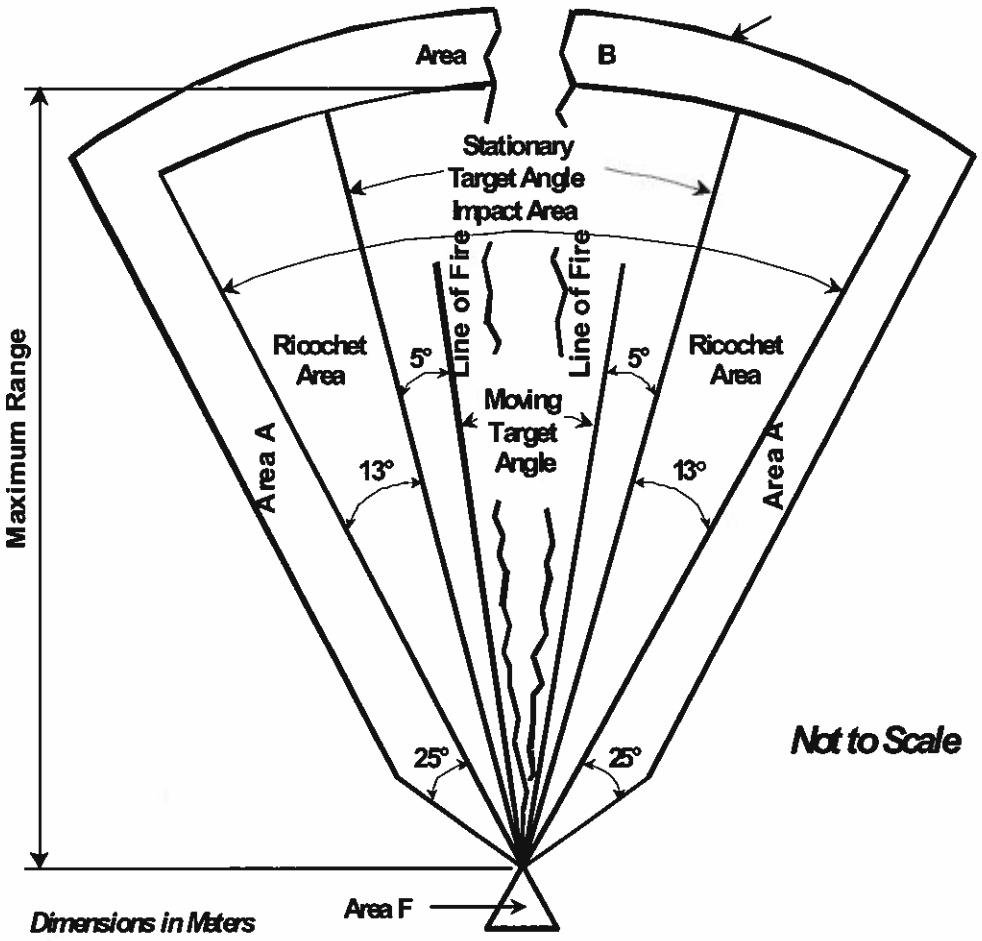
Figure 2. SDZ Configuration — Target Line Wider Than Firing Line



NOTES

1. Additional firing positions may be added provided minimum of 6 m (19 ft) is maintained.
2. Provide a 100-m (328-ft) clear zone (Areas A and B) around the perimeter of the range for EOD disposal of dud rounds with explosive type projectiles.
3. Ranges only certified for use of M781 or other inert projectile rounds are not required to include the 100-m (328-ft) space (Area A) to the left and right of the firing positions.

Figure 3. SDZ Configuration — M79 and M203 Grenade Launcher Range



	Area		Minimum Range to Impact	Maximum Range	Area F	
	A	B			Depth	Base
66mm HEAT Rocket, M72	250	250	75	1250	40	25
35mm Subcaliber, M73	100	100	50	1300	40	25
84mm HEAT Rocket, M136	227	448	50	2100	95	190

Figure 4. SDZ Configuration — Light Anti-Tank Weapons (LAW) Range

7.1.5.6. SDZ for Frangible Ammunition. On existing ranges that do not have the required SDZ, the use of frangible ammunition may mitigate the lack of SDZ and allow the range to continue to operate safely. This may only be used as a temporary measure and the owning unit must program for corrective action to allow firing of full-power ball ammunition. The SDZ depicted in Figures 5 and 6 are based on firing from the firing line only; down-range firing training operations shall not be used unless a projectile trajectory analysis is performed.

7.1.5.6.1. For an existing 25-meter (82-foot) partially contained range with earth side berms and an earth backstop, the required SDZ when using frangible ammunition is 300 yards (274 meters). See Figure 5.

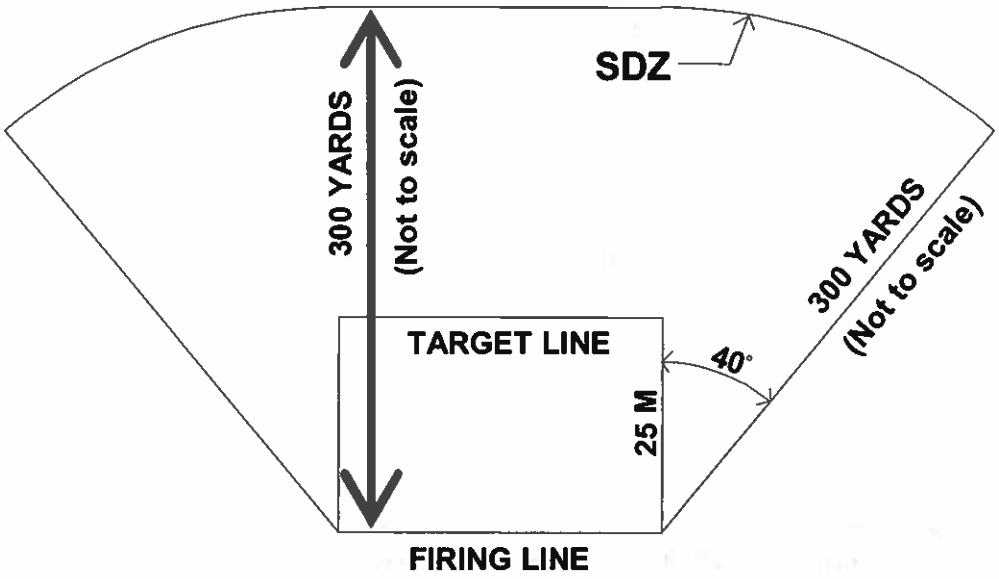


Figure 5. SDZ Requirement for Frangible Ammunition on a 25-Meter (82-Foot) Partially Contained Range with Earth Side Berms and Earth Backstop

7.1.5.6.2. For an existing 25-meter (82-foot) partially contained range with sidewalls of concrete or concrete block, overhead ballistic baffles (angled or vertical), and a bullet trap, the required SDZ when using frangible ammunition is 100 meters (328 feet). See Figure 6.

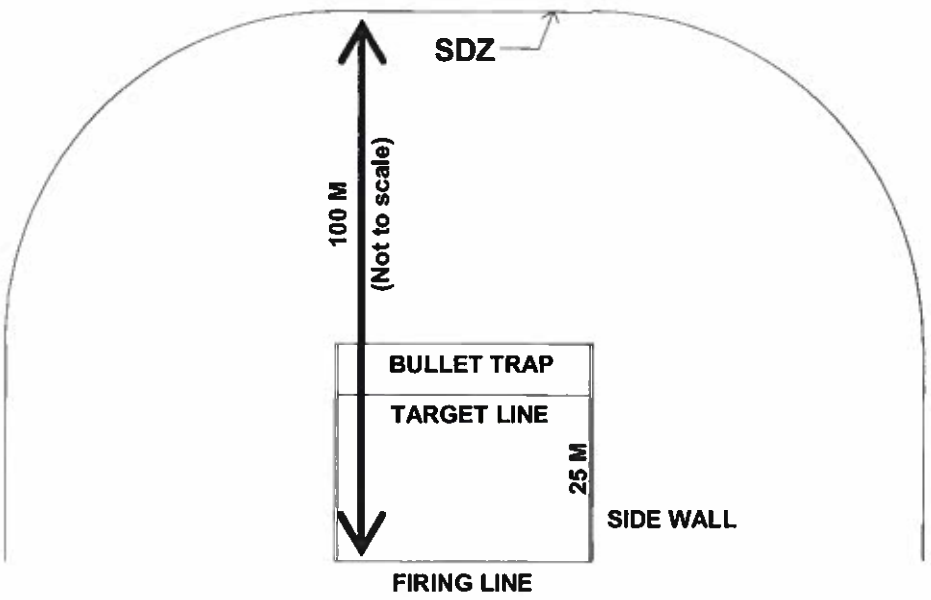


Figure 6. SDZ Requirements for Frangible Ammunition on a 25-Meter (82-Foot) Partially Contained Range with Sidewalls and Bullet Trap

7.1.5.7. Firing Line Positions/Platforms. The number of firing positions establishes the width of the firing line. All small arms (rifle, pistol, and shotgun) ranges must have a minimum of fourteen positions on the firing line. Add additional positions in increments of seven firing positions. The width of the firing positions must be at least 1.52 meters (5 feet) center-to-center. The firing line must be located on a stable horizontal surface that is at least 4.3 meters (14 feet) wide, clear distance, for the length of the firing line. For most ranges, the firing platform is a concrete slab on grade. For non-contained ranges that have fighting positions dug in the ground, sandbags, or other definite structures to identify the firing line, the firing platform can be an earth surface. For special weapons, CA personnel will specify the number of firing positions and the widths of each position based upon training requirements.

7.1.5.7.1. Position Numbering. Each firing position will be numbered beginning from the left when facing the target line. The numbers must be at least 200 millimeters (8 inches) tall and displayed on rectangular backgrounds attached to the position barricade or other location that is clearly visible to all shooters and range officials. Odd-numbered positions will be marked with white numbers on a black background; even-numbered positions will be marked with black numbers on a white background.

7.1.5.7.2. Position Barricades. A wooden barricade in the form of a cross (+) must be installed at the left edge of each firing position. The minimum

nominal dimensions of the wood must be 50 millimeters (2 inches) by 150 millimeters (6 inches). The top surface of the horizontal member must be 1220 millimeters (48 inches) above the platform.

7.1.5.7.3. Firing Line. Paint a red line a minimum of 100 millimeters (4 inches) wide on the leading edge of the firing platform on the target side. For non-contained ranges without concrete firing line platforms, a firing line will be marked definitively in red on the downrange side of the firing positions; examples would include treated timber imbedded along the firing line and painted red or a line of safety cones. This is the stationary firing line and must be continuous for the full length of all the firing positions. For move-and-shoot courses of fire, the firing line is relocated down range as appropriate for the training scenario.

7.1.5.8. Ready Line. Paint a yellow line 100 millimeters (4 inches) wide on the firing line platform at least 2.4 meters (8 feet) behind the firing line (towards the rear of the firing platform). The line must be continuous for the length of the firing platform. This line is designated the ready line.

7.1.5.9. Target Line. Targets are placed along the target line, which runs parallel to the firing line. Targets are placed opposite and aligned with each firing position.

7.1.5.10. Target Line Configuration.

7.1.5.10.1. The distance from the firing line to the target line must be the same for all firing positions. Targets may be placed on turning, pop-up, or stationary mechanisms, or target retrieval systems along the target line. Ensure that the line of sight from the firing line to the target line is clear and structural members, baffles, walls, or improper lighting do not obstruct the shooter's sight picture from any firing position the shooters will use (e.g., prone, kneeling, left barricade, right barricade). Number each target location the same as its corresponding firing position. On non-contained ranges, the target line may be fixed and several firing lines constructed to permit firing at reduced distances. When this option is used, only the rear-most firing line will incorporate a firing platform. If the range has an earthen backstop, ensure there is sufficient distance between the closest firing line and the earthen backstop to eliminate the possibility of backspatter and ricochets affecting the shooter.

7.1.5.10.2. The center of the target must be located between the upper limit of fire (standing position), which is 1500 millimeters (60 inches) above the firing line, and the lower limit of fire (prone position), which is 150 millimeters (6 inches) above the firing platform. The entire target face must be fully displayed to the firing position when exposed to the shooter for engagement.

7.2. Criteria Applicable to All Ranges. Design all range components (including ballistic safety structures and deflector plates) to satisfy the requirements for the weapon and ball ammunition used on the range. Except for non-contained ranges, ballistic safety structures are required for firing ranges. Ballistic safety structures include baffles, side containment, and backstops. Baffles are safety structures classified as canopy baffles or overhead baffles. Side containment is provided by sidewalls, berms, or discontinuous side baffles. A backstop is an impact berm or bullet trap designed to stop direct-fired rounds. See paragraph 7.5 for more detailed descriptions of ballistic safety structures.

7.2.1. Construction Materials. The materials selected for range construction must achieve the longest life-cycle possible considering frequency of use, budget constraints, or other concerns. The desired life expectancy of permanent small arms range construction is 20 years. Permanent construction does not include protective construction, baffles, or sacrificial materials intended to capture projectiles. Evaluate alternative range design options using a life-cycle cost comprised of the initial costs plus all operation and maintenance (O&M) costs for the first five years of range operation. Using the proper materials for sidewalls, baffles, overhead containment, bullet traps, and other areas where a projectile could impact will ensure that the bullet is deflected downrange and not towards the firing line. Ricochet control must be considered when positioning brackets used for baffles, locating bolt heads, and selecting protective construction.

7.2.2. Horizontal and Vertical Control. Establish vertical control by assuming the firing platform surface is equal to elevation 0.0 meter. The firing line is the baseline for horizontal control.

7.2.3. Drains. On outdoor ranges, use positive grading to direct water away from the firing line and toward the target line. When the length of the slope or the natural terrain requires using drains between the target and the firing line, a trench drain should be located at the forward edge of the bullet trap. If a trench drain is installed, the bullet trap should extend into the trench drain to eliminate any exposed edges that may cause unpredictable ricochets. Use grade breaks to prevent exposing vertical surfaces to the firing line. Do not route storm water runoff from any range floor to a stream, pond, or other body of surface water. In some circumstances, if the range is located near a surface water body, it may be necessary to incorporate detention basins or flow-through sand or peat filters to prevent particulate heavy metals that may be present in storm water runoff from reaching surface water bodies. Indoor ranges will not have floor drains downrange of the firing line. See EPA *Best Management Practices for Lead at Outdoor Shooting Ranges* for additional guidance.

7.2.4. Range Occupational Health Standards. All ranges should be designed to allow the use of service ammunition which contains lead and other contaminants. Design the range to control heavy metals and/or dust produced at both the

muzzle, ejection port of the weapon, bullet trap, and from the ventilation exhaust to ensure compliance with local, state, and federal regulations. Review NMCPHC-TM 6290.10, *Indoor Firing Ranges Industrial Hygiene Technical Guide*, and the EPA's *Best Management Practices for Lead at Outdoor Shooting Ranges*. Additionally, the designer should coordinate with the base safety and bioenvironmental engineering health offices for additional requirements and review AFOSH standards to ensure compliance with current policy, including, but not limited to, AFOSH Standard 161.2, *Industrial Ventilation*.

7.2.5. Floor Surfaces. Fully contained indoor ranges must have a smooth, steel-trowel-finished concrete floor extending from the firing line to the bullet trap. Fully contained outdoor ranges may have a concrete floor with a broom finish parallel with the firing direction to prevent a slipping hazard. The concrete floor should not be painted and must be protected with a waterproof sealant. The outdoor range floor should slope from the firing line toward the target line. In special circumstances, hardened steel plate of a thickness sufficient to prevent penetration of the projectile may be used for the range floor if the designer provides design criteria, supporting data, and supporting calculations for approval. No protrusions from the floor that could be struck by bullets are permissible. Fully contained range floors should be cleaned using approved "dry" methods, such as HEPA-filtered vacuuming or damp mopping. Water wash-down or dry sweeping is not permitted. Design the range floor as a pavement to support anticipated vehicular loads (training or service vehicles). Design and locate floor slab joints to minimize the potential for unpredictable ricochets. Sawed control joints are permitted. Locate longitudinal floor joints between firing lanes. Traditional chamfered construction joints are not permitted.

7.2.6. Wall Surfaces. Construct wall surfaces for fully contained ranges of reinforced concrete, fully grouted reinforced masonry, or hardened steel plate of a thickness sufficient to prevent penetration by any projectiles fired on the range. If hardened steel plate walls are used, submit data and supporting calculations to the MAJCOM for approval. Steel plate wall designs must address noise abatement in the design and must not have exposed bolts or anchors. If concrete or masonry walls are used, they must remain unpainted to preserve their inherent sound-absorbing properties. Walls should have a continuous smooth surface, with no projections above the wall surface from bolt or rivet heads or the leading edge of deflector plates. Wall expansion/contraction joints should be designed with care to ensure a smooth wall surface is maintained. The typical 19-millimeter (0.75-inch) chamfered wall joint detail is not permitted unless baffle/deflection plates are incorporated in the joint design to span the chamfer. To eliminate erratic ricochets, install baffle/deflection plates to protect any range features attached to the wall. The deflector plates should be recessed into the wall surface to eliminate exposed edges.

7.2.7. Openings. If an existing building is converted for use as a range, all openings downrange of the firing line must be filled in with ballistic safety

structures. All heating, ventilation, and air conditioning (HVAC) equipment downrange of the firing line must be located behind baffles or the backstop. In new buildings, conceal pipes and conduits in the walls, above the ceiling baffles, or behind protective baffles. In converted buildings, relocate exposed pipes or provide protective construction. When doors are required downrange, they must be constructed of ballistic-resistant materials and equipped with hardware to allow opening only from the range side. Protect downrange doors with baffles and provide them with a visual and audible alarm.

7.2.8. Ventilation. The ventilation system must control exposure to lead and heavy metals in accordance with 29 CFR 1910.1025, *Lead*. The supply and exhaust air system is critical to the safe operation of a fully contained indoor or outdoor range and to the health of range inhabitants.

7.2.8.1. Airflow. The ventilation system should provide laminar airflow across the firing line toward the bullet trap. At the firing line, the air velocity should be 23 meters per minute (mpm) (75 feet per minute), ±5 percent. Airflow should be evenly distributed across the firing line. Noise from the ventilation system will not exceed 85 decibels (dBA) behind the firing line.

7.2.8.2. Air Distribution. To ensure contaminants are ventilated from the firing line, install a perforated air distribution plenum or other distribution fixture along the rear wall to provide unidirectional airflow across the firing line and continuing downrange. The distance from the firing line to the perforated rear wall or plenum will be a minimum of 5 meters (16.4 feet).

7.2.8.3. For an indoor range, the ventilation design must include a positive exhaust system for removing airborne contaminants. Maintain a slight negative air pressure on the range, achieved by exhausting 3 to 7 percent more air than is supplied. Supply and exhaust fan systems must have control interlocks to ensure simultaneous operation. All doors into the negative pressure area must have air locks. Re-circulation of range air is not permitted.

7.2.8.4. Exhaust Intakes. Do not locate exhaust intakes near the firing line, and particularly not above the firing line. To ensure proper airflow, locate exhaust intakes at or behind the bullet trap.

7.2.8.5. Exhaust Air Discharge. Exhaust air discharged from the range and bullet traps must meet local, state, and federal requirements and be separated from the supply air intake to prevent cross-contamination of heavy metal-laden air. If the range is part of a larger building, do not discharge exhaust air at locations which would cause cross-contamination of overall building air.

7.2.8.6. Heavy Metal Dust at Ranges. Clean, hazard-free air is essential for a firing range. The Occupational Safety and Health Administration (OSHA) has

established the permissible exposure limit (PEL) for airborne heavy metal dust at 50 micrograms per cubic meter per hour average for an eight-hour day (total daily exposure may not exceed 400 micrograms). Fully contained ranges (indoor and outdoor) must have ventilation systems designed to control exposure from the use of heavy-metal-containing ammunition. Lead-free ammunition (LFA) is now available and may be used to eliminate the lead contamination concern with older existing ventilation systems.

WARNING

Exposure to heavy metal dust is a severe health hazard associated with the operation of a small arms range.

7.2.9. Noise Reduction. Noise reduction in the range and noise transmission out of the range are different design considerations. Mass and limpness are two desirable attributes for sound absorption. Unpainted heavy masonry walls provide mass. Absorptive acoustical surfacing will reduce the noise level in the range but have little effect on transmission outside the range. Ambient noise levels at the firing line should not exceed 85 dBA, and should be considerably less to improve communication between shooters and the range official. Short-duration noise such as gunfire will exceed the 85 dBA level and may be as high as 160 dBA. The range design must prevent the reflection of these higher noise levels by using sound-absorbing materials where possible. Hearing protection for shooters will provide protection against this noise.

7.2.9.1. Use acoustical treatment on surfaces behind the firing line. Floor areas behind the firing line may be covered with acoustic material (rubber mats) if it will not impede heavy metal dust removal.

7.2.9.2. Do not paint downrange walls or acoustic tile, since paint significantly degrades the sound-absorbing qualities of the materials. Existing ranges may continue using painted surfaces. Special sound-absorbing concrete blocks are available that reduce the noise in the range.

7.2.9.3. Acoustic panels no larger than 1200 millimeters (47 inches) wide may be installed on walls and ceilings in the firing line area. Blown-on acoustic material and carpeting are not permitted due to the difficulty of cleaning accumulated heavy metal dust.

7.2.10. Infrastructure.

7.2.10.1. Range Control Booth. The control booth is a control center from where the chief range officer can observe and control the entire range. All range types should have a control booth. The following criteria apply to the design and construction of control booths.

7.2.10.1.1. Locate the control booth behind the ready line. Place the booth to permit an unrestricted view of all firing positions. The booth location and design must not impede ventilation airflow.

7.2.10.1.2. The minimum size for the control booth platform is 1.5 meters by 3 meters (5 feet by 10 feet). Align the long side parallel to the firing line.

7.2.10.1.3. The booth must be high enough (0.6 meter [2 feet] minimum above the floor) to permit the range official an unrestricted view of the entire firing line and the projectile impact area, including all range entry points. Also, windows and doors within the booth must not restrict or distort the range official's view. Closed-circuit television monitors may be used to enhance, but will not replace, this requirement.

7.2.10.1.4. Provide a worktable or counter at least 0.8 meter by 1.2 meters (2.5 feet by 4 feet) to accommodate reference materials, and provide at least one electrical outlet in the worktable/counter area. Provide red and white lighting for night/limited visibility operations.

7.2.10.2. Communication Systems. The range communication system must support communications between the control booth, the firing line, range control, range support buildings, and emergency response personnel. A permanent, hard-wired public address system is required. On a multiple-range complex, the system must also support communications between individual ranges. If it is not practical to install landlines, or if a break in landline service occurs, radio or cellular communications may be used. The control booth should be wired with connections to the base local area computer network.

7.2.10.3. Lighting. Design downrange lighting (both red and white light) in accordance with the IESNA Lighting Handbook to provide for safety and housekeeping operations as well as general range illumination. Light intensity at the target face should be 914 to 1076 lux (85 to 100 foot-candles) measured 1200 millimeters (47 inches) above the range surface at the target face. Provide approximately 322 lux (30 foot-candles) for white light general range illumination and approximately 107 lux (10 foot-candles) for red lights. Provide controls to vary lighting intensity throughout the range to accommodate subdued-light training requirements. Controls for all lighting will be operated from the control booth. Also provide flashing red and blue lights at the firing line and downrange to simulate emergency situations.

7.2.11. Barriers, Fences, and Signs. Secure the range and SDZ areas to prevent unauthorized entry. Use barriers to block roads, walkways, or paths.

7.2.11.1. Fully contained ranges require barriers in the form of key-operated, locked doors or electrically locked doors to prevent entry while firing is in progress.

7.2.11.2. Non-contained (impact) ranges require a number of barriers and signs to make the range safe. The number of barriers required depends on the number of roads, walkways, and paths that lead into the SDZ. Attach reflective warning signs to barriers.

7.2.11.3. Use fencing to prevent people, animals, and vehicles from entering range SDZs. A chain-link fence around the complete range complex, including the SDZ, is preferred. Use barriers or gates to block access paths. On baffled ranges with earth side berms and an earth/metal backstop, as a minimum, install a 1.82-meter (6-foot) chain-link fence along the sides of the SDZ and on the downrange side of the impact area, incorporating the berms. Install the fence no closer than 5 meters (16 feet) from the toe of the berms and backstop. For fully contained ranges with concrete containment walls and an earth/metal backstop, as a minimum, install the fence from one wall, around the backstop, to the opposite wall when range components are exposed. For example, if the back side of the bullet trap and spent round retrieval system is exposed, erect a fence to restrict access by unauthorized personnel. Provide a locked access gate for maintenance equipment.

7.2.11.4. Typical range signs are shown in Figure 7. Warning signs, and flashing red warning lights for night operations, should be positioned on the approaches to the range and along the perimeter of the SDZ if access is not otherwise restricted. Place red flags and/or rotating/flashing red lights at appropriate locations to signal when the range is in use. Place signs along the normal boundaries of the range. Post the signs no further apart than 100 meters (328 feet) along the range perimeter, parallel to roads or paths. Based on local topography, place signs close enough to give reasonable warning along other areas of the SDZ. Refer to Table 2 for proper location of warning signs. Signs must be bilingual where English is not the national language or multilingual where needed. Post bilingual signs on continental United States (CONUS) ranges located near foreign borders. Consult the installation legal office for local policy on bilingual signs. Construct warning signs in compliance with UFC 3-120-01, *Air Force Sign Standard*. The warning signs should have standard red letters on a white background.

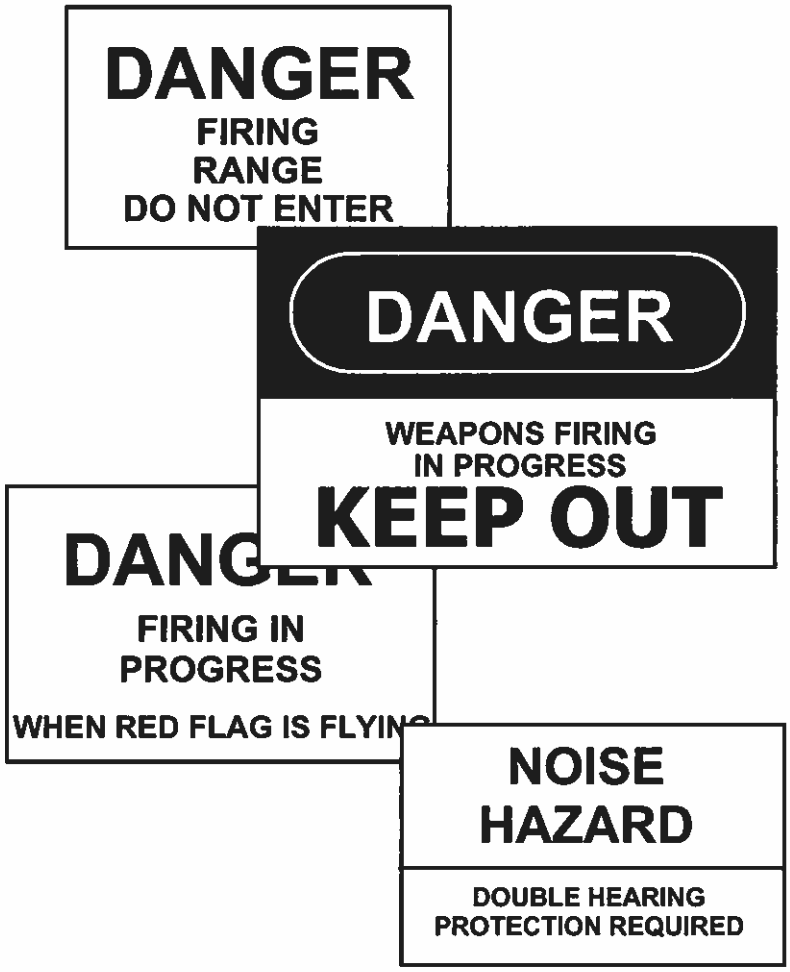


Figure 7. Typical Range Signs

Table 2. Locations of Warning Signs

Warning Sign	Location
Danger Firing in Progress When Red Flag is Flying	Approach roads
Danger Firing Range Do Not Enter	Fencing and barriers
Danger Weapons Firing in Progress Keep Out	Entry road
Noise Hazard Double Hearing Protection Required	Firing line

7.2.12. Utilities. Install utilities to prevent damage from normal firing range operations. Do not place any aboveground utilities in the impact zone or the ricochet zone. When utilities are directly behind backstops or berms, provide access for a maintenance vehicle. Underground utilities with proper cover may be placed anywhere on the range complex if maintenance and repair easements are provided.

7.2.12.1. Water and Sanitation. Water must be available for drinking, sanitation, and safety equipment. The required latrine size will be determined using conventional planning criteria and based on the number of people (instructors and trainees) supported.

7.2.12.2. Electrical Power. Provide electrical power for lighting, maintenance equipment, public address systems, HVAC, bullet trap dust collection system, and target-turning mechanisms.

7.2.12.3. HVAC. Heat and/or air conditioning is not recommended. Because re-circulated air within a range is prohibited, heating or cooling a range is costly. Some outdoor ranges in colder climates will require radiant heat or a heated air curtain on the firing line. Outdoor ranges must be oriented so the prevailing wind is at the shooters' backs.

7.2.13. Roads and Parking. Design roads and parking for access by passenger vehicles and light or medium trucks. Provide surfaced all-weather roads for

connector roads from public roads to the range complex. Parking and roadway standoff must comply with UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*.

7.2.13.1. Range access roads must approach the range complex from behind the firing line and outside the SDZ footprint.

7.2.13.2. Locate parking areas to the rear of the firing platform. On fully contained ranges, the parking area may be beside the range side containment walls. Typically, one parking space per firing position plus an allowance for range personnel is sufficient. Ranges with heavy training loads occasionally require two spaces per firing position. When feasible, surface parking lots for all-weather operation.

7.2.14. Storm Water Runoff and Drainage. Design storm water control structures to prevent storm water erosion of impact berms. Divert surface water runoff within the range (including the SDZ) using best management practices (BMP) for heavy metal management that may include filtration, vegetated detention or retention basin, or other engineered structure to prevent direct discharge to a surface water body. Discharge of effluent to water bodies must meet all requirements of federal, state, and local laws.

7.2.15. Contaminant Monitoring. A contaminant monitoring program provides early indications of heavy metal and contaminant movement. A comprehensive monitoring program should sample the surface soil, surface water, and ground water for soluble lead, dissolved lead, total lead, and nitrates. The frequency of sampling is dependent on how often the range is used and site hydrological conditions. Consult with the installation CE and bioenvironmental engineering personnel to determine if a contaminant monitoring program is required.

7.3. Additional Criteria for Non-contained Ranges.

7.3.1. Siting Considerations. Take advantage of natural geologic formations for use as backstops. Trees are allowed downrange of the impact berm, but not between the firing line and the target line. Take advantage of natural drainage. Where terrain permits, slope the range floor toward the backstop. Flowing watercourses (streams, ditches) in the impact area or near a berm should be avoided. Avoid establishing range impact areas in wetlands or in locations subject to frequent flooding. The non-contained range line of fire should not be in the direction of residential areas or upwind of residential areas.

7.3.2. Provide maintenance vehicle access to all range areas, including the backstop, side earth berm areas, and impact areas.

7.3.3. Soils. Do not use pea gravel to surface or edge the impact area of the range or the area between the firing line and the target line. Naturally occurring

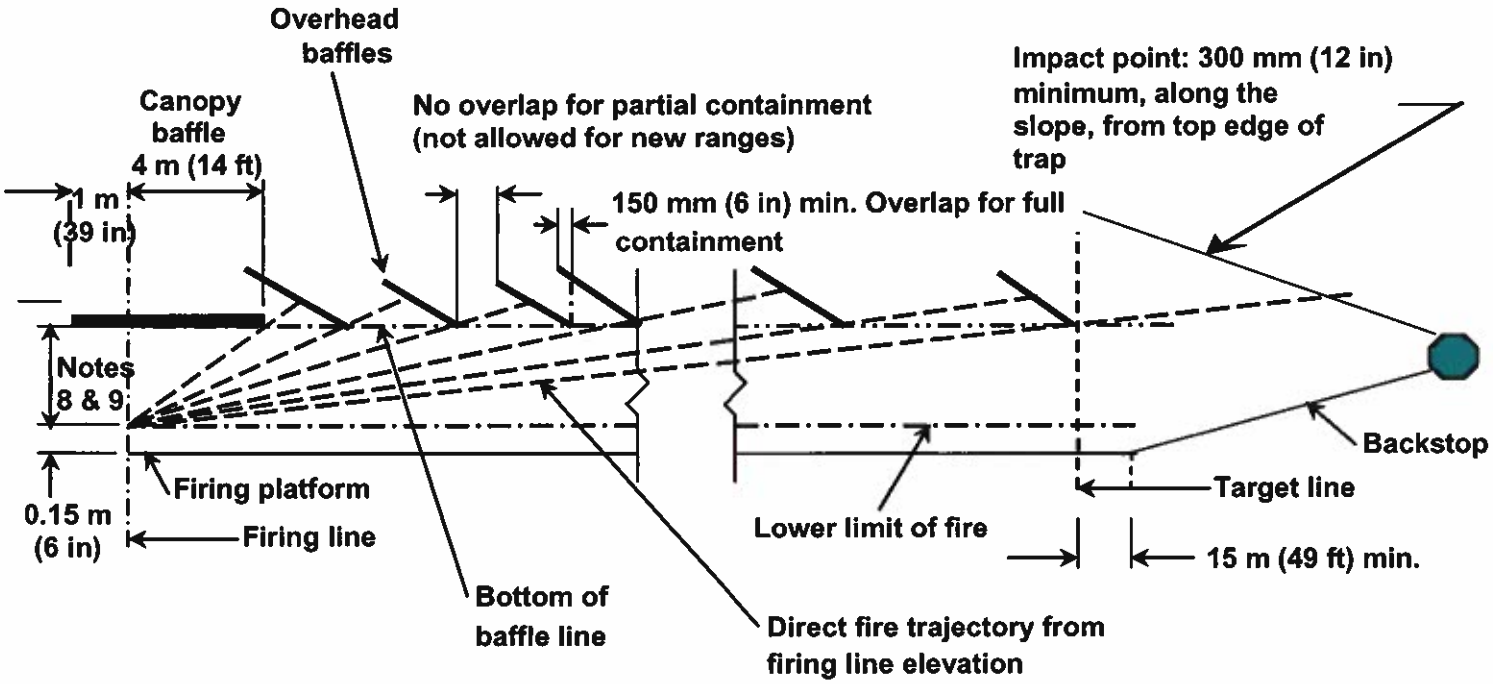
soils that are not excessively rocky may be used between the firing line and the target line. Typically these will be clays, clayey sands, sands, silts, and silty sands that are mostly free of rocks and debris, with no more than 15 percent of the material gradation retained on a 24-millimeter (1-inch) sieve.

7.3.3.1. Soil Amendments. BCE environmental management must test soils within the impact areas for pH levels every two years. The desired pH ranges from 7 to 8. Test soil additives to ensure that they will not cause cementing or hardening of the soil surface. Do not use lime as an additive or soil conditioner when the natural soil gradation includes more than 30 percent passing the #200 sieve, American Society for Testing and Materials (ASTM) C136, *Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates*, and/or the natural soil Plasticity Index is higher than 12.

7.3.3.2. Vegetation. Maintain vegetation on berms and drainage-ways when possible. Plant grass on impact areas. Turf grasses do an especially good job of retaining water and sediment onsite. Choose a grass variety that is native to the area and will require minimal water and fertilizer.

7.3.3.3. Reclamation and Recycling. Remove lead from the impact face of earth berm backstops when there is evidence of lead mass buildup. This will typically require that soil be excavated to a depth of 0.6 to 0.9 meter (2 to 3 feet) and screened using a 4-millimeter (#5) wire screen. Personnel certified in lead reclamation and wearing proper personal protection may sift the lead from the soil by screening onsite after consulting with bioenvironmental engineering personnel and satisfying all environmental requirements. Reclaimed lead must be disposed of or recycled in accordance with federal, state, and local laws and regulations. Consult BCE environmental management, bioenvironmental management, and the Defense Reutilization Management Office (DRMO) about reclaiming, recycling, or disposing of lead. Lead removed from bullet traps and earth berms is not considered a hazardous waste if recycled for metal recovery.

7.4. Additional Criteria for Fully Contained Ranges. Construct fully contained ranges to preclude any bullets from leaving the limits of containment. This requires additional attention to detail so no gaps, openings, or other paths for bullet escape are present. Use ballistic safety structures to provide the containment. For fully contained ranges, construct overhead baffles with a minimum of 150 millimeters (6 inches) of horizontal overlap between the trailing edge of any baffle and the leading edge of the next baffle downrange. This arrangement will provide containment such that a vertical line perpendicular to the range floor and projected upwards does not encounter any "blue sky" space. Figure 8 shows a baffle arrangement for full containment.



NOTES

1. This profile is based on a level range and a fixed firing line.
2. The target distance is established by CA to satisfy the intended training or courses of fire.
3. A tactical, fully contained range will allow shooters to move laterally along the firing line and downrange.
4. Overhead baffles must be angled from 12° to 32° from the horizontal.
5. Fully contained ranges require a 150-mm (6 in) minimum baffle overlap.
6. For existing partially contained ranges, baffles are spaced as required to bring the bullet into the baffle at a point not less than 300 mm (12 in) below the top of the following baffle as measured along its slope.
7. The bullet impact point on the bullet trap is not less than 300 mm (12 in) below the top edge of the trap as measured along the slope.
8. If vehicle access is not required, locate the bottom of the baffles at least 2.45 m (8 ft) above the firing platform.
9. If vehicle access without machine gun pedestal, locate the bottom of the baffles at least 3.68 m (12 ft) above the platform.
10. The canopy baffle may be sloped up to 30 degrees from the horizontal. If sloped, the high point of the canopy is closest to the target line.

Figure 8. Typical Overhead Baffle Configuration

7.4.1. Construct ballistic safety structures for fully contained ranges with attention to the quality of the fabricated parts. Baffle plates with butt joints must fit together closely to prevent any gaps more than 1.6 millimeters (0.0625 inch) wide. Modern plate-cutting techniques can provide precise dimensions, but particular care must be taken in erecting the baffles to ensure a precision fit of parts. The development of construction/erection details that use overlapping joints and joint-closure plates may provide a better, more economical solution than precise fabrication and also may simplify the erection procedures.

7.4.2. Good examples of fully contained ranges are at the Federal Law Enforcement Training Center in Glynco, Georgia. These ranges are considered fully contained and have a track record of millions of rounds fired without a single documented case of a bullet leaving the containment limits.

7.4.3. Additional Criteria for Vehicle Access. New training scenarios will use vehicles for practicing vehicle dismount, cover, and engagement of targets from the vehicle. The design vehicle for range design purposes is a HMMWV ("Humvee") without a pedestal-mounted weapon. Vehicle access requires consideration of higher clearance from range floor to baffles and vehicle paths into the range. See Figure 8.

7.5. Ballistic Safety Structures.

7.5.1. Canopy Baffles. A canopy baffle is an angled or horizontal baffle attached to and directly above the firing platform, extending downrange from the firing line. It prevents direct-fired rounds from escaping the range between the firing line and the first overhead baffle. The bottom of the canopy baffle must be at least 2.45 meters (8 feet) above the level of the firing platform if vehicle access is not required. The canopy will begin at least 1 meter (3.2 feet) behind the firing line and extend at least 4 meters (14 feet) forward of the firing line toward the target line. The canopy baffle must block line-of-sight daylight from any possible firing position. A canopy baffle may be used to provide a covered firing line position. A canopy baffle may be used on a non-contained range without either overhead baffles or side containment. Face the portion of the canopy baffle directly over the firing positions with plywood or lumber of sufficient thickness to capture the ricochet from a round fired directly over the shooters.

7.5.2. Overhead Baffles. An overhead baffle is an angled baffle (vertical baffles are not authorized for new range projects) installed downrange to deflect and contain direct-fired rounds. Install overhead baffles downrange beyond the firing line to prevent line-of-sight daylight when sighting downrange from any firing position. A shallow angle deflects bullets more easily and there is less metal fatigue and denting in the surface of the plate. A fully contained range requires a 150-millimeter (6-inch) minimum overlap of baffles. The overlapping baffles will allow shooter movement throughout the range and will prevent projectiles from leaving the range even if the weapon is accidentally fired straight up. Line-of-

sight analysis shall consider rounds fired from any angle and any training position forward of the firing line. Angled overhead baffles redirect projectiles downrange. Install angled overhead baffles with the bottom edge further downrange than the top edge. Install overhead baffles parallel to the firing line. Under no circumstances may any "blue sky" be visible forward of the firing line from any firing position. Refer to Figure 8 for a typical configuration. Install angled overhead baffles for new ranges and baffle replacement projects.

7.5.3. Ground Baffles. Ground baffles are not permitted on Air Force ranges.

7.5.4. Baffle Construction. As a minimum, use materials specified in Table 3. These materials may also be used for protective construction. For angled steel plate baffles, install plywood facing to prevent "splash-back" ricochets on baffles located within 5 meters (16.4 feet) of the expected position of the shooter. If shooters move downrange and fire, the splash-back protection will be required for baffles at the downrange locations as well. **Note:** Install acoustic materials to canopy baffles to reduce noise. **Note:** The Brinnell Hardness Number (BHN) measures steel hardness. The higher the BHN, the harder the steel.

Table 3. Construction Materials for Canopy and Overhead Baffles

Weapons	Ammunition	Construction*
Handguns	.22 LR, .38 cal., .45 cal., .357 cal., 9mm, .44 cal.	6 mm (0.25 in) steel plate with a nominal 440 BHN or higher, covered with one sheet of 19 mm (0.75 in) and one sheet of 11 mm (0.4375 in) plywood
Rifle, carbine, machine gun	5.56mm, 7.62mm, .30 cal.	10 mm (0.375 in) steel plate with a nominal 500 BHN, covered with one sheet of 19 mm (0.75 in) and one sheet of 11 mm (0.4375 in) plywood

***Notes:**

1. On steel plate baffles, install plywood facing on overhead baffles located within 5 meters (16.4 feet) of the shooter to mitigate the risk of "splash-back" ricochets. Attach the 19-millimeter (0.75-inch) sheathing to the steel using flathead countersunk screws. Attach the 11-millimeter (0.4375-inch) plywood to the 19-millimeter (0.75-inch) sheathing using #8 flathead screws at 300-millimeter (11.8-inch) spacing.

2. Nominal AR500 ballistic plate manufactured to BHN 500 may have BHN values ranging from 480 to 530.

7.5.5. Side Containment or Sidewalls. Sidewalls are required to prevent direct fire from exiting the range. Finished elevation of a sidewall must be above the top edge of the highest overhead baffles. Each sidewall must be at least 1.52 meters (5 feet) from the outside edge of the firing position limits of fire and extend at

least 1 meter (3.2 feet) to the rear of the firing line. Sidewalls may be made of earth, fully grouted reinforced masonry block (CMU), reinforced concrete, or hardened steel.

7.5.5.1. Continuous Walls. Vertical smooth-faced walls constructed of reinforced concrete, CMU with fully filled cores, or hardened steel may be used for sidewalls. Table 4 lists minimum wall thicknesses. Design these walls for all dead and live loads, including lateral forces. See paragraph 7.2.9 for noise reduction requirements. Walls will extend 1 meter (3.2 feet) behind the firing line to prevent a bullet fired parallel to the firing line from leaving the range.

Table 4. Sidewall Minimum Thickness

Material	Caliber			
	.45/9mm	5.56mm	7.62mm	.50
3500 psi concrete	150 mm (6 in)	150 mm (6 in)	200 mm (8 in)	300 mm (12 in)
Grout-filled CMU	200 mm (8 in) CMU	300 mm (12 in) CMU	300 mm (12 in) CMU	600 mm (24 in) CMU

7.5.5.2. Discontinuous Sidewall Baffles. Side baffles are similar to overhead baffles, except they provide discontinuous protection to each side of the range outside the entire length of the line of fire. They are set between 15 and 45 degrees relative to the line of fire and provide an advantage over continuous walls whenever cross-range ventilation is needed.

7.5.5.3. Earth Berms. The slope of earth berms must not exceed a 2:3 vertical-to-horizontal ratio unless materials are stabilized. If native soil characteristics will not produce a stable slope at this angle, use fabric reinforcement in the fill. The soil may require conditioning to achieve satisfactory soil pH levels to prevent lead decomposition. Typical angles of repose for natural soils in loose or least-dense state are shown in Table 5. Use Table 5 only as a guide, since mechanical stabilization may increase the angle of repose. The width of the top of the berm must be at least 3 meters (9.8 feet). Construct the outer layer (2 meters [6.5 feet] thick) of the impact face with sands, silty sands, or clayey sands, free of rocks, and with 100 percent passing the #4 sieve, ASTM C136. Soil with more than 40 percent clay-size particles passing the #200 sieve is not acceptable for the outer 2-meter (6.5-foot) layer of the impact face. Clay may be used for the core. For erosion control, plant a vegetative cover on the faces and tops of berms.

Irrigation devices may be used on the faces and tops of berms not subject to direct fire. Ensure access for maintenance vehicles.

Table 5. Natural Angles of Repose (Internal Friction) for Naturally Occurring Soils

Soil Types	Angle of Repose/ (Internal Friction)
Silty sand/fine sand/clayey sand	30
Coarse sand	35
Silts	25
Gravel/sandy gravel/gravelly sand	34

7.5.6. Backstops. A backstop is used behind the target line. It must stop a direct-fire bullet by media capture or deflect the bullet into a trap.

7.5.6.1. Earth Backstops. Earth backstops are the most common backstop for outdoor ranges. As an example, for a 25-meter (82-foot) outdoor range, locate the backstop so the longitudinal centerline of the berm (backstop) is at least 50 meters (164 feet) from the firing line. The toe of the slope must be located at least 9 meters (29.5 feet) from the target line nearest the backstop. The top of the backstop must be high enough so that a line drawn from the firing line and under the last overhead baffle will intersect the backstop at least 2 meters (6.5 feet) below its top. The impact face of the earth backstop must be soil with 100 percent passing the #4 sieve, ASTM C136, for a depth of 2 meters (6.5 feet). The slopes should be stabilized with grass vegetation with access locations provided for maintenance and repair equipment. Incorporate a steel deflector plate (eyebrow) into the backstop if a higher degree of confidence is required to prevent direct-fired rounds from leaving the impact area of the backstop. Soil with more than 40 percent clay-size particles passing the #200 sieve is not acceptable for use in the impact area face of the backstop. If required, soil should be conditioned to achieve suitable pH levels as indicated in paragraph 7.3.3.1.

7.5.6.2. Metal Backstops. Metal backstops are large plates installed behind the target line to stop direct fire and ricochets. Metal backstops are not approved for new construction. They are typically found on older existing partially contained or fully contained ranges but may be found on non-contained ranges. A metal backstop is not a bullet trap. See paragraph 7.5.6.4 for a discussion of bullet trap requirements. The metal backstop should be located a minimum of 15 meters (49 feet) beyond the target line to allow target and backstop maintenance and to minimize the possibility of splashback ricochets or lead exposure to the shooters executing a

downrange course of fire. Additionally, provide sufficient vehicle access to maintain the backstop. The required direct fire and ricochet containment must not be compromised when providing vehicle access. On outdoor ranges, provide corrosion protection for a metal backstop. Painting does not provide adequate protection. Consider adding an overhead cover to provide protection.

CAUTION

Do not use armor-piercing or incendiary rounds with metal backstops or bullet traps unless the backstops or traps have been designed to accommodate these rounds. If commercially designed range components are used, ensure that the products satisfy the design requirements for the ammunition used on the range.

7.5.6.3. Backstop Deflector Plates (Eyebrows). A deflector plate is not a bullet trap. See paragraph 7.5.6.4 for a discussion of bullet trap requirements. A backstop deflector is typically installed on top of an earth backstop to provided added containment safety. Install the backstop deflector plate at an angle between 30 and 42 degrees from horizontal. Angles other than these are permissible if test data and calculations support the design. Set the highest edge of the deflector plate nearest the firing line. The shallow angle deflects bullets more easily and there is less metal fatigue and denting in the surface of the plate. Anchor steel plates supported by concrete or masonry with flush countersunk heads. Eliminate exposed edges which may produce erratic ricochets. Ensure edges of steel plates are milled at all joints and joints are butted flush and smooth. Plates must be free from buckle or wave. Exposed edges must be chamfered to a 45-degree angle to a fillet approximately 4 millimeters (0.16 inch) wide. Exposed structural members supporting deflector plates are not permitted. Welding must conform to American Welding Society (AWS) D1.1, *Structural Welding Code – Steel*, latest edition. Position steel plates so welds are no closer than 450 millimeters (17.7 inches) from the center of a target position. Steel plate jointed at and supported on structural steel supports must be spot-welded. (See Figure 11.)

7.5.6.4. Bullet Traps. Only commercially designed and constructed bullet traps are permitted. Sand, media or water traps (recycled lubricating water excepted) are not permitted in new construction. Bullet traps are typically used on contained ranges and placed in front of the backstop or rear wall of the range. They are total systems that deflect, stop, trap and contain direct-fired rounds, and may incorporate vacuum or other dust-management systems to capture projectile particles. Bullet traps installed at indoor ranges must have a dust-management system installed to provide heavy metal particle removal from the range environment. The bullet trap must be

designed to accommodate the ammunition/weapon to be fired as well as the expected quantity of ammunition fired (annual rate of fire). The bullet trap should extend the entire width of the firing line. The trap shall not present any blunt surface exposure that would create a ricochet hazard internal to the equipment or at the connection to the sidewalls and floor. All future purchases of bullet traps must incorporate trap designs with a continuous, non-partitioned, and unbroken slot or bullet path into the deceleration chamber. Typical designs have in the past had fabrication details with vertical bulkhead plates in the deceleration chambers. These plates create vertical blunt edges that cause back-splash-type ricochets of the steel penetrator tips of the M855 5.56mm round. There have been documented cases of the steel penetrator tips ricocheting back to the firing line and endangering the shooters. The trap must have the capability to be cleaned of accumulated deposits of bullets and fragments while minimizing lead exposure to the maintainer.

Note: Only trained personnel wearing proper personal protection will remove lead, and only after consulting with bioenvironmental engineering personnel and following the trap manufacturer's recommended procedures.

The space directly behind the bullet trap must be easily accessible for maintenance and repair of the bullet trap and backstop. The bullet trap metal thickness and hardness must meet the minimums listed in Table 6 for each type of ammunition to be fired on the range. If lesser thicknesses are proposed, the range component designer must provide test data and calculations supporting a lesser thickness. Angles of the metal plates must conform to those directed by the manufacturer to handle the munitions fired from varying shooter positions, target distances, and target positions. Design all traps for tracer rounds if a tracer round can be used in the weapon operated on the range.

7.5.6.4.1. Qualifications for Commercial Trap Manufacturers. Commercial bullet trap and range component manufacturers must demonstrate at least five years of continuous component manufacturing and submit a minimum of five examples of similar range components installed by the manufacturer, with customer references.

Table 6. Minimum Steel Plate Thickness for Metal Backstops, Deflector Plates, and Bullet Traps

Max Angle	Ammunition	Armor Plate/ 300 BHN	440 BHN	500 BHN
42	.22 LR rim fire	6 mm	6 mm	6 mm
42	.38 cal. ball	10 mm	6 mm	6 mm
42	.45 cal./.357 cal.	10 mm	6 mm	6 mm
42	9mm pistol	10 mm	6 mm	6 mm
42	.44 cal. magnum	12 mm	10 mm	10 mm
30	5.56mm, 7.62mm	12 mm	Not recommended	10 mm
30	.30 cal. carbine	12 mm	Not recommended	10 mm

Note: 0.25-inch and 0.375-inch plate may be substituted for 6-mm and 10-mm plate, respectively.

7.5.7. Metal Backstop, Deflector Plates, and Bullet Trap Material.

7.5.7.1. Construct metal backstops, deflector plates, and bullet traps with the minimum metal thickness and hardness listed in Table 6. Small variations of BHN (less than 5 percent lower than the nominal number) are acceptable.

The design/specification must reference the applicable ASTM standard or MIL SPEC, the grade of steel required, and the hardness. To ensure that the correct grade of steel is installed (all steel plate looks the same), require a certificate of compliance. The plate thickness tests were conducted for the plate angles listed; however, a flatter plate angle is desired (the flatter the angle of the plate, the better). A shallow angle deflects bullets more easily, and there is less metal fatigue and denting on the surface of the plate.

7.5.7.2. Do not use mild structural steel, carbon steel plate, or low-alloy steel conforming to ASTM A36/A36M, *Standard Specification for Carbon Structural Steel*, ASTM A242/A242M, *Standard Specification for High-Strength, Low-Alloy Structural Steel*, or A572/A572M, *Standard Specification for High-Strength, Low-Alloy Columbium-Vanadium Structural Steel*; they lack adequate pitting resistance and deteriorate rapidly on small arms ranges.

7.6. Range Support Facilities. Range support facilities include the CA building and munitions storage room/building (Category Code 171-476), a building for the storage of range supplies and equipment (Category Code 171-472), and a building for target storage and repair (Category Code 171-473).

7.6.1. CA Building. The CA building provides a temperature-controlled environment for the CA section. The building houses classrooms, administrative offices, weapons maintenance areas, space for the cleaning and degreasing of

weapons, an alarmed weapons and munitions storage room, sanitary facilities, a student weapons cleaning room, and miscellaneous storage. Figure 9 presents an example of a typical floor plan. A small arms range with more than 21 firing points or an installation with more than one range or type of range requires proportionately larger facilities. Give consideration for space to accommodate weapons simulator training as mission needs dictate.

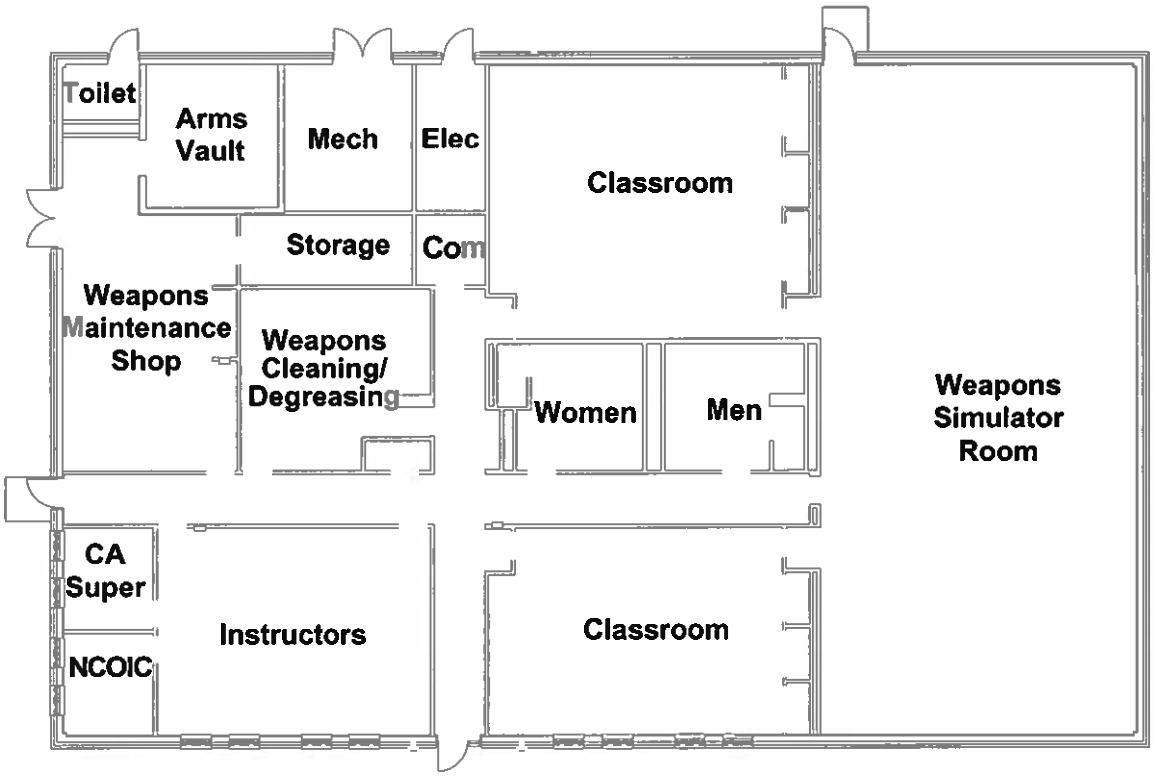


Figure 9. A Typical CA Building Configuration

7.6.1.1. Classrooms. Classrooms must be large enough to provide each student receiving handgun, rifle, shotgun, or submachine gun training a chair and a table work surface of at least 610 by 915 millimeters (24 by 36 inches). Provide space for each student receiving machine gun or LAW training to accommodate a work surface of at least 865 by 1145 millimeters (34 by 45 inches). The classroom will include a raised instructor's platform, aisle space for instructor access to individual tables, and sufficient space and connections for audiovisual equipment and computers.

7.6.1.2. Administrative Space. This area (typically about 13 square meters [140 square feet]) contains offices for program administrators and CA personnel such as the NCOIC and several instructors.

7.6.1.3. Weapons Simulator Room. This room is specifically designed for commercially purchased projection-based weapons simulators. A five-lane system requires a room approximately 10.7 meters by 5.3 meters (35 feet by 17.5 feet). A ten-lane system requires approximately 10.7 meters by 10.7 meters (35 feet by 35 feet). The room should have at least a 2.7-meter (9-foot) ceiling height and no windows. The room must have dimmable lighting, HVAC, and a minimum of four 110-volt and/or 220-volt dedicated power outlets to operate air compressors, projectors, and computers. Two dedicated telephone lines are required for operating the system and for remote diagnostic support.

7.6.1.4. Weapons Maintenance Shop. The weapons maintenance shop must have space for workbenches, hand tools, power tools, equipment, and spare parts storage. A range that supports less than 5,000 weapons requires a 28-square-meter (300-square-foot) shop. An installation that supports over 5,000 weapons will require 37 square meters (400 square feet). Provide a lavatory with potable water in the immediate area. An emergency eyewash station is also required. Provide additional ventilation as required. Maintain relative humidity (RH) below 65 percent.

7.6.1.5. Weapons Cleaning/Degreasing Room. This room accommodates workbenches, degreasing tanks, and spray hoods. Special design requirements include exhaust and ventilation air, vapor-proof electrical fixtures, compressed air service, and solvent-resistant wall and ceiling finishes. The minimum space requirement is typically about 12 square meters (130 square feet). A lavatory with potable water should be in the immediate area. An emergency eyewash station is also required. The installation safety office and bioenvironmental engineering may have additional design requirements. Exhaust make-up air can be transferred from the administrative and classroom area as long as sufficient ventilation air is provided in those areas to prevent negative air pressure in relation to the outside.

7.6.1.6. Weapons and Ammunition Storage. The vault provides secure storage for all weapons for which the CA section is responsible and a less-than-30-day supply of each type of ammunition used on the range. A gross floor area of 14 square meters (151 square feet) is usually adequate. Room construction must satisfy the requirements of AFI 31-101, *The Air Force Installation Security Program* (FOUO), and UFC 4-020-01, *Security Engineering: Project Development* (FOUO), for construction materials and specifications. Additionally, requirements of DOD 5100.76-M, *Physical Security of Sensitive Conventional Arms, Ammunition, and Explosives*, must be satisfied. In general, vault construction must provide a minimum ten minutes of forced entry delay. Typical vault construction features walls, floors, and roof of 200-millimeter (7.9-inch) concrete reinforced with two layers of number 4 rebar on 225-millimeter (9-inch) centers, fitted with a class V door. Maintain RH below 65 percent.

7.6.1.7. Latrines (Sanitary Facilities). Provide facilities for both men and women. Provide additional cold water hand-washing stations at the entrance to the CA building and at the firing range. The size of sanitary facilities depends upon the class size at that particular installation. Typically, the women's latrine need only accommodate about one-fourth the number of people as the men's latrine. Because instructors have daily contact with lead/heavy metals and may transfer these contaminants by casual contact, hand-washing stations, showers, changing areas, laundry facilities, and lockers should be provided for instructors to remove lead contamination. Use of these facilities will prevent recurring casual contamination and potential health concerns away from the range facilities. Cold water should be used for body washing to prevent lead absorption; do not use hot water since it opens the pores of the skin and permits easier absorption.

7.6.1.8. Student Weapons Cleaning Area/Room. Students must clean their weapons after completing firing. The cleaning area may be outside as long as it is covered; in cold climates, provide a room large enough to accommodate cleaning tables/benches and cleaning materials. Ensure the room is well ventilated and contains an emergency eye wash station.

7.6.1.9. Miscellaneous Storage. A storage area is required for administrative supplies, training aids, tools, and miscellaneous items. The size of this area is directly related to the type and quantity of training accomplished by the CA section.

7.6.2. Range Supplies and Equipment Storage. This building provides secure storage for miscellaneous range supplies, tools, and equipment. Use prefabricated metal, reinforced concrete, reinforced masonry, or wooden construction. Depending on location, type, and value of items stored, this facility may be combined with the target storage and repair building.

7.6.3. Range Target Storage and Repair Building. This facility provides space for repairing and storing targets and related equipment items, including target mechanisms and construction and repair material. Use prefabricated metal, reinforced concrete, masonry, or wooden construction. The repair space contains tables and workbenches. An electrical power source for operating power tools is required.

7.7. Specialty Weapons Ranges.

7.7.1. 40mm Grenade Launcher Range (Figure 3). The range supports firing of 40mm low-velocity grenades fired from M79 and M203 grenade launchers. The entire surface of the impact area must be cleared of vegetation or clipped extremely close during mowing so grenades will readily detonate on impact and EOD personnel can easily locate dud high-explosive rounds for disposal.

Construct targets using lumber, steel, or concrete. Terrain features, course of fire, and weather conditions determine if a spotting tower may be needed for observing the impact area (to note point of impact for adjustment of fire and for safety). Range personnel must be able to spot and mark dud rounds as they occur. A central tower high enough to permit observation of the entire range may be required. The range must have electrical power and lighting for the night-fire course.

7.7.2. LAW Range (Figure 4). The LAW range is set up for firing the M72 66mm rocket, the M73 35mm sub-caliber training device, and the AT-4. The danger zone to the rear of the launcher (Area F) must be clear of personnel, material, and vegetation. Arrange firing points so individual back-blast areas do not overlap.

7.7.3. Ten-Meter Machine Gun Range. If a non-contained machine gun range is not available, the machine gun must be fired on either a 10-meter tube range or on a fully contained range designed to accommodate the firing of the automatic weapon. Ten-meter machine gun ranges must incorporate range tubes as described in paragraphs 7.7.3.1 through 7.7.3.3. Range tubes function as baffles, thereby reducing the SDZ requirements. When the machine gun tube range is constructed in accordance with Figures 10 and 11, the SDZ length requirement is 700 meters measured downrange from the firing line. Range tubes are not required on a fully contained range designed for firing automatic weapons which has ballistic safety structures (baffles, traps, berms) designed to prevent penetration of the containment based on the ammunition being fired. Range tubes also are not required for a non-contained range with sufficient real estate to accommodate the full SDZ. The machine gun tube range is acceptable for M60/M240B/M249 machine guns.

7.7.3.1. Machine Gun Tubes.

7.7.3.1.1. If a non-contained machine gun range is not available, the 10-meter machine gun range tubes must measure at least 1.52 meters (5 feet) inside diameter by 7.3 meters (24 feet) in length. The tubes may be constructed of sectional pieces as long as the spigot end of the bell-spigot joint is pointed downrange. Tubes may be made of reinforced concrete pipe and must meet ASTM C76, *Standard Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe*, Class V reinforced concrete pipe (RCP) requirements, or may be steel pipe of suitable thickness fabricated from rolled plates. The interior of the tubes must have a smooth continuous surface. Repair any lifting lugs or holes so the tube interior is smooth and does not produce erratic ricochets.

7.7.3.1.2. For drainage, slope the tubes approximately 150 millimeters (6 inches) toward the target line. Firing positions must be at least 3.7 meters (12 feet) apart, measured center-to-center. The end of the tube toward the

shooter should touch the firing line. When firing, the muzzle of the machine gun will be at least 150 millimeters (6 inches) inside the tube (see Figures 10 and 11).

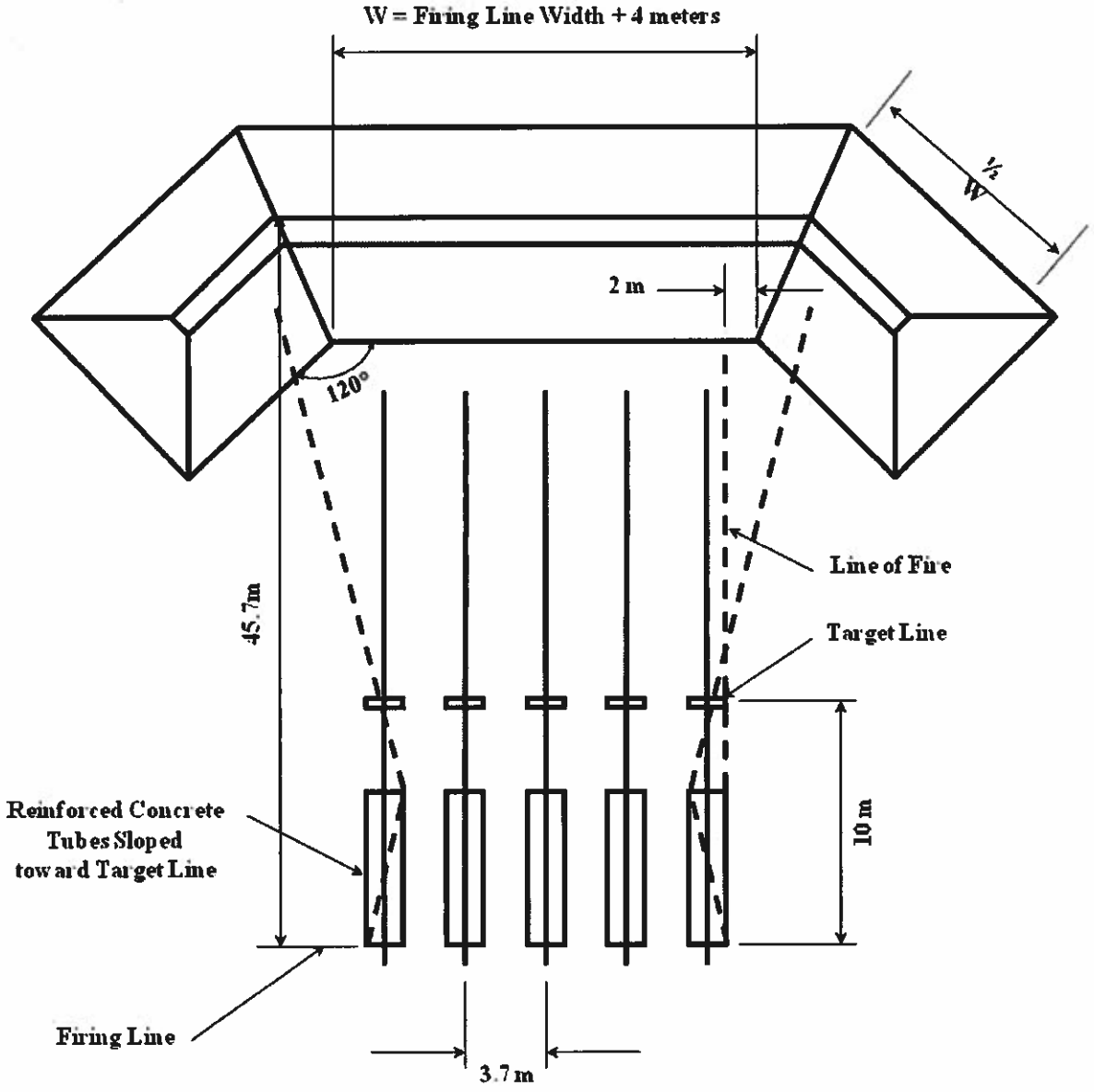


Figure 10. Machine Gun, 10-Meter Tube Range Typical Range Configuration

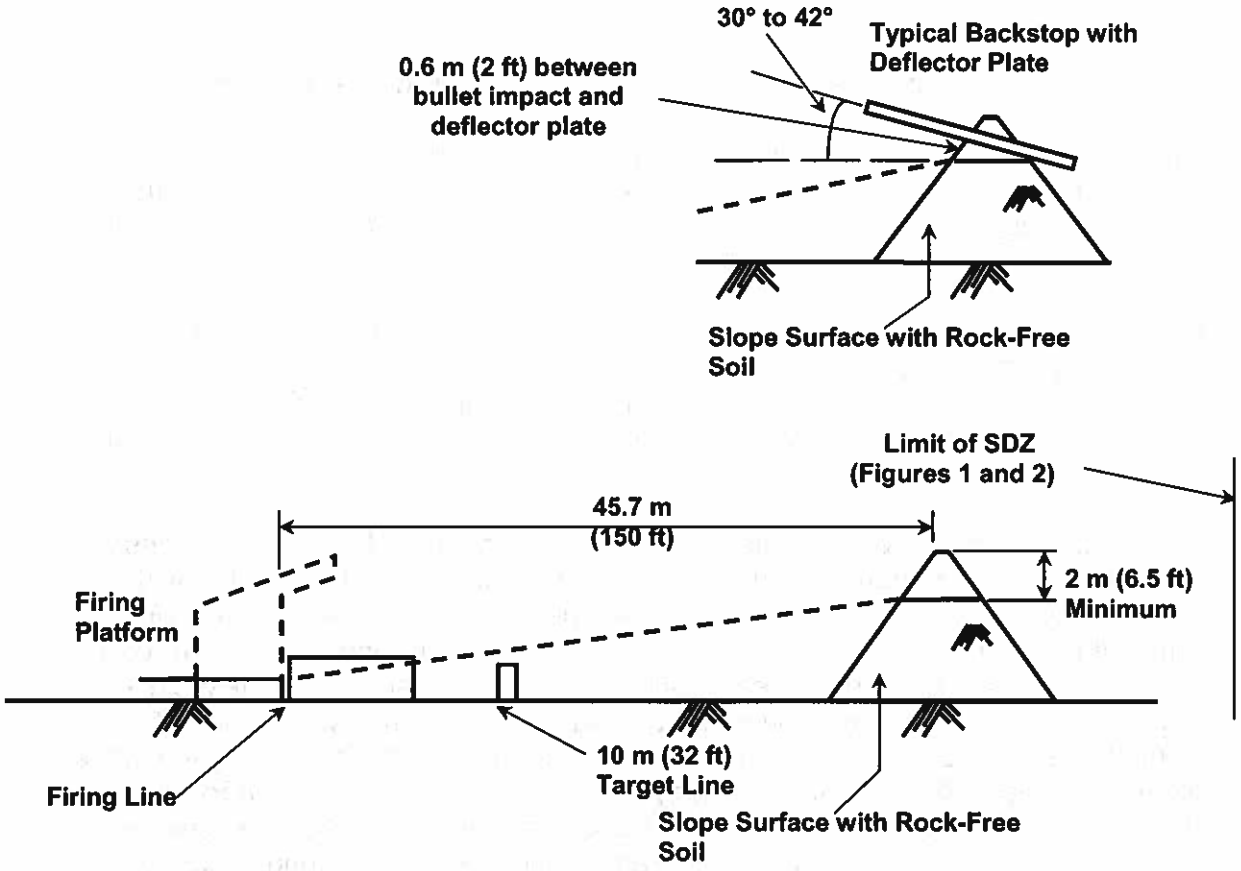


Figure 11. Machine Gun, 10-Meter Tube Range Typical Cross-Section

7.7.3.2. Firing Platform. Ensure that the firing tube placement and the firing platform height will place the muzzle of the machine gun at the approximate center of the tube diameter and at least 150 millimeters (6 inches) inside the tube. A recess in the platform may be needed, about 76 millimeters (3 inches) deep and large enough to accept a tripod.

7.7.3.3. Backstop/Deflector Plate/Bullet Trap. For berm backstops, locate the berm no more than 45.7 meters (150 feet) from the firing line to the centerline of the berm. The minimum height of the backstop is established by determining where a line drawn from the firing line to the backstop, and intersecting the highest point that a bullet could exit the target end of the tube, intersects the berm. This line must intersect the berm not less than 2 meters (6.5 feet) from the top. When a deflector plate is used, locate the deflector plate at least 0.6 meter (2 feet) above the bullet impact point on the berm. For metal trap backstops, locate the trap at least 25 meters (82 feet) away from the firing point. The line drawn from the firing point to trap shall intersect the top plate of the trap not less than 300 millimeters (12 inches) from the top, measured along the slope of the trap.

8. Design Review, Construction Inspection, Test Firing, and Trial Operation.

8.1. Design Approval. The design agent will submit a set of prefinal drawings and project specifications to the respective MAJCOM representatives of combat arms (CA), civil engineering (CE), safety (SE), and bioenvironmental engineering (SGPB) for review to ensure compliance with this ETL.

After MAJCOM approval is complete, HQ AFSFC/SFXW must approve all new range designs and major renovations (changes to the type or function of the range). This approval also applies to portable or trailer type ranges. HQ AFSFC/SFXW is the approval authority for deviations or waivers from design criteria and will coordinate requests with HQ AFCESA/CEOA.

8.2. Baffle Test Before Construction. For baffles which differ from the weapons and construction recommended in Table 3, construct baffle test blocks/cells using the baffle materials and construction details specified in the design documents. Completion of this test is required before construction and installation of the overhead baffles. From a protected position, a shooter will engage the test block/cell with direct fire from the most powerful round authorized for the range. The baffle test should have secondary containment to stop the round if it penetrates the test baffle. Do not test the baffle blocks/cells using tracers. Do not test baffles after they are installed in their overhead position. Conducting direct-fire tests following construction could be very unsafe and costly if the baffles fail to stop the round. Machine gun range tubes do not have to be tested if they meet the material requirements listed in paragraph 7.7.3.1.1.

8.3. Construction Inspection. The BCE will validate that the proper materials have been used and construction complies with the specifications and drawings. The range and its support facilities, when completed, must satisfy or exceed the requirements of this ETL. The materials, distances, and angles are critical to safety. Distances from the firing lines to target lines are critical and must be measured during construction and on completion of the range. On fully contained ranges, visually check baffles to make sure they overlap the required 150 millimeters (6 inches), there is no "blue sky" observed from any firing position or as one travels downrange toward the targets, and the HVAC system has been fully tested and commissioned.

8.4. Test Fire Requirements. After construction or rehabilitation, and before conducting training and qualification operations, CA personnel must accomplish controlled test-firing using tracer ammunition. If tracer ammunition cannot be safely fired on the range, CA personnel will fire ball ammunition with witness screens to conduct the test fire. Representatives of ground safety and CE will act as observers. The CA instructor will use the most powerful ammunition authorized for use on the range for the test. Remove all fire hazards from the range and areas surrounding the range. Make sure firefighting equipment is immediately available when conducting range tests using tracer ammunition. Provide sandbags or other protection for the

shooter during test firing. Hang witness screens of paper when firing non-tracer rounds to see if splash-back ricochets are occurring at the bullet trap when using the M855 round.

8.4.1. Non-contained Ranges. A test-fire is not required for a non-contained range. After the construction inspection confirms that the full SDZ land is available and all barriers, fences and signs are erected, proceed to trial operations.

8.4.2. Fully Contained Ranges. Do not test baffles with direct fire. Test baffles for direct-fired round containment before construction, as described in paragraph 8.2. To test for ricochet containment, the shooter first must fire service ammunition (non-tracer) from the prone position into the backstop and then at the floor. A test screen (witness) may be used to test the ricochet potential of the range floor. A test screen may be constructed from Celotex (National Stock Number [NSN] 5640-00-073-2803) or cardboard material, fashioned into a 1.2-meter by 1.2-meter (3.9-foot by 3.9-foot) four-sided cube. Place the test screen at different locations on the range floor. Fire into the range floor in front of the test screen at various angles from the firing line. To determine if ricochets would have left the range, sight along a small-diameter dowel placed through ricochet holes in the screen material. Take corrective measures if the angle of departure and the sighting verifies that the bullet left the range. To determine ricochet patterns, conduct tracer tests using the same caliber of ammunition to be used on the range. Using tracer ammunition is the fastest and most efficient method of determining ricochet patterns and hazard potential.

8.5. Trial Operations. Trial operation of a new or rehabilitated range is mandatory. The CA NCOIC and installation ground safety representative will be present during trial operations. Document the results of the trial operations in a range trial operation report. One copy of the trial operations report must be included in the construction acceptance documentation. The CA section will retain an additional copy on file for the life of the range. Include the following items in the report:

- Date of construction completion.
- Date of trial operation.
- Course of fire.
- Type of weapon, caliber, and ammunition used for the trial. (This must be the most powerful ammunition intended for use on the range.)
- Target system functioning (may be mechanical or fixed).
- Number of shooters who fired.
- Firing points used.
- Damage incurred or improperly functioning items.

9. Point of Contact. Recommendations for improvements to this ETL are encouraged and should be furnished to the Small Arms Range Program Manager, HQ AFCESA/CEOA, DSN 523-6332, commercial (850) 283-6332, e-mail AFCESAReachbackCenter@tyndall.af.mil

LESLIE C. MARTIN, Colonel, USAF
Director, Operations and Programs Support

3 Atchs
1. Minimum VDZ Height Requirements for Small Arms Ammunition for Non-contained Ranges
2. Operational Risk Management (ORM) Evaluation of Existing Range Facilities
3. Distribution List

MINIMUM VDZ HEIGHT REQUIREMENTS FOR SMALL ARMS AMMUNITION FOR NON-CONTAINED RANGES

Weapon/Caliber	Ammunition	Maximum Ordinate of Ammunition at 30° VDZ Meters (Feet)	Safety Factor Meters (Feet)	VDZ Height in Meters (Feet)
.22 long rifle		500 (1640)	175 (575)	675 (2215)
Handgun, .38 cal.	Ball, M41, PGU-12/B	500 (1640)	175 (575)	675 (2215)
Handgun, .45 cal. pistol		400 (1312)	160 (525)	560 (1837)
Submachine gun, .45 cal.		400 (1312)	160 (525)	560 (1837)
Handgun, .357 magnum		TBD	TBD	TBD
Handgun, 9mm pistol		500 (1640)	175 (575)	675 (2215)
Submachine gun, 9mm		TBD	TBD	TBD
Handgun, .44 magnum		TBD	TBD	TBD
Shotgun, 12 gauge	00 buckshot	200 (656)	130 (427)	330 (1083)
Rifle/machine gun, .30 caliber	Ball and M21	TBD	TBD	TBD
Carbine, .30 caliber		TBD	TBD	TBD
Rifle, 5.56mm	Ball, M193; tracer, M196	800 (2625)	220 (722)	1020 (3347)

Weapon/Caliber	Ammunition	Maximum Ordinate of Ammunition at 30° VDZ Meters (Feet)	Safety Factor Meters (Feet)	VDZ Height in Meters (Feet)
Rifle, 5.56mm	Ball M855; tracer, M856	900 (2953)	220 (722)	1120 (3675)
Rifle, 5.56mm	M862	TBD	TBD	TBD
Rifle/machine gun, 7.62mm	Ball, M80	1100 (3609)	265 (869)	1365 (4478)
Rifle/machine gun, 7.62mm	Match, M118	1200 (3937)	280 (919)	1480 (4856)
Machine gun, .50 cal.	Ball, M2 and M33/Tracer M17/M8 API/M20 APIT	1600 (5248)	340 (1115)	1940 (6365)
M79 and M203, 40mm low-velocity	M781/M407A1/M406/ M433/M381/M386/ M441	100 (328)	115 (377)	215 (705)
MK-19, 40mm high-velocity	M918/280M383/M430	500 (1640)	175 (575)	675 (2215)
M72 LAW, 35mm subcaliber	M73	300 (984)	145 (475)	445 (1460)
M72 Law, 66mm RKT HEAT	M72, 66 mm RKT HEAT	200 (656)	280 (919)	480 (1575)
AT4, 84mm RKT HEAT	M136	TBD	TBD	TBD

Notes:

1. VDZ in excess of 61 meters (200 feet) in height requires coordination with the local airfield manager.
2. Use a VDZ of 500 meters (1640 feet) for partially contained (baffled) ranges.

OPERATIONAL RISK MANAGEMENT (ORM) EVALUATION OF EXISTING RANGE FACILITIES

A2.1. Overview. Operational Risk Management (ORM) is a tool used to assess the risks associated with continued use of existing firing ranges that do not satisfy the minimum criteria outlined in this ETL. For further information on ORM, refer to AFI 90-901, *Operational Risk Management*, and AFPAM 90-902, *Operational Risk Management (ORM) Guidelines and Tools*. This attachment gives an example of how the ORM process can be applied to a safety evaluation of an existing range. Briefly, the ORM process can be considered to be a six-step process:

1. Identify the hazard
2. Assess the risk
3. Analyze risk control measures
4. Make control decisions
5. Implement risk controls
6. Supervise and review

A2.2. Action Items. The six steps of the process can be broken down into several sub-steps called "actions." A discussion of each action follows.

A2.2.1. Identify the Hazard. This step has three actions:

- Mission/task analysis (e.g., training personnel to fire weapons)
- Listing the hazards (e.g., fired rounds leaving the range)
- Listing the causes (e.g., baffles are of insufficient thickness)

Listing the causes of the hazards is the action where deficiencies or discrepancies are items that are found to not satisfy the ETL criteria. A tabular method for recording these actions and steps is presented in the following paragraphs.

A2.2.2. Assess the Risk. This step has three actions:

A2.2.2.1. Assess hazard severity category:

- I Catastrophic (i.e., mission failure, death, system loss)
- II Critical (i.e., major mission impact, severe injury, or major system loss)
- III Moderate (i.e., minor mission impact, injury, or system damage)
- IV Negligible (i.e., little mission impact, minor injury, or damage)

A2.2.2.2. Assess the mishap probability:

- A – Frequent, daily, often, 10^{-1} to 10^{-4}
- B – Likely, three weeks, occurs several times, 10^{-2} to 10^{-4}
- C – Occasional, six months, will occur, 10^{-3} to 10^{-5}
- D – Seldom, five years, could occur, 10^{-4} to 10^{-6}
- E – Unlikely, past five years has not occurred, rarely, 10^{-5} to 10^{-7}

A2.2.2.3. Assign a numerical rating based on the combination of steps A2.2.2.1 and A2.2.2.2. See Table A2.1 for the numerical value to assign to the risk.

Table A2.1. Mishap Probability

Severity		Frequent A	Likely B	Occasional C	Seldom D	Unlikely E
Catastrophic	I	1	2	6	8	12
Critical	II	3	4	7	11	15
Moderate	III	5	9	10	14	16
Negligible	IV	13	17	18	19	20

Note: Lower numbers indicate the highest risk.

A2.2.3. Analyze Risk-Control Measures. This step has three actions:

A2.2.3.1. Identify risk control options: Measures taken to mitigate the risk.

A2.2.3.2. Determine control effects: Select the control options desired for consideration.

A2.2.3.3. Determine the residual risk: Prioritize the control measures and re-score the risk based on the implemented control measures using the same procedures in paragraph A2.2.2.3.

A2.2.4. Make Control Decisions. This step has two actions:

A2.2.4.1. Select the risk control measures to implement.

A2.2.4.2. Decide whether the residual risk level is acceptable or not.

A2.2.5. Implement Risk Controls. This step has three actions:

A2.2.5.1. Make the implementation clear to all parties.

A2.2.5.2. Establish accountability and responsibility for implementing risk-control measures.

A2.2.5.3. Provide support to those tasked to implement the control measures.

A2.2.6. Supervise and Review. There are two actions in this step:

A2.2.6.1. Supervise the implementation of the control measures.

A2.2.6.2. Review the effectiveness of the control measures.

A2.3. Example. The following example shows a tabular method for performing the operational risk assessment for existing firing ranges. The example shows discrepancies taken from an actual assessment made at a real world Air Force base.

BASE "X" FIRING RANGE
OPERATIONAL RISK EVALUATION

Discrepancy	ORM STEP 1	ORM STEP 2			ORM STEP 3		ORM STEP 4	ORM STEP 5	ORM STEP 6
	Hazard	Severity	Probability	Risk	Control Options	Residual Risk	Decision	Implementation	Results
Baffle materials do not meet ETL guidelines	Shoot through the baffle and bullets leave the range containment	I	C	6	Add additional thickness to baffles, or replace with correct material	Repair or replace will yield I,E=12	12	Make repairs	Compare as-built repairs with ETL guidelines
Baffle materials or slopes do not meet ETL guidelines	Ricochet	II	C	7	Install plywood facing on two baffles nearest the shooter, frangible ammunition	Install plywood facing is II,D=11. Frangible ammunition is III,E=16	16	Buy frangible ammunition	Verify ammunition performs as advertised
Baffle materials or slopes do not meet ETL guidelines	Lead pollution, outside of containment	II	C	7	Lead-free ammunition, frangible ammunition	Lead Free is IV,E=20. Frangible ammo is III, D= 14	20	Buy lead-free ammunition	Verify that lead ammunition is no longer being used
Side wall berm has an opening that is visible to some firing positions	Bullets leave the range containment	I	A	1	Fill in the opening or establish a procedure to not use those firing positions	Fill opening is IV,D=19. Procedure is II,E=15	19	Fill in opening	Re-inspect to verify opening has been closed
Side wall berm has an opening that is visible to some firing positions	Lead pollution, outside of containment	II	A	3	Fill in the opening or establish a procedure to not use those firing positions; lead monitoring program; lead-free ammunition	Fill opening is IV,D=19. Procedure is II,E=15. Lead Monitoring is II,E=15, Lead Free Ammo is IV,E=20	19	Fill in opening	Re-inspect to verify opening has been closed
Surface water runoff can leave the range	Lead pollution, outside of containment	II	C	7	Water monitoring program, including surface water samples and groundwater monitoring wells	Monitoring program is II,E=15	15	Install monitoring wells and hire environmental testing firm	Regular reports documenting monitoring results

DISTRIBUTION LIST

DEPARTMENT OF DEFENSE

Defense Commissary Agency (1)
Design and Construction Division
2250 Foulois St., Suite 2
Lackland AFB, TX 78236

AAFES (1)
ATTN: RE-C
PO Box 660202
Dallas, TX 75266-0202

SPECIAL INTEREST ORGANIZATIONS

Information Handling Services (1)
15 Inverness Way East
Englewood, CO 80150

Construction Criteria Base (1)
National Institute of Bldg Sciences
Washington, DC 20005

Leon Hughes

From: Wanda Parrish
Sent: Tuesday, April 25, 2017 4:12 PM
To: Leon Hughes
Subject: FW: Crucible Re-zoning request
Attachments: 284 homes.jpg

From: Stephan Picard [mailto:sjpicard@gmail.com]
Sent: Tuesday, February 07, 2017 2:15 PM
To: Wanda Parrish
Cc: Aimee Mann; Mark Brinkman; Dallas CIV George M
Subject: Crucible Re-zoning request

Good Afternoon Ms Parrish,

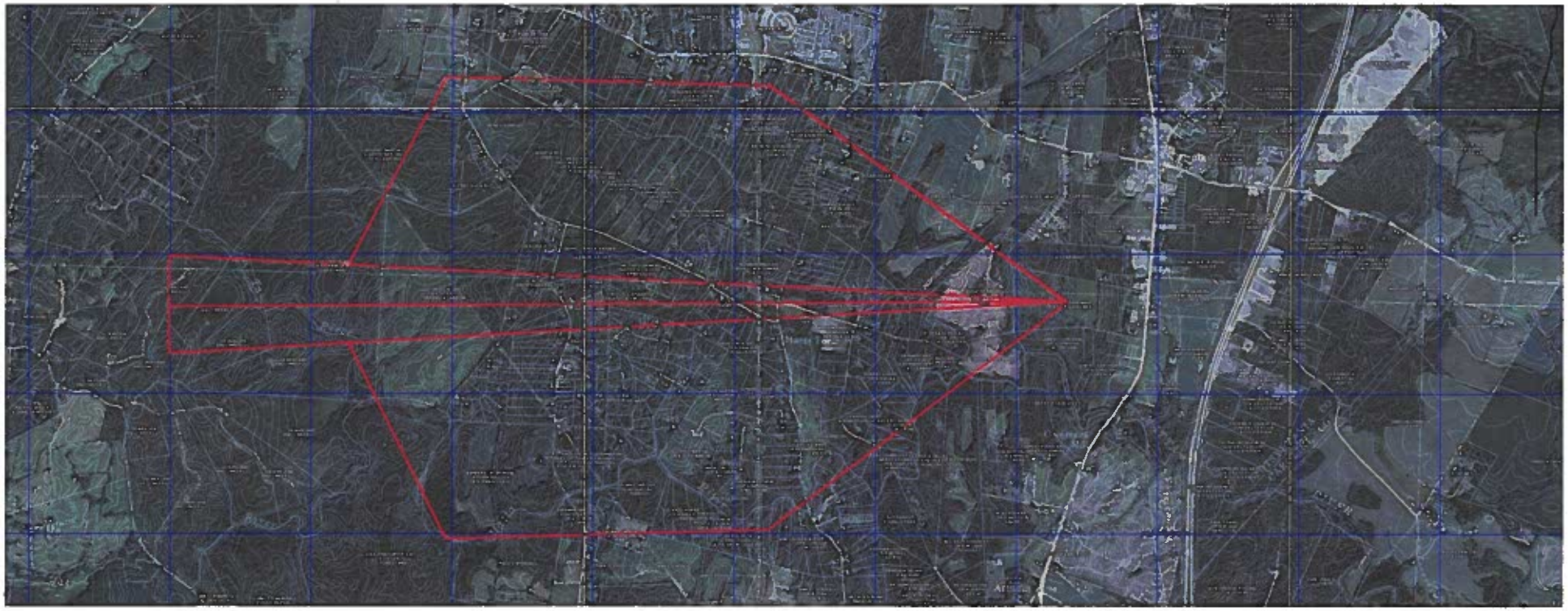
I was hoping that you might provide an update as to if the county had received the re-zoning request? As you know we in that area are very very concerned about both the physical danger of errant rounds, but also the exemption for Noise abatement.

Our group overlayed the Surface Danger Zone for 50 caliber ammunition (which is considered small arms) over the map of our county and we show that there are 284 homes in the Surface Danger Zone. I am hopeful that as a part of this process the county asks the developer to provide this information for each caliber weapon to be used? I think that this is a serious liability for the county if approved and somehow the supervisors would need to assure all those homeowners they are not in danger. I cannot imagine how you would resell a home that is inside a SDZ so this is a critical planning factor. I have included an example here and a number of us have decades of range experience and would be happy to discuss if you like.

thank you,
Stephan Picard

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This email was Malware checked by UTM 9. http://www.sophos.com

Surface Danger Zone
.50 Cal M2 ball
Distance X: 6,500M
284 properties within the SDZ



Ref USMC Range Safety Pocket Guide p32

Leon Hughes

From: Wanda Parrish
Sent: Tuesday, April 25, 2017 4:11 PM
To: Leon Hughes
Subject: FW: Noise

-----Original Message-----
From: Brinkman Col Mark T [mailto:mark.brinkman@usmc.mil]
Sent: Wednesday, January 18, 2017 9:44 AM
To: Gary Skinner; Wanda Parrish
Subject: Noise

Mr. Skinner and Ms. Parrish,

I have been doing lots of reading on noise from small arms. The below link is one of the many source documents my statements were based on last night. What I like about this document is that it gives a good understanding of noise issues in a very short concise length. If you have time I would recommend opening the document and reading section 2.4.1 and 2.4.2 starting on pg 11, and section 2.4.4 starting on pg 15. 3 pages total of reading and this document uses the same source information I used in the graphics on the handouts I gave you.

http://vko.va.ngb.army.mil/virginiaguard/environmental/VAARNG%20SONMP%20Final%20July%202005.pdf

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This email was Malware checked by UTM 9. http://www.sophos.com

Thomas and Shirley Brady
6109 Taverneer Lane
Spotsylvania, Va 22551

May 12, 2017

Re: Team-Crucible Rezoning Request

To: Tim Kaine, Terry McAuliffe, and "Buddy" Fowler, Jr.

I am sending you a copy of the letter that I sent to ALL of the Spotsylvania County Board of Supervisors and Planning Commission Members. If there is any way you could advise or help us, as well as our neighbors in Taverneer Subdivision and surrounding subdivisions in the Berkeley District, we would appreciate it very much. Shown below is the letter sent and for your information, a note was added about this facility.
****

We attended a Public Meeting on Wednesday, May 10, 2017, regarding Team-Crucible, a private military training outfit that has requested the county supervisors to rezone a 70 acre parcel located just behind D'Marie's off Rt. 1.

PLEASE Vote NO on this rezoning request. We live in Taverneer Subdivision, the danger zone area, and are at great risk from this proposed facility. This type of facility should never be near any residential housing.

We moved to this area over twenty-five (25) years ago and had our home built in Taverneer Subdivision over nineteen (19) years ago. I am a retired Spotsylvania County Public School teacher and my husband was retired from a Fredericksburg church. We felt this was a good area to raise our daughter and intended to stay in the home we had built through our lifetime. We were shocked to think that Spotsylvania County would even consider such a dangerous facility, so near any residential area. At this point, we feel Spotsylvania County Supervisors no longer care for our safety and well-being and fear the worst is yet to come.

Based on your own Code of Ethics, which puts citizen safety above revenue, we feel you have no other choice than to **DENY** the rezoning request made by Team-Crucible.

From: Very Supremely Concerned Citizens,

Thomas and Shirley Brady

NOTE: Team- Crucible is a private military training outfit currently located in Stafford, VA. They have requested Spotsylvania County Supervisors to rezone a 70 acre parcel just behind D'Marie's off Rt. 1, south of Morris Road, to allow them to build and operate a private military training center on the property. The approved plan would eventually include 6 outdoor shooting ranges, a simulated urban warfare area, a track to train vehicles using simulated improvised explosive devices (IED's), as well as other facilities. The facility would conduct training from 6am to 10pm, 7 days a week with NO noise level restrictions. There are over 800 houses down-range and 280 within the danger zone of this proposed facility presenting a real danger to our families and the noise levels would disrupt activities and drive down property values.

Thomas and Shirley Brady
6109 Taverneer Lane
Spotsylvania, Va 22551

May 12, 2017

Re: Team-Crucible Rezoning Request

To: ALL of the Spotsylvania County Board of Supervisors and Planning Commission Members

We attended a Public Meeting on Wednesday, May 10, 2017, regarding Team-Crucible, a private military training outfit that has requested the county supervisors to rezone a 70 acre parcel located just behind D'Marie's off Rt. 1.

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Based on your own Code of Ethics, which puts citizen safety above revenue, we feel you have no other choice than to **DENY** the rezoning request made by Team-Crucible.

From: Very Supremely Concerned Citizens,

Thomas and Shirley Brady

Thomas and Shirley Brady

FW: Precedence

Sent: May 17, 2017 4:18 PM

From: Wanda Parrish

To: Leon Hughes;

1 Attachments

Green county.pdf (782 KB);

FYI re Green Co case...it appears the NRA may have provided some input...

-----Original Message-----
From: Brinkman Col Mark T [mailto:mark.brinkman@usmc.mil]
Sent: Tuesday, February 21, 2017 12:55 PM
To: Wanda Parrish
Cc: Stephan Picard; mgalati07@gmail.com; Greg Cebula
Subject: Precedence

Wanda,
I assume the official package has still not been submitted, but Crucible continues to build buildings in accordance with the plan they showed us at the Speedway. The only difference is they got a zoning approval on 20 Jan (meeting on 17 Jan, zoning approval for 2 pole barns submitted on 18th, approved on 20th....pretty fast compared to how long my garage permit took). They are just claiming these buildings are "Pole Barns". Kind of funny considering I talked to the owner of the company and he told me if he does not get the re-zoning approved, he will have to sell the land. I hope the County clearly documents that the intended purpose for the 2 building they are building is for agricultural use. In the Stafford SUP case they pleaded that they had already invest significant amount of money in the facility. If they try to use this in this case, it should be noted that there is zero investment in the property to date because all investment is into agricultural use. I'm sure code Compliance will be all over them if the re-zoning is approved and these "Pole Barns" are used for something else.

I wanted to provide the attached document as another document to go in the file. This is a similar decision faced by a nearby county. The major differences in this decision are:
1) Green County was in need of a shooting range Spotsylvania County is not.
2) The Green County range would be available to the public, the Crucible is a company to generate profit.
3) The proposal for the Green County range was fully baffled (side and overhead baffles with "No Blue Sky"), the Crucible Range does not have any baffling.
4) The Green county range included acoustic baffling, the Crucible plan to date has not shown investment in acoustic materials, just moving dirt and using trees.
5) The applicant in Green county was respected in the community, Crucible has a reputation with Stafford County, and with the building of 2 "Pole Barns" on the Crucible facility when the expressed intended use for the land is the Re-Zoning to a training facility is certainly reason to question the Crucible as an upstanding citizen.
6) Green County request was to re-zone 2 acres of 105.37 acre piece of land, Crucible wants to re-zone the entire 69 acres.

The decision in Green County was NO. They did not approve the SUP.

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October 13, 2015

County of Greene, Virginia

THE GREENE COUNTY BOARD OF SUPERVISORS MET ON TUESDAY, OCTOBER 13, 2015 AT 6:30 P.M. AT THE PERFORMING ARTS CENTER AT WILLAM MONROE HIGH SCHOOL.

Present were: David Cox, Chairman
Jim Frydl, Vice Chairman
Eddie Deane, Member
Davis Lamb, Member
Bill Martin, Member
John C. Barkley, County Administrator
Ray Clarke, County Attorney
Patti Vogt, Deputy Clerk

RE: PUBLIC HEARING – PHILLIPS FAMILY PROPERTIES III, LLC/HAROLD PHILLIPS – REZONE

Mr. Bart Svoboda, Zoning Administrator, reviewed the request from Phillips Family Properties, III, LLC/Harold Phillips to rezone approximately 1.4 acres of 5.36 acres zoned B-2, Business, and M-1, Industrial, to M-2, Industrial, with the remaining acreage remaining as M-1, Industrial, zoning designation located at 56 Commerce Drive and identified on County Tax Maps as 60C-(6)-A1. (RZ#15-002) Property currently has four (4) structures. Applicant is requesting the rezone so the current structures could be leased to a multitude of businesses that are currently not available under the business zoning districts.

Planning Commission recommended approval of rezoning RZ15-002 to rezone the B-2 area of the parcel to the M-1 (Industrial, General) Zoning District as recommended by staff. The applicant was amenable to the recommendations for the application and felt that M-1 zoning would enable him to meet his goals for the property.

Mr. Harold Phillips, applicant, spoke briefly on his request.

The Chairman opened and closed the public hearing with no public comments.

Mr. Lamb questioned the specific building. Mr. Svoboda said the parcel does not cross the street.

Mr. Martin said it looks like staff and Planning Commission has done their homework. Applicant has a good plan and everything seems in order with ordinances.

Mr. Deane reiterated staff has done homework and agreed with support.

Mr. Lamb said he is ok with it.

Mr. Frydl supported the rezone saying it supports business opportunities in that area. Does not change the area. Same pattern of development.

Mr. Cox agreed saying this is in the growth area.

Upon motion by Bill Martin and unanimous vote, the Board approved rezoning RZ#15-002 to rezone the B-2 area of the parcel to M-1 (Industrial, General) Zoning District as recommended by the Planning Commission.

Recorded vote:	David Cox	-	Yes
	Jim Frydl	-	Yes
	Eddie Deane	-	Yes
	Davis Lamb	-	Yes
	Bill Martin	-	Yes

Motion carried.

RE: RECESS

The Chairman called a five minute recess.

RE: PUBLIC HEARING – ELLIS LYLE ii AND TAMMY DURRER/ELLIS AND VIRGINIA DURRER – SPECIAL USE PERMIT

Mr. Svoboda reviewed the request from Ellis Lyle II and Tammy Durrer/Ellis and Virginia Durrer for a Special Use Permit for an outdoor shooting range on approximately 2.0 acres of a 105.37 acre tract, zoned A-1, Agricultural, located near 15337 Spotswood Trail and identified on County Tax Maps as 61-(A)-6. (SUP#15-001)

The proposed site is zoned A-1and is currently a working cattle farm with existing residence and barns. This property is adjacent to growth area and is approximately 1.2 miles from the intersection of Route 29 and Route 33.

The Board of Supervisors has the ability to place conditions on a Special Use Permit to mitigate impacts by that use if the use is deemed appropriate, would not change the character and established pattern of development of area, and would be in harmony with the uses permitted .

Planning Commission recommended denial for the following reason having to do with Article 16-2:

- It would tend to change the character and established pattern of the development of the area or community in which it wishes to locate.

Lyle and Tammy Durrer, applicants, reviewed a power point presentation regarding their request. Contacted by EDA in September, 2014 if he would be interested in getting shooting range. Residents have to go to other counties to shoot. There is a need for classes in Greene for those who want to be taught safety and concealed carry laws/rules.

Mr. Durrer said they started looking into it to find out what was involved and found this to be a feasible option at this location. Met with neighbors who were willing to meet.

Factors considered were safety, noise, lead, design, traffic and benefits.

Bullet traps are self-contained and capture 99% of lead dust, stop ricochets and are bi-directional. Baffles used down range are there for safety. When looking down range, cannot see blue sky, can't hit blue sky. Have ballistic acoustical rubber to stop ricochets and help mitigate sound as it escapes Shooting stalls are 8 inches of concrete on sides and 6 inches overhead.

Standard Operating Procedure is a living document and can be revised as necessary. A Range Safety Officer will be on duty at all times during operational hours. There will be

cameras in each stall for safety. Check-in will be required at the entrance and again with the RSO. Also have to check out when done. There will be a safety and rules briefing before using the range and a document that will need signature indicating the safety rules at this range were read and understood.

Natural terrain at site was recommended by NRA. VDOT has already approved entrance and traffic.

Three different acoustical studies were conducted. One by Sheriff's Department, one self-conducted, and one by professional company which included a 24 hour study. Troy Acoustics needed to know what the ambient noise level was during operational hours. If noise level is not louder than what is being heard everyday then there can be no noise nuisance.

EPA has manual for lead management. Range will follow recommendations to control and contain lead. Lead mitigation is not that difficult. Location has clay soil which helps in mitigation. The traps capture and contain 99% of lead. Shooting stalls will be wiped down with a product that bonds to lead in between opening and closing. Traps have round counter per lane. Once maximum count is reached a company will come in to clean everything. Have to document and keep records of lead

Mr. Durrer reviewed the key design components which included concrete construction, overhead baffles, acoustic material, safety measures and ballistic rubber backstop. Also reviewed preliminary design of range, lane elevations and details, and shooting stall detail.

Mr. Durrer said the design was arrived at by conferring with accredited professionals in the industry, and the NRA. All agreed that this design is above and beyond what is required. This design will cost more but is what he thought should be done.

Benefits include having a range for local law enforcement to use, bring business to the County, and tax revenue.

In regards to property values, property assessments and tax rates are established to meet the budget of the County. Market conditions drive assessments not neighboring properties. Referred to letter from Commissioner of Revenue stating, in the last 28 years, he does not recall anything being built in the County that would cause property values to decrease.

Mr. Durrer gave Lafayette Gun Club located in Yorktown, VA as an example of a range within a growth area. Within ½ mile of the range, there exists an elementary school, county school system building, and houses that are within 150 feet of this range. This range did not stop growth be it residential or commercial. The range was built in 1948 and the school was built in 1965.

NRA has helped with design, location and acoustics, but will not endorse a range.

Mr. Durrer said he has done everything asked by the County. A legal and regulated gun range is consistent with the Zoning Ordinance and allowed by Special Use Permit. This will turn a by-right activity into a business. Use is compatible with character of surrounding development because there is no discernably established pattern at this time at this location. Will not infringe on neighboring properties because all activities will be contained within the facility and lawfully compile with all state and federal regulations. Mr. Durrer challenged anyone to demonstrate a use that would be discontinued or impossible to engage in as a result of a lawfully managed gun range. Real estate data and experience clearly show that legally compliant ranges do not impair the value of surrounding land. This will bring in much needed revenue to the County, will be good for economic growth, and does not cost the County anything. Will promote tourism, recreational venture and bring in money to other local businesses also. Land is appropriate for

shooting range and use is appropriate. Mr. Durrer said he has already invested considerable time, money and energy in this project to come up with absolute safest plan possible and provided documentation for qualified accredited professionals.

Asked that this decision not be made on emotion, not in my backyard or falsehoods, but on facts and the need for this range. Thanked all who has supported him in this endeavor. Finally asked for all in favor of the range to please stand.

The Chairman opened the floor for public comment.

Noel Guarino – 308 Kenwood Lane. Read statement on behalf of husband, retired U.S. Army Colonel, with lots of expertise in range design and management. He would not allow this range to be built on a military installation.

Michael Laukitis – Hunter, member of NRA, NRA Certified Firearms Instructor, concealed carry permit holder. Would welcome properly designed and appropriately located range in Greene. Design does not eliminate all risk. More than 70 homes within the surface safety zone which is the land around range that is at risk for escaped bullets.

Daniel Held – lives ½ mile from Big Iron and former military officer, gun owner. Would be enthusiastic about gun range if in right location. Site is not suited for gun range. No blue sky is misleading. Estimated revenue will not offset loss in property values.

Louie Deane – Entire family has been in police work. . Spoke about range in Nokesville. Questioned bullets deflected from range and hitting a person/building. Having safe place to train would be essential. Range will not require infrastructure like housing development.

Gloria Gore – Has concealed carry and shoots at ranges. This is big property rights issue. Durrer ancestors have been here since 1700's. Range has been certified by several people as being safe. Felt people who are worried have gotten information that isn't necessarily correct.

Peter Griffith – Extensive background with guns and shooting. Spoke on real estate values of surrounding homes, two of which have been on market from 200 to over 300 days. Did not feel the gun range would affect sale of property.

Suzan Hiller – Read letter from Sarah Conrad, practicing and licensed Audiologist, who also lives in Ruckersville. Noise from the proposed gun range will adversely affect the quality of life for neighbors. People will detect gun fire over ambient noise.

Mary Saunders – Son is fully disabled combat vet and suffers from traumatic brain injury, PTSD, chronic fatigue syndrome, neck/spinal problems and hearing loss. He can't handle what they are dealing with now coming from Durrer property. Continued with letter from Sarah Conrad.

Eleanor Mower - Ruckersville. Some neighbors are refugees from war-torn countries and can't be expected to not be bothered by the sound of constant gun fire. Not fair to impose this level of stress on neighbors. Strongly advised an independent noise study.

Dwight Webster – Ruckersville. Retired Army Lt. Colonel who has been in war zone. Predicts there will be a ricochet wounding within first month at this range. Expressed his concern for children in the area.

Renee Birchell – Speaking on behalf of her father Steven Birchell. Has developed commercial and residential properties in Greene. This will affect the sale of the remaining lots in Hancock Farms, their ability to receive income, and property values.

Cathy Whitebread – Godalming Subdivision. Sound is big factor. Siebein Assoc., leading acoustical consulting firm, found numerous inconsistencies in Polysonics study. Read from report. Copy included in information.

Stephanie Herring – Ruckersville . Continued with summary of Siebein analysis of noise study submitted by Big Iron. Recommended applicant be required to conduct noise study with specific criteria.

Michael Derdeyn – Attorney representing Greene County Neighbors, LLC . The issue for Board of Supervisors has to do with Zoning Ordinance. Outdoor shooting range is not appropriate use in residential area and only allowed in A-1 zone by Special Use Permit.

Beth Luellen – Ruckersville. Stay-at-home mom. Any given weekend and some week days there is barrage of gun fire from Durrer property. Noise and thought of stray bullet is absolutely disturbing. Durrer has been noncompliant with current Special Use Permit.

Anthony Herring – Ruckersville. Former member of Planning Commission. Planning Commission voted 3 to 2 to deny. Majority stated facts for their decision. As a whole, opposition is in favor of right to bear arms and an indoor range at the right location per current ordinances.

Eric Hensley – Stanardsville. Lives within ¼ mile of active hunting preserve on Route 621 where unmitigated gun fire is the norm. Can't hear within home and outside is no nuisance at all. Ambient noise is much louder. Range would provide safe controlled shooting environment.

Lance Pickett – Godalming. Want range but not at this location in middle of densely populated residential area. Did not think every safety aspect can be fully mitigated. Not in accordance with Zoning Ordinance.

Bill Saunders – He requested deferral previously to allow Durrers to address many problems in application. Provide full design, identify surface danger zone, standard operating procedure, etc. Nothing has changed. Asked Board to consider an ordinance to give clear criteria for this use.

Mark Norman – Hancock Farms. Added support for previous comments. Chose to live in Ruckersville for tranquility and peacefulness. Lives 1.6 miles from proposed range. Can clearly hear each and every shot from site when outside. Property values will decrease.

Carolyn Politis – Godalming. Half mile from propose range. Applicant does not have right to do whatever he wants on his land. Make right decision for community. Referred to several other Special Use Permits that were denied. Planning Commission recommended denial.

Kristine Norman – Hancock Farms. Reviewed past SUP's either denied or approved with conditions due to noise concerns. Noise can be considered pollution and can constitute a nuisance which is an unreasonable interference with a person's use and enjoyment of their property. Homes were there first.

Eleni Politis – Godalming. Please don't let gun range move near our homes. Hear every single day when riding bike, playing soccer, playing volleyball, frisbee or having friend over. Gets headaches because of banging sound and her dog goes crazy. Fears stray bullets.

John Glass – Hancock Farms. Chose to move to Greene because of really nice property, close to his work, and most importantly the property tax structure was so much less than neighboring Albemarle. Low taxes may be lost. Not against a range. Opposed to this location.

Tammy Laukitis – Hancock Farms. Can't believe this is even under consideration. One main concern is safety aspect. Nearest property line is 30 feet. Children won't be able to play outside. Noise another big concern. Doesn't belong in this area.

Deanna Wills – Ruckersville. Located here because of family friendly atmosphere, conservative values and serene landscape. Gun owner and believes in 2nd amendment. Proposed

site is wrong location adjacent to residential area. Misinformation that Sheriff will be able to use this range.

Wesley Wills – Member of Department of Defense. Deals with science and technology at work. In court of law, an expert will look at facts, science, physics of this range and available material. What did Board do to verify independent facts? Not on firm ground when determining scientific facts. Not comfortable with 99% containment.

Harold Bare – Purchased land from applicant's family for business investment. Mr. Snow's letter is worth nothing in this situation. Durrer can't shoot anytime he wants. All are subject to ordinances of County. No record of EDA approaching applicant. Applicant did not talk with everyone. County needs to bring schools up a notch and have better water and sewer infrastructure.

The Chairman called five minute recess.

Mike Collins – Godalming. Pro 2nd Amendment, gun owners, NRA members. This is wrong design and wrong location. Ambient noise is existing background noise level characteristic for the current environment. Constant gun fire is not ambient noise. Safety issue

Luke Whitebread – Godalming. Speaking on behalf of Frank Stoner, Milestone Investment Group. About to begin a multi-million dollar redevelopment project on south east corner at intersection of Route 29 and 33. Not this design at this location. Impact on surrounding area.

Kenneth Chase – Godalming. Read letter from Fraidoon Hovazi, J6 Developers, LLC. (planned unit development property on East View Road) Have potential buyer for property. Proposed range can potentially kill the deal and destroy potential development for elderly.

James Oliver – 27 year veteran United States Navy. Firm believer in 2nd Amendment. Has completed plans, policy and programming centered on operational risk management. Understand every single activity has risk associated with it. Standard operating procedures are pretty good start but needs to be better.

Ronald Padley – Ruckersville. Would not have settled here if he had known about this. Does not want to hear a constant barrage of gun fire. Moved here for peace and quiet. Gun owner. Prefers a totally enclosed facility which would be much safer.

Thomas Wharton – Should make decision mathematically. Acoustical measurement study. Hi powered rifle will produce 168 decibels in sound. Houses in close proximity. Impossible to reduce from 168 to 65 decibels. This range will not meet sound requirements.

Tilahun Goshu – Godalming. He and family are naturalized citizens originally from Ethiopia. After eight years, he has master's degree in public health and currently working on doctorate. Terrified for safety of his family. Children suffer from PTSD.

Meseret Workelul – Godalming . She and her husband work fulltime and he goes to school also. Have four children. Came to USA for safety. Left country and family. Worried about what will happen. Children panic at hearing gun shots.

Jerry Gore – Provided Mr. Durrer assistance in understanding acoustic challenges with this project. Forty year Navy career in acoustic engineering and 10 years as consultant. Was on site for sound testing. Noise measured will be no higher than ambient level measured at those locations. Well within criteria for this County and far safer than shooting in open field.

Ronnie Davis – Taxpayers have funded the Regional Jail which has private law enforcement range 25 minutes from here. Standard law enforcement training requires qualifying

from 7 and 15 yard line. The is not suitable for law enforcement training. Spoke on training requirements. Sheriff's Department does not need this range.

Frank Morris – Family owns several properties within vicinity of site. No problems. Great local business and lots of opportunity for stores/restaurants. Thinks this is great location and feels this does not change the character of the area.

Scott Hiller – Godalming. Owns small contracting business. This is not proper location. Over 300 homes within mile radius. Clients are putting outdoor projects on hold until decision is made on gun range. Concerned about potential 30% drop in home value.

Ramona Goff – Range safety officer and NRA certified instructor. Does not live in Greene. Impressed with plans for proposed range. First and foremost is safety. Accidents won't happen unless someone is irresponsible. Would bring in more revenue for County.

Cynthia Hash – Realtor for 16 years. Lives in Albemarle County. Concerned that this is not indoor range and it will affect property values. Possible 30% reduction within ½ mile and 25% within mile. Decreased property values equals decreased tax revenue.

Edward Wagamon - Preddy Creek. Concerned about lead mitigation. Build facsimile and test for noise levels. Doesn't think children will be frightened by gun shots. Get range design that everyone can agree on. Can't agree on this, get one somewhere else in Greene.

Temnasera McKonnen – Godalming. Has memories of living in Ethiopia and house being shot at. She and her brother were both frightened by gun fire recently. Please vote no.

Jenny Strain – Deer Lake Estates. Board's job is to uphold and enforce ordinances of County and make decisions that do not conflict with Comprehensive Plan. Will violate noise ordinance and affect home values.

Laila Bare – Why at this location? Understands applicant owns property that would be better alternative. Be prepared to defend decision made tonight. Will not be able to improve school ranking without increased, sustained revenue.

Autumn Hiller – Ruckersville. Lots of children live in surrounding neighborhoods. Dogs panic at gun fire. Gun shots this past Saturday caused her to go inside.

Claude Cooper – Registered professional engineer. Project manager for outdoor range baffle project in Prince William County, VA. Outdoor baffle design proposed is a proven technique. Acoustical treatment is also proven technique. Possible for range to be good neighbor if designed properly.

Marie Durrer – Son is applicant. Shooting this past Saturday was not on their property. . Own property and have right to shoot on property. Range is designed to be safe, controlled, state-of-art facility. Provide additional revenue for County. Will continue to shoot on property.

Steve Smith – Sheriff's Office needs range in Greene County. He's looking out for safety of deputies and citizens. Orange County wants to charge for use of range. Range here would be a lot easier for scheduling. There are no ordinances in Greene about shooting firearms on agricultural land.

Anita Schwartz - Spoke on behalf of owner at 578 Moore Road. Property line is 30 to 50 feet from range location. Owner opposes site mostly for safety and noise reasons. Would this increase appeal of Ruckersville? Opposed to range at this location.

Bill Stump – Ruckersville. County needs gun range. People need instruction on how to use guns properly. Hears lots of shooting during hunting season.

Jeff Newby – Monroe District. Lots of thing being completely distorted about this request. Venue will provide place to learn safe handling of firearms. Design is beyond state-of-the-art. Thinks this will be good for the County.

Jeff Morgan – Respect views of opposition but thought it shameful court action has been threatened if Board approves the request. Worst case scenarios described will never come true. Shooting is dangerous and a place is needed to do this in safe way.

Mark Pulczinski– Opposition has no ill will to proponents of range. Asked Board to look at facts and make comprehensive decision based on ordinances. Many residences in community. Consideration has to be for the many over the one.

Chris Findley – Ruckersville. Would welcome well designed range to County but is opposed to this design at proposed location. Information submitted by applicant demonstrates an ever-changing design that is incomplete, inconsistent and contains errors. Deny permit.

Hugh Wright – Property values. Has property on market that was active until plan was announced for gun range. This will hurt property values and sale of homes. Liked tranquility and views from his property. Deny request.

Mark Luellen – Godalming. No one contacted him. If EDA wanted Durrer to do this, why haven't we heard from them? What happens when he no longer owns property? Why is his investment more important than mine? This is business. Read quote about Lafayette Gun Club.

Darryl Mesaros –Lives in Earlysville. Rents and doesn't have place to shoot. This would be convenient, local and safe place to shoot. Urged Board to support.

Julie Kuhl – Lives within ½ mile of proposed gun range. Local realtor. This will devalue property. Citizens have shared concerns about water fees and pending property tax rate increase. Can the County afford to approve gun range in the middle of Ruckersville?

Drew Taylor – Lives in Orange County which has two gun ranges. Four essential elements for value of real estate are demand, utility, scarcity and transferability. Reviewed approaches for determining property value and recent property sales near or adjacent to gun ranges.

Chris Politis – Ruckersville. Readings not taken on western or southern boundaries of subject property. Analyzed all 114 ranges listed by the National Shooting Sports Foundation. All, with few exceptions, were in remote locations, obscured by trees or hilly terrain, few or no homes nearby, and nowhere near city center.

Heping Zheng – Godalming. Agreed with comments by neighbors. He has three children who will grow up here. Would like to have a place to shoot in the county but at another location. Has another location even been considered?

The public hearing was closed.

Mr. Cox thanked everyone for their comments and conduct during the public portion of the meeting.

Mr. and Mrs. Durrer addressed issues brought up during the hearing.

Mr. Durrer noted he is not the only person in Ruckersville who owns and shoots guns.

The acoustical engineer placed equipment where deemed appropriate.

Farm is in A-1 zone. Godalming subdivision is also in A-1 zone.

Does not own this land at this time. Special Use Permit for gun shop said no shooting range on his land. Won't own the land until this is approved.

Hours of operation of shop have changed. Notified in early spring that the SUP was never filed. Has been filed now and hours have been changed.

Mr. Durrer said he didn't knock on doors in Godalming. He met with Anthony and Stephanie Herring to explain what he was doing. He asked Anthony if he would email everyone in subdivision. Doesn't know if he did.

NRA has worked with them but does not endorse ranges. Help on location, give suggestions on how to build and connect with professionals in industry to help with process.

Mrs. Durrer asked the Board to listen to the facts that were presented. Gone above and beyond and spent many hours on this project. Done our homework and we know what we're doing. Please approve request.

Mr. Martin asked about major players. Mr. Durrer said NRA put him in touch with Range Systems, Mid-West Tactical Application Group, and Troy Acoustics. Mid-West Tactical Application did range design. Troy Acoustics did acoustical design and will apply acoustical treatments. Range Systems did the granulated trap system and overhead baffles. A concrete contractor will do all concrete work. Mr. Durrer said he would be in charge of the project as the primary contractor. He has a Class A contractor's license.

Mr. Martin asked if there are letters of support or endorsement from these three companies. Something about the engineering design and industry standards. Mr. Durrer said information should be in packet. Three companies have worked together on this design.

Mr. Martin said it is noted in the letter from Troy Acoustics that the purpose of the acoustical material inside the range is really for the convenience of the shooter. Mr. Durrer said it does help the shooter and also has an 85% co-efficient of reducing noise.

Mr. Durrer said he referred to the book from the NSSF (National Shooting Sports Foundation). The NSSF will rate a range after it is in operation.

Mr. Martin asked about a surface danger zone analysis. Mr. Durrer said this design is a bullet containment range. SDZ applies more to military type shooting ranges. Mr. Martin asked if he would provide an analysis if requested. Mr. Durrer said he could contact NRA to see if they tell him anything different.

In response to a question by Mr. Martin regarding stray rounds or ricochets leaving range as designed, Mr. Durrer said anyone saying they can build a range and guarantee 100% that nothing will come out of it would be lying. Mr. Durrer said he would not say that.

Mr. Martin asked what kind of insurance company provides comprehensive liability insurance for the owner. Mr. Durrer said insurance would be though NRA same as for his gun shop.

Mr. Martin felt it would have been useful for a representative from NRA or NSSF to have been present to address the Board. He asked where this type range is located in North America. Mr. Durrer said a range of this design is currently under construction in California.

Mr. Martin asked how far proposed range is from property line of Big Iron Gun Shop. Mr. Durrer said the range would meet setback for property and would probably be 40 to 50 yards from the shop.

Mr. Martin referred to the approval of the Special Use Permit for the gun shop in 2011. Planning Commission and Board of Supervisors were in full agreement about approval. Mr. Durrer stated at that time that he would conduct test firing of guns from time to time but it would not be anything obnoxious. Must have stayed true to this because he hasn't heard complaints about test fire. Mr. Martin said the condition on the SUP prohibiting a gun range on the subject parcel was because of a real concern at that time that it could become an issue.

Mr. Lamb asked if the representative from the NRA realized how many houses were nearby. Mr. Durrer said NRA knew there are 340 houses within a mile. Mr. Lamb said the NRA Resource Book said that one (1) bullet equal one (1) week of hazardous occupational noise exposure. An avid target shooter can be exposed to an entire year's worth of hazardous occupational noise within a few minutes. (NRA 1999) Mr. Durrer said that's true if you don't wear hearing protection, which will be required in addition to eye protection..

Mr. Deane questioned the acoustical product used and the distance from the bench to the outside opening which would be 12 feet.

Mr. Cox said thanks for hospitality by the Durrers for visit on short notice. He said he is familiar with the property as he worked on it for a time. Biggest thing is R-1 and A-1 zones adjoining.

Mr. Lamb noted indoor ranges are allowed in the A-1 district by Special Use Permit.

Mr. Deane thanked everyone for emails and phone call. The Board is concerned about each citizen and property values. Visited Mr. Pickett's house to look from that side of the fence.. Spoke with a representative of Troy Acoustics today who said the treatments and concrete walls would reduce noise to 70 decibels and gunfire would not be intrusive in the homes or backyard activities. Mr. Deane said he did not see a problem with safety as much as noise. Noise is his main issue. This will be a hi-tech gun range.

Mr. Martin said he spent time pouring over hundreds of pages of information, emails, etc. One thing is clear, we do need a gun range in Greene County. Sheriff Smith had told him that when he was a new member of the Board. The question is location. Mr. Martin pledged to help find a suitable site for a gun range in Greene County if this request is not approved.

Mr. Martin noted the Board recently rejected an application for a bed and breakfast because it was convinced by the community, data and ordinances that it did not fit with prevailing practices or within local ordinances. He believes that using a range would be a safer situation than what is happening around the county. That doesn't mean this proposed location is optimal given legitimate safety, acoustical and quality of life concerns. Finds lack of surface danger zone map a serious flaw in application. He said rounds will escape from the range and due diligence demands the applicant show that this fact has been considered. Finds the letters and comments from developers compelling. J6 Developers, Birchell, Hiller, Mile Stone Partners have expressed concern for their investments for things we have approved and have had plans to develop well before this proposal came up. Those plans are in concert with our Comprehensive Plan and Zoning Ordinance.

Mr. Martin said he is not convinced that neighbor's concerns regarding safety, noise and quality of life are adequately factored in to proposed plans. Many people have life investment in their homes and chose to live in this area without any idea that this proposal might come to fruition. Recent Boards have carefully considered concerns of neighbors prior to granting a Special Use Permit.

Mr. Martin said he understands why the Durrers want this near their home and gun shop but could not let their convenience trump local ordinance, Comprehensive Plan, or perceived safety and quality of life for neighbors. This Board has to be consistent in consideration of Special Use Permits. How could we take a position against a B&B in residential community and then support a gun range when there is clearly a higher impact, clearly safety and quality of life issues.

Despite the Planning Commission requesting Mr. Martin said he still does not see a design that convinces him that safety and quality of life issues of neighbors have been addressed. Plan still seems to be evolving. Disappointed that representative from NRA, NSSF or MTAG can't take position on this. In his opinion, no one on this Board is qualified to make technical judgements required for the safety and acoustical issues raised. So the Board counts on assurances from experts which he does not see. Personally has high level of uncertainty of much of data he has seen with this application. Sees risks associated much, much greater than potential returns. The burden is not on the County to tell applicant what is needed. Not up to the County to make this safe and in harmony with the community. Burden is on applicant to provide information so the Board feels comfortable.

Mr. Martin said this is a nation based on the rule of law. Provisions in Article 16-2 is all we have to go by. Can't make judgements outside of this. A lot of discussion tonight was outside of this. Believes the proposed use would change the character and established pattern of development in this community. Proposed use is not in harmony with the pattern of development in this area and would adversely affect the neighboring properties. Based on letters and comments from developers, it seems like there is a risk that the proposed use would discourage developers from moving ahead with approved plans. Mr. Martin is a licensed realtor and is absolutely and totally convinced that the sales of residential real estate in this area will slow dramatically because many buyers are going to be affected in their purchasing decision. Demand will decrease and ultimately the price and value will be affected. The proposed use on land zoned A-1 is fine but this parcel is surrounded by residential communities that may well be, perhaps will be, in harm's way. He is unconvinced that an active 20 lane gun range will produce noise that stays at or under the ambient noise level. Tests were done with single shots. This would affect the quality of life of families who have already made significant investments in the community. Mr. Martin said he finds this particular A-1 parcel to be inappropriate for the proposed use. No option but to vote to deny because it doesn't comply with our zoning ordinances and to approve it would be inconsistent with decisions this Board and prior Boards have made.

Mr. Frydl clarified that outdoor shooting is a use allowed as a special use under the C-1 district. A-1 district includes uses allowed in C-1 district. So it is allowed in the district. Why would this get this far? It's supposed to get this far. Applicant has right to request a special use permit and should be respected for exercising that right. To the comment, if you own property, you should be able to do whatever you want on that property. Mr. Frydl said he did not think I even those who say that truly believe it. Don't think many people here would approve of a smoke stack factory up top of the Blue Ridge Mountains. There are things that are suitable and things that are not suitable. The ordinance requires the Board to review requests. The purpose of ordinance is spelled out in State Code and includes health, safety, welfare, mitigating danger, congestion, affects upon light and movement of air. SUPs are considered to have greater impact. These permits are for the piece of property not for an individual. Durrers have done a lot of great work to have concept that is a really nice quality gun range. Mr. Frydl said he truly believes that the Durrers will do everything possible to build a safe range, to build a range that mitigates sound. The SUP is not about the Durrers. The SUP travels forever with that piece of property. Without guarantee that it is the Durrers, Mr. Frydl said he does not have the same confidence.

Mr. Frydl noted a citizen comment that a range would be a wonderful thing if designed and operated properly. He said, other than the fact that he truly believes the Durrers, there is

nothing that ties that to the land. Nothing that allows him to approve this and know that forever those conditions will be met. Proposal and restrictions don't specifically spell out mitigation of impacts. Mr. Frydl said he believes that it would change the character of development in the area and negatively impact property values. Have hard time getting past that. Doesn't see enough specifics to overturn Planning Commission decision.

Mr. Deane asked Mr. Martin if he would be pleased if the range had a roof. Mr. Martin said he did not have that plan in front of him but would love to see a plan with a roof. He would consider a range under roof much more favorably.

Mr. Deane noted the residents on Larchmont Circle now have Tractor Supply in their backyard . This changed the character of their neighborhood. Referred to the Lafayette range asking how this Board could think our law supersedes what happened there. That gun range was there first and a school was built in 1965 within a quarter mile. That ranges does not have concrete walls and baffling the Durrer range will have. Can't lean upon the law of 16-2 meaning we can't do this when a legal and regulatory compliant gun range is consistent with zoning. This SUP is simply commercializing an existing by-right activity. Gun range is compatible with character of surrounding development which has no discernable established pattern. Located adjacent to a mixed use zoning a mile from Route 29. Does not feel a range of this type will infringe on the use of neighboring properties in anyway. All commercial activities at the range will be contained within the facility lawfully compliant with State and Federal regulations. If property is sold, still under regulation. What we're doing is backwards from Lafayette. That range was built and then growth happened. Can't agree with Mr. Martin or Mr. Frydl because there is going to be shooting on this property regardless and he would rather the shooting be done within the realms of legal regulation and SUP zoning restrictions. Would rather shooting be done with us, not without us. Mr. Deane felt he would be doing a disservice to the community if he didn't vote for this range.

Mr. Lamb agreed with Mr. Martin and Mr. Frydl noting the Lafayette range is probably grandfathered. Changes will have to be made at that range when people start complaining just like at shooting range in Glenmore.

Mr. Cox said he was highly upset when he received emails with pictures a couple weeks ago. He is a farmer and proud to be one. Things happen on a farm that cannot be controlled. We all have buildings that will go downhill. Don't be making fun of a farmer's property when you don't want a gun range on 2 acres of it. Not fair to the farmer. He received phone calls, returned phone calls, had over 550 emails as of 3:30 this afternoon. Read every one of them and understand concerns. Talking about using 2 acres the furthest away from subdivisions discussed. Noted Mr. Durrer could put in a turkey house or hog operation by right. Mr. Cox said his neighbors shoot constantly at a target nailed to a cedar tree. He felt a professionally designed gun range would be safer. Safety is number one with him. Supports range as designed on 2 acres of A-1 land.

Mr. Frydl said he appreciates Mr. Dean's point that he doesn't feel like it will change the character noting the gun ranges that exists in other communities. Our ordinance is the law of Greene County and not the law of other communities. Our laws do not apply to those areas. .

Upon motion by Davis Lamb and affirmative vote, the Board denied the request for SUP#15-001 based on the following points:

Article 1 - Authority, Intent, and Enactment

1-1 Whereas, by of the General Assembly of Virginia as provided in Chapter 28, Article 8, Section 15.2-2280, Code of Virginia and amendments thereto, the governing body of any county may, by ordinance, divide the territory under its jurisdiction into districts of such number, shape and area as it may deem best suited to carry out the purpose of this article, and in each district it may regulate, restrict, permit, prohibit, and determine the following:

a. The use of land, building, structures, and other premises for agricultural, commercial, industrial, residential, floodplain and other specific uses;

1-3 Now, therefore, be it ordained by the governing body of Greene County, Virginia, for the purpose of promoting the health, safety, or general welfare of the public and of further accomplishing the objectives of Section 15.2-2283, that the following be adopted as the Zoning Ordinance of Greene County, Virginia, together with the accompanying map. This ordinance has been designed:

(1) to provide for adequate light, air, convenience of access, and safety from fire, flood and other dangers;

(3) to facilitate the creation of a convenient, attractive and harmonious community;

(6) to protect against one or more of the following: overcrowding of land, undue density of population in relation to the community facilities existing or available, obstruction of light and air, danger and congestion in travel and transportation, or loss of life, health, or property from fire, flood, panic or other dangers;

16-2 SPECIAL USE PERMITS

After review by the Planning Commission, the Board of Supervisors shall hold a public hearing and decide applications for Special Use Permits. The Board, in its decision to grant, to grant conditionally or to deny shall consider the following guidelines and standards:

a. The use shall not tend to change the character and established pattern of development of the area or community in which it wishes to locate.

b. The use shall be in harmony with the uses permitted by right under a Zoning Permit in the zoning district and shall not affect adversely the use of neighboring property.

c. The requested or related conditions shall be such that the use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof.

d. Due consideration shall be given to the suitability of the property for the use applied for with respect to trends of growth or change; the effect of the proposed use upon the community; requirements for transportation, school, parks, playgrounds, recreational areas; conservation of natural resources, preservation of flood-plains, and encouraging the most appropriate use of the land.

Recorded vote:	David Cox	-	No
	Jim Frydl	-	Yes
	Eddie Deane	-	No
	Davis Lamb	-	Yes
	Bill Martin	-	Yes

Motion carried.

Mr. Lamb thanked both applicant proponents and opposition for hard work in gathering information for members to use in making their decision. Know it has been stressful for all involved and hoped a more suitable location can be found in Greene County in the future.

RE: EXECUTIVE SESSION

Upon motion by Davis Lamb and unanimous vote, the Board entered into Executive Session to discuss legal and personnel matters pursuant to Section 2.2-3711 Subsection (a, 1-7) of the Code of Virginia.

INSERT

Recorded vote:	David Cox	-	Yes
	Jim Frydl	-	Yes
	Eddie Deane	-	Yes
	Davis Lamb	-	Yes
	Bill Martin	-	Yes

Motion carried.

Upon motion by Davis Lamb and unanimous vote, the Board returned to Open Session.

Recorded vote:	David Cox	-	Yes
	Jim Frydl	-	Yes
	Eddie Deane	-	Yes
	Davis Lamb	-	Yes
	Bill Martin	-	Yes

Motion carried.

By unanimous vote, all members certified that only public business matters lawfully exempted from the Open Meeting requirement and only such matters as identified by the motion to enter into Executive Session were discussed.

Recorded vote:	David Cox	-	Yes
	Jim Frydl	-	Yes
	Eddie Deane	-	Yes
	Davis Lamb	-	Yes
	Bill Martin	-	Yes

Motion carried.

RE: ADJOURN MEETING

The meeting was adjourned at 12:09 a.m.

David L. Cox, Chairman
Greene County Board of Supervisors

AT THE HEART OF THE MISSION
NDIA
1919 2019
2101 Wilson Boulevard, Suite 700, Arlington, VA 22201-3060 • (703) 522-1820 • (703) 522-1885 Fax • NDIA.org

June 20, 2019

Mr. John R. Garman
60 Jack Ellington Road
Fredericksburg, VA 22406

Dear Mr. Garman,

Thank you for your support of the 2019 Armament Systems Forum and Technology Demonstration.

With your support, and access to Crucible, we were able to bring together government agencies and industry to showcase their innovative, advanced technologies and products that will benefit the capabilities of the warfighter.

The NDIA team really appreciated the professionalism and ease of working with you and your team to execute a successful demonstration, a vital component to the Armament Systems Forum.

Not only would NDIA like to thank the Crucible for providing space to facilitate the Forum's Technology Demonstration, but for all the hard work that goes into providing a full-service training facility allowing soldiers to become more effective in their mission.

Sincerely,

James C. Boozer
Major General, USA (Ret)
Executive Vice President

RECEIVED
SEP 24 2018
SPOTSYLVANIA COUNTY
PLANNING DEPARTMENT

Kevin E. Lay
6117 Jefferson Davis Hwy.
Woodford, VA 22580

Sept. 21, 2018

Spotsylvania County Planning Commission
Mr. Leon Hughes
9019 Old Battlefield Blvd.
Spotsylvania, VA 22553

Members of the Planning Commission,

My wife and I have lived directly across the street from the proposed Crucible site for 24 years and my wife has been a Spotsylvania County resident for 42 years. We attended the public meeting at the racetrack to learn about Crucible and their proposal. Unfortunately, many of the people attending had preconceived opinions based on inaccurate information that, Crucible was stifled from educating the local residents about their business. Such close mindedness toward a company that has already existed for many years in another county can not be beneficial to Spotsylvania county. The unwillingness of residents and businesses to learn what Crucible is all about has opened the door for a lot of misconception and false information, which has been posted to social media, resulting in a lot of misinformed people. Everyone is entitled to their own opinion, but opinions should not be based on hearsay.

From what we have observed the property has been improved and well kept. They have done a great job in preserving a cemetery that was previously unrecognizable as such. We have personally met the owners of Crucible and believe them to be men of honor and integrity. The improvements to the property were done almost solely by the hard work of one of the owners. I have a lot of respect for anyone displaying that level of work ethic. We see their operation as a valuable resource for the government in this country's war on terror as well as a potential training resource for local law enforcement.

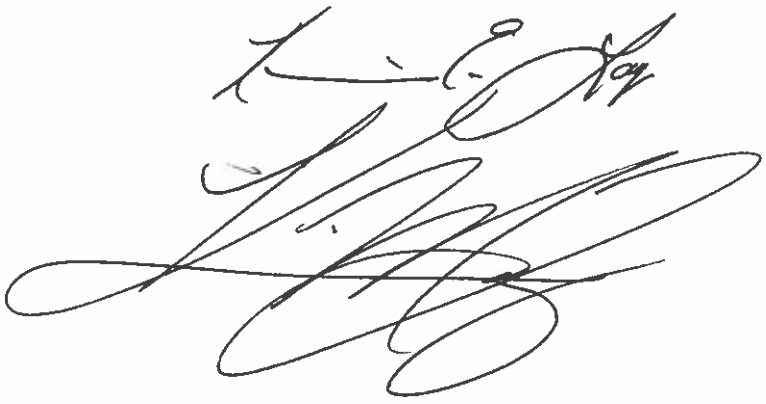
Residents have voiced concerns about stray bullets but, on most any given weekend and a lot of weekdays we hear rapid gun fire from people living in the area. This seems to be a much greater safety concern. Who is firing the guns, what training do they have, what safety precautions have they taken to see that there are no stray bullets endangering local citizens. I am all for our 2nd amendment rights and for all law abiding citizens to be well armed, but we don't know where these bullets are going or whether the guns are being used in a safe manner. On the other hand, any gun fire that would take place at Crucible would be controlled by trained professionals with proper safety barriers. The gunfire that we hear on a regular basis has been blamed on Crucible which is ridiculous. This was going on long before they were here and they have not fired any weapons on the property. All this is hypocritical and coming from misinformed people.

Living directly across the street we've had the opportunity to observed what is going on. It

appears to us that the owner of this property has been harassed by unfounded accusations. Illegal drones have been launched over the property. People have trespassed on the property. Someone even made an issue of the removal of a tree stump. Unlike the owner of the property, these people are hypocrites with no integrity and need to figure out something to do in their life that is more constructive. If people treated me like that on my own property I would be extremely angry as I'm sure the other residents of this county would be if someone did these things to them on their properties. I have heard concerns of property value loss. Allowing the number of unsightly used car dealers in this area is a much greater concern to property value loss. The legitimacy of these businesses is questionable; The local populations' need for used cars could not possibly support so many dealers. It raises the question of what else might be going on to keep these businesses going.

There have been people coming onto our property to have petitions signed against Crucible. They give exaggerated and incorrect consequences associated with the training facility. On one occasion a prospective politician came to my house and asked me what I thought of Crucible coming in. I responded that I had no problem with them. Immediately she told me she had nothing to talk to me about and promptly (and rudely) left. What a poor excuse for someone wanting to be a representative of the residents of Spotsylvania County, who is unwilling to listen to the opinions of all her constituents. I was also warned against placing a sign supporting Crucible in my yard because someone might hurt me.

In conclusion, we see Crucible as a professional operation providing valuable services to our government. It is run by men with integrity who are planning all the necessary safety and environmental precautions. If the residents of Spotsylvania County would take the time to learn facts and not rely on social media for their education then they might have a different opinion. My wife and I feel no safety threat to our family, property or property value from Crucible and think they would be as good a neighbor to Spotsylvania residents as they have been in Stafford.



OUR PURPOSE. YOUR MISSION.

January 5, 2017

To Whom It May Concern,

ADS, Inc. provides equipment and logistic solutions to the US Government. Located in Virginia Beach, VA, ADS holds more than 50 Indefinite Delivery, Indefinite Quantity (IDIQ) contracts and Blanket Purchase Agreements (BPAs) and has grown to be a top DLA Supplier and Top 50 Federal Government Contractor.

Each year ADS hosts a one day exposition for government purchasers to review the newest equipment available at Team Crucible's existing site in Stafford County.

We look forward to working with Team Crucible in their new location in Spotsylvania County and many future opportunities to bring government purchasers to the new location.

Respectfully,

Brendan Drury
Federal Sales Manager
ADS, Inc.
757-352-2536
bdrury@adsinc.com

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September 4, 2017

Planning Commission
9019 Old Battlefield Blvd.
Spotsylvania, VA. 22553

To Members of the Planning Commission and Staff,

I urge you to support the application presented to you by Crucible to build a new training facility in Spotsylvania County. I have been living next to their Stafford facility for years and often forget the facility even exists. I have been impressed with how professional and courteous they have been to us in the neighborhood.

I certainly wish them well and hope you will work with them to relocate their corporate headquarters there.

Regards,

Thomas L Rodgers

E. Rodgers
94 Arnett Way
Fredericksburg, VA 22406

RICHMOND VA 230
02 SEP 2017 PM 5 L

Planning Commission
9019 Old Battlefield Blvd.
Spotsylvania, VA 22553

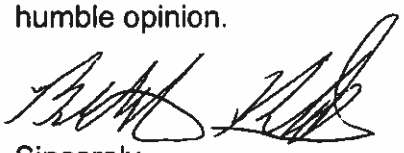
22553-203995

September 5, 2017

Planning Commission
Spotsylvania County
9019 Old Battlefield Blvd.
Spotsylvania, Va. 22553

Dear Planning Commission Members & Staff,

I would urge you to support the proposed Crucible project in your County. I am one of the closest homes to their current location and this company has respected and worked to ensure all the safety and noise concerns are addressed by those in the community. I have made friends of the staff and certainly enjoyed them as our neighbors and hope you will allow them to build a world-class facility in Spotsylvania County. The training they provide should be encouraged in my humble opinion.



Sincerely,
Britton Dovel & Family
540 940 9622

24 September 2017

From: Johnny and Anne Wolfe
140 Gold Mine Road
Fredericksburg, VA 22406

To: Planning Commission
Spotsylvania County
9019 Old Battlefield Blvd
Spotsylvania, VA 22553

Subj: Letter of Reference for The Crucible

To Planning Commission Members and Staff,

We have lived at our residence since 2006 and The Crucible has been our neighbors the entire time. We have never had any issues with them and they continue to be very respectful of the neighbor and are good neighbors.

We live on a small farm and have quite a few animals to include horses and donkeys. The Crucible has had no adverse impact to them what so ever. In fact, we are believers that desensitizing animals of common sounds in our area is actually a good thing. We believe that it provides for a calmer animal, particularly horses that are ridden, so that when they encounter such things out of their pasture environment when being ridden it is safer for the rider.

Knowing what we know about The Crucible and how they operate, there should be no concern about them being located in your county. I am positive that they will be good neighbors there as they are now in Stafford County and in our local neighborhood.

We would urge you to support their application to build a new training facility in Spotsylvania County. We wish them well and hope that you will see the benefits of allowing them to relocate their corporate headquarters there.

Sincerely,

Johnny and Anne Wolfe

From: Kelly Shannon (kshannon) <kshannon@umw.edu>
Sent: Thursday, October 05, 2017 10:17 AM
To: John Garman
Subject: FW: Crucible-SOAR meeting

Hi John,
I apologize for the delay! Here are some words from Erin, who was with the group the duration of the trip.

Thanks!

Kelly L. Shannon, MSEd, ACSM EP-C
Director, Campus Recreation
University of Mary Washington

From: "Erin Hill (ehill3)" <ehill3@umw.edu>
Date: Tuesday, October 3, 2017 at 2:13 PM
To: Kelly Shannon <kshannon@umw.edu>
Subject: Re: Crucible-SOAR meeting

To the Spotsylvania Planning Commission:
We would like to take this opportunity to speak on the character of Crucible and the company practices. As neighbors to the University of Mary Washington's Eagle Lake Outpost, they have been welcoming and helpful when it comes to events and needs. Their practices have not disturbed our patrons, events or grounds. They are peaceful neighbors and we would like to take this opportunity to state our support for their plans in Spotsylvania County.

Best,

Erin Hill
Graduate Assistant of Fitness and Wellness
University of Mary Washington
540-654-1197

8/23
2:43 pm

Dear members of the Spotsylvania County Board of Supervisors,

I am a resident of Spotsylvania County, and I support Team-Crucible.

Team Crucible provides those who protect our freedom with the training they need to operate effectively and return home safely.

This training is highly supervised and provided by a team of experts with special skills developed from past careers in the military, law enforcement, or as first responders.

Team-Crucible has operated in Stafford County for years without any issues or negative impacts on the surrounding community, and they are already working to address concerns voiced in Spotsylvania County.

I am confident Team-Crucible will make a good neighbor. Please approve the rezoning request required for their training facility in Spotsylvania County.

Sincerely,
Karin DeRemer
4000 Fountain Bridge Court
Fredericksburg, VA 22408

9/7
7:04pm

Dear members of the Spotsylvania County Board of Supervisors.

I am a resident of Spotsylvania County, and I support Team-Crucible.

There are so many reasons to support the Crucible facility in the County. But I am supportive because they are adding so many new safety features that exceed the requirements. There are so many ranges in our area, or hunt clubs that do not have any of these protections at all. These folks are professionals who want nothing more than to run a safe business to help our most important men and women in uniform. I am also glad to know that they will work with our local law enforcement to assist them in additional training that will benefit us all.

I am confident Team-Crucible will make a good neighbor. Please approve the rezoning request required for their training facility in Spotsylvania County.

Sincerely,
Frank Conway
13103 Beckman Ct
Fredericksburg, Va 22408

9/9
1:38PM

Dear members of the Spotsylvania County Board of Supervisors,

I am a resident of Spotsylvania County, and I support Team-Crucible.

After learning about the new proposal presented by Crucible, there is no question that they should be allowed to build their state-of-the-art facility here in Spotsylvania. This company is not A.P. Hill or Quantico. It is a small private company that provides very specialized training that is not provided by the U.S. government for over 20 years. They have a proven safety track record by working with our government and they have gone above and beyond to address our concerns. I welcome them here and hope you will vote to allow them to continue to provide their special services to our men and women abroad.

I am confident Team-Crucible will make a good neighbor. Please approve the rezoning request required for their training facility in Spotsylvania County.

Sincerely,
Kathy Hutchesonalabamagirl22127@gmail.com
7709 Courthouse Road
Spotsylvania, Virginia 22551

9/9
8:25 am

Dear members of the Spotsylvania County Board of Supervisors,

I am a resident of Spotsylvania County, and I support Team-Crucible.

After learning about the new proposal presented by Crucible, there is no question that they should be allowed to build their state-of-the-art facility here in Spotsylvania. This company is not A.P. Hill or Quantico. It is a small private company that provides very specialized training that is not provided by the U.S. government for over 20 years. They have a proven safety track record by working with our government and they have gone above and beyond to address our concerns. I welcome them here and hope you will vote to allow them to continue to provide their special services to our men and women abroad.

I am confident Team-Crucible will make a good neighbor. Please approve the rezoning request required for their training facility in Spotsylvania County.

Sincerely,
David Goosman
9509 Quail Meadows Dr
Spotsylvania, Va 22551

9/11
4:45 pm

Dear members of the Spotsylvania County Board of Supervisors,

I am a resident of Spotsylvania County, and I support Team-Crucible.

I have been very impressed by the new Crucible proposed facility plan before the County for consideration. It seems to me that this company took the time to listen to the community concerns and has done all they can do to address every issue. They have shown a real interest in working with us and I hope you will see fit to support their application.

I am confident Team-Crucible will make a good neighbor. Please approve the rezoning request required for their training facility in Spotsylvania County.

Sincerely,
Joshua Maida
12814 Lake Wilderness Ln
Spotsylvania, VA 21551

Residents of Taverneer Subdivision Petition Spotsylvania County, VA to **Vote NO** on Team-Crucible, a private military training outfit that has requested the county supervisors **to rezone** a 70 + acre parcel located just behind D'Marie's off Rt. 1.

	Printed Name	Signature	Address	Date
1)	Thomas Brady	Thomas Brady	6109 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
2)	Shirley Brady	Shirley Brady	6109 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
3)	Dorothy Harman	Dorothy Harman	6105 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
4)	John Johnson		6100 Taverneer Lane, Spotsylvania, VA 22551	5-25 2017
5)	Elizabeth Vickers	Elizabeth Vickers	6102 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
6)	Lester Vickers		6102 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
7)	Lester Vickers III		6102 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
8)	Chase Grymes		6106 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
9)	Ann Ison		6112 Taverneer Lane, Spotsylvania, VA 22551	5-25 2017
10)	James Ison Jr		6112 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
11)	Joyce Minor	Joyce E Minor	6116 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
12)	Cynthia Minor		6116 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
13)	Robert Robes		6114 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
14)	Tonia Robes		6114 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
15)	Wendy Laster	Wendy Laster	6114 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
16)	Edward Osborne	Colleen O Osborne	6113 Taverneer Lane, Spotsylvania, VA 22551	5-25- 2017
17)	Lauren Paul		6118 Taverneer Lane, Spotsylvania, VA 22551	5-26- 2017
18)	Nicodemus Lydell Tyler Jr.		6212 Taverneer Lane, Spotsylvania, VA 22551	5-26- 2017
19)	Larry Purtell	Larry Purtell	6215 Taverneer Lane, Spotsylvania, VA 22551	5-26- 2017
20)	Sharon Reedy	Sharon A Reedy	6310 Taverneer Lane, Spotsylvania, VA 22551	5-26- 2017
21)	Carmen Rocciolo		6301 Taverneer Lane, Spotsylvania, VA 22551	2017
~~22)~~	~~[redacted]~~	(Next 19)	Taverneer Lane, Spotsylvania, VA 22551	2017
23)	Frank Ayers		6111 Taverneer Lane, Spotsylvania, VA 22551	6-2- 2017
24)	Wallen Harman		6105 Taverneer Lane, Spotsylvania, VA 22551	

Residents of Taverneer Subdivision Petition Spotsylvania County, VA to **Vote NO** on Team-Crucible, a private military training outfit that has requested the county supervisors **to rezone** a 70 + acre parcel located just behind D'Marie's off Rt. 1. (Page 2)

	Printed Name	Signature	Address	Date
24)	David W Saunders		6108 Taverneer Lane, Spotsylvania, VA 22551	6-2-2017
25)	Michelle Spina		6101 Taverneer Lane, Spotsylvania, VA 22551	6-8-2017
26)	GARY Spina		6101 Taverneer Lane, Spotsylvania, VA 22551	6-8-2017
27)	Bryan Juniors		6110 Taverneer Lane, Spotsylvania, VA 22551	6-9-2017
28)	JOEY Lewis		6110 Taverneer Lane, Spotsylvania, VA 22551	6-9-2017
29)	Deborah D Armstrong		5708 East Point Ct., Spotsylvania, VA 22551	5-26-2017
30)	Delma Armstrong		5708 East Point Ct., Spotsylvania, VA 22551	5-26-2017
31)	RAYMOND POSTON		5706 East Point Ct., Spotsylvania, VA 22551	5-26-2017
32)	Alicia Herrera		5700 East Point Ct., Spotsylvania, VA 22551	5-26-2017

	Printed Name	Signature	Address	Date
33)	Daniel Newton		5703 South Ct, Spotsylvania, VA 22551	5-26-17 2017
34)	Pamela Vaira		5702 South Ct, Spotsylvania, VA 22551	6-2-2017
35)	Mark Schmitz		5702 South Ct, Spotsylvania, VA 22551	6-2-2017
36)	Fred Allen IV		5701 South Ct, Spotsylvania, VA 22551	6-2-2017

PLEASE Vote NO on this rezoning request

Petition to Stop the Rezoning of Lot 76-A-2

228
151
379
33
412
453

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

261
192
453

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Ed Johnson	Ed	6010 Red Fox Dr Spotsylvania VA 22551	4/
Tony Hafner	Tony H	5900 Red Fox Dr. Spotsy Va.	4-28-17
Mary Stewart	Mary Stewart	5800 Red Fox Dr. Spotsy Va	4-28-17

Petition to Stop the Rezoning of Lot 76-A-2

Petition summary and background	The residents of Thornburg are opposed to this re-zoning change unless the county ensures the following: 1. Safety: 100% of the Surface Danger Zone must reside within the property lines or the range must use overhead and side baffling consistent with the National Shooting Sport Foundation and National Rifle Association "No Blue Sky" concept. 2. Noise Pollution: Transmission of unconstrained noise pollution will have an adverse affect on quality of life and property value. Spotsylvania County must restrict noise pollution that extends beyond property lines. 3. Require full environmental impact study to include noise, water and air pollutants. 4. Require the company to post sufficient bond to clean up the lead and other residues from operations should they go out of business or abandon the site. 5. Proper notification: Any re-submissions from Team-Crucible should require positive notification of any resident or business that lives in an affected area. Based on this submission, it would include al those within the 87dBP contour, or reside in a Surface Danger Zone.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now to stop the rezoning of lot 76-A-2 to Industrial II special uses Industry Type III

Printed Name	Signature	Address	Date
Robert Kibes	Robert Kibes	6114 Tavernier lane, Spotsylvania	5/10/17
Kathy Tatum	K Tatum	6924 Roxbury Mill Ct. Spotsylvania VA 22551	5-10-17
Charles Tatum	Charles Tatum	6924 Roxbury Mill Ct. Spotsylvania VA 22551	5-10-17
Thomas Lewis	Thomas Lewis	5506 Coach Four Ln Woodford VA 22580	5/10/17
Toni Lewis	Toni Lewis	5506 Coach Four Ln Woodford VA 22580	5/10/17
Maxine Frazier	Maxine Frazier	6147 Jeff Davis Hwy Woodford VA 22580	5/10/17
Sue Ellen Elliott	Sue Ellen Elliott	6148 Jeff Davis Hwy, Woodford Va 22580	5/10/17
Wayne Brookfield	Wayne Brookfield	5920 Red Fox Dr. Spotsylvania, VA 22551	10 May 2017

Printed Name	Signature	Address	Date
Bill Blevins		6904 Cloudy Way Spotsy. VA 22551	5-10-17
Michele Harlow		1304 Heatherbrook Ct 22407	5-10-17
Peter Larson		5808 Red fox Dr Spotsy 22551	5/10/17
Melissa Bronz		6016 Harts Run Spotsy 22551	5/10/17
Stephanie Larson		5808 Red Fox Drive Spotsy 22551	5/10/17

Petition to Stop the Rezoning of Lot 76-A-2

Petition summary and background	The residents of Thornburg are opposed to this re-zoning change unless the county ensures the following: 1. Safety: 100% of the Surface Danger Zone must reside within the property lines or the range must use overhead and side baffling consistent with the National Shooting Sport Foundation and National Rifle Association "No Blue Sky" concept. 2. Noise Pollution: Transmission of unconstrained noise pollution will have an adverse affect on quality of life and property value. Spotsylvania County must restrict noise pollution that extends beyond property lines. 3. Require full environmental impact study to include noise, water and air pollutants. 4. Require the company to post sufficient bond to clean up the lead and other residues from operations should they go out of business or abandon the site. 5. Proper notification: Any re-submissions from Team-Crucible should require positive notification of any resident or business that lives in an affected area. Based on this submission, it would include al those within the 87dBP contour, or reside in a Surface Danger Zone.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now to stop the rezoning of lot 76-A-2 to Industrial II special uses Industry Type III

Printed Name	Signature	Address	Date
Mary Wyche	Mary Wyche	6011 Black Snake Ct Spotsylvania, VA	
Brian Elliott		6160 Jeff Davis Hwy	5-10-12

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Susan Matlock		5805 Red Fox Dr. Spotsylvania, VA 22551	7/4/17
Gary Smith		5832 Red Fox Dr. Spotsylvania, VA 22551	7/23/17
Sheilla Smith		5832 Red Fox Dr. Spotsylvania, VA 22551	7/23/17
Mark A. Smith		5832 Red Fox Dr. Spotsylvania, VA 22551	7/23/17
Mark A. Walsh		5801 Red Fox Dr Spotsylvania VA 22551	7/22/17
Gary Duckworth		6021 Harts Run Rd Spotsy 22551	4/29/18
Tom Hilderbrake		6000 Harts Run Spotsy, 22551	4/29/18
Karen Bohn		6101 Harts Run Spotsy 22551	4/23/18
Sandra Johnson		6010 Red Fox Dr. Spotsylvania VA 22551	4/28/18

Petition to Stop the Rezoning of Lot 76-A-2

Petition summary and background	The residents of Thornburg are opposed to this re-zoning change unless the county ensures the following: 1. Safety: 100% of the Surface Danger Zone must reside within the property lines or the range must use overhead and side baffling consistent with the National Shooting Sport Foundation and National Rifle Association "No Blue Sky" concept. 2. Noise Pollution: Transmission of unconstrained noise pollution will have an adverse affect on quality of life and property value. Spotsylvania County must restrict noise pollution that extends beyond property lines. 3. Require full environmental impact study to include noise, water and air pollutants. 4. Require the company to post sufficient bond to clean up the lead and other residues from operations should they go out of business or abandon the site. 5. Proper notification: Any re-submissions from Team-Crucible should require positive notification of any resident or business that lives in an affected area. Based on this submission, it would include al those within the 87dBP contour, or reside in a Surface Danger Zone.
Action petitioned for	We, the undersigned, are concerned citizens who urge our leaders to act now to stop the rezoning of lot 76-A-2 to Industrial II special uses Industry Type III

Printed Name	Signature	Address	Date
Cindy L Picard	Cindy L Picard	5820 Plantation Estates Way Woodford, VA 22580	5/10/17
Stephanie S bed	Stephanie S bed	6113 Tavernier Ln Spotsy, VA 22580	5/10/17
GARY DUCKWORTH	Gary Duckworth	6021 HARTS RUN SPOTSY VA 22551	5-10-17
PATRICIA HARDING	Patricia Harding	" " SAME	5-10-2017
Rhonda Graber	Rhonda Graber	6030 Harts Run Spotsylvania VA 22551	5-10-2017
Daniel Wyche	D. Wyche	6011 Black Snake Ct. Spts, Va 22551	
ERIC ELLIOTT	Eric Elliott	6144 Jefferson Davis Hwy Woodford VA 22580	5-10-17
Melissa Schooley	Melissa Schooley	5804 Plantation Estates Way Woodford, VA 22580	5-10-17

Printed Name	Signature	Address	Date
Pamela Viera	Pamela Viera	5702 South Ct. Spotsy. VA	05/10/2017
MARK SCHULTZ	[illegible]	5[illegible] SOUTH CT [illegible]SYLVANIA	05/10/2017
Freedman Partners	[illegible]	6118 Tallwood Ln 22551	5/10/17
Donna Elliott	Donna A. Elliott	6160 Jeff Davis Hwy Woodford VA 22580	5/10/17
Nelson Gentry	[illegible]	8701 Lake Anna Pkwy Spotsy. VA 22551	5/10/17

Residents of Taverneer Subdivision Petition Spotsylvania County, VA to **Vote NO** on Team-Crucible, a private military training outfit that has requested the county supervisors **to rezone** a 70 + acre parcel located just behind D'Marie's off Rt. 1.

	Printed Name	Signature	Address	Date
1)	Thomas Brady	Thomas J Brady	6109 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
2)	Shirley Brady	Shirley Brady	6109 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
3)	Dorothy Harman	Dorothy Harman	6105 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
4)	John Johnson		6100 Taverneer Lane, Spotsylvania, VA 22551	5-25 2017
5)	ELIZABETH VICKERS	Elizabeth Vickers	6102 Taverneer Lane, Spotsylvania, VA 22551	5 25 2017
6)	LESTER VICKERS		6102 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
7)	LESTER T VICKERS III		6102 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
8)	Chase Grymes		6106 Taverneer Lane, Spotsylvania, VA 22551	5.25-2017
9)	[illegible]		6112 Taverneer Lane, Spotsylvania, VA 22551	5-25 2017
10)	JAMES ISON JR		6112 Taverneer Lane, Spotsylvania, VA 22551	5-25 2017
11)	Joyce Minor	Joyce E Minor	6116 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
12)	CYNTHIA Minor		6116 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
13)	Robert Kobes		6114 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
14)	Jane Kobes		6114 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
15)	Wendy Laster	Wendy Laster	6114 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
16)	[illegible]	Colleen O'Bannon	6113 Taverneer Lane, Spotsylvania, VA 22551	5-25-2017
17)	Lauren Paul	Lauren Paul	6118 Taverneer Lane, Spotsylvania, VA 22551	5-26-2017
18)	Nicholas Lyell Tyler Jr.	Nicholas Lyell Tyler Jr.	6212 Taverneer Lane, Spotsylvania, VA 22551	5-26-2017
19)	LARRY PURTELL	Larry Purtell	6215 Taverneer Lane, Spotsylvania, VA 22551	5-26-2017
20)	SHARON KEEDY	Sharon M Keedy	6310 Taverneer Lane, Spotsylvania, VA 22551	5-26-2017
21)	Carmen Rocciolo		6301 Taverneer Lane, Spotsylvania, VA 22551	5-26-2017
~~22)~~	~~[illegible]~~	(Next Pg)	Taverneer Lane, Spotsylvania, VA 22551	2017
23)	Frank Ayers		6111 Taverneer Lane, Spotsylvania, VA 22551	2017
24)	WARREN HARMAN		6105 Taverneer Lane, Spotsylvania, VA 22551	6-2-2017

Petition Spotsylvania County, VA to **Vote NO** on Team-Crucible, a private military training outfit that has requested the county supervisors **to rezone** a 70 + acre parcel located just behind D'Marie's off Rt. 1. (Page 2)

	Printed Name	Signature	Address	Date
24)	David W Saunders		6108 Taverneer Lane, Spotsylvania, VA 22551	6-2 – 2017
25)	Michelle Spina		6101 Taverneer Lane, Spotsylvania, VA 22551	6-8 – 2017
26)	GARY SPINA		6101 Taverneer Lane, Spotsylvania, VA 22551	6-8 – 2017
27)	Bryan Junious		6110 Taverneer Lane, Spotsylvania, VA 22551	6-9- 2017
28)	JOEL LEWIS		6110 Taverneer Lane, Spotsylvania, VA 22551	6-9- 2017
29)	Debra D. Hamstead		5708 East Point Ct., Spotsylvania, VA 22551	5-26- 2017
30)	Velma Armstead		5708 East Point Ct., Spotsylvania, VA 22551	5-26- 2017
31)	RAYMOND FOSTON		5706 East Point Ct., Spotsylvania, VA 22551	5-26- 2017
32)	Alicia Herrera		5700 East Point Ct., Spotsylvania, VA 22551	5-26- 2017

	Printed Name	Signature	Address	Date
33)	Daniel Newton		5703	
	↓		↓ South Ct, Spotsylvania, VA 22551	5-26-17 2017
34)	Pamela Vaia	Pamela Vaia	5702 South Ct, Spotsylvania, VA 22551	6-2 – 2017
35)	Mark Schultz		5702 South Ct, Spotsylvania, VA 22551	6-2 – 2017
36)	Fred Allen IV		5701 South Ct, Spotsylvania, VA 22551	6-2 – 2017

PLEASE Vote NO on this rezoning request

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Susie Sallinger	Susie Sallinger	9423 Laurel OAK Dr Fredericksburg VA 22407	31-MAY 17
Patricia Burke	Patricia Burke	6817 Violet Dr Fred. VA 22407	5-31-17
Linda Stimpson	Linda L Stimpson	96 Gerber Dr. Spotsylvania VA 22408	5-31-17

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Richard S. Hitt	Richard S Hitt	310 Belle Grove Lane Spotsylvania VA 22551	2 June 2017
Jennifer Hitt	Jennifer Hitt	310 Belle Grove Lane Spotsylvania VA 22551	2 June 2017
Carl V Taylor	Carl V Taylor	110 Matta Way Spotsylvania VA 22551	2 June 2017
Cheri L Taylor	Cheri L Taylor	110 Matta Way Spotsylvania VA 22551	2 June 2017
Charlene Taylor	Charlene Taylor	110 Matta Way Spotsylvania Va 22551	2 June 2017
DALE BENWARE	Dale Benware	101 MATTA SPOTSYLVANIA VA 22551	2 June 2017
Linda Benware	Linda Benware	101 Matta Way Spotsylvania 22551	June 2, 2017
Teresa Cornwell	T Cornwell	97 Matta Way, Spotsy. VA 22553	June 2, 2017
Andrea Henry	Andrea Henry	302 Bellegrove Ln, Spotsy VA 22551	June 4, 2017

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
JOSEPH CAGNINA	J.W Cagnina	113 MATTA WAY SPOTSYLVANIA VA	1 JUNE 17
MYRNA CAgnina	Myrna Cagnina	113 Matta Way Spotsylvania VA	1 Jun 17
Robert Osborne	Robert Osborne	309 Bellgrove Lane Spotsylvania VA 22551	1 Jun 17
Marilyn Osborne	Marilyn Osborne	309 Bellgrove Lane Spotsylvania VA 22551	1 JUNE 17
Kurt Nordstrom	Kurt Nordstrom	306 Bell Grove Lane, Spotsylvania VA 22551	6/1/2017
Ruth Amunzi	Ruth Amunzi	307 Bell Grove Lane	6/1/17
MARK AMUNZEN	Mark Amunzen	307 BELL GROVE LN. SPOTSYLVANIA, VA. 22551	6/1/17
Mara Hernandez	Mara Hernandez	302 Bellgrove Ln Spotsylvania VA 22551	6/1/17
JAMES SPIVEY	J.W Spivey	112 MATTA WAY SPTSY 22551	6/1/17

Petition to Stop the Rezoning of Lot 76-A-2

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Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
John Kanary	John Kanary	109 Matta Way Spotsylvania VA	6-04-2017
Claire Kanary	Claire Kanary	109 Matta Way Spotsylvania Va 22551	6/4/17
Tony Barb	Tony Barb	304 Belle Grove Ln. Spotsy. VA.	6/4/17
Teresa Barb	Teresa Barb	304 Belle Grove La, Spotsy VA	6/4/17
MONICA DIBELLA	M DiBella	305 Bell Grove Lane, Spotsylvania VA	6/5/17
LARRY Stanley	Larry Stanley	108 matta WAY	6/11/17
TAWANNA Kelly	Tawanna Kelly	6049 STANFIELD RD. Spotsylvania	6-19-17

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Michael Elliott	Michael Elliott	6146. Jefferson Davis Hwy, Woodford, VA. 22580	6, June 2017
Donna A Elliott	Donna A Elliott	6160 Jefferson Davis Hwy Woodford, VA 22580	6, June 2017
Sue Ellen Elliott	Sue Ellen Elliott	6148 Jeff. Davis Hwy. Woodford, Va, 22580	6, June 2017
Marine Grasser	Marine Grasser	6148 Jeff Davis Hwy Woodford, VA 22580	6, June 2017
Brian Elliott	[illegible]	6160 Jeff Davis Hwy Woodford VA 22580	6-7-17
~~Caroline Hayden~~	~~Caroline Hayden~~	~~4911 Guinea Station Rd Fred 22407~~	~~6-8-17~~
~~CARROLL HAYDEN~~	~~[illegible]~~	~~4911 Guinea Station Rd Fred 22407~~	~~6-08-17~~
Douglas Taylor	[illegible]	10003 Law Place Fredericksburg, Va 22407	6/8/17
Lou Ambrosini	[illegible]	12803 West Catharpin Rd Spotsylvania 22551	6/9/17
Michael Johnson	[illegible]	3670 Shanley's Hill Rd Partlow VA 22534	6/9/17
William D Strickland	[illegible]	11421 Catharpin Rd Spotsy 22553	6/14/17
Allen Faulconer	[illegible]	8627 Brock Rd Spotsy 22553	6/14/17

Petition to Stop the Rezoning of Lot 76-A-2

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Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Barbara S Grogan	Barbara S Grogan	6016 Morris Rd Spotsy Va 22551	9 June 2017
Autumn Jewell			
Lynn Marie Lunsford	Lynn Lunsford	9217 Saint Andrews Lane, Fred. Va. 22408	June 13 2017
Sarah Vekos	Sarah Vekos	9416 Old Mill Lane, Spotsy VA 22551	7 July 2017
Meagan Carter	Meagan Carter	15 Briarwood Drive Fredericksburg VA 22405	14 July 2017
Katie Engel	Katie Engel	5410 S. Branch Rd Fredericksburg VA 22407	14 July 2017

Petition to Stop the Rezoning of Lot 76-A-2

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Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
WARREN HARMAN	Warren Harman	6105 TAVERNEER LN. SPOTSYLVANIA, VA.	6-21-17
Dorothy Harman	Dorothy Harman	6105 Taverneer LN. Spotsylvan, Va.	6-21-17
James J. Kelly Jr	James J. Kelly	6106 Taverneer Ln. Spot. VA.	6-21-17
Ishmael Paz	I Paz	6112 Taverneer Ln Spot. VA	6-21-17
Christina Armstrox		5706 East Pt Ln. Spotsy VA 22551	6-21-17
Deborah Armstr	Robert D. Armstr	5708 East Pointer Spotsylvania 22551	6-21-17
RAYMOND W BOSTON	Ray J Boston	5706 EAST POINTER, SPOTSY 22551	6-21-17
Ed CLARK	Ed Clark	5704 E. Point Cir	6-21-17
Brenda Wirt	BRENDA WIRT	5701 E. POINT CIRCLE	6-21-17

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Beverly Endicott	Beverly Endicott	6214 main street, Thorn Burg VA 22551	21, MAY 2017
MAthew CRASCO	Mathew Crasco	6214 main street, thorn burg 22551	21, MAY 2017
ELIZABeth Endicott	Elizabeth Endicott	6214 main street, thornsburge VA 22551	21- MAY 2017
Robert Kobes		6114 Taverneer lane Spotsylvania VA 22551	21-6-17
Linda Kobes		6114 Taverneer Lane Spotsylvania VA 22551	6-21-17
Wendy Laster		6114 Taverneer Ln Spotsylvania VA 22551	6/21/17
Claire Mon		6116 Taoneer Lane Spot. VA 22551	6/21/17
Joyce Minor	Joyce E. Minor	6116 TAVerneer lane Spotsylvania Va. 22551	6/21/17
Tom Vickers		602 TAVERNEER LANE SPOTSYLVANIA VA 22551	6-21-17

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
ELVIA RATLIFF	Elvia Ratliff	105 Matta Way, spotsy va 22551	6.29.17
GERALD WILLIAMSON	[illegible]	102 SAINT SULIAN Ct SPOTS VA 22551	6.29.17
James A. Strat	[illegible]	508 Santee DR. Spotsy 22551	6-29-17
Stephen strat	[illegible]	508 Santee dr spotsylvania va 22551	6-29.17
DorcThy Ford	[illegible]	504 Santee Dr Spotsylvania 22551	6-30-17

Petition to Stop the Rezoning of Lot 76-A-2

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Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Travis Urda		7635 Po River Dr. Spotsylvania, VA 22551	04 July 2017
Amy Philbrick		11819 Duck Circle Spotsylvania VA 22553	7/11/17
PAM CRISP		105 Creek Ln. Flaurg VA 22407	7-12-17
Dwayne Crisp		105 Creek Ln Fburg VA 22407	7-12-17
Julia Lookabill		6907 Marble Hills Dr. Spotsy VA 22551	7-12-17
Ronnie Lookabill		6907 Marble Hills Dr. Spotsy VA 22551	7-12-17
Michael Killian		4 Shetland Ct., Spotsylvania VA 22551	7-12-17
Charles Andrews		11300 Enchanted Woods Way Fredericksburg 22407	7-12-17
Stephanie Andrews		11300 Enchanted Woods Way Fredericksburg 22407	7-12-17

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Tom Lee	Tom Lee	6040 Harms Ct. P.O. 709 Woodford 22565 Thornburg	7-9-17
James Wade	James Wade	15093 CRUSP LN WOODFORD VA 22580	9-9-17
Robert Lefler	Robert Lefler	11330 Jackson Trail Spts. VA 22553	9-9-17
Denise Craig	Denise R Craig	6544 Lanes Corner Rd Spts VA 22551	9-9-17
Laura Smith	L. Smith	11669 Eastham Rd Bumpass VA 23024	7-9-17
Todd Leake	Michael Leake	7315 Clover Hill Rd Spotsy. VA 22551	7-10-17
Jose RAMIREZ		6851 Harris RD Spotsylvania VA 22551	7/10/17
Antonio Rivas		5414 Mudd tavern RD Thornburg VA	7/10/17
Mariana Ramirez		5414 Mudd tavern RD Thornburg VA	7/10/17

Petition to Stop the Rezoning of Lot 76-A-2

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Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Claudia Garcia		5851 MORRIS RD SPOTSYLVANIA VA 22551	7 10 17
MARSIA MARCUS		5414 MUD TAVERN RD THORNBURG VA 22580	7 10 17
MARCO BIANCO		5851 MORRIS RD SPOTSYLVANIA VA 22551	
Don Reedy		6411 Adamson Rd, Woodford, VA	7-10-17
ANTONIO LARA		5851 MORRIS RD SPOTSYLVANIA VA 22551	7-10-17
ELISEO GARCIA		6411 ADAMSON RD WOODFUD VA 22551	7-10-17
Tristan Feduccia		6900 in the woods way VA 22551	7-10-17
Paula Feduccia		6900 In the woods Way Spotsy VA 22551	7/10/17
Nubia Montano		424 land Or drive, Rther Glen, VA	7/11/17

Petition to Stop the Rezoning of Lot 76-A-2

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
PETER LARSON	PE LARSON	5808 RED FOX DR, THORNBURG, 22551	31 MAY '17
Greg Jeffers	Greg Jeffers	507 Redground Dr, Ruther Glen, VA 22546	15 Jun 17
Charles Hall	Charles Hall	3616 shirleys Hill road partlow VA 22534	7-15-17
Jimmy Guevara	Jimmy Guevara	11708 virginia Pine Dr. Germantown MD	7/15/17
Andrew Iannone	Andrew Iannone	5309 Sovereign Place Frederick MD	7/15/17
Lea Handlesheit	Lea Handlesheit	638 fewers lane, WOODFORD VA 22580	7/15/17
BRANDIE HANDLESHEIT	BHandlesheit	404 S. BROOKS DR FBURG VA 22408	7/15/17
Evan Pere	Evan Pere	637 charlotte Rd Richmond VA 23222	7/15/17
ROSA LOPEZ	Rosa Lopez	5414 mud tavern Rd	7/15/17
Mike Evans	Mike Evans	4530 MORRIS Rd Spotsy 22551	5/16/17
Jacqueline Tiller	Jacqueline Tiller	3609 Partlow Rd., Partlow, VA 22534	7/16/17
Angela Rose Mastrovito	Angela Rose Mastrovito	5751 Partlow Rd Partlow 22534	7.16.17
Amanda Saffelle	Amanda Saffelle	8600 Sleepy Hollow Ln, Partlow VA 22534	7-16-17

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Jon D Kimmel		118A Lone OAK Rd Partlow VA 22534	7-8-17
Jon D Kimmel II		118A lone oak RD. partlow VA. 22534	7-8-17
Jessica Hawkins		118A Lone Oak Rd Partlow Va 22534	7-8-17
Marcy Specht	Marcy Specht	7903 lakeanna Pkwy Spotsy VA 22551	7-8-17
Todd Lanoue		10201 Tamington Way Spotsy 22551	7-8-17
Timothy Specht		7903 lake anna parkway spots. 22551	7-8-17
Lisa Leichsenring		10078 Gdansk Rd.	7/8/17
Tina Stoker		15390 Union Church Rd 23015	7/8/17
Linda Lee	Linda Lee	6040 Hamp Ct. P.O. Box 709 Woodford, Va 22565 Thornburg	7-9-17

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
KAREN BOHN	Karen Bohn	6101 HARTS RUN SPOTSYLVANIA VA	7/10/2017
CAROL REEDY	Carol Reedy	6411 ADAMSON Rd, WOODFORD, VA	7/10/2017
BERNER JOHNSON	Berner Johnson	8804 MILLWOOD DR, SPOTSYLVANIA, VA	7/10/2017
KAY ANN JOHNSON	Kay Ann Johnson	8804 MILLWOOD DR, SPOTSYLVANIA, VA.	10 July '17
BILL ISON	Bill Ison	MILLSTREAM, Spotsylvania	7/10/17
Linda Ison	Linda Ison	Millstream Spotsylvania	7/10/17
Bob Brown	Bob Brown	8808 MILLWOOD - SPOTSY	7/10/17
MARIANO RAMIREZ	MR	5414 Mudd TAVERN Rd VA 22580	07.10.17
MESINA MARIANO	RM	5851 MORRIS RD SPOTSYLVANIA VA 22551	7.10.17

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Andrea L. Arthur	Andrea Arthur	5931 Marye Rd Woodford VA 22580	7-2-17
James Atwell	James R Att	5931 MARYE RD Woodford VA 22550	7-2-17
Bobbie Cauthorn	Bobbie Cauthorn	14059 Stonewall Jackson rd, Woodford VA 22580	7-6-17
Bill Blevins	Bill Blevins	6904 CloudyWAY Spotsy 22551	7-6-17
TRACY BLEVINS	TBlevins	6904 Cloudy Way Spotsy 22551	7/6/17
Elizabeth Berry	E Berry	4010 Claiborne Plantation Fred 22408	7-6-17
Jeanette Irgang	Jeanette Irgang	6 50 L Prospect Fred 22407	7-7-17
James Bowling	J Bowling	4433 Fairview Drive Woodford VA 22580	7-7-17
James Bryant	James Bryant	6701 Hook Ct Spotsylvania	7-7-17

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
CRISTIAN [redacted]	[redacted]	5851 MORRIS RD SPOTSYVANIA VA 22551	7-14-17
Tamara v Mark Mullick	Tamara Mullick	6304 Grace Hill, Spotsylvania VA 22551	7/14/17
Mark Mullick	Mark Mullick	6304 GRACE HILL SPOTSYLVANIA VA 22551	7-14-17
Alicia Adams	AAdam	4704 Colonnade Way 22408	7/15/17
CynthiaAckerman	CyRA	12124 Shotleaf Rd 22546	7/15/17
Melissa Reyes	MaissaR	835 campers lane 22546 Ruther Glen	7/15/17
Jalissa Reyes	JalissaR	835 campers lane 22546	7/15/17
ENSO MORENO	EHM	5851 MORRIS RD SPOTSYVANIA VA 22551	7-17-17
ALISSON REMIAS	AR	5158 MORRIS RD SPOTSYVANIA VA 22551	7 17 17

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Idelma Reyes		5231 magnolia Pl Fredericksburg VA 22407	7/16/2017
Malissa Reyes		835 campers lane ruther Glen VA 22546	16 July 17
Hana Chahan		8410 Shepherds Way, Partlow VA 22534	07/16/17
Will Yarbrough		123 Main street thornburg VA 22551	07/17/17
Eric Crook		123 Main Street thornburg VA 22551	07/17/17
Kevin collins		1209 SUNKEN Rock	7/17/17
JACOB LOHR		5817 MORRIS RD SPOTSYLVANIA VA 22551	7/19/17
Jane Prout		3301 Riverbend Ct Bumpass VA 23024	7/19/17
Joseph L Bongiovi		3233 CAVALRY RIDGE RD Fd. VA	7/19/17

Petition to Stop the Rezoning of Lot 76-A-2

9

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
ABE 2 SOH		5703 South ct Spotsylvania	8-4-18
BRIAN HACKETT		5700 SOUTH CT SPOTSYLVANIA	8-4-18
Frank S. Ayers		6111 Tavern Rd Spotsylvania	8-4-18
Mary Smart	Mary Smart	we live in Spotsy 5641 Bear Lane Woodford 22580	8-5-18
Jim Smart	Jim Smart	5641 Bear Lane Woodford 22580	8-5-18
Patricia L Chew	Patricia Chew	6884 South Roxbury Mill Rd 22565	8-10-18
BRANDI PARRISH	Brandi Parrish	11115 Stoneade Dr. Spotsylvania	8-11-18
Matt Burkett		5919 Cascade Dr Fbg 22407	8-12-18
ANDREW VALENCIA		613 LANCASTER ST, F'BURG 22405	8-12-18

Petition to Stop the Rezoning of Lot 76-A-2

6

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
B. Scott Cook	B Scott Cook	10818 Catharpin Rd Spotsy VA 22553	8-13-18
Jacqueline Williams	Jacqueline Williams	9410 Everette Ct Spotsy VA 22553	8-13-18
Quander Kay	Quander Kay	6205 Taverneer Ln, Spotsy, 22551	8-15-18
Mary Newton	Mary Newton	7204 Courthouse Rd Spotsy 22551	10/6/18
Cliff Newton	Cliff C Newton	7204 Courthouse Rd Spotsy 22551	10/6/18
Tonya Newton	Tonya Newton	7457 Courthouse Rd Spotsy VA 22551	10/6/18

Petition to Stop the Rezoning of Lot 76-A-2

9

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Kate Valencia		613 Lancaster St Fburg VA 22405	8/12/18
Kate Powers	Kate Powers	6533 Venison Dr Fredericksburg VA 22407	8/13/18
Ruth Freeman	Ruth Freeman	5798 First Landing Way Spfld VA	8/13/18
Rose O Davis	Rose O. Davis	411 Polk Dr. Spotsylvania, VA 22551	8/13/18
ROBERT D. DAVIS	Robert D. Davis	411 POLK DR. SPOTSYLVANIA, VA 22551	8/13/18
Tim Henderson		1150 Rogers Dr F'burg 22408	8/13/18
NORA ELDRIDGE	Nora Eldridge	10003 MOORGATE AVE #104 SPOTSY. VA 22553	8/13/18
AUDREY GARDINER	Audrey Gardiner	12725 Banner Plantation Dr. Fredericksburg VA 22407	8-13-18
Rabih Abousmaid	Rabih Abousmaid	5821 Jackson Rd. Fredericksburg VA 22407	8-13-18

Petition to Stop the Rezoning of Lot 76-A-2

We, the residents of Spotsylvania, call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a military training facility. Such a facility would physically threaten our homes, families & property, degrade our property values, be a noise nuisance, and has no place in such close proximity to our homes and businesses. We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility. Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

Printed Name	Signature	Address	Date
John Q. Public	John Q. Public	123 Main Street, Thornburg, VA 22551	23 May 2017
Jerry Spillman		5818 Morris Rd Spotsy	9-12-17
michael J. Galati		6011 Rd Fox Dr. Spotsy 22551	10-14-17
Marlena Bittner		6331 Heronedam way Spotsy 22551	10-19-17
Martha Ayres	Martha Ayres	5949 Partlow Rd Spotsy 22551	7-29-18
Beverly Rueda		5953 Partlow Rd Spotsy 22551	7-29-18
TODD WOOLLAM		3co MORNINGSIDE DR FRED 22401	8-2-18
William D. McClain		11415 Wytheville Ct F'burg 22407	8-2-18
Benjamin Wright		6001 OAKTON BRANCH LN FREDERICKSBURG VA	8-2-18
Christopher Bare		205 Hawke St APT B Fbg VA 22401	8-2-18

ipetitions
YOUR VOICE COUNTS

This petition has collected
192 signatures
using the online tools at ipetitions.com

Printed on 2018-12-10

Demand the Board of Supervisors deny the Crucible re-zoning request

About this petition

We, the residents of Spotsylvania call for the Spotsylvania County Board of Supervisors to reject the request by Team-Crucible for a zoning variance on lot 76-A-2 from agricultural to industrial to build a mercenary training facility.

Such a facility would physically threaten our homes, families and property, degrade our property values, be a noise nuisance, and this type of business has no place in such close proximity to our homes and businesses.

We further insist that the Board of Supervisors take all necessary actions to stop Crucible from proceeding with the building and use of this facility.

Any resubmission by Team-Crucible should require positive notification of any residence, property owner, or business within the 87 dBP counter line or Surface Danger Zone.

THANK YOU.

http://StopCrucible.com

Signatures

1. Name: Katie Skelly on 2017-05-30 14:28:25
Please provide your zip code: 22580
Please enter your street address: 6401 Adamson Ln

---

2. Name: Heather Wheeler on 2017-05-30 14:31:34
Please provide your zip code: 22551
Please enter your street address: 7400 courthouse road Spotsylvania va 22551

---

3. Name: Thomas vickers on 2017-05-30 15:07:13
Please provide your zip code: 22551
Please enter your street address: 6102 Taverneeer LN

---

4. Name: Eadee Foley on 2017-05-30 20:08:03
Please provide your zip code: 22580
Please enter your street address: 5409 Hams Ford Rd. Woodford Va 22580

---

5. Name: Patricia Antosh on 2017-05-30 21:48:05
Please provide your zip code: 22407
Please enter your street address: 20 Twin Springs Dr
Fredericksburg, VA

---

6. Name: Michael Schooley on 2017-05-30 23:42:13
Please provide your zip code: 22580
Please enter your street address: 5809 plantation estates way

---

7. Name: Wally Hunt on 2017-05-31 01:51:51
Please provide your zip code: 22408
Please enter your street address: 7731 Riparian Ct

---

8. Name: Faith Carr on 2017-05-31 02:39:52
Please provide your zip code: 22580
Please enter your street address: 5917 Jefferson Davis highway
Woodford va 22580

---

9. Name: Lisa Diskin on 2017-05-31 14:12:38
Please provide your zip code: 22551
Please enter your street address: 8021 Fox Trail

---

10. Name: Gregory Combs on 2017-06-01 01:24:25
Please provide your zip code: 22408
Please enter your street address: 3602 East Glen Dower Drive

---

11. Name: Cynthia Combs on 2017-06-01 01:32:34
Please provide your zip code: 22408
Please enter your street address: 3602 East Glen Dower Dr

---

12. Name: lea dodge on 2017-06-01 01:59:25
Please provide your zip code: 22408
Please enter your street address: 8909 ridge crest court Fredericksburg va

---

13. Name: Jonathan Colp on 2017-06-01 02:34:53
Please provide your zip code: 22551
Please enter your street address: 5805 Red Fox Dr
Spotsylvania, Va

---

14. Name: Jay Pennington on 2017-06-01 02:43:21
Please provide your zip code: 22551
Please enter your street address: 7923 kerrydale court spotsylvania virgina 22551

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15. Name: Danielle Beach on 2017-06-01 11:50:50
Please provide your zip code: 22407
Please enter your street address: 11509 Ashby dr. Fburg va

---

16. Name: James perry on 2017-06-01 11:57:21
Please provide your zip code: 22534
Please enter your street address: 4412 shepherds hollow

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17. Name: Malinda Willis on 2017-06-01 12:01:49
Please provide your zip code: 22408
Please enter your street address: 725 Olde Greenwich Cir.

---

18. Name: Robert Young on 2017-06-01 14:48:40
Please provide your zip code: 22408
Please enter your street address: 10810 Samantha Place

---

19. Name: Monika Brinkman on 2017-06-01 16:29:09
Please provide your zip code: 22580
Please enter your street address: 5821 Plantation Estates Way

---

20. Name: Cindy Pedigo on 2017-06-02 10:03:01
Please provide your zip code: 22553
Please enter your street address: 10108 Brookrun Ct., Spotsylvania, VA

---

21. Name: Angela Rose Mastrovito on 2017-06-11 03:17:53
Please provide your zip code: 22534
Please enter your street address: 5751 Partlow Rd.

22. Name: Sharon Breakfield on 2017-06-12 01:07:07
Please provide your zip code: 22551
Please enter your street address: 5920 Red Fox Drive

23. Name: Brian Hill on 2017-06-13 23:51:00
Please provide your zip code: 22553
Please enter your street address: 10522 Ni River Dr

24. Name: Carol A Albright on 2017-06-18 02:00:22
Please provide your zip code: 22408
Please enter your street address: 4301 Bridlepath Court

25. Name: Judy Rogers on 2017-06-18 14:06:03
Please provide your zip code: 23015
Please enter your street address: 2709 Partlow Rd

26. Name: Cherie L Taylor on 2017-06-21 22:29:55
Please provide your zip code: 22551-2820
Please enter your street address: 110 Matta Way
Spotsylvania VA 22551

27. Name: Carl Taylor on 2017-06-21 22:31:08
Please provide your zip code: 22551
Please enter your street address: 110 Matta Way

28. Name: Charlene Butler on 2017-06-21 22:31:34
Please provide your zip code: 22551
Please enter your street address: 110 Matta Way

29. Name: Crystal Taylor on 2017-06-21 22:32:14
Please provide your zip code: 22551
Please enter your street address: 110 Matta Way

30. Name: Yvonne Lee on 2017-06-21 23:07:40
Please provide your zip code: 22546
Please enter your street address: 17261 Library Blvd
Ruther Glen VA

31. Name: Elizabeth Fincham on 2017-06-23 23:03:11
Please provide your zip code: 22551
Please enter your street address: 6002 Jennifer Rd

32. Name: Richard Fincham on 2017-06-23 23:13:06

Please provide your zip code: 22551
Please enter your street address: 6002 Jennifer Rd

---

33. Name: Shawndi Mills on 2017-06-24 02:22:49
Please provide your zip code: 22534
Please enter your street address: 5000 GREENBRANCH ST

---

34. Name: Roger Mills on 2017-06-24 02:26:53
Please provide your zip code: 22534
Please enter your street address: 5000Greenbranch St Partlow Va

---

35. Name: Kenneth Nestor on 2017-06-24 23:05:42
Please provide your zip code: 22534
Please enter your street address: 8338 Marye Rd
Partlow Va
22534

---

36. Name: Jerome Tavik on 2017-06-29 21:49:14
Please provide your zip code: 22551
Please enter your street address: 6308 Tree Haven Ln

---

37. Name: Sandra Tavik on 2017-06-29 21:51:06
Please provide your zip code: 22551
Please enter your street address: 6308 Tree Haven Ln

---

38. Name: Barbara Dailey on 2017-06-29 21:55:29
Please provide your zip code: 22551
Please enter your street address: 6308 Tree Haven Ln

---

39. Name: joseph Cagnina on 2017-06-30 14:48:55
Please provide your zip code: 22551
Please enter your street address: 113 Matta Wat

---

40. Name: Nicole Howdyshell on 2017-06-30 21:52:42
Please provide your zip code: 22580
Please enter your street address: 13412 countyline church road

---

41. Name: Chris Howdyshell on 2017-06-30 22:02:02
Please provide your zip code: 22408
Please enter your street address: 3604 Alberta Drive

---

42. Name: Linda and Tom Lee on 2017-07-01 14:23:12
Please provide your zip code: 22565
Please enter your street address: 6040 Hams Court

43. Name: Chris on 2017-07-01 17:44:37
Please provide your zip code: 22546
Please enter your street address: 12124 Shortleaf Rd Ruther Glen VA 22546

---

44. Name: Tami Turner on 2017-07-05 13:33:27
Please provide your zip code: 22407
Please enter your street address: 9511 Secca Drive

---

45. Name: Leslie Bird on 2017-07-05 22:33:30
Please provide your zip code: 22534
Please enter your street address: 5721 Partlow Road
Partlow, VA

---

46. Name: D King on 2017-07-06 13:56:15
Please provide your zip code: 22551
Please enter your street address: 12700 Post Oal Rd

---

47. Name: Suzanne Christopher on 2017-07-07 14:23:43
Please provide your zip code: 22551
Please enter your street address: 6035 Harts Run

---

48. Name: Noemi Mcdaniel on 2017-07-07 21:27:54
Please provide your zip code: 22580
Please enter your street address: 5810 Plantation Estates Way, Woodford, Virginia 22580

---

49. Name: Marion Marshall on 2017-07-08 17:13:29
Please provide your zip code: 22551
Please enter your street address: 5139 stanfield road spotsylvania

---

50. Name: Jacob Breeden on 2017-07-08 18:31:28
Please provide your zip code: 22553
Please enter your street address: 6607 Plantation Forest Drive

---

51. Name: Andrea Kenny on 2017-07-08 21:49:46
Please provide your zip code: 22551
Please enter your street address: We own land near Berkeley Elementary School but have not built yet.

---

52. Name: James Rivera on 2017-07-08 22:58:53
Please provide your zip code: 22551
Please enter your street address: 407 Marc Dr.
Spotsylvania Va. 22551

53. Name: Frank DuBois on 2017-07-09 13:24:13
Please provide your zip code: 22551
Please enter your street address: 509 Santee Drive
Spotsylvania, VA 22551

54. Name: Jeremy Symonds on 2017-07-09 15:15:24
Please provide your zip code: 22551
Please enter your street address: 6647 courthouse rd
Spotsylvania va 22551

55. Name: Janice Feagan on 2017-07-09 18:06:32
Please provide your zip code: 22551
Please enter your street address: 3306 Danbury Circle
Spotsylvania, VA

56. Name: Malysa Rhodes on 2017-07-11 15:52:17
Please provide your zip code: 22534
Please enter your street address: 8708 marye rd
Partlow va

57. Name: Tiffany Garland on 2017-07-11 22:46:34
Please provide your zip code: 22546
Please enter your street address: 6280 Mt Airy Dr

58. Name: Danny Hale on 2017-07-13 20:56:43
Please provide your zip code: 22551
Please enter your street address: 5700 Stanfield Road

59. Name: Candice glover on 2017-07-13 23:24:15
Please provide your zip code: 22551
Please enter your street address: 6913 aspen ln spotsylvania va

60. Name: julie cline on 2017-07-16 23:26:33
Please provide your zip code: 22551
Please enter your street address: 6011 harts run

61. Name: Sharon reedy on 2017-07-17 16:37:20
Please provide your zip code: 22551
Please enter your street address: 6310 taverneer ln

62. Name: Rebecca Glass on 2017-07-18 15:03:50
Please provide your zip code: 22580
Please enter your street address: 6431 Adamson Lane

63. Name: Pamela Viera on 2017-07-18 20:26:55
Please provide your zip code: 22551
Please enter your street address: 5702 South Ct

64. Name: Richard Lee on 2017-07-19 00:03:34
Please provide your zip code: 22580
Please enter your street address: 6427Adamson Lane

65. Name: Emma Gazaway on 2017-07-19 23:14:56
Please provide your zip code: 22580
Please enter your street address: 6160 Gatewood Rd

66. Name: Mike Resnick on 2017-07-20 00:16:11
Please provide your zip code: 22407
Please enter your street address: 6001 Fox Point Road
Fredericksburg Va 22407

67. Name: Kyle Martin on 2017-07-20 18:48:43
Please provide your zip code: 22551
Please enter your street address: 6326 Grace HL
Spotsylvania VA 22551

68. Name: Noelle Beeler on 2017-07-20 23:26:55
Please provide your zip code: 22551
Please enter your street address: 7604 cross creek lane Spotsylvania va 22551

69. Name: Mark DiFilippo on 2017-07-22 17:24:14
Please provide your zip code: 22534
Please enter your street address: 5901 Block House Road

70. Name: Robert Pettit on 2017-07-22 18:45:05
Please provide your zip code: 22553
Please enter your street address: 10221 Shawnee Ln

71. Name: Wayne Dowdy on 2017-07-24 17:40:51
Please provide your zip code: 22551
Please enter your street address: 8302 Quicks Way Spotsylvania va

72. Name: Lauren Simpson on 2017-07-26 17:49:32
Please provide your zip code: 22551
Please enter your street address: 14520 Woolfolk rd

73. Name: Patrick Riley on 2017-07-28 12:14:19

Please provide your zip code: 22407
Please enter your street address: 6515 Prospect St
Fredericksburg, VA 22407

---

74. Name: Alexandria Carrier on 2017-07-29 16:01:54
Please provide your zip code: 22534
Please enter your street address: 3610 Shirley's Hill Rd, Partlow VA

---

75. Name: Tammy Elmore on 2017-07-30 04:57:06
Please provide your zip code: 22534
Please enter your street address: P.o. box 284

---

76. Name: Dorothy Harman on 2017-07-30 12:20:37
Please provide your zip code: 22551
Please enter your street address: 6105 Taverneer lane spotsylvania VA

---

77. Name: Sarah Newton on 2017-08-01 20:05:00
Please provide your zip code: 22553
Please enter your street address: 9001 John Myer St.

---

78. Name: Sarah Dye on 2017-08-04 16:43:39
Please provide your zip code: 22551
Please enter your street address: 15 Berkshire Lane

---

79. Name: Jake on 2017-08-05 04:00:52
Please provide your zip code: 22534
Please enter your street address: 5341 Wilton Lane

---

80. Name: Shawn Bennett on 2017-08-06 18:17:08
Please provide your zip code: 22408
Please enter your street address: 7209 Cumberland Dr

---

81. Name: Sarah Eckenrode on 2017-08-07 14:26:45
Please provide your zip code: 22551
Please enter your street address: 7937 Dowd Farm Rd
Spotsylvania VA

---

82. Name: Christopher Eckenrode on 2017-08-07 14:28:17
Please provide your zip code: 22551
Please enter your street address: 7937 Dowd Farm Rd
Spotsylvania VA

---

83. Name: abeni gold on 2017-08-10 02:35:43
Please provide your zip code: 22546

Please enter your street address: 2506 quail oak dr
Ruther glen va 22546

---

84. Name: Brandy Bradley on 2017-08-10 02:45:35
Please provide your zip code: 22401
Please enter your street address: 220 Green Arbor Dr

---

85. Name: Emily Rose on 2017-08-10 02:56:17
Please provide your zip code: 22546
Please enter your street address: 310 Land or Dr.

---

86. Name: Shirley Mathis on 2017-08-10 10:01:35
Please provide your zip code: 22546
Please enter your street address: 2506 Quail Oak Dr

---

87. Name: derrick Jones on 2017-08-11 18:30:05
Please provide your zip code: 22546
Please enter your street address: 2606 meadow lane,ruther glen va 22546

---

88. Name: Joe Ruedi on 2017-08-14 12:11:46
Please provide your zip code: 22551
Please enter your street address: 5953 Partlow Rd Spotsy VA 22551

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89. Name: Michaela Doyle on 2017-08-20 20:23:36
Please provide your zip code: 28443
Please enter your street address: 128 holiday dr

---

90. Name: Al Darcangelo on 2017-08-26 18:47:51
Please provide your zip code: 22408
Please enter your street address: 4109 Corbin Hall 22408 - do not give out our address to anyone!

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91. Name: Jane Darcangelo on 2017-08-26 18:49:25
Please provide your zip code: 22408
Please enter your street address: 4109 Corbin Hall 22408 Do not give out our address to others.

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92. Name: Manda Maddox on 2017-08-27 12:59:48
Please provide your zip code: 22408
Please enter your street address: 608 Olde Greenwich Circle

---

93. Name: Danielle Richards on 2017-08-28 09:02:41
Please provide your zip code: 22551
Please enter your street address: 4206 French Acors Rd

94. Name: Elizabeth Newsome on 2017-08-28 14:06:15
Please provide your zip code: 22551
Please enter your street address: 4201 French Acors Rd Spotsylvania

95. Name: Jill Greene on 2017-08-28 14:20:05
Please provide your zip code: 22551
Please enter your street address: 4206 French acors rd
Spotsylvania

96. Name: Adam burton on 2017-08-28 17:51:26
Please provide your zip code: 23015
Please enter your street address: 1411 log cabin road beaverdam

97. Name: Brandie Howdershelt on 2017-09-02 01:53:41
Please provide your zip code: 22408
Please enter your street address: 404 S Brooks Dr
Fredericksburg, VA 22408

98. Name: angel ours on 2017-09-02 16:31:07
Please provide your zip code: 22408
Please enter your street address: 4229 mine Rd

99. Name: Patrick Herbst on 2017-09-05 02:28:53
Please provide your zip code: 22551
Please enter your street address: 6307 taverneer lane

100. Name: Mark Delahanty on 2017-09-16 12:48:27
Please provide your zip code: 22534
Please enter your street address: 4118 Jasper Ln
Partlow Va. 22534

101. Name: Susan Wood on 2017-09-29 02:19:14
Please provide your zip code: 22534
Please enter your street address: 8427 Marye Road

102. Name: Dustin gayle on 2017-09-29 21:43:07
Please provide your zip code: 22553
Please enter your street address: 10405 Daniels court

103. Name: Katie Brown on 2017-09-29 21:44:30
Please provide your zip code: 22407
Please enter your street address: 809 Barkley Drive

Fredericksburg VA 22407

---

104. Name: Adam Caldwell on 2017-09-29 21:47:19
Please provide your zip code: 22551
Please enter your street address: 6717 timberbrook lane

---

105. Name: Lisa on 2017-09-29 23:24:39
Please provide your zip code: 22551
Please enter your street address: 6404 Newell Ln. Spotsylvania Va 22551

---

106. Name: Karen Bohn on 2017-09-29 23:40:47
Please provide your zip code: 22551
Please enter your street address: 6101 Harts Run
Spotsylvania, VA

---

107. Name: Michelle Harrison on 2017-09-30 00:08:19
Please provide your zip code: 22551
Please enter your street address: 6813 Morris Rd..

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108. Name: Robert Parker on 2017-09-30 00:15:31
Please provide your zip code: 22534
Please enter your street address: 5500 Enterprise Court

---

109. Name: Barry Christopher on 2017-09-30 00:49:18
Please provide your zip code: 22551
Please enter your street address: 6035 Harts Run

---

110. Name: Angelia Shook on 2017-09-30 01:00:52
Please provide your zip code: 22580
Please enter your street address: 13441 county line church rd

---

111. Name: Karissa roberson on 2017-09-30 03:07:19
Please provide your zip code: 22551
Please enter your street address: 8720 old mill

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112. Name: Nancy Parke on 2017-09-30 10:53:50
Please provide your zip code: 22534
Please enter your street address: 4132 Partlow Rd Partlow, VA

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113. Name: John Parke on 2017-09-30 10:55:31
Please provide your zip code: 22534
Please enter your street address: 4132 Partlow Rd Partlow

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114. Name: Heather Sullivan on 2017-09-30 14:55:05

Please provide your zip code: 22551
Please enter your street address: 6814 Morris Rd spotsylvania va

---

115. Name: charles w estes on 2017-09-30 18:37:49
Please provide your zip code: 22551
Please enter your street address: 6501 s roxbury mill rd

---

116. Name: Dale shelton on 2017-10-01 03:10:44
Please provide your zip code: 22534
Please enter your street address: 4720 partlow road

---

117. Name: Caroline Hayden on 2017-10-01 03:13:22
Please provide your zip code: 22407
Please enter your street address: 4911 Guinea Station
Fred Va22407

---

118. Name: Joshua Blum on 2017-10-01 13:35:56
Please provide your zip code: 23551
Please enter your street address: Morris Road,
Spotsylvania, Va

---

119. Name: Mary Wyche on 2017-10-01 15:59:50
Please provide your zip code: 22551
Please enter your street address: Marta River Woods

---

120. Name: Ana on 2017-10-02 17:54:40
Please provide your zip code: 22407
Please enter your street address: 111 Green Arbor Dr

---

121. Name: Beverly Ruedi on 2017-10-03 02:12:19
Please provide your zip code: 22551
Please enter your street address: 5953 Partlow Road

---

122. Name: Martha Ayres on 2017-10-03 12:46:35
Please provide your zip code: 22551-3071
Please enter your street address: 5949 PARTLOW RD

---

123. Name: Jennifer Ruiz on 2017-10-04 03:00:45
Please provide your zip code: 22551
Please enter your street address: Taverneer Ln

---

124. Name: Nicole on 2017-10-13 00:49:37
Please provide your zip code: 22407
Please enter your street address: 9304 Laurel Oak Drive

125. Name: Anthony Fiesel on 2017-10-13 20:40:42
Please provide your zip code: 22551
Please enter your street address: 5709 East Point Circle

---

126. Name: Milo on 2017-10-15 23:47:00
Please provide your zip code: 22553
Please enter your street address: 10006 Crystal Palace Ln

---

127. Name: Nick Ignacio on 2017-10-16 16:27:12
Please provide your zip code: 22553
Please enter your street address: 10602 chesterwood dr

---

128. Name: Judith ledbetter on 2017-10-17 11:59:01
Please provide your zip code: 22580
Please enter your street address: 5500 Coach Four La
Woodford,va

---

129. Name: Britney Buskirk on 2017-10-18 12:57:05
Please provide your zip code: 22551
Please enter your street address: 503 Santee dr

---

130. Name: Kelsey Whitacre on 2017-10-20 20:30:39
Please provide your zip code: 22551
Please enter your street address: Stop Crucible!

---

131. Name: Aaron Whitacre on 2017-10-20 20:48:33
Please provide your zip code: 22551
Please enter your street address: 4801 BLAYDES CORNER RD

---

132. Name: Joshua Barton on 2017-10-26 02:41:51
Please provide your zip code: 22534
Please enter your street address: 4221 shepherds rd parlow va

---

133. Name: Charles Barton on 2017-10-26 02:44:10
Please provide your zip code: 22534
Please enter your street address: 4221 Shepherds Rd

---

134. Name: Julie Barton on 2017-10-26 02:45:47
Please provide your zip code: 22534
Please enter your street address: 4221 shepherds rd

---

135. Name: Twila dew on 2017-10-27 21:59:01
Please provide your zip code: 22551

Please enter your street address: 8101 Waterford drive

---

136. Name: Nick dougherty on 2017-10-27 22:03:54
Please provide your zip code: 22551
Please enter your street address: 8107 Waterford drive

---

137. Name: Jose inglacias on 2017-10-27 22:06:31
Please provide your zip code: 22551
Please enter your street address: 6309 taverneer lane

---

138. Name: John munson on 2017-10-27 22:08:38
Please provide your zip code: 22551
Please enter your street address: 6310 taverneer lane

---

139. Name: Susan fleer on 2017-10-27 22:11:10
Please provide your zip code: 22551
Please enter your street address: 6301 taverneer lane

---

140. Name: Jim sturgis on 2017-10-27 22:12:11
Please provide your zip code: 22551
Please enter your street address: 6305 taverneer lane

---

141. Name: Sherly mckinley on 2017-10-27 22:14:26
Please provide your zip code: 22551
Please enter your street address: 6300 taverneer lane

---

142. Name: Gerald hoots on 2017-10-27 22:15:31
Please provide your zip code: 22551
Please enter your street address: 6315 taverneer lane

---

143. Name: James teiner on 2017-10-27 22:17:03
Please provide your zip code: 22551
Please enter your street address: 8109 Waterford drive

---

144. Name: Judy meister on 2017-10-27 22:19:45
Please provide your zip code: 22551
Please enter your street address: 8100 Waterford drive

---

145. Name: Ron speegler on 2017-10-27 22:20:53
Please provide your zip code: 22551
Please enter your street address: 6317 taverneer lane

---

146. Name: Jeff bloom on 2017-10-27 22:21:58
Please provide your zip code: 22551

Please enter your street address: 6314 taverneer lane

---

147. Name: Tammy mcallister on 2017-10-27 22:23:34
Please provide your zip code: 22551
Please enter your street address: 8112 Waterford drive

---

148. Name: Justin beere on 2017-10-27 22:25:36
Please provide your zip code: 22551
Please enter your street address: 6320 taverneer lane

---

149. Name: Berniece Vermilyea on 2017-10-31 13:14:16
Please provide your zip code: 22551
Please enter your street address: 6415 HamsFord Road

---

150. Name: Victoria Breakfield on 2017-11-08 15:10:08
Please provide your zip code: 22551
Please enter your street address: 6106 Hart's Run

---

151. Name: Taikneka on 2017-11-15 14:51:56
Please provide your zip code: 22546
Please enter your street address: 25470 Zion rd.

---

152. Name: Kevin Northridge on 2017-12-08 16:51:14
Please provide your zip code: 22407
Please enter your street address: 9903 Box Oak Court
Fredericksburg VA 22407

---

153. Name: Deborah Hayes on 2017-12-24 22:38:27
Please provide your zip code: 22553
Please enter your street address: 215Woodfield Dr

---

154. Name: Ben Brady on 2017-12-25 21:25:52
Please provide your zip code: 22408
Please enter your street address: 16 English Oak Circle

---

155. Name: Woodie Dillman on 2017-12-28 16:50:20
Please provide your zip code: 23015
Please enter your street address: 1921 WIGGLESWORTH RD

---

156. Name: Aimee Dillman on 2017-12-28 16:52:05
Please provide your zip code: 23015
Please enter your street address: 1921 Wigglesworth Rd

---

157. Name: Robert Cooper on 2018-01-17 16:34:06

Please provide your zip code: 22551
Please enter your street address: I live at 5923 Morris RD and would like the Thornburg area developed in a way that promotes benfits for the whole community. This project would scare away the type of good development that we want to occur.

---

158. Name: Brooke on 2018-02-15 15:55:57
Please provide your zip code: 22546
Please enter your street address: 18431 countyline church rd

---

159. Name: Margaret on 2018-07-24 02:27:42
Please provide your zip code: 22551
Please enter your street address: 5825 morris rd

---

160. Name: Jessica TaVIK on 2018-07-26 18:36:23
Please provide your zip code: 22408
Please enter your street address: 9603 Coventry Creek Dr.

---

161. Name: Tracy Dowdy on 2018-07-27 18:12:27
Please provide your zip code: 22580
Please enter your street address: 5655 Bear Ln
Woodford VA 22580

---

162. Name: Paul benson on 2018-07-27 19:19:08
Please provide your zip code: 22580
Please enter your street address: 5661 bear ln

---

163. Name: Kari Christaldi on 2018-07-28 13:02:18
Please provide your zip code: 22655
Please enter your street address: We purchased property at Indian Acres and my understanding is that the site is less than a mile through the woods to the campground. Safety is a huge concern.

---

164. Name: Samuel W Browne on 2018-07-28 18:39:39
Please provide your zip code: 22407
Please enter your street address: 6819 Resground Rd

---

165. Name: Mary Heck on 2018-07-28 21:03:49
Please provide your zip code: 22551
Please enter your street address: 5901 Red Fox Drive

---

166. Name: Jennifer Cline on 2018-07-28 23:30:19
Please provide your zip code: 22551
Please enter your street address: 6011 Harts run

---

167. Name: Debbie Wolfe on 2018-07-29 23:21:59
Please provide your zip code: 22534
Please enter your street address: 8111 wade st

---

168. Name: Jeremiah Lloyd on 2018-07-31 21:47:33
Please provide your zip code: 22553
Please enter your street address: P.o. box 1300

---

169. Name: walter w hoeffer on 2018-08-09 01:03:55
Please provide your zip code: 22580
Please enter your street address: 5925 jeff davis hwy

---

170. Name: Bill Van Stone on 2018-08-11 23:52:32
Please provide your zip code: 22534
Please enter your street address: 9230 Thurston Lane

---

171. Name: Peggy VanStone on 2018-08-11 23:58:05
Please provide your zip code: 22534
Please enter your street address: 9230 Thurston Lane

---

172. Name: David Becker on 2018-08-14 23:31:23
Please provide your zip code: 22407
Please enter your street address: 6535 Venison Drive

---

173. Name: Sonya Sparks on 2018-08-18 15:54:58
Please provide your zip code: 22551
Please enter your street address: 5714 Blue Star Ln

---

174. Name: Robin Williams on 2018-08-31 15:51:48
Please provide your zip code: 22534
Please enter your street address: 5711 Partlow Road

---

175. Name: cindy gutshall on 2018-09-10 18:45:09
Please provide your zip code: 22408
Please enter your street address: 12122 kingswood blvd

---

176. Name: Isis neumann on 2018-09-20 18:32:04
Please provide your zip code: 22406
Please enter your street address: 491 holly corner road, fredericksburg Va 22406

---

177. Name: Anne Fantini on 2018-09-23 17:36:59
Please provide your zip code: 23034
Please enter your street address: 2903 Peaceful court
Bumpass , VA

178. Name: Mike Fantini on 2018-09-23 17:40:12
Please provide your zip code: 23043
Please enter your street address: 2903 Peaceful court
Bumpass, Va

179. Name: Michelle Brady on 2018-10-12 15:47:21
Please provide your zip code: 22534
Please enter your street address: 9700 Edenton Road

180. Name: Vanwarden Stanard Jr on 2018-10-16 21:41:38
Please provide your zip code: 22408
Please enter your street address: 2919 Cahill Street

181. Name: Teresa Catoe on 2018-10-20 01:03:20
Please provide your zip code: 22485
Please enter your street address: 7314 Columbia Dr

182. Name: Katherine Henriquez on 2018-10-30 16:11:44
Please provide your zip code: 22534
Please enter your street address: Oak crest Dr

183. Name: Catrin Jones on 2018-10-31 18:56:28
Please provide your zip code: 23024
Please enter your street address: 11405 piney forest rd.

184. Name: brandon williams on 2018-11-08 23:00:15
Please provide your zip code: 22551
Please enter your street address: 6011 harts run

185. Name: Carter Cline on 2018-11-08 23:01:10
Please provide your zip code: 22551
Please enter your street address: 6010 Morris Road

186. Name: Zachaeus bush on 2018-11-08 23:14:57
Please provide your zip code: 22551
Please enter your street address: 6322 grace hill

187. Name: Adil Elassali on 2018-11-13 16:25:41
Please provide your zip code: 22551
Please enter your street address: 6035 Partlow rd

188. Name: Judy hawkins on 2018-11-13 18:26:46
Please provide your zip code: 22551

Please enter your street address: 4300 french acors rd

---

189. Name: Kayla Spinola on 2018-11-26 03:44:28
Please provide your zip code: 22551
Please enter your street address: 5401 Stonebridge Court

---

190. Name: kayla vega on 2018-12-02 18:12:13
Please provide your zip code: 22407
Please enter your street address: 10723 rolling wood dr

---

191. Name: JUAN VEGA on 2018-12-02 18:12:48
Please provide your zip code: 22407
Please enter your street address: 10723 rolling wood dr

---

192. Name: bygbg fesfhj on 2018-12-07 21:01:30
Please provide your zip code: 22554
Please enter your street address: Trffccff

To: Attn: Paulette Mann, Commission Secretary
Rezoning: R17-0005 Radio Reconnaissance Technologies, Inc. (Team Crucible, LLC)
Special Use: SUP17-0003 Radio Reconnaissance Technologies, Inc. (Team Crucible, LLC)
From: Shirley and Thomas Brady Jan. 26, 2021
Voting District: Berkeley District #Seven(7)

Since early 2017, we have let our concerns be known that behind a subdivision and shopping area is NOT the right location for Team Crucible. We feel a security training facility would be better located on one hundred (100) plus acres away from family residences and public shopping. In our efforts to get our message across, we have mailed letters to all members of the Spotsylvania County Board of Supervisors and Planning Commission, written "Letters to the Editor" of The Free Lance Star and The Washington Post newspapers, collected a Tavernew Subdivision petition against the location of Team Crucible, and went on Channel 4 television station. Now, here we are again in 2021, during a Covid 19 Pandemic, and Team Crucible is still trying to get rezoning and special use of 69.96 acres of land right behind our subdivision.

We have lived in Tavernew Subdivision for about twenty thru (23) years. During this time, we have been productive citizens working and supporting Spotsylvania County. According to the three(3) recent letters and based on tax records, we have become property owners within three thousand (3 feet of Team Crucible's project. Property owners in a danger zone and noise pollution zone.

Is there anyone in Spotsylvania County that would like to have Team Crucible move into their back yard? If so, "Please Volunteer Now"! We do not believe there would be any neighborhood that would want Team Crucible in their back yard. If what we believe is correct, HOW can the Planning Commission and Board of Supervisors believe this will be good for Tavernew Subdivision?

(Continued on back)

Do we mean so little to Spotsylvania County?
Why here? Why now? We will find out soon.

Our prayer is that the County will please stand by their own Code of Ethics, which puts citizen safety above revenue, and deny the rezoning and special use requests made by Team Crucible.

Thank you,
Shirley and Thomas Brady

Paulette Mann

From: Elizabeth Fincham <efincham621@gmail.com>
Sent: Wednesday, January 27, 2021 10:29 PM
To: Paulette Mann
Subject: [EXTERNAL]: Stop Crucible

CAUTION: This email originated from an external source. Do not click on any links or open attachments unless you recognize the sender and know the content is safe.

To Spotsylvania Planning Commission,

My name is Richard Fincham I've been a resident on Jennifer Rd in the Berkeley district since 1983. I am addressing, the Crucible matter in my opinion this is not good for the residence's in this area. It will effect people's health and well being as some have PTSD and other health conditions including anxiety and autism. Also, people's pets have health issues with loud sounds as does one of our pets.

My dog name is Pebbles and she has seizures when she hears loud noises, gunshots, and explosions. She has to take Diazepam, Phenobarbital, or Trazodone. These seizures could well end her life. At one meeting at Salem library, I explained this to the group about Pebbles and a Crucible member said its just an animal. But that's not true she's a family member. These are just some concerns.

Also allowing foreign groups in for military training may not be safe, who's vetting them remember 9/11 also we have a nuclear electric plant not far away. Our property values could go down. We already have noise inside our homes from the race track. I'm very worried to imagine what Crucible would do or sound like. Please help us by not allowing Crucible to establish a military training facility in this area. They should consider moving to another county example Essex county where they could purchase 1000 acre track for safety.

Thank you
Richard Fincham
Barkley District Resident

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This email was Malware checked by Sophos http://www.sophos.com

Paulette Mann

From: Leon Hughes
Sent: Wednesday, January 27, 2021 7:25 PM
To: Paulette Mann
Subject: FW: [EXTERNAL]: Crucible Rezoning & CUP Application

To be read

B. Leon Hughes
B. Leon Hughes, AICP
Director of Planning and Zoning
Spotsylvania County
Office(540)507-7434
Direct (540)507-7220
lhughes@spotsylvania.va.us

From: Clay Mihoulides [mailto:Clay@chrismarr.com]
Sent: Tuesday, January 26, 2021 5:14 PM
To: Barry Jett <BJett@spotsylvania.va.us>; Deborah H. Frazier <DHFrazier@spotsylvania.va.us>; Timothy J. McLaughlin <McLaughlinTJ@Spotsylvania.va.us>; David Ross <David.Ross@Spotsylvania.va.us>; Chris Yakabouski <CYakabouski@spotsylvania.va.us>; Gary Skinner <GSkinner@spotsylvania.va.us>
Cc: Aimee Mann <AMann@spotsylvania.va.us>; Kevin Marshall <KMarshall@spotsylvania.va.us>; Amit Parbadia <amit@sonahomes.com>; Kirit Parbadia <kirit@sonahomes.com>; Leon Hughes <LHughes@spotsylvania.va.us>
Subject: [EXTERNAL]: Crucible Rezoning & CUP Application

CAUTION: This email originated from an external source. Do not click on any links or open attachments unless you recognize the sender and know the content is safe.

Dear Members of the Board,

Thank you for your time and effort in working to make Spotsylvania County a prosperous and safe community for all its residents. My name is Clay Mihoulides and I represent Amit and Kirit Parbadia the owners of 59 acres of land off of Morris Rd. (SR 606) adjacent to the Taverneer subdivision (Tax Parcels: 63-A-35 & 63-A-35C). We have submitted a rezoning application for a future residential subdivision to be developed on this property called Thornburg Commons. This prospective subdivision, which falls within the Counties growth area, will provide much needed housing that in turn will help lead to additional commercial growth and prosperity for the Thornburg area.

We are extremely concerned about the Crucible project and the potential detrimental effects it would have on our property and the other surrounding properties. I am intimately aware of the Crucible's operations, having visited their existing facility off of Jack Ellington Rd. in the Hartwood area of Stafford County on multiple occasions over the years. While they provide a much needed service in their contracts with the Federal Government, they are a consistent nuisance to their existing neighbors and the surrounding property owners of that area. This most assuredly will be the case should you vote to approve their rezoning and special use permit application to construct a facility off US 1 in the heart of the growth area of Thornburg. The level of noise created by the Crucible's day to day operations does not fit with the County's comprehensive land use plan for this area, and for this reason alone I encourage you to vote against approving their application.

Please feel free to call or email me with any questions you might have about our prospective project. I wish you and your families the best and again thank you for your time.

Sincerely,

Clay Mihoulides
Licensed VA Real Estate Broker
If you like our service please leave us a favorable review on Google*

CHRISMAR PROPERTIES
O:540-373-6189
C:540-424-1664
F:540-479-1855
180 Chatham Heights Rd.
Fredericksburg, VA 22405

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This email was Malware checked by Sophos http://www.sophos.com

Jan. 16, 2021

Spotsylvania Planning Commission

9019 Old Battlefield Blvd

Spotsylvania Va 22553

RE. CRUCIBLE OPPOSITION

To whom it may concern,

I wish to add my voice to the opposition of the Crucible Project at the present location near Thornburg Va.

I believe it will have a major negative impact to the homes and businesses located nearby.

I believe neighboring property values will suffer greatly due to the excessive noise and safety concerns due to the firing ranges. The berms will not stop sound, nor stop the occasional stray round.

Joseph Ruedi

5953 Partlow Rd.,

Spotsylvania, Va 22553

Paulette Mann

From: Koechlin, Mike <mkoechlin@hitt-gc.com>
Sent: Wednesday, January 27, 2021 2:13 PM
To: pann@spotsylvania.va.us
Subject: Crucible

Sir, and Spotsylvania Planners

I as a longtime resident of the town of Thornburg. I find it quite distressing the idea of any County member allowing a Mercenary Training Camp to the area!!

Even if it were only a shooting range,
the location in the Town Center next to the Grocery store is appalling.

First, look at the need. None!!

Second, per DOD guideline #1 for selecting a location for a shooting range(more or less a Mercenary training facility). A remote area!!

Third, Look at Crubuical past record in Stafford VA. Piss poor and that is why they forced them out!

Fourth, you see 90% of the effected area has a yard sign to say No!

Thornburg in the next 20 years is positioned to gain a lot of growth potential. And I mean real Qualty growth.
We have put up with the county's limited growth (liquor store, pawn shop, vaping shop, two dollar stores, and unlimited amount of flood damaged car lots.
We took one for the team In allowing the Mannassas race track move.
Which I could see as being positive for the whole County if managed properly!?!
Even though I hear the gear jamming all day long (through closed Anderson widows)on my weekends(this was not supposed to happen by the way!!) 2.5 miles away too.....

If you allow this reckless site you will kill my home value, our social value, and any chance of future investment in Thornburg.

So what say you?
Are you for the majority of tax paying citizens? Or are you for sale?
I not only ask for you to do the right thing and vote No To Crubuical.
But, I beg you!!
As I do not want Thornburg now or in the future to be Beirut!

Sincerely, Mike Koechlin, Kathy Koechlin, and or Whole Community.

Paulette Mann

From: Stephan Picard <sjpicard@gmail.com>
Sent: Friday, January 8, 2021 3:38 PM
To: Aimee Mann; Paulette Mann
Cc: Wendy Picard; Mark Brinkman; Michael Galati; stevielarson; Wayne Breakfield; Mike Schooley; Mike McDaniel; Kathleen Dallas; Peter Dechat; Wendy Luttrell

Subject: [EXTERNAL]: Crucible rezoning request

CAUTION: This email originated from an external source. Do not click on any links or open attachments unless you recognize the sender and know the content is safe.

Good Afternoon,
I am writing to you today as a resident of Berkeley and as the HOA president for Plantation Estates at Matta River representing the residents.

Please bear with me to allow me to explain my familiarity with weapons and gun ranges.

I am a retired Army Infantry Colonel. I served 27 years in the military and during that time I commanded the following:

- Infantry Platoon
- Anti Tank Missile platoon,
- Mortar platoon,
- Infantry company,
- Military Police company

I have designed and run the following weapons ranges:

- M16 and M4 rifle,
- Pistol,
- M60 machine Gun,
- 50 caliber machine gun,
- 81 MM mortar and
- Anti-tank missile ranges.

I was qualified as expert in the following weapons:

- Rifle and
- Pistol

I am a combat veteran from OIF 06-08 where I was the deputy commander of an aviation brigade of more than 3500 soldiers.

I lay these things out to simply show that I know weapons, their effects and weapons ranges of all kinds. I truly understand what the range Crucible is requesting will be and how it will affect all the surrounding area.

The time has finally come for you to vote and every citizen in my HOA is opposed to this zoning change.

Bottom Line:
Placing this facility with the current design on Lot 76-A-2 will:

- Impact 810 properties via noise pollution, safety, or both.
- Render 206 acres with 75 close in homes in Taverneer Subdivision and adjacent to the property uninhabitable due to excessive noise
- Ruin the quality of life for an additional 3005 acres containing 444 properties in the surrounding area due to excessive noise.
- Create a Surface Danger Zone that encompasses many many homes where all range design best practices state there is a reasonable chance of a projectile from a potentially unsafe range causing death, injury or destruction of property – The county incurs shared liability should it approve this design.
- Reduce tax revenue by reducing $143M assessed values of the 811 affected properties, negatively impacting the $1.215M annual tax revenue an estimated* $107K per year. Combined with the 3.7% retarded growth of real estate next to a range and this decision could result in $2.2M tax loss over a 20 year period.
- Create an immediate loss of more than $12.5M in property value as those properties in the affected area will NOT sell for a comparable price as an identical property not exposed to danger and constant weapons fire noise.
- Create long lasting equity loss as those properties in the affected area appreciate 3.7% slower than identical properties not exposed to danger and constant weapons fire noise.

The Board of Supervisors has 8 specific decision criteria they must follow to approve a special use permit. In accordance with Sec 23-4.5.7 they are the following:

1. That the proposed use is in accordance with the comprehensive plan and other official plans adopted by the county;
2. That the proposed use or development of the land will be in harmony with the scale, bulk, coverage, density, and character of the area or neighborhood in which it is located;
3. That the proposed use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof;
4. That the proposed use will not adversely affect the health or safety of persons residing or working in the neighborhood of the proposed use;
5. That the proposed use will not be detrimental to the public welfare or injurious to property or improvements within the neighborhood.
6. That the proposed use is appropriately located with respect to transportation facilities, water supply, wastewater treatment, fire and police protection, waste disposal, and similar facilities
7. That the proposed use will not cause undue traffic congestion or create a traffic hazard;
8. That the proposed use will have no unduly adverse impact on environmental or natural resources.

The rezoning and special use request that you are considering does not meet any of the 8 criteria.

1. The request does not comport with the comprehensive plan for the area and in fact it is very destructive to the tourist zone designation.
2. This request is not in harmony with the neighborhood in any way. It is unprotected so that accidents or misfires can harm or kill residents and the noise of constant gunfire will destroy the quality of life in the surrounding area.
3. This request will hinder future development. Who would build an office park or town center next to a range where there is excessive noise and bullets that may hit them?

4. I recommend that we convene the BOS meeting and vote on a 20 foot berm that I will construct while 20 people fire weapons at the base of the berm. Yes this sounds ludicrous, but it is because it's common sense that accidents happen and nobody would stand on top of a berm while people are shooting at it. You can easily see that if we would not stand on the berm, then the homes on the downrange side are in danger. this adversely affects the citizens' safety for sure!
5. Same argument as above. Add to this ammunition storage, weapons storage, fire hazards, traffic issues etc.
6. This plan does not hook to public sewer and water as required. Also there is no additional police coverage provided nor additional fire and ambulance services provided.
7. This is an unknown
8. There is a long record of many places such as this ruining groundwater or runoff. There should be sufficient bond posted if approved to do a site cleanup should the business fail.

Some things to consider in your decision:
1. Team Crucible and their parent company, have a long history of court cases and lawsuits in Stafford county due to zoning issues.
2. Team Crucible began construction without permits and assumed spotsylvania would just roll over and blanket approve this.
3. NO military or NRA range would be built in this fashion with no protection for down range. They always own the land where the bullets can land "just in case"
4. Team Crucible refused to do SARNAM analysis of the sound issues and used a so-called paid expert. But they ignored atmospherics and many other variables needed to calculate sound. have you ever received the email from the county: due to low cloud cover you may hear the explosions from AP Hill?) It very much matters.
5. Team Crucible states they will fire only certain ammunition --- BUT Spotsylvania has no ammunition inspection nor ability to control this. Imagine the Sheriff having to do spot checks? What size bullet is in that gun today?
6. Once the special use permit is approved they no longer have ANY sound restrictions no matter what they say. That specific permit use allows for sound customary to the industry. Guns are loud.

thank you,

Stephan Picard, COL (r), President, Plantation Estates at Matta River HOA
5820 Plantation Estates Way
Woodford, VA 22580 (Spotsylvania County)

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Citizen's Revised Impact Analysis
Team Crucible Zoning Request

January 2021

Agenda

- Bottom Line up Front
- Summary
- Crucible Layout
- Resident top 3 issues
  - Noise Pollution/Quality of Life
  - Safety
  - Economic Impact
- County Decision Criteria
- Current Status
- Conclusion and Questions

Bottom Line:

The Planning Commission should recommend disapproval of this request

Bottom Line:

The Planning Commission should recommend disapproval of this request

- The surrounding community is nearly 100% against this proposal
  - We have more than 450 signatures from surrounding residents who oppose this rezoning
  - This will create a black hole for any development in the center of one of the most promising areas in the county
- This is a clear case of SPOT ZONING
  - Rezoning of this property as requested does NOT support the Spotsylvania Comprehensive Plan will have a severe negative impact on future development in the Thornburg area.
  - 6 of 8 Board of Supervisor Decision Criteria (Sec. 23-4.5.7) do not support approval.
  - Rezoning of this property as requested severely impacts 810 property owners
- The revised Crucible submission invalidates their economic analysis. – less ranges means less training days
- Although Crucible proffers ammunition sizes, there is no enforcement capability in Spotsylvania so the residents will never feel safe
- Crucible refused to do a SARNAM sound analysis and their analysis does not take in to account any environmental factors. It is a “best case” analysis and is not accurate for what the citizens will suffer.
- Once approved, the county can never go back and this will forever change and destroy harmonious and positive development of the area
- Proffer to use sound suppressors “when approved by customers” is ridiculous on its face. There is no enforcement nor any incentive to use a suppressor which increases wear and tear on weapons and provides unrealistic training depending on the scenario

Summary:

- Placing this facility with the current design on Lot 76-A-2 will do the following:
  - **Impact 810 properties via noise pollution, safety, or both**.
  - 206 acres including Taverneer Subdivision and those along Rte 1 adjacent to the property will be virtually uninhabitable (noise levels in excess of 104 dB peak)
  - 3005 acres containing 437 residential and commercial properties in the surrounding area will have their quality of life ruined (noise levels from 87 dB to 104 dB)
  - 617 properties including 3 Subdivisions will be inside the Surface Danger Zone where all range design best practices state there is a reasonable chance of a projectile from a potentially unsafe range causing death, injury or destruction of property – The county incurs shared liability should it approve this design.
  - **The average property owner will lose at least $97,588 in household equity over a 20 year period.***
  - **Spotsylvania will lose at least $ 7,601,667 ($ 101,747 in the first year) in property tax revenues over 20 years due to devalued property.***

* Estimate based on 15% reduction for properties in high complaint noise and dispersion area of SDZ and 7% reduction for homes in moderate noise and ricochets area of SDZ

Specifics of Request

- Lot 76-A-2 is requesting rezoning for Agricultural 2 (A-2) to Industrial 2, specifically rezoning under Sec. 23-6.22.4 Special uses, (12) Industry, type III.
- Definition: Industry, type III means an establishment which has the **potential to be dangerous or extremely obnoxious.** Included are those in which explosives are stored, petroleum is refined, natural and liquid gas and other petroleum derivatives are stored and/or distribution in bulk, radioactive material are compounded, pesticides and certain acids are manufactured, and hazardous waste is treated or stored as the establishment's principal activity.
- Additional: under Sec. 14-52 Exemptions for noise, the applicant feels they meet paragraph 14-52-a-3 "Noise emitted by a commercial or industrial establishment which noise customarily emitted by such establishment or industries." **would be exempt from noise pollution sound levels from 6:00a.m. to 10:00 p.m. daily.**

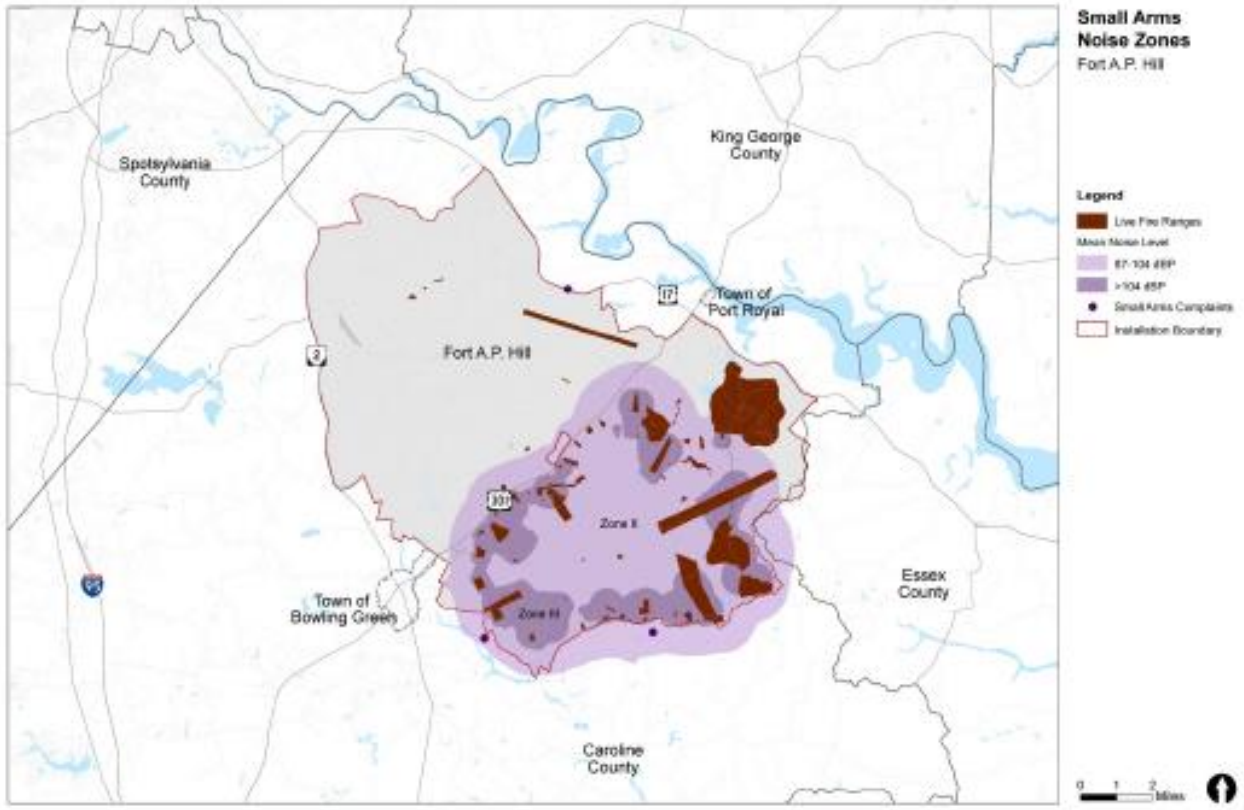
Once approved the County can never go back!

- Statute: VA Code Ann. § 15.2-917
- No local ordinance regulating any noise shall subject a sport shooting range to noise control standards more stringent than those in effect at its effective date. **The operation or use of a sport shooting range shall not be enjoined on the basis of noise,** nor shall any person be subject to action for nuisance or criminal prosecution in any matter relating to noise resulting from the operation of the range, if the range is in compliance with all ordinances relating to noise in effect at the time construction or operation of the range was approved, or at the time any application was submitted for the construction or operation of the range
- For purposes of this section, “effective date” means the time the construction or operation of the sports shooting range initially was approved, or at the time any application was submitted for the construction or operation of the sports shooting range, whichever is earliest.

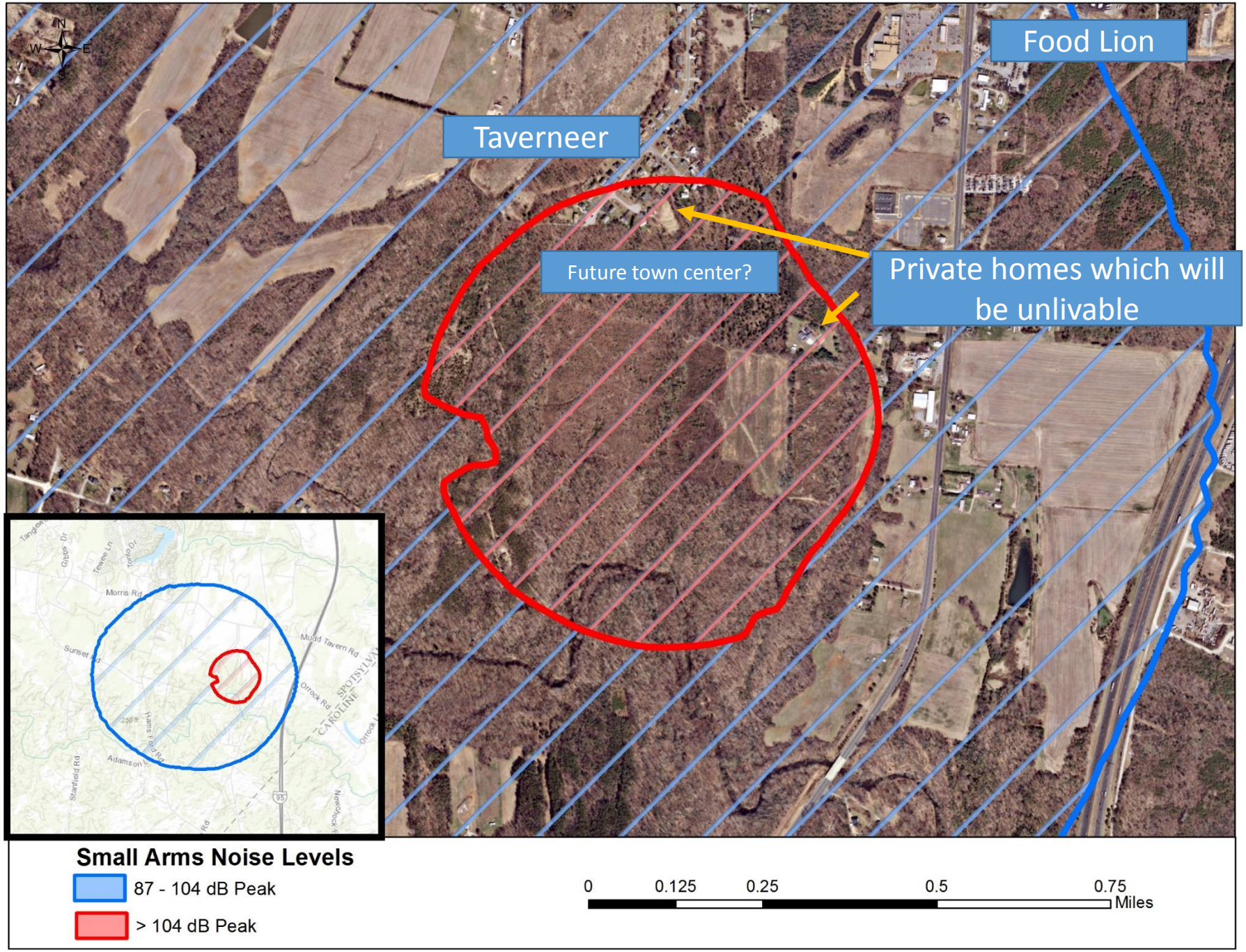
Quality of Life

- Unconstrained Environmental Pollution (Noise) will adversely impact quality of life for current residents and impact future development in the effected area.
- The following 2 slides depict the areas that will be negatively impacted by the noise pollution.
  - The yellow area depicts the areas that will be annoyed to the level of taking actions like complaints, or real estate decisions. DoD recommends no future development in this area without significant risk of conflict
  - Red represents the High Complaint area. DoD recommends no habitation in this area.
- Noise sensitive land uses are discouraged in areas where dBP from small arms weapons is between 87 and 104 dB with medium risk of complaints. Noise sensitive land uses are strongly discouraged in areas where dBP from small arms weapons is equal to or greater than 104 dB with high risk of noise complaints.

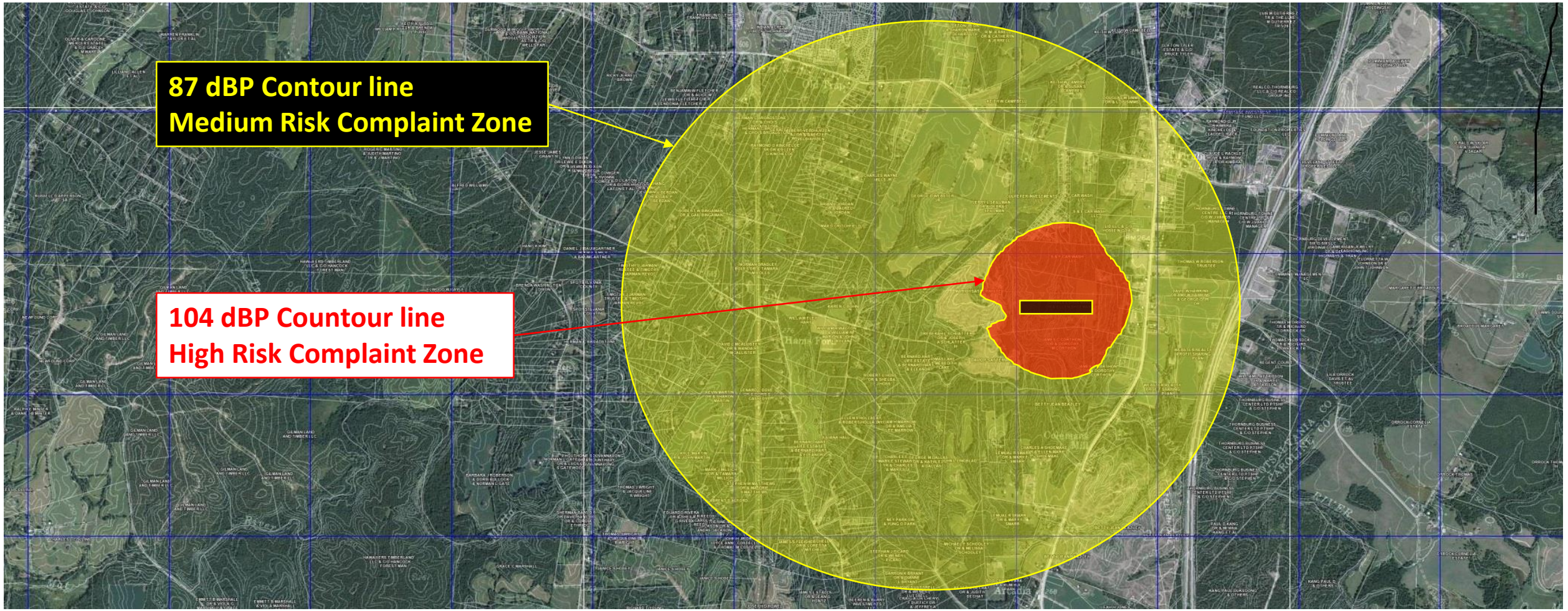
Ref: AIRCRAFT, ORDNANCE, AND SMALL ARMS NOISE STUDY FOR NAVAL WEAPONS SYSTEM TRAINING FACILITY BOARDMAN, OREGON (Aug 2012)



SARNAM Model for FT. AP Hill, Fort A.P. Hill Joint Land Use Study - December 2014

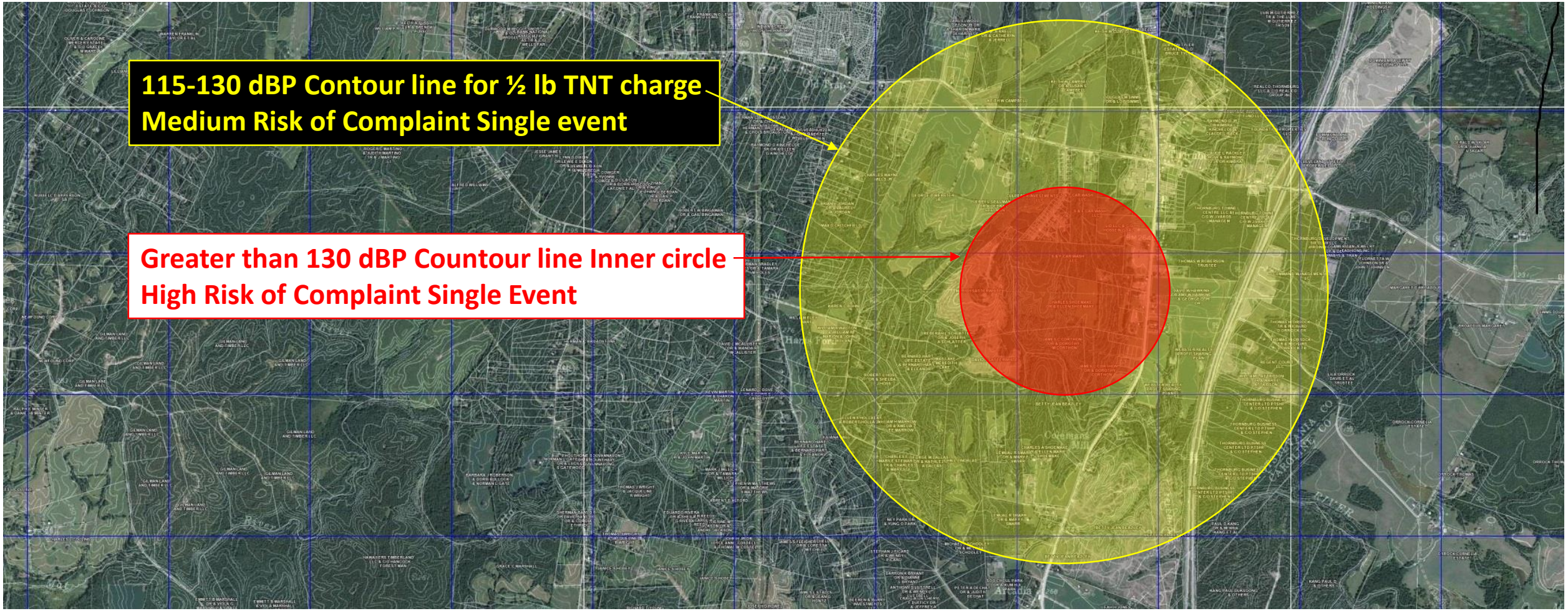

Food Lion
Taverneer
Future town center?
Private homes which will be unlivable
Small Arms Noise Levels
87 - 104 dB Peak
> 104 dB Peak
0
0.125
0.25
0.5
0.75
Miles

Small Arms Range Noise Assessment Model (SARNAM)
Team Crucible Training Complex
Small Arms (.308, 5.56mm, 9mm) weapons



Ref: https://www.serdp-estcp.org/Program-Areas/Weapons-Systems-and-Platforms/Noise-and-Emissions/Noise/WP-200006/SARNAM-Noise-Impact-Software

Small Arms Range Noise Assessment Model (SARNAM)
Team Crucible Training Complex
½ Pound TNT



Ref: https://www.serdp-estcp.org/Program-Areas/Weapons-Systems-and-Platforms/Noise-and-Emissions/Noise/WP-200006/SARNAM-Noise-Impact-Software

dBA	Example	Home & Yard Appliances	Workshop & Construction
0	healthy hearing threshold		
10	a pin dropping		
20	rustling leaves		
30	whisper		
40	babbling brook	computer	
50	light traffic	refrigerator	
60	conversational speech	air conditioner	
70	shower	dishwasher	
75	toilet flushing	vacuum cleaner	
80	alarm clock	garbage disposal	
85	passing diesel truck	snow blower	
90	squeeze toy	lawn mower	arc welder
95	inside subway car	food processor	belt sander
100	motorcycle (riding)		handheld drill
105	sporting event		table saw
110	rock band		jackhammer
115	emergency vehicle siren		riveter
120	thunderclap		oxygen torch
125	balloon popping		
130	peak stadium crowd noise		
135	air raid siren		
140	jet engine at takeoff		
145	firecracker		
150	fighter jet launch		
155	cap gun		
160	shotgun		
165	.357 magnum revolver		
170	safety airbag		
175	howitzer cannon		
180	rocket launch		

Safety

- The Team-Crucible range is an **“OPEN RANGE” -** bullets **WILL** overshoot and cross the Lot 76-A-2 property line - it is just a matter of probability and time. (Plan and concerns were reviewed by C. Vargas, PE – Range design)
- The Following slides depict the Surface Danger Zones for some of the small arms weapons Crucible is requesting to shoot. *depending on final range layout on the ground the angles of the areas may change but not the size of the areas.
- Anyone within the Surface Danger Zone depicted in yellow is at risk of loss of life when the range is in operation.
- This position is consistent with Department of Defense, Department of Energy, National Shooting Sports Foundation, and the National Rifle Association.

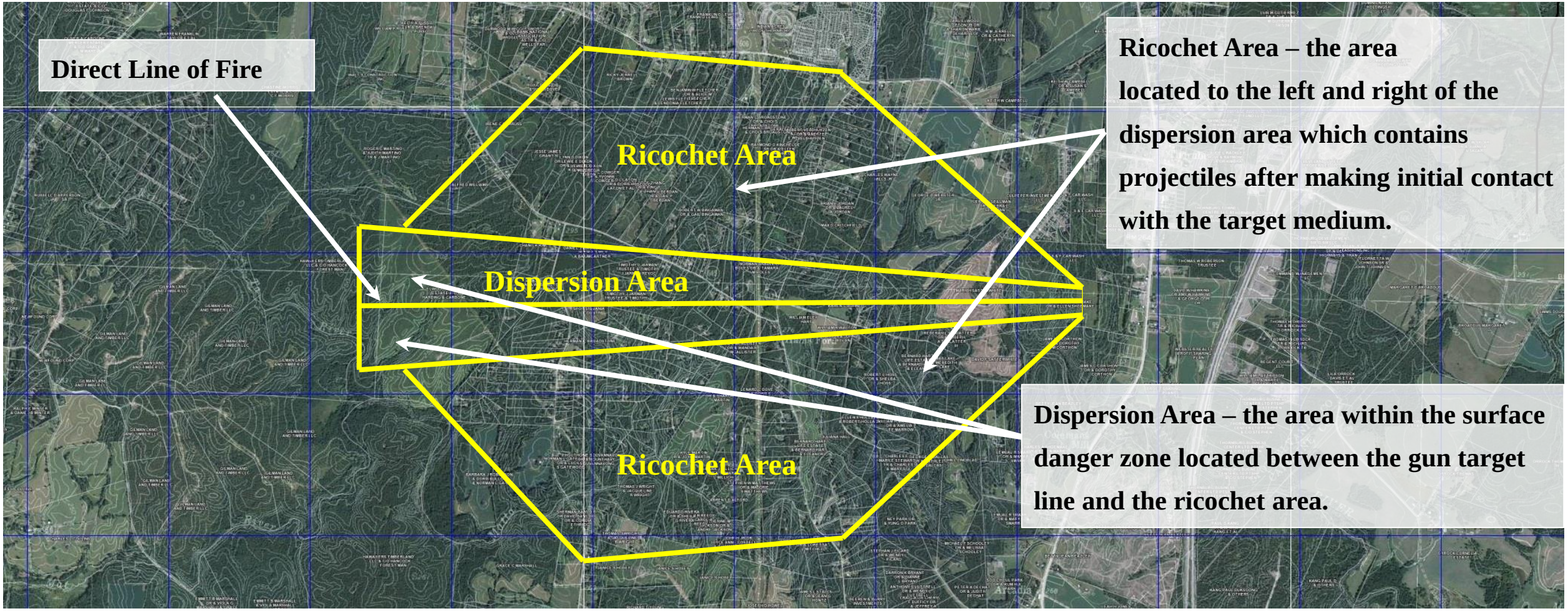
“*A designer develops the impact sector area by first imagining a person who is firing at ground level at a surface target being able to deviate 10 degrees each side of a center line of fire and allowing him to raise the rifle or the pistol at a 30- to 35-degree angle. These are the angles that will give a maximum trajectory. You now have the maximum distance of impact and a description of the area that is impacted by a range.” Design Criteria for Shooting Ranges, Clark Vargas NSSF* http://www.nssf.org/ranges/rangeresources/library/detail.cfm?filename=facility_mngmnt/design/design_criteria.htm&CAT=Facility%20Management

“*If you build in a populated area, your range must be totally baffled so that the range owner can demonstrate to a judge that a round cannot escape.*” C. Vargas 1996 Third National Shooting Range Symposium, www.nssf.org/ranges/rangesources

“*safety baffles defines a structure which is used to restrict fired bullets to smaller areas than would otherwise be possible without them...baffles are erected so that the shooter, regardless of the shooting position used (or permitted) cannot see any sky downrange, either over the top of the backstop or to the side of the range…The overall responsibility of the range owner/operator is to stop fired bullets before they exit the property*” David Luke, Range Technical Advisor, National Rifle Association, 1996 Third National Shooting Range Symposium, www.nssf.org/ranges/rangesources

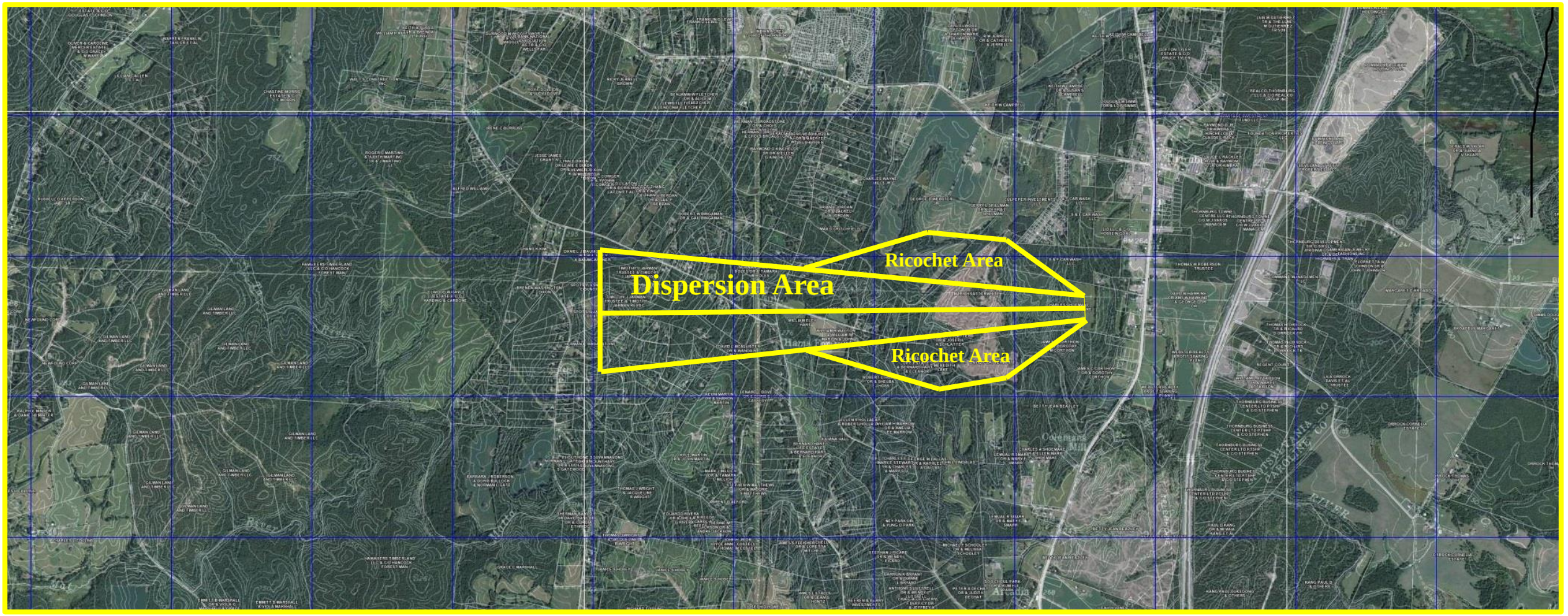
*The Surface Danger Zone (SDZ) is a depiction of the mathematically predicted area a projectile **will** impact upon return to earth, either by direct fire or ricochet. The SDZ is the area extending from a firing point to a distance downrange based on the projectiles fired. This area has specific dimensions for the expected caliber of the weapon(s) being fired so that all projectile fragments will be contained in this area. These dimensions are found in DA PAM 385-63 - Range Safety.*

Surface Danger Zone
.308
Distance X: 5,288M Angle P: 43.18 deg (earth/water)



Ref USMC Range Safety Pocket Guide p32

Surface Danger Zone
5.56mm M855 Ball
Distance X: 3,437M Angle P: 34.2 deg (earth/water)



Ref USMC Range Safety Pocket Guide p32

Ranges with “No Blue Sky” Overhead Baffles

http://www.cvaltd.com/2011/06/nssf-video-berms-baffles-and-backstops/



This is NOT what is proposed, but would be required in this area





Economic Impact

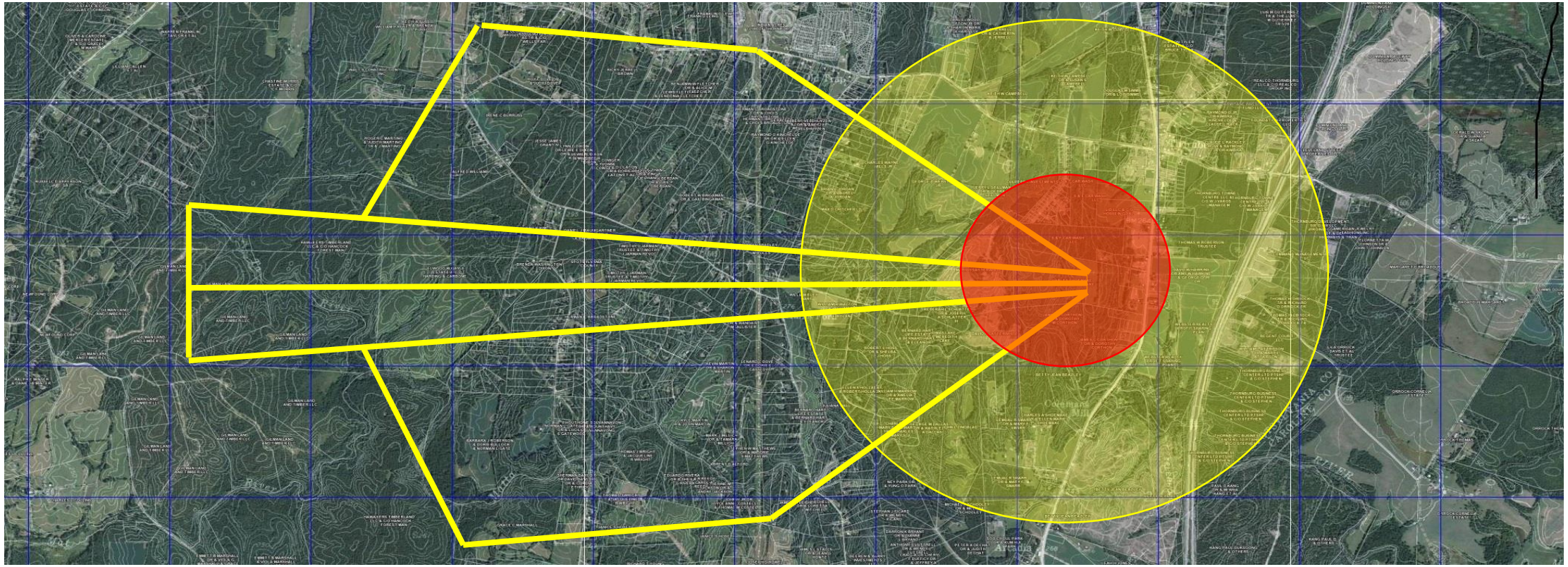
- If the rezoning is granted, the average property owner will **lose at least $97,588** in equity over a 20 year period.
- If the rezoning is granted, the projected total loss in property tax revenues for Spotsylvania county over 20 years is **$ 7,601,667 with $ 101,747 being lost in the first year**.

- 810 Properties economically impacted due to noise pollution, safety, or a combination of both.
- Unconstrained Environments Pollution (Noise) will adversely impact quality of life, future development, and impair values for 437 residential and commercial properties.
- The threat of loss of life or injury due to working or living within the surface danger zone of a live fire range will negatively impact the value of at least 617 properties.
- Studies have shown loss of value amounts vary from 7.5 % to 25%.
- The following graphs assume a 7% or 15% initial loss depending on proximity to the range locations and Surface Danger Zone
- Property Values for 2015 were taken from the GIS Mapping Page on the Spotsylvania County Website

Property Loss References

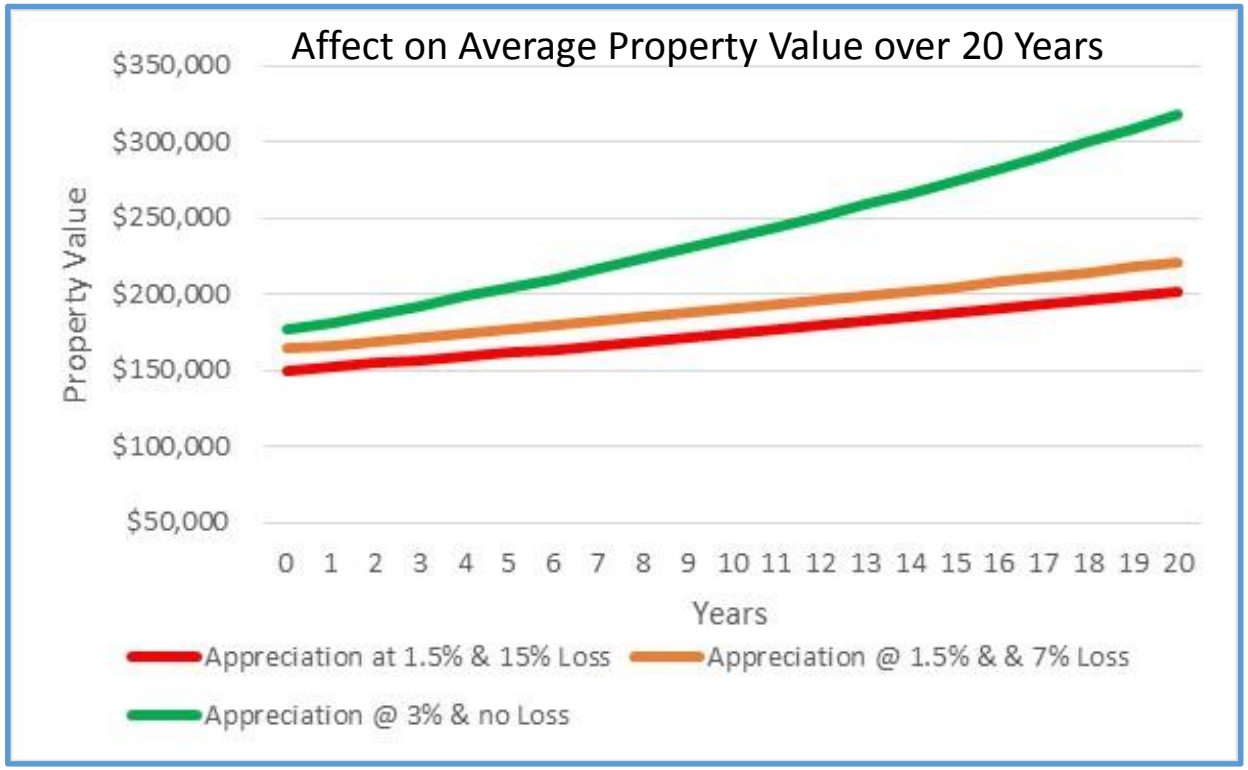
- Appreciation Impact Value: Realtor.com identifies being located next to a shooting range as #4 on a ranked list of neighborhood features that drag down your home value. Being in the proximity of a rifle range drags the appreciation of property by 3.7%
  - http://www.realtor.com/news/things-that-affect-your-property-value/
- Maine professional real estate appraiser performed statistical analysis resulting in a 7.5% loss of property value resulting form a 175 acre parcel being located within 1.5 mile radius of a rifle range.
  - http://www.bridgton.com/waterford-gun-club-noise-hurts-property-values-county-rules/
- Appendix D reports possible property losses of 25 %
  - http://www.deq.virginia.gov/Portals/0/DEQ/EnvironmentalImpactReview/10.017Sappendixd.PDF
- Green county Record reports possible property losses of 30%
  - http://www.dailyprogress.com/greenenews/news/gun-range-proponents-it-s-a-safe-place-to-shoot/article_cecc95ba-41d2-11e5-a678-83dc0f3c372e.html
- Numerous other articles available on the internet

Properties Evaluated



- **Properties in the Extreme Area depicted by the red circle depreciated at 15%.**
- **Properties in the Moderate Noise Area depreciated by the yellow circle7%**
- **Properties in the center portion of the Surface danger Zone (SDZ) depreciated by 15%**
- **Properties in the ricochet area of the SDZ depreciated by 7%**
- **No properties double counted (in both the noise area and SDZ)**

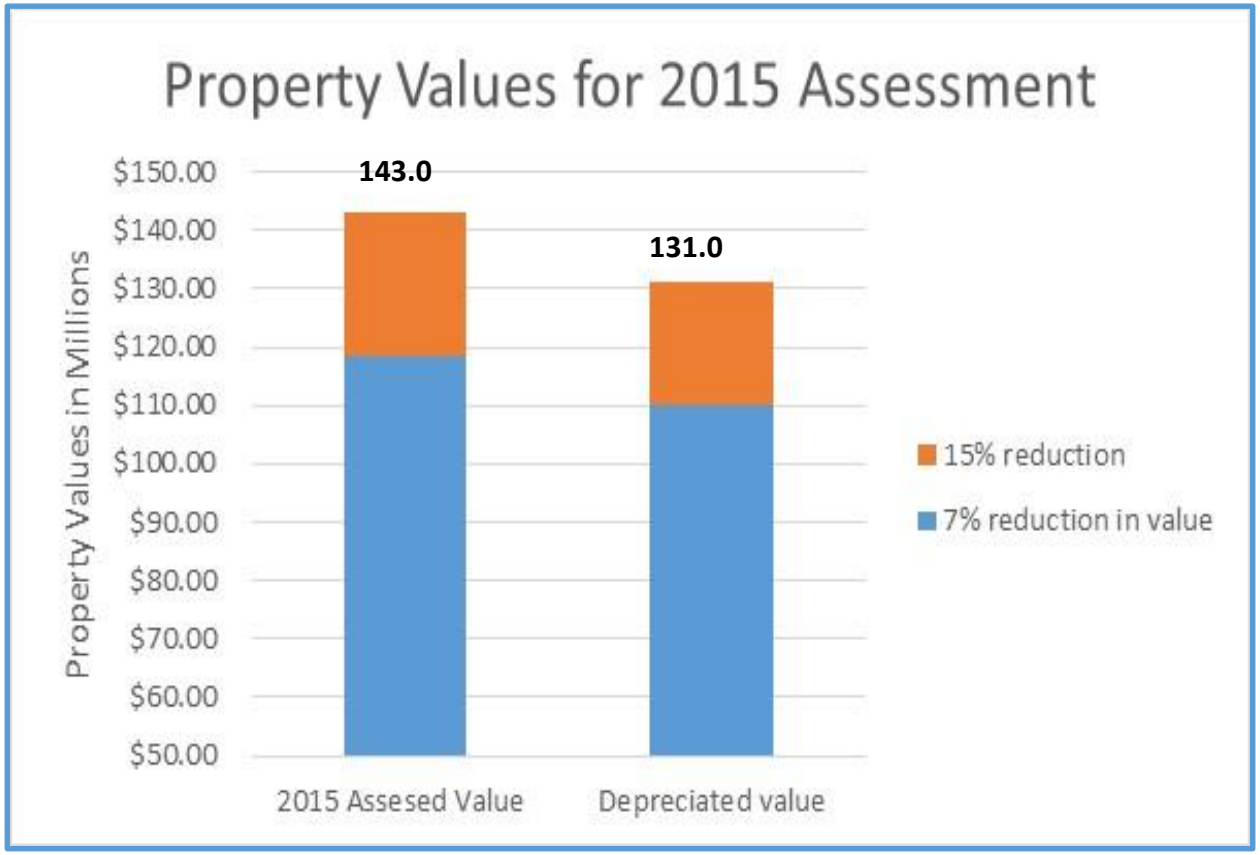
Property Value Impact

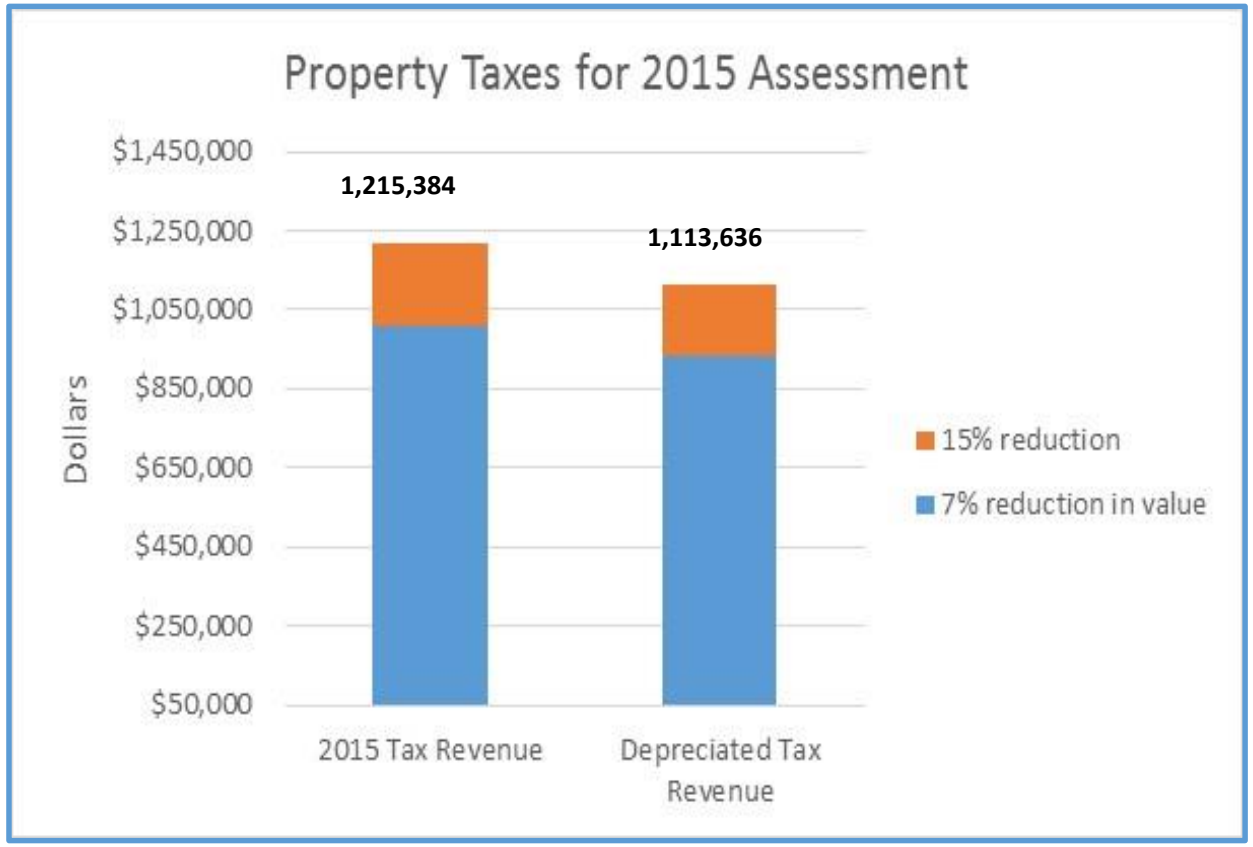


- The average property value in the affected area is $176,300.00 based on 2015 assessments.
- The red line shows average property value after an initial 15% loss and decreased appreciation of 1.5%. Property value after 20 years is $201,833.00 or a loss of $116,584.00.
- The orange area shows average property value after an initial 7% loss and decreased appreciation of 1.5%. Property value after 20 years is $220,829.00 or a loss of $97,588.00.
- The green line shows no property value loss and appreciation of 3%. (The rezoning is not granted) The property value appreciates to $318,417.00.

If the rezoning is granted, the average property owner will be forced to give up at least $97,588.00 in equity over a 20 year period.

Property Value & Tax losses





Property Values decrease from 143.0 Million to 131.0 Million resulting in property tax losses to the county of $101,747.00 the first year.

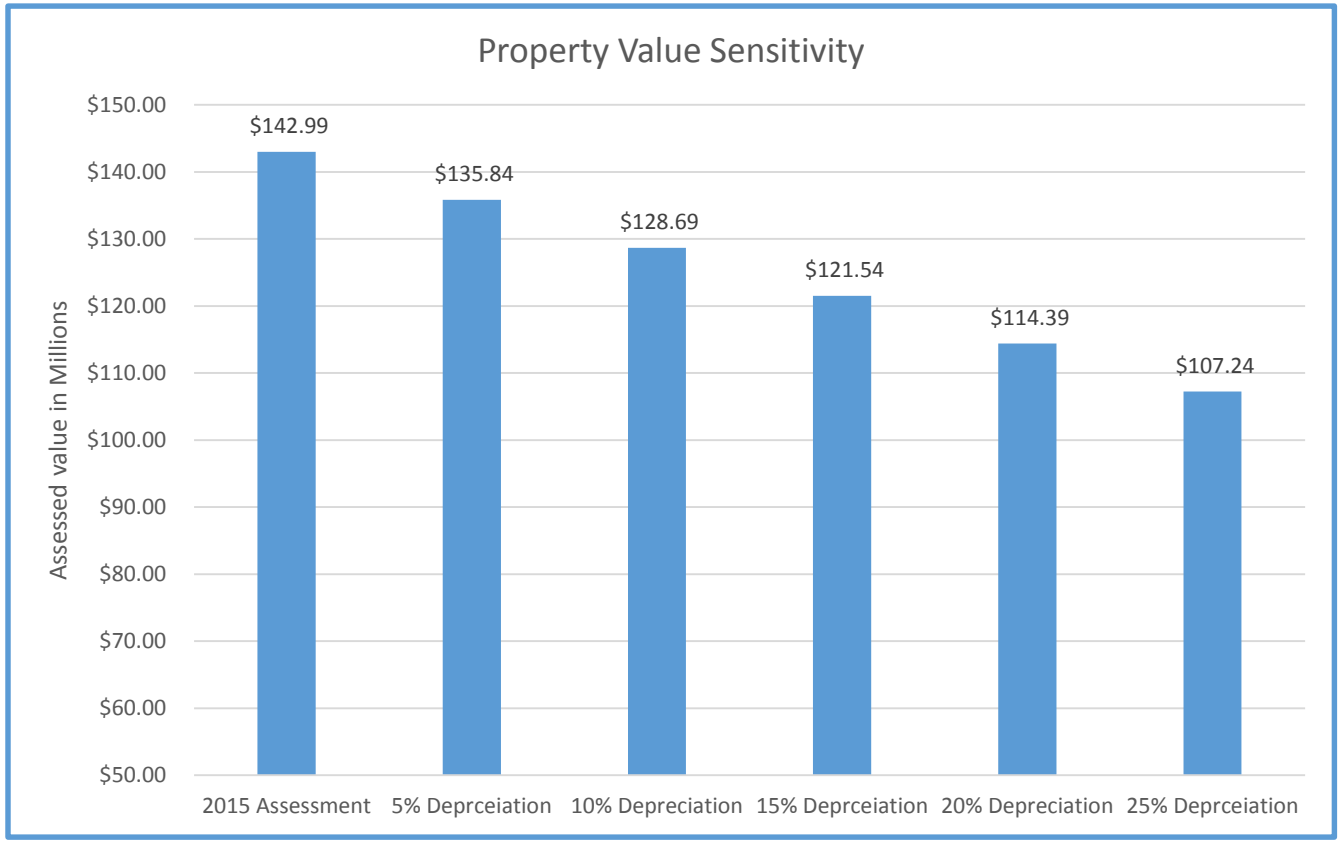
Tax Revenue Losses over Time



- The blue line shows the property taxes collected for the 2015 assessed value for properties in the surface danger zone and noise impact areas with a 3% appreciation for 20 years.
- The orange line shows the property taxes collected with an initial depreciation of 7% or 15% based upon their location in the noise area or surface danger zone with a 1.5% appreciation for 20 years.

The projected total loss in property tax revenues for Spotsylvania county over 20 years is $7,601,667 with $101,747 being lost in the first year.

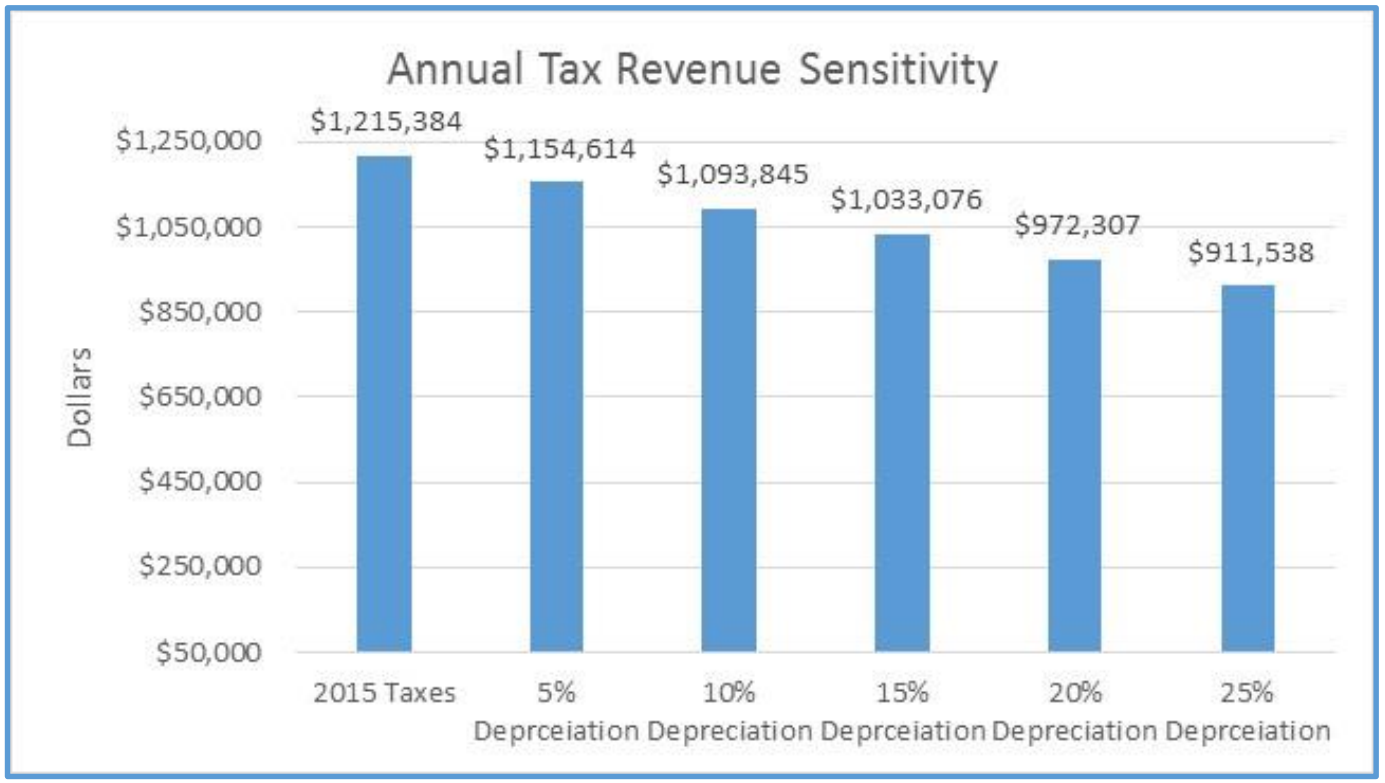
Property Value Loss Sensitivity



- The total property value in the affected area is nearly $143 million dollars based on 2015 assessments for 810 properties.
- This graph shows the total property values for 2015 and the impact of depreciated property values from -5% to -25% at 5% intervals.
- If property value losses exceed the assumed values, property value losses could increase substantially.

If the property values decline at a greater rate than 7 & 15 percent, resident property value losses could increase substantially.

Tax Revenue Loss Sensitivity



- The average property value in the affected area is $176,300.00 based on 2015 assessments for 810 properties.
- This graph shows the annual property taxes for 2015 and the impact of depreciated property values from -5% to -25% at 5% intervals.
- If property value losses exceed the assumed values, property tax losses could increase substantially.

If the property values decline at a greater rate than 7 & 15 percent, tax revenue loss could increase substantially.

Board of Supervisor Decision Criteria (Sec. 23-4.5.7)

- The planning commission shall not recommend, nor shall the board of supervisors approve, the proposed special use unless it satisfies the following standards:
  1. That the proposed use is in accordance with the comprehensive plan and other official plans adopted by the county;
  2. That the proposed use or development of the land will be in harmony with the scale, bulk, coverage, density, and character of the area or neighborhood in which it is located;
  3. That the proposed use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof;
  4. That the proposed use will not adversely affect the health or safety of persons residing or working in the neighborhood of the proposed use;

Satisfied
Partially or Unknown
Not Satisfied

Board of Supervisor Decision Criteria (Cont)

5. That the proposed use will not be detrimental to the public welfare or injurious to property or improvements within the neighborhood;
6. That the proposed use is appropriately located with respect to transportation facilities, water supply, wastewater treatment, fire and police protection, waste disposal, and similar facilities;
7. That the proposed use will not cause undue traffic congestion or create a traffic hazard;
8. That the proposed use will have no unduly adverse impact on environmental or natural resources.

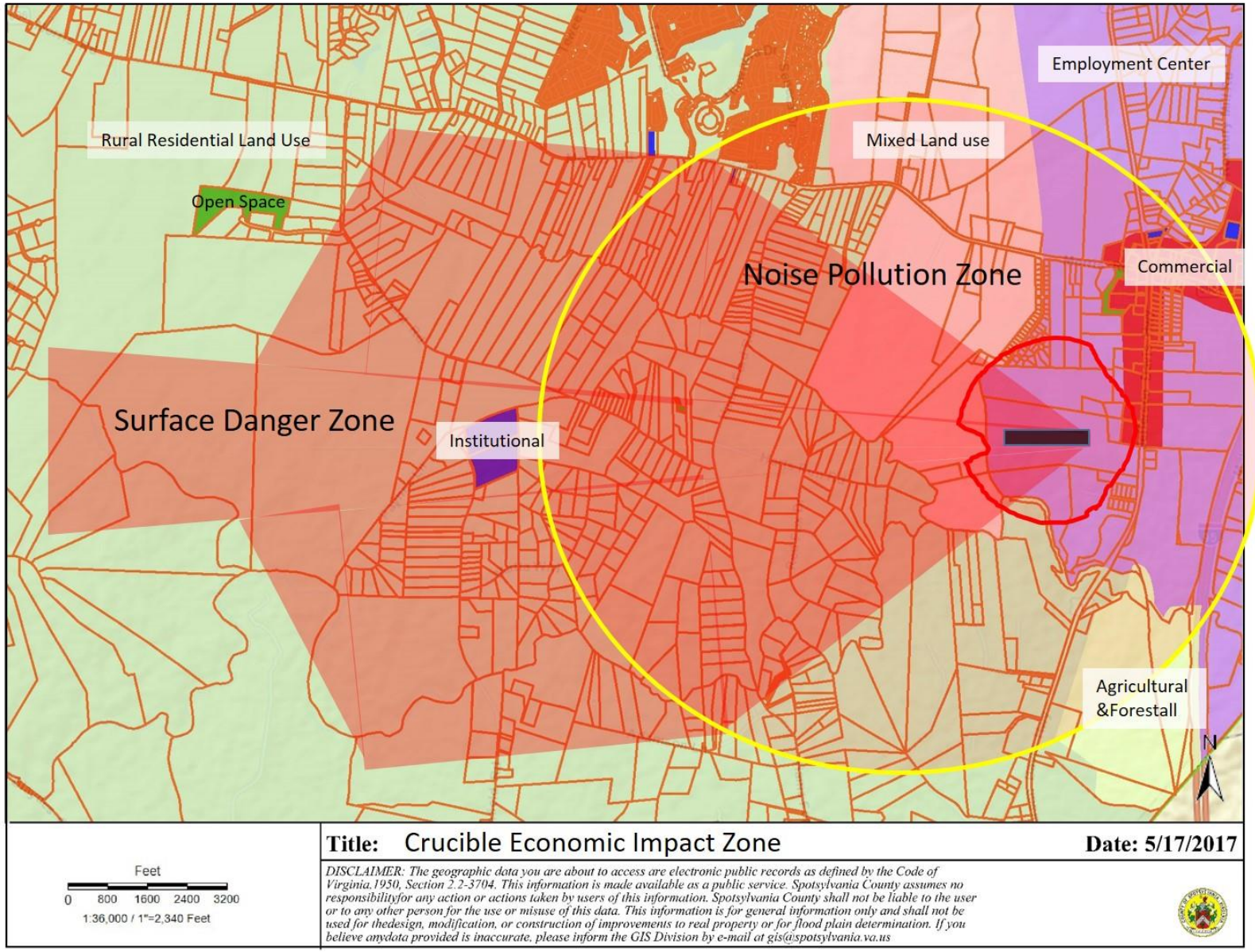
Satisfied
Partially or Unknown
Not Satisfied

1. That the proposed use is in accordance with the comprehensive plan and other official plans adopted by the county;

- Lot 76-A-2 is identified as an “Employment Center” in the 2016 Comprehensive plan.
  - “The employment center land use area is envisioned to be the primary location for new office and industrial development within the County, with the focus on larger scale office complexes, industrial users, and business parks….Heavy industrial uses tend to be larger in scale and often can have pollution on the surrounding area. While these impacts should be minimized, there is the recognition that not all negative effects can be completely mitigated. The location of these users within industrial parks, both new and existing, should be encouraged…”
- Fort A.P. Hill Joint Land Use Study, December 2014
  - Spotsylvania county recognizes that noise levels approaching 80 dBA* “generate undesirable noise levels on current and future development”
  - Recommends
    - “real estate disclosures for prospective buyers or renters of real estate transactions for properties within the influence area as part of subdivision plats.”
    - “Encourage sound attenuation for new construction of residences, schools, hospitals, nursing homes, churches and other public building within public gathering spaces.”

Crucible will have a large negative impact on the comprehensive plan

- Requires re-zoning of all areas inside the effected sound area to commercial as each property will be exposed to commercial sound levels.
- More than 44 Mixed Use properties in the Noise Pollution Zone including all of Taverneer Subdivision
- 6 Mixed Use properties inside the SDZ
- More than 50 Employment Center properties inside the Noise Pollution Zone
- 3 Employment Center Properties inside the SDZ
- Most of the Thornburg Commercial District inside the Noise Pollution Zone.
- County Landfill directly down range, with approval Spotsylvania accepts and condones the risk of residents being hit by projectiles at the landfill.



2. That the proposed use or development of the land will be in harmony with the scale, bulk, coverage, density, and character of the area or neighborhood in which it is located;

- There are no less than 4 subdivisions, 617 parcels of land, within the SDZ and noise pollution area of this proposed range complex.
- This proposed complex will destroy the “harmony and character” of all residents within the effected noise pollution area and SDZ.
- All residents contacted within the effected area oppose this re-zoning change and the construction of this facility without extensive mitigation for both noise pollution and safety
- The proposed development of a town center WILL NOT HAPPEN IF THIS IS APPROVED

This request is not in harmony with the scale, bulk, coverage, density, and character of the Taverneer, Plantation Estates at Matta River, Finney Estates and Matta River Woods Subdivisions

Who will ever develop here down range?



3. That the proposed use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof

- **Safety:** Surface Danger Zones depict the impact area for a given weapon system. Approving a SUP for a live fire facility puts the lives of anyone inside the surface danger zone at risk of loss of life.
- **Sound:** Unconstrained Environments Pollution (Noise) will adversely impact development, use of adjacent land, and impair values thereof. If any re-zoning is approved, appropriate noise mitigation language must be established.
- **Value:** Realtor.com identifies being located next to a shooting range as #4 on a ranked list of neighborhood features that drag down your home value.
  - If the rezoning is granted, the average property owner will lose at least $97,588 in equity over a 20 year period.
  - If the rezoning is granted, the projected total loss in property tax revenues for Spotsylvania county over 20 years is $7,601,667 with $101,747 being lost in the first year.

4. That the proposed use will not adversely affect the health or safety of persons residing or working in the neighborhood of the proposed use;

- Safety - A range must control 100% of the Surface Danger Zone, or employ overhead and side baffling to guarantee a projectile will remain never leave the facility.
- Environmental – Environmental impact not addressed in request.
  - This facility if it is approved must comport with two EPA regulations (the Resource Conservation and Recovery Act and Clean Water Act). Neither of these is addressed in the submission
    - Impact to Well water and the Mattaponi River – Lead, Oil/Fuel spill, explosives residue
  - Guarantee/Bond to ensure land can be cleaned of all hazardous material in the event Crucible exits the property.
    - The U.S. Department of Agriculture (USDA) Forest Service expects to pay $980,000 to remove contaminated soil where the former Prescott Sportsmen's Club Shooting Range (PSC) site existed off Iron Springs and North Granite Basin roads near the Wildwood Estates subdivision. https://www.dcourier.com/news/2017/jan/05/shooting-range-cleanup-cost-forest-service-nearly-/ (JAN 2017)

5. That the proposed use will not be detrimental to the public welfare or injurious to property or improvements within the neighborhood;

- Safety - A range must control 100% of the Surface Danger Zone, or employ overhead and side baffling to guarantee a projectile will remain never leave the facility.
  - The submission does not address safety in the “shoot house” – No berms and no overhead cover

- In the Fort A.P. Hill Joint Land Use Study in paragraph 7.3.1 Spotsylvania County characterized noise levels above 80dBA as “undesirable noise levels on current and future development.”

6. That the proposed use is appropriately located with respect to transportation facilities, water supply, wastewater treatment, fire and police protection, waste disposal, and similar facilities;

- Proposal states: “ The Property is located within the PDB, but given the distance of existing utilities, it is not feasible during the initial phases of the Project to extend public utilities to the said site.”
- Spotsylvania County Code Section 22-5(a) states: ”Where a public water main or sanitary sewer is available to a new subdivision or development, the developer of any new subdivision intended for residential or commercial use or any combination thereof, or the developer of any industrial site shall construct all sanitary sewers and domestic freshwater distribution lines within his subdivision or development at his own expense. Immediately upon completion and acceptance of the construction work, the sanitary sewer and water facilities with necessary easement shall become the property of the county”

7. That the proposed use will not cause undue traffic congestion or create a traffic hazard;

- Proposal address traffic flow, but does not address if impulse noises exceeding 98 dBP for small arms and 130 dBP for ½ lb TNT along Route 1 will create distractions to vehicle operators resulting in accidents.

8. That the proposed use will have no unduly adverse impact on environmental or natural resources.

- Noise as stated in earlier slides with respect to residents.
- Environmental Mitigations talks to lead migration, but does not address Petroleum Oil and Lubricant containment that would be consistent with a “Rally Course” used as a driving training facility.
- EPA regulations and law not addressed as recommended in the EPA best practices guide (Resource Conservation and Recovery Act and Clean Water Act).
- Noise impact to livestock has not been assessed. Cattle and horses are very sensitive to loud noises and will impact their behavior.
    - Ref: Powhatan County Farm Bureau, 28 May 2010



Before Purchase



Today*

*Crucible built two pole barns and two wells without a permit

We the People of Berkeley Position

The residents of Thornburg are opposed to this re-zoning change unless the county ensures the following:

- Safety: 100% of the Surface Danger Zone must reside within the property lines or the range must use overhead and side baffling consistent with the National Shooting Sport Foundation and National Rifle Association “No Blue Sky” concept.
- Noise Pollution: Transmission of unconstrained noise pollution will have an adverse affect on quality of life and property value. Spotsylvania County must disapprove special use request and restrict noise pollution that extends beyond property lines.
- Require full environmental impact study to include noise, water and air pollutants.
- Require the company to post sufficient bond to clean up the lead and other residues from operations should they go out of business or abandon the site.
- Proper notification: Any re-submissions from Team-Crucible should require positive notification of any resident or business that lives in an affected area. Based on this submission, it would include al those within the 87dBP contour, or reside in a Surface Danger Zone.

Bottom Line:

- Placing this facility with the current design on Lot 76-A-2 will:
  - **Impact 810 properties via noise pollution, safety, or both**.
  - **If the rezoning is granted as requested, our analysis shows the average property owner will lose at least $97,588 in equity over a 20 year period.**
  - **If the rezoning is granted as requested, our analysis shows the projected total loss in property tax revenues for Spotsylvania county over 20 years is $7,601,667 with $101,747 being lost in the first year.**
  - **Now that the county is aware that this is an unsafe range, if approved and when a round goes over the berm and hurts or kills a citizen, the damages awarded following a lawsuit will be magnified significantly**

Planning must recommend disapproval -
Once granted and approved, the County can NEVER go back. It's State law.

Questions?

Paulette Mann

From: Elizabeth Fincham <efincham621@gmail.com>
Sent: Wednesday, January 27, 2021 10:29 PM
To: Paulette Mann
Subject: [EXTERNAL]: Stop Crucible

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To Spotsylvania Planning Commission,

My name is Richard Fincham I've been a resident on Jennifer Rd in the Berkeley district since 1983. I am addressing, the Crucible matter in my opinion this is not good for the residence's in this area. It will effect people's health and well being as some have PTSD and other health conditions including anxiety and autism. Also, people's pets have health issues with loud sounds as does one of our pets.

My dog name is Pebbles and she has seizures when she hears loud noises, gunshots, and explosions. She has to take Diazepam, Phenobarbital, or Trazodone. These seizures could well end her life. At one meeting at Salem library, I explained this to the group about Pebbles and a Crucible member said its just an animal. But that's not true she's a family member. These are just some concerns.

Also allowing foreign groups in for military training may not be safe, who's vetting them remember 9/11 also we have a nuclear electric plant not far away. Our property values could go down. We already have noise inside our homes from the race track. I'm very worried to imagine what Crucible would do or sound like. Please help us by not allowing Crucible to establish a military training facility in this area. They should consider moving to another county example Essex county where they could purchase 1000 acre track for safety.

Thank you
Richard Fincham
Barkley District Resident

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January 28, 2021

VIA ELECTRONIC DELIVERY

Mr. Leon Hughes
Planning Director, Spotsylvania County
9019 Old Battlefield Blvd., Suite 320
Spotsylvania, VA 22553

RE: Crucible Project – Opposition

Dear Mr. Hughes,

It is usually not in our interest as a developer to write about another development project except in extremely unusual circumstances. This particular situation unfortunately warrants that. LID, LLC purchased the land for Thornburg Village in 2014 and began working with a local attorney and engineer to bring the project for rezoning. Because of our commitment to work with the County, our formal filing was delayed as changes were made to the proposal in response to comments from County officials. As a result, the plans went through several iterations prior to the formal filing of the application to your office on October 19, 2020. During the course of our being responsive to the community, even before filing the application for rezoning, we discovered that the purchase of adjacent land was negotiated for the Crucible project. We believe that the Crucible and its component activities are incompatible with office, retail and residential uses and that its proposal at the present location, just one-half mile south of Mudd Tavern Road, and 1.5 miles from the I-95 interchange, is detrimental to the value of the Thornburg Village proposal, but also to all of the surrounding properties.

We have submitted the necessary documents to begin the rezoning process for Thornburg Village mixed use development. After much community feedback, our project was amended prior to filing to take into account community concerns and suggestions. It is our understanding that the Crucible activities will include a firing range, the use of "simulated IED's" and other activities simulating combat and violent situations. This type of activity abutting Thornburg Village residential lots would be detrimental to the future homeowners' peaceful enjoyment of the property, and frankly will directly impact project economics of all of the surrounding properties. The zoning ordinance states that rezoning and use permits must take into account the impact on future development of adjacent properties and unfortunately the Crucible project will not only impact our project but several others that would be along the Route 1 corridor that the County has planned as an employment center.

Having an industrial facility in the heart of a development corridor will stunt future development and negatively impact current slated projects. For that reason, we urge County Staff and Supervisors to turn down the Crucible project. Thank you for your consideration.

Sincerely,

Saif Rahman

Saif Rahman, Managing Partner

Thornburg Village Development

Paulette Mann

From: Albert Clark <aareptiles38@gmail.com>
Sent: Wednesday, February 3, 2021 8:53 AM
To: Paulette Mann
Subject: [EXTERNAL]: Stop Crucible

CAUTION: This email originated from an external source. Do not click on any links or open attachments unless you recognize the sender and know the content is safe.

Hello neighbors, my name is Albert Presly Clark Jr. My voting district is the Berkeley district. As a retired NYC paramedic, parent, and a new resident in the Taverneer Lane subdivision since 2018 I join my residential neighbors in opposition to the rezoning plan. Many of the homeowners here in the Taverneer subdivision are retirees who enjoy the safety and quietness of our community. We courteously are against any establishment of any military or paramilitary types of training facilities that would bring a risk of bodily harm and injuries to all of us. Not to mention the extra loud noise from weapons , live ammunition and explosives and the like. Please reconsider the location and be advised that we strongly oppose this industrial rezoning. Thank you! Respectfully, Albert Presly Clark Jr.

Sent from my iPhone
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This email was Malware checked by Sophos http://www.sophos.com

WARREN C. KISHPAUGH
6308 HAMS FORD ROAD, SPOTSYLVANIA, VA. 22551
540-582-2452
January 29, 2021

Spotsylvania Planning Commission
VIA – E-MAIL – pmann@Spotsylvania.va.us

RE: Team Crucible rezoning – Wednesday February 3, 2021

I am a resident of Berkeley District, Spotsylvania County and wish to inform you my family and I are **opposed** to this rezoning request to establish a military type training facility on their land near Thornburg from agriculture to industrial 2. Their proposal which includes a live-fire range and improvised explosive device training would adversely impact local residents from a noise and safety perspective from 6 a.m. to 10 p.m. 7 days a week without any noise restrictions at all. The range of their military caliber weapons far exceeds their property boundaries and places me and my family at risk when a round leaves their range. As I live about one mile away, I am concerned about the distance the ammo travels. Once the special use permit is approved, they no longer have any sound restrictions or restrictions on the building of additional live-fire rifle ranges. I am also concerned about a decline in property values in this area for which we won't be compensated.

If approved, I believe Team Crucible's training facility with its on-going noise will discourage other more desirable development from occurring in the Thornburg area. I understand other developers have been looking at nearby properties with the desire to develop mixed business and residential opportunities as well as recreational facilities. If the Team Crucible request is approved, many of the developers will look elsewhere to invest their money.

I'm an avid outdoors man, love hunting and shooting! I would totally support this in the County on other large land areas away from residents and businesses! I don't think it is a good fit for the Thornburg area. **How would you like a shooting range beside or in front of your house? Be honest - I URGE YOU TO VOTE AGAINST THIS PROPOSAL!!**

Respectfully,

S/ Warren C. Kishpaugh

Cc: Board of Supervisors

Paulette Mann

From: Aviv Goldsmith <precursors@aol.com>
Sent: Sunday, January 31, 2021 12:23 PM
To: Jennifer Maddox
Cc: Paulette Mann
Subject: [EXTERNAL]: Crucible

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Dear Ms. Maddox:

I am writing to urge you to vote against the Crucible development as my Berkeley District rep on the Planning Commission. I am hoping that the County will respect the rights and property values of existing landowners and not approve incompatible uses.

If the Thornburg area is to be developed responsibly into a commercial center we shouldn't approve an incompatible land use. The rights of all in the area to quiet and safe enjoyment of their land should also be respected.

Thank you for your consideration for the Berkeley District.

Peace,

Aviv Goldsmith
6147 Hickory Ridge Rd
22551

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This email was Malware checked by Sophos http://www.sophos.com

Paulette Mann

From: Laurel Jordan <laurel96@hotmail.com>
Sent: Monday, February 1, 2021 12:32 PM
To: Paulette Mann
Subject: [EXTERNAL]: Proposed rezoning

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Dear members of the Planning Commission,

I am writing to advise you that I am opposed to the Crucible's request to rezone land in the Berkeley district from agricultural to industrial 2. I believe that the Crucible does important work. However, I strongly believe that my backyard and those of my neighbors are not the appropriate place to do it. My concerns are the same as those voiced by my many others. Most of us moved to the Thornburg area to enjoy the rural setting and the generally quiet atmosphere it provides. In their updated proposal the Crucible states it will attempt to keep noise to a minimum by firing suppressed weapons. The same document also states that if the customer desires to fire unsuppressed weapons, then they will provide what the customer wants. I am also very concerned about safety. I understand that the Crucible's safety record in Stafford has been good; however, it only takes a single stray bullet to injure or kill someone. You can understand how that would concern those of us who live downrange of the proposed site. Additionally, I believe that the Crucible's presence, if allowed, would lower the property values of homes in the surrounding area, including mine. Not only is this unfair to me, but is the county willing to sacrifice tax revenue to gain this business?
Team Crucible has amended their proposal in hopes of showing intent to be a 'good neighbor'. I feel that if that were a priority for the Crucible they would work things out with their current county. Instead, they have been engaged in multiple lawsuits with Stafford over the years. I sincerely hope that Spotsylvania County can find a more suitable neighbor for us. Thank you for your consideration of this matter.

Laurel Jordan
Berkeley District resident

Paulette Mann

From: Delma Armstrong
Sent: Monday, February 1, 2021 1:40 PM
To: Paulette Mann
Subject: Stop Crucible

Hello, my name is Delma W. Armstrong Jr. I live in the Berkley Voting District. I am a resident of Taverneer Subdivision. I have been a lifetime resident of Spotsylvania County and have worked for Spotsylvania County for 35 years.
My concern with the Crucible is the noise. The people of Thornburg are already putting up with the noise from the Dominion Raceway. Now there's a chance that there will be more noise if this so called training facility is approved. When is it going to stop. If civilian people want to get military type training then they should join the military. There are other parcels in this same are that are proposed for single family homes. It's like adding oil to water. It just doesn't mix. I would hope that the planning commission and the Board of Supervisors will feel the same and turn down this re-zoning.
Thank You.

Paulette Mann

From: Terry Jemison <terry.jemison@gmail.com>
Sent: Tuesday, February 2, 2021 6:44 PM
To: Paulette Mann
Subject: [EXTERNAL]: Fwd: Comment for 2/3/21 Hearing - Radio Reconnaissance Technologies

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Ms. Mann,
Greetings. I see that the email address for providing testimony (PC or BOS) given at https://www.spotsylvania.va.us/738/Public-Hearings is different from the instruction in the postal-mailed notice of the PC hearing. Thus, I am re-sending this to you per the instructions in that postal-mailed letter. Sorry for any confusion. If the first mail has alredy been appropriately handled, please disregard this followup.
Thank you,
Terry Jemison

---------- Forwarded message ---------
From: **Terry Jemison** <terry.jemison@gmail.com>
Date: Tue, Feb 2, 2021 at 12:51 PM
Subject: Comment for 2/3/21 Hearing - Radio Reconnaissance Technologies
To: <planning@spotsylvania.va>

Members of the Planning Commission,

I urge your support of the thoughtful staff recommendation and testify in opposition to the Crucible proposal. In particular, my concerns include both the simulated IEDs and outdoor range discharges of 12 gauge shotguns and other firearms until approximately 10 p.m. weekdays. I own a half-acre residential lot at 5509 Coach Four Lane (76A 1 - 5). This is in the small Parcel N in the staff report (p. 6), south of Crucible's proposed complex. My parcel at the northwest corner of the subdivision is the closest of the Coach Four Lane owners to the prospective outdoor range. I have read the applicant's acoustic study, but can't believe that in the relatively quiet hours of darkness, particularly in cold weather when soundwaves travel further (footnote 1) and the wave bends back toward the ground, neighbors would not hear the steady cadence of gunfire and explosions when class is in session. Its contractor's conclusion at page 20 of the acoustic report that "noise levels affecting the surrounding community are expected to be notably reduced…compared to their original design…" is not enough.

Thornburg is blossoming with new potential given impending projects of others nearby that would foster economic growth and broaden the tax base. But this proposal before the Commission weighs against this progress. Firearms and security training is a necessity that I applaud, but Radio Reconnaissance Technologies' contribution must be at a more remote site **at least for the outdoor shooting portion of its curriculum.**

Thank you for your consideration of community concerns and what is in the interest of Thornburg today and its healthy future growth.

Terry Jemison

(1) Ref. https://www.discovery.com/science/Sound-Carries-Farther-Cold-Days

Paulette Mann

From: jean Hoss <bjh634@msn.com>
Sent: Tuesday, February 2, 2021 11:05 PM
To: Paulette Mann
Subject: [EXTERNAL]: Fw: Request Rezoning of Crucible R17-0005 be denied.

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From: jean Hoss
Sent: Tuesday, February 2, 2021 10:52 PM
To: pmann@spotsyvania.va.us <pmann@spotsyvania.va.us>
Subject: Request Rezoning of Crucible R17-0005 be denied.

We are opposed to the proposed rezoning of 69.96 acres from agriculture to industrial to accommodate Team Crucible R17-0005. We have had land in the subdivision of Matta River Woods for over 40 years. It is part of our retirement. I am 86 years and legally blind. My wife is 84 and has many major health problems. No one wants to buy residential property backed up to a shooting range such as our property . Why would they put a firing range in a populated subdivision 3,000 feet from our lot, as well as being near other occupied lots? Since there is much open space elsewhere, why put a shooting range in a populated area at this location? We hope the County Planning Commission takes into consideration the danger of building Crucible in a populated community such as Matta River and other nearby subdivisions.

We ask your support in voting "NO" to Crucible R17-0005.

Robert L. and Shelba Jean Hoss

(Lot 13, Matta River Woods Subdivision)

Telephone No. 304 754-7112,

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This email was Malware checked by Sophos http://www.sophos.com

Paulette Mann

From: jaruedi@aol.com
Sent: Wednesday, February 3, 2021 11:44 AM
To: Paulette Mann
Subject: [EXTERNAL]: Stop Crucible

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Mr Mann, this is to be read into the record

I'm raising my voice against Crucible. Admittedly I live outside the directly affected area, still against it in this part of the county.

Reasons I'm against it is Safety concerns, Noise pollution, and Property values.

Range berms are great, but still the odd occasional round can still go over them and you have established communities in the surrounding areas. One wrong round in the wrong spot can be an unneeded tragedy.

Reducing the number of ranges is great as is the reduction in range hours. And I do love to shoot my muzzleloaders. But virtually any time I go outside (I live between Partlow and Snell) I'm treated to a 'symphony' of gunfire. Automatic gunfire, pistols, rifles and "WTF was THAT?" going off just about any day or time I go outside. And this is just from private citizenry, at their homes. I would not want to think of living near a constantly used range.
And I would never live nor set up a business near one.

Crucible is already in Stafford, and apparently not a good neighbor. I only know this from a business owner that had customers that were neighbors of the Stafford operation, and they were not happy with Crucible. Neighbors could neither enjoy or sell their properties.

J A Ruedi
Partlow Rd
Spotsylvania 22553

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Citizen's Revised Impact Analysis
Team Crucible Zoning Request

January 2021

Agenda

- Bottom Line up Front
- Summary
- Crucible Layout
- Resident top 3 issues
  - Noise Pollution/Quality of Life
  - Safety
  - Economic Impact
- County Decision Criteria
- Current Status
- Conclusion and Questions

Bottom Line:

The Planning Commission should recommend disapproval of this request

Bottom Line:

The Planning Commission should recommend disapproval of this request

- The surrounding community is nearly 100% against this proposal
  - We have more than 450 signatures from surrounding residents who oppose this rezoning
  - This will create a black hole for any development in the center of one of the most promising areas in the county
- This is a clear case of SPOT ZONING
  - Rezoning of this property as requested does NOT support the Spotsylvania Comprehensive Plan will have a severe negative impact on future development in the Thornburg area.
  - 6 of 8 Board of Supervisor Decision Criteria (Sec. 23-4.5.7) do not support approval.
  - Rezoning of this property as requested severely impacts 810 property owners
- The revised Crucible submission invalidates their economic analysis. – less ranges means less training days
- Although Crucible proffers ammunition sizes, there is no enforcement capability in Spotsylvania so the residents will never feel safe
- Crucible refused to do a SARNAM sound analysis and their analysis does not take in to account any environmental factors. It is a "best case" analysis and is not accurate for what the citizens will suffer.
- Once approved, the county can never go back and this will forever change and destroy harmonious and positive development of the area
- Proffer to use sound suppressors "when approved by customers" is ridiculous on its face. There is no enforcement nor any incentive to use a suppressor which increases wear and tear on weapons and provides unrealistic training depending on the scenario

Summary:

- Placing this facility with the current design on Lot 76-A-2 will do the following:
  - **Impact 810 properties via noise pollution, safety, or both.**
  - 206 acres including Taverneer Subdivision and those along Rte 1 adjacent to the property will be virtually uninhabitable (noise levels in excess of 104 dB peak)
  - 3005 acres containing 437 residential and commercial properties in the surrounding area will have their quality of life ruined (noise levels from 87 dB to 104 dB)
  - 617 properties including 3 Subdivisions will be inside the Surface Danger Zone where all range design best practices state there is a reasonable chance of a projectile from a potentially unsafe range causing death, injury or destruction of property – The county incurs shared liability should it approve this design.
  - **The average property owner will lose at least $97,588 in household equity over a 20 year period.***
  - **Spotsylvania will lose at least $ 7,601,667 ($ 101,747 in the first year) in property tax revenues over 20 years due to devalued property.***

* Estimate based on 15% reduction for properties in high complaint noise and dispersion area of SDZ and 7% reduction for homes in moderate noise and ricochets area of SDZ

Specifics of Request

- Lot 76-A-2 is requesting rezoning for Agricultural 2 (A-2) to Industrial 2, specifically rezoning under Sec. 23-6.22.4 Special uses, (12) Industry, type III.
- Definition: Industry, type III means an establishment which has the **potential to be dangerous or extremely obnoxious.** Included are those in which explosives are stored, petroleum is refined, natural and liquid gas and other petroleum derivatives are stored and/or distribution in bulk, radioactive material are compounded, pesticides and certain acids are manufactured, and hazardous waste is treated or stored as the establishment's principal activity.
- Additional: under Sec. 14-52 Exemptions for noise, the applicant feels they meet paragraph 14-52-a-3 "Noise emitted by a commercial or industrial establishment which noise customarily emitted by such establishment or industries." **would be exempt from noise pollution sound levels from 6:00a.m. to 10:00 p.m. daily.**

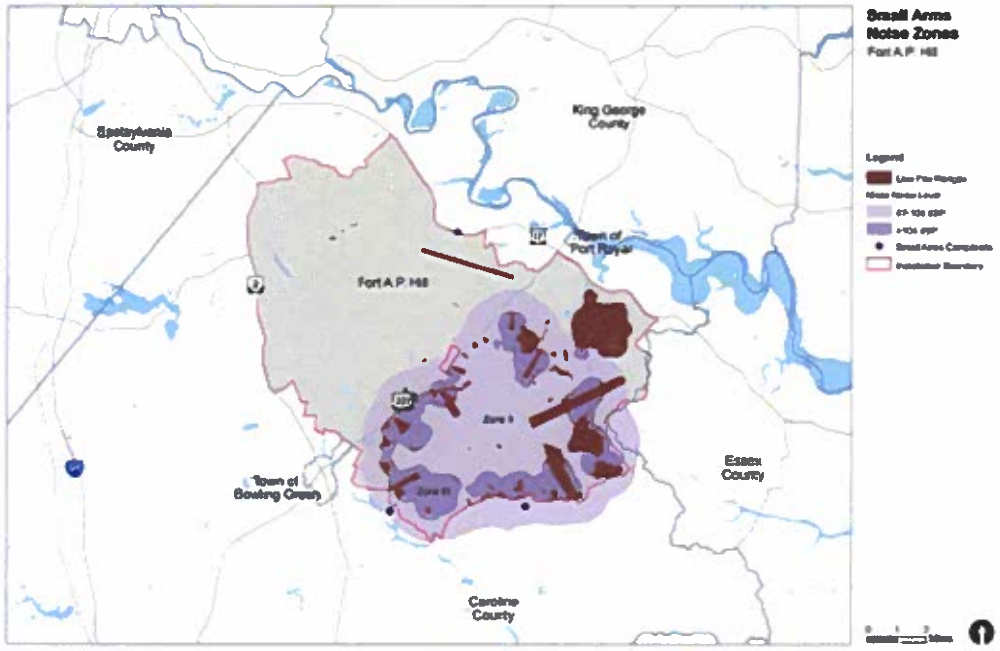
Once approved the County can never go back!

- Statute: VA Code Ann. § 15.2-917
- No local ordinance regulating any noise shall subject a sport shooting range to noise control standards more stringent than those in effect at its effective date. **The operation or use of a sport shooting range shall not be enjoined on the basis of noise,** nor shall any person be subject to action for nuisance or criminal prosecution in any matter relating to noise resulting from the operation of the range, if the range is in compliance with all ordinances relating to noise in effect at the time construction or operation of the range was approved, or at the time any application was submitted for the construction or operation of the range
- For purposes of this section, "effective date" means the time the construction or operation of the sports shooting range initially was approved, or at the time any application was submitted for the construction or operation of the sports shooting range, whichever is earliest.

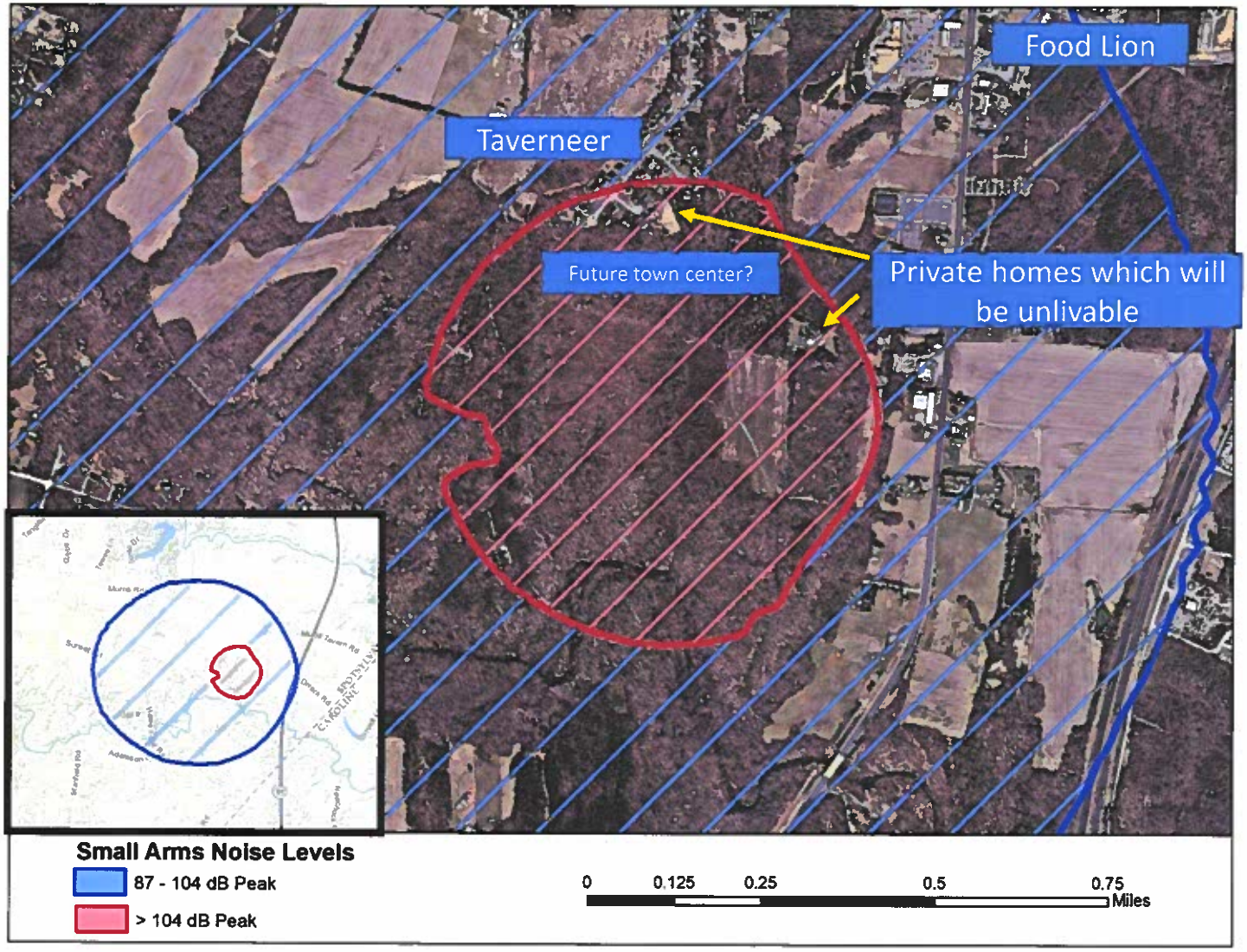
Quality of Life

- Unconstrained Environmental Pollution (Noise) will adversely impact quality of life for current residents and impact future development in the effected area.
- The following 2 slides depict the areas that will be negatively impacted by the noise pollution.
  - The yellow area depicts the areas that will be annoyed to the level of taking actions like complaints, or real estate decisions. DoD recommends no future development in this area without significant risk of conflict
  - Red represents the High Complaint area. DoD recommends no habitation in this area.
- Noise sensitive land uses are discouraged in areas where dBP from small arms weapons is between 87 and 104 dB with medium risk of complaints. Noise sensitive land uses are strongly discouraged in areas where dBP from small arms weapons is equal to or greater than 104 dB with high risk of noise complaints.

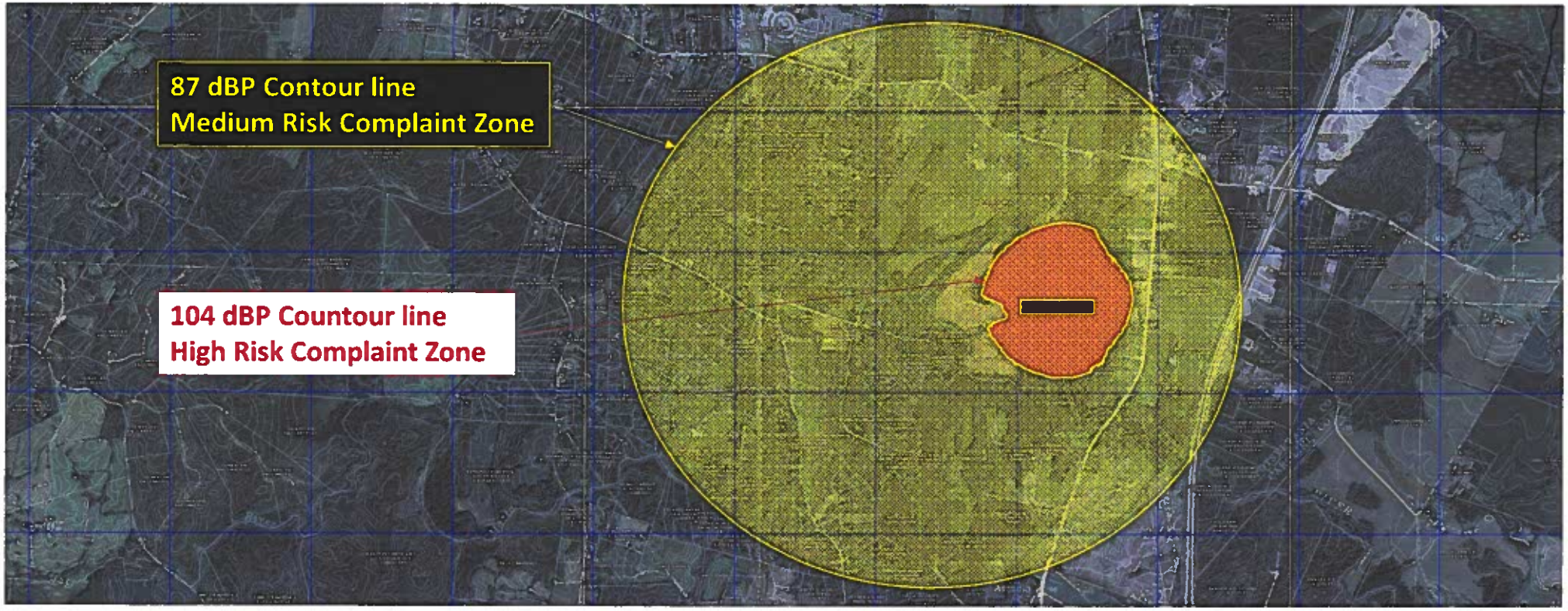
Ref: AIRCRAFT, ORDNANCE, AND SMALL ARMS NOISE STUDY FOR NAVAL WEAPONS SYSTEM TRAINING FACILITY BOARDMAN, OREGON (Aug 2012)



SARNAM Model for FT. AP Hill, Fort A.P. Hill Joint Land Use Study - December 2014

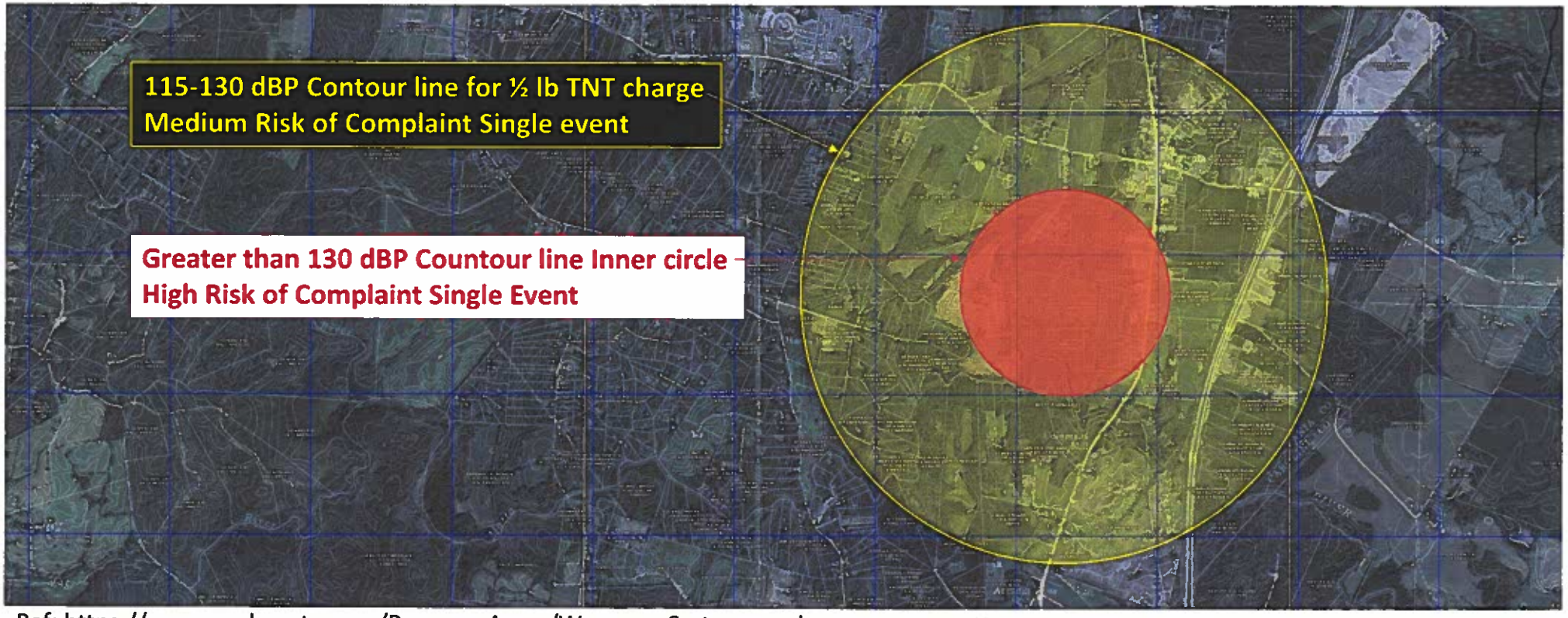

Food Lion
Taverneer
Future town center?
Private homes which will be unlivable
Small Arms Noise Levels
87 - 104 dB Peak
> 104 dB Peak
0
0.125
0.25
0.5
0.75
Miles

Small Arms Range Noise Assessment Model (SARNAM)
Team Crucible Training Complex
Small Arms (.308, 5.56mm, 9mm) weapons



Ref: https://www.serdp-estcp.org/Program-Areas/Weapons-Systems-and-Platforms/Noise-and-Emissions/Noise/WP-200006/SARNAM-Noise-Impact-Software

Small Arms Range Noise Assessment Model (SARNAM)
Team Crucible Training Complex
½ Pound TNT



Ref: https://www.serdp-estcp.org/Program-Areas/Weapons-Systems-and-Platforms/Noise-and-Emissions/Noise/WP-200006/SARNAM-Noise-Impact-Software

dBA	Example	Home & Yard Appliances	Workshop & Construction
0	healthy hearing threshold		
10	a pin dropping		
20	rustling leaves		
30	whisper		
40	babbling brook	computer	
50	light traffic	refrigerator	
60	conversational speech	air conditioner	
70	shower	dishwasher	
75	toilet flushing	vacuum cleaner	
80	alarm clock	garbage disposal	
85	passing diesel truck	snow blower	
90	squeeze toy	lawn mower	arc welder
95	inside subway car	food processor	belt sander
100	motorcycle (riding)		handheld drill
105	sporting event		table saw
110	rock band		jackhammer
115	emergency vehicle siren		riveter
120	thunderclap		oxygen torch
125	balloon popping		
130	peak stadium crowd noise		
135	air raid siren		
140	jet engine at takeoff		
145	firecracker		
150	fighter jet launch		
155	cap gun		
160	shotgun		
165	.357 magnum revolver		
170	safety airbag		
175	howitzer cannon		
180	rocket launch		

Safety

- The Team-Crucible range is an **"OPEN RANGE" -** bullets **WILL** overshoot and cross the Lot 76-A-2 property line - it is just a matter of probability and time. (Plan and concerns were reviewed by C. Vargas, PE – Range design)
- The Following slides depict the Surface Danger Zones for some of the small arms weapons Crucible is requesting to shoot. *depending on final range layout on the ground the angles of the areas may change but not the size of the areas.
- Anyone within the Surface Danger Zone depicted in yellow is at risk of loss of life when the range is in operation.
- This position is consistent with Department of Defense, Department of Energy, National Shooting Sports Foundation, and the National Rifle Association.

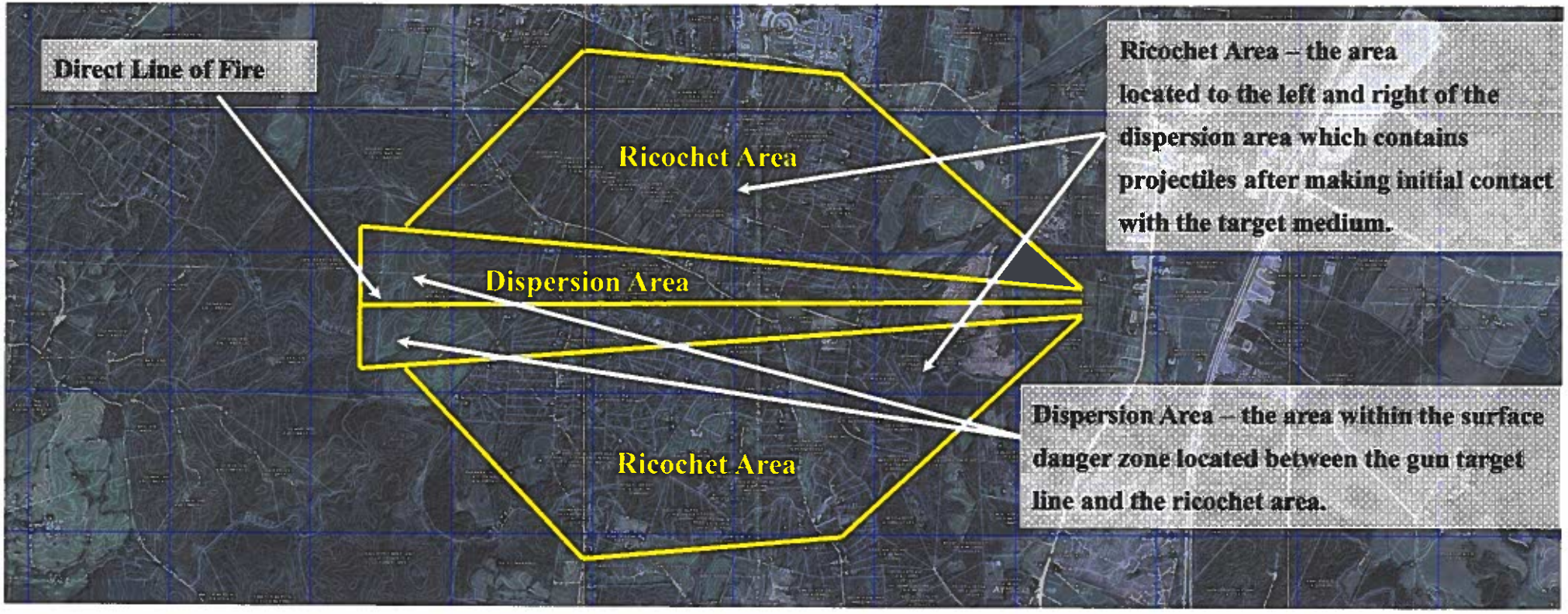
"A designer develops the impact sector area by first imagining a person who is firing at ground level at a surface target being able to deviate 10 degrees each side of a center line of fire and allowing him to raise the rifle or the pistol at a 30- to 35-degree angle. These are the angles that will give a maximum trajectory. You now have the maximum distance of impact and a description of the area that is impacted by a range." Design Criteria for Shooting Ranges, Clark Vargas NSSF http://www.nssf.org/ranges/rangeresources/library/detail.cfm?filename=facility_mngmnt/design/design_criteria.htm&CAT=Facility%20Management

"If you build in a populated area, your range must be totally baffled so that the range owner can demonstrate to a judge that a round cannot escape." C. Vargas 1996 Third National Shooting Range Symposium, www.nssf.org/ranges/rangesources

"safety baffles defines a structure which is used to restrict fired bullets to smaller areas than would otherwise be possible without them...baffles are erected so that the shooter, regardless of the shooting position used (or permitted) cannot see any sky downrange, either over the top of the backstop or to the side of the range...The overall responsibility of the range owner/operator is to stop fired bullets before they exit the property" David Luke, Range Technical Advisor, National Rifle Association, 1996 Third National Shooting Range Symposium, www.nssf.org/ranges/rangesources

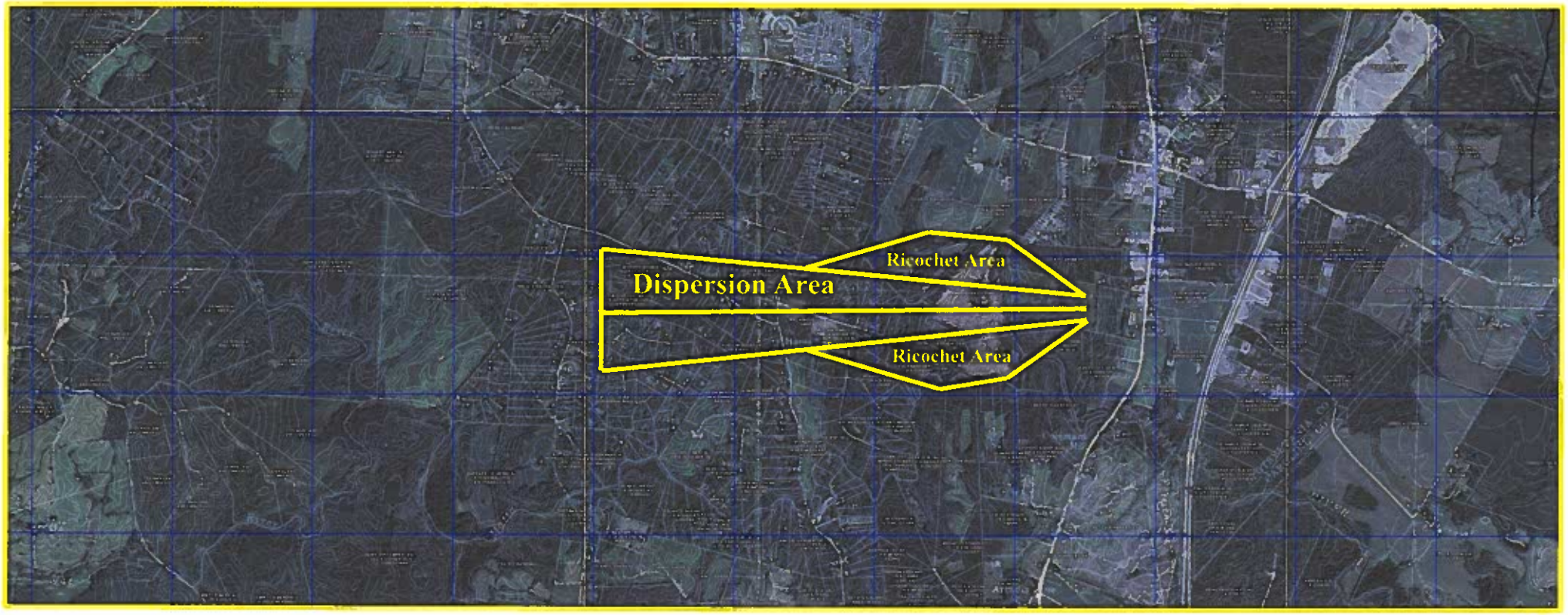
*The Surface Danger Zone (SDZ) is a depiction of the mathematically predicted area a projectile **will** impact upon return to earth, either by direct fire or ricochet. The SDZ is the area extending from a firing point to a distance downrange based on the projectiles fired. This area has specific dimensions for the expected caliber of the weapon(s) being fired so that all projectile fragments will be contained in this area. These dimensions are found in DA PAM 385-63 - Range Safety.*

Surface Danger Zone
.308
Distance X: 5,288M Angle P: 43.18 deg (earth/water)



Ref USMC Range Safety Pocket Guide p32

Surface Danger Zone
5.56mm M855 Ball
Distance X: 3,437M Angle P: 34.2 deg (earth/water)



Ref USMC Range Safety Pocket Guide p32

Ranges with "No Blue Sky" Overhead Baffles

http://www.cvaltd.com/2011/06/nssf-video-berms-baffles-and-backstops/





This is NOT what is proposed, but would be required in this area



Economic Impact

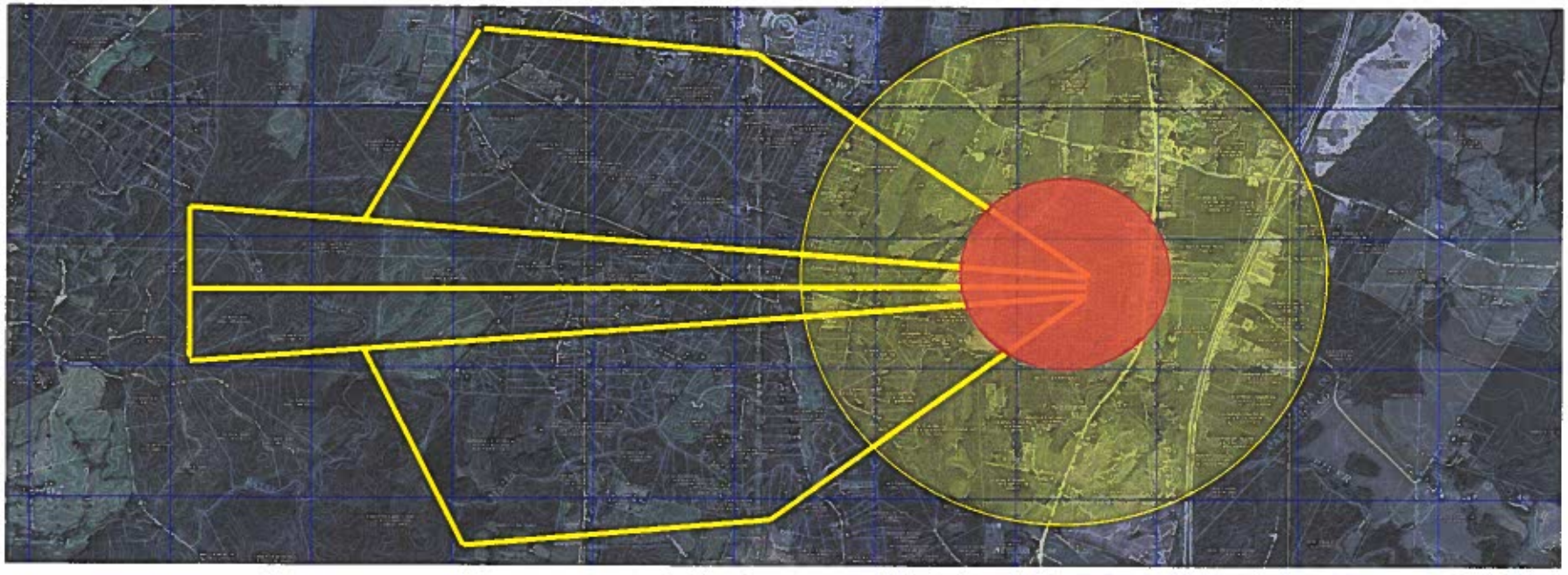
- If the rezoning is granted, the average property owner will **lose at least $97,588** in equity over a 20 year period.
- If the rezoning is granted, the projected total loss in property tax revenues for Spotsylvania county over 20 years is **$ 7,601,667 with $ 101,747 being lost in the first year**.

- 810 Properties economically impacted due to noise pollution, safety, or a combination of both.
- Unconstrained Environments Pollution (Noise) will adversely impact quality of life, future development, and impair values for 437 residential and commercial properties.
- The threat of loss of life or injury due to working or living within the surface danger zone of a live fire range will negatively impact the value of at least 617 properties.
- Studies have shown loss of value amounts vary from 7.5 % to 25%.
- The following graphs assume a 7% or 15% initial loss depending on proximity to the range locations and Surface Danger Zone
- Property Values for 2015 were taken from the GIS Mapping Page on the Spotsylvania County Website

Property Loss References

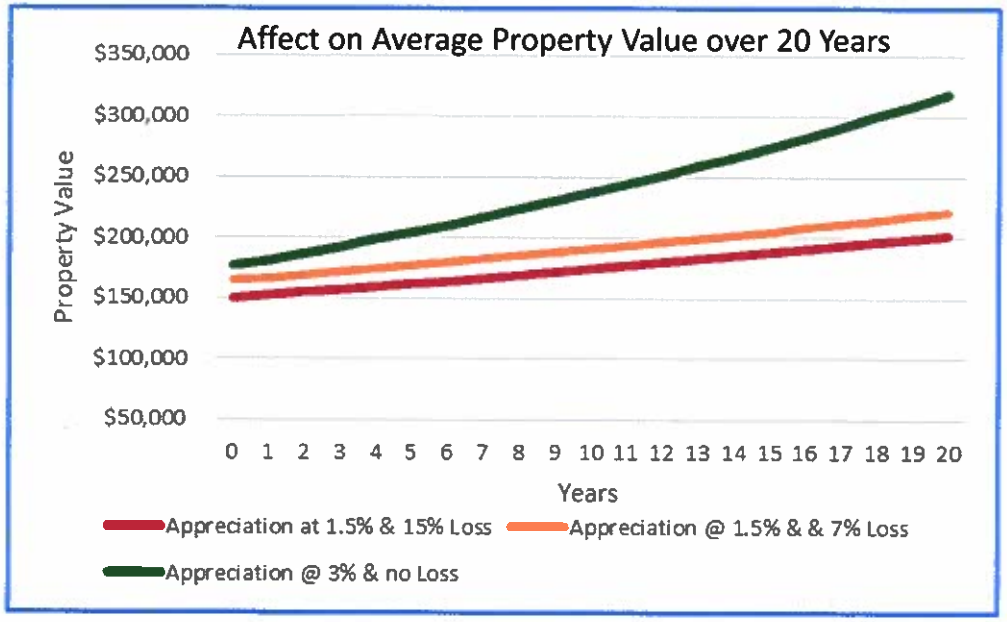
- Appreciation Impact Value: Realtor.com identifies being located next to a shooting range as #4 on a ranked list of neighborhood features that drag down your home value. Being in the proximity of a rifle range drags the appreciation of property by 3.7%
  - http://www.realtor.com/news/things-that-affect-your-property-value/
- Maine professional real estate appraiser performed statistical analysis resulting in a 7.5% loss of property value resulting form a 175 acre parcel being located within 1.5 mile radius of a rifle range.
  - http://www.bridgton.com/waterford-gun-club-noise-hurts-property-values-county-rules/
- Appendix D reports possible property losses of 25 %
  - http://www.deq.virginia.gov/Portals/0/DEQ/EnvironmentalImpactReview/10.017Sappendixd.PDF
- Green county Record reports possible property losses of 30%
  - http://www.dailyprogress.com/greenenews/news/gun-range-proponents-it-s-a-safe-place-to-shoot/article_cecc95ba-41d2-11e5-a678-83dc0f3c372e.html
- Numerous other articles available on the internet

Properties Evaluated



- **Properties in the Extreme Area depicted by the red circle depreciated at 15%.**
- **Properties in the Moderate Noise Area depreciated by the yellow circle7%**
- **Properties in the center portion of the Surface danger Zone (SDZ) depreciated by 15%**
- **Properties in the ricochet area of the SDZ depreciated by 7%**
- **No properties double counted (in both the noise area and SDZ)**

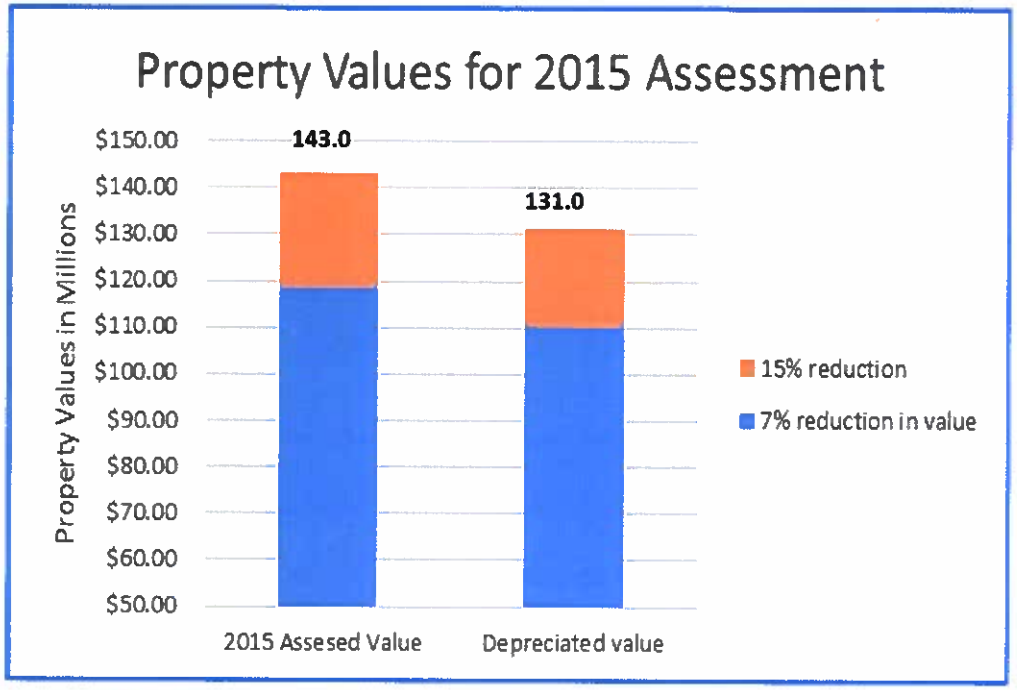
Property Value Impact

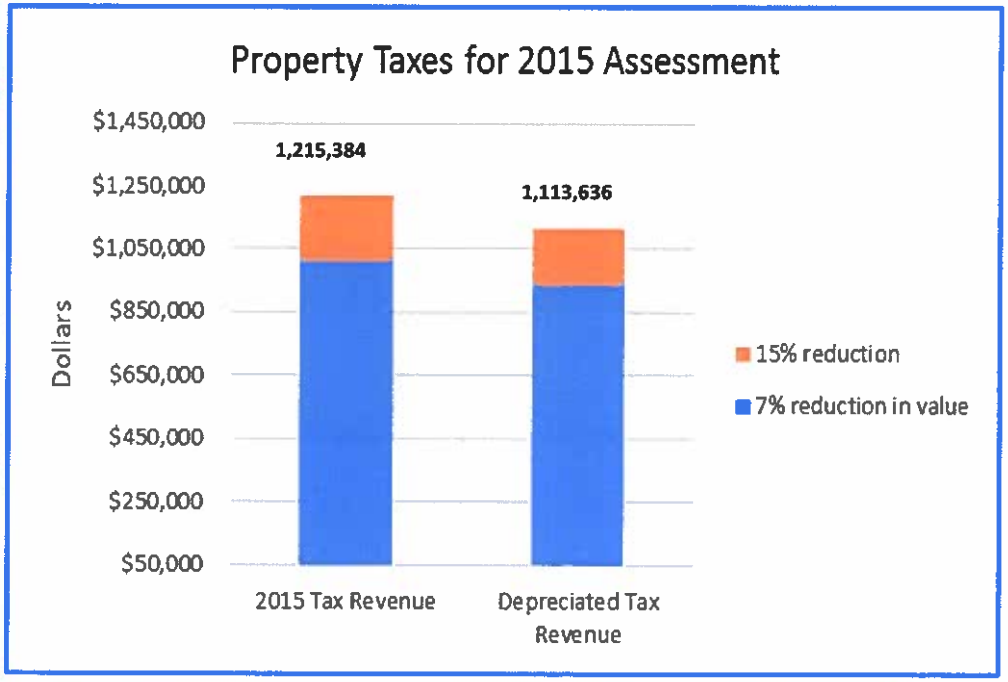


- The average property value in the affected area is $176,300.00 based on 2015 assessments.
- The red line shows average property value after an initial 15% loss and decreased appreciation of 1.5%. Property value after 20 years is $201,833.00 or a loss of $116,584.00.
- The orange area shows average property value after an initial 7% loss and decreased appreciation of 1.5%. Property value after 20 years is $220,829.00 or a loss of $97,588.00.
- The green line shows no property value loss and appreciation of 3%. (The rezoning is not granted) The property value appreciates to $318,417.00.

If the rezoning is granted, the average property owner will be forced to give up at least $97,588.00 in equity over a 20 year period.

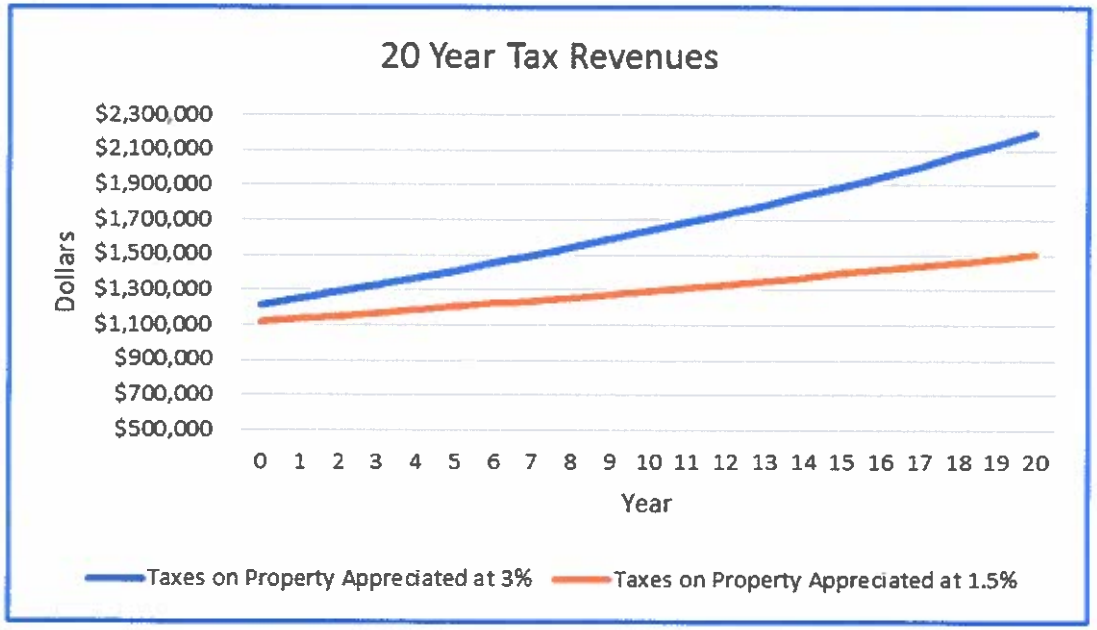
Property Value & Tax losses





Property Values decrease from 143.0 Million to 131.0 Million resulting in property tax losses to the county of $101,747.00 the first year.

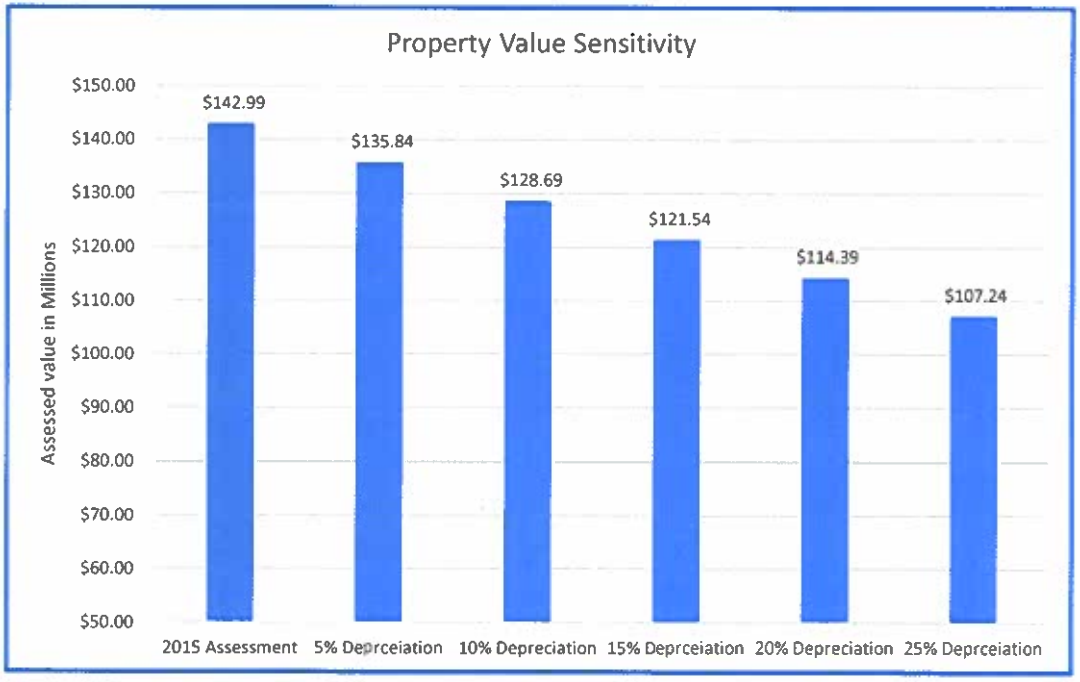
Tax Revenue Losses over Time



- The blue line shows the property taxes collected for the 2015 assessed value for properties in the surface danger zone and noise impact areas with a 3% appreciation for 20 years.
- The orange line shows the property taxes collected with an initial depreciation of 7% or 15% based upon their location in the noise area or surface danger zone with a 1.5% appreciation for 20 years.

The projected total loss in property tax revenues for Spotsylvania county over 20 years is $7,601,667 with $101,747 being lost in the first year.

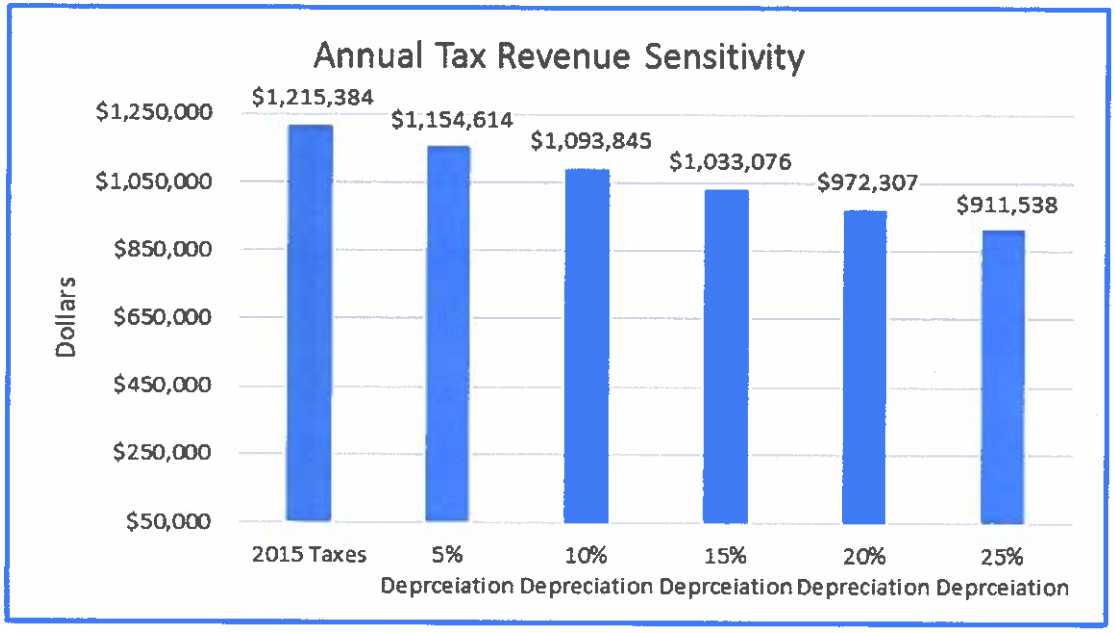
Property Value Loss Sensitivity



- The total property value in the affected area is nearly $143 million dollars based on 2015 assessments for 810 properties.
- This graph shows the total property values for 2015 and the impact of depreciated property values from -5% to -25% at 5% intervals.
- If property value losses exceed the assumed values, property value losses could increase substantially.

If the property values decline at a greater rate than 7 & 15 percent, resident property value losses could increase substantially.

Tax Revenue Loss Sensitivity



- The average property value in the affected area is $176,300.00 based on 2015 assessments for 810 properties.
- This graph shows the annual property taxes for 2015 and the impact of depreciated property values from -5% to -25% at 5% intervals.
- If property value losses exceed the assumed values, property tax losses could increase substantially.

If the property values decline at a greater rate than 7 & 15 percent, tax revenue loss could increase substantially.

Board of Supervisor Decision Criteria (Sec. 23-4.5.7)

- The planning commission shall not recommend, nor shall the board of supervisors approve, the proposed special use unless it satisfies the following standards:
  1. That the proposed use is in accordance with the comprehensive plan and other official plans adopted by the county;
  2. That the proposed use or development of the land will be in harmony with the scale, bulk, coverage, density, and character of the area or neighborhood in which it is located;
  3. That the proposed use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof;
  4. That the proposed use will not adversely affect the health or safety of persons residing or working in the neighborhood of the proposed use;

Satisfied
Partially or Unknown
Not Satisfied

Board of Supervisor Decision Criteria (Cont)

5. That the proposed use will not be detrimental to the public welfare or injurious to property or improvements within the neighborhood;
6. That the proposed use is appropriately located with respect to transportation facilities, water supply, wastewater treatment, fire and police protection, waste disposal, and similar facilities;
7. That the proposed use will not cause undue traffic congestion or create a traffic hazard;
8. That the proposed use will have no unduly adverse impact on environmental or natural resources.

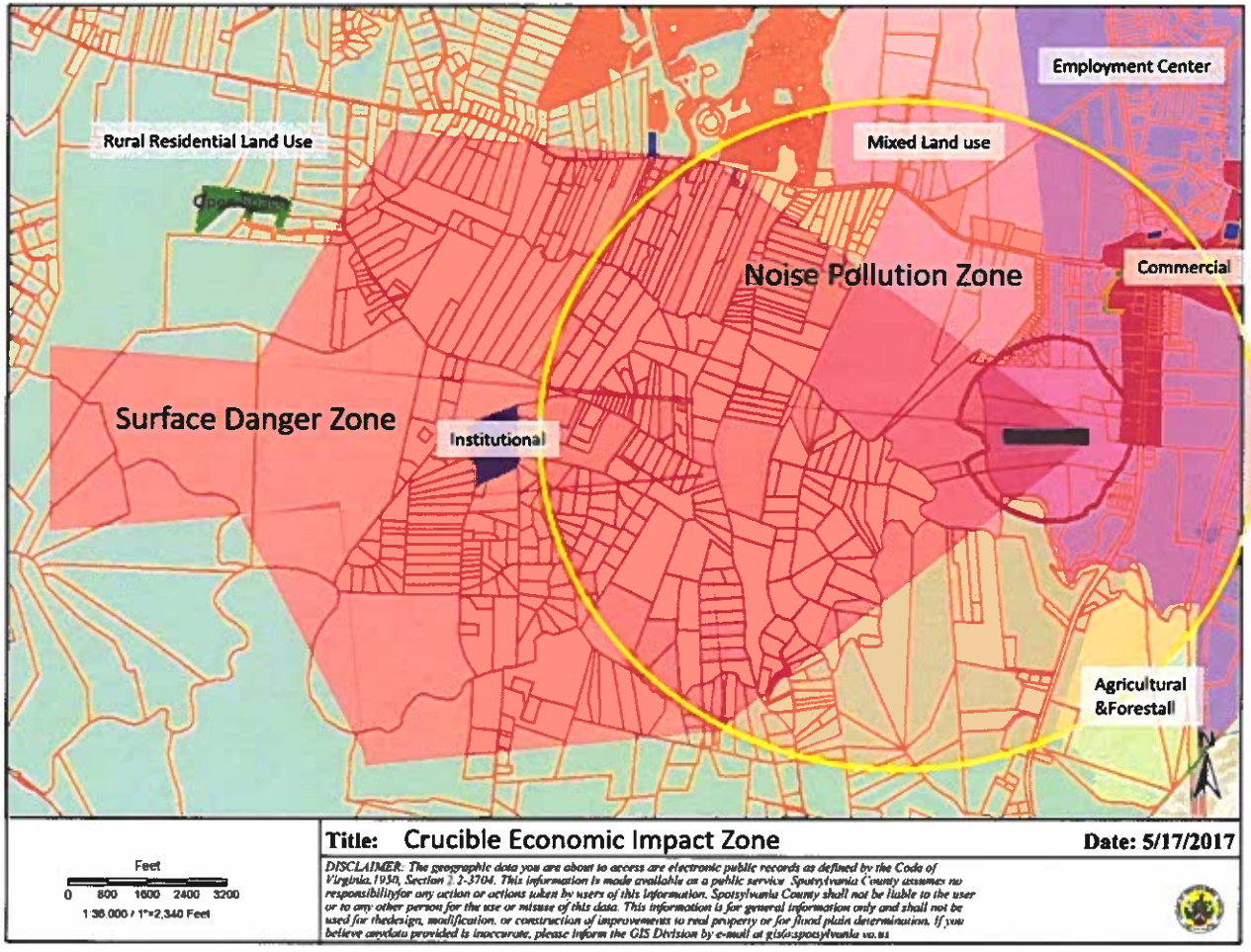
Satisfied
Partially or Unknown
Not Satisfied

1. That the proposed use is in accordance with the comprehensive plan and other official plans adopted by the county;

- Lot 76-A-2 is identified as an "Employment Center" in the 2016 Comprehensive plan.
  - "The employment center land use area is envisioned to be the primary location for new office and industrial development within the County, with the focus on larger scale office complexes, industrial users, and business parks....Heavy industrial uses tend to be larger in scale and often can have pollution on the surrounding area. While these impacts should be minimized, there is the recognition that not all negative effects can be completely mitigated. The location of these users within industrial parks, both new and existing, should be encouraged..."
- Fort A.P. Hill Joint Land Use Study, December 2014
  - Spotsylvania county recognizes that noise levels approaching 80 dBA* "generate undesirable noise levels on current and future development"
  - Recommends
    - "real estate disclosures for prospective buyers or renters of real estate transactions for properties within the influence area as part of subdivision plats."
    - "Encourage sound attenuation for new construction of residences, schools, hospitals, nursing homes, churches and other public building within public gathering spaces."

Crucible will have a large negative impact on the comprehensive plan

- Requires re-zoning of all areas inside the effected sound area to commercial as each property will be exposed to commercial sound levels.
- More than 44 Mixed Use properties in the Noise Pollution Zone including all of Taverneer Subdivision
- 6 Mixed Use properties inside the SDZ
- More than 50 Employment Center properties inside the Noise Pollution Zone
- 3 Employment Center Properties inside the SDZ
- Most of the Thornburg Commercial District inside the Noise Pollution Zone.
- County Landfill directly down range, with approval Spotsylvania accepts and condones the risk of residents being hit by projectiles at the landfill.



2. That the proposed use or development of the land will be in harmony with the scale, bulk, coverage, density, and character of the area or neighborhood in which it is located;

- There are no less than 4 subdivisions, 617 parcels of land, within the SDZ and noise pollution area of this proposed range complex.
- This proposed complex will destroy the "harmony and character" of all residents within the effected noise pollution area and SDZ.
- All residents contacted within the effected area oppose this re-zoning change and the construction of this facility without extensive mitigation for both noise pollution and safety
- The proposed development of a town center WILL NOT HAPPEN IF THIS IS APPROVED

This request is not in harmony with the scale, bulk, coverage, density, and character of the Taverneer, Plantation Estates at Matta River, Finney Estates and Matta River Woods Subdivisions

Who will ever develop here down range?



3. That the proposed use will not hinder or discourage the appropriate development and use of adjacent land and buildings or impair the value thereof

- **Safety:** Surface Danger Zones depict the impact area for a given weapon system. Approving a SUP for a live fire facility puts the lives of anyone inside the surface danger zone at risk of loss of life.
- **Sound:** Unconstrained Environments Pollution (Noise) will adversely impact development, use of adjacent land, and impair values thereof. If any re-zoning is approved, appropriate noise mitigation language must be established.
- **Value:** Realtor.com identifies being located next to a shooting range as #4 on a ranked list of neighborhood features that drag down your home value.
  - If the rezoning is granted, the average property owner will lose at least $97,588 in equity over a 20 year period.
  - If the rezoning is granted, the projected total loss in property tax revenues for Spotsylvania county over 20 years is $7,601,667 with $101,747 being lost in the first year.

4. That the proposed use will not adversely affect the health or safety of persons residing or working in the neighborhood of the proposed use;

- Safety - A range must control 100% of the Surface Danger Zone, or employ overhead and side baffling to guarantee a projectile will remain never leave the facility.
- Environmental – Environmental impact not addressed in request.
  - This facility if it is approved must comport with two EPA regulations (the Resource Conservation and Recovery Act and Clean Water Act). Neither of these is addressed in the submission
    - Impact to Well water and the Mattaponi River – Lead, Oil/Fuel spill, explosives residue
  - Guarantee/Bond to ensure land can be cleaned of all hazardous material in the event Crucible exits the property.
    - The U.S. Department of Agriculture (USDA) Forest Service expects to pay $980,000 to remove contaminated soil where the former Prescott Sportsmen's Club Shooting Range (PSC) site existed off Iron Springs and North Granite Basin roads near the Wildwood Estates subdivision. https://www.dcourier.com/news/2017/jan/05/shooting-range-cleanup-cost-forest-service-nearly-/ (JAN 2017)

5. That the proposed use will not be detrimental to the public welfare or injurious to property or improvements within the neighborhood;

- Safety - A range must control 100% of the Surface Danger Zone, or employ overhead and side baffling to guarantee a projectile will remain never leave the facility.
  - The submission does not address safety in the "shoot house" – No berms and no overhead cover

- In the Fort A.P. Hill Joint Land Use Study in paragraph 7.3.1 Spotsylvania County characterized noise levels above 80dBA as "undesirable noise levels on current and future development."

6. That the proposed use is appropriately located with respect to transportation facilities, water supply, wastewater treatment, fire and police protection, waste disposal, and similar facilities;

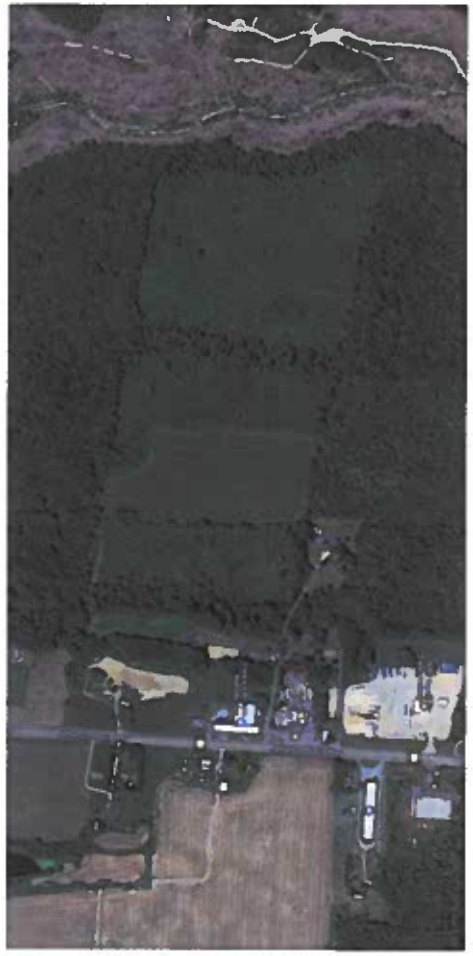
- Proposal states: " The Property is located within the PDB, but given the distance of existing utilities, it is not feasible during the initial phases of the Project to extend public utilities to the said site."
- Spotsylvania County Code Section 22-5(a) states: "Where a public water main or sanitary sewer is available to a new subdivision or development, the developer of any new subdivision intended for residential or commercial use or any combination thereof, or the developer of any industrial site shall construct all sanitary sewers and domestic freshwater distribution lines within his subdivision or development at his own expense. Immediately upon completion and acceptance of the construction work, the sanitary sewer and water facilities with necessary easement shall become the property of the county"

7. That the proposed use will not cause undue traffic congestion or create a traffic hazard;

- Proposal address traffic flow, but does not address if impulse noises exceeding 98 dBP for small arms and 130 dBP for ½ lb TNT along Route 1 will create distractions to vehicle operators resulting in accidents.

8. That the proposed use will have no unduly adverse impact on environmental or natural resources.

- Noise as stated in earlier slides with respect to residents.
- Environmental Mitigations talks to lead migration, but does not address Petroleum Oil and Lubricant containment that would be consistent with a "Rally Course" used as a driving training facility.
- EPA regulations and law not addressed as recommended in the EPA best practices guide (Resource Conservation and Recovery Act and Clean Water Act).
- Noise impact to livestock has not been assessed. Cattle and horses are very sensitive to loud noises and will impact their behavior.
    - Ref: Powhatan County Farm Bureau, 28 May 2010



Before Purchase



Today*

*Crucible built two pole barns and two wells without a permit

We the People of Berkeley Position

The residents of Thornburg are opposed to this re-zoning change unless the county ensures the following:

- Safety: 100% of the Surface Danger Zone must reside within the property lines or the range must use overhead and side baffling consistent with the National Shooting Sport Foundation and National Rifle Association "No Blue Sky" concept.
- Noise Pollution: Transmission of unconstrained noise pollution will have an adverse affect on quality of life and property value. Spotsylvania County must disapprove special use request and restrict noise pollution that extends beyond property lines.
- Require full environmental impact study to include noise, water and air pollutants.
- Require the company to post sufficient bond to clean up the lead and other residues from operations should they go out of business or abandon the site.
- Proper notification: Any re-submissions from Team-Crucible should require positive notification of any resident or business that lives in an affected area. Based on this submission, it would include al those within the 87dBP contour, or reside in a Surface Danger Zone.

Bottom Line:

- Placing this facility with the current design on Lot 76-A-2 will:
  - **Impact 810 properties via noise pollution, safety, or both.**
  - **If the rezoning is granted as requested, our analysis shows the average property owner will lose at least $97,588 in equity over a 20 year period.**
  - **If the rezoning is granted as requested, our analysis shows the projected total loss in property tax revenues for Spotsylvania county over 20 years is $7,601,667 with $101,747 being lost in the first year.**
  - **Now that the county is aware that this is an unsafe range, if approved and when a round goes over the berm and hurts or kills a citizen, the damages awarded following a lawsuit will be magnified significantly**

Planning must recommend disapproval -
Once granted and approved, the County can NEVER go back. It's State law.

Questions?