FINAL

ENVIRONMENTAL ASSESSMENT (EA)

TENNESSEE ARMY NATIONAL GUARD VOLUNTEER TRAINING SITE MILAN EXPANSION, RANGE CONSTRUCTION, AND TRAINING ACTIVITIES CARROLL AND GIBSON COUNTIES, TENNESSEE

Prepared for:

Tennessee Army National Guard

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ENVIRONMENTAL ASSESSMENT
SIGNATURE PAGE

LEAD AGENCY: National Guard Bureau

COOPERATING AGENCIES: None

TITLE OF PROPOSED ACTION: Volunteer Training Site Milan (VTS-M) Expansion, Range Construction, and Training Activities

AFFECTED JURISDICTION: VTS-M, Tennessee

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DOCUMENT DESIGNATION: Environmental Assessment

ABSTRACT: TNARNG currently operates a 2,479.72-acre training area at Milan. Under the Proposed Action, the TNARNG proposes to develop the approximately 16,000 acres of VTS-M lands received through the divesture of the Milan Army Ammunition Plant for maneuver of military force training to build and sustain operational readiness for TNARNG units. Components of the Proposed Action include training operations, maneuver exercises, small-arms training (50 cal or smaller) use of smoke discharge, aviation, and driving training, as well as infrastructure improvements and associated tree harvesting. This EA considers all components of the overall Proposed Action and evaluates the Proposed Action. Alternative B is the TNARNG's preferred alternative, since it meets maneuver requirements of FM 3-96 and the expanded tree harvest area provides TNARNG with flexibility for locating maneuver lanes and corresponding low water crossings, thereby maximizing training opportunities and its alternatives collectively. Individual components of the Proposed Action analyzed in the EA should be considered independent of each other. TNARNG could choose to implement all, none, or any combination of them.

This EA addresses the potential environmental, socioeconomic, and cultural impacts of this Proposed Action and its implementation alternatives (Alternatives A and B). This EA evaluates the individual and cumulative effects of the Proposed Action and the No Action Alternative with respect to the following criteria: land use, air quality and climate change, noise, earth resources, water resources, biological resources, cultural resources, socioeconomics, infrastructure, and hazardous and toxic materials and wastes.

The evaluation performed in this EA concluded that there would be no significant adverse impact, either individually or cumulatively, on the resources analyzed. While no mitigation is required, to compensate for the loss of habitat for listed bat species associated with the Proposed Action, approximately 3,416 acres of forest in two large tracts would be set aside in perpetuity. Within the

two set-aside areas, training would still be permitted; however, trees and snags would not be removed except when presenting a safety risk to people or property. Standard best management practices (BMPs) are also included with this proposal to avoid or minimize impacts.

DRAFT
FINDING OF NO SIGNIFICANT IMPACT (FNSI)

TENNESSEE ARMY NATIONAL GUARD
VOLUNTEER TRAINING SITE – MILAN EXPANSION, RANGE CONSTRUCTION, AND TRAINING ACTIVITIES
CARROL AND GIBSON COUNTIES, TENNESSEE

Background

Pursuant to the National Environmental Policy Act of 1969 (NEPA), Title 42 United States Code (USC) Sections (§§) 4321-4347, implemented by the President's Council on Environmental Quality (CEQ) regulations under Title 40 Code of Federal Regulations (CFR) Parts 1500–1508, 32 CFR Part 651, *Environmental Analysis of Army Actions*, this Environmental Assessment (EA) has been prepared by the Tennessee Army National Guard (TNARNG) to identify and evaluate potential environmental impacts associated with the proposed Volunteer Training Site – Milan (VTS-M), Tennessee, expansion, range construction, and heavy and light maneuver training activities. Maneuver is movement in conjunction with fires (Army Doctrine Publication [ADP] 3-90). The purpose of maneuver is to gain and exploit positions of relative advantage to accomplish the mission (see ADP 3-90 for more information on the art and science of tactics). Heavy maneuver is typically characterized by the use of vehicles such as tanks and infantry fighting vehicles. Light maneuver is characterized by foot traffic. TNARNG currently operates a 2,479.72-acre training area at Milan.

In accordance with CEQ NEPA regulations (40 CFR Parts 1500-1508, § 1502.13), this section specifies the purpose of and need for the proposed project. Per 10 USC § 10501, the National Guard Bureau (NGB) is a joint activity of the Department of Defense (DoD). Pursuant to DoD Directive 5105.77, *NGB*, dated 30 October 2015, the NGB serves as the principal advisor to the U.S. Army on matters involving the Army National Guard (ARNG) and is responsible for implementing DoD guidance on the structure and strength authorizations of the ARNG. The NGB is responsible for ensuring that ARNG activities are performed in accordance with applicable policies and regulations. As such, the NGB is the lead federal agency responsible for preparation of NEPA-compliant documentation on projects for which the TNARNG is the proponent. In that capacity, the NGB is ultimately responsible for environmental analyses and documentation; however, the local responsibility for NEPA document preparation falls upon the TNARNG. If the TNARNG is unable to implement the Proposed Action as described in this EA, findings of this EA would be reviewed, and a supplemental or additional NEPA analysis would be completed, if necessary, before implementing any additional proposed actions.

Purpose and Need

The purpose of the Proposed Action is to provide additional training land at VTS-M to allow heavy and light maneuver training, including maneuver support, land augmentation, communications, unmanned aerial vehicle operations, air insertion, causality evacuation, and new live-fire capabilities training within proposed ranges, to TNARNG units within the state to better support TNARNG training requirements and mission.

The Proposed Action is needed because there is currently a deficit in training area lands available to train and qualify TNARNG units in heavy mounted and light maneuvers; there are no current training areas in Tennessee capable of supporting the TNARNG's heavy and light maneuver training requirement. The current shortage of available training areas has created scheduling conflicts and has forced TNARNG personnel to travel out of state for training activities, with approximately 45 percent of TNARNG's overall training completed out of state across the force. Increasing TNARNG training opportunities within the state would greatly reduce travel time and associated costs and improve safety by limiting transportation of weapons and equipment on public roadways. Further, training is needed to meet the TNARNG mission and DoD training requirements outlined in Field Manual 3-96 *Brigade Combat Team*, Training Circular 25-1 *Training Land*, DoD Instruction Number 1215.06, and National Guard Regulation 350-1, and to better prepare TNARNG for Large-Scale Combat Operations through Mission Essential Task Lists (METL) proficiency.

Description of Proposed Action and Alternatives

Proposed Action

This EA considers all components of the overall Proposed Action and evaluates the Proposed Action and its alternatives collectively. Individual components of the Proposed Action analyzed in the EA should be considered independent of each other. TNARNG could choose to implement all, none, or any combination of them.

***Training Operations*:** The TNARNG proposes to develop the approximately 16,000 acres received through the divesture of the Milan Army Ammunition Plant for maneuver of military force training to build and sustain operational readiness for TNARNG units in accordance with METL. The use of a variety of wheeled vehicles, with the largest being Heavy Equipment Transporter Systems, is proposed for training operations at VTS-M. TNARNG's training activities would occur within designated training areas on VTS-M. The Proposed Action would include new live-fire capabilities for TNARNG training on VTS-M. TNARNG would also gain new maneuver capabilities, including two or more companies maneuvering at once; nine heavy maneuver Training Areas (TAs) (14,533 acres); six light maneuver TAs (598 acres); nonlive fire TAs (814 acres); and Tank Engagement Area (1,008 acres).

***Maneuver Exercises*:** The proposed maneuver training includes minimally restricted offensive and defensive movement and maneuvers for an element up to a Combined Arms Battalion. The Combined Arms Battalion consists of a Battalion headquarters and headquarters company (HHC), three maneuver companies, and one Forward Support Company attached from the Armored Brigade Combat Team's Brigade Support Battalion. The battalion comes under the overall command of a Lieutenant Colonel. Mounted tracked and wheeled vehicle platforms would conduct training for non-live-fire Integrated Weapons Training Strategy requirements (see Table 5 in the EA). Heavy maneuver TAs that contain the Tank Engagement Area and Heavy Maneuver Corridors would be actively used day and/or night, up to 140 days per year (see Table 5 in the EA). The light maneuver training areas would be used for squad through battalion-level combat engagement training with dismounted or light to heavy-wheeled vehicles operating on or off road and tracked vehicles remaining on or within 100 feet of roads, except on select ranges. Light maneuver TAs would be actively used day and/or night, up to 40 days per year (see Table 5 in the EA). Fighting positions and ditches would be filled in, seeded, and/or covered with straw or grass

mats for soil stabilization immediately following training events. Soil disturbance from maneuver activities would be stabilized and seeded as needed following training events. Engineering digging exercises, to depths no greater than 6 feet below ground level, would also be conducted in the designated maneuver areas. These exercises would include fighting positions and battle positions that consist of excavating holes large enough for a soldier and a vehicle.

***Small-Arms Training*:** More than 11,000 acres of the reassigned VTS-M property would include nondudded small-arms training Surface Danger Zones (SDZ). The SDZ is the area extending from a firing point to a distance downrange based on the projectiles fired. This area has specific dimensions that provide a contained area for all fragments resulting from the caliber of weapons fired. These dimensions are found in Department of the Army Pamphlet (DA PAM) 385-63. The ranges could see use any time of year, totaling up to 173 days per year. When the proposed ranges are not occupied, the SDZs could be used for heavy maneuver training. The existing approximately 905-acre dudded impact NO GO area would remain; however, no activities would occur in that area.

***Smoke*:** TNARNG currently trains with smoke. Under the Proposed Action, training, maneuver, and engagement activities may include the use of smoke grenades in both light and heavy maneuver areas up to 140 days per year. Only smoke grenades are used to produce smoke on VTS-M. A maximum potential of 368 smoke grenades for signaling and obscurant purposes could be used on VTS-M in a year, although significantly fewer is likely due to the specific meaning of different colors for signaling. Smoke grenades would typically be used in open to semi-open areas to signal specific meanings and mark the user's location, but smoke could drift into forested areas or be deployed in forested areas for cover and concealment.

***Aviation*:** Current TNARNG aviation training consists of air insertion, sling-load operations, firefighting operations, and general flight training for crews. Under the Proposed Action, aviation training would comprise rotary wing aircraft (helicopters), and Unmanned Aerial Vehicle (UAV) use. Helicopters used on post would include UH-60 Blackhawk for delivery and extraction of soldiers, cargo delivery, sling-load, Bambi-bucket fire suppression operations, and UH-72 helicopters for medical/casualty evacuation. Helicopters could be used any time of day or night anywhere on post up to 60 days per year. Typical use would involve aircraft traveling over 500 feet above ground level, during daylight conditions, with a rapid decent/assent at target locations. It is possible that on rare occasions helicopters could fly very low above the ground and treetops and that flights could sometimes occur during hours of darkness. Two types of UAVs would be used by TNARNG, the RQ11-B (Raven) and RQ28-A (Short Range Recon). UAVs could be operated day or night in conjunction with maneuver activities up to 140 days per year.

***Military Vehicle Driver Training*:** Current TNARNG driver training consists of vehicle familiarization, basic vehicle driving skills in a field environment, and night vision use while driving. Under the Proposed Action, driver training on military vehicles would be conducted throughout VTS-M on all trails and roads for general familiarization. These training activities could occur both day and night, in lighted, blackout drive, or totally dark night vision modes. An existing TNARNG Driver's Training Course in TA 3 would continue to be used to train and familiarize drivers with more difficult and complex obstacles and slopes during daylight conditions. All driving on post would be conducted at less than 25 miles per hour.

***Infrastructure Improvements*:** Improvements to the transportation infrastructure on the expanded VTS-M would also be implemented to reduce traffic in maintenance areas, facilitate access between the cantonment area and ranges, allow Unit Training Equipment site access, construct up to seven tank crossings on Graball Road, construct three tank trail crossings on Graball Road, and construct three tank trails (a central route, south route, and north route). Numerous low water crossings would also be constructed. An area approximately 40 feet by 100 feet would be clear-cut to construct each hardened low water crossing. The average low water crossing proposed would be made from cable concrete and riprap and would require roughly 175 tons of 2-inch minus stone, 350 square yards of cable concrete block, and 600 tons of 6-inch riprap. In some areas, M60A1 or M104 Wolverine armored vehicle launched bridge emplacement may be utilized instead of the construction of low water crossing for potential cost savings.

***Tree Harvesting*:** Proposed tree harvesting would include thinning of and clear-cut removal of trees throughout the proposed maneuver TAs on VTS-M. In accordance with Training Circular 25-1, light maneuver TAs require tree spacing of at least 15 meters (49.2 feet), while heavy maneuver TAs require 20-meter (65.6-foot) tree spacing. All tree harvests would occur during the inactive season for bats (15 October to 31 March). All tree harvests, except for stream/gap crossing sites (approximately 3.4 acres total) and tank trail crossings would only occur outside the 50-foot Streamside Management Zones (SMZ) buffers around streams and wetlands. Trees would not be cut in, or felled into, SMZs, nor would harvest equipment be driven into them, except at low water crossing and tank trail crossing construction sites. Tree harvest water quality protection measures and best management practices (BMPs) would be implemented and would vary as needed by site. All BMPs would follow standards established in the *Tennessee Best Management Practices for Logging*, as stated in the Tennessee Department of Agriculture's *Guide to Forestry Best Management Practices in Tennessee*.

Alternatives

The NEPA and the CEQ regulations mandate the consideration of reasonable alternatives for the Proposed Action. "Reasonable alternatives" are those that could also be utilized to meet the purpose of and need for the Proposed Action. TNARNG applied specific selection standards to identify alternatives that meet the purpose of and need for the Proposed Action. The screening of alternatives eliminated one alternative (Alternative C). All other proposed alternatives (Alternatives A and B) were carried forward for further analysis in the EA.

The CEQ regulations require consideration of the No Action Alternative. The No Action Alternative serves as a baseline against which the impacts of the Proposed Action and other potential action alternatives can be evaluated. The No Action Alternative was evaluated in the EA.

All training operations, maneuver exercises, small-arms training, smoke, aviation, and driving training, as well as infrastructure improvements, at VTS-M would be the same under Alternatives A and B (Preferred Alternative). However, the total area of tree harvest and proposed tree harvest locations vary between alternatives.

Alternative A: Under Alternative A, tree harvesting would include the thinning of approximately 438 acres to a minimum tree spacing of 20 meters (65.6 feet) and the clear-cut removal of approximately 5,15.4 acres (419.4 acres of hardwood forest, 61 acres of conifer forest, and 35 acres of mixed hardwood and conifer forest) within the Tank Engagement Area, and low water

crossings, and for tank trail construction. Alternative A would include construction of up to seven tank crossings on Graball Road. In total, approximately 953.4 acres of tree harvest are proposed.

Alternative B (Preferred Alternative): Under Alternative B, tree harvesting would include thinning of approximately 3,247 acres within proposed maneuver lanes to a tree spacing of 20 meters (65.6 feet) and the clear-cut removal of approximately 515 acres within the Tank Engagement Area, low water crossings, and for tank trail construction. Alternative B would also include construction of the tank crossings on Graball Road. In total, approximately 3,762 acres of tree harvest are proposed.

The component projects in Alternative A and B are identical. Under Alternative A, 953.4 acres of trees will be removed and under Alternative B 3,762 acres of trees would be removed. TNARNG's preferred alternative is Alternative B because it meets maneuver requirements of Field Manual 3-96 and the expanded tree harvest area provides TNARNG with flexibility for locating maneuver lanes and corresponding low water crossings, thereby maximizing training opportunities.

Environmental Impacts of the Proposed Action

The analysis of environmental impacts focused on the following environmental resources: land use, air quality and climate change, noise, earth resources, water resources, biological resources, cultural resources, socioeconomics, infrastructure, and hazardous and toxic materials and wastes. Details of the environmental consequences are provided in the EA. The evaluation performed in this EA concluded that there would be no significant adverse impact, either individually or cumulatively, on the resources analyzed. No mitigation measures are necessary to reduce adverse effects to below significant levels.

TNARNG's training activities have the potential to impact listed species over time; however, TNARNG has made efforts to avoid and minimize potential impacts to listed species. TNARNG reduced the original footprint of the timber harvest from 2,075 acres to approximately 901.4 acres to reduce habitat loss for listed bat species and to maintain habitat connectivity throughout the landscape. Clear-cut acreage was reduced from 561 acres to 515.4 acres and thinning to a minimum tree spacing of 20 meters was reduced from 1,514 acres to 438 acres. The final design of the timber harvest also incorporated protection of approximately 108.8 acres of forested wetland and stream buffers within the clear-cut areas. Pathways of the thinned portions of maneuver corridors were also diverted to avoid and protect approximately 17 acres of forested wetlands. By protecting these forested wetlands and buffers, some of the highest-quality habitat for the forest-dwelling northern long-eared (*Myotis septentrionalis*), Indiana (*Myotis sodalis*), and tri-colored (*Perimyotis subflavus*) bats would remain on the landscape. Tree harvest would occur during the bat inactive season (15 October through 31 March) to avoid potential impacts on roosting and rearing bats. Timber harvest water quality protection measures and BMPs would vary by location but would follow standards established in the Tennessee Best Management Practices for Logging as stated in the *Guide to Forestry Best Management Practices in Tennessee*. Following these BMPs would reduce the potential for siltation and other water quality impacts on streams, which would benefit aquatic insects that serve as potential prey for foraging bats.

To comply with Section 7 of the Endangered Species Act and to compensate for habitat loss associated with the timber harvests and other proposed actions, approximately 3,416 acres of forest in two large tracts would be set aside in perpetuity. Within the two set-aside areas, training would

still be permitted; however, trees and snags would not be removed except when presenting a safety risk to people or property. TNARNG would monitor snag densities in the set-aside areas at least every 3 to 5 years and maintain them as high-quality roost habitat by girdling trees for snag creation and/or installing artificial roost structures as needed. The proposed set-aside area would contain 2,803 acres of forested land and 613 acres of open area. Some of the open areas would be proximate to abandoned munitions storage igloos/bunkers, and some would be in agriculture and grazing leases. These open areas would be permitted to revert back to forest conditions to replace lost forest habitat.

Stakeholder Involvement

Based on the description of the Proposed Action as set forth in the EA, all activities have been found to comply with the criteria or standards of environmental quality. Coordination with appropriate federal, state, and local agencies regarding this EA has been completed. The attached EA and this FNSI are being made available to the public for a 15-day review period. Agency and public comments will be addressed as part of the analysis of potential environmental effects performed in the EA.

Conclusion

Finding of No Significant Impact: After careful review of the EA, I have concluded that implementation of the Proposed Action would not have a significant impact on the quality of the human or natural environment nor generate significant controversy. The FNSI has been signed, and the action will be implemented. This analysis fulfills the requirements of NEPA and the CEQ regulations. An Environmental Impact Statement will not be prepared, and the NGB will issue this FNSI.

Date

JAMES E. CALDWELL
COL, GS
Chief, G-9, Army National Guard

TABLE OF CONTENTS

Section **Page**

1.0 PURPOSE OF AND NEED FOR THE PROPOSED ACTION 1
1.1 Introduction 1
1.2 Background 1
1.2.1 Existing TNARNG Training at VTS-M 2
1.3 Location 3
1.4 Purpose and Need 3
1.5 Decision to Be Made 7
1.6 Applicable Regulatory Requirements 8
1.7 Public and Agency Involvement 10
1.8 Public Review 10
1.9 Scope of this Environmental Analysis 11
2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES 13
2.1 Introduction 13
2.2 Proposed Action 13
2.2.1 Training Operations 13
2.2.2 Maneuver Exercises 16
2.2.3 Small-Arms Training 17
2.2.4 Smoke Discharge 17
2.2.5 Aviation 19
2.2.6 Military Equipment Driver Training 19
2.2.7 Infrastructure Improvements 19
2.2.8 Tree Harvesting 20
2.3 Alternative A 21
2.4 Alternative B 21
2.5 Alternatives Consideration Process 21
2.5.1 Alternatives Development (Screening Standards) 24
2.5.2 Alternatives Considered 24
2.5.3 Alternatives Eliminated from Further Consideration 28
2.5.4 Alternatives Evaluated 28
2.6 Summary of Environmental Consequences 28
3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES 33
3.1 Introduction 33
3.1.1 Resources Identified for Analysis 33

3.1.2 Location Description 33
3.1.3 Reasonably Foreseeable Future Actions 34
3.2 Land Use 34
3.2.1 Affected Environment 34
3.2.2 Environmental Consequences 35
3.3 Air Quality and Climate Change 40
3.3.1 Affected Environment 40
3.3.2 Environmental Consequences 42
3.4 Noise 45
3.4.1 Affected Environment 45
3.4.2 Environmental Consequences 52
3.5 Earth Resources 65
3.5.1 Affected Environment 65
3.5.2 Environmental Consequences 71
3.6 Water Resources 72
3.6.1 Affected Environment 72
3.6.2 Environmental Consequences 77
3.7 Biological Resources 81
3.7.1 Affected Environment 81
3.7.2 Environmental Consequences 90
3.8 Cultural Resources 95
3.8.1 Affected Environment 95
3.8.2 Environmental Consequences 99
3.9 Socioeconomics 102
3.9.1 Affected Environment 102
3.9.2 Environmental Consequences 104
3.10 Infrastructure 105
3.10.1 Affected Environment 105
3.10.2 Environmental Consequences 106
3.11 Hazardous and Toxic Materials and Wastes 108
3.11.1 Affected Environment 108
3.11.2 Environmental Consequences 111
4.0 REFERENCES 116
5.0 LIST OF PREPARERS 122

LIST OF FIGURES

Page

Figure 1. Regional Location of Volunteer Training Site – Milan....4
Figure 2. Training Areas at Volunteer Training Site – Milan....5
Figure 3. Proposed Training Operations and Maneuver Training Areas at Volunteer Training Site – Milan....14
Figure 4. Proposed Maneuver Training Areas at Volunteer Training Site – Milan....18
Figure 5. Alternative A at Volunteer Training Site – Milan....22
Figure 6. Alternative B at Volunteer Training Site – Milan....23
Figure 7. Alternative C at Volunteer Training Site – Milan....27
Figure 8. Land Use Areas at Volunteer Training Site – Milan....36
Figure 9. Locations of Current Agricultural Lease Areas at Volunteer Training Site – Milan....38
Figure 10. Existing Small-Arms Activity Noise Zones at Volunteer Training Site – Milan....49
Figure 11. Single-Event Peak Levels Breach Facility 0.0198-Pound Detonation....51
Figure 12. Proposed Light Demolition Range Noise Zones....55
Figure 13. Proposed Light Demolition Range: 1.25-Pound Single-Event Peak Noise Levels....56
Figure 14. Proposed Light Demolition Range: 40-Pound Single-Event Peak Noise Levels....57
Figure 15. Proposed Hand Grenade Familiarization Range Noise Zones....59
Figure 16. Proposed Hand Grenade Familiarization Range High Explosive Single-Event Peak Noise Levels....60
Figure 17. Combined Conditions: Hand Grenade Familiarization Range and Light Demolition Range Noise Zones....62
Figure 18. Combined Noise Zones Comparison to Light Demolition Range Noise Zones....63
Figure 19. Combined Conditions: Single-Event Peak Noise Levels Hand Grenade Familiarization Range and Light Demolition Range (1.25 pounds)....64
Figure 20. Soils at Volunteer Training Site – Milan....68
Figure 21. Prime Farmlands at Volunteer Training Site – Milan....70
Figure 22. Watersheds at Volunteer Training Site – Milan....74
Figure 23. Surface Waters at Volunteer Training Site – Milan....75
Figure 24. Floodplains at Volunteer Training Site – Milan....76
Figure 25. Wetlands at Volunteer Training Site – Milan....78
Figure 26. State Protected Plant Species Known at Volunteer Training Site – Milan....89
Figure 27. Proposed Bat Habitat Set-Aside Areas at Volunteer Training Site – Milan....93
Figure 28. Operable Unit 5 and the Proposed Action at Volunteer Training Site – Milan....112

LIST OF TABLES

Page

Table 1. Tennessee Army National Guard Major Units 2
Table 2. Purpose of and Need for Individual Sub-proposals Included in the Proposed Action 6
Table 3. Applicable Regulatory Requirements 8
Table 4. Persons and Agencies Consulted/Coordinated 10
Table 5. Proposed Equipment Density for Training at Volunteer Training Site – Milan 15
Table 6. Proposed Actions on Volunteer Training Site – Milan 15
Table 7. Proposed New Live-Fire Capabilities on Volunteer Training Site – Milan 16
Table 8. Maximum Annual Use of Smokes/Obscurants on Volunteer Training Site – Milan 17
Table 9. Proposed Tree Harvest at Volunteer Training Site – Milan 20
Table 10. Alternatives Development (Screening Standards) 25
Table 11. Summary of Environmental Consequences 29
Table 12. Land Uses at Volunteer Training Site – Milan 34
Table 13. Agricultural Lease Areas at Volunteer Training Site – Milan 37
Table 14. National Ambient Air Quality Standards 41
Table 15. Land Use Planning Guidelines 46
Table 16. Complaint Risk Guidelines (Impulsive Events) 46
Table 17. Existing Range Activity 48
Table 18. Audibility to the Side of the Grenade Launcher, Inert[a] Round (40 mm) 50
Table 19. Audibility to the Rear of the Grenade Launcher, Inert[a] Round (40 mm) 50
Table 20. Projected Range Activity with the Proposed Action 52
Table 21. Predicted Peak Noise Levels for 5.56 mm Blank[a] Round 53
Table 22. Predicted Peak Noise Levels for 7.62 mm-Caliber Blank[a] Round 53
Table 23. Predicted Peak Noise Levels for .50-Caliber Blank[a] Round 54
Table 24. LDR 40-Pound Charge Complaint Risk Area under Unfavorable Weather Conditions 58
Table 25. Demolition Noise Zone Area Comparison 61
Table 26. Threatened and Endangered Species with the Potential to Occur at VTS-M 86
Table 27. Effects Determination for Federally Listed Species with the Potential to Occur or Are Known to Occur on or near VTS-M 91
Table 28. Summary of Cultural Resource Investigations at VTS-Milan 95
Table 29. Eligible and Unassessed Archaeological Sites at VTS-Milan 96
Table 30. Historic Cemeteries at VTS-Milan 97
Table 31. Contributing Resources of the MLAAP Historic District at VTS-M 98

LIST OF APPENDICES

Page

Appendix A. Agency and Tribal Correspondence and Record of Public Notice A-1
Appendix B. Supporting National Environmental Policy Act Documentation B-1
Appendix C. Affected Environment Resource Tables C-1

FORMAT PAGE

GLOSSARY OF ABBREVIATIONS AND ACRONYMS

§	section
§§	sections
ACAM	Air Conformity Applicability Model
ACE	Armored Combat Earthmover
ADA	ammunition destruction area
ADNL	A-Weighted Day-Night Average Sound Level
ADP	Army Doctrine Publication
AGL	above ground level
APC	Division of Air Pollution Control
APE	area of potential effect
AR	Army Regulation
ARAP	Aquatic Resource Alteration Permit
ARNG	Army National Guard
ARNG I&E	Army National Guard G-9 (Installation & Environment)
ARRM	Army Range Requirements Model
AST	aboveground storage tank
ASV	Armored Security Vehicle
AQCR	Air Quality Control Region
AVLB	Armored Vehicle Launched Bridge
BA	Biological Assessment
BO	Biological Opinion
BEA	Bureau of Economic Analysis
BNOISE2	Blast Noise, version 2
CAA	Clean Air Act
CARA	Cumberland Applied Research Associates Inc.
CDNL	C-Weighted Day-Night Average Sound Level
Cem	cemetery
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFMO	Construction and Facilities Management Officer
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide e
CO_2e	carbon dioxide equivalent
dB	decibel(s)
DoD	Department of Defense
EA	Environmental Assessment
ECP	Environmental Condition of Property
EO	Executive Order
ERDC	U.S. Army Engineer Research and Development Center
ESA	Endangered Species Act
°F	degrees Fahrenheit
FFA	Federal Facility Agreement and Consent Order
FM	Field Manual
FY	fiscal year
GHG	greenhouse gas
GPR	ground-penetrating radar

GLOSSARY OF ABBREVIATIONS AND ACRONYMS (CONTINUED)

HABS	Historic American Buildings Survey
HAER	Historic American Engineering Record
HGFR	Hand Grenade Familiarization Range
HUMMWV	High Mobility Multipurpose Wheeled Vehicle
INRMP	Integrated Natural resources Management Plan
IPaC	Information for Planning and Conservation
JFHQ	Joint Force Headquarters
lb	pound(s)
LBP	lead-based paint
LDR	Light Demolition Range
LED	light-emitting diode
LSCO	Large-Scale Combat Operations
LUC	land use control
LUCIP	Land Use Control Implementation Plan
LUPZ	Land Use Planning Zone
m^3	cubic meter(s)
MBTA	Migratory Bird Treaty Act
METL	Mission Essential Task List
Milan-RC	Milan Readiness Center
MLAAP	Milan Army Ammunition Plant
mm	millimeter
MMT	million metric tons
MPU	City of Milan Public Utilities
MRAP	Mine Resistant Ambush Protected
MRS	Munitions Response Site
N/A	not applicable
NAAQS	National Ambient Air Quality Standards
NCES	National Center for Education Statistics
NEPA	National Environmental Policy Act
NEW	net explosive weight
NGB	National Guard Bureau
NHPA	National Historic Preservation Act
NMSZ	New Madrid Seismic Zone
NO_2	nitrogen dioxide
NOGO	avoidance area
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O_3	ozone
OBG	open burning ground
OB/OD	Open Burn/Open Detonation
ORA	Operational Range Assessment
OU	Operable Unit
PCB	polychlorinated biphenyl
PK50(met)	Peak 15 metric
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter

GLOSSARY OF ABBREVIATIONS AND ACRONYMS (CONTINUED)

PM_{10}	particulate matter less than 10 microns in diameter
ppb	part per billion
ppm	parts per million
PSD	prevention of significant deterioration
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
ROI	region of influence
RP	Reasonable and Prudent Measures
RTE	rare, threatened, and endangered
SAIC	Science Applications International Corporation
SARNAM	Small-Arms Range Noise Assessment Model
SC-CO_2	social cost of carbon
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SMZ	Streamside Management Zone
SO_2	sulfur dioxide
SWPPP	Stormwater Pollution Prevention Plan
TA	training area
TCA	Tennessee Code Annotated
TDEC	Tennessee Department of Environment and Conservation
TNARNG	Tennessee Army National Guard
TNEPPC	Tennessee Exotic Pest Plant Council
TNT	2,4,6-trinitrotoluene
TP	target practice
TWRA	Tennessee Wildlife Resources Agency
UAC	Urban Assault Course
UAV	Unmanned Aerial Vehicle
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
VTS	Volunteer Training Site
VTS-M	Volunteer Training Site – Milan

FORMAT PAGE

1.0 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

1.1 Introduction

Pursuant to the National Environmental Policy Act of 1969 (NEPA), Title 42 United States Code (USC) Sections (§§) 4321-4347, implemented by the President's Council on Environmental Quality (CEQ) regulations under Title 40 Code of Federal Regulations (CFR) Parts 1500–1508, 32 CFR Part 651, *Environmental Analysis of Army Actions*, U.S. Army Regulation (AR) 200-1, *Environmental Protection and Enhancement*, and *The Army National Guard NEPA Handbook*, this Environmental Assessment (EA) has been prepared by the Tennessee Army National Guard (TNARNG) to identify and evaluate potential environmental impacts associated with the proposed Volunteer Training Site – Milan (VTS-M), Tennessee, expansion, range construction, and heavy and light maneuver training activities. Maneuver is movement in conjunction with weapons firing (Army Doctrine Publication [ADP] 3-90 *Offense and Defense).* The purpose of maneuver is to gain and exploit positions of relative advantage to accomplish the mission (see ADP 3-90 for more information on the art and science of tactics). Heavy maneuver is typically characterized by the use of vehicles such as tanks and infantry fighting vehicles. Light maneuver is characterized by foot traffic. TNARNG currently operates a 2,479.72-acre training area at Milan.

In accordance with CEQ NEPA regulations (40 CFR §§1500-1508, § 1502.13), this section specifies the purpose of and need for the proposed project. Per 10 USC § 10501, the National Guard Bureau (NGB) is a joint activity of the Department of Defense (DoD). Pursuant to DoD Directive 5105.77, *National Guard Bureau (NGB)*, dated 30 October 2015, the NGB serves as the principal advisor to the U.S. Army on matters involving the Army National Guard (ARNG) and is responsible for implementing DoD guidance on the structure and strength authorizations of the ARNG. The NGB is responsible for ensuring that TNARNG activities are performed in accordance with applicable policies and regulations. As such, the NGB is the lead federal agency responsible for preparation of NEPA-compliant documentation on projects for which the TNARNG is the proponent. In that capacity, NGB is ultimately responsible for environmental analyses and documentation; however, the local responsibility for NEPA document preparation falls upon the TNARNG. If the TNARNG is unable to implement the Proposed Action as described in this EA, findings of this EA would be reviewed and a supplemental or additional NEPA analysis would be completed, if necessary, before implementing any additional proposed actions.

1.2 Background

The TNARNG has a dual mission. During peacetime, the role of the TNARNG is to be a state military force under the direction of the Governor of Tennessee, as Commander-in-Chief of the state. The TNARNG may be called upon to maintain or restore order in emergency situations, to rescue civilians whose lives are in danger, or to assist during natural disasters. The state mission is to provide trained and disciplined forces for domestic emergencies or as otherwise required by state laws. The state mission provides for the protection of life and property and preserves peace, order, and public safety under the competent orders of the state governor.

The President of the United States has the authority to mobilize NGB units or individuals, putting them in federal duty status. While federalized, TNARNG units or personnel report to the Combatant Commander of the theatre in which they operate and, ultimately, to the President of the United States. Even when not on federal duty status, the TNARNG has a federal mission to

maintain properly trained and equipped units, available for prompt mobilization for war, national emergency, or as otherwise needed. The Army also has an environmental mission to sustain the environment to enable the Army mission and secure the future.

The TNARNG is composed of four major units: the 278th Armored Cavalry Regiment in Knoxville, the 230th Sustainment Brigade based in Chattanooga, the 194th Engineer Brigade in Jackson, and the 30th Troop Command headquartered in Tullahoma (**Table 1**).

Table 1. Tennessee Army National Guard Major Units

194TH ENG BDE
230TH EN BN
255TH EN DET
212TH EN CO (VERT)
913TH EN CO (HORZ)
190TH EN CO (MAC)
775TH EN DET (WELL)
890TH SAPPER
117TH MP BN
252ND MP CO
253RD MP CO
269TH MP CO
168TH MP BN
130TH MP CO
251ST MP CO
267TH MP CO
268TH MP CO

278TH ACR HQ
1/278TH ACR (AR)
2/278TH ACR (INF)
4/278TH ACR (ARS)
FA SQDN, 278TH ACR
SPT SQDN, 278TH
RES, 278TH ACR

230TH SB
155TH SIG CO
105TH PERS CO
1128TH FN DET
1129TH FN DET
1130TH FN DET
176TH CSSB
1176TH TC CO
776TH MT CO
777TH MT CO
30TH CSSB
1172ND TC CO
730TH QM CO
1175TH TC CO

30TH TC
1-107TH AOB
MED CMD
1-181 HIMARS BN
181ST FSC
230TH DLD
1-230TH AV REG
DETS 1-111 AV REG (MEDEVAC)
DETS 1-171 AV REG (MEDEVAC)
DETS 2-135 AV REG (MEDEVAC)
CO C (-) 2-151 AV REG
CO C (-) 2-151 AV REG
DET 5 CO B 248TH CS SPT
DET 4 CO B 777TH CS SPT
DET 4, CO B 638th
DET 2, CO B 628th SPT BN
301ST TC
208TH ASMC
118TH MPAD
1957TH SPT DET
230TH SIG CO (TIN-R)
129TH ARMY BAND
1196TH JA SR
1109TH JA FL
DET 2, CPT 175

LEGEND

TDA STRUCTURE
MTOE BDE
MTOE BN

The TNARNG's total force structure authorization is approximately 9,500 soldiers within four major units and the Joint Force Headquarters (JFHQ). The major units include an Engineer Brigade, Armored Brigade, Troop Command Brigade, and a Sustainment Brigade. Under those four major units, TNARNG has 18 Battalion/Squadron level units. Under the JFHQ, TNARNG has a Recruiting Battalion, a Regional Training Institute, and a Training Site Command.

1.2.1 *Existing TNARNG Training at VTS-M*

VTS-M was established during World War II as part of the Milan Arsenal on 2,466 acres, the bulk of which are located in the town of Lavinia in Carroll County, Tennessee, with three small parcels in Gibson County, Tennessee. VTS-M is utilized by the TNARNG as a combat readiness training facility for the TNARNG and Reserve Components of the armed forces. VTS-M currently includes several small-arms ranges and training areas (TAs) that are utilized by armored vehicles to conduct U.S. Army Table III gunnery drills training using aids, devices, and blank ammunition. The facility road network is used for practice with driving and maneuvering large trucks used in transporting such items. Areas of VTS-M are also used as field camps or bivouacs for troops in training. One area with use restricted to engineer troops is used for training related to large-scale excavation and filling operations with heavy equipment.

VTS-M is a Level V Garrison Training Center (National Guard Regulation 5-3), which is a training site that has a basic nonautomated live-fire-exercise range capability and supports requirements at the individual and/or small unit level at or near the home station. Some facilities may be authorized that are consistent with training in a field environment. VTS-M includes a cantonment area with barracks for occupancy during temporary field operations only, vehicle storage and maintenance facilities, firing ranges, and designated TAs. The mission of VTS-M is to:

1. Provide a training site to prepare units of the TNARNG for transition to war and to respond to the Governor's requests.
2. Provide surface maintenance services to specified TNARNG units; and
3. Provide inactive duty training facilities for the assigned units.

On 9 August 2022, the U.S. Army's Milan Army Ammunition Plant (MLAAP) reassigned more than 16,000 acres to NGB as the land-holding command. NGB subsequently licensed the property to TNARNG for use, increasing the size of VTS-M to over 18,500 acres. The justification for the land reassignment was the shortage in VTS-M maneuver area. The expanded size of VTS-M would provide TNARNG with enough maneuver space to train its largest units, which it has been unable to do within Tennessee.

1.3 Location

VTS-M is located in Carroll and Gibson counties, in western Tennessee (**Figure 1**). The city of Milan lies immediately west of the site; Jackson, Tennessee, on Interstate 40, is approximately 20 miles to the south; and the Rutherford Fork of the Obion River forms a portion of VTS-M's northern boundary (**Figure 1**). TNARNG training currently takes place on six of VTS-M's 15 designated TAs, and the Proposed Action would include training throughout the entire approximately 18,500-acre training site utilizing 15 designated TAs (**Figure 2**).

1.4 Purpose and Need

The TNARNG has expanded VTS-M from 2,479.72 acres to 18,581.40 acres through a land transfer from MLAAP. TNARNG's intention is to develop and use the expanded installation to resolve shortfalls in light and heavy maneuver and live-fire weapons training and qualification opportunities in addition to its current uses. The existing training and qualification shortfalls subject soldiers and civilians to greater safety risks, and units to greater expense while traveling out of state to meet training and qualification requirements.

The purpose of the Proposed Action is to provide additional training land at VTS-M to allow for heavy and light maneuver training, including maneuver support, land augmentation, communications, unmanned aerial vehicle operations, air insertion, causality evacuation, and new live-fire capabilities training within proposed ranges, to TNARNG units within the state to better support TNARNG training requirements and mission.

The Proposed Action is needed because there is currently a deficit in TA lands available to train and qualify TNARNG units in heavy mounted and light maneuvers; there are no current TAs in Tennessee capable of supporting the TNARNG's heavy and light maneuver training requirement. The current shortage of available TAs has created scheduling conflicts and has forced TNARNG personnel to travel out of state for training activities, with approximately 45 percent of TNARNG's overall training completed out of state across the force.

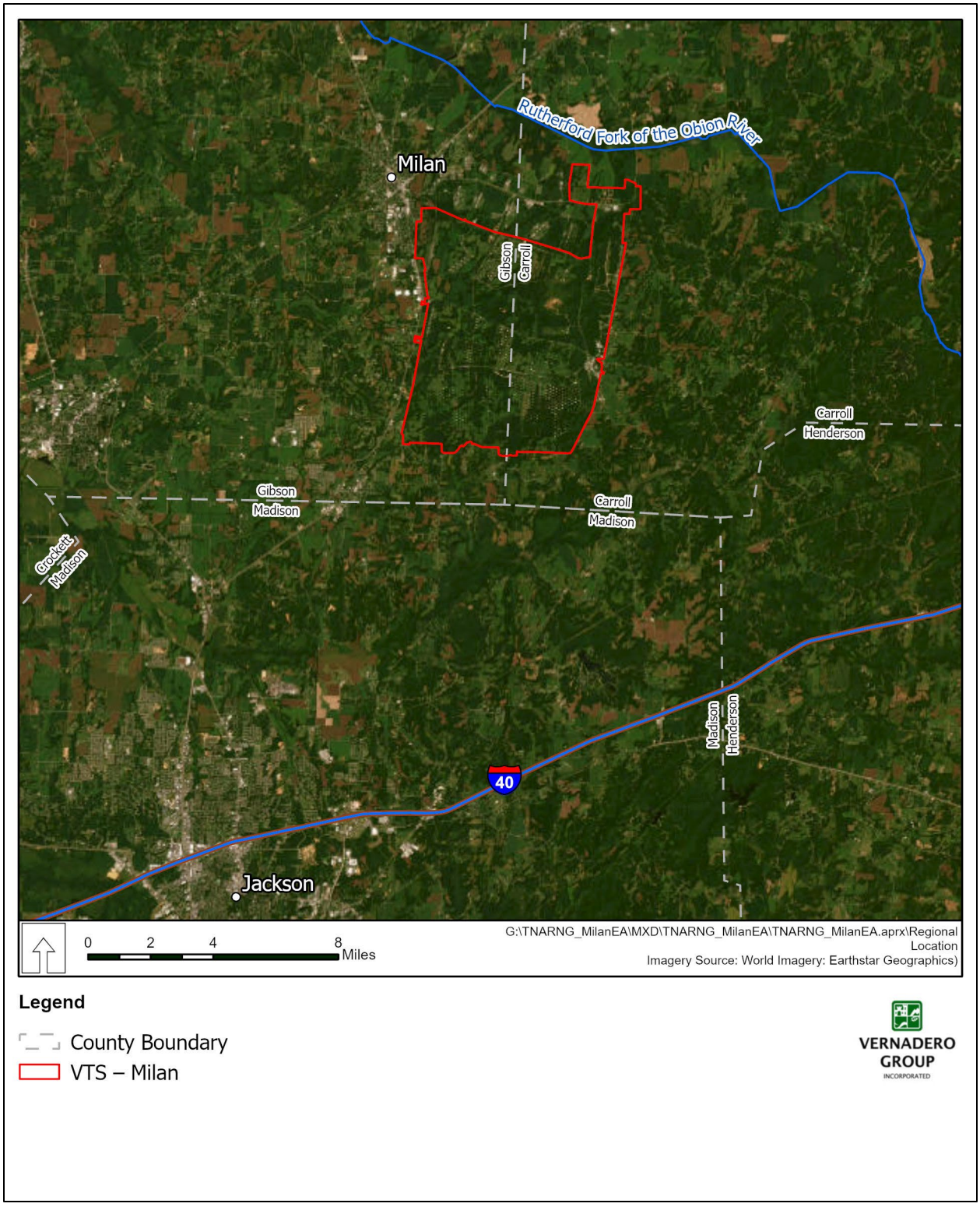

Figure 1. Regional Location of Volunteer Training Site – Milan

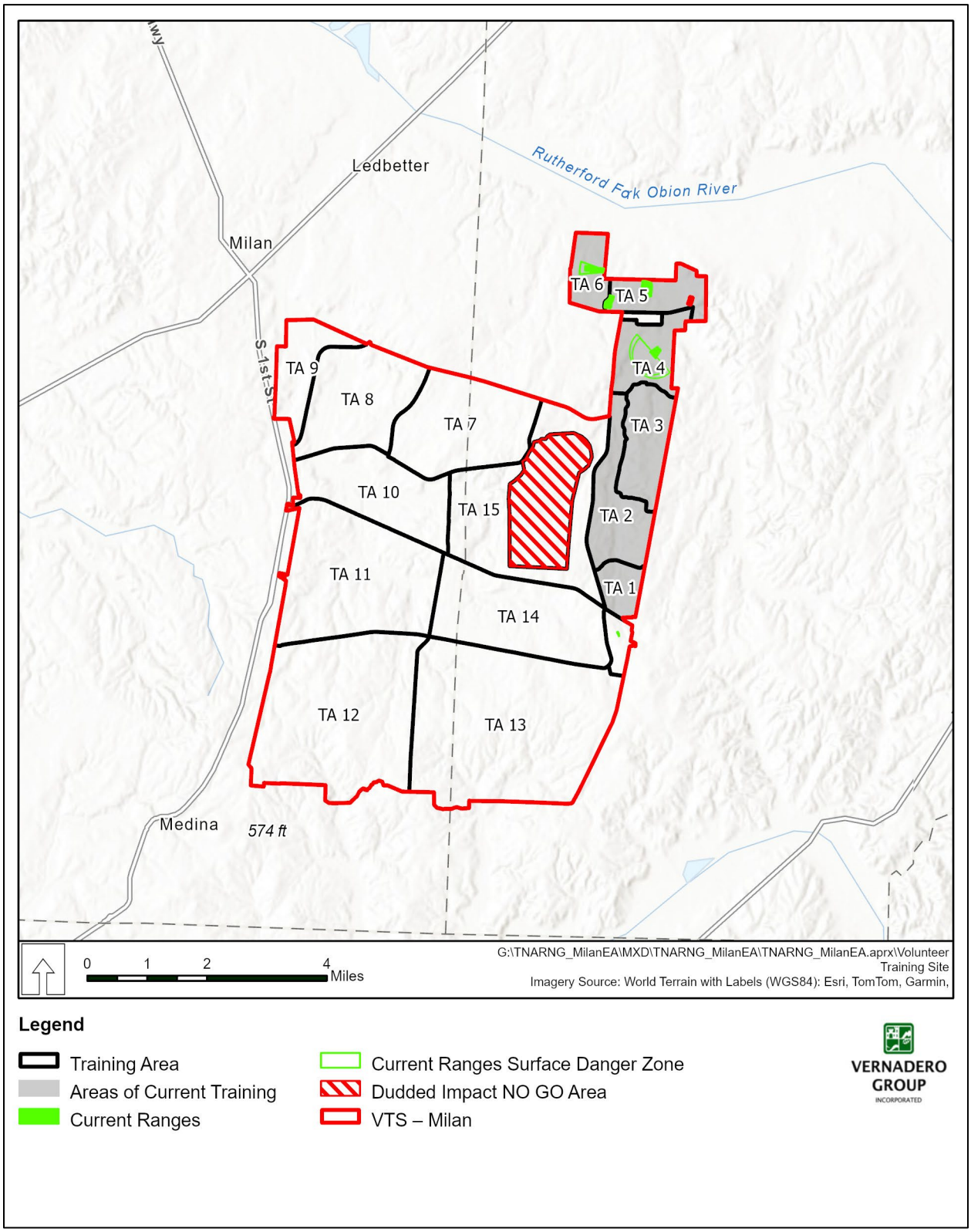

Figure 2. Training Areas at Volunteer Training Site – Milan

Increasing TNARNG training opportunities within the state would greatly reduce travel time and associated costs and improve safety by limiting transportation of weapons and equipment on public roadways. Further, training is needed to meet the TNARNG mission and DoD training requirements outlined in Field Manual (FM) 3-96 *Brigade Combat Team*, Training Circular 25-1 *Training Land*, DoD Instruction Number 1215.06, and National Guard Regulation 350-1, and to better prepare TNARNG for Large-Scale Combat Operations (LSCO) through Mission Essential Task List (METL) proficiency. METLs are the Headquarters, Department of the Army official listings of the fundamental tasks that units are designed to perform in any operational environment.

The Proposed Action consists of 17 individual projects that are currently programmed for implementation between fiscal year (FY) 2025 and FY 2035. These projects are evaluated collectively in this EA to streamline the NEPA compliance process; however, each project is independent of the others and could be implemented separately from or concurrently with the other projects over the next 10 years. The individual purpose of and need for each project in the Proposed Action are presented in **Table 2**; additional information about the individual projects is presented in **Chapter 2**.

Table 2. Purpose of and Need for Individual Sub-proposals Included in the Proposed Action

Proposed Project	Project Purpose	Project Need
Tracked Vehicle Engagement Area Tree Harvest	The purpose of this project is to thin the timber to provide/establish an area for tank and Bradley engagements.	This project is needed to ensure vehicle crews have the ability to maneuver and train to complete METL tasks.
Tracked Vehicle Engagement Area Heavy Maneuver Training	This is a training requirement for TNARNG's organic Armor Brigade Combat Team.	This is needed to facilitate unit readiness through METL proficiency training.
Tracked Vehicle Maneuver Corridor Tree Thinning	The purpose of this project is to thin the timber to support heavy-track vehicles off road maneuvers.	This project is needed to facilitate unit readiness through METL proficiency training.
Tracked Vehicle Maneuver Corridor Heavy Maneuver Training	This is a training requirement for TNARNG's organic Armor Brigade Combat Team.	This is needed to facilitate unit readiness through METL proficiency training.
Heavy Maneuver Training	This is a training requirement for TNARNG's organic Armor Brigade Combat Team.	This is needed to facilitate unit readiness through METL proficiency training.
Heavy Maneuver Training	The purpose of this project is to fill ARRM shortage requirements.	This project is required to enable light demolition training and live hand grenade training.
Heavy Maneuver Training	This is a training requirement applicable for TNARNG's organic force structure.	This is needed to facilitate unit readiness through METL proficiency training.
Dudded Impact NO GO Area	The purpose of this project is to remove trees and vegetation in order to establish the range footprint required.	This project is needed to rectify the ARRM shortage of this type of facility within the TNARNG.
Light Maneuver Training	The purpose of this action is to enable additional throughput of TNARNG Soldiers on this activity.	This project is needed to address capability shortfalls in order to meet annual qualification requirements.
Light Demolition Range Construction and Operation	This is a training requirement for TNARNG's organic Armor Brigade Combat Team.	This is needed to facilitate unit readiness through METL proficiency training.
Hand Grenade Familiarization Range (Live)	The purpose of this project is to address ARRM shortage requirements.	This project is needed to rectify the ARRM shortage of this type of facility within the TNARNG.
UAV Operations	This is a training requirement for select units within the TNARNG force	This is needed to facilitate unit readiness through METL proficiency

Proposed Project	Project Purpose	Project Need
	structure per FM 3-04.155.	training.
Aerial Operations, Air Insertions, and Casualty Evacuation	This is a training requirement for select units within the TNARNG force structure.	This is needed to facilitate unit readiness through METL proficiency training.
Engineer Training	This is a training requirement for select units within the TNARNG force structure.	This is needed to facilitate unit readiness through METL proficiency training.
Tank Trail Construction and Use	The purpose of this project is to establish movement capability, especially for heavy vehicles, throughout the entire Installation.	This project is needed to address the ability to move heavy tracked and select wheeled vehicles throughout the Installation, which does not currently have water crossings that can support the weight of these types of vehicles. Also, this addresses safety issues by separating regular light vehicle traffic from heavy vehicles and convoys.
Tank Crossing Construction and Use	The purpose of this project is to enable movement by track vehicles over Graball Gate Road.	This project is needed to protect the sewer line running parallel with Graball Gate Road. It allows contiguous training throughout the heavy maneuver area in order enable unit readiness through METL proficiency training.
Low Water Crossing Construction and Use	The purpose of this project is to establish select points for track and wheeled vehicles to cross within Training Areas.	This is needed to facilitate unit readiness through METL proficiency training by enable true "maneuver" vs. "movement."
AVLB Emplacement and Use	The purpose of this project is to establish select points for track and wheeled vehicles to harden crossing within Training Areas.	This is needed to facilitate unit readiness through METL proficiency training by enable true "maneuver" vs. "movement.

METL – Mission Essential Tasks Lists; **TNARNG** – Tennessee Army National Guard; **ARRM** – Army Range Requirements Model; **UAV** – unmanned aerial vehicle; **AVLB** – Armored Vehicle Launched Bridge

1.5 Decision to Be Made

The EA evaluates whether the Proposed Action would result in significant impacts on the human or natural environment. Based on the analysis in this EA, TNARNG will make one of three decisions regarding the Proposed Action: 1) determine the potential environmental consequences associated with the Proposed Action or alternatives are not significant and sign a Finding of No Significant Impact, 2) initiate preparation of an Environmental Impact Statement if it is determined that significant impacts would occur from the implementation of the Proposed Action or alternatives, or 3) select the No Action Alternative, whereby the Proposed Action would not be implemented. As required by NEPA and its implementing regulations, preparation of an environmental document must precede final decisions regarding the proposed project and be available to inform decision makers of the potential environmental impacts. The component projects in Alternative A and B are identical. Under Alternative A 953.4 acres of trees will be removed and under Alternative B 3,247 acres of trees would be removed. TNARNG's preferred alternative is Alternative B because it meets maneuver requirements of FM 3-96 and the expanded tree harvest area provides TNARNG with flexibility for locating maneuver lanes and corresponding low water crossings, thereby maximizing training opportunities.

The proposed activities addressed in this EA constitute a major federal action and, therefore, must be assessed in accordance with NEPA, which requires federal agencies to consider the environmental consequences of proposed actions in the decision-making process (42 USC 4321, et seq.). The intent of NEPA is to protect, restore, or enhance the environment through well-informed decisions by the federal decision maker. The CEQ was established under NEPA, 42 USC 4342, et seq., to implement and oversee federal policy in this process. In 1978, the CEQ issued regulations implementing the NEPA process under Title 40 CFR 17 Parts 1500–1508. On 20 April 2022, CEQ issued *National Environmental Policy Act Implementing Regulations Revisions* for CFR §§1502, 1507, and 1508 (87 Federal Register 2345340).

The Army's *Environmental Analysis of Army Actions* is set forth in 32 CFR 651 This EA has been prepared in accordance with all NEPA and CEQ guidance and 32 CFR 651.

1.6 Applicable Regulatory Requirements

Applicable federal, state, and local regulations have been considered during analysis of the impacts on individual environmental and social resources evaluated as part of this EA. **Table 3** presents legislation and Executive Orders (EOs) that have been given consideration.

Table 3. Applicable Regulatory Requirements

Clean Air Act (42 USC 7401)	Executive Order (EO) 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*
Clean Water Act (33 USC 1251)	*Migratory Bird Conservation Memorandum of Understanding between the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS)* established under EO 13186
Endangered Species Act (ESA) (16 USC 1531–1543)	EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*
Migratory Bird Treaty Act (MBTA) (16 USC 703–712)	EO 12898*, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*
Bald and Golden Eagle Protection Act (16 USC 668-668d)	EO 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All*
National Historic Preservation Act (NHPA) (42 USC 300101 et seq.)	EO 13175, *Consultation and Coordination with Indian Tribal Governments*
Stormwater requirements under Section 438 of the Energy Independence and Security Act (42 USC 17094)	EO 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 9601–9675)	EO 14008, *Tackling the Climate Crisis at Home and Abroad*
Resource Conservation and Recovery Act (RCRA) (42 USC 6901)	EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*
Toxic Substances Control Act of 1970 (15 USC §§ 2601-2671)	EO 11990, *Protection of Wetlands*
Occupational Safety and Health Act (29 USC §§ 651)	

Section 7 of the Endangered Species Act (ESA), as amended, and implementing regulations of the Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act, require that, through consultation with the U.S. Fish and Wildlife Service (USFWS), federal actions do not jeopardize the continued existence of threatened, endangered, or proposed species or result in the destruction or adverse modification of critical habitat. Section 7(a)(1) of the ESA directs federal agencies, in consultation with the USFWS, to use their authorities to further the purposes of the ESA by carrying out programs for the conservation of endangered and threatened species. Additionally, §7(a)(2) of the ESA requires federal agencies to ensure that any action they

authorize, fund, or carry out (i.e., has a federal nexus) is not likely to jeopardize the continued existence of any federally listed threatened or endangered species or result in the destruction or adverse modification of designated critical habitat.

Per 10 USC § 10501, NGB is a joint activity of the DoD. Pursuant to DoD Directive 5105.77, *NGB,* dated 30 October 2015, NGB serves as the principal advisor to U.S. Army on matters involving the ARNG, and is responsible for implementing DoD guidance on the structure and strength authorizations of the ARNG. NGB is responsible for ensuring that ARNG activities are performed in accordance with applicable policies and regulations. As such, the NGB is the lead federal agency responsible for compliance with the ESA and preparation of ESA Section 7 consultation documentation on projects for which the ARNG is the action agency. The NGB is ultimately responsible for ESA compliance at ARNG installations; however, local responsibility for ESA document preparation and direct interaction with USFWS officials falls upon state Guard organizations – in this case, the TNARNG.

On 4 December 2023, TNARNG initiated consultation by discussing the Proposed Action with USFWS. TNARNG sought USFWS input on the adequacy and appropriateness of its avoidance, minimization, and conservation measures to be included in a forthcoming Programmatic Biological Assessment (BA). On 20 December 2023, USFWS and TNARNG met in person to discuss the Proposed Action and avoidance and minimizations measures, and conservation measures. During the meeting, the USFWS requested additional data, and on 21 December 2023, TNARNG provided a summary of all previous VTS-M bat surveys and the 2013 bat habitat assessment report (VTS-M 2013). Records of correspondence with the USFWS for the Proposed Action are included in **Appendix A**. Reasonable and Prudent Measures (RPMs) from the pending Biological Opinion (BO) will be implemented.

The TNARNG will complete formal ESA §7 Consultation with the USFWS for this agency action. TNARNG will implement the conservation measures identified in the Draft Programmatic Biological Assessment (BA) that it will submit to USFWS's Cookeville Field Office. These BA conservation measures are intended to avoid/minimize the proposed actions' impact on listed species and/or to provide a benefit to the species. TNARNG will also implement any RPMs identified in the USFWS' BO. TNARNG and ARNG G-9 will work with USFWS to develop RPMs for inclusion in their Final BO. Preliminarily, TNARNG has agreed to provide conservation benefits for the bats on two large tracts of forest at Milan VTS – approximately 3,416 acres - in perpetuity. This TNARNG commitment will be memorialized in the Final BO issued by USFWS.

To comply with the NHPA and its implementing regulations at 36 CFR 800.3 et seq. and DoD Instruction 4710.02, *DoD Interactions with Federally Recognized Tribes*, federally recognized tribes affiliated historically within the VTS-M geographic region are invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal coordination process is distinct from NEPA coordination and requires separate notification of all relevant tribes. Timelines for tribal consultation are also distinct from those of intergovernmental consultations. TNARNG initiated consultation for the Proposed Action. Records of correspondence with the Native American tribal governments for the Proposed Action are included in **Appendix A.**

TNARNG consulted with the Tennessee State Historic Preservation Office (SHPO) regarding the management of cultural resources and historic properties within the VTS-M area. Records of correspondence with the SHPO for the Proposed Action are included in **Appendix A**.

TNARNG would comply with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA) and all applicable state and federal regulations concerning the transport, storage, use, and disposal of hazardous substances, including all hazardous materials and wastes. In addition to meeting the above requirements, TNARNG would obtain all necessary permits (e.g., National Pollutant Discharge Elimination System Construction General Permit, individual permits from the Tennessee Department of Environment and Conservation) prior to the initiation of construction activities. EPA and TDEC entered into an agreement with Army in 1992. This agreement referenced as a "Record of Decision" was to ensure the management of the CERLCA activities at MLAAP remained an Army responsibility. TNARNG training activities are in no way related to MLAAP's restoration activities. The TNARNG would also ensure that no training activities interfere with or impede the ongoing restoration activities by MLAAP.

1.7 Public and Agency Involvement

The Proposed Action is subject to the requirements and objectives of EO 11988 because it would involve an action in a floodplain if implemented. Therefore, an early public notice was published in *The Jackson Sun* and *The Mirror-Exchange* on 26 December 2023. The early public notice solicited public comments on the Proposed Action and practicable alternatives. **Appendix A** provides a copy of the early public notice. No public comments were received during the early public review period.

Agency scoping is an important component of the EA process and includes consultation with agencies that regulate or influence activities and resources associated with the Proposed Action. **Table 4** provides a list of agencies and tribes contacted as part of the preparation of this EA, and **Appendix A** provides a copy of the scoping documents to those agencies and tribes.

Table 4. Persons and Agencies Consulted/Coordinated

Federal Agencies	
U.S. Environmental Protection	U.S. Department of Agriculture
U.S. Fish and Wildlife Service	U.S. Army Corps of Engineers
State Agencies	
Tennessee Department of Environment and Conservation	Tennessee Division of Archaeology
Tennessee Historic Commission	Tennessee Wildlife Resources Agency
Tribes	
Alabama-Coushatta Tribe of Texas	Chickasaw Nation
Jena Band of Choctaw Indians	Eastern Shawnee Tribe of Oklahoma
Thlopthlocco Tribal Town	United Keetoowah Band of Cherokee Indians
Absentee Shawnee Tribe of Oklahoma	Alabama Quassarte Tribal Town of Oklahoma
Cherokee Nation	Coushatta Tribe of Louisiana
Eastern Band of Cherokee Indians	

1.8 Public Review

The TNARNG invited public participation in decision making on this proposal through the NEPA process. Consideration of the views and information of all interested persons promotes open communications and enables better decision making. Agencies, organizations, tribes, and members of the public were urged to participate. A record of public notice and comments is included in **Appendix A.**

Open public involvement occurred during the review of this EA. Review copies were made available to the public for a period of 15 days at the Mildred G. Fields Memorial Library in Milan,

Tennessee, and on the internet at https://www.tn.gov/military/who-we-are/state-administration-military/environmental.html. Notification of this EA was accomplished via a display advertisement published in *The Jackson Sun* and *The Mirror-Exchange.*

1.9 Scope of this Environmental Analysis

This EA analyzes the potential environmental consequences associated with ongoing TNARNG training as well as a future enhancement in TNARNG training activities at VTS-M. Alternative B is the TNARNG's preferred alternative, since it meets maneuver requirements of FM 3-96 and the expanded tree harvest area provides TNARNG with flexibility for locating maneuver lanes and corresponding low water crossings, thereby maximizing training opportunities. While the components of the Proposed Action are not specifically predictable, the Proposed Action would implement ongoing current training requirements as well as a future expanded training.

FORMAT PAGE

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 Introduction

This chapter of the EA describes the Proposed Action with Alternative A, Proposed Action with Alternative B, (Preferred) and the No Action Alternative. The two Proposed Action alternatives include construction activities, military training operations, and maintenance activities on VTS-M lands. If approved, land clearing (timber harvests) and construction activities (infrastructure improvements) associated with the Proposed Action could begin as early as FY2024. Differences in the proposed alternatives are based on project design features, public access restrictions during maneuver training activities, site access changes, tree removal acreages, and the total number of constructed low water crossings. The proposed location and configuration of the TAs were determined based on the TNARNG's purpose and need, screening criteria, and site assessment process.

Section 2.6 describes the process TNARNG used to determine which alternative(s) to retain for analysis in this EA and which alternatives to eliminate from further consideration. Alternatives that were considered but not evaluated further in this EA are discussed in **Section 2.6.3.** The No Action Alternative, under which VTS-M lands would not be used to support additional military training activities, was evaluated in this EA as a baseline for comparison with the proposed alternatives.

2.2 Proposed Action

Components of the Proposed Action include training operations, maneuver exercises, small-arms training (less than 50 cal.), use of smoke discharge, aviation, and driving training, as well as infrastructure improvements and associated tree harvesting. Alternative A and B have similar components however Alternative B is the TNARNG's preferred alternative, since it meets maneuver requirements of FM 3-96 and the expanded tree harvest area provides TNARNG with flexibility for locating maneuver lanes and corresponding low water crossings, thereby maximizing training opportunities. This EA considers all components of the overall Proposed Action and evaluates the Proposed Action and its alternatives collectively. Individual components of the Proposed Action analyzed in the EA should be considered independent of each other. TNARNG could choose to implement all, none, or any combination of them. TNARNG's preferred alternative is Alternative B.

2.2.1 *Training Operations*

TNARNG's training activities would occur within designated TAs on VTS-M (**Figure 3**). The TNARNG proposes to develop the approximately 16,000 acres received through the divesture of the MLAAP for the maneuvering of military force training to build and sustain operational readiness for TNARNG units in accordance with METL. The use of a variety of wheeled vehicles, with the largest being Heavy Equipment Transporter Systems, are proposed for training operations at VTS-M. **Table 5** provides the proposed equipment density breakdown within the current authorized force structure for the TNARNG. **Table 6** presents the proposed actions/military training actions, the location and land area on VTS-M for each action, and the proposed days per year each action would occur. **Table 7** presents the proposed new live-fire capabilities for TNARNG training on VTS-M.

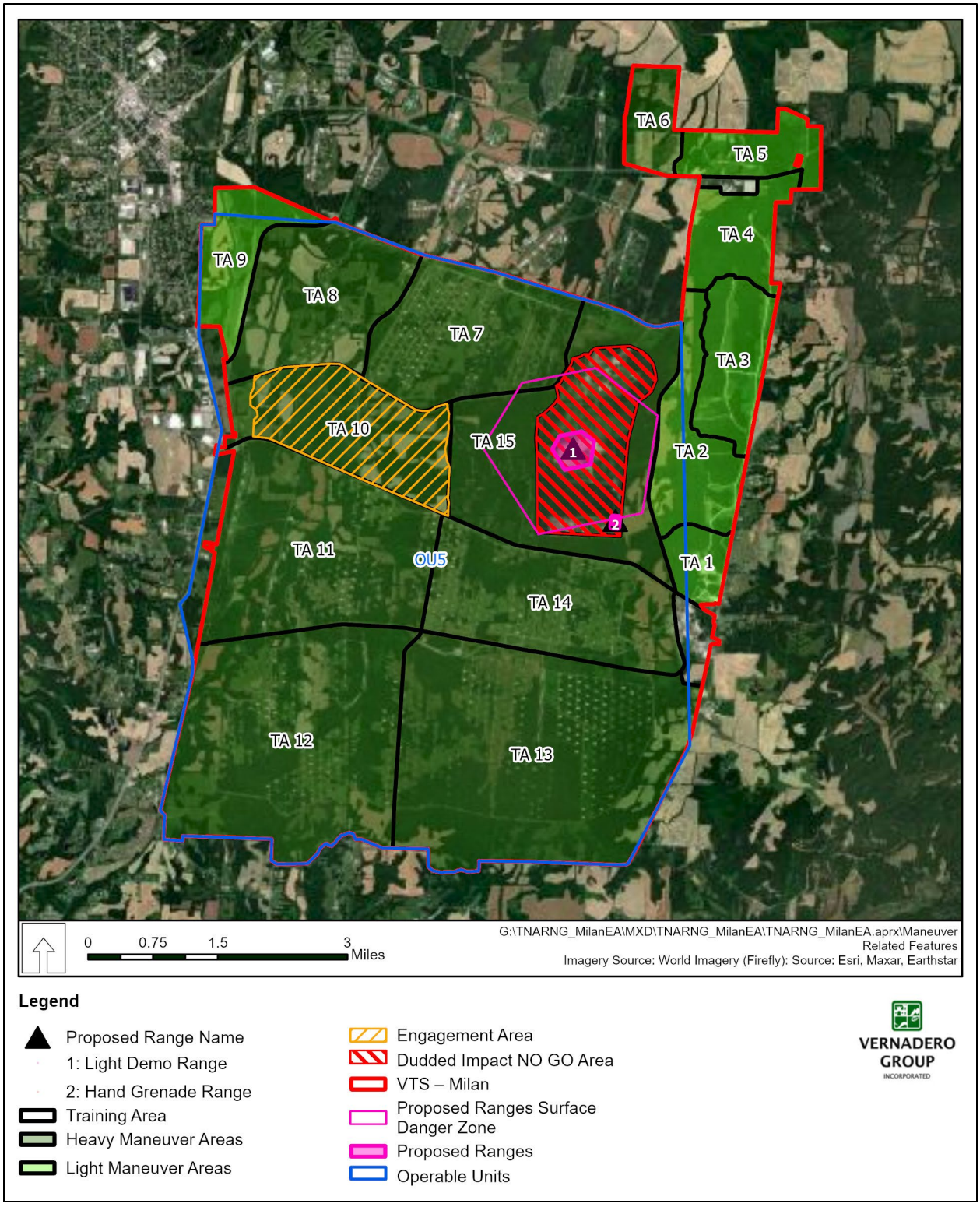

Figure 3. Proposed Training Operations and Maneuver Training Areas at Volunteer Training Site – Milan

Table 5. Proposed Equipment Density for Training at Volunteer Training Site – Milan

Equipment	Proposed Equipment Density for Training Operations at VTS-M
M1 Abrams Combat Tanks	58
Bradley Fighting Vehicle	113
Other Tracked Vehicle (M113)	238
Combat Engineer Vehicle (ACE)	50
Wheeled Vehicle (HUMMWV, MRAP, ASV)	2,268
Heavy/Cargo Trailer	845
MAT-V Military Police Armored Security Vehicle	93
High-Mobility Artillery Rockery System Launcher	18
Heavy Equipment Transporter	96
Rotary Wing Aircraft (UH60, CH47, LUH 72)	33
TOTAL	**3,812**

VTS-M – Volunteer Training Site – Milan; **ACE** – Armored Combat Earthmover; **HUMMWV** – High Mobility Multipurpose Wheeled Vehicle; **MRAP** – Mine Resistant Ambush Protected; **ASV** – Armored Security Vehicle

Table 6. Proposed Actions on Volunteer Training Site – Milan

Proposed Action/Military Training	Location/Land Area on VTS-M	Days of Use Annually	Anticipated Implementation Date
Tracked Vehicle Engagement Area Tree Harvest	Throughout the 15 training areas	N/A	FY25
Tracked Vehicle Engagement Area Heavy Maneuver Training	Training Area 10 (approximately 1,103 acres)	140	FY26
Tracked Vehicle Maneuver Corridor Tree Thinning	Throughout Training Areas 11, 12,13, and 14	N/A	FY25
Tracked Vehicle Maneuver Corridor Heavy Maneuver Training	Training Areas 11, 12, 13, and 14 (approximately 9,320 acres)	140	FY26
Heavy Maneuver Training	Training Area 7 (approximately 1,313 acres)	140	FY30
Heavy Maneuver Training	Training Area 8 (approximately 1,149 acres)	140	FY30
Heavy Maneuver Training	Training Area 15 (approximately 1,398 acres)	140	FY26
Dudded Impact NO GO Area	905 acres	88	FY25
Light Maneuver Training	Training Area 9 (approximately 507 acres)	40	FY27
Light Demolition Range Construction and Operation	Within proposed Light Demolition Range area	50	FY25
Hand Grenade Familiarization Range (Live)	Within the proposed Hand Grenade Familiarization Range area	38	FY26
UAV Operations	Throughout the 15 Training Areas at no greater than 500 feet AGL	140	FY25
Aerial Operations, Air Insertions, and Causality Evacuation	Throughout the 15 Training Areas at no greater than 500 feet AGL	60	FY24
Engineer Training	Within nondudded heavy maneuver training areas within Training Areas 7, 8, 10, 11, 12, 13 and 14	140	FY25
Tank Trail Construction and Use	Three proposed Tank Trail Locations: (1) Graball Road, (2) South Loop, and (3) North Range Loop	140*	Phase 1: FY26 Phase 2: FY29 Phase 3: FY32
Tank Crossing Construction and Use	Up to 7 locations on Graball Road	140*	FY27
Low Water Crossing Construction and Use	Up to 30 locations throughout the 15 Training Areas	140*	FY24–FY30

Proposed Action/Military Training	Location/Land Area on VTS-M	Days of Use Annually	Anticipated Implementation Date
AVLB Emplacement and Use	As needed at locations throughout the 15 Training Areas	140*	FY25

VTS-M – Volunteer Training Site – Milan; **N/A** – not applicable; **FY** – Fiscal Year; **UAV** – unmanned aerial vehicle; **AGL** – above ground level; **AVLB** – Armored Vehicle Launched Bridge;
* Days of use annually after construction is completed.
Note: Not applicable (N/A) indicates that there would be no annual use associated with tree harvest or construction.

Table 7. Proposed New Live-Fire Capabilities on Volunteer Training Site – Milan

Proposed Live-fire Capability	Ammunition
Next Generation Squad Weapons	6.8 mm
Enhanced Performance Rounds	5.56 and 7.62 mm
M240	7.62 mm machine gun
M2	.50 caliber machine gun
MK19	40 mm machine gun
M242	25 mm and 30 mm Bradley chain gun

mm – millimeter

2.2.2 *Maneuver Exercises*

Several TNARNG new maneuver capabilities would occur under the Proposed Action, including two or more companies maneuvering at once; nine heavy maneuver TAs (14,533 acres); six light maneuver TAs (598 acres); nonlive fire TAs (814 acres); and Tank Engagement Area (1,008 acres).

The proposed maneuver training (**Figure 4**) includes minimally restricted offensive and defensive movement and maneuver for an element up to a Combined Arms Battalion. The Combined Arms Battalion consists of a Battalion headquarters and headquarters company, three maneuver companies, and one Forward Support Company attached from the Armored Brigade Combat Team's Brigade Support Battalion. The battalion comes under the overall command of a Lieutenant Colonel. The ability to emplace and breach obstacles is desired throughout all identified heavy maneuver areas. Mounted tracked and wheeled vehicle platforms would conduct training for non-live-fire Integrated Weapons Training Strategy requirements. Dismounted operations would be conducted on all designated maneuver areas. Assembly areas, bivouac sites, and base camps may be established in these maneuver areas. Proposed aviation operations would include Air Traffic Control of rotary wing assets, Forward Arming and Refueling Points operations, and Air Assault insertions. The intent is to employ pyrotechnics and blank ammunition within all designated maneuver areas.

Heavy maneuver TAs that contain the Tank Engagement Area and Heavy Maneuver Corridors (TAs 6, 7, 8, 10, 11, 12, 13, 14, and 15) (**Figure 4**) would be actively used day and/or night, up to 140 days per year (see **Table 6**). Tank engagement is a term used for armored vehicles to engage enemy forces of all types. In this training environment it is a specified area that is used for armored vehicle training in simulation of enemy engagement (FM 17-1, *Armor Operations Small Units*). The light maneuver training areas (TAs 1, 2, 3, 4, 5 and 9) would be used for squad through battalion level combat engagement training with dismounted or light to heavy wheeled vehicles operating on or off road and tracked vehicles remaining on or within 100 feet of roads except on select ranges. Light maneuver TAs would be actively used day and/or night, up to 40 days per year

(see **Table 6**). Fighting positions and ditches would be filled in, seeded, and/or covered with straw or grass mats for soil stabilization immediately following training events. Soil disturbance from maneuver activities would be stabilized and seeded as needed following training events. Typical use of the area would have potential for generating loud noise, temporary intense light, and Smoke Discharge.

Engineering digging exercises, to depths no greater than 6 feet below ground level, would also be conducted in the designated maneuver areas under the Proposed Action. These exercises would include fighting positions and battle positions, which consist of excavating holes large enough for a soldier and a vehicle according to FM 21-75, Chapter 2, and FM 5-103, Chapter 4, respectively.

2.2.3 *Small-Arms Training*

More than 11,000 acres of the reassigned 16,000-acre VTS-M property would include nondudded small-arms training Surface Danger Zone (SDZ). The SDZ is the area extending from a firing point to a distance downrange based on the projectiles fired. This area has specific dimensions that provide a contained area for all fragments resulting from the caliber of weapons fired. These dimensions are found in Department of the Army Pamphlet (DA PAM) 385-63. The ranges could be used any time of year, totaling up to 173 days per year (see **Table 5**). When the proposed ranges are not occupied, it is proposed to also use these areas for heavy maneuver training. The existing approximately 905-acre dudded impact NO GO area would remain (**Figure 4**); however, no activities would occur in that area, which includes the Ammunition Destruction Area (ADA), the Open Burning Grounds (OBG), and the closed sanitary landfill that are all subject to land use controls (LUCs).

2.2.4 *Smoke Discharge*

TNARNG currently trains with smoke discharging equipment. Under the Proposed Action, training, maneuver, and engagement activities may include the use of smoke grenades in both light and heavy maneuver areas up to 140 days per year. Only smoke grenades are used to produce smoke on VTS-M. A maximum potential of 368 smoke grenades for signaling and obscurant purposes could be used on VTS-M in a year (**Table 8**), although significantly fewer is likely due to the specific meaning of different colors for signaling. Smoke grenades would typically be used in open to semi-open areas to signal specific meanings and mark the user's location, but smoke could drift into forested areas or be deployed in forested areas for cover and concealment.

Table 8. Maximum Annual Use of Smokes/Obscurants on Volunteer Training Site – Milan

Ammunition DODIC	Maximum Expected Annual Quantity
G940 – HG Smoke Green M18	42
G945 – HG Smoke Yellow M18	74
G950 – HG Smoke Red M18	104
G955 – HG Smoke Violet M18	44
G982 – HG Smoke TA Practice M83	62
GG25 – HG, Bursting, Obscuration M106	42
Total	**368**

DODIC – Department of Defense Identification Code; **HG** – hand grenade

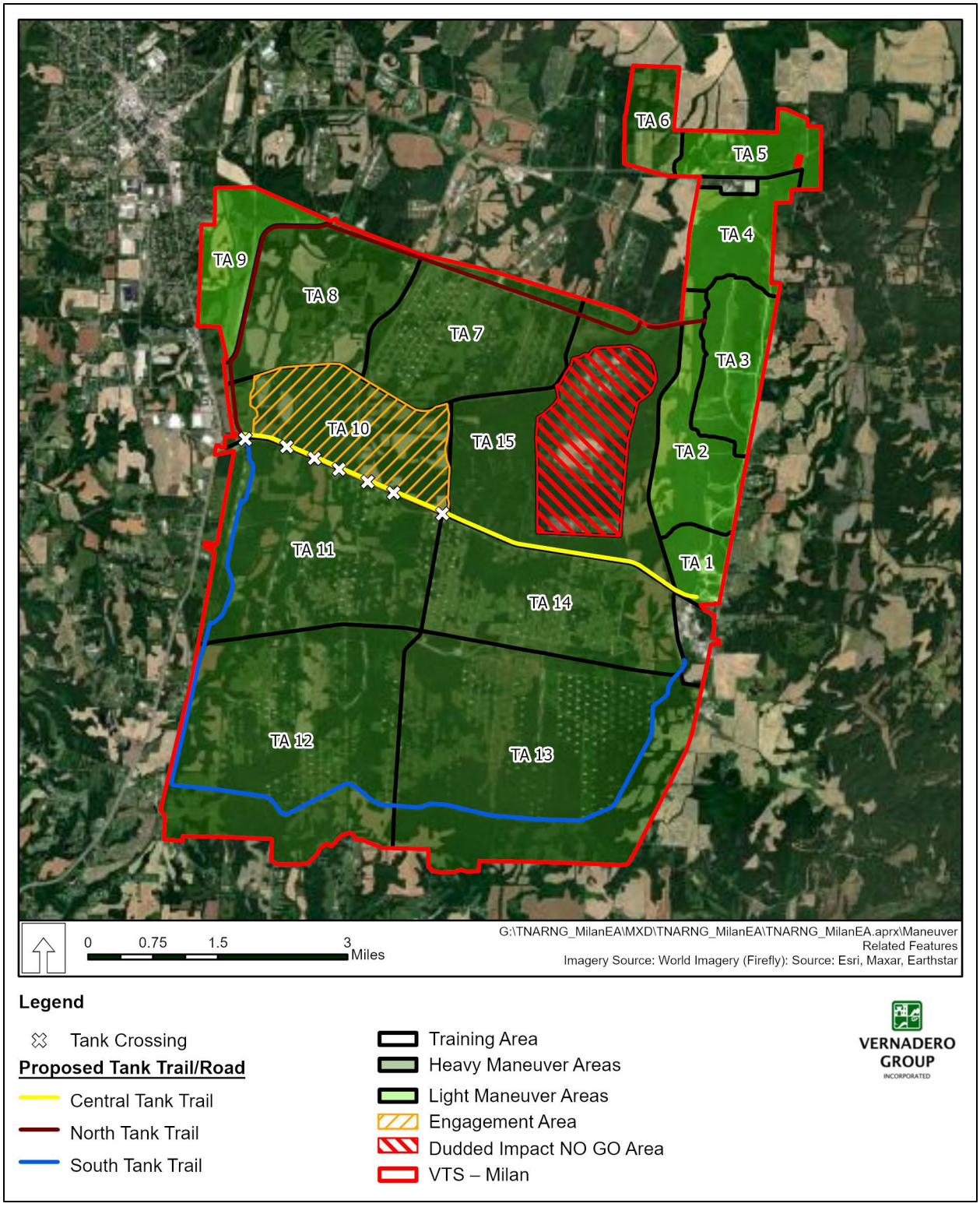

Figure 4. Proposed Maneuver Training Areas at Volunteer Training Site – Milan

2.2.5 *Aviation*

Current TNARNG aviation training consists of air insertion, sling-load operations, firefighting operations, and general flight training for crews. Under the Proposed Action, aviation training on VTS-M would be comprised of rotary wing aircraft (helicopters), and unmanned aerial vehicle (UAV) use. Helicopters used on post would include UH-60 Blackhawk for delivery and extraction of soldiers, cargo delivery, sling-load, and Bambi-bucket fire suppression operations, and the UH-72 for medical/casualty evacuation. Helicopters could be used any time of day or night anywhere on post up to 60 days per year. Typical use would involve aircraft traveling over 500 feet above ground level (AGL), during daylight conditions, with a rapid decent/assent at target locations. It is possible that on rare occasions helicopters could fly very low above the ground and treetops and that flights could sometimes occur during hours of darkness. Two types of UAVs would be used by TNARNG, the RQ11-B (Raven) and RQ28-A (Short Range Recon). UAVs could be operated day or night in conjunction with maneuver activities up to 140 days per year.

2.2.6 *Military Equipment Driver Training*

Current TNARNG driver training consists of vehicle familiarization, basic vehicle driving skills in a field environment, and night vision use while driving. Under the Proposed Action, driver training on military vehicles would be conducted throughout VTS-M on all trails and roads for general familiarization. These training activities could occur both day and night, in lighted, blackout drive, or totally dark night vision modes. An existing Driver's Training Course in TA 3 would continue to be used to train and familiarize drivers with more difficult and complex obstacles and slopes during daylight conditions. All driving on post would be conducted at less than 25 miles per hour.

2.2.7 *Infrastructure Improvements*

Improvements to the transportation infrastructure on VTS-M would also be implemented to reduce traffic in maintenance areas, facilitate access between the cantonment area and ranges, allow Unit Training Equipment site access, construct up to seven tank crossings on Graball Road, construct three tank trail crossings on Graball Road, and construct three tank trails (a central route, south route, and north route) (see **Figure 4**). In addition, the existing cantonment area would continue to be used until future master planning is developed and funding is available for a new one. The existing cantonment would provide no permanent occupancy; barracks would provide temporary occupancy during times of field operations only.

Numerous low water crossings (see Table 5) would also be constructed. Low water crossings are the most economical way to cross stream beds without building actual bridges; they also prevent erosion. An area approximately 40 feet by 100 feet would be clearcut to construct each hardened low water crossing. The average water crossing on VTS-M is approximately 20 feet deep and 15 feet wide at the bottom. Generally, the side slopes are steep and unconsolidated. The bottoms are sandy and silted. Most of VTS-M suffers from poor soil conditions and steep slopes; as a result, there are many areas with poor vegetative cover and erosion control issues. The average low water crossing proposed would be made from cable concrete and riprap and would require roughly 175 tons of 2-inch minus stone, 350 square yards of cable concrete block, and 600 tons of 6-inch riprap. Generally, each crossing would need at least 12 inches of topsoil and vegetation removed from the side slopes. A minimum of 12 inches of 6-inch riprap would be reinstalled in place of the topsoil and vegetation. Where cable concrete block is to be placed, all topsoil, vegetation, sand, and silt would be removed from the ditch, approach, and departure slopes. The area under the cable

concrete block would be excavated 3 feet and recompacted. Where this is not feasible and/or erosion and scouring would still be an issue, engineered fill would be installed in place of the natural fill, then compacted. All areas of the low water crossing would require geosynthetic fabric to be installed beneath the side slopes and cable concrete block. In some places the areas adjacent to the low water crossing would need to be stabilized to prevent erosion that could cause the crossing to fail. This would allow Soldiers to move throughout the area and navigate the natural obstacles in a more safe and effective manner. In some areas, M60A1 or M104 Wolverine armored vehicle launched bridge (AVLB) emplacement may be utilized instead of the construction of low water crossing for potential cost savings.

2.2.8 *Tree Harvesting*

Proposed tree harvesting would include thinning of and clear-cut removal of trees throughout the proposed maneuver TAs on VTS-M (**Table 9**). In accordance with Training Circular 25-1, for optimal movement/maneuver, light maneuver TAs require a tree spacing of at least 15 meters (49.2 feet), while heavy maneuver TAs require 20-meter (65.6-foot) tree spacing. When possible, timber removals would be accomplished with timber sales contracted through U.S. Army Corps of Engineers (USACE) Mobile District as described in the VTS-M Forest Management Plan (Thompson Engineering et al. 2006). When timber/tree removals are not suitable for contracted sales (i.e., unmerchantable quantities or situations), they would be accomplished by on-site staff.

All tree harvests would occur during the bat inactive season (15 October – 31 March). All tree harvests, except for stream/gap crossing sites (approximately 3.4 acres total) and tank trail crossings would only occur outside the 50-foot Streamside Management Zones (SMZ) buffers around streams and wetlands, as required by the VTS-M Integrated Natural Resources Management Plan (INRMP) for riparian habitat and water quality protection purposes. Trees would not be cut in, or felled into, SMZs, nor would harvest equipment be driven into them, except at low water crossing and tank trail crossing construction sites. Tree harvest water quality protection measures and best management practices (BMPs) would be implemented and would vary as needed by site. All BMPs would follow standards established in the *Tennessee Best Management Practices for Logging*, as stated in the Tennessee Department of Agriculture's *Guide to Forestry Best Management Practices in Tennessee*.

Table 9. Proposed Tree Harvest at Volunteer Training Site – Milan

Proposed Action	Harvest Type	Total Area (acres)	Area by Forest Type (acres)			Conversion Habitat Type
			Hardwood	Conifer	Mixed Hardwood and Conifer	
Tank Engagement Area	Clear-cut	421	342	59	20	Permanent Grassland
Low Water Crossings	Clear-cut	3.4	3.4	0	0	Permanent Hardened Crossing
Tank Trail Construction	Clear-cut	52	52	0	0	Permanent Dirt/Gravel Trail
Heavy Maneuver Corridors	Thinning with 20-m Minimum Tree Spacing	438	359	15	64	Maintained at 20-m Minimum Tree Spacing

m – meters

All training operations, maneuver exercises, and infrastructure improvements, including proposed low water crossings and AVLBs, outlined in **Section 2.3** would be the same under Alternatives A and B. However, the total area of tree harvest and proposed tree harvest locations varies between alternatives.

2.3 Alternative A

Up to 31 low water crossings would be constructed over the next 10 years. Construction of the low water crossings would be divided into phases, depending on funding availability. In addition to the low water crossings, AVLBs are also proposed under Alternative A (**Figure 5**).

Tree harvesting would include the thinning of approximately 438 acres to a minimum tree spacing of 20 meters and the clear-cut removal of approximately 515.4 acres (419.4 acres of hardwood forest, 61 acres of conifer forest, and 35 acres of mixed hardwood and conifer forest) within the Tank Engagement Area, low water crossings, and for tank trail construction (see **Table 6** and **Figure 5**). Alternative A would include construction of up to seven tank crossings on Graball Road (**Figure 5**). In total, approximately 953.4 acres of tree harvest are proposed.

Construction of three tank trails, which would be phased, depending on funding availability, would include construction of a central route during Phase I, a south route during Phase II, and a north route as part of Phase III (**Figure 5**).

2.4 Alternative B (Preferred)

Up to 31 low water crossings (**Figure 6**) would be constructed. Construction of the low water crossings would be divided into phases, depending on funding availability. In addition to the low water crossings, AVLBs are also proposed under Alternative B (**Figure 6**).

To maximize maneuver capability, tree harvesting would include thinning of the approximately 3,247 acres within proposed maneuver lanes to a tree spacing of 20 meters and the clear-cut removal of approximately 515 acres within the Tank Engagement Area, low water crossings, and for tank trail construction (**Figure 6**).

Alternative B would also include construction of the tank crossings on Graball Road (see **Figure 6**). In total, approximately 3,762 acres of tree harvest are proposed. Construction of three tank trails would be phased under Alternative B as described for Alternative A (see **Figure 6**).

The component projects in Alternative A and B are identical. Under Alternative A, 953.4 acres of trees will be removed and under Alternative B 3,762 acres of trees would be removed. TNARNG's preferred alternative is Alternative B because it meets maneuver requirements of FM 3-96 and the expanded tree harvest area provides TNARNG with flexibility for locating maneuver lanes and corresponding low water crossings, thereby maximizing training opportunities.

2.5 Alternatives Consideration Process

As required by NEPA, CEQ regulations, and 32 CFR 651, all reasonable alternatives are to be explored and objectively evaluated. Alternatives that are eliminated from detailed study must be identified along with a brief discussion of the reasons for eliminating them. An alternative is reasonable only if it would enable TNARNG to accomplish its primary mission to support unit training of forces at VTS-M and to meet the purpose of and need for the Proposed Action.

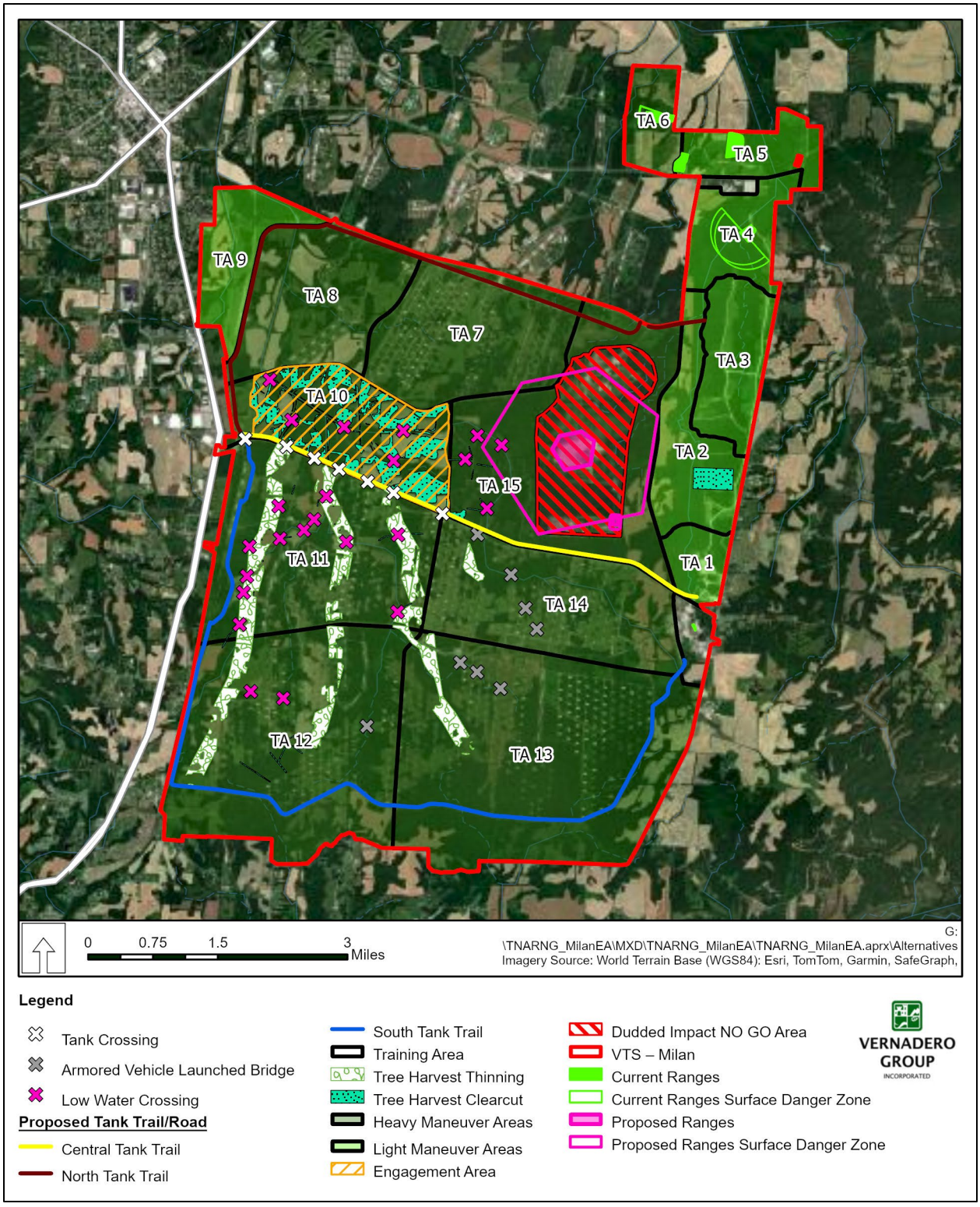

Figure 5. Alternative A at Volunteer Training Site – Milan

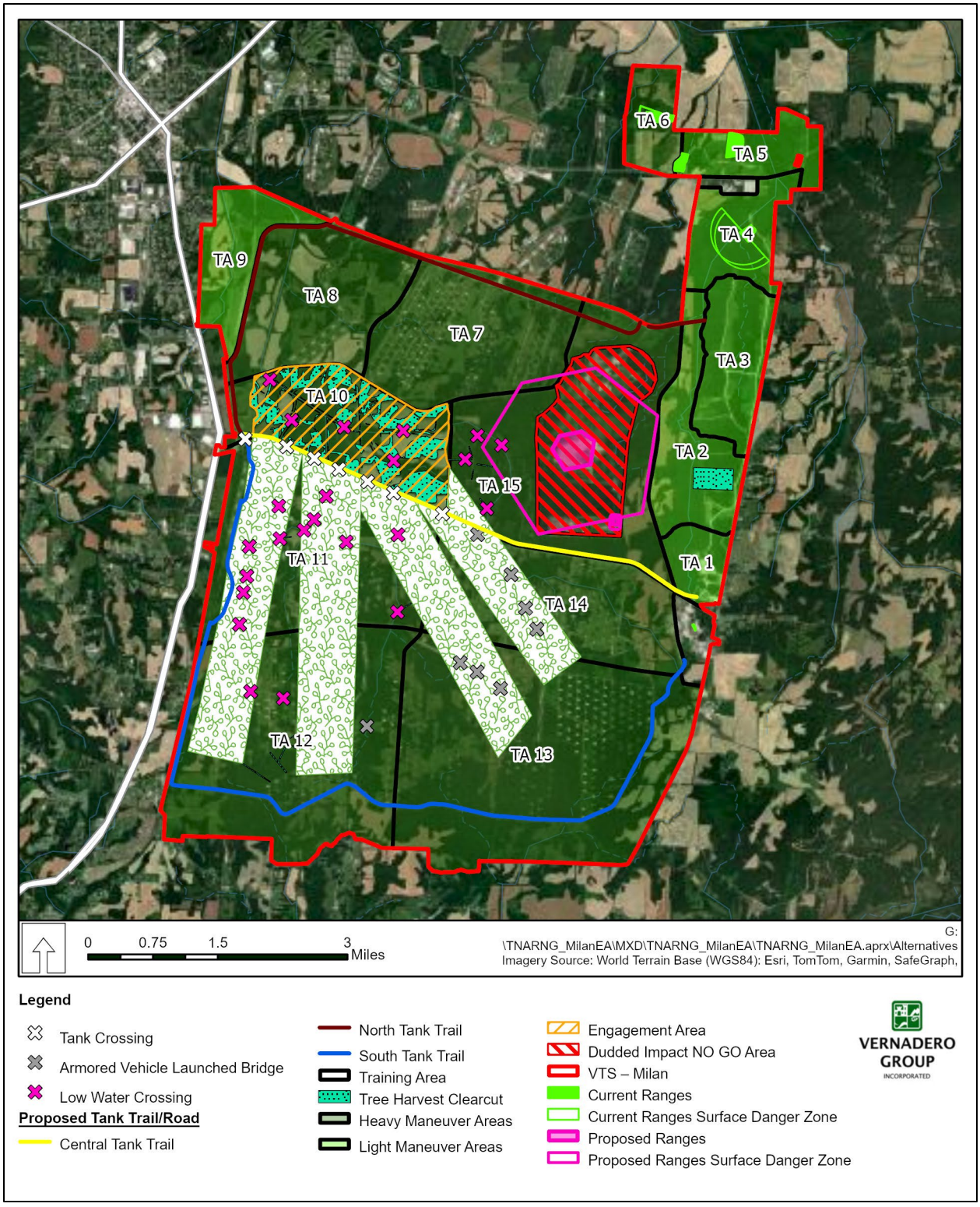

Figure 6. Alternative B at Volunteer Training Site – Milan

2.5.1 *Alternatives Development (Screening Standards)*

Because there is currently a deficit in TA lands available to train and qualify TNARNG units in heavy and light maneuver training, and since there are no other training lands in Tennessee capable of supporting the TNARNG's heavy and light maneuver training, it was determined that training lands outside the existing boundaries of the TNARNG's four volunteer TAs were needed. Based on the infrastructure needed to support the existing mission and associated level of use and training, it would be logistically and economically infeasible to locate additional proposed training lands anywhere but directly adjacent to an existing VTS.

Land ownership and control, parcel configuration, and land availability in the areas around the TNARNG's existing VTSs, restricts TNARNG's proposed heavy and light maneuver training to VTS-M. The newly expanded size of VTS-M would provide TNARNG with enough maneuver space to train its largest units. There are no other land ownerships of sufficient size and in proximity to the other VTSs to be economically and logistically viable alternatives.

The TNARNG developed and applied the following standards to screen and evaluate possible alternatives for the Proposed Action:

- Alternatives must meet TNARNG needs for both federal and state missions by providing the necessary training lands to sustain the ongoing TNARNG mission.
- Alternatives must be located on federally owned or controlled property.
- Alternatives must be of sufficient size and configuration to sustainably meet DoD maneuver training requirements as defined under FM 3-96 and Training Circular 25-1.
- Alternatives must be of sufficient size and configuration to sustainably conduct LSCO to meet METL proficiency.
- Alternatives must allow for required military training operations with limited restrictions and limited conflicts with public users.
- Alternatives must meet TNARNG budget constraints. The expected cost of the considered alternatives must be reasonably consistent with TNARNG budget forecasts.
- Alternatives should minimize environmental impacts. Impacts on cultural and environmental resources, specifically tree cutting, surface stream integrity, endangered species, and culturally significant areas must be considered, and these impacts minimized.

Through application of these seven screening standards, it became clear that the only reasonable alternative that met these criteria was for the TNARNG to utilize VTS-M for heavy and light maneuver training.

2.5.2 *Alternatives Considered*

Seven screening standards were used to evaluate various land-clearing (timber harvests) and construction activities (infrastructure improvements) associated with the Proposed Action (**Table 10**).

Three action alternatives were recommended for consideration. Those three alternatives and the No Action Alternative are described below.

Table 10. Alternatives Development (Screening Standards)

Screening Criteria	Alternative A	Alternative B (Preferred)	Alternative C	No Action
Meet TNARNG needs for both federal and state missions by providing the necessary training lands to sustain the ongoing TNARNG mission	Yes	Yes	Yes	**No**
Be located on federally owned or controlled property	Yes	Yes	Yes	Yes
Be of sufficient size and configuration to sustainably meet DoD maneuver training requirements as defined under FM 3-96 and Training Circular 25-1	Yes	Yes	Yes	**No**
Be of sufficient size and configuration to sustainably conduct LSCO to meet METL proficiency	Yes	Yes	Yes	**No**
Allow for required military training operations with limited restrictions and limited conflicts with public users	Yes	Yes	Yes	**No**
Meet TNARNG budget constraints	Yes	Yes	**No**	**Yes**
Minimize impacts on cultural and environmental resources, specifically tree cutting, surface stream integrity, endangered species, and culturally significant areas	Yes	Yes	**No**	**No**

TNARNG – Tennessee Army National Guard; **DoD** – Department of Defense; **FM** – Field Manual; **LSCO** – Large-Scale Combat Operations; **METL** – Mission Essential Task List

Alternative A: Alternative A would implement training operations, maneuver exercises, infrastructure improvements, and tree harvesting on approximately 18,500 acres of VTS-M lands. Alternative A would construct up to 31 low water crossings and AVLBs, thin approximately 438 acres to a minimum tree spacing of 20 meters within proposed maneuver lanes, clear-cut approximately 515 acres within the Engagement Area, and construct up to seven tank crossings on Graball Road and three tank trails. In total, approximately 953.4 acres of tree harvest are proposed. Impacts on cultural resources would be minimized by avoidance of known cemeteries and identified cultural resources sites. Impacts on environmental resources would be minimized by construction of the fewest possible low water crossings that would still allow soldiers to move throughout the area and navigate the natural obstacles in a safe and effective manner and by siting and designing low water crossings to minimize impacts on wetlands and streams. Impacts on endangered species (federally listed bats) would be minimized by conducting all tree harvesting activities during the winter months when bats are hibernating. Alternative A would meet TNARNG budget constraints.

Alternative B (Preferred): Alternative B would implement training operations, maneuver exercises, infrastructure improvements, and tree harvesting on approximately 18,500 acres of VTS-M lands. Alternative B would construct up to 31 low water crossings and AVLBs; thin approximately 3,247 acres within proposed maneuver lanes to a tree spacing of 20 meters; clear-cut approximately 515 acres within some TAs and the Engagement Area; and construct up to seven tank crossings on Graball Road and three tank trails. Impacts on cultural resources would be minimized by avoidance of known cemeteries and identified cultural resources sites.

In total, approximately 3,762 acres of tree harvest are proposed. Impacts on environmental resources would be minimized by constructing the fewest possible low water crossings that would still allow soldiers to move throughout the area and navigate the natural obstacles in a safe and effective manner and by siting and designing low water crossings to minimize impacts on wetlands and streams. This alternative would still allow soldiers to move throughout the area and navigate the natural obstacles in a safe and effective manner and would involve siting and designing low water crossings to minimize impacts on wetlands and streams. Impacts on endangered species (federally listed bats) would be minimized by conducting all tree harvesting activities during the winter months when bats are hibernating. Alternative B would meet TNARNG budget constraints.

Alternative C: Alternative C would implement training operations, maneuver exercises, infrastructure improvements, and tree harvesting on approximately 18,500 acres of VTS-M lands. Alternative C would construct up to 31 low water crossings and AVLBs; thin the entire approximately 14,582-acre area proposed for heavy maneuver training; clear-cut approximately 515 acres within some TAs and the Engagement Area; and construct up to seven tank crossings on Graball Road and three tank trails (**Figure 7**).

In total, approximately 15,099 acres of tree harvest are proposed. Because of the large area proposed for timber harvest, impacts on cultural resources and endangered species (federally listed bats) could not be fully minimized Alternative C would not meet the screening standards to minimize potential impacts on cultural and environmental resources or meet TNARNG budget constraints.

No Action Alternative: The Proposed Action would not be implemented. The deficit in TA lands available to train and qualify TNARNG units in heavy and light maneuver training would remain. While the No Action Alternative would not satisfy the purpose of or need for the Proposed Action, this alternative was retained to provide a comparative baseline against which to analyze the effects of the Proposed Action, as required under the CEQ Regulations (40 CFR Part 1502.14). The No Action Alternative reflects the status quo and serves as a benchmark against which the effects of the Proposed Action can be evaluated.

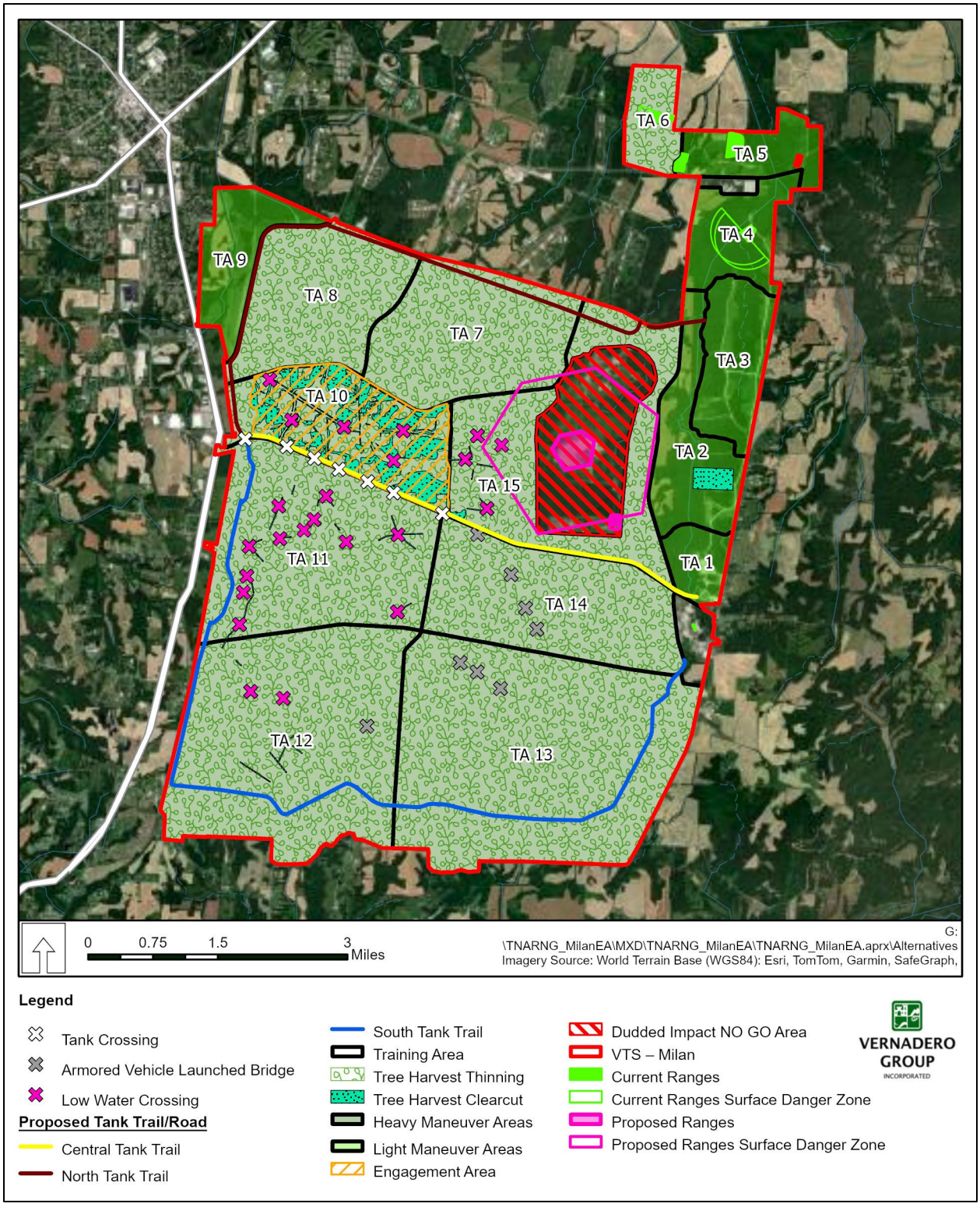

Figure 7. Alternative C at Volunteer Training Site – Milan

2.5.3 *Alternatives Eliminated from Further Consideration*

Alternatives that are eliminated from detailed study must be identified along with a brief discussion of the reasons for eliminating them. An alternative was considered "unreasonable" if it would not enable the TNARNG to meet the purpose of and need for the Proposed Action. Alternative C was eliminated from further analysis because the screening process indicated that this alternative does not reasonably meet the screening standards outlined in **Section 2.6.1** and summarized in **Table 9.** The proposed 15,099 acres proposed for tree harvest under Alternative C would likely cause significant impacts on cultural significant site like cemeteries and archeological resources as well as environmental resources, including surface stream integrity through increased runoff and endangered species that utilize the habitat proposed for removal. Further, the funding required for the proposed tree harvest effort would not meet TNARNG budget constraints.

2.5.4 *Alternatives Evaluated*

This EA evaluates the potential direct, indirect, and cumulative environmental, cultural, and socioeconomic impacts of Alternative A, Alternative B, and the No Action Alternative in implementing the Proposed Action. Alternative B is the preferred alternative.

2.6 Summary of Environmental Consequences

The potential impacts associated with Alternative A, Alternative B, and the No Action Alternative are summarized in **Table 11.** The summary is based on information discussed in detail in Chapter 3, *Affected Environment and Environmental Consequences,* of the EA, which includes a concise definition of the issues addressed and the potential environmental impacts associated with each alternative.

Table 11. Summary of Environmental Consequences

Resource Area	Alternative A	Alternative B (Preferred)	No Action Alternative
Land Use	Approximately 953.4 acres of tree harvest, but overall land use would remain unchanged. Minor adverse impacts on land use from the proposed increased heavy and light maneuver training activities and expansion of training areas.	Approximately 3,762 acres of tree harvest, but overall land use would remain unchanged. Minor adverse impacts on land use from the proposed increased heavy and light maneuver training activities and expansion of training areas.	No impacts on land use attributable to TNARNG action.
Air Quality and Climate Change	Short- and long-term minor adverse effects on air quality. Short-term effects due to the use of heavy equipment and generation of fugitive dust during tree harvest and infrastructure improvements. TNARNG would use wet suppression or other measures to minimize the generation of fugitive dust. Long-term, minor adverse effects from increases in emissions from ground-training activities.	Same impacts as Alternative A.	No impacts on air quality attributable to TNARNG action.
Noise	Noise from Alternative A is considered compatible with most of the surrounding land use. Alternative A would have short- and long-term, minor, adverse effects on the noise environment. To lessen the risk of annoyance and potential noise complaints, TNARNG would provide prior public notice of scheduled use of training events, including date(s) and approximate start and stop times.	Same impacts as Alternative A.	No impacts on noise attributable to TNARNG action.
Earth Resources	Minor, adverse impacts on earth resources related to the disturbance of soils during current and proposed heavy and light maneuver training activities, creation of new training areas and ranges, tree harvest, and infrastructure improvements. No adverse impacts on the local or regional geology at VTS-M, and no training activities would be affected by geologic processes such as seismicity. TNARNG would implement BMPs during training area construction would minimize impacts on soils during and immediately following construction activities. All project components would be engineered so that potential impacts resulting from erosion, siltation, and geological hazards (e.g., landslides) would be minimized.	Same impacts as Alternative A.	No impacts on earth resources attributable to TNARNG action.
Water Resources	Minor adverse impacts on surface waters from increased stormwater runoff from new training areas, as well as construction of up to seven tank crossings, three tank trails, and up to 30 new low water crossings and increased sediment transport in stormwater from current and proposed training activities that occur off road, especially those activities off road that use vehicles and equipment. Increasing training activities at VTS-M would have no adverse impacts on wetlands or floodplains as no fill activities would be associated with this increased training. However, Alternative A would result in impacts on water resources from the harvest of approximately 953.4 acres of trees.	Similar impacts as Alternative A, but at a greater magnitude due to increased proposed tree harvest (3,247 acres).	No impacts on water resources attributable to TNARNG action.

Resource Area	Alternative A	Alternative B (Preferred)	No Action Alternative
Water Resources (continued)	TNARNG would implement the Tennessee Division of Forestry BMPs for forestry operations to prevent the impairment of water quality and would obtain all required permits.		
Biological Resources	Impacts on vegetation would be long term and moderate. Alternative A would result in impacts on vegetation from the harvest of approximately 953.4 acres of trees, as well as construction of up to seven tank crossings, three tank trails, and up to 30 new low water crossings. No population-level effects on any species would be expected from vegetation removal. Impacts on wildlife would be short term and would affect only wildlife in the immediate project area. Tree removal and construction activities, along with TNARNG training activities, would have the potential for injury or mortality from direct wildlife strikes by vehicles or construction equipment. To the extent practicable, TNARNG would schedule any vegetation removal associated with the Alternative A to occur outside of times of increased migratory bird and bat activity. TNARNG is preparing a Programmatic Biological Assessment to facilitate consultation with the USFWS under the ESA for protected bat species and the monarch butterfly. TNARNG has determined that the Proposed Action would have no effect on all other ESA listed, proposed listed, or candidate species. To compensate for bat habitat loss associated with the timber harvests and other proposed actions, approximately 3,416 acres of forest in two large tracts would be set aside in perpetuity. Within the two set-aside areas, training would still be permitted; however, trees and snags would not be removed except when presenting a safety risk to people or property.	Similar impacts as Alternative A, but at a greater magnitude due to increased proposed tree harvest (3,247 acres).	No impacts on biological resources attributable to TNARNG action.
Cultural Resources	No effect on the NRHP-eligible buildings or the NRHP-eligible historic district. Alternative A would not physically affect any archaeological sites that have been determined to be eligible for the NRHP. However, Site 40CL143 may be affected by the construction and use of the proposed central tank trail, use of Training Area 15, and activity within a proposed Range SDZ. Use of mounted tracked and/or wheeled vehicles, emplacement of obstacles, and/or engineering digging exercises within or adjacent to the site could negatively impact the site. Site 40CL71 is in the cantonment area, and Site 40CL73 is in TA 3. Both historic cemeteries are fenced and protected; no current or proposed training activities would occur within these boundaries. All NRHP-eligible cemeteries are in TAs 7, 13A, and 15. Due to the 50 m buffer around each cemetery and proposed avoidance of these areas, none of the cemeteries would be physically impacted.	No effect on the NRHP-eligible buildings or the NRHP-eligible historic district. Alternative B would not physically affect any archaeological sites that have been determined to be eligible for the NRHP. However, under Alternative B, one NRHP-eligible archaeological site (40CL69) is located at the edge of a proposed TA3. The site is currently managed and protected, and existing and proposed training activities would not physically impact the site. Site 40CL71 is in the cantonment area, and Site 40CL73 is in TA 3. Both historic cemeteries are fenced and protected; no current or proposed training activities would occur within these boundaries. All NRHP-eligible cemeteries are in TAs 7, 13A, and 15. Due to the 50 m buffer around each	No impacts on cultural resources attributable to TNARNG action.

Resource Area	Alternative A	Alternative B (Preferred)	No Action Alternative
Cultural Resources (continued)	Alternative A would have no effect on the NRHP-eligible buildings or the NRHP-eligible historic district.	cemetery and proposed avoidance of these areas, none of the cemeteries would be physically impacted. Alternative B would have no effect on the NRHP-eligible buildings or the NRHP-eligible historic district.	
Socioeconomics	There would be no adverse impacts on socioeconomics from the continuation of current TNARNG training activities. No change in employment or housing would occur. The proposed increase in heavy and light maneuver training activities at VTS-M would have a minor beneficial impact on socioeconomics. The additional personnel involved in training activities, along with the additional expenditures for fuel and materials to support increased training, would benefit the local economies of Carroll and Gibson counties. Tree removal and the construction, establishment, maintenance, and use of the proposed new roads, trails, and ranges would have short- and long-term minor beneficial impacts on socioeconomics. Under Alternative A, VTS-M would continue current agricultural leases. The approximately 68 farming jobs produced on the agricultural leases would continue. The leases would continue to generate approximately $721,000 annually, with a portion of that invested back into the local economy.	Similar impacts as Alternative A, but at a greater area of proposed tree harvest (3,247 acres could generate more revenue in timber sales and employ additional tree removal contractors.	No impacts on socioeconomics attributable to TNARNG action.
Infrastructure	There would be no modification or change in use of VTS-M's potable water, wastewater, waste disposal, electric, or communication services. Current and proposed ground training activities would not modify these systems or place additional strain on their capacity. The proposed increase in training activities in existing training areas would increase the use of potable water and generate additional wastewater to support the increased personnel training operations. However, the VTS-M water and wastewater systems are adequate to support the increased demands by more personnel during training operations. Additional solid waste would be generated by these training activities; however, the local landfills have adequate capacity to accept the additional solid waste. Alternative A would have short- and long-term minor adverse effects on traffic and transportation.; however, Alternative B would not result in (1) a substantial increase in on- or off-base traffic or (2) substantial congestion on or around VTS-M. There would be an increase in heavy and light maneuver training within the existing training areas and proposed ranges. Although the exact number of individual personnel is unknown at this time, it is expected that the incremental change would not be perceptible when compared to existing conditions. These effects on traffic and transportation would be minor.	Same impacts as Alternative A.	No impacts on infrastructure attributable to TNARNG action.
Hazardous and	Long-term minor beneficial effects on hazardous waste use, storage, and	Same impacts as Alternative A.	No impacts on

Resource Area	Alternative A	Alternative B (Preferred)	No Action Alternative
Toxic Materials and Wastes	treatment. Current and proposed training activities including the expansion of heavy and light maneuver training and the use of new ranges would continue to use small amounts of hazardous materials. With compliance with DoD and Army requirements, minor adverse impacts from the increased use of hazardous materials and increased generation of hazardous waste are expected from the implementation of Alternative A. Alternative A would require typical excavation and construction equipment for tree removal and construction of ranges, trails, roads, and water crossings. The maximum excavation depth would be no greater than 6 feet below ground level. Any groundwater intrusion would be tested and disposed of in accordance with all regulations. There would be no ground disturbance in the NO GO area (LUC area), and all LUCs would be strictly maintained. Use of such equipment also has potential for inadvertent release of hazardous or toxic substances such as fuels and hydraulic fluids. Standard BMPs would be implemented to minimize and avoid, to the extent practicable, release of such hazardous substances into the environment. Potential also exists for minor, short-term indirect impacts on surface waters if an inadvertent release of fuels or hydraulic fluids were to occur during a storm event. Although standard BMPs would be implemented to reduce runoff and erosion, such methods would not necessarily prevent seepage of such chemicals into surface waters.		hazardous and toxic materials and wastes attributable to TNARNG action.

TNARNG – Tennessee Army National Guard; **VTS-M** – Volunteer Training Site – Milan; **BMP** best management practice; **USFWS** – U.S. Fish and Wildlife Service; **ESA** – Endangered Species Act; **NRHP** – National Register of Historic Places; SDZ – Surface Danger Zone; **TA** – Training Area; **m** – meter(s); **DoD** – Department of Defense; **LUC** – land use control

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Introduction

This chapter describes the existing conditions of environmental resources on and proximate to VTS-M and potential impacts on those resources from the Proposed Action and No Action Alternative. As stated in *The 2023 Army National Guard NEPA Handbook*, only environmental resource parameters that could be affected by the action or are of public concern are included to allow for a comprehensive analysis of potential impacts.

3.1.1 *Resources Identified for Analysis*

After considering comments received from the public and various agencies, TNARNG identified that the following resources would be assessed: land use, air quality and climate change, noise, earth resources, water resources, biological resources, cultural resources, socioeconomics, infrastructure, and hazardous and toxic materials and wastes. It was determined that the Proposed Action would not have the potential for direct, indirect, or cumulative impacts on Environmental Justice and Protection of Children. Therefore, this resource is not been carried forward for detailed analysis in this EA. EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, and EO 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All*, direct federal agencies to address disproportionate environmental and human health effects in minority and low-income communities and to identify and assess environmental health and safety risks to children. TNARNG accessed the USEPA *EJScreen: Environmental Justice Screening and Mapping Tool* and based on that data concluded that there would be no disproportionate impacts on minority populations, low-income communities, or children from the continuation of current training activities or the expansion of light and heavy maneuver training activities at VTS-M (**Appendix B – Summary EJ Screen Community Report**).

3.1.2 *Location Description*

VTS-M is located in the central part of west Tennessee in Carroll and Gibson counties; the majority of the training site lies in Carroll County (see Figure 1). VTS-M lies north of U.S. Interstate 40, approximately 60 miles east of the Mississippi River. Neighboring towns include Milan (to the northwest), Lavinia (to the east), and Humboldt (to the west). Access is provided by State Route 220 and Highway 104. Jackson, Tennessee, on Interstate 40, is approximately 20 miles to the south. The major metropolitan population centers nearest the site are Memphis, which is located 87 miles to the southwest, and Nashville, which is located 110 miles to the east.

Property adjacent to VTS-M to the north, south, and east is privately owned and in a rural setting that includes small farms and rural residential properties. The small town of Lavinia lies to the east of the cantonment area at the junction of State Route 220 and the Lavinia-Atwood Road.

VTS-M is part of the Southeastern Plains and Hills ecoregion within the Southeastern Plains. The natural vegetation is characterized as oak-hickory forest, which converts to oak-hickory-pine to the south (Griffith et al. 1997). Bailey (1995) classifies the ecosystem as the Eastern Broadleaf Forest (Continental) Province of the Hot Continental Division of the Humid Temperate Domain. Vegetation on the training site is a mosaic of hardwood and mixed forests and grassland areas, heavily influenced by human action and by relatively minor changes of topography.

The climate of Carroll and Gibson counties is characterized by relatively mild winters, warm summers, and generally abundant rainfall. Weather patterns in western Tennessee, like the rest of the state, are influenced by pressure systems generally moving from northwest to southeast interacting with air masses from the Gulf of Mexico.

3.1.3 *Reasonably Foreseeable Future Actions*

A list of the reasonably foreseeable future actions that could interact with TNARNG's Proposed Action and were considered when evaluating potential cumulative impacts of the action alternatives is provided in **Appendix A**.

3.2 Land Use

3.2.1 *Affected Environment*

The land on VTS-M is divided among multiple land uses, some of which overlap. VTS-M includes maneuver and TAs; buffer zones (which are managed as agricultural and grazing outleases, or managed forest areas); forested lands; the cantonment area; TAs and ranges; light industrial areas, including the domestic wastewater treatment plant, holding lagoon, and irrigation spray fields; landfills; and munition areas (**Table 12** and **Figure 8**).

In general, existing land uses adjacent to VTS-M are functional and compatible with military operations. Land use on portions of the former MLAAP that have recently been acquired as part of VTS-M include light industrial areas with large warehouses and a rail head. This rail head and spur are not operational. Areas adjacent to the rest of VTS-M are generally open space that serves as required standoff from munitions storage bunkers. Other land uses adjacent to VTS-M include agriculture, with scattered rural housing. This area falls within Carroll County with no zoning. The town of Lavinia, adjacent to the main entrance to VTS-M and 5 miles east of the town of Milan, is an unincorporated community in Carroll County. The land uses and zoning pose no major encroachment problems for either the military or the community, but any increase in density of the housing may result in encroachment.

Agricultural Leases

Approximately 13,597 acres of the VTS-M are leased for agricultural use (**Table 13** and **Figure 9**). The leases are issued for 5 years, and they expire on a rotating basis. The leases are with private individuals for livestock grazing or crop production and are managed by the USACE Mobile District. The maintenance services provided by the individuals leasing the land offset maintenance expenses for VTS-M.

Table 12. Land Uses at Volunteer Training Site – Milan

Land Use	Purpose	Approximate Area	Shared Use
Buffer Zone	Agricultural leases	7,645 acres in 57 leased areas (32 in crop production, 25 in grazing)	Hunting
	Managed forest land	6,859 acres	Hunting
	Hunting areas	19,976 acres	Agricultural leases ad managed forest land
Cantonment Area	Administration, former housing	80 acres	None

Land Use	Purpose	Approximate Area	Shared Use
Domestic Wastewater Treatment Plant, Holding Lagoon, and Irrigation Spray Field	Slow-rate spray irrigation system; used to treat domestic (sanitary) wastewater	110 acres	None
Landfill	Two inactive industrial landfills	15 acres and 65 acres	None
	Two closed construction debris	1 acre	None
	One closed sanitary landfill	6 acres	None
	Two active landfills, one for construction debris, one for inert debris	1 acre	None
	One active Class II industrial landfill	174 acres; less than 2 acres in use	None
Munitions Destruction (ADA and OB/OD)	Open burning and detonation of defective, rejected, or unsafe explosives and explosives components	699 acres	None
Munitions Production (11 former production lines, all inactive)	Load, assemble, and pack ammunition; demilitarize ammunition	429 acres	None
Munitions Storage (inactive)	Former ammunition storage	7,198 acres in four fenced areas	Cattle grazing, hunting, fishing, forest management
Munitions Testing (inactive)	Former ammunition function testing and ammunition subassembly to verify performance and quality	78 acres	None
Various Developed Areas	Developed areas including storage igloos, parking, office space, and manufacturing	23 acres	None

ADA – ammunition destruction area; **OB/OD** – open burn/open detonation

3.2.2 *Environmental Consequences*

If an alternative would conflict with adopted plans and goals of the affected community or if it would result in a substantial alteration of the present or planned land use of an area, it could have a significant direct effect. If an alternative would result in substantial new development or prevent such development elsewhere, it could have a significant indirect effect. In addition, an alternative could significantly affect visual resources if it would result in abrupt changes to the complexity of the landscape and skyline (i.e., in terms of vegetation, topography, or structures) when viewed from points readily accessible by the public.

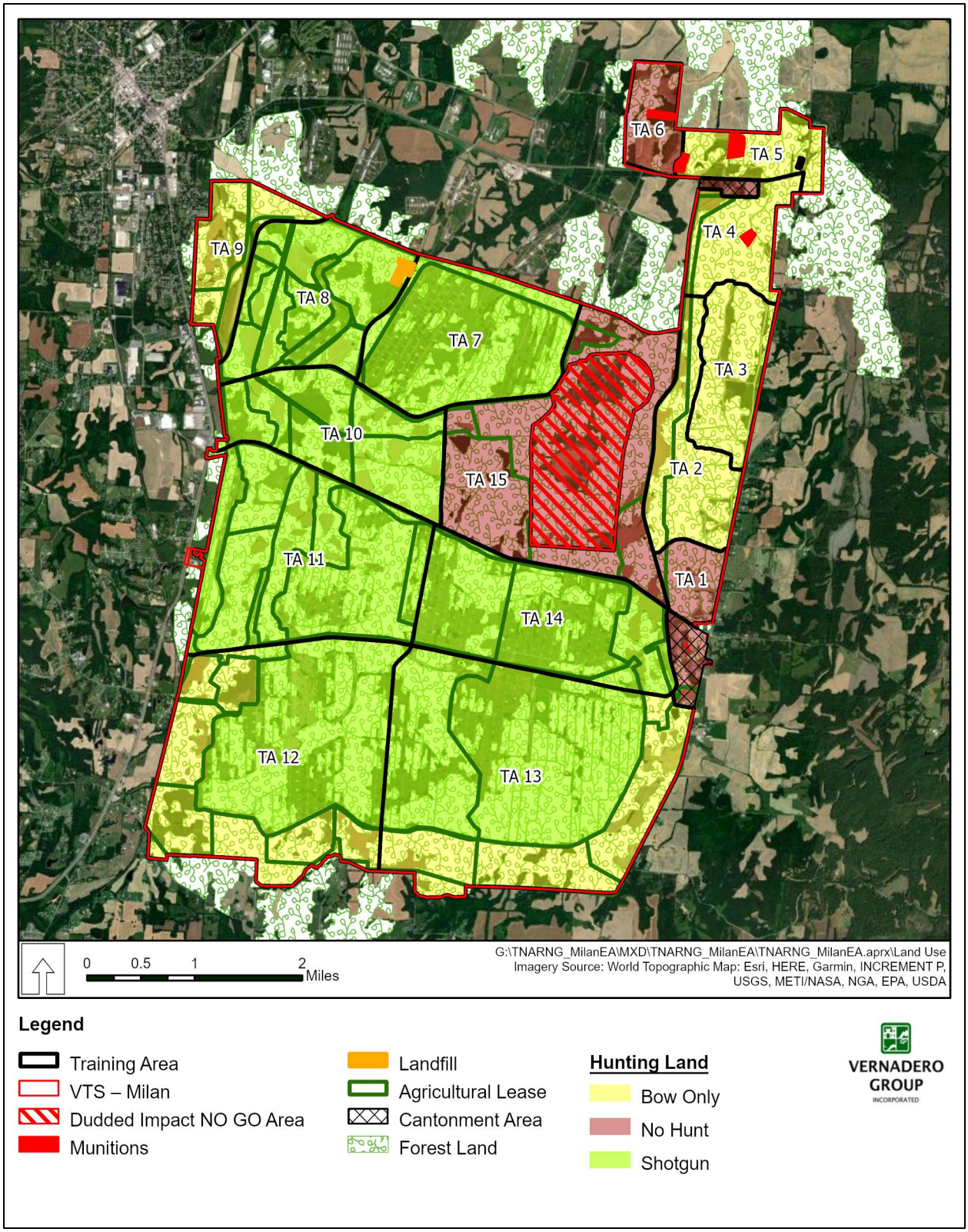

Figure 8. Land Use Areas at Volunteer Training Site – Milan

Table 13. Agricultural Lease Areas at Volunteer Training Site – Milan

Agricultural Unit	Type of Agricultural Lease	Acreage
8	Livestock and hay	43.3
11	Crop	247.8
16	Crop	77.8
17	Livestock and hay	197.4
18	Livestock and hay	200.8
19	Livestock and hay	111.2
21	Crop	327.3
22	Livestock and hay	138.2
24	Livestock and hay	305.1
25	Crop	404.4
36	Crop	306.1
59	Crop	182.1
60	Livestock and hay	109.8
61	Crop	161.1
62	Crop	76.2
63	Crop	97.2
64	Livestock and hay	125.8
65	Livestock and hay	124.3
66	Crop	169.0
67	Crop	206.3
68	Livestock and hay	271.4
69	Crop	90.3
70	Crop	184.0
71	Crop	343.1
72	Crop	478.6
73	Crop	163.0
80	Livestock and hay	217.6
81	Crop	274.0
82	Crop	243.7
83	Crop	128.8
84	Crop	246.0
A	Livestock and hay	723.4
B	Livestock and hay	580.7
C	Livestock and hay	622
E	Livestock and hay	1,517.8
H	Livestock and hay	2,348.9
K	Livestock and hay	190.5
P&L	Livestock and hay	1,168.7
R	Livestock and hay	106
Y	Livestock and hay	87.3
TOTAL	**13,597**	

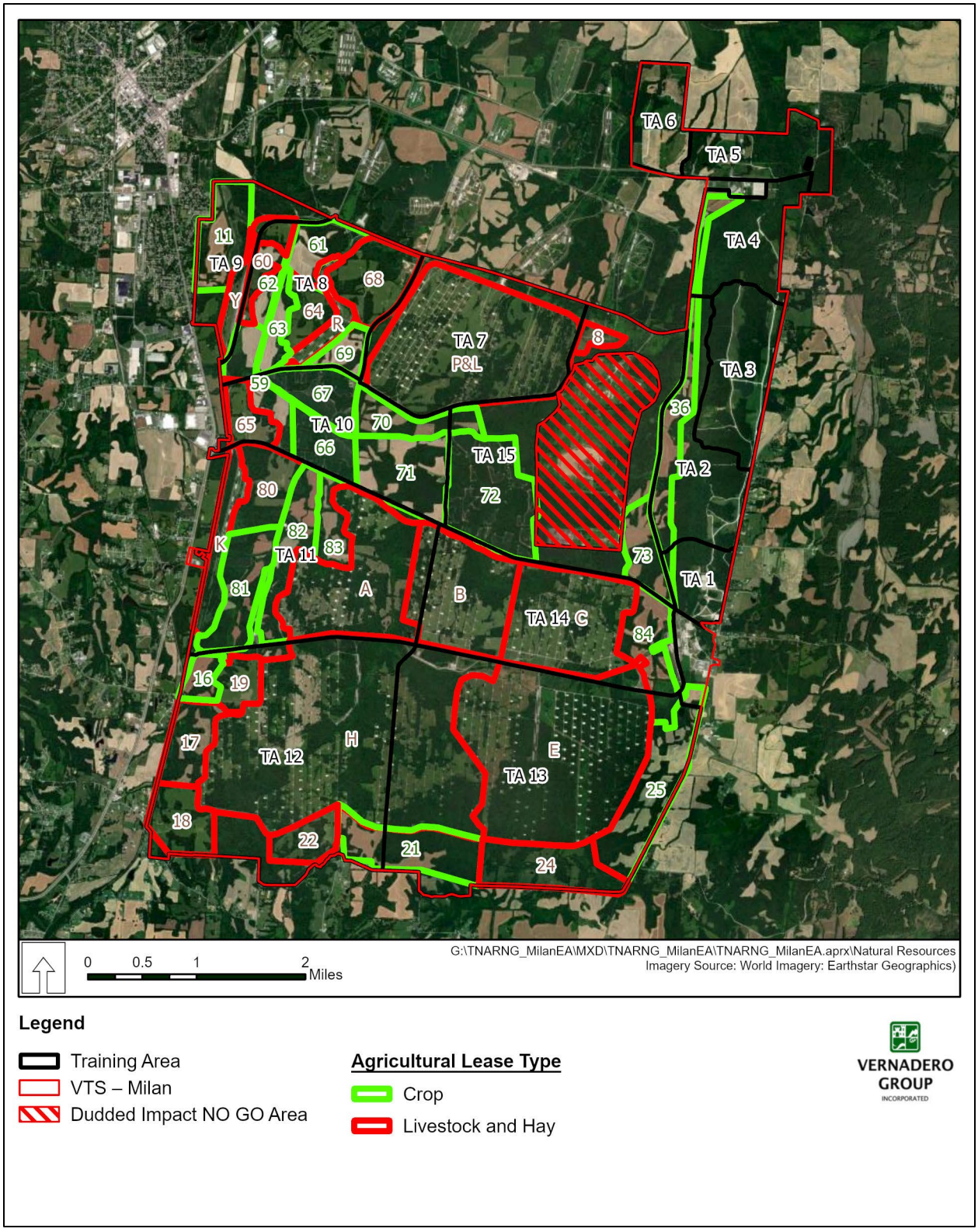

Figure 9. Locations of Current Agricultural Lease Areas at Volunteer Training Site – Milan

Alternative A

There would be no adverse impacts on land use from the continuation of current ground-training activities. All training activities, including the maintenance and use of existing TAs, would occur on VTS-M, and the primary purpose of VTS-M is for military training and support activities. Nearly all training activities would be confined to existing TAs that are designated specifically for military training.

Tree harvest is proposed on approximately 953.4 acres. Alternative A would also include construction of up to seven tank crossings on Graball Road and construction of three tank trails, which would be phased, depending on funding availability. Whereas trees would be removed and new crossings and trails would be constructed, overall land use would remain unchanged. Similarly, all existing land uses (see **Table 9**) would remain unchanged under Alternative A, and lands leased on VTS-M for agriculture would remain in agricultural production, with no land use change.

There would be minor adverse impacts on land use from the proposed increased heavy and light maneuver training activities and expansion of TAs. The proposed expansion of training activities in existing TAs would have no impacts on land use at VTS-M. The proposed heavy and light maneuver training activities would occur entirely on VTS-M, which provides support primarily for military training activities, and no land use designations would change. The proposed new TAs are located within land designated for various military support activities and the use of these areas for training activities would not change these land use designations.

Alternative B (Preferred)

There would be no adverse impacts on land use from the continuation of current ground training activities. All training activities, including the maintenance and use of existing TAs, would occur on VTS-M, and the primary purpose of VTS-M is for military training and support activities. Nearly all training activities would be confined to existing TAs that are designated specifically for military training, including the use of small arms.

Tree harvest is proposed on approximately 3,762 acres under Alternative B. Alternative B would also include construction of the tank crossings on Graball Road and construction of three tank trails that would be phased depending on funding availability. Similarly, all existing land uses (see **Table 8**) would remain unchanged under Alternative B, and lands leased on VTS-M for agriculture would remain in agricultural production, with no land use change.

There would be minor adverse impacts on land use from the proposed increased heavy and light maneuver training activities and expansion of TAs as described for Alternative A. The proposed expansion of training activities in existing TAs would have no impacts on land use at VTS-M as described for Alternative A.

No Action Alternative

There would be no impacts on land use under the No Action Alternative. There would be no change in the existing TNARNG maneuver training lands at VTS-M under the No Action Alternative. Land use and management of the proposed project area would not change, and current uses would continue. Under the No Action Alternative, no change in land clearing (timber harvests) or infrastructure improvements would occur.

Cumulative Effects

No adverse cumulative effects on land use would be expected. The proposed increased heavy and light maneuver training activities and expansion of TAs would have no effect on land uses outside of VTS-M and vice versa. Land use in Gibson and Carroll counties is governed by comprehensive plans and zoning ordinances, and there are no proposed changes to those plans and ordinances that would create any large shifts in land use in the counties.

3.3 Air Quality and Climate Change

3.3.1 *Affected Environment*

National Ambient Air Quality Standards and Attainment Status

The U.S. Environmental Protection Agency (USEPA) Region 4 and the Tennessee Department of Environment and Conservation (TDEC) regulate air quality in Tennessee. The Clean Air Act (CAA) (42 USC § 7401-7671q), as amended, assigns the USEPA responsibility to establish the primary and secondary National Ambient Air Quality Standards (NAAQS) (40 CFR 50) that specify acceptable concentration levels of six criteria pollutants: particulate matter (measured as both particulate matter less than 10 microns in diameter [PM_{10}] and particulate matter less than 2.5 microns in diameter [$PM_{2.5}$]), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and lead. Short-term NAAQS (1-, 8-, and 24-hour periods) have been established for pollutants contributing to acute health effects, whereas long-term NAAQS (annual averages) have been established for pollutants contributing to chronic health effects. **Table 14** outlines the NAAQS for each criteria pollutant. Notably, the State of Tennessee has adopted statewide air quality standards that are slightly more restrictive than the NAAQS.

Federal regulations designate Air Quality Control Regions (AQCRs) in violation of the NAAQS as *nonattainment* areas. Federal regulations designate AQCRs with levels below the NAAQS as *attainment* areas. CAA Section 176(c), *General Conformity*, requires federal agencies to demonstrate that their proposed activities would conform to the applicable State Implementation Plans (SIPs) for attainment of the NAAQS. General conformity applies to federal actions within nonattainment areas (40 CFR 93.153).

VTS-M is within the Western Tennessee Intrastate AQCR (40 CFR § 81.119). The USEPA has designated both Carroll and Gibson counties, and therefore all areas associated with the Proposed Action, as in attainment for all criteria pollutants (USEPA 2021). Because the Proposed Action is entirely within an area that is designated as being in attainment for all criteria pollutants, the general conformity rules do not apply.

VTS-M generates air pollutant emissions through activities that combust fossil fuels, primarily heating systems and motorized vehicle use during ground-training activities. Lesser contributions result from munitions, maintenance activities, road dust emissions, stationary internal combustion engines, and pesticide and herbicide applications. Emission rates for these lesser contributing sources are well below major source trigger thresholds.

Table 14. National Ambient Air Quality Standards

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		Primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead		Primary and Secondary	Rolling 3-month average	0.15 micrograms/m^3	Not to be exceeded
Nitrogen Dioxide (NO_2)		Primary	1-hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Primary and Secondary	Annual	53 ppb	Annual mean
Ozone (O_3)		Primary and Secondary	8-hour	0.070 ppm	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particulate Matter	($PM_{2.5}$)	Primary	Annual	12 micrograms/m^3	Annual mean, averaged over 3 years
		Secondary	Annual	15 micrograms/m^3	Annual mean, averaged over 3 years
		Primary and Secondary	24-hour	35 micrograms/m^3	98th percentile, averaged over 3 years
	(PM_{10})	Primary and Secondary	24-hour	150 micrograms/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		Primary	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Source: USEPA 2020a
ppm – parts per million; **m^3** – cubic meters; **ppb** – parts per billion; **PM** – Particulate Matter

Greenhouse Gases and Climate Change

EO 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis* (2021) and EO 14008, *Tackling the Climate Crisis at Home and Abroad* (2021), outlines policies to reduce greenhouse gas (GHG) emissions and to bolster resilience to the impacts of climate change. The EO directs the CEQ to review, revise, and update its 2016 final guidance titled, *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews.* When considering GHG emissions and their significance, agencies should use appropriate tools and methodologies for quantifying GHG emissions and comparing GHG quantities across alternative scenarios. The CEQ guidance specifically requires agencies within the DoD to quantify GHG emissions in NEPA assessments and review federal actions in the context of future climate scenarios and resiliency.

In addition, EO 14008 requires federal agencies to capture the full costs of GHG emissions as accurately as possible, including taking global damages into account. Doing so facilitates sound decision making, recognizes the breadth of climate impacts, and supports the international leadership of the United States on climate issues. The USEPA and other federal agencies use

estimates of the social cost of carbon (SC-CO_2) to determine a value of the climate impacts of rulemaking. The SC-CO_2 is a measure, in dollars, of the long-term damage done by a ton of carbon dioxide (CO_2) emissions in a given year. This dollar figure also represents the value of damages avoided for a small emission reduction (i.e., the benefit of a CO_2 reduction). The current SC-CO_2 is estimated at $51.00 per ton (Interagency Working Group on the Social Cost of Greenhouse Gases 2021).

The Army issued *Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in Army National Environmental Policy Act Reviews* (2021) providing guidance on the inclusion of GHG emissions and climate change, as well as social costs, as part of the environmental baseline for NEPA analyses prepared in accordance with 32 CFR 651, *Environmental Analysis of Army Actions*.

GHGs are compounds that may contribute to accelerated climate change by altering the thermodynamic properties of the earth's atmosphere. GHGs consist of CO_2, methane, nitrous oxide, and fluorinated gases (USEPA 2021). Under the USEPA Mandatory Reporting Rule, facilities that emit 25,000 metric tons or more per year of carbon dioxide equivalent (CO_2e) emissions must submit annual reports to the USEPA (USEPA 2009).

This EA evaluates GHG emissions as a category of air emissions. It also assesses issues of temperature and precipitation trends (climate change). This EA identifies the GHG emissions of the Proposed Action, including offsets and any carbon sequestration loss, and compares this to regional, state, and national emissions. Currently, this installation records 3,250 metric tons of GHG emissions per year (**Appendix B – 2023 Data**).

The Proposed Action is located in Milan, Tennessee. The climate in Milan, Tennessee, is warm during summer when temperatures tend to be in the 70 degrees Fahrenheit (°F) range and very cold during winter when temperatures tend to be in the 30°F range. The warmest month of the year is July, with an average maximum temperature of 89.6°F, while the coldest month of the year is January, with an average minimum temperature of 22.9°F (Idcide 2022). The annual average precipitation at Milan is approximately 54 inches (U.S. Climate Data 2024). Rainfall is fairly evenly distributed throughout the year. The wettest month of the year is December, with an average rainfall of 5.64 inches (Idcide 2022).

Tennessee's climate is changing. Although the average temperature did not change much during the 20th century, the state has warmed in the last 20 years. Average annual rainfall is increasing, and a rising percentage of that rain is falling on the four wettest days of the year. In the coming decades, the changing climate is likely to reduce crop yields, threaten some aquatic ecosystems, and increase some risks to human health. Floods may be more frequent, and droughts may be longer, which would increase the difficulty of meeting the competing demands for water in the Tennessee and Cumberland rivers (USEPA 2016).

3.3.2 *Environmental Consequences*

Effects on air quality would be considered significant if air emissions resulting from a proposed action would (1) exceed the prevention of significant deterioration (PSD) major source thresholds or (2) contribute to a violation of any local, state, or federal air quality regulation.

The Air Conformity Applicability Model (ACAM) and USEPA AP-42, *Compilation of Air Emissions Factors,* Chapter 15: Ordnance Detonation, were used to estimate the overall emissions from ground training activities at training areas identified in Chapter 2. The estimated overall

increase in emissions from the proposed training activities would be below the PSD major source thresholds; therefore, the level of effects would be less than significant.

Alternative A

Air Quality. Alternative A would have short- and long-term minor adverse effects on air quality. Short-term effects would be due to the use of heavy equipment and generation of fugitive dust during tree harvest and infrastructure improvements, including low water crossings and AVLBs, tank crossings, and tank trails. Such impacts may include air pollution from construction equipment, open burning associated with land-clearing activities, and fugitive dust. Truck traffic associated with construction projects may also generate emissions of particulate matter, SO_2, nitrogen oxides, volatile organic compounds, and CO. In accordance with TDEC's Division of Air Pollution Control (APC) recommendations, TNARNG would enact idle restrictions for heavy construction equipment and dump trucks when in use and on site to minimize emissions. In addition, all construction equipment employed on site would be well maintained and equipped with the emissions control equipment relevant to its model year.

Disposal of trees and vegetation could be necessary during the proposed tree harvest. TNARNG would comply with all state open burning requirements and would evaluate alternatives to open burning. TNARNG would use wet suppression or other measures to minimize the generation of fugitive dust associated with tree removal, site preparation, demolition, and construction activities.

Long-term, minor adverse effects on air quality would result from increases in emissions from ground training activities (i.e., additional heavy vehicle use, personnel, and munitions use), which TNARNG would be responsible for permitting. Increases in emissions would not exceed the PSD major source threshold values, and Alternative A would not contribute to a violation of any federal, state, or local air regulation.

Greenhouse Gases and Climate Change. Using the USEPA's *Greenhouse Gas Equivalencies Calculator*, the estimated peak GHG emissions from implementation of Alternative A would be 6,500 metric tons per year of CO2e (**Appendix B – GHG Emissions Data**). Compared to regional, state, and national emissions, this relates to an approximate 0.0019 percent, 0.0005 percent, and 0.000004 percent increase respectively (U.S. Energy Information Administration 2023).

With the changing climate, increased heat, drought, and insect outbreaks are expected to increase wildfires throughout the region (National Climate Assessment 2019). Although the annual average temperatures in Tennessee have not increased over the last 100 years, they are projected to rise by 3°F by 2041 and by 8°F by 2099, with the greatest increases in the summer and fall. Summertime heat waves are projected to become longer and hotter, whereas the number of wintertime cold-air outbreaks will decrease (National Oceanic and Atmospheric Administration 2019; USEPA 2020b). Implementation of the Proposed Action would not worsen the predicted climate change impacts experienced in the region. Training at VTS-M would not affect the climate; however, climate could influence training activities if wildfire, temperatures, and precipitation increase as predicted.

The USEPA and other federal agencies use estimates of SC-CO_2 to determine a value of the climate impacts of rulemakings. SC-CO_2 is a measure, in dollars, of the long-term damage done by a ton of CO_2 emissions in a given year. This dollar figure also represents the value of damages avoided for a small emission reduction (i.e., the benefit of a CO_2 reduction). The $37 per ton of CO_2 has

been adjusted for inflation to $51 per ton. Therefore, the social cost for Alternative A would be $365,416 (Interagency Working Group on Social Cost of Greenhouse Gases 2021).

Alternative B (Preferred)

Air Quality. Alternative B would have similar short- and long-term minor adverse effects on air quality as Alternative A. Short-term effects would be due to the use of heavy equipment and generation of fugitive dust during tree harvest and infrastructure improvements, including low water crossings and AVLBs, tank crossings, and tank trails. Such impacts may include air pollution from construction equipment, open burning associated with land-clearing activities, and fugitive dust. Under Alternative B, TNARNG would enact all APC recommendations and would comply with all open burning and dust suppression requirements described in Alternative A.

Like Alternative A, Alternative B would have long-term, minor adverse effects on air quality from increases in emissions from ground-training activities (i.e., additional heavy vehicle use, personnel, and munitions use), which TNARNG would be responsible for permitting. Increases in emissions would not exceed the PSD major source threshold values, and Alternative B would not contribute to a violation of any federal, state, or local air regulation.

Greenhouse Gases and Climate Change. Using the USEPA's Greenhouse Gas Equivalencies Calculator, the estimated peak GHG emissions from implementation of Alternative B would be 6,500 metric tons per year of CO2e (**Appendix B – GHG Emissions Data**). Compared to regional, state, and national emissions, this relates to an approximate 0.0019 percent, 0.0005 percent, and 0.000004 percent increase respectively (U.S. Energy Information Administration 2023). The social cost for Alternative B would be $365,416 (Interagency Working Group on Social Cost of Greenhouse Gases 2021).

No Action Alternative

The No Action Alternative would result in no changes in air quality. This alternative involves maintaining existing environmental conditions through current operational controls. Because the number and type of activities would remain consistent with current levels under the No Action Alternative, TNARNG would continue its current use of fossil fuels for mobile and temporary sources, resulting in minor impacts due to similar levels of emissions of both criteria pollutants and GHGs (**Appendix B – 2024 Data**).

Cumulative Effects

By directly inventorying all emissions in nonattainment regions and monitoring concentrations of criteria pollutants in attainment regions, Tennessee takes into account the effects of all past and present emissions in the state. This structure of rules and regulations is contained in the SIP. SIPs contain the regulations and other materials for meeting clean air standards and associated CAA requirements. SIPs include (1) USEPA-approved and state-implemented air quality regulations, (2) USEPA-approved and state-implemented pollution controls for individual sources of air emissions, and (3) planning documents such as areawide emissions estimates, modeling analyses, and regulatory requirements that ensure that the state will meet air quality standards. Therefore, no significant cumulative impacts on air quality associated with the implementation of the Proposed Action in combination with reasonably foreseeable projects would occur.

3.4 Noise

3.4.1 *Affected Environment*

Sensitive Noise Receptors

Sensitive noise receptors consist of, but are not limited to, schools, residences, libraries, hospitals, and other care facilities. The nearest school to VTS-M is Milan High School, and the nearest hospital is West Tennessee Healthcare Milan Hospital. Both are less than a mile to the north of TA 9, which is the northwest portion of the training site where only light maneuver training is proposed. Several churches are located to the west of VTS-M across U.S. Highway 45 E from the training site. Lavina Baptist Church is just east across Spring Creek Road from VTS-M's cantonment area. Several scattered low-density residential properties do exist east of VTS-M across Highway 220.

Noise Assessment Guidelines

AR 200-1 translates noise exposure on communities into Noise Zones. Regulation guidelines state that for land use planning purposes, noise-sensitive land uses range from acceptable to not compatible within the Noise Zones (Chapter 14 of Department of the Army 2007). **Table 15** lists the land use planning guidelines from AR 200-1. The program defines the following Noise Zones:

- **Zone III.** Noise-sensitive land uses are not recommended (incompatible).
- **Zone II.** Although local conditions such as availability of developable land or cost may require noise-sensitive land uses in Zone II, this type of land use is generally not compatible and is strongly discouraged on the Installation and in surrounding communities. All viable alternatives should be considered to limit development in Zone II to nonsensitive activities such as industry, manufacturing, transportation, and agriculture.
- **Zone I.** Noise-sensitive land uses are acceptable within Zone I. However, though an area may receive only Zone I levels, military operations may be loud enough to be heard or even judged as loud on occasion. Zone I is not delineated on contour maps; rather, it is the entire area outside of Zone II.
- The Land Use Planning Zone (LUPZ) is a subdivision or upper limit of Zone I. The LUPZ represents an area starting at the lower limit of Zone II and extends outward to a distance significant enough to allow for a 5-decibel (dB) reduction in sound level for aircraft and impulsive (large caliber and demolition) noise. Within this area, noise-sensitive land uses are generally acceptable. However, communities and individuals often have different views regarding what level of noise is acceptable or desirable. To address this, some local governments have implemented land use planning measures beyond Zone II limits. Additionally, implementing planning controls within the LUPZ can develop a buffer to avert future noise conflicts.

Table 15. Land Use Planning Guidelines

Noise Zone	Noise Limits			Noise-Sensitive Land Use
	Aviation ADNL (dB)	Impulsive[a] CDNL (dB)	Small-Arms Peak (dB)	
LUPZ	60–65	57–62	N/A	Generally compatible
I	< 65	< 62	< 87	Generally compatible
II	65–75	62–70	87–104	Generally not compatible
III	> 75	> 70	> 104	Not compatible

Source: AR 200-1
ADNL – A-Weighted Day-Night Average Sound Level; **dB** – decibel(s); **CDNL** – C-Weighted Day-Night Average Sound Level; **LUPZ** – Land Use Planning Zone; **N/A** – not applicable
[a] Impulsive is defined as demolition/explosive events and large caliber (20-millimeter and greater) weapons.

Average noise levels are considered to be the best tool for long-term land use planning for impulsive large-caliber and demolitions, but they may not adequately assess the probability of community complaint risk. As recommended in AR 200-1, this noise analysis includes supplemental metrics (peak) to identify where noise from explosive activity may periodically reach levels high enough to generate complaints. In many instances, complaints are registered from areas where the Noise Zones indicate land use compatibility. Noise complaints from impulsive noise, often referred to as blast noise, typically are attributable to a specific event rather than annual average noise levels. Peak levels are useful for estimating the risk of receiving a noise complaint from blast noise, as they correlate with the receiver's perception of the sound. **Table 16** lists the Army's complaint risk guidelines.

Table 16. Complaint Risk Guidelines (Impulsive Events)

Perceptibility[a]	dB Peak	Risk of Receiving Noise Complaints
May Be Audible	< 115	Low
Noticeable, Distinct	115 – 130	Moderate
Very Loud, May Startle	> 130	High

dB – decibel
[a] Perceptibility is subjective. The classifications are based on how a typical person might describe the event.

Peak sound levels correlate to many of the unique characteristics of impulsive noise and the difficulties encountered in assessing their impact, which include the following:

- People in an area experiencing peak levels between 115 and 130 dB may describe events as noticeable and distinct. From within this area, there is a moderate risk of receiving noise complaints. The magnitude of the complaint risk depends upon frequency of occurrence in addition to factors such as time of day activity occurs, propagation conditions under which activity takes place, and noise sensitivity of individuals in these areas.
- Peak sound pressure levels above 130 dB are generally objectionable and are often described as very loud and startling. These levels correlate with a high risk of noise complaints. If the operations that generate high peak sound pressure levels in the community are very infrequent, land use controls may not be warranted. However, prior public notification is important for mitigating the risk of complaints and is an important part of being good neighbors.
- Peak sound pressure levels directly correlate with airborne vibration, which is the dominant cause of structural response from explosive events. Peak sound pressure levels approaching

120 dB may rattle windows or loose ornaments (e.g., pictures on walls) and annoy occupants, but will not cause structural damage.

- Peak levels can vary significantly and are highly dependent on weather conditions. Thus, the supplemental peak contours included in this assessment have the following weather conditions applied:
    - **Unfavorable Weather Conditions.** Peak 15 metric (PK15(met)) is the peak sound level, factoring in statistical variations caused by weather, which is likely to be exceeded only 15 percent of the time (i.e., 85 percent certainty that the sound will be within this range). This "85 percent solution" gives the TNARNG and its neighboring communities a means to consider whether the areas may be impacted by training noise. PK15(met) levels would occur under unfavorable weather conditions that enhance sound propagation.
    - **Neutral Weather Conditions.** Peak 50 metric (PK50(met)) is the peak sound level that is likely to be exceeded 50 percent of the time (i.e., 50 percent certainty that the sound will be within this range). These levels occur during neutral weather conditions. It should be noted that if activities take place during favorable weather conditions, such as the wind blowing away from the receiver, noise levels would be lower.

For unfavorable weather conditions, PK15(met) is a good tool to indicate areas that may periodically be exposed to high noise levels. However, since the complaint risk areas are based on single events and are not dependent on the number of events, planners should also consider the frequency of operations when making land use decisions.

Noise Contouring Procedures

The Blast Noise, version 2 (BNOISE2) modeling program calculates noise levels generated by firing large-caliber (20 mm and greater) and high-explosive charges (U.S. Army Engineer Research and Development Center [ERDC] 2009). Firing operations from large-caliber weapons, demolitions, and other impulsive sounds generally create the largest complaint issues around Army installations. This is primarily due to the abundance of low-frequency energy, which can travel long distances, is difficult to mitigate, and can cause vibration that may increase community annoyance. Noise Zones for large caliber weapons are assessed using the C-Weighted Day-Night Average Sound Level (CDNL). The Noise Zones were modeled using an assessment period of 104 days.

The computer model used to create the noise zones for small arms (.50 caliber and below) ranges is the Small-Arms Range Noise Assessment Model (SARNAM) (ERDC 2015). SARNAM calculations are based on weapons noise source models, directivity, sound propagation, mitigation effects, and safety structures when necessary. The calculation algorithms assume weather conditions for wind direction that favor sound propagation. Small-caliber weapons noise is addressed utilizing peak levels and therefore has no assessment period.

Range Activity

The existing range facilities are in the east-northeast area of VTS-M. **Table 17** lists current activity on each range. Although the 40 mm target practice (TP) rounds and small-arms activity (.50-caliber and below) are addressed via single-event levels (peak), the annual expenditure is provided to relay the frequency of these activities. All range activity at VTS-M occurs prior to 2200 hours (10 PM).

Table 17. Existing Range Activity

Facility	Ammunition/Weapon Platform[a]	Average Annual Number of Rounds
25-Meter Rifle Range	5.56 mm M4/M16	13,500
25-Meter Pistol Range	9 mm	9,500
Breach Facility	12-gauge breaching charge	25
Grenade Launcher Range	40 mm TP M203/M320	250
Urban Assault Course	5.56 mm blank	35,000
	5.56 mm blank M4/M16	75,000
	7.62 mm blank M60	3,000
	.50-caliber blank M2	N1,500

mm – millimeter(s); **TP** – target practice
[a] Blank is defined as any round that contains propellant but no bullet.

Noise Zone III remains within the VTS-M boundary (**Figure 10**). Zone II extends approximately 450 meters (0.3 mile) beyond the eastern boundary, encompassing low-density residential properties, scattered throughout the Noise Zone, and agricultural lands (**Figure 10**).

Demolition and Large Caliber Activity

The large-caliber designation includes weapons 20 mm or greater and any weapon that contains demolition/explosive charges. At VTS-M, activity in this category is limited to the existing Breach Facility, existing Grenade Launcher Range the proposed Hand Grenade Familiarization Range (HGFR), and the proposed Light Demolition Range (LDR). The launch noise from the 40 mm grenade is not included in the demolition large-caliber Noise Zones and is addressed separately via predicted peak noise levels.

Annual average Noise Zones are the primary noise descriptor for land use compatibility, providing a reliable relationship between noise exposure and community response. However, individual training events may be audible outside of a Noise Zone and in some cases may be objectionable to the surrounding community. As a supplemental descriptor, peak contours are provided to help forecast where sound may be audible or loud from singular events. It is worth noting the vibration that often accompanies low-frequency noise from demolition activity is almost always airborne (not ground-borne). Neighbors located near the "loud" area on the map may occasionally notice pictures or windows rattling from airborne vibration; however, this rattling does not indicate damage, and usually occurs at levels well below those required to cause structural damage.

As mentioned previously, environmental noise is addressed in a cumulative format (i.e., total noise exposure with all ranges firing). Where appropriate, this analysis will depict the noise environment generated by each proposed action individually as well as provide a cumulative analysis.

Existing Breach Facility

The Breach Facility activity is limited to 12-gauge breaching charges with a net explosive weight (NEW) of 0.0034 pounds. On average, 25 breaching charges are used per year. The low annual expenditure would not generate CDNL Noise Zones. Additionally, the lower limit of the BNOISE2 model is 0.0198 pounds (approximately a NEW that is five times greater than the breaching charge utilized).

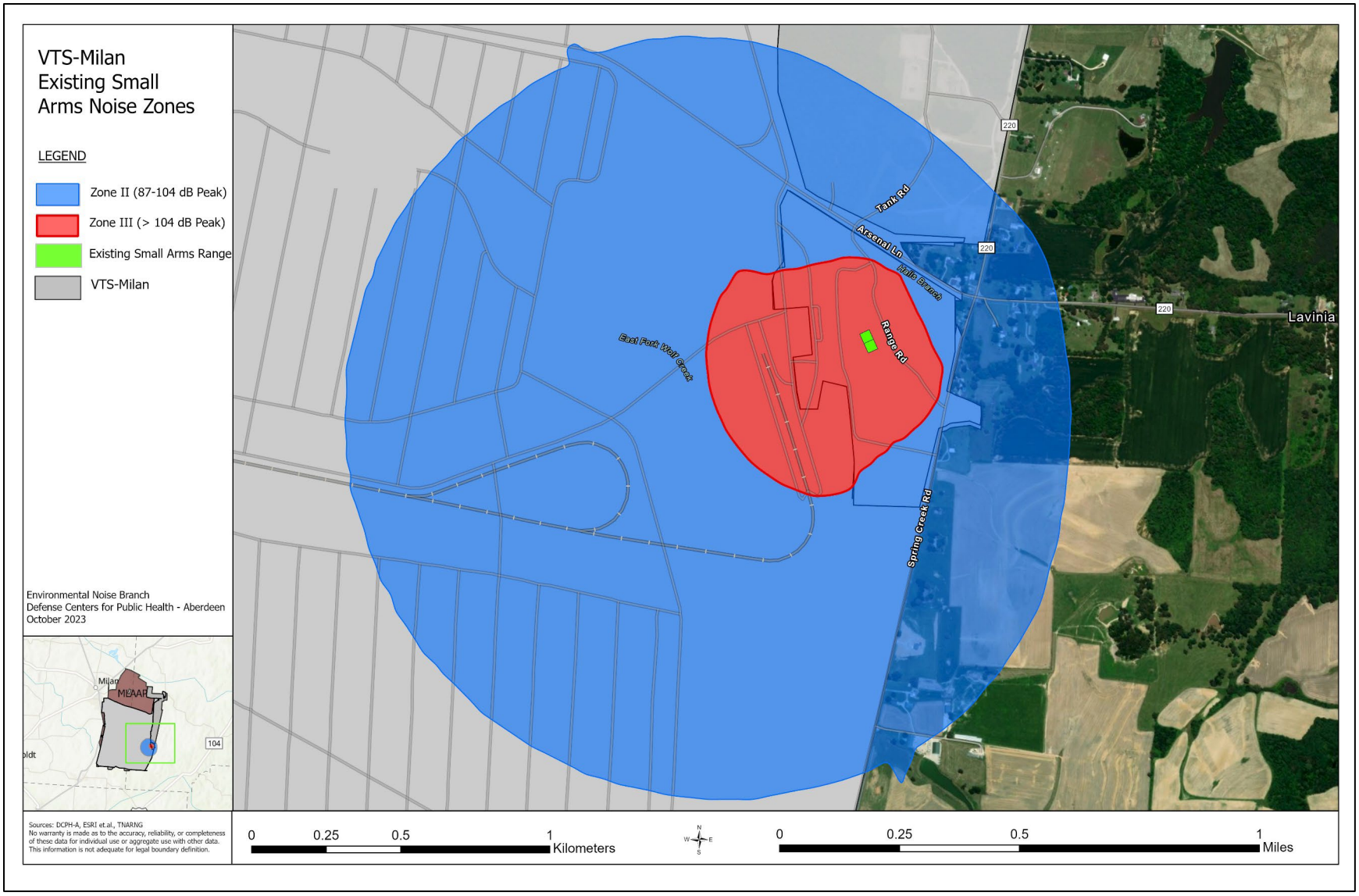

Figure 10. Existing Small-Arms Activity Noise Zones at Volunteer Training Site – Milan

Although the 12-gauge breaching charge NEW is well below the model's lower limit, single-event peak sound levels were developed based on a 0.0198-pound charge to indicate a maximum potential complaint risk area. As shown in **Figure 11**, under unfavorable weather conditions, peak sound levels above 130 dB extend 150 meters, and levels between 115 and 130 dB extend 525 meters (radius distance from the detonation site). Occasionally, the breaching charge may be audible in the area adjacent to the VTS-M boundary; however, it is unlikely to generate noise complaints. Under neutral weather conditions, peak levels above 115 dB remain within VTS-M.

Existing Grenade Launcher Range Activity

The 40 mm grenade family contains both high-velocity grenades fired from MK19 grenade machine guns and low-velocity grenades fired from handheld weapons (M203 and M320). At VTS-M, grenade machine guns and handheld weapons are limited to TP rounds. A 40 mm TP round simulates the firing and distance capabilities of the equivalent high explosive round without the impact noise and safety concerns.

Tables 18 and **19** list calculated distances for firing 40 mm TP rounds, which correlate to the audibility of predicted peak dB levels in the Army's Complaint Risk Guidelines criteria. The distances and levels listed represent a conservative approach and were calculated based upon hearing conservation criteria (U.S. Army 1999) and known measurements (U.S. Army 1984). As evidenced in **Tables 18 and 19**, in most cases, once the receiver is beyond 300 meters (984 feet) from the side or 110 meters (361 feet) to the rear of the firing point, noise impacts are minimal.

The Grenade Launcher Range is in the northeast corner of VTS-M adjacent to the boundary. Currently there are no noise-sensitive land uses within 2 kilometers (1.24 miles) of the facility.

Table 18. Audibility to the Side of the Grenade Launcher, Inert[a] Round (40 mm)

Risk of Complaints	Distance from Grenade Launcher (meters)	Noise Level (dB peak)
Low	> 300 [b]	< 115
Moderate	65 – 300 [b]	115
High	< 65 [b]	>130
Risk of Hearing Damage for Unprotected Ears	< 19 [c]	>140

dB – decibel(s)
[a] Inert is defined as any round that does not make noise upon impact, such as smoke, illumination, and TP.
[b] Calculated value
[c] Known value, hearing conservation criteria

Table 19. Audibility to the Rear of the Grenade Launcher, Inert[a] Round (40 mm)

Risk of Complaints	Distance from Grenade Launcher (meters)	Noise Level (dB Peak)
Low	> 110 [b]	< 115
Moderate	25 – 110 [b]	115
High	< 25 [b]	>130
Risk of Hearing Damage for Unprotected Ears	< 7 [c]	>140

dB – decibel(s)
[a] Inert is defined as any round that does not make noise upon impact, such as smoke, illumination, and TP.
[b] Calculated value
[c] Known value, hearing conservation criteria

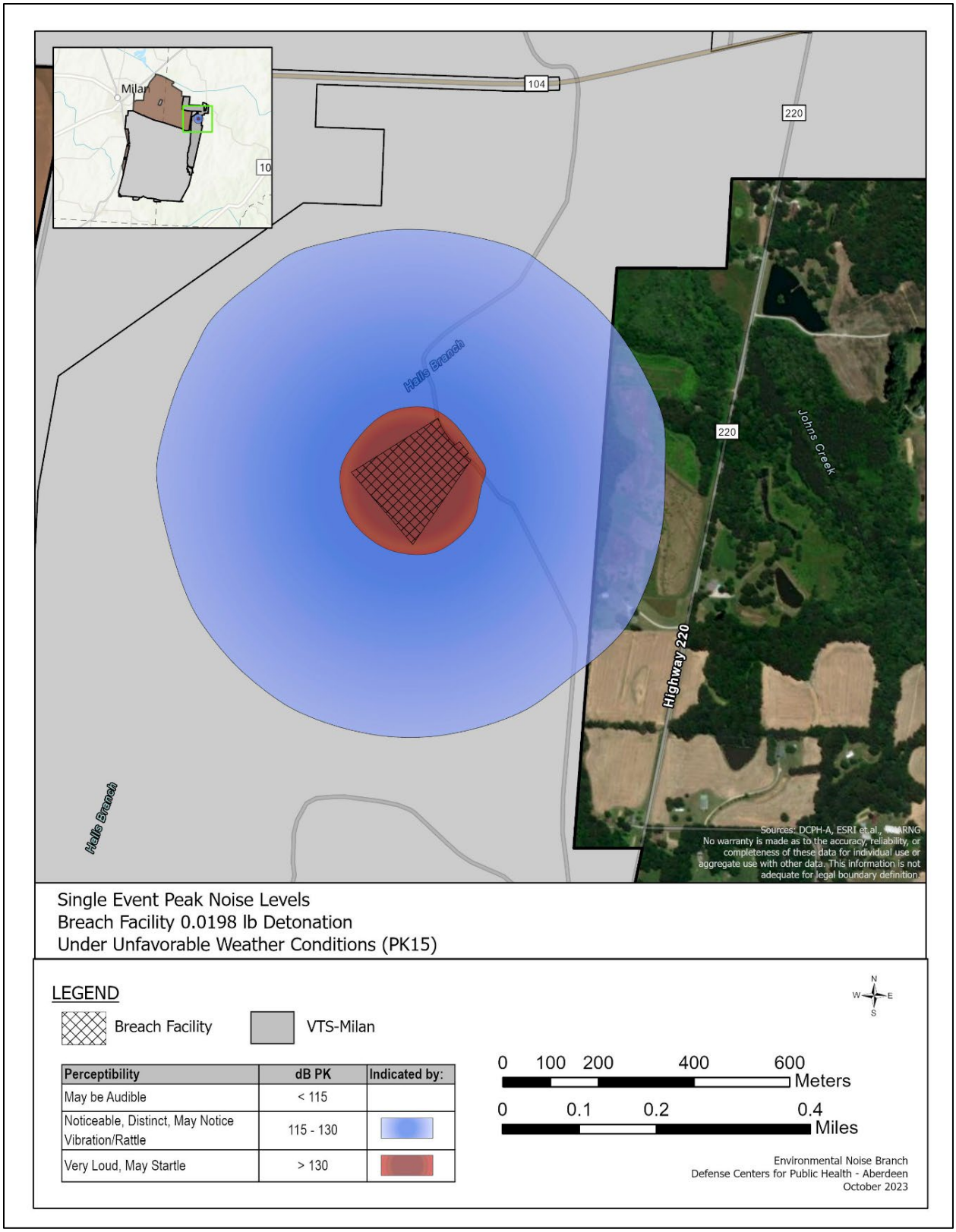

Figure 11. Single-Event Peak Levels Breach Facility 0.0198-Pound Detonation

3.4.2 *Environmental Consequences*

For this EA, the Defense Centers for Public Health–Aberdeen completed a noise assessment for the Proposed Action (*Noise Assessment for Volunteer Training Site-Milan Proposed Range Expansion Project Milan, Tennessee 18 September – 14 December 2023*; **Appendix B)**. Environmental noise is addressed in a cumulative format (i.e., all ranges firing). Where appropriate this consultation will depict the noise environment generated by each proposed action individually as well as provide a cumulative analysis.

Small-Arms Activity

The SARNAM noise model requires specific firing point and target point locations to generate noise contours. As the Urban Assault Course (UAC) does not have set firing points or target points, the facility is addressed via predicted peak noise levels as described for the nonfixed firing activity (**Section 3.5.2**) and is excluded from the small-arms Noise Zones. **Table 20** lists the projected activity at the UAC. All UAC activity under the Proposed Action at VTS-M would occur prior to 2200 hours (10 PM).

Table 20. Projected Range Activity with the Proposed Action

Facility	Ammunition/Weapon Platform	Average Annual Number of Rounds
Urban Assault Course	Demolition, C-4 block, 1.25 lb	7,350
	Demolition, shaped charge, 40 lb	225
	Demolition, Kit TNT NEW, 40 lb[a]	25
	Demolition, bangalore, M1A2/M1A2E	450

mm – millimeter(s); **TNT** – 2,4,6-trinitrotoluene

[a] Total NEW based upon three 40 lb cratering charges and twenty-four C-4 1.25 lb blocks. Training activity consists of eight 1.25 lb C-4 blocks attached to a single cratering charge.

Nonfixed Small-Arms Firing Activity

At the UAC, troops conduct collective training utilizing blank ammunition and/or simunitions, which produce training scenarios that replicate real-world environments. With the absence of specific firing and target point locations, Noise Zones for these activities cannot be modeled. However, by looking at predicted peak levels of small-arms ammunition, noise exposure from these training activities can be assessed.

Tables 21 through **23** list the predicted peak levels for blank ammunition utilized in nonfixed firing areas. In each column, the upper limit levels would occur under weather conditions that enhance sound propagation (unfavorable), such as the wind blowing toward the receiver. The lower limit levels occur under favorable weather conditions, such as the wind blowing away from the receiver. The azimuth angle can be defined as the direction of fire, i.e., zero degrees is directly in front of the weapon and 180 degrees is directly behind the weapon. When combining these variables, the highest peak levels occur when rounds are fired in the direction of the receiver (0 degree azimuth) and under unfavorable weather conditions. As an example, **Table 21** indicates that under unfavorable weather conditions, a Zone II noise level (87 dB peak) extends approximately 200 (656 feet) meters for the 5.56 mm blank at all three given azimuth angles.

The UAC facility is located in the northeast corner of VTS-M. There are a few residential properties within 1,200 meters (3,937 feet) of the UAC footprint. The .50-caliber blank ammunition firing activities may expose the residents to noise levels that approach/exceed Zone II.

It should be noted that variables such as the actual firing location within the UAC complex and weather conditions at the time of firing would all influence the degree of noise impact and audibility. For the 5.56 mm and 7.62 mm blank activity, noise levels approaching Zone II would not encompass any noise-sensitive land uses.

Table 21. Predicted Peak Noise Levels for 5.56 mm Blank[a] Round

Distance (meters)	Predicted Level, Peak (dB) Azimuth		
	0°[b]	90°	180°
100 (328 feet)	87–97	86–96	87–97
200[c] (656 feet)	80–90	79–89	80–90

dB – decibel(s)
[a] Blank is defined as any round that contains propellant but no bullet.
[b] The 0° is directly in front of the weapon and the 180° azimuth is directly behind the weapon.
[c] The maximum distance where levels approach/exceed 87 dB peak (Zone II).

Table 22. Predicted Peak Noise Levels for 7.62 mm-Caliber Blank[a] Round

Distance (meters)	Predicted Level, Peak (dB) Azimuth		
	0°[b]	90°	180°
100 (328 feet)	109–119	106–116	101–111
200 (656 feet)	103–113	100–110	94–104
400 (1,312 feet)	92–102	89–99	85–95
800[c] (2,625 feet)	84–94	81–91	77–87

dB – decibel(s)
[a] Blank is defined as any round that contains propellant but no bullet.
[b] The 0° is directly in front of the weapon and the 180° azimuth is directly behind the weapon.
[c] The maximum distance where levels approach/exceed 87 dB Peak (Zone II).

Table 23. Predicted Peak Noise Levels for .50-Caliber Blank[a] Round

Distance (meters)	Predicted Level, Peak (dB) Azimuth		
	0°[b]	90°	180°
100 (328 feet)	116–126	110–120	111–121
200 (656 feet)	109–119	103–113	104–114
400 (1,312 feet)	97–107	92–102	91–101
800[c] (2,625 feet)	89–99	84–94	84–94
1,200[c] (3,937 feet)	84–94	79–89	84–94

dB – decibel(s)
[a] Blank is defined as any round that contains propellant but no bullet.
[b] The 0° is directly in front of the weapon and the 180° azimuth is directly behind the weapon.
[c] The maximum distance where levels approach/exceed 87 dB Peak (Zone II).

Proposed Light Demolition Range Activity

The LDR CDNL Noise Zones would extend north onto MLAAP and beyond the eastern VTS-M boundary (**Figure 12**). Zone III would remain within VTS-M (**Figure 12**). Zone II would extend 300 meters (0.2 mile) beyond the boundary, encompassing low-density residential land use (**Figure 12**). The LUPZ would extend up to 1.8 kilometers (1.1 miles) beyond the boundary (**Figure 12**). Lands within the LUPZ are primarily agricultural; however, some scattered low-density residential properties do exist.

Overall, the CDNL Noise Zones indicate the proposed activity would be compatible with the surrounding land use. However, individual training events could be audible outside of a Noise Zone, and, in some cases, objectionable to the surrounding community. As a supplemental descriptor, peak contours are provided to help forecast where sound may be audible or loud from singular events. **Figure 13** illustrates the single-event peak sound levels for the most common explosive event (C-4 Block, 1.25-lb) at the LDR. Under unfavorable weather conditions, Peak levels between 115 and 130 dB would extend into MLAAP and beyond the eastern boundary of VTS-M less than 400 meters (0.25 mile), encompassing scattered residential properties (**Figure 13)**. Peak sound levels above 130 dB would remain within VTS-M boundaries (**Figure 13)**. Under neutral conditions, the single-event peak levels would be contained within the Installation boundary.

Figure 14 illustrates the single-event peak sound level contours for the largest projected explosive event (40 lb) at the LDR. Under unfavorable weather, peak sound levels between 115 and 130 dB could extend beyond the boundary in most directions (**Table 24** and **Figure 14**). Citizens within 2 miles of VTS-Milan may find 40-lb shots to be noticeable and distinct. Peak sound levels above 130 dB would remain within VTS-Milan and MLAAP (**Figure 14**).

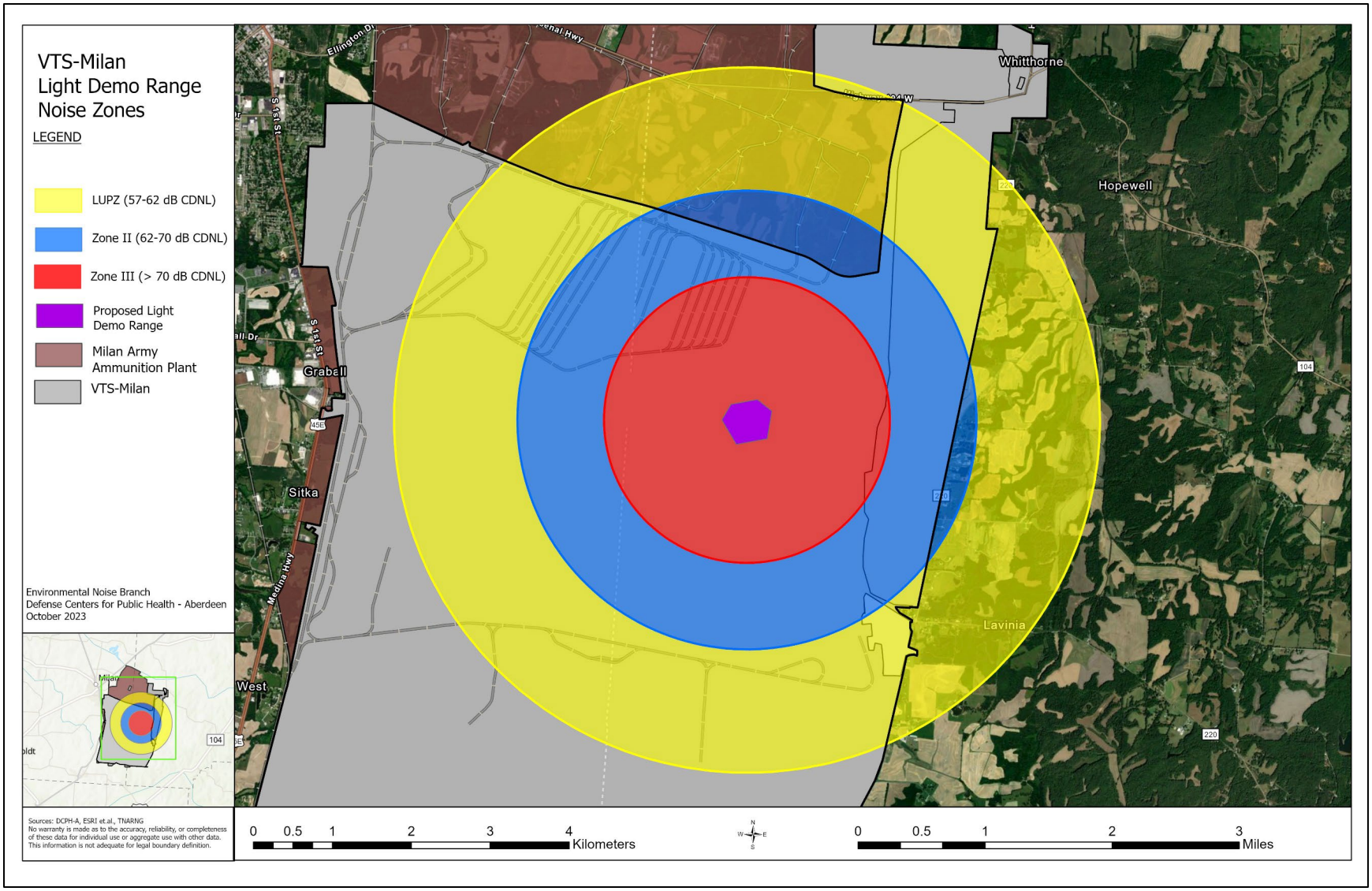

Figure 12. Proposed Light Demolition Range Noise Zones

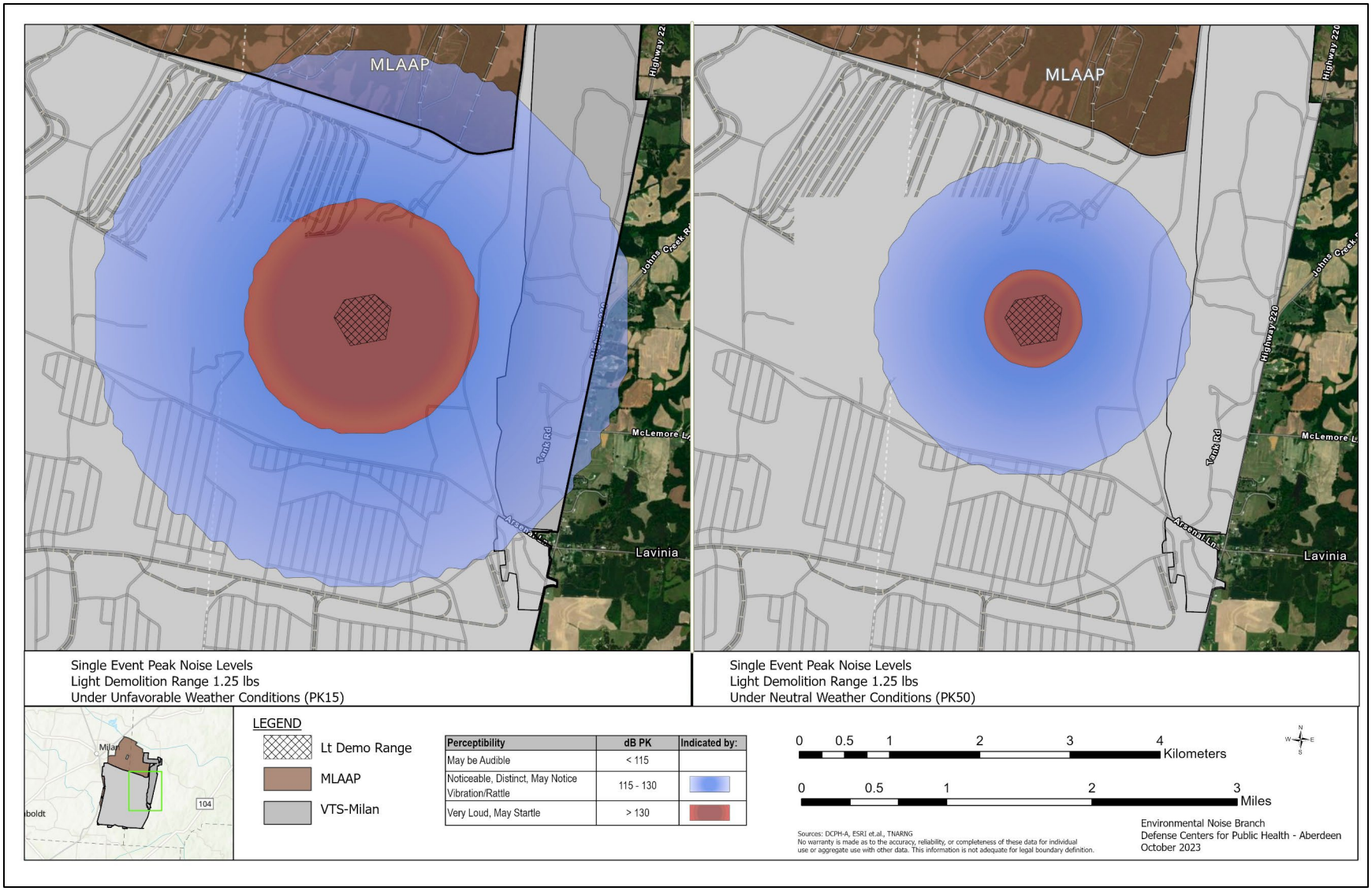

Figure 13. Proposed Light Demolition Range: 1.25-Pound Single-Event Peak Noise Levels

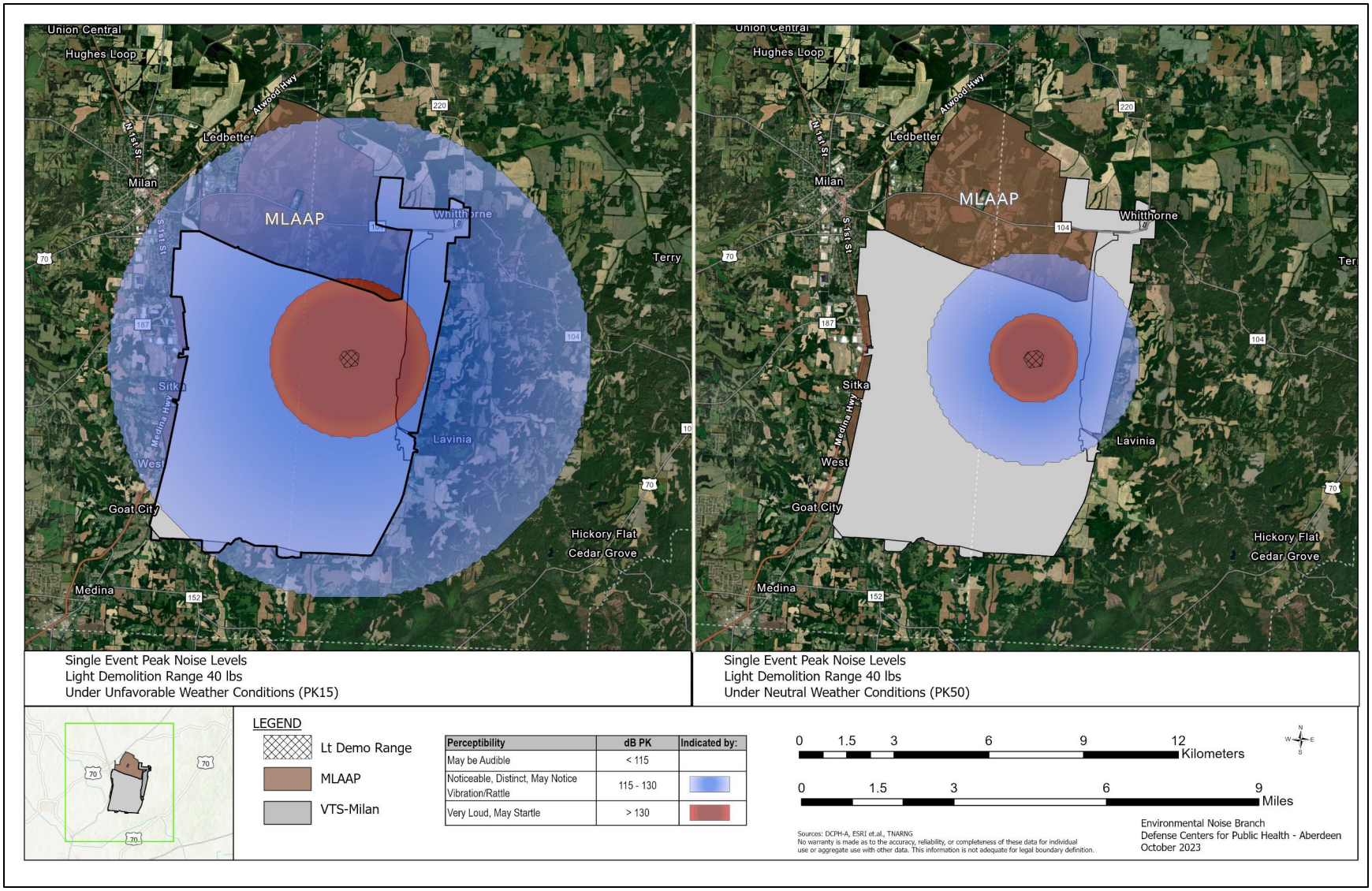

Figure 14. Proposed Light Demolition Range: 40-Pound Single-Event Peak Noise Levels

Table 24. LDR 40-Pound Charge Complaint Risk Area under Unfavorable Weather Conditions

dB Peak	Direction	Distance[a]		Affected Land Use
		Kilometers	Miles	
115 –130	North	2.6	1.6	Low-density residential; Area primarily encompasses MLAAP lands
	East	5	3	Communities of Hopewell and Lavinia
	South	1.4	0.9	Low-density residential
	West	2.3	1.5	City of Milan (Low-density residential, religious facilities)
> 130	North	< 0.4	0.25	MLAAP property

dB – decibels; **MLAAP** – Milan Army Ammunition Plant
[a] Mileage conversion is rounded for simplicity.

Under neutral weather conditions, noise impacts beyond the boundary would be greatly reduced. Noise levels between 115 and 130 dB would only extend up to 800 meters (0.4 mile) beyond the eastern boundary encompassing residential properties. Peak sound levels above 130 dB would remain within VTS-M.

Proposed Hand Grenade Range Activity

The Noise Zones from high explosive rounds at the HGFR would remain within VTS-M (**Figure 15**). **Figure 16** illustrates the single-event peak sound levels for a high explosive hand grenade round. Under unfavorable weather conditions, peak levels between 115 and 130 dB would extend less than 400 meters (0.25 mile) beyond the eastern boundary (**Figure 16**), encompassing scattered residential properties. Peak sound levels above 130 dB would remain within VTS-M (**Figure 16**). Under neutral conditions, the single-event peak levels would also remain within the VTS-M boundary.

Proposed Combined Light Demolition Range Activity and Hand Grenade Range Activity

Figure 17 depicts the combined (with the proposed LDR and HGFR activity) CDNL Noise Zones. Overall, the combined Noise Zones would be very similar to the individual LDR Noise Zone footprint (see **Figure 12**). Off-post there would be a slight acreage increase to Zone II and the LUPZ (**Figure 17** and **Table 25**). The LDR Noise Zones would extend 300 meters (0.2 mile) for Zone II and up to 1.8 kilometers (1.1 miles) for the LUPZ (**Figure 18** and **Table 25**). Under combined conditions, these Zones would increase to 350 meters (0.2 mile) and 1.9 kilometers (1.2 miles) respectively (**Figure 20** and **Table 25**).

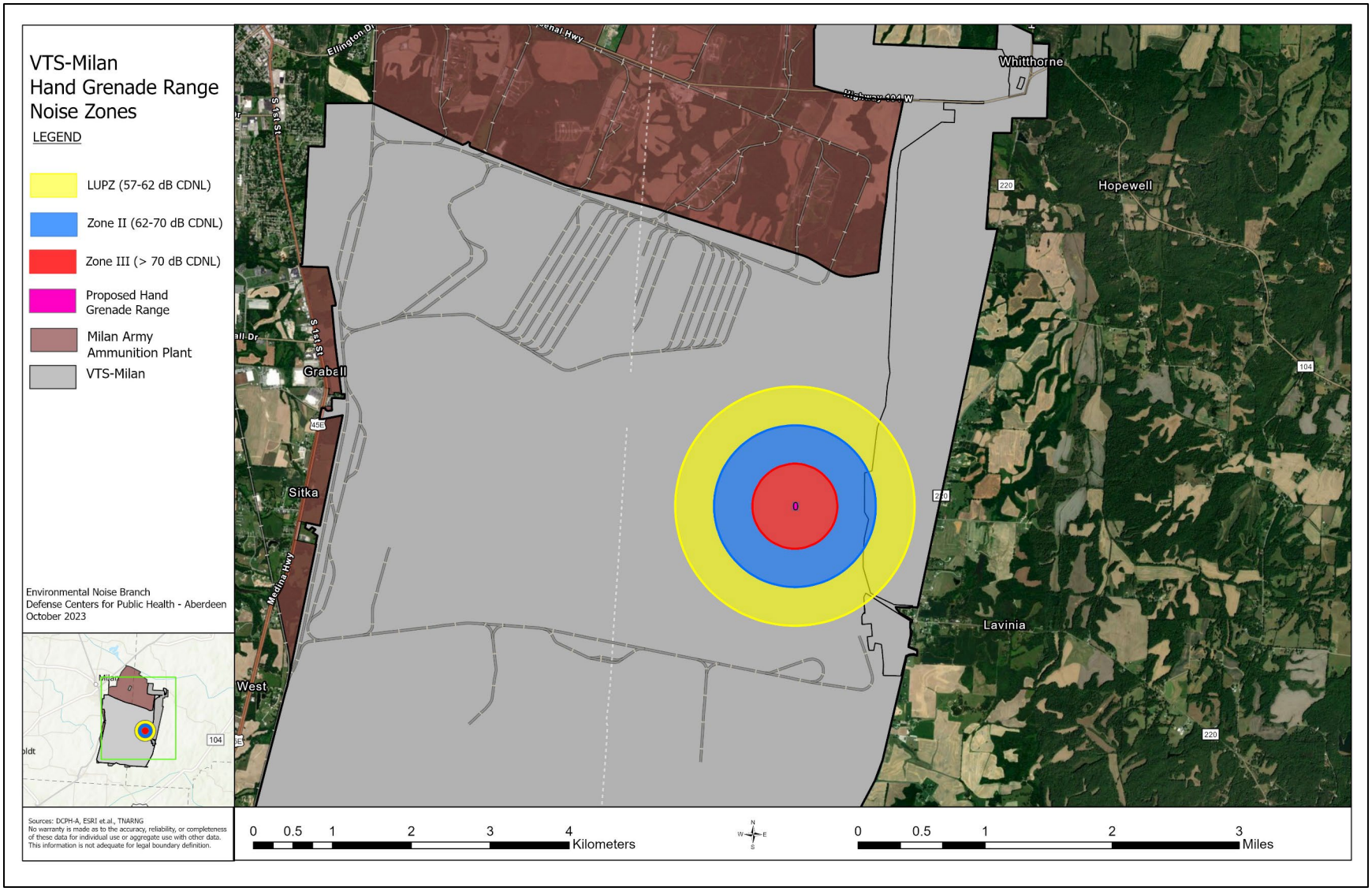

Figure 15. Proposed Hand Grenade Familiarization Range Noise Zones

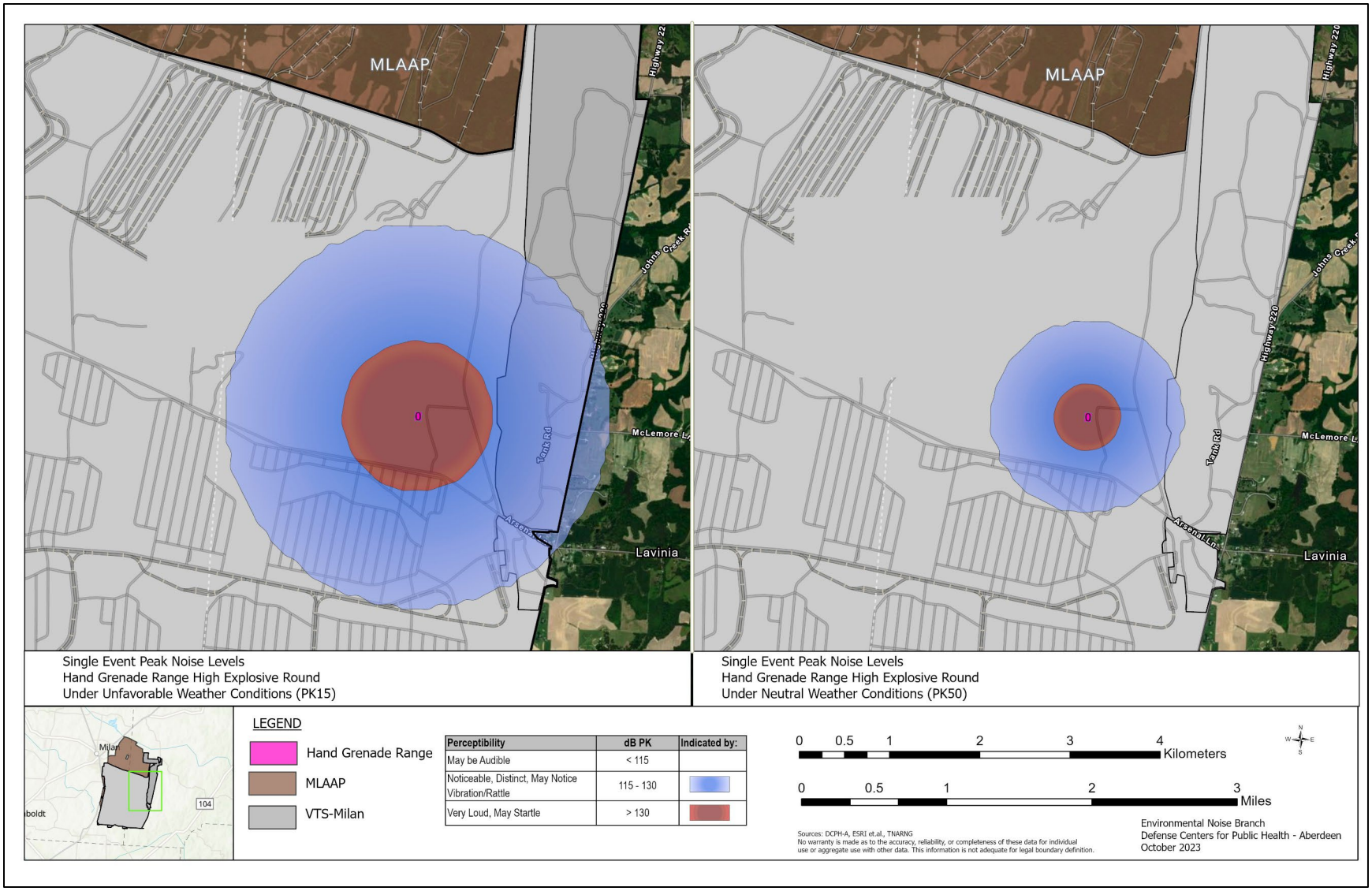

Figure 16. Proposed Hand Grenade Familiarization Range High Explosive Single-Event Peak Noise Levels

Table 25. Demolition Noise Zone Area Comparison

Noise Zone	Noise Zone (Acres)								
	Light Demolition Range			Hand Grenade Range			Combined Conditions		
	Total	MLAAP	Off-Post	Total	MLAAP	Off-Post	Total	MLAAP	Off-Post
LUPZ (57–62 dB CDNL)	8,952	1,604	2,260	969	0	0	9,045	1,615	2,336
Zone II (62–70 dB CDNL)	4,018	390	130	590	0	0	4,071	394	167
Zone III (> 70 dB CDNL)	2,545	0	0	225	0	0	2,652	0	0

MLAAP – Milan Army Ammunition Plant; **LUPZ** – Land Use Planning Zone; **dB** – decibel(s); **CDNL** – C-Weighted Day-Night Average Sound Level

The combined single-event peak sound levels (HGFR and LDR 1.25-pound events) are shown in **Figure 19**. As with the individual conditions, peak levels between 115 and 130 dB would extend beyond the eastern boundary less than 400 meters (0.25 mile), encompassing scattered residential properties, and peak sound levels above 130 dB would remain within VTS-M (**Figure 19**).

Alternative A

According to Army guidelines, the noise from Alternative A is considered compatible with most of the surrounding land use. Alternative A would have short- and long-term, minor, adverse effects on the noise environment. Short-term increases in noise would be caused by tree harvesting and infrastructure improvements, including low water crossings and AVLBs, tank crossings, and tank trails. Alternative A would not create appreciable long-term increases in areas of incompatible land use due to noise and would not lead to a violation of any federal, state, or local noise regulation. Further, proposed increases in noise would not (1) substantially increase the number of individuals within areas normally not recommended for noise-sensitive land uses; or (2) generate individual acoustic events loud enough to damage hearing or structures.

There would be long-term minor adverse effects due to noise. Effects would be from increases in heavy and light maneuver training, new live-fire capabilities, new ranges, and use of pyrotechnics and blank ammunition within all designated maneuver areas. For existing small-arms activity, Zone II extends beyond the eastern boundary, encompassing low-density residential land uses. Zone III is entirely contained within VTS-M.

Under Alternative A, the HGFR Noise Zones would remain within the VTS-M boundaries and would be compatible with the surrounding communities. Additionally, the live hand grenade rounds would have a low risk of generating noise complaints.

The LDR Noise Zones would extend north into MLAAP and beyond the eastern boundary of VTS-M. Zone III would remain within VTS-M. Zone II and the LUPZ would extend beyond the eastern boundary, encompassing primarily agricultural lands and scattered low-density residential properties. Under adverse weather conditions, a worst case 40-pound detonation event at the LDR could cause annoyance and potentially generate noise complaints within 2 miles of VTS-M. For the most common NEW (1.25 pounds), depending upon weather conditions, residences adjacent to VTS-M may occasionally be exposed to peak sound levels that correlate to a moderate risk of complaints. The largest projected detonation at the LDR would be 140 pounds. Under adverse weather conditions, this event may cause annoyance and potentially generate noise complaints to the east within 4.4 miles and up to 2 miles to the north, south, and west of VTS-Milan.

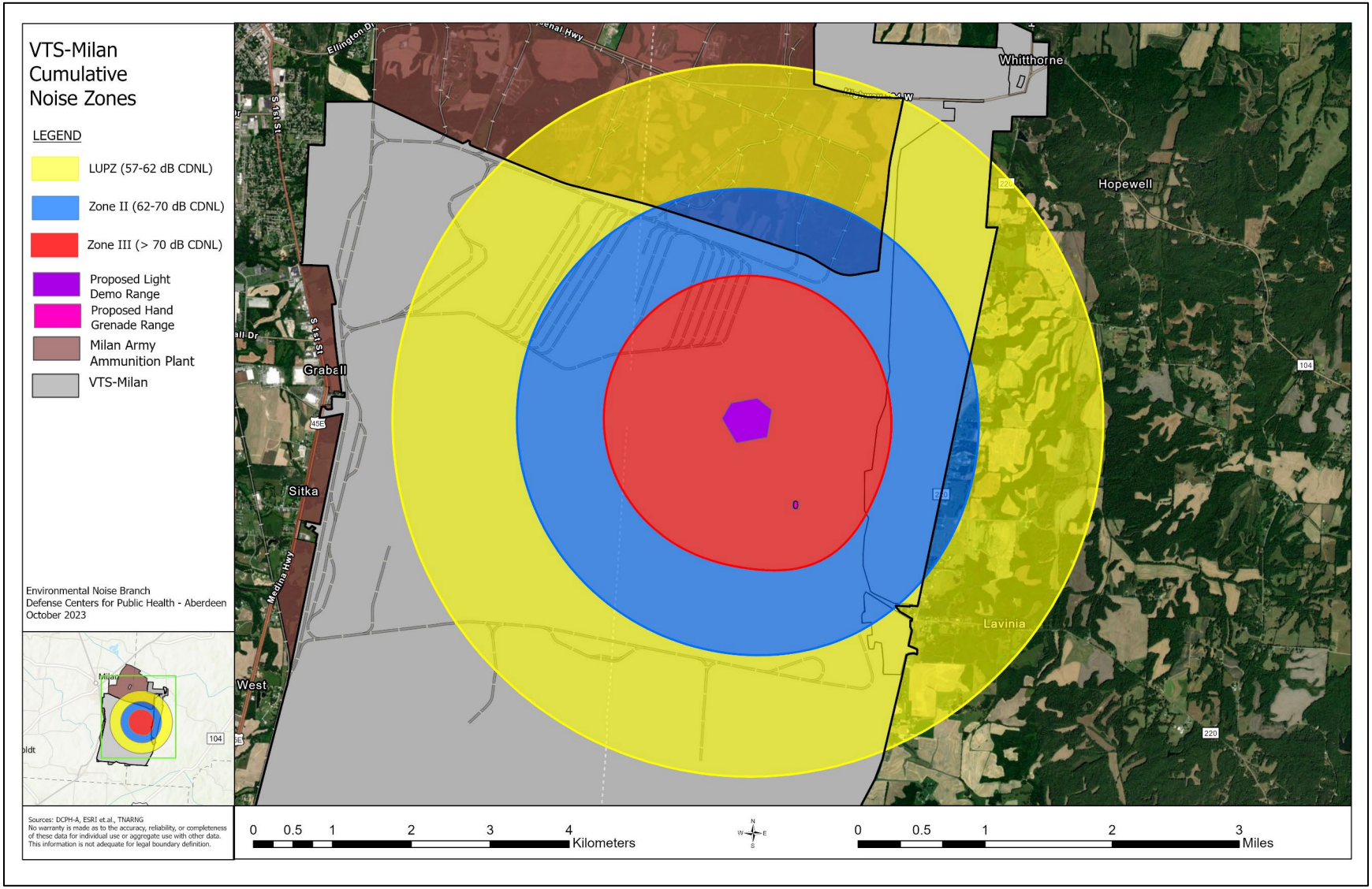

Figure 17. Combined Conditions: Hand Grenade Familiarization Range and Light Demolition Range Noise Zones

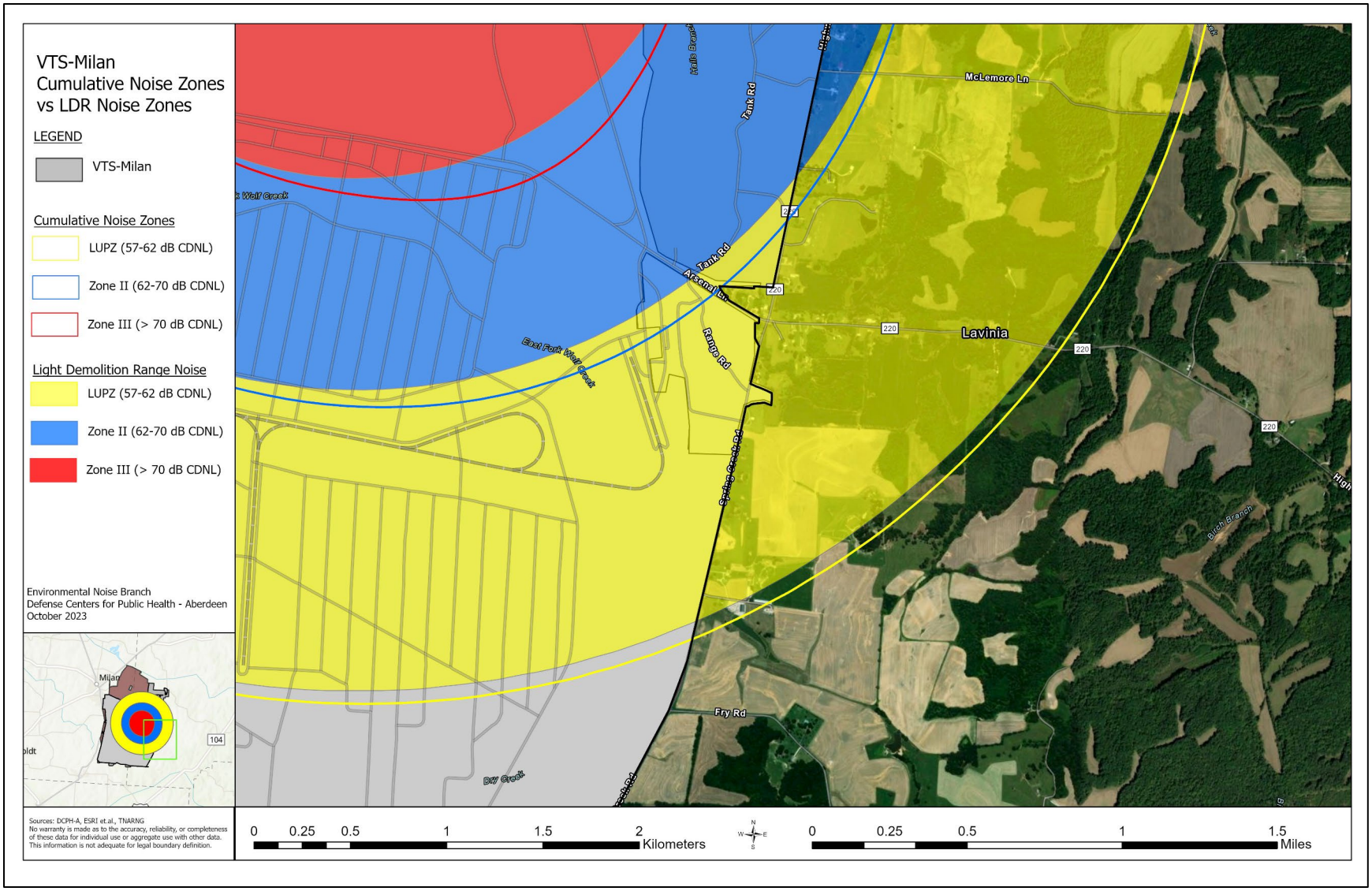

Figure 18. Combined Noise Zones Comparison to Light Demolition Range Noise Zones

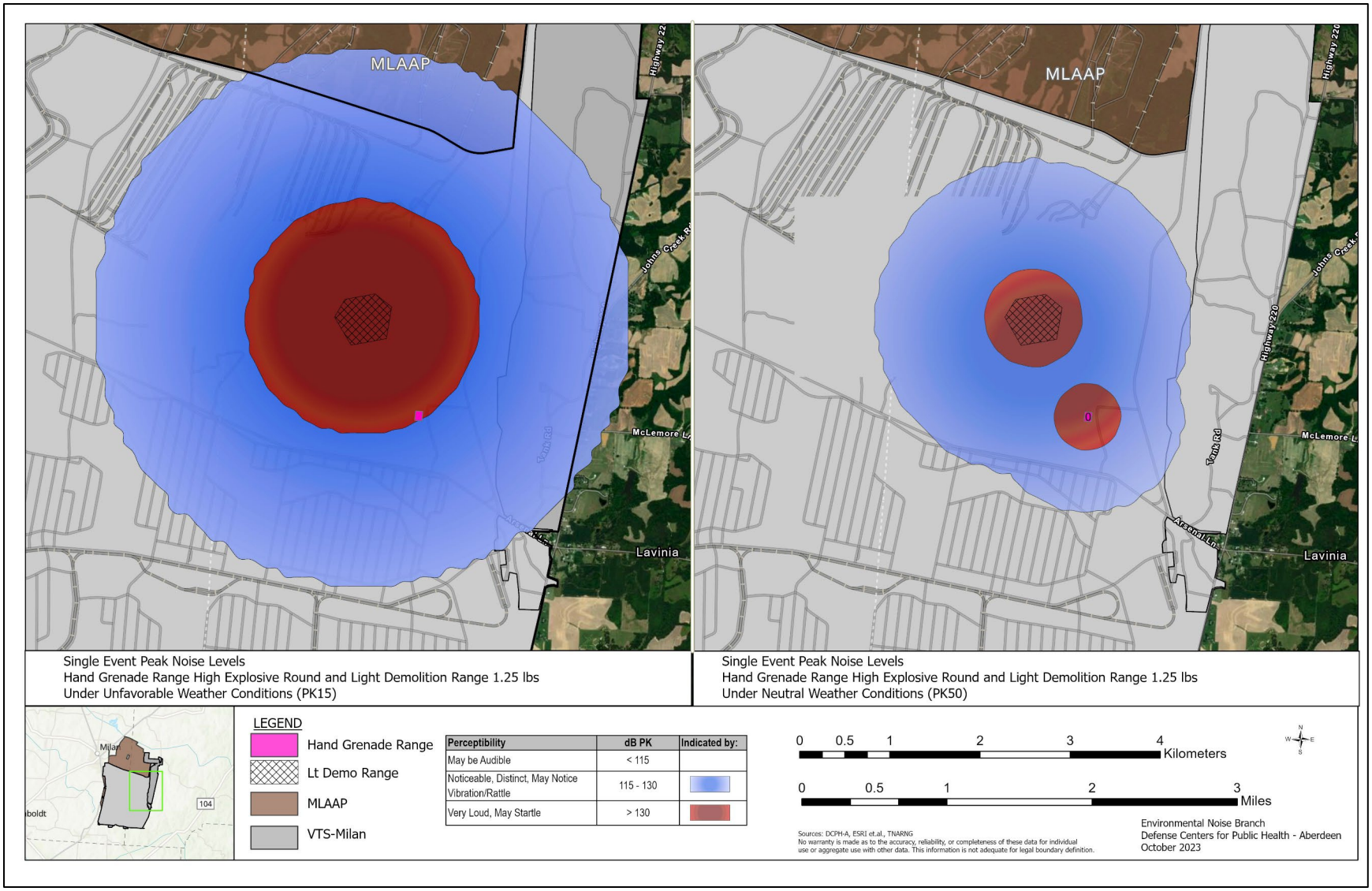

Figure 19. Combined Conditions: Single-Event Peak Noise Levels Hand Grenade Familiarization Range and Light Demolition Range (1.25 pounds)

The combined operation (HGFR and LDR activities) land use planning Noise Zones are driven by the noise generated from the proposed LDR activity. As such, the areas off-post that have the potentially to be affected by noise would be similar to those described for the LDR Noise Zones.

To lessen the risk of annoyance and potential noise complaints, TNARNG would provide prior public notice of scheduled use of training events, including date(s) and approximate start and stop times. In addition, all range activity at VTS-M would continue to occur prior to 2200 hours (10 PM).

Alternative B (Preferred)

According to Army guidelines, the noise from the Alternative B is considered compatible with most of the surrounding land use. Impacts associated with Alternative B would be the same as those for Alternative A.

No Action Alternative

No adverse effects on the noise environment would be expected under the No Action Alternative. The overall noise environment would remain unchanged when compared to existing conditions.

Cumulative Effects

The majority of all reasonably foreseeable future actions at and surrounding VTS-M would be located within areas of current TNARNG training activities and operations. Implementation of the Proposed Action, in conjunction with other reasonably foreseeable projects that may be planned in the near future, would not change the character or nature of the noise environment at VTS-M. Cumulative noise impacts would not be expected to be significant as construction-related noise associated with the Proposed Action would be short term and temporary and would be similar in nature to the existing noise environment. No significant long-term cumulative noise impacts associated with the implementation of the Proposed Action in combination with reasonably foreseeable projects in the region would occur.

3.5 Earth Resources

3.5.1 *Affected Environment*

Physiography and Topography

VTS-M is within the physiographic region known as the East Gulf Coastal Plain section of the Coastal Plain Province. The Coastal Plain is the westernmost physiographic province in Tennessee and was formed with numerous interbedded, flat-lying sequences of sand, silt, and mud deposited from a marine source. These sediments have never been deeply buried and do not resist erosion very effectively. Instead, they form rolling hills, poorly drained lowlands, and shallow, wide stream valleys. Elevations are usually less than 500 feet National Geodetic Vertical Datum and decrease rather steadily toward the Mississippi River to the west.

The topography of Carroll and Gibson counties is gently sloping to moderately steep. Topography at VTS-M ranges from relatively flat with poor surface drainage in the southern portion of the Installation to moderately rolling with defined stream channels in the northern section. VTS-M slopes and drains to the west and north with the Rutherford Fork of the Obion River. Elevation on the site ranges from approximately 320 feet above mean sea level on the north end to 590 feet at the southeast corner of VTS-M. Steep slopes (greater than 10 percent) cover approximately 30 to 40 percent of the site and limit training suitability in these areas.

Geology

VTS-M is centrally located on the West Tennessee Plain, slightly west of the midway point between the major drainages of the Mississippi and Tennessee rivers (MLAAP 2019). West Tennessee is within the Mississippi Embayment, part of the Gulf Coastal Plain and an area where the terrain is flatter than in the eastern parts of the state. Structurally, the embayment is a down-warped, downfaulted trough whose axis approximates the present course of the Mississippi River. Sediments ranging in age from Cretaceous to recent have been deposited in this trough. These sediments consist of sand, gravel, lignite, clay, chalk, and limestone units that vary in thickness. The Memphis Sand is 0 to 900 feet thick and, where the original thickness is preserved, it is 400 to 900 feet thick. The exact depth to bedrock under VTS-M is not known but is estimated to be 1,800 to 2,000 feet.

The Memphis Sand outcrops in a broad belt across western Tennessee but is covered in most places by fluvial deposits of Tertiary and Quaternary age and loess and alluvium of Quaternary age (Parks and Carmichael 1990). The Memphis Sand consists of a thick body of sand that includes subordinate lenses or beds of clay and silt at various depths. The clay and silt locally are carbonaceous and lignitic; thin lenses of lignite also occur locally. Thick beds of clay and silt in the upper part of the Memphis Sand may, in some places, be confused with the overlying Cook Mountain Formation. The exact depth to bedrock under VTS-M is not known, but it exceeds 1,200 feet in a nearby test well near Jackson, Tennessee.

Seismicity

The VTS-M is located within the New Madrid Seismic Zone (NMSZ), the most seismically active zone in the United States east of the Rocky Mountains. The NMSZ has produced historically damaging earthquakes, including at least three earthquakes estimated to have had moment magnitudes of 8.0 or greater on the Mercalli scale during the years from 1811 to 1812. An earthquake of magnitude 6.0 or larger is expected somewhere in the zone about every 70 years.

Petroleum and Mineral Resources

Northern Carroll and Gibson counties are producers of ball clay (Tennessee Division of Geology and U.S. Geological Survey 2004). No oil, gas, or coal is produced in Carroll or Gibson counties; testing during the 1980s failed to reveal any deposits. No mineral resources are produced from VTS-M.

Soils

The U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) completed a soil survey of Carroll County in 1984 (Moore et al. 1984) and of Gibson County in 1994 (Jenkins 1994). Soil maps and descriptions were prepared using Moore et al. (1984), Jenkins (1994), and NRCS' Web Soil Survey database.

The soils at VTS-M are mapped in three major soil associations (**Figure 20** and **Table C1 in Appendix C**): Waverly-Falaya-Collins Association, Lexington-Grenada-Loring Association, and Smithdale-Lexington-Providence Association. These soil associations are generalized categories of soil series and types that occur together in a geographical location. They are named for the dominant soils present, but several other similar soils may be part of an association. A total of 10 soil series are found within the three associations at VTS-M. Slope and, in two cases, a combination with additional soil series, further divides these 10 series into the 24 soil types displayed in **Figure 20** and **Table C1 in Appendix C**.

Soil Erosion Potential

Soil erosion potential, or erosivity, is of particular importance in an area that is subject to the effects of armored vehicular training and other activities that would remove vegetative cover and disturb the soil surface. Soils at VTS-M are somewhat erodible to erodible, based on the Erosion Factor "K" used by NRCS to indicate the susceptibility of a soil to sheet and rill erosion by water (NRCS 2020). Factor K is one of six factors used to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity. Values of Factor K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Values of Factor K for soils at VTS-M range from 0.20 to 0.55. Soils at VTS-M with a Factor K in the range of 0.20 to 0.37 are considered "somewhat erodible," and soils at VTS-M with a Factor K above 0.37 are classified as "erodible." At VTS-M, approximately 6 percent of soils are somewhat erodible, and 93 percent of soils are considered erodible (MLAAP 2021).

At VTS-M, physical factors of the soil, including texture, vegetative cover, and slope, influence the amount of erosion more than the other factors. Interpretation of the data found in the soil survey reveals that soil erosion and compaction are the primary problems affecting the soil resources at VTS-M.

Prime Farmland Soils and Soils of Statewide Importance

Prime farmland soils are protected under the Farmland Protection Policy Act of 1981. The intent of the act is to minimize the extent to which federal programs contribute to the unnecessary or irreversible conversion of farmland soils to nonagricultural uses. The act also ensures that federal programs are administered in a manner that to the maximum extent practicable will be compatible with private, state, and local government programs and policies to protect farmland.

NRCS is responsible for overseeing compliance with the Farmland Protection Policy Act and has developed the rules and regulations for implementing the act (7 CFR part 658). "Prime farmland," as defined by NRCS, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for those uses. Prime farmland could include cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas (NRCS 2000). Acquisition or use of farmland by a Federal agency for national defense purposes is exempted by section 1547(b) of the Act, 7 U.S.C. 4208(b).

Various soils at VTS-M are prime farmland soils, including those of the Calloway, Center, Collins, Falaya, Grenada, Lexington, Loring, and Providence soil types (**Figure 21**). Prime farmland soils account for approximately 53 percent of the soils at VTS-M (NRCS 2020).

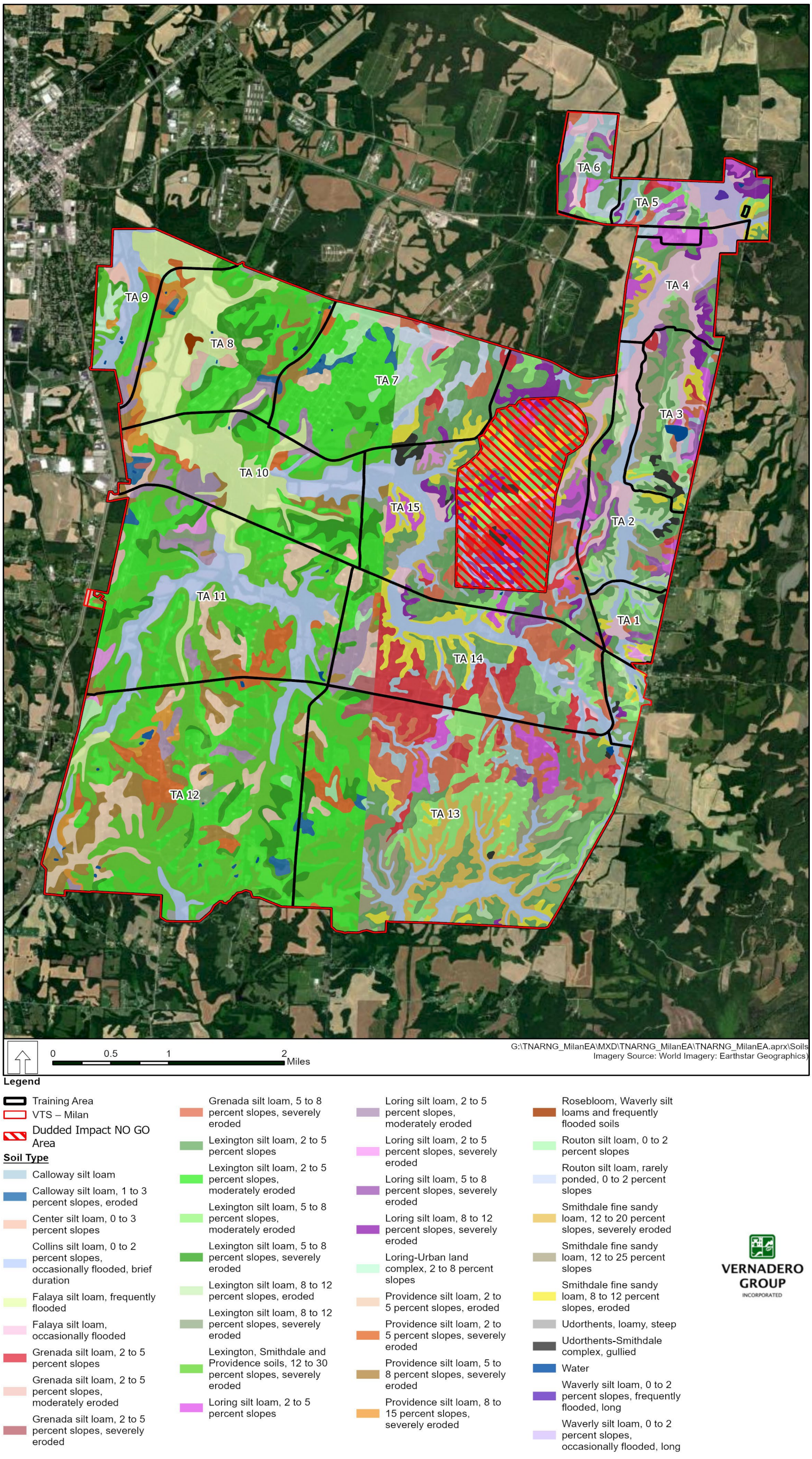

Figure 20. Soils at Volunteer Training Site – Milan

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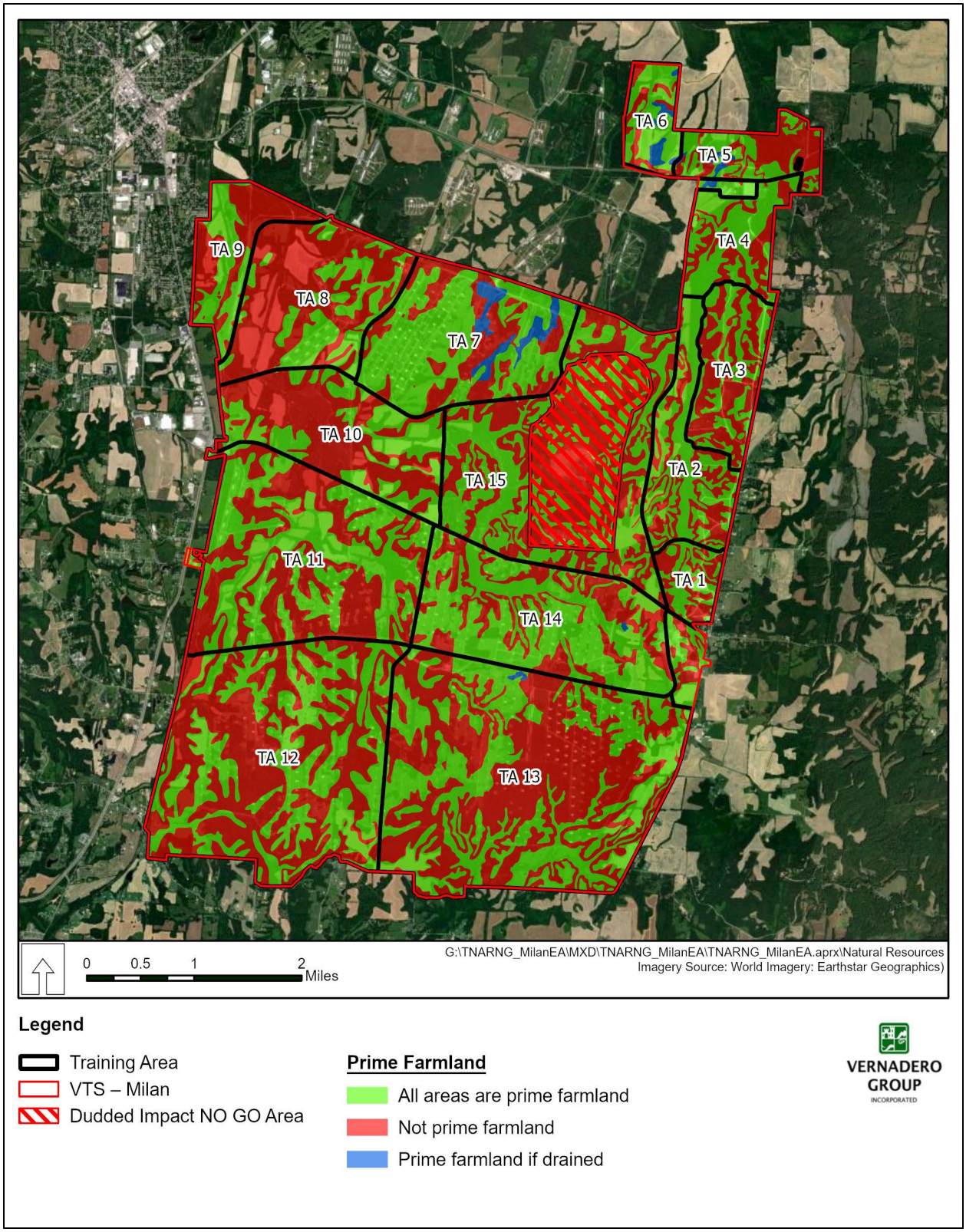

Figure 21. Prime Farmlands at Volunteer Training Site – Milan

3.5.2 *Environmental Consequences*

Effects on earth resources would be considered significant if a proposed action would (1) increase potential occurrences of soil erosion, siltation, or geological hazards (e.g., landslides); (2) incorporate engineering or construction techniques that do not adequately address potential geologic hazards; or (3) expose people or structures to substantial geologic hazards. Generally, impacts with regard to earth resources can be avoided or minimized if proper construction techniques, soil erosion/siltation control measures, and structural engineering designs are incorporated into project development.

Alternative A

Alternative A would cause minor, adverse impacts on earth resources. Impacts would primarily be related to the disturbance of soils during current and proposed heavy and light maneuver training activities, creation of new TAs and ranges, tree harvest, and infrastructure improvements, including construction of low water crossings and AVLBs, tank crossings, and tank trails. Proposed heavy and light maneuver training would have no adverse impacts on the local or regional geology at VTS-M, and no training activities would be affected by geologic processes such as seismicity.

Proposed heavy and light maneuver training activities, creation of new TAs and ranges, tree harvest, and infrastructure improvements would cause continued soil disturbance and minor soil erosion. Increasing training activities in existing TAs would not impact the local or regional geology but would have long-term minor adverse impacts on soils. The increased training activities would expand the area where soils could be disturbed by vehicle and equipment movement. Increased vehicle and equipment movement associated with more training events could cause additional soil disturbance and erosion. The creation, maintenance, and use of new heavy and light maneuver TAs at VTS-M would have short-term and long-term minor adverse impacts on soils. No impacts on local or regional geology would occur from establishment and use of new TAs.

Impacts on soils would result from the new live-fire capabilities for TNARNG training on VTS-M, new maneuver capabilities including two or more companies maneuvering at once, nine heavy maneuver TAs consisting of approximately 14,533 acres, six light maneuver TAs consisting of approximately 598 acres of new light maneuver training, non-live-fire TAs consisting of approximately 814 acres, and an Engagement Area consisting of approximately 1,008 acres. Alternative A would also disturb soil during the construction of up to 31 low water crossings, up to seven tank crossings on Graball Road, and three new tank trails, along with the proposed 953.4 acres of tree harvest.

TNARNG would implement BMPs associated with each project's Stormwater Pollution Prevention Plan (SWPPP), Spill Prevention Control and Countermeasures Plan, and General Construction Permits. The implementation of BMPs during TA construction would minimize impacts on soils during and immediately following construction activities. All project components would be engineered so that potential impacts resulting from erosion, siltation, and geological hazards (e.g., landslides) would be minimized. Further, any construction limitations would be overcome or minimized by planning, design, or installation. Implementation of Alternative A would include proper construction techniques, soil erosion/siltation control measures, and structural engineering designs that would minimize potential soil limitations related to construction. Alternative A would therefore not pose a substantial erosion hazard. However, where

erosion hazards may exist, the use of BMPs, including erosion and turbidity control structures, would substantially reduce the potential for erosion and siltation.

Alternative B (Preferred)

Similar minor, adverse impacts on earth resources, as described under Alternative A, would result from the implementation of Alternative B. However, with a greater acreage of proposed tree harvest (3,247 acres), impacts could be expected to be slightly greater in magnitude.

No Action Alternative

Under the No Action Alternative, there would be no increase in heavy and light maneuver training in existing TAs at VTS-M, no new TAs or ranges would be established, and no tree harvest or infrastructure improvements (low water crossings and AVLBs, tank crossings, and tank trails) would occur. Therefore, there would be no impacts on geology or soils from tree removal, TA establishment, maintenance, or TA use.

Cumulative Effects

Potential cumulative effects on earth resources associated with implementation of the Proposed Action would be limited to ground-disturbing activities associated with heavy and light maneuver training, establishment of new TAs and ranges, tree harvest, and infrastructure improvements. BMPs would be implemented to minimize potential erosion, siltation, and soil compaction, and any impacts would be minor and would last only for the duration of ground-disturbing activities. Implementation of the Proposed Action, in conjunction with other reasonably foreseeable projects, would not result in long-term significant cumulative impacts on regional geology, topography, seismicity, or soils.

3.6 Water Resources

3.6.1 *Affected Environment*

Groundwater

VTS-M lies within the range of the west Tennessee tertiary aquifer system, which is the most prolific source of groundwater in the state and is the primary source of drinking water for the city of Memphis, Tennessee. This aquifer system is made up of Quaternary- and Tertiary-age unconsolidated sand and gravel beds, separated by clays. Several formations that experience hydraulic interchange function together as one system. Memphis Sand and the Fort Pillow Sand are the two major water-bearing units in the Tertiary aquifer system (Brahana et al. 1986).

Groundwater in the western Tennessee area generally flows to the west, in the direction of the regional dip of the underlying sands, and it can also trend to the north because of topographic influences (Lose and Associates 1994). Water quality within the Tertiary aquifer system is generally considered excellent and typically contains less than 200 milligrams per liter of dissolved solids. Water from wells on the MLAAP has been found to contain nitrate contamination (Brahana et al. 1986). Groundwater contamination is monitored through a series of wells across the MLAAP, including several on the VTS-M.

Explosive compounds were detected in groundwater samples from the western portion of MLAAP, as well as in three city of Milan drinking water supply wells, in 1991 and 1992 (USEPA 2000). The direction of groundwater flow in the area (the plume is moving northwest from the original point of detection) makes it unlikely that additional groundwater below VTS-M will be affected

by this contamination. Additional monitoring and remediation efforts have been initiated, and remediation, via extraction, treatment, and discharge of the treated groundwater, is still under way (Arcadis G&M Inc. 2005).

Watersheds

VTS-M has three major drainages: Wolf Creek, which drains about 11,000 acres in the southern, central, and northwestern portions of the Installation; the Middle Fork of the Forked Deer River, which drains a small portion of the igloo storage area at the extreme southern portion of the Installation; and the Rutherford Fork of the Obion River, which drains about 6,460 acres in the east and northeastern portions of the site (**Figure 22**) (MLAAP 2019). Wolf Creek and its tributaries are the Installation's principal drainage system. The three drainages flow to the Obion River, which empties into the Mississippi River.

Surface Waters

The Installation also has many perennial and ephemeral surface water features, and there are two named perennial streams that flow on the VTS-M (**Figure 23**), Halls Branch and Johns Creek. Halls Branch is a tributary of Johns Creek. Minkin et al. (1998) identified 18.4 miles of intermittent or flowing streams on the site. Most of these waterways, including sections of Halls Branch and Johns Creek, are dry during the late summer to early fall. There are also nine ponds totaling 14.6 acres on VTS-M, the majority of which are human-made. Most of the ponds are very small (less than 0.15 acre).

Floodplains and Riparian Areas

Approximately 1,000 acres of VTS-M are within the 100-year floodplain. Buildings and structures are not in floodplain areas. All floodplain areas on VTS-M are level, narrow, and associated with small streams and creeks, except where the Rutherford Fork of the Obion River flows past the northern boundary (**Figure 24**).

The riparian ecosystem, which includes the land adjacent to the streams and wetlands, is extensive on VTS-M, surrounding Johns Creek, Halls Branch, and the associated wetland areas. It consists primarily of mixed bottomland hardwood forests. Riparian areas serve as the interface between aquatic and terrestrial ecosystems. They serve as valuable wildlife habitat and corridors, promote streambank stabilization, trap sediments and nutrients, filter runoff water, and help to moderate flooding. Limited military training activities occur within riparian areas at VTS-M. Stream crossings by vehicles are only permitted at designated bridged or culverted sites. Stream crossing by soldiers on foot is permitted anywhere along streams and through wetlands.

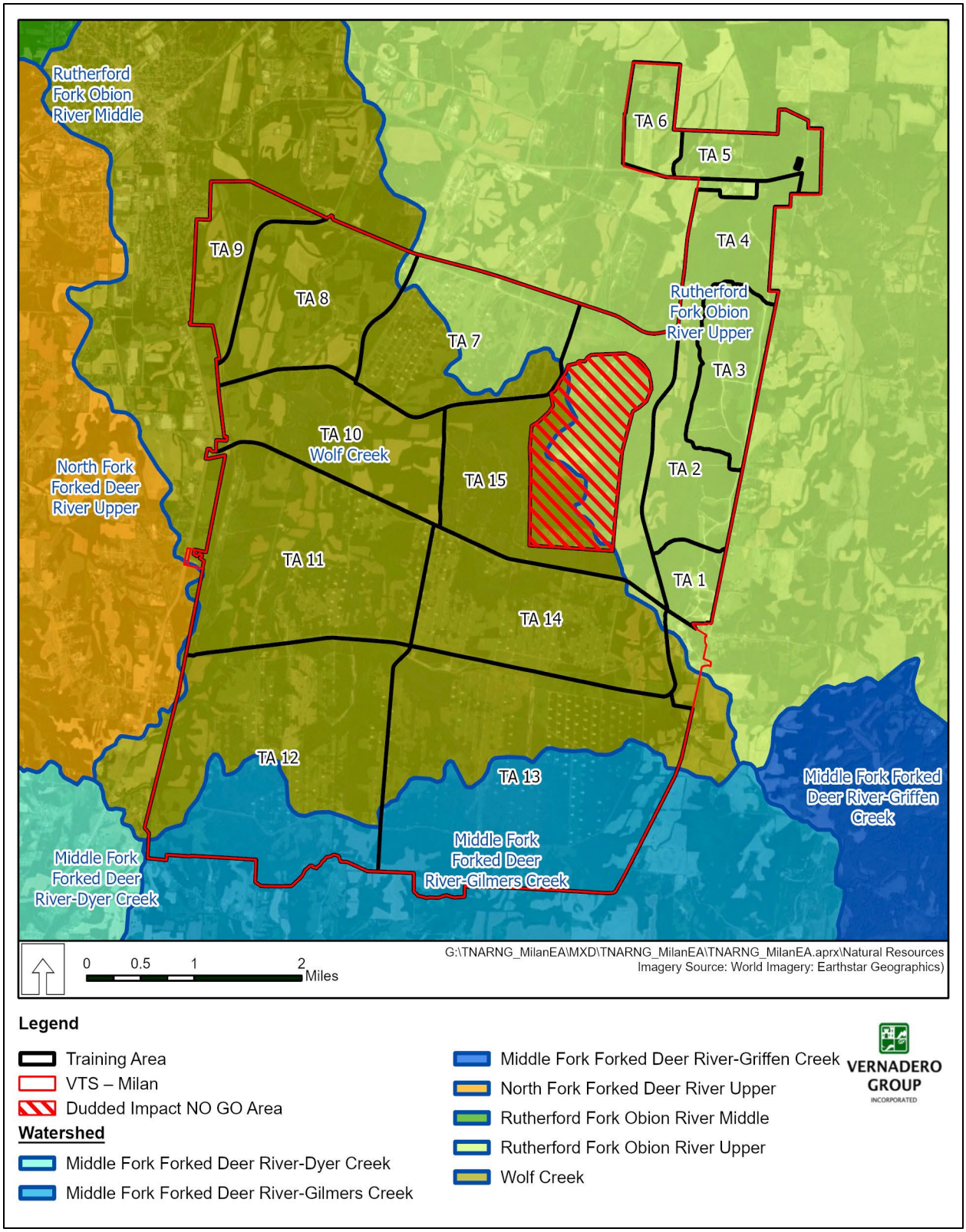

Figure 22. Watersheds at Volunteer Training Site – Milan

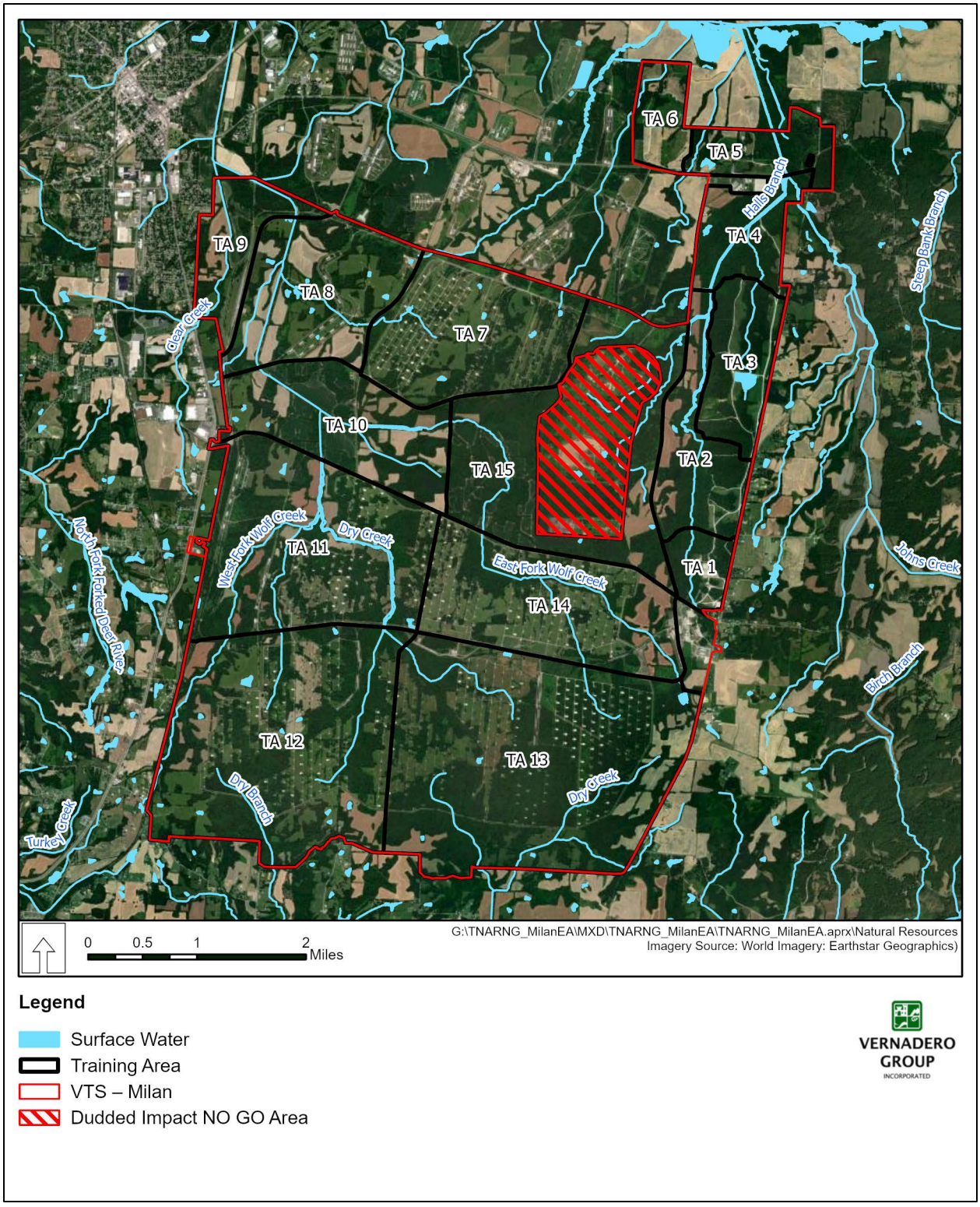

Figure 23. Surface Waters at Volunteer Training Site – Milan

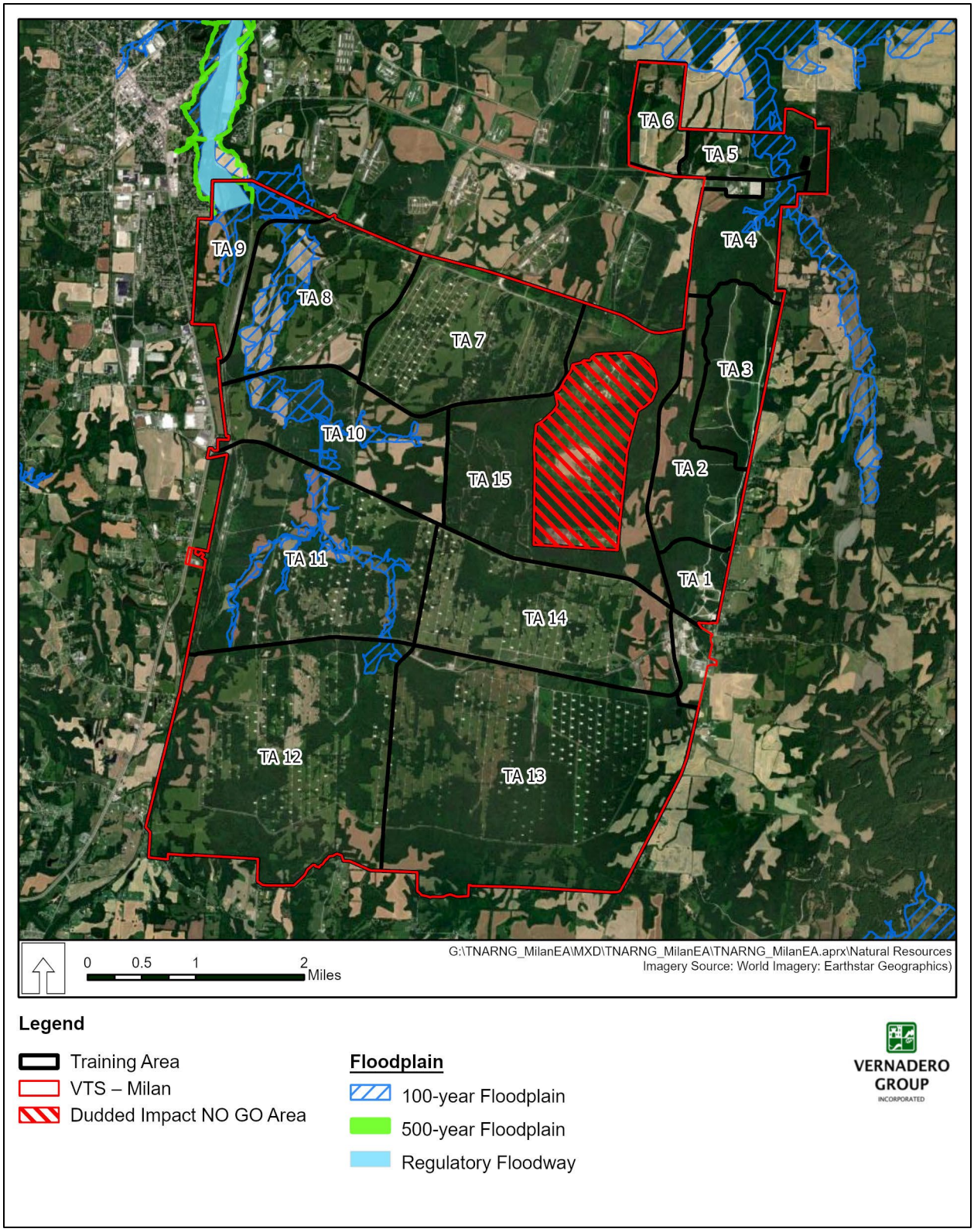

Figure 24. Floodplains at Volunteer Training Site – Milan

Riparian areas are particularly susceptible to invasion by exotic plant species. The bottomland forests around Johns Creek and Hall Branch are heavily infested with Nepalese browntop (*Microstegium vimineum*) and privet (*Ligustrum* sp.).

Wetlands

Wetlands on VTS-M were historically associated with streams and tributaries, particularly Halls Branch and Johns Creek. In 2022, a wetland survey and characterization of the then 2,400-acre VTS-M was completed (Riverside Environmental Consulting, LLC 2022). A total of 13.5 miles of stream were identified and included John's Creek (0.73 mile) and Hall Branch (4.26 mile), resulting in 4.99 miles of perennial stream, 6.80 miles of intermittent streams, and 1.75 miles of ephemeral drains (Riverside Environmental Consulting, LLC 2022). A total of 15 wetland areas totaling 285.4 acres were identified (Riverside Environmental Consulting, LLC 2022) (**Figure 25)**. Six of the wetland areas were classified as non-jurisdictional while 9 (including Lake Walker) were jurisdictional. The nonjurisdictional wetlands totaled 1.1 acres. These areas were primarily the result of impounded areas such as old farm ponds or recreation ponds. Lake Walker (11.9 acres) is considered both an open water area and waters of the United States. Lake Walker includes a wetland fringe, particularly on the south end. Lake Walker and the wetland fringe area are waters of the United States as there is a positive nexus with other waters of the United States, (i.e., Halls Branch Tributary 6).

In 2023, a wetland delineation was completed for all MLAAP lands, including all areas designated as VTS-M (approximately 16,133 acres, excluding an approximate 1,022-acre UXO area) (Tetra Tech, Inc. 2023). Of the acres investigated, approximately 568 acres had previously been identified as wetlands in the National Wetlands Inventory completed by the USFWS (USFWS 2023). The 2023 delineation identified the presence and extent of areas on MLAAP, including all VTS-M lands, that meet the criteria for federal wetlands designation according to USACE guidelines and are potentially jurisdictional and regulated under Section 404 of the Clean Water Act (CWA). In total, the 2023 wetland delineation identified approximately 71.4 miles of streams, 241 acres of wetlands, 43 acres of ponds, and 318 acres of wetland streams (riverine areas) within the VTS-M boundaries (**Figure 25**) (Tetra Tech, Inc. 2023).

3.6.2 *Environmental Consequences*

Evaluation criteria for potential impacts on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. Adverse impacts on water resources would occur if the Proposed Action were to (1) reduce water availability or supply to existing users; (2) cause overdrafts of groundwater basins; (3) exceed safe annual yield of water supply sources; (4) affect water quality adversely; (5) endanger public health by creating or worsening health hazard conditions; or (6) violate established laws or regulations adopted to protect water resources. Potential impacts related to flood hazards can be significant if such actions are proposed in areas with high probabilities of flooding; however, all impacts can be mitigated through the use of design features to minimize the effects of flooding.

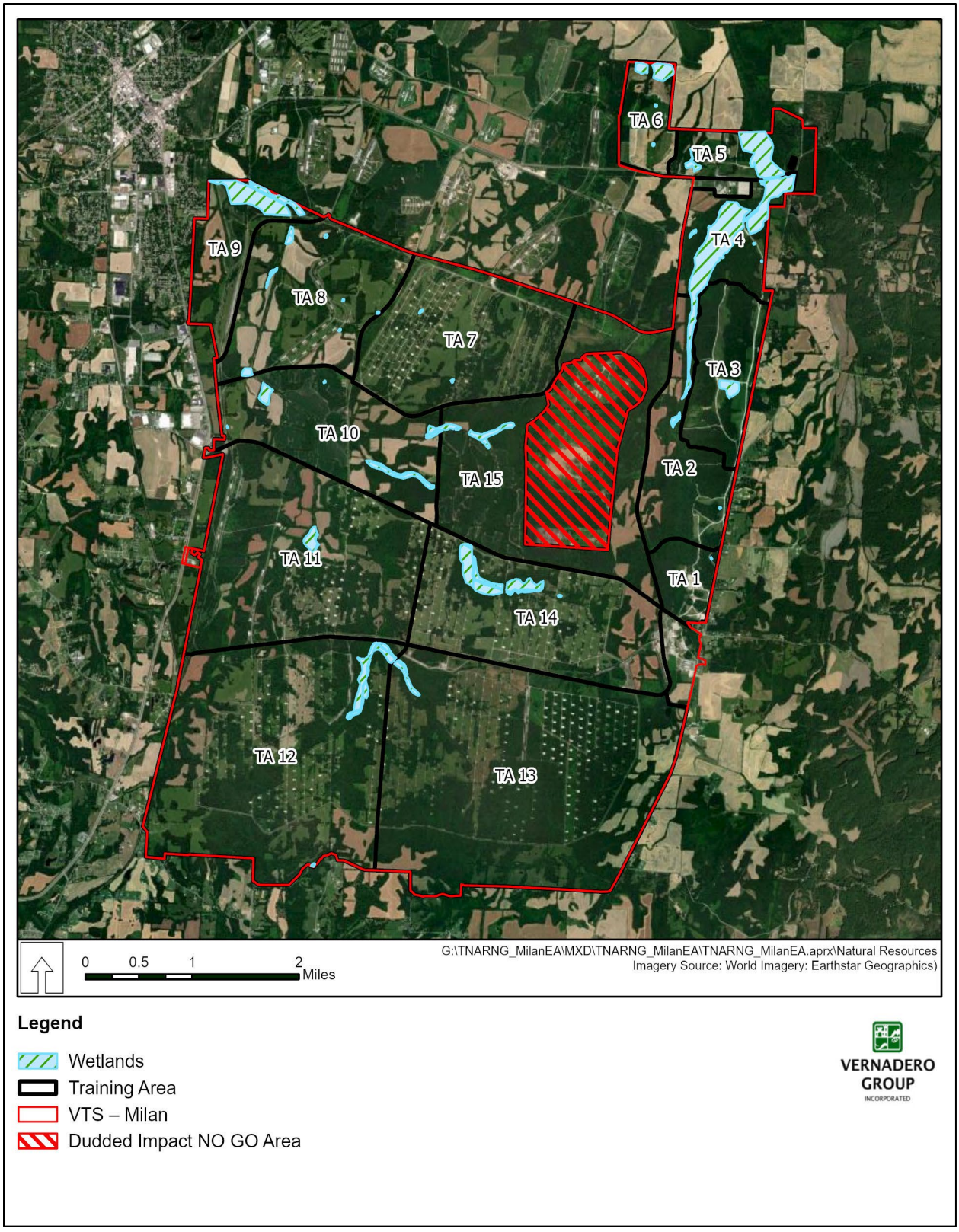

Figure 25. Wetlands at Volunteer Training Site – Milan

Alternative A

There would be minor adverse impacts on water resources. Impacts on surface waters would occur from increased stormwater runoff from new TAs and increased sediment transport in stormwater from current and proposed training activities that occur off road, especially those activities off road that use vehicles and equipment. Current training activities in the existing TAs would result in no additional impacts on water resources.

Increasing training activities at VTS-M, including an increase in the number of personnel, vehicles, equipment, and munitions, would have no adverse impacts on wetlands or floodplains as no fill activities would be associated with this increased training. The use of vehicles and equipment during training activities would continue to be limited to existing roads and developed areas and would not increase the area of impermeable surfaces; therefore, there would be no adverse impacts on surface or groundwater as a result of an increase in training activities in existing TAs.

Alternative A would result in impacts on water resources from the harvest of approximately 953.4 acres of trees. Removal of or damage to vegetative cover can increase runoff and erosion particularly on steeper terrain. Halls Branch and Johns Creek provide drainage for the TAs. The prevalence of stream drainages across the site, coupled with the highly erosive nature of the soils, result in a high potential for sedimentation problems resulting from any activity which disturbs the soil surface or impacts the vegetation cover; however, BMPs would be included in the SWPPP and additional forestry BMPs have been developed to reduce the adverse effects of forest operations on ecosystems and to protect water quality. BMPs will be applied to all tree harvest and timber management activities on the VTS-M.

The Tennessee Division of Forestry has adopted BMPs for forestry operations to prevent the impairment of water quality in the state's streams. The Tennessee BMPs are offered as nonregulatory guidelines to be used during the construction of roads, log landings, and skid trails to minimize the environmental impact of forest management activities. The BMPs are summarized in **Table C2** in **Appendix C** and are available in manual form at following website: https://www.tn.gov/content/dam/tn/agriculture/documents/forestry/2023/Forestry-BMP-Guide.pdf.

Construction of up to seven tank crossings on Graball Road and three tank trails, which would be phased, depending on funding availability, as well as the construction of up to 30 new low water crossings and AVLBs would also result in impacts on water resources at VTS-M.

All areas of the low water crossing would require geosynthetic fabric to be installed beneath the side slopes and cable concrete block. In some places the areas adjacent to the low water crossing would need to be stabilized to prevent erosion that could cause the crossing to fail. This would allow soldiers to move throughout the area and navigate the natural obstacles in a more safe and effective manner. In other areas, AVLB emplacement may be utilized for potential cost savings and to limit potential impacts. To minimize impacts, TNARNG would implement BMPs (see **Table C2** in **Appendix C**) for the protection of watersheds and water quality during the Proposed Action.

There are wetlands and riparian areas located within the portions of VTS-M where tree harvesting and water crossings are proposed; however, the removal of woody vegetation and clearing of land under Alternative A would implement BMPs ensuring that there would be no adverse impacts on surface waters from construction activities (see **Table C2** in **Appendix C**). The removal of trees

within the 100-year floodplain would not alter floodplain hydrology or cause induced flooding in areas not currently located within the floodplain.

The TNARNG would continue to maintain riparian habitats along streams by implementing at minimum a 50-foot riparian buffer zone on either side of every creek (also called a Streamside Management Zone [SMZ]) in which vegetation and soil disturbance will be avoided. Authorization must be obtained before conducting maintenance or construction activities within an SMZ. Foot traffic through riparian areas is not regulated, but vehicles will be kept to established roads and trails. Where wetlands are present, a 50-foot riparian buffer zone will be established and marked with SMZ signs or Siebert stakes on all sides of the wetland. The riparian habitat is variable in size. While the restricted-activity SMZ is 50 feet on either side of the waterway, the actual riparian area typically extends much farther beyond the streambank. All areas of bottomland hardwood forest are considered to be within the riparian zone, and care is taken to minimize impacts on water and habitat quality.

TNARNG would obtain all required permits. TDEC's Division of Water Resources has reviewed the proposed project and has indicated that the stream and wetland crossings associated with the Proposed Action would require an Aquatic Resource Alteration Permit (ARAP) (**Appendix A**). A water quality permit from the Division of Water Resources is required when any alteration of a stream, river, lake, or wetland is proposed. Physical alterations to properties of waters of the state also require an ARAP. TNARNG will continue to coordinate with TDEC to obtain an ARAP and to discuss potential mitigation efforts that may be required to compensate for impacts on water resources. If required, TNARNG would also conduct a new aquatic resources inventory to check for state or federally listed species within the proposed water crossing areas, in accordance with USFWS and other state requirements.

A federal permit may also be required from the USACE for the discharge of dredged or fill material into waters of the United States, including wetlands. Deposition of dredged or fill material into waters of the United States requires a permit under Section 404 of the Clean Water Act. When a Section 404 permit is required, a Section 401 certification must first be obtained from the Division of Water Resources. A Section 401 certification affirms that the discharge would not violate Tennessee's water quality standards.

Alternative B (Preferred)

Minor, adverse impacts on water resources, similar to those described under Alternative A, would result from the implementation of Alternative B.

Alternative B would result in impacts on water resources from the harvest of approximately 3,762 acres of trees. Removal of or damage to vegetative cover can increase runoff and erosion particularly on steeper terrain. The prevalence of stream drainages across the site, coupled with the highly erosive nature of the soils, result in a high potential for sedimentation problems resulting from any activity that disturbs the soil surface or impacts the vegetation cover; however, BMPs would be included in the SWPPP and additional forestry BMPs (see **Table C2** in **Appendix C**) have been developed to reduce the adverse effects of forest operations on ecosystems and to protect water quality. BMPs would be applied to all tree harvest and timber management activities on the VTS-M.

As part of Alternative B, TNARNG would obtain all required permits as discussed under Alternative A.

No Action Alternative

Under the No Action Alternative, there would be no increase in heavy and light maneuver training in existing TAs at VTS-M, no new TAs or ranges would be established, and no tree harvest or infrastructure improvements (low water crossings and AVLBs, tank crossings, and tank trails) would occur. There would be no impacts on surface waters, including wetlands, groundwater, or floodplains from the continuation of existing training activities.

Cumulative Effects

Potential cumulative effects on water resources associated with implementation of the Proposed Action would be limited to ground-disturbing activities associated with heavy and light maneuver training, establishment of new TAs and ranges, tree harvest, and infrastructure improvements. BMPs would be implemented to minimize potential erosion, siltation, and soil compaction, and any impacts would be minor and would last only for the duration of ground-disturbing activities. Implementation of the Proposed Action, in conjunction with other reasonably foreseeable projects, would not result in long-term significant cumulative impacts on regional water resources.

3.7 Biological Resources

3.7.1 *Affected Environment*

Vegetation

VTS-M is part of the Southeastern Plains and Hills ecoregion within the Southeastern Plains. The natural vegetation is characterized as oak-hickory forest, which converts to oak-hickory-pine to the south (Griffith et al. 1997). Bailey et al. (1995) classifies the ecosystem as the Eastern Broadleaf Forest (Continental) Province of the Hot Continental Division of the Humid Temperate Domain. Vegetation on the training site is a mosaic of hardwood and mixed forests and grassland areas, heavily influenced by human action and by relatively minor changes of topography.

Eleven plant communities have been described at VTS-M (Science Applications International Corporation [SAIC] 2000) (**Table C3** in **Appendix C**). Plant community delineation was based on the dominant plant species present, landform, soils, hydrologic condition, and land use. These community types were further refined by a vegetation community classification based on the National Vegetation Classification Standard (Dynamic Solutions 2006).

Forest Inventory and Management

MLAAP operated a forest management program that included the VTS-M land until the establishment of the training site. A forest inventory was conducted for the TNARNG in 1986, and a Forest Management Plan was developed based on that inventory. Records indicate that Declaration of Timber Availability was produced to initiate a 1989 sale of 20,000 board feet of hardwood sawtimber from 3 acres along major tank trails. There are no extant documents verifying that this sale took place; however, examination of the 1987 stand maps suggest that the sale was completed, and the tank trails were subsequently widened. No further timber sales were conducted as a result of the 1987 Forest Management Plan (Thompson Engineering et al. 2006).

In 2003, a salvage harvest timber sale was conducted to dispose of storm-damaged timber on approximately 30 acres of VTS-M lands. The “emergency disposal” sale was conducted through the USACE and removed 420 tons of hardwood pulpwood and 1,220 tons of hardwood sawtimber.

A forest inventory and a management plan were completed in 2006 (VTS-M 2019). VTS-M was inventoried by TA to ensure stand identification and management was compatible with other management activities on the training site. Stands were delineated through the use of aerial imagery and ground observations. The forest inventory determined that a total of 1,733 acres of the then VTS-M were covered in forests in April 2005. The forest stands are typically dominated by red oaks and white oaks, and yellow poplar is a common codominant species in many of the stands. Pine, while a relatively common constituent in the stands, only dominates or codominates in two stands covering approximately 36 acres. The average diameter at breast height for the entire Installation was 13 inches, and the average basal area was 93 square feet per acre. Most stands are 30 to 40 years old; although trees approaching 70 years in age are relatively common. The complete data for all forest stands is provided in the VTS-M Forest Management Plan (Thompson Engineering et al. 2006). The forest inventory data were utilized to develop management prescriptions for each forest stand on VTS-M based on forest health and commercial timber production goals. Military requirements and goals were then incorporated into the final Forest Management Plan for VTS-M (VTS-M 2006).

The forest stands on VTS-M have been largely neglected for a number of years. There has been no planned management of the forests since the TNARNG took over management of VTS-M in 1988. A timber inventory was recently conducted for the TNARNG at VTS-M in 2023 in anticipation of the proposed tree harvesting associated with the Proposed Action.

Wildland Fire Management

VTS-M has a long-standing wildland fire management program used to control or prevent wildfires, reduce fuels, improve training conditions, and maintain or improve biological communities and ecosystems. The wildland fire program is currently managed under the VTS-M Integrated Wildland Fire Management Plan (TNARNG 2018a) and the MLAAP Integrated Wildland Fire Management Plan (MLAAP 2018). Given the relatively wet and humid environment, with long seasons of lush green vegetative growth, wildfires have historically been uncommon, with only one to two small training-caused fires per year. Climate change predictions for the region of hotter and drier conditions indicate this may change over the long term. The roads are used to provide a system of firebreaks to contain and prevent the spread of fires.

Currently, TNARNG uses prescribed fire to enhance natural vegetation communities, reduce fuel loads, improve safety, and enhance training conditions. TNARNG also takes advantage of fire's added benefit of reducing the frequency and costs associated with maintaining open areas and intends to expand that use as agriculture and grazing leases are phased out. Natural systems in Tennessee have evolved in the presence of fire, both natural and manmade. Fires have been suppressed on the landscape for over a hundred years resulting in unnatural vegetation communities, reduced habitat quality for plants and wildlife, and less healthy and resilient natural systems. TNARNG is currently focusing its prescribed fire program on reestablishing a more natural fire cycle to improve the health and resilience of its natural communities and habitats. Approximately 300 to 400 acres of prescribed fires are conducted annually on VTS-M. All prescribed fires are conducted during the bat inactive season, when listed bats (northern long-eared bat [*Myotis septentrionalis*] and tricolored bat [*Perimyotis subflavus*]) and monarch butterflies (*Danaus plexippus*) are not present.

Fuels loads are currently higher than would normally be present, with light to moderate loads (TNARNG 2018a). These higher-than-average fuel loads increase the risk of more extreme

wildfire behavior, risk of fires moving on or off post, and subsequent risk to human safety and property. With the current climate change predictions of hotter, drier weather with more frequent drought conditions in west Tennessee, risks associated with higher fuel loads are accentuated. The VTS-M prescribed fire program is also directed at reducing these risks through fuel load reduction at a much lower cost than with mechanical methods.

Nonnative Plants

A number of nonnative plant species have been observed at VTS-M (VTS-M 2019). A survey of VTS-M for nonnative exotic species was completed in 2006 (Dynamic Solutions 2006). Chief among the problem species are privet, Japanese honeysuckle (*Lonicera japonica*), Nepalese browntop, sericea lespedeza (*Lespedeza cuneata*), and kudzu (*Pueraria montana*). An exotic species survey completed in 2013 found 20 species on VTS-M, with the most common species the same as those in the 2006 survey, with the addition of multiflora rose (*Rosa multiflora*) (VTS-M 2019). That survey also found four species with more focused distributions that would provide a good opportunity for possible eradication (tree of heaven [*Ailanthus altissima*], mimosa [*Albizia julibrissin*], winter creeper [*Euonymous fortuneii*], and Korean clover [*Kummerowia stipulacea*]) (VTS-M 2019). The full list of nonnative species observed at VTS-M is provided in **Table C4** in **Appendix C**.

All of these species are listed as "severe threats" or "significant threats" on the Tennessee Exotic Pest Plant Council (TNEPPC) list. The TNEPPC defines severe threat as an exotic plant species that possesses characteristics of invasive species and spreads easily in native plant communities and displaces native vegetation. Alternatively, a significant threat is a species that possesses the characteristics of invasive species but are not presently considered to spread as easily into native plant communities (TNEPPC 2017). All landowners are requested to control such plants if found growing on their property. In addition to impacting native communities and threatening rare or endangered plant species, these exotic pest plants can interfere with training activities. Privet and kudzu, in particular, can create dense, difficult-to-traverse stands that make an area unsuitable for mounted or dismounted maneuvers, while the thorns of the multiflora rose make foot travel uncomfortable to impossible.

As detailed in the VTS-M Invasive Pest Plant Control Plan (VTS-M 2019), control of nonnative plant species is typically a combination of manual/nonchemical efforts and application of herbicides. The use of chemical herbicides is planned carefully with regard to the waterways and extensive wetland areas at VTS-M. Care is taken to avoid drift of herbicides onto surface water or wetlands. Chemical treatment within wetlands is also restricted to herbicides that are labeled for wetland or aquatic use.

Fish and Wildlife

The fish and wildlife discussed in this section represent the common birds, mammals, fish, and reptiles that been observed at MLAAP and VTS-M during various surveys and assessments.

Mammal and Herptile Species. Selected groups of mammals were inventoried on MLAAP from 1999 to 2009 and during follow-up surveys in 2013 and 2014 (MLAAP 2014). **Table C5** in **Appendix C** includes a list of mammal species observed at MLAAP.

Herpetofauna of MLAAP was surveyed from May 1994 to September 1995, yielding 20 species of amphibians and 19 species of reptiles (MLAAP 2019). Populations of two relatively rare species of amphibians, the mole salamander (*Ambystoma talpoideum*) and the barking treefrog (*Hyla*

gratiosa), were discovered. Since then, the mole salamander has been found to be widely distributed across most of Tennessee and is no longer considered rare. However, the barking treefrog is still listed as a species in need of management in Tennessee. Monitoring of herpetofauna for the 10-year database began in 2006 with continuous annual sampling through 2013 and follow-up monitoring in 2015 and 2019. Sampling was conducted at 18 selected ponds in the four major habitat types at MLAAP. **Table C6** in **Appendix C** includes a list of herpetofauna observed at MLAAP.

A comprehensive mammal survey was conducted in 2009 at VTS-M and identified 25 mammal species. A 2015 mammal and herptile (reptile and amphibian) survey documented 23 non-bat mammals and 31 herptile species on VTS-M (VTS-M 2019). These species combined with 6 bat species documented during bat studies indicate the presence of at least 31 total mammal species on the Installation (VTS-M 2019). A 2010 herpetofauna survey identified eight reptile and eight amphibian species at VTS-M (VTS-M 2019).

Birds. Former MLAAP land and VTS-M likely represent an important site in western Tennessee for many species of birds, especially grassland birds. A pilot study of birds occurring at MLAAP was conducted from 1994 to 1995. In 1999, a breeding bird survey was initiated at MLAAP and was continued through 2003 to determine relative abundance and distribution of breeding birds on MLAAP using traditional point-count techniques. The survey was conducted annually from 2005 to 2009. Long-term monitoring surveys were conducted in 2012 and 2016. One species of concern (Cooper's hawk [*Accipiter cooperii*]) was encountered during point-counts, initially in 2003. The grasshopper sparrow (*Ammondramus savannarum*), a species listed during a portion of the survey by the TWRA as in need of management, was also found during point counts. **Table C7** in **Appendix C** includes a list of bird species observed at MLAAP.

Game Species. Game species known to occur on VTS-M include white-tailed deer, wild turkey (*Meleagris gallopavo*), northern bobwhite quail (*Colinus virginianus*), dove (*Zenaida macroura*), wood duck (*Aix sponsa*), raccoon (*Procyon lotor*), cottontail rabbit (*Sylvilagus floridanus*), and squirrel (*Sciurus niger* and *S. carolinensis*). There are currently no management activities specific to these species; instead, management efforts focus on maintenance of general wildlife habitat quality. There has not previously been a hunting program on VTS-M lands, due to its small size and linear shape and the potential for interference with training. However, on the former MLAAP lands, agricultural lands and managed forest areas provided nearly 20,000 acres within 40 hunting zones for hunting throughout the Installation (MLAAP 2019).

Aquatic Species. Aquatic fauna on VTS-M is sparse due to the ephemeral nature of the stream system. Long reaches of Halls Branch routinely dry up during the summer, and even Johns Creek may lose continuity of flow during dry years, providing less than adequate year-round habitat. The smaller tributaries are distinctly intermittent, driven by precipitation events. Walker Lake does maintain a reasonable water level in most years, but the fish population is heavily influenced by past stocking efforts implemented by the facility manager.

Fish surveys at MLAAP were first conducted from 2000 to 2001 and continued from 2004 to 2009 (MLAAP 2019). A total of 32 species of fish have been collected at MLAAP, and an additional 9 species have been collected adjacent to MLAAP in the Rutherford Fork of the Obion River. The grass carp (*Ctenopharyngodon idella*) is an exotic species occurring on MLAAP that was stocked in fish ponds to control vegetation (MLAAP 2019). **Table C8** in **Appendix C** includes a list of fish species observed at MLAAP.

An aquatic survey was conducted in 1998-1999 to determine the ichthyofauna and benthic macroinvertebrate fauna at VTS-M (SAIC 1999 and VTS-M 2019). Thirteen species and one hybrid were represented in the 280 individual fish collected in 1998 and 1999. Relatively few fish were collected from Halls Branch; most were creek chub (*Semotilus atromaculatus*). Significantly higher numbers of fish were collected from Johns Creek; most were Tennessee shiner (*Notropis leuciodu*s). More fish were collected from Walker Lake than either creek; bluegill sunfish (*Lepomis macrochirus*) was the most common species. Benthic macroinvertebrate species were also sampled as part of the 1998-1999 survey (SAIC 1999). The benthic macroinvertebrate communities exhibited low diversity and relatively few organisms. In general, the results indicated poor quality habitat and degraded conditions, primarily due to the intermittent streamflow, but also resulting from the physical characteristics of the streams (sand and silty substrate, few riffles, and steep eroded streambanks).

Invertebrates. A survey of invertebrates at MLAAP was conducted in 1997 (MLAAP 2019). Specimens from 14 orders, 118 families, and 8 subfamilies were identified. No RTE species were recorded. From 2006 to 2009, and again in 2015, the status and distribution of aquatic macroinvertebrates in selected ponds and selected sites in the Wolf Creek watershed and the Rutherford Fork of the Obion River at MLAAP was assessed. Results of the 2015 survey have not been compiled yet (MLAAP 2019). Several insects were recorded during invertebrate surveys at MLAAP (2005 through 2013), including moth, butterfly, dragonfly, damselfly, grasshopper, cricket, cockroach, mantids, stonefly, caddisfly, beetle, fly, mayfly, cicada, hopper whitefly, aphid, and scale species (MLAAP 2019). The monarch butterfly was recorded at MLAAP during previous invertebrate surveys (MLAAP 2019); this species currently is a federal candidate species under the ESA and is not yet listed or proposed for listing (**Table 26**).

Threatened and Endangered Species

The USFWS, TDEC, TWRA, and TNARNG maintain lists of plant and animal species that require special management concern based on the biological status of that species, or a designated population of that species. Three categories of federal and state listed status are considered in this EA, including:

- **Federal Threatened and Endangered Species.** The ESA of 1973 provides protection to species listed under this category. Endangered species are those species that are at risk for extinction in all or a large portion of their range. Threatened species are those that are likely to be listed as endangered in the near future.
- **Federally Proposed or Candidate Species.** These are species that the USFWS is considering for listing as threatened or endangered but for which a proposed rule has not yet been developed. Candidate species do not benefit from legal protection under the ESA. In some instances, candidate species may be emergency listed if the USFWS determines that the species population is at risk due to a potential or imminent impact. The USFWS encourages federal agencies to consider candidate species in their planning process, as they may be listed in the future.
- **State Threatened and Endangered Species.** A list of state threatened and endangered species is maintained by the State of Tennessee, and these species are protected from harassment, taking, and possession. Similar definitions of threatened and endangered in the federal category apply to the state category. State and federal lists often have considerable overlap. State

categories do not provide federal protection under the ESA but do provide a context for evaluating the sensitivity of habitats or communities.

The USFWS also maintains a list of migratory birds protected under the MBTA. Bald and golden eagles are also protected under the MBTA and the Bald and Golden Eagle Protection Act. Any activity that results in take of migratory birds or eagles is prohibited unless authorized by the USFWS. All federal actions that have the potential to affect migratory birds or eagles must be considered in the NEPA process. The USFWS maintains the Information for Planning and Conservation (IPaC), a searchable database of all federal trust resources under the management auspices of the USFWS. The list of threatened and endangered species that may occur at VTS-M was generated from the IPaC database (**Appendix B**) and indicates that nine bird species under protection of the MBTA, including bald eagles, have the potential to occur at VTS-M (**Table 26**).

The USFWS IPaC database indicates that two federally listed mammals, one nonessential experimental population bird species (Whooping Crane), one proposed reptile, and one candidate insect species have the potential to occur at VTS-M (**Table 26**). Three ESA-listed bat species, Indiana bat (*Myotis sodalis*), tricolored bat (*Perimyotis subflavus*), and gray bat (*Myotis grisescens*) have been documented on VTS-M. The monarch butterfly, a candidate species, has also been documented on the facility. The northern long-eared bat (*Myotis septentrionalis*; NLEB) has the potential to occur on VTS-M based on possible acoustic detections, but as yet remains unconfirmed by surveys. The alligator snapping turtle (*Macrochelys temminckii*) and whooping crane (*Grus americana* have the potential to be on post but remain undetected despite a long survey history at both MLAAP and VTS-M. The little brown bat (*Myotic lucifugus*), which is currently under 12-month review with a federal listing decision scheduled before project completion, has the potential to be present on VTS-M based on likely but not manually vetted acoustic detections.

Several state-listed species are known to occur within Carroll and Gibson counties (TDEC 2023), with some known to occur at VTS-MMLAAP 2019 and VTS-M 2019; **Table 26**). Portions of VTS-M have been identified as areas with special management considerations for the compass plant (*Silphium laciniatum*) (**Figure 26**). Management within these areas for compass plant includes no mowing until October to facilitate maturing and dispersal of seeds and an annual winter burn to maintain a grassy habitat (VTS-M 2019). While willowleaf aster (*Symphyotrichum praealtum*) has been identified at VTS- M (**Figure 28**), no specific management plan has been identified for the species (VTS-M 2019).

Table 26. Threatened and Endangered Species with the Potential to Occur at VTS-M

Common Name	Scientific Name	Federal Status	State Status	TDEC State Rank	Global Rank	Potential to Occur at VTS-M
Plants						
Compass Plant	*Silphium laciniatum*	None	T	S2	G5	Known to occur
Willowleaf Aster	*Symphyotrichum praealtum*	None	E	S1	G5	Known to occur
Mammals						
Indiana Bat	*Myotis sodalis*	E	None	S1	G2	Known to occur (Acoustic confirmation)
Northern Long-Eared Bat	*Myotis septentrionalis*	E	None	None	None	Possible occurrence in wooded habitats
Tricolored Bat	*Perimyotis subflavus*	PE	None	None	None	Known to occur
Gray Bat	*Myotis grisescens*	E	E	S2	G3G4	Known to occur (Acoustic confirmation)

Common Name	Scientific Name	Federal Status	State Status	TDEC State Rank	Global Rank	Potential to Occur at VTS-M
Eastern Woodrat	*Neotoma floridana*	None	D	S3	G5T5	Known to occur
Meadow Jumping Mouse	*Zapus hudsonius*	None	D	S4	G5	Known to occur
Southeastern Shrew	*Sorex longirostris*	None	D	S4	G5	Known to occur
Birds						
Whooping Crane	*Grus americana*	NE EP	None	None	G1	Unlikely; very rare migrant and winter resident in middle and east Tennessee
American Kestrel	*Falco sparverius paulus*	MBTA BCC	None	None	G5T4	Known to occur
Bald Eagle	*Haliaeetus leucocephalus*	BGEPA MBTA	D	S3	G5	Possible occurrence in areas close to large bodies of water
Barn Owl	*Tyto alba*	None	D	S3	G5	Known to occur
Chimney Swift	*Chaetura pelagica*	MBTA BCC	None	S5	G4	Likely to occur; common migrant and summer resident in Tennessee
Great Egret	*Ardea alba*	None	D	S2B S3N	G5	Known to occur
Kentucky Warbler	*Oporornis formosus*	MBTA BCC	None	S4	G5	Known to occur
Loggerhead Shrike	*Lanius ludovicianus*	None	D	S1B S2N	G4	Known to occur
Northern Harrier	*Circus cyaneus*	None	None	S4N	G5	Known to occur
Prairie Warbler	*Dendroica discolor*	MBTA BCC	None	S3S4	G5	Known to occur
Prothonotary Warbler	*Protonotaria cirea*	MBTA BCC	None	S4	G5	Known to occur
Red-Headed Woodpecker	*Melanerpes erythrocephalus*	MBTA BCC	None	S4	G5	Known to occur
Rusty Blackbird	*Euphagus carolinus*	MBTA BCC	None	S4N	G5	Unlikely to occur; uncommon migrant and winter resident across Tennessee, but much more common in western Tennessee
Sharp-Shinned Hawk	*Accipiter striatus*	None	D	S3B	G5	Known to occur
Wood Thrush	*Hylocichla mustelina*	MBTA BCC	None	S4	G5	Known to occur
Yellow-Bellied Sapsucker	*Sphyrapicus varius*	None	D	S1B S4N	G5	Known to occur
Amphibians						
Barking Tree Frog	*Hyla gratiosa*	None	D	S3	G5	Known to occur
Reptiles						
Alligator Snapping Turtle	*Mecrochelys termminckii*	PT	RVR D	S2S3	G3	Unlikely to occur; primarily occurs in western Tennessee with a few scattered records in central Tennessee. As of 2020, one record in Tennessee during the period of 2000 through 2020.*
Fish						
Chickasaw Darter	*Etheostoma cervus*	None	D	S2S3	G2G3	Unlikely to occur given the intermittent

Common Name	Scientific Name	Federal Status	State Status	TDEC State Rank	Global Rank	Potential to Occur at VTS-M
						nature of most waterbodies at VTS-M
Firebelly Darter	*Etheostoma pyrrhogaster*	None	D	S2	G2G3	Unlikely to occur given the intermittent nature of most waterbodies at VTS-M
Invertebrates						
Monarch Butterfly	*Danaus plexippus*	C	None	S4	G4	Known to occur

TDEC – Tennessee Department of Environment and Conservation; **VTS-M** – Volunteer Training Site – Milan
Federal Status: E – endangered; **PE** – proposed endangered; **NE EP** – nonessential experimental population; **PT** – proposed threatened; **C** – candidate; **BCC** – bird of conservation concern; **BGEPA** –Bald and Golden Eagle Protection Act; **MBTA** – Migratory Bird Treaty Act
State Status: E – endangered**; T** – threatened; **D** – deemed in need of management; **RVR** – rare, very rare
TDEC State Rank: S2 – very rare and imperiled within the state, 6-20 occurrences, or few remaining individuals, or because of some factor(s) making it vulnerable to extinction; **S** – rare and uncommon in the state, from 21-100 occurrences; **S4** – widespread, abundant, and apparently secure within the state, but with cause for long-term concern; **S5** – demonstrably widespread and secure in the state; **B** – breeds in Tennessee; **N** – occurs in Tennessee in a nonbreeding status (several birds)
Global Rank: G1 – critically imperiled globally; 5 or fewer occurrences worldwide imperiled globally; **G2**– imperiled globally; 6 to 20 occurrences worldwide; **G3** – very rare and local throughout its range or found locally in a restricted range, or, because of other factors, vulnerable to extinction throughout its range; **G4** – apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery; thus, it is of long-term concern; **G5** –demonstrably secure globally, though it might be quite rare in parts of its range, especially at the periphery.
* As of 2020, state natural heritage programs have records of at least 120 occurrences with confirmed individuals during the period 2000 to 2020. This count assumes that all occurrences have been delineated using the appropriate separation distances. The state breakdown is as follows: Tennessee: 1; Alabama: 6; Florida: 15; Georgia: 13; Kentucky: 1; Louisiana: 24; Missouri: 28; Mississippi: 5; Oklahoma: 8; Texas: 20. In addition, there are at least two occurrences in Arkansas (NatureServe 2023).

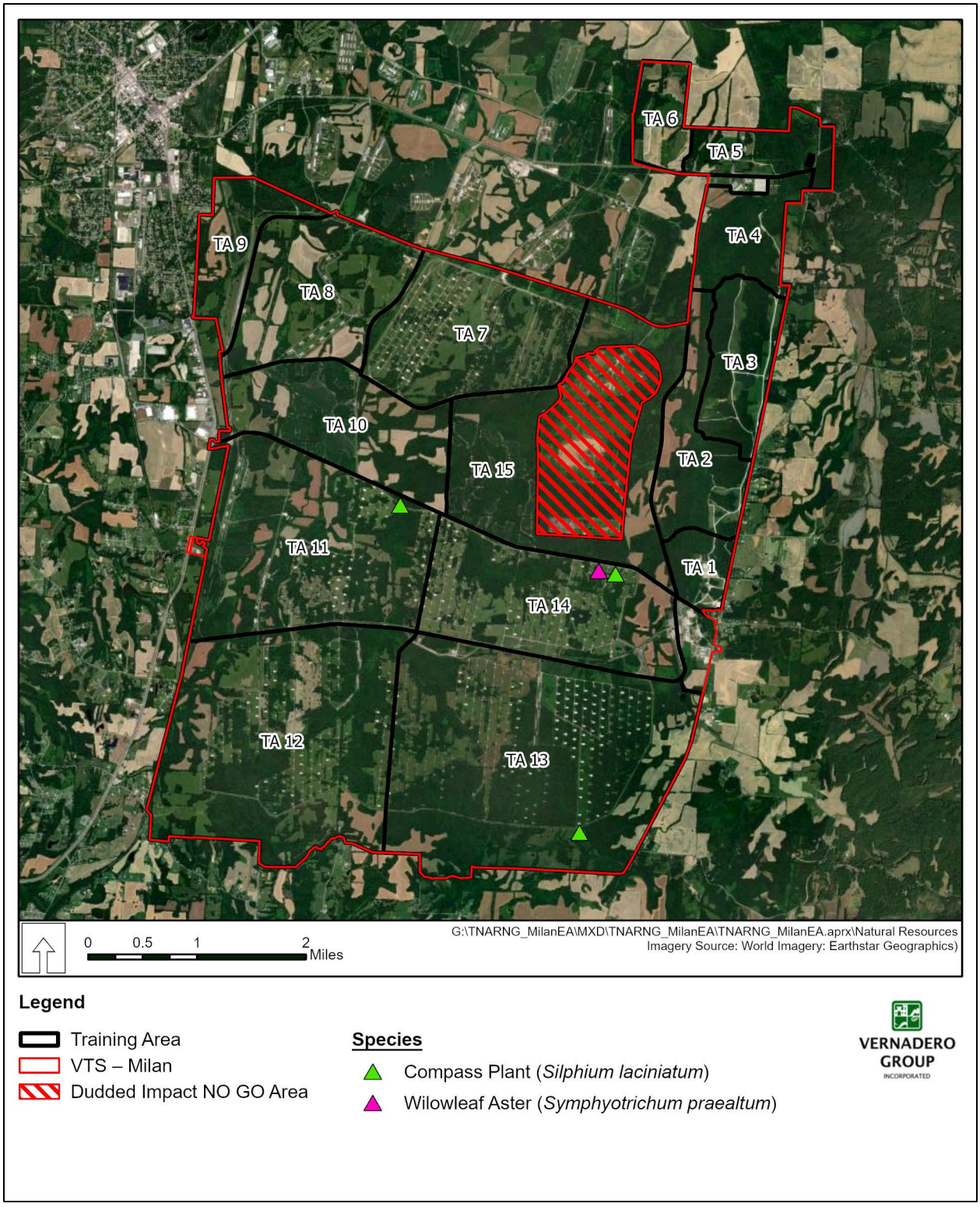

Figure 26. State Protected Plant Species Known at Volunteer Training Site – Milan

3.7.2 *Environmental Consequences*

The significance criteria for effects of the Proposed Action on biological resources are based on (1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource, (2) the proportion of the resource that would be affected relative to its occurrence in the region, (3) the sensitivity of the resource to the proposed activities, and (4) the duration of ecological ramifications. Effects on biological resources would be considered significant if implementation of a proposed action would adversely impact a threatened or endangered species and could not be mitigated, greatly diminish habitat for a plant or animal species, substantially diminish a regionally or locally important plant or animal species, interfere with wildlife movement or reproductive behavior, and/or result in an infusion of exotic plant or animal species.

Regardless of which alternative is chosen timber sales will be managed by USACE. All funds generated will be controlled by the US government. TNARNG will enter into an agreement allowing a portion of the funds to be used to support conservation initiatives on VTS-M.

Alternative A

Vegetation

Impacts on vegetation would be adverse, long term, and moderate and would result from the harvest of approximately 953.4 acres of trees, construction of up to seven tank crossing, three tank trails, and up to 30 new low water crossings. Vegetation removal would represent long-term habitat loss; however, the mixed hardwood forest habitat loss would be small in area when compared to total available habitat in Carroll and Gibson counties. The removal of trees may have moderate impacts on foraging, nesting, and other behaviors for mammals, birds (including migratory birds), reptiles, and amphibians. While any habitat loss could adversely affect individual plants and animals, the amount of impacted habitat is small compared with similar habitat available in the vicinity. Overall, population-level effects on any species are not expected as a result of vegetation removal.

Wildland Fire Management

Military training has the potential to ignite wildfires on the landscape from pyrotechnics (aerial flares, blanks, smoke grenades, artillery and hand grenade simulators, and trip flayers), ranges (live and tracer ammunition, etc.), and equipment (tank exhaust, metal sparks from tracks on rocks, etc.). Upon detection of fires on ranges, they would be immediately shut down, Range Control would be notified, and suppression efforts would begin to minimize fire spread or to extinguish the fire until fire response agencies arrived. Upon arrival, responding fire agencies would take shared control of the incident in conjunction with Range Control. If fires occur off ranges, fires would be immediately reported to range control and initial attack would be conducted by training units that ignite or discover the fire, if they can do so safely, until fire response agencies arrive and assume incident command in conjunction with Range Control.

Historically, MLAAP Fire Department and local volunteer fire departments responded to wildfires on site and had the option to request assistance from the Tennessee Department of Agriculture Forest Service if needed. As part of the training site expansion, TNARNG is developing a fire department that would be responsible for responding to structural and wildland fires, with the option to call in local fire departments and Tennessee Department of Agriculture Forest Service for assistance when needed. With the expected increase in the installation area under the Proposed Action, and range staff interest in use of fire to help maintain open areas, it is expected that

prescribed fire use would eventually be expanded to 2,400 to 3,200 acres or more per year. All prescribed fires would continue to be conducted during the bat inactive season, when listed bats and monarch butterflies are not present.

Fish and Wildlife

Impacts on wildlife would be short term and adverse and would affect only wildlife in the immediate project area. Wildlife in the proposed project area could be temporarily disturbed or displaced due to increased noise and human activity associated with the site preparation, tree harvest, construction, and training at VTS-M. While some individuals might avoid the site for the long term, the affected area is very small compared with other, similar available habitat nearby.

Tree removal and construction activities, along with TNARNG training activities, would have the potential for injury or mortality from direct wildlife strikes by vehicles or construction equipment. Mobile species, such as adult birds, would not be as susceptible to physical strikes, while others, such as smaller and/or less mobile species, would have greater potential to be impacted. To the extent practicable, TNARNG would schedule any vegetation removal associated with Alternative A to occur outside of times of increased migratory bird and bat activity. Most of the wildlife species expected at VTS-M are locally and regionally common, and mortality or injury to a small number of individuals would not result in an overall decrease in population diversity, abundance, or fitness of any species.

Threatened and Endangered Species

The state-protected compass plant, willowleaf aster, eastern woodrat, meadow jumping mouse, southeastern shrew, American kestrel, barn owl, great egret, Kentucky warbler, loggerhead shrike, northern harrier, prairie warbler, prothonotary warbler, red-headed woodpecker, sharp-shinned hawk, wood thrush, yellow-bellied sapsucker, and barking tree frog, have all been observed on the former MLAAP lands that are now part of VTS-M or during past surveys on VTS-M lands. The Indiana bat, tricolored bat, gray bat, and monarch butterfly have been documented on VTS-M. The NLEB has the potential to occur on VTS-M based on possible acoustic detections but remains unconfirmed by surveys. The little brown bat has the potential to be present on VTS-M based on acoustic detections. The alligator snapping turtle and whooping crane have never been detected on VTS-M. TNARNG has determined that the Proposed Action would have no effect on alligator snapping turtle and whooping crane (**Table 27**).

TNARNG has determined that the Proposed Action may affect and is likely to adversely affect the NLEB tricolored bat, Indiana bat, gray bat, and monarch butterfly (**Table 27**). TNARNG has prepared a draft Programmatic BA to facilitate consultation with the USFWS under the ESA for the protected bat species and the monarch butterfly. Detailed direct, indirect, and cumulative effects of the Proposed Action on listed bat species and the monarch butterfly are provided in the Programmatic BA (**Appendix B**).

Table 27. Effects Determination for Federally Listed Species with the Potential to Occur or Are Known to Occur on or near VTS-M

Species	Status	Effects Determination
Northern Long-Eared Bat (*Myotis septentrionalis*)	Threatened	May affect, likely to adversely affect
Tricolored Bat (*Perimyotis subflavus*)	Proposed endangered	May affect, likely to adversely affect

Species	Status	Effects Determination
Indiana Bat (*Myotis sodalis*)	Endangered	May affect, likely to adversely affect
Gray Bat (*Myotis grisescens*)	Endangered	May affect, likely to adversely affect
Whooping Crane (*Grus americana*)	Experimental population, nonessential	No effect
Alligator Snapping Turtle (*Mecrochelys termminckii*)	Proposed threatened	No effect
Monarch Butterfly (*Danaus plexippus*)	Candidate	May affect, likely to adversely affect

TNARNG's training activities have the potential to impact listed species over time; however, TNARNG has made efforts to avoid and minimize potential impacts to listed species. TNARNG reduced the original footprint of the timber harvest from 2,075 acres to approximately 901.4 acres. to reduce habitat loss for listed bat species and to maintain habitat connectivity throughout the landscape. Clear-cut acreage was reduced from 561 acres to 515.4 acres and thinning to a minimum tree-spacing of 20 m was reduced from 1,514 acres to 438 acres. The final design of the timber harvest also incorporated protection of approximately 108.8 acres of forested wetland and stream buffers within the clear-cut areas. Pathways of the thinned portions of maneuver corridors were also diverted to avoid and protect approximately 17 acres of forested wetlands. By protecting these forested wetlands and buffers, some of the highest quality habitat for forest-dwelling NLEB, Indiana, and tri-colored bats would remain on the landscape. Tree harvest would occur during the bat inactive season (15 October through 31 March) to avoid potential impacts on roosting and rearing bats. Timber harvest water quality protection measures and BMPs would vary by location but would follow standards established in the Tennessee Best Management Practices for Logging as stated in the *Guide to Forestry Best Management Practices in Tennessee*. Following these BMPs would reduce the potential for siltation and other water quality impacts on streams, which would benefit aquatic insects that serve as potential prey for foraging bats.

To compensate for habitat loss associated with the timber harvests and other proposed actions, TNAARNG would set aside approximately 3,416 acres of forest in two large tracts in perpetuity (**Figure 27**). Within the two set-aside areas, training would still be permitted; however, trees and snags would not be removed except when presenting a safety risk to people or property. TNARNG would monitor snag densities in the set aside areas at least every 3 to 5 years and maintain them as high-quality roost habitat by girdling trees for snag creation and/or installing artificial roost structures as needed. The proposed set-aside area contains 2,803 acres of forested land and 613 acres of open areas. Some of the open areas are around abandoned munitions storage igloos/bunkers, and some are in agriculture and grazing leases. These open areas would be permitted to succeed back to forest conditions to replace lost forest habitat. This action is an RPM agreement between TNARNG and USFWS and is referenced in the Draft Programmatic BA.

TNARNG would undertake several additional efforts to improve habitat for listed forest-dwelling bat species. In areas that are currently too dense for bat use, harvesting, prescribed fire, and mechanical and chemical thinning will be used to create conditions more suitable for their use.

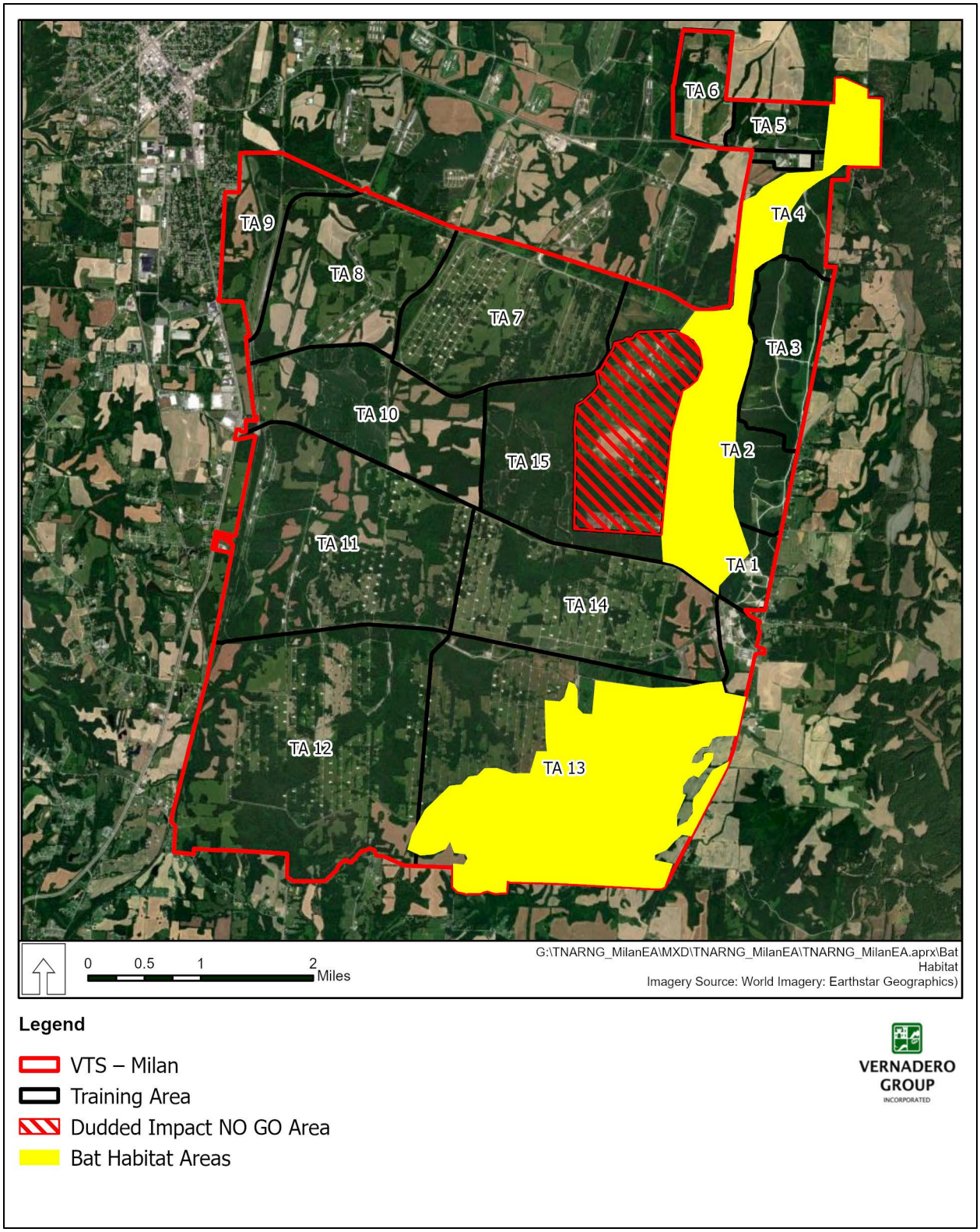

Figure 27. Proposed Bat Habitat Set-Aside Areas at Volunteer Training Site – Milan

To prevent or minimize potential impacts, the outdoor lighting plan would include bat-friendly lighting that incorporates the use of building and security light fixtures that direct light downward and not sideways or up, in conjunction with light-emitting diodes (LEDs) designed to produce wavelengths less visible and less disturbing to listed bats (amber to red spectrum). These LED lights would prevent concentrating insects and therefore bats in open areas near occupied buildings, reducing impediments to commuting and foraging, and reducing susceptibility to predation.

Use of pesticides would be restricted to the minimum effective amount/concentration, alter using methods that minimize drift and adhering to the application situation restrictions of the label. This would minimize potential effects on plants and insects, including the monarch butterfly, in surrounding areas, water bodies, bat insect forage species, and the potential for impacting nearby water sources. Further, TNARNG would make efforts to avoid and minimize the project's potential impacts on milkweed, the host plant for the monarch butterfly.

TNARNG would continue to monitor bat populations on VTS-M every 2 to 5 years, based on funding availability, as described in the INRMP (VTS-M 2019). Surveys would adhere to current guidelines established by USFWS for NLEB and Indiana bats. Radio telemetry would be used to identify and protect high-use areas, roosts, and/or maternity colonies of listed bat species. Snag densities would be monitored, and optimum densities maintained and/or created in set-aside areas and those identified as high use with roosts and/or maternity colonies through telemetry, to protect and enhance the best roosting and foraging habitat. Additionally, natural roosting sites may be supplemented by installing bat boxes and/or additional BrandenBark™ structures.

Alternative B (Preferred)

Vegetation

Impacts on vegetation would be long term, adverse, and moderate. Alternative B would result in impacts on vegetation from the harvest of approximately 3,762 acres of trees, construction of up to seven tank crossing, three tank trails, and up to 30 new low water crossings. Vegetation removal associated with Alternative B would have the same impacts as Alternative A.

Fish and Wildlife

Impacts on wildlife would be the same as those described for Alternative A.

Threatened and Endangered Species

Impacts from Alternative B, and the environmental protection measures to be implemented, would be the same as those described for Alternative A.

No Action Alternative

No effects on biological resources would occur. The Proposed Action would not be implemented. There would be neither beneficial nor adverse effects on vegetation, fish, and wildlife, or threatened and endangered species, and these resources would not change when compared to existing conditions.

Cumulative Effects

The Proposed Action and reasonably foreseeable future actions would result in localized, direct and indirect cumulative impacts on vegetation and wildlife due to tree harvest, infrastructure improvements (road, trail, new range construction), and increased training activities. The proposed

tree removal activities could result in potential direct and indirect cumulative impacts on federally listed species, none of which would be significant. TNARNG would consult with the USFWS for future projects that have the potential to affect habitat for federally listed bat species.

The TNARNG will complete formal ESA §7 Consultation with the USFWS for this agency action. TNARNG will implement the conservation measures identified in the Draft BA that it will submit to USFWS's Cookeville Field Office. These BA conservation measures are intended to avoid/minimize the proposed actions' impact on listed species and/or to provide a benefit to the species. TNARNG will also implement any RPMs identified in the USFWS's BO. TNARNG and ARNG G-9 will work with USFWS to develop RPMs for inclusion in their final BO. Preliminarily, TNARNG has agreed to provide conservation benefits for the bats on two large tracts of forest at Milan VTS – approximately 3,416 acres - in perpetuity. This TNARNG commitment will be memorialized in the Final BO issued by USFWS.

3.8 Cultural Resources

3.8.1 *Affected Environment*

VTS-M's expanded TAs were investigated during a 2022 archaeological survey (Pruitt et al. 2023; **Appendix B**). The 2022 and other archaeological investigations at VTS-M have located 37 archaeological sites, 17 isolated finds, and 22 cemeteries (6 of which are also recorded as archaeological sites) (**Table 28**). One archaeological site (40CL69), a prehistoric artifact scatter and historic house site on the east side of VTS-M, has been determined to be eligible for the NRHP (**Table 29**). Three sites (40CL71, 40CL73, and 40CL143) are unassessed pending additional Phase II testing. Sites 40CL71 and 40CL73 are both historic cemeteries, and Site 40CL143 is a historic house site. Based on conversations with TNARNG, Phase II testing will be completed within the next five years. The remaining 33 sites are not eligible for the NRHP and require no further management.

Table 28. Summary of Cultural Resource Investigations at VTS-Milan

Date	Description	Agency/Client	Consultant	Reference
1984	Archaeological overview and management plan for the MLAAP	National Park Service and U.S. Army Material Development and Readiness	Woodward-Clyde Consultants	Smith and Hartsell 1984
1984	HABS/HAER documentation of MLAAP architecture	USACE, Mobile District	Building Technology Inc.	Hess 1985
1986-1987	Cultural resources survey of selected portions of MLAAP	USACE, Mobile District	USACE, Mobile District	USACE 1987
1989	MLAAP Historic Preservation Plan	USACE, Mobile District	Building Technology Inc.; USACE, Mobile District	USACE 1989
1999	Phase I cultural resource survey of the Milan Training Center	SAIC	TRC Garrow Associates Inc.	Stanyard et al. 1999
2004	NRHP eligibility evaluation of MLAAP	USACE Research Lab	Grashof Design Studio, Inc	Grashof 2004
2004	Phase I archeological survey of the TNARNG Milan Volunteer Training Site (VTS)	TNARNG	TRC Garrow Associates Inc.	Deter-Wolf 2005
2006	Investigations of cemeteries at the TNARNG Milan and Tullahoma VTSs	TNARNG	TRC Garrow Associates Inc.	Deter-Wolf and Karpynec 2006
2015	Architectural survey and evaluation of 99 buildings and structures at the MLAAP	Tetra Tech; USACE, Mobile District	New South Associates Inc.	Price 2015

Date	Description	Agency/Client	Consultant	Reference
2017	GPR survey of the Adams Cemetery (40CL73)	TNARNG	MRS Consultants LLC.	Meyer and Beasley 2017
2020	Phase I archaeological survey of 452 acres at VTS-M	TNARNG	Cumberland Applied Research Associates Inc.	Kroulek 2021
2021	GPR survey of Sites 40CL70 and 40CL72	TNARNG	Cumberland Applied Research Associates Inc.	Kroulek 2022
2022	GPR of the Lucy Bryant Cemetery (40CL74)	TNARNG	Dudek	Comeau and Lynch 2022
2022	Phase II archaeological testing of 40CL69, 40CL118, 40CL119, and 40CL120	TNARNG	Cumberland Applied Research Associates Inc.	Kroulek et al. 2023
2022	Phase I archaeological survey of the TNARNG portion of the MLAAP	Vernadero and TNARNG	Brockington and Associates Inc.	Pruitt et al. 2023

MLAAP – Milan Army Ammunition Plant; **HABS** – Historic American Buildings Survey; **HAER** – Historic American Engineering Record; **USACE** – U.S. Army Corps of Engineers; **SAIC** – Science Applications International Corporation; **NRHP** – National Register of Historic Places; **TNARNG** – Tennessee Army National Guard; **VTS** – Volunteer Training Site; **GPR** – ground-penetrating radar; **VTS-M** – Volunteer Training Site – Milan

Table 29. Eligible and Unassessed Archaeological Sites at VTS-Milan

Resources Number /Name	Cultural Affiliation	Description	Reference	National Register of Historic Places Status
40CL69	Archaic; mid-nineteenth to early twentieth century	Prehistoric artifact scatter; historic house site	Kroulek 2021; Kroulek et al. 2023; Stanyard et al. 1999	Eligible
40CL71/ J.C. Smith Family Cemetery	Mid- to late nineteenth century (c.1846-1881)	Historic cemetery	Deter-Wolf and Karpynec 2006; Stanyard et al. 1999	Unassessed (additional work needed); protected by Tennessee burial laws
40CL73/ Adams Cemetery	Mid-nineteenth to early twentieth century (c.1851-1918)	Historic cemetery	Kroulek 2021; Meyer and Beasley 2017; Stanyard et al. 1999	Unassessed (additional work needed); protected by Tennessee burial laws
40CL143	Unknown prehistoric; late nineteenth to early twentieth century	Prehistoric lithic scatter; historic house site	Pruitt et al. 2023	Unassessed; additional Phase II testing needed

Three cemeteries are NRHP-eligible (Cemeteries [Cems] 4, 7, and 14), and 16 cemeteries are considered unassessed pending additional investigations (**Table 30**). The three remaining cemeteries have been determined to be ineligible for the NRHP. All 22 recorded cemeteries are also protected by Tennessee burial laws (Tennessee Code Annotated [TCA] 39-17-311 to 312; TCA 46-4-101 to 104; TCA 46-8-101 to 103; TCA 68-3-508; and Rule 1200-7-1-.08). All cemeteries are currently fenced or marked with metal stakes and are designated as completely off limits for training purposes. While the precise boundaries of some cemeteries are unknown, all cemeteries are protected by a restrictive buffer of 10 to 20 meters.

Table 30. Historic Cemeteries at VTS-Milan

Resource Number/Name	Cultural Affiliation	Reference	National Register of Historic Places Status
40CL70	Unknown historic	Deter-Wolf and Karpynec 2006; Kroulek 2022; Stanyard et al. 1999	Not eligible; protected by Tennessee burial laws
40CL71/J.C. Smith Family Cemetery	Mid- to late nineteenth century	Deter-Wolf and Karpynec 2006; Stanyard et al. 1999	Unassessed (additional work needed); protected by Tennessee burial laws
40CL72	Unknown historic	Deter-Wolf and Karpynec 2006; Kroulek 2022; Stanyard et al. 1999	Not eligible; protected by Tennessee burial laws
40CL73/Adams Cemetery	Mid-nineteenth to early twentieth century	Kroulek 2021; Meyer and Beasley 2017; Stanyard et al. 1999	Unassessed (additional work needed); protected by Tennessee burial laws
40CL74/Lucy Bryant Cemetery	Unknown historic	Comeau and Lynch 2022; Deter-Wolf and Karpynec 2006; Kroulek 2021; Stanyard et al. 1999	Not eligible; protected by Tennessee burial laws
40CL145/Shiloh Methodist Church and Cemetery	Mid-nineteenth century to present (European American)	Pruitt et al. 2023	Unassessed under Criterion D; protected by Tennessee burial laws
Cem 4/Friendship Cemetery	Mid-nineteenth century to present (European American)	Pruitt et al. 2023	Eligible (Criterion C); protected by Tennessee burial laws
Cem 5/Killen Cemetery	Unknown historic	Pruitt et al. 2023	Unassessed under Criterion D; Protected by Tennessee burial laws
Cem 6/Moore Cemetery	Unknown historic	Pruitt et al. 2023	Unassessed under Criterion D; protected by Tennessee burial laws
Cem 7/Blankenship Cemetery	Mid-nineteenth to early twentieth century (European American)	Pruitt et al. 2023	Eligible (Criterion C); protected by Tennessee burial laws
Cem 8/Elam Family Cemetery	Mid- to late nineteenth century (European American)	Pruitt et al. 2023	Unassessed under Criterion D; protected by Tennessee burial laws
Cem 9/Elam Cemetery	Unknown historic (African American)	Pruitt et al. 2023	Unassessed under Criterion D; protected by Tennessee burial laws
Cem 10/Williams Cemetery	Unknown historic	Pruitt et al. 2023	Unassessed under Criterion D; protected by Tennessee burial laws
Cem 11/ Lavinia/Strayhorn Cemetery	Late nineteenth to early twentieth century (African American)	Pruitt et al. 2023	Unassessed under Criterion D; protected by Tennessee burial laws
Cem 12/Barksdale Cemetery	Unknown historic	Pruitt et al. 2023	Unassessed under Criterion D; protected by Tennessee burial laws
Cem 13/Cooke Cemetery	Unknown historic	Pruitt et al. 2023	Unassessed under Criterion D; protected by Tennessee burial laws
Cem 14/Burrow Cemetery	Unknown historic (African American)	Pruitt et al. 2023	Eligible (Criterion C); protected by Tennessee burial laws
Cem 15/Achison Cemetery	Late nineteenth to early twentieth century (African American)	Pruitt et al. 2023	Unassessed under Criterion D; protected by Tennessee burial laws
Cem 16/Sires Cemetery	Unknown historic	Pruitt et al. 2023	Unassessed under Criterion D; protected by Tennessee burial laws

Resource Number/Name	Cultural Affiliation	Reference	National Register of Historic Places Status
Cem 17/Haynes Cemetery	Mid-nineteenth century (European American)	Pruitt et al. 2023	Unassessed under Criterion D; protected by Tennessee burial laws
Cem 19/Hope Hill Cemetery	Mid-nineteenth century to present (European American)	Pruitt et al. 2023	Unassessed under Criterion D; protected by Tennessee burial laws
Hope Hill Cemetery 2	Late nineteenth century to present (African American)	Pruitt et al. 2023	Unassessed under Criterion D; protected by Tennessee burial laws
40CL70	Unknown historic	Deter-Wolf and Karpynec 2006; Kroulek 2022; Stanyard et al. 1999	Not Eligible; protected by Tennessee burial laws

Cem – cemetery

Numerous surveys of World War II and Cold War Era buildings and structures have been undertaken at VTS-M. As a result of these surveys, the entire MLAAP installation was documented as a historic district (MLAAP Historic District) (Grashof 2004). This resource has been determined NRHP-eligible with several contributing elements. Nine contributing resources have been documented within VTS-M (I-1; I-2; I-18; I-19; I-21; I-23; I-152; I-215; Area Q) (**Table 31**). Two of these were documented and demolished with concurrence from the SHPO in 2005 (I-23 and Area Q). Additionally, Resource I-215 does not require further Section 106 consultation due to the 2006 Program Comments for World War II and Cold War Era (1939-1974) Army Ammunition Production Facilities and Plants. Therefore, only six contributing resources remain within VTS-M. These resources are all located within the cantonment area and would not be affected by proposed expanded training activities.

Table 31. Contributing Resources of the MLAAP Historic District at VTS-M

Resource	Past Use	Current Use	Description	Date	Reference	Current Status
I-1	Administration Building	Classroom/comm and post exercise building	T-shaped brick administration building	1941	Stanyard et al. 1999	Present
I-2	Administration/ Fire Control/Clinic/ Post Stockade	Offices/ classroom	L-shaped brick administration building	1941	Stanyard et al. 1999	Present
I-18	Multifamily Dwelling	Multifamily dwelling	Colonial Revival brick duplex building	1941	Stanyard et al. 1999	Present
I-19	Multifamily Dwelling	Multifamily dwelling	Colonial Revival brick duplex building	1941	Stanyard et al. 1999	Present
I-21	Post Commander's Quarters	Single-family dwelling	Minimal Traditional frame dwelling	1941	Stanyard et al. 1999	Present
I-23	Dining Hall	N/A	Front-gabled terracotta tile cafeteria	1941	Stanyard et al. 1999	Demolished
I-152	Storage	Welding shop	Front-gabled metal Butler Building	1945	Stanyard et al. 1999	Present
I-215	Sand Storage	Engineering maintenance facility	Uncovered concrete block storage structure	1941	Price 2015	No further management due to Advisory Council on Historic Preservation program comments

Resource	Past Use	Current Use	Description	Date	Reference	Current Status
Area Q	Military Housing	N/A	Two-story frame Classical Revival residences and garages (Buildings Q0001-Q0036)	1941	Grashof 2004	Demolished

N/A – not applicable

No traditional cultural properties have been identified at VTS-M through previous consultation efforts. No federally recognized tribes have identified traditional cultural properties.

TNARNG initiated government-to-government consultation regarding the Proposed Action with nine Native American tribes on 2 August 2023 (**Appendix A**). These nine tribes were also invited to comment on potential impacts to cultural resources as a result of the Proposed Action. To date, none of the tribes have expressed any concerns related to the project (**Appendix A**).

In summary, TNARNG has determined that the proposed comprehensive TA areas of potential effect (APEs) contain a portion of one NRHP-eligible historic district (six contributing resources), one NRHP-eligible site (40CL69), three archaeological sites that are unassessed pending additional Phase II testing (40CL71, 40CL73, 40CL143), and 22 cemeteries (including Sites 40CL71 and 40CL73). No sacred sites, traditional cultural properties, or other tribal resources have been identified in the APE.

3.8.2 *Environmental Consequences*

Section 106 of the NHPA requires all federal agencies to assess the effects of their undertakings on historic properties and seek to avoid, minimize, or mitigate adverse effects on those properties [36 CFR 800.1(a)]. For cultural resource analysis, the APE is used as the region of influence (ROI). APE is defined as the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR 800.16[d]), and thereby diminish their historic integrity.

Direct effects include alteration or damage during construction activities. Indirect effects include the introduction of visual, audible, or atmospheric elements that are out of character with a property or that alter its historic setting. Direct and indirect effects are considered adverse if a project would cause a change in the quality of a property that qualifies it for inclusion in the NRHP. The APE for direct effects includes the footprints of the TAs where potential ground disturbance may occur. The APE for indirect effects includes a 1,000-foot buffer surrounding the TAs to account for noise or visual impacts.

Alternative A

Archaeological Sites

One potentially eligible site (unassessed pending additional Phase II testing), Site 40CL143, a historic house site with intact surface features (e.g., well, foundation, privy) was identified in 2022 (Pruitt et al. 2023). Under Alternative A, Site 40CL143 is located directly north of the proposed Central Tank Trail in a Heavy Maneuver Area (TA 15) within a Proposed Ranges Surface Danger Zone. Proposed training activities have the potential to physically impact the site.

VTS-M also currently includes one NRHP-eligible archaeological site (40CL69), (Kroulek et al. 2023). Site 40CL69 is a prehistoric artifact scatter and historic house site located near the eastern

border of VTS-M, at the edge of a Light Maneuver Area (TA 3). The site is currently managed and protected, and existing and proposed training activities would not physically impact the site.

Two other previously recorded sites (both historic cemeteries) are considered unassessed pending additional investigation (40CL71 and 40CL73) (Deter-Wolf and Karpynec 2006; Kroulek 2021). Under Alternative A, Site 40CL71 is in the cantonment area and Site 40CL73 is in a Light Maneuver Area (TA 3). Both historic cemeteries are fenced and protected; no current or proposed training activities would occur within these boundaries.

Alternative A would not physically affect any archaeological sites that have been determined eligible for the NRHP (40CL69) or the two unassessed cemetery sites (40CL71 and 40CL73). However, 40CL143 may be affected by the construction and use of the Central Tank Trail directly to the south, use of a Heavy Maneuver Area (TA 15), and activity within a Proposed Ranges Surface Danger Zone. Use of mounted tracked and/or wheeled vehicles, emplacement of obstacles, and/or engineering digging exercises within or adjacent to the site could negatively impact the site. On 22 March 2024, SHPO concurred with TNARNG's determinations (**Appendix A**) for the for the 21 archaeological sites investigated and that Site 40CL143 is potentially eligible and should be avoided by all ground-disturbing activities or subjected to additional archaeological investigation. Like cemeteries, Site 40CL143 would be fenced or marked with metal stakes and designated as completely off limits for training purposes (TNARNG 2018b).

Cemeteries

Cemeteries are currently no-go areas for training. For expanded training under Alternative A, TNARNG would stake a 50-meter buffer around each cemetery and produce maps for avoidance to be used during most training activities.

Under Alternative A, all the NRHP-eligible cemeteries (Cems 4, 7, and 14) are in Heavy Maneuver Areas (TAs 7, 13A, and 15). Due to the 50-meter buffer around each cemetery and proposed avoidance of these areas, none of the cemeteries would be physically impacted by proposed heavy maneuver training activities with implementation of this alternative.

Under Alternative A, one of the unassessed cemeteries is located within the proposed Engagement Area and tree harvest clear-cut area (Cem 8), and 11 cemeteries are located within proposed Ranges Surface Danger Zones (Cems 6, 7, 8, 9, 10, 12, 13, 15, 16, 17, and 19). Three cemeteries (Cem 12, 13, and 15) that would be located within proposed Ranges Surface Danger Zones are also located directly adjacent to proposed tree harvest thinning areas. The remaining cemeteries are located within areas proposed as Light and Heavy Maneuver Areas. One ineligible cemetery (40CL74) is located within a proposed Ranges Surface Danger Zone in TA 2. However, due to the 50-meter buffer around each cemetery and proposed avoidance of these areas, none of the cemeteries would be physically impacted by the proposed training activities associated with **Alternative A**.

Architectural Resources

Architectural surveys have been completed for World War II and Cold War Era buildings and structures at VTS-M (Grashof 2004; Price 2015). All buildings at least 50 years of age through 2015 have been evaluated. The majority of VTS-M is located within a large NRHP-eligible historic district (MLAAP Historic District). The six remaining contributing elements to the historic district within VTS-M are located within the proposed cantonment area (I-1; I-2; I-18; I-19; I-21; I-152) (see **Table 31**).

Under Alternative A, none of these resources would be physically impacted; no building demolition or modification would occur. Proposed actions within the cantonment area include improving the transportation infrastructure to reduce traffic in maintenance areas and facilitate access between the cantonment area and ranges. Therefore, Alternative A would have no effect on the NRHP-eligible buildings or the NRHP-eligible historic district. On 22 March 2024, SHPO concurred with TNARNG's determinations (**Appendix A**).

Alternative B (Preferred)

Archaeological Sites

Under Alternative B, Site 40CL143 is located directly north of the Central Tank Trail in a Heavy Maneuver Area (TA 15) within a proposed Ranges Surface Danger Zone. Proposed training activities have the potential to physically impact the site. Site 40CL69 is located at the edge of a proposed Light Maneuver Area (TA 3). The site is currently managed and protected, and existing and proposed training activities would not physically impact the site. Site 40CL71 is in the cantonment area and Site 40CL73 is in a Light Maneuver Area (TA 3). Both historic cemeteries are fenced and protected; no current or proposed training activities would occur within these boundaries.

Alternative B would not physically affect any archaeological sites that have been determined eligible for the NRHP (40CL69) or the two unassessed cemetery sites (40CL71 and 40CL73). However, Site 40CL143 may be affected by the construction and use of the proposed Central Tank Trail directly to the south, use of a Heavy Maneuver Area (TA 15), and activity within a proposed Ranges Surface Danger Zone. Use of mounted tracked and/or wheeled vehicles, emplacement of obstacles, and/or engineering digging exercises within or adjacent to the site could negatively impact the site. On 22 March 2024, SHPO concurred with TNARNG's determinations (**Appendix A**) for the for the 21 archaeological sites investigated and that Site 40CL143 is potentially eligible and should be avoided by all ground-disturbing activities or subjected to additional archaeological investigation.

Cemeteries

Cemeteries are currently no-go areas for training. For expanded training under Alternative B, TNARNG plans to stake a 50-meter buffer around each cemetery and produce maps for avoidance during most training activities.

Under Alternative B, all the NRHP-eligible cemeteries are in proposed Heavy Maneuver Areas. Due to the 50-meter buffer around each cemetery and proposed avoidance of these areas, none of the cemeteries would be physically impacted by proposed heavy maneuver training activities.

Due to the 50-meter buffer around each cemetery and proposed avoidance of these areas, no cemeteries would be physically impacted by the proposed training activities under Alternative B.

Architectural Resources

Under Alternative B, none of the architectural resources previously described under Alternative A would be physically impacted; no building demolition or modification would occur. Proposed actions within the cantonment area include improvements to transportation infrastructure to reduce traffic in maintenance areas and facilitate access between the cantonment area and ranges. Therefore, Alternative B would have no effect on the NRHP-eligible buildings or the NRHP-

eligible historic district. On 22 March 2024, SHPO concurred with TNARNG's determinations (**Appendix A**).

No Action Alternative

Under the no action alternative there would be no effect on any cultural resource because there would be no construction, ground-disturbing activities, or increased training actions.

Cumulative Effects

Cumulative effects include minor actions that occur over time that can have a larger or cumulative effect.

Use of heavy tracked and wheeled vehicles within NRHP-eligible or unassessed archaeological sites or adjacent to cemeteries could cause damage to surface features, as well as considerable soil compaction and disturbance. Vibrations created by these vehicles could also gradually cause damage to headstones in the cemeteries. If the markers are already in poor condition, vibrations could exacerbate cracks and cause them to topple. Similarly, vibrations caused by maneuvering heavy equipment around the NRHP-eligible buildings could deteriorate building materials and structure (e.g., windows, concrete, roofing), especially if the buildings are in poor condition.

It is possible that dismounted pedestrian training within NRHP-eligible or unassessed archaeological sites or adjacent to cemeteries could cause damage. Large numbers of personnel moving on foot through an area could, over time, expose shallowly buried deposits. Digging or constructing fighting positions would negatively impact archaeological sites and cemeteries. Additionally, use of these areas for assembly areas, bivouac sites, and base camps could cause surface disturbance and soil compaction.

Firing small-arms weapons within NRHP-eligible or unassessed archaeological sites or adjacent to cemeteries could cause damage to surface features (e.g., foundations, wells, chimneys) and/or headstones or other grave markers.

3.9 Socioeconomics

This section describes the socioeconomic environment of the ROI surrounding VTS-M, including employment, income, population, and housing. The socioeconomic ROI is the geographic area within which most of the impacts on socioeconomic resources would be concentrated. The socioeconomic ROI for VTS-M is Carroll, Gibson, and Madison counties. Parts of VTS-M are in Carroll and Gibson counties, and VTS-M is approximately 20 miles north of the Jackson, Tennessee, Metropolitan Statistical Area. Jackson is the largest metropolitan area in the ROI and is about halfway between Memphis and Nashville. The city of Milan in Gibson County is adjacent to VTS-M to the west. Humboldt, Tennessee, about 12 miles southwest of Milan, is the largest city in Gibson County, and Huntingdon, Tennessee, about 20 miles east of MLAAP, is the county seat of Carroll County.

3.9.1 *Affected Environment*

Population

VTS-M is in a relatively rural area, with ROI population density of 99 people per square mile. The ROI's 2019 population was 174,884, a decrease of 1 percent from the 2010 population of 176,476 (**Table C9** in **Appendix C;** U.S. Census Bureau 2021a). During the same time period, Tennessee's population grew by 8 percent and the U.S. population increased by 6 percent (**Table C9** in

Appendix C; U.S. Census Bureau 2021a). The population in all counties in the ROI decreased slightly between 2010 and 2019 (**Table C9** in **Appendix C;** U.S. Census Bureau 2021a). Madison County had the smallest population decrease at less than 1 percent; Carroll County had the largest at about 3 percent (**Table C9** in **Appendix C;** U.S. Census Bureau 2021a). Within the ROI, the number of persons per household is the same, or nearly so, as state and national average (**Table C9** in **Appendix C;** U.S. Census Bureau 2021a).

Industry

VTS-M is in a rural, agricultural area with light-to-medium industry. Farming accounted for 2 percent of total employment within the ROI (**Table C10** in **Appendix C;** Bureau of Economic Analysis [BEA] 2020a). The largest share of nonfarm employment in the ROI is concentrated in five sectors of the economy: government (17 percent, which includes military, federal civilian, and state and local government), manufacturing (12 percent), retail trade (11 percent), healthcare and social assistance (9 percent), and accommodation and food services (7 percent) (**Table C10** in **Appendix C;** BEA 2020a). Together, these five sectors accounted for 56 percent of employment within the ROI (**Table C10** in **Appendix C;** BEA 2020a).

Employment

Top employers in the ROI include city and county governments, public school districts, manufacturing companies, regional hospitals and healthcare centers, and Walmart retail stores. The largest single employer in the ROI is the Jackson-Madison County General Hospital with about 5,000 employees. Other hospitals and healthcare employers in the region are Baptist Memorial Hospital, McKenzie Hospital and Medical Center, Tennova Healthcare, and the Winfrey Center. Manufacturing companies in the ROI include AADG (metal doors), Delta Faucet, Gerdau Ameristeel US Inc., Granges (metal industry supplier), Maclean Power Systems, Pinnacle Foods, Pringles, and Porter-Cable (power tools). Each of these companies employs 220 to 900 people (Tennessee Department of Economic and Community Development 2020).

Farmers lease 7,645 acres, which is about 1 percent of the 608,158 acres of farmland in the ROI (MLAAP 2020, 2021; USDA 2017). The leases generate approximately $721,000 annually, with about $300,000 of that invested back into the local economy through land improvement contracts issued by MLAAP. Per the USDA Farm Service Agency, crop production of the leased land generates $2.4 million annually. This is 1 percent of the $239.2 million produced in the ROI in 2017 (USDA 2017). MLAAP had 57 active agricultural leases that are leased by 17 farms. Each farm employs an average of four people, for a total of 68 farm employees.

Table C11 in **Appendix C** provides employment and unemployment trends in the ROI (Bureau of Labor Statistics 2021). Within the ROI, total employment increased by 6 percent (4,563 jobs) between 2010 and 2019. The largest share of total employment was in Madison County (60 percent); Madison County accounted for almost all (96 percent) of the employment increase in the ROI between 2010 and 2019 (**Table C11** in **Appendix C**; Bureau of Labor Statistics 2021).

Unemployment trends from 2010 to 2019 within the ROI mirrored that of the nation and the state, with unemployment rates decreasing during that time period (**Table C11** in **Appendix C**; Bureau of Labor Statistics 2021). Within the ROI, the 2019 annual unemployment rate was 3.9 percent, which is close to the 2019 national and state unemployment rates of 3.7 percent and 3.4 percent, respectively (**Table C11** in **Appendix C**; Bureau of Labor Statistics 2021). Unemployment in the ROI counties in 2019 ranged from a high of 4.8 percent in Carroll County to a low of 3.6 percent

in Madison County (**Table C11** in **Appendix C**; Bureau of Labor Statistics 2021). As of October 2023, the U.S. unemployment rate was 3.9 percent, the Tennessee rate was 3.2 percent, and the ROI rate was 3.4 percent (Bureau of Labor Statistics 2023).

Income

Table C12 in **Appendix C** provides income data in the ROI income data (BEA 2020b). Within the ROI, total personal income increased 28 percent between 2010 and 2019, compared to 47 percent for Tennessee and 48 percent for the United States during the same time period (**Table C12** in **Appendix C;** BEA 2020b). Per capita income within the ROI is lower than state and national income levels. The 2019 per capita personal income within the ROI was $41,894, which was 86 percent of the state's per capita personal income ($48,684) and 74 percent of the national per capita personal income ($56,490) (**Table C12** in **Appendix C;** BEA 2020b). Within the ROI, per capita personal income increased by 29 percent between 2010 and 2019. For comparison, Tennessee's per capita personal income increased by 37 percent and the per capita personal income for the U.S. increased by 39 percent during the same time period (**Table C12** in **Appendix C;** BEA 2020b).

Housing

VTS-M has no on-post housing. The family housing units in the former MLAAP Area Q were vacated in September 2004 and subsequently demolished (Kennedy 2014). There were an estimated 78,973 housing units within the ROI (**Table C13** in **Appendix C;** U.S. Census Bureau 2021b). More than half (55 percent) of the housing units were in Madison County (**Table C13** in **Appendix C;** U.S. Census Bureau 2021b). The ROI has 10,747 vacant housing units (14 percent of the housing stock). The percent of vacant units was highest in Carroll County (17 percent) and lowest in Madison County (12 percent) (**Table C13** in **Appendix C;** U.S. Census Bureau 2021b). The ROI had 2,359 vacant units that were available for rent or for sale, accounting for 22 percent of the vacant housing units and 3 percent of the total number of housing units (**Table C13** in **Appendix C;** U.S. Census Bureau 2021b).

Schools

VTS-M has no on-post schools. The city of Milan public school district has an elementary school, a middle school, and a high school. The nearest school to VTS-M is Milan High School, less than a mile to the north. The Milan School District student enrollment is 1,996, with 800 in elementary, 575 in middle, and 621 in high school (National Center for Education Statistics [NCES] 2022). The ROI has 13 public school districts with a total of 59 schools and an enrollment of about 26,470 students. Madison County also has eight private schools with a student enrollment of about 2,694 (NCES 2020).

3.9.2 *Environmental Consequences*

Alternative A

There would be no adverse impacts on socioeconomics from the continuation of current TNARNG training activities at established TAs VTS-M. No change in employment or housing would occur.

The proposed increase in heavy and light maneuver training activities at VTS-M would have a minor beneficial impact on socioeconomics. The additional personnel involved in training activities along with the additional expenditures for fuel and materials to support increased training would benefit the local economies of Carroll and Gibson counties.

Tree removal and the construction, establishment, maintenance, and use of the proposed new roads, trails, and ranges would have short- and long-term minor beneficial impacts on socioeconomics. The establishment of the new TAs would require forestry crews, construction workers, equipment, and materials during the tree removal and construction activities; this would have a minor increase in employment and expenditures in the local area during the construction. Tree removal from the proposed TAs could result in timber sales. Maintenance and use of the proposed TAs would require the purchase of small amounts of goods and materials in the area. Additional personnel training in the proposed TAs would contribute to additional expenditures in the regional economy.

Under Alternative A, VTS-M would continue current agricultural leases. The approximately 68 farming jobs produced on the agricultural leases would continue. The leases are issued for 5 years, and they expire on a rotating basis. The leases are with private individuals for livestock grazing or crop production and are managed by the USACE Mobile District. The maintenance services provided by the individuals leasing the land offsets maintenance expenses on VTS-M. The leases would continue to generate approximately $721,000 annually, with a portion of that invested back into the local economy.

Alternative B (Preferred)

Under Alternative B, impacts on socioeconomics would be the same as those described for Alternative A.

No Action Alternative

There would be no impacts on the socioeconomics of the region under the No Action Alternative, as no change in TNARNG training at VTS-M would occur.

Cumulative Effects

No adverse cumulative effects on socioeconomics would be expected. Economic and demographic indicators for Gibson and Carroll counties do not point to large changes in the socioeconomics of the region. Reasonably foreseeable changes in the economy of the ROI that would lead to sudden changes in any of these socioeconomic factors have not been identified.

3.10 Infrastructure

3.10.1 *Affected Environment*

Potable Water Supply

VTS-M receives potable water from the Cedar Grove Utility District. No water treatment is conducted on VTS-M.

Sanitary Wastewater and Solid Waste Disposal

Sanitary wastewater from the VTS-M cantonment area is pumped using a force main that connects the VTS-M to the Milan Readiness Center (Milan-RC) and then to the City of Milan Public Utilities (MPU) sewer system. The combined sewage from the VTS-M and Milan-RC facilities is treated and disposed through the City of Milan's publicly owned treatment works.

Domestic waste generated at VTS-M is collected by a refuse contractor and transported to an off-site landfill for disposal. Industrial waste, construction waste, and other inert debris are disposed of in VTS-M landfills.

Electricity

The Tennessee Valley Authority supplies electrical energy to MPU, from which VTS-M purchases electricity and distributes it across the site. The electrical system consists of approximately 81 miles of high-voltage power lines with transformers installed throughout the system for facility and building-level service. Electrical service is provided from two independent connections in two counties, a primary metered connection, and an alternative connection that is only energized by MPU in the event the primary connection is not available. The system provides redundancy if one feed is interrupted. The electrical distribution system is a looped network with numerous switches that allow power to be shut off to sections as needed for repairs and maintenance without affecting the entire system.

Communications Network

The communications network consists of telephone and information system connected to more than 80 miles of copper and fiber-optic communication cable. The cable network is a combination of overhead and underground cable. Audible fire alarms, associated with the fire alarm system connected to the plant Fire Department and Security Headquarters, can be heard from virtually any location at VTS-M.

Transportation

VTS-M is bisected by State Highway 104 in the northern third of the Installation and bordered on the west by U.S. Highway 45 E. U.S. Highways 70 and 79 intersect in Milan on the northwestern boundary of VTS-M. VTS-M is serviced by paved roads in all lines and areas. Gravel roads and dirt field roads service agricultural leases and remote portions of the site. These roads are low-volume traffic roads, other than security patrols, averaging less than 10 vehicles per day (VTS-M 2019). State Highway 104 is maintained by the Tennessee Department of Transportation.

Approximately 87 miles of government-owned rail and a railroad switch yard are also present on VTS-M. MLAAP was formerly serviced by two major rail lines, CSX and West Tennessee Railroad.

3.10.2 *Environmental Consequences*

Impacts on infrastructure from the Proposed Action are evaluated for their potential to disrupt or improve existing levels of service in the ROI, as well as generate additional requirements for energy or water consumption, and for impacts on resources such as sanitary sewer systems. The Proposed Action would result in an adverse impact to utilities or services if the project required more than the existing infrastructure could provide or required services in conflict with adopted plans and policies for the area. The effects on transportation and traffic would be considered significant if an alternative resulted in (1) a substantial increase in on- or off-base traffic or (2) substantial congestion on or around VTS-M.

Alternative A

Under Alternative A, there would be no modification or change in use of VTS-M's potable water, wastewater, waste disposal, electric, or communication services. Current and proposed ground-training activities would not modify these systems or place additional strain on their capacity.

The proposed increase in training activities in existing TAs would increase the use of potable water and generate additional wastewater to support the increased personnel training operations.

However, the VTS-M water and wastewater systems are adequate to support the increased demands by more personnel during training operations. Additional solid waste would be generated by these training activities; however, the local landfills have adequate capacity to accept the additional solid waste.

Alternative A would have short- and long-term minor adverse effects on traffic and transportation. Only small barely noticeable changes to traffic would be expected with the implementation of this alternative. The changes would be primarily attributable to construction vehicles and small changes in localized traffic patterns due to the additional personnel utilizing the TAs. Alternative A would not result in (1) a substantial increase in on- or off-base traffic or (2) substantial congestion on or around VTS-M.

Traffic would increase due to additional construction vehicles and traffic delays near active construction for the proposed new ranges, trails, tank roads, and water crossing, as well as during tree removal activities at VTS-M. These effects would be temporary and would end with the construction phase. The local roadway infrastructure would be sufficient to support any increase in construction vehicle traffic. In addition, road closures or detours to accommodate utility system work would be expected, creating short-term traffic delays. All construction vehicles would be equipped with backing alarms, two-way radios, and slow-moving-vehicle signs when appropriate. Although the effects would be minor, TNARNG would route and schedule construction vehicle traffic to minimize conflicts with other traffic and would strategically locate construction material staging areas to minimize impacts.

There would be an increase in heavy and light maneuver training within the existing TAs and proposed ranges. Although the exact number of individual personnel is unknown at this time, it is expected that the incremental change would not be perceptible when compared to existing conditions. These effects would on traffic and transportation would be minor.

Alternative B (Preferred)

Under Alternative B, impacts on VTS-M's infrastructure would be the same as those described for Alternative A.

No Action Alternative

The No Action Alternative would result in no effects on utilities, transportation, or infrastructure. There would be no short- or long-term changes in training activities, no changes in personnel due to the Proposed Action, no tree removal, and no range, trail, tank, or water crossing construction. Transportation infrastructure, traffic conditions, utility demands, and communication systems would remain unchanged when compared to existing conditions.

Cumulative Effects

No significant long-term cumulative impacts on infrastructure associated with the implementation of the Proposed Action in combination with reasonably foreseeable projects in the region would occur. The majority of all reasonably foreseeable future actions at and surrounding VTS-M would be located within areas of current TNARNG training activities and operations. Implementation of the Proposed Action, in conjunction with other reasonably foreseeable projects, would not require more than the existing infrastructure could provide or require services in conflict with adopted plans and policies for the area. Transportation and traffic would be not substantial increase on- or off-base, and no substantial congestion on or around VTS-M would occur.

3.11 Hazardous and Toxic Materials and Wastes

The Army National Guard NEPA Handbook indicates that the following hazardous and toxic materials and wastes must be considered in preparation of NEPA documents: (1) Environmental Condition of Property (ECP), (2) storage and handling facilities; (3) waste disposal methods; (4) Installation Restoration Program; (5) materials and wastes present, including asbestos-containing materials, lead-based paint (LBP), (6) polychlorinated biphenyls (PCBs), and radioisotopes.

The analysis in this section, unless otherwise referenced, is based on the findings from the *Environmental Condition of Property (ECP) Report, Milan Army Ammunition Plant, Milan, TN* (MLAAP 2020; **Appendix B**), which established the environmental baseline and condition of approximately 22,351 acres of MLAAP property, including the approximately 16,000 acres TNARNG received through the divesture of MLAAP. The ECP report is required before real property can be conveyed out of federal ownership, and it is used to determine the overall environmental condition of the property, identifying any contaminated areas, and determining disposal requirements for those areas, as required under CERCLA Section 120(h), P*roperty Transferred by Federal Agencies.*

3.11.1 *Affected Environment*

Environmental Permits

Active environmental permits held by MLAAP for the management and treatment of hazardous waste included:

- RCRA Hazardous Waste Management Permit #TNHW-152 for container storage units, Permit #TNHW-153 for Subpart X Open Burning Open Detonation Treatment, and a RCRA Subtitle D Industrial Waste Landfill Permit #IDL-27-101-0085 for an active industrial waste landfill. MLAAP also has an EPA Corrective Action Site ID #TN0210020582 and is listed as a RCRA large-quantity generator and transport, storage, and disposal facility.
- National Pollutant Discharge Elimination System (NPDES) Individual Permit #TN0000060 for stormwater and wastewater discharges.
- A public water supply system permit designated as Community System #1, PWSID #0000798.
- An operating Title V Air Permit (#467630) issued by the TDEC Air Pollution Control Board.

Environmental Cleanup

Past ordnance production, testing, calibration, and storage activities at MLAAP have resulted in uncontrolled releases of hazardous substances to soil and groundwater, including explosives constituents both on and off the Installation. Because of the contamination, MLAAP was placed on the National Priorities List in 1987. After being listed, the Army, USEPA, and the State of Tennessee entered into a CERCLA Federal Facility Agreement and Consent Order (FFA) in 1989. The FFA established a formal framework by which all the signatory parties would proceed with the environmental investigation and cleanup of the Installation.

Environmental investigations and cleanup conducted as part of the Army's Installation Restoration Program and under the Military Munitions Response Program at MLAAP focused on five Operable Units (OUs).

The OU underling VTS-M includes:

- Sitewide groundwater plume (and all portions of the property south of Route 54, including the ADAs, ammunition test areas, and OBG soils (OU5)

Sitewide remedial investigations and feasibility studies have been completed to investigate contamination and to evaluate potential remediation alternatives for areas within the OU. Records of Decision (RODs) that mandate a permanent remedy and contain technical and health information to aid in cleanup were prepared between 1992 and 2014 for the OU. After evaluation of the remedial alternatives for the OU, a ROD was implemented to address remedial actions for sitewide groundwater and soil impacts. As part of the remedial actions, a groundwater extraction system was designed and installed to remediate groundwater impacted with explosive contaminants and has been operating since 1995. The latest ROD, signed in 2014, incorporates a single comprehensive groundwater remedy for sitewide groundwater and supersedes all previous RODs. Required remedial activities within the OU have been completed or are in place and operating according to the respective RODs. Future remedial activities will include the closure of a 40 mm Test Area and the RCRA-permitted ADA open detonation and OBG burn pans. Estimated completion of sitewide groundwater treatment is 2029, while the goals for groundwater cleanup and monitored natural attenuation are estimated to be complete in 2074 (MLAAP 2017).

To ensure established remedies continue to be protective, the U.S. Army conducts 5-year reviews, operation and maintenance activities, and long-term monitoring. The Army has also implemented numerous LUCs.

Land Use Controls

The 2014 MLAAP Land Use Control Implementation Plan (LUCIP) describes and documents all LUC requirements for the Installation. LUCs are a component of the final remedy for the OU and the Military Munitions Response Program site that minimize the potential for human exposure to contaminants above permissible levels and exposure to explosive hazards for ant Munitions Response Site (MRS). The LUC objectives for the OU and MRS include:

- OU5: Prevent residential land use and child-care facilities in capped areas, prevent unauthorized disturbance of caps, and maintain the integrity of the caps. Also includes LUCs for the OBG MRS. Prohibit residential, recreational, and agricultural land use of the MRS; prevent access and unauthorized intrusive activities at the MRS; and maintain the integrity of fences and signs.
- Sitewide groundwater (all groundwater associated with OU5 and plumes that have migrated off the site): restrict and control the use of groundwater at all areas on-post and in areas off-post where portions of the plume have migrated and maintain the integrity of the remedy (including existing or future monitoring wells and remediation systems).

DoD components must incorporate future land use activities into the environmental restoration process and ensure that those activities are compatible with land use restrictions imposed on the affected property.

In addition to MLAAP LUCs, the City of Milan has ordinances in place to protect the public from exposure to contaminated groundwater. City Ordinance 18-122 restricts the potable water use within the city to that supplied by the City of Milan only, and that water cannot be resold or

otherwise disposed of without written permission from the city. City Ordinance 18-309 places restrictions on water from a source other than public supply (MLAAP 2020).

Storage Tanks

Historically, about 90 underground storage tanks (USTs) and nine aboveground storage tanks (ASTs) were used at MLAAP. However, most have been removed or closed in place. Only 18 USTs and two ASTs remain, and they are managed in compliance with current laws and regulations (MLAAP 2020).

Special Hazards

Munitions Constituents and Munitions and Explosives of Concern

Many buildings on MLAAP are contaminated with munitions constituents due to many years of explosives operations. In addition to environmental hazards, some buildings may pose an explosive hazard. In accordance with AR 385-10, *The Army Safety Program*, real property known or suspected to contain munitions and explosives of concern must not be leased or transferred from DoD control until a munition's response consistent with the determined or reasonably anticipated land use, from an explosives safety perspective, has been completed per a DoD Explosives Safety Board-approved Munitions Response Explosives Safety Submission.

Asbestos

A sitewide asbestos survey was completed at MLAAP in 1994 based on a subsample of the areas on MLAAP. The survey included assumptions that locations with or without asbestos in one part of MLAAP would be similar at another site. Some of the assumptions have since been proven inaccurate, and additional asbestos surveys have been performed to identify asbestos in more detail at production lines and buildings. Any friable asbestos that was identified, such as pipe insulation, has either been removed or is encapsulated in place to remove the immediate safety and health hazard. Friable asbestos is generally used as pipe insulation on older steam lines while nonfriable asbestos is prevalent as "transite" siding, floor tiles, and roofing materials. Most locations where asbestos has been identified are in uninhabited buildings (MLAAP 2020).

Lead-Based Paint

A complete survey of buildings for LBP has not been conducted at MLAAP. Many of the buildings on MLAAP were constructed prior to 1978 and are known to have LBP. Prior to renovations, repair, or demolition of structures, an LBP survey is required to ensure proper management.

Polychlorinated Biphenyls

As of July 2019, MLAAP had approximately 59 PCB-contaminated transformers still in use. Historically, hundreds of PCB transformers were in use on the Installation, but they have been incrementally removed from service. Older fluorescent light fixtures contain ballasts that are assumed to be PCB ballasts if they are not marked with a manufacture date or a manufacturer's "non-PCB" sticker (MLAAP 2020).

Radon

A 1990 radon survey determined that six aboveground ammunition storage buildings in the ammunition storage areas either are at or exceed USEPA's safe level guideline of 4.0 picocuries per liter. The survey concluded that the aboveground ammunition storage buildings are seldom

occupied and are used infrequently and for short durations and, therefore, "pose no threat to human health" (MLAAP 2020).

3.11.2 *Environmental Consequences*

Impacts on hazardous materials management would be considered adverse if the federal action resulted in noncompliance with applicable federal and state regulations, or increased the amounts generated or procured beyond current waste management procedures and capacities at VTS-M. Impacts on the Installation Restoration Program would be considered adverse if the federal action disturbed (or created) contaminated sites, resulting in negative effects on human health or the environment.

Alternative A

Long-term minor beneficial effects on hazardous waste use, storage, and treatment would be expected under Alternative A. Hazardous and toxic substances used during MLAAP installation operations are no longer being produced, used, or stored. All hazardous materials and hazardous waste used, stored, or generated leading up to the time of transfer were treated or disposed of in accordance with applicable laws and regulations. As appropriate, RCRA hazardous waste permits, such as those for storage and treatment hazardous waste, were closed, and the sites managed under these permits were closed in accordance with permit requirements. The provisions of CERCLA section 120(h) apply regarding remediation activities. Those provisions require that necessary remedial actions be completed or in place and proven to be operating properly and successfully. Per CERCLA section 120(h)(3)(C), property may be transferred before all necessary remedial actions have been completed, provided certain conditions are met.

Cleanup activities associated with the transfer of MLAAP lands likely lowered concentrations of hazardous substances in the environment, resulting in a beneficial effect. The Army is under a mandate to characterize contamination, define the appropriate remediation in coordination with regulatory agencies, and provide for the required remediation. Further, TNARNG's use of the former MLAAP lands must be consistent with the remedial constraints, land use restrictions, and protection of human health and the environment, and the Army would continue to conduct remedial and other activities. The Army provides notification regarding hazardous substances stored, released, or disposed of on the property in excess of the 40 CFR Part 373 reportable quantities. Even after transfer, the U.S. government remains responsible for remedial actions for contamination attributable to Army activities.

The entire VTS-M site would be an operational range. The use of BMPs would prevent any migration off site from occurring. VTS-Milan will be subject to the Army's Operational Range Assessment (ORA) Program. The ORA is the Army's systematic effort to evaluate whether munitions constituents from training and testing munitions are migrating from operational ranges to off-range areas at levels that pose an unacceptable risk to human health and the environment. ORA is the Army's portion of a DoD-wide, proactive initiative to identify and address issues before they cause restrictions of range use or threaten human health and the environment. Army operational ranges are vital to conduct a variety of training scenarios or to test weapons systems. ORA directly supports Army Readiness by keeping operational ranges open and available.

TNARNG training activities would occur only in OU5 and not in the MLAAP's former production line area. OU5 underlies the entire portion of VTS-M land acquired from MLAPP (**Figure 28**).

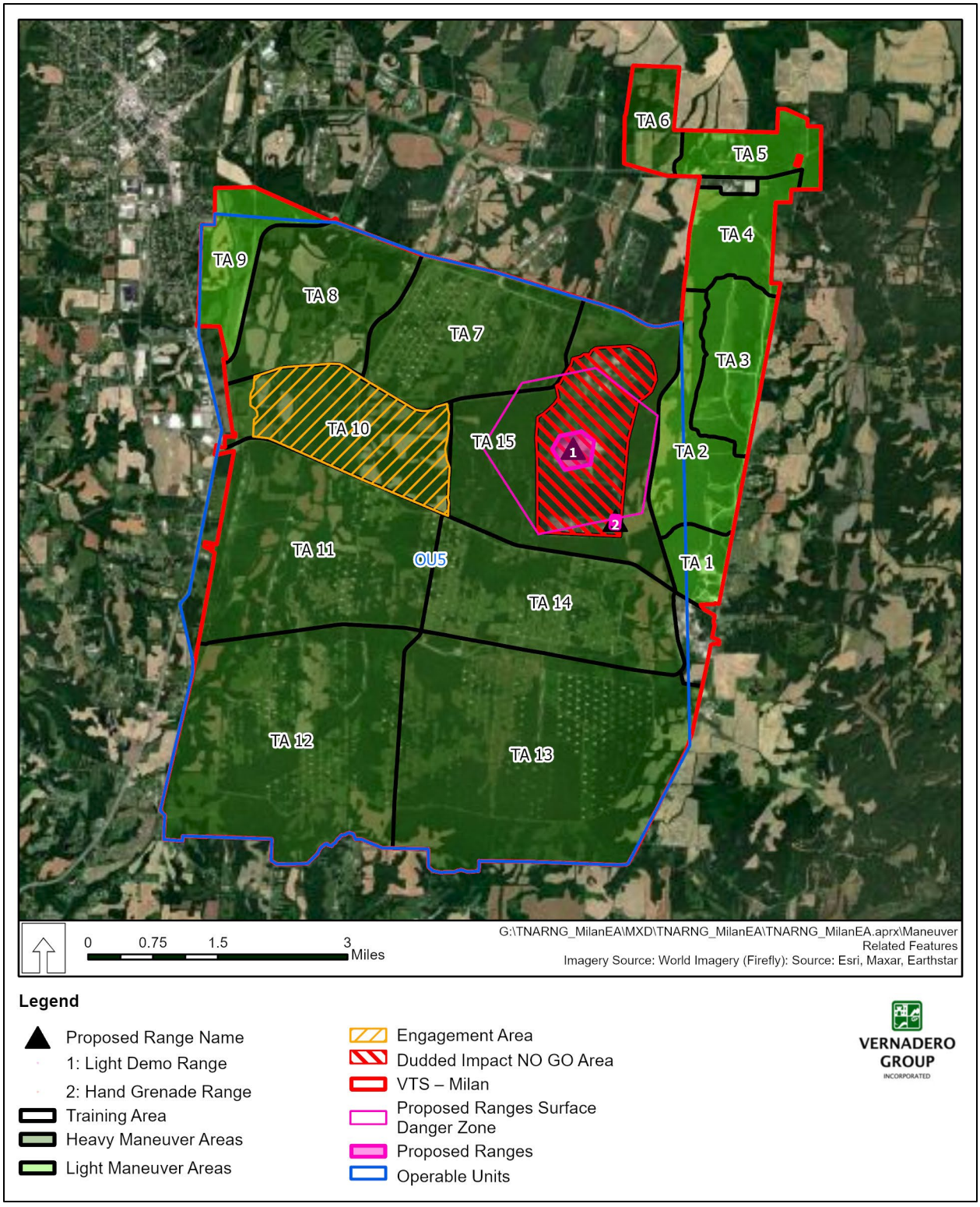

Figure 28. Operable Unit 5 and the Proposed Action at Volunteer Training Site – Milan

As such, areas with known soil and groundwater contamination underlie TAs proposed under Alternative A. All LUCs discussed in **Section 3.13.1** are clearly marked on the ground as avoidance (NOGO) areas. All LUC areas are fenced, have signage posted, or are painted orange with protective bollards (wells). Approximately 1,000 acres have been designated as NOGO areas; no TNARNG ground training would be allowed in these areas due to the LUCs. There would be no drilling and no construction of facilities for any permanent habitation within NOGO areas.

Long-term beneficial effects would result from proper management of ongoing operations and continued contamination cleanup efforts. Prior to renovations, repair, or demolition of structures, an LBP survey would be completed to ensure proper management. PCB-contaminated transformers would be managed properly in accordance with 40 CFR Part 761 (Toxic Substances Control Act). Current and proposed training activities and the use of new ranges would continue to use small amounts of hazardous materials. With compliance with DoD and Army requirements, minor adverse impacts from the increased use of hazardous materials and increased generation of hazardous waste are expected from the implementation of Alternative A.

Alternative A would require typical excavation and construction equipment for tree removal and construction of ranges, trails, roads, and water crossings. The maximum excavation depth would be no greater than 6 feet below ground level. Any groundwater intrusion would be tested and disposed of in accordance with all regulations. There would be no ground disturbance in the NO GO area (LUC area), and all LUCs would be strictly maintained. Use of such equipment also has potential for inadvertent release of hazardous or toxic substances such as fuels and hydraulic fluids. Standard BMPs would be implemented to minimize and avoid, to the extent practicable, release of such hazardous substances into the environment. The potential also exists for minor, short-term indirect impacts on surface waters if an inadvertent release of fuels or hydraulic fluids were to occur during a storm event. Although standard BMPs would be implemented to reduce runoff and erosion, such methods would not necessarily prevent seepage of such chemicals into surface waters.

Alternative B (Preferred)

Long-term minor beneficial effects on hazardous waste production, use, storage, and treatment would be expected under Alternative B and would be the same as those under Alternative A.

No Action Alternative

Under the No Action Alternative, no impacts on hazardous materials and wastes are expected. Activities requiring the use of such materials would continue and they would be properly managed in accordance with applicable laws and regulations. Long-term beneficial effects would result from proper management of ongoing operations and continued contamination cleanup efforts.

Cumulative Effects

Implementation of the Proposed Action is not expected to result in a cumulative significant adverse impact on hazardous and toxic materials and waste use, storage, and treatment. With divesture of the MLAAP property to NGB, hazardous and toxic substances used during MLAAP Installation operations are no longer used or stored. All identified hazardous materials and hazardous waste used, stored, or generated leading up to the time of transfer were treated or disposed of in accordance with applicable laws and regulations. As appropriate, RCRA hazardous waste permits, such as those for storage and treatment hazardous waste, were closed, and the sites managed under these permits were closed in accordance with permit requirements. The provisions of CERCLA

Section 120(h) apply regarding remediation activities. Those provisions require that necessary remedial actions be completed or in place and proven to be operating properly and successfully. Per CERCLA Section 120(h)(3)(C), property may be transferred before all necessary remedial actions have been completed, provided certain conditions are met. Cleanup activities associated with the transfer of lands likely lowered concentrations of hazardous substances in the environment, resulting in a beneficial effect. Further, long-term beneficial cumulative effects would result from proper management of ongoing operations and continued contamination cleanup efforts.

FORMAT PAGE

4.0 REFERENCES

AMEC. 2010. *Report, Planning Level Mammal Surveys for TNARNG Volunteer Training Sites, Nashville, Tennessee.*

Arcadis G&M Inc. 2005. *Final Second Five-Year Review, Milan Army Ammunition Plant.* Prepared for the U.S. Army Environmental Center, Atlanta, Georgia.

Bailey R.G., P.E. Avers, T. King, and W.H. McNab. 1995. *Ecoregions and Subregions of the United States.* [Map.] U.S. Department of Agriculture, U.S. Forest Service. Map scale 1:7,500,000.

Brahana, J.V., Michael W. Bradley, and Dolores Mulderink. 1986. *Preliminary Delineation and Description of the Regional Aquifers of Tennessee – Tertiary Aquifer System.* U.S. Geological Survey, Water-Resources Investigations Report 83-4011. Nashville, Tennessee.

Bureau of Economic Analysis (BEA). 2020a. Regional Data, GDP and Personal Income. Table CAEMP25N: Total Full-Time and Part-Time Employment by NAICS Industry. https://apps.bea.gov/itable/iTable.cfm?ReqID=70&step=1. Accessed November 2023.

Bureau of Economic Analysis (BEA). 2020b. Regional Data, GDP and Personal Income. Table CAINC: Personal Income Summary: Personal Income, Population, Per Capita Personal Income. https://apps.bea.gov/itable/iTable.cfm?ReqID=70&step=1. Accessed November 2023.

Bureau of Labor Statistics. 2021. Local Area Unemployment Statistics. https://www.bls.gov/data/#unemployment. Accessed November 2023.

Bureau of Labor Statistics. 2023. *Economy at a Glance: Tennessee.* October 2023. https://www.bls.gov/eag/eag.tn.htm. Accessed November 2023.

CH2M Hill. 2007. *Final Environmental Assessment. Implementation of BRAC Actions at Milan Army Ammunition Plant, Tennessee.* Prepared for U.S. Army Corps of Engineers by CH2M Hill, Atlanta, Georgia.

Comeau and Lynch. 2022. *Ground Penetrating Radar Survey Report: Lucy Bryant Cemetery.* Report submitted to the Tennessee Army National Guard. Prepared by Dudek, Norfolk, Virginia.

Council on Environmental Quality (CEQ). 1997. *Environmental Justice Guidance under the National Environmental Policy Act.* Executive Office of the President, Council on Environmental Quality, Washington, DC.

Deter-Wolf, A. 2005. *Phase I Archaeological Survey at the Tennessee Army National Guard Milan Volunteer Training Site, Carroll and Gibson Counties, Tennessee.* Report submitted to the Tennessee Army National Guard, Environmental Office. Prepared by TRC Inc., Nashville, Tennessee.

Deter-Wolf, A., and T. Karpynec. 2006. *Documentary and Field Investigations of Cemeteries at the Tennessee National Guard Milan and Tullahoma Volunteer Training Sites.* TRC Inc., Nashville, Tennessee.

Dynamic Solutions. 2006. *Final Biological Survey Report for Invasive Plant Species for Tennessee Army National Guard Volunteer Training Site – Milan, Carroll and Gibson Counties, Tennessee.* Knoxville, Tennessee.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

Grashof, B.C. 2004. *Milan Army Ammunition Plant, Milan, Tennessee – National Register of Historic Places Eligibility Evaluation.* Report submitted to the U.S. Army Corps of Engineers Research Lab. Prepared by Grashof Design Studio Inc., Atlanta, Georgia.

Griffith, G., J. Omernik, and S. Azevedo. 1997. *Ecoregions of Tennessee.* EPA/600/R- 97/022. NHREEL, Western Ecological Division, U.S. Environmental Protection Agency, Corvallis, Oregon**.**

Hess, J.A. 1985. *Milan Army Ammunition Plant, TN-9. Historic American Engineering Record.* National Parks Service, Washington, DC.

Idcide. 2022. Milan, TN Weather. https://www.idcide.com/weather/tn/milan.htm. Accessed October 2023.

Interagency Working Group on Social Cost of Greenhouse Gases. 2021. *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990.* February.

Intergovernmental Panel on Climate Change. 2014. *Fifth Assessment Report of the Intergovernmental Panel on Climate Change.* https://www.ipcc.ch/assessment-report/ar5. Accessed 24 October 2023.

Jenkins, Johnson C. 1994. Soil Survey of Gibson County, Tennessee. USDA Soil Conservation Service, in cooperation with Tennessee Agricultural Experiment Station.

Kennedy, M.L. 2014. *Integrated Natural Resource Management Plan, Milan Army Ammunition Plant 1998-2003.* Revision I: 2004-2008. Prepared for the Milan Army Ammunition Plant by the University of Memphis, Department of Biology, Memphis, Tennessee.

Kroulek, O.S. 2021. *Phase I Archaeological Survey of 452 Acres of Training Areas at the VTS Milan, Carroll County, Tennessee.* Report submitted to the Tennessee Army National Guard, Cultural Resources. Prepared by Cumberland Applied Research Associates Inc., Signal Mountain, Tennessee.

Kroulek, O.S. 2022. *Geophysical (GPR & Magnetometry) Survey of Sites 40CL70 & 40CL72 at VTS Milan, Carroll County, Tennessee.* Report submitted to the Tennessee Army National Guard. Prepared by Cumberland Applied Research Associates Inc., Signal Mountain, Tennessee, and Seramur and Associates, PC, Boone, North Carolina.

Kroulek, O.S., M. Schneider, and S. McCormack. 2023. *Phase II Archaeological Evaluation of Sites 40CL69, 40CL118, 40CL119, and 40CL120 at the Volunteer Training Site Milan, Caroll and Gibson Counties, Tennessee.* Report submitted to the Tennessee Army National Guard and the Tennessee Historical Commission. Prepared by Cumberland Applied Research Associates Inc., Signal Mountain, Tennessee.

Lose and Associates. 1994. *Phase I Natural Resource Survey, Milan Training Center.* Prepared for the Tennessee Army National Guard by Lose and Associates Inc., Nashville, Tennessee.

Meyer, C.C., and V.R. Beasley. 2017. *A Ground Penetrating Radar Survey of the Adams Cemetery (40CL73) on VTS-Milan Volunteer Training Facility, Carroll County, Tennessee*. Report submitted to Tennessee Military Department, Tennessee Army National Guard. Prepared by MRS Consultants LLC, Tuscaloosa, Alabama.

Milan Army Ammunition Plant (MLAAP). 2014. *Final Sitewide Land Use Control Implementation Plan.* Milan Army Ammunition Plant, Milan, Tennessee.

Milan Army Ammunition Plant (MLAAP). 2017. *Preliminary Close Out Report.* Milan Army Ammunition Plant, Milan, Tennessee.

Milan Army Ammunition Plant (MLAAP). 2018. *Integrated Wildland Fire Management Plan*. Prepared for Milan Army Ammunition Plant by American Ordnance LLC, Milan, Tennessee. November.

Milan Army Ammunition Plant (MLAAP). 2019. *Integrated Natural Resources Management Plan 2020–2024.* Prepared for Milan Army Ammunition Plant by Tetra Tech Inc., Fairfax, Virginia.

Milan Army Ammunition Plant (MLAAP). 2020. *Milan Army Ammunition Plant Disposal Report.* Milan Army Ammunition Plant, Milan, Tennessee.

Milan Army Ammunition Plant (MLAAP). 2021. *Final Environmental Assessment for Closure and Disposal of Milan Army Ammunition Plant, Milan, Tennessee.* May.

Minkin, P., W. Packer, S. Sutton, D. Gravett, M. Bishop, and A. Bishop. 1998. *Delineation of Wetlands and Other Regulated Waters, Milan Training Site.* U.S. Army Engineer Waterways Experiment Station.

Moore, Charles L., Aaron B. Clement, Donald C. Dagnan, and Wesley C. Jackson. 1984. Soil Survey of Carroll County, Tennessee. USDA Soil Conservation Service in cooperation with Tennessee Agricultural Experiment Station.

National Center for Education Statistics (NCES). 2020. *Final Environmental Condition of Property Report Milan Army Ammunition Plant Milan, Tennessee.* March.

National Center for Education Statistics (NCES). 2022. *Search for Public School Districts. Milan School District.* https://nces.ed.gov/ccd/districtsearch/district_list.asp?Search=1&details=1&InstName=Milan&DistrictID=&Address=&City=&State=&Zip=&Miles=&County=&PhoneAreaCode=&Phone=&DistrictType=1&DistrictType=2&DistrictType=3&DistrictType=4&DistrictType=5&DistrictType=6&DistrictType=7&DistrictType=8&DistrictType=9&NumOfStudents=&NumOfStudentsRange=more&NumOfSchools=&NumOfSchoolsRange=more. Accessed November 2023.

National Oceanic and Atmospheric Administration. 2019. *State Climate Summaries, Tennessee.* https://statesummaries.ncics.org/downloads/TN-screen-hi.pdf. Accessed October 2023.

Natural Resources Conservation Service (NRCS). 2000. Prime Farmland. United States Department of Agriculture Natural Resources Conservation Service, Washington, DC. https://www.nrcs.usda.gov/wps/portal/nrcs/detail/null/?cid=nrcs143_014052. Accessed November 2023.

NatureServe. 2023. *Macrochelys temminckii* Alligator Snapping Turtle Estimated Number of Element Occurrences. Tennessee State Breakdown. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.102590/Macrochelys_temminckii. Accessed October 2023.

Natural Resources Conservation Service (NRCS). 2020. Web Soil Survey. https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Accessed November 2023.

Parks, W.S., and J.K. Carmichael. l990. *Geology and Groundwater Resources of the Memphis Sand in Western Tennessee.* U.S. Geological Survey Water Resources Investigation Report 88-4182. U.S. Geological Survey, Memphis, Tennessee.

Price, D.L. 2015. *Architectural Survey and Evaluation of the Milan Army Ammunition Plant, Gibson and Carroll Counties, Tennessee.* Report submitted to Tetra Tech Inc. Prepared by New South Associates, Stone Mountain, Georgia.

Pruitt, S.W, E. Poplin, and L. Koszarsky. 2023. *Phase I Archaeological Survey of the TNARNG Portion of the Milan Army Ammunition Plant, Carroll and Gibson Counties, Tennessee.* Report submitted to Veradero Group Inc. and the Tennessee Army National Guard. Prepared by Brockington and Associates, Atlanta, Georgia.

Riverside Environmental Consulting, LLC. 2022. *Wetland Survey and Characterization Report for the Volunteer Training Site at Milan, Tennessee.* Prepared for TNARNG.

Science Applications International Corporation (SAIC). 1999. *Natural Resources Aquatic Survey at the Milan Training Center, Lavinia, Tennessee.* Oak Ridge, Tennessee.

Science Applications International Corporation (SAIC). 2000. *Phase II Natural Resources Terrestrial Survey, Milan Training Center, Milan, Tennessee.* Oak Ridge, Tennessee.

Stanyard, W.F., M. Chancellor, and R. Lane. 1999. *Phase I Cultural Resource Survey of the Milan Training Center, Carroll and Gibson Counties, Tennessee.* Report submitted to Science Applications International Corporation. Prepared by TRC Garrow Associates Inc., Atlanta, Georgia.

Tennessee Army National Guard (TNARNG). 2018a. "Wildland Fire Management Plan, VTS-Milan, Tennessee Army National Guard." Prepared by Anchor Point Group, Boulder, Colorado. 51 pp. In Volunteer Training Site Milan (VTS-M). 2019. *Integrated Natural Resources Management Plan Volunteer Training Site – Milan, Tennessee, Army National Guard, Annex 2.* December.

Tennessee Army National Guard (TNARNG). 2018b. *Integrated Cultural Resources Management Plan for Installations of the Tennessee Army National Guard.* November.

Tennessee Department of Economic and Community Development. 2020. County Profile Tool. https://www.tnecd.com/county-profiles. Accessed November 2023.

Tennessee Division of Geology and U.S. Geological Survey. 2004. "The Mineral Industry of Tennessee." *In U.S. Geological Survey Minerals Yearbook – 2004.* http://minerals.usgs.gov/minerals/pubs/state/2004/tnstmyb04.pdf Accessed October 2023.

Tennessee Exotic Pest Plant Council (TNEPPC). 2017. Revised List of Invasive Plants of Tennessee. https://www.tnipc.org/revised-list-of-invasive-plants. Accessed November 2023.

Thompson Engineering, Forest Management Group, and Aerostar Environmental Services. 2006. *Volunteer Training Site – Milan Forest Management Plan.* Prepared for the TNARNG.

U.S. Army. 1984. *Noise Measurement Study, Camp Bullis, Texas, 27 February – 2 March 1984.* Army Environmental Hygiene Agency, Environmental Noise Assessment No. 52-34-0442-84.

U.S. Army. 1999. *Health Hazard Assessment Report on the 40 mm XM1001 Canister Cartridge for the MK-19 Mod 3 Grenade Machine Gun.* No. 69-37-2735-00, Center for Health Promotion and Preventive Medicine. November.

U.S. Army Corps of Engineers (USACE). 1987. *A Cultural Resources Survey of Selected Portions of Milan Army Ammunition Plant, Gibson and Carroll Counties, Tennessee.* Report submitted to the Milan Army Ammunition Plant. Prepared by the U.S. Army Corps of Engineers, Mobile District, Mobile, Alabama.

U.S. Army Corps of Engineers (USACE). 1989. *Milan Army Ammunition Plant, Historic Preservation Plan.* Report submitted to Martin Marietta Ordnance Systems, Milan Army Ammunition Plant, Milan, Tennessee. Prepared by Environmental Resources Planning Section, U.S. Army Corps of Engineers, Mobile District, Mobile, Alabama.

U.S. Army Engineer Research and Development Center (ERDC). 2009. BNOISE2 Computer Model. Version 1.3. 30 November 2009.

U.S. Army Engineer Research and Development Center (ERDC). 2015. SARNAM Computer Model. Version 27. July 2015.

U.S. Census Bureau 2021a. QuickFacts. https://www.census.gov/quickfacts. Accessed November 2023.

U.S. Census Bureau. 2021b. *2015-2019 American Community Survey 5-Year Estimates.* https://data.census.gov/cedsci. Accessed November 2023.

U.S. Census Bureau 2023. Poverty Thresholds for 2022 by Size of Family and Number of Related Children under 18. https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html. Accessed November 2023.

U.S. Climate Data. 2024. Climate Milan – Tennessee. Milan Weather Averages. https://www.usclimatedata.com/climate/milan/tennessee/united-states/ustn0330. Accessed June 2024.

U.S. Department of Agriculture (USDA). 2017. Census of Agriculture State and County Profiles Tennessee. www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/County_Profiles/Tennessee. Accessed November 2023.

U.S. Energy Information Administration. 2023. Rankings: Total Carbon Dioxide Emissions, 2021 (million metric tons), last updated 21 September 2023. https://www.eia.gov/state/rankings/?sid=TN#series/226. Accessed June 2024.

U.S. Environmental Protection Agency (USEPA). 2016. What Climate Change Means for Tennessee. https://19january2017snapshot.epa.gov/sites/production/files/2016-09/documents/climate-change-tn.pdf. Accessed May 2024.

U.S. Environmental Protection Agency (USEPA). 2000. *USEPA Superfund Record of Decision: Milan Army Ammunition Plan, Milan, Tennessee.* Document Number 18. 36 pp.

U.S. Environmental Protection Agency (USEPA). 2020a. Global Greenhouse Gas Emissions Data. https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data. Accessed November 2023.

U.S. Environmental Protection Agency (USEPA). 2020b. Climate Change Indicators: Health and Society. https://www.epa.gov/climate-indicators/health-society. Accessed October 2023.

U.S. Environmental Protection Agency (USEPA). 2021. Tennessee Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants. https://www3.epa.gov/airquality/greenbook/anayo_tn.html. Accessed October 2023.

U.S. Fish and Wildlife Service (USFWS). 2019. Information for Planning and Conservation. U.S. Department of the Interior, U.S. Fish and Wildlife Service. https://ecos.fws.gov/ipac/location/CVHQDMEE6ZFENMPPIJLDJMAGN4/resources. Accessed 2019.

U.S. Fish and Wildlife Service (USFWS). 2023. National Wetlands Inventory Wetlands Mapper Webtool. https://fwsprimary.wim.usgs.gov/wetlands/apps/wetlands-mapper.

Volunteer Training Site Milan (VTS-M). 2006. *Integrated Natural Resources Management Plan Volunteer Training Site – Milan. Tennessee Army National Guard.* December.

Volunteer Training Site Milan (VTS-M). 2019. *Integrated Natural Resources Management Plan Volunteer Training Site – Milan, Tennessee Army National Guard.* December.

5.0 LIST OF PREPARERS

This EA has been prepared under the direction of the NGB and TNARNG. The individuals who contributed to the preparation of this EA are listed in **Table 33.**

Table 33. List of Preparers

Name/Organization	Education	Resource Area	Years of Experience
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Travis Gaussoin Vernadero Group Inc.	BA, Anthropology	GIS and Figure Creation	8
Katharine Hewlings	BA, Anthropology MS, Architecture MA, Museum Studies	GIS and Figure Creation	5
Brian Knapp Tennessee Army National Guard	BS, Wildlife Biology MS, Wildlife Biology	Biological Resources, Biological Assessment, and U.S. Fish and Wildlife Service Consultation	33
Leigh Koszarsky Brockington and Associates, Inc.	BA, Anthropology and History MA, Historical Archaeology Masters Certificate, Geographic Information Systems	Cultural Resources	3
Carey Lynn Perry Vernadero Group Inc.	BS, Marine Science, Marine Biology Concentration MS, Oceanography and Coastal Sciences	Land Use, Air Quality, Earth Resources, Water Resources, Biological Resources, Infrastructure, Socioeconomics, Environmental Justice and Protection or Children, Hazardous and Toxic Materials and Wastes	16
Eric Poplin Brockington and Associates Inc.	BA, Anthropology, Political Science, Mathematics PhD, Archaeology	Cultural Resources	47
Stacey Pruitt Brockington and Associates Inc.	BA, Anthropology/ History MA, Anthropology/ Archaeology	Cultural Resources	15
Greg Turner Tennessee Army National Guard	BS, Aerospace Administration	Technical Review	19
Eric Webb, PhD Vernadero Group Inc.	BS, Biology MS, Biology PhD, Oceanography and Coastal Sciences	Technical Review	27

Appendix A

Agency and Tribal Correspondence and Record of Public Notice

FORMAT PAGE

Agency Scoping Letters

DEPARTMENTS OF THE ARMY AND AIR FORCE
JOINT FORCE HEADQUARTERS
TENNESSEE NATIONAL GUARD
HOUSTON BARRACKS, PO BOX 41502
NASHVILLE, TENNESSEE 37204-1502

NGTN-FMZ-ENV 31 July 2023

U.S. Department of Agricultural
Natural Resources Conservations Services
Area 1 – Jackson Area (West Tennessee)
Attn: Joshua Richardson
235 Oil Well Road
Jackson, TN 38305-7914

Submitted via email to joshua.richardson@usda.gov.

Dear Mr. Richardson

An Environmental Assessment (EA) is being prepared by the Tennessee Army National Guard (TNARNG) to identify and evaluate potential environmental impacts associated with the proposed heavy and light maneuver training at the Volunteer Training Site – Milan (VTS-M), Tennessee. A copy of the Draft EA will be made available for your review and comment when complete.

VTS-M is located in Carroll and Gibson counties, Tennessee (**Figure 1**). The city of Milan lies immediately west of the site; Jackson, Tennessee, on Interstate 40, is approximately 20 miles to the south; and the Rutherford Fork of the Obion River forms a portion of VTS-M's northern boundary (**Figure 1**). TNARNG training currently takes place on six of VTS-M's 15 designated training areas, and the Proposed Action would include training throughout the entire approximately 18,500-acre training site utilizing 15 designated training areas (**Figure 2**).

VTS-M is a Level V Garrison Training Center, which is a training site that has a basic nonautomated live-fire-exercise range capability and supports requirements at the individual and/or small unit level at or near the home station. Some facilities may be authorized that are consistent with training in a field environment. VTS-M includes a cantonment area with barracks, vehicle storage and maintenance facilities, firing ranges, and designated training areas. The mission of VTS-M is to:

1. Provide a training site to prepare units of the TNARNG for transition to war and to respond to the Governor's requests;
2. Provide surface maintenance services to specified TNARNG units; and
3. Provide inactive duty training facilities for the assigned units.

On 9 August 2022, the U.S. Army's Milan Army Ammunition Plant (MLAAP) reassigned more than 16,000 acres to the TNARNG, increasing the size of VTS-M to over 18,500 acres. The justification for the land reassignment was the shortage in VTS-M maneuver

area. The expanded size of VTS-M would provide TNARNG with enough maneuver space to train its largest units, which have been unable to do so within Tennessee.

The proposed heavy and light maneuver training is needed because there is currently a deficit in training area lands available to train and qualify TNARNG units in heavy mounted and light maneuvers; there are no current training areas in Tennessee capable of supporting the TNARNG's heavy and light maneuver training requirement. The purpose of TNARNG's proposed action is to provide sufficient training land to allow for heavy and light maneuver training, including maneuver support, land augmentation, communications, unmanned aerial vehicle operations, air insertion, causality evacuation, and new live-fire capabilities training within proposed ranges, to TNARNG units within the state to better support TNARNG training requirements and mission.

If you have any comments or concerns you would like to provide regarding the Proposed Action or its environmental impacts, please respond to us within 30 days of receipt of this letter. Please send your written responses via e-mail (preferred) to Mr. Gregory Turner at Turner, gregory.m.turner.nfg@army.mil.

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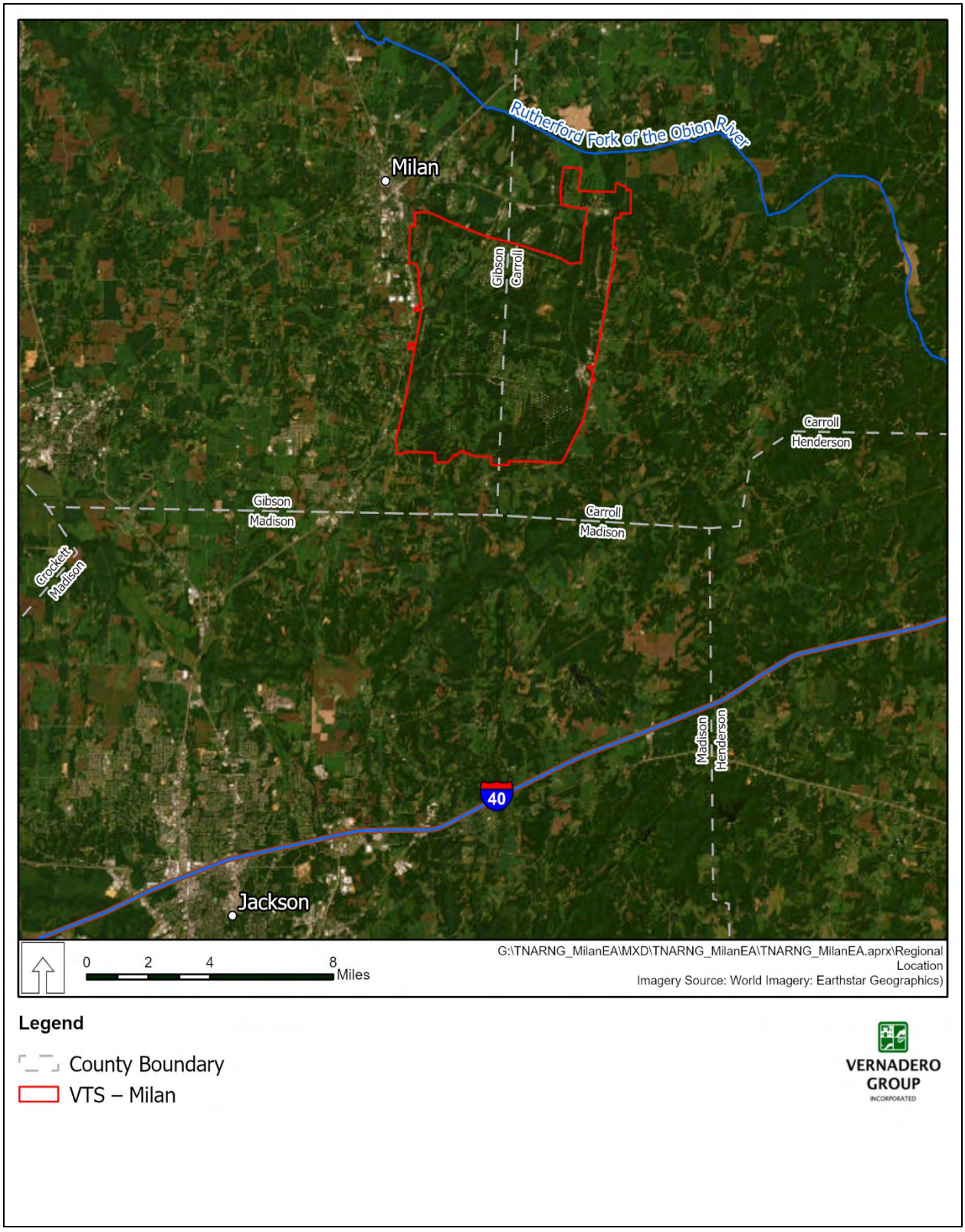
GREGORY M. TURNER
Environmental Program Manager
Tennessee Army National Guard

Enclosures:

Figure 1. Regional Location of Volunteer Training Site – Milan
Figure 2. Training Areas at Volunteer Training Site – Milan



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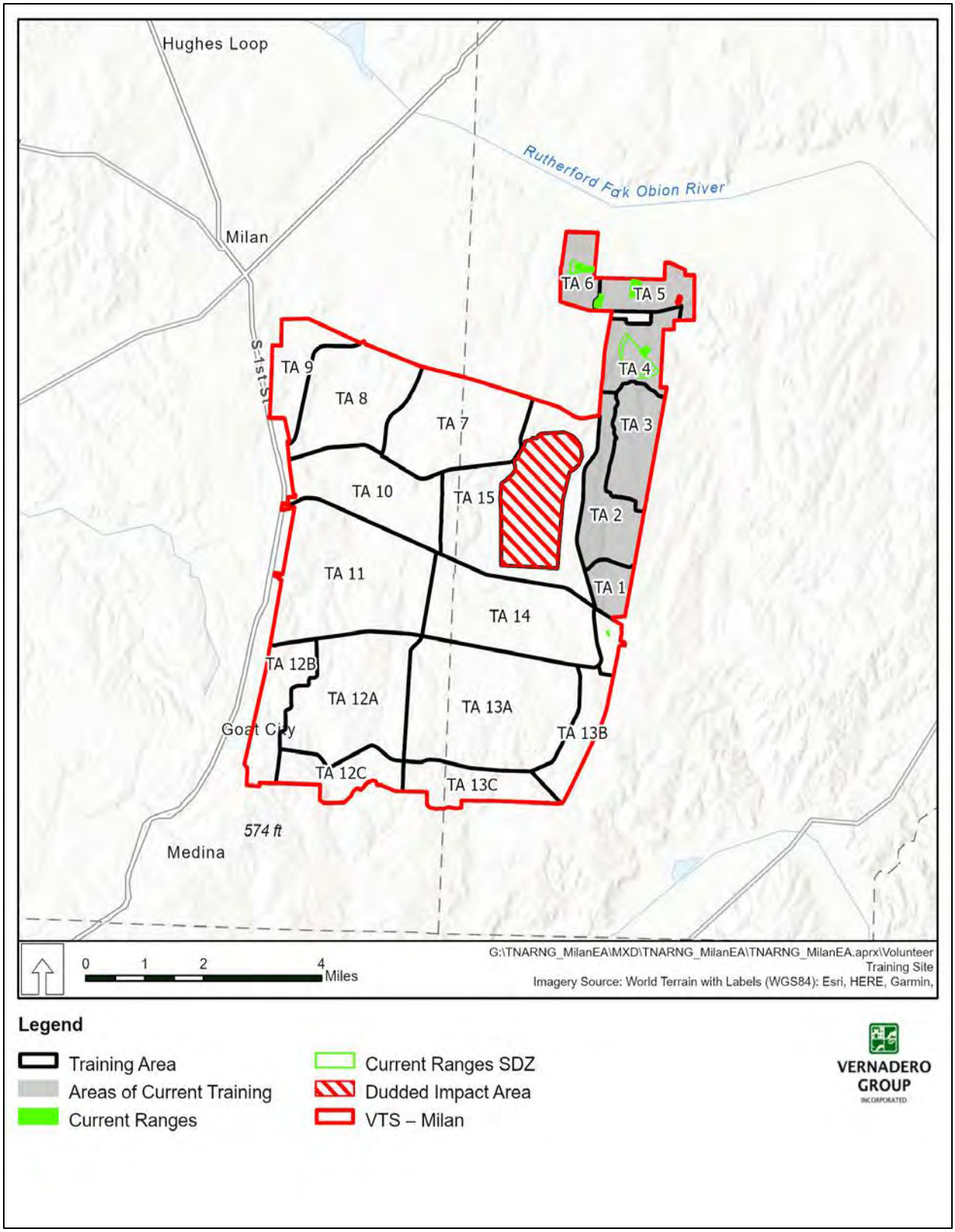

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JOINT FORCE HEADQUARTERS
TENNESSEE NATIONAL GUARD
HOUSTON BARRACKS, PO BOX 41502
NASHVILLE, TENNESSEE 37204-1502

NGTN-FMZ-ENV 31 July 2023

Tennessee Department of Environment & Conservation
Jackson Environmental Field Office
Attn: Mr. Rudy Collins
1625 Hollywood Drive
Jackson, TN 38305

Submitted via email to rudy.collins@tn.gov.

Dear Mr. Collins

An Environmental Assessment (EA) is being prepared by the Tennessee Army National Guard (TNARNG) to identify and evaluate potential environmental impacts associated with the proposed heavy and light maneuver training at the Volunteer Training Site – Milan (VTS-M), Tennessee. A copy of the Draft EA will be made available for your review and comment when complete.

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Tennessee Army National Guard

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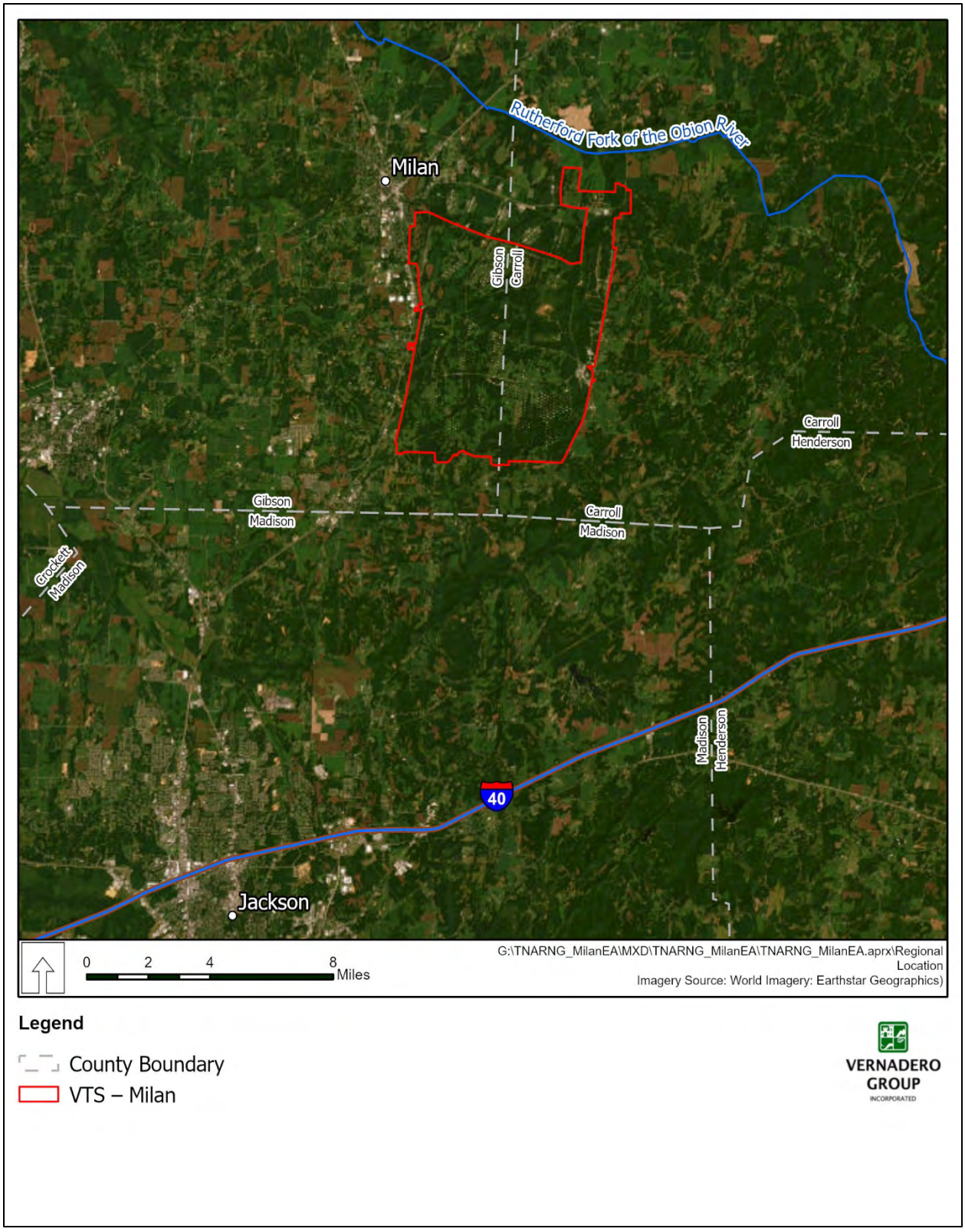

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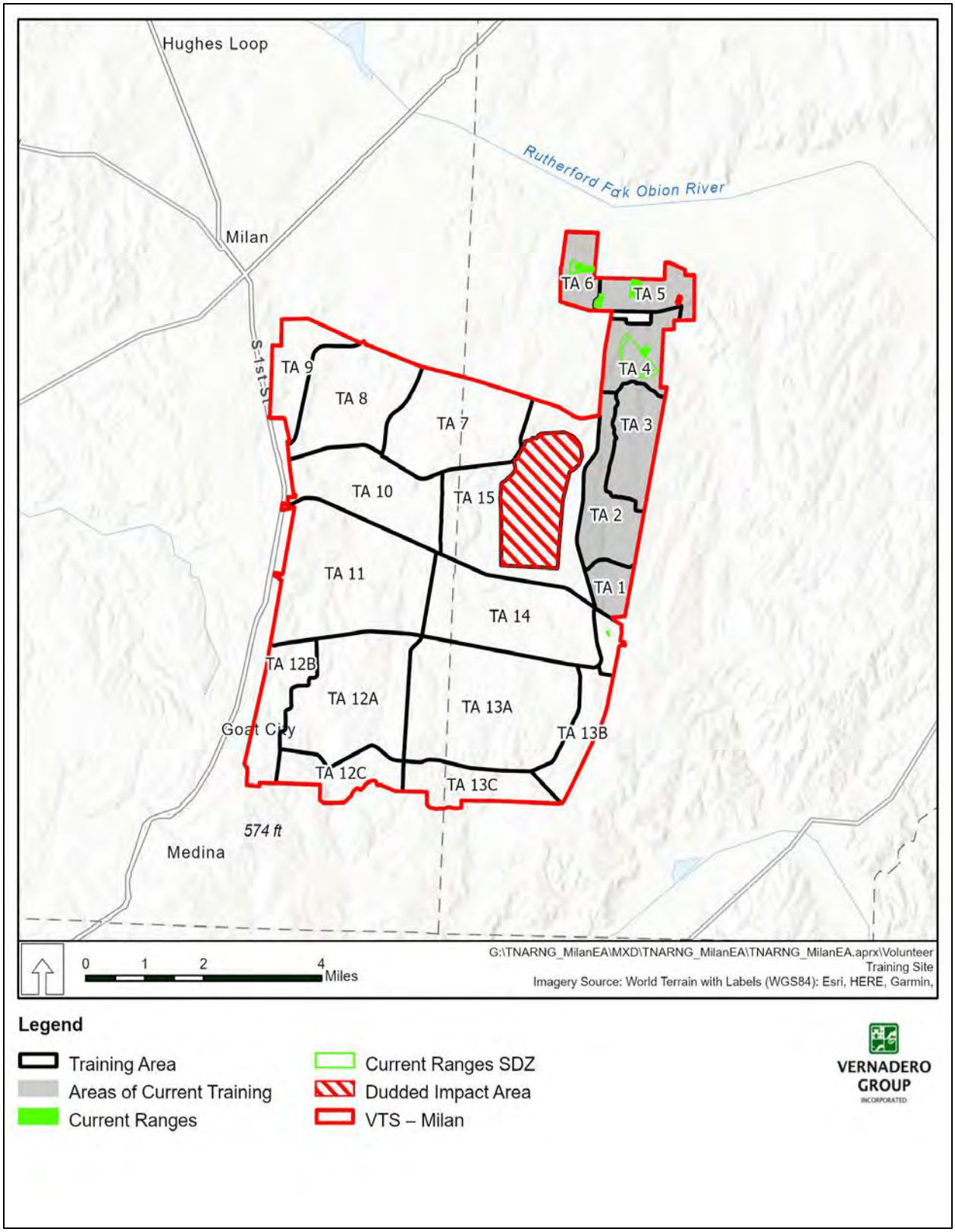

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HOUSTON BARRACKS, PO BOX 41502
NASHVILLE, TENNESSEE 37204-1502

NGTN-FMZ-ENV 31 July 2023

Tennessee Department of Environment & Conservation
Division of Natural Areas
Attn: David W. Salyers
312 Rosa L. Parks Avenue
Nashville, TN 37243

Submitted via email to salyers@tn.gov.

Dear Mr. Salyers

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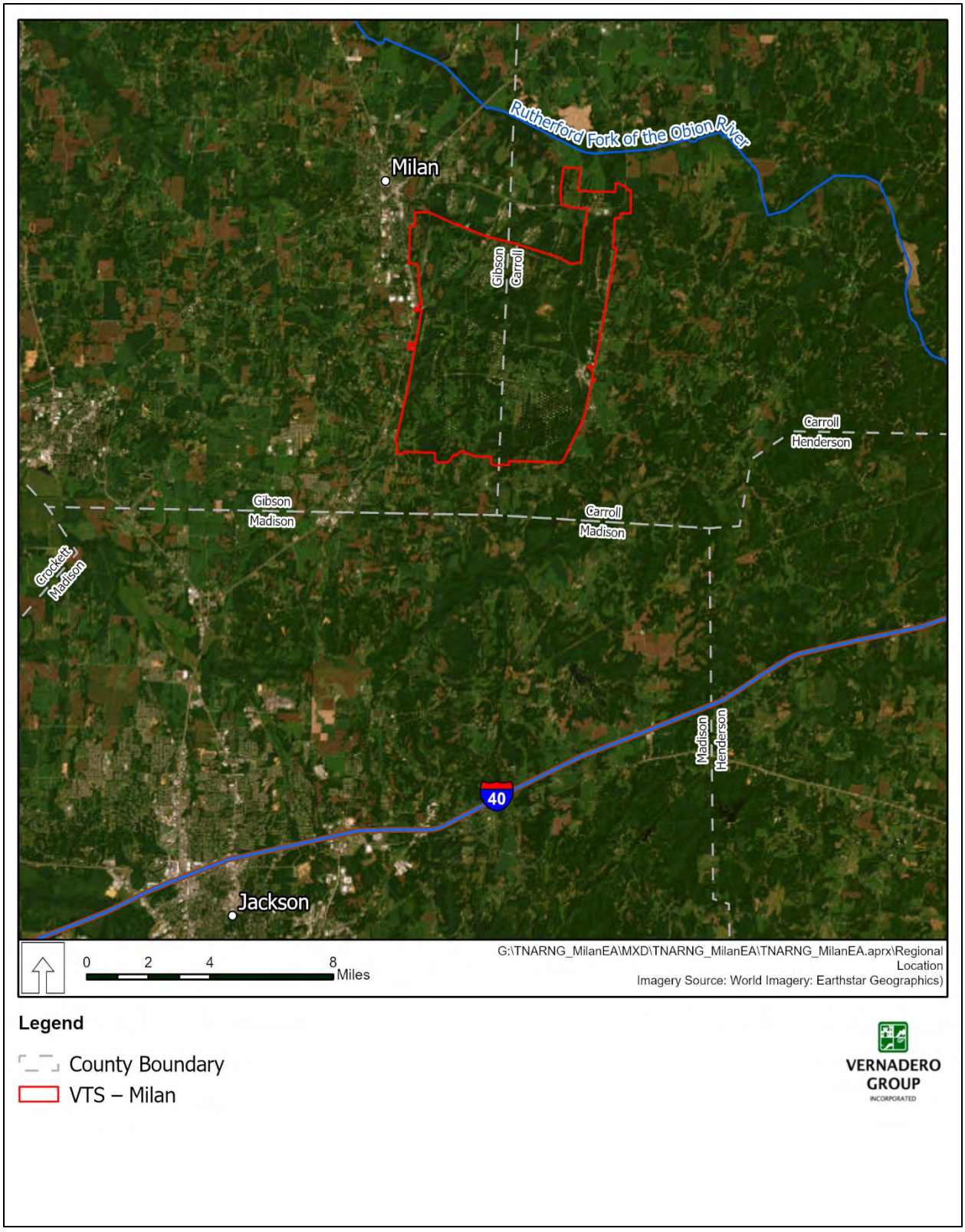

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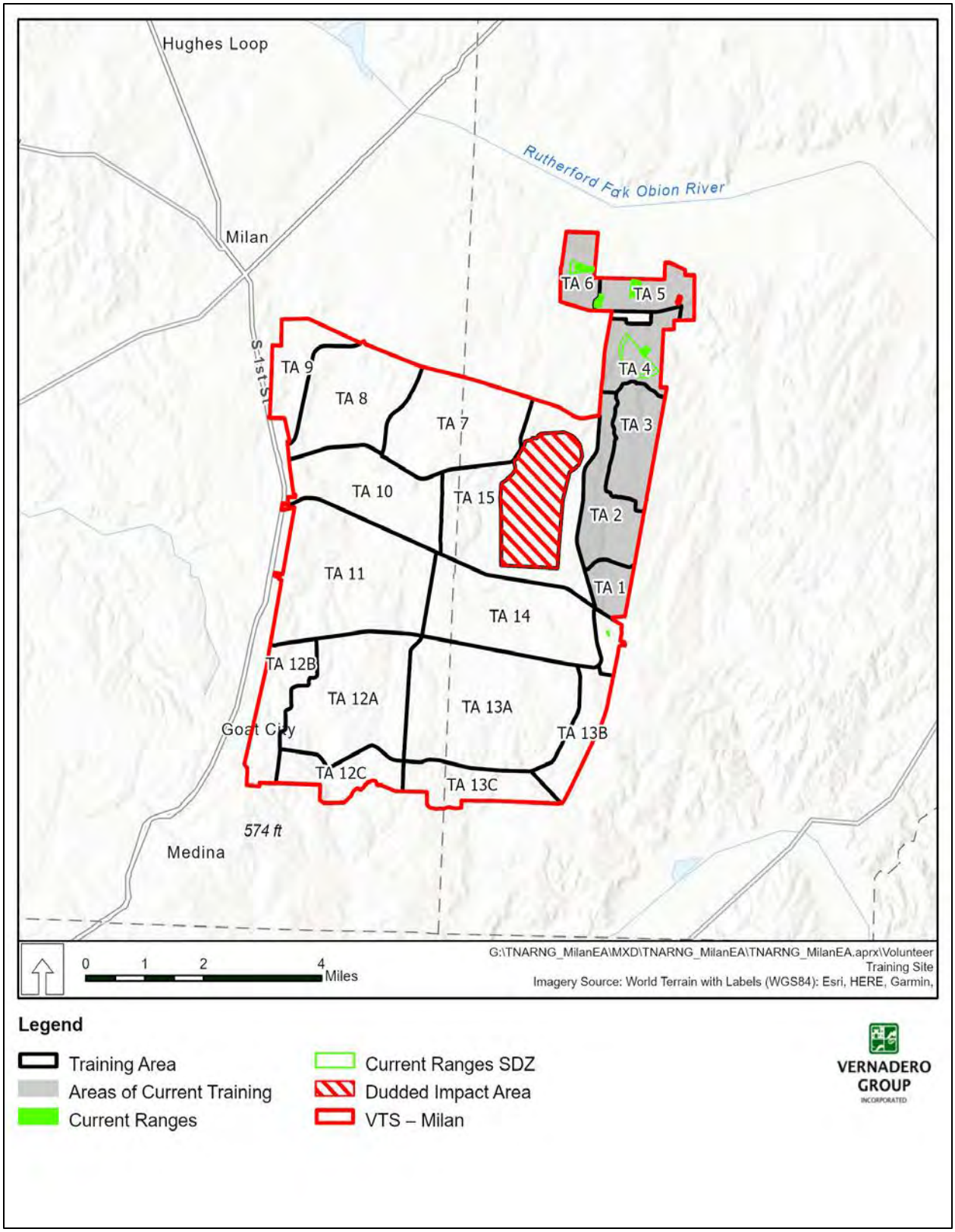

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NASHVILLE, TENNESSEE 37204-1502

NGTN-FMZ-ENV 31 July 2023

Tennessee Department of Environment & Conservation
Office Sustainable Practices
NEPA Reviews
Attn: Matthew Taylor
312 Rosa L. Parks Avenue
Nashville, TN 37243

Submitted via email to matthew.k.taylor@tn.gov.

Dear Mr. Taylor

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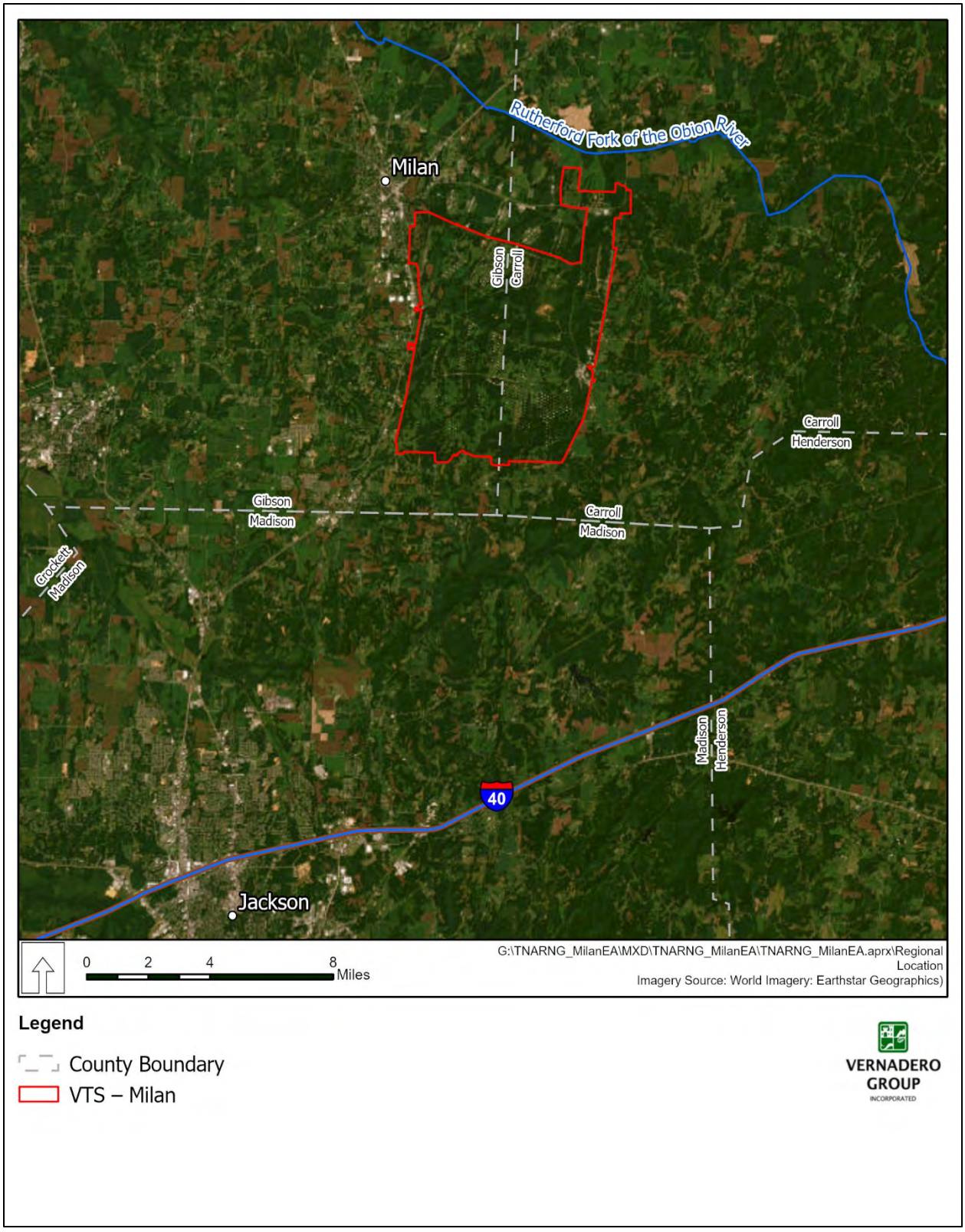

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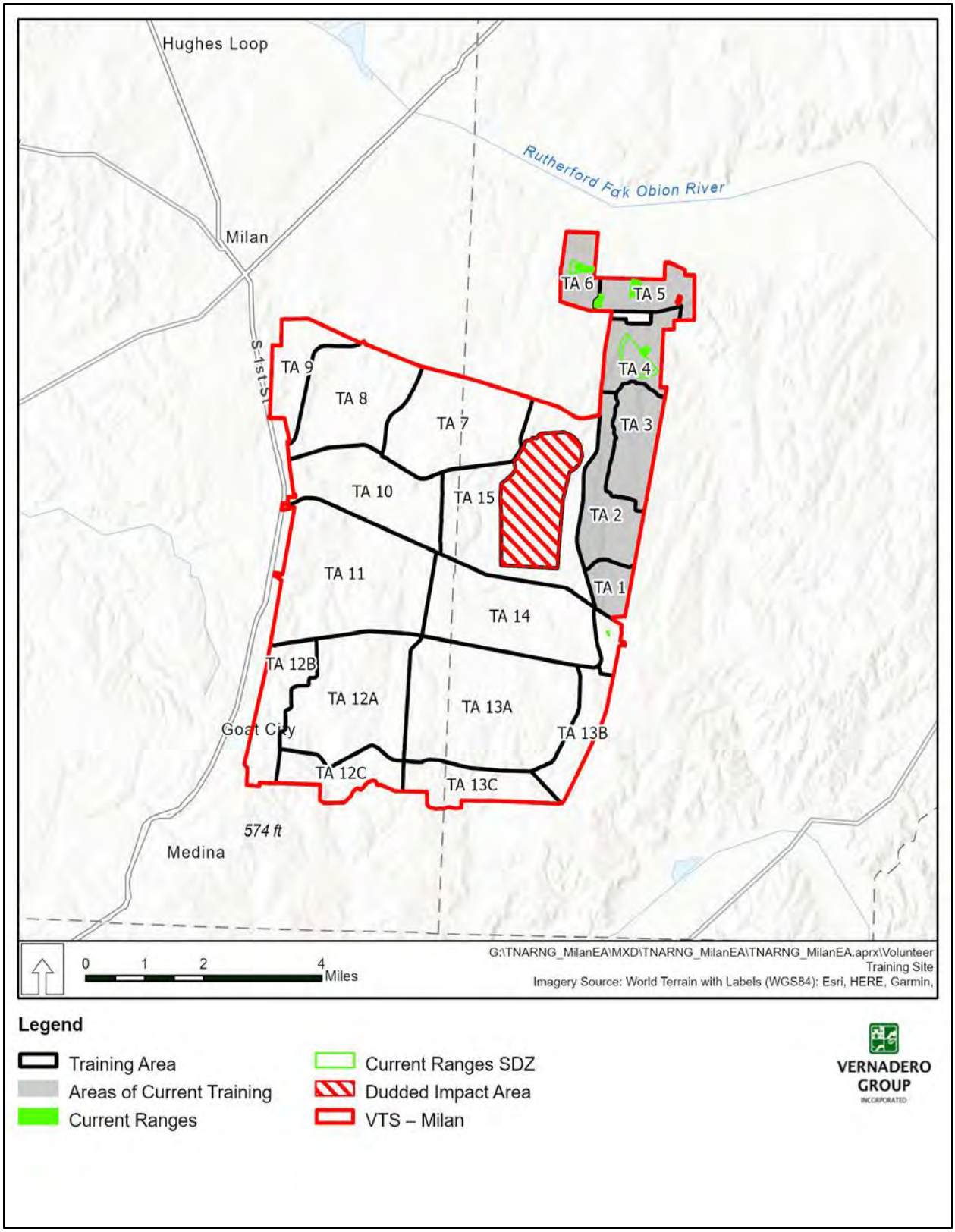

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HOUSTON BARRACKS, PO BOX 41502
NASHVILLE, TENNESSEE 37204-1502

NGTN-FMZ-ENV 31 July 2023

Tennessee Division of Archaeology
Attn: Mr. Phil Hodge
Cole Building #3
1216 Foster Avenue
Nashville, TN 37243

Submitted via email to phil.hodge@tn.gov.

Dear Mr. Hodge

An Environmental Assessment (EA) is being prepared by the Tennessee Army National Guard (TNARNG) to identify and evaluate potential environmental impacts associated with the proposed heavy and light maneuver training at the Volunteer Training Site – Milan (VTS-M), Tennessee. A copy of the Draft EA will be made available for your review and comment when complete.

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GREGORY M. TURNER
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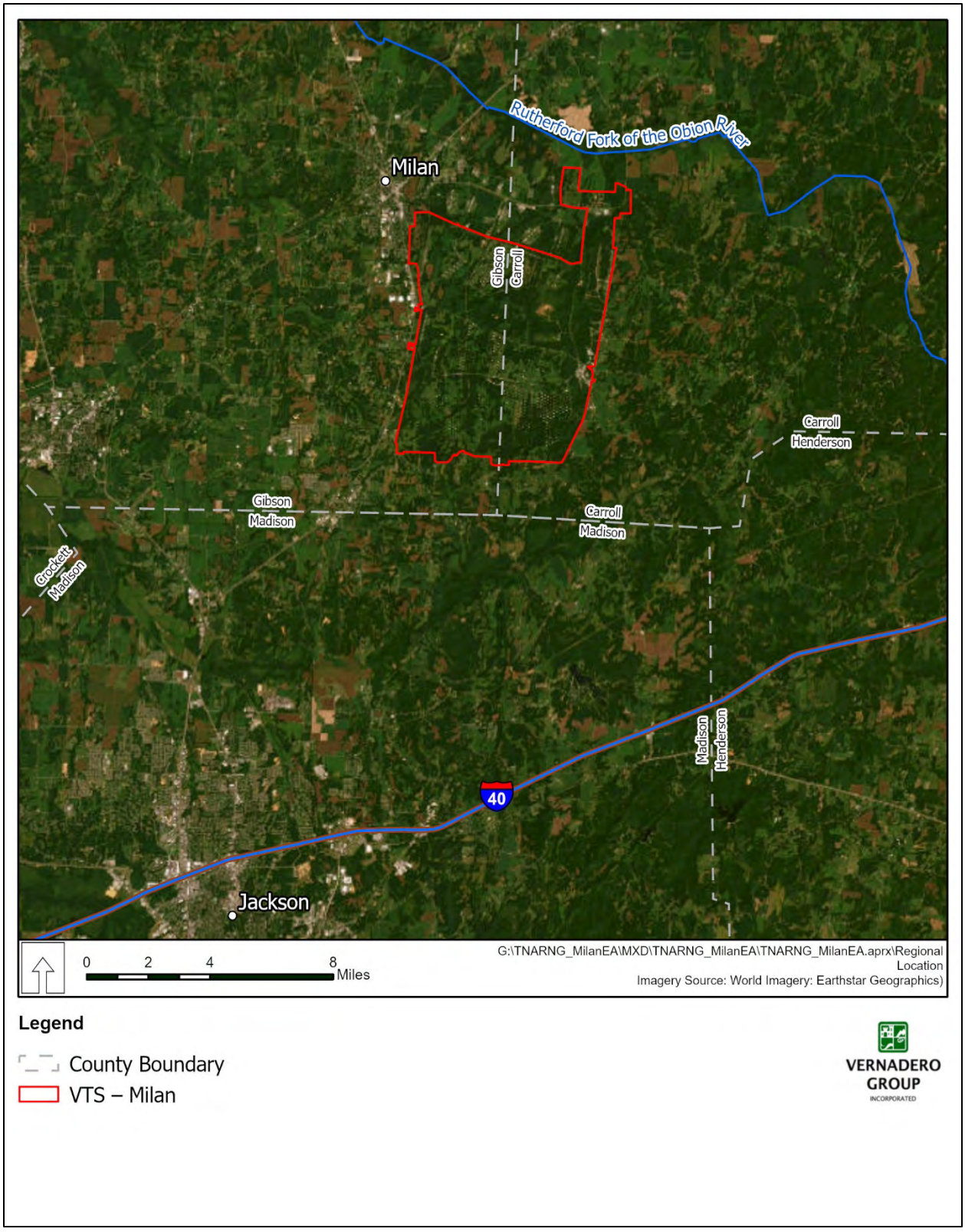

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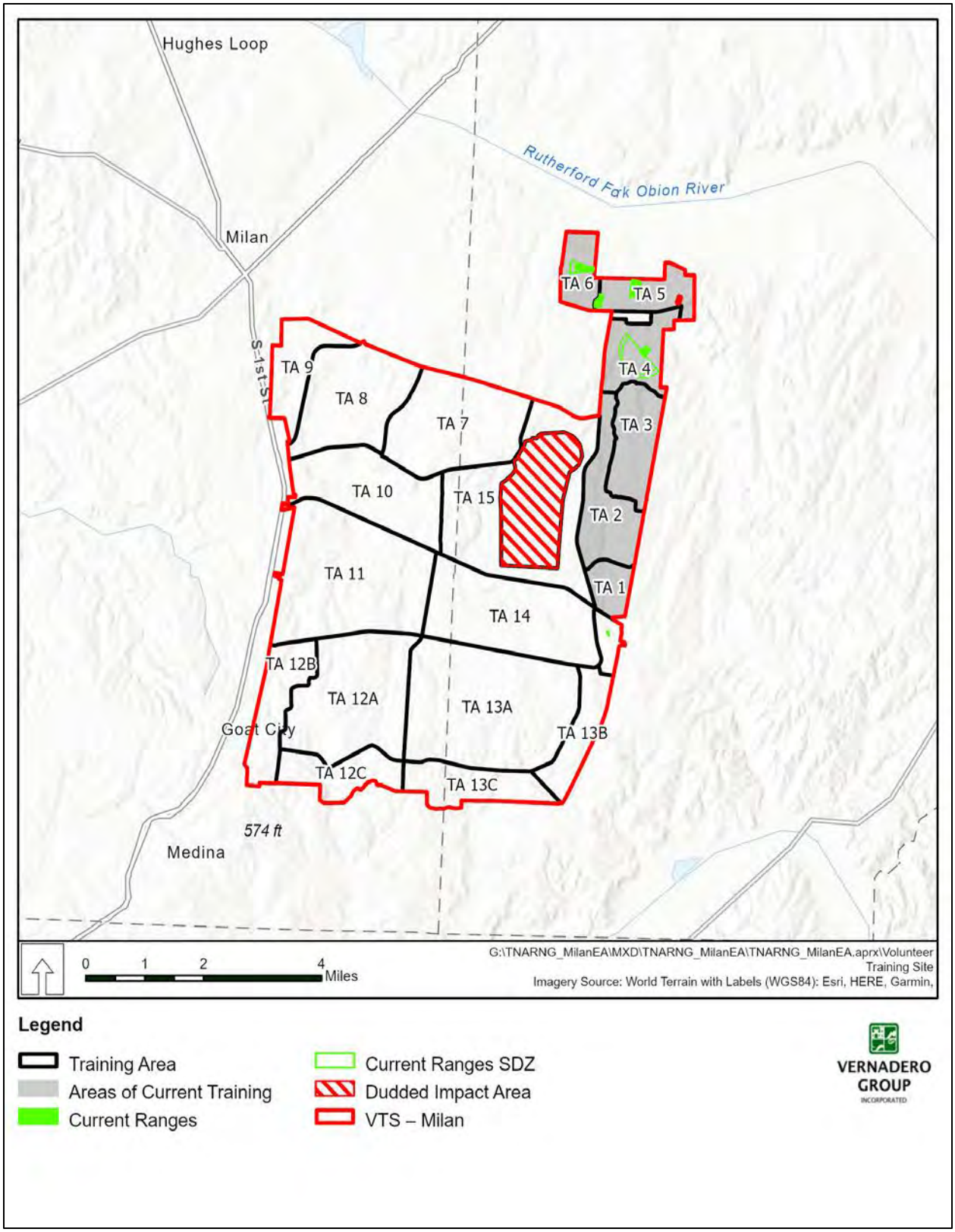

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NGTN-FMZ-ENV 31 July 2023

Tennessee Historic Commission
State Historic Preservation Office
Attn: Mr. Patrick McIntyre
2941 Lebanon Pike
Nashville, TN 37214

Submitted via email to Patrick.mcintyre@tn.gov.

Dear Mr. McIntyre

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Environmental Program Manager
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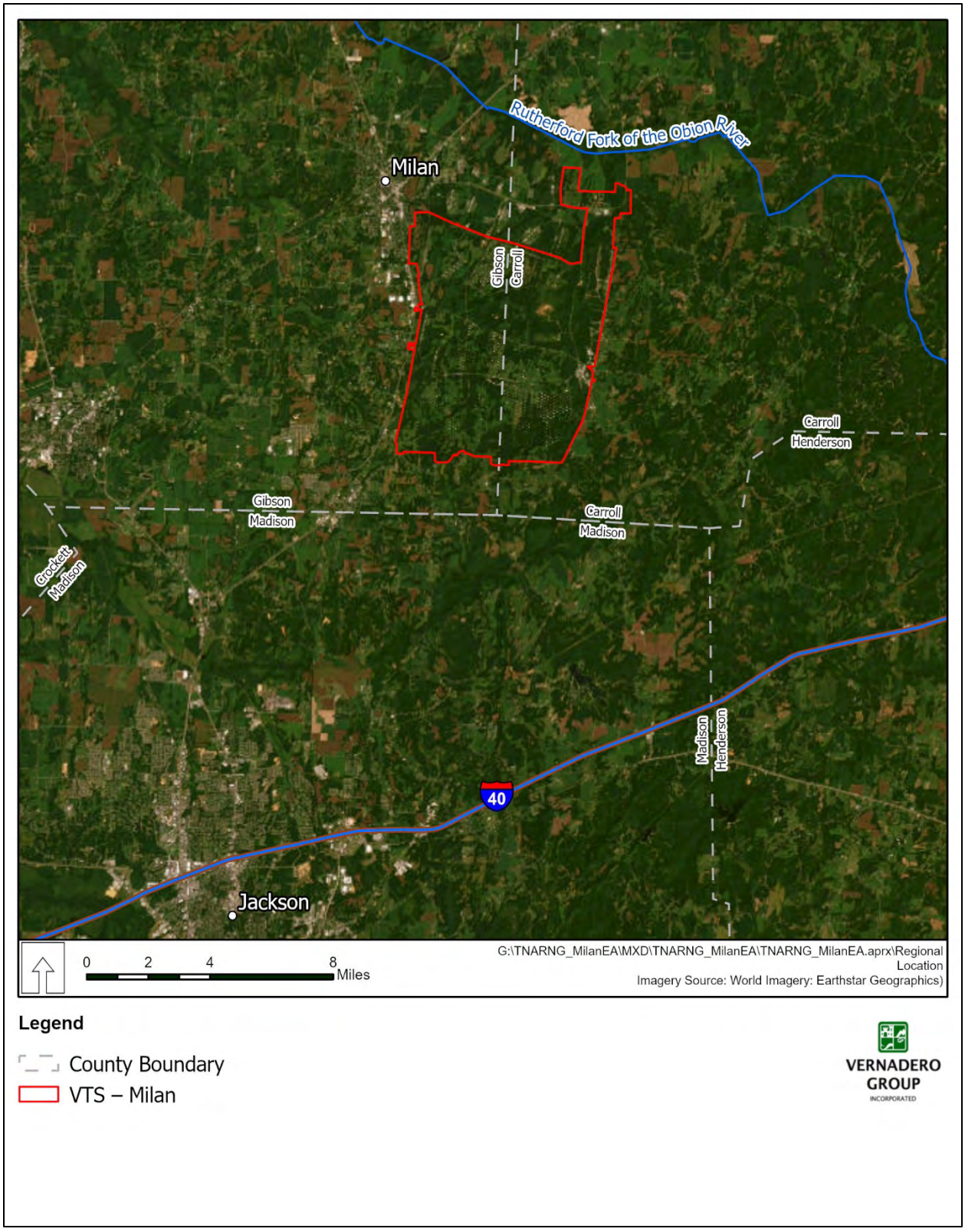

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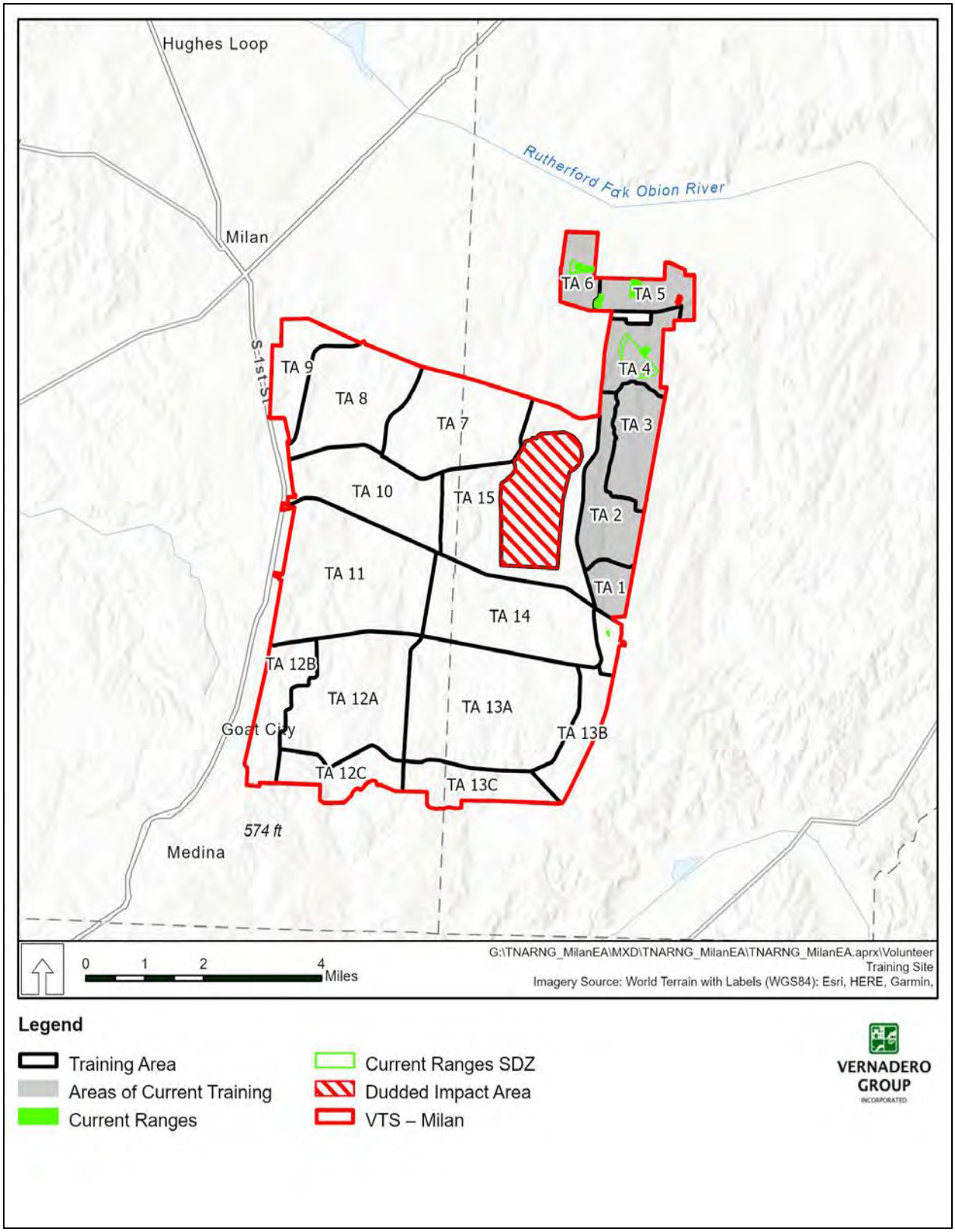

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NGTN-FMZ-ENV 31 July 2023

Tennessee Wildlife Resources Agency
West Tennessee Region 1
Attn: Mr. Patrick Lemons
200 Lowell Thomas Drive
Jackson, TN 38301

Submitted via email to patrick.lemons@tn.gov.

Dear Mr. Lemons

An Environmental Assessment (EA) is being prepared by the Tennessee Army National Guard (TNARNG) to identify and evaluate potential environmental impacts associated with the proposed heavy and light maneuver training at the Volunteer Training Site – Milan (VTS-M), Tennessee. A copy of the Draft EA will be made available for your review and comment when complete.

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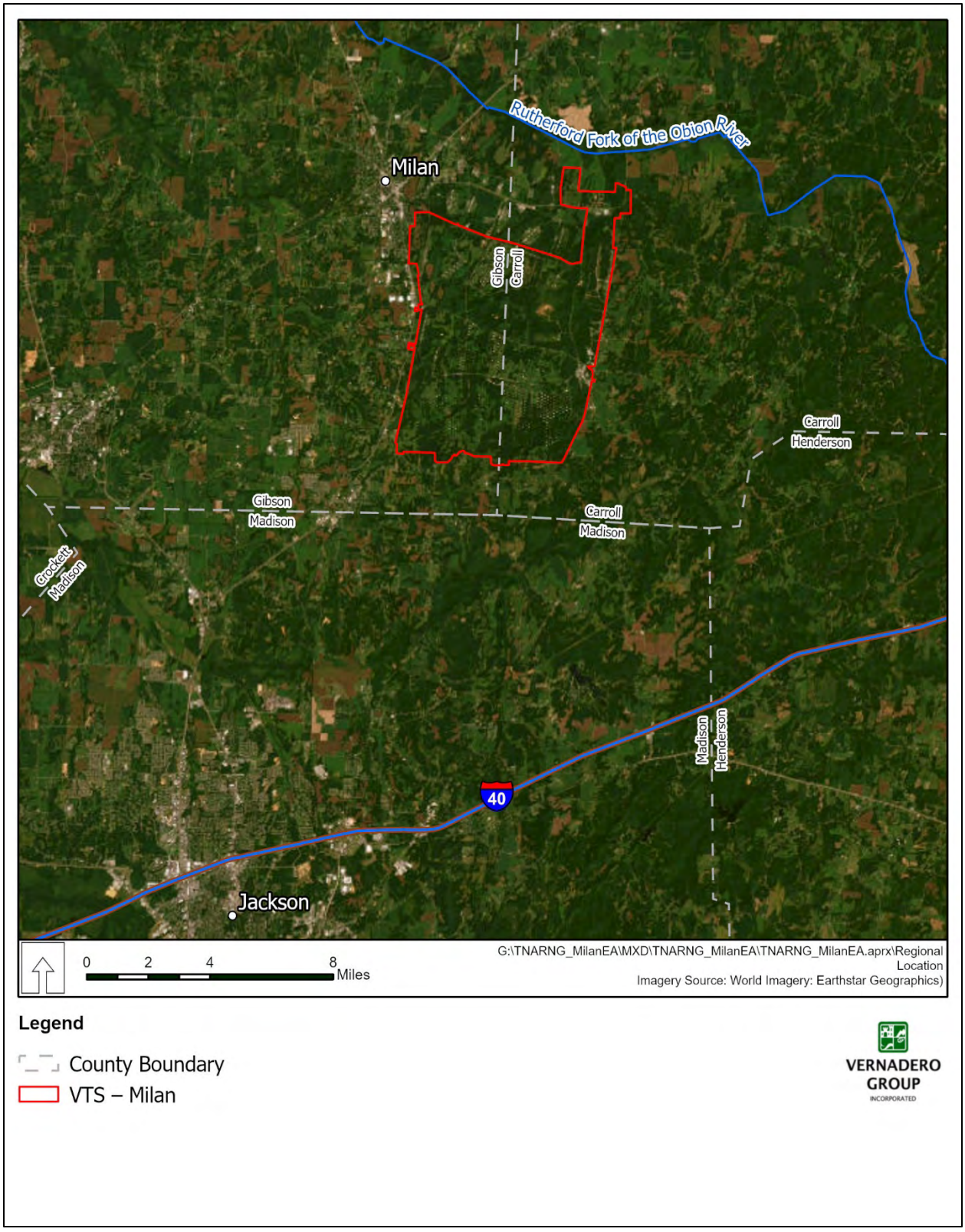

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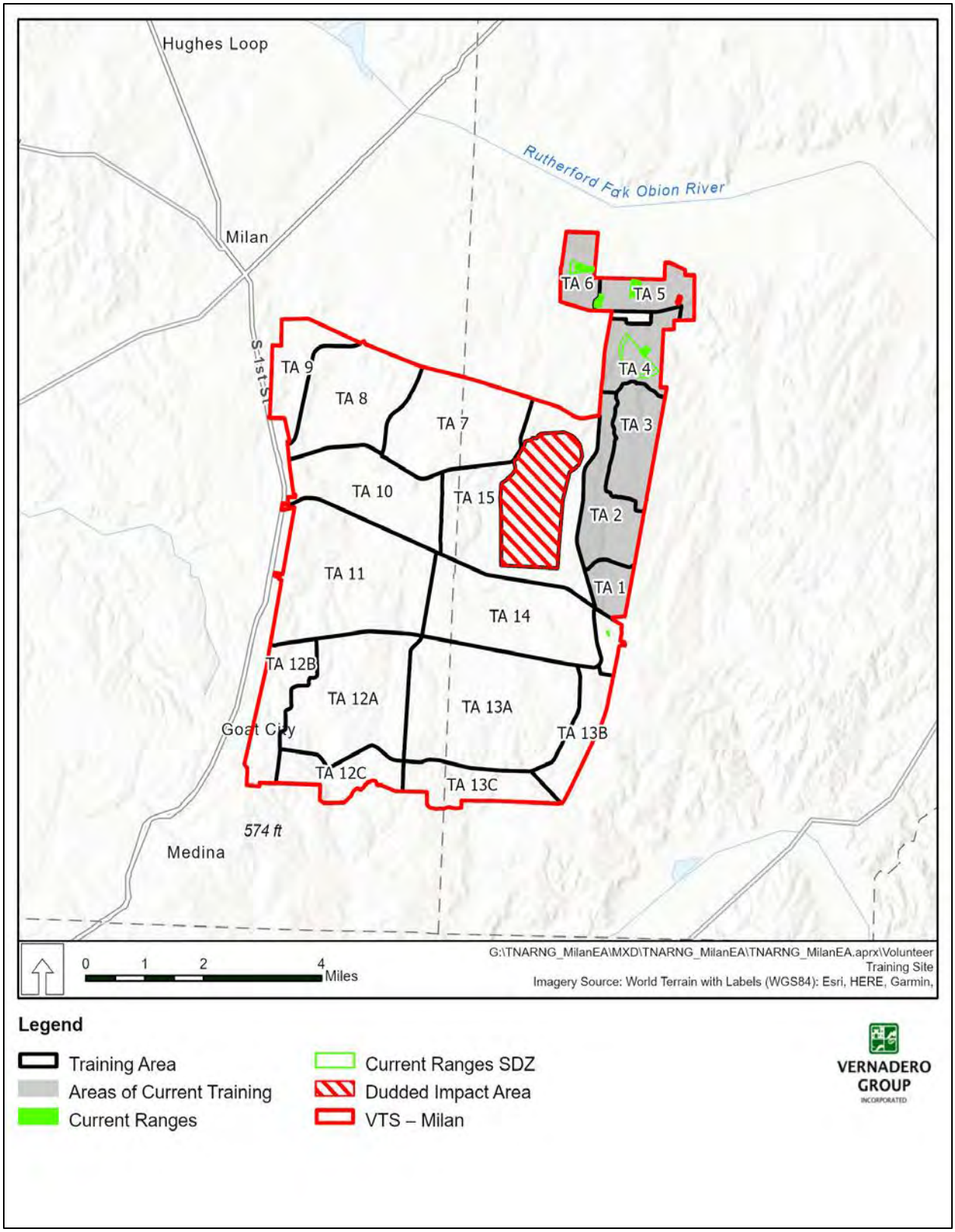

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NGTN-FMZ-ENV 31 July 2023

U.S. Army Corps of Engineers
Memphis District
Attn: Gregg W. Williams
167 North Main Street, Room B202
Memphis, TN 38103

Submitted via email to *gregg.w.williams@usace*.army.mil.

Dear Mr. Williams

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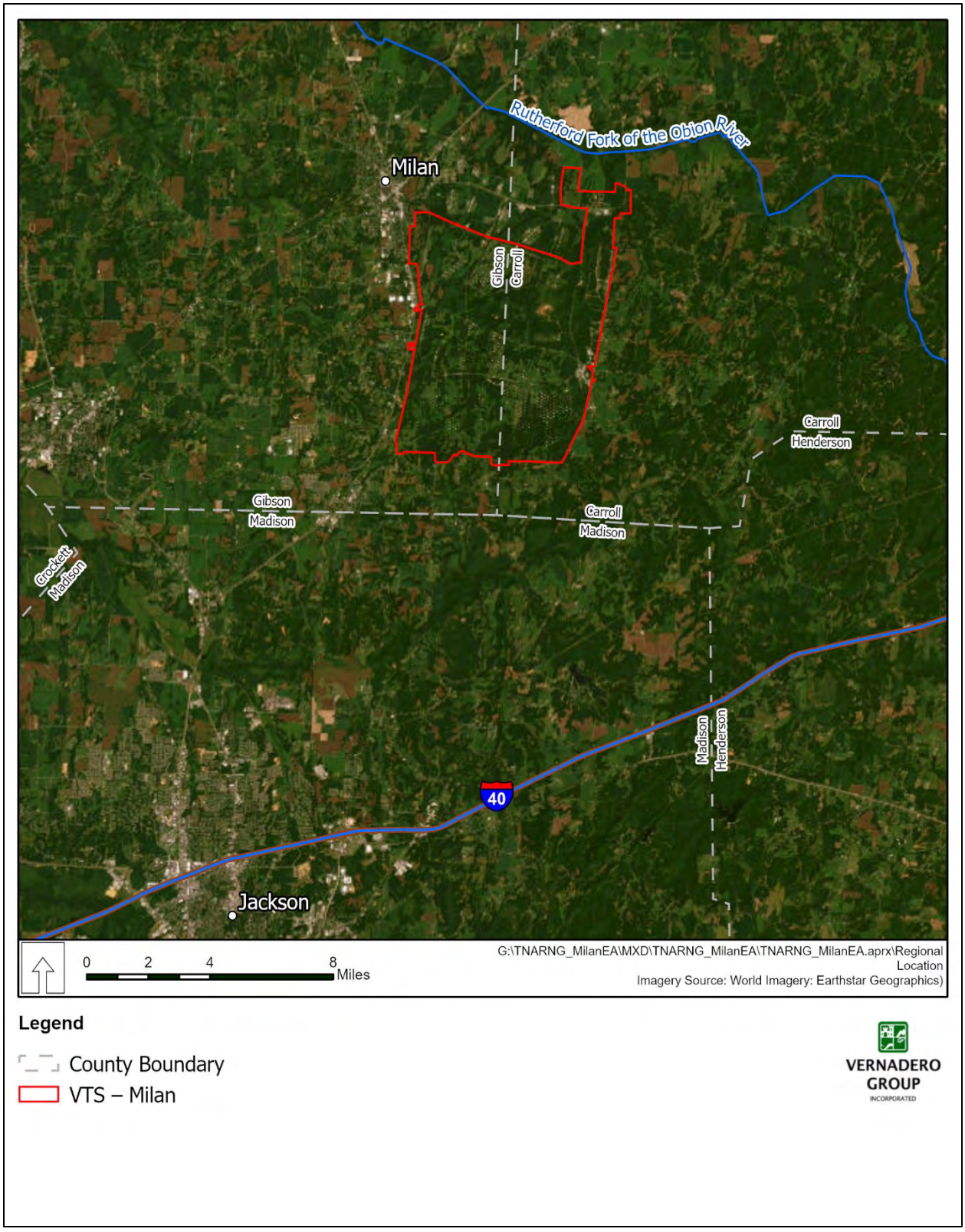

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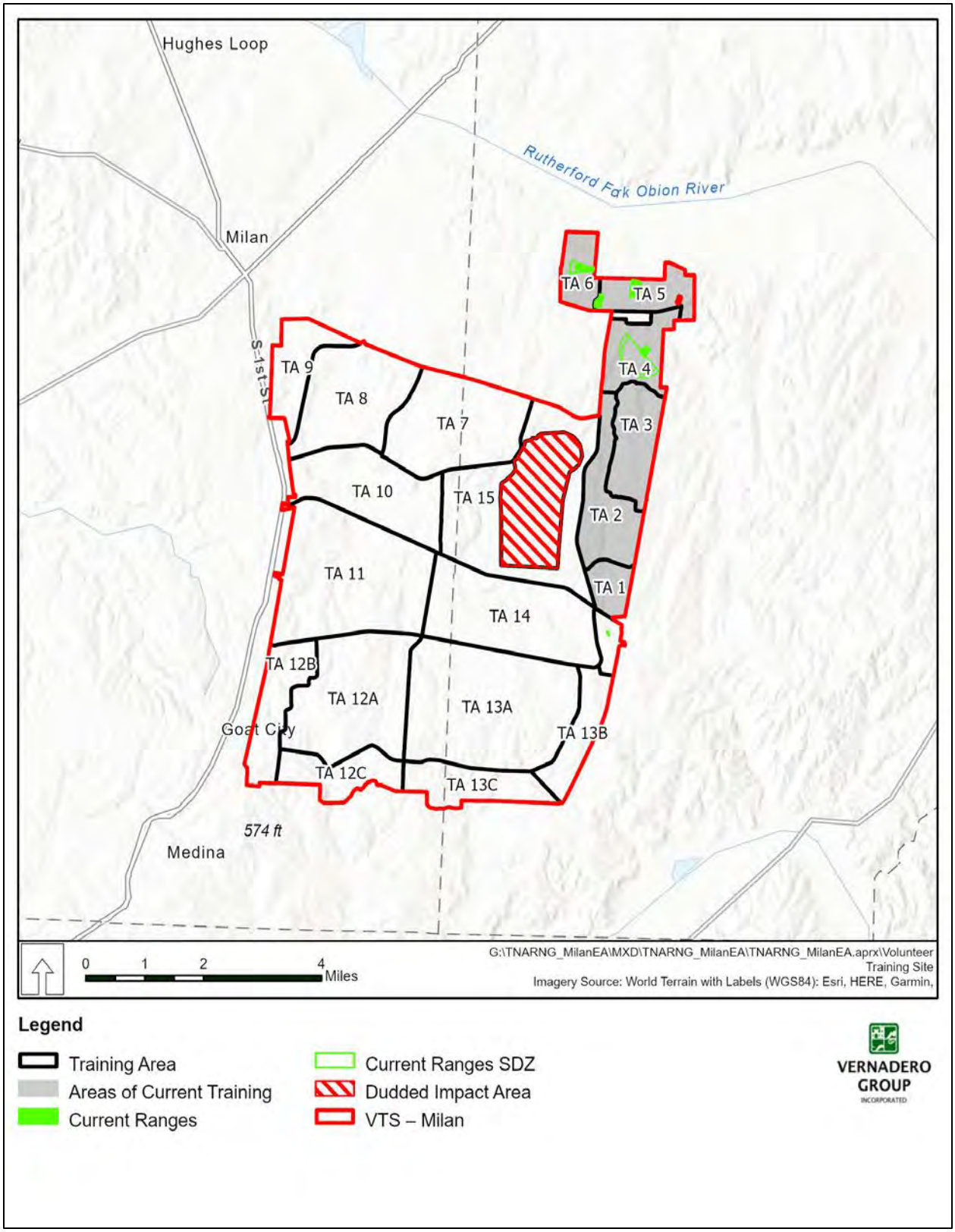

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NGTN-FMZ-ENV 31 July 2023

U.S. Environmental Protection Agency
Region 4
Attn: Mr. John Blevins
980 College Station Road
Athens, GA 30605-2720

Submitted via email to blevins.john@epa.gov.

Dear Mr. Blevins

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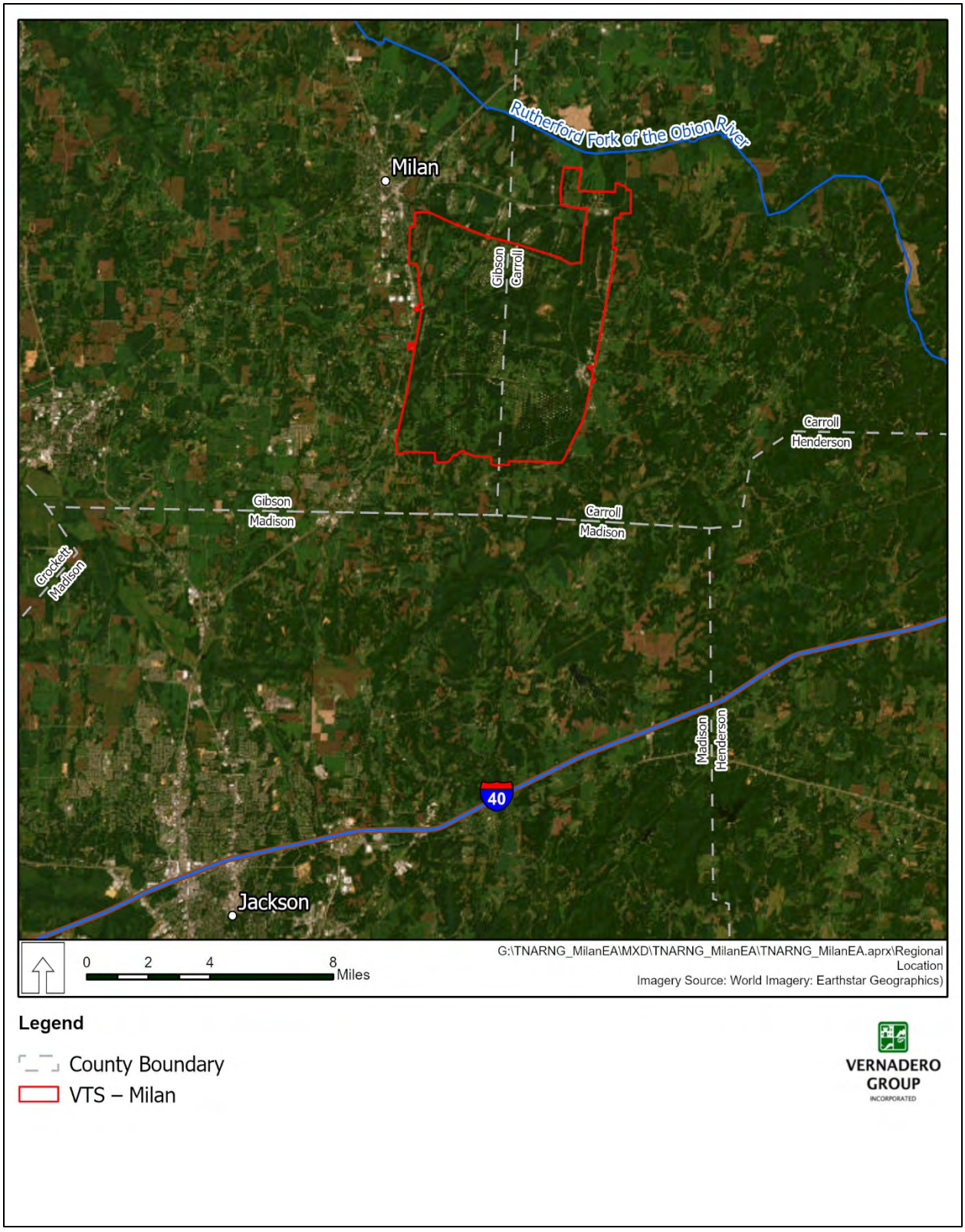

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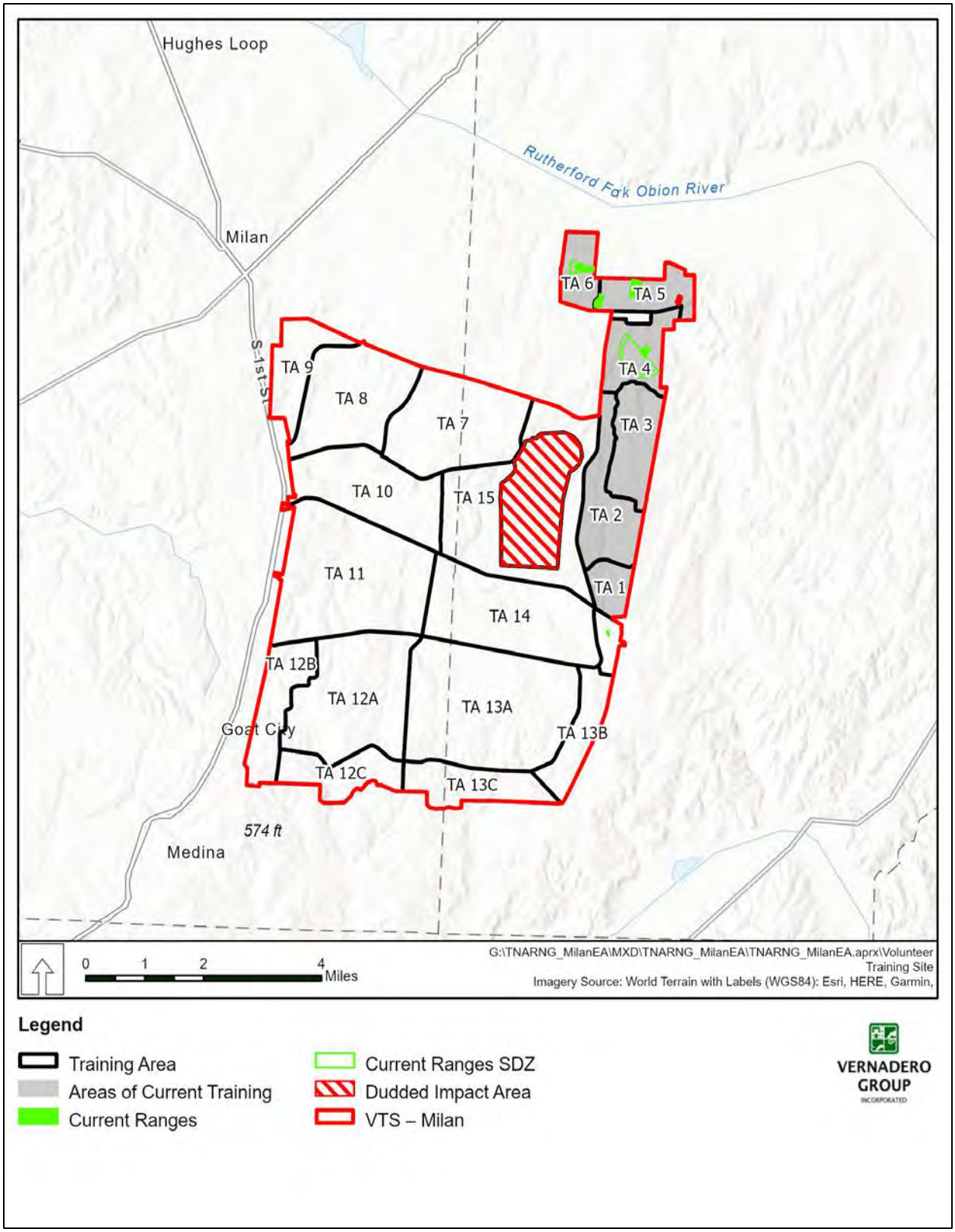

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NGTN-FMZ-ENV 31 July 2023

U.S. Fish and Wildlife Service
Tennessee Ecological Services Field Office
Attn: Mr. Daniel Elbert
446 Neal Street
Cookeville, TN 38501

Submitted via email to daniel_elbert@fws.gov.

Dear Mr. Elbert

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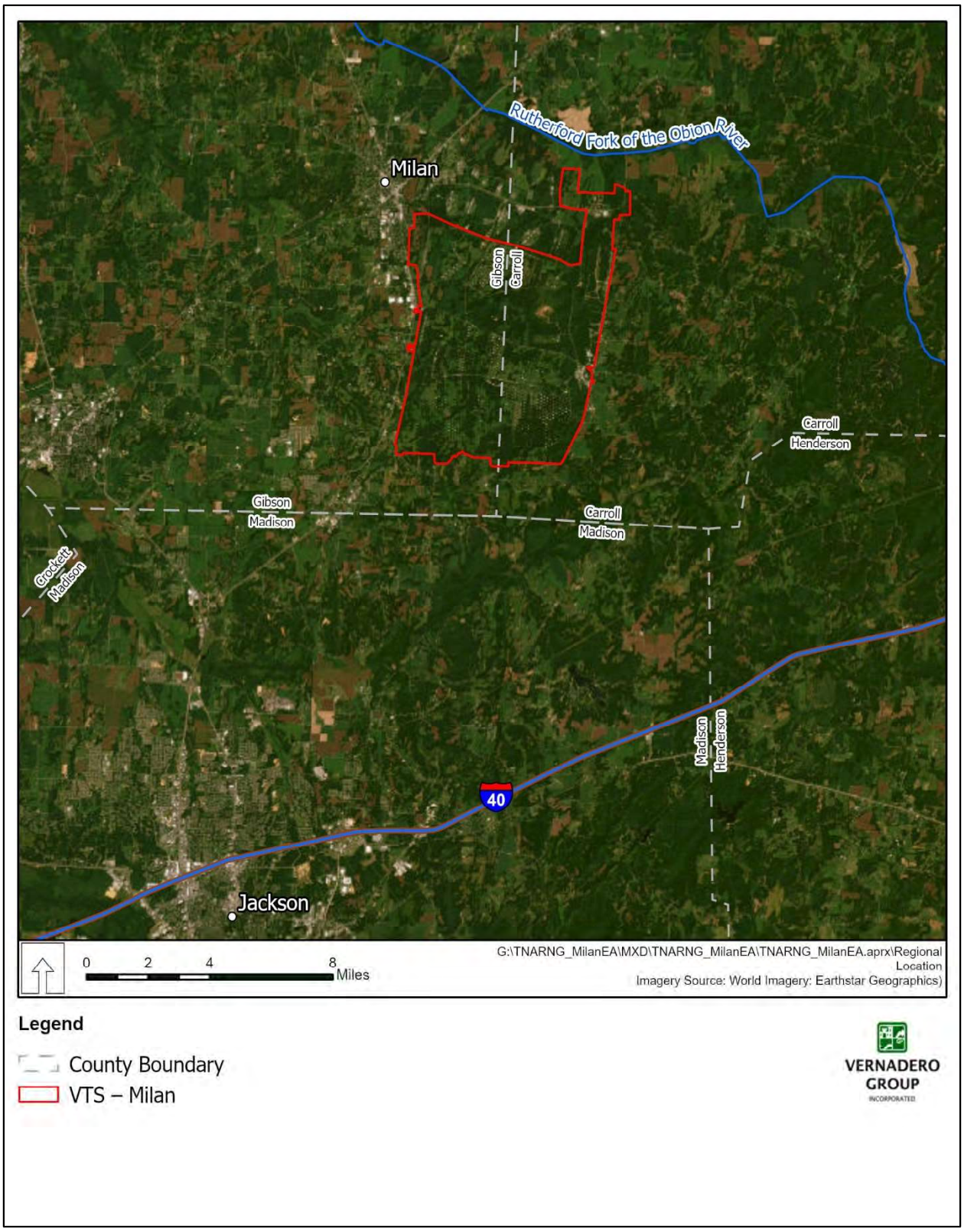

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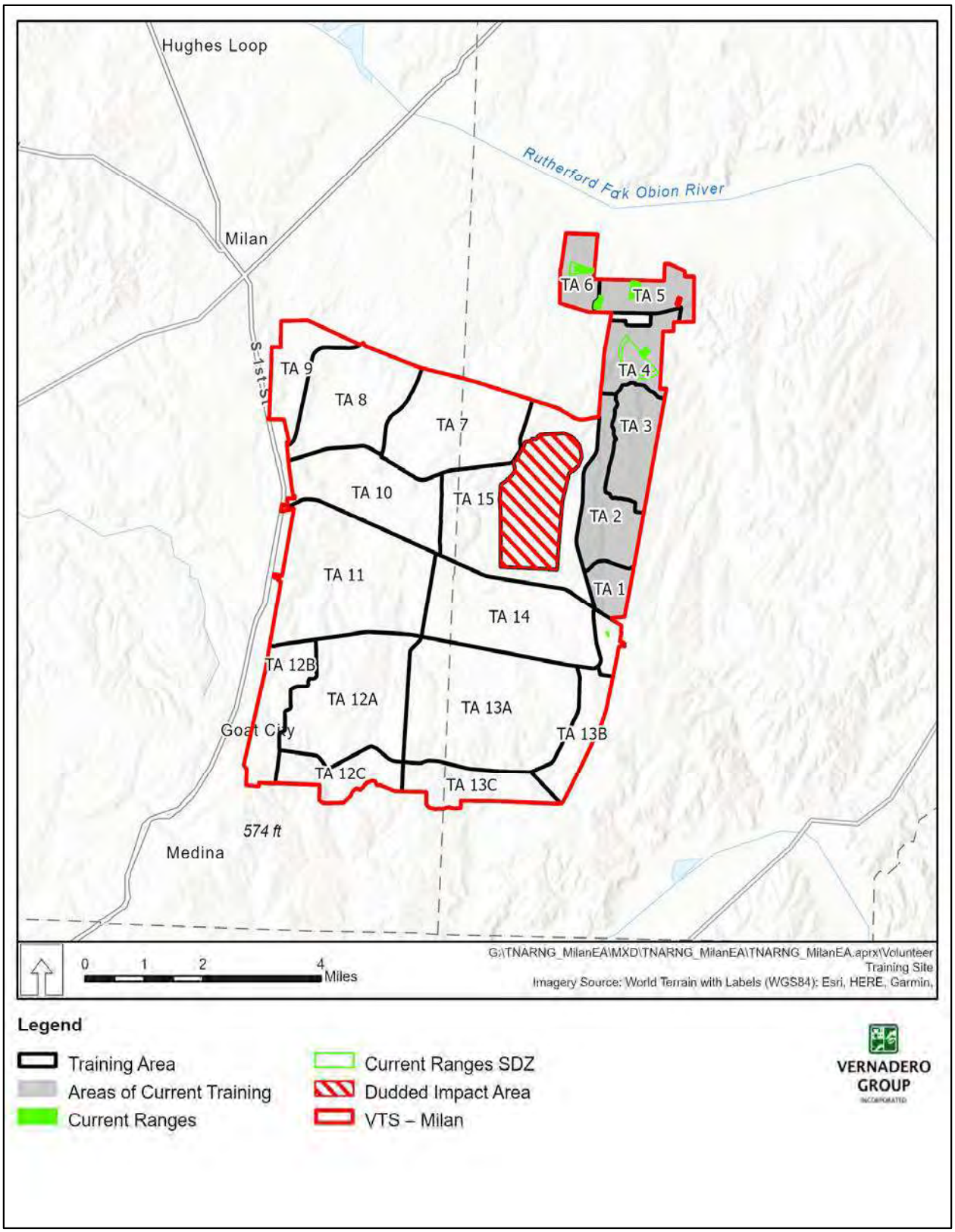

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Agency Responses to Scoping Letters

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Division of Remediation
William R. Snodgrass TN Tower
312 Rosa L. Parks Avenue, 14th Floor
Nashville, Tennessee 37243

August 25, 2023

Mr. Greg Turner
Department of Army and Air Force
Joint Force Headquarters
Tennessee Army National Guard
Houston Barracks, P. O. Box 41502
Nashville, Tennessee 37204-1502

Re: Volunteer Training Site – Milan (VTS – Milan) Environmental Assessment (EA) Scoping Letter dated July 31, 2023

Dear Mr. Turner,

This letter is written in response to your July 31, 2023 letter to the Tennessee Department of Environment and Conservation (TDEC) Commissioner David Salyers requesting information to assist the Tennessee Army National Guard (TNARNG) "identify and evaluate potential environmental impacts associated with the proposed heavy and light maneuver training at the Volunteer Training Site – Milan (VTS-M), Tennessee." It is understood the information to be provided will be used to draft an Environmental Assessment (EA) for TDEC's "review and comment when complete."

In your letter, it is stated, "the purpose of TNARNG's proposed action is to provide sufficient training land to allow for heavy and light maneuver training, including maneuver support, land augmentation, communications, unmanned aerial vehicle operations, air insertion, causality evacuation, and new live-fire capabilities training within proposed ranges, to TNARNG units within the state to better support TNARNG training requirements and mission." However, in a later conversations with Mr. Pete Roth and Ms. Alison Campany, it was clarified that the scope of activities for this EA are limited to general maneuver and is not associated with live fire as planning for those activities are dependent upon funding and may not be implemented for several years. It was also explained that when appropriate, each planned range will have a separate EA in accordance with National Environmental Policy Act (NEPA) requirements. The Department anticipates scoping letters for these as well in which the activities associated with those proposed projects are detailed.

DoR's regulatory concerns associated with the former Milan Army Ammunition Plant (MLAAP) site that should be considered when drafting the EA for the VTS – Milan project include the following:

1. National Priorities List (NPL) – The MLAAP site is listed on the Federal NPL as one of national priority among sites with known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. It is

further categorized as a fence-to-fence site. This means *all* 22,000+ acres, including the VTS – Milan, are considered part of the site and are subject to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), not just the Areas of Concern (AOCs) currently identified.

2. Federal Facilities Agreement (FFA) – In 1989, TDEC (formally the Tennessee Department of Health and the Environment), the United States Environmental Protection Agency (EPA), and the Army entered into an FFA. The general purposes of this agreement are to:

a. Ensure that the environmental impacts associated with past and present activities at the entire site are thoroughly investigated and appropriate remedial action is taken as necessary to protect the public health, welfare and the environment;
b. Establish a procedural framework and schedule for developing, implementing and monitoring appropriate response actions at the entire site…
c. Facilitate cooperation, exchange of information and participation of the Parties in such actions.

This 76-page document details the history of the facility as well as the expectations, relationship, and responsibilities of each signatory and other information that may be useful in the preparation of the upcoming EA since it encompasses the VTS – Milan.

3. Records of Decision (RODs) – As a site regulated under CERCLA, it has been subject to an extensive remedial investigation. That effort identified the areas impacted with site contaminants and their concentrations. From this information, appropriate remedial activities were chosen and are being implemented by the Army. The remedies chosen are detailed in the site's RODs. These documents should be carefully reviewed and considered prior to any training activities performed at VTS – Milan to ensure site activities do not conflict with remedial activities.

4. Land Use Control Implementation Plan (LUCIP) – A key part of the MLAAP site's remedial plan includes prohibiting or restricting activities or access in areas where known contamination remains based upon previous investigations. It should be noted that land use assumptions made for the drafting of the current LUCIP were based upon the status and use of MLAAP *prior to* its reassignment to the National Guard Bureau (NGB) and the subsequent licensing to the TNARNG. Further, the LUCIP states, "Any change in land use that would be inconsistent with the exposure assumptions in the human health and/or ecological risk assessments that served as the basis for the LUCs" "will require regulatory review." As such, DoR requests additional discussion among stakeholders to ensure activities planned by the TNARNG are adequately protective of human health and the environment. A revised LUCIP, Site Management Plan (SMP), and/or sampling activities are potentially required prior to the execution of the activities currently proposed by the TNARNG associated with this EA, especially those considered "land augmentation."

5. Five-Year Reviews (FYRs) - FYRs are documents prepared every five years to evaluate the implementation and performance of site remedies detailed in the RODs to determine if they remain protective of human health and the environment for both the short- and long-term. FYRs will continue at MLAAP until such time as it is designated as suitable for unlimited use and unrestricted exposure (UU/UE). UU/UE generally is the level of cleanup at which all exposure pathways present an acceptable level of risk for all land uses. There are currently no

projections as to when the site might be given this designation. Therefore, FYRs are to continue at MLAAP indefinitely. Since the purpose of FYRs is to evaluate the short- and long-term protectiveness of the selected remedies, it is crucial that the activities at VTS – Milan not only do not impact the implementation and performance of these remedies, but also that no activities *further* contribute to detrimental impacts to human health and the environment.

DoR looks forward to working with the TNARNG as it implements planned training activities at the VTS – Milan facility in the future. Please do not hesitate to contact me at Evan.W.Spann@tn.gov or (615) 532-0919 should you have any questions or concerns regarding this correspondence.

Thank you.

Sincerely,

Evan Spann
Deputy Director of Field Office Operations
TDEC-DoR Nashville Central Office

CC:
Alison Campany, TDEC-DoR, Memphis Environmental Field Office
Merrie Salyers, TDEC-DoR, Memphis Environmental Field Office
Peter Roth, Veteran's Services
Michael Lewis, TDEC- Office of General Counsel
Jennifer Tribble, TDEC - Office of Policy and Sustainable Practices
Steve Sanders, TDEC-DoR Director
Ahmet Bulbulkaya, TDEC-DoR Environmental Fellow

Carey Perry

From: Turner, Gregory M NFG NG TNARNG (USA) <gregory.m.turner.nfg@army.mil>
Sent: Tuesday, October 3, 2023 9:42 AM
To: Buxbaum, David; Woolheater, Tim; Corrigan, William R III CIV USARMY JMC (USA)
Cc: J.D. Cressman; Michael D. Lewis; Demoss, Nicole; Martin, Anna; alison.campany@tn.gov; Milligan, Andrew P COL USARMY NG TNARNG (USA)
Subject: RE: Early Agency Notification -- Tennessee Army National Guard Proposed Heavy and Light Maneuver Training at Volunteer Training Site - Milan, TN

Sir,

Per Mr. Cressman "the license agreement has not been executed yet. COL Milligan and I are planning to set up a time with the TAG to brief him and obtain his signature."

All areas that are included in the LUCIP (OBG, ADA, and monitoring wells, etc.) will be explicitly called out in the EA and are all clearly marked on the ground as NOGO areas. All are fenced, have signage posted, or are painted bright orange with protective bollards (wells). The TNARNG has been aware since the beginning that about 1000 +- acres will not be usable for ground training due to the LUC's and have planned the EA accordingly. There will be no drilling and no construction of facilities for any permanent habitation.

NOGO areas (LUC's) and monitoring wells are a familiar sight to most of our Soldiers. We train at VTS Tullahoma which is part of Arnold Engineering Development Center and there are LUC's and wells at that site.

I am hoping that we can have discussions about any EA concerns hashed out well before the review period and eliminate any unneeded delays.

I am encouraging everyone to feel free to reach out with any questions or concerns.

V//R

TN Department of Military

Greg Turner
Environmental Program Manager
Tennessee Army National Guard
JFHQ, Nashville, TN
615-313-0765 Office

From: Buxbaum, David <Buxbaum.David@epa.gov>
Sent: Tuesday, October 3, 2023 8:28 AM
To: Turner, Gregory M NFG NG TNARNG (USA) <gregory.m.turner.nfg@army.mil>; Woolheater, Tim <Woolheater.Tim@epa.gov>; Corrigan, William R III CIV USARMY JMC (USA) <william.r.corrigan4.civ@army.mil>
Cc: J.D. Cressman <J.D.Cressman@tn.gov>; Michael D. Lewis <Michael.D.Lewis@tn.gov>; Demoss, Nicole <demoss.ana@epa.gov>; Martin, Anna <Martin.Anna@epa.gov>; alison.campany@tn.gov

Subject: [Non-DoD Source] RE: Early Agency Notification -- Tennessee Army National Guard Proposed Heavy and Light Maneuver Training at Volunteer Training Site - Milan, TN

Gentlemen – do we know whether the amendment to the License has been executed between USACE/AMC and TN Department of Military? The updated License that includes environmental protection provisions related to the CERCLA remedial actions including land use controls required for areas on the transferred property should be recognized in the EA. Certain areas and remedy components (e.g. cover/caps and groundwater monitoring wells) cannot be disturbed (i.e., restricted areas). Also, the Army is required to notify EPA and TDEC of any planned land use change per the Land Use Control Implementation Plans (LUCIP) that could affect the remedy and get EPA and TDEC approval. Excerpt below from Soils OU3/OU4 LUCIP.

V. Modification of LUCs

The Army shall not modify or terminate LUCs, implementation actions, or modify land use with out EPA and TDEC approval. The Army shall seek prior concurrence before any anticipated action that may disrupt the effectiveness of the LUCs or any action that may alter or negate the need for LUCs.

Thanks,
David M. Buxbaum, Senior Attorney
U.S. EPA Region 4, Office of Regional Counsel
Atlanta Federal Center 61 Forsyth St. S.W.
Atlanta, GA 30303
Phone: 404 562-9549 (currently not monitored)
Work Cell (470) 382-9449

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From: Turner, Gregory M NFG NG TNARNG (USA) <gregory.m.turner.nfg@army.mil>
Sent: Friday, September 22, 2023 4:56 PM
To: Woolheater, Tim <Woolheater.Tim@epa.gov>
Subject: Fwd: Early Agency Notification -- Tennessee Army National Guard Proposed Heavy and Light Maneuver Training at Volunteer Training Site - Milan, TN

I received a strange undeliverable message on my email. Hopefully this gets through.

Greg Turner
Environmental Program Manager
Tennessee Army National Guard
615-313-0765

From: "Turner, Gregory M NFG NG TNARNG (USA)" <gregory.m.turner.nfg@army.mil>
Date: Friday, September 22, 2023 at 15:34:00
To: "Woolheater, Tim" <Woolheater.Tim@epa.gov>
Cc: "Martin, Anna" <Martin.Anna@epa.gov>, "adams.glen@epa.gov" <adams.glen@epa.gov>, "Milligan, Andrew P COL USARMY NG TNARNG (USA)" <andrew.p.milligan.mil@army.mil>

Subject: FW: Early Agency Notification -- Tennessee Army National Guard Proposed Heavy and Light Maneuver Training at Volunteer Training Site - Milan, TN

Good afternoon Mr. Woolheater,

See below and attached for the scoping letter to region 4. Sorry, for the delay.

We have been in contact with TDEC about the EA in process and attempted to discuss the way forward with them. Hopefully now that we have the correct contact, we can have some meaningful conversations about the Tennessee Army National Guard's (TNARNG's) proposed land use for training.

Have a great weekend.

V//R

Greg Turner

Environmental Program Manager

Tennessee Army National Guard

JFHQ, Nashville, TN

615-313-0765 Office

From: Carey Perry <cperry@vernadero.com>
Sent: Monday, July 31, 2023 1:54 PM
To: blevins.john@epa.gov
Cc: Turner, Gregory M NFG NG TNARNG (USA) <gregory.m.turner.nfg@army.mil>
Subject: [URL Verdict: Neutral][Non-DoD Source] Early Agency Notification -- Tennessee Army National Guard Proposed Heavy and Light Maneuver Training at Volunteer Training Site - Milan, TN

Dear Mr. Blevins,

On behalf of the Tennessee Army National Guard (TNARNG), we are contacting you in hopes of obtaining input on the potential impacts from the TNARNG's proposed heavy and light maneuver training at the Volunteer Training Site – Milan (VTS-M), Tennessee. The proposed heavy and light maneuver training is needed because there is currently a deficit in training area lands available to train and qualify TNARNG units in heavy mounted and light maneuvers; there are no current training areas in Tennessee capable of supporting the TNARNG's heavy and light maneuver training requirement. The purpose of TNARNG's proposed action is to provide sufficient training land to allow for heavy and light maneuver training, including maneuver support, land augmentation, communications, unmanned aerial vehicle operations, air insertion, causality evacuation, and new live-fire capabilities training within proposed ranges, to TNARNG units within the state to better support TNARNG training requirements and mission.

Attached as early agency notification, in accordance with the National Environmental Policy Act of 1969 (NEPA), Title 42 United States Code (USC) Sections (§§) 4321-4347, implemented by the President's Council on Environmental Quality (CEQ) regulations under Title 40 Code of Federal Regulations (CFR) Parts 1500–1508, 32 CFR Part 651, *Environmental Analysis of Army Actions*, and U.S. Army Regulation 200-2, *Environmental Analysis of Army Actions*, is the proposal and notice that the TNARNG is in the process of preparing an Environmental Assessment (EA) to assess the potential environmental impacts of the Proposed Action.

If you have any comments or concerns you would like to provide regarding the Proposed Action or its environmental impacts, please respond to us within 30 days of receipt of this letter. Please send your written responses via e-mail (preferred) to Mr. Gregory Turner at Turner, gregory.m.turner.nfg@army.mil.

Thank you.

Carey

Carey Lynn Perry

Senior Project Manager / NEPA Specialist

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From: Travis Blake <Travis.Blake@tn.gov>
Sent: Thursday, August 24, 2023 7:43 AM
To: Turner, Gregory M NFG NG TNARNG (USA) <gregory.m.turner.nfg@army.mil>
Cc: Jennifer Tribble <Jennifer.Tribble@tn.gov>
Subject: [Non-DoD Source] FW: Scoping Comments for TN Army National Guard Volunteer Training Site - Milan -- Due 8/30

The Tennessee Department of Environment's Division of Air Pollution Control (APC) has reviewed your scoping request to identify and evaluate potential environmental impacts associated with the proposed heavy and light maneuver training at the Volunteer Training Site in Milan, Tennessee. Based on our prior experience and our review of your notice, we offer the following suggestions.

Air Quality Impacts: Several actions can negatively impact air quality on a short-term basis, and APC recommends an evaluation of such impacts prior to any clearing, demolition, or construction. Such impacts may include, but are not limited to, air pollution from construction equipment, open burning associated with land clearing activities, and fugitive dust. Local air quality conditions are available online at https://www.airnow.gov/.

Asbestos: For projects that involve the demolition or renovation of structures, we advise that there are federal regulations enforced by the EPA and APC regarding asbestos renovation and demolition activity. These regulations apply to any building or structure known to contain asbestos and to any facilities proposed to be demolished. When any structures are proposed to be demolished, an asbestos demolition notification must be provided in advance, and proper pre demolition surveys must be conducted to identify any regulated asbestos containing material (ACM) present. Prior to any building demolition, all facilities must be examined for ACM, and all potential ACM in the buildings proposed for demolition must be handled and disposed of in accordance with the applicable Federal, state, and local regulations. Tennessee's asbestos regulations can be found in Chapter 1200-03-11 of the Tennessee Air Pollution Control Regulations (TAPCR).

Idling: Truck traffic associated with construction projects generate emissions of particulate matter, carbon monoxide, sulfur dioxide, nitrogen oxides, volatile organic compounds, and carbon dioxide, and APC recommends the operation of trucks with up-to-date emission control technologies and proper maintenance to minimize vehicle and equipment emissions. The Division of Air Pollution Control also recommends that you adopt best practices to minimize vehicle idling to minimize the impact of mobile source emissions on ambient air quality.

Open Burning: If disposal of trees or vegetation is necessary during construction, APC recommends that you evaluate alternatives to open burning. Additional information about Tennessee's open burning requirements can be found at https://publications.tnsosfiles.com/rules/1200/1200-03/1200-03-04.pdf.

Fugitive Dust: If fugitive dust will be generated from construction activities, APC recommends the use of wet suppression or other measures to minimize the generation of fugitive dust.

Please contact me if you have any questions or need additional information.

Travis J. Blake| Environmental Fellow
Division of Air Pollution Control
William R. Snodgrass Tennessee Tower, 15th Floor
312 Rosa L. Parks Avenue, Nashville, TN 37243
p. (615) 532-0617
travis.blake@tn.gov
tn.gov/environment

We value your opinion. Please take a few minutes to complete our customer satisfaction survey.

From: Jennifer Tribble <Jennifer.Tribble@tn.gov>
Sent: Tuesday, August 1, 2023 10:59 AM
To: Lacey Hardin <Lacey.Hardin@tn.gov>; Marc Corrigan <Marc.Corrigan@tn.gov>; Daniel Brock <Daniel.Brock@tn.gov>; Benjamin Almassi <Benjamin.Almassi@tn.gov>; Tom Moss <Tom.Moss@tn.gov>; Travis Blake <Travis.Blake@tn.gov>; Michelle Pruett <Michelle.Pruett@tn.gov>; Ryan Crihfield <Ryan.Crihfield@tn.gov>; Ahmet Bulbulkaya <Ahmet.Bulbulkaya@tn.gov>
Subject: Scoping Comments for TN Army National Guard Volunteer Training Site - Milan -- Due 8/30

Good morning,

We received a notice that the Tennessee Army National Guard will identify and evaluate potential environmental impacts associated with the proposed heavy and light maneuver training at the Volunteer Training Site – Milan, Tennessee. This project is in the scoping phase. Therefore, I am passing along information about the project and asking that if your Division has comments that those get sent directly to Mr. Gregory Turner (Gregory.m.turner.nfg@army.mil) by August 30. We will coordinate Department-wide comments when the draft NEPA documents are available in the future.

Best,
Jenn

TN Department of Environment & Conservation
Jennifer Tribble, PhD | Director
Office of Policy & Planning
Tennessee Tower, Second Floor
312 Rosa L. Parks Ave., Nashville, TN 37243
c. 615-210-7139
jennifer.tribble@tn.gov
We value your feedback! Please complete our customer satisfaction survey.

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
William R. Snodgrass - Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor
Nashville, Tennessee 37243-1102

August 11, 2023

Mr. Greg Turner
Department of Army and Air Force
Joint Force Headquarters
Tennessee Army National Guard
Houston Barracks, P. O. Box 41502
Nashville, Tennessee 37204-1502

re: Volunteer Training Site, Milan
Carroll and Gibson Counties, TN

*Sent via email to:*gregory.m.turner.nfg@army.mil

Dear Mr. Turner:

Staff within the Division of Water Resources have reviewed the proposed project. My understanding is that there will be a number of stream and wetland crossings that will require an Aquatic Resource Alteration Permit (ARAP), probably with mitigation due the number that will be constructed. Removal of vegetation around streams will also need to be addressed in any permitting action. There will also need to be a new aquatic resources inventory performed which will involve checking for state or federally listed species, and will have to comply the both USFWS and state requirements.

If you have any further questions, I will be glad to try to assist you. You may reach me at (615) 917-4135 or tom.moss@tn.gov.

Sincerely,

Tom Moss

Tom Moss, P.G.
Environmental Review Coordinator
Compliance and Enforcement Unit

cc: Conner Franklin, Manager, DWR Jackson Environmental Field Office
Jennifer Tribble, Office of Policy and Sustainable Practices, TDEC
Lee Barber, Manager, Natural Resources Unit

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, MEMPHIS DISTRICT
167 NORTH MAIN STREET B-202
MEMPHIS, TENNESSEE 38103-1894

August 8, 2023

Gregory M. Turner
Environmental Program Manager
Tennessee Army National Guard
Houston Barracks, PO Box 41502
Nashville, Tennessee 37204-1502

Dear Mr. Turner:

This is in reference to your request for an environmental review and discussion of the proposed construction and potential environmental impacts associated with the proposed heavy and light maneuver training at the Volunteer Training Site in Gibson County, Milan, Tennessee. The notice lacked sufficient information to state with certainty that a Department of the Army (DA) Permit would not be required for your project. Please note that deposition of dredged or fill material into waters of the United States requires a permit under Section 404 of the Clean Water Act. However, the Corps of Engineers has a series of Nationwide Permits (NWP) that can typically be used to authorize projects with minor impacts.

Please contact this office If you have questions about the jurisdictional status of a specific location. We would be glad to discuss jurisdiction and potential permitting considerations. Also, we recommend that you contact the Tennessee Department of Environment and Conservation (TDEC) for information regarding their program.

Please let us know if any documentation is being prepared in compliance with the National Environmental Policy Act. If possible, we would be happy to discuss cooperating agency status for the Corps of Engineers if it could help streamline future permitting decisions.

The Memphis District, Regulatory Division is committed to providing quality and timely service to our customers. In an effort to improve customer service, we invite you to complete a Customer Service Survey found at https://regulatory.ops.usace.army.mil/customer-service-survey/. Your comments, positive or negative, will not affect any current or future dealings with the Corps of Engineers.

If you have questions, please contact Jonathan Wilson at (901) 544-0738 and refer to File No. MVM-2023-227.

Sincerely,

2023.08.08
09:54:25 -05'00'

Roger Allan
Deputy Chief
Regulatory Division

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET, SW
ATLANTA, GEORGIA 30303-8960

December 1, 2023

Mr. Gregory Turner
Tennessee National Guard
Houston Barracks, P.O. Box 41502
Nashville, Tennessee 37204-1502

Re: EPA Comments on the Letter of Intent to Prepare an Environmental Assessment for the Heavy and Light Maneuver Training Area at Volunteer Training Site Milan, Carroll and Gibson Counties, Tennessee

Dear Mr. Turner:

The U.S. Environmental Protection Agency (EPA) has reviewed the referenced document in accordance with Section 309 of the Clean Air Act (CAA) and Section 102(2)(C) of the National Environmental Policy Act (NEPA). The CAA Section 309 role is unique to the EPA. It requires the EPA to review and comment on any proposed federal action subject to NEPA's environmental impact statement requirement and to make its comments public. According to the letter, dated July 31, 2023, the Tennessee Army National Guard (TNARNG) is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts resulting from the expansion of warfare training at Volunteer Training Site Milan (VTS-M) to include land that was formerly part of the U.S. Army's Milan Army Ammunition Plant (MLAAP).

The letter states that the purpose of the Proposed Action is to provide sufficient training land to allow for heavy and light maneuver training, including maneuver support, land augmentation, communications, unmanned aerial vehicle operations, air insertion, causality evacuation, and new live-fire capabilities training within proposed ranges, to TNARNG units within the state to better support TNARNG training requirements and mission. On August 9, 2022, the U.S. Army's Milan Army Ammunition Plant (MLAAP) reassigned more than 16,000 acres to the TNARNG, increasing the size of VTS-M to over 18,500 acres. Under the Proposed Action, TNARNG would expand training to include the entire approximately 18,500-acre training site. TNARNG may also expand or construct training support facilities similar to facilities that are already present at VTS-M. VTS-M facilities currently include a cantonment area with barracks, vehicle storage and maintenance facilities, firing ranges, and designated training areas.

Based on the EPA's review of preliminary information provided by the TNARNG notice and associated map of the proposed facilities, as well as the U.S. Army Final EA for Closure And Disposal Of Milan Army Ammunition Plant [1], the EPA's initial comments and recommendations on the scope of the Draft EA are specific to the following areas: (1) water resources, (2) air quality, (3) hazardous materials and containment, (4) environmental justice, (5) climate change, (6) wildlife habitat and land use, (7) energy and recycling, and (8) noxious weeds. The following comments are provided for your consideration:

[1]https://www.jmc.army.mil/News/Milan/MLAAP%20DRAFT%20EA.pdf

(1) Water Resources: *Existing Conditions*

Existing conditions are a key frame of reference for quantifying and characterizing magnitudes of adverse and positive environmental effects from the Proposed Action. The EPA recommends evaluating the effects of the Proposed Action against existing environmental conditions and that the Draft EA identify existing data and verify whether historical data are representative of current conditions. The analysis may be improved by the following actions:

- Providing clear maps of the project area, including wetland delineation and regional water features.
- Conducting a wetland function analysis if there are any potential that an alternative will cause impacts.
- Including resources directly impacted by potential project footprints within the geographic scope of analysis, including inundation, as well as the resources indirectly (or secondarily) impacted by any of the alternatives. These indirectly impacted areas may include downstream segments, streams, any other resource areas which may be affect by changes in water management or operations.

The EPA recommends that the Draft EA include a discussion of existing aquatic resource conditions in the project area, to provide the basis for an effective analysis of potentially significant impacts from the proposed construction to hydrology, water quality, habitat, and other water resources in the project area. To describe effects to aquatic resources in the project area, we recommend the Draft EA include the following analyses or descriptions:

- A clear map and summary of project waters and downstream waters, including streams, lakes, springs and wetlands. It would be helpful if the summary identified high resource value water bodies and their designated beneficial uses (e.g., agriculture, fisheries, drinking water, recreation);
- Watershed conditions, including vegetation cover and composition, soil conditions and areas not meeting desired future conditions;
- Surface water information, including available water quality data in relation to current state and federal water quality standards, stream functional assessments, stream channel/stream bank stability conditions, sediment loads, and aquatic life;
- Types, function, conditions and acreage of wetlands, riparian areas, and springs;
- Available groundwater information, including quality and location of aquifers;
- A map and list of Clean Water Act (CWA) impaired or threatened water body segments within, or downstream of, the planning area, including the designated uses of the water bodies and the specific pollutants of concern potentially affected by on-going activities.

Water Quality Data: Water quality data for the streams, lakes, and wetlands within, or adjacent to, the project area provides important information for evaluating the potential influence of the Project on downstream water quality. Such an evaluation can then guide management for the Project, with the data providing a baseline for future monitoring of impacts. We recommend the Draft EA provide a summary of available information and monitoring data on water quality within the project area and for downstream water that may be affected by the Proposed Action, including parameters such as total phosphorus, total nitrogen, *Escherichia coli,* fecal coliform, total suspended solids, turbidity, total dissolved solids, and temperature. It will also be important to include water quality data for parameters listed for impaired water bodies within or downstream of the project area. Identifying any significant gaps in available data may be helpful in developing a monitoring plan. At a minimum, the EPA recommends providing a reference to publicly accessible technical document or an appendix containing the relevant water quality parameters.

Potential Impacts to Impaired Waterbodies

Based upon the most recent EPA-approved CWA Section 303(d) list for Tennessee (April 22, 2022) there are impaired waterbodies located within the project area, including Rutherford Fork Obion River and Johns Creek. These resources are important to evaluate as the proposed activities may further impact systems or portions of systems downstream. We recommend the Draft EA include an analysis of water quality that, at a minimum, evaluates the following areas:

- Water quality impairments per State CWA Section 303(d) lists, draft or established TMDLs, and potentially affected dischargers.
- Source Water Protection areas and explanation of how the project will be consistent with Source Water Protection planning measures.

Wetlands: We recommend the Draft EA include a description of the impacts to wetlands that may result from the Proposed Action. Such impacts may include changes to supporting wetland hydrology, groundwater hydrology, and wetland disturbance. If impacts are anticipated, we also recommend the Draft EA describe how TNARNG intends to "minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands" as described in Executive Order 11990, Protection of Wetlands, including how wetlands will be identified and avoided, and how unavoidable impacts would be mitigated.

Discharge of dredged or fill material into Waters of the United States (WOTUS), including wetlands, is regulated under CWA Section 404. This permit program is administered jointly by the U.S. Army Corps of Engineers (Corps) and the EPA. We recommend TNARNG consult with the Corps to determine the applicability of CWA Section 404 permit requirements to wetlands that may be impacted in the planning area and to ensure appropriate minimization measures are applied to avoid adverse impacts to wetlands. The EPA's and the Corps' Final Rule for Mitigation for Losses of Aquatic Resources [33 CFR Parts 325 and 332; 40 CFR Part 230 (73 FR 19594, April 10, 2008)] emphasizes the need to avoid and minimize impacts to these "difficult-to-replace" resources and requires that any compensation be provided by in-kind preservation, rehabilitation, or enhancement to the extent practicable. We recommend restoration plans require that soil profiles and hydrology are re-established as much as possible to the original state. In addition, the EPA recommends TNARNG consider the Mitigation Rule to protect aquatic resources even when a CWA Section 404 permit is not required.

Erosion and Sediment Load Analysis: Erodible soils may represent a source of pollutants in the planning area. Increased sediment from surface disturbance may degrade water quality in receiving streams and may represent a significant source of pollutants when mobilized by natural and human-caused soil disturbances. Depending on a host of variables including soil characteristics, condition of roads and/or associated runoff from development of the project could introduce sediments as well as salts, selenium, heavy metals, nutrients, and other pollutants into surface waters. Soil disturbance in support of construction would necessitate issuance of construction stormwater permits before construction projects can begin. Coverage under a statewide National Pollutant Discharge Elimination System (NPDES) construction stormwater general permit will be needed if the project disturbs one acre or more of contiguous land. The EPA recommends that erosion and sediment control measures be implemented in accordance with the State's NPDES construction general permit requirements, and that the measures be addressed during the design and construction phases of the project.

The nature of heavy maneuver training is that which has the potential to introduce long-term erosion and ground disturbance issues at the site of the Proposed Action. The Tennessee Department of Environment and Conservation should be consulted for the appropriate application of NPDES permitting for

continuous ground disturbance where training will be conducted.

Groundwater: Groundwater is an important resource since it provides domestic and public water supply. Construction and maintenance practices associated with roads, and heavy equipment use have the potential to impact groundwater by altering surface run-off, infiltration, evapotranspiration, sedimentation, and soil compaction. Additionally, construction and maintenance actions such as equipment fueling and waste practices in temporary work areas have the potential to introduce contaminants to groundwater and shallow aquifers. Shallow aquifers are more susceptible to contamination because a contaminant introduced at the surface may more rapidly enter the system, and there is less intervening soil to adsorb the contaminants before they reach the groundwater. Shallow aquifers also commonly exchange flows with surface-water features, such as streams and lakes, and may supply groundwater to support wetlands and wildlife. The EPA recommends the Draft EA include a generalized map depicting the location of sensitive groundwater resources, including municipal watersheds, source water protection zones, sensitive aquifers, and recharge areas.

Best Management Practices (BMPs) and Monitoring: The EPA recommends that the Draft EA analyze options for avoiding environmental impacts, including impacts to nearby wetland and other water features. BMPs include, but are not limited to, alternative site locations and low-impact site preparation and construction techniques should be considered in the context of landscape features, including emergent wetlands and ephemeral streams. Use of protective buffer areas around essential resources help to control flooding, protect water flows, conserve native vegetation and wildlife, and support climate resiliency to land use and development. The inspection, maintenance, and adjustment of BMPs will ensure their effectiveness; therefore, we recommend the Draft EA include a clearly defined monitoring plan for aquatic resources, including an operational plan for finding and solving runoff problems. The EPA recommends TNARNG consider information collected as a part of monitoring efforts to inform considerations around avoidance, minimization, and mitigation of unavoidable impacts from the Proposed Action. We recommend that the Draft EA describe the mechanism by which information from monitoring efforts for training infrastructure at other National Guard sites could be used to inform the design, construction, and operation of the Proposed Action, and whether there would be a mechanism for sharing monitoring results with the public for the Proposed Action.

(2) Air Quality: Protection of air quality is important to address in the Draft EA. We recommend establishing existing environmental conditions of the Proposed Action based on the most current air quality monitoring data. Monitoring data presented as design values is available from the EPA's design values webpage[2]. In order to disclose potential impacts from the implementation of the proposed alternative, we recommend the Draft EA identify the activities necessary to construct and operate the facilities. Based on the training and construction activity, we recommend identifying equipment that may be needed as well as an operating schedule for the equipment. Based on the duration of operations and construction, and magnitude of emitting equipment and activities that are anticipated, it may be appropriate to quantify emissions associated with the Proposed Action. We recommend that the Draft EA disclose operational activities that have the potential to effect air quality, such as maneuver training operations, commuter trips to and from the site, stationary sources (such as generators), and exposed areas that may be susceptible to wind erosion. If substantial vehicle traffic or other emission sources are anticipated, it may be appropriate to quantify operation emissions in the Draft EA. The EPA is available to assist TNARNG as it plans the appropriate level of analysis. Additionally, we recommend TNARNG consider opportunities to reduce vehicle emissions as well as road and construction-related dust emissions through application of BMPs such as dust suppression and limited vehicle idling.

[2] Design Values https://www.epa.gov/air-trends/air-quality-design-values

(3) Hazardous Materials and Containment: Section 3.11 of the Final EA for Closure and Disposal of Milan Army Ammunition Plant, dated May 2021, identifies Land-Use Control (LUC) sites at MLAAP, LUCs for installation ground water, permits for a hazardous waste landfill, open burning and open detonation treatment, storage tanks, and long-term treatment measures. Section 3.11.4 states "To ensure established remedies continue to be protective, the U.S. Army conducts 5-year reviews, operation and maintenance activities, and long-term monitoring, and has implemented LUCs." "Estimated completion of sitewide groundwater treatment is 2029, while the goals for groundwater cleanup and monitored natural attenuation are estimated to be complete in 2074." "DoD components must incorporate future land use activities into the environmental restoration process and ensure that those activities are compatible with land use restrictions imposed on the affected property."

The EPA recommends that the Draft EA identify LUCs and contamination throughout the full extent of the expanded VTS-M site, as well as remediation infrastructure, and the specific operational activities and construction of the Proposed Action that would be near these sites. The Draft EA should also evaluate the compatibility of these proposals and existing contamination and remediation efforts. TNARNG should develop a plan to ensure the continued operation of remediation equipment and efforts. The EPA also recommends that the extent and layout of proposed firing and explosive ranges be limited and designed in such manner to reduce the area of contamination and impact of lead and explosive constituents associated with these activities, including land-use controls associated with closed military ranges.

For the protection of WOTUS and as required by the CWA, the EPA recommends the use of secondary containment where storage and handling of Petroleum, Oils, and Lubricants (POL) will take place, including storage sites of single wall POL tanks. Where secondary containment is not directly practicable, spill ponds and oil water separators should be constructed downstream of POL related activities. Operations in support of the Proposed Action should ensure that Resource Conservation and Recovery Act regulated solid wastes are disposed of in accordance with federal regulations. As part of this analysis, the EPA also recommends that the Draft EA identity possible waste types and their expected storage, disposal, and management. BMPs include identifying areas and procedures for fueling and providing a protected vehicle washout. We recommend that any references to standard operating protocols be clearly identified and referenced in the Draft EA.

(4) Environmental Justice: The EPA recommends that TNARNG complete an Environmental Justice (EJ) analysis of the Proposed Action. The EJ analysis should extend to all areas that will potentially experience impacts from the Proposed Action. Consistent with Executive Order 12898, Federal Actions to Address EJ in Minority Populations and Low-Income Populations[3], please ensure protected populations are not disproportionately or adversely impacted by the Proposed Action. The Environmental Justice Interagency Working Group *Promising Practices for EJ Methodologies in NEPA Reviews*, dated March 2016, provides guiding principles agencies can consider when identifying disproportionate impacts on minority and low-income populations and engaging in meaningful, targeted community outreach, analyzing and minimizing community impacts, and advancing EJ through NEPA implementation. EJ analysis of the Proposed Action should also be completed in accordance with Executive Order 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All*, published April 21, 2023.

[3] EO 12898 https://www.epa.gov/laws-regulations/summary-executive-order-12898-federal-actions-address-environmental-justice

The EPA strongly encourages the use of EJScreen[4], the EPA's nationally consistent EJ screening and mapping tool, when conducting EJ scoping efforts. The tool provides information on environmental and socioeconomic indicators as well as pollution sources, health disparities, critical service gaps, and climate change data. The tool can help identify potential community vulnerabilities by calculating EJ Indexes and displaying other environmental and socioeconomic information in color-coded maps and standard data reports.

(5) Climate change: On January 9, 2023, the Council on Environmental Quality (CEQ) published interim guidance to assist federal agencies in assessing and disclosing climate change impacts during environmental reviews. CEQ developed this guidance in response to EO 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis.* This interim guidance is effective immediately. CEQ indicated that agencies should use this interim guidance to inform NEPA reviews for all new proposed actions and may use it for evaluations in process, as agencies deem appropriate, such as informing the considerations of alternatives or helping address comments raised through the public comment process. The EPA recommends the Draft EA apply the interim guidance as appropriate, to ensure robust consideration of potential climate impacts, mitigation, and adaptation issues.

Greenhouse Gas Emissions: The EPA recommends including an estimate of the greenhouse gas (GHG) emissions associated with construction and operation of the Proposed Action. Example tools for estimating and quantifying GHG emissions can be found at CEQ's NEPA.gov website.[5] Recognizing that climate impacts are not attributable to any single action, but are exacerbated by a series of smaller decisions, the EPA does not recommend comparing the GHG emissions from a proposed action to global, national or state emissions, as this approach is limited by the cumulative nature of GHG concentration and the impacts of climate change. Because of these limitations, these comparisons inappropriately minimize the significance of emissions and do not provide meaningful information for a project level analysis.

Adaptive Management: The EPA also recommends that the Draft EA describe how the Proposed Action would be affected by ongoing and foreseeable changes and trends in the affected environment, for instance, under a scenario of continued decreasing precipitation days, changing frequency of intense storms and related flood events, and increasing drought intensity in the Project area. Full consideration of influences from the Proposed Action may inform necessary design modifications to enhance project resiliency and changes to operational assumptions for determining resource supplies, system demands, system performance requirements, and operational constraints. The US Climate Resilience Toolkit[6] serves as a repository of information related to climate resilience in the U.S., including steps to build resilience, case studies, expertise, and special topic areas, including renewable energy technology development. The EPA's Climate Change Indicators[7] presents a key set of indicators related to the causes and effects of climate change. The EPA partners with various government agencies, academic institutions, and other organizations to compile these indicators that are used to understand and track the science and impacts of climate change.

Mitigating Climate Change Effects: Finally, consistent with the goals of EO 14008, *Tackling the Climate Crisis at Home and Abroad,* the EPA encourages identifying measures to provide for diverse, healthy ecosystems that are resilient to climate stressors; requiring effective mitigation and encouraging

[4] EJ Screen https://www.epa.gov/ejscreen
[5] CEQ GHG guidance https://ceq.doe.gov/docs/ceq-regulations-and-guidance/nepa_final_ghg_guidance.pdf#xml=
[6] U.S. Climate Resilience Toolkit, https://toolkit.climate.gov/
[7] U.S. Climate Change Indicators, https://www.epa.gov/climate-indicators

voluntary mitigation to offset the adverse impacts of projects or actions; reduction of greenhouse gas emissions from authorized activities to the lowest practical levels; identify and protect areas of potential climate refugia; reduce barriers to plant migration; use pollinator-friendly plant species in restoration and revegetation projects; and project design to mitigate potential structural impacts associated with extreme weather events.

(6) Wildlife Habitat and Land Use: Based on the EPA's preliminary assessment of the project area, land cover at TNARNG is comprised of mowed grass and trees. Much of this land is identified as prime farmland. We encourage TNARNG to coordinate with the U.S. Fish and Wildlife Service and U.S. Department of Agriculture during evaluation of all existing wildlife resources, prime farmland, and impacts from facility and operations siting decisions and avoidance measures in developing the Draft EA.

(7) Energy and Recycling: The EPA recommends the use of sustainable building practices that maximize energy and water conservation, and the use of renewable energy. Please consult appropriate federal agencies for energy conservation requirements. Efforts should be made to divert any recyclable materials such as concrete, steel and asphalt away from landfills and repurpose materials instead.[8] The Draft EA should also address potential environmental and health impacts to construction workers.

(8) Noxious Weeds: Management of noxious weeds is an important issue to address in the Draft EA since these species tend to gain a foothold where there are disturbances to the landscape. Transportation of military equipment has the potential to carry species across relatively far distances. We recommend the Draft EA provide information on the current state of invasive species in the project area and how alternatives may impact distribution and prevalence of invasive species. We further recommend that the Draft EA disclose specific management actions that will address invasive species through prevention, early detection and rapid response, and restoration and rehabilitation. If any herbicides will be used to treat noxious weeds, we recommend disclosing any potential hazards related to the application of the chemicals and describing what actions will be taken to minimize impacts of toxic substances released into the environment.

Thank you for the opportunity to provide comments on the Proposed Action. Upon completion of the Draft EA, please submit an electronic version to the EPA for review. If you have any questions regarding the EPA's comments, please contact me at White.Douglas@epa.gov or 404-562-8586.

[8] Guiding Principles for Sustainable Federal Buildings https://www.energy.gov/eere/femp/sustainable-federal-buildings

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
NASHVILLE, TENNESSEE 37243-0435

DAVID W. SALYERS, P.E.
COMMISSIONER

BILL LEE
GOVERNOR

April 23, 2024

Mr. Greg Turner
Department of Army and Air Force
Joint Force Headquarters
Tennessee Army National Guard
Houston Barracks, P.O. Box 41502
Nashville, Tennessee 37204-1502

RE: TDEC Comments on the Pre-Draft Environmental Assessment for the Heavy and Light Maneuver Training Area at Volunteer Training Site Milan, Carroll and Gibson Counties, Tennessee

Dear Mr. Turner,

The Tennessee Department of Environment and Conservation (TDEC) appreciates the opportunity to provide comments on the Tennessee Army National Guard (TNARNG)'s Pre-Draft Environmental Assessment (EA) for the expansion of warfare training at Volunteer Training Site Milan (VTS-M) which is located within the U.S. Army's former Milan Army Ammunition Plant (MLAAP). The Draft EA evaluates the potential environmental, socioeconomic, and cultural effects of the TNARNG's proposed activities at VTS-M.

On August 25, 2023, TDEC provided comments as part of the EA scoping period. TDEC fully supports the upcoming preparation for and execution of training efforts at the VTS-M. Comments provided are meant to address the protection of human health and the environment during these activities, not hinder them. TDEC welcomes coordination of all parties to proactively address the safest and most efficient ways to ensure the protection of human health and the environment while supporting the execution of needed training activities. Additionally, TDEC reserves the right to offer additional comments beyond those provided herein during the public comment period for the official Draft EA.

TDEC has reviewed the Pre-Draft EA and provides the following comments:

General Comments

Section 12.3 of the current (2022) Sitewide Land Use Control Implementation Plan (LUCIP) relevant to the VTS-M sites states:

"Major land use changes are effected to enhance a property's efficiency. Land use changes defined as "major changes" by DoD guidance on Land Use Control Agreements (March 2, 2001) will require regulatory review. Department of Defense (DOD) guidance defines "major change in land use" as the following:

- Any change in land use (e.g., a change from industrial/commercial to a more sensitive land use such as residential) that would be inconsistent with the exposure assumptions in the human health and/or ecological risk assessments that served as the basis for the LUCs.
- Any site activity that may disrupt the effectiveness of the implemented remedial action (e.g., excavation at a landfill; groundwater pumping that may impact a groundwater pump and treat system; a construction project that may affect ecological habitat protected by the remedy; the permanent removal of a fence; or the permanent removal of warning signs).
- Any site activity intended to alter or negate the need for the specific LUCs implemented at the site.

TDEC requests that the TNARNG include in the Draft EA an explanation of the process by which the TNARNG will request regulatory review for upcoming land augmentation activities including, but not limited to: construction activities, tank trails, engineering digging exercises, excavating holes large enough for a soldier and a vehicle, low-water crossings, and the like. Further, the TNARNG should discuss the applicability and role of dig permits in the execution of these and similar activities.

Air Pollution Control

- Truck traffic associated with construction projects generate emissions of PM, CO, NO_2, SO_2, VOC, and CO_2. TDEC recommends the operation of trucks with up-to-date emission control technologies and proper maintenance to minimize vehicle and equipment emissions. TDEC also recommends the adoption of best practices to minimize vehicle idling to minimize the impact of mobile source emissions on ambient air quality.
- If disposal of trees or vegetation is necessary during construction, TDEC recommends the evaluation of alternatives to open burning. TDEC's open burning regulations are located in Tennessee Air Pollution Control Regulation Chapter 1200-03-04 (https://publications.tnsosfiles.com/rules/1200/1200-03/1200-03-04.pdf).
- Site remediation activities (excluding asbestos removal or activities subject to 40 C.F.R. 63 Subpart GGGGG) are generally not regulated by TDEC. For any remediation projects involving mercury or lead-based paint, TDEC recommends that the TNARNG follow best practices to minimize the lead emissions into the ambient air. Similarly, TDEC recommends that the TNARNG avoid the disturbance of soils that are contaminated or potentially contaminated from the manufacture, storage, and disposal of munitions.

- Tennessee regulations require certain sources to obtain permits prior to commencing construction or operation. Additional information on air pollution control permitting requirements is available online at https://www.tn.gov/content/tn/environment/permit-permits/air-permits/construction.html.

Water Resources

TDEC notes that there will be several stream and wetland crossings that will require an Aquatic Resource Alteration Permit (ARAP), likely with mitigation due to the number that will be constructed. A hydrologic determination is needed to assess the water resources that will be impacted. TNARNG will also need to address the removal of vegetation around streams and stream buffers in any permitting action to avoid impacts wherever possible. As the land disturbance will be more than one acre, the TNARNG will need an individual construction water permit and an individual ARAP. TNARNG will also need to perform a new aquatic resources inventory to check for state or federally listed species and will need to comply with both US Fish and Wildlife Services and state requirements.

Cultural and Natural Resources

There is the potential that significant archaeological resources could be disturbed by the proposed project. Archaeological surveys of the property have found several sites that require additional assessment and mitigation. TNARNG should continue consultation with the State Historic Preservation Officer to assess the National Register eligibility of sites 40CL71, 40CL73, and 40CL143. The Blankenship Cemetery (Cemetery 7) is listed as eligible and could be impacted by the proposed alternatives. The Draft EA should include a discussion of mitigation strategies for potential impacts to the cemetery. Please note that this is a state review response only and cannot be substituted for a federal agency review.

Specific Comments

Page references below correspond to the page numbers indicated in the footer of the Draft EA document.

- "Environmental Assessment Signature Page": TNARNG previously mentioned that National Guard Bureau (NGB) legal counsel would review and approve this document. As the property owner, NGB should be among the signatories to this document. Please add the NGB to the list of signatories in the Draft EA.
- Table ES-1: TDEC notes that there would be additional groundwater impacts that are not discussed in the Hazardous and Toxic Materials and Waste row under Alternative A. These impacts are due to the hazardous waste in the aboveground detonation area (ADA), which is regulated under permit TNHW-153. TDEC requests that the TNARNG address these additional impacts in the Draft EA.

- Table ES-1, "Hazardous and Toxic Materials and Wastes," and Table 6. Summary of Environmental Consequences "Hazardous and Toxic Materials and Wastes": In the August 25, 2023 letter responding to the scoping request for this project, TDEC highlighted its collaboration with the United States Environmental Protection Agency (EPA) on project management of the site as one on the National Priorities List (NPL) because the VTS-M site is located *entirely* within the boundary of the former Milan Army Arsenal site. Therefore, the potential for hazardous and toxic material wastes to be located *anywhere* within VTS-M exists. Land disturbance activities could release these contaminants exposing humans and natural resources to the hazardous materials and wastes. TDEC requests that the TNARNG include a discussion on this fact and clearly describe the actions to be taken to proactively identify substances *prior to* their potential mobilization due to activities planned at VTM-S in the Draft EA. Further, discussion should be provided regarding the mitigation of potential exposure risks that will protect human health and the environment should these contaminants be identified in the investigative process.
- On page 3, line 13-14: TDEC requests that the TNARNG revise this sentence to state, "On 9 August 2022, the U.S. Army's Milan Army Ammunition Plant (MLAAP) reassigned more than 16,000 acres to the *NGB, which licensed it to the TNARNG*…."
- On page 8, lines 22-36: There is no mention of state statues or rules that are pertinent to the environmental impacts of the activities. TDEC requests that these state statutes and rules be reflected in the Draft EA.
- On page 8, lines 22-42: TDEC requests that the TNARNG consider whether the Farmland Protection Policy Act of 1981 should be listed among the applicable federal, state, and local regulations considered for this EA If so, the TNARNG should include this in the Draft EA.
- On page 10, line 6: TDEC agrees that agency scoping is an important component of the EA process, but it is unclear if the *replies* from those contacted will be included within Appendix A. TDEC requests that the TNARNG include documentation of the replies from those contacted during the scoping and drafting of the EA.
- On page 10, Table 2.: At VTS-M, approximately 13,597 acres (or approximately 73%) is agricultural and approximately 53 percent of site soils are classified as "prime farmland soils." Was the National Resource Conservation Service (NCRS) contacted for input regarding potential impacts from the proposed activities in the EA since it "is responsible for overseeing compliance with the Farmland Protection Policy Act and has developed the rules and regulations for implementing the act?" TDEC requests that this information be included in the Draft EA.
- Re: pages 12, 13, 21, 22, 23, 24, 28, and 29: An e-mail from EPA Remediation Project Manager (RPM) Diedre Lloyd to the TNARNG dated February 23, 2024 reads:

> EPA SEMD requests figures that include all proposed DOPAA activities be overlain on top of the CERCLA LUC boundaries and CERCLA/RCRA Ous to ensure an understanding of the where each proposed training activity will take place within CERCLA LUC boundaries and where proposed training activities are in relation to OU contamination to ensure appropriate protectiveness for all parties involved. Please submit these maps as soon as possible to facilitate review and understanding of training activities and how they are related to CERCLA LUCs and Ous.

In response, two figures were provided by the TNARNG on February 28, 2024. The inclusion of the figures shown on these pages of the EA is confusing as they depict activities that may be outside the scope of this EA seeing as during previous discussions, it was indicated that the development of ranges would be planned in the future and that separate EAs for those projects would be developed as funding becomes available. Those discussions were also captured in the August 25, 2023 letter from TDEC. TDEC requests that the TNARNG clarify and consider revising the type of figures included so that only the activities proposed for *this* EA are included. If they are relevant to this EA, please include the figures provided via e-mail on February 28, 2024 within this draft.

- On page 25, line 12: TDEC requests that the TNARNG revise this sentence to state, "In late summer 2022, the Army's MLAAP reassigned more than 16,000 acres to the *NGB*…."
- On page 36, line 35: As these agricultural leases expire, are they going to be renewed or will these areas otherwise remain agricultural? In other words, is the estimated total agricultural acreage estimated to remain at about 10,000 acres after tree clearing? TDEC requests that the TNARNG address this in the Draft EA.
- On page 42, figure 10: It is unclear whether the black outlined area (dudded impact area) is included or excluded in the training area. TDEC requests that this be clarified in the Draft EA.
- On page 44, lines 1-3: There is impacted groundwater in the site as closure requirements have not been fully performed under RCRA permits. TDEC requests that the TNARNG clarify the responsible party for the cumulative impacts on groundwater and RCRA closure requirements for the impacted areas given the statement that no land use designations would change.
- On page 44, lines 35 and 36: The EA states, "General conformity applies to federal actions within nonattainment areas (40 CFR 93.153)." 40 CFR §93.153(b) states that general conformity applies in both nonattainment and maintenance areas.
- On page 45: The NAAQS table should be updated to include the new $PM_{2.5}$ NAAQS (see https://www.govinfo.gov/content/pkg/FR-2024-03-06/pdf/2024-02637.pdf).
- On page 46: TDEC requests that the TNARNG check the climate information indicated for Milan, TN. The average annual precipitation appears to be listed as 9.99 inches,

which appears to be very low. NOAA indicates the normal rainfall for 1991-2020 for Milan is 56.18 inches.

- On page 131, section 3.13: The ADA area and associated waste from treatment under the RCRA permit is not mentioned under hazardous and toxic materials and wastes. TDEC requests that this area be addressed in the Draft EA.
- On page 134, figure 32: TDEC notes that, until closure activities are performed under the active RCRA permits, there are significant risks associated with heavy vehicle movement due to the potential for undetonated ordnances. TDEC requests that this be addressed in the Draft EA.
- On page 138, lines 2-5 and 28: Groundwater monitoring is required under permit TNHW-153. Once closure activities are met, groundwater monitoring activities and oversight will continue under TDEC's Division of Remediation. TDEC requests that this be reflected in the Draft EA.
- On page 140, line 6: TDEC requests that the TNARNG revise this sentence to state, "With the divestiture of the MLAAP property to NGB, …."
- On page 140, lines 8-10 and page 141, lines 23-25: TDEC requests that the TNARNG revise this sentence to state, "All *identified* hazardous materials and hazardous wastes used, stored, or generated leading up to the time of transfer were treated or disposed of in accordance with applicable laws and regulations."
- On page 141, lines 3-5: The types of land augmentation activities planned at the VTS-M site will disrupt areas that have not yet been subject to investigation per the CERCLA process. Therefore, the potential for exposure of as-yet unidentified contaminants to human health and the environment should be discussed in terms of proactively investigating the area for the contaminants and the potential mitigation of risk to human health and the environment if discovered through the investigative process. Otherwise, the activity would be considered as being one that "increased the amounts" of hazardous materials beyond current capacities at VTS-M (see page 165, lines 40 and 41). Proactive efforts should be made to decrease risk of exposing personnel and the environment to site hazardous wastes. TDEC requests that the TNARNG address these comments in the Draft EA.

TDEC appreciates the opportunity to provide comment on the Pre-Draft EA. Please note that these comments are not indicative of approval or disapproval of the proposed projects or activities contained within. Please contact me should you have any questions regarding these comments.

Sincerely,

Jennifer Tribble

Jennifer Tribble, Director
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Tennessee Department of Environment and Conservation
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CC:
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REGION 4
ATLANTA, GA 30303

May 3, 2024

Mr. Greg Turner
Environmental Program Manager
JFHQ Tennessee Army National Guard
Nashville, Tennessee 37204

Re: EPA Comments on the Administrative Draft Environmental Assessment for Heavy and Light Maneuver Training at Volunteer Training Site Milan, Carroll and Gibson counties, Tennessee

Dear Mr. Turner:

The United States Environmental Protection Agency has reviewed the administrative Draft Environmental Assessment for Heavy and Light Maneuver Training at Volunteer Training Site Milan, in accordance with Section 309 of the Clean Air Act and Section 102(2)(C) of the National Environmental Policy Act. The Tennessee Army National Guard is preparing an EA to evaluate potential environmental impacts associated with the development of military vehicle and small-arms ranges at Volunteer Training Site Milan. The purpose of the Proposed Action is to provide training land to allow heavy and light maneuver training within proposed ranges, to TNARNG units within the state to support training and mission requirements. The Proposed Action is needed because there are no current training areas in Tennessee capable of supporting the TNARNG's heavy and light maneuver training requirements.

Under the Proposed Action, TNARNG would develop and operate approximately 16,000 acres received through the divesture of the Milan Army Ammunition Plant for maneuver of military force training. Training at VTS would include live-fire and maneuver capabilities including two or more companies maneuvering at once. Training would take place on nine heavy maneuver training areas consisting of approximately 14,533 acres, six light maneuver training areas consisting of approximately 598 acres, non-live fire training areas consisting of approximately 814 acres, an Engagement Area consisting of approximately 1,008 acres, and an Automated Record Fire Range consisting of approximately 47 acres. More than 11,000 acres of the reassigned VTS property would include small-arms munitions Surface Danger Zone areas.

TNARNG evaluated two Action Alternatives and the No-Action Alternative. Alternative A would remove approximately 1,090 acres of forest for the establishment of ranges while Alternative B would remove approximately 3,764 acres. Both alternatives would construct up to 30 hardened stream crossings or vehicle launched bridge emplacement sites.

The EPA identified public health, welfare, and environmental quality concerns in the analysis that the EPA recommends be addressed in the Draft EA. We have enclosed additional technical

recommendations for your consideration (see enclosure). The EPA requests that TNARNG continue to work with federal and local government partners, communities surrounding VTS Milan, and other stakeholders to address impacts as they are identified and to disseminate project status updates.

The EPA appreciates the opportunity to review the administrative Draft EA and looks forward to continued participation with VTS and TNARNG projects. If you have any questions regarding our technical recommendations, please contact me at white.douglas@epa.gov or at 404-562-8586.

Sincerely,

Ntale Kajumba
NEPA Manager

Enclosure

EPA Comments on the Administrative Draft Environmental Assessment for Heavy and Light Maneuver Training at Volunteer Training Site Milan, Carroll and Gibson counties, Tennessee

Hazardous Materials and Containment: There is demonstrated past historical evidence that explosives were produced onsite and have left explosive residual contamination onsite and may present future exposure concerns in areas that have not been investigated on the Milan Army Ammunition Plant facility that previously utilized open burning grounds of explosives, ammunition destruction areas, landfills, several production and wash-out lines utilized to produce and clean/dispose of explosives that drained into several ponds and surface drainage ditches. These lines, drainage ditches and ponds have origins on MLAAP property to property boundaries and potentially beyond. The MLAAP initially covered 22,544 acres of land with a recent land transfer/lease of 16,000+ acres from the U.S. Army to the U.S. National Guard for military training activities to be implemented by the Tennessee Army National Guard.

Section 3.11 of the Final EA for Closure and Disposal of Milan Army Ammunition Plant, dated May 2021, identifies Land-Use Control sites at MLAAP, LUCs for installation ground water, permits for a hazardous waste landfill, open burning and open detonation treatment, storage tanks, and long-term treatment measures. Section 3.11.4 of the Final EA states “To ensure established remedies continue to be protective, the U.S. Army conducts 5-year reviews, operation and maintenance activities, and long-term monitoring, and has implemented LUCs.” “Estimated completion of sitewide groundwater treatment is 2029, while the goals for groundwater cleanup and monitored natural attenuation are estimated to be complete in 2074.” “DoD components must incorporate future land use activities into the environmental restoration process and ensure that those activities are compatible with land use restrictions imposed on the affected property.”

Section 3.13.2 of the administrative Draft EA for VTS states “All LUC areas are fenced, have signage posted, or are painted orange with protective bollards (wells). Approximately 1,000 acres have been designated as NOGO areas; no TNARNG ground training would be allowed in these areas due to the LUCs. There would be no drilling and no construction of facilities for any permanent habitation within NOGO areas.”

Recommendation: While the lead agency, the U.S. Army is the responsible party, all parties inclusive of the U.S. Army National Guard, the U.S. National Guard Bureau, and the TNARNG along with all regulatory agencies should understand what proposed training activities will be implemented at each specific area of the site along with an associated timeframe for proposed activities. The EPA recommends that TNARNG include detailed maps and figures of the contaminated sites at VTS. The maps/figures should include all training activities within each Operable Unit on the MLAAP site and be of appropriate scale. The maps should include all training activities overlain on each Operable Unit along with all the documented contaminated areas associated with each OU. These requested maps should include all/any known contamination that is associated with each OU.

The EPA recommends that a single OU be utilized in a figure to ensure clarity and understanding of proposed training activities at an appropriate scale. Each map/figure should include a legend that identifies each contaminated area and each proposed training activity. There are many training activities and contaminated areas within each OU, each OU map/figure should be followed by a brief description of each training activity and the associated names/titles for each contaminated area within each OU. The brief descriptions should also include which regulation that each contaminated unit is associated with such as the Comprehensive Environmental Response Compensation and Liability Act, the Resource Conservation and Recovery Act.

The brief descriptions should also include specific measure that will be taken to prevent or mitigate negative impacts to the site for each proposed training activity. If it is preferred the training activities can be divided into "like training activities" and then these groupings can include specific measures taken to prevent negative impacts to the site. Negative impacts are limited to but will include contribution to contamination that results in potential migration or adverse risks to human and ecological receptors.

Section 3.13.1, Affected Environment, indicates that Figure 34 shows the five OUs that have undergone, "environmental investigations and cleanup conducted as part of the Army's Installation Restoration Program and under the Military Munitions Response Program"; however, OU2 is not depicted on Figure 34 or listed in the legend. Knowing the location of the OU2 O-Line Pond cap is important in evaluating potential cap damage and subsequent soil exposure due to training activities, especially activities involving heavy track vehicles or Heavy Equipment Transporter Systems. Please revise Figure 34 to show the location of OU2.

The Figure 32 Environmental Condition of Property Areas legend shows the symbology for ECP Types 5 and 6; however, these ECP areas cannot be located on the figure. Please revise Figure 32 to show ECP Types 5 and 6.

The EPA also recommends that TNARNG develop measures to reduce the ongoing contamination and impact of lead and explosive constituents associated with the Proposed Action, including those that may contribute to future land-use controls associated with closed military ranges.

Air Quality: The Proposed Action is located in Carroll and Gibson counties, Tennessee which are in attainment with the National Ambient Air Quality Standards. Section 3.3.2 the administrative Draft EA states that "Long-term, minor adverse effects on air quality would result from increases in emissions from ground training activities (i.e., additional heavy vehicle use, personnel, and munitions use), which TNARNG would be responsible for permitting. Increases in emissions would not exceed the PSD 20 major source threshold values, and Alternative A would not contribute to a violation of any federal, state, or local air regulation."

Recommendation: The EPA recommends that the EA evaluate the emissions of proposed construction and operation using computer aided tools such as the Air Conformity Applicability Model. Air emissions models should be used to verify that resulting emissions would remain below the significance threshold.

Water Resources and Wetlands: Section 3.7.1 states that VTS lies within the range of the west Tennessee tertiary aquifer system, which is the most prolific source of groundwater in the state and is the primary source of drinking water for the city of Memphis. Explosive compounds were detected in groundwater samples from the western portion of MLAAP, as well as in three city of Milan drinking water supply wells, in 1991 and 1992. The EA also states that additional monitoring and remediation efforts have been initiated, and remediation, via extraction, treatment, and discharge of the treated groundwater, is still under way 24 (Arcadis G&M Inc. 2005).

Significant ground disturbance would occur during construction and maneuver training would contribute to ongoing disturbances. Section 3.6.2 states that TNARNG would implement best management practices associated with each project's Stormwater Pollution Prevention Plan and General Construction Permits. The EA also states that a federal permit may also be required from the U.S. Army Corps of Engineers for the discharge of dredged or fill material into Waters of the United States, including wetlands. Tennessee Department of Environment and Conservation's Division of Water Resources reviewed the proposed project and TDEC indicated that the stream and wetland crossings associated with the Proposed Action would require an Aquatic Resource Alteration Permit.

Recommendation: The EPA recommends that the EA identify when the VTS SWPPP and Spill Prevention Control and Countermeasures plan will be updated to include the operation of the Proposed Action. The EA should also identify specific BMP measures that will be used during construction as well as operations that will disturb the ground and potentially carry sediments to WOTUS. Mitigation may be required where impacts to WOTUS cannot be avoided. Flood zone and flood inundation maps should be used to help ensure proposed activities do not take place in floodplains except where alternatives are not practicable. The EPA also recommends the use of secondary containment where storage and handling of petroleum, oils, and lubricants will take place, including maintenance bays and storage sites of single wall POL tanks. Where secondary containment is not directly practicable, spill ponds and oil water separators should be constructed downstream of POL related activities.

The Figure 33 *Long-Term Monitoring Year 8 Concentrations (2016-2017)* legend shows various concentration categories, but the specific contaminant of concern to which this refers is unclear. Please revise Figure 33 to indicate which contaminant of concern is addressed by the concentration categories in the legend. Section 3.7.2 states that under Alternative A, "The use of vehicles and equipment during training activities would continue to be limited to existing roads and developed areas…therefore, there would be no adverse impacts on surface or groundwater…"; however, the text then states, "In addition, construction of up to seven tank crossings on Graball Road and three tank trails…as well as the construction of up to 30 new low-water crossings and AVLBs [armored vehicle launched bridges] would result in impacts on water resources at VTS-M.". Please revise this section to remove this contradictory language.

The EPA also recommends that the EA include a summary of available information and monitoring data on water quality within the project area and for downstream water that may be affected by the Proposed Action, including parameters such as total phosphorus, total nitrogen, Escherichia coli, fecal

coliform, total suspended solids, turbidity, total dissolved solids, and temperature. It will also be important to include water quality data for parameters listed for impaired water bodies within or downstream of the project area. Identifying any significant gaps in available data may be helpful in developing a monitoring plan. At a minimum, the EPA recommends providing a reference to publicly accessible technical document or an appendix containing the relevant water quality parameters.

Environmental Justice and Noise: Section 3.11.2 states that there would be no disproportionate impacts on minority populations, low-income communities, or children from the continuation of current training activities at VTS. The expansion of training on VTS would increase peak noise levels beyond VTS boundaries; the areas within the increased peak noise contours include residential areas as described in Section 3.5. Where peak noise levels increase beyond the boundary, there is the potential for disproportionate impacts on minority populations, low-income communities, and children. The administrative Draft EA suggest that there are no communities with significant environmental justice concerns within the noise contours and therefore there would be no disproportionate impacts on these populations due to the increased peak noise from implementation of Alternative A.

Recommendation: The Environmental Justice Interagency Working Group Promising Practices for EJ Methodologies in NEPA Reviews, dated March 2016, provides guiding principles agencies can consider in identifying disproportionately high and adverse impacts on minority and low-income populations and appropriately engage in meaningful, targeted community outreach, analyze, and minimize community impacts and advance EJ through NEPA implementation. EJ analysis of the Proposed Action should also be completed in accordance with Executive Order 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All, published April 21, 2023.

The EPA recommends TNARNG identify efforts to meaningfully engage communities, including communities with EJ concerns, that may be affected by Proposed Action. TNARNG should ensure that the public and surrounding communities are aware of the proposed action and its impacts and ensure that these communities have a mechanism to address ongoing concerns. Such mechanisms may include the publicly available phone numbers and emails of the VTS Public Affairs Office. In situations where disproportionate adverse impacts on communities with EJ concerns cannot be avoided or mitigated through operational changes, the EPA recommends that TNARNG address long-term impacts with residential noise abatement measures.

The EPA strongly encourages the use of EJScreen, the EPA's nationally consistent EJ screening and mapping tool, when conducting EJ scoping efforts. The tool provides information on environmental and socioeconomic indicators as well as pollution sources, health disparities, critical service gaps, and climate change data. The tool can help identify potential community vulnerabilities by calculating EJ Indexes and displaying other environmental and socioeconomic information in color-coded maps and standard data reports. The EA should include maps generated in support of the EJ analysis and identify any specific census tract groups that have EJ concerns and have the potential to be effected by the Proposed Action.

Climate Change: Section 3.3.2 analyzes impacts to climate change using comparisons to external emissions and quantification of the estimated social cost of greenhouse gases. SC-GHG calculations from the EA rely on outdated estimates from 2020.

Recommendation: On January 9, 2023, the Council on Environmental Quality published interim guidance to assist federal agencies in assessing and disclosing climate change impacts during environmental reviews. CEQ developed this guidance in response to EO 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis. This interim guidance is effective immediately. CEQ indicated that agencies should use this interim guidance to inform NEPA review for all new proposed actions and may use it for evaluations in process, as agencies deem appropriate, such as informing the considerations of alternatives or helping address comments raised through the public comment process. The EPA recommends that TNARNG apply the interim guidance as appropriate, to ensure robust consideration of potential climate impacts, mitigation, and adaptation issues.

The EPA recommends that TNARNG avoid expressing project level GHG emissions as a percentage of national or state GHG emissions. The approach of comparing project level emissions to national and state emissions diminishes the significance of substantial project scale GHG emissions. This approach is also misleading given the nature of the climate policy challenge to reduce GHG emissions from a multitude of sources, each making relatively small individual contributions to overall GHG emissions.

The EPA also recommends that the SC-GHG analysis fully integrate the February 2021 interim SC-GHG estimates developed by the Interagency Working Group on the SC-GHGs as the most appropriate current estimates for use in policy analysis.

Biological Resources: Section 3.8.2 states that TNARNG is preparing a Biological Assessment to facilitate consultation with the U.S. Fish and Wildlife Service under the Endangered Species Act for the northern long-eared bat and tricolored bat.

Recommendation: The EPA principally defers USFWS regarding compliance with the Endangered Species Act. The EPA recommends that any additional conservation measures identified by USFWS during consultation be implemented.

Section 3.8.2 states, “TNARNG [Tennessee Army National Guard] has determined the Proposed Action at VTS-M may affect but is not likely to adversely affect the federally protected northern long-eared bat or tricolored bat”; however, this is contradictory to the information shown in Table 24, which states that the Proposed Action is likely to adversely affect the northern long-eared bat and tricolored bat. The EPA recommends that TNARNG verify any potential adverse effects to northern long-eared bats and tricolored bats and revise the text or Table 24 accordingly.

Table ES-1 states that impacts on water and biological resources under Alternative B are the same as those under Alternative A. However, the impacts under Alternative B are expected to be more severe since 2,674 additional acres would be harvested than under Alternative A; given the significant difference, the EPA recommends that TNARNG revise the “Alternative B” column for water resources

and biological resources in both tables to state that the impacts under Alternative A would potentially be exacerbated under Alternative B.

The EPA recommends that TNARNG identify measures that will be taken to prevent the introduction of invasive species into known Compass Plant and Willowleaf Aster areas. According to Figures 6, 7, and 29, the Compass Plant and Willowleaf Aster, which are state protected species, have known growth stands along the proposed central tank trail. Willowleaf Aster also occurs near the proposed south tank trail. Furthermore, under Alternatives A and B, tree harvest clear cutting and thinning are proposed near known areas of Compass Plant growth. Tree harvest and thinning, along with increased vehicle and training activities, promotes the establishment of invasive species through changes in sunlight exposure, soil and nutrient adaptations, fire potential, and other ecological processes. However, no discussion exists on these ecological effects and the potential for growth of invasive species within areas of the Compass Plant and Willowleaf Aster. Please revise the EA to discuss how these undesirable changes in ecological processes due to the proposed activities under Alternatives A and B will be eliminated and/or mitigated.

Cultural resources: Section 3.9.2 states "Under Alternative A, Site 40CL143 is located directly north of the proposed Central Tank Trail in Heavy Maneuver Area (TA 15) within a Proposed Ranges Surface Danger Zone (Figure 29). Proposed training activities have the potential to physically impact the site." and, "40CL143 may be affected by the construction and use of the Central Tank Trail directly to the south, use of a Heavy Maneuver Area (TA 15), and activity within a Proposed Ranges Surface Danger Zone. Use of mounted tracked and/or wheeled vehicles, emplacement of obstacles, and/or engineering digging exercises within or adjacent to the site could negatively impact the site." Section 3.9.1 states that this site is unassessed for eligibility for the National Register of Historic Places and is pending additional Phase II testing.

Recommendation: The EPA recommends that the EA identify specific measures that will be taken to ensure the protection of Site 40CL143.

General Comments

1. **Section 2.0, Description of the Proposed Action and Alternatives, Page 11:** This section does not include a pertinent statement from the Army National Guard National Environmental Policy Act (NEPA) Handbook. Per the NEPA Handbook, an EA must state, "While the No Action Alternative would not satisfy the purpose of or need for the Proposed Action, this alternative was retained to provide a comparative baseline against which to analyze the effects of the Proposed Action, as required under the CEQ Regulations (40 CFR Part 1502.14). The No Action Alternative reflects the status quo and serves as a benchmark against which the effects of the Proposed Action can be evaluated;" however, this section does not include that statement. Please revise Section 2.0 to include the statement referenced above.

2. **Figure 9, Land Use Areas at Volunteer Training Site – Milan, Page 41:** Figure 9 does not present the features discussed in the text in Section 3.2.1, Affected Land Use. This section states that lodging, located on the north side of the VTS-M; administrative, medical, and light industrial areas, located in the central area of the Installation in Area A, with the exception of Building T-113; and the 10- and 25-meter berm/baffle firing range complex, located southeast of the administrative core in Area A, can be found on Figure 9; however, these features are not included. Please revise Figure 9 to show the location of lodging, administrative, medical, light industrial areas including Building T-113, and the 10- and 25-meter berm/baffle firing range complex.

3. **Section 3.7.1, Affected Environment, Page 90; Figure 26, Surface Waters at Volunteer Training Site – Milan, Page 88; and Section 3.7.2, Environmental Consequences, Page 96:** Section 3.7.1, states that Halls Branch, "originates just southeast of the VTS-M and enters the training site across the eastern border of the cantonment area" and "Johns Creek then flows north across TA B and exits across the northern boundary"; however, Figure 26 appears to show that Halls Branch originates and enters the site from the north of VTS-M and that Johns Creek flows south. In addition, contradictory to the text in Section 3.7.1, Section 3.7.2 states that, "Halls Branch runs northward through the western side of VTS-M, draining all of the A TAs, and joins Johns Creek near the conjunction of the A, B, and C areas." Please revise Figure 26 to depict the correct origin, entry and direction of Halls Branch and Johns Creek or revise the directional explanation in the text.

4. **Table 33, List of Preparers, Page 148:** Education and Years of Experience are missing for three individuals. Please revise Table 33 to include the missing Education and Years of Experience for those three individuals and if not possible, include an explanatory footnote.

5. **Section 3.3.2 for Alternative B**: states "Alternative A would not contribute to a violation of any federal, state, or local air regulation." This should be updated to reflect Alternative B.

6. Please include information for all risk assessments performed to date for areas proposed for training activities. The proposed training activities may pose risks to either human or ecological populations associated with the differing property usage for proposed military training activities.

7. There are several Training Areas described in the EA that are not identified on the figures. This includes "TA A," "TA B," "TA C," "B2," and "B3;" therefore, it is unknown where these areas and their associated features, are located. Please revise the EA to include a figure that shows the location of all Training Areas. See comment #1 for additional details.

8. List of Tables, Page xvi: Table 33, List of Preparers, found in Section 5.0, List of Preparers is not included in the List of Tables. Please revise the List of Tables to include Table 33.

9. Glossary of Abbreviations and Acronyms, Page xix, and Table 16, Projected Range Activity with the Proposed Action, Page 56: The abbreviation "TNT" (2,4,6-trinitrotoluene) is used in the table but is not defined in the footnotes or listed in the Glossary of Abbreviations and Acronyms. Please define TNT in the footnotes of Table 16 and add it to the Glossary of Abbreviations and Acronyms.

10. There are several figures in the EA that are inserted in the middle of a sentence. This specifically involves Figures 13 and 14, 32, 33, and 34. Please revise the EA to place these figures after complete sentences.

Tribal Scoping Letters

DEPARTMENTS OF THE ARMY AND AIR FORCE
JOINT FORCE HEADQUARTERS
TENNESSEE NATIONAL GUARD
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NGTN-FMZ-ENV 2 August 2023

Chief Nelson Harjo
Alabama Quassarte Tribal Town of Oklahoma
P.O. Box 187
Wetumka OK 74883

Also submitted via email to Mr. Benjamin Yahola at ben.yahola@alabama-quassarte.org.

Dear Chief Harjo

An Environmental Assessment is being prepared by the Tennessee Army National Guard (TNARNG) to identify and evaluate potential environmental impacts associated with the proposed heavy and light maneuver training at the Volunteer Training Site – Milan (VTS-M), Tennessee. Per Section 3016108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 Code of Federal Regulations (CFR) Part 800, TNARNG is accounting for various environmental concerns by engaging early with tribal governments as it formulates the undertaking.

VTS-M is located in Carroll and Gibson counties, Tennessee (**Figure 1**). The city of Milan lies immediately west of the site; Jackson, Tennessee, on Interstate 40, is approximately 20 miles to the south; and the Rutherford Fork of the Obion River forms a portion of VTS-M's northern boundary (**Figure 1**). TNARNG training currently takes place on six of VTS-M's 15 designated training areas, and the Proposed Action would include training throughout the entire approximately 18,500-acre training site utilizing 15 designated training areas (**Figure 2**).

VTS-M is a Level V Garrison Training Center, which is a training site that has a basic nonautomated live-fire-exercise range capability and supports requirements at the individual and/or small unit level at or near the home station. Some facilities may be authorized that are consistent with training in a field environment. VTS-M includes a cantonment area with barracks, vehicle storage and maintenance facilities, firing ranges, and designated training areas. The mission of VTS-M is to:

1. Provide a training site to prepare units of the TNARNG for transition to war and to respond to the Governor's requests;
2. Provide surface maintenance services to specified TNARNG units; and
3. Provide inactive duty training facilities for the assigned units.

On 9 August 2022, the U.S. Army's Milan Army Ammunition Plant (MLAAP) reassigned more than 16,000 acres to the TNARNG, increasing the size of VTS-M to over 18,500 acres. The justification for the land reassignment was the shortage in VTS-M maneuver area. The expanded size of VTS-M would provide TNARNG with enough maneuver space to train its largest units, which have been unable to do so within Tennessee.

The proposed heavy and light maneuver training is needed because there is currently a deficit in training area lands available to train and qualify TNARNG units in heavy mounted and light maneuvers; there are no current training areas in Tennessee capable of supporting the TNARNG's heavy and light maneuver training requirement. The purpose of TNARNG's Proposed Action is to provide sufficient training land to allow for heavy and light maneuver training, including maneuver support, land augmentation, communications, unmanned aerial vehicle operations, air insertion, causality evacuation, and new live-fire capabilities training within proposed ranges, to TNARNG units within the state to better support TNARNG training requirements and mission.

In October and November 2022, a Phase I archaeological survey of the TNARNG's newly acquired 16,000-acre property at the MLAAP was completed. This archaeological survey was conducted in accordance with the stipulations of Section 106 of the NHPA (per 36 CFR Part 800, as amended through 2016) and the Advisory Council on Historic Preservation's revised 36 CFR Part 800 regulations and followed current guidelines established by the Tennessee State Historic Preservation Office (SHPO) (*Tennessee SHPO Standards and Guidelines for Archaeological Resource Management* [October 2018]) as well as other pertinent state and federal guidelines. All archaeological resources identified during this investigation were evaluated for eligibility for inclusion in the National Register of Historic Places (NRHP) based on criteria set forth by 36 CFR Part 60.4. Supervising personnel for this survey met or exceeded the Secretary of the Interior's Professional Qualification Standards in accordance with 36 CFR Part 61.

Background research revealed four previously recorded archaeological sites within the project tract (40CL52, 40CL53, 40GB134, and 40GB152). Sites 40CL52 and 40CL53 were previously documented as prehistoric artifact scatters, and Site 40GB134 was documented as a historic hamlet based on surface inspection only. Site 40GB152 was previously documented as an open habitation site. These sites were revisited, and each underwent systematic surface and subsurface investigations. Artifacts and cultural material were identified at three of these sites (40CL52, 40CL53, and 40GB134). However, due to the low density of artifacts and overall level of disturbance, all three sites are recommended as not eligible for the NRHP. No artifacts were encountered at the previously documented location of Site 40GB152. Based on the absence of artifacts and the presence of eroded and disturbed soils, Site 40GB152 was originally documented as either being in an approximate location and not being present within the tested area or as having been destroyed.

Field investigation identified 17 new archaeological sites (40CL129- 40CL137; 40CL139-40CL145; 40GB218) and 13 isolated finds. Newly identified sites include nineteenth- to twentieth-century house sites and artifact scatters and one historic church and cemetery (40CL145). Several of the sites also have small, unknown prehistoric lithic scatter components. Due to the low density of artifacts and the overall level of disturbance, 15 of these sites are recommended as not eligible for the NRHP. No further management of

these sites is necessary. Likewise, the 13 isolated finds are recommended not eligible for the NRHP and require no additional management.

The NRHP eligibility of one historic house site (40CL143) is unknown pending additional testing. Site 40CL143 is a late nineteenth- to early twentieth-century house site with several intact features (well, privy, house foundation, cellar, and road cut). The site may reveal significant information regarding late nineteenth- to early twentieth-century life in the region. Therefore, site avoidance is recommended. If the proposed use of the property for heavy and light maneuver training cannot be designed to avoid this site, it is recommended that a more extensive Phase II archaeological testing be conducted to determine the site's NRHP eligibility.

A total of 17 historic cemeteries (including Site 40CL145) were identified within or directly adjacent to the project tract. These cemeteries were thoroughly documented, photographed, and recorded as historic resources. Three cemeteries are recommended as eligible for the NRHP under Criterion C (*design/construction*). Additionally, all the historic cemeteries may be eligible under Criterion D (*information potential*) and should be considered unevaluated under this criterion. If graves and human remains are still present, additional archaeological investigation may help determine the age of the cemeteries and the socioeconomic status of those interred there. Cemeteries are also protected by Tennessee burial laws (Tennessee Code Annotated [TCA] 39-17-311 to 312; TCA 46-4-101 to 104; TCA 46-8-101 to 103; TCA 68-3-508 and Rule 1200-7-1-.08). Therefore, it is recommended that all cemeteries be avoided. If the proposed use of the property for heavy and light maneuver training cannot be designed to avoid these resources, consultation with Tennessee SHPO and additional cemetery documentation and possible relocation are recommended.

In accordance with the NHPA, TNARNG would like to initiate government-to-government consultation regarding the Proposed Action. TNARNG requests your input in identifying any issues or areas of concern you feel should be addressed in the environmental analysis. Additionally, please let us know if you believe this undertaking might adversely affect historic properties of religious or cultural significance.

If you have any comments or concerns you would like to provide regarding the Proposed Action or its environmental impacts, please respond to us within 30 days of receipt of this letter. Please send your written responses via email to Mr. Gregory Turner, TNARNG Environmental Program Manager, at gregory.m.turner.nfg@army.mil.

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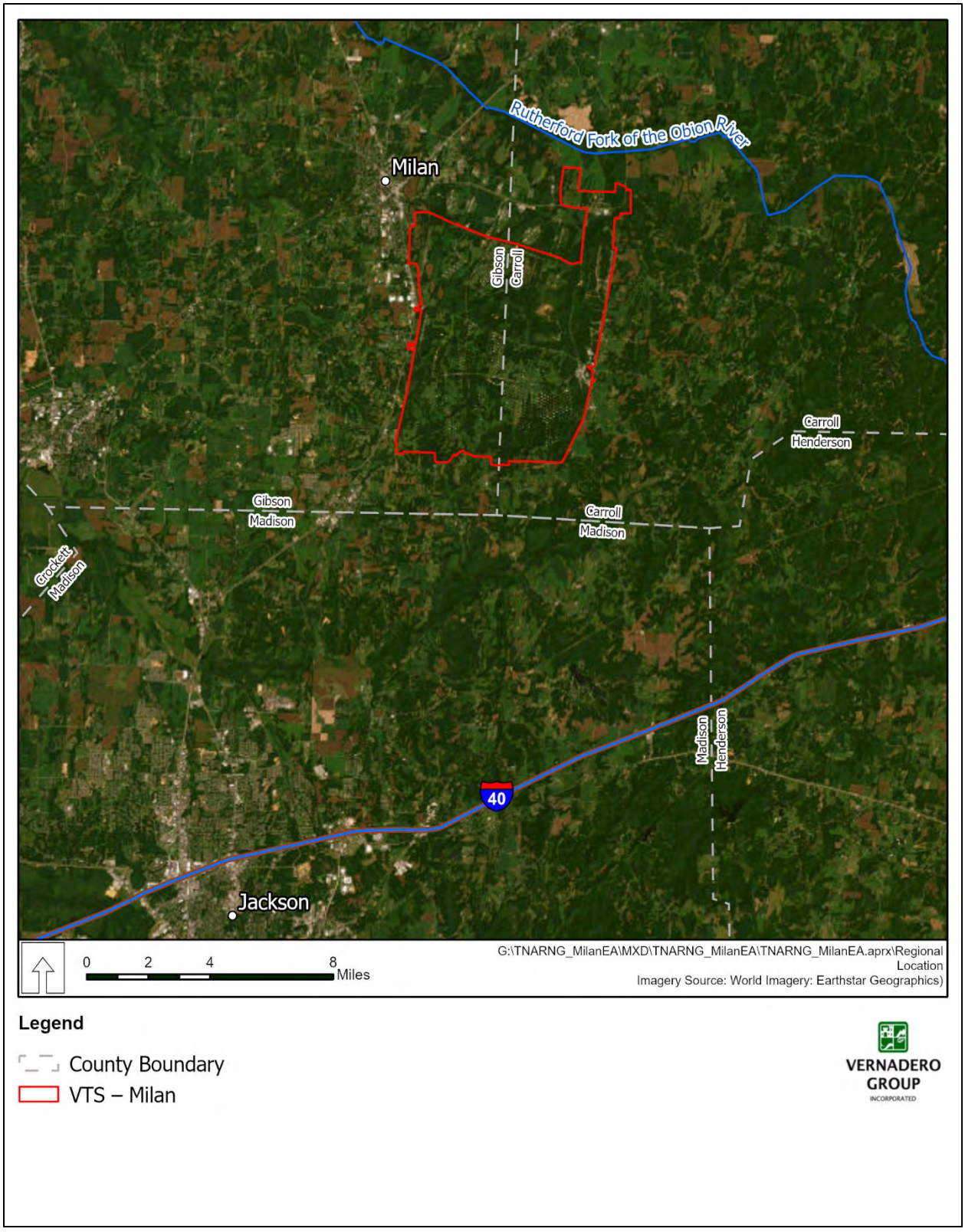
GREGORY M. TURNER
Environmental Program Manager
Tennessee Army National Guard

Enclosures:

Figure 1. Regional Location of Volunteer Training Site – Milan
Figure 2. Training Areas at Volunteer Training Site – Milan



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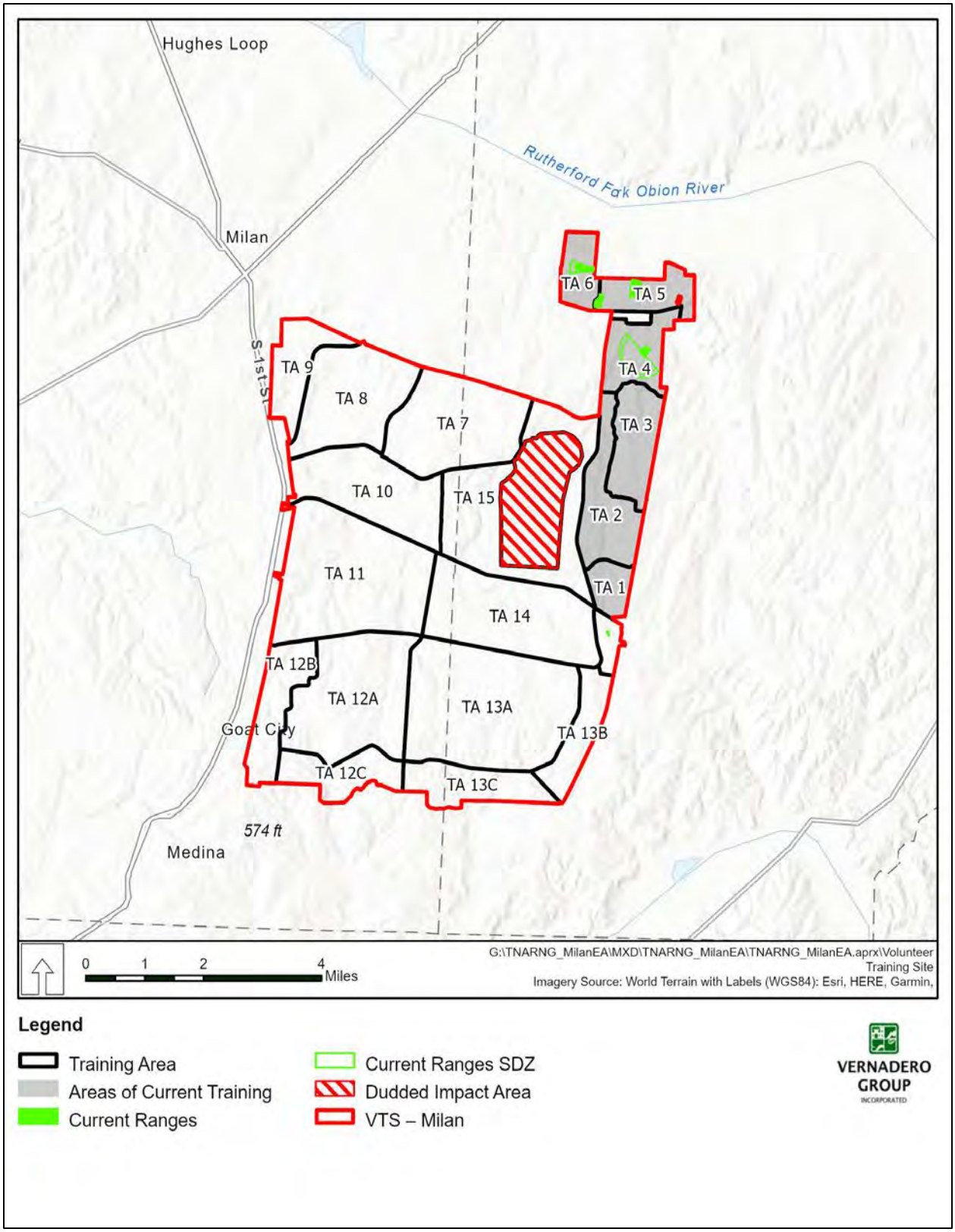

Figure 2. Training Areas at Volunteer Training Site – Milan

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NGTN-FMZ-ENV 2 August 2023

Governor John Raymond Johnson
Absentee Shawnee Tribe of Oklahoma
2025 S. Gordon Cooper Drive
Shawnee OK 74801

Also submitted via email to Ms. Devon Frazier at 106NAGPRA@astrube.com and dfrazier@astribe.com

Dear Governor Johnson

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GREGORY M. TURNER
Environmental Program Manager
Tennessee Army National Guard

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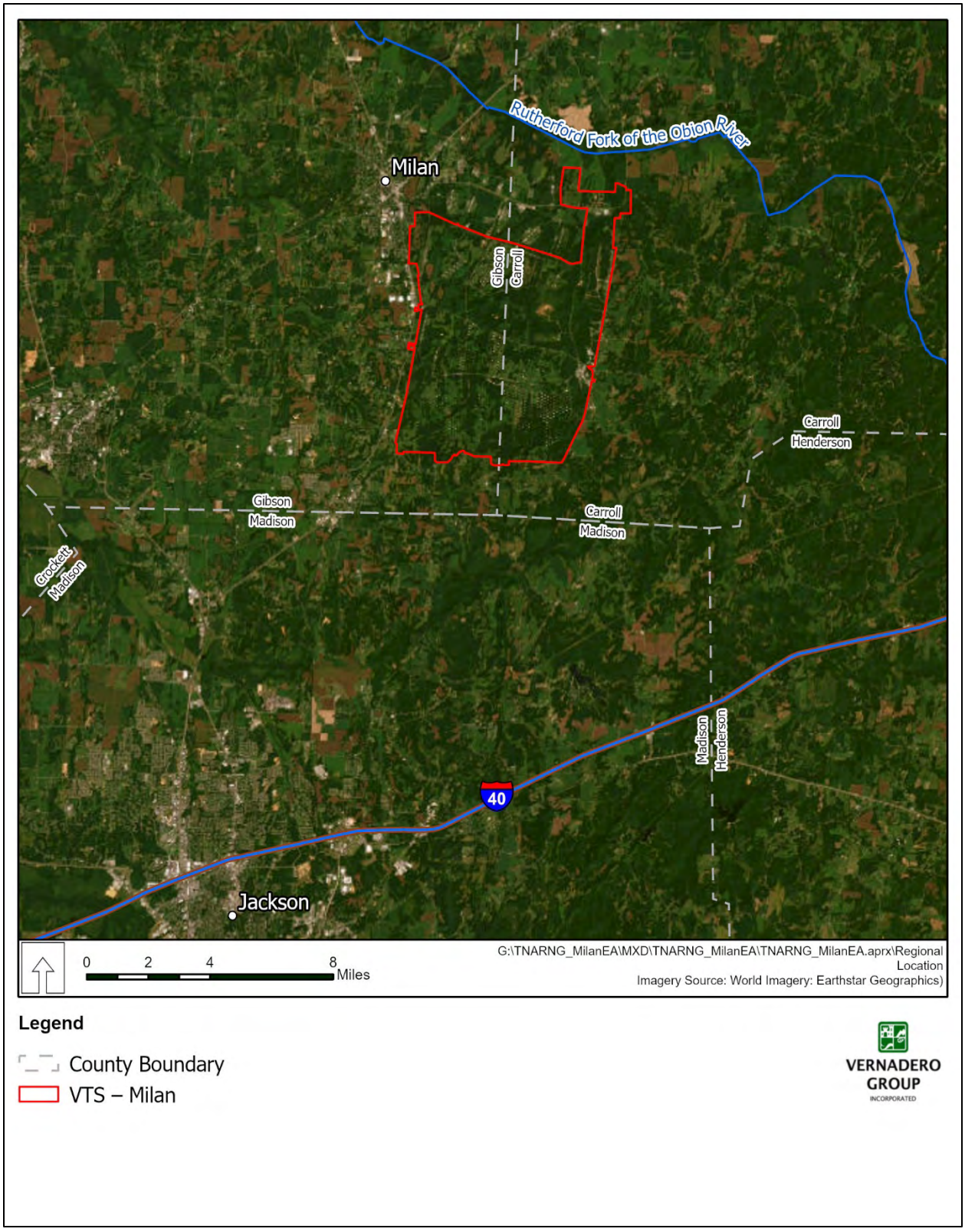

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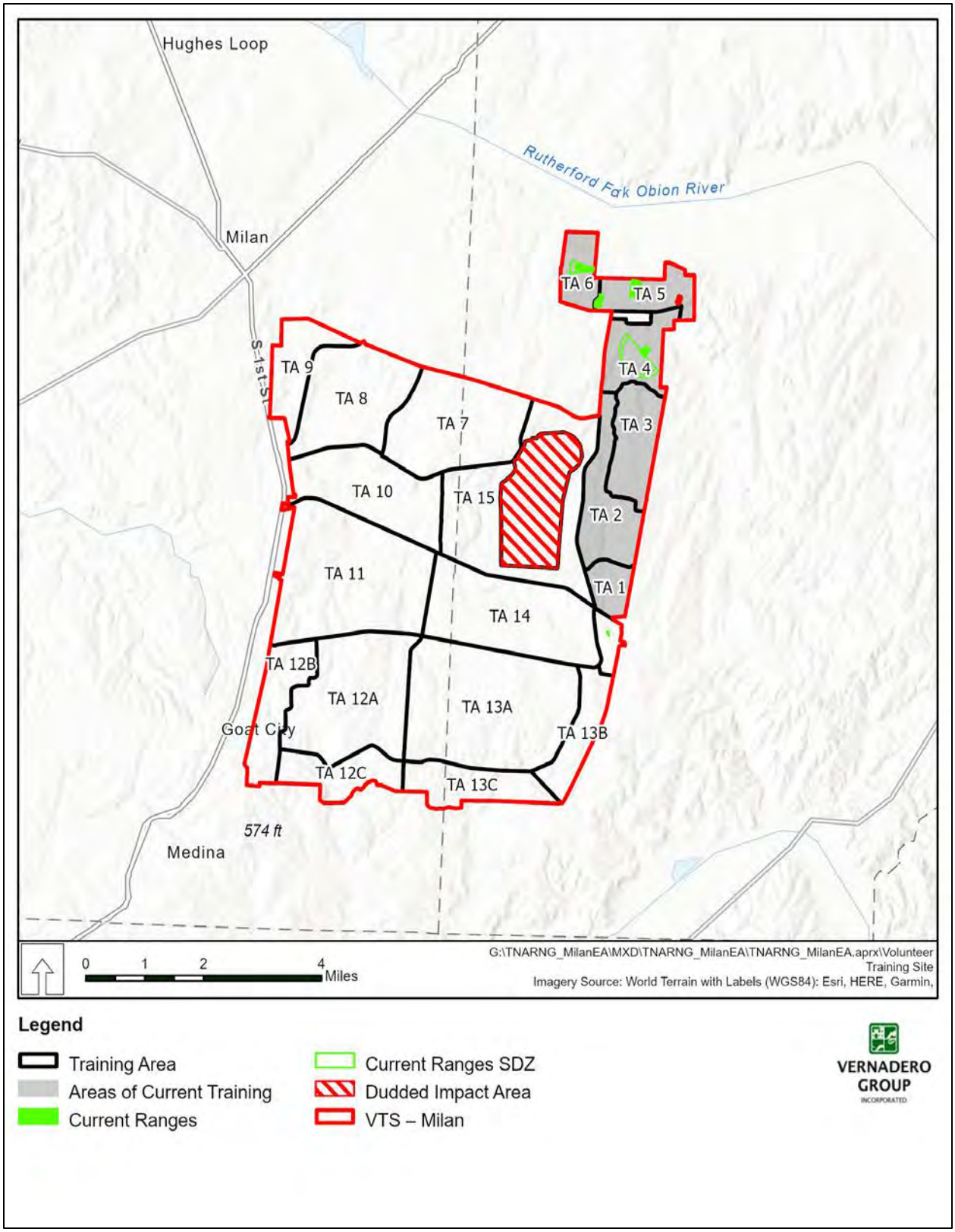

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NASHVILLE, TENNESSEE 37204-1502

NGTN-FMZ-ENV 2 August 2023

Chief Chuck Hoskin, Jr.
Cherokee Nation
P.O. Box 948
Tahlequah OK 74465-0948

Also submitted via email to Ms. Elizabeth Toombs at Elizabeth-toombs@cherokee.org.

Dear Chief Hoskin

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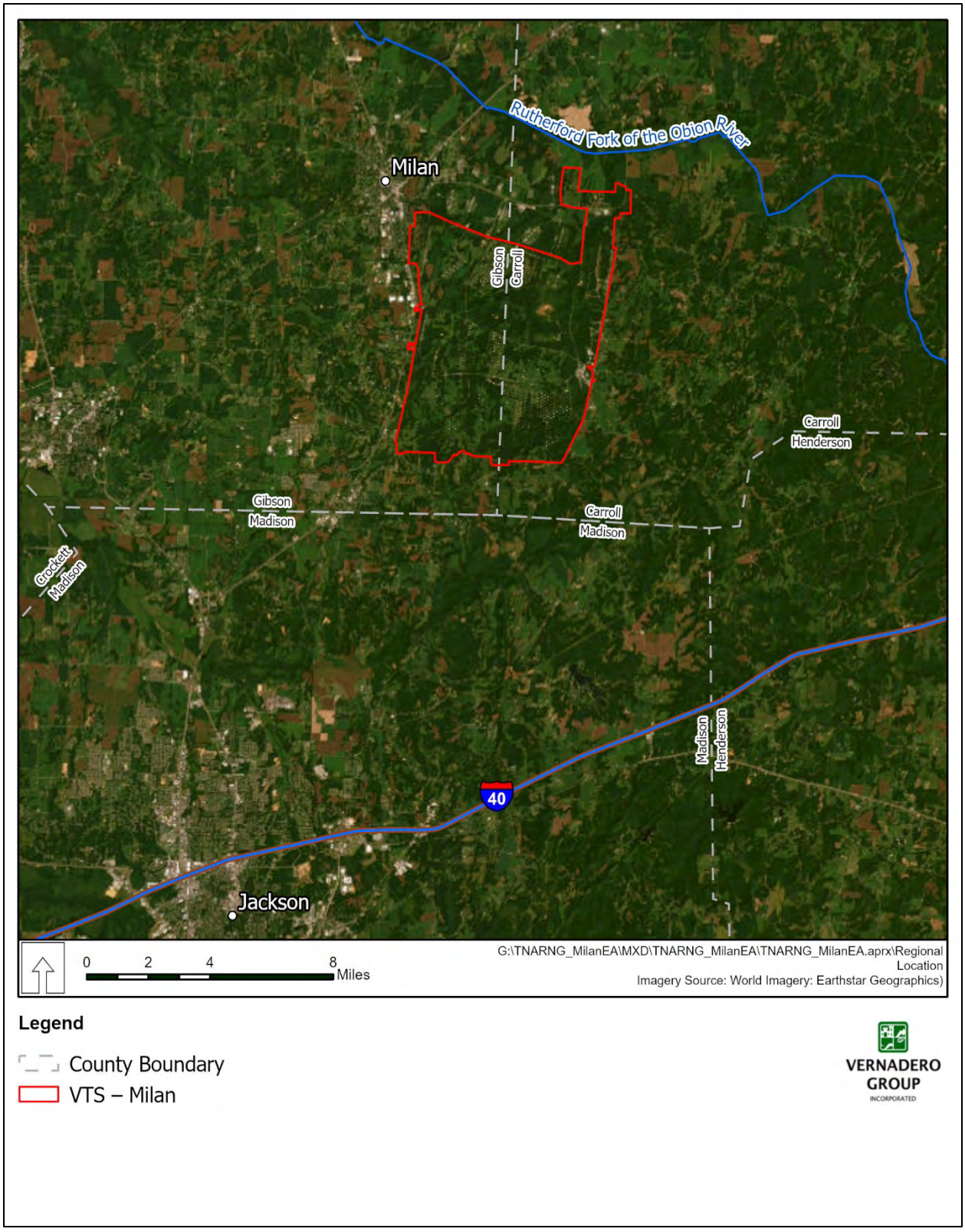

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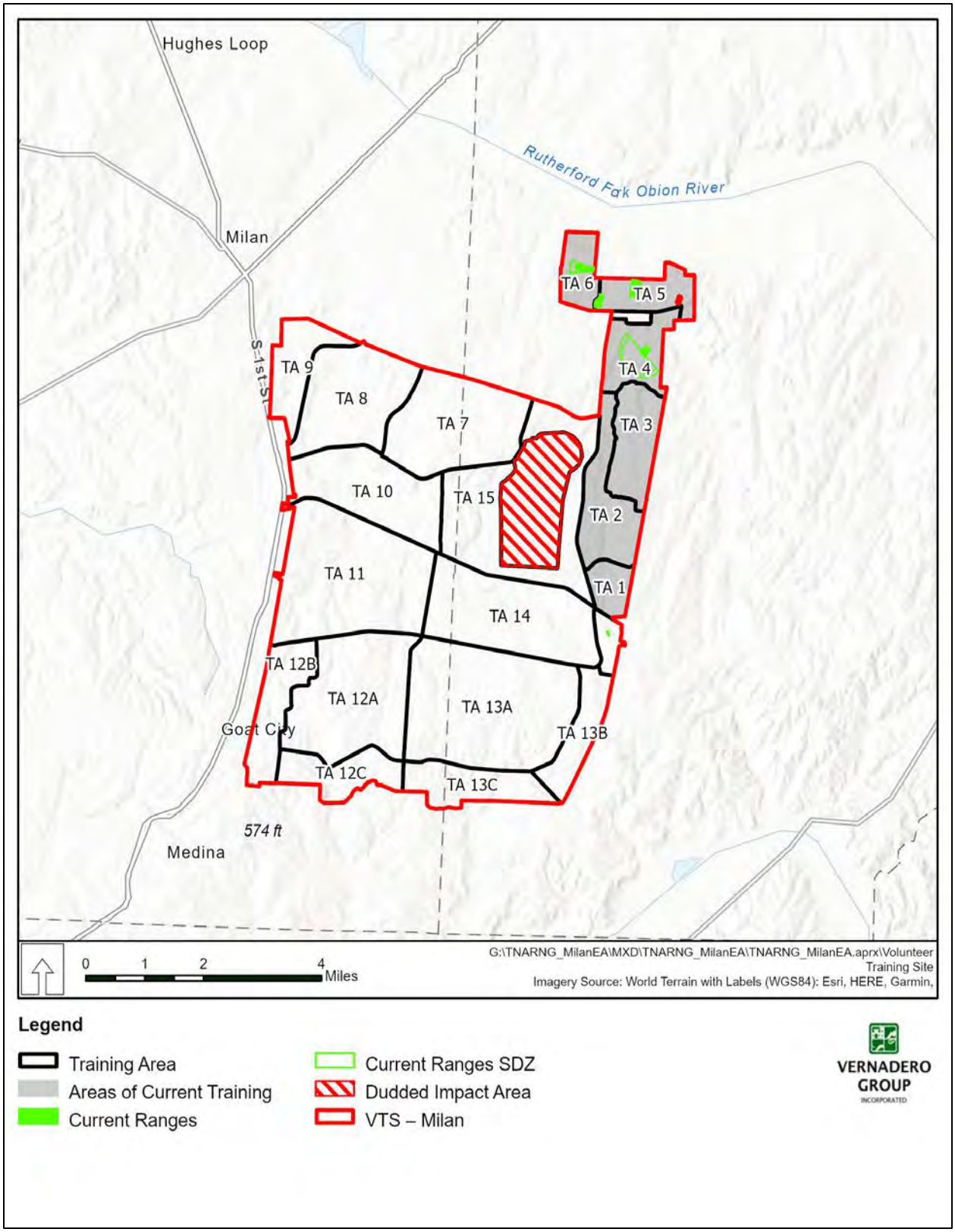

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NGTN-FMZ-ENV 2 August 2023

Governor Bill Anoatubby
Chickasaw Nation of Oklahoma
P.O. Box 1548
Ada OK 74821-1548

Also submitted via email to Ms. Karen Brunso at karen.brunso@chickasaw.net; Ms. Virginia Nail at gingy.nail@chickasaw.net; and Mr. Kirk Perry at kirk.perry@chickasaw.net.

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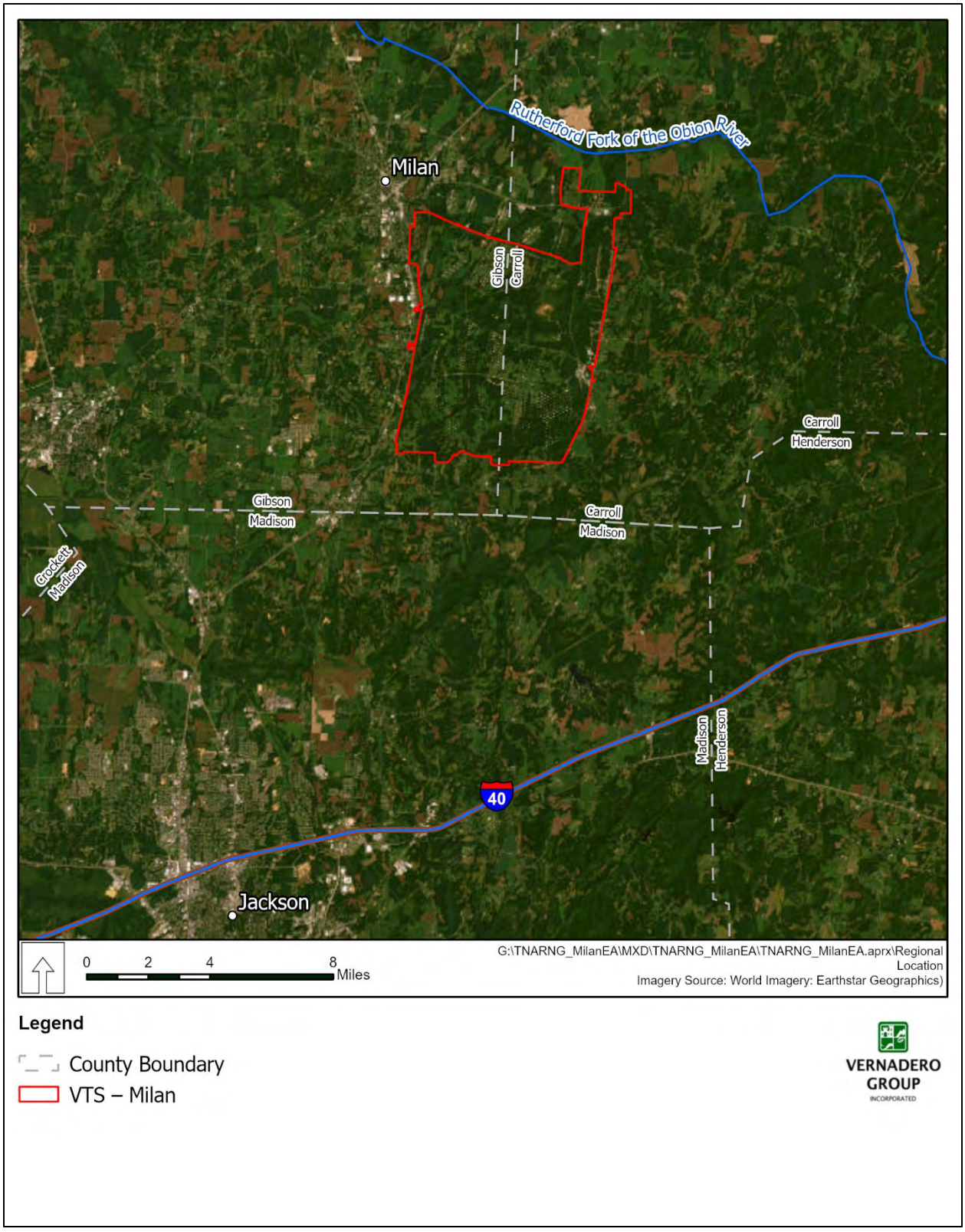

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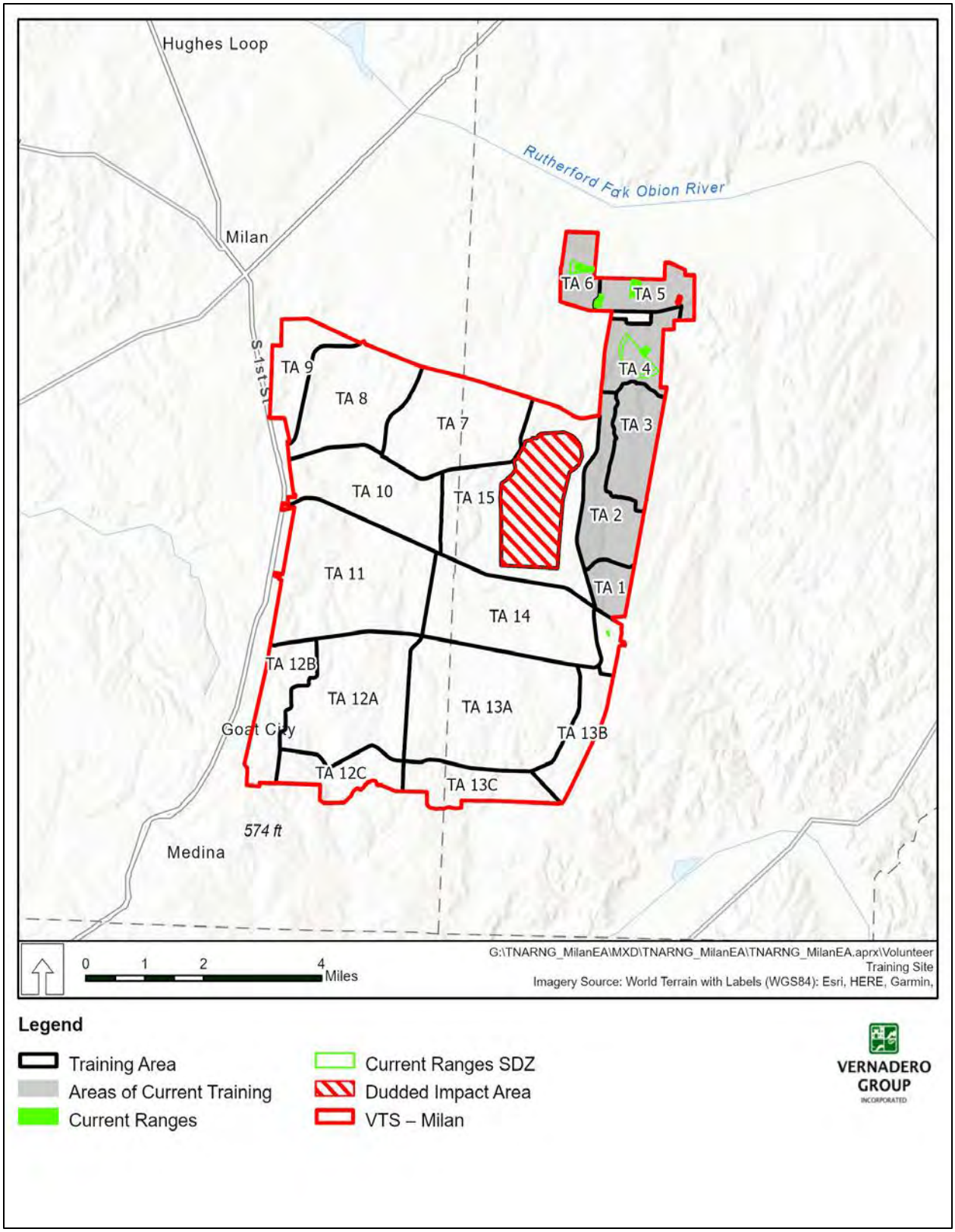

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NGTN-FMZ-ENV 2 August 2023

Chairman Jonathan Cernek
Coushatta Tribe of Louisiana
P.O. Box 10
Elton LA 70532

Also submitted via email to Ms. Linda Langley at llangley@coushatta.org.

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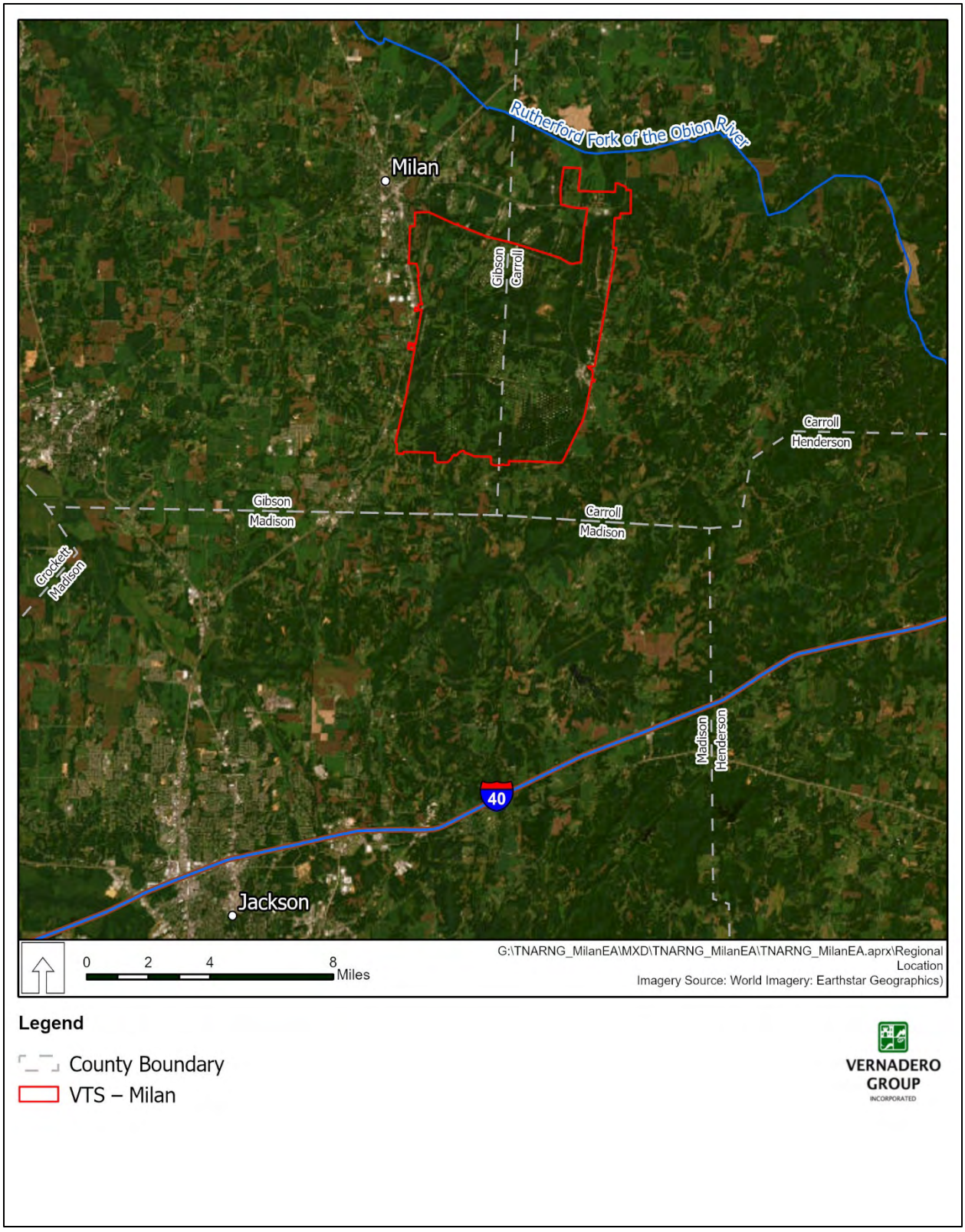

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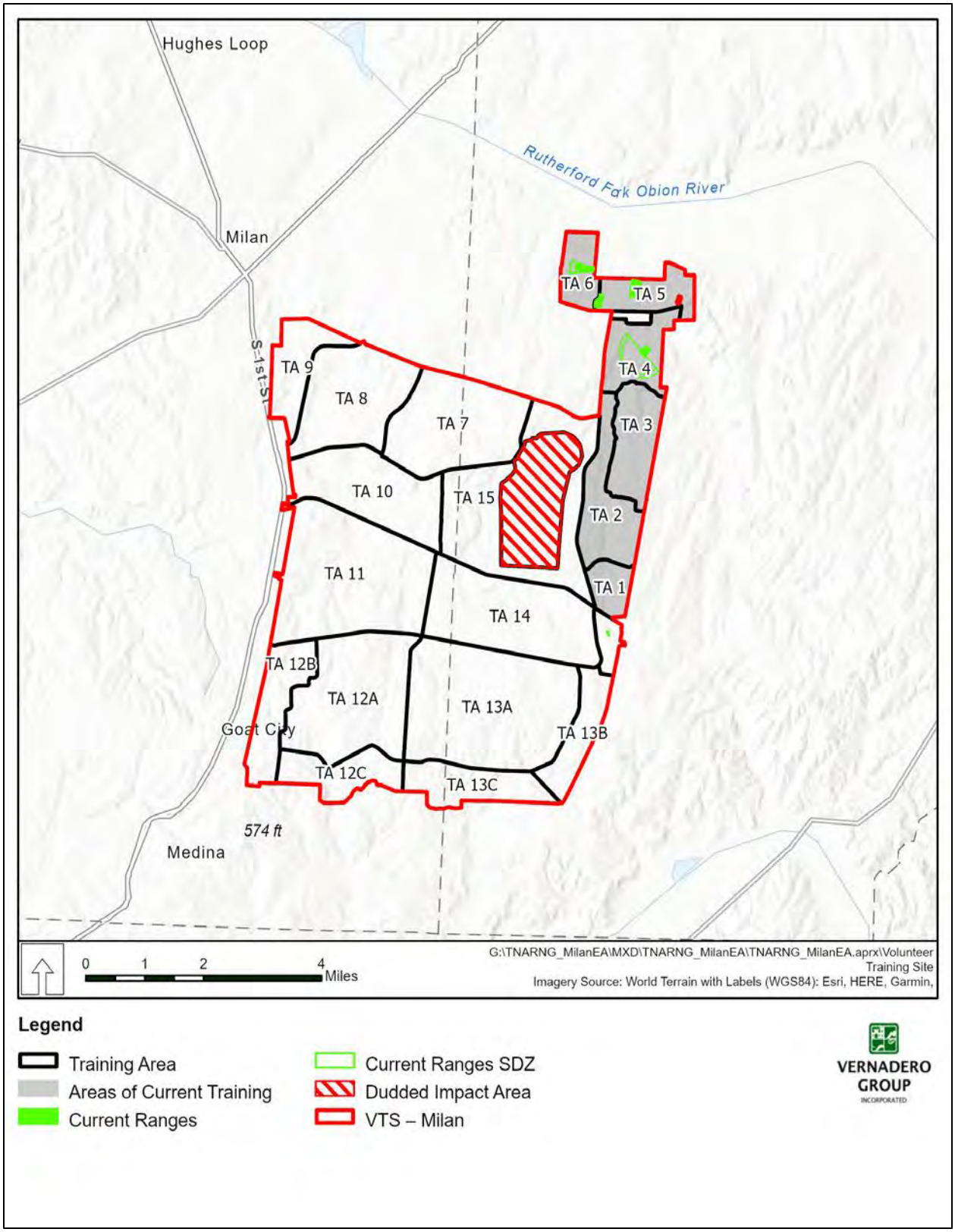

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NGTN-FMZ-ENV 2 August 2023

Chief Richard Sneed
Eastern Band of Cherokee Indians
P.O. Box 455
Cherokee NC 28719

Also submitted via email to Mr. Russell Townsend at russtown@nc-cherokee.com; Mr. Stephen Yerka at syerka@nc-cherokee.com; and Ms. Miranda Panther Laney at miralane@nc-cherokee.com.

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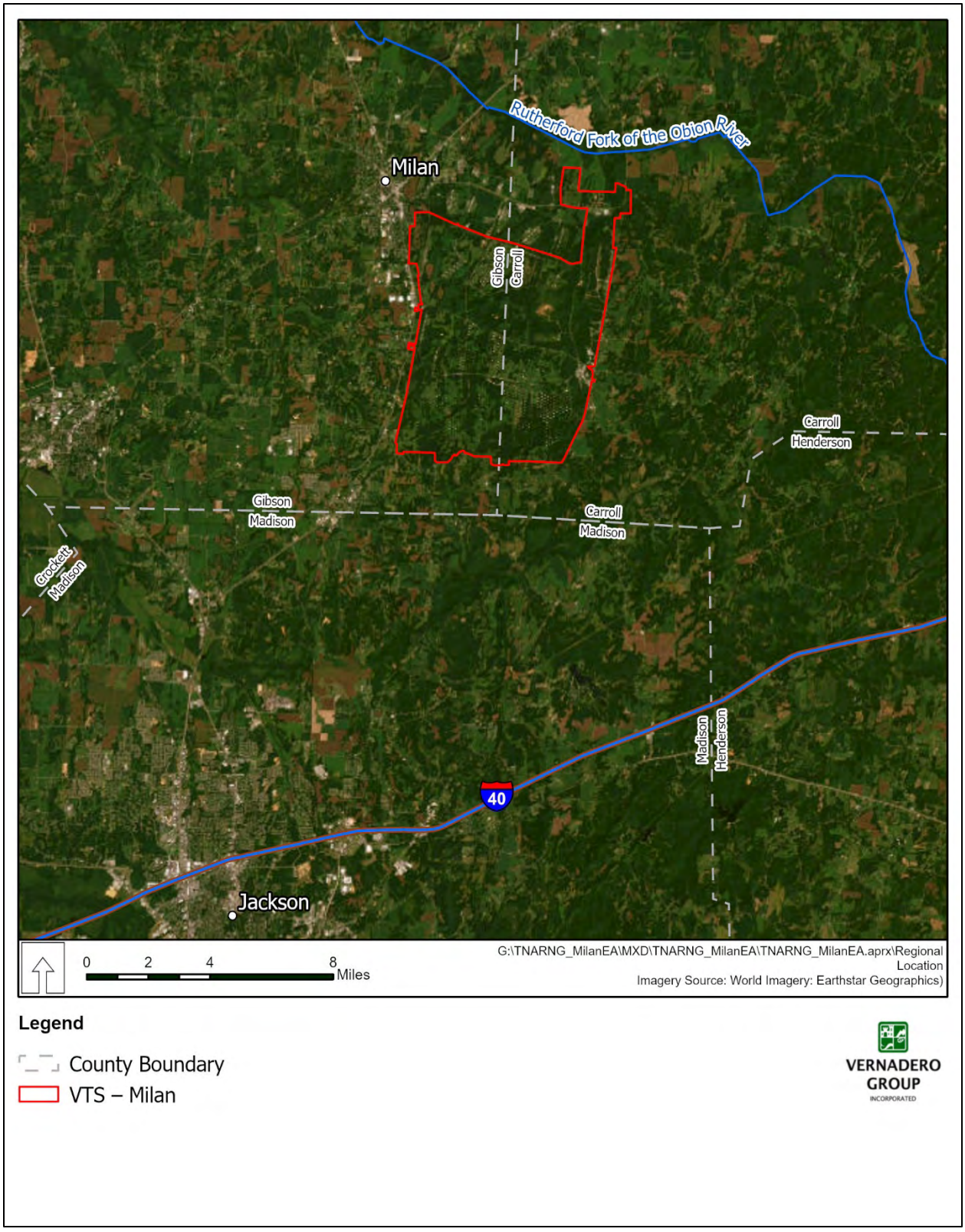

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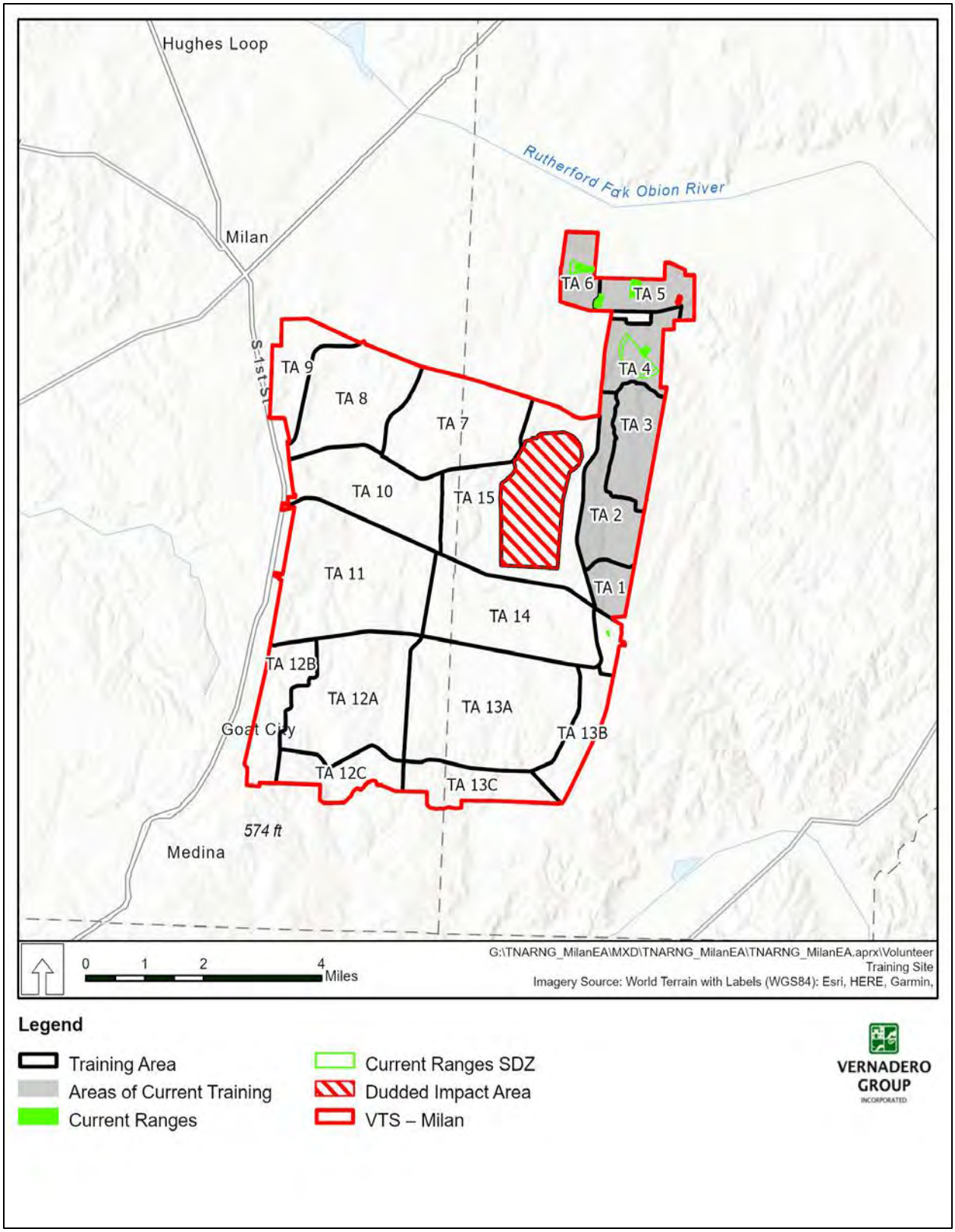

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NASHVILLE, TENNESSEE 37204-1502

NGTN-FMZ-ENV 2 August 2023

Chief Glenna Wallace
Eastern Shawnee Tribe of Oklahoma
P.O. Box 350
Seneca MO 64865

Also submitted via email to Mr. Paul Barton at pbarton@estoo.net and Ms. Janet Hansen at jhansen@stoo.net.

Dear Chief Wallace

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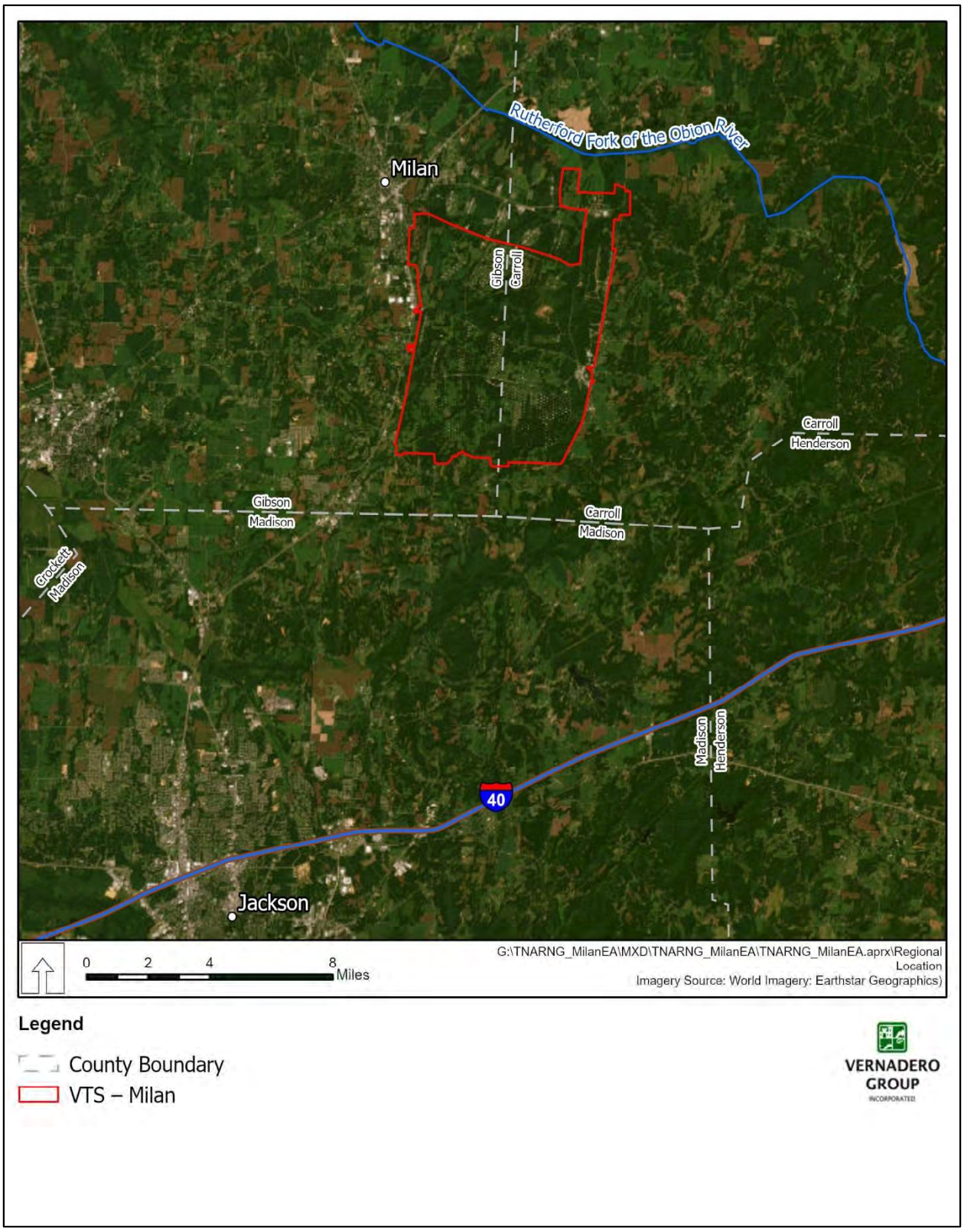

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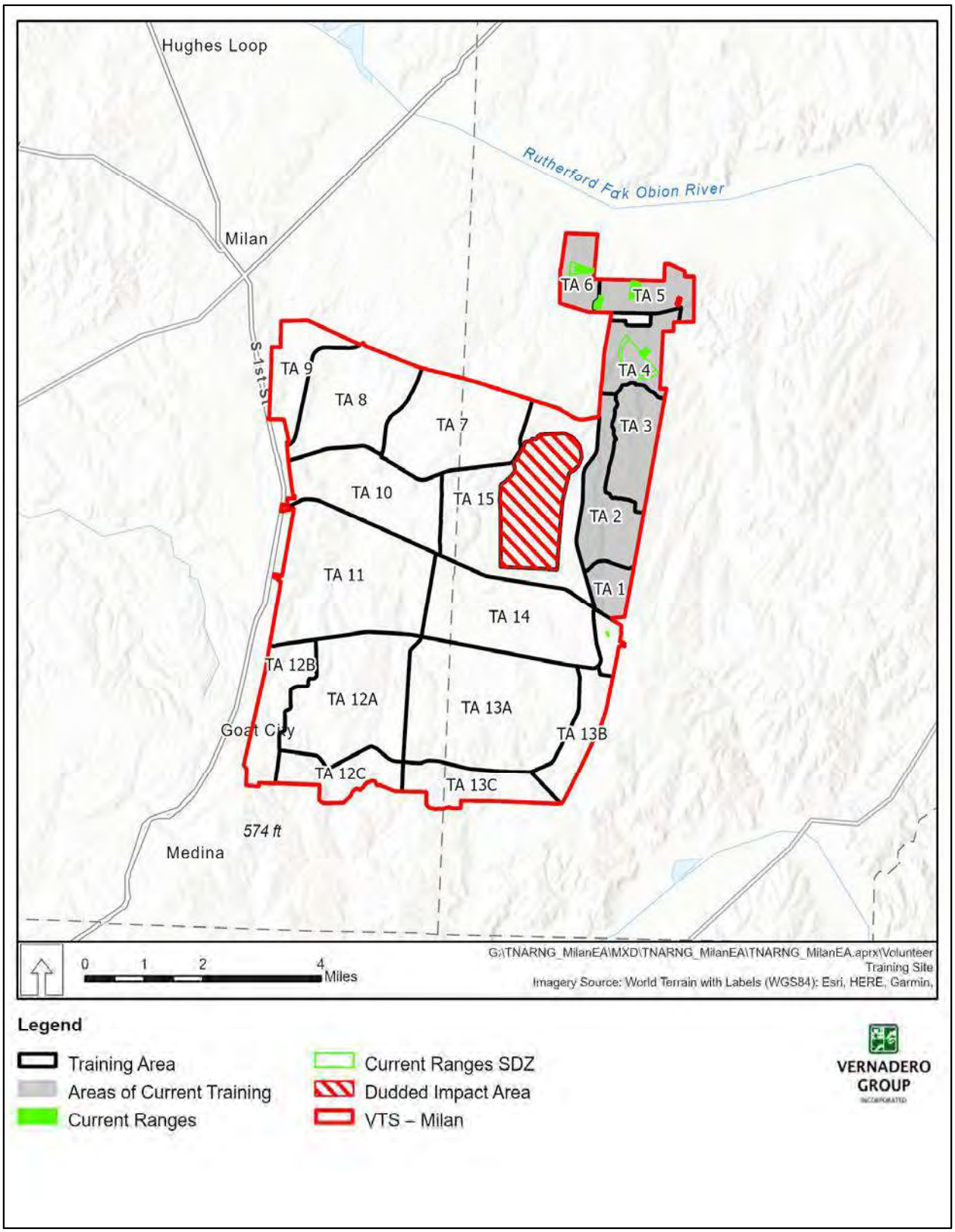

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NGTN-FMZ-ENV 2 August 2023

Chief Ryan Morrow
Thlopthlocco Tribal Town
P.O. Box 188
Okemah OK 74859

Also submitted via email to Mr. David Frank at thpo@ttown.org.

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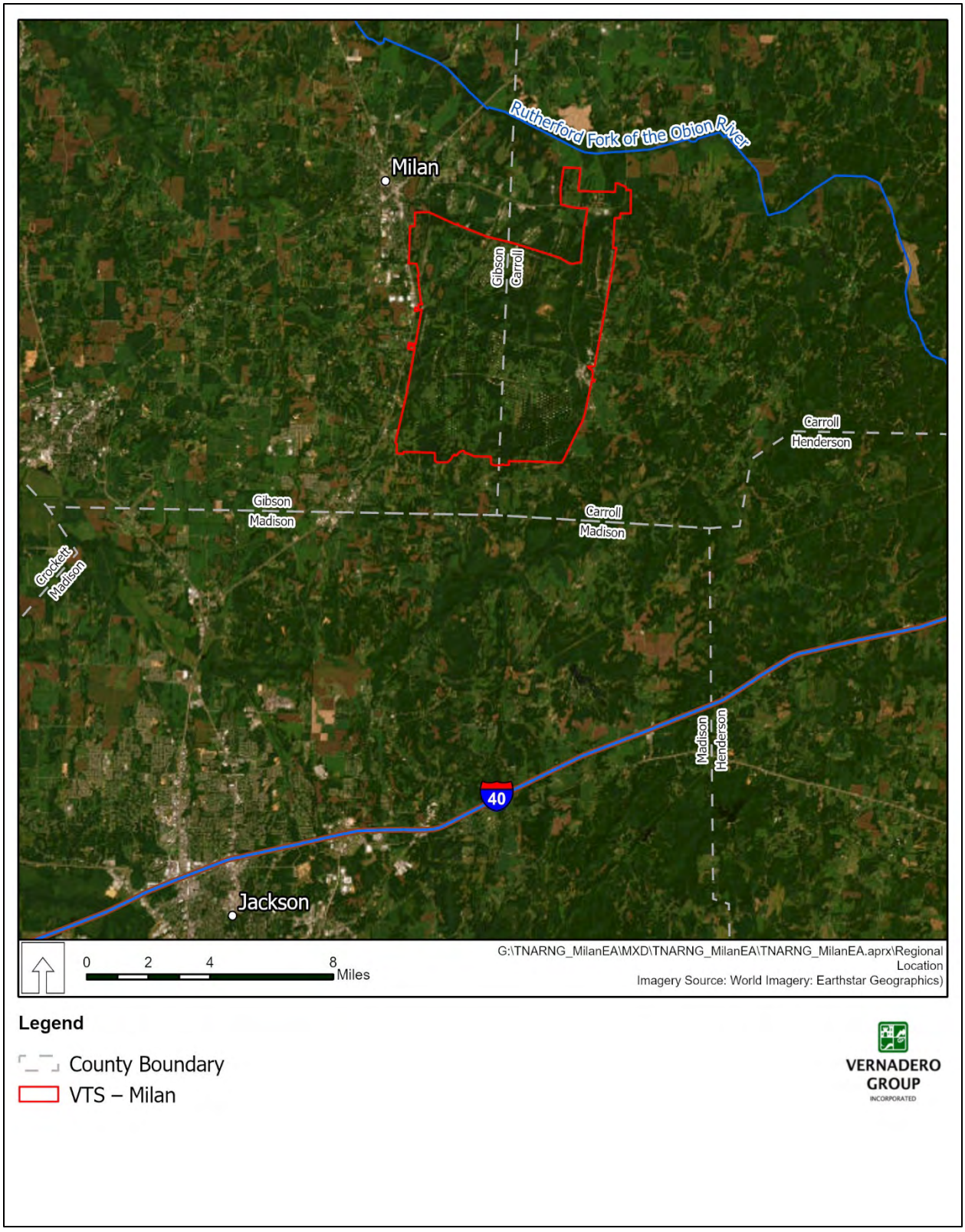

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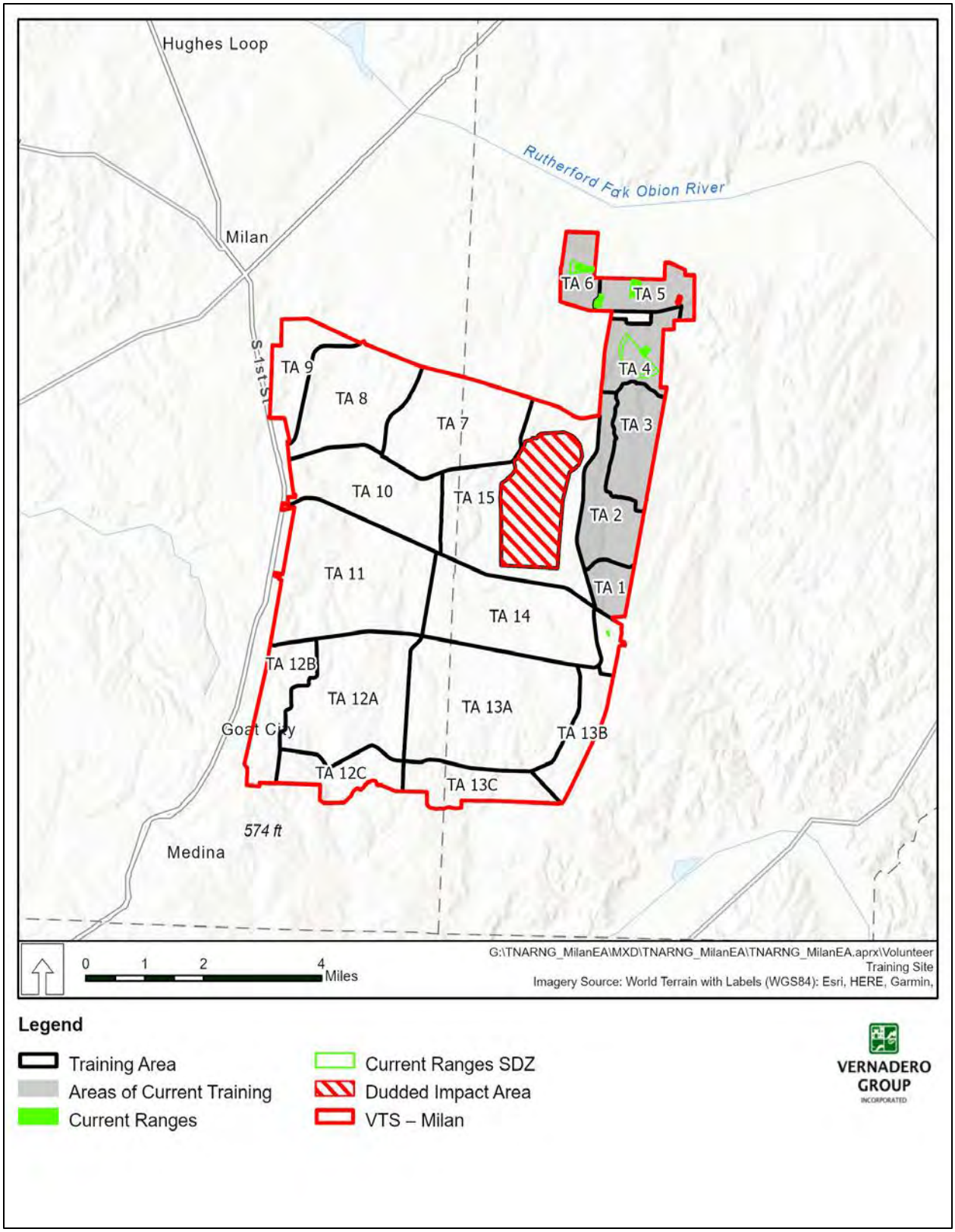

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NGTN-FMZ-ENV 2 August 2023

Chief Joe Bunch
United Keetoowah Band of Cherokee Indians in Oklahoma
P.O. Box 746
Tahlequah OK 74464

Also submitted via email to Whitney Warrior at wwarrior@ukb-nsn.gov.

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If you have any comments or concerns you would like to provide regarding the Proposed Action or its environmental impacts, please respond to us within 30 days of receipt of this letter. Please send your written responses via email to Mr. Gregory Turner, TNARNG Environmental Program Manager, at gregory.m.turner.nfg@army.mil.

TURNER.GREGORY.MATTHEW.1105989861
Digitally signed by TURNER.GREGORY.MATTHEW.1105989861
Date: 2023.08.02 08:29:53 -05'00'

GREGORY M. TURNER
Environmental Program Manager
Tennessee Army National Guard

Enclosures:

Figure 1. Regional Location of Volunteer Training Site – Milan
Figure 2. Training Areas at Volunteer Training Site – Milan

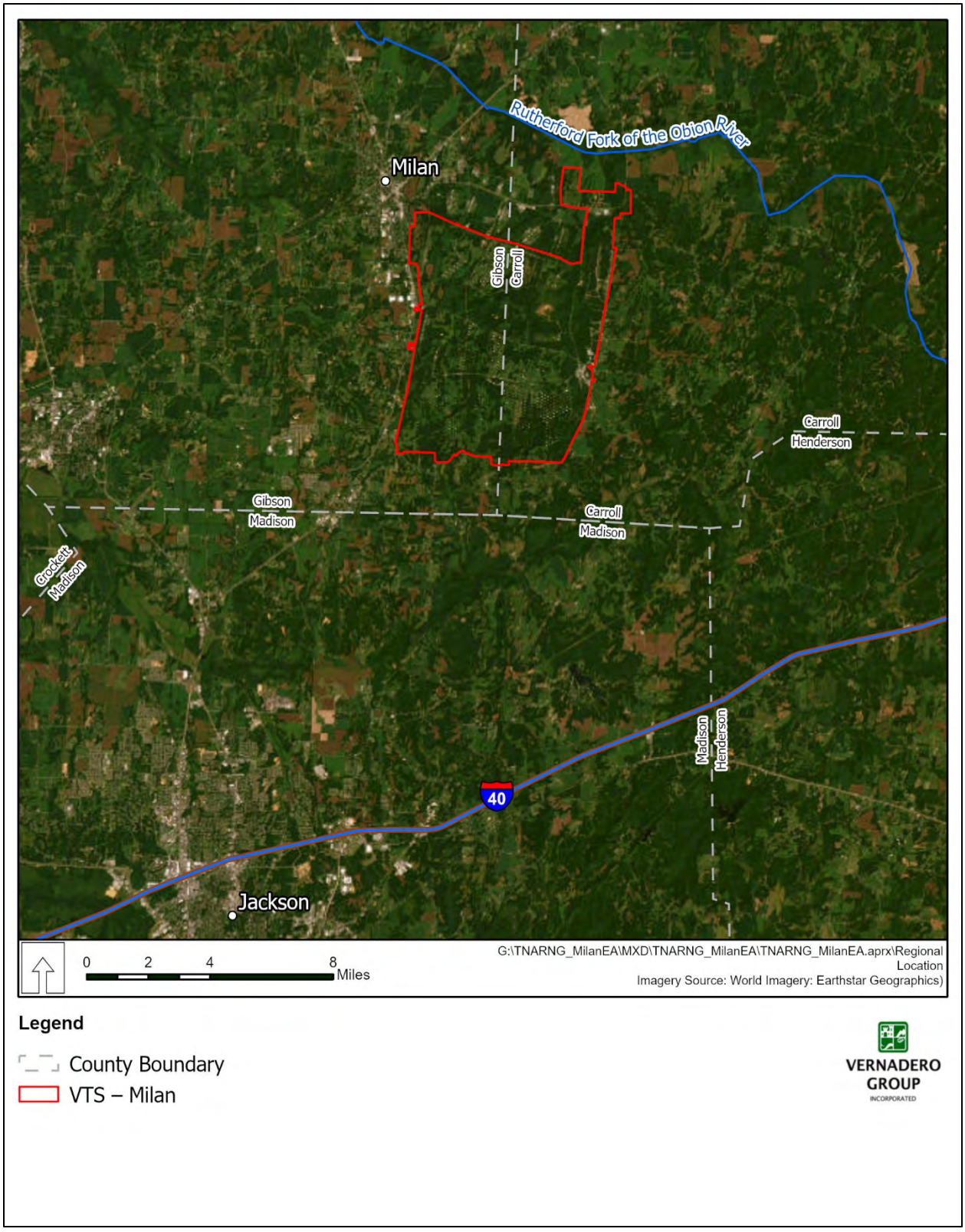


Figure 1. Regional Location of Volunteer Training Site – Milan

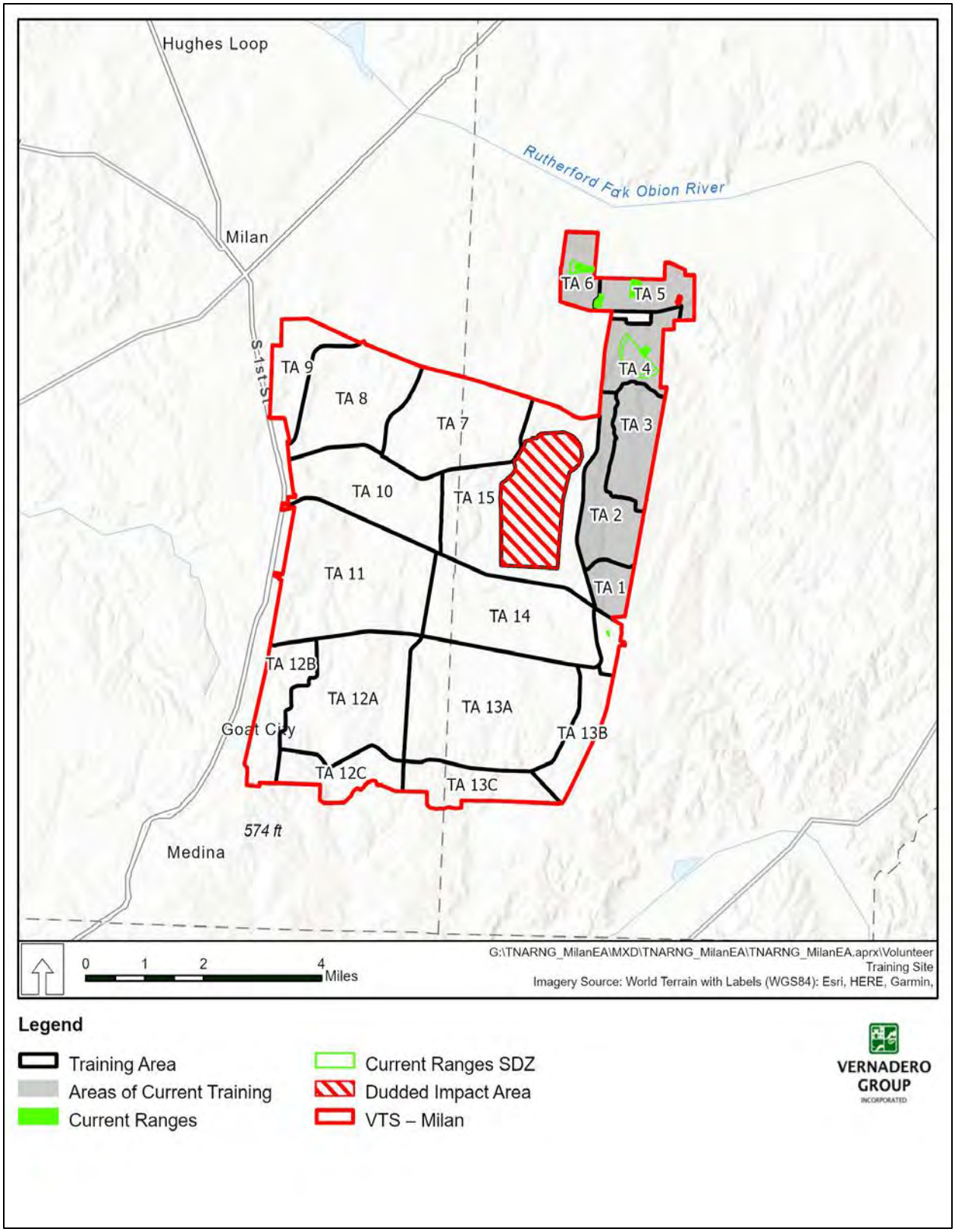


Figure 2. Training Areas at Volunteer Training Site – Milan

Tribal Responses to Scoping Letters

August 29, 2023

Mr. Gregory M. Turner
Environmental Program Manager
Department of the Army and Air Force
Joint Force Headquarters
Tennessee National Guard
Houston Barracks, Post Office Box 41502
Nashville, TN 37204-1502

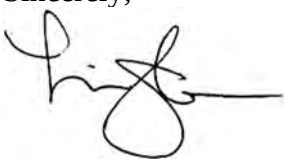
Dear Mr. Turner:

Thank you for the letter of notification regarding the proposed heavy and light maneuver training at the Volunteer Training Site in Gibson and Carroll Counties, Tennessee. We accept the invitation to consult under Section 106 of the National Historic Preservation Act.

The Chickasaw Nation is in support of the proposed undertaking, and we do not believe there will be specific historic properties affected. In the event the agency becomes aware of the need to enforce other statutes, we request to be notified under ARPA, AIRFA, NEPA, NAGPRA, NHPA, and Professional Standards.

Your efforts to preserve and protect significant historic properties are appreciated. If you have any questions, please contact Ms. Karen Brunso, tribal historic preservation officer, at (580) 272-1106 or by email at hpo@chickasaw.net.

Sincerely,



Lisa John, Secretary
Department of Culture and Humanities

Cc: gregory.m.turner.nfg@army.mil

Early Public Notice

PUBLICATION AFFIDAVIT

STATE OF TENNESSEE
COUNTY OF GIBSON

Early Notice

Personally appeared before me, a Notary Public, in and for said County and State Melissa Price, who deposes and swears that she is bookkeeper of The Mirror Exchange, a newspaper published in the City of Milan, Tennessee, and that the notice, a copy of which is attached hereto, was published in the said Mirror Exchange for 1 consecutive weeks, the first publication being on the 26 day of Dec, 2023; the second publication the _____ day of _____ 2023; the third publication the _____ day of _____, 2023.

Signed: Melissa Price

Sworn to and subscribed before me this 26 day of Dec, 2023.

Scarlet P. Elliott, Notary Public

SCARLET P. ELLIOTT
STATE OF TENNESSEE
NOTARY PUBLIC
GIBSON COUNTY

PUBLIC NOTICE

EARLY NOTICE OF A PROPOSED ACTIVITY WITH POTENTIAL TO IMPACT FLOODPLAINS AND WETLANDS TENNESSEE ARMY NATIONAL GUARD VOLUNTEER TRAINING SITE – MILAN, TENNESSEE

The Tennessee Army National Guard (TNARNG) is preparing a Draft Environmental Assessment (EA) to evaluate potential environmental impacts associated with proposed heavy and light maneuver training at the Volunteer Training Site at Milan (VTS-M) in Carroll and Gibson counties, Tennessee. The city of Milan lies immediately west of the site; Jackson, Tennessee, on Interstate 40, is approximately 20 miles to the south, and the Rutherford Fork of the Obion River lies a short distance north of VTS-M's northern boundary. Under the Proposed Action, the TNARNG proposes to develop approximately 16,000 acres received through the divesture of the Milan Army Ammunition Plant for maneuver of military force training to build and sustain operational readiness for TNARNG units. The Proposed Action includes new live-fire capabilities for TNARNG training on VTS-M; new maneuver capabilities; range development including a 25-meter zero range, an automated record fire range, a multipurpose machine gun range, and a multipurpose training range; new cantonment area expansion within the existing cantonment area; improvements to transportation infrastructure; construction of numerous low-water crossings and armored vehicle launched bridges; and tree harvesting.

The purpose of the Proposed Action is to provide sufficient training land to allow heavy and light maneuver training, including maneuver support, land augmentation, communications, unmanned aerial vehicle operations, air insertion, causality evacuation, and new live-fire capabilities training within proposed ranges, to TNARNG units within the state to better support TNARNG training requirements and mission. The Proposed Action is needed because there is currently a deficit in training area lands available to train and qualify TNARNG units in heavy mounted and light maneuvers; there are no current training areas in Tennessee capable of supporting the TNARNG's heavy and light maneuver training requirement. The current shortage of available training areas has created scheduling conflicts and has forced TNARNG personnel to travel out of state for training.

The proposed project is subject to the requirements and objectives of Executive Order (EO) 11988, *Floodplain Management*, and EO 11990, *Protection of Wetlands*, because parts of the Proposed Action would occur within portions of the 100-year floodplain and wetlands on VTS-M.

The TNARNG requests advance public comment to determine if there are public concerns regarding the proposed project's potential impacts on floodplains and wetlands. The TNARNG would also like to solicit public input or comments on potential project alternatives. The proposed project will be analyzed in the forthcoming EA, and the public will have the opportunity to comment on the Draft EA when it is released.

The advance public comment period is 26 December 2023 to 25 January 2024. Please submit comments or requests for more information to Mr. Greg Turner, Environmental Program Manager, Tennessee Army National Guard, 3041 Sidco Drive, Nashville, Tennessee 37204-1502, or at gregory.m.turner.nfg@army.mil.

AFFIDAVIT OF PUBLICATION

0005868014
Newspaper Jackson Sun

State of Tennessee

Account Number 8667087640VERN
Advertiser VERNADERO GROUP INC.

VERNADERO GROUP INC.
4833 CONTI ST., SUITE 103
NEW ORLEANS, LA
70119

Keegan Moran Sales Assistant for the above mentioned newspaper,

hereby certify that the attached advertisement appeared in said newspaper on the following dates:

12/26/23

Keegan Moran

Subscribed and sworn to before me this 26 day of Dec, 2023.

Notary Public exp. 8.25.26

MARIAH VERHAGEN
Notary Public
State of Wisconsin

Affidavits Requested:

1

0005868014EARLYNOTICEOFAPROPOSEDACTIVITYWI1
Re: VOLUNTEER TRAINING SITE - MILAN, TENNESSEE

0005868014

EARLY NOTICE OF A PROPOSED ACTIVITY WITH POTENTIAL TO IMPACT FLOODPLAINS AND WETLANDS TENNESSEE ARMY NATIONAL GUARD VOLUNTEER TRAINING SITE - MILAN, TENNESSEE

The Tennessee Army National Guard (TNARNG) is preparing a Draft Environmental Assessment (EA) to evaluate potential environmental impacts associated with proposed heavy and light maneuver training at the Volunteer Training Site at Milan (VTS-M) in Carroll and Gibson counties, Tennessee. The city of Milan lies immediately west of the site; Jackson, Tennessee, on Interstate 40, is approximately 20 miles to the south, and the Rutherford Fork of the Obion River lies a short distance north of VTS-M's northern boundary. Under the Proposed Action, the TNARNG proposes to develop approximately 16,000 acres received through the divesture of the Milan Army Ammunition Plant for maneuver of military force training to build and sustain operational readiness for TNARNG units. The Proposed Action includes new live-fire capabilities for TNARNG training on VTS-M; new maneuver capabilities; range development including a 25-meter zero range, an automated record fire range, a multipurpose machine gun range, and a multipurpose training range; new cantonment area expansion within the existing cantonment area; improvements to transportation infrastructure; construction of numerous low-water crossings and armored vehicle launched bridges; and tree harvesting.

The purpose of the Proposed Action is to provide sufficient training land to allow heavy and light maneuver training, including maneuver support, land augmentation, communications, unmanned aerial vehicle operations, air insertion, causality evacuation, and new live-fire capabilities training within proposed ranges, to TNARNG units within the state to better support TNARNG training requirements and mission. The Proposed Action is needed because there is currently a deficit in training area lands available to train and qualify TNARNG units in heavy mounted and light maneuvers; there are no current training areas in Tennessee capable of supporting the TNARNG's heavy and light maneuver training requirement. The current shortage of available training areas has created scheduling conflicts and has forced TNARNG personnel to travel out of state for training.

The proposed project is subject to the requirements and objectives of Executive Order (EO) 11988, Floodplain Management, and EO 11990, Protection of Wetlands, because parts of the Proposed Action would occur within portions of the 100-year floodplain and wetlands on VTS-M.

The TNARNG requests advance public comment to determine if there are public concerns regarding the proposed project's potential impacts on floodplains and wetlands. The TNARNG would also like to solicit public input or comments on potential project alternatives. The proposed project will be analyzed in the forthcoming EA, and the public will have the opportunity to comment on the Draft EA when it is released.

The advance public comment period is 26 December 2023 to 25 January 2024. Please submit comments or requests for more information to Mr. Greg Turner, Environmental Program Manager, Tennessee Army National Guard, 3041 Sidco Drive, Nashville, Tennessee 37204-1502, or at gregory.m.turner.nfg@army.mil.

Agency Coordination Letters

DEPARTMENTS OF THE ARMY AND THE AIR FORCE
JOINT FORCE HEADQUARTERS
TENNESSEE NATIONAL GUARD
HOUSTON BARRACKS, PO BOX 41502
NASHVILLE, TENNESSEE 37204-4505

NGTN-FMZ-ENV March 8, 2024

Mr. E. Patrick McIntyre, Jr.
Executive Director
Tennessee Historical Commission
2941 Lebanon Road
Nashville, TN 37243-0442

SHPO Project#: SHPO…..

Dear Mr. McIntyre Jr.,

The Tennessee Army National Guard (TNARNG) is requesting comments and/or feedback to the "DRAFT" Phase I Archaeological Survey of the TNARNG Portion of the Milan Army Ammunition Plant, at the Volunteer Training Site (VTS) Milan, Lavinia, Carroll & Gibson Counties, Tennessee (TN) from the Tennessee State Historic Preservation Office (TN-SHPO). The draft report has been electronically submitted through the Section 106 State Service Portal for all conservation parties involved.

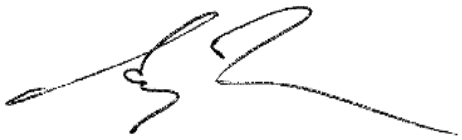
Under Section 110 of the National Historic Preservation Act (NHPA), the TNARNG is responsible for protection of historic properties and tasked to locate, inventory, and nominate all properties that may qualify for the National Register of Historic Places (NRHP). The TNARNG's cultural resources program has inserted within its management plan (2024-2028 Integrated Cultural Resource Management Plan-ICRMP) the proper standards to preserve and protect historic properties such as with these nearly acquired lands.

This project, using standard conventions for introductory archaeological investigations (Phase I, pedestrian survey, interval shovel testing, etc.), was to 1.) to locate any below grounds cultural materials if present, 2.) to nominate any discovered site for the NRHP and/or to propose further testing (such as Phase II's that include unit testing, etc.) to confirm eligibility potential. Simply put, this project was undertaken to ensure that any future training exercises or grounds disturbance activities would not pose a risk of an inadvertent discovery and that future training missions, and natural resource actions such as firebreaks, tree harvesting, etc. are scoped out appropriately.

The TNARNG has determined that no archaeological resources would be adversely affected as a result of this Phase I archaeological survey. The TNARNG consulted with the contracting agent (Brockington Cultural Resources Consulting) and is in concurrence that nineteen (19) of the recorded sites and the thirteen (13) isolated finds be considered NRHP-ineligible due to the low density of artifacts and overall level of disturbance. The TNARNG concurs that 40CL143 has potential NRHP-eligibility pending further investigations. Brockington also recorded seventeen (17) historic cemeteries. The TNARNG concurs with the recommendation to nominate three (3) as NRHP-eligible under Criterion C; Cemetery 4, 7, & 14. The TNARNG requests concurrence with this determination. The point of contact (POC) for this undertaking is

Cultural Resources Manager (CRM) Jonathan Guilford and who can receive comments at (615) 313-0768 or jonathan.r.guilford.nfg@army.mil

Sincerely,



Greg Turner
TNARNG Environmental Program Manager
CFMO Environmental Division

Agency Responses to Coordination Letters

From:	TN Help
To:	Guilford, Jonathan R NFG NG TNARNG (USA)
Subject:	TNARNG, VTS Milan Portion of the Milan Army Ammunition Plant - Project # SHPO0004647
Date:	Friday, March 22, 2024 2:39:17 PM
Attachments:	State Seal for TDEC.pngx patricksignature.pngx

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

2024-03-22 14:31:47 CDT

Mr. Jonathan Guilford
Tennessee Army National Guard (TNARNG)
jonathan.r.guilford.nfg@army.mil

RE: Department of Defense (DOD), TNARNG, VTS Milan Portion of the Milan Army Ammunition Plant, Project#: SHPO0004647, Lavinia, Carroll County, TN

Dear Mr. Jonathan Guilford:

We have reviewed the documents you submitted regarding your proposed undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act.

Our office concurs with your agency's eligibility determinations for the 21 archaeological sites investigated during the current survey. Site 40CL143 is potentially eligible and should be avoided by all ground-disturbing activities or subjected to additional archaeological investigation.

Our office requires additional information before we can determine the eligibility of the cemeteries as above-ground resources. Please address the following concerns:

There are issues with the evaluations of Criterion A, B, and C throughout the report. For Criterion A and B, the report usually states that there are no known associations with significant events or persons and therefore there is "no basis for evaluating the property under Criterion A or B." That does not make sense. If you have attempted research and found no significance then that IS the basis to evaluate the property under Criterion A and B with a finding that it is not eligible under those criteria. A lack of significance is a valid reason to argue a property is not eligible. Perhaps that is what they mean, but that is not how it is conveyed. For Criterion C, the report typically appears to rely on the idea of 'uniqueness' equaling significance. That does not follow

National Register guidelines. Criterion C requires something to be an important example of design, which could be that it is a great example of a typical resource of its age in its context. Uniqueness does not automatically make something eligible just as being 'common' does not make a resource automatically ineligible.

We require more information on Shiloh Baptist Church and Cemetery. Our office would like to see more information about the history for both the church and cemetery, as well as approximate percentages of how many graves are of historic age vs. those that are not, as well as how the historic and non-historic burials are generally arranged (is there a recognizable, defined historic section?). Did the cemetery function as a community cemetery or just for the congregation? Did the church play a role in the community, like for local events or just for use by the congregation? In addition, the evaluation for criteria C needs to be applied to the church as well. The Criterion C argument only discusses the design of the cemetery but contains no discussion about the church. The church appears to be have been altered so approximate dates for those alterations should be included.

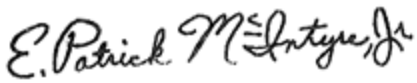
Our office would like similar additional information for the Hope Hill Cemetery (percentages of historic and non-historic graves, how they are arranged in terms of age) and more explanation of why this could not be eligible. It appears to be a community center for several early families. Is there a lack of integrity due to too many non-historic graves? The cemetery appears to have multiple examples of different grave marker styles, some quite ornate, so we would like additional explanation on why this could not qualify for Criterion C.

We require additional information for Hope Hill Cemetery 2. Does this cemetery have a direct connection with the other Hope Hill Cemetery? Was this the Black segregated counterpart to the Hope Hill Cemetery? Or were their names just derived from the road and they had no historic association?

For Other cemeteries that the report identified as eligible, our office is not convinced of the proposed significance. We think additional context specific to cemeteries in this area and explanations of why those cemeteries are important is needed. It is unclear the report's basis for saying that one cemetery is eligible while others are not. Some of the cemeteries appear similar with similar arguments used sometimes to justify eligibility and non-eligibility for others. The easiest way to address this question would be to simply add a context specific to cemeteries in this area with a comparative discussion of the cemeteries within this report to better show why some cemeteries rise to the level of National Register eligibility while others do not.

Upon receipt of this additional documentation, we will continue our review of this undertaking as quickly as possible. Please be advised that until this office has provided you a final written comment on this undertaking, you have not met your Section 106 obligation under federal law. Include the Project # when submitting additional information regarding this undertaking through the e106 system. Questions and comments may be directed to Casey Lee, who drafted this response, at Casey.Lee@tn.gov, +16152533163. We appreciate your cooperation.

Sincerely,



E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

Ref:MSG13060687_gJewPdyCXdN4WNJyRpU

From:	TN Help
To:	Guilford, Jonathan R NFG NG TNARNG (USA)
Subject:	TNARNG, VTS Milan Portion of the Milan Army Ammunition Plant - Project # SHPO0004647
Date:	Thursday, June 6, 2024 1:23:44 PM
Attachments:	image image

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

2024-06-06 13:20:11 CDT

Mr. Jonathan Guilford
Tennessee Army National Guard (TNARNG)
jonathan.r.guilford.nfg@army.mil

RE: Department of Defense (DOD), TNARNG, VTS Milan Portion of the Milan Army Ammunition Plant, Project#: SHPO0004647, Lavinia, Carroll County, Gibson County, TN

Dear Mr. Jonathan Guilford :

At your request, our office has reviewed the above-referenced cultural resources final report. This review is a requirement of Section 110 of the National Historic Preservation Act.

Based on the information provided, our office concurs with your agency's eligibility determinations for the 21 archaeological sites investigated during the current survey. Site 40CL143 is potentially eligible and should be avoided by all ground-disturbing activities or subjected to additional archaeological investigation. Further, we concur that an eligibility determination for the 17 cemeteries cannot be determined as further research is needed.

Your continued cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.

E. Patrick McIntyre, Jr.

Executive Director and
State Historic Preservation Officer

Ref:MSG14110930_9aKrWrBA0CZKADoq3i4

Reasonably Foreseeable Future Actions

The table below provides a list of the reasonably foreseeable future actions that could interact with the Proposed Action and that were considered when evaluating potential cumulative impacts of the action alternatives.

Table 3-3. Reasonably Foreseeable Future Actions

Project	Project Summary	Anticipated Implementation Date	Relationship to Proposed Action
TNARNG VTS- M Future Actions			
Expansion of the Cantonment Area at VTS-M	This project would include new construction and expansion with within the current Cantonment Area footprint at VTS-M.	FY31	Noise, air quality, water resources, earth resources, infrastructure, biological resources, cultural resources, socioeconomics
Construction and use of the ARF Range at VTS-M	This project would include tree and vegetation removal, construction, and use of an ARF Range at VTS-M, which is needed to rectify the ARRM shortage of this type of facility within TNARNG and address capability shortfalls in order to meet annual qualification requirements.	FY25-FY33	Noise, air quality, water resources, earth resources, infrastructure, biological resources, cultural resources, socioeconomics
Construction and use of the Zero Range at VTS-M	This project would include tree and vegetation removal, conversion of existing infostructure, and use of a Zero Range at VTS-M, which is needed to rectify the ARRM shortage of this type of facility within TNARNG and ensure vehicle crews have the ability to maneuver and train to complete METL tasks.	FY25-FY33	Noise, air quality, water resources, earth resources, infrastructure, biological resources, cultural resources, socioeconomics
Construction and use of the MPTR at VTS-M	This project would include construction and use of a MPTR at VTS-M, which is needed to rectify the shortage of this type of facility within the TNARNG.	FY35	Noise, air quality, water resources, earth resources, infrastructure, biological resources, cultural resources, socioeconomics
Construction and use of the MPMG Range at VTS-M	This project would include construction and use of a MPMG Range at VTS-M, which is needed to rectify the shortage of this type of facility within the TNARNG.	FY34	Noise, air quality, water resources, earth resources, infrastructure, biological resources, cultural resources, socioeconomics

Project	Project Summary	Anticipated Implementation Date	Relationship to Proposed Action
Other Agencies Future Actions			
Hazelwood Subdivision Ennis and North Main, Milan	Construction of a new subdivision near Ennis and North Main Streets in Milan, TN.	2025	Noise, air quality, water resources, earth resources, infrastructure, biological resources, cultural resources, socioeconomics
Minor Subdivision on Oakwood Drive, Milan	Construction of a new subdivision on Oakwood Drive in Milan, TN.	2025	Noise, air quality, water resources, earth resources, infrastructure, biological resources, cultural resources, socioeconomics
Milan Special School District New Alternative School	Construction and operation of a new alternative school within the Milan Special School District.	2025	Noise, air quality, water resources, earth resources, infrastructure, biological resources, cultural resources, socioeconomics
INTOCAST US Operation at Huntingdon Industrial Park South in Huntingdon, TN (Carroll County)	Construction and operation of a factory at the Huntingdon Industrial Park South to manufacture magnesia-carbon refractories and materials to support INTOCAST's U.S. market.	July 2024	Noise, air quality, water resources, earth resources, infrastructure, biological resources, cultural resources, socioeconomics, health and safety

VTS-M – Volunteer Training Site – Milan; **ARF** – Automated Record Fire; **ARRM** – Army Range Requirements Model; **METL** – Mission Essential Task List; **MPTR** – Multipurpose Training Range; **TNARNG** – Tennessee Army National Guard; **MPMG** – Multipurpose Machine Gun Range; **TN** – Tennessee

Notice of Availability

Final Environmental Assessment and Draft Finding of No Significant Impact

DEPARTMENTS OF THE ARMY AND AIR FORCE
JOINT FORCE HEADQUARTERS
TENNESSEE NATIONAL GUARD
HOUSTON BARRACKS, PO BOX 41502
NASHVILLE, TENNESSEE 37204-1502

12 July 2024

NGTN-FMZ-ENV

Katie Hollandsworth
Library Director
Mildred G. Fields Memorial Library
1075-A East Van Hook St.
Milan, TN 38358

Re: Draft Environmental Assessment (EA) for Tennessee Army National Guard (TNARNG) Volunteer Training Site – Milan (VTS-M) Expansion, Range Construction, and Training Activities Carroll and Gibson Counties, Tennessee

Dear Ms. Hollandsworth

Please find attached the Final Environmental Assessment (EA) and Draft Finding of No Significant. Impact (FNSI) that identify and evaluate potential environmental impacts associated with the proposed Volunteer Training Site – Milan (VTS-M), Tennessee expansion, range construction, and heavy and light maneuver training activities. In accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality regulations implementing NEPA, TNARNG requests that libraries file this document for public access and reference. Please maintain this document for public access for 15 days. An electronic copy for the Draft EA and proposed FONSI is available at: https://www.tn.gov/military/who-we-are/state-administration military/environmental.html.

TNARNG is soliciting comments from interested local, state, and federal elected officials and agencies, as well as interested members of the public. Although comments can be submitted to the TNARNG at any time during the EA process, comments are requested by 31 July 2024 to ensure full consideration in the process. The public comment period for this Draft EA will be from 16 July through 31 July 2024. Please send your written comments via e-mail to Mr. Gregory Turner at gregory.m.turner.nfg@army.mil.

TURNER.GREGORY.MATTHEW.1105989861
Digitally signed by TURNER.GREGORY.MATTHEW.1105989861
Date: 2024.07.12 09:34:28 -05'00'

GREGORY M. TURNER
Environmental Program Manager
Tennessee Army National Guard

DEPARTMENTS OF THE ARMY AND AIR FORCE
JOINT FORCE HEADQUARTERS
TENNESSEE NATIONAL GUARD
HOUSTON BARRACKS, PO BOX 41502
NASHVILLE, TENNESSEE 37204-1502

12 July 2024

MEMORANDUM FOR ALL INTERESTED GOVERNMENT AGENCIES, PUBLIC OFFICIALS, ORGANIZATIONS, AND INDIVIDUAL PARTIES

FROM: Tennessee Army National Guard
Joint Force Headquarters
Nashville, TN 37204

SUBJECT: Final Environmental Assessment (EA) and Draft Finding of No Significant Impact (FNSI) for Tennessee Army National Guard (TNARNG) Volunteer Training Site – Milan (VTS-M) Expansion, Range Construction, and Training Activities Carroll and Gibson Counties, Tennessee

1. As public and agency notification, to comply with the National Environmental Policy Act (NEPA) of 1969, and the President's Council on Environmental Quality's implementing regulations, this memorandum announces the availability of the Draft EA and proposed FONSI/ FONPA for TNARNG Heavy and Light Maneuver Training at the VTS-M, Tennessee.

2. This Final EA and Draft FNSI are available for review at: https://www.tn.gov/military/who-we-are/state-administration-military/environmental.html and at the Mildred G. Fields Memorial Library located at 1075-A E Van Hook St, Milan, TN 38358.

3. TNARNG currently operates a 2,479.72-acre training area at Milan. Under the Proposed Action, the TNARNG proposes to develop the approximately 16,000 acres of VTS-M lands received through the divesture of the Milan Army Ammunition Plant for maneuver of military force training to build and sustain operational readiness for TNARNG units. Components of the Proposed Action include training operations, maneuver exercises, small-arms training, use of smoke, aviation, and driving training, as well as infrastructure improvements and associated tree harvesting. TNARNG's intention is to develop and use the expanded installation to resolve shortfalls in light and heavy maneuver and live-fire weapons training and qualification opportunities in addition to its current uses. The existing training and qualification shortfalls subject soldiers and civilians to greater safety risks, and units to greater expense while traveling out of state to meet training and qualification requirements.

The purpose of the Proposed Action is to provide additional training land at VTS-M to allow for heavy and light maneuver training, including maneuver support, land augmentation, communications, unmanned aerial vehicle operations, air insertion, causality evacuation, and new live-fire capabilities training within proposed ranges, to TNARNG units within the state to better support TNARNG training requirements and mission. The proposed heavy and light maneuver training is needed because there is currently a deficit in training area lands available to train and qualify TNARNG units in heavy mounted and light maneuvers; there are no current

training areas in Tennessee capable of supporting the TNARNG's heavy and light maneuver training requirement.

Resource areas considered in the impact analysis for this EA are land use, air quality and climate change, noise, earth resources, water resources, biological resources, cultural resources, socioeconomics, infrastructure, and hazardous and toxic materials and wastes. This Draft EA concludes that there will be no significant adverse environmental impacts resulting from the Proposed Action.

4. The public comment period for Final EA and Draft FNSI will be from 16 July through 31 July 2024. Please send your written responses via e-mail to Mr. Gregory Turner at gregory.m.turner.nfg@army.mil.

TURNER.GREGORY.MATTHEW.1105989861
Digitally signed by TURNER.GREGORY.MATTHEW.1105989861
Date: 2024.07.12 09:24:28 -05'00'

GREGORY M. TURNER
Environmental Program Manager
Tennessee Army National Guard

DEPARTMENTS OF THE ARMY AND AIR FORCE
JOINT FORCE HEADQUARTERS
TENNESSEE NATIONAL GUARD
HOUSTON BARRACKS, PO BOX 41502
NASHVILLE, TENNESSEE 37204-1502

12 July 2024

NGTN-FMZ-ENV

Governor John Raymond Johnson
Absentee Shawnee Tribe of Oklahoma
2025 S. Gordon Cooper Drive
Shawnee OK 74801

Also submitted via email to Ms. Devon Frazier at 106NAGPRA@astrube.com and dfrazier@astribe.com.

Dear Governor Johnson

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GREGORY M. TURNER
Environmental Program Manager
Tennessee Army National Guard

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NGTN-FMZ-ENV 12 July 2024

Governor Bill Anoatubby
Chickasaw Nation of Oklahoma
P.O. Box 1548
Ada OK 74821-1548

Also submitted via email to Ms. Karen Brunso at karen.brunso@chickasaw.net; Ms. Virginia Nail at gingy.nail@chickasaw.net; Autumn Gorrell at autumn.gorrell@chickasaw.net, and Mr. Kirk Perry at kirk.perry@chickasaw.net.

Dear Governor Anoatubby

In August 2023, the Tennessee Army National Guard (TNARNG) provided you with a letter initiating government-to-government consultation and briefly describing the TNARNG's proposal to develop the approximately 16,000 acres of Volunteer Training Site – Milan (VTS-M) lands received through the divesture of the Milan Army Ammunition Plant for maneuver of military force training to build and sustain operational readiness for TNARNG units. Attached as notification, to comply with the National Environmental Policy Act of 1969 (NEPA), the President's Council on Environmental Quality's implementing regulations, and the National Historic Preservation Act and its implementing regulations, is the Draft Environmental Assessment (EA) for Tennessee Army National Guard Volunteer Training Site Milan Expansion, Range Construction, and Training Activities in Carroll and Gibson Counties, Tennessee. This Draft EA is available for review at https://www.tn.gov/military/who-we-are/state-administration-military/environmental.html and at the Mildred G. Fields Memorial Library located at 1075-A E Van Hook St, Milan, TN 38358.

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GREGORY M. TURNER
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Tennessee Army National Guard

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NGTN-FMZ-ENV 12 July 2024

Chairman Jonathan Cernek
Coushatta Tribe of Louisiana
P.O. Box 10
Elton LA 70532

Also submitted via email to Mr. Kristian Poncho at kponcho@coushatta.org.

Dear Chairman Cernek

In August 2023, the Tennessee Army National Guard (TNARNG) provided you with a letter initiating government-to-government consultation and briefly describing the TNARNG's proposal to develop the approximately 16,000 acres of Volunteer Training Site – Milan (VTS-M) lands received through the divesture of the Milan Army Ammunition Plant for maneuver of military force training to build and sustain operational readiness for TNARNG units. Attached as notification, to comply with the National Environmental Policy Act of 1969 (NEPA), the President's Council on Environmental Quality's implementing regulations, and the National Historic Preservation Act and its implementing regulations, is the Draft Environmental Assessment (EA) for Tennessee Army National Guard Volunteer Training Site Milan Expansion, Range Construction, and Training Activities in Carroll and Gibson Counties, Tennessee. This Draft EA is available for review at https://www.tn.gov/military/who-we-are/state-administration-military/environmental.html and at the Mildred G. Fields Memorial Library located at 1075-A E Van Hook St, Milan, TN 38358.

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NGTN-FMZ-ENV 12 July 2024

Chief Glenna Wallace
Eastern Shawnee Tribe of Oklahoma
P.O. Box 350
Seneca MP 64865

Also submitted via email to Ms. Lora Nuckolls at lnuckolls@estoo.net.

Dear Chief Wallace

In August 2023, the Tennessee Army National Guard (TNARNG) provided you with a letter initiating government-to-government consultation and briefly describing the TNARNG's proposal to develop the approximately 16,000 acres of Volunteer Training Site – Milan (VTS-M) lands received through the divesture of the Milan Army Ammunition Plant for maneuver of military force training to build and sustain operational readiness for TNARNG units. Attached as notification, to comply with the National Environmental Policy Act of 1969 (NEPA), the President's Council on Environmental Quality's implementing regulations, and the National Historic Preservation Act and its implementing regulations, is the Draft Environmental Assessment (EA) for Tennessee Army National Guard Volunteer Training Site Milan Expansion, Range Construction, and Training Activities in Carroll and Gibson Counties, Tennessee. This Draft EA is available for review at https://www.tn.gov/military/who-we-are/state-administration-military/environmental.html and at the Mildred G. Fields Memorial Library located at 1075-A E Van Hook St, Milan, TN 38358.

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Tennessee Army National Guard

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NGTN-FMZ-ENV 12 July 2024

Mrs. Johnna Flynn
Tribal Historic Preservation Officer
Jena Band of Choctaw Indians

Submitted via email to Ms. Johnna Flynn at jflynn@jenachoctaw.org.

Dear Mrs. Flynn

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NGTN-FMZ-ENV 12 July 2024

Chief Joe Bunch
United Keetoowah Band of Cherokee Indians
P.O. Box 746
Tahlequah OK 74464

Also submitted via email to Mr. Roger Cain at rcain@ukb-nsn.gov.

Dear Chief Bunch

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GREGORY M. TURNER
Environmental Program Manager
Tennessee Army National Guard

Newspaper
Notice of Availability

Final Environmental Assessment and Draft Finding of No Significant Impact

Notice of Availability

Final Environmental Assessment and Draft Finding of No Significant Impact for Tennessee Army National Guard Volunteer Training Site Milan Expansion, Range Construction, and Training Activities Carroll and Gibson Counties, Tennessee

A Final Environmental Assessment (EA) and Draft Finding of No Significant Impact (FNSI) have been prepared by the Tennessee Army National Guard (TNARNG) to identify and evaluate potential environmental impacts associated with the proposed Volunteer Training Site – Milan (VTS-M), Tennessee expansion, range construction, and heavy and light maneuver training activities. TNARNG currently operates a 2,479.72-acre training area at Milan. Under the Proposed Action, the TNARNG proposes to develop the approximately 16,000 acres of VTS-M lands received through the divesture of the Milan Army Ammunition Plant for maneuver of military force training to build and sustain operational readiness for TNARNG units. Components of the Proposed Action include training operations, maneuver exercises, small-arms training, use of smoke, aviation, and driving training, as well as infrastructure improvements and associated tree harvesting. TNARNG's intention is to develop and use the expanded installation to resolve shortfalls in light and heavy maneuver and live-fire weapons training and qualification opportunities in addition to its current uses. The existing training and qualification shortfalls subject soldiers and civilians to greater safety risks, and units to greater expense while traveling out of state to meet training and qualification requirements.

TNARNG invites the public to provide comments on the Final EA and Draft FNSI. The Final EA and Draft FNSI are available for review at: https://www.tn.gov/military/who-we-are/state-administration military/environmental.html and at the Mildred G. Fields Memorial Library located at 1075-A E Van Hook St, Milan, TN 38358.

The public comment period for the Final EA and Draft FNSI will be from 16 July through 31 July 2024. Please send your written comments via e-mail to Mr. Gregory Turner at gregory.m.turner.nfg@army.mil. For further information, contact Mr. Turner at (615) 313-0765.

Appendix B

Supporting National Policy Act Documentation

FORMAT PAGE

EPA EJScreen Community Report

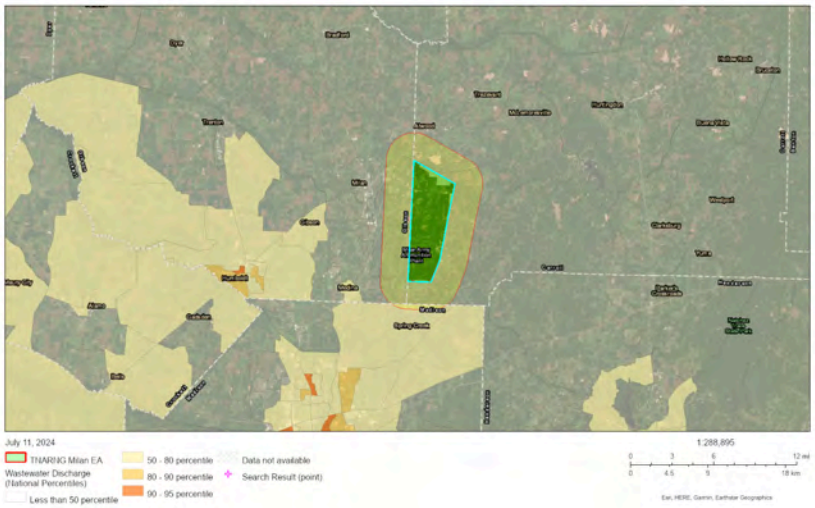
Tennessee Army National Guard
Volunteer Training Site Milan

EJScreen Community Report

This report provides environmental and socioeconomic information for user-defined areas, and combines that data into environmental justice and supplemental indexes.

Carroll County, TN

2 miles Ring around the Area
Population: 1,423
Area in square miles: 74.94



LANGUAGES SPOKEN AT HOME

LANGUAGE	PERCENT
English	97%
Spanish	3%
Total Non-English	3%

COMMUNITY INFORMATION

- Low income: 35 percent
- People of color: 16 percent
- Less than high school education: 10 percent
- Limited English households: 0 percent
- Unemployment: 5 percent
- Persons with disabilities: 23 percent
- Male: 52 percent
- Female: 48 percent
- 75 years — Average life expectancy
- N/A — Per capita income
- Number of households: 627
- Owner occupied: 88 percent

BREAKDOWN BY RACE

- White: 84%
- Black: 6%
- American Indian: 0%
- Asian: 1%
- Hawaiian/Pacific Islander: 0%
- Other race: 0%
- Two or more races: 5%
- Hispanic: 5%

BREAKDOWN BY AGE

From Ages 1 to 4	5%
From Ages 1 to 18	23%
From Ages 18 and up	77%
From Ages 65 and up	19%

LIMITED ENGLISH SPEAKING BREAKDOWN

Speak Spanish	0%
Speak Other Indo-European Languages	0%
Speak Asian-Paci c Island Languages	0%
Speak Other Languages	0%

Notes: Numbers may not sum to totals due to rounding. Hispanic population can be of any race.
Source: U.S. Census Bureau, American Community Survey (ACS) 2018-2022. Life expectancy data comes from the Centers for Disease Control.

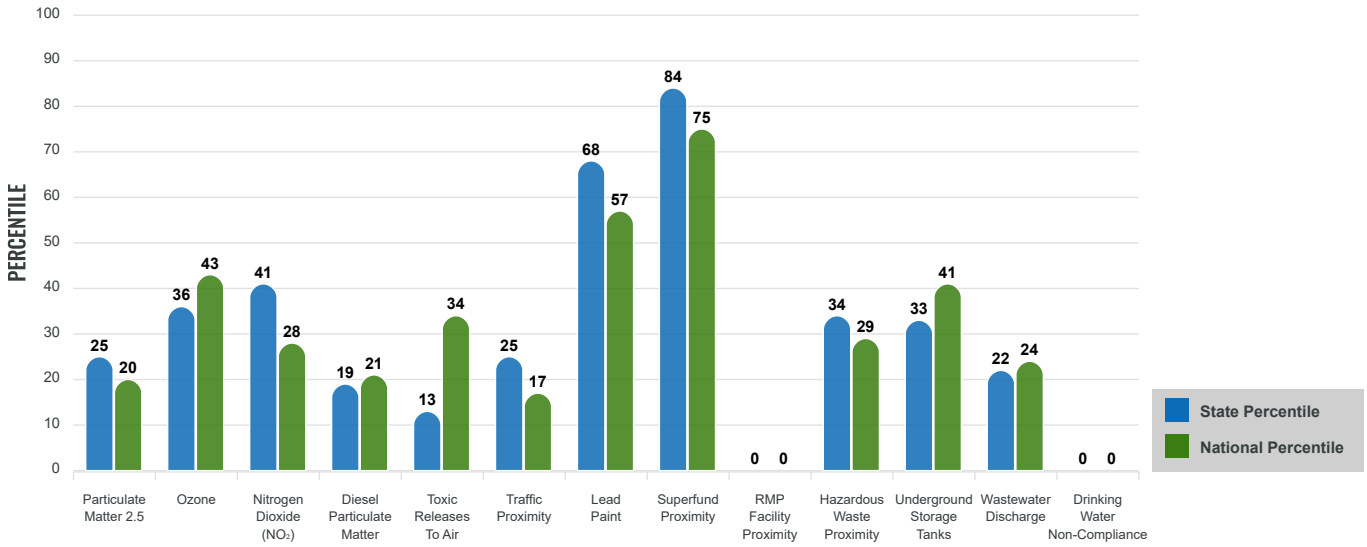
Environmental Justice & Supplemental Indexes

The environmental justice and supplemental indexes are a combination of environmental and socioeconomic information. There are thirteen EJ indexes and supplemental indexes in EJScreen re ecting the 13 environmental indicators. The indexes for a selected area are compared to those for all other locations in the state or nation. For more information and calculation details on the EJ and supplemental indexes, please visit the EJScreen website.

EJ INDEXES

The EJ indexes help users screen for potential EJ concerns. To do this, the EJ index combines data on low income and people of color populations with a single environmental indicator.

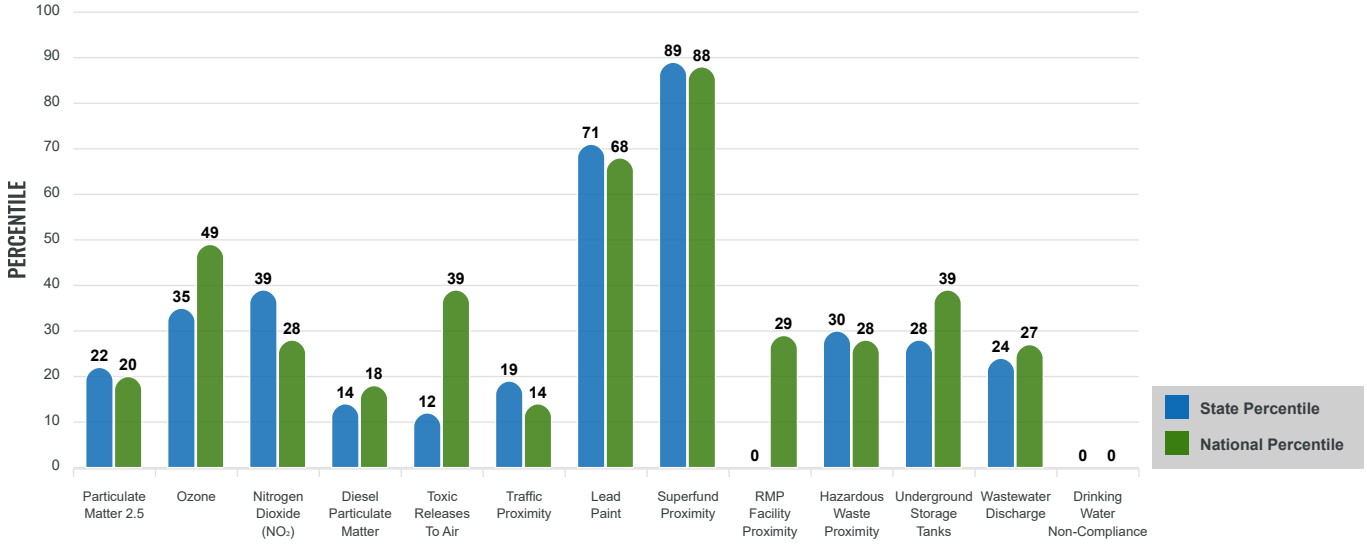
EJ INDEXES FOR THE SELECTED LOCATION



SUPPLEMENTAL INDEXES

The supplemental indexes offer a different perspective on community-level vulnerability. They combine data on percent low-income, percent linguistically isolated, percent less than high school education, percent unemployed, and low life expectancy with a single environmental indicator.

SUPPLEMENTAL INDEXES FOR THE SELECTED LOCATION



These percentiles provide perspective on how the selected block group or buffer area compares to the entire state or nation.

Report for 2 miles Ring around the Area

EJScreen Environmental and Socioeconomic Indicators Data

SELECTED VARIABLES	VALUE	STATE AVERAGE	PERCENTILE IN STATE	USA AVERAGE	PERCENTILE IN USA
ENVIRONMENTAL BURDEN INDICATORS					
Particulate Matter 2.5 ($\mu g/m^3$)	6.7	7.52	19	8.45	13
Ozone (ppb)	38.3	39	25	41	34
Nitrogen Dioxide (NO_2) (ppbv)	4.6	6.1	29	7.8	19
Diesel Particulate Matter ($\mu g/m^3$)	0.0648	0.156	13	0.191	14
Toxic Releases to Air (toxicity-weighted concentration)	150	5,300	9	4,600	28
Tra c Proximity (daily tra c count/distance to road)	44,000	590,000	17	1,700,000	11
Lead Paint (% Pre-1960 Housing)	0.24	0.21	69	0.3	53
Superfund Proximity (site count/km distance)	0.47	0.16	92	0.39	83
RMP Facility Proximity (facility count/km distance)	0.036	0.45	0	0.57	0
Hazardous Waste Proximity (facility count/km distance)	0.12	1.4	23	3.5	19
Underground Storage Tanks (count/km^2)	0.072	1.3	26	3.6	32
Wastewater Discharge (toxicity-weighted concentration/m distance)	41	810	71	700000	48
Drinking Water Non-Compliance (points)	0.037	1.3	0	2.2	0
SOCIOECONOMIC INDICATORS					
Demographic Index USA	1.07	N/A	N/A	1.34	46
Supplemental Demographic Index USA	1.97	N/A	N/A	1.64	72
Demographic Index State	1.12	1.32	50	N/A	N/A
Supplemental Demographic Index State	1.68	1.6	56	N/A	N/A
People of Color	16%	28%	49	40%	31
Low Income	35%	35%	53	30%	63
Unemployment Rate	5%	6%	59	6%	57
Limited English Speaking Households	0%	2%	0	5%	0
Less Than High School Education	10%	12%	53	11%	60
Under Age 5	5%	6%	56	5%	56
Over Age 64	19%	18%	61	18%	63

*Diesel particulate matter index is from the EPA's Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

Sites reporting to EPA within defined area:

Superfund 1
Hazardous Waste, Treatment, Storage, and Disposal Facilities 1
Water Dischargers 11
Air Pollution 3
Brown elds 0
Toxic Release Inventory 4

Other community features within defined area:

Schools 0
Hospitals 0
Places of Worship 12

Other environmental data:

Air Non-attainment ..... No
Impaired Waters ..... Yes

Selected location contains American Indian Reservation Lands* ..... No
Selected location contains a "Justice40 (CEJST)" disadvantaged community ..... Yes
Selected location contains an EPA IRA disadvantaged community ..... Yes

Report for 2 miles Ring around the Area

EJScreen Environmental and Socioeconomic Indicators Data

HEALTH INDICATORS

INDICATOR	VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Low Life Expectancy	24%	22%	62	20%	85
Heart Disease	7.4	6.7	63	5.8	82
Asthma	10.7	10.9	43	10.3	62
Cancer	7.4	6.7	62	6.4	68
Persons with Disabilities	20.7%	16.1%	75	13.7%	87

CLIMATE INDICATORS

INDICATOR	VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Flood Risk	7%	11%	40	12%	54
Wild re Risk	0%	3%	0	14%	0

CRITICAL SERVICE GAPS

INDICATOR	VALUE	STATE AVERAGE	STATE PERCENTILE	US AVERAGE	US PERCENTILE
Broadband Internet	18%	16%	64	13%	74
Lack of Health Insurance	9%	11%	46	9%	64
Housing Burden	No	N/A	N/A	N/A	N/A
Transportation Access Burden	Yes	N/A	N/A	N/A	N/A
Food Desert	No	N/A	N/A	N/A	N/A

Report for 2 miles Ring around the Area

Report produced July 11, 2024 using EJScreen Version 2.3

EPA Simplified GHG Emissions Calculator ("the Calculator") April 2024

Tennessee Army National Guard Volunteer Training Site Milan - GHG Emissions Data

EPA Simplified GHG Emissions Calculator ("the Calculator")

April 2024

The EPA Simplified GHG Emissions Calculator ("the Calculator") is designed as a simplified calculation tool to help organizations estimate and inventory their annual greenhouse gas (GHG) emissions for US-based operations. All methodologies and default values provided are based on the most current Center for Corporate Climate Leadership Greenhouse *Gas Inventory Guidance Documents* and the *Emission Factors Hub* . The Calculator will quantify the direct and indirect emissions from sources at an organization when activity data are entered into the various sections of the workbook for one annual period.

Before entering data, please: 1) Enable Macros and 2) Familiarize yourself with the S*implified Guide to GHG Management for Organizations.*

Access the guide: https://www.epa.gov/system/files/documents/2022-09/Simplified_Guide_GHG_Management_Organizations.pdf

The simplified guide presents more details and information covered in the calculator; please check the guide for more info if you have questions

There are three primary steps in completing a GHG inventory. Each emissions source also has these three steps.

(1) **DEFINE**: The first step in completing a GHG inventory is to determine the boundaries and emissions sources included within those boundaries. After you have defined your organizational and operational boundaries, you can use the questions on the "Boundary Questions" worksheet to help you determine which emissions sources are relevant to your business.

Go to Boundary Questions

(2) **COLLECT**: The second step is to collect data for the defined annual period. This step is typically the most time consuming, since the data can be difficult to gather. This Calculator has help sheets with suggestions and guidance for each emissions source and a general help sheet for data management. **Click the drop down menu boxes below to navigate to these sheets**.

Help - Market-Based Method

(3) **QUANTIFY**: The third step is to calculate emissions. This Calculator is designed to complete the emissions quantification step for you. Once the user enters data in this MS Excel spreadsheet, the emissions will be calculated and totaled on the "Summary" sheet.

Calculator Guidance - Important Information

(A) Navigate to the data entry sheets using the drop down menu in the dark grey cell below and then clicking on the "Go To Data Entry Sheet" button. On the data entry sheets enter data in ORANGE cells only.

(B) This Calculator has several "Tool Sheets" with useful reference data such as unit conversions, heat contents, and emission factors. Click on the buttons below to go to the appropriate Tool Sheet.

(C) Data must be entered in the units specified on the data entry sheets. Use the "Unit Conversions" or "Heat Content" sheets if unit conversion is necessary prior to entering data into the Calculator.

(D) If more guidance is needed, you can reference the emission factor data sources found on the "Emission Factors" sheet.

Tool Sheets	Quick Data Entry Navigation
Unit Conversions	Stationary Combustion
Heat Content	
Emission Factors	

Calculator Notes

Emission sources of all seven major GHGs are accounted for in the inventory and in this Calculator: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3). The Calculator allows the user to estimate GHG emissions from scope 1 (direct), scope 2 (indirect), and some scope 3 (other indirect) sources.

The Calculator uses U.S.-specific cross-sector emission factors from the *Emission Factors Hub* . Many industrial sectors also have process-related emissions sources that are specific to their sector. EPA's Greenhouse Gas Reporting Program provides guidance and tools that can aid in the calculation and reporting of these emissions:

https://www.epa.gov/ghgreporting

The GHG Protocol also provides guidance on calculating emissions from industrial processes.

Back to Intro

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Operational Boundary Questions - Emissions Sources to Include

Guidance
Use the questions below to help you determine which emissions sources should be included in the inventory.

Emissions Source Questions
A typical office-based organization will likely have the following (scope 1 and scope 2) emissions sources:

- Stationary Combustion
- Refrigeration and AC
- Electricity

If you answer "yes" to a question below, that emissions source should be included in your inventory. For each facility within the defined organizational boundary, collect the necessary data for the selected time period. Use the corresponding Excel sheet to quantify these emissions.

Tip: you may need to ask your landlord about heating sources, steam purchased and refrigerants

Stationary Combustion	**Yes or No?**
Do you have facilities that burn fuels on-site (e.g., natural gas, propane, coal, fuel oil for heating, diesel fuel for backup generators, biomass fuels)?	Y
Mobile Sources	
Do any vehicles fall within your organizational boundary? This can include cars, trucks, propane forklifts, aircraft, boats. Only vehicles owned or leased by your organization should be included here.	Y
Refrigeration and Air Conditioning	
Do your facilities use refrigeration or air conditioning equipment?	Y
Fire Suppression	
Do your facilities use chemical fire suppressants?	N
Purchased Gases	
Do you purchase any industrial gases for use in your business? These gases may be purchased for use in manufacturing, testing, or laboratories.	N
Electricity	
Does your inventory include facilities that use electricity?	Y
Steam	
Market-Based Emission Factors (entered on Electricity and or Steam tabs)	
Do you purchase renewable energy certificates (RECs) or green power products? Do you purchase electricity through a power purchase agreement (PPA)? Do you have supplier-specific emission factors?	N

The questions below refer to scope 3 emissions sources and offsets. If you answer "yes" you may choose whether or not to include these emissions sources in your inventory. Use the corresponding sheet to enter data.

Business Travel	**Yes or No?**
Do your employees travel for business using transportation other than owned or leased vehicles (e.g., commercial airline flights, rental cars, trains)?	Y
Employee Commuting	
Do your employees commute to work in personal vehicles or use public transportation?	Y
Upstream Transportation and Distribution	
Do you hire another company to transport products or other materials to or from your	Y
Waste Generated in Operations	
Do you generate waste that is disposed of in a facility owned by another organization?	Y
Offsets	
Do you purchase greenhouse gas offsets?	N

Back to Intro

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Emissions Summary

Guidance

The total GHG emissions from each source category are provided below. You may also use this summary sheet to fill out the *Annual GHG Inventory Summary and Target Tracking Form* (.xls) as this Calculator only quantifies one year of emissions at a time. The form is available here: https://www.epa.gov/climateleadership/target-setting

By entering the data below into the appropriate cell of the *Annual GHG Inventory Summary and Target Tracking Form,* you will be able to compare multiple years of data.

If you have multiple Calculator files covering sub-sets of your inventory for a particular reporting period, sum each of the emission categories (e.g. Stationary Combustion) to an organizational total, which then can be entered into the *Annual GHG Inventory Summary and Target Tracking Form*.

(A) Enter organization information into the orange cells. Other cells on this sheet will be automatically calculated from the data entered in the sheets in this workbook. Blue cells indicate required emission sources if applicable. Green cells indicate scope 3 emission sources and offsets, which organizations may optionally include in its inventory.

(B) The "Go To Sheet" buttons can be used to navigate to the data entry sheets.

Organizational Information:

Organization Name:	TNARNG
Organization Address:	Milan, TN
Inventory Reporting Period:	2023
Start:	1/1/2023
End:	12/31/2023
Name of Preparer:	Greg Turner
Contact Information of Preparer:	gregory.m.turner.nfg@army.mil
Date Prepared:	6/5/2024

Scope 1 Emissions

		CO_2-e (metric tons)
Go To Sheet	Stationary Combustion	941
Go To Sheet	Mobile Sources	3,074
Go To Sheet	Refrigeration / AC Equipment Use	#N/A
Go To Sheet	Fire Suppression	0
Go To Sheet	Purchased Gases	0

	CO2-e (metric tons)		
	Gross	Offsets	Net
Scope 1 Summary	#N/A	0	#N/A

Scope 2 Emissions

	Location-Based Scope 2 Emissions	CO_2-e (metric tons)
Go To Sheet	Purchased and Consumed Electricity	2,485
Go To Sheet	Purchased and Consumed Steam	0

	CO_2-e (metric tons)		
	Gross	Offsets	Net
Location-Based Scope 2 Summary	2,485	0	2,485

	Market-Based Scope 2 Emissions	CO_2-e (metric tons)
Go To Sheet	Purchased and Consumed Electricity	2,485
Go To Sheet	Purchased and Consumed Steam	0

	CO_2-e (metric tons)		
	Gross	Offsets	Net
Market-Based Scope 2 Summary	2,485	0	2,485

Scope 1 & 2 Summary

	CO_2-e (metric tons)	
	Gross	Net
Total Scope 1 & Location-Based Scope 2	#N/A	#N/A
Total Scope 1 & Market-Based Scope 2	#N/A	#N/A

Scope 3 Emissions

		CO_2-e (metric tons)		
		Gross	Offsets	Net
Go To Sheet	Business Travel	0	0	0
Go To Sheet	Employee Commuting	34	0	34
Go To Sheet	Upstream Transportation and Distribution	0	0	0
Go To Sheet	Waste	1,052	0	1,052

Required Supplemental Information

		CO_2-e (metric tons)
Go To Sheet	Biomass CO_2 Emissions from Stationary Sources	0
Go To Sheet	Biomass CO_2 Emissions from Mobile Sources	0

Scope 1 Emissions from Stationary Combustion Sources

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Guidance

(A) Enter annual data for each combustion unit, facility, or site (by fuel type) in ORANGE cells on **Table 1**. Example entry is shown in first row (*GREEN Italics*).
- Select "Fuel Combusted" from drop down box.
- Enter "Quantity Combusted" and choose the appropriate units from the drop down box in the unit column. If it's necessary to convert units, common heat contents can be found on the "Heat Content" sheet and unit conversions on the "Unit Conversion" sheet.

(B) If fuel is consumed in a facility but stationary fuel consumption data are not available, an estimate should be made for completeness. See the "Items to Note" section of the Help sheet for suggested estimation approaches.

(C) Biomass CO_2 emissions are not reported in the total emissions, but are reported separately at the bottom of the sheet.

Table 1. Stationary Source Fuel Combustion

Source ID	Source Description	Source Area (sq ft)	Fuel Combusted	Fuel State (solid, liquid, gas)	Quantity Combusted	Units
BLR-012	*East Power Plant*	*12,517*	*Natural Gas*	*Gas*	*10,000*	*MMBtu*
47545	VTS Milan, facility natural gas use	1,958,149	Natural Gas	Gas	178,497	Therm
47545	VTS Milan, Boiler	56,000	Natural Gas	Gas	15	Therm

GHG Emissions

Total Organization-Wide Stationary Source Combustion by Fuel Type

Fuel Type	Quantity Combusted	Units
Coal and Coke - Solid		
Sub-bituminous Coal	0	short ton
Lignite Coal	0	short ton
Mixed (Commercial Sector)	0	short ton
Mixed (Electric Power Sector)	0	short ton
Mixed (Industrial Coking)	0	short ton
Mixed (Industrial Sector)	0	short ton
Coal Coke	0	short ton
Other Fuels - Solid		
Municipal Solid Waste	0	short ton
Petroleum Coke (Solid)	0	short ton
Plastics	0	short ton
Tires	0	short ton
Biomass Fuels - Solid		
Agricultural Byproducts	0	short ton
Peat	0	short ton
Solid Byproducts	0	short ton
Wood and Wood Residuals	0	short ton
Gaseous Fuels		
Natural Gas	17,260,659	scf
Propane Gas	0	scf
Landfill Gas	0	scf
Petroleum Products		
Distillate Fuel Oil No. 2	0	gallons
Residual Fuel Oil No. 6	0	gallons
Kerosene	0	gallons
Liquefied Petroleum Gases (LPG)	0	gallons
Biomass Fuels - Liquid		
Biodiesel (100%)	0	gallons
Ethanol (100%)	0	gallons
Rendered Animal Fat	0	gallons
Vegetable Oil	0	gallons

Total Organization-Wide CO_2, CH_4 and N_2O Emissions from Stationary Source Fuel Combustion

Fuel Type	CO_2 (kg)	CH_4 (g)	N_2O (g)
Coal and Coke - Solid			
Mixed (Commercial Sector)	0	0.0	0.0
Mixed (Electric Power Sector)	0	0.0	0.0
Mixed (Industrial Coking)	0	0.0	0.0
Mixed (Industrial Sector)	0	0.0	0.0
Coal Coke	0	0.0	0.0
Other Fuels - Solid			
Municipal Solid Waste	0	0.0	0.0
Petroleum Coke (Solid)	0	0.0	0.0
Plastics	0	0.0	0.0
Tires	0	0.0	0.0
Gaseous Fuels			
Natural Gas	939,670	17,778.5	1,726.1
Propane Gas	0	0.0	0.0
Landfill Gas	0	0.0	0.0
Petroleum Products			
Distillate Fuel Oil No. 2	0	0.0	0.0
Residual Fuel Oil No. 6	0	0.0	0.0
Kerosene	0	0.0	0.0
Liquefied Petroleum Gases (LPG)	0	0.0	0.0
Total Fossil Fuel Emissions	**939,670**	**17,778.5**	**1,726.1**
Biomass Fuels - Solid			
Agricultural Byproducts	0	0.0	0.0
Peat	0	0.0	0.0
Solid Byproducts	0	0.0	0.0
Wood and Wood Residuals	0	0.0	0.0
Biomass Fuels - Liquid			
Biodiesel (100%)	0	0.0	0.0
Ethanol (100%)	0	0.0	0.0
Rendered Animal Fat	0	0.0	0.0
Vegetable Oil	0	0.0	0.0
Total Non-Fossil Fuel Emissions	**0**	**0.0**	**0.0**
Total Emissions for all Fuels	**939,670**	**17,778.5**	**1,726.1**

Total CO_2 Equivalent Emissions (metric tons) - Stationary Combustion	**940.6**
Total Biomass CO_2 Equivalent Emissions (metric tons) - Stationary Combustion	**0.0**

Scope 1 Emissions from Mobile Sources

Guidance

(A) Enter annual data for each vehicle or group of vehicles (grouped by vehicle type, vehicle year, and fuel type) in ORANGE cells in **Table 1** (Example entry is shown in first row of DATA Table 1). Only enter vehicles owned or leased by your organization on this sheet. All other vehicles (such as employee commuting or business travel) is considered a scope 3 emissions source and should be reported in the corresponding scope 3 sheets.
- *Note: The latest mobile combustion factors reflect year 2021 data. Therefore, for all vehicle model years 2022 onward, the 2021 year factor is used.*
- Select "On-Road" or "Non-Road" from the drop down box to determine the Vehicle Types available. You ***must make this selection before picking the vehicle type.***
- Select "Vehicle Type" from drop down box (closest type available).
- Enter Fuel Usage (if mileage is known, select "Miles" from the Units box to be selected).
- If mileage or fuel usage is unknown, estimate using approximate fuel economy values from the manufacturer, www.fueleconomy.gov, or the Reference Table below.
- Vehicle year and Miles traveled are not necessary for non-road equipment.

(B) When using biofuels, typically the biofuel (biodiesel or ethanol) is mixed with a petroleum fuel (diesel or gasoline) for use in vehicles. Enter the biodiesel and ethanol percentages of the fuel if known, or leave default values shown below.

Biodiesel Percent:	20	%
Ethanol Percent:	85	%

(C) Biomass CO_2 emissions from biodiesel and ethanol are not reported in the total emissions, but are reported separately at the bottom of the sheet.

Table 1. Mobile Source Fuel Combustion and Miles Traveled

Source ID	Source Description	On-Road or Non-Road?	Vehicle Type	Vehicle Year	Fuel Usage	Units	Miles Traveled
Example	*GC Forklift*	*NonRoad*	*Passenger Cars - Gasoline*	*2019*		*gal*	*10,000*
TMWIN2	M1 ABRAMS	NonRoad	Industrial/Commercial Equipment - Diesel		28,650	gal	100
TMWIN2	M2 BRADLEY	NonRoad	Industrial/Commercial Equipment - Diesel		19,750	gal	100
TMWIN2	M113 VARIANTS	NonRoad	Industrial/Commercial Equipment - Diesel		23,810	gal	100
TMWIN2	COMBAT ENGINEER VEH	NonRoad	Industrial/Commercial Equipment - Diesel		9,700	gal	100
TMWIN2	M88 ARLED VEHICLES	NonRoad	Industrial/Commercial Equipment - Diesel		14,550	gal	100
TMWIN2	M9 ACE	NonRoad	Industrial/Commercial Equipment - Diesel		9,400	gal	100
TMWIN2	M977 V	NonRoad	Industrial/Commercial Equipment - Diesel		7,680	gal	100
TMWIN2	HMMWV	NonRoad	Industrial/Commercial Equipment - Diesel		600	gal	100
TMWIN2	UH60	NonRoad	Aircraft - Jet Fuel		11,160	gal	100
TMWIN2	LUH72	NonRoad	Aircraft - Jet Fuel		600	gal	100

Reference Table: Average Fuel Economy by Vehicle Type

Vehicle Type	Average Fuel Economy (mpg)
Passenger Cars	29.8
Other 2-Axle, 4-Tire Vehicles	19.1
Motorcycles	44.0
Single-unit 2-Axle 6-Tire or More Trucks	7.0
Combination Trucks	6.9
Buses (Diesel Heavy-Duty Vehicles)	7.0

Average mpg values from the U.S. Department of Transportation, Federal Highway Administration, Highway Statistics 2022 (Updated February 2024), Table VM-1.

GHG Emissions

Total Organization-Wide Mobile Source Fuel Usage and CO_2 Emissions (On-Road and Off-Road Vehicles)

Fuel Type	Fuel Usage	Units	CO_2 (kg)
Motor Gasoline	0	gallons	0
Diesel Fuel	298,270	gallons	3,024,533
Residual Fuel Oil	0	gallons	0
Aviation Gasoline	0	gallons	0
Kerosene-Type Jet Fuel	0	gallons	0
Liquefied Petroleum Gases (LPG)	0	gallons	0
Ethanol	0	gallons	0
Biodiesel	0	gallons	0
Liquefied Natural Gas (LNG)	0	gallons	0
Compressed Natural Gas (CNG)	0	scf	0

Note: emissions here are only for the gasoline portion of the fuel. Biogenic CO_2 emissions are reported below

Note: emissions here are only for the diesel portion of the fuel. Biogenic CO_2 emissions are reported below

Total Organization-Wide On-Road Gasoline Mobile Source Mileage and CH_4/N_2O Emissions

Vehicle Type	Vehicle Year	Mileage (miles)	CH_4 (g)	N_2O (g)
Passenger Cars - Gasoline	1984-93	0	0.0	0.0
	1983	0	0.0	0.0
	1985	0	0.0	0.0
	1986	0	0.0	0.0
	1987	0	0.0	0.0
	1988	0	0.0	0.0
	1989	0	0.0	0.0
	1990	0	0.0	0.0
	1991	0	0.0	0.0
	2002	0	0.0	0.0
	2003	0	0.0	0.0
	2004	0	0.0	0.0
	2005	0	0.0	0.0
	2006	0	0.0	0.0
	2007	0	0.0	0.0
	2008	0	0.0	0.0
	2009	0	0.0	0.0
	2010	0	0.0	0.0
	2011	0	0.0	0.0
	2012	0	0.0	0.0
	2013	0	0.0	0.0
	2014	0	0.0	0.0
	2015	0	0.0	0.0
	2016	0	0.0	0.0
	2017	0	0.0	0.0
	2018	0	0.0	0.0
	2019	0	0.0	0.0
	2020	0	0.0	0.0
	2021	0	0.0	0.0
	2022	0	0.0	0.0
	2023	0	0.0	0.0
	2024	0	0.0	0.0
Light-Duty Trucks - Gasoline (Vans, Pickup Trucks, SUVs)	1987-93	0	0.0	0.0
	1994	0	0.0	0.0
	1995	0	0.0	0.0
	1996	0	0.0	0.0
	1997	0	0.0	0.0
	1998	0	0.0	0.0
	1999	0	0.0	0.0
	2000	0	0.0	0.0
	2001	0	0.0	0.0
	2002	0	0.0	0.0
	2003	0	0.0	0.0
	2004	0	0.0	0.0
	2005	0	0.0	0.0
	2006	0	0.0	0.0
	2007	0	0.0	0.0
	2008	0	0.0	0.0
	2009	0	0.0	0.0
	2010	0	0.0	0.0
	2011	0	0.0	0.0
	2012	0	0.0	0.0
	2013	0	0.0	0.0
	2014	0	0.0	0.0
	2015	0	0.0	0.0
	2016	0	0.0	0.0
	2017	0	0.0	0.0
	2018	0	0.0	0.0
	2019	0	0.0	0.0
	2020	0	0.0	0.0
	2021	0	0.0	0.0
	2022	0	0.0	0.0
	2023	0	0.0	0.0
	2024	0	0.0	0.0
Heavy-Duty Vehicles - Gasoline	1985-86	0	0.0	0.0
	1987	0	0.0	0.0
	1988-1989	0	0.0	0.0
	1990-1998	0	0.0	0.0
	1996	0	0.0	0.0
	1997	0	0.0	0.0
	1998	0	0.0	0.0
	1999	0	0.0	0.0
	2000	0	0.0	0.0
	2001	0	0.0	0.0
	2002	0	0.0	0.0
	2003	0	0.0	0.0
	2004	0	0.0	0.0
	2005	0	0.0	0.0
	2006	0	0.0	0.0
	2007	0	0.0	0.0
	2008	0	0.0	0.0
	2009	0	0.0	0.0
	2010	0	0.0	0.0
	2011	0	0.0	0.0
	2012	0	0.0	0.0
	2013	0	0.0	0.0
	2014	0	0.0	0.0
	2015	0	0.0	0.0
	2016	0	0.0	0.0
	2017	0	0.0	0.0
	2018	0	0.0	0.0
	2019	0	0.0	0.0
	2020	0	0.0	0.0
	2021	0	0.0	0.0
	2022	0	0.0	0.0
	2023	0	0.0	0.0
	2024	0	0.0	0.0
Motorcycles - Gasoline	1960-1996	0	0.0	0.0
	1998-2005	0	0.0	0.0
	2006-2024	0	0.0	0.0

Total Organization-Wide On-Road Non-Gasoline Mobile Source Mileage and CH_4/N_2O Emissions

Vehicle Type	Fuel Type	Vehicle Year	Mileage (miles)	CH_4 (g)	N_2O (g)
Passenger Cars - Diesel	Diesel	1960-1982	0	0.0	0.0
		1983-2006	0	0.0	0.0
		2007-2024	0	0.0	0.0
Light-Duty Trucks - Diesel	Diesel	1960-1982	0	0.0	0.0
		1983-2006	0	0.0	0.0
		2007-2024	0	0.0	0.0
Medium- and Heavy-Duty Vehicles	Diesel	1960-2006	0	0.0	0.0
		2007-2024	0	0.0	0.0
Light-Duty Cars	Methanol		0	0.0	0.0
	Ethanol		0	0.0	0.0
	LNG		0	0.0	0.0
	LPG		0	0.0	0.0
	Biodiesel		0	0.0	0.0
Light-Duty Trucks	Ethanol		0	0.0	0.0
	CNG		0	0.0	0.0
	LPG		0	0.0	0.0
	Methanol		0	0.0	0.0
Medium-Duty Trucks	CNG		0	0.0	0.0
	LPG		0	0.0	0.0
	LNG		0	0.0	0.0
	Biodiesel		0	0.0	0.0
Heavy-Duty Trucks	Methanol		0	0.0	0.0
	CNG		0	0.0	0.0
	LPG		0	0.0	0.0
	LNG		0	0.0	0.0
	Biodiesel		0	0.0	0.0
Buses	Methanol		0	0.0	0.0
	CNG		0	0.0	0.0
	LPG		0	0.0	0.0
	LNG		0	0.0	0.0
	Biodiesel		0	0.0	0.0

Total Organization-Wide Non-Road Mobile Source Fuel Usage and CH_4/N_2O Emissions

Vehicle Type	Fuel Type	Fuel Usage (gallons)	CH_4 (g)	N_2O (g)
Ships and Boats	Residual Fuel Oil	0	0.0	0.0
	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Diesel	0	0.0	0.0
Locomotives	Diesel	0	0.0	0.0
Aircraft	Jet Fuel	1,787.9	0.0	3,939.2
	Aviation Gasoline	0	0.0	0.0
Agricultural Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Gasoline Off-Road Trucks	0	0.0	0.0
	Diesel Equipment	0	0.0	0.0
	Diesel Off-Road Trucks	0	0.0	0.0
	LPG	0	0.0	0.0
Construction/Mining Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Gasoline Off-Road Trucks	0	0.0	0.0
	Diesel Equipment	0	0.0	0.0
	Diesel Off-Road Trucks	0	0.0	0.0
	LPG	0	0.0	0.0
Lawn and Garden Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Diesel	0	0.0	0.0
	LPG	0	0.0	0.0
Airport Equipment	Gasoline	0	0.0	0.0
	Diesel	0	0.0	0.0
	LPG	0	0.0	0.0
Industrial/Commercial Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	284,595	119886.8	17786.6
	Diesel	0	0.0	0.0
	LPG	0	0.0	0.0
Logging Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Diesel	0	0.0	0.0
Railroad Equipment	Gasoline	0	0.0	0.0
	Diesel	0	0.0	0.0
	LPG	0	0.0	0.0
Recreational Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Diesel	0	0.0	0.0
	LPG	0	0.0	0.0

Total CO_2 Equivalent Emissions (metric tons) - Mobile Sources	**3,024.5**
Total Biomass CO_2 Equivalent Emissions (metric tons) - Mobile Sources	**0.0**

Back to Intro | Back to Summary | Help

Scope 1 Emissions from Refrigeration and Air Conditioning Equipment

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Guidance

(A) HFC, PFC, CO_2, and SF_6 refrigerants from facilities and vehicles are required to be included in the GHG inventory. Ozone depleting substances, such as CFCs and HCFCs, are regulated internationally and are typically excluded from a GHG inventory or reported as a memo item.
(B) Select ONE of the three options with which to estimate emissions. Options range from most preferred method (Option 1) to least preferred method (Option 3). Limited data availability often makes Option 3 an appropriate choice. If Option 3 is used and emissions are determined to be significant when compared to other emission sources, consider using one of the other methods to calculate emissions more accurately.
(C) Enter annual data in ORANGE cells as appropriate for the selected option.

Option 1. Material Balance Method: Enter organization-wide total gases stored and transferred (by gas) in Table 1.
- Choose the appropriate gas from the Gas drop down menu.
- Inventory Change = difference of gas stored in inventory from beginning to end of reporting period.
  (Includes only gas stored on-site (i.e. cylinders) and not gas contained within equipment).
- Transferred Amount = gas purchased minus gas sold/disposed during reporting period.
  -- Gas purchased includes: Purchases for inventory, as part of equipment servicing (not from inventory), within purchased equipment, and gas returned to the site after off-site recycling.
  -- Gas sold/disposed includes: Returns to supplier, sales or disposals (including within equipment), and gas sent off-site for recycling, reclamation, or destruction.
- Capacity Change = capacity of all units at beginning minus capacity of all units at end of reporting period.
  (can be assumed to be capacity of retired units minus capacity of new units).

Table 1. Organization-Wide Refrigeration Gas CO_2 Equivalent Emissions - Material Balance

Gas	Gas GWP	Inventory Change (kg)	Transferred Amount (kg)	Capacity Change (kg)	CO_2 Equivalent Emissions (kg)
R-410A	1,924	0.0	0.0	0.0	0.0

Option 2. Material Balance Method (Simplified): Enter organization-wide total gases in units (by gas) in Table 2.
- Choose the appropriate gas from the drop down menu.
- New units are those installed during reporting period (do not include any data for new units pre-charged by supplier), disposed units were disposed of during the reporting period, and existing units are all others.
- Charge/Recharge = gas added to units by organization or a contractor (do not include pre-charge by manufacturer).
- Capacity = sum of the full capacity for all units (do not include new units pre-charged by manufacturer).
- Amount recovered = total gas recovered from all retired units.

Table 2. Organization-Wide Refrigeration Gas CO_2 Equivalent Emissions - Simplified Material Balance

Gas	Gas GWP	New Units		Existing Units	Disposed Units		CO_2 Equivalent
		Charge (kg)	Capacity (kg)	Recharge (kg)	Capacity (kg)	Recovered (kg)	Emissions (kg)

Option 3. Screening Method: Enter refrigerant information for each unit or group of units (by refrigerant) in **Table 3.**
- Select the "Type of Equipment" (closest available) and "Gas" from the drop down box.
- Enter amount of refrigerant added to new units by the organization (not pre-charged amount from manufacturer). This will be blank if no refrigerant is added to new units by the organization.
- Enter the Number of Months in Operation - this is the number of months in the year the unit was operating (from 0-12). For example, if the equipment was installed at the beginning of July, enter 6.
- Enter refrigerant capacity (by equipment type and refrigerant) for all units operating and disposed during reporting period.
  -- If data entered for multiple units, sum the capacities or charge quantity for all like units.
  -- If capacity of unit(s) is not known, use upper value of default capacity provided in the **Reference Table** below.
  -- If no units are disposed, Disposed Units will be blank
- See example entry in first row (*GREEN Italics*).

Table 3. Source Level Refrigeration Gas CO_2 Equivalent Emissions - Screening Method

Source ID	Type of Equipment	Gas	Gas GWP	New Units Charge (kg)	Number of Months in Operation in Reporting Year	Capacity		CO_2 Equivalent Emissions (kg)
						Operating Units (kg)	Disposed Units (kg)	
Bldg-012	*Domestic Refrigeration*	*HFC-32*	677	*1000*	*12*	*0.5*	*0.25*	*6,812.3*
47545		R-410A		0.0	12	1,250.00	0.00	#N/A

Reference Table: Type of Equipment and Default Capacity Ranges (Lower to Upper Range) for Table 3

Type of Equipment	Equipment Description	Capacity (kg)	Installation Emission Factor K % of Capacity	Operating Emissions X % of Capacity/yr	Refrigerant Remaining at Disposal Y % of Capacity	Recovery Efficiency Z % of Remaining
Domestic Refrigeration	Domestic refrigeration units	0.05–0.5	1%	1%	80%	70%
Stand-Alone Commercial	Stand alone commercial applications	0.2–6	3%	15%	80%	70%
Medium/Large Commercial	Medium and large commercial refrigeration units	50–2,000	3%	35%	100%	70%
Transport Refrigeration	Transportation refrigeration units	3–8	1%	50%	50%	70%
Industrial Refrigeration	Industrial, food processing and cold storage units	10–10,000	3%	25%	100%	90%
Chillers	Commercial chillers	10–2,000	1%	15%	100%	95%
Residential/Commercial A/C	Residential and commercial units, including heat pumps	0.5-100	1%	10%	80%	80%
Maritime A/C Units	Maritime A/C units	5-6,500	1%	40%	50%	50%
Railway A/C Units	Railway A/C Units	10-30	1%	20%	50%	50%
Buses A/C Units	Buses A/C Units	4-18	1%	20%	50%	50%
Other Mobile A/C Units	All other mobile A/C units	0.5-2	1%	20%	50%	50%

Source: Screening Method of the inventory guidance document Direct Fugitive Emissions from Refrigeration, Air Conditioning, Fire Suppression, and Industrial Gases
https://www.epa.gov/climateleadership/scope-1-and-scope-2-inventory-guidance

GHG Emissions

Total CO_2 Equivalent Emissions (metric tons) - Refrigeration and AC Equipment	**#N/A**

Notes:
1. CO_2 emissions estimated using emission factors provided in Table 3 of the Center for Corporate Climate Leadership *Greenhouse Gas Inventory Guidance Direct Fugitive Emissions from Refrigeration, Air Conditioning, Fire Suppression and Industrial Gases. (Dec 2020).*
2. GWP values are from *Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (2011).*

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Scope 1 Emissions from Fire Suppression Equipment

Guidance

(A) HFC, PFC, and CO_2 fire suppressants are required to be included in the GHG inventory. Other fire suppressants such as Halon compounds, HCFCs, aqueous solutions, or inert gases are typically excluded from a GHG inventory.
(B) Select ONE of the three options from which to estimate emissions. Options range from most preferred method (Option 1) to least preferred method (Option 3). If option 3, screening method, is used and emissions are determined to be significant when compared to other emission sources, then one of the other methods should be applied to calculate emissions more accurately.
(C) Enter annual data in ORANGE cells as appropriate for the selected option.

Option 1. Material Balance Method: Enter organization-wide fire suppression gases stored and transferred (by gas) in Table 1.
- Inventory Change = difference of gas stored in inventory from beginning to end of reporting period. (Includes only gas stored on-site (i.e. cylinders) and not gas contained within equipment).
- Transferred Amount = gas purchased minus gas sold/disposed during reporting period.
  -- Gas purchased includes: Purchases for inventory, as part of equipment servicing (not from inventory) within purchased equipment and gas returned to the site after off-site recycling.
  -- Gas sold/disposed includes: Returns to supplier, sales or disposals (including within equipment), and gas sent off-site for recycling, reclamation, or destruction.
- Capacity Change = capacity of all units at beginning minus capacity of all units at end of reporting period. (can be assumed to be capacity of retired units minus capacity of new units).

Table 1. Organization-Wide Fire Suppression Gas CO_2 Equivalent Emissions - Material Balance

Gas	Gas GWP	Inventory Change (lb)	Transferred Amount (lb)	Capacity Change (lb)	CO_2 Equivalent Emissions (lb)
Carbon dioxide	1				
HFC-23	12,400				
HFC-125	3,170				
HFC-134a	1,300				
HFC-227ea	3,350				
HFC-236fa	8,060				
PFC-14	6,630				
PFC-31-10	9,200				

Option 2. **Material Balance Method (Simplified): Enter organization-wide fire suppression gas in units (by gas) in Table 2.**
- New units are those installed during reporting period (do not include any data for new units pre-charged by supplier), disposed units were disposed of during the reporting period, and existing units are all others.
- Charge/Recharge = gas added to units by organization or a contractor (do not include pre-charge by manufacturer).
- Capacity = sum of the full capacity for all units (do not include new units pre-charged by manufacturer).
- Amount recovered = total gas recovered from all retired units.

Table 2. Organization-Wide Fire Suppression Gas CO_2 Equivalent Emissions - Simplified Material Balance

Gas	Gas GWP	New Units		Existing Units	Disposed Units		CO_2 Equivalent Emissions (lb)
		Charge (lb)	Capacity (lb)	Recharge (lb)	Capacity (lb)	Recovered (lb)	
Carbon dioxide	1						
HFC-23	12,400						
HFC-125	3,170						
HFC-134a	1,300						
HFC-227ea	3,350						
HFC-236fa	8,060						
PFC-14	6,630						
PFC-31-10	9,200						

Option 3. Screening Method: Enter fire suppression gas information for each unit or group of units (by gas) in **Table 3.**
- Enter "Type of Equipment" (Fixed or Portable) and select "Gas Type" from the drop down box.
- Enter capacity (by gas type) for all units that operated during reporting period.
  -- For each unit added or removed during reporting period, multiply its capacity by a usage factor (0.0 to 1.0).
  -- If data entered for multiple units, sum the capacities for all units.
- See example entry in first row (*Green Italics*).

Table 3. Source Level Fire Suppression Gas CO_2 Equivalent Emissions - Screening Method

Source ID	Type of Equipment (Fixed/Portable)	Gas Type	Gas GWP	Unit Capacity (lb)	CO_2 Equivalent Emissions (lb)
Bldg-012	*Fixed*	*HFC-134a*	*1,300*	*1.5*	*68.3*
47545	Portable	Carbon dioxide		1,290.0	32.3
47545	Fixed	Carbon dioxide		60.0	2.1

Reference Table: Fire Suppressant Leak Rates for Table 3

Type of Equipment	Leak Rate
Fixed	3.5%
Portable	2.5%

Source: EPA (2021) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2019. Page A-275.

GHG Emissions

Total CO_2 Equivalent Emissions (metric tons) - Fire Suppression Equipment	**0.0**

Notes:
1. Leak rates of fire extinguishers from Page A-28, *US EPA (2021) - Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 - 2018.*
2. GWP values are from *Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (2011).*

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Scope 1 Emissions from Purchased Gases

Guidance

(A) Any use and release of the seven major greenhouse gases (CO_2, CH_4, N_2O, PFCs, HFCs, SF_6, and NF_3) is required to be included in the GHG inventory. Ozone depleting substances, such as CFCs and HCFCs, are regulated internationally and are typically excluded from a GHG inventory or reported as a memo item.

(B) Select the gas you purchase from the drop down menu and the amount purchased for the annual inventory reporting period in the ORANGE cells.

(C) It is assumed that all gas purchased in the reporting period used and released during the reporting period. If your business makes bulk purchases and plans on using the gas for several years, divide the bulk amount by the years of usage and report that amount.

Tip: If you purchase bulk gas, remember to report it for future years as well.

Table 1. Purchased Gases

Gas	Gas GWP	Purchased Amount (lb)	CO_2 Equivalent Emissions (lb)

GHG Emissions

Total CO_2 Equivalent Emissions (metric tons) - Purchased Gas	**0.0**

Notes:

1. GWP values are from Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (2011).

Back to Intro | Back to Summary | Help | Help - Market-Based Method

Scope 2 Emissions from Purchase of Electricity

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Guidance

The Indirect Emissions from Purchased Electricity Guidance document provides guidance for quantifying two scope 2 emissions totals, using a **location-based method** and a **market-based method**. The organization should quantify and report both totals in its GHG inventory. The location-based method considers average emission factors for the electricity grids that provide electricity. The market-based method considers contractual arrangements under which the organization procures electricity from specific sources, such as renewable energy.

(A) Enter total annual electricity purchased in kWh and each eGRID subregion for each facility or site in ORANGE cells of **Table 1**.
(B) If electricity consumption data are not available for a facility, an estimate should be made for completeness. See the "Items to Note" section of the Help sheet for suggested estimation approaches.
(C) Select "eGRID subregion" from drop box and enter "Electricity Purchased."
- Use map (Figure 1) at bottom of sheet to determine appropriate eGRID subregion. If subregion cannot be determined from the map, find the correct subregion by entering the location's zip code into EPA's Power Profiler: https://www.epa.gov/egrid/power-profiler#/

(D) See the market-based emission factor hierarchy on the market-based method Help sheet. If any of the first four types of emission factors are applicable, enter the factors in the yellow cells marked as "<enter factor>". If not, leave the yellow cells as is, and eGRID subregion factors will be used for market-based emissions.

Example entry is shown in first row (*GREEN Italics*) for a facility that purchases RECs for 100% of its consumption, and therefore has a market-based emission factor of 0.

Tips: Enter electricity usage by location and then look up the eGRID subregion for each location.
If you purchase renewable energy that is less than 100% of your site's electricity, see the example in the market-based method Help sheet.

Table 1. Total Amount of Electricity Purchased by eGRID Subregion

					Market-Based						Location-Based		
					Use these cells to enter applicable market-based emission factors								
					Emission Factors			Emissions			Emissions		
Source ID	Source Description	Source Area (sq ft)	eGRID Subregion *where electricity is consumed*	Electricity Purchased (kWh)	CO_2 Emissions (lb/MWh)	CH_4 Emissions (lb/MWh)	N_2O Emissions (lb/MWh)	CO_2 Emissions (lb)	CH_4 Emissions (lb)	N_2O Emissions (lb)	CO_2 Emissions (lb)	CH_4 Emissions (lb)	N_2O Emissions (lb)
Bldg-012	*East Power Plant*	*12,517*	*HICC Miscellaneous*	*200,000*	*0*	*0*	*0*	*0.0*	*0.0*	*0.0*	*231,097.2*	*24.8*	*3.8*
						<enter factor>	<enter factor>						
47545	VTS Milan		SERC Tennessee Valley	5,836,085	<enter factor>	<enter factor>	<enter factor>	5,445,458.1	478.6	70.0	5,445,458.1	478.6	70.0
					<enter factor>	<enter factor>	<enter factor>						
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Total Emissions for All Sources				**5,836,085**				**5,445,458.1**	**478.6**	**70.0**	**5,445,458.1**	**478.6**	**70.0**

GHG Emissions

CO_2 Equivalent Emissions (metric tons)	
Location-Based Electricity Emissions	2,484.6
Market-Based Electricity Emissions	2,484.6

Notes:
1. CO_2, CH_4 and N_2O emissions are estimated using methodology provided in EPA's Center for Corporate Climate Leadership Greenhouse Gas Inventory Guidance - Indirect Emissions from Purchased Electricity (January 2016).

Figure 1. EPA eGRID2022, January 2024.

Back to Intro | Back to Summary | Heat Content | Help | Help - Market-Based Method

Scope 2 Emissions from Purchase of Steam

Guidance

(A) Enter annual data for each facility or site in ORANGE cells in **Table 1**.
- Enter amount of steam purchased in mmBtu. Heat Content conversions can be found on the "Heat Content" sheet.
- Select "Fuel Type" from drop box to indicate the fuel used to generate the steam.
  - -- If "Fuel Type" is not known, select "Natural Gas" from drop box as default value.
  - -- If more than one fuel type is used, enter multiple rows, apportioning the steam using the same percentages as the fuel mix.

(B) If steam is purchased at a facility but steam consumption data are not available, an estimate should be made for completeness. See the "Items to Note" section of the Help sheet for suggested estimation approaches.

(C) Preferred Method (steam emission factors ARE available from your supplier). Example entry is shown in first data row (*GREEN Italics*).
- Enter supplier emission factors for CO_2, CH_4, and N_2O in the purple cells marked as "<enter factor>" if available, otherwise leave factor cells blank.
  - - These should be expressed in lb / mmBtu of Steam. Heat Content conversions can be found on the "Heat Content" sheet.
  - - Boiler Efficiency is not necessary if emission factors are available.
- Typically supplier emission factors for steam will apply to both location-based and market-based emissions, and no market-based emission factors need to be entered. However, if there are different applicable market-based emission factors, enter the factors in the yellow cells marked as "<enter factor>". If needed, see the market-based method Help Sheet for guidance.

(D) Alternative Method (supplier-specific emission factors are NOT available). Example entry is shown in second data row (*BLUE Italics*).
- Enter boiler efficiency. If boiler efficiency is not known, use 80% as default value. Do not enter market-based emission factors.

Table 1. Fuel, Boiler, Steam and Emission Factor Data for Steam Purchased

						Location-Based *Use these cells to enter emission factors from the steam supplier (if available)*						Market-Based *Use these cells to enter market-based emission factors if different than the supplier emission factors.*					
						Emission Factors			Emissions			Emission Factors			Emissions		
Source ID	Source Description	Source Area (sq ft)	Fuel Type	Boiler Efficiency (%)	Steam Purchased (mmBtu)	CO_2 Factor (kg / mmBtu)	CH_4 Factor (g / mmBtu)	N_2O Factor (g / mmBtu)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)	CO_2 Factor (kg / mmBtu)	CH_4 Factor (g / mmBtu)	N_2O Factor (g / mmBtu)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
Bldg-011	*Office*	*5,000*	*Natural Gas*	*80*	*5,000*	*72.00*	*1.50*	*0.60*	*450,000*	*9,375*	*3,750*	70.00	1.00	0.50	*437,500*	*6,250*	*3,125*
Bldg-012	*Steam-Blr Room*	*2,000*	*Sub-bituminous Coal*	*80*	*1,000*	<enter factor>	<enter factor>	<enter factor>	121,463	13,750	2,000	<enter factor>	<enter factor>	<enter factor>	121,463	13,750	2,000
						<enter factor>	<enter factor>	<enter factor>				<enter factor>	<enter factor>	<enter factor>			
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GHG Emissions

Emissions by Source and Fuel Type for Steam Purchased

	Location-Based			Market-Based		
Fuel Type	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
Natural Gas	0.0	0.0	0.0	0.0	0.0	0.0
Distillate Fuel Oil No. 2	0.0	0.0	0.0	0.0	0.0	0.0
Residual Fuel Oil No. 6	0.0	0.0	0.0	0.0	0.0	0.0
Kerosene	0.0	0.0	0.0	0.0	0.0	0.0
Liquefied Petroleum Gases (LPG)	0.0	0.0	0.0	0.0	0.0	0.0
Anthracite Coal	0.0	0.0	0.0	0.0	0.0	0.0
Bituminous Coal	0.0	0.0	0.0	0.0	0.0	0.0
Sub-bituminous Coal	0.0	0.0	0.0	0.0	0.0	0.0
Lignite Coal	0.0	0.0	0.0	0.0	0.0	0.0
Mixed (Electric Power Sector)	0.0	0.0	0.0	0.0	0.0	0.0
Coal Coke	0.0	0.0	0.0	0.0	0.0	0.0
Wood and Wood Residuals	0.0	0.0	0.0	0.0	0.0	0.0
Landfill Gas	0.0	0.0	0.0	0.0	0.0	0.0
Total Emissions for All Sources	0.0	0.0	0.0	0.0	0.0	0.0

CO_2 Equivalent Emissions (metric tons)	
Location-Based Electricity Emissions	**0.0**
Market-Based Electricity Emissions	**0.0**

Back to Intro | Back to Summary | Help

Scope 3 Emissions from Business Travel

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Guidance

(A) Enter annual data in ORANGE cells in the table corresponding to the transport method. Example entry is shown in first row (*GREEN Italics*).
(B) Mileage data can be entered for individual trips or individual employees, or miles for multiple employees can be subtotaled by vehicle type or flight length.
(C) For employees traveling by car, select "Vehicle Type" and enter miles traveled (vehicle-miles) in **Table 1**.
(D) For employees traveling by rail or bus, select "Vehicle Type" and enter miles traveled (passenger-miles) in **Table 2**.
(E) For employees traveling by air, select "Flight Length" and enter miles traveled (passenger-miles) in **Table 3**.

--- Note: The emission factors for air travel do not include radiative forcing. Per the GHG Protocol, for air travel emission factors, multipliers or other corrections to account for radiative forcing may be applied to the GWP of emissions arising from aircraft transport. If applied, companies should disclose the specific factor used.

Table 1. Personal Vehicle, Rental Car or Taxi - Business Travel by Vehicle-Miles (CO_2, CH_4 and N_2O)

Source ID	Source Description	Vehicle Type	Vehicle-Miles (miles)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
JD-001	*John Doe 1*	*Passenger Car*	*100*	*18*	*0.5*	*0.3*
47545	Military Personnel	Passenger Car	2,500	438	12.9	8.6
Total for all Personal Vehicle Business Travel				438	12.9	8.6

Table 2. Rail or Bus - Business Travel by Passenger-Miles (CO_2, CH_4 and N_2O)

Source ID	Source Description	Vehicle Type	Passenger-Miles (miles)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
JD-001	*John Doe 1*	*Transit Rail (i.e. Subway, Tram)*	*100*	*9*	*0.7*	*0.1*
Total for all Rail and Bus Business Travel				0	0.0	0.0

Table 3. Air - Business Travel by Passenger-Miles (CO_2, CH_4 and N_2O)

Source ID	Source Description	Flight Length	Passenger-Miles (miles)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
JD-001	*John Doe 1*	*Medium Haul (>= 300 miles, < 2300 miles)*	*1,000*	*229*	*10.4*	*8.5*
Total for all Air Business Travel				0.0	0.0	0.0

GHG Emissions

Total CO_2 Emissions by Travel Type

Transport Type	CO_2 (kg)	CH_4 (g)	N_2O (g)
Passenger Car	437.9	12.9	8.6
Light-Duty Truck	0.0	0.0	0.0
Motorcycle	0.0	0.0	0.0
Intercity Rail - Northeast Corridor	0.0	0.0	0.0
Intercity Rail - Other Routes	0.0	0.0	0.0
Intercity Rail - National Average	0.0	0.0	0.0
Commuter Rail	0.0	0.0	0.0
Transit Rail (i.e. Subway, Tram)	0.0	0.0	0.0
Bus	0.0	0.0	0.0
Air Short Haul (< 300 miles)	0.0	0.0	0.0
Air Medium Haul (>= 300 miles, < 2300 miles)	0.0	0.0	0.0
Air Long Haul (>= 2300 miles)	0.0	0.0	0.0

Total CO_2 Equivalent Emissions (metric tons) - Business Travel	**0.4**

Back to Intro | Back to Summary | Help

Scope 3 Emissions from Employee Commuting

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Guidance

(A) Enter annual data in ORANGE cells in the table corresponding to the transport method. Example entry is shown in first row (*GREEN Italics*).
(B) For employees commuting in a personal vehicle, select the "Vehicle Type" and enter miles traveled (vehicle-miles) in **Table 1**.
(C) For employees commuting using public transportation, select the "Transport Type" and enter miles traveled (passenger-miles) in **Table 2**.

Tip: If more than one employee travels by the same vehicle type or transport type, miles can be combined and entered in one row.

Table 1. Personal Vehicle - Employee Commuting by Vehicle-Miles (CO_2, CH_4 and N_2O)

Source ID	Source Description	Vehicle Type	Vehicle-Miles (miles)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
JD-001	*John Doe 1*	*Passenger Car*	*100*	*18*	*0.5*	*0.3*
47545	Site Employees	Passenger Car	195,000	34,155	1,002.6	670.9
Total for all Personal Vehicle Employee Commuting				34,155	1,002.6	670.9

Table 2. Public Transportation - Employee Commuting by Passenger-Miles (CO_2, CH_4 and N_2O)

Source ID	Source Description	Transport Type	Passenger-Miles (miles)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
JD-001	*John Doe 1*	*Bus*	*100*	*7*	*0*	*0.2*
Total for all Public Transportation Employee Commuting				0	0.0	0.0

GHG Emissions

Total CO_2 Emissions by Commuting Type

Transport Type	CO_2 (kg)	CH_4 (g)	N_2O (g)
Passenger Car	34,155	1,002.6	670.9
Light-Duty Truck	0	0.0	0.0
Motorcycle	0	0.0	0.0
Intercity Rail - Northeast Corridor	0	0.0	0.0
Intercity Rail - Other Routes	0	0.0	0.0
Intercity Rail - National Average	0	0.0	0.0
Commuter Rail	0	0.0	0.0
Transit Rail (i.e. Subway, Tram)	0	0.0	0.0
Bus	0	0.0	0.0

Total CO_2 Equivalent Emissions (metric tons) - Commuting **34.4**

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Scope 3 Emissions from Upstream Transportation and Distribution

Guidance

(A) Enter annual data in ORANGE cells in the table corresponding to the transport method. Example entry is shown in first row (*GREEN Italics*).
(B) For rail, water, or air shipments, enter short ton-mile data in **Table 2.** See Help sheet for details on calculating short ton-miles.
(C) For road shipments, if your organization's product is the only product transported in the vehicle (i.e. full truckload shipment) then enter the vehicle type and miles for each leg of transport in Table 1. Emissions are calculated using vehicle-miles.
(D) For road shipments, if your organization's product makes up only part of the truck load (i.e. less-than-load or LTL shipment), then enter the vehicle type and short ton-miles (product weight (short tons) x distance) for each leg of transport in Table 2. Emissions are calculated using short ton-miles. See Help sheet for details on calculating ton-miles.

Tip: Make sure all transport legs are accounted for from manufacturing facility to distribution to customer.
--- Note: This Calculator does not currently provide a place to calculate emissions from distribution warehouses.

Table 1. On-Road Product Transport by Vehicle-Miles (CO_2, CH_4 and N_2O)

Source ID	Source Description	Vehicle Type	Vehicle-Miles (miles)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
Bldg-012	*East Power Plant Finished Goods*	*Medium- and Heavy-duty Truck*	*100*	*125*	*1.1*	*3.5*
Total for Product Transport by Vehicle-Miles				0	0.0	0.0

Table 2. Product Transport by Ton-Miles (CO_2, CH_4 and N_2O)

Source ID	Source Description	Vehicle Type	Short Ton-Miles	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
Bldg-012	*East Power Plant Finished Goods*	*Medium- and Heavy-Duty Truck*	*100*	*16.8*	*0.1*	*0.5*
Total for all Product Transport by Ton-Miles				0	0.0	0.0

GHG Emissions

Transport Type	CO_2 (kg)	CH_4 (g)	N_2O (g)
Medium- and Heavy-Duty Truck			
Light-Duty Truck			
Passenger Car			
Rail			
Aircraft			
Waterborne Craft			

Total CO_2 Equivalent Emissions (metric tons) - Upstream Transportation and Distributior 0.0

Back to Intro | Back to Summary | Help

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Scope 3 Emissions from Waste

Guidance

(A) Enter annual waste data in ORANGE cells. Example entry is shown in first row (*GREEN Italics*).

(B) First, choose the appropriate material then the disposal method from the drop down options. For the average-data method, use one of the mixed material types, such as mixed MSW. If the exact waste material is not available, consider an appropriate proxy. For example, dimensional lumber can be used as a proxy for wood furniture.

(C) Choose an appropriate disposal method. Note that not all disposal methods are available for all materials. If there is a #NA or # Value error in the emissions column, you must pick a new material type or appropriate disposal method.

Table 1. Waste Disposal Weight by Waste Material and Disposal Method (CO_2, CH_4 and N_2O)

Source ID	Source Description	Waste Material	Disposal Method	Weight	Unit	CO_2e Emissions (kg)
Bldg-012	*East Power Plant Finished Goods*	*Copper Wire*	*Landfilled*	*1,000*	*metric ton*	*22,040*
47545	Installation Total for FY23	Mixed MSW municipal solid waste	Landfilled	1,814	short ton	

GHG Emissions

Total Emissions by Disposal Method

Waste Material	CO_2e (kg)
Recycled	
Landfilled	
Combusted	
Composted	
Anaerobically Digested (Dry Digestate with Curing)	
Anaerobically Digested (Wet Digestate with Curing)	

EPA Climate Leaders Simplified GHG Emissions Calculator (Optional 3.0)

Total CO_2 Equivalent Emissions (metric tons) - Waste **1,052.1**

Back to Intro | Back to Summary | Help

Purchased Offsets

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Guidance

(A) Enter quantity of offsets purchased for each offset project in terms of CO_2 equivalent in ORANGE cells of **Table 1.** Enter offsets purchased for the inventory reporting period. Example entry is shown in first row (*GREEN Italics*).

Table 1. Total Amount of Purchased Offsets

ID	Project Description	Offset Scope/Category	Offsets Purchased (Metric Tons CO_2e)
Trees	*Forestry Project*	*Scope 1*	*5,000*

GHG Reductions

Total CO_2 Equivalent Emission Reductions (metric tons) - Offsets	**0.0**

GHG Reductions by Scope	Offsets (Metric Tons CO_2e)
Scope 1	0.0
Scope 2 - Location-Based	0.0
Scope 2 - Market-Based	0.0
Scope 3 - Business Travel	0.0
Scope 3 - Employee Commuting	0.0
Scope 3 - Upstream Transportation and Distribution	0.0
Scope 3 - Waste	0.0

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Tool Sheet: Unit Conversions

Mass			
Convert From	**Convert To**	**Multiply By**	**Units**
pounds (lb)	gram (g)	453.6	g / lb
pounds (lb)	kilogram (kg)	0.4536	kg / lb
pounds (lb)	metric ton	0.0004536	metric ton / lb
kilogram (kg)	pounds (lb)	2.205	lb / kg
gram (g)	short ton	0.000001102	short ton / g
kilogram (kg)	short ton	0.001102000	short ton / kg
metric ton	short ton	1.102	short ton / metric ton
pounds (lb)	short ton	0.0005	short ton / lb
short ton	short ton	1.00	short ton / short ton
metric ton	pounds (lb)	2,205	lb / metric ton
metric ton	kilogram (kg)	1,000	kg / metric ton

Source: Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021 – Annexes, Chapter 6.4, Constants, Units and Conversions. https://www.epa.gov/system/files/documents/2023-04/US-GHG-Inventory-2023-Annexes.pdf

Volume			
Convert From	**Convert To**	**Multiply By**	**Units**
standard cubic foot (scf)	US gallon (gal)	7.4805	gal / scf
standard cubic foot (scf)	barrel (bbl)	0.1781	bbl / scf
standard cubic foot (scf)	liters (L)	28.32	L / scf
standard cubic foot (scf)	cubic meters (m3)	0.02832	m3 / scf
US gallon (gal)	barrel (bbl)	0.0238	bbl / gal
US gallon (gal)	liters (L)	3.785	L / gal
US gallon (gal)	cubic meters (m3)	0.003785	m3 / gal
barrel (bbl)	US gallons (gal)	42	gal / bbl
barrel (bbl)	liters (L)	158.99	L / bbl
barrel (bbl)	cubic meters (m3)	0.1589	m3 / bbl
liters (L)	cubic meters (m3)	0.001	m3 / L
liters (L)	US gallon (gal)	0.2642	gal / L
cubic meters (m3)	barrel (bbl)	6.2897	bbl / m3
cubic meters (m3)	US gallon (gal)	264.2	gal / m3
cubic meters (m3)	liters (L)	1,000	L / m3

Energy			
Convert From	**Convert To**	**Multiply By**	**Units**
kilowatt hour (kWh)	Btu	3,412	Btu / kWh
kilowatt hour (kWh)	kilojoules (KJ)	3,600	KJ / kWh
megajoule (MJ)	gigajoules (GJ)	0.001	GJ / MJ
gigajoule (GJ)	million Btu (mmBtu)	0.9478	mmBtu / GJ
gigajoule (GJ)	kilowatt hours (kWh)	277.8	kWh / GJ
Btu	joules (J)	1,055	J / Btu
million Btu (mmBtu)	gigajoules (GJ)	1,055	GJ / mmBtu
million Btu (mmBtu)	kilowatt hours (kWh)	293	kWh / mmBtu
therm	Btu	100,000	Btu / therm
therm	gigajoules (GJ)	0.1055	GJ / therm
therm	kilowatt hours (kWh)	29.3	kWh / therm

Distance			
Convert From	**Convert To**	**Multiply By**	**Units**
mile	kilometers (km)	1.609	km / mile
nautical mile	miles	1.15	mile / nautical mile
kilometer (km)	miles	0.622	mile / km

Other

Back to Intro | Back to Summary | Back to Stationary Combustion | Back to Steam

Tool Sheet: Heat Content for Specific Fuels

Additional heat contents can be found in the Emission Factors Hub.

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Fuel Type	Convert From	Convert To	Multiply By	Units	Source
Natural Gas	mmBtu	scf	974.7	scf / mmBtu	
Natural Gas	Dth (Decatherm)	scf	974.7	scf / Dth	
Natural Gas	therm	scf	97.5	scf / therm	
Natural Gas	ccf	scf	100	scf / ccf	
Natural Gas	Mcf	scf	1000	scf / Mcf	
Natural Gas	cubic meter	scf	35.31	scf / cubic meter	
Natural Gas	kWh	scf	3.326	scf / kWh	
Anthracite Coal	mmBtu	Short ton	0.03986	short ton / mmBtu	
Bituminous Coal	mmBtu	Short ton	0.04011	short ton / mmBtu	
Sub-bituminous Coal	mmBtu	Short ton	0.05797	short ton / mmBtu	
Lignite Coal	mmBtu	Short ton	0.07037	short ton / mmBtu	
Mixed (Commercial Sector)	mmBtu	Short ton	0.04675	short ton / mmBtu	
Mixed (Electric Power Sector)	mmBtu	Short ton	0.05068	short ton / mmBtu	
Mixed (Industrial Coking)	mmBtu	Short ton	0.03805	short ton / mmBtu	
Mixed (Industrial Sector)	mmBtu	Short ton	0.04474	short ton / mmBtu	EPA, Emission Factors Hub March 2024, Based on Federal
Coal Coke	mmBtu	Short ton	0.04032	short ton / mmBtu	Register EPA; 40 CFR Part 98; e-CFR, (see link below).
Agricultural Byproducts	mmBtu	Short ton	0.12121	short ton / mmBtu	
Peat	mmBtu	Short ton	0.12500	short ton / mmBtu	Table C-1, Table C-2 (as amended at 81 FR 89252, Dec. 9,
Solid Byproducts	mmBtu	Short ton	0.09625	short ton / mmBtu	2016), Table AA-1 (78 FR 71965, Nov. 29, 2013).
Wood and Wood Residuals	mmBtu	Short ton	0.05721	short ton / mmBtu	https://www.ecfr.gov/cgi-bin/text-
Municipal Solid Waste	mmBtu	Short ton	0.10050	short ton / mmBtu	idx?SID=ae265d7d6f98ec86fc8640b0793a3f58&mc=true&node
Petroleum Coke (Solid)	mmBtu	Short ton	0.03333	short ton / mmBtu	=pt40.23.98&rgn=div5#ap40.23.98_19.1
Plastics	mmBtu	Short ton	0.02632	short ton / mmBtu	
Tires	mmBtu	Short ton	0.03571	short ton / mmBtu	
Distillate Fuel Oil No. 2	mmBtu	gallon	7.2464	gallon / mmBtu	
Residual Fuel Oil No. 6	mmBtu	gallon	6.667	gallon / mmBtu	
Kerosene	mmBtu	gallon	7.407	gallon / mmBtu	
Liquefied Petroleum Gases (LPG)	mmBtu	gallon	10.870	gallon / mmBtu	
Biodiesel (100%)	mmBtu	gallon	7.813	gallon / mmBtu	
Ethanol (100%)	mmBtu	gallon	11.905	gallon / mmBtu	
Rendered Animal Fat	mmBtu	gallon	8.000	gallon / mmBtu	
Vegetable Oil	mmBtu	gallon	8.333	gallon / mmBtu	
Propane Gas	mmBtu	scf	397	scf / mmBtu	
Propane Gas	therm	scf	39.7	scf / therm	
Landfill Gas	mmBtu	scf	2060	scf / mmBtu	
Landfill Gas	therm	scf	206.2	scf / therm	
Steam	Mlb (1,000 pounds)	mmBtu	1.194	mmBtu / Mlb	EPA, ENERGY STAR, https://www.energystar.gov/buildings/tools
Steam	lb	mmBtu	0.001194	mmBtu / lb	and-resources/portfolio-manager-technical-reference-thermal-
Steam	short ton	mmBtu	2.388	mmBtu / short ton	conversion-factors

Back to Intro | Back to Summary

Tool Sheet: Emission Factors

All emission factors are sourced from EPA's Emission Factors Hub, February 2024 unless otherwise noted. Fuel emission factors presented represent the combustion-only (tank-to-wheel) emissions and do not represent upstream (well-to-wheel) emissions.

Reference the below link to the EPA's Emission Factors Hub for source data information and links to the methodology and technical documents associated with each table.

[illegible]

Stationary Combustion

Fuel Type	CO_2 Factor	CH_4 Factor	N_2O Factor	CO_2 Factor	CH_4 Factor	N_2O Factor	Unit
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Mobile Combustion

Fuel Type	CO_2 Emission Factor	Unit
[illegible]	[illegible]	[illegible]

Vehicle Type	Model Year	CH_4 Factor	N_2O Factor	Notes
[illegible]	[illegible]	[illegible]	[illegible]	
	[illegible]	[illegible]	[illegible]	These factors are used for ethanol heavy-duty vehicles and buses
	[illegible]	[illegible]	[illegible]	Held constant from most recent data (year 2021 factor)
Gasoline Motorcycles	[illegible]	[illegible]	[illegible]	Held constant from most recent data (year 2021 factor)

Note:
The latest mobile combustion factors reflect year 2021 data. Therefore, for all vehicle model years 2022 onward, the 2021 year factor is used.

Vehicle Type	Fuel Type	Model Year	CH_4 Factor	N_2O Factor	Notes
Passenger Cars	Diesel	[illegible]	[illegible]	[illegible]	Held constant for 2022 onwards from most recent data year (year 2021 data)
Light-Duty Trucks	Diesel	[illegible]	[illegible]	[illegible]	Held constant for 2022 onwards from most recent data year (year 2021 data)
Medium- and Heavy-Duty Vehicles	Diesel	[illegible]	[illegible]	[illegible]	Held constant for 2022 onwards from most recent data year (year 2021 data)
Light-Duty Cars	[illegible]		[illegible]	[illegible]	
Light-Duty Trucks	[illegible]		[illegible]	[illegible]	
Medium-Duty Trucks	[illegible]		[illegible]	[illegible]	
Heavy-Duty Trucks	[illegible]		[illegible]	[illegible]	
Buses	[illegible]		[illegible]	[illegible]	

Vehicle Type	Fuel Type	CH_4 Factor	N_2O Factor
Ships and Boats	Gasoline (4 stroke)	[illegible]	[illegible]
Aircraft	[illegible]	[illegible]	[illegible]
Agricultural Equipment	[illegible]	[illegible]	[illegible]
Construction/Mining Equipment	[illegible]	[illegible]	[illegible]
Lawn and Garden Equipment	[illegible]	[illegible]	[illegible]
Airport Equipment	[illegible]	[illegible]	[illegible]
Industrial/Commercial Equipment	[illegible]	[illegible]	[illegible]
Logging Equipment	[illegible]	[illegible]	[illegible]
Railroad Equipment	[illegible]	[illegible]	[illegible]
Recreational Equipment	[illegible]	[illegible]	[illegible]

Notes:
Agricultural equipment includes equipment, such as tractors and combines, as well as fuel consumption from trucks that are used off-road in agriculture.
Construction/Mining equipment, such as cranes, dumpers, and excavators, as well as fuel consumption from trucks that are used off-road in construction.

Electricity

eGRID Subregion	CO_2 Factor	CH_4 Factor	N_2O Factor
[illegible]	[illegible]	[illegible]	[illegible]

Note:
These factors do not include upstream transmission and distribution emissions associated with delivered electricity.

Scope 3 Sources

Vehicle Type	CO_2 Factor	CH_4 Factor	N_2O Factor	Units
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

WARM Material	Material for SGEC Lookup (punctuation removed)	Metric Tons CO_2e / Short Ton Material: Recycled	Landfilled	Combusted	Composted	Anaerobically Digested (Dry Digestate with …)	Anaerobically Digested (Wet Digestate with …)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Notes: These factors do not include any avoided emissions impact from any of the disposal methods.
All the factors presented here include transportation emissions, which are optional in the Scope 3 Calculation Guidance, with an assumed average distance traveled to the processing facility.
AR4 GWP values are used to convert all waste emission factors into CO_2e.

Recycling emissions include transport to recycling facility and sorting of recycled materials at material recovery facility. This is consistent with the GHG Protocol Scope 3 guidance, and includes the voluntary transportation emissions, with an assumed average distance traveled to the processing facility.
Landfilling emissions include transport to landfill, equipment use at landfill and landfill CH4 emissions from anaerobic decomposition of biogenic carbon compounds. Landfill CH4 is based on typical landfill gas collection practices, average landfill moisture conditions, and U.S.-average non-baseload electricity grid mix.
Combustion emissions include transport to waste-to-energy facility and combustion-related non-bigenic CO2 and N2O. This is consistent with the GHG Protocol Scope 3 guidance, and includes the voluntary transportation emissions, with an assumed average distance traveled to the processing facility.
Composting emissions include transport to compost facility, equipment use at compost facility and CH4 and N2O emissions during composting. This is consistent with the GHG Protocol Scope 3 guidance, and includes the voluntary transportation emissions, with an assumed average distance traveled to the processing facility.

Vehicle Type	CO_2 Factor	CH_4 Factor	N_2O Factor	Units
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	passenger-mile

Global Warming Potential (GWP)

Industrial Designation or Common Name	Chemical Formula	100-Year GWP
Carbon dioxide	[illegible]	[illegible]
Methane	[illegible]	[illegible]
Nitrous oxide	[illegible]	[illegible]
HFC-23	[illegible]	[illegible]
HFC-32	[illegible]	[illegible]
HFC-41	[illegible]	[illegible]
HFC-125	[illegible]	[illegible]
HFC-134	[illegible]	[illegible]
HFC-134a	[illegible]	[illegible]
HFC-143	[illegible]	[illegible]
HFC-143a	[illegible]	[illegible]
HFC-152	[illegible]	[illegible]
HFC-152a	[illegible]	[illegible]
HFC-161	[illegible]	[illegible]
HFC-227ea	[illegible]	[illegible]
HFC-236cb	[illegible]	[illegible]
HFC-236ea	[illegible]	[illegible]
HFC-236fa	[illegible]	[illegible]
HFC-245ca	[illegible]	[illegible]
HFC-245fa	[illegible]	[illegible]
HFC-365mfc	[illegible]	[illegible]
HFC-43-10mee	[illegible]	[illegible]
Sulfur hexafluoride	[illegible]	[illegible]
Nitrogen trifluoride	[illegible]	[illegible]
PFC-14	[illegible]	[illegible]
PFC-116	[illegible]	[illegible]
PFC-218	[illegible]	[illegible]
PFC-318	[illegible]	[illegible]
PFC-31-10	[illegible]	[illegible]
PFC-41-12	[illegible]	[illegible]
PFC-51-14	[illegible]	[illegible]
PFC-91-18	[illegible]	[illegible]
Note: This Calculator tool update includes the above update to GWP values from IPCC Fifth Assessment Report (AR5), 2013 Chapter 8, Table 8.A.1 Lifetimes, Radiative Efficiencies and Metric Values. This represents a methodology change.		

Note:
This Calculator tool uses GWP values from IPCC Fifth Assessment Report (AR5), 2013 Chapter 8, Table 8.A.1, Lifetimes, Radiative Efficiencies and Metric Values. This represents a methodology change.

ASHRAE #	[illegible]	Blend Make-up
[illegible]	[illegible]	53% HCFC-22, 34% HCFC-124, 13% HFC-152a
[illegible]	[illegible]	61% HCFC-22, 28% HCFC-124, 11% HFC-152a
[illegible]	[illegible]	33% HCFC-22, 52% HCFC-124, 15% HFC-152a
[illegible]	[illegible]	38% HCFC-22, 60% HFC-125, 2% propane
[illegible]	[illegible]	60% HCFC-22, 38% HFC-125, 2% propane
[illegible]	[illegible]	56% HCFC-22, 39% PFC-218, 5% propane
[illegible]	[illegible]	44% HFC-125, 4% HFC-134a, 52% HFC-143a
[illegible]	[illegible]	55% HCFC-22, 41% HCFC-142b, 4% isobutane
[illegible]	[illegible]	20% HFC-32, 40% HFC-125, 40% HFC-134a
[illegible]	[illegible]	10% HFC-32, 70% HFC-125, 20% HFC-134a
[illegible]	[illegible]	23% HFC-32, 25% HFC-125, 52% HFC-134a
[illegible]	[illegible]	15% HFC-32, 15% HFC-125, 70% HFC-134a
[illegible]	[illegible]	47% HCFC-22, 7% HFC-125, 46% HFC-143a
[illegible]	[illegible]	60% HCFC-22, 25% HCFC-124, 15% HCFC-142b
[illegible]	[illegible]	50% HFC-32, 50% HFC-125
[illegible]	[illegible]	45% HFC-32, 55% HFC-125
[illegible]	[illegible]	87.5% HCFC-22, 11% HFC-152a, 1.5% propylene
[illegible]	[illegible]	94% HCFC-22, 3% HFC-152a, 3% propylene
[illegible]	[illegible]	51% HCFC-22, 28.5% HCFC-124, 16.5% HCFC-142b, 4% isobutane
[illegible]	[illegible]	50% HCFC-22, 39% HCFC-124, 9.5% HCFC-142b, 1.5% isobutane
[illegible]	[illegible]	46.6% HFC-125, 50% HFC-134a, 3.4% butane
[illegible]	[illegible]	85.1% HFC-125, 11.5% HFC-134a, 3.4% isobutane
[illegible]	[illegible]	65.1% HFC-125, 31.5% HFC-134a, 3.4% isobutane
[illegible]	[illegible]	50.5% HFC-125, 47% HFC-134a, 1% butane, 0.9% isobutane, 0.6% isopentane
[illegible]	[illegible]	5.1% HFC-125, 93% HFC-134a, 1.3% butane, 0.6% isobutane
[illegible]	[illegible]	77.5% HFC-125, 20% HFC-143a, 1.9% isobutane, 0.6% propane
[illegible]	[illegible]	63.2% HFC-125, 16% HFC-134a, 18% HFC-143a, 2.8% isobutane
R-507A	3,985	50% HFC-125, 50% HFC-143a
[illegible]	[illegible]	39% HFC-23, 61% PFC-116
[illegible]	[illegible]	46% HFC-23, 54% PFC-116

Note:
This Calculator tool uses GWP values from IPCC Fifth Assessment Report (AR5), 2013 Chapter 8, Table 8.A.1, Lifetimes, Radiative Efficiencies and Metric Values. This represents a methodology change. GWP values of blended refrigerants are based only on their HFC and PFC constituents, which are based on data from https://www.epa.gov/snap/compositions-refrigerant-blends.

Back to Intro

Stationary Combustion

Data Management - HELP SHEET

On this sheet you will find general suggestions regarding GHG inventory data management.

DATA MANAGEMENT

This Calculator provides the calculations to quantify your organization's GHG emissions based on annual totals for activity data, which are entered in the ORANGE data entry cells in this workbook. It is good practice to use a spreadsheet or database to track more detailed activity data, such as monthly energy consumption, and aggregate that detailed data into annual totals for entry into the Calculator. This approach provides an "audit trail" that retraces the steps completed to arrive at the annual usage numbers you enter into the Calculator. ENERGY STAR's Portfolio Manager is one database option if your business is already using this tool. (More information on Portfolio Manager is available in the Guide to GHG Management). The bullets below suggest the type of data you may want to store in the data management spreadsheet or database.

A List of Facilities and Attributes
* Facility Name or Site ID
* Address (including zip
* Floor area (sq ft)
* Number of Employees
* Open and Close Date of
* Type of Facility

Electricity Data
* Monthly Consumption Data by Meter or Facility
* Monthly Cost Data by Meter or Facility
* Record of renewable energy purchased

Stationary Fuel Data (for each Fuel Type)
* Monthly Consumption Data by Meter or Facility
* Monthly Cost Data by Meter or Facility

Mobile Fuel Data
* List of Vehicles (Year, Make, Model, Fuel
* Fuel Consumption by
* Fuel Cost by Vehicle
* Miles Traveled by Vehicle

Refrigeration and AC Data
* Inventory of Equipment by Facility
* Refrigerant Capacity of Equipment
* Refrigerant Purchase, Inventory, and Disposal

Fire Suppression Data
* Inventory of Equipment by Facility
* Fire Suppressant Capacity of Equipment
* Fire Suppressant Purchase, Inventory, and Disposal Data

Purchased Gas Data
* Types of Gas Purchased
* Amount of Gas Purchased

Steam Data
* Monthly Consumption Data by Meter
* Monthly Cost Data by Meter or Facility
* Steam Provider Emission Factors
* Fuel Type Used to Generate Steam
* Boiler Efficiency

Business Travel
* Mode of Transportation
* Mileage by Trip (i.e., for each leg of transport)

Commuting
* Mode of Transportation per Employee
* Mileage by Trip (i.e., for each leg of

Product Transport
* Mode of Transportation for each
* Weight of Product Transported for
* Distance Product Transported for

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) - Suggested Checks

The accuracy of a GHG inventory depends on the accuracy of the activity data. Here are a few quick checks to make sure your data are realistic. If any of these checks lead to questions, it is best to review the data month by month to look for data points that are significantly higher or lower than other points. Checking data sources such as utility bills can confirm data entry accuracy.

Benchmarks

Compare your energy consumption data against typical benchmarks.

1. Compare your energy consumption data per square foot of floor area against the averages by building type and region in the tables below. See below for building type definitions.
2. Does any facility look significantly higher or lower than these averages? If so, can the difference be explained?

Electricity Intensity — kWh electricity / sq ft / year

Principal Building Activity	Northeast	Midwest	South	West
Education	7.9	8.1	11.4	9.0
Food sales	Insufficient Data	67.3	53.7	Insufficient Data
Food service	29.7	43.0	52.7	36.9
Health care	19.0	25.0	27.3	22.2
Inpatient	22.4	28.3	32.2	29.5
Outpatient	15.9	18.6	19.6	15.9
Lodging	13.7	14.8	15.2	13.2
Mercantile	15.1	15.4	17.8	17.2
Retail (other than mall)	11.3	12.7	15.3	13.0
Enclosed and strip malls	17.9	18.9	20.2	20.1
Office	13.8	12.0	15.4	12.5
Public assembly	9.6	11.6	15.1	9.4
Public order and safety	Insufficient Data	Insufficient Data	16.7	11.6
Religious worship	5.1	4.2	5.4	4.2
Service	7.3	5.7	9.0	7.6
Warehouse and storage	6.0	5.2	6.5	5.5
Other	31.4	24.0	25.3	45.5
Vacant	Insufficient Data	4.2	4.9	Insufficient Data

Natural Gas Intensity — standard cubic feet (scf) natural gas / sq ft / year

Principal Building Activity	Northeast	Midwest	South	West
Education	41.5	38.7	21.2	21.9
Food sales	Insufficient Data	75.4	Insufficient Data	Insufficient Data
Food service	Insufficient Data	212.0	152.2	106.4
Health care	58.2	59.4	63.5	54.2
Inpatient	89.5	71.1	76.0	84.0
Outpatient	30.9	34.0	22.8	22.4
Lodging	45.7	44.1	27.1	38.6
Mercantile	41.9	41.4	28.9	37.1
Retail (other than mall)	25.0	26.4	20.0	22.5
Enclosed and strip malls	49.2	58.9	34.2	43.9
Office	20.6	26.3	18.7	18.6
Public assembly	52.6	48.5	28.7	33.5
Public order and safety	Insufficient Data	Insufficient Data	40.2	34.8
Religious worship	33.8	28.6	16.7	17.4
Service	38.2	38.3	51.3	39.1
Warehouse and storage	19.3	27.7	13.5	10.4
Other	38.7	Insufficient Data	21.2	Insufficient Data
Vacant	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data

Fuel Oil Intensity — gallons fuel oil / sq ft / year

Principal Building Activity	Northeast	Midwest	South	West
Education	0.1305	0.0288	0.0432	Insufficient Data
Health care	0.0480	0.0201	0.0099	Insufficient Data
Office	0.0445	0.0052	0.0057	0.002
All others	0.0915	0.0170	0.0145	Insufficient Data

Source:

1. Source- EIA's 2018 Commercial Buildings Energy Consumption Survey, Table C15 (Electricity), Table C25 (Natural Gas), Table C35 (Fuel Oil).
https://www.eia.gov/consumption/commercial/data/2018/index.php?view=consumption#c33-c36
2. Building Type Definitions Source- http://www.eia.gov/consumption/commercial/building-type-definitions.cfm

Ca cu ated Un Costs

Calculated unit costs that are out of expected ranges can indicate data entry errors.

1. Use the cost and consumption data entered into your data management file to calculate the cost per unit of consumption for each month and each emissions source.
2. Is the unit cost within expected ranges? Is it fairly constant month to month? Keep in mind that very low consumption (such as with heating fuel during the summer) can skew the unit cost due to fixed monthly fees.
3. If the calculated unit cost is not reasonable, is there an error in either the consumption data or the cost data?

Year Over Year Comparison

Compare usage data from one year to the next.

1. Is there a significant change in consumption data year over year? If so, hone in on the facilities causing the change.
2. If there is a significant change, can it be explained?
3. If this amount is not reasonable, is there an error in either the consumption data or the data entry? Check monthly data by facility.

Bu d ng Types

Building Type	Description	Examples
Education	Buildings used for academic or technical classroom instruction, such as elementary, middle, or high schools, and classroom buildings on college or university campuses. Buildings on education campuses for which the main use is not classroom are included in the category relating to their use. For example, administration buildings are part of "Office," dormitories are "Lodging," and libraries are "Public Assembly."	elementary or middle school, high school, college or university, preschool or daycare, adult education, career or vocational training, religious education
Food Sales	Buildings used for retail or wholesale of food.	grocery store or food market, gas station with a convenience store, convenience store,
Food Service	Buildings used for preparation and sale of food and beverages for consumption.	fast food, restaurant or cafeteria, bar, catering service or reception hall, coffee, bagel, or doughnut shop, ice cream or frozen yogurt shop
Health Care (Inpatient)	Buildings used as diagnostic and treatment facilities for inpatient care.	hospital, inpatient rehabilitation
Health Care (Outpatient)	Buildings used as diagnostic and treatment facilities for outpatient care. Medical offices are included here if they use any type of diagnostic medical equipment (if they do not, they are categorized as an office building).	medical office (see previous column), clinic or other outpatient health care, outpatient rehabilitation, veterinarian
Lodging	Buildings used to offer multiple accommodations for short-term or long-term residents, including skilled nursing and other residential care buildings.	motel or inn, hotel, dormitory, fraternity, or sorority, retirement home, nursing home, assisted living, or other residential care, convent or monastery, shelter, orphanage, or children's home, halfway house
Mercantile (Retail Other Than Mall)	Buildings used for the sale and display of goods other than food.	retail store, beer, wine, or liquor store, rental center, dealership or showroom for vehicles or boats, studio/gallery
Mercantile (Enclosed and Strip Malls)	Shopping malls comprised of multiple connected establishments.	enclosed mall, strip shopping center
Office	Buildings used for general office space, professional office, or administrative offices. Medical offices are included here if they do not use any type of diagnostic medical equipment (if they do, they are categorized as an outpatient health care building).	administrative or professional office, government office, mixed-use office, bank or other financial institution, medical office (see previous column), sales office, contractor's office (e.g. construction, plumbing, HVAC), non-profit or social services, city hall or city center, religious office, call center
Public Assembly	Buildings in which people gather for social or recreational activities, whether in private or non-private meeting halls.	social or meeting (e.g. community center, lodge, meeting hall, convention center,senior center), recreation (e.g. gymnasium, health club, bowling alley, ice rink, field house, indoor racquet sports), entertainment or culture (e.g. museum, theater, cinema, sports arena, casino, night club), library, funeral home, student activities center, armory, exhibition hall, broadcasting studio, transportation terminal
Public Order and Safety	Buildings used for the preservation of law and order or public safety.	police station, fire station, jail, reformatory, or penitentiary, courthouse or probation office
Religious Worship	Buildings in which people gather for religious activities, (such as chapels, churches, mosques, synagogues, and temples).	No subcategories collected
Service	Buildings in which some type of service is provided, other than food service or retail sales of goods	vehicle service or vehicle repair shop, vehicle storage/ maintenance (car barn), repair shop, dry cleaner or laundromat, post office or postal center, car wash, gas station, photo processing shop, beauty parlor or barber shop, tanning salon, copy center or printing shop, kennel
Warehouse and Storage	Buildings used to store goods, manufactured products, merchandise, raw materials, or personal belongings (such as self-storage).	refrigerated warehouse, non-refrigerated warehouse, distribution or shipping center
Other	Buildings that are industrial or agricultural with some retail space; buildings having several different commercial activities that, together, comprise 50 percent or more of the floorspace, but whose largest single activity is agricultural, industrial/ manufacturing, or residential; and all other miscellaneous buildings that do not fit into any other category.	airplane hangar, crematorium, laboratory, telephone switching, agricultural with some retail space, manufacturing or industrial with some retail space, data center or server farm
Vacant	Buildings in which more floorspace was vacant than was used for any single commercial activity at the time of interview. Therefore, a vacant building may have some occupied floorspace.	No subcategories collected, but a question was asked to determine whether the building was completely vacant.

Scope 1 Emissions from Stationary Combustion Sources - HELP SHEET

DEFINITION

Combustion emission sources are stationary sources that combust fuel, like a natural gas hot water heater for an office building or an oil burning boiler. Emissions result from the actual combustion of the fuels to produce useful products, like heat and hot water.

COLLECT

To account for these sources, collect information about the type of fuel used and the quantity of fuel combusted at each facility. Sources of data can vary, but the data are often provided by the utility organization that supplies the fuel to the organization. A monthly natural gas bill, for example, can be used to provide information regarding how much natural gas was purchased for the previous billing cycle.

Data Collection Checklist (for all facilities)

- Type of fuel consumed
- Amount of fuel consumed

QUANTIFY

After the data has been collected, it should be entered into the appropriate orange colored boxes of the Calculator section titled "Stationary Combustion." The fuel type can be selected from the form. After the data are entered into the Calculator, the CO_2 equivalent emissions are displayed in the blue colored box.

Items to Note

- Use the heat content sheet to convert units provided on the invoice into the units the Calculator requires.
- If you are one of many tenants in a facility and you do not have the actual amount of fuel used in your space, you may estimate your fuel usage by multiplying the fuel usage of the entire facility by the percentage of the floor area that your organization occupies.
- Companies with home offices can optionally include these spaces in their inventory if the energy use associated with business activities can be reasonably estimated.
- The Energy Information Administration conducts a Commercial Building Energy Consumption Survey and provides average energy consumption by building type per square foot. Use the numbers below to compare against your data or to estimate for natural gas if no data are available. For example, if you have a 1,000 sq ft office suite in the Northeast multiply by 20.6 to get an estimation of 20,600 scf natural gas for a year.

Natural Gas Intensity	standard cubic feet (scf) natural gas / sq ft / year			
Principal Building Activity	**Northeast**	**Midwest**	**South**	**West**
Education	41.5	38.7	21.2	21.9
Food sales	Insufficient Data	75.4	Insufficient Data	Insufficient Data
Food service	Insufficient Data	212.0	152.2	106.4
Health care	58.2	59.4	63.5	54.2
Inpatient	89.5	71.1	76.0	84.0
Outpatient	30.9	34.0	22.8	22.4
Lodging	45.7	44.1	27.1	38.6
Mercantile	41.9	41.4	28.9	37.1
Retail (other than mall)	25.0	26.4	20.0	22.5
Enclosed and strip malls	49.2	58.9	34.2	43.9
Office	20.6	26.3	18.7	18.6
Public assembly	52.6	48.5	28.7	33.5
Public order and safety	Insufficient Data	Insufficient Data	40.2	34.8
Religious worship	33.8	28.6	16.7	17.4
Service	38.2	38.3	51.3	39.1
Warehouse and storage	19.3	27.7	13.5	10.4
Other	38.7	Insufficient Data	21.2	Insufficient Data
Vacant	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data

Source: EIA's Commercial Buildings Energy Consumption Survey (CBECS) 2018, Released September 2022. Table C25: Natural gas consumption and conditional energy intensity by Census region, 2018

https://www.eia.gov/consumption/commercial/data/2018/index.php?view=characteristics

Scope 1 Emissions from Mobile Sources - HELP SHEET

DEFINITION

Mobile sources, like owned or leased cars and heavy duty vehicles generate emissions by burning fuel. The fuel usage for any vehicle that is under the organization's operational control should be reported here as scope 1 emissions. As required by GHG Protocol these emissions are only calculated for the combustion of the fuel (e.g., tank-to-wheel).

COLLECT

Determine the types of vehicles, types and amount of fuel, and the miles driven for each vehicle or vehicle type. Data sources vary but fuel usage is often determined from fuel receipts or purchase records and provided in gallons, and mileage from vehicle records. Mileage or fuel use can also be estimated based on vehicle fuel economy from the manufacturer or www.fueleconomy.gov if the other data sources are not readily available.
www.fueleconomy.gov

Data Collection Checklist (for all vehicles)

- Type and year of vehicle
- Amount of fuel consumed for the inventory reporting period
- Total miles driven for the inventory reporting period

QUANTIFY

Enter the data into the appropriate orange colored boxes of the Calculator section titled "Mobile Sources." If the organization owns or leases biofuel or ethanol vehicles, the percentage of biologically-based fuel should be entered into the boxes provided; default values are available if needed. Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colored box. Biomass CO_2 emissions are calculated and summarized in the green colored box, and are typically not summed into the organization's total GHG emissions because they are considered to be a net zero emission source.

Vehicle Classification Guidelines

Pickups, Vans, and SUVs should be classified as "Light Trucks"
Trucks weighing more than 8,500 lb should be classified as "Heavy- Duty Trucks"
Non-highway vehicles should be classified as "Other Offroad Equipment"

Items to Note

- Vehicle Classification Guidelines

  Trucks weighing more than 8,500 lb should be classified as "Heavy- Duty Vehicles"
  Pickup trucks, vans, and SUVs should be classified as "Light-Duty Trucks"
  Non-highway vehicles should be classified as "Construction Equip."
- Fuel usage and mileage is reported the same for hybrid vehicles as for conventional vehicles. If you are estimating mileage or fuel usage keep in mind the fuel efficiency.
- If your organization owns a private jet or plane it should be included here. Depending on the fuel it uses, pick the appropriate type from the drop down menu (i.e., Aviation Gasoline Aircraft, Jet Fuel Aircraft).
- If you are using biodiesel or ethanol, the percentage of biodiesel and ethanol should be filled out accordingly. If you are using these fuels in pure form, then you would enter 100%. If you are using a mixture of biodiesel and petroleum diesel, or a mixture of ethanol and gasoline then you would enter the biodiesel or ethanol percentage in that mixture. For example, B100 is 100% biodiesel, likewise B20 is 20% biodiesel. This is similar for ethanol, E85 is 85% ethanol.
- The Vehicle Type column is organized in order of most common vehicle types and their fuels.

Scope 1 Emissions from Refrigeration and Air Conditioning Equipment - HELP SHEET

DEFINITION

Refrigeration and Air Conditioning (AC) equipment sources can vary in size based on the type of organization. Emissions from refrigeration and AC devices, in facilities or vehicles, are caused by the leakage of chemicals with global warming impact during use, maintenance and/or disposal of the device. They are often small sources for office-based organizations. For example, a small office building may have one rooftop AC unit while a grocery store chain may have several rooftop AC units per store as

COLLECT

Choose one of three different calculation methods available in the "Refrigeration and AC" section of the Calculator. The types of refrigerants along with the data needs for each method are listed in the Calculator. Data for these sources is often collected from maintenance and inspection records, work orders, or invoices from contractors that service this equipment. Refrigerants not included on the list may be chemicals that do not need to be included in the inventory. For example, ozone depleting substances, such as chlorofluorocarbons (CFCs) or "freon" and hydrochlorofluorocarbons (HCFCs), are regulated internationally and are typically excluded from a GHG inventory or reported as a memo item. A reason to track these sources is to provide explanation for the increase of HFCs and PFCs when they replace the

Data Collection Checklist (by equipment)

- Refrigerant purchase, inventory, and disposal data
- Inventory of equipment by facility
- Refrigerant capacity of equipment
- Amount of refrigerant (HFC and PFC) emitted over the inventory reporting period
- Optional: Track HCFC and CFCs, such as R-22

QUANTIFY

Determine which of the three options is suitable for your business and enter the data into the appropriate orange colored boxes of the Calculator section titled "Refrigeration and AC." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colored box.

Option 1: The Detailed Material Balance Method is recommended for companies who maintain their own equipment. This method requires data from inventories, purchase and service records, and the full and proper charges of equipment. It includes emissions from equipment operation, servicing, and disposal.

Option 2: The Simplified Material Balance Method is recommended for companies who have contractors service their HFC/PFC containing equipment. This method tracks emissions from equipment operation, servicing, and disposal. The method requires data on the quantity of refrigerant: (a) used to fill new equipment during installation, (b) used to service equipment, and (c) recovered from retiring equipment, as well as the full and proper charges of new and retiring equipment. If notified in advance of the need for this information, the contractor should be able to

Option 3: It is recommended that the Screening Method be used only as a screening tool because the emission factors used in the approach are highly uncertain. Emission factors vary between individual pieces of equipment and over time. Even if the amount of refrigerant added to a piece of equipment has been tracked carefully, permitting the previous leak rate of that equipment to be established, that leak rate can change after a leak is repaired or as the equipment ages.

Items to Note

- If you are one of many tenants in a facility and you cannot quantify the refrigerant emissions specific to your space, you may estimate them based on the percentage of the floor area that your organization occupies.
- Emissions from refrigerants in an office-based organization are typically less than 2 percent of emissions. Consider this as you decide which Option is most appropriate.
- If your organization uses a refrigerant that is not listed, the user may need to determine the constituent blend. This website lists common refrigerant compositions:
  http://www.epa.gov/ozone/snap/refrigerants/refblend.html
- R-134a is the predominantly used refrigerant in vehicle AC systems. If you are uncertain of which refrigerant your vehicles use, you can assume R-134a.

Back to Intro | Back to Data Entry

Scope 1 Emissions from Fire Suppression Equipment - HELP SHEET

DEFINITION

Fire suppression emission sources can range in scale from a small portable fire extinguisher to a large scale fire suppression system for an office building or warehouse. The emissions are caused by chemicals (e.g., HFCs or CO_2) emitted from fire suppression devices during use, maintenance, and disposal.

COLLECT

Choose one of three different calculation methods available in the "Fire Suppression" section of the Calculator. In each method, choose the types of fire suppression gases used and then gather the corresponding emissions data. Data for these sources is often collected from maintenance and inspection records, work orders, or invoices from contractors that service this equipment.

Data Collection Checklist (by equipment and/or facility)

- Fire suppressant purchase, inventory, and disposal data
- Inventory of equipment by facility
- Fire suppressant capacity of equipment
- Amount of fire suppressant (HFC and PFC) emitted over the inventory reporting period

QUANTIFY

Enter the data into the appropriate orange colored boxes of the Calculator section titled "Fire Suppression." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colored box.

Items to Note

- Contact the manufacturer if you cannot find the list of propellants or chemicals used in the fire extinguisher.

Back to Intro Back to Data Entry

Scope 1 Emissions from Purchased Gases - HELP SHEET

DEFINITION

Industrial gases are sometimes used in processes such as manufacturing, testing, or laboratory uses. For example, CO_2 gas is often used in welding operations. These gases are typically released to the atmosphere after use. Any releases of the seven major greenhouse gases (CO_2, CH_4, N_2O, PFCs, HFCs, SF_6 and NF_3) must be included in the GHG inventory. Ozone depleting substances, such as CFCs and HCFCs, are regulated internationally and are typically excluded from a GHG inventory or reported as a memo item.

COLLECT

Determine if CO_2, CH_4, N_2O, PFCs, HFCs, SF_6 or NF_3 are used in processes such as those mentioned above. If so, collect the mass of gas purchased. If data are not available in mass units, the user may need to convert from volume to mass using the density of the specific gas.

Data Collection Checklist (for all applicable facilities)

- Type of gas purchased
- Amount of gas purchased
- Purpose for the gas

QUANTIFY

Enter the data into the appropriate orange colored boxes of the Calculator section titled "Gas." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colored box.

Items to Note

- If your business makes bulk purchases and plans on using the gas for several years, you should divide the bulk amount by the years of usage and report that amount.

EPA CENTER FOR CORPORATE CLIMATE LEADERSHIP
U.S. Environmental Protection Agency

Scope 2 Emissions from Purchase of Electricity - HELP SHEET

DEFINITION

GHGs are emitted when fossil fuels are combusted to generate electricity. Companies account for their responsibility for these emissions by reporting them as scope 2 indirect emissions. This Calculator quantifies emissions from both the location-based method and the market-based method, and both totals should be reported. The location-based method considers average emission factors for the electricity grids that provide electricity. The market-based method considers contractual arrangements under which the organization procures power from specific sources, such as renewable energy. Market-based emission factors reflect these arrangements. Examples of market-based emission factors are: renewable energy certificates (RECs), power purchase agreements (PPAs), and supplier-specific factors. For detailed information on the location-based method and the market-based method review EPA's Indirect Emissions from Purchased Electricity Guidance (link at the bottom of this sheet).

COLLECT

Collect electricity purchase information in units of kWh for each facility. The best data source is typically its electricity bill or invoice. In the Calculator, there is a map at the bottom of the "Electricity" section which divides the United States into subregions based on the electric grid. Select the subregion(s) in which the organization's facilities are located to determine the correct CO_2, CH_4, and N_2O emission factors to use, since different parts of the country use different fuels to generate electricity. Multiple facility locations can be entered as separate line items in the Calculator. If a facility is on the border of a subregion, enter the zip code into EPA's Power Profiler (https://oaspub.epa.gov/powpro/ept_pack.charts) to find the correct subregion.

Data Collection Checklist (for all facilities)

- Amount of electricity purchased
- Amount of electricity purchased using contractual arrangements
- Emission factors (CO_2, CH_4 and N_2O) for contractual arrangements

QUANTIFY

There are two methods to quantify emissions from electricity: location-based and market-based. Both must be quantified to be in accordance with the Center for Corporate Climate Leadership Greenhouse Gas Inventory Guidance.

Location-based: Enter the data into the appropriate orange colored boxes (Table 1) of the Calculator section titled "Electricity." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colored box for the location based method.

Market-based: Enter applicable market-based emission factors (lb/MWh) for the purchased electricity in the yellow cells (Table 1) of the Calculator section titled "Electricity." See the market-based method Help sheet for additional guidance. Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colored box for the market-based method.

HELP - Market-Based Method

Items to Note

- If you are one of many tenants in a facility and you do not have the actual amount of electricity used in your space, you may estimate your usage by multiplying the electricity usage of the entire facility by the percentage of the floor area that your organization occupies.
- The number off the utility bill to use is the total usage amount (i.e., the difference between the meter reading at the beginning of the month and the end of the month).
- Companies with home offices can optionally include these spaces in their inventory if the energy use associated with business activities can be reasonably estimated.
- The Energy Information Administration conducts a Commercial Building Energy Consumption Survey and provides average energy consumption by building type per square foot. Use the numbers below to compare against your data or to estimate if no data are available. For example, if you have a 1,000 sq ft office suite in the Northeast multiply by 17.1 to get an estimation of 17,100 kWh electricity for a year.

Electricity Intensity	kWh electricity / sq ft / year			
Principal Building Activity	**Northeast**	**Midwest**	**South**	**West**
Education	7.9	8.1	11.4	9.0
Food sales	Insufficient Data	67.3	53.7	Insufficient Data
Food service	29.7	43.0	52.7	36.9
Health care	19.0	25.0	27.3	22.2
Inpatient	22.4	28.3	32.2	29.5
Outpatient	15.9	18.6	19.6	15.9
Lodging	13.7	14.8	15.2	13.2
Mercantile	15.1	15.4	17.8	17.2
Retail (other than mall)	11.3	12.7	15.3	13.0
Enclosed and strip malls	17.9	18.9	20.2	20.1
Office	13.8	12.0	15.4	12.5
Public assembly	9.6	11.6	15.1	9.4
Public order and safety	Insufficient Data	Insufficient Data	16.7	11.6
Religious worship	5.1	4.2	5.4	4.2
Service	7.3	5.7	9.0	7.6
Warehouse and storage	6.0	5.2	6.5	5.5
Other	31.4	24.0	25.3	45.5
Vacant	Insufficient Data	4.2	4.9	Insufficient Data

Source: Commercial Buildings Energy Consumption Survey (CBECS) 2012, Released September 2022, Table C15. Electricity consumption and conditional energy intensity by Census region, 2018

https://www.eia.gov/consumption/commercial/data/2018/index.php?view=characteristics

Refer to the Greenhouse Gas Inventory Guidance: Indirect Emissions from Purchased Electricity Guidance for more information.
https://www.epa.gov/climateleadership/scope-1-and-scope-2-inventory-guidance

Market-Based Method - HELP SHEET

Market-Based Electricity Emission Factors

The market-based method considers contractual arrangements under which the organization procures electricity from specific sources, such as fossil, renewable, or other generation facilities. Market-based emission factors reflect these arrangements. The following are the types of market-based emission factors available, listed in order of preference based on the precision of the factors. If any of the first four types of emission factors are applicable, enter the factors in the yellow cells marked as "<enter factor>". If not, leave the yellow cells as is, and eGRID subregion factors will be used for market-based emissions.

(1) Energy Attribute Certificates	If an energy attribute certificate carries with it an emission factor, that factor can be used to quantify emissions in the market-based method. Examples are renewable energy certificates (RECs) or Guarantees of Origin (GOs). The emission factor is based on the specific source that the certificate represents, regardless of the energy resource used. Typically these certificates represent renewable energy and may have an emission factor of zero, but they may in some cases have a non-zero emission factor (e.g., if there is a fossil-fuel or biomass
(2) Contracts	An organization may have a contract, such as a power purchase agreement (PPA), to purchase electricity from a specified generating facility, which may be located at the organization's facility, at a nearby location with a direct line connection to the organization, or located remotely. If there are no certificates available, the contract itself carries the emission factor associated with the generation facility, regardless of the energy resource used. If certificates are used, see Energy Attribute Certificates above.
(3) Supplier-Specific Emission Factor	An electricity supplier, such as a regulated utility or a deregulated supplier, may provide information to its customers on the emission factor associated with its electricity product. To be used in the market-based method, the emission factor must include all the electricity delivered by the supplier, including electricity it generates as well as electricity it purchases from others.
(4) Residual Mix Factor	A residual mix emission factor represents the emissions and generation that remain after certificates, contracts, and supplier-specific factors have been claimed and removed from the calculation. Residual mix emission factors are currently not widely available. Organizations are encouraged to check for available residual mix factors each year when their GHG inventory is completed, if the options above are not available or relevant.
(5) Regional Emission Factor	If residual mix factors are not available, organizations can use a regional grid average emission factor as the default. This Calculator will use eGRID subregion emission factors in this case.
(6) National Emission Factor	This should not be applicable for any companies reporting US based emissions, due to the availability of regional emission factors.

Quality Criteria for Contractual Instruments

All contractual instruments used in the market-based method must meet the following criteria:

(1) Convey the direct GHG emission rate attribute associated with the unit of electricity produced.
(2) Be the only instruments that carry the GHG emission rate attribute claim associated with that quantity of electricity generation. See the "Items to Note" section of the Help sheet for suggested estimation approaches.
(3) Be tracked and redeemed, retired, or canceled by or on behalf of the reporting entity. This can be done through a tracking system, an audit of contracts, third-party certification, or other means.
(4) Have a vintage that matches as closely as possible to the date of the reporting period to which the instruments are applied. The vintage of the instrument is based on the date of the energy generation that the instrument represents.
(5) Be sourced from the same market in which the reporting entity's electricity-consuming operations are located and to which the instrument is applied. A market is defined as a geographical area which has a common system for trading and retiring contractual instruments. For this purpose the U.S. constitutes a single market, despite regional grid boundaries.

The Indirect Emissions from Purchased Electricity Guidance defines EPA best-practice quality recommendations that go beyond these minimum requirements.

Items to Note

- EPA encourages organizations to use renewable energy as a way to reduce the environmental impacts associated with the electricity they purchase. Organizations can reduce their market-based scope 2 emissions by purchasing renewable energy, or "green power." They can do this by choosing a differentiated electricity product from their utility or electricity supplier, by contracting directly with a renewable energy generator (if the regulatory rules allow), or by purchasing unbundled renewable energy certificates (RECs). In any case, the RECs must be acquired and retired.

An Example

In a situation where an organization has procured electricity from a specific source that is relevant to report for the market-based method, but the source supplies less than 100% of the kWh consumed by the facility, it is important to enter the data correctly. Consider the following scenario:

- 100,000 kWh total facility consumption for Building A. 25,000 kWh purchased with energy attribute certificates such as renewable energy certificates (RECs).
- 50,000 kWh total facility consumption for Building B. All electricity purchased from the local utility.
- Emission factors for RECs from many RE sources are zero.
- No other market-based emission factors are available.

The table below shows how to enter the data for these example sites. There are two rows entered for the Building A in order to allocate the market-based emissions to the appropriate kWh.
The total Electricity Purchased (kWh) of the two rows adds up to Building A's total consumption. Be careful not to double count kWh.
The REC emission factors are entered in the first row. In the second row, the supplier-specific emission factor for the local utility is entered.
In the third row, electricity is purchased from the grid with no market-based mechanism, so market-based emissions are equal to location-based emissions.

Table 1. Total Amount of Electricity Purchased by eGRID Subregion

					Market-Based						Location-Based					
					Emission Factors			Emissions			Emission Factors			Emissions		
Source ID	Source Description	Source Area (sq ft)	eGRID Subregion *where electricity is consumed*	Electricity Purchased (kWh)	CO_2 Emissions (lb/kWh)	CH_4 Emissions (lb/kWh)	N_2O Emissions (lb/kWh)	CO_2 Emissions (lb)	CH_4 Emissions (lb)	N_2O Emissions (lb)	CO_2 Emissions (lb/kWh)	CH_4 Emissions (lb/kWh)	N_2O Emissions (lb/kWh)	CO_2 Emissions (lb)	CH_4 Emissions (lb)	N_2O Emissions (lb)
Building A	Wind Farm RECs	6,000	RFC West	25,000	0	0	0	0.0	0.0	0.0	1,000.1	0.087	0.012	25,001.3	2.2	0.3
Building A	Local Utility Specific Factor	6,000	RFC West	75,000	800	0.060	0.010	60,015.0	4.5	0.8	1,000.1	0.087	0.012	75,004.0	6.5	0.9
Building B	Unknown	2,000	ERCOT All	50,000	<enter factor>	<enter factor>	<enter factor>	38,564.2	2.5	0.4	771.1	0.049	0.007	38,564.2	2.5	0.4
Total Emissions for All Sources								**98,579.2**	**7.0**	**1.1**				**138,569.5**	**11.2**	**1.6**

GHG Emissions

CO_2 Equivalent Emissions (metric tons)	
Location-Based Electricity Emissions	**63.2**
Market-Based Electricity Emissions	**44.9**

Refer to the Greenhouse Gas Inventory Guidance: Indirect Emissions from Purchased Electricity Guidance for more information.
https://www.epa.gov/climateleadership/center-corporate-climate-leadership-greenhouse-gas-inventory-guidance

Scope 2 Emissions from Purchase of Steam - HELP SHEET

DEFINITION

Similar to electricity production, GHGs are emitted when fossil fuels are combusted to generate heat or steam. If the organization purchases heat or steam, the emissions are accounted for as scope 2 indirect emissions. Also similar to electricity, both the location-based method and the market-based method should be calculated and reported as done in this Calculator. Typically supplier-specific emission factors for steam will apply to both location-based and market-based emissions, and no market-based emission factors need to be entered. If needed, see the market-based method Help Sheet for more information.

COLLEC

Determine the amount of steam purchased, the types of fuel that the steam supplier uses to generate the steam, and either the emission factors provided by the steam supplier or the boiler efficiency. If values for boiler efficiency are unavailable, a default of 80% is provided in the Calculator.

Data Collection Checklist (for all facilities)

- Amount of steam purchased
- Fuel type used to generate steam
- Boiler efficiency or supplier-specific emission factors

QUANTIFY

Enter the data into the appropriate orange colored boxes (Table 1) of the Calculator section titled "Steam." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colored box. Enter the market-based emission factors in the yellow cells if applicable.

Items to Note

- Use the heat content sheet to convert units provided on the invoice into the units the Calculator requires.
- If you are one of many tenants in a facility and you do not have the actual amount of steam used in your space, you may estimate your usage by multiplying the steam usage of the entire facility by the percentage of the floor area that your organization occupies.

Scope 3 Emissions from Business Travel - HELP SHEET

DEFINITION

Scope 3 business travel emissions differ from the scope 1 mobile source emission reporting in that they account for business travel in vehicles not owned or leased by the organization, such as taxis, trains, commercial airplanes, and personal vehicles used for sales.

COLLECT

Collect information about business travel method. Travel by vehicle-miles is used when the employee is traveling in a personal vehicle. Travel by passenger-mile is used when the employee is traveling in a vehicle shared with many other people (i.e., bus, train or plane). For travelers that use a personal vehicle, choose the vehicle type from the Calculator and collect data for the vehicle miles during the reporting period. For rail, bus, and air travel, the mode of travel should be selected from the Calculator options and an estimate of the passenger mileage data provided for each.

Data Collection Checklist (for all employee travel)

- Type of transport (personal vehicle, train, bus, plane)
- Miles traveled for each transport type. For air travel, mileage should ideally be determined considering each flight segment individually. If you use a travel agent, they may have these data in their records.

QUANTIFY

Enter the data into the appropriate orange colored boxes (Tables 1-3) of the Calculator section titled "Business Travel." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the green colored box. The emission factors included for air travel do not include radiative forcing. Per the GHG Protocol, for air travel emission factors, multipliers or other corrections to account for radiative forcing may be applied to the GWP of emissions arising from aircraft transport. If applied, companies should disclose the specific factor used.

Scope 3 Emissions from Employee Commuting - HELP SHEET

DEFINITION

Employee commuting emissions differ from the required mobile source emission reporting in that they account for employee travel to and from work in vehicles not owned or leased by the organization, including personal vehicles, buses,

COLLEC

Collect information about each employee's commuting method. If not all employees can provide information on their commuting habits, you can calculate an average per employee and multiply by total employees to estimate. For commuters that use a personal vehicle, the appropriate vehicle type should be selected from the Calculator and data collected for the vehicle-miles during the reporting period. For rail, bus, and air travel, the mode of transport should be selected from the Calculator options and an estimate of the passenger mileage data provided for each.

Data Collection Checklist (per Employee)

- Commuting days per year (consider vacation, sick time and business travel)
- Mode of transport (this may be multiple modes of transport)
- Round trip mileage

QUANTIFY

After the data has been collected, enter the data into the appropriate orange colored boxes (Tables 1-2) of the Calculator section titled "Commuting." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the green colored box.

Items to Note

- Commuting by vehicle-miles is used when the employee is traveling in their own vehicle. Travel by passenger-mile is used when the employee is traveling in a vehicle shared with many other people (i.e., bus, train or plane).
- If employees carpool, only their portion of the mileage should be included in the GHG inventory. For example, if one of your employees drives 10 miles alone to meet two other people (not employees) to carpool and then drives 30 miles to work then the organization should include 20 miles (10 miles + 30 (1/3)) in the corporate inventory.
- If collecting data from all your employees is not possible due to the size of your organization, you may collect data from as many employees as possible, and use that sample to estimate for the rest of the employees. Make sure the sample size is adequate, and keep in mind this will calculate less accurate results.

Scope 3 Emissions from Upstream Transportation and Distribution - HELP SHEET

DEFINITION

Scope 3 emissions from upstream transportation and distribution include all product transportation between product/materials origin to end customers by vehicles not owned or leased by the organization. For example, the organization could hire another company to transport product from the manufacturing location to distribution centers or final markets. (Note: If an organization owns or leases the trucks or other transport vehicles, these would be part of its scope 1 mobile source emissions). Another example of product transport is paying a courier to transport documents from one office to another. While this category does include emissions from warehousing of products, there is not currently a place to account for those emissions in this Calculator.

COLLECT

Collect information about shipment methods (on-road vehicle, waterborne craft, freight rail, or aircraft). For road shipments the user may enter data based on vehicle mileage or ton-miles of product transported. If the vehicle mileage option is chosen, then the organization should select the type of vehicle and enter the total mileage for that vehicle type. The ton-miles option is only applicable for heavy-duty trucks and the organization need only enter the total ton-miles traveled. For product transport via freight rail, waterborne, or air transport, the organization should enter the total ton-miles data.

Data Collection Checklist

- All product transport legs (origin and destination) and mileage
- Mode of transport per leg
- Weight transported per shipment for ton-mile calculation

QUANTIFY

Enter the data into the appropriate orange colored boxes (Tables 1-2) of the Calculator section titled "Upstream Transpt. and Dist." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the green colored box.

Items to Note

- To calculate ton-miles, multiply the weight transported (short tons) by the distance (miles) for each individual shipment. In Table 2, you can enter data either for individual shipments, or for the sum of ton-miles for multiple shipments.
- If you do not have shipment-by-shipment data, you may multiply **total** tons transported by the **average** miles per shipment. You may also multiply **average** tons transported per shipment times the **total** miles transported. Do not multiply **total** tons by **total** miles, as this will give an incorrect result.
- **Example**: Every week a company ships 10 short tons of product 100 miles. That equates to 52 shipments per year of 1,000 ton-miles each. The sum of the individual shipments is 52,000 ton-miles per year. Multiplying the total tons transported (520 tons) by the average miles per shipment (100 miles) provides the correct result of 52,000 ton-miles. Multiplying the average tons transported per shipment (10 tons) times the total miles (5,200 miles) also gives the correct result. Multiplying total tons (520 tons) by total miles (5,200 miles) gives an incorrect result.

Scope 3 Emissions from Waste - HELP SHEET

DEFINITION

Scope 3 emissions from waste include the disposal and treatment of waste generated in the reporting company's operations in the reporting year in facilities not owned or controlled by the reporting company. These emission factors align with the requirements of the GHG Protocol Scope 3 Standard. The emission factors do not include any avoided emissions impact from any of the disposal methods. All the factors presented include transportation emissions, which are optional in the Scope 3 Calculation Guidance, with an assumed average distance traveled to the processing facility. AR4 GWP values are used to convert all waste emission factors into CO_2e.

COLLECT

Collect information on the amount of weight disposed at your facilities, by the type of waste (plastics, paper, etc.) and disposal method (recycling, incineration, etc.). Refer to the Emission Factors tab for a complete list of materials and available disposal methods.

Data Collection Checklist

- Weight of waste disposed by material type and disposal method

QUANTIFY

Enter the data into the appropriate orange colored boxes (Tables 1) of the Calculator section titled "Waste." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the green colored box.

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Purchased Offsets - HELP SHEET

DEFINITION

Offsets are project-based emission reductions and/or removals that occur outside the organizational boundary of the reporting organization. Offsets can be purchased by an organization to offset emissions from scope 1, scope 2, and/or scope 3 sources.

COLLECT

Quantity of offsets purchased in metric tons CO_2 equivalent for each offset project by scope 1, 2, or scope 3 category.

QUANTIFY

Enter the data into the appropriate orange colored boxes (Table 1) of the Calculator section titled "Offsets." Once the data are entered into the Calculator, the CO_2 equivalent emissions are summarized in the green colored box by scope and category.

EPA Simplified GHG Emissions Calculator ("the Calculator") April 2024

Tennessee Army National Guard Volunteer Training Site Milan - 2023 Data

EPA Simplified GHG Emissions Calculator ("the Calculator")

April 2024

The EPA Simplified GHG Emissions Calculator ("the Calculator") is designed as a simplified calculation tool to help organizations estimate and inventory their annual greenhouse gas (GHG) emissions for US-based operations. All methodologies and default values provided are based on the most current Center for Corporate Climate Leadership Greenhouse *Gas Inventory Guidance Documents* and the *Emission Factors Hub* . The Calculator will quantify the direct and indirect emissions from sources at an organization when activity data are entered into the various sections of the workbook for one annual period.

Before entering data, please: 1) Enable Macros and 2) Familiarize yourself with the S*implified Guide to GHG Management for Organizations.*

Access the guide: https://www.epa.gov/system/files/documents/2022-09/Simplified_Guide_GHG_Management_Organizations.pdf

The simplified guide presents more details and information covered in the calculator; please check the guide for more info if you have questions

There are three primary steps in completing a GHG inventory. Each emissions source also has these three steps.

(1) **DEFINE**: The first step in completing a GHG inventory is to determine the boundaries and emissions sources included within those boundaries. After you have defined your organizational and operational boundaries, you can use the questions on the "Boundary Questions" worksheet to help you determine which emissions sources are relevant to your business.

Go to Boundary Questions

(2) **COLLECT**: The second step is to collect data for the defined annual period. This step is typically the most time consuming, since the data can be difficult to gather. This Calculator has help sheets with suggestions and guidance for each emissions source and a general help sheet for data management. **Click the drop down menu boxes below to navigate to these sheets**.

Help - Market-Based Method

(3) **QUANTIFY**: The third step is to calculate emissions. This Calculator is designed to complete the emissions quantification step for you. Once the user enters data in this MS Excel spreadsheet, the emissions will be calculated and totaled on the "Summary" sheet.

Calculator Guidance - Important Information

(A) Navigate to the data entry sheets using the drop down menu in the dark grey cell below and then clicking on the "Go To Data Entry Sheet" button. On the data entry sheets enter data in ORANGE cells only.

(B) This Calculator has several "Tool Sheets" with useful reference data such as unit conversions, heat contents, and emission factors. Click on the buttons below to go to the appropriate Tool Sheet.

(C) Data must be entered in the units specified on the data entry sheets. Use the "Unit Conversions" or "Heat Content" sheets if unit conversion is necessary prior to entering data into the Calculator.

(D) If more guidance is needed, you can reference the emission factor data sources found on the "Emission Factors" sheet.

Tool Sheets	Quick Data Entry Navigation
Unit Conversions	Stationary Combustion
Heat Content	
Emission Factors	

Calculator Notes

Emission sources of all seven major GHGs are accounted for in the inventory and in this Calculator: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3). The Calculator allows the user to estimate GHG emissions from scope 1 (direct), scope 2 (indirect), and some scope 3 (other indirect) sources.

The Calculator uses U.S.-specific cross-sector emission factors from the *Emission Factors Hub* . Many industrial sectors also have process-related emissions sources that are specific to their sector. EPA's Greenhouse Gas Reporting Program provides guidance and tools that can aid in the calculation and reporting of these emissions:

https://www.epa.gov/ghgreporting

The GHG Protocol also provides guidance on calculating emissions from industrial processes.

Back to Intro

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Operational Boundary Questions - Emissions Sources to Include

Guidance
Use the questions below to help you determine which emissions sources should be included in the inventory.

Emissions Source Questions
A typical office-based organization will likely have the following (scope 1 and scope 2) emissions sources:

- Stationary Combustion
- Refrigeration and AC
- Electricity

If you answer "yes" to a question below, that emissions source should be included in your inventory. For each facility within the defined organizational boundary, collect the necessary data for the selected time period. Use the corresponding Excel sheet to quantify these emissions.

Tip: you may need to ask your landlord about heating sources, steam purchased and refrigerants

Stationary Combustion	**Yes or No?**
Do you have facilities that burn fuels on-site (e.g., natural gas, propane, coal, fuel oil for heating, diesel fuel for backup generators, biomass fuels)?	Y
Mobile Sources	
Do any vehicles fall within your organizational boundary? This can include cars, trucks, propane forklifts, aircraft, boats. Only vehicles owned or leased by your organization should be included here.	Y
Refrigeration and Air Conditioning	
Do your facilities use refrigeration or air conditioning equipment?	Y
Fire Suppression	
Do your facilities use chemical fire suppressants?	N
Purchased Gases	
Do you purchase any industrial gases for use in your business? These gases may be purchased for use in manufacturing, testing, or laboratories.	N
Electricity	
Does your inventory include facilities that use electricity?	Y
Steam	
Market-Based Emission Factors (entered on Electricity and or Steam tabs)	
Do you purchase renewable energy certificates (RECs) or green power products? Do you purchase electricity through a power purchase agreement (PPA)? Do you have supplier-specific emission factors?	N

The questions below refer to scope 3 emissions sources and offsets. If you answer "yes" you may choose whether or not to include these emissions sources in your inventory. Use the corresponding sheet to enter data.

Business Travel	**Yes or No?**
Do your employees travel for business using transportation other than owned or leased vehicles (e.g., commercial airline flights, rental cars, trains)?	Y
Employee Commuting	
Do your employees commute to work in personal vehicles or use public transportation?	Y
Upstream Transportation and Distribution	
Do you hire another company to transport products or other materials to or from your	Y
Waste Generated in Operations	
Do you generate waste that is disposed of in a facility owned by another organization?	Y
Offsets	
Do you purchase greenhouse gas offsets?	N

Back to Intro

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Emissions Summary

Guidance

The total GHG emissions from each source category are provided below. You may also use this summary sheet to fill out the *Annual GHG Inventory Summary and Target Tracking Form* (.xls) as this Calculator only quantifies one year of emissions at a time. The form is available here: https://www.epa.gov/climateleadership/target-setting

By entering the data below into the appropriate cell of the *Annual GHG Inventory Summary and Target Tracking Form,* you will be able to compare multiple years of data.

If you have multiple Calculator files covering sub-sets of your inventory for a particular reporting period, sum each of the emission categories (e.g. Stationary Combustion) to an organizational total, which then can be entered into the *Annual GHG Inventory Summary and Target Tracking Form*.

(A) Enter organization information into the orange cells. Other cells on this sheet will be automatically calculated from the data entered in the sheets in this workbook. Blue cells indicate required emission sources if applicable. Green cells indicate scope 3 emission sources and offsets, which organizations may optionally include in its inventory.

(B) The "Go To Sheet" buttons can be used to navigate to the data entry sheets.

Organizational Information:

Organization Name:	TNARNG
Organization Address:	Milan, TN
Inventory Reporting Period:	2023
Start:	1/1/2023
End:	12/31/2023
Name of Preparer:	Greg Turner
Contact Information of Preparer:	gregory.m.turner.nfg@army.mil
Date Prepared:	6/6/2024

Summary of Organization's Emissions:

Scope 1 Emissions

		CO_2-e (metric tons)
Go To Sheet	Stationary Combustion	470
Go To Sheet	Mobile Sources	1,537
Go To Sheet	Refrigeration / AC Equipment Use	#N/A
Go To Sheet	Fire Suppression	0
Go To Sheet	Purchased Gases	0

	CO2-e (metric tons)		
	Gross	Offsets	Net
Scope 1 Summary	#N/A	0	#N/A

Scope 2 Emissions

	Location-Based Scope 2 Emissions	CO_2-e (metric tons)
Go To Sheet	Purchased and Consumed Electricity	1,242
Go To Sheet	Purchased and Consumed Steam	0

	CO_2-e (metric tons)		
	Gross	Offsets	Net
Location-Based Scope 2 Summary	1,242	0	1,242

	Market-Based Scope 2 Emissions	CO_2-e (metric tons)
Go To Sheet	Purchased and Consumed Electricity	1,242
Go To Sheet	Purchased and Consumed Steam	0

	CO_2-e (metric tons)		
	Gross	Offsets	Net
Market-Based Scope 2 Summary	1,242	0	1,242

Scope 1 & 2 Summary

	CO_2-e (metric tons)	
	Gross	Net
Total Scope 1 & Location-Based Scope 2	#N/A	#N/A
Total Scope 1 & Market-Based Scope 2	#N/A	#N/A

Scope 3 Emissions

		CO_2-e (metric tons)		
		Gross	Offsets	Net
Go To Sheet	Business Travel	0	0	0
Go To Sheet	Employee Commuting	17	0	17
Go To Sheet	Upstream Transportation and Distribution	0	0	0
Go To Sheet	Waste	1,052	0	1,052

Required Supplemental Information

		CO_2-e (metric tons)
Go To Sheet	Biomass CO_2 Emissions from Stationary Sources	0
Go To Sheet	Biomass CO_2 Emissions from Mobile Sources	0

Scope 1 Emissions from Stationary Combustion Sources

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Guidance

(A) Enter annual data for each combustion unit, facility, or site (by fuel type) in ORANGE cells on **Table 1**. Example entry is shown in first row (*GREEN Italics*).
- Select "Fuel Combusted" from drop down box.
- Enter "Quantity Combusted" and choose the appropriate units from the drop down box in the unit column. If it's necessary to convert units, common heat contents can be found on the "Heat Content" sheet and unit conversions on the "Unit Conversion" sheet.

(B) If fuel is consumed in a facility but stationary fuel consumption data are not available, an estimate should be made for completeness. See the "Items to Note" section of the Help sheet for suggested estimation approaches.

(C) Biomass CO_2 emissions are not reported in the total emissions, but are reported separately at the bottom of the sheet.

Table 1. Stationary Source Fuel Combustion

Source ID	Source Description	Source Area (sq ft)	Fuel Combusted	Fuel State (solid, liquid, gas)	Quantity Combusted	Units
BLR-012	*East Power Plant*	*12,517*	*Natural Gas*	*Gas*	*10,000*	*MMBtu*
47545	VTS Milan, facility natural gas use	1,958,149	Natural Gas	Gas	89,249	Therm
47545	VTS Milan, Boiler	56,000	Natural Gas	Gas	7	Therm

GHG Emissions

Total Organization-Wide Stationary Source Combustion by Fuel Type

Fuel Type	Quantity Combusted	Units
Coal and Coke - Solid		
Sub-bituminous Coal	0	short ton
Lignite Coal	0	short ton
Mixed (Commercial Sector)	0	short ton
Mixed (Electric Power Sector)	0	short ton
Mixed (Industrial Coking)	0	short ton
Mixed (Industrial Sector)	0	short ton
Coal Coke	0	short ton
Other Fuels - Solid		
Municipal Solid Waste	0	short ton
Petroleum Coke (Solid)	0	short ton
Plastics	0	short ton
Tires	0	short ton
Biomass Fuels - Solid		
Agricultural Byproducts	0	short ton
Peat	0	short ton
Solid Byproducts	0	short ton
Wood and Wood Residuals	0	short ton
Gaseous Fuels		
Natural Gas	8,630,330	scf
Propane Gas	0	scf
Landfill Gas	0	scf
Petroleum Products		
Distillate Fuel Oil No. 2	0	gallons
Residual Fuel Oil No. 6	0	gallons
Kerosene	0	gallons
Liquefied Petroleum Gases (LPG)	0	gallons
Biomass Fuels - Liquid		
Biodiesel (100%)	0	gallons
Ethanol (100%)	0	gallons
Rendered Animal Fat	0	gallons
Vegetable Oil	0	gallons

Total Organization-Wide CO_2, CH_4 and N_2O Emissions from Stationary Source Fuel Combustion

Fuel Type	CO_2 (kg)	CH_4 (g)	N_2O (g)
Coal and Coke - Solid			
Mixed (Commercial Sector)	0	0.0	0.0
Mixed (Electric Power Sector)	0	0.0	0.0
Mixed (Industrial Coking)	0	0.0	0.0
Mixed (Industrial Sector)	0	0.0	0.0
Coal Coke	0	0.0	0.0
Other Fuels - Solid			
Municipal Solid Waste	0	0.0	0.0
Petroleum Coke (Solid)	0	0.0	0.0
Plastics	0	0.0	0.0
Tires	0	0.0	0.0
Gaseous Fuels			
Natural Gas	469,835	8,889.2	863.0
Propane Gas	0	0.0	0.0
Landfill Gas	0	0.0	0.0
Petroleum Products			
Distillate Fuel Oil No. 2	0	0.0	0.0
Residual Fuel Oil No. 6	0	0.0	0.0
Kerosene	0	0.0	0.0
Liquefied Petroleum Gases (LPG)	0	0.0	0.0
Total Fossil Fuel Emissions	**469,835**	**8,889.2**	**863.0**
Biomass Fuels - Solid			
Agricultural Byproducts	0	0.0	0.0
Peat	0	0.0	0.0
Solid Byproducts	0	0.0	0.0
Wood and Wood Residuals	0	0.0	0.0
Biomass Fuels - Liquid			
Biodiesel (100%)	0	0.0	0.0
Ethanol (100%)	0	0.0	0.0
Rendered Animal Fat	0	0.0	0.0
Vegetable Oil	0	0.0	0.0
Total Non-Fossil Fuel Emissions	**0**	**0.0**	**0.0**
Total Emissions for all Fuels	**469,835**	**8,889.2**	**863.0**

Total CO_2 Equivalent Emissions (metric tons) - Stationary Combustion	**470.3**
Total Biomass CO_2 Equivalent Emissions (metric tons) - Stationary Combustion	**0.0**

Back to Intro | Back to Summary | Help

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Scope 1 Emissions from Mobile Sources

Guidance

(A) Enter annual data for each vehicle or group of vehicles (grouped by vehicle type, vehicle year, and fuel type) in ORANGE cells in **Table 1** (Example entry is shown in first row of DATA table). Only enter vehicles owned or leased by your organization on this sheet. All data entered on this sheet for employee commuting or business travel is considered a scope 3 emissions source and should be reported in the corresponding scope 3 sheets.
- *Note: The latest mobile combustion factors reflect year 2021 data. Therefore, for all vehicle model years 2022 onward, the 2021 year factor is used.*
- Select "On-Road" or "Non-Road" from the drop down box to determine the Vehicle Types available. You ***must make this selection before picking the vehicle type.***
- Select "Vehicle Type" from drop down box (closest type available).
- Enter "Fuel Usage" and "Miles Traveled" (if applicable) for the vehicle type is selected).
- If mileage or fuel usage is unknown, estimate using approximate fuel economy values from the manufacturer, www.fueleconomy.gov, or the Reference Table below.
- Vehicle year and Miles traveled are not necessary for non-road equipment.

(B) When using biofuels, typically the biofuel (biodiesel or ethanol) is mixed with a petroleum fuel (diesel or gasoline) for use in vehicles. Enter the biodiesel and ethanol percentages of the fuel if known, or leave default values shown below.

Biodiesel Percent:	20	%
Ethanol Percent:	85	%

(C) Biomass CO_2 emissions from biodiesel and ethanol are not reported in the total emissions, but are reported separately at the bottom of the sheet.

Table 1. Mobile Source Fuel Combustion and Miles Traveled

Source ID	Source Description	On-Road or Non-Road?	Vehicle Type	Vehicle Year	Fuel Usage	Units	Miles Traveled
Example	*GC Forklift*	*Non-Road*	*Industrial/Commercial Equipment - Diesel*	*2019*	*1,000*	*gal*	*10,000*
TMKRNG	M1 ABRAMS	Non-Road	Industrial/Commercial Equipment - Diesel		14,640	gal	100
TMKRNG	M2 BRADLEY	Non-Road	Industrial/Commercial Equipment - Diesel		9,678	gal	100
TMKRNG	M113 VARIANTS	Non-Road	Industrial/Commercial Equipment - Diesel		11,640	gal	100
TMKRNG	COMBAT ENGINEER VEH	Non-Road	Industrial/Commercial Equipment - Diesel		3,390	gal	100
TMKRNG	M88 FOV VEHICLES	Non-Road	Industrial/Commercial Equipment - Diesel		6,780	gal	100
TMKRNG	M915	Non-Road	Industrial/Commercial Equipment - Diesel		43,260	gal	100
TMKRNG	M977 V	Non-Road	Industrial/Commercial Equipment - Diesel		7,720	gal	100
TMKRNG	HMMWV	Non-Road	Industrial/Commercial Equipment - Diesel		490	gal	100
TMKRNG	UH60	Non-Road	Aircraft - Jet Fuel		9,680	gal	100
TMKRNG	LUH72	Non-Road	Aircraft - Jet Fuel		895	gal	100

Reference Table: Average Fuel Economy by Vehicle Type

Vehicle Type	Average Fuel Economy (mpg)
Passenger Cars	28.9
Other 2-Axle, 4-Tire Vehicles	19.1
Motorcycles	44.0
Single-unit 2-Axle 6-Tire or More Trucks	7.8
Combination Trucks	6.9
Buses (Diesel Heavy-Duty Vehicles)	6.4

Average mpg values from the U.S. Department of Transportation, Federal Highway Administration, Highway Statistics 2022 (Updated February 2024), Table VM-1.

GHG Emissions

Total Organization-Wide Mobile Source Fuel Usage and CO_2 Emissions (On-Road and Off-Road Vehicles)

Fuel Type	Fuel Usage	Units	CO_2 (kg)
Motor Gasoline	0	gallons	0
Diesel Fuel	148,167	gallons	1,512,167
Residual Fuel Oil	0	gallons	0
Aviation Gasoline	0	gallons	0
Kerosene-Type Jet Fuel	0	gallons	0
Liquefied Petroleum Gases (LPG)	0	gallons	0
Ethanol	0	gallons	0
Biodiesel	0	gallons	0
Liquefied Natural Gas (LNG)	0	gallons	0
Compressed Natural Gas (CNG)	0	scf	0

Note: emissions here are only for the gasoline portion of the fuel. Biogenic CO_2 emissions are repor
Note: emissions here are only for the diesel portion of the fuel. Biogenic CO_2 emissions are reporte

Total Organization-Wide On-Road Gasoline Mobile Source Mileage and CH_4/N_2O Emissions

Vehicle Type	Vehicle Year	Mileage (miles)	CH_4 (g)	N_2O (g)
Passenger Cars - Gasoline	1984-93	0	0.0	0.0
	1983	0	0.0	0.0
	1985	0	0.0	0.0
	1986	0	0.0	0.0
	1987	0	0.0	0.0
	1988	0	0.0	0.0
	1989	0	0.0	0.0
	2000	0	0.0	0.0
	2001	0	0.0	0.0
	2002	0	0.0	0.0
	2003	0	0.0	0.0
	2004	0	0.0	0.0
	2005	0	0.0	0.0
	2006	0	0.0	0.0
	2007	0	0.0	0.0
	2008	0	0.0	0.0
	2009	0	0.0	0.0
	2010	0	0.0	0.0
	2011	0	0.0	0.0
	2012	0	0.0	0.0
	2013	0	0.0	0.0
	2014	0	0.0	0.0
	2015	0	0.0	0.0
	2016	0	0.0	0.0
	2017	0	0.0	0.0
	2018	0	0.0	0.0
	2019	0	0.0	0.0
	2020	0	0.0	0.0
	2021	0	0.0	0.0
	2022	0	0.0	0.0
	2023	0	0.0	0.0
	2024	0	0.0	0.0
Light-Duty Trucks - Gasoline (Vans, Pickup Trucks, SUVs)	1987-93	0	0.0	0.0
	1994	0	0.0	0.0
	1995	0	0.0	0.0
	1996	0	0.0	0.0
	1997	0	0.0	0.0
	1998	0	0.0	0.0
	1999	0	0.0	0.0
	2000	0	0.0	0.0
	2001	0	0.0	0.0
	2002	0	0.0	0.0
	2003	0	0.0	0.0
	2004	0	0.0	0.0
	2005	0	0.0	0.0
	2006	0	0.0	0.0
	2007	0	0.0	0.0
	2008	0	0.0	0.0
	2009	0	0.0	0.0
	2010	0	0.0	0.0
	2011	0	0.0	0.0
	2012	0	0.0	0.0
	2013	0	0.0	0.0
	2014	0	0.0	0.0
	2015	0	0.0	0.0
	2016	0	0.0	0.0
	2017	0	0.0	0.0
	2018	0	0.0	0.0
	2019	0	0.0	0.0
	2020	0	0.0	0.0
	2021	0	0.0	0.0
	2022	0	0.0	0.0
	2023	0	0.0	0.0
	2024	0	0.0	0.0
Heavy-Duty Vehicles - Gasoline	1985-86	0	0.0	0.0
	1987	0	0.0	0.0
	1988-1989	0	0.0	0.0
	1990-1998	0	0.0	0.0
	1996	0	0.0	0.0
	1997	0	0.0	0.0
	1998	0	0.0	0.0
	1999	0	0.0	0.0
	2000	0	0.0	0.0
	2001	0	0.0	0.0
	2002	0	0.0	0.0
	2003	0	0.0	0.0
	2004	0	0.0	0.0
	2005	0	0.0	0.0
	2006	0	0.0	0.0
	2007	0	0.0	0.0
	2008	0	0.0	0.0
	2009	0	0.0	0.0
	2010	0	0.0	0.0
	2011	0	0.0	0.0
	2012	0	0.0	0.0
	2013	0	0.0	0.0
	2014	0	0.0	0.0
	2015	0	0.0	0.0
	2016	0	0.0	0.0
	2017	0	0.0	0.0
	2018	0	0.0	0.0
	2019	0	0.0	0.0
	2020	0	0.0	0.0
	2021	0	0.0	0.0
	2022	0	0.0	0.0
	2023	0	0.0	0.0
	2024	0	0.0	0.0
Motorcycles - Gasoline	1960-1996	0	0.0	0.0
	1998-2005	0	0.0	0.0
	2006-2024	0	0.0	0.0

Total Organization-Wide On-Road Non-Gasoline Mobile Source Mileage and CH_4/N_2O Emissions

Vehicle Type	Fuel Type	Vehicle Year	Mileage (miles)	CH_4 (g)	N_2O (g)
Passenger Cars - Diesel	Diesel	1960-1982	0	0.0	0.0
		1983-2006	0	0.0	0.0
		2007-2024	0	0.0	0.0
Light-Duty Trucks - Diesel	Diesel	1960-1982	0	0.0	0.0
		1983-2006	0	0.0	0.0
		2007-2024	0	0.0	0.0
Medium- and Heavy-Duty Vehicles	Diesel	1960-2006	0	0.0	0.0
		2007-2024	0	0.0	0.0
Light-Duty Cars	Methanol		0	0.0	0.0
	Ethanol		0	0.0	0.0
	CNG		0	0.0	0.0
	LPG		0	0.0	0.0
	Biodiesel		0	0.0	0.0
Light-Duty Trucks	Ethanol		0	0.0	0.0
	CNG		0	0.0	0.0
	LPG		0	0.0	0.0
	LNG		0	0.0	0.0
	Methanol		0	0.0	0.0
Medium-Duty Trucks	CNG		0	0.0	0.0
	LPG		0	0.0	0.0
	LNG		0	0.0	0.0
	Biodiesel		0	0.0	0.0
Heavy-Duty Trucks	Methanol		0	0.0	0.0
	CNG		0	0.0	0.0
	LPG		0	0.0	0.0
	LNG		0	0.0	0.0
	Biodiesel		0	0.0	0.0
Buses	Methanol		0	0.0	0.0
	CNG		0	0.0	0.0
	LPG		0	0.0	0.0
	LNG		0	0.0	0.0
	Biodiesel		0	0.0	0.0

Total Organization-Wide Non-Road Mobile Source Fuel Usage and CH_4/N_2O Emissions

Vehicle Type	Fuel Type	Fuel Usage (gallons)	CH_4 (g)	N_2O (g)
Ships and Boats	Residual Fuel Oil	0	0.0	0.0
	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Diesel	0	0.0	0.0
Locomotives	Diesel	0	0.0	0.0
Aircraft	Jet Fuel	9830	0.0	1734.0
	Aviation Gasoline	0	0.0	0.0
Agricultural Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Gasoline Off-Road Trucks	0	0.0	0.0
	Diesel Equipment	0	0.0	0.0
	Diesel Off-Road Trucks	0	0.0	0.0
	LPG	0	0.0	0.0
Construction/Mining Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Gasoline Off-Road Trucks	0	0.0	0.0
	Diesel Equipment	0	0.0	0.0
	Diesel Off-Road Trucks	0	0.0	0.0
	LPG	0	0.0	0.0
Lawn and Garden Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Diesel	0	0.0	0.0
	LPG	0	0.0	0.0
Airport Equipment	Gasoline	0	0.0	0.0
	Diesel	0	0.0	0.0
	LPG	0	0.0	0.0
Industrial/Commercial Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Diesel	142298	88963.1	8382.0
	LPG	0	0.0	0.0
Logging Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Diesel	0	0.0	0.0
Railroad Equipment	Gasoline	0	0.0	0.0
	Diesel	0	0.0	0.0
	LPG	0	0.0	0.0
Recreational Equipment	Gasoline (2 stroke)	0	0.0	0.0
	Gasoline (4 stroke)	0	0.0	0.0
	Diesel	0	0.0	0.0
	LPG	0	0.0	0.0

Total CO_2 Equivalent Emissions (metric tons) - Mobile Sources	**1,527.1**
Total Biomass CO_2 Equivalent Emissions (metric tons) - Mobile Sources	**83**

Back to Intro | Back to Summary | Help

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Scope 1 Emissions from Refrigeration and Air Conditioning Equipment

Guidance

(A) HFC, PFC, CO_2, and SF_6 refrigerants from facilities and vehicles are required to be included in the GHG inventory. Ozone depleting substances, such as CFCs and HCFCs, are regulated internationally and are typically excluded from a GHG inventory or reported as a memo item.

(B) Select ONE of the three options with which to estimate emissions. Options range from most preferred method (Option 1) to least preferred method (Option 3). Limited data availability often makes Option 3 an appropriate choice. If Option 3 is used and emissions are determined to be significant when compared to other emission sources, consider using one of the other methods to calculate emissions more accurately.

(C) Enter annual data in ORANGE cells as appropriate for the selected option.

Option 1. Material Balance Method: Enter organization-wide total gases stored and transferred (by gas) in Table 1.
- Choose the appropriate gas from the Gas drop down menu.
- Inventory Change = difference of gas stored in inventory from beginning to end of reporting period. (Includes only gas stored on-site (i.e. cylinders) and not gas contained within equipment).
- Transferred Amount = gas purchased minus gas sold/disposed during reporting period.
  -- Gas purchased includes: Purchases for inventory, as part of equipment servicing (not from inventory), within purchased equipment, and gas returned to the site after off-site recycling.
  -- Gas sold/disposed includes: Returns to supplier, sales or disposals (including within equipment), and gas sent off-site for recycling, reclamation, or destruction.
- Capacity Change = capacity of all units at beginning minus capacity of all units at end of reporting period. (can be assumed to be capacity of retired units minus capacity of new units).

Table 1. Organization-Wide Refrigeration Gas CO_2 Equivalent Emissions - Material Balance

Gas	Gas GWP	Inventory Change (kg)	Transferred Amount (kg)	Capacity Change (kg)	CO_2 Equivalent Emissions (kg)
R-410A	1,924	0.0	0.0	0.0	0.0

Option 2. Material Balance Method (Simplified): Enter organization-wide total gases in units (by gas) in Table 2.
- Choose the appropriate gas from the drop down menu.
- New units are those installed during reporting period (do not include any data for new units pre-charged by supplier), disposed units were disposed of during the reporting period, and existing units are all others.
- Charge/Recharge = gas added to units by organization or a contractor (do not include pre-charge by manufacturer).
- Capacity = sum of the full capacity for all units (do not include new units pre-charged by manufacturer).
- Amount recovered = total gas recovered from all retired units.

Table 2. Organization-Wide Refrigeration Gas CO_2 Equivalent Emissions - Simplified Material Balance

Gas	Gas GWP	New Units		Existing Units	Disposed Units		CO_2 Equivalent
		Charge (kg)	Capacity (kg)	Recharge (kg)	Capacity (kg)	Recovered (kg)	Emissions (kg)

Option 3. Screening Method: Enter refrigerant information for each unit or group of units (by refrigerant) in **Table 3.**
- Select the "Type of Equipment" (closest available) and "Gas" from the drop down box.
- Enter amount of refrigerant added to new units by the organization (not pre-charged amount from manufacturer). This will be blank if no refrigerant is added to new units by the organization.
- Enter the Number of Months in Operation - this is the number of months in the year the unit was operating (from 0-12). For example, if the equipment was installed at the beginning of July, enter 6.
- Enter refrigerant capacity (by equipment type and refrigerant) for all units operating and disposed during reporting period.
  -- If data entered for multiple units, sum the capacities or charge quantity for all like units.
  -- If capacity of unit(s) is not known, use upper value of default capacity provided in the **Reference Table** below.
  -- If no units are disposed, Disposed Units will be blank
- See example entry in first row (*GREEN Italics*).

Table 3. Source Level Refrigeration Gas CO_2 Equivalent Emissions - Screening Method

Source ID	Type of Equipment	Gas	Gas GWP	New Units Charge (kg)	Number of Months in Operation in Reporting Year	Capacity		CO_2 Equivalent Emissions (kg)
						Operating Units (kg)	Disposed Units (kg)	
Bldg-012	*Domestic Refrigeration*	*HFC-32*	677	*1000*	*12*	*0.5*	*0.25*	*6,812.3*
47545		R-410A		0.0	12	625.00	0.00	#N/A

Reference Table: Type of Equipment and Default Capacity Ranges (Lower to Upper Range) for Table 3

Type of Equipment	Equipment Description	Capacity (kg)	Installation Emission Factor K % of Capacity	Operating Emissions X % of Capacity/yr	Refrigerant Remaining at Disposal Y % of Capacity	Recovery Efficiency Z % of Remaining
Domestic Refrigeration	Domestic refrigeration units	0.05–0.5	1%	1%	80%	70%
Stand-Alone Commercial	Stand alone commercial applications	0.2–6	3%	15%	80%	70%
Medium/Large Commercial	Medium and large commercial refrigeration units	50–2,000	3%	35%	100%	70%
Transport Refrigeration	Transportation refrigeration units	3–8	1%	50%	50%	70%
Industrial Refrigeration	Industrial, food processing and cold storage units	10–10,000	3%	25%	100%	90%
Chillers	Commercial chillers	10–2,000	1%	15%	100%	95%
Residential/Commercial A/C	Residential and commercial units, including heat pumps	0.5-100	1%	10%	80%	80%
Maritime A/C Units	Maritime A/C units	5-6,500	1%	40%	50%	50%
Railway A/C Units	Railway A/C Units	10-30	1%	20%	50%	50%
Buses A/C Units	Buses A/C Units	4-18	1%	20%	50%	50%
Other Mobile A/C Units	All other mobile A/C units	0.5-2	1%	20%	50%	50%

Source: Screening Method of the inventory guidance document Direct Fugitive Emissions from Refrigeration, Air Conditioning, Fire Suppression, and Industrial Gases
https://www.epa.gov/climateleadership/scope-1-and-scope-2-inventory-guidance

GHG Emissions

Total CO_2 Equivalent Emissions (metric tons) - Refrigeration and AC Equipment **#N/A**

Notes:
1. CO_2 emissions estimated using emission factors provided in Table 3 of the Center for Corporate Climate Leadership *Greenhouse Gas Inventory Guidance Direct Fugitive Emissions from Refrigeration, Air Conditioning, Fire Suppression and Industrial Gases. (Dec 2020).*
2. GWP values are from *Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (2011).*

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Scope 1 Emissions from Fire Suppression Equipment

Guidance

(A) HFC, PFC, and CO_2 fire suppressants are required to be included in the GHG inventory. Other fire suppressants such as Halon compounds, HCFCs, aqueous solutions, or inert gases are typically excluded from a GHG inventory.
(B) Select ONE of the three options from which to estimate emissions. Options range from most preferred method (Option 1) to least preferred method (Option 3). If option 3, screening method, is used and emissions are determined to be significant when compared to other emission sources, then one of the other methods should be applied to calculate emissions more accurately.
(C) Enter annual data in ORANGE cells as appropriate for the selected option.

Option 1. Material Balance Method: Enter organization-wide fire suppression gases stored and transferred (by gas) in Table 1.
- Inventory Change = difference of gas stored in inventory from beginning to end of reporting period. (Includes only gas stored on-site (i.e. cylinders) and not gas contained within equipment).
- Transferred Amount = gas purchased minus gas sold/disposed during reporting period.
  -- Gas purchased includes: Purchases for inventory, as part of equipment servicing (not from inventory) within purchased equipment and gas returned to the site after off-site recycling.
  -- Gas sold/disposed includes: Returns to supplier, sales or disposals (including within equipment), and gas sent off-site for recycling, reclamation, or destruction.
- Capacity Change = capacity of all units at beginning minus capacity of all units at end of reporting period. (can be assumed to be capacity of retired units minus capacity of new units).

Table 1. Organization-Wide Fire Suppression Gas CO_2 Equivalent Emissions - Material Balance

Gas	Gas GWP	Inventory Change (lb)	Transferred Amount (lb)	Capacity Change (lb)	CO_2 Equivalent Emissions (lb)
Carbon dioxide	1				
HFC-23	12,400				
HFC-125	3,170				
HFC-134a	1,300				
HFC-227ea	3,350				
HFC-236fa	8,060				
PFC-14	6,630				
PFC-31-10	9,200				

Option 2. Material Balance Method (Simplified): Enter organization-wide fire suppression gas in units (by gas) in Table 2.
- New units are those installed during reporting period (do not include any data for new units pre-charged by supplier), disposed units were disposed of during the reporting period, and existing units are all others.
- Charge/Recharge = gas added to units by organization or a contractor (do not include pre-charge by manufacturer).
- Capacity = sum of the full capacity for all units (do not include new units pre-charged by manufacturer).
- Amount recovered = total gas recovered from all retired units.

Table 2. Organization-Wide Fire Suppression Gas CO_2 Equivalent Emissions - Simplified Material Balance

Gas	Gas GWP	New Units		Existing Units	Disposed Units		CO_2 Equivalent Emissions (lb)
		Charge (lb)	Capacity (lb)	Recharge (lb)	Capacity (lb)	Recovered (lb)	
Carbon dioxide	1						
HFC-23	12,400						
HFC-125	3,170						
HFC-134a	1,300						
HFC-227ea	3,350						
HFC-236fa	8,060						
PFC-14	6,630						
PFC-31-10	9,200						

Option 3. Screening Method: Enter fire suppression gas information for each unit or group of units (by gas) in **Table 3.**
- Enter "Type of Equipment" (Fixed or Portable) and select "Gas Type" from the drop down box.
- Enter capacity (by gas type) for all units that operated during reporting period.
  -- For each unit added or removed during reporting period, multiply its capacity by a usage factor (0.0 to 1.0).
  -- If data entered for multiple units, sum the capacities for all units.
- See example entry in first row (*Green Italics*).

Table 3. Source Level Fire Suppression Gas CO_2 Equivalent Emissions - Screening Method

Source ID	Type of Equipment (Fixed/Portable)	Gas Type	Gas GWP	Unit Capacity (lb)	CO_2 Equivalent Emissions (lb)
Bldg-012	*Fixed*	*HFC-134a*	*1,300*	*1.5*	*68.3*
47545	Portable	Carbon dioxide		645.0	16.1
47545	Fixed	Carbon dioxide		30.0	1.1

Reference Table: Fire Suppressant Leak Rates for Table 3

Type of Equipment	Leak Rate
Fixed	3.5%
Portable	2.5%

Source: EPA (2021) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2019. Page A-275.

GHG Emissions

Total CO_2 Equivalent Emissions (metric tons) - Fire Suppression Equipment	**0.0**

Notes:
1. Leak rates of fire extinguishers from Page A-28, *US EPA (2021) - Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 - 2018.*
2. GWP values are from *Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (2011).*

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Scope 1 Emissions from Purchased Gases

Guidance

(A) Any use and release of the seven major greenhouse gases (CO_2, CH_4, N_2O, PFCs, HFCs, SF_6, and NF_3) is required to be included in the GHG inventory. Ozone depleting substances, such as CFCs and HCFCs, are regulated internationally and are typically excluded from a GHG inventory or reported as a memo item.

(B) Select the gas you purchase from the drop down menu and the amount purchased for the annual inventory reporting period in the ORANGE cells.

(C) It is assumed that all gas purchased in the reporting period used and released during the reporting period. If your business makes bulk purchases and plans on using the gas for several years, divide the bulk amount by the years of usage and report that amount.

Tip: If you purchase bulk gas, remember to report it for future years as well.

Table 1. Purchased Gases

Gas	Gas GWP	Purchased Amount (lb)	CO_2 Equivalent Emissions (lb)

GHG Emissions

Total CO_2 Equivalent Emissions (metric tons) - Purchased Gas	**0.0**

Notes:

1. GWP values are from Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (2011).

Back to Intro | Back to Summary | Help | Help - Market-Based Method

Scope 2 Emissions from Purchase of Electricity

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Guidance

The Indirect Emissions from Purchased Electricity Guidance document provides guidance for quantifying two scope 2 emissions totals, using a **location-based method** and a **market-based method**. The organization should quantify and report both totals in its GHG inventory. The location-based method considers average emission factors for the electricity grids that provide electricity. The market-based method considers contractual arrangements under which the organization procures electricity from specific sources, such as renewable energy.

(A) Enter total annual electricity purchased in kWh and each eGRID subregion for each facility or site in ORANGE cells of **Table 1**.
(B) If electricity consumption data are not available for a facility, an estimate should be made for completeness.
See the "Items to Note" section of the Help sheet for suggested estimation approaches.
(C) Select "eGRID subregion" from drop box and enter "Electricity Purchased."
- Use map (Figure 1) at bottom of sheet to determine appropriate eGRID subregion. If subregion cannot be determined from the map, find the correct subregion by entering the location's zip code into EPA's Power Profiler:
https://www.epa.gov/egrid/power-profiler#/

(D) See the market-based emission factor hierarchy on the market-based method Help sheet. If any of the first four types of emission factors are applicable, enter the factors in the yellow cells marked as "<enter factor>". If not, leave the yellow cells as is, and eGRID subregion factors will be used for market-based emissions.

Example entry is shown in first row (*GREEN Italics*) for a facility that purchases RECs for 100% of its consumption, and therefore has a market-based emission factor of 0.

Tips: Enter electricity usage by location and then look up the eGRID subregion for each location.
If you purchase renewable energy that is less than 100% of your site's electricity, see the example in the market-based method Help sheet.

Table 1. Total Amount of Electricity Purchased by eGRID Subregion

					Market-Based						Location-Based		
					Use these cells to enter applicable market-based emission factors								
					Emission Factors			Emissions			Emissions		
Source ID	Source Description	Source Area (sq ft)	eGRID Subregion *where electricity is consumed*	Electricity Purchased (kWh)	CO_2 Emissions (lb/MWh)	CH_4 Emissions (lb/MWh)	N_2O Emissions (lb/MWh)	CO_2 Emissions (lb)	CH_4 Emissions (lb)	N_2O Emissions (lb)	CO_2 Emissions (lb)	CH_4 Emissions (lb)	N_2O Emissions (lb)
Bldg-012	*East Power Plant*	*12,517*	*HICC Miscellaneous*	*200,000*	*0*	*0*	*0*	*0.0*	*0.0*	*0.0*	*231,097.2*	*24.8*	*3.8*
						<enter factor>	<enter factor>						
47545	VTS Milan		SERC Tennessee Valley	2,918,042	<enter factor>	<enter factor>	<enter factor>	2,722,729.0	239.3	35.0	2,722,729.0	239.3	35.0
					<enter factor>	<enter factor>	<enter factor>						
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					<enter factor>	<enter factor>	<enter factor>						
					<enter factor>	<enter factor>	<enter factor>						
Total Emissions for All Sources				**2,918,042**				**2,722,729.0**	**239.3**	**35.0**	**2,722,729.0**	**239.3**	**35.0**

GHG Emissions

CO_2 Equivalent Emissions (metric tons)	
Location-Based Electricity Emissions	1,242.3
Market-Based Electricity Emissions	1,242.3

Notes:
1. CO_2, CH_4 and N_2O emissions are estimated using methodology provided in EPA's Center for Corporate Climate Leadership Greenhouse Gas Inventory Guidance - Indirect Emissions from Purchased Electricity (January 2016).

Figure 1. EPA eGRID2022, January 2024.

Back to Intro | Back to Summary | Heat Content | Help | Help - Market-Based Method

Scope 2 Emissions from Purchase of Steam

Guidance

(A) Enter annual data for each facility or site in ORANGE cells in **Table 1**.
- Enter amount of steam purchased in mmBtu. Heat Content conversions can be found on the "Heat Content" sheet.
- Select "Fuel Type" from drop box to indicate the fuel used to generate the steam.
  - -- If "Fuel Type" is not known, select "Natural Gas" from drop box as default value.
  - -- If more than one fuel type is used, enter multiple rows, apportioning the steam using the same percentages as the fuel mix.

(B) If steam is purchased at a facility but steam consumption data are not available, an estimate should be made for completeness. See the "Items to Note" section of the Help sheet for suggested estimation approaches.

(C) Preferred Method (steam emission factors ARE available from your supplier). Example entry is shown in first data row (*GREEN Italics*).
- Enter supplier emission factors for CO_2, CH_4, and N_2O in the purple cells marked as "<enter factor>" if available, otherwise leave factor cells blank.
  - - These should be expressed in lb / mmBtu of Steam. Heat Content conversions can be found on the "Heat Content" sheet.
  - - Boiler Efficiency is not necessary if emission factors are available.
- Typically supplier emission factors for steam will apply to both location-based and market-based emissions, and no market-based emission factors need to be entered. However, if there are different applicable market-based emission factors, enter the factors in the yellow cells marked as "<enter factor>". If needed, see the market-based method Help Sheet for guidance.

(D) Alternative Method (supplier-specific emission factors are NOT available). Example entry is shown in second data row (*BLUE Italics*).
- Enter boiler efficiency. If boiler efficiency is not known, use 80% as default value. Do not enter market-based emission factors.

Table 1. Fuel, Boiler, Steam and Emission Factor Data for Steam Purchased

						Location-Based *Use these cells to enter emission factors from the steam supplier (if available)*						Market-Based *Use these cells to enter market-based emission factors if different than the supplier emission factors.*					
						Emission Factors			Emissions			Emission Factors			Emissions		
Source ID	Source Description	Source Area (sq ft)	Fuel Type	Boiler Efficiency (%)	Steam Purchased (mmBtu)	CO_2 Factor (kg / mmBtu)	CH_4 Factor (g / mmBtu)	N_2O Factor (g / mmBtu)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)	CO_2 Factor (kg / mmBtu)	CH_4 Factor (g / mmBtu)	N_2O Factor (g / mmBtu)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
Bldg-011	*Office*	*5,000*	*Natural Gas*	*80*	*2,500*	*72.00*	*1.50*	*0.60*	*225,000*	*4,688*	*1,875*	70.00	1.00	0.50	*218,750*	*3,125*	*1,563*
Bldg-012	*Steam-Blr Room*	*2,000*	*Sub-bituminous Coal*	*80*	*1,000*	<enter factor>	<enter factor>	<enter factor>	121,463	13,750	2,000	<enter factor>	<enter factor>	<enter factor>	121,463	13,750	2,000
						<enter factor>	<enter factor>	<enter factor>				<enter factor>	<enter factor>	<enter factor>			
						<enter factor>	<enter factor>	<enter factor>				<enter factor>	<enter factor>	<enter factor>			
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						<enter factor>	<enter factor>	<enter factor>				<enter factor>	<enter factor>	<enter factor>			

GHG Emissions

Emissions by Source and Fuel Type for Steam Purchased

	Location-Based			Market-Based		
Fuel Type	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
Natural Gas	0.0	0.0	0.0	0.0	0.0	0.0
Distillate Fuel Oil No. 2	0.0	0.0	0.0	0.0	0.0	0.0
Residual Fuel Oil No. 6	0.0	0.0	0.0	0.0	0.0	0.0
Kerosene	0.0	0.0	0.0	0.0	0.0	0.0
Liquefied Petroleum Gases (LPG)	0.0	0.0	0.0	0.0	0.0	0.0
Anthracite Coal	0.0	0.0	0.0	0.0	0.0	0.0
Bituminous Coal	0.0	0.0	0.0	0.0	0.0	0.0
Sub-bituminous Coal	0.0	0.0	0.0	0.0	0.0	0.0
Lignite Coal	0.0	0.0	0.0	0.0	0.0	0.0
Mixed (Electric Power Sector)	0.0	0.0	0.0	0.0	0.0	0.0
Coal Coke	0.0	0.0	0.0	0.0	0.0	0.0
Wood and Wood Residuals	0.0	0.0	0.0	0.0	0.0	0.0
Landfill Gas	0.0	0.0	0.0	0.0	0.0	0.0
Total Emissions for All Sources	0.0	0.0	0.0	0.0	0.0	0.0

CO_2 Equivalent Emissions (metric tons)	
Location-Based Electricity Emissions	0.0
Market-Based Electricity Emissions	0.0

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Scope 3 Emissions from Business Travel

Guidance

(A) Enter annual data in ORANGE cells in the table corresponding to the transport method. Example entry is shown in first row (*GREEN Italics*).
(B) Mileage data can be entered for individual trips or individual employees, or miles for multiple employees can be subtotaled by vehicle type or flight length.
(C) For employees traveling by car, select "Vehicle Type" and enter miles traveled (vehicle-miles) in **Table 1**.
(D) For employees traveling by rail or bus, select "Vehicle Type" and enter miles traveled (passenger-miles) in **Table 2**.
(E) For employees traveling by air, select "Flight Length" and enter miles traveled (passenger-miles) in **Table 3**.

--- Note: The emission factors for air travel do not include radiative forcing. Per the GHG Protocol, for air travel emission factors, multipliers or other corrections to account for radiative forcing may be applied to the GWP of emissions arising from aircraft transport. If applied, companies should disclose the specific factor used.

Table 1. Personal Vehicle, Rental Car or Taxi - Business Travel by Vehicle-Miles (CO_2, CH_4 and N_2O)

Source ID	Source Description	Vehicle Type	Vehicle-Miles (miles)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
JD-001	*John Doe 1*	*Passenger Car*	*100*	*18*	*0.5*	*0.3*
47545	Military Personnel	Passenger Car	1,250	219	6.4	4.3
Total for all Personal Vehicle Business Travel				219	6.4	4.3

Table 2. Rail or Bus - Business Travel by Passenger-Miles (CO_2, CH_4 and N_2O)

Source ID	Source Description	Vehicle Type	Passenger-Miles (miles)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
JD-001	*John Doe 1*	*Transit Rail (i.e. Subway, Tram)*	*100*	*9*	*0.7*	*0.1*

Total for all Rail and Bus Business Travel				0	0.0	0.0

Table 3. Air - Business Travel by Passenger-Miles (CO_2, CH_4 and N_2O)

Source ID	Source Description	Flight Length	Passenger-Miles (miles)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
JD-001	*John Doe 1*	*Medium Haul (>= 300 miles, < 2300 miles)*	*1,000*	*229*	*10.4*	*8.5*
Total for all Air Business Travel				0.0	0.0	0.0

GHG Emissions

Total CO_2 Emissions by Travel Type

Transport Type	CO_2 (kg)	CH_4 (g)	N_2O (g)
Passenger Car	218.9	6.4	4.3
Light-Duty Truck	0.0	0.0	0.0
Motorcycle	0.0	0.0	0.0
Intercity Rail - Northeast Corridor	0.0	0.0	0.0
Intercity Rail - Other Routes	0.0	0.0	0.0
Intercity Rail - National Average	0.0	0.0	0.0
Commuter Rail	0.0	0.0	0.0
Transit Rail (i.e. Subway, Tram)	0.0	0.0	0.0
Bus	0.0	0.0	0.0
Air Short Haul (< 300 miles)	0.0	0.0	0.0
Air Medium Haul (>= 300 miles, < 2300 miles	0.0	0.0	0.0
Air Long Haul (>= 2300 miles)	0.0	0.0	0.0

Total CO_2 Equivalent Emissions (metric tons) - Business Travel	0.2

Scope 3 Emissions from Employee Commuting

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Guidance

(A) Enter annual data in ORANGE cells in the table corresponding to the transport method. Example entry is shown in first row (*GREEN Italics*).
(B) For employees commuting in a personal vehicle, select the "Vehicle Type" and enter miles traveled (vehicle-miles) in **Table 1**.
(C) For employees commuting using public transportation, select the "Transport Type" and enter miles traveled (passenger-miles) in **Table 2**.

Tip: If more than one employee travels by the same vehicle type or transport type, miles can be combined and entered in one row.

Table 1. Personal Vehicle - Employee Commuting by Vehicle-Miles (CO_2, CH_4 and N_2O)

Source ID	Source Description	Vehicle Type	Vehicle-Miles (miles)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
JD-001	*John Doe 1*	*Passenger Car*	*100*	*18*	*0.5*	*0.3*
47545	Site Employees	Passenger Car	97,500	17,077	501.3	335.5
Total for all Personal Vehicle Employee Commuting				17,077	501.3	335.5

Table 2. Public Transportation - Employee Commuting by Passenger-Miles (CO_2, CH_4 and N_2O)

Source ID	Source Description	Transport Type	Passenger-Miles (miles)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
JD-001	*John Doe 1*	*Bus*	*100*	*7*	*0*	*0.2*
Total for all Public Transportation Employee Commuting				0	0.0	0.0

GHG Emissions

Total CO_2 Emissions by Commuting Type

Transport Type	CO_2 (kg)	CH_4 (g)	N_2O (g)
Passenger Car	17,077	501.3	335.5
Light-Duty Truck	0	0.0	0.0
Motorcycle	0	0.0	0.0
Intercity Rail - Northeast Corridor	0	0.0	0.0
Intercity Rail - Other Routes	0	0.0	0.0
Intercity Rail - National Average	0	0.0	0.0
Commuter Rail	0	0.0	0.0
Transit Rail (i.e. Subway, Tram)	0	0.0	0.0
Bus	0	0.0	0.0

Total CO_2 Equivalent Emissions (metric tons) - Commuting **17.2**

Back to Intro | Back to Summary | Help

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Scope 3 Emissions from Upstream Transportation and Distribution

Guidance

(A) Enter annual data in ORANGE cells in the table corresponding to the transport method. Example entry is shown in first row (*GREEN Italics*).
(B) For rail, water, or air shipments, enter short ton-mile data in **Table 2.** See Help sheet for details on calculating short ton-miles.
(C) For road shipments, if your organization's product is the only product transported in the vehicle (i.e. full truckload shipment) then enter the vehicle type and miles for each leg of transport in Table 1. Emissions are calculated using vehicle-miles.
(D) For road shipments, if your organization's product makes up only part of the truck load (i.e. less-than-load or LTL shipment), then enter the vehicle type and short ton-miles (product weight (short tons) x distance) for each leg of transport in Table 2. Emissions are calculated using short ton-miles. See Help sheet for details on calculating ton-miles.

Tip: Make sure all transport legs are accounted for from manufacturing facility to distribution to customer.
--- Note: This Calculator does not currently provide a place to calculate emissions from distribution warehouses.

Table 1. On-Road Product Transport by Vehicle-Miles (CO_2, CH_4 and N_2O)

Source ID	Source Description	Vehicle Type	Vehicle-Miles (miles)	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
Bldg-012	*East Power Plant Finished Goods*	*Medium- and Heavy-duty Truck*	*100*	*125*	*1.1*	*3.5*
Total for Product Transport by Vehicle-Miles				0	0.0	0.0

Table 2. Product Transport by Ton-Miles (CO_2, CH_4 and N_2O)

Source ID	Source Description	Vehicle Type	Short Ton-Miles	CO_2 Emissions (kg)	CH_4 Emissions (g)	N_2O Emissions (g)
Bldg-012	*East Power Plant Finished Goods*	*Medium- and Heavy-Duty Truck*	*100*	*16.8*	*0.1*	*0.5*
Total for all Product Transport by Ton-Miles				0	0.0	0.0

GHG Emissions

Transport Type	CO_2 (kg)	CH_4 (g)	N_2O (g)
Medium- and Heavy-Duty Truck			
Light-Duty Truck			
Passenger Car			
Rail			
Aircraft			
Waterborne Craft			

Total CO_2 Equivalent Emissions (metric tons) - Upstream Transportation and Distributior **0.0**

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Scope 3 Emissions from Waste

Guidance

(A) Enter annual waste data in ORANGE cells. Example entry is shown in first row (*GREEN Italics*).

(B) First, choose the appropriate material then the disposal method from the drop down options. For the average-data method, use one of the mixed material types, such as mixed MSW. If the exact waste material is not available, consider an appropriate proxy. For example, dimensional lumber can be used as a proxy for wood furniture.

(C) Choose an appropriate disposal method. Note that not all disposal methods are available for all materials. If there is a #NA or # Value error in the emissions column, you must pick a new material type or appropriate disposal method.

Table 1. Waste Disposal Weight by Waste Material and Disposal Method (CO_2, CH_4 and N_2O)

Source ID	Source Description	Waste Material	Disposal Method	Weight	Unit	CO_2e Emissions (kg)
Bldg-012	*East Power Plant Finished Goods*	*Copper Wire*	*Landfilled*	*1,000*	*metric ton*	*22,040*
47545	Installation Total for FY23	Mixed MSW municipal solid waste	Landfilled	1,814	short ton	

GHG Emissions

Total Emissions by Disposal Method

Waste Material	CO_2e (kg)
Recycled	
Landfilled	
Combusted	
Composted	
Anaerobically Digested (Dry Digestate with Curing)	
Anaerobically Digested (Wet Digestate with Curing)	

EPA Climate Leaders Simplified GHG Emissions Calculator (Optional 3.0)

Total CO_2 Equivalent Emissions (metric tons) - Waste **1,052.1**

Back to Intro | Back to Summary | Help

Purchased Offsets

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Guidance

(A) Enter quantity of offsets purchased for each offset project in terms of CO_2 equivalent in ORANGE cells of **Table 1.** Enter offsets purchased for the inventory reporting period. Example entry is shown in first row (*GREEN Italics*).

Table 1. Total Amount of Purchased Offsets

ID	Project Description	Offset Scope/Category	Offsets Purchased (Metric Tons CO_2e)
Trees	*Forestry Project*	*Scope 1*	*5,000*

GHG Reductions

Total CO_2 Equivalent Emission Reductions (metric tons) - Offsets	**0.0**

GHG Reductions by Scope	Offsets (Metric Tons CO_2e)
Scope 1	0.0
Scope 2 - Location-Based	0.0
Scope 2 - Market-Based	0.0
Scope 3 - Business Travel	0.0
Scope 3 - Employee Commuting	0.0
Scope 3 - Upstream Transportation and Distribution	0.0
Scope 3 - Waste	0.0

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Tool Sheet: Unit Conversions

Mass			
pounds (lb)	gram (g)	453.6	g / lb
pounds (lb)	kilogram (kg)	0.4536	kg / lb
pounds (lb)	metric ton	0.0004536	metric ton / lb
kilogram (kg)	pounds (lb)	2.205	lb / kg
gram (g)	short ton	0.000001102	short ton / g
kilogram (kg)	short ton	0.001102000	short ton / kg
metric ton	short ton	1.102	short ton / metric ton
pounds (lb)	short ton	0.0005	short ton / lb
short ton	short ton	1.00	short ton / short ton
metric ton	pounds (lb)	2,205	lb / metric ton
metric ton	kilogram (kg)	1,000	kg / metric ton

Source: Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021 – Annexes, Chapter 6.4, Constants, Units and Conversions. https://www.epa.gov/system/files/documents/2023-04/US-GHG-Inventory-2023-Annexes.pdf

Volume			
standard cubic foot (scf)	US gallon (gal)	7.4805	gal / scf
standard cubic foot (scf)	barrel (bbl)	0.1781	bbl / scf
standard cubic foot (scf)	liters (L)	28.32	L / scf
standard cubic foot (scf)	cubic meters (m3)	0.02832	m3 / scf
US gallon (gal)	barrel (bbl)	0.0238	bbl / gal
US gallon (gal)	liters (L)	3.785	L / gal
US gallon (gal)	cubic meters (m3)	0.003785	m3 / gal
barrel (bbl)	US gallons (gal)	42	gal / bbl
barrel (bbl)	liters (L)	158.99	L / bbl
barrel (bbl)	cubic meters (m3)	0.1589	m3 / bbl
liters (L)	cubic meters (m3)	0.001	m3 / L
liters (L)	US gallon (gal)	0.2642	gal / L
cubic meters (m3)	barrel (bbl)	6.2897	bbl / m3
cubic meters (m3)	US gallon (gal)	264.2	gal / m3
cubic meters (m3)	liters (L)	1,000	L / m3

Energy			
kilowatt hour (kWh)	Btu	3,412	Btu / kWh
kilowatt hour (kWh)	kilojoules (KJ)	3,600	KJ / kWh
megajoule (MJ)	gigajoules (GJ)	0.001	GJ / MJ
gigajoule (GJ)	million Btu (mmBtu)	0.9478	mmBtu / GJ
gigajoule (GJ)	kilowatt hours (kWh)	277.8	kWh / GJ
Btu	joules (J)	1,055	J / Btu
million Btu (mmBtu)	gigajoules (GJ)	1.055	GJ / mmBtu
million Btu (mmBtu)	kilowatt hours (kWh)	293	kWh / mmBtu
therm	Btu	100,000	Btu / therm
therm	gigajoules (GJ)	0.1055	GJ / therm
therm	kilowatt hours (kWh)	29.3	kWh / therm

Distance			
mile	kilometers (km)	1.609	km / mile
nautical mile	miles	1.15	mile / nautical mile
kilometer (km)	miles	0.622	mile / km

Other	
Kilo	1,000
Mega	1,000,000
Giga	1,000,000,000
Tera	1,000,000,000,000
Molecular Weigh of C	12
Molecular Weight of CO_2	44

Back to Intro | Back to Summary | Back to Stationary Combustion | Back to Steam

Tool Sheet: Heat Content for Specific Fuels
Additional heat contents can be found in the Emission Factors Hub.

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Fuel Type	Convert From	Convert To	Multiply By	Units	Source
Natural Gas	mmBtu	scf	974.7	scf / mmBtu	
Natural Gas	Dth (Decatherm)	scf	974.7	scf / Dth	
Natural Gas	therm	scf	97.5	scf / therm	
Natural Gas	ccf	scf	100	scf / ccf	
Natural Gas	Mcf	scf	1000	scf / Mcf	
Natural Gas	cubic meter	scf	35.31	scf / cubic meter	
Natural Gas	kWh	scf	3.326	scf / kWh	
Anthracite Coal	mmBtu	Short ton	0.03986	short ton / mmBtu	
Bituminous Coal	mmBtu	Short ton	0.04011	short ton / mmBtu	
Sub-bituminous Coal	mmBtu	Short ton	0.05797	short ton / mmBtu	
Lignite Coal	mmBtu	Short ton	0.07037	short ton / mmBtu	
Mixed (Commercial Sector)	mmBtu	Short ton	0.04675	short ton / mmBtu	
Mixed (Electric Power Sector)	mmBtu	Short ton	0.05068	short ton / mmBtu	
Mixed (Industrial Coking)	mmBtu	Short ton	0.03805	short ton / mmBtu	
Mixed (Industrial Sector)	mmBtu	Short ton	0.04474	short ton / mmBtu	EPA, Emission Factors Hub March 2024, Based on Federal
Coal Coke	mmBtu	Short ton	0.04032	short ton / mmBtu	Register EPA; 40 CFR Part 98; e-CFR, (see link below).
Agricultural Byproducts	mmBtu	Short ton	0.12121	short ton / mmBtu	
Peat	mmBtu	Short ton	0.12500	short ton / mmBtu	Table C-1, Table C-2 (as amended at 81 FR 89252, Dec. 9,
Solid Byproducts	mmBtu	Short ton	0.09625	short ton / mmBtu	2016), Table AA-1 (78 FR 71965, Nov. 29, 2013).
Wood and Wood Residuals	mmBtu	Short ton	0.05721	short ton / mmBtu	https://www.ecfr.gov/cgi-bin/text-
Municipal Solid Waste	mmBtu	Short ton	0.10050	short ton / mmBtu	idx?SID=ae265d7d6f98ec86fc8640b0793a3f58&mc=true&node
Petroleum Coke (Solid)	mmBtu	Short ton	0.03333	short ton / mmBtu	=pt40.23.98&rgn=div5#ap40.23.98_19.1
Plastics	mmBtu	Short ton	0.02632	short ton / mmBtu	
Tires	mmBtu	Short ton	0.03571	short ton / mmBtu	
Distillate Fuel Oil No. 2	mmBtu	gallon	7.2464	gallon / mmBtu	
Residual Fuel Oil No. 6	mmBtu	gallon	6.667	gallon / mmBtu	
Kerosene	mmBtu	gallon	7.407	gallon / mmBtu	
Liquefied Petroleum Gases (LPG)	mmBtu	gallon	10.870	gallon / mmBtu	
Biodiesel (100%)	mmBtu	gallon	7.813	gallon / mmBtu	
Ethanol (100%)	mmBtu	gallon	11.905	gallon / mmBtu	
Rendered Animal Fat	mmBtu	gallon	8.000	gallon / mmBtu	
Vegetable Oil	mmBtu	gallon	8.333	gallon / mmBtu	
Propane Gas	mmBtu	scf	397	scf / mmBtu	
Propane Gas	therm	scf	39.7	scf / therm	
Landfill Gas	mmBtu	scf	2060	scf / mmBtu	
Landfill Gas	therm	scf	206.2	scf / therm	
Steam	Mlb (1,000 pounds)	mmBtu	1.194	mmBtu / Mlb	EPA, ENERGY STAR, https://www.energystar.gov/buildings/tools
Steam	lb	mmBtu	0.001194	mmBtu / lb	and-resources/portfolio-manager-technical-reference-thermal-
Steam	short ton	mmBtu	2.388	mmBtu / short ton	conversion-factors

Back to Intro | Back to Summary

Tool Sheet: Emission Factors

All emission factors are sourced from EPA's Emission Factors Hub, February 2024 unless otherwise noted. Fuel emission factors presented represent the combustion-only (tank-to-wheel) emissions and do not represent upstream (well-to-wheel) emissions.

Reference the below link to the EPA's Emission Factors Hub for source data information and links to the methodology and technical documents associated with each table.

[illegible link]

Stationary Combustion

Fuel Type	CO_2 Factor	CH_4 Factor	N_2O Factor	CO_2 Factor	CH_4 Factor	N_2O Factor	Unit
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Mobile Combustion

Fuel Type	CO_2 Emission Factor	Unit
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Compressed Natural Gas (CNG)	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Liquefied Petroleum Gases (LPG)	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Residual Fuel Oil	[illegible]	[illegible]

Vehicle Type	Model Year	CH_4 Factor	N_2O Factor	Notes
[illegible]	[illegible]	[illegible]	[illegible]	
	[illegible]	[illegible]	[illegible]	Held constant from most recent data (year 2021 factor).
	[illegible]	[illegible]	[illegible]	These factors are used for ethanol heavy-duty vehicles and buses
	[illegible]	[illegible]	[illegible]	Held constant from most recent data (year 2021 factor).
Gasoline Motorcycles	[illegible]	[illegible]	[illegible]	
	[illegible]	[illegible]	[illegible]	Held constant from most recent data (year 2021 factor).

Note:
The latest mobile combustion factors reflect year 2021 data. Therefore, for all vehicle model years 2022 onward, the 2021 year factor is used.

Vehicle Type	Fuel Type	Model Year	CH_4 Factor	N_2O Factor	Notes
Passenger Cars	Diesel	[illegible]	[illegible]	[illegible]	Held constant for 2022 onwards from most recent data year (year 2021 data).
Light-Duty Trucks	Diesel	[illegible]	[illegible]	[illegible]	Held constant for 2022 onwards from most recent data year (year 2021 data).
Medium- and Heavy-Duty Vehicles	Diesel	[illegible]	[illegible]	[illegible]	Held constant for 2022 onwards from most recent data year (year 2021 data).
Light-Duty Cars	[illegible]		[illegible]	[illegible]	
Light-Duty Trucks	[illegible]		[illegible]	[illegible]	
Medium-Duty Trucks	[illegible]		[illegible]	[illegible]	
Heavy-Duty Trucks	[illegible]		[illegible]	[illegible]	
Buses	[illegible]		[illegible]	[illegible]	

Vehicle Type	Fuel Type	CH_4 Factor	N_2O Factor
Ships and Boats	Gasoline (4 stroke)	[illegible]	[illegible]
Aircraft	[illegible]	[illegible]	[illegible]
Agricultural Equipment	[illegible]	[illegible]	[illegible]
Construction/Mining Equipment	[illegible]	[illegible]	[illegible]
Lawn and Garden Equipment	[illegible]	[illegible]	[illegible]
Airport Equipment	[illegible]	[illegible]	[illegible]
Industrial/Commercial Equipment	[illegible]	[illegible]	[illegible]
Logging Equipment	[illegible]	[illegible]	[illegible]
Railroad Equipment	[illegible]	[illegible]	[illegible]
Recreational Equipment	[illegible]	[illegible]	[illegible]

Notes:
Agricultural equipment includes equipment, such as tractors and combines, as well as fuel consumption from trucks that are used off-road in agriculture.
Construction/Mining equipment, such as cranes, dumpers, and excavators, as well as fuel consumption from trucks that are used off-road in construction.

Electricity

eGRID Subregion	CO_2 Factor	CH_4 Factor	N_2O Factor
[illegible]	[illegible]	[illegible]	[illegible]

Note:
These factors do not include upstream transmission and distribution emissions associated with delivered electricity.

Scope 3 Sources

Vehicle Type	CO_2 Factor	CH_4 Factor	N_2O Factor	Units
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

WARM Material	Material for SGEC Lookup (punctuation removed)	Metric Tons CO₂e / Short Ton Material: Recycled	Landfilled	Combusted	Composted	Anaerobically Digested (Dry Digestate with ...)	Anaerobically Digested (Wet Digestate with ...)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Notes: These factors do not include any avoided emissions impact from any of the disposal methods.
All the factors presented here include transportation emissions, which are optional in the Scope 3 Calculation Guidance, with an assumed average distance traveled to the processing facility.
AR4 GWP values are used to convert all waste emission factors into CO_2e.

Recycling emissions include transport to recycling facility and sorting of recycled materials at material recovery facility. This is consistent with the GHG Protocol Scope 3 guidance, and includes the voluntary transportation emissions, with an assumed average distance traveled to the processing facility.
Landfilling emissions include transport to landfill, equipment use at landfill and landfill CH4 emissions from anaerobic decomposition of biogenic carbon compounds. Landfill CH4 is based on typical landfill gas collection practices, average landfill moisture conditions, and U.S.-average non-baseload electricity grid mix.
Combustion emissions include transport to waste-to-energy facility and combustion-related non-bigenic CO2 and N2O. This is consistent with the GHG Protocol Scope 3 guidance, and includes the voluntary transportation emissions, with an assumed average distance traveled to the processing facility.
Composting emissions include transport to compost facility, equipment use at compost facility and CH4 and N2O emissions during composting. This is consistent with the GHG Protocol Scope 3 guidance, and includes the voluntary transportation emissions, with an assumed average distance traveled to the processing facility.

Vehicle Type	CO_2 Factor	CH_4 Factor	N_2O Factor	Units
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	passenger-mile

Global Warming Potential (GWP)

Industrial Designation or Common Name	Chemical Formula	100-Year GWP
Carbon dioxide	[illegible]	[illegible]
Methane	[illegible]	[illegible]
Nitrous oxide	[illegible]	[illegible]
HFC-23	[illegible]	[illegible]
HFC-32	[illegible]	[illegible]
HFC-41	[illegible]	[illegible]
HFC-125	[illegible]	[illegible]
HFC-134	[illegible]	[illegible]
HFC-134a	[illegible]	[illegible]
HFC-143	[illegible]	[illegible]
HFC-143a	[illegible]	[illegible]
HFC-152	[illegible]	[illegible]
HFC-152a	[illegible]	[illegible]
HFC-161	[illegible]	[illegible]
HFC-227ea	[illegible]	[illegible]
HFC-236cb	[illegible]	[illegible]
HFC-236ea	[illegible]	[illegible]
HFC-236fa	[illegible]	[illegible]
HFC-245ca	[illegible]	[illegible]
HFC-245fa	[illegible]	[illegible]
HFC-365mfc	[illegible]	[illegible]
HFC-43-10mee	[illegible]	[illegible]
Sulfur hexafluoride	[illegible]	[illegible]
Nitrogen trifluoride	[illegible]	[illegible]
PFC-14	[illegible]	[illegible]
PFC-116	[illegible]	[illegible]
PFC-218	[illegible]	[illegible]
PFC-318	[illegible]	[illegible]
PFC-31-10	[illegible]	[illegible]
PFC-41-12	[illegible]	[illegible]
PFC-51-14	[illegible]	[illegible]
PFC-91-18	[illegible]	[illegible]
Note: This Calculator tool update includes the above update to GWP values from IPCC Fifth Assessment Report (AR5), 2013 Chapter 8, Table 8.A.1 Lifetimes, Radiative Efficiencies and Metric Values. This represents a methodology change.		

Note:
This Calculator tool uses GWP values from IPCC Fifth Assessment Report (AR5), 2013 Chapter 8, Table 8.A.1, Lifetimes, Radiative Efficiencies and Metric Values. This represents a methodology change.

[illegible]	[illegible]	Blend Make-up
[illegible]	[illegible]	53% HCFC-22 , 34% HCFC-124 , 13% HFC-152a
[illegible]	[illegible]	61% HCFC-22 , 28% HCFC-124 , 11% HFC-152a
[illegible]	[illegible]	33% HCFC-22 , 52% HCFC-124 , 15% HFC-152a
[illegible]	[illegible]	38% HCFC-22 , 60% HFC-125 , 2% propane
[illegible]	[illegible]	60% HCFC-22 , 38% HFC-125 , 2% propane
[illegible]	[illegible]	56% HCFC-22 , 39% PFC-218 , 5% propane
[illegible]	[illegible]	44% HFC-125 , 4% HFC-134a , 52% HFC-143a
[illegible]	[illegible]	55% HCFC-22 , 41% HCFC-142b , 4% isobutane
[illegible]	[illegible]	20% HFC-32 , 40% HFC-125 , 40% HFC-134a
[illegible]	[illegible]	10% HFC-32 , 70% HFC-125 , 20% HFC-134a
[illegible]	[illegible]	23% HFC-32 , 25% HFC-125 , 52% HFC-134a
[illegible]	[illegible]	15% HFC-32 , 15% HFC-125 , 70% HFC-134a
[illegible]	[illegible]	47% HCFC-22 , 7% HFC-125 , 46% HFC-143a
[illegible]	[illegible]	60% HCFC-22 , 25% HCFC-124 , 15% HCFC-142b
[illegible]	[illegible]	50% HFC-32 , 50% HFC-125
[illegible]	[illegible]	45% HFC-32 , 55% HFC-125
[illegible]	[illegible]	87.5% HCFC-22 , 11% HFC-152a , 1.5% propylene
[illegible]	[illegible]	96% HCFC-22 , 3% HFC-152a , 3% propylene
[illegible]	[illegible]	51% HCFC-22 , 28.5% HCFC-124 , 16.5% HCFC-142b , 4% isobutane
[illegible]	[illegible]	50% HCFC-22 , 39% HCFC-124 , 9.5% HCFC-142b , 1.5% isobutane
[illegible]	[illegible]	46.6% HFC-125 , 50% HFC-134a , 3.4% butane
[illegible]	[illegible]	85.1% HFC-125 , 11.5% HFC-134a , 3.4% isobutane
[illegible]	[illegible]	65.1% HFC-125 , 31.5% HFC-134a , 3.4% isobutane
[illegible]	[illegible]	50.5% HFC-125 , 47% HFC-134a , 1% butane , 0.9% isobutane , 0.6% isopentane
[illegible]	[illegible]	5.1% HFC-125 , 93% HFC-134a , 1.3% butane , 0.6% isobutane
[illegible]	[illegible]	77.5% HFC-125 , 20% HFC-143a , 1.9% isobutane , 0.6% propane
[illegible]	[illegible]	63.2% HFC-125 , 18% HFC-134a , 16% HFC-143a , 2.8% isobutane
R-507A	3,985	50% HFC-125 , 50% HFC-143a
[illegible]	[illegible]	39% HFC-23 , 61% PFC-116
[illegible]	[illegible]	46% HFC-23 , 54% PFC-116

Note:
This Calculator tool uses GWP values from IPCC Fifth Assessment Report (AR5), 2013 Chapter 8, Table 8.A.1, Lifetimes, Radiative Efficiencies and Metric Values. This represents a methodology change. GWP values of blended refrigerants are based only on their HFC and PFC constituents, which are based on data from https://www.epa.gov/snap/compositions-refrigerant-blends.

Data Management - HELP SHEET

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On this sheet you will find general suggestions regarding GHG inventory data management.

DATA MANAGEMENT

This Calculator provides the calculations to quantify your organization's GHG emissions based on annual totals for activity data, which are entered in the ORANGE data entry cells in this workbook. It is good practice to use a spreadsheet or database to track more detailed activity data, such as monthly energy consumption, and aggregate that detailed data into annual totals for entry into the Calculator. This approach provides an "audit trail" that retraces the steps completed to arrive at the annual usage numbers you enter into the Calculator. ENERGY STAR's Portfolio Manager is one database option if your business is already using this tool. (More information on Portfolio Manager is available in the Guide to GHG Management). The bullets below suggest the type of data you may want to store in the data management spreadsheet or database.

A List of Facilities and Attributes
* Facility Name or Site ID
* Address (including zip code)
* Floor area (sq ft)
* Number of Employees
* Open and Close Date of Facility
* Type of Facility

Electricity Data
* Monthly Consumption Data by Meter or Facility
* Monthly Cost Data by Meter or Facility
* Record of renewable energy purchased through

Stationary Fuel Data (for each Fuel Type)
* Monthly Consumption Data by Meter or Facility
* Monthly Cost Data by Meter or Facility

Mobile Fuel Data
* List of Vehicles (Year, Make, Model, Fuel Type)
* Fuel Consumption by Vehicle
* Fuel Cost by Vehicle
* Miles Traveled by Vehicle

Refrigeration and AC Data
* Inventory of Equipment by Facility
* Refrigerant Capacity of Equipment
* Refrigerant Purchase, Inventory, and Disposal Data

Fire Suppression Data
* Inventory of Equipment by Facility
* Fire Suppressant Capacity of Equipment
* Fire Suppressant Purchase, Inventory, and Disposal Data
Disposal Data

Purchased Gas Data
* Types of Gas Purchased
* Amount of Gas Purchased

Steam Data
* Monthly Consumption Data by Meter or Facility
* Monthly Cost Data by Meter or Facility
* Steam Provider Emission Factors
* Fuel Type Used to Generate Steam
* Boiler Efficiency

Business Travel
* Mode of Transportation
* Mileage by Trip (i.e., for each leg of transport)

Commuting
* Mode of Transportation per Employee
* Mileage by Trip (i.e., for each leg of transport)

Product Transport
* Mode of Transportation for each Shipment
* Weight of Product Transported for each Shipment
* Distance Product Transported for each Shipment

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) - Suggested Checks

The accuracy of a GHG inventory depends on the accuracy of the activity data. Here are a few quick checks to make sure your data are realistic. If any of these checks lead to questions, it is best to review the data month by month to look for data points that are significantly higher or lower than other points. Checking data sources such as utility bills can confirm data entry accuracy.

Benchmarks

Compare your energy consumption data against typical benchmarks.

1. Compare your energy consumption data per square foot of floor area against the averages by building type and region in the tables below. See below for building type definitions.
2. Does any facility look significantly higher or lower than these averages? If so, can the difference be explained?

Electricity Intensity	kWh electricity / sq ft / year			
Principal Building Activity	**Northeast**	**Midwest**	**South**	**West**
Education	7.9	8.1	11.4	9.0
Food sales	Insufficient Data	67.3	53.7	Insufficient Data
Food service	29.7	43.0	52.7	36.9
Health care	19.0	25.0	27.3	22.2
Inpatient	22.4	28.3	32.2	29.5
Outpatient	15.9	18.6	19.6	15.9
Lodging	13.7	14.8	15.2	13.2
Mercantile	15.1	15.4	17.8	17.2
Retail (other than mall)	11.3	12.7	15.3	13.0
Enclosed and strip malls	17.9	18.9	20.2	20.1
Office	13.8	12.0	15.4	12.5
Public assembly	9.6	11.6	15.1	9.4
Public order and safety	Insufficient Data	Insufficient Data	16.7	11.6
Religious worship	5.1	4.2	5.4	4.2
Service	7.3	5.7	9.0	7.6
Warehouse and storage	6.0	5.2	6.5	5.5
Other	31.4	24.0	25.3	45.5
Vacant	Insufficient Data	4.2	4.9	Insufficient Data

Natural Gas Intensity	standard cubic feet (scf) natural gas / sq ft / year			
Principal Building Activity	**Northeast**	**Midwest**	**South**	**West**
Education	41.5	38.7	21.2	21.9
Food sales	Insufficient Data	75.4	Insufficient Data	Insufficient Data
Food service	Insufficient Data	212.0	152.2	106.4
Health care	58.2	59.4	63.5	54.2
Inpatient	89.5	71.1	76.0	84.0
Outpatient	30.9	34.0	22.8	22.4
Lodging	45.7	44.1	27.1	38.6
Mercantile	41.9	41.4	28.9	37.1
Retail (other than mall)	25.0	26.4	20.0	22.5
Enclosed and strip malls	49.2	58.9	34.2	43.9
Office	20.6	26.3	18.7	18.6
Public assembly	52.6	48.5	28.7	33.5
Public order and safety	Insufficient Data	Insufficient Data	40.2	34.8
Religious worship	33.8	28.6	16.7	17.4
Service	38.2	38.3	51.3	39.1
Warehouse and storage	19.3	27.7	13.5	10.4
Other	38.7	Insufficient Data	21.2	Insufficient Data
Vacant	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data

Fuel Oil Intensity	gallons fuel oil / sq ft / year			
Principal Building Activity	**Northeast**	**Midwest**	**South**	**West**
	0.1305	0.0288	0.0432	Insufficient Data
	0.0480	0.0201	0.0099	Insufficient Data

Office	0.0445	0.0052	0.0057	0.002
All others	0.0915	0.0170	0.0145	Insufficient Data

Source:

1. Source- EIA's 2018 Commercial Buildings Energy Consumption Survey, Table C15 (Electricity), Table C25 (Natural Gas), Table C35 (Fuel Oil).
   https://www.eia.gov/consumption/commercial/data/2018/index.php?view=consumption#c33-c36
2. Building Type Definitions Source- http://www.eia.gov/consumption/commercial/building-type-definitions.cfm

Calculated Unit Costs

Calculated unit costs that are out of expected ranges can indicate data entry errors.

1. Use the cost and consumption data entered into your data management file to calculate the cost per unit of consumption for each month and each emissions source.
2. Is the unit cost within expected ranges? Is it fairly constant month to month? Keep in mind that very low consumption (such as with heating fuel during the summer) can skew the unit cost due to fixed monthly fees.
3. If the calculated unit cost is not reasonable, is there an error in either the consumption data or the cost data?

Year Over Year Comparison

Compare usage data from one year to the next.

1. Is there a significant change in consumption data year over year? If so, hone in on the facilities causing the change.
2. If there is a significant change, can it be explained?
3. If this amount is not reasonable, is there an error in either the consumption data or the data entry? Check monthly data by facility.

Building Types

Education	Buildings used for academic or technical classroom instruction, such as elementary, middle, or high schools, and classroom buildings on college or university campuses. Buildings on education campuses for which the main use is not classroom are included in the category relating to their use. For example, administration buildings are part of "Office," dormitories are "Lodging," and libraries are "Public Assembly."	elementary or middle school, high school, college or university, preschool or daycare, adult education, career or vocational training, religious education
Food Sales	Buildings used for retail or wholesale of food.	grocery store or food market, gas station with a convenience store, convenience store,
Food Service	Buildings used for preparation and sale of food and beverages for consumption.	fast food, restaurant or cafeteria, bar, catering service or reception hall, coffee, bagel, or doughnut shop, ice cream or frozen yogurt shop
Health Care (Inpatient)	Buildings used as diagnostic and treatment facilities for inpatient care.	hospital, inpatient rehabilitation
Health Care (Outpatient)	Buildings used as diagnostic and treatment facilities for outpatient care. Medical offices are included here if they use any type of diagnostic medical equipment (if they do not, they are categorized as an office building).	medical office (see previous column), clinic or other outpatient health care, outpatient rehabilitation, veterinarian
Lodging	Buildings used to offer multiple accommodations for short-term or long-term residents, including skilled nursing and other residential care buildings.	motel or inn, hotel, dormitory, fraternity, or sorority, retirement home, nursing home, assisted living, or other residential care, convent or monastery, shelter, orphanage, or children's home, halfway house
Mercantile (Retail Other Than Mall)	Buildings used for the sale and display of goods other than food.	retail store, beer, wine, or liquor store, rental center, dealership or showroom for vehicles or boats, studio/gallery
Mercantile (Enclosed and Strip Malls)	Shopping malls comprised of multiple connected establishments.	enclosed mall, strip shopping center
Office	Buildings used for general office space, professional office, or administrative offices. Medical offices are included here if they do not use any type of diagnostic medical equipment (if they do, they are categorized as an outpatient health care building).	administrative or professional office, government office, mixed-use office, bank or other financial institution, medical office (see previous column), sales office, contractor's office (e.g. construction, plumbing, HVAC), non-profit or social services, city hall or city center, religious office, call center
Public Assembly	Buildings in which people gather for social or recreational activities, whether in private or non-private meeting halls.	social or meeting (e.g. community center, lodge, meeting hall, convention center,senior center), recreation (e.g. gymnasium, health club, bowling alley, ice rink, field house, indoor racquet sports), entertainment or culture (e.g. museum, theater, cinema, sports arena, casino, night club), library, funeral home, student activities center, armory, exhibition hall, broadcasting studio, transportation terminal
Public Order and Safety	Buildings used for the preservation of law and order or public safety.	police station, fire station, jail, reformatory, or penitentiary, courthouse or probation office
Religious Worship	Buildings in which people gather for religious activities, (such as chapels, churches, mosques, synagogues, and temples).	No subcategories collected
Service	Buildings in which some type of service is provided, other than food service or retail sales of goods	vehicle service or vehicle repair shop, vehicle storage/ maintenance (car barn), repair shop, dry cleaner or laundromat, post office or postal center, car wash, gas station, photo processing shop, beauty parlor or barber shop, tanning salon, copy center or printing shop, kennel
Warehouse and Storage	Buildings used to store goods, manufactured products, merchandise, raw materials, or personal belongings (such as self-storage).	refrigerated warehouse, non-refrigerated warehouse, distribution or shipping center
Other	Buildings that are industrial or agricultural with some retail space; buildings having several different commercial activities that, together, comprise 50 percent or more of the floorspace, but whose largest single activity is agricultural, industrial/ manufacturing, or residential; and all other miscellaneous buildings that do not fit into any other category.	airplane hangar, crematorium, laboratory, telephone switching, agricultural with some retail space, manufacturing or industrial with some retail space, data center or server farm
Vacant	Buildings in which more floorspace was vacant than was used for any single commercial activity at the time of interview. Therefore, a vacant building may have some occupied floorspace.	No subcategories collected, but a question was asked to determine whether the building was completely vacant.

Scope 1 Emissions from Stationary Combustion Sources - HELP SHEET

DEFINITION

Combustion emission sources are stationary sources that combust fuel, like a natural gas hot water heater for an office building or an oil burning boiler. Emissions result from the actual combustion of the fuels to produce useful products, like heat and hot water.

COLLECT

To account for these sources, collect information about the type of fuel used and the quantity of fuel combusted at each facility. Sources of data can vary, but the data are often provided by the utility organization that supplies the fuel to the organization. A monthly natural gas bill, for example, can be used to provide information regarding how much natural gas was purchased for the previous billing cycle.

Data Collection Checklist (for all facilities)

- Type of fuel consumed
- Amount of fuel consumed

QUANTIFY

After the data has been collected, it should be entered into the appropriate orange colored boxes of the Calculator section titled "Stationary Combustion." The fuel type can be selected from the form. After the data are entered into the Calculator, the CO_2 equivalent emissions are displayed in the blue colored box.

Items to Note

- Use the heat content sheet to convert units provided on the invoice into the units the Calculator requires.
- If you are one of many tenants in a facility and you do not have the actual amount of fuel used in your space, you may estimate your fuel usage by multiplying the fuel usage of the entire facility by the percentage of the floor area that your organization occupies.
- Companies with home offices can optionally include these spaces in their inventory if the energy use associated with business activities can be reasonably estimated.
- The Energy Information Administration conducts a Commercial Building Energy Consumption Survey and provides average energy consumption by building type per square foot. Use the numbers below to compare against your data or to estimate for natural gas if no data are available. For example, if you have a 1,000 sq ft office suite in the Northeast multiply by 20.6 to get an estimation of 20,600 scf natural gas for a year.

Natural Gas Intensity	**standard cubic feet (scf) natural gas / sq ft / year**			
Principal Building Activity	**Northeast**	**Midwest**	**South**	**West**
Education	41.5	38.7	21.2	21.9
Food sales	Insufficient Data	75.4	Insufficient Data	Insufficient Data
Food service	Insufficient Data	212.0	152.2	106.4
Health care	58.2	59.4	63.5	54.2
Inpatient	89.5	71.1	76.0	84.0
Outpatient	30.9	34.0	22.8	22.4
Lodging	45.7	44.1	27.1	38.6
Mercantile	41.9	41.4	28.9	37.1
Retail (other than mall)	25.0	26.4	20.0	22.5
Enclosed and strip malls	49.2	58.9	34.2	43.9
Office	20.6	26.3	18.7	18.6
Public assembly	52.6	48.5	28.7	33.5
Public order and safety	Insufficient Data	Insufficient Data	40.2	34.8
Religious worship	33.8	28.6	16.7	17.4
Service	38.2	38.3	51.3	39.1
Warehouse and storage	19.3	27.7	13.5	10.4
Other	38.7	Insufficient Data	21.2	Insufficient Data
Vacant	Insufficient Data	Insufficient Data	Insufficient Data	Insufficient Data

Source: EIA's Commercial Buildings Energy Consumption Survey (CBECS) 2018, Released September 2022. Table C25: Natural gas consumption and conditional energy intensity by Census region, 2018

https://www.eia.gov/consumption/commercial/data/2018/index.php?view=characteristics

Back to Intro | Back to Data Entry

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Scope 1 Emissions from Mobile Sources - HELP SHEET

DEFINITION

Mobile sources, like owned or leased cars and heavy duty vehicles generate emissions by burning fuel. The fuel usage for any vehicle that is under the organization's operational control should be reported here as scope 1 emissions. As required by GHG Protocol these emissions are only calculated for the combustion of the fuel (e.g., tank-to-wheel).

COLLECT

Determine the types of vehicles, types and amount of fuel, and the miles driven for each vehicle or vehicle type. Data sources vary but fuel usage is often determined from fuel receipts or purchase records and provided in gallons, and mileage from vehicle records. Mileage or fuel use can also be estimated based on vehicle fuel economy from the manufacturer or www.fueleconomy.gov if the other data sources are not readily available.

www.fueleconomy.gov

Data Collection Checklist (for all vehicles)

- Type and year of vehicle
- Amount of fuel consumed for the inventory reporting period
- Total miles driven for the inventory reporting period

QUANTIFY

Enter the data into the appropriate orange colored boxes of the Calculator section titled “Mobile Sources.” If the organization owns or leases biofuel or ethanol vehicles, the percentage of biologically-based fuel should be entered into the boxes provided; default values are available if needed. Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colored box. Biomass CO_2 emissions are calculated and summarized in the green colored box, and are typically not summed into the organization’s total GHG emissions because they are considered to be a net zero emission source.

Vehicle Classification Guidelines

Pickups, Vans, and SUVs should be classified as "Light Trucks"
Trucks weighing more than 8,500 lb should be classified as "Heavy- Duty Trucks"
Non-highway vehicles should be classified as "Other Offroad Equipment"

Items to Note

- Vehicle Classification Guidelines
  Trucks weighing more than 8,500 lb should be classified as "Heavy- Duty Vehicles"
  Pickup trucks, vans, and SUVs should be classified as "Light-Duty Trucks"
  Non-highway vehicles should be classified as "Construction Equip."
- Fuel usage and mileage is reported the same for hybrid vehicles as for conventional vehicles. If you are estimating mileage or fuel usage keep in mind the fuel efficiency.
- If your organization owns a private jet or plane it should be included here. Depending on the fuel it uses, pick the appropriate type from the drop down menu (i.e., Aviation Gasoline Aircraft, Jet Fuel Aircraft).
- If you are using biodiesel or ethanol, the percentage of biodiesel and ethanol should be filled out accordingly. If you are using these fuels in pure form, then you would enter 100%. If you are using a mixture of biodiesel and petroleum diesel, or a mixture of ethanol and gasoline then you would enter the biodiesel or ethanol percentage in that mixture. For example, B100 is 100% biodiesel, likewise B20 is 20% biodiesel. This is similar for ethanol; E85 is 85% ethanol.
- The Vehicle Type column is organized in order of most common vehicle types and their fuels.

Scope 1 Emissions from Refrigeration and Air Conditioning Equipment - HELP SHEET

DEFINITION

Refrigeration and Air Conditioning (AC) equipment sources can vary in size based on the type of organization. Emissions from refrigeration and AC devices, in facilities or vehicles, are caused by the leakage of chemicals with global warming impact during use, maintenance and/or disposal of the device. They are often small sources for office-based organizations. For example, a small office building may have one rooftop AC unit while a grocery store chain may have several rooftop AC units per store as

COLLECT

Choose one of three different calculation methods available in the "Refrigeration and AC" section of the Calculator. The types of refrigerants along with the data needs for each method are listed in the Calculator. Data for these sources is often collected from maintenance and inspection records, work orders, or invoices from contractors that service this equipment. Refrigerants not included on the list may be chemicals that do not need to be included in the inventory. For example, ozone depleting substances, such as chlorofluorocarbons (CFCs) or "freon" and hydrochlorofluorocarbons (HCFCs), are regulated internationally and are typically excluded from a GHG inventory or reported as a memo item. A reason to track these sources is to provide explanation for the increase of HFCs and PFCs when they replace the

Data Collection Checklist (by equipment)

- Refrigerant purchase, inventory, and disposal data
- Inventory of equipment by facility
- Refrigerant capacity of equipment
- Amount of refrigerant (HFC and PFC) emitted over the inventory reporting period
- Optional: Track HCFC and CFCs, such as R-22

QUANTIFY

Determine which of the three options is suitable for your business and enter the data into the appropriate orange colored boxes of the Calculator section titled "Refrigeration and AC." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colored box.

Option 1: The Detailed Material Balance Method is recommended for companies who maintain their own equipment. This method requires data from inventories, purchase and service records, and the full and proper charges of equipment. It includes emissions from equipment operation, servicing, and disposal.

Option 2: The Simplified Material Balance Method is recommended for companies who have contractors service their HFC/PFC containing equipment. This method tracks emissions from equipment operation, servicing, and disposal. The method requires data on the quantity of refrigerant: (a) used to fill new equipment during installation, (b) used to service equipment, and (c) recovered from retiring equipment, as well as the full and proper charges of new and retiring equipment. If notified in advance of the need for this information, the contractor should be able to

Option 3: It is recommended that the Screening Method be used only as a screening tool because the emission factors used in the approach are highly uncertain. Emission factors vary between individual pieces of equipment and over time. Even if the amount of refrigerant added to a piece of equipment has been tracked carefully, permitting the previous leak rate of that equipment to be established, that leak rate can change after a leak is repaired or as the equipment ages.

Items to Note

- If you are one of many tenants in a facility and you cannot quantify the refrigerant emissions specific to your space, you may estimate them based on the percentage of the floor area that your organization occupies.
- Emissions from refrigerants in an office-based organization are typically less than 2 percent of emissions. Consider this as you decide which Option is most appropriate.
- If your organization uses a refrigerant that is not listed, the user may need to determine the constituent blend. This website lists common refrigerant compositions:
  http://www.epa.gov/ozone/snap/refrigerants/refblend.html
- R-134a is the predominantly used refrigerant in vehicle AC systems. If you are uncertain of which refrigerant your vehicles use, you can assume R-134a.

Back to Intro | Back to Data Entry

Scope 1 Emissions from Fire Suppression Equipment - HELP SHEET

DEFINITION

Fire suppression emission sources can range in scale from a small portable fire extinguisher to a large scale fire suppression system for an office building or warehouse. The emissions are caused by chemicals (e.g., HFCs or CO_2) emitted from fire suppression devices during use, maintenance, and disposal.

COLLECT

Choose one of three different calculation methods available in the "Fire Suppression" section of the Calculator. In each method, choose the types of fire suppression gases used and then gather the corresponding emissions data. Data for these sources is often collected from maintenance and inspection records, work orders, or invoices from contractors that service this equipment.

Data Collection Checklist (by equipment and/or facility)

- Fire suppressant purchase, inventory, and disposal data
- Inventory of equipment by facility
- Fire suppressant capacity of equipment
- Amount of fire suppressant (HFC and PFC) emitted over the inventory reporting period

QUANTIFY

Enter the data into the appropriate orange colored boxes of the Calculator section titled "Fire Suppression." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colored box.

Items to Note

- Contact the manufacturer if you cannot find the list of propellants or chemicals used in the fire extinguisher.

Back to Intro Back to Data Entry

Scope 1 Emissions from Purchased Gases - HELP SHEET

DEFINITION

Industrial gases are sometimes used in processes such as manufacturing, testing, or laboratory uses. For example, CO_2 gas is often used in welding operations. These gases are typically released to the atmosphere after use. Any releases of the seven major greenhouse gases (CO_2, CH_4, N_2O, PFCs, HFCs, SF_6 and NF_3) must be included in the GHG inventory. Ozone depleting substances, such as CFCs and HCFCs, are regulated internationally and are typically excluded from a GHG inventory or reported as a memo item.

COLLECT

Determine if CO_2, CH_4, N_2O, PFCs, HFCs, SF_6 or NF_3 are used in processes such as those mentioned above. If so, collect the mass of gas purchased. If data are not available in mass units, the user may need to convert from volume to mass using the density of the specific gas.

Data Collection Checklist (for all applicable facilities)

- Type of gas purchased
- Amount of gas purchased
- Purpose for the gas

QUANTIFY

Enter the data into the appropriate orange colored boxes of the Calculator section titled "Gas." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colored box.

Items to Note

- If your business makes bulk purchases and plans on using the gas for several years, you should divide the bulk amount by the years of usage and report that amount.

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Scope 2 Emissions from Purchase of Electricity - HELP SHEET

DEFINITION

GHGs are emitted when fossil fuels are combusted to generate electricity. Companies account for their responsibility for these emissions by reporting them as scope 2 indirect emissions. This Calculator quantifies emissions from both the location-based method and the market-based method, and both totals should be reported. The location-based method considers average emission factors for the electricity grids that provide electricity. The market-based method considers contractual arrangements under which the organization procures power from specific sources, such as renewable energy. Market-based emission factors reflect these arrangements. Examples of market-based emission factors are: renewable energy certificates (RECs), power purchase agreements (PPAs), and supplier-specific factors. For detailed information on the location-based method and the market-based method review EPA's Indirect Emissions from Purchased Electricity Guidance (link at the bottom of this sheet).

COLLECT

Collect electricity purchase information in units of kWh for each facility. The best data source is typically its electricity bill or invoice. In the Calculator, there is a map at the bottom of the "Electricity" section which divides the United States into subregions based on the electric grid. Select the subregion(s) in which the organization's facilities are located to determine the correct CO_2, CH_4, and N_2O emission factors to use, since different parts of the country use different fuels to generate electricity. Multiple facility locations can be entered as separate line items in the Calculator. If a facility is on the border of a subregion, enter the zip code into EPA's Power Profiler (https://oaspub.epa.gov/powpro/ept_pack.charts) to find the correct subregion.

Data Collection Checklist (for all facilities)

- Amount of electricity purchased
- Amount of electricity purchased using contractual arrangements
- Emission factors (CO_2, CH_4 and N_2O) for contractual arrangements

QUANTIFY

There are two methods to quantify emissions from electricity: location-based and market-based. Both must be quantified to be in accordance with the Center for Corporate Climate Leadership Greenhouse Gas Inventory Guidance.

Location-based: Enter the data into the appropriate orange colored boxes (Table 1) of the Calculator section titled "Electricity." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colored box for the location based method.

Market-based: Enter applicable market-based emission factors (lb/MWh) for the purchased electricity in the yellow cells (Table 1) of the Calculator section titled "Electricity." See the market-based method Help sheet for additional guidance. Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colored box for the market-based method.

HELP - Market-Based Method

Items to Note

- If you are one of many tenants in a facility and you do not have the actual amount of electricity used in your space, you may estimate your usage by multiplying the electricity usage of the entire facility by the percentage of the floor area that your organization occupies.
- The number off the utility bill to use is the total usage amount (i.e., the difference between the meter reading at the beginning of the month and the end of the month).
- Companies with home offices can optionally include these spaces in their inventory if the energy use associated with business activities can be reasonably estimated.
- The Energy Information Administration conducts a Commercial Building Energy Consumption Survey and provides average energy consumption by building type per square foot. Use the numbers below to compare against your data or to estimate if no data are available. For example, if you have a 1,000 sq ft office suite in the Northeast multiply by 17.1 to get an estimation of 17,100 kWh electricity for a year.

Electricity Intensity	kWh electricity / sq ft / year			
Principal Building Activity	**Northeast**	**Midwest**	**South**	**West**
Education	7.9	8.1	11.4	9.0
Food sales	Insufficient Data	67.3	53.7	Insufficient Data
Food service	29.7	43.0	52.7	36.9
Health care	19.0	25.0	27.3	22.2
Inpatient	22.4	28.3	32.2	29.5
Outpatient	15.9	18.6	19.6	15.9
Lodging	13.7	14.8	15.2	13.2
Mercantile	15.1	15.4	17.8	17.2
Retail (other than mall)	11.3	12.7	15.3	13.0
Enclosed and strip malls	17.9	18.9	20.2	20.1
Office	13.8	12.0	15.4	12.5
Public assembly	9.6	11.6	15.1	9.4
Public order and safety	Insufficient Data	Insufficient Data	16.7	11.6
Religious worship	5.1	4.2	5.4	4.2
Service	7.3	5.7	9.0	7.6
Warehouse and storage	6.0	5.2	6.5	5.5
Other	31.4	24.0	25.3	45.5
Vacant	Insufficient Data	4.2	4.9	Insufficient Data

Source: Commercial Buildings Energy Consumption Survey (CBECS) 2012, Released September 2022, Table C15. Electricity consumption and conditional energy intensity by Census region, 2018

https://www.eia.gov/consumption/commercial/data/2018/index.php?view=characteristics

Refer to the Greenhouse Gas Inventory Guidance: Indirect Emissions from Purchased Electricity Guidance for more information.
https://www.epa.gov/climateleadership/scope-1-and-scope-2-inventory-guidance

Market-Based Method - HELP SHEET

Market-Based Electricity Emission Factors

The market-based method considers contractual arrangements under which the organization procures electricity from specific sources, such as fossil, renewable, or other generation facilities. Market-based emission factors reflect these arrangements. The following are the types of market-based emission factors available, listed in order of preference based on the precision of the factors. If any of the first four types of emission factors are applicable, enter the factors in the yellow cells marked as "<enter factor>". If not, leave the yellow cells as is, and eGRID subregion factors will be used for market-based emissions.

(1) Energy Attribute Certificates — If an energy attribute certificate carries with it an emission factor, that factor can be used to quantify emissions in the market-based method. Examples are renewable energy certificates (RECs) or Guarantees of Origin (GOs). The emission factor is based on the specific source that the certificate represents, regardless of the energy resource used. Typically these certificates represent renewable energy and may have an emission factor of zero, but they may in some cases have a non-zero emission factor (e.g., if there is a fossil-fuel or biomass

(2) Contracts — An organization may have a contract, such as a power purchase agreement (PPA), to purchase electricity from a specified generating facility, which may be located at the organization's facility, at a nearby location with a direct line connection to the organization, or located remotely. If there are no certificates available, the contract itself carries the emission factor associated with the generation facility, regardless of the energy resource used. If certificates are used, see Energy Attribute Certificates above.

(3) Supplier-Specific Emission Factor — An electricity supplier, such as a regulated utility or a deregulated supplier, may provide information to its customers on the emission factor associated with its electricity product. To be used in the market-based method, the emission factor must include all the electricity delivered by the supplier, including electricity it generates as well as electricity it purchases from others.

(4) Residual Mix Factor — A residual mix emission factor represents the emissions and generation that remain after certificates, contracts, and supplier-specific factors have been claimed and removed from the calculation. Residual mix emission factors are currently not widely available. Organizations are encouraged to check for available residual mix factors each year when their GHG inventory is completed, if the options above are not available or relevant.

(5) Regional Emission Factor — If residual mix factors are not available, organizations can use a regional grid average emission factor as the default. This Calculator will use eGRID subregion emission factors in this case.

(6) National Emission Factor — This should not be applicable for any companies reporting US based emissions, due to the availability of regional emission factors.

Quality Criteria for Contractual Instruments

All contractual instruments used in the market-based method must meet the following criteria:

(1) Convey the direct GHG emission rate attribute associated with the unit of electricity produced.
(2) Be the only instruments that carry the GHG emission rate attribute claim associated with that quantity of electricity generation. See the "Items to Note" section of the Help sheet for suggested estimation approaches.
(3) Be tracked and redeemed, retired, or canceled by or on behalf of the reporting entity. This can be done through a tracking system, an audit of contracts, third-party certification, or other means.
(4) Have a vintage that matches as closely as possible to the date of the reporting period to which the instruments are applied. The vintage of the instrument is based on the date of the energy generation that the instrument represents.
(5) Be sourced from the same market in which the reporting entity's electricity-consuming operations are located and to which the instrument is applied. A market is defined as a geographical area which has a common system for trading and retiring contractual instruments. For this purpose the U.S. constitutes a single market, despite regional grid boundaries.

The Indirect Emissions from Purchased Electricity Guidance defines EPA best-practice quality recommendations that go beyond these minimum requirements.

Items to Note

- EPA encourages organizations to use renewable energy as a way to reduce the environmental impacts associated with the electricity they purchase. Organizations can reduce their market-based scope 2 emissions by purchasing renewable energy, or "green power." They can do this by choosing a differentiated electricity product from their utility or electricity supplier, by contracting directly with a renewable energy generator (if the regulatory rules allow), or by purchasing unbundled renewable energy certificates (RECs). In any case, the RECs must be acquired and retired.

An Example

In a situation where an organization has procured electricity from a specific source that is relevant to report for the market-based method, but the source supplies less than 100% of the kWh consumed by the facility, it is important to enter the data correctly. Consider the following scenario:

- 100,000 kWh total facility consumption for Building A. 25,000 kWh purchased with energy attribute certificates such as renewable energy certificates (RECs).
- 50,000 kWh total facility consumption for Building B. All electricity purchased from the local utility.
- Emission factors for RECs from many RE sources are zero.
- No other market-based emission factors are available.

The table below shows how to enter the data for these example sites. There are two rows entered for the Building A in order to allocate the market-based emissions to the appropriate kWh.
The total Electricity Purchased (kWh) of the two rows adds up to Building A's total consumption. Be careful not to double count kWh.
The REC emission factors are entered in the first row. In the second row, the supplier-specific emission factor for the local utility is entered.
In the third row, electricity is purchased from the grid with no market-based mechanism, so market-based emissions are equal to location-based emissions.

Table 1. Total Amount of Electricity Purchased by eGRID Subregion

					Market-Based						Location-Based					
					Emission Factors			Emissions			Emission Factors			Emissions		
Source ID	Source Description	Source Area (sq ft)	eGRID Subregion *where electricity is consumed*	Electricity Purchased (kWh)	CO_2 Emissions (lb/MWh)	CH_4 Emissions (lb/MWh)	N_2O Emissions (lb/MWh)	CO_2 Emissions (lb)	CH_4 Emissions (lb)	N_2O Emissions (lb)	CO_2 Emissions (lb/MWh)	CH_4 Emissions (lb/MWh)	N_2O Emissions (lb/MWh)	CO_2 Emissions (lb)	CH_4 Emissions (lb)	N_2O Emissions (lb)
Building A	Wind Farm RECs	6,000	RFC West	25,000	0	0	0	0.0	0.0	0.0	1,000.1	0.087	0.012	25,001.3	2.2	0.3
Building A	Local Utility Specific Factor	6,000	RFC West	75,000	800	0.060	0.010	60,015.0	4.5	0.8	1,000.1	0.087	0.012	75,004.0	6.5	0.9
Building B	Unknown	2,000	ERCOT All	50,000	<enter factor>	<enter factor>	<enter factor>	38,564.2	2.5	0.4	771.1	0.049	0.007	38,564.2	2.5	0.4
Total Emissions for All Sources								**98,579.2**	**7.0**	**1.1**				**138,569.5**	**11.2**	**1.6**

GHG Emissions

CO_2 Equivalent Emissions (metric tons)	
Location-Based Electricity Emissions	**63.2**
Market-Based Electricity Emissions	**44.9**

Refer to the Greenhouse Gas Inventory Guidance: Indirect Emissions from Purchased Electricity Guidance for more information.
https://www.epa.gov/climateleadership/center-corporate-climate-leadership-greenhouse-gas-inventory-guidance

Scope 2 Emissions from Purchase of Steam - HELP SHEET

DEFINITION

Similar to electricity production, GHGs are emitted when fossil fuels are combusted to generate heat or steam. If the organization purchases heat or steam, the emissions are accounted for as scope 2 indirect emissions. Also similar to electricity, both the location-based method and the market-based method should be calculated and reported as done in this Calculator. Typically supplier-specific emission factors for steam will apply to both location-based and market-based emissions, and no market-based emission factors need to be entered. If needed, see the market-based method Help Sheet for more information.

COLLEC

Determine the amount of steam purchased, the types of fuel that the steam supplier uses to generate the steam, and either the emission factors provided by the steam supplier or the boiler efficiency. If values for boiler efficiency are unavailable, a default of 80% is provided in the Calculator.

Data Collection Checklist (for all facilities)

- Amount of steam purchased
- Fuel type used to generate steam
- Boiler efficiency or supplier-specific emission factors

QUANTIFY

Enter the data into the appropriate orange colored boxes (Table 1) of the Calculator section titled "Steam." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the blue colored box. Enter the market-based emission factors in the yellow cells if applicable.

Items to Note

- Use the heat content sheet to convert units provided on the invoice into the units the Calculator requires.
- If you are one of many tenants in a facility and you do not have the actual amount of steam used in your space, you may estimate your usage by multiplying the steam usage of the entire facility by the percentage of the floor area that your organization occupies.

Scope 3 Emissions from Business Travel - HELP SHEET

DEFINITION

Scope 3 business travel emissions differ from the scope 1 mobile source emission reporting in that they account for business travel in vehicles not owned or leased by the organization, such as taxis, trains, commercial airplanes, and personal vehicles used for sales.

COLLECT

Collect information about business travel method. Travel by vehicle-miles is used when the employee is traveling in a personal vehicle. Travel by passenger-mile is used when the employee is traveling in a vehicle shared with many other people (i.e., bus, train or plane). For travelers that use a personal vehicle, choose the vehicle type from the Calculator and collect data for the vehicle miles during the reporting period. For rail, bus, and air travel, the mode of travel should be selected from the Calculator options and an estimate of the passenger mileage data provided for each.

Data Collection Checklist (for all employee travel)

- Type of transport (personal vehicle, train, bus, plane)
- Miles traveled for each transport type. For air travel, mileage should ideally be determined considering each flight segment individually. If you use a travel agent, they may have these data in their records.

QUANTIFY

Enter the data into the appropriate orange colored boxes (Tables 1-3) of the Calculator section titled "Business Travel." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the green colored box. The emission factors included for air travel do not include radiative forcing. Per the GHG Protocol, for air travel emission factors, multipliers or other corrections to account for radiative forcing may be applied to the GWP of emissions arising from aircraft transport. If applied, companies should disclose the specific factor used.

Back to Intro | Back to Data Entry

Scope 3 Emissions from Employee Commuting - HELP SHEET

DEFINITION

Employee commuting emissions differ from the required mobile source emission reporting in that they account for employee travel to and from work in vehicles not owned or leased by the organization, including personal vehicles, buses,

COLLEC

Collect information about each employee's commuting method. If not all employees can provide information on their commuting habits, you can calculate an average per employee and multiply by total employees to estimate. For commuters that use a personal vehicle, the appropriate vehicle type should be selected from the Calculator and data collected for the vehicle-miles during the reporting period. For rail, bus, and air travel, the mode of transport should be selected from the Calculator options and an estimate of the passenger mileage data provided for each.

Data Collection Checklist (per Employee)

- Commuting days per year (consider vacation, sick time and business travel)
- Mode of transport (this may be multiple modes of transport)
- Round trip mileage

QUANTIFY

After the data has been collected, enter the data into the appropriate orange colored boxes (Tables 1-2) of the Calculator section titled "Commuting." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the green colored box.

Items to Note

- Commuting by vehicle-miles is used when the employee is traveling in their own vehicle. Travel by passenger-mile is used when the employee is traveling in a vehicle shared with many other people (i.e., bus, train or plane).
- If employees carpool, only their portion of the mileage should be included in the GHG inventory. For example, if one of your employees drives 10 miles alone to meet two other people (not employees) to carpool and then drives 30 miles to work then the organization should include 20 miles (10 miles + 30 (1/3)) in the corporate inventory.
- If collecting data from all your employees is not possible due to the size of your organization, you may collect data from as many employees as possible, and use that sample to estimate for the rest of the employees. Make sure the sample size is adequate, and keep in mind this will calculate less accurate results.

Scope 3 Emissions from Upstream Transportation and Distribution - HELP SHEET

DEFINITION

Scope 3 emissions from upstream transportation and distribution include all product transportation between product/materials origin to end customers by vehicles not owned or leased by the organization. For example, the organization could hire another company to transport product from the manufacturing location to distribution centers or final markets. (Note: If an organization owns or leases the trucks or other transport vehicles, these would be part of its scope 1 mobile source emissions). Another example of product transport is paying a courier to transport documents from one office to another. While this category does include emissions from warehousing of products, there is not currently a place to account for those emissions in this Calculator.

COLLECT

Collect information about shipment methods (on-road vehicle, waterborne craft, freight rail, or aircraft). For road shipments the user may enter data based on vehicle mileage or ton-miles of product transported. If the vehicle mileage option is chosen, then the organization should select the type of vehicle and enter the total mileage for that vehicle type. The ton-miles option is only applicable for heavy-duty trucks and the organization need only enter the total ton-miles traveled. For product transport via freight rail, waterborne, or air transport, the organization should enter the total ton-miles data.

Data Collection Checklist

- All product transport legs (origin and destination) and mileage
- Mode of transport per leg
- Weight transported per shipment for ton-mile calculation

QUANTIFY

Enter the data into the appropriate orange colored boxes (Tables 1-2) of the Calculator section titled "Upstream Transpt. and Dist." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the green colored box.

Items to Note

- To calculate ton-miles, multiply the weight transported (short tons) by the distance (miles) for each individual shipment. In Table 2, you can enter data either for individual shipments, or for the sum of ton-miles for multiple shipments.
- If you do not have shipment-by-shipment data, you may multiply **total** tons transported by the **average** miles per shipment. You may also multiply **average** tons transported per shipment times the **total** miles transported. Do not multiply **total** tons by **total** miles, as this will give an incorrect result.
- **Example**: Every week a company ships 10 short tons of product 100 miles. That equates to 52 shipments per year of 1,000 ton-miles each. The sum of the individual shipments is 52,000 ton-miles per year. Multiplying the total tons transported (520 tons) by the average miles per shipment (100 miles) provides the correct result of 52,000 ton-miles. Multiplying the average tons transported per shipment (10 tons) times the total miles (5,200 miles) also gives the correct result. Multiplying total tons (520 tons) by total miles (5,200 miles) gives an incorrect result.

Scope 3 Emissions from Waste - HELP SHEET

DEFINITION

Scope 3 emissions from waste include the disposal and treatment of waste generated in the reporting company's operations in the reporting year in facilities not owned or controlled by the reporting company. These emission factors align with the requirements of the GHG Protocol Scope 3 Standard. The emission factors do not include any avoided emissions impact from any of the disposal methods. All the factors presented include transportation emissions, which are optional in the Scope 3 Calculation Guidance, with an assumed average distance traveled to the processing facility. AR4 GWP values are used to convert all waste emission factors into CO_2e.

COLLECT

Collect information on the amount of weight disposed at your facilities, by the type of waste (plastics, paper, etc.) and disposal method (recycling, incineration, etc.). Refer to the Emission Factors tab for a complete list of materials and available disposal methods.

Data Collection Checklist

- Weight of waste disposed by material type and disposal method

QUANTIFY

Enter the data into the appropriate orange colored boxes (Tables 1) of the Calculator section titled "Waste." Once the data are entered into the Calculator, the CO_2 equivalent emissions are calculated and summarized in the green colored box.

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Purchased Offsets - HELP SHEET

DEFINITION

Offsets are project-based emission reductions and/or removals that occur outside the organizational boundary of the reporting organization. Offsets can be purchased by an organization to offset emissions from scope 1, scope 2, and/or scope 3 sources.

COLLECT

Quantity of offsets purchased in metric tons CO_2 equivalent for each offset project by scope 1, 2, or scope 3 category.

QUANTIFY

Enter the data into the appropriate orange colored boxes (Table 1) of the Calculator section titled "Offsets." Once the data are entered into the Calculator, the CO_2 equivalent emissions are summarized in the green colored box by scope and category.

Noise Assessment for Volunteer Training Site-Milan
Proposed Range Expansion Project
Milan, Tennessee
18 September – 14 December 2023

DEFENSE HEALTH AGENCY
DEFENSE CENTERS FOR PUBLIC HEALTH–ABERDEEN
8300 RICKETTS POINT ROAD BUILDING E-2850
ABERDEEN PROVING GROUND MARYLAND 21010-5403

Public Health

DCPH-AEHSE-EHS 18 January 2024

MEMORANDUM FOR Natural Resource Program, Tennessee Army National Guard (JFHQ-TN-FMO-ENV/Mr. Brian Knapp), 3041 Sidco Drive, Nashville, TN 37204-1502

SUBJECT: Environmental Health Sciences, Environmental Noise Consultation No. S.0101338a-24, Noise Assessment for Volunteer Training Site-Milan, Proposed Range Expansion Project, Milan, Tennessee, 18 September–14 December 2023

Subject document is enclosed.

The Defense Centers for Public Health–Aberdeen (DCPH-A) strives to provide high quality products and services in a timely manner. We would appreciate a few moments of your time to tell us how we did. Please visit the following link: https://usaphcapps.amedd.army.mil/Survey/se.ashx?s=25113745052C38DC. To help ensure we evaluate the proper project:

For Question 1 "Directorate/Division" please indicate:

1. Directorate: Environmental Health Sciences and Engineering

2. Division: Environmental Health Sciences

For Question 2 "Type of product or service received," please indicate: Technical or Surveillance Report

Our points of contact for this consultation are Ms. Kristy Broska, Environmental Protection Specialist, or Mr. Dan Reichard, Branch Chief, Environmental Noise, DCPH-A, commercial 410-417-1328, or via email: kristy.a.broska.civ@health.mil or daniel.k.reichard.civ@health.mil.

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EXECUTIVE SUMMARY
ENVIRONMENTAL HEALTH SCIENCES
ENVIRONMENTAL NOISE CONSULTATION
NO. S.0101338a-24
NOISE ASSESSMENT FOR
VOLUNTEER TRAINING SITE–MILAN
PROPOSED RANGE EXPANSION PROJECT
MILAN, TENNESSEE
18 SEPTEMBER–14 DECEMBER 2023

1. PURPOSE

The Defense Centers for Public Health–Aberdeen completed this consultation to provide a noise assessment for the proposed range expansion at Volunteer Training Site-Milan (VTS-Milan). The range expansion consists of an: Automated Record Fire (ARF) Range, a Hand Grenade Familiarization Range (HGFR), and a Light Demolition Range (LDR).

2. CONCLUSIONS

Environmental noise is addressed in a cumulative format (i.e., total noise exposure). Where appropriate this consultation depicts the noise environment generated by each proposed action individually as well as provides a cumulative analysis.

According to Army guidelines, the noise from the proposed range expansion project is considered compatible with most of the surrounding land use.

2.1 Small Arms Activity

The existing small arms Noise Zone II extends beyond the eastern boundary encompassing scattered residential land uses. Zone III is contained to VTS-Milan.

The addition of the ARF range generates a Zone III area that extends beyond the boundary, encompassing one residential property (5600 block of Highway 220). The Zone II area off-post encompasses scattered residential properties and agricultural land.

2.2 Demolition/Explosive Activity

The HGFR Noise Zones are contained to VTS-Milan which indicates compatibility with the surrounding communities. Additionally, the live hand grenade rounds have a low risk of generating noise complaints.

The LDR Noise Zones extend north into Milan Army Ammunition Plant and beyond the eastern VTS-Milan boundary. Zone III is entirely contained to VTS-Milan. Zone II and the land use planning zone (LUPZ) extend beyond the eastern boundary, encompassing primarily agricultural lands and scattered low-density residential properties. The supplemental metric analysis shows that under adverse weather conditions, a 40-pound (lb) detonation may cause annoyance and potentially generate noise complaints within 2 miles of VTS-Milan.
For the most common activity (1.25 lbs) and depending upon weather conditions, noise-sensitive land uses adjacent to VTS-Milan may occasionally be exposed to Peak sound levels

that correlate to a moderate risk of complaints. The largest projected detonation at the LDR would be 140 lbs. Under adverse weather conditions, this event may cause annoyance and potentially generate noise complaints up to 5 miles from VTS-Milan.

The cumulative HGFR and LDR Noise Zones are driven by the LDR activity. As such, the cumulative Zones off-post are similar to the singular LDR Zones in size and shape.

3. RECOMMENDATIONS

Include the information from this consultation in any environmental analysis documentation for the proposed actions.

Include the information from this consultation in the Endangered Species Act Biological Assessment.

Provide public notification of upcoming training events, including date(s) and approximate start and stop times.

Environmental Health Sciences, Environmental Noise Consultation No. S.0101338a-24,
18 September–14 December 2023

TABLE OF CONTENTS

Page

1. PURPOSE 1

2. REFERENCES AND TERMS 1

3. GENERAL 1

4. NOISE ASSESSMENT GUIDELINES 1

5. NOISE CONTOURING PROCEDURES 4

6. RANGE ACTIVITY 4

7. NOISE ASSESSMENT 7

7.1 General 7
7.2 Small Arms Activity 7
7.3 Demolition and Large Caliber Activity 13

8. CONCLUSIONS 28

9. RECOMMENDATIONS 29

APPENDICES

A REFERENCES A-1
B SUPPLEMENTAL NOISE LEVELS FOR BIOLOGICAL ASSESSMENT PURPOSES B-1
C VEHICLE NOISE C-1

Glossary Glossary-1

Environmental Health Sciences, Environmental Noise Consultation No. S.0101338a-24,
18 September–14 December 2023

FIGURES

1. Range Locations 6
2. Existing Activity Small Arms Noise Zones 8
3. Projected Activity Small Arms Noise Zones 9
4. Projected Activity Small Arms Noise Zones Automated Record Fire Off-Post Area 10
5. Single Event Peak Levels Breach Facility 0.0198 lb Detonation 14
6. Proposed Light Demolition Range Noise Zones 19
7. Proposed Light Demolition Range: 1.25 lb Single Event Peak Noise Levels 20
8. Proposed Light Demolition Range: 40-lb Single Event Peak Noise Levels 21
9. Proposed Light Demolition Range: 140-lb Singe Event Peak Noise Levels 22
10. Proposed Hand Grenade Familiarization Range Noise Zones 23
11. Proposed Hand Grenade Familiarization Range High Explosive Round Single Event Peak Noise Levels 24
12. Cumulative Conditions: Hand Grenade Familiarization Range and Light Demolition Range Noise Zones 25
13. Cumulative Noise Zones Comparison to Light Demolition Range Noise Zones 26
14. Cumulative Conditions: Single Event Peak Noise Levels Hand Grenade Familiarization Range and Light Demolition Range (1.25 lbs) 27
B-1. Bat Hearing Thresholds B-2
B-2. Human vs. Bat Hearing Thresholds B-3
B-3. Sound Exposure Level Example B-4

TABLES

1. Land Use Planning Guidelines 2
2. Complaint Risk Guidelines (Impulsive Events) 3
3. Existing Range Activity 5
4. Projected Activity for the Range Expansion Project 5
5. Small Arms Noise Zone Acreage Comparison 7
6. Predicted Peak Noise Levels for 5.56mm Blank Round 11
7. Predicted Peak Noise Levels for 7.62mm Blank Round 12
8. Predicted Peak Noise Levels for .50 Caliber Blank Round 12
9. Audibility to the Side of the Grenade Launcher, Inert Round (40mm) 15
10. Audibility to the Rear of the Grenade Launcher, Inert Round (40mm) 15
11. Light Demolition Range 40-lb Charge Complaint Risk Area under Unfavorable Weather Conditions 16
12. Demolition Noise Zone Acreage Comparison 18
B. Bat-Sound Exposure Level for Small Arms Firing B-5
C-1. Maximum Noise Levels of Common Construction Machinery/Vehicles C-1
C-2. Maximum Noise Levels of Common Tactical Vehicles C-2

ENVIRONMENTAL HEALTH SCIENCES
ENVIRONMENTAL NOISE CONSULTATION
NO. S.0101338a-24
NOISE ASSESSMENT FOR
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The Defense Centers for Public Health–Aberdeen completed this consultation to provide a noise assessment for the proposed range expansion at Volunteer Training Site-Milan (VTS-Milan). The range expansion consists of an: Automated Record Fire (ARF) Range, a Hand Grenade Familiarization Range (HGFR), and a Light Demolition Range (LDR).

2. REFERENCES AND TERMS

Appendix A contains a list of references used to prepare this consultation. The glossary provides definitions of acronyms, abbreviations, and terms.

3. GENERAL

Unless otherwise indicated, information presented or referenced to a noise-sensitive land use is based upon human response to noise. Appendix B contains supplemental noise levels to assist further assessment of the Indiana bat (*Myotis sodalis*), a local threatened and endangered species. Appendix C provides a summary of vehicle noise levels related to the range expansion project, to include temporary vehicle noise during construction, and tactical vehicle training at VTS-Milan.

4. NOISE ASSESSMENT GUIDELINES

Army Regulation (AR) 200-1 translates noise exposure on communities into Noise Zones. Regulation guidelines state that for land use planning purposes, noise-sensitive land uses range from acceptable to not compatible within the Noise Zones (Chapter 14) (DA 2007). Table 1 lists the land use planning guidelines from AR 200-1. The program defines the following Noise Zones:

- Zone III – Noise-sensitive land uses are not recommended (incompatible).
- Zone II – Although local conditions such as availability of developable land or cost may require noise-sensitive land uses in Zone II, this type of land use is generally not compatible and is strongly discouraged on the installation and in surrounding communities. All viable alternatives should be considered to limit development in Zone II to non-sensitive activities such as industry, manufacturing, transportation, and agriculture.

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- Zone I – Noise-sensitive land uses are acceptable within Zone I. However, though an area may only receive Zone I levels, military operations may be loud enough to be heard or even judged as loud on occasion. Zone I is not delineated on contour maps; rather it is the entire area outside of Zone II.

- The LUPZ is a subdivision or upper limit of Zone I. The LUPZ represents an area starting at the lower limit of Zone II and extends outward to a distance significant enough to allow for a 5-decibel (dB) reduction in sound level for aircraft and impulsive (large caliber and demolition) noise. Within this area, noise-sensitive land uses are generally acceptable. However, communities and individuals often have different views regarding what level of noise is acceptable or desirable. To address this, some local governments have implemented land use planning measures beyond Zone II limits. Additionally, implementing planning controls within the LUPZ can develop a buffer to avert future noise conflicts.

Table 1. Land Use Planning Guidelines

	Noise Limits			
Noise Zone	Aviation ADNL (dB)	Impulsive[1] CDNL (dB)	Small Arms Peak (dB)	**Noise-Sensitive Land Use**
LUPZ	60 – 65	57 – 62	n/a	Generally Compatible
I	< 65	< 62	< 87	Generally Compatible
II	65 – 75	62 – 70	87 – 104	Generally, Not Compatible
III	> 75	> 70	> 104	Not Compatible

Source: AR 200-1
Legend:
n/a = not applicable
dB = decibel
ADNL = A-weighted Day-Night average sound Level
CDNL = C-weighted Day-Night average sound Level
LUPZ = Land Use Planning Zone
Note:
[1] Impulsive is defined as demolition/explosive events and large caliber (20 millimeter (mm) and greater) weapons.

Average noise levels are considered the best tool for long-term land use planning for impulsive large caliber and demolitions, but they may not adequately assess the probability of community complaint risk. As recommended in AR 200-1, this consultation includes supplemental metrics (Peak) to identify where noise from explosive activity may periodically reach levels high enough to generate complaints. In many instances, complaints are registered from areas where the Noise Zones indicate land use compatibility. Noise complaints from impulsive noise, often referred to as blast noise, typically are attributable to a specific event rather than annual average noise levels. Peak levels are useful for estimating the risk of receiving a noise complaint from blast noise, as they correlate with the receiver's perception of the sound. Table 2 lists the Army's complaint risk guidelines.

Table 2. Complaint Risk Guidelines (Impulsive Events)

Perceptibility	dB Peak	Risk of Receiving Noise Complaints
May be Audible	< 115	Low
Noticeable, Distinct	115 – 130	Moderate
Very Loud, May Startle	> 130	High

Legend:
dB = decibel
Note:
Perceptibility is subjective. The classifications are based on how a typical person might describe the event.

Peak sound levels correlate to many of the unique characteristics of impulsive noise and the difficulties encountered in assessing their impact, which include the following:

- People in an area experiencing peak levels between 115 and 130 dB may describe events as noticeable and distinct. From within this area, there is a moderate risk of receiving noise complaints. The magnitude of the complaint risk is dependent upon frequency of occurrence in addition to factors such as time of day activity occurs, propagation conditions under which activity takes place, and noise sensitivity of individuals in these areas.

- Peak sound pressure levels above 130 dB are generally objectionable and are often described as very loud and startling. These levels correlate with a high risk of noise complaints. If the operations that generate high peak sound pressure levels in the community are very infrequent, land use controls may not be warranted. However, prior public notification is important for mitigating complaint risk and is an important role of being good neighbors.

- Peak sound pressure levels directly correlate with airborne vibration, which is the dominant cause of structural response from explosive events. Peak sound pressure levels approaching 120 dB may rattle windows or loose ornaments (e.g., pictures on walls) and annoy occupants, but will not cause structural damage.

- Peak levels can vary significantly and are highly dependent on weather conditions. Thus, the supplemental peak contours included in this assessment have the following weather conditions applied:

  - Unfavorable Weather Conditions: Peak 15 Metric (PK15(met)) is the peak sound level, factoring in statistical variations caused by weather, which is likely to be exceeded only 15% of the time (i.e., 85% certainty that sound will be within this range). This “85% solution” gives the Tennessee Army National Guard and the neighboring communities a means to consider the areas may be impacted by training noise. PK15(met) levels would occur under unfavorable weather conditions that enhance sound propagation.

  - Neutral Weather Conditions: Peak 50 Metric (PK50(met)) is the peak sound level that is likely to be exceeded 50% of the time (i.e., 50% certainty that sound will be within this range). These levels occur during neutral weather

conditions. It should be noted that if activities take place occur during favorable weather conditions, such as the wind blowing away from the receiver, noise levels would be lower.

The unfavorable weather conditions PK15(met) is a good tool to indicate areas that may periodically be exposed to high noise levels. However, since the complaint risk areas are based on single events and are not dependent on the number of events, planners should also consider the frequency of operations when making land use decisions.

5. NOISE CONTOURING PROCEDURES

The Blast Noise Version 2 (BNOISE2) modeling program calculates noise levels generated by firing large caliber (20 millimeter (mm) and greater) and high-explosive charges (U.S. Army Engineer Research and Development Center (ERDC) 2009). Firing operations from large caliber weapons, demolitions, and other impulsive sounds generally create the largest complaint issues around Army installations. This is primarily due to the abundance of low-frequency energy present, which can travel long distances, is difficult to mitigate, and can cause vibration that may increase community annoyance. Noise Zones for large caliber weapons are assessed using the C-weighted Day-Night average sound Level (CDNL). The Noise Zones were modeled using an assessment period of 104 days.

The computer model used to create the noise zones for small arms (.50 caliber and below) ranges is the Small Arms Range Noise Assessment Model (SARNAM) (ERDC 2015). SARNAM calculations are based on weapons noise source models, directivity, sound propagation, mitigation effects, and safety structures when necessary. The calculation algorithms assume weather conditions for wind direction that favor sound propagation. Small caliber weapons noise is addressed utilizing peak levels and therefore has no assessment period.

6. RANGE ACTIVITY

The existing and proposed range facilities are in the east-northeast area of VTS-Milan (Figure 1). Tables 3 and 4 list current and projected activity on each range. Although the 40mm Target Practice (TP) rounds and small arms activity (.50 caliber and below) are addressed via single event levels (Peak), the annual expenditure is provided relay the frequency of these activities. All range activity at VTS-Milan occurs prior to 2200 hours (10 pm).

Table 3. Existing Range Activity

Facility	Ammunition/Weapon Platform[a]	Average Annual Number of Rounds
25-meter Rifle Range	5.56mm M4/M16	13,500
25-meter Pistol Range	9mm	9,500
Breach Facility	12-gauge Breaching Charge	25
Grenade Launcher Range	40mm TP M203/M320	250
Urban Assault Course	5.56mm Blank M4/M16 7.62mm Blank M60 .50 cal Blank M2	75,000 3,000 1,500

Legend:
cal = caliber
mm = millimeters
TP = Target Practice
Note:
[a] Blank is defined as any round that contains propellant but no bullet.

Table 4. Projected Activity for the Range Expansion Project

Facility	Ammunition/Weapon Platform	Annual Number of Rounds
Automated Record Fire	5.56mm M4/M16	850,000
Hand Grenade Familiarization Range	M67 High Explosive	1,800
Light Demolition Range	Demolition, C-4 Block, 1.25 lb	7,350
	Demolition, Shaped Charge, 40 lb	225
	Demolition, Kit TNT NEW, 140 lb[1]	25
	Demolition, Bangalore, M1A2/M1A2E	450

Legend:
lb = pound(s)
mm = millimeters
n/a = not applicable
NEW = Net Explosive Weight
TNT =Trinitrotoluene
Note:
[1] Total NEW based upon three 40 lb Cratering Charges and twenty-four C-4 1.25 lb blocks. Training activity consists of eight 1.25 lb C-4 blocks attached to a single cratering charge. Although each group (C-4 blocks and cratering charge) is separate the system is connected through detonation cord and blasting caps/fuzes.

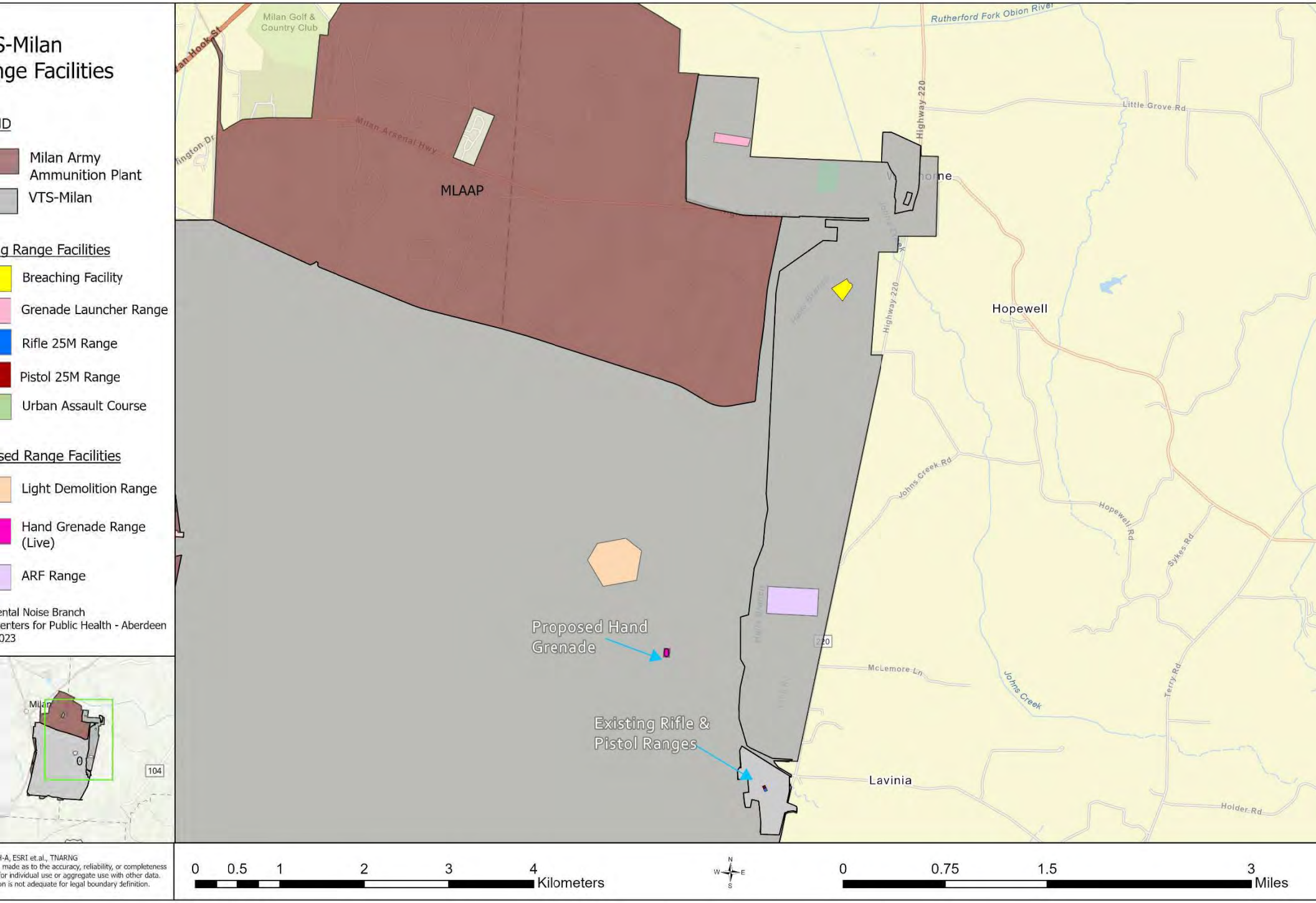

Figure 1. Range Locations

7. NOISE ASSESSMENT

7.1 General

Environmental noise is addressed in a cumulative format (i.e., all ranges firing). Where appropriate this consultation will depict the noise environment generated by each proposed action individually as well as provide a cumulative analysis.

7.2 Small Arms Activity

The SARNAM noise model requires specific firing point and target point locations to generate noise contours. As the Urban Assault Course (UAC) does not have set firing points or target points, the facility is addressed via predicted peak noise levels in the Non-fixed Firing Activity subparagraph 7.2.3 and is excluded from the small arms Noise Zones.

7.2.1 Existing Small Arms Range Activity

As shown in Figure 2, Noise Zone III remains within the VTS-Milan boundary. Zone II extends approximately 450 meters (0.3 mile) beyond the eastern boundary, encompassing low density residential properties, scattered throughout the Noise Zone, and agricultural lands.

7.2.2 Proposed Small Arms Range Activity

The addition of the ARF range creates a Zone III that extends less than 60 meters (< 0.1 mile) beyond the eastern boundary. Zone II extends beyond the eastern boundary less than 500 meters (0.3 mile) (Figure 3). Figure 4 depicts the ARF generated Noise Zones off-post in greater detail. Within the Zone III area off-post there is one residential property (5600 block of Highway 220). The Zone II area off-post encompasses scattered residential properties and agricultural land. There are no changes to the existing Zone II area beyond the boundary. Table 5 provides a comparison of the existing and proposed small arms Noise Zone acreage.

Table 5. Small Arms Noise Zone Acreage Comparison

	Existing Activity		Proposed Activity		Noise Zone Acreage Difference	
	Noise Zone Acreage		Noise Zone Acreage			
Noise Zone	Total	Off-Post	Total	Off-Post	Total	Off-Post
Zone II (87 – 104 dB Peak)	1,082	169	2,276	352	+ 1,194	+ 183
Zone III (> 104 dB Peak)	115	0	282	5	+ 167	+ 5

Legend:
dB = decibels

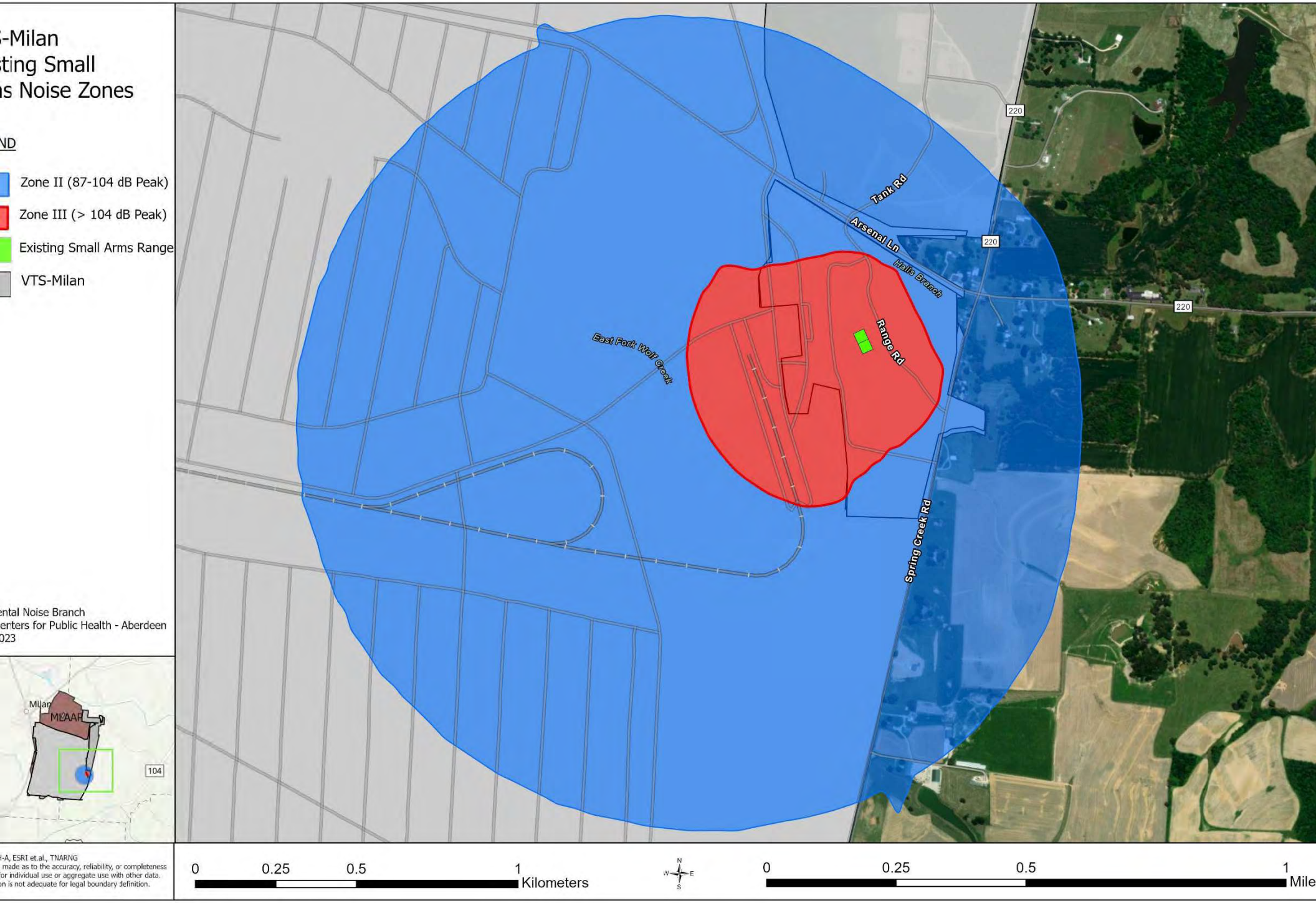

Figure 2. Existing Activity Small Arms Noise Zones

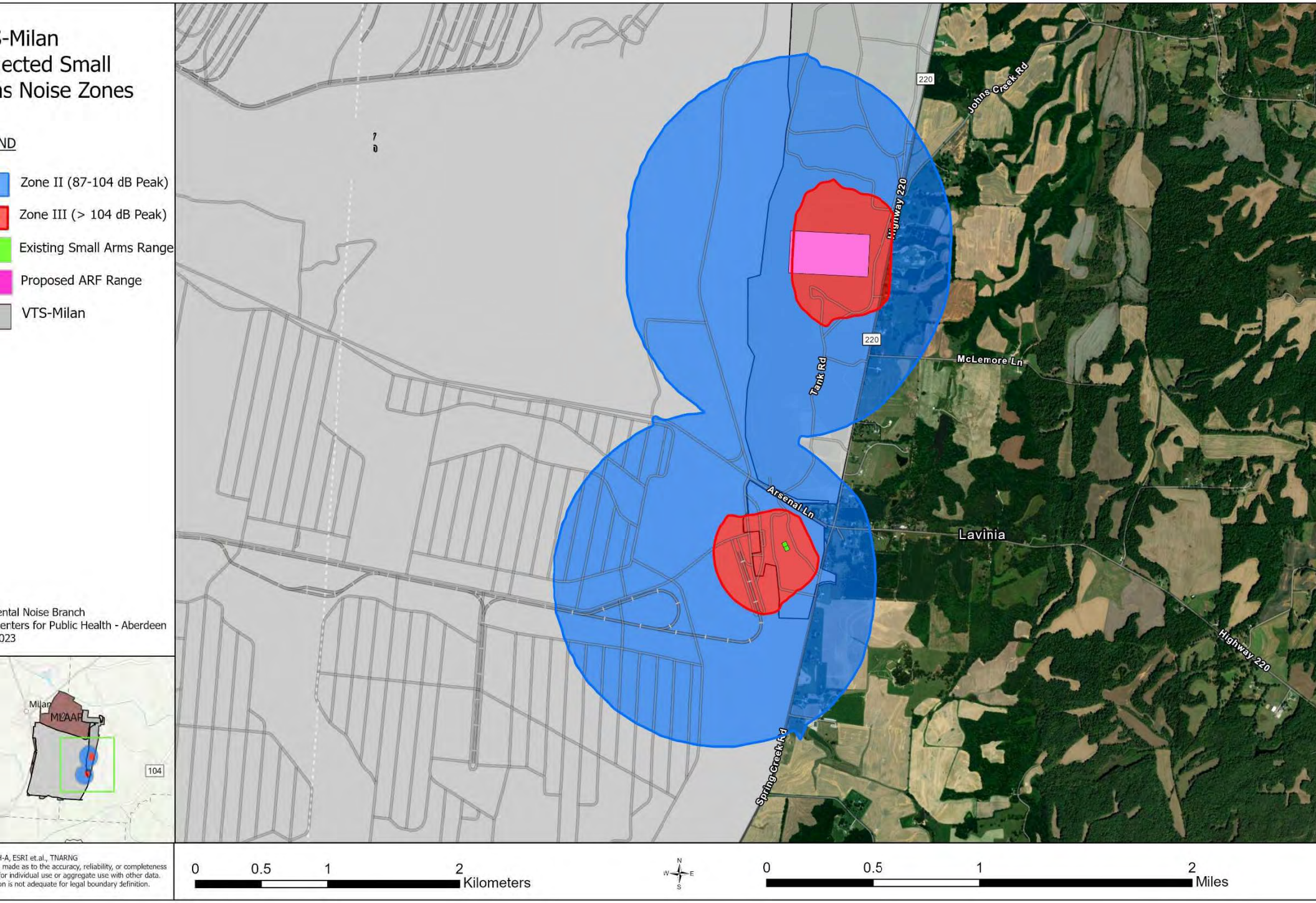

Figure 3. Projected Activity Small Arms Noise Zones

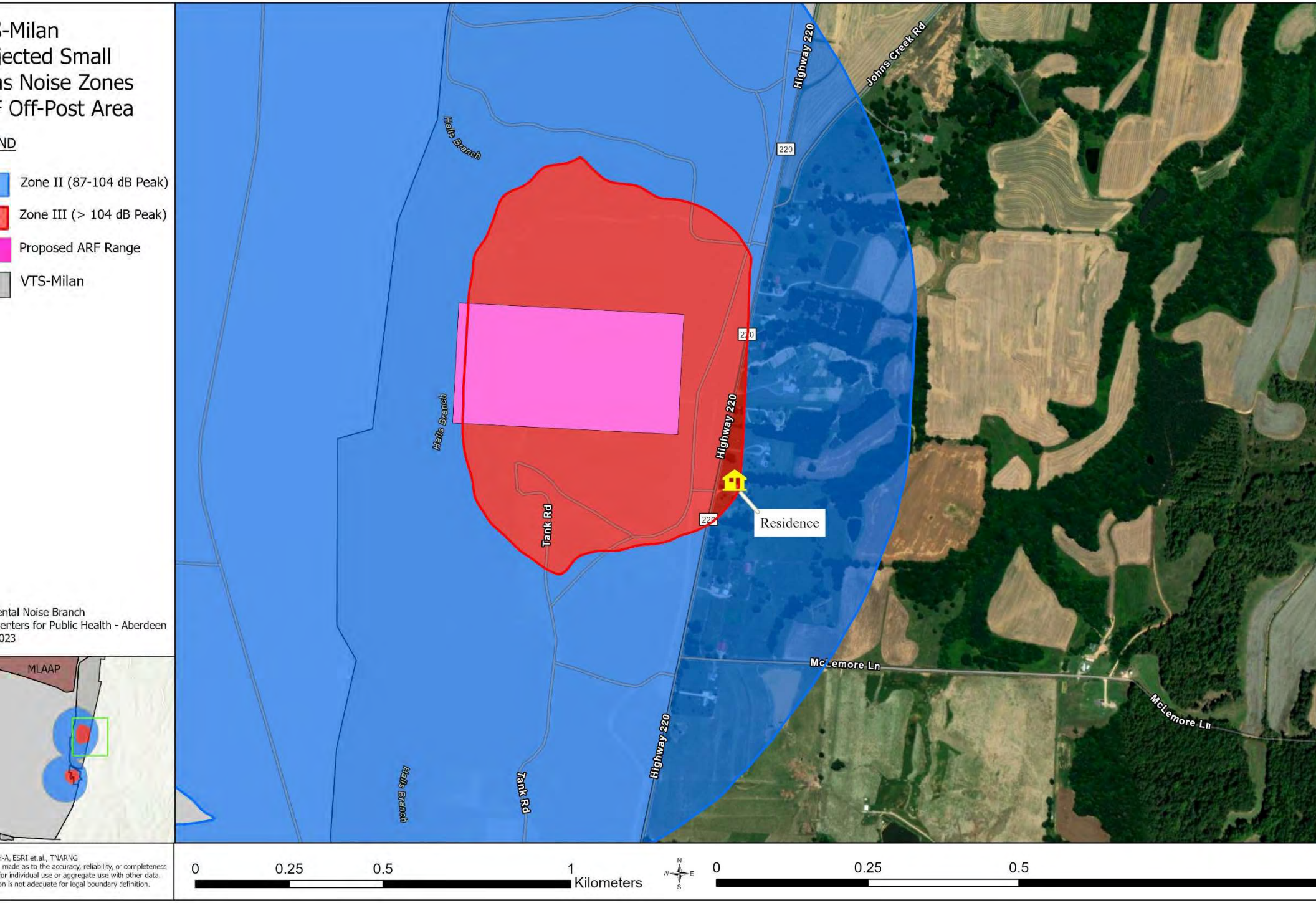

Figure 4. Projected Activity Small Arms Noise Zones Automated Record Fire Off-Post Area

7.2.3 Existing Non-fixed Small Arms Firing Activity

At the UAC, troops conduct collective training utilizing blank ammunition and/or simunitions, which produce training scenarios that replicate real-world environments. With the absence of specific firing and target point locations, Noise Zones for these activities cannot be modeled. However, by looking at predicted peak levels of small arms ammunition, we can assess noise exposure from these training activities.

Tables 6 through 8 list the predicted peak levels for blank ammunition utilized in non-fixed firing areas. In each column, the upper limit levels would occur under weather conditions that enhance sound propagation (unfavorable), such as the wind blowing toward the receiver. The lower limit levels occur under favorable weather conditions, such as the wind blowing away from the receiver. The azimuth angle can be defined as the direction of fire, i.e., zero degrees is directly in front of the weapon and 180 degrees is directly behind the weapon. When combining these variables, the highest peak levels occur when rounds are fired in the direction of the receiver (0-degree azimuth) and under unfavorable weather conditions. As an example, Table 6 indicates that under unfavorable weather conditions, a Zone II noise level (87 dB Peak) extends approximately 200 meters for the 5.56mm blank at all three given azimuth angles.

The UAC facility is in the northeast corner of VTS-Milan. There are a few residential properties within 1,200 meters of the UAC footprint. The .50 caliber blank ammunition firing activities may expose the residents to noise levels which approach/exceed Zone II. It should be noted that variables such as actual firing location within the UAC complex and weather conditions at the time of firing would all influence the degree of noise impact and audibility. For the 5.56mm and 7.62mm blank activity, noise levels approaching Zone II would not encompass any noise-sensitive land uses.

Table 6. Predicted Peak Noise Levels for 5.56mm Blank Round

	Predicted Level, dB Peak Azimuth		
Distance, meters	**0º**	**90º**	**180º**
100	87-97	86-96	87-97
200	80-90	79-89	80-90

Legend:
dB = decibels
Notes:
The 0º is directly in front of the weapon and the 180º azimuth is directly behind the weapon.
Blank is defined as any round that contains propellant but no bullet.
Highlighted row indicates the maximum distance where levels approach/exceed 87 dB Peak (Zone II).

Environmental Health Sciences, Environmental Noise Consultation No. S.0101338a-24, 18 September–14 December 2023

Table 7. Predicted Peak Noise Levels for 7.62mm Blank Round

	Predicted Level, dB Peak Azimuth		
Distance, meters	**0º**	**90º**	**180º**
100	109-119	106-116	101-111
200	103-113	100-110	94-104
400	92-102	89-99	85-95
800	84-94	81-91	77-87

Legend:
dB = decibels
Notes:
The 0º is directly in front of the weapon and the 180º azimuth is directly behind the weapon.
Blank is defined as any round that contains propellant but no bullet.
Highlighted row indicates the maximum distance where levels approach/exceed 87 dB Peak (Zone II).

Table 8. Predicted Peak Noise Levels for .50 Caliber Blank Round

	Predicted Level, dB Peak Azimuth		
Distance, meters	**0º**	**90º**	**180º**
100	116-126	110-120	111-121
200	109-119	103-113	104-114
400	97-107	92-102	91-101
800	89-99	84-94	84-94
1,200	84-94	79-89	84-94

Legend:
dB = decibels
Notes:
The 0º is directly in front of the weapon and the 180º azimuth is directly behind the weapon.
Blank is defined as any round that contains propellant but no bullet.
Highlighted row indicates the maximum distance where levels approach/exceed 87 dB Peak (Zone II).

7.3 Demolition and Large Caliber Activity

The large caliber designation includes weapons 20mm or greater and any weapon that contains demolition/explosive charges. At VTS-Milan, activity in this category is limited to the existing Breach Facility, existing grenade launcher range, the proposed HGFR, and the proposed LDR. The launch noise from the 40mm grenade is not included in the demolition large caliber Noise Zones and is addressed separately via predicted peak noise levels (subparagraph 7.3.1.2).

Annual average Noise Zones are the primary noise descriptor for land use compatibility providing a reliable relationship between noise exposure and community response. However, individual training events can be audible outside of a Noise Zone and in some cases objectionable to the surrounding community. As a supplemental descriptor, Peak contours are provided to help forecast where sound may be audible or loud from singular events. It is worth noting the vibration that often accompanies low-frequency noise from demolition activity is almost always air-borne (not ground-borne). Neighbors located near the “loud” area on the map may occasionally notice picture or window rattling from air-borne vibration; however, this rattling does not indicate damage, and usually occurs at levels well below those required to cause structural damage.

As mentioned previously, environmental noise is addressed in a cumulative format (i.e., total noise exposure with all ranges firing). Where appropriate this consultation will depict the noise environment generated by each proposed action individually as well as provide a cumulative analysis.

7.3.1 Existing Activity

7.3.1.1 Existing Breach Facility

The Breach Facility activity is limited to 12-gauge breaching charges with a Net Explosive Weight (NEW) of 0.0034 lbs. On average 25 breaching charges are used per year. The low annual expenditure would not generate CDNL Noise Zones. Additionally, the lower limit of the BNOISE model is 0.0198 lbs (approximately a 5-time greater NEW than the breaching charge utilized).

Although the 12-gauge breaching charge NEW is well below the model’s lower limit, single event Peak sound levels were developed based on a 0.0198 lb charge to indicate a maximum potential complaint risk area. As shown in Figure 5, under unfavorable weather conditions, Peak sound levels above 130 dB extend 150 meters, and levels between 115 and 130 dB extend 525 meters (radius distance from the detonation site). Occasionally, the breaching charge maybe audible in the area adjacent to the boundary, however; it is unlikely to generate noise complaints. Under neutral weather conditions Peak levels above 115 dB remain within VTS-Milan.

Environmental Health Sciences, Environmental Noise Consultation No. S.0101338a-24, 18 September–14 December 2023

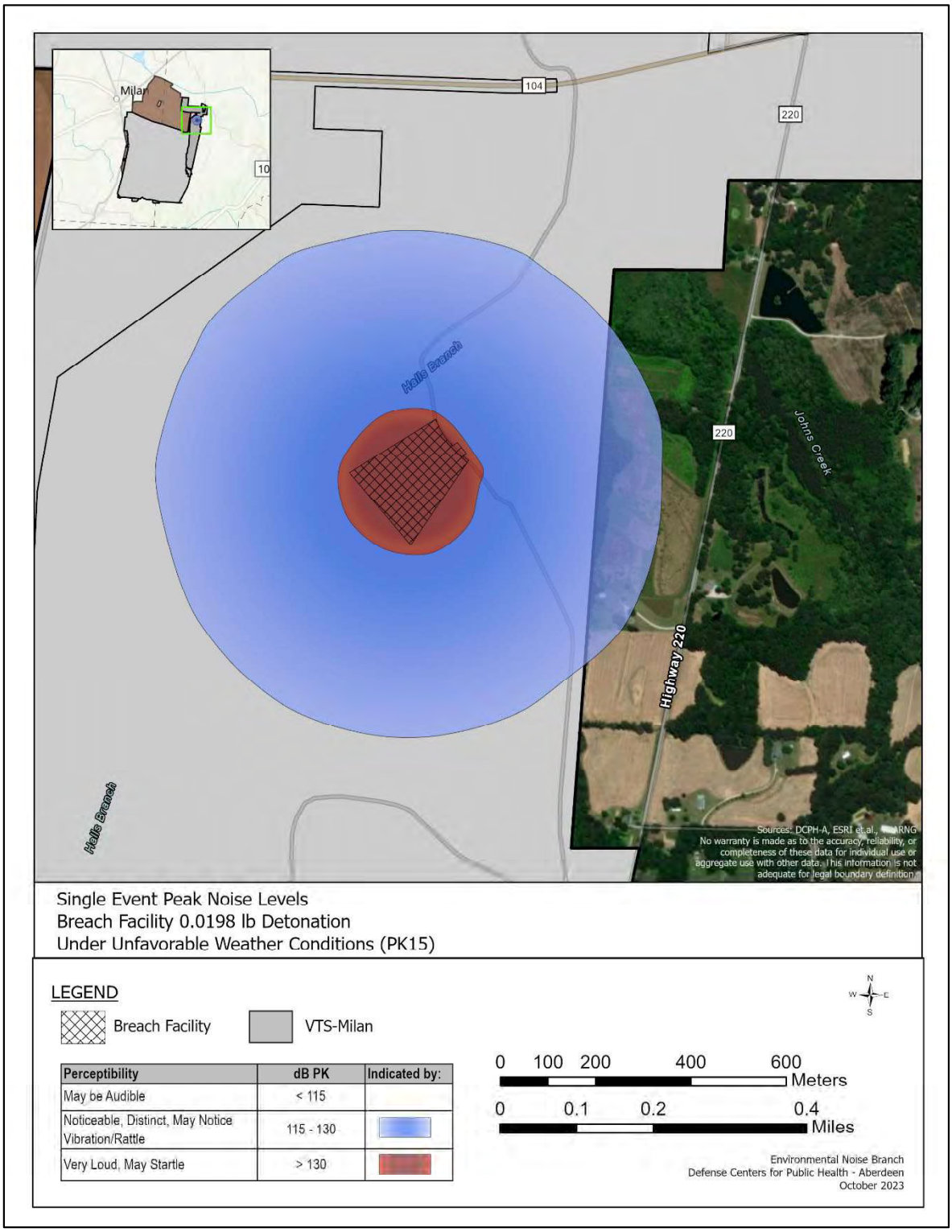

Figure 5. Single Event Peak Levels Breach Facility 0.0198 lb Detonation

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7.3.1.2 Existing Grenade Launcher Range Activity

The 40mm grenade family contains both high-velocity grenades fired from MK19 grenade machine guns and low-velocity grenades fired from hand-held weapons (M203 and M320). At VTS-Milan, grenade machine guns and hand-held weapons are limited to TP rounds. A 40mm TP round simulates the firing and distance capabilities of the equivalent high explosive round without the impact noise and safety concerns.

Tables 9 and 10 list calculated distances for firing 40mm TP rounds, which correlate to audibility of predicted peak decibel levels in the Army's Complaint Risk Guidelines criteria (Table 2). The distances and levels listed represent a conservative approach and were calculated based upon hearing conservation criteria (U.S. Army 1999) and known measurements (U.S. Army 1984). As evidenced in the Tables, in most cases, once the receiver is beyond 300 meters from the side or 110 meters to the rear of the firing point, noise impacts are minimal.

The Grenade Launcher Range is in the northeast corner of VTS-Milan adjacent to the boundary. Currently there are no noise-sensitive land uses within 2 kilometers (km) of the facility.

Table 9. Audibility to the Side of the Grenade Launcher, Inert Round (40mm)

Risk of Complaints	Distance from Grenade Launcher (meters)	Noise Level dB Peak
Low	> 300[a]	< 115
Moderate	65 - 300[a]	115
High	< 65[a]	>130
Risk of hearing damage for unprotected ears	< 19[b]	>140

Legend:
dB = decibels
Notes:
Inert is defined as any round that does not make noise upon impact, such as smoke, illum, TP.
[a] Calculated value
[b] Known value, hearing conservation criteria

Table 10. Audibility to the Rear of the Grenade Launcher, Inert Round (40mm)

Risk of Complaints	Distance from Grenade Launcher (Meters)	Noise Level-dB Peak
Low	> 110[a]	< 115
Moderate	25 - 110[a]	115
High	< 25[a]	>130
Risk of hearing damage for unprotected ears	< 7[b]	>140

Legend:
dB = decibels
Notes:
Inert is defined as any round that does not make noise upon impact, such as smoke, illum, TP.
[a] Calculated value
[b] Known value, hearing conservation criteria

7.3.2 Proposed Activity

7.3.2.1 Proposed Light Demolition Range Activity

The LDR CDNL Noise Zones extend north into Milan Army Ammunition Plant (MLAAP) and beyond the eastern boundary (Figure 6). Zone III remains within VTS-Milan. Zone II extends 300 meters (0.2 mile) beyond the boundary, encompassing low-density residential land use. The LUPZ extends up to 1.8 km (1.1 miles) beyond the boundary. Lands within the LUPZ are primarily agricultural, however some scattered low-density residential properties do exist.

Overall, the CDNL Noise Zones indicate the proposed activity is compatible with the surrounding land use. However, individual training events can be audible outside of a Noise Zone and in some cases objectionable to the surrounding community. As a supplemental descriptor, Peak contours are provided to help forecast where sound may be audible or loud from singular events. Figure 7 illustrates the single event Peak sound levels for the most common explosive event (C-4 Block, 1.25-lb) at the LDR. Under unfavorable weather conditions, Peak levels between 115 and 130 dB extend into MLAAP and beyond the eastern boundary less than 400 meters (0.25 mile), encompassing scattered residential properties. Peak sound levels above 130 dB remain within VTS-Milan. Under neutral conditions, the single event Peak levels are contained within the installation boundary.

Figure 8 illustrates the single event Peak sound level contours for the 40-lb explosive at the LDR. Under unfavorable weather, Peak sound levels between 115 and 130 dB extend beyond the boundary in most directions (Table 9). Citizens within 2 miles of VTS-Milan may find 40-lb shots to be noticeable and distinct. Peak sound levels above 130 dB remain within VTS-Milan and MLAAP.

Table 11. Light Demolition Range 40-lb Charge Complaint Risk Area under Unfavorable Weather Conditions

dB Peak	Direction	Distance		Affected Land Use
		Kilometer	Mile	
115 – 130	North	2.6	1.6	Low-density residential; Area primarily encompasses MLAAP lands
	East	5	3	Communities of Hopewell & Lavinia
	South	1.4	0.9	Low-density residential
	West	2.3	1.5	City of Milan (Low-density residential, religious facilities)
> 130	North	< 0.4	0.25	MLAAP property

Legend:
dB = decibels
MLAAP = Milan Army Ammunition Plant
Note:
Mileage conversion is rounded for simplicity.

Under neutral weather conditions, noise impacts beyond the boundary are greatly reduced. Noise levels between 115 and 130 dB extend up to 800 meters (0.4 mile) beyond the eastern boundary encompassing residential properties. Peak sound levels above 130 dB remain within VTS-Milan.

Additional LDR training activity consists of three 40-lb Cratering Charges and twenty-four C-4 1.25 lb blocks resulting in a total NEW of 140 lbs. Eight 1.25 lb C-4 blocks are attached to a single cratering charge. Each grouping (C-4 blocks and cratering charge) is separate; however, the entire system is connected through detonation cord and blasting caps/fuzes. Although it is unlikely that all three units would detonate simultaneously, single event Peak levels for a total NEW of 140 lbs were developed to depict a conservative analysis. Under adverse weather conditions, this event may cause annoyance and potentially generate noise complaints within 7 km (4.4 miles) of the eastern boundary and up to 3 km (1.9 miles) to the north, south, and west of VTS-Milan (Figure 9). Peak levels above 130 dB extend less than 250 meters (0.2 mile) beyond the eastern boundary. Under neutral weather conditions, noise levels between 115 and 130 dB extend up to 1.3 km (0.9 mile) beyond the eastern boundary, encompassing residential properties. Peak sound levels above 130 dB remain within VTS-Milan.

7.3.2.2 Proposed Hand Grenade Range Activity

The Noise Zones from high explosive rounds at the HGFR remain within VTS-Milan (Figure 10).

Figure 11 illustrates the single event Peak sound levels for a high explosive hand grenade round. Under unfavorable weather conditions, Peak levels between 115 and 130 dB extend less than 400 meters (0.25 mile) beyond the eastern boundary, encompassing scattered residential properties. Peak sound levels above 130 dB remain within VTS-Milan. Under neutral conditions the single event Peak levels remain within the boundary.

7.3.2.3 Cumulative Conditions

Figure 12 depicts the cumulative (HGFR and LDR activity) CDNL Noise Zones. Overall, the cumulative Noise Zones are very similar to the individual LDR Noise Zone footprint. Off-post there is a slight acreage increase to Zone II and the LUPZ (Figure 13 and Table 12). The LDR Noise Zones extend 300 meters (0.2 mile) for Zone II and up to 1.8 km (1.1 miles) for the LUPZ. Under cumulative conditions, these Zones increase to 350 meters (0.2 mile) and 1.9 km (1.2 miles) respectively.

The cumulative single event Peak sound levels (HGFR and LDR 1.25-lb events) are shown in Figure 14. As with the individual conditions, Peak levels between 115 and 130 dB extend beyond the eastern boundary less than 400 meters (0.25 mile), encompassing scattered residential properties and Peak sound levels above 130 dB remain within VTS-Milan.

Table 12. Demolition Noise Zone Acreage Comparison

	Noise Zone Acreage								
	Light Demolition Range			Hand Grenade Range			Cumulative Conditions		
Noise Zone	Total	MLAAP	Off-Post	Total	MLAAP	Off-Post	Total	MLAAP	Off-Post
LUPZ (57-62 dB CDNL)	8,952	1,604	2,260	969	0	0	9,045	1,615	2,336
Zone II (62–70 dB CDNL)	4,018	390	130	590	0	0	4,071	394	167
Zone III (> 70 dB CDNL)	2,545	0	0	225	0	0	2,652	0	0

Legend:
CDNL = C-weighted Day-Night average sound Level
dB = decibels
LUPZ = Land Use Planning Zone
MLAAP = Milan Army Ammunition Plant

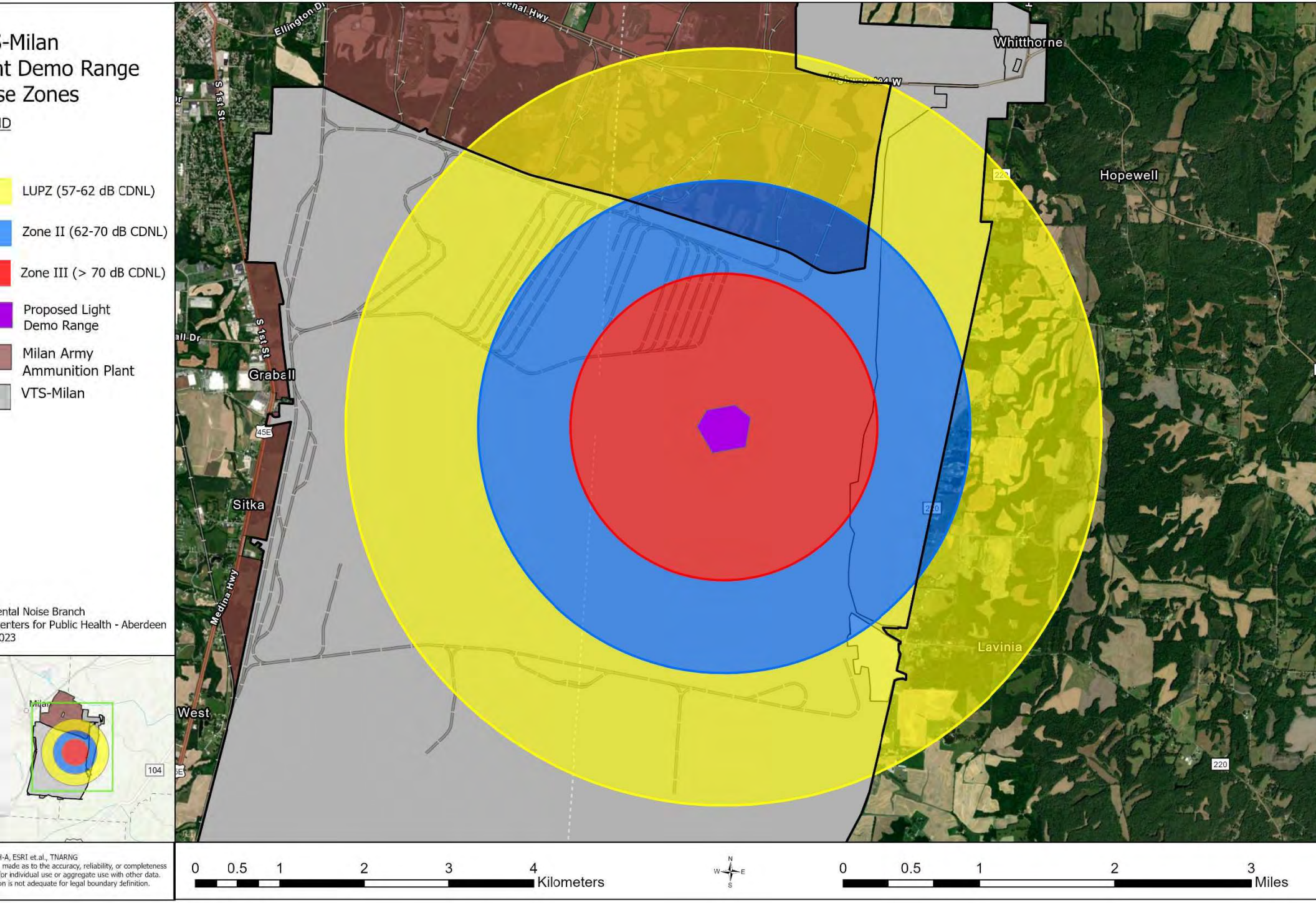
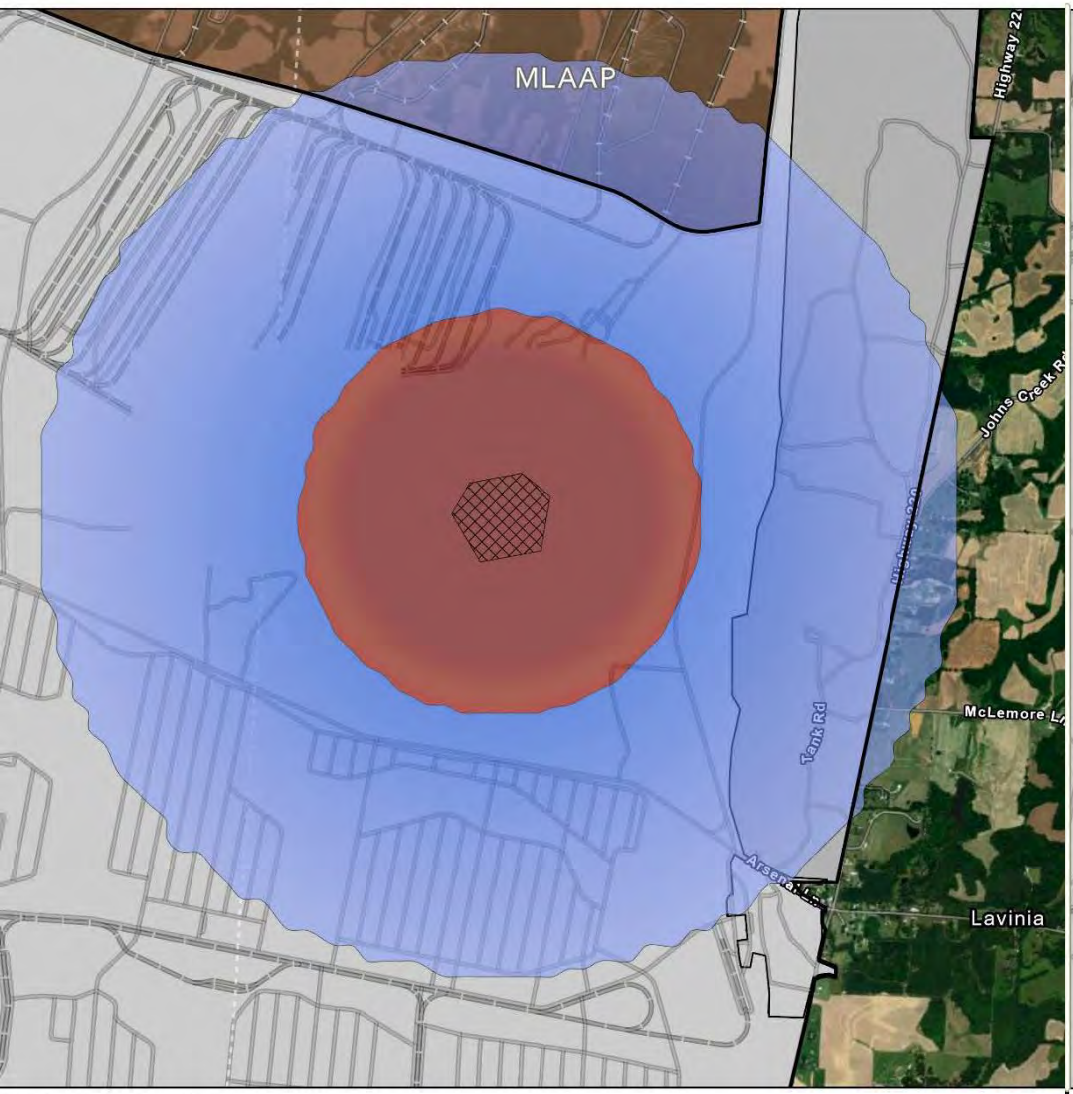
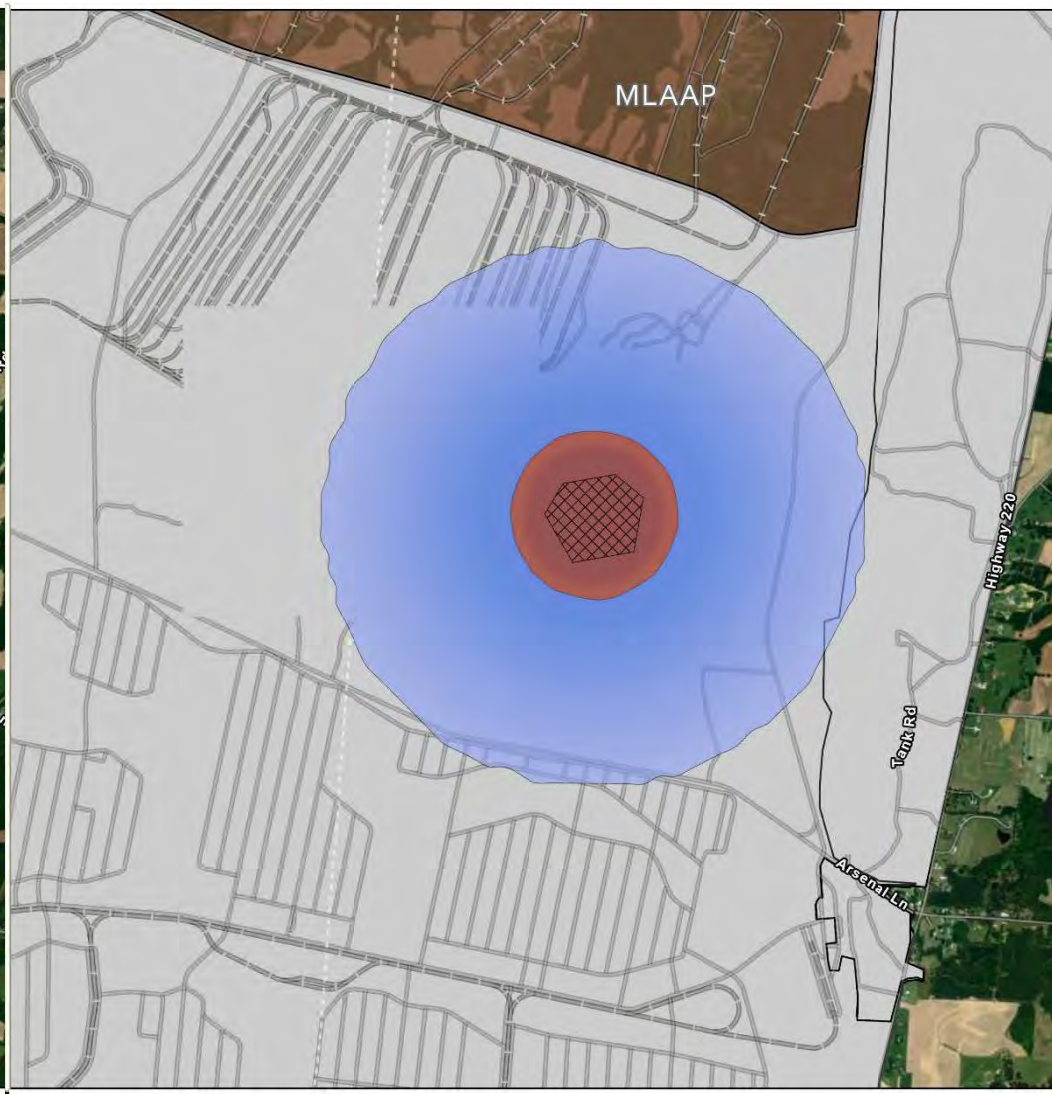


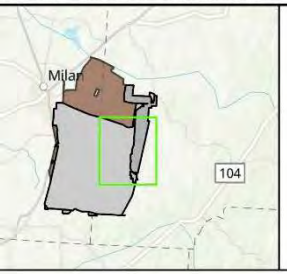
Figure 6. Proposed Light Demolition Range Noise Zones



Single Event Peak Noise Levels
Light Demolition Range 1.25 lbs
Under Unfavorable Weather Conditions (PK15)



Single Event Peak Noise Levels
Light Demolition Range 1.25 lbs
Under Neutral Weather Conditions (PK50)



LEGEND

- Lt Demo Range
- MLAAP
- VTS-Milan

Perceptibility	dB PK	Indicated by:
May be Audible	< 115	
Noticeable, Distinct, May Notice Vibration/Rattle	115 - 130	
Very Loud, May Startle	> 130	

0 0.5 1 2 3 4 Kilometers

0 0.5 1 2 3 Miles

Sources: DCPH-A, ESRI et.al., TNARNG
No warranty is made as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This information is not adequate for legal boundary definition.

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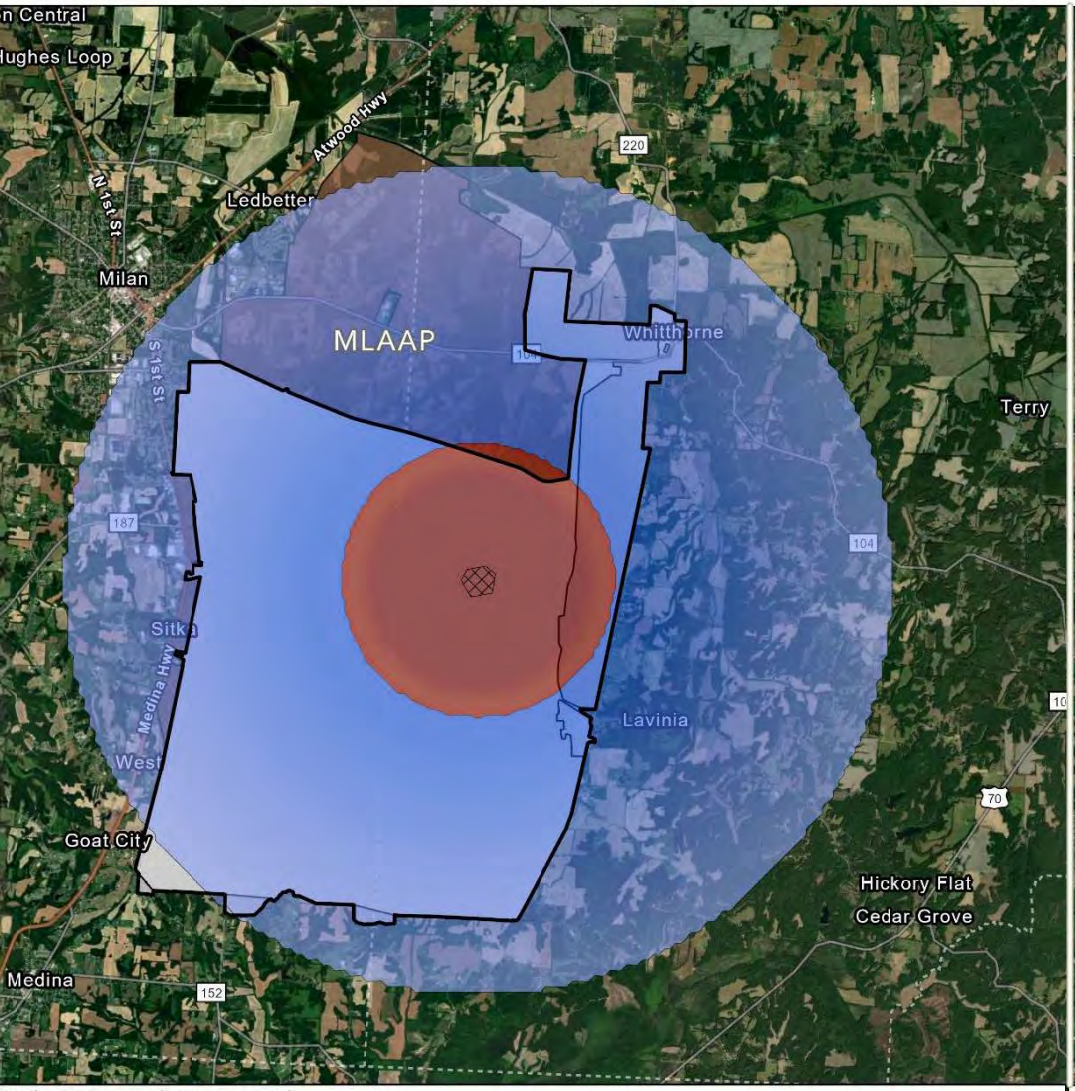
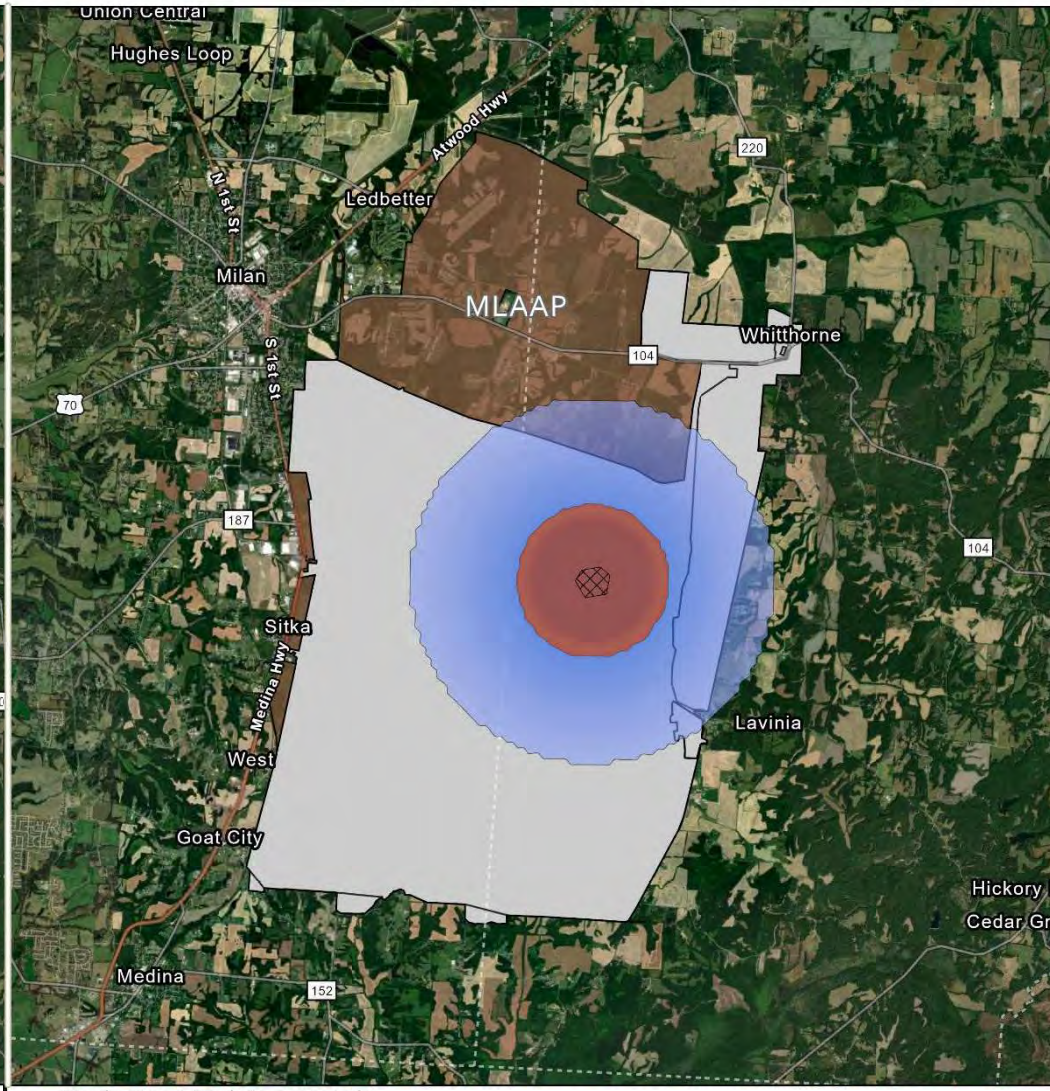
October 2023

Figure 7. Proposed Light Demolition Range: 1.25-lb Single Event Peak Noise Levels



Single Event Peak Noise Levels
Light Demolition Range 40 lbs
Under Unfavorable Weather Conditions (PK15)



Single Event Peak Noise Levels
Light Demolition Range 40 lbs
Under Neutral Weather Conditions (PK50)

LEGEND

- Lt Demo Range
- MLAAP
- VTS-Milan

Perceptibility	dB PK	Indicated by:
May be Audible	< 115	
Noticeable, Distinct, May Notice Vibration/Rattle	115 - 130	
Very Loud, May Startle	> 130	

0 1.5 3 6 9 12 Kilometers

0 1.5 3 6 9 Miles

Sources: DCPH-A, ESRI et.al., TNARNG
No warranty is made as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This information is not adequate for legal boundary definition.

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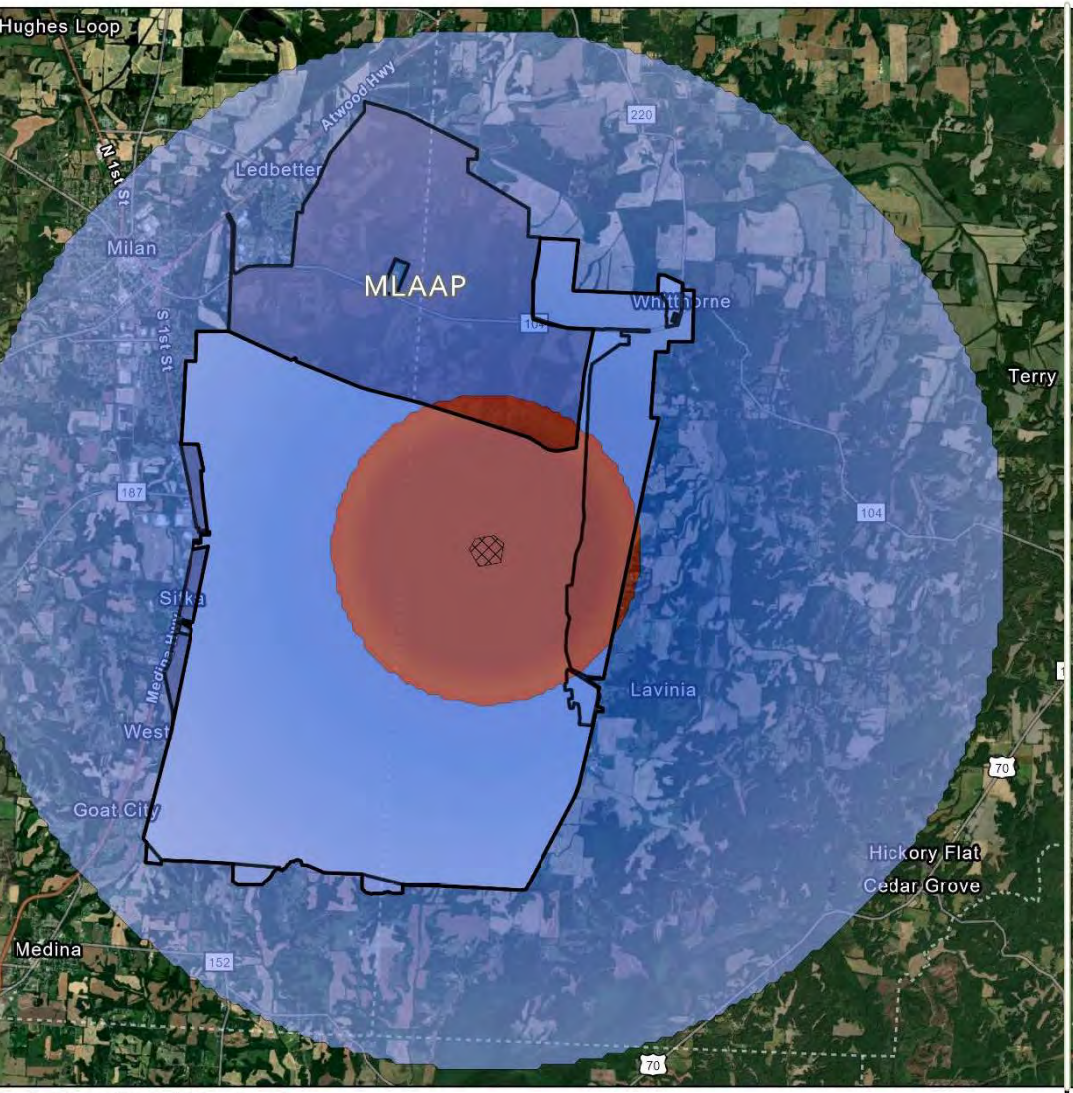
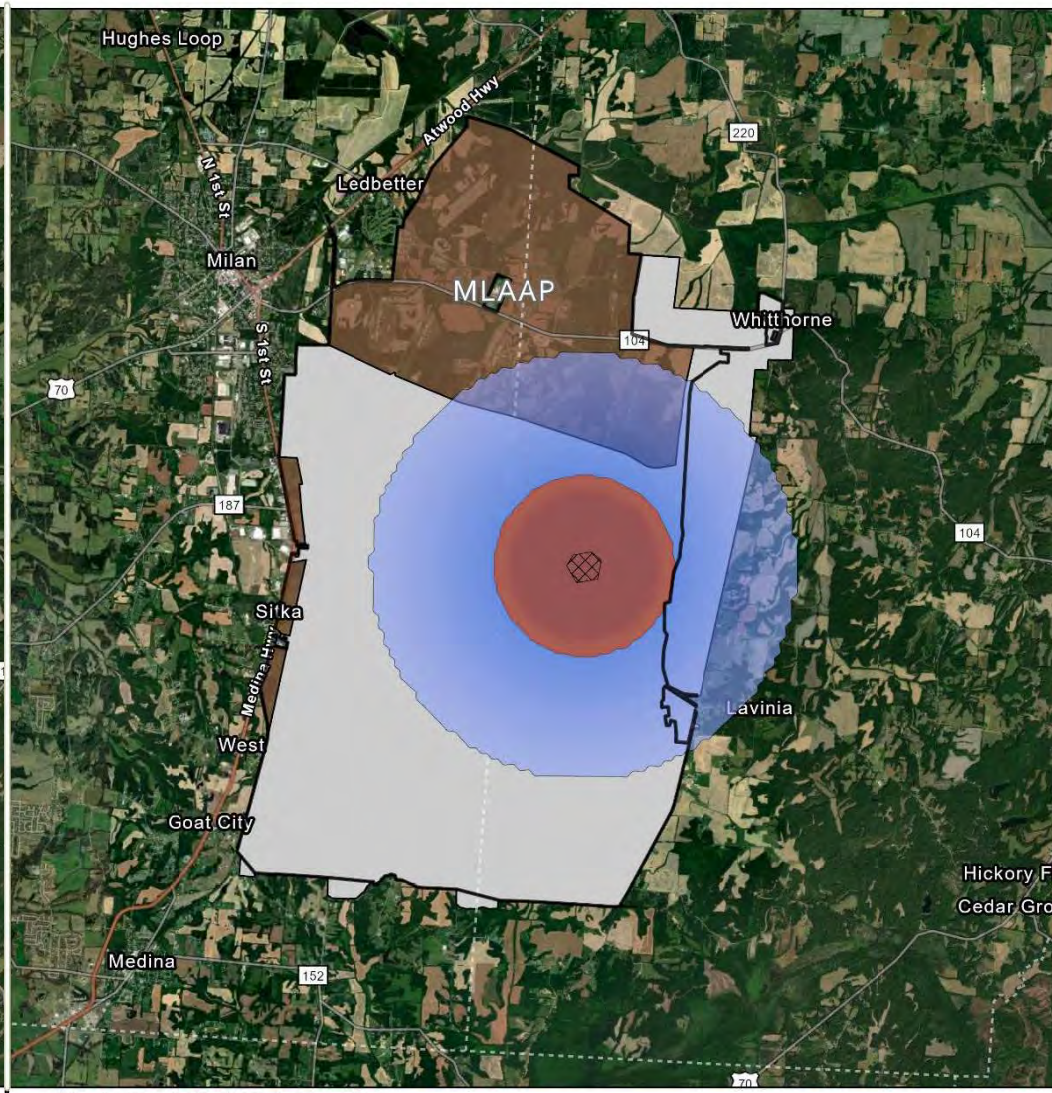
Figure 8. Proposed Light Demolition Range: 40-lb Single Event Peak Noise Levels



ingle Event Peak Noise Levels
ght Demolition Range 140 lbs
nder Unfavorable Weather Conditions (PK15)



Single Event Peak Noise Levels
Light Demolition Range 140 lbs
Under Neutral Weather Conditions (PK50)

LEGEND

- Lt Demo Range
- MLAAP
- VTS-Milan

Perceptibility	dB PK	Indicated by:
May be Audible	< 115	
Noticeable, Distinct, May Notice Vibration/Rattle	115 - 130	
Very Loud, May Startle	> 130	

0 1.5 3 6 9 12 Kilometers

0 1.5 3 6 9 Miles

Sources: DCPH-A, ESRI et.al., TNARNG
No warranty is made as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This information is not adequate for legal boundary definition.

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October 2023

Figure 9. Proposed Light Demolition Range: 140-lb Single Event Peak Noise Levels

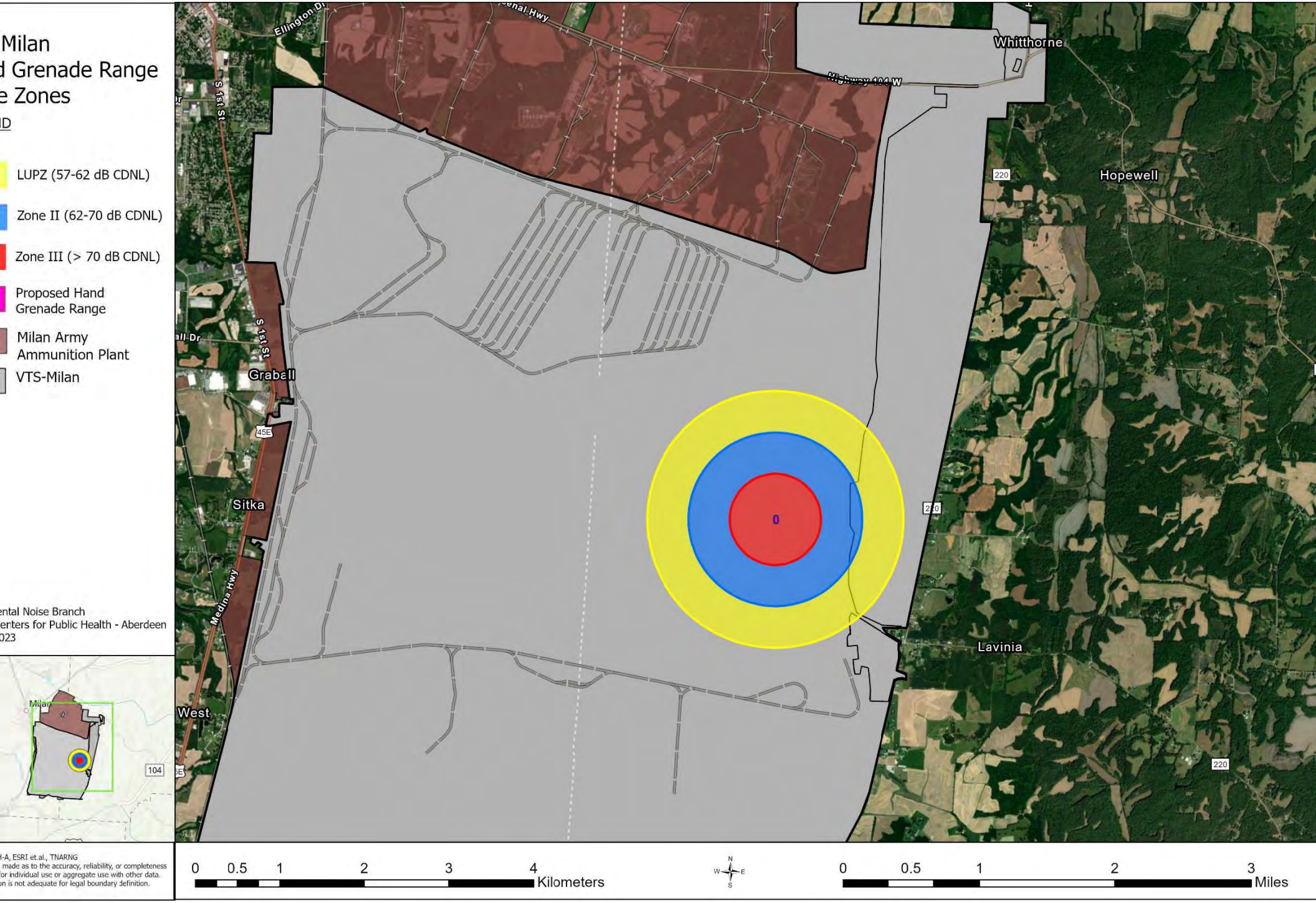
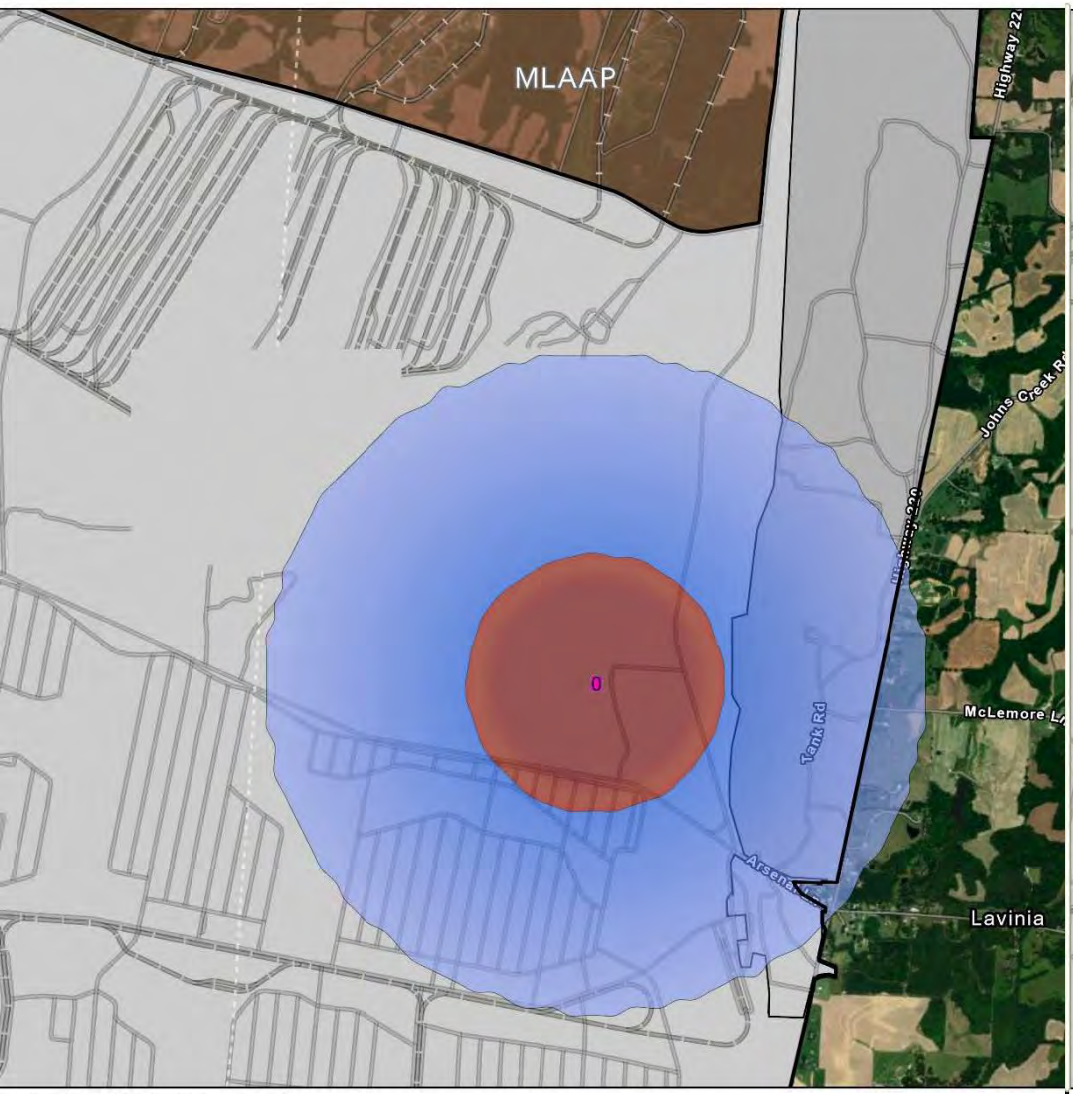
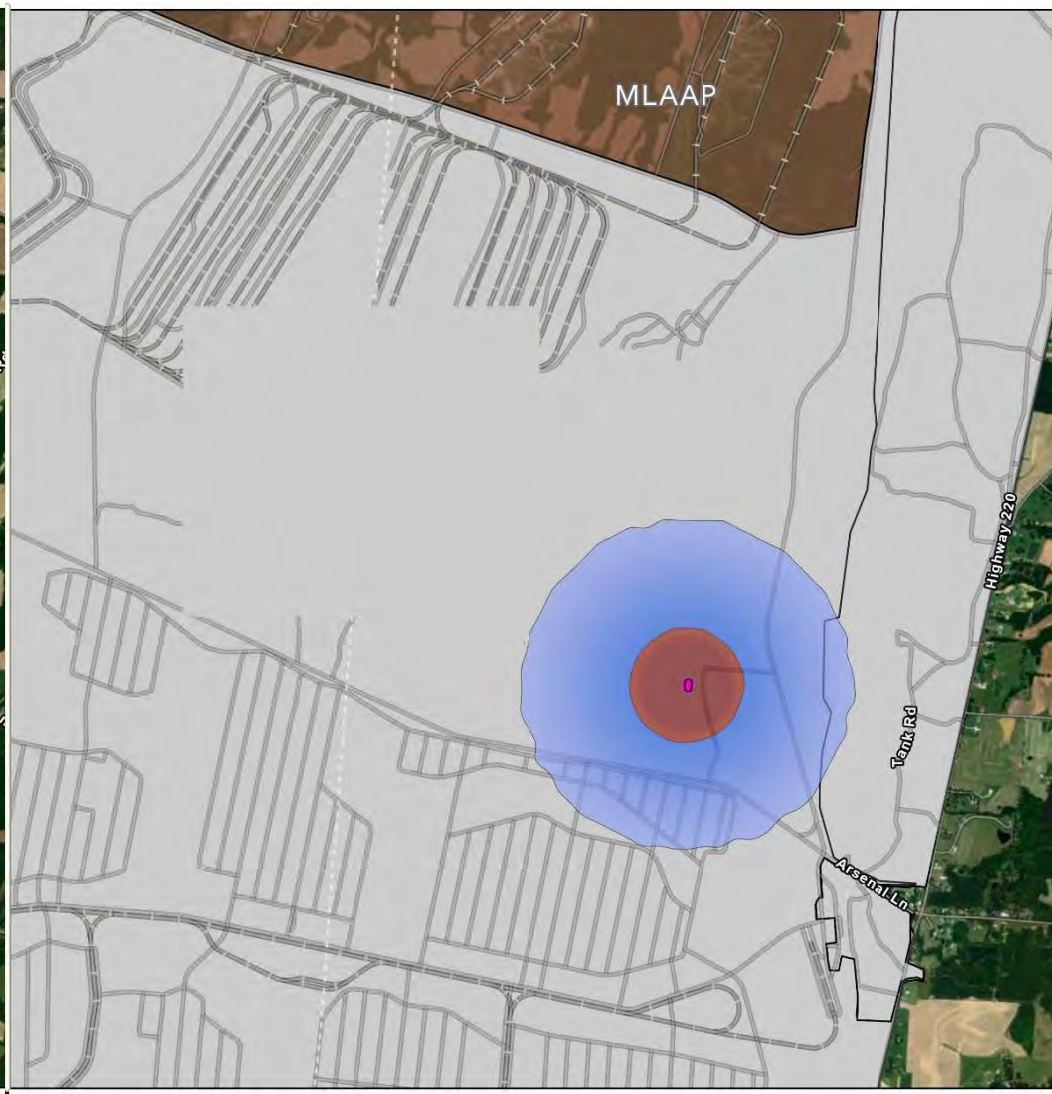


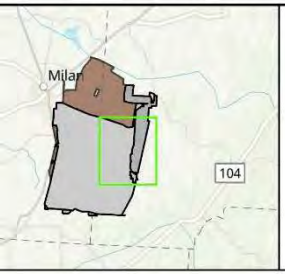
Figure 10. Proposed Hand Grenade Familiarization Range Noise Zones



ingle Event Peak Noise Levels
and Grenade Range High Explosive Round
nder Unfavorable Weather Conditions (PK15)



Single Event Peak Noise Levels
Hand Grenade Range High Explosive Round
Under Neutral Weather Conditions (PK50)



LEGEND

- Hand Grenade Range
- MLAAP
- VTS-Milan

Perceptibility	dB PK	Indicated by:
May be Audible	< 115	
Noticeable, Distinct, May Notice Vibration/Rattle	115 - 130	
Very Loud, May Startle	> 130	

0 0.5 1 2 3 4 Kilometers

0 0.5 1 2 3 Miles

Sources: DCPH-A, ESRI et.al., TNARNG
No warranty is made as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This information is not adequate for legal boundary definition.

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October 2023

Figure 11. Proposed Hand Grenade Familiarization Range High Explosive Single Event Peak Noise Levels

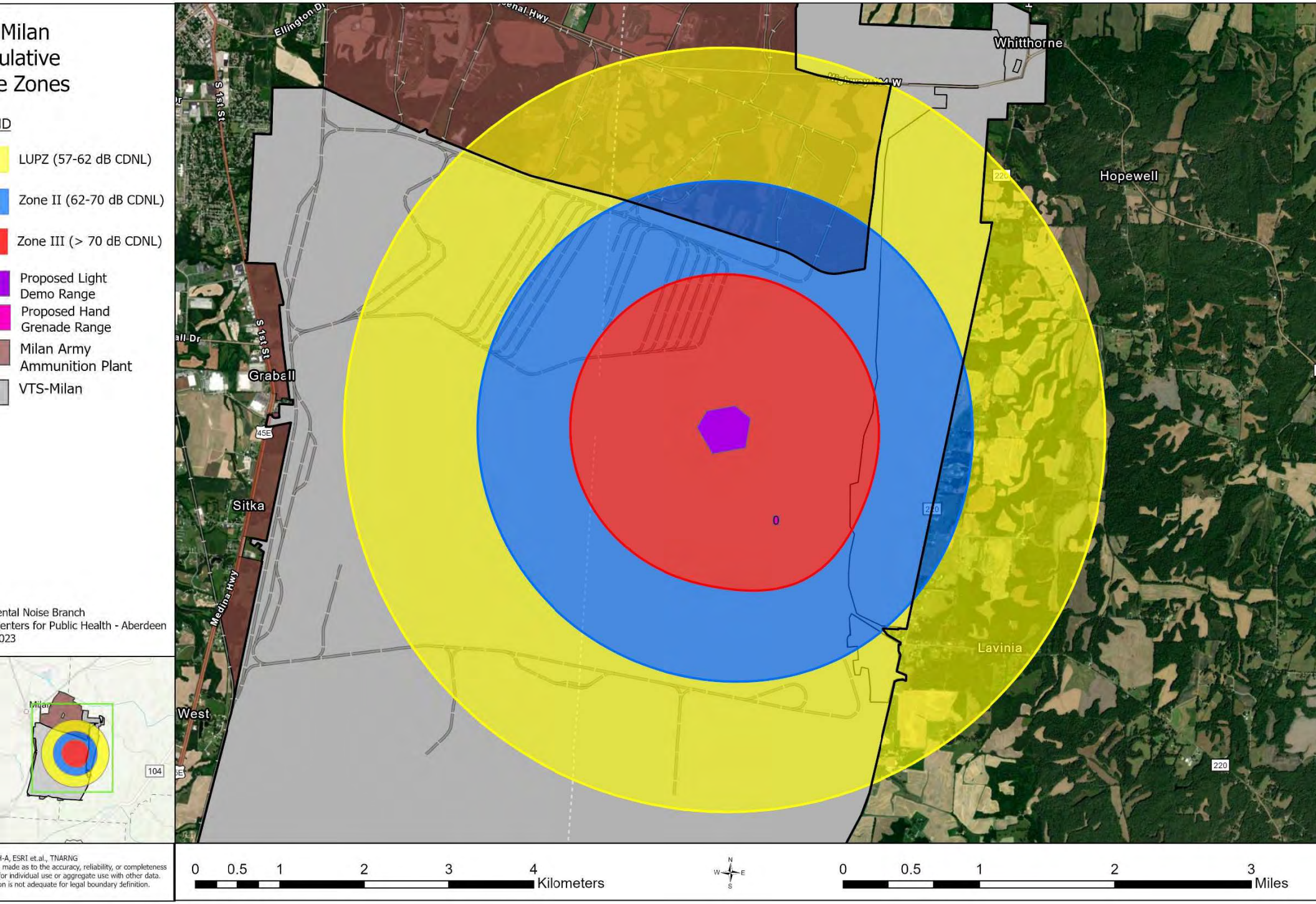


Figure 12. Cumulative Conditions: Hand Grenade Familiarization Range and Light Demolition Range Noise Zones

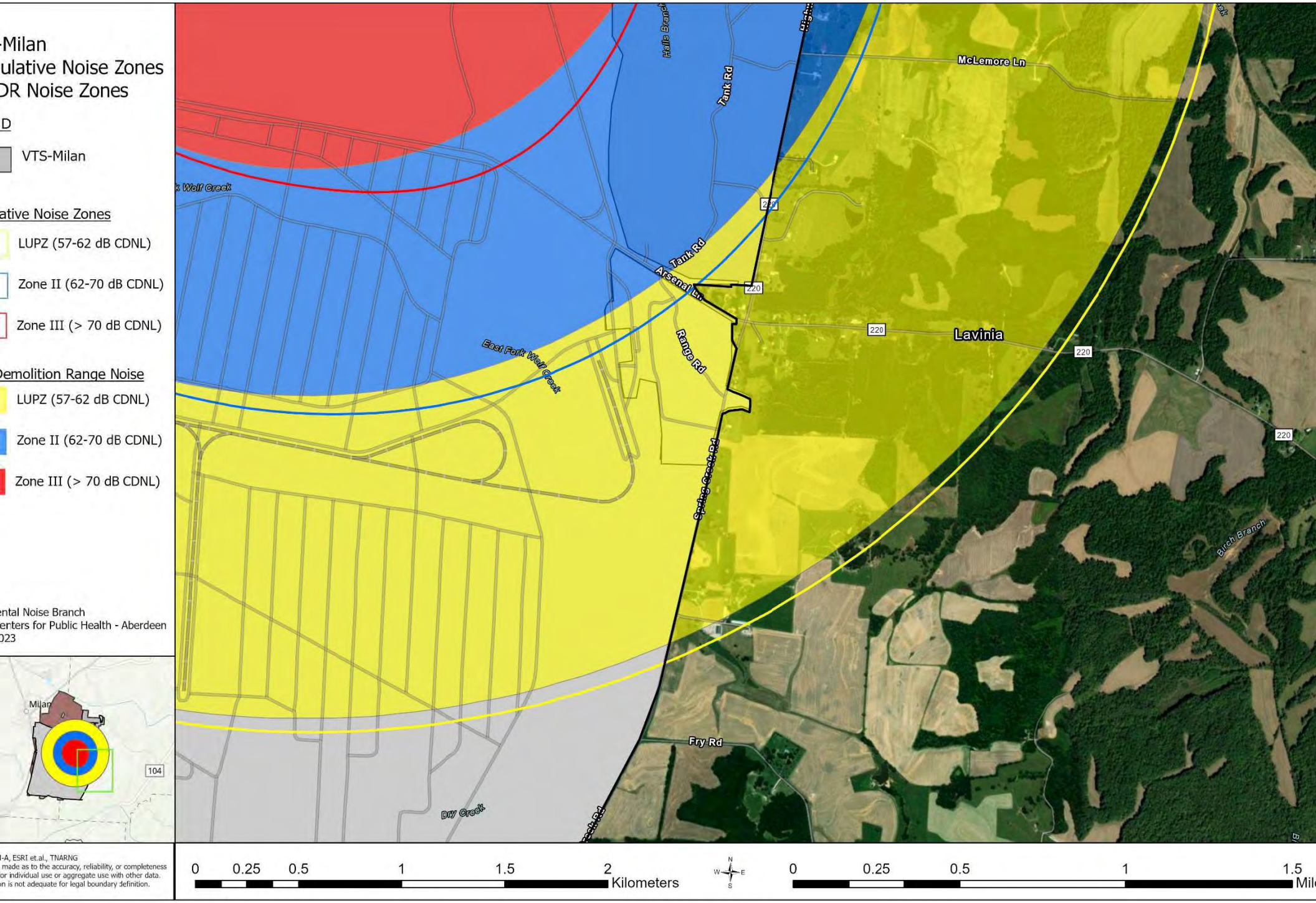
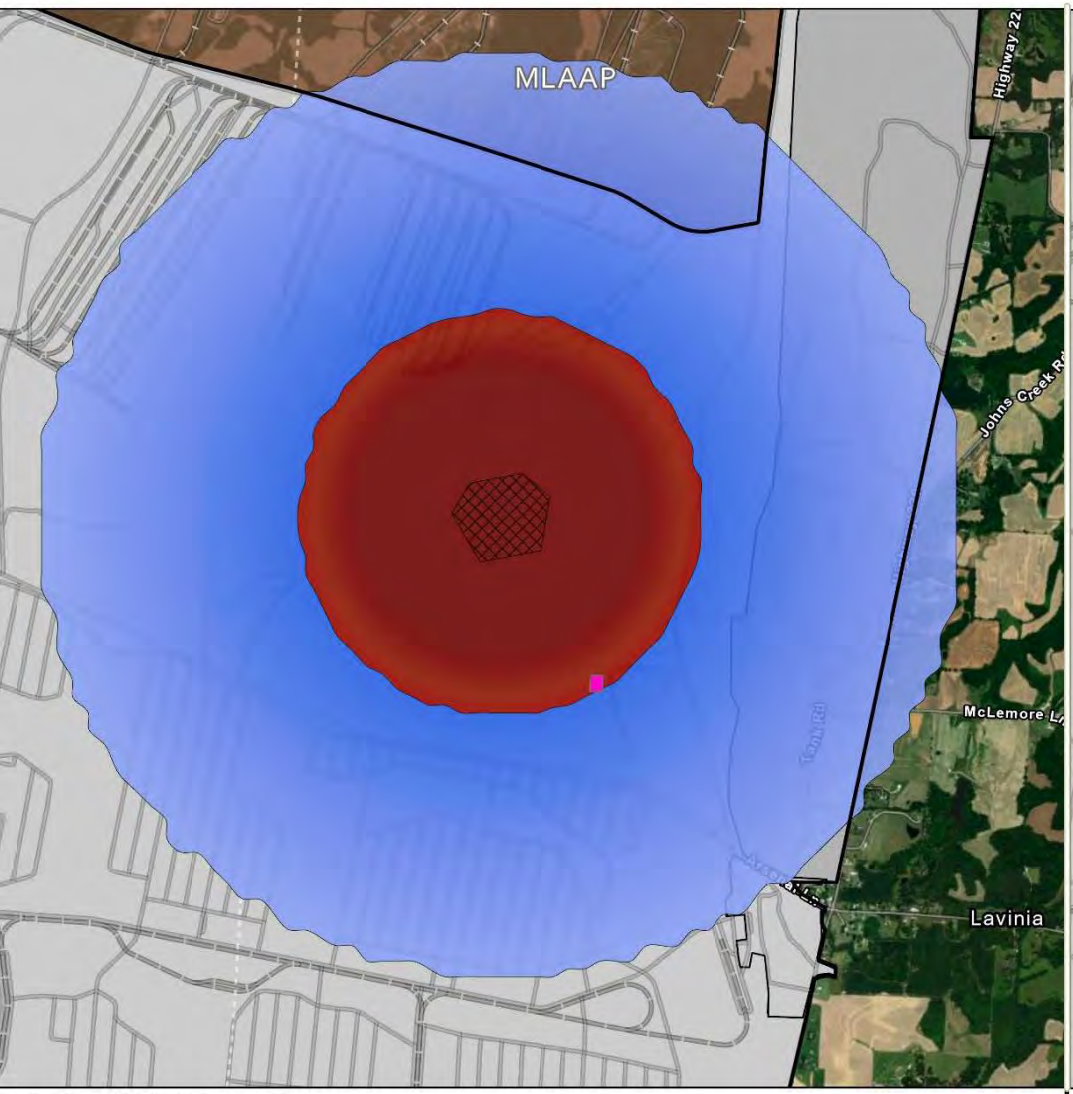
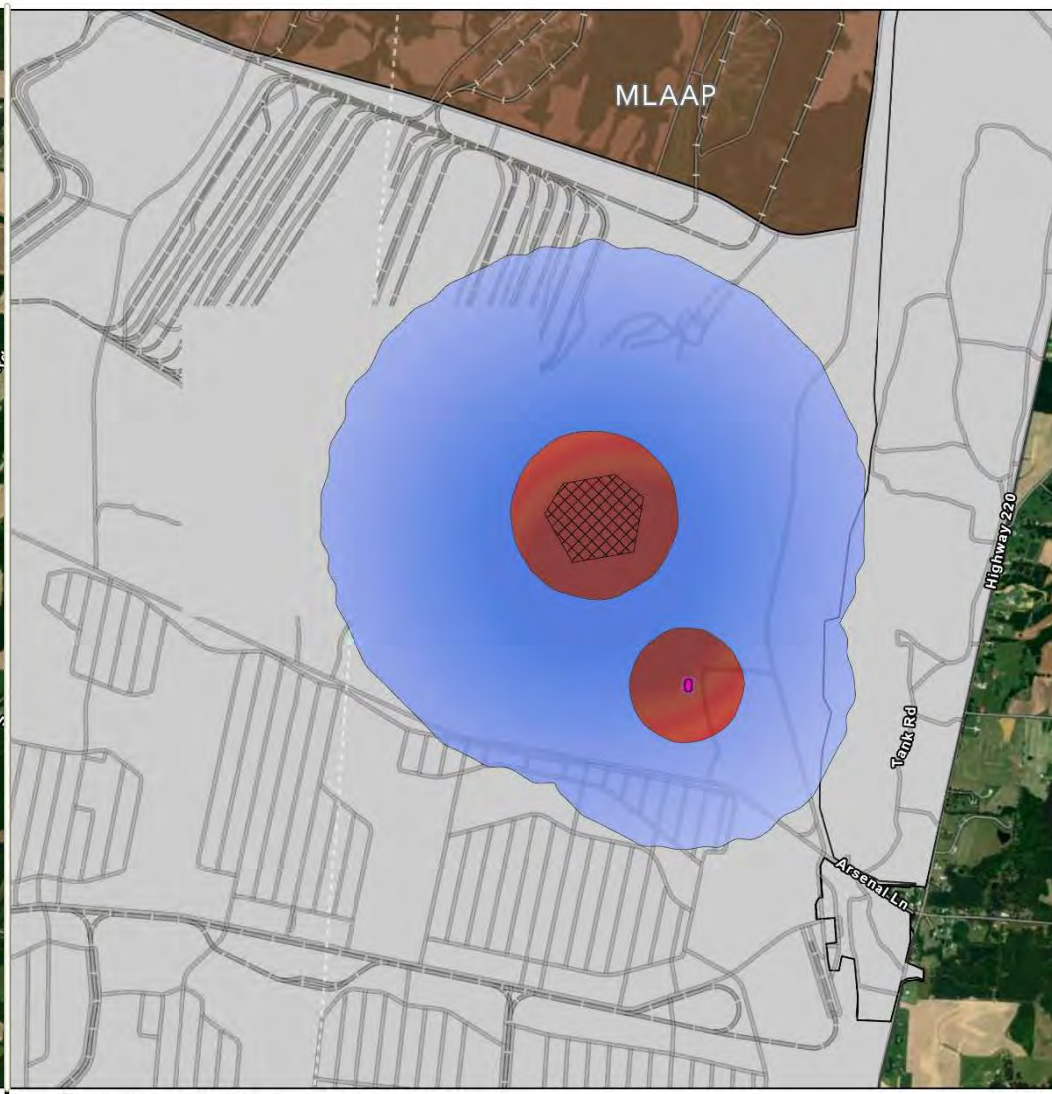


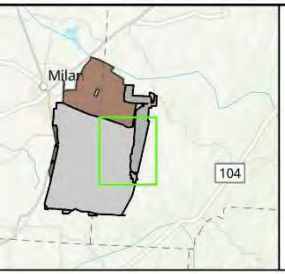
Figure 13. Cumulative Noise Zones Comparison to Light Demolition Range Noise Zones



ingle Event Peak Noise Levels
and Grenade Range High Explosive Round and Light Demolition Range 1.25 lbs
nder Unfavorable Weather Conditions (PK15)



Single Event Peak Noise Levels
Hand Grenade Range High Explosive Round and Light Demolition Range 1.25 lbs
Under Neutral Weather Conditions (PK50)



LEGEND

- Hand Grenade Range
- Lt Demo Range
- MLAAP
- VTS-Milan

Perceptibility	dB PK	Indicated by:
May be Audible	< 115	
Noticeable, Distinct, May Notice Vibration/Rattle	115 - 130	
Very Loud, May Startle	> 130	

0 0.5 1 2 3 4 Kilometers

0 0.5 1 2 3 Miles

Sources: DCPH-A, ESRI et.al., TNARNG
No warranty is made as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This information is not adequate for legal boundary definition.

Environmental Noise Branch
Defense Centers for Public Health -
October 2023

Figure 14. Cumulative Conditions: Single Event Peak Noise Levels Hand Grenade Familiarization Range and Light Demolition Range (1.25 lbs)

8. CONCLUSIONS

According to Army guidelines, the noise from the proposed range expansion project is considered compatible with most of the surrounding land use.

8.1 Small Arms Activity

For existing small arms activity, Zone II extends beyond the eastern boundary encompassing low-density residential land uses. Zone III is contained to VTS-Milan.

The addition of the ARF range generates a Zone III which extends beyond the eastern boundary encompassing one residential property (5600 block of Highway 220) and a Zone II that encompasses scattered low-density residential properties and agricultural land.

8.2 Demolition and Large Caliber Activity

The HGFR Noise Zones remain within the VTS-Milan boundary and are compatible with the surrounding communities. Additionally, the live hand grenade rounds have a low risk of generating noise complaints.

The LDR Noise Zones extend north into MLAAP and beyond the eastern VTS-Milan boundary. Zone III remains within VTS-Milan. Zone II and the LUPZ extend beyond the eastern boundary, encompassing primarily agricultural lands and scattered low-density residential properties. Under adverse weather conditions, a worst case 40-lb detonation event at the LDR may cause annoyance and potentially generate noise complaints within 2-miles of VTS-Milan. For the most common NEW (1.25 lbs), depending upon weather conditions, residences adjacent to VTS-Milan may occasionally be exposed to Peak sound levels that correlate to a moderate risk of complaints. The largest projected detonation at the LDR would be 140 lbs. Under adverse weather conditions, this event may cause annoyance and potentially generate noise complaints to the east within 4.4-miles and up to 2-miles to the north, south and west of VTS-Milan.

The cumulative operations (HGFR and LDR) land use planning Noise Zones are driven by the LDR activity. As such, the cumulative areas off-post are similar to the individual LDR noise zone footprint.

Environmental Health Sciences, Environmental Noise Consultation No. S.0101338a-24,
18 September–14 December 2023

9. RECOMMENDATIONS

Include the information from this consultation in the environmental analysis documentation for the proposed actions.

Include the information from this consultation in the Endangered Species Act Biological Assessment.

Provide prior public notice of scheduled use of training events, including date(s) and approximate start and stop times.

BROSKA.KRISTY.ANNETTE.1231370168
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Date: 2024.01.29 10:36:10 -05'00'

KRISTY BROSKA
Environmental Protection Specialist

APPROVED:

REICHARD.DANIEL.K.1256021737
Digitally signed by REICHARD.DANIEL.K.1256021737
Date: 2024.01.29 10:48:31 -05'00'

DAN REICHARD
Branch Chief, Environmental Noise

Environmental Health Sciences, Environmental Noise Consultation No. S.0101338a-24, 18 September–14 December 2023

APPENDIX A

REFERENCES

Department of the Army. 2007. Army Regulation 200-1, *Environmental Protection and Enhancement.* https://armypubs.army.mil/ProductMaps/PubForm/Details.aspx?PUB_ID=2232

U.S. Army Engineer Research and Development Center (ERDC). 2009. BNOISE2 Computer Model, Version 1.3 2009-11.30.

ERDC. 2015. SARNAM Computer Model, Version 2015-07-27.

U.S. Army. 1984. Army Environmental Hygiene Agency, Environmental Noise Assessment No. 52-34-0442-84, Noise Measurement Study, Camp Bullis, Texas, 27 February – 2 March 1984.

U.S. Army. 1999. Center for Health Promotion and Preventive Medicine. 1999. Health Hazard Assessment Report on the 40mm XM1001 Canister Cartridge for the MK-19 Mod 3 Grenade Machine Gun, No. 69-37-2735-00, November 1999.

APPENDIX B

SUPPLEMENTAL NOISE LEVELS FOR BIOLOGICAL ASSESSMENT PURPOSES

B-1. REFERENCES

Dalland J. 1965. Hearing sensitivity in bats. *Science* 150:1185–1186. https://doi.org/10.1126/science.150.3700.1185

U.S. Army Construction Engineering Research Laboratories. 2003. SARNAM Computer Model, Version 2.6.2003-06-06.

U.S. Army Engineer Research and Development Center. 2009. BNOISE2 Computer Model, Version 1.3 2009-11.30.

B-2. GENERAL

Defense Centers for Public Health–Aberdeen makes no judgment on the effects of training activity noise on wildlife. The Tennessee Army National Guard requested information regarding two Bat species of concern at Milan-Volunteer Training Site (VTS). The information in this appendix is intended to provide insight for decision makers with regard to biological assessment.

B-3. AUDIOGRAMS

Biological assessments utilize species specific audiograms to determine potential noise impacts on wildlife. Although no audiograms are available for either the Indiana bat (*Myotis sodalis*) or the Gray bat (*Myotis grisescens),* audiograms are available for a surrogate species, the Little Brown bat (*Myotis lucifugus*). The Little Brown bat has poor hearing in frequencies below 10 kilohertz (kHz), with peak hearing sensitivity at 40 kHz (Figure B-1) (Dalland, 1965). Based on these hearing thresholds, a species-specific weighted metric (Bat-sound exposure level (SEL)) was developed for use in the Small Arms Range Noise Assessment Model (SARNAM) and Blast Noise Version 2 (BNOISE2) noise modeling programs (U.S. Army Construction Engineering Research Laboratories, 2003; U.S. Army Engineer Research and Development Center, 2009).

Human response to noise is typically presented as A-weighted or C-weighted. The A-weighted scale filters out very low and very high frequencies replicating the hearing sensitivity of humans. C-weighting follows the frequency sensitivity of the human ear, at very high noise levels, and accounts for much more of the dominant low-frequencies that are present in demolition and large caliber weapons noise. As evidenced in Figure B-2, human hearing is far more sensitive to live-fire operations when compared to bats. That difference would be significant, as a large majority of the noise generated by explosive activity and weapons firing occurs in lower frequencies (2 kHz and below).

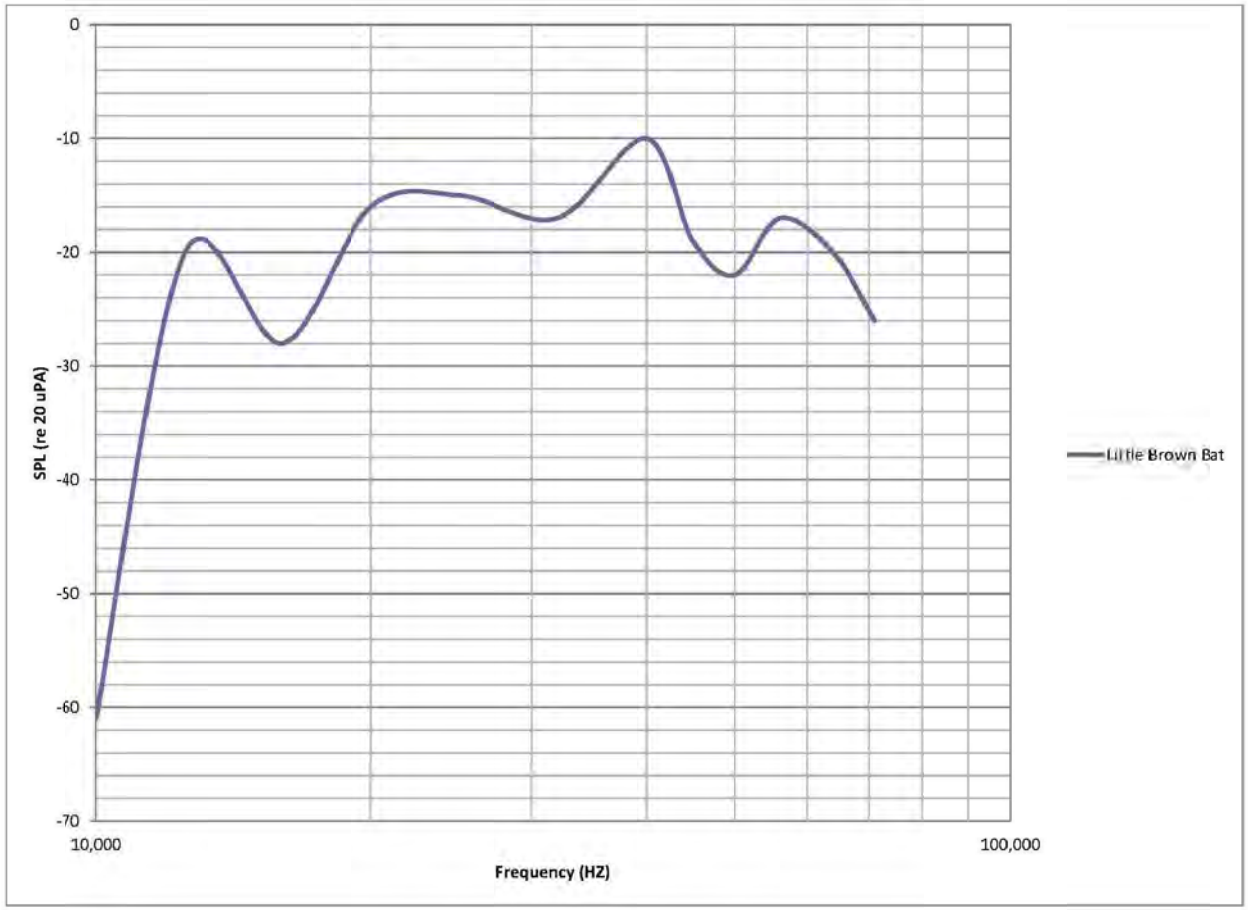


Figure B-1. Bat Hearing Threshold

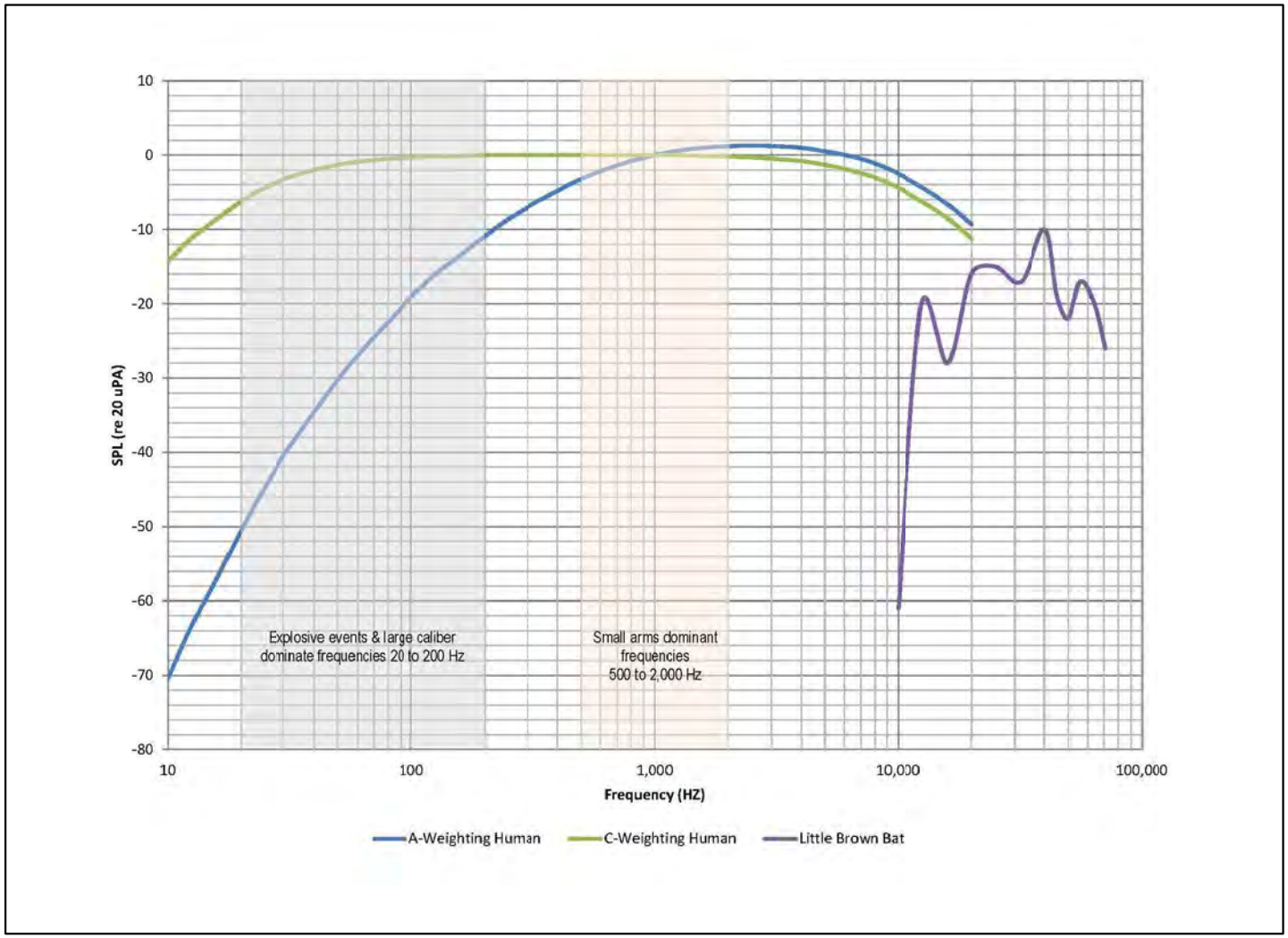


Figure B-2. Human vs. Bat Hearing Thresholds

B-4 SOUND EXPOSURE LEVEL

Sound Exposure Level (SEL) represents all the acoustic energy (e.g., sound pressure) of an individual noise event as if that event has occurred with a one-second time period. SEL captures both the level (magnitude) and the duration of a sound event in a single numerical quantity by "squeezing" all the noise energy from an event into one second. This provides a uniform way to make comparisons among noise events of various durations.

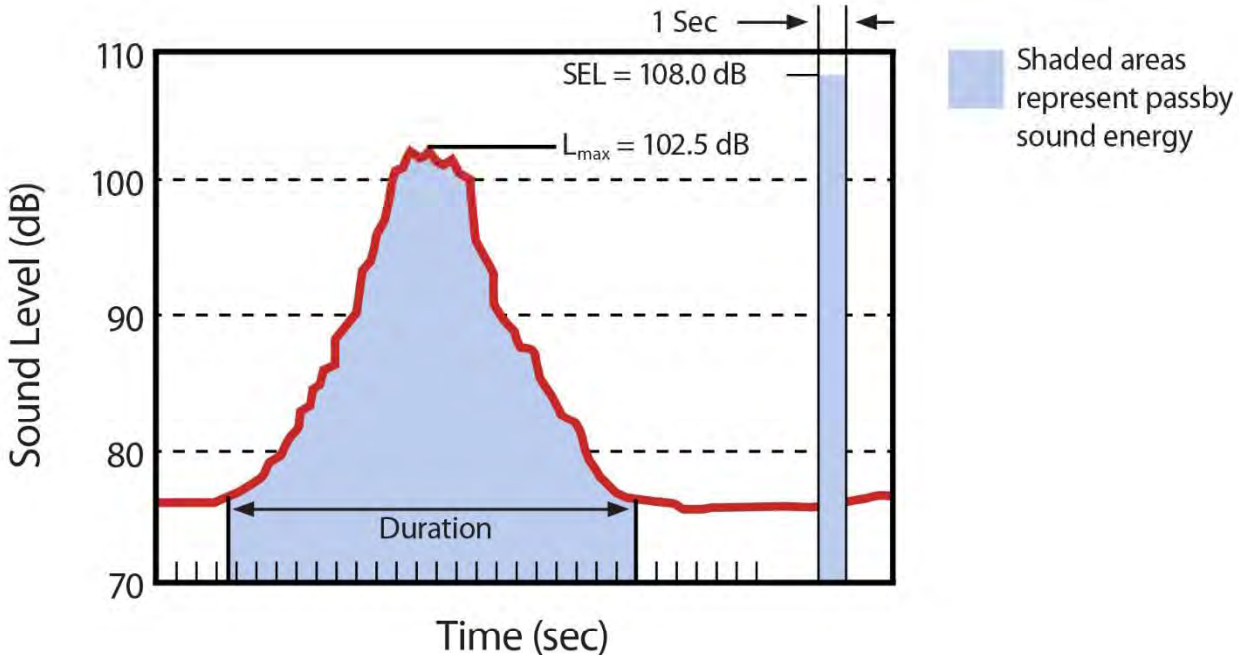


Figure B-3. Sound Exposure Level Example

An SEL value is the best available methodology to address noise impact on wildlife. The noise modeling programs were instructed to generate the Bat-SEL associated with common firing activities at VTS-Milan (explosives and small arms firing).

The dominant frequency range for explosive events is 20 to 200 Hertz (Hz) (Figure B-2). As mentioned previously, the Little Brown bat has poor hearing in frequencies below 10 kHz. As a result, the Bat-SEL values for explosive events are below the computer modeling threshold of 40 decibels (dB) at 50 meters.

Small arms firing generates slightly higher dominant frequencies (500 to 2,000 Hz) when compared to larger caliber (20 millimeters (mm) and above) and explosive events. As shown in Table B, the Bat-SEL level reaches the computer model threshold (40 dB) within 100 meters of the firing point. Within 50 meters the Bat-SEL level varies based upon the azimuth in relation to the firing point. The results were the same for all small arms weapon types (.50 caliber and below).

Table B. Bat-Sound Exposure Level for Small Arms Firing

	Predicted Level, Bat-SEL Azimuth		
Distance, meters	**0º**	**90º**	**180º**
50	120	104	104
100	40	40	40

Legend:
Bat-SEL = Bat-weighted Sound Exposure Level
Note:
The 0º is directly in front of the weapon, 90º is to the side of the weapon, and the 180º azimuth is directly behind the weapon.

APPENDIX C

VEHICLE NOISE

C-1. CONSTRUCTION VEHICLES

Table C-1 lists noise levels from various types of equipment that may be used during construction of the proposed range projects. The table shows noise levels at distances of 50 feet and 100 feet from the construction noise source. Generally, noise levels decrease by six decibels over hard surfaces and nine decibels over soft surfaces for each doubling of distance. For example, over a hard surface the noise level for a bulldozer would be 85 decibels A-weighted (dBA) at 50 feet, 79 dBA at 100 feet, and 73 dBA at 200 feet.

Although construction-related noise impacts at the Automated Record Fire Range (closest project to noise-sensitive land uses) should be minimal, the following best management practices are suggested to further reduce any realized noise impacts:

- Construction should occur during normal weekday business hours in areas adjacent to noise-sensitive land uses such as residential areas.
- Occupants adjacent to construction areas should be notified of the construction activity and the anticipated duration of construction prior to the onset of work.

Table C-1. Maximum Noise Levels of Common Construction Machinery/Vehicles

Equipment/Noise Source	Noise Level (dBA)[1]			
	50 Feet	100 Feet	200 Feet	400 Feet
Air Compressor	80	74	68	62
Backhoe	80	74	68	62
Ballast Equalizer	82	76	70	64
Ballast Tamper	83	77	71	65
Bulldozer	85	79	73	67
Chainsaw	86	80	74	68
Compactor	82	76	70	64
Concrete mixer	85	79	73	67
Concrete pump	82	76	70	64
Concrete vibrator	76	70	64	58
Crane, derrick	88	82	76	70
Crane, mobile	83	77	71	65
Excavator/ shovel	82	76	70	64
Generator	81	75	69	63
Grader	85	79	73	67
Jackhammer	88	82	76	70
Loader	85	79	73	67
Paver	89	83	77	71
Pile driver (impact)	101	95	89	83

Environmental Health Sciences, Environmental Noise Consultation No. S.0101338a-24, 18 September–14 December 2023

Table C-1. Maximum Noise Levels of Common Construction Machinery/Vehicles (continued)

Equipment/Noise Source	Noise Level (dBA)[1]			
	50 Feet	100 Feet	200 Feet	400 Feet
Pile driver (sonic)	96	90	84	78
Pneumatic tool	85	79	73	67
Pump	76	70	64	58
Rock drill	98	92	86	80
Roller	85	79	73	67
Saw	76	70	64	58
Scraper	89	83	77	71
Shovel	82	76	70	64
Truck	88	82	76	70
Woodchipper	89	83	77	71

Legend:
dBA = decibels A-weighted
Notes:
[1] Assumes a 6 dBA decrease based upon doubling of distance from a point source.

C-2. TACTICAL VEHICLES

Table C-2 lists the A-weighted Maximum noise levels (dBA Lmax) of common tactical vehicles operating at VTS-Milan.

Table C-2. Maximum Noise Levels of Common Tactical Vehicles

Vehicle	Noise Level (dBA Lmax)				Note
	50 Feet	100 Feet	200 Feet	400 Feet	
M548 Ammo Carrier (idle)	70	64	58	52	1
M548 Ammo Carrier (moving)	85	79	73	67	2
M88 Recovery Vehicle (idle)	70	64	58	52	1
M88 Recovery Vehicle (moving)	97	92	86	80	2
M113 Personnel Carrier (idle)	76	70	64	58	1
M113 Personnel Carrier (moving)	87	82	76	70	2
M1A1 Tank (idle)	75	69	63	57	1
M1A1 Tank (moving)	89	85	79	73	2
HMMWV (moving)	75	69	63	57	1
FMTV (moving)	80	74	68	62	1

Legend:
dBA = decibels A-weighted Maximum
Lmax = maximum noise level
HMMWV = High Mobility Multipurpose Wheeled Vehicle
FMTV = Family of Medium Tactical Vehicles
Notes:
[1] Field measurement at 50 feet. Values for 100, 200 and 400 feet assumes a 6 dBA decrease based upon doubling of distance from a point source.
[2] Field measurements at 50 and 100 feet. Values for 200 and 400 feet assumes a 6 dBA decrease based upon doubling of distance from a point source.

Environmental Health Sciences, Environmental Noise Consultation No. S.0101338a-24, 18 September–14 December 2023

GLOSSARY

Acronyms/Abbreviations

AR
Army Regulation

ARF
Automated Record Fire

BNOISE2
Blast Noise Version 2

CDNL
C-weighted Day-Night average sound Level

dB
decibel

dBA
decibel A-weighted

DNL
Day-Night average sound Level

HGFR
Hand Grenade Familiarization Range

Hz
Hertz

kHz
kilohertz

km
kilometers

lb(s)
pound(s)

LDR
Light Demolition Range

LUPZ
Land Use Planning Zone

Environmental Health Sciences, Environmental Noise Consultation No. S.0101338a-24, 18 September–14 December 2023

MLAAP
Milan Army Ammunition Plant

mm
millimeter

PK
Peak

PK15(met)
Peak 15(meteorological) metric

PK50(met)
Peak 50(meteorological) metric

SEL
Sound Exposure Level

TP
Target Practice

UAC
Urban Assault Course

VTS-Milan
Volunteer Training Site–Milan

Environmental Health Sciences, Environmental Noise Consultation No. S.0101338a-24,
18 September–14 December 2023

Terms

Average Sound Level
The mean-squared sound exposure level of all events occurring in a stated time interval, plus 10 times the common logarithm of the quotient formed by the number of events in the time interval, divided by the duration of the time interval in seconds.

C-Weighted Sound Level
A sound level weighting technique that is used to normalize the low, impulsive sounds to the range of human hearing. It is used when measuring low frequency sound such as those from large caliber, demolitions, and sonic booms.

Day-Night Average Sound Level (DNL)
The 24-hour average frequency-weighted sound level, in decibels, from midnight to midnight, obtained after addition of 10 decibels to sound levels in the night from midnight up to 7 am and from 10 pm to midnight (0000 up to 0700 and 2200 up to 2400 hours).

Decibels (dB)
A logarithmic sound pressure unit of measure.

Land Use Planning Zone (LUPZ)
DNL noise contours represent an annual average that separates the Noise Zone II from the Noise Zone I (57–62 dB for demolition and large caliber weapons).

Noise
Noise is unwanted sound considered unpleasant, loud, or disruptive.

Noise Zone III
The area around a noise source in which the C-weighted Day-Night average sound Level (CDNL) is greater than 70 dB for demolition and large caliber weapons and greater than 104 dB Peak for small arms weapons.

Noise Zone II
The area around a noise source in which the CDNL is 62–70 dB for demolition and caliber weapons and the Peak is 87–104 dB for small arms weapons.

Noise Zone I
Includes all areas around a noise source in which the CDNL is less than 62 dB for demolition and large caliber weapons and less than 87 dB Peak for small arms weapons. This area is usually suited for all types of land use activities.

Peak
Peak is a single-event sound level metric without weighting and is the highest instantaneous level of an event. There is no root mean square time averaging with the Peak metric.

Environmental Health Sciences, Environmental Noise Consultation No. S.0101338a-24,
18 September–14 December 2023

Peak 15 Metric (PK15(met))
Peak sound level, without frequency weighting and accounting for the statistical variation cause by weather, expected to be exceeded by 15% of all events that might occur. This metric cannot be measured on a sound level meter as it is a statistical probability generated by computer modeling. A PK15(met) level of greater than 130 dB has a high risk of complaints, 115–130 dB has a moderate risk of complaints, and below 115 dB has a low risk of complaints.

Peak 50 Metric (PK50(met))
Similar to the PK15(met) except that it represents the peak noise level that is exceeded 50% of the time. This metric also accounts for weather but assumes conditions that are not favorable for noise propagation. This metric cannot be measured on a sound level meter, as it is a statistical probability generated by computer modeling.

United States Department of the Interior
Fish and Wildlife Service
Information for Planning and Consultation (IPaC)
List of Threatened and Endangered Species
13 November 2023

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, TN 38501-4027
Phone: (931) 528-6481 Fax: (931) 528-7075

In Reply Refer To: November 13, 2023
Project Code: 2024-0015659
Project Name: Proposed heavy and light maneuver training at the Volunteer Training Site at Milan (VTS-M)

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

https://www.fws.gov/sites/default/files/documents/endangered-species-consultation-handbook.pdf

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts, see https://www.fws.gov/program/migratory-bird-permit/what-we-do.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures, see https://www.fws.gov/library/collections/threats-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/partner/council-conservation-migratory-birds.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, TN 38501-4027
(931) 528-6481

PROJECT SUMMARY

Project Code: 2024-0015659

Project Name: Proposed heavy and light maneuver training at the Volunteer Training Site at Milan (VTS-M)

Project Type: Military Operations

Project Description: The Proposed Action includes military training operations, construction activities, and maintenance activities on VTS-M lands. Under the Proposed Action, the TNARNG proposes to develop the approximately 16,000 acres received through the divesture of the Milan Army Ammunition Plant (MLAAP) for maneuver of military force training to build and sustain operational readiness for TNARNG units. The type of equipment intended for training operations on the newly acquired VTS-M lands would primarily include heavy track vehicles. The majority of the TNARNG's training activities would occur within designated training areas on VTS-M.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@35.8624044,-88.70590560259983,14z

Counties: Carroll and Gibson counties, Tennessee

ENDANGERED SPECIES ACT SPECIES

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat *Perimyotis subflavus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME	STATUS
Whooping Crane *Grus americana* Population: U.S.A. (AL, AR, CO, FL, GA, ID, IL, IN, IA, KY, LA, MI, MN, MS, MO, NC, NM, OH, SC, TN, UT, VA, WI, WV, western half of WY) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/758	Experimental Population, Non-Essential

REPTILES

NAME	STATUS
Alligator Snapping Turtle *Macrochelys temminckii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4658	Proposed Threatened

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

BALD & GOLDEN EAGLES

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act[1] and the Migratory Bird Treaty Act[2].

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats[3], should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

---

1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read the supplemental

information and specifically the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

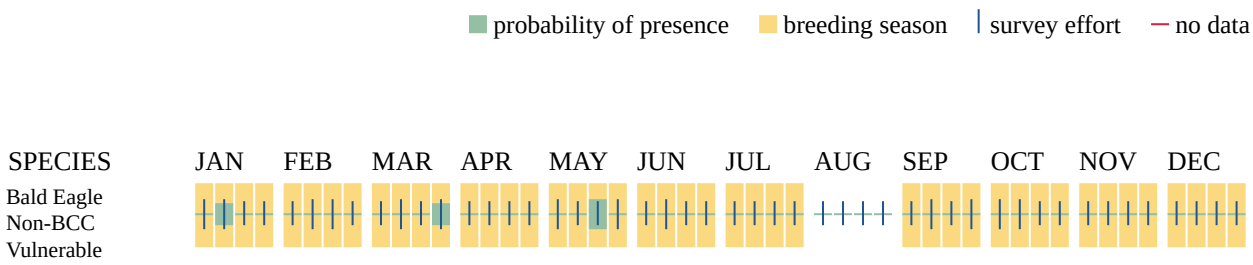
Probability of Presence (■)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Additional information can be found using the following links:

- Eagle Managment https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats[3] should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Kestrel *Falco sparverius paulus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9587	Breeds Apr 1 to Aug 31
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Sep 1 to Jul 31
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Kentucky Warbler *Oporornis formosus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9443	Breeds Apr 20 to Aug 20
Prairie Warbler *Dendroica discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9513	Breeds May 1 to Jul 31
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9439	Breeds Apr 1 to Jul 31
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9398	Breeds May 10 to Sep 10

NAME	BREEDING SEASON
Rusty Blackbird *Euphagus carolinus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9478	Breeds elsewhere
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9431	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read the supplemental information and specifically the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (▪)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

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Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

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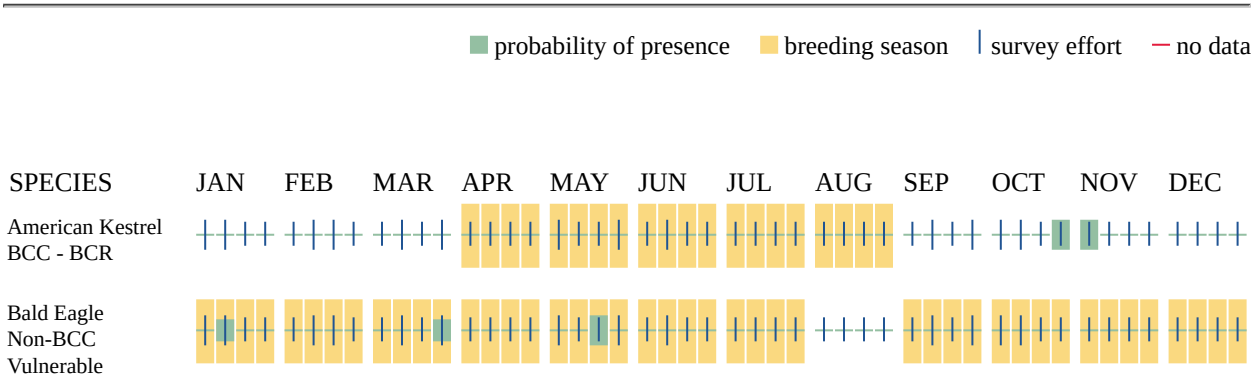

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE VISIT HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

IPAC USER CONTACT INFORMATION

Agency: State of Tennessee
Name: Carey Lynn Perry
Address: 2730 E Camelback Rd
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City: Phoenix
State: AZ
Zip: 85016
Email cperry@vernadero.com
Phone: 5045847366

LEAD AGENCY CONTACT INFORMATION

Lead Agency: Army National Guard

Tennessee Army National Guard
Programmatic Biological Assessment
Tennessee Army National Guard Volunteer Training Site Milan Expansion, Range Construction, and INRMP Activities
July 2024

PROGRAMATIC BIOLOGICAL ASSESSMENT

TENNESSEE ARMY NATIONAL GUARD VOLUNTEER TRAINING SITE MILAN EXPANSION, RANGE CONSTRUCTION, TRAINING, AND INRMP ACTIVITIES

Consulting Agencies:
US Army National Guard G-9 (Installation & Environment)

Designated Non-Federal Representative:
Tennessee Military Department/Tennessee Army National Guard

Submitted To:
US Fish and Wildlife Service
Tennessee Ecological Services Field Office
Cookeville, Tennessee

Date:
1 July 2024

Executive Summary

The Tennessee Army National Guard (TNARNG) is preparing an Environmental Assessment (EA) evaluating potential environmental impacts associated with changes in land use, landscape manipulations, and training use of the recently expanded VTS-Milan. TNARNG and Army National Guard G-9 have prepared this Programmatic Biological Assessment (PBA) to evaluate potential effects of the proposed actions on five species listed or proposed for listing under the Endangered Species Act of 1973 (ESA). Species evaluated include the Indiana bat (*Myotis sodalis*, endangered), tricolored bat (Perimyotis subflavus, proposed endangered), gray bat (M. grisescens, endangered) which have likely detections recorded on post; the northern long-eared bat (*M. septentrionalis*, endangered) which has possible detections recorded; and monarch butterfly (*Danaus plexippus*, candidate species) which has been documented on post. In addition, there are historic likely detections of the little brown bat (*M. lucifugus*, under 12-month review) on post. To prevent the need to reinitiate consultation if it becomes listed, the little brown bat is evaluated for conference purposes in a separate appendix. There are no designated critical habitats for any listed species present on VTS-Milan. The document was developed in coordination with USFWS to provide a streamlined compliance pathway to meet TNARNG's current and anticipated needs for training and land management activities, while avoiding, minimizing, and offsetting impacts to ESA listed species to the greatest extent practicable. As the proponent, Army National Guard G-9 will be the federal Action Agency for consultation.

VTS-Milan was expanded when 16,133.05 ac. was reassigned from Army Material Command's (AMC) Milan Army Ammunition Plant (MLAAP) to National Guard Bureau (NGB), and subsequently licensed by the United States Army Corps of Engineers (USACE) for use by the TNARNG, expanding the facility from 2,448.35 ac. to 18,581.4 ac. in August 2022. Use of the acquired land will change from ammunition storage in bunkers, munitions destruction through detonation, agricultural and grazing leases, and forestry products production, to forest clearing and thinning for training facilities development, heavy armored vehicle maneuver, light wheeled vehicle maneuver, dismounted training, smoke grenade and pyrotechnic use, demolitions and live hand grenade ranges, live fire range construction, tank trail construction, low-water and gap crossing construction, and other military readiness and training activities. Natural resources on VTS-Milan are managed under two existing INRMPs for MLAAP and VTS-Milan until a new comprehensive INRMP is developed. The proposed action is intended to resolve shortfalls of TNARNG's training infrastructure, which prevents TNARNG from meeting its requirements to train and qualify soldiers in heavy and light maneuver and weapons live-fire. The shortfall in training area has created scheduling conflicts and forced TNARNG soldiers to travel out of state to meet training requirements, driving up costs and increasing safety risks to military personnel and civilians. The proposed action will provide TNARNG with its own facility of adequate size and infrastructure to support armored engagement, light maneuver, and live-fire weapons training.

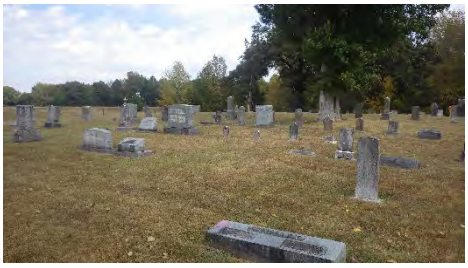
For evaluation purposes, proposed projects have been organized in three general categories, Training Site Development, Military Training and Readiness, and Land Management and INRMP Implementation. Potential effects among species vary with their life history and resulting requirements and susceptibilities. All proposed actions and determinations, along with related conservation measures have been consolidated into tables for each activity type and can be viewed in Appendix E for ease of overview and reference. In general, Training Site Development projects had likely adverse effects for forest dwelling bats (NLEB, Indiana, and tri-colored) and in some cases the monarch, but were not likely to adversely affect the gray bat. These determinations generally related to the likelihood that the species would be in the area and exposed to project effects. For example, timber harvest and forest conversion were likely to adversely affect the forest dwelling bats because they rely on the forest to roost and forage, but were unlikely to adversely affect the gray bat and monarch because they don't rely on forest interior areas; gray bats roost in caves that aren't present on site during the daylight hours when harvesting operations would be conducted. Military training and readiness activities were generally likely to adversely affect all species in some way or for some duration. Many land management and INRMP implementation activities were likely to adversely affect all species, at least in the short term, but will be beneficial to the species overall in the long term.

Phase I Archaeological Survey
of the TNARNG Portion of the Milan Army Ammunition Plant
Carroll and Gibson Counties, Tennessee
(TN SHPO Project No. SHPO0004647)

Management Summary
June 2024

Phase I Archaeological Survey of the TNARNG Portion of the Milan Army Ammunition Plant

Carroll and Gibson Counties, Tennessee



June 2024

TN SHPO Project No. SHPO0004647

Brockington®
CULTURAL RESOURCES CONSULTING

Phase I Archaeological Survey of the TNARNG Portion of the Milan Army Ammunition Plant

Carroll and Gibson Counties, Tennessee

June 2024

TN SHPO Project No. SHPO0004647

Prepared for:
Vernadero Group, Inc.
3400 S. Carrollton Ave. #850752
New Orleans, Louisiana 70118

and

Tennessee Army National Guard
3041 Sidco Drive
Nashville Tennessee, 37204

Prepared by:
Stacey Pruitt, RPA
Archaeologist

Eric Poplin, RPA
Principal Investigator

and

Leigh Koszarsky
Graphics Specialist

Brockington and Associates, Inc.
Atlanta • Charleston • Savannah

Management Summary

Brockington and Associates, Inc. (Brockington) completed a Phase I archaeological survey of the Tennessee Army National Guard's (TNARNG) newly acquired 16,000-acre property at the Milan Army Ammunition Plant (MLAAP) in Carroll and Gibson counties, Tennessee. Brockington conducted this archaeological survey for Vernadero Group, Inc. (Vernadero) in accordance with the stipulations of Section 106 of the National Historic Preservation Act (NHPA), current guidelines established by the Tennessee (TN) State Historic Preservation Office (SHPO), as well as other pertinent state and federal guidelines.

Prior to fieldwork, Brockington conducted background research and developed a site potential model for the project tract based on topography, soil conditions, and land use since the mid-twentieth century. Background research revealed one National Register of Historic Places (NRHP)-listed building (Browning House) and one NRHP-eligible historic district (Milan Army Ammunition Plant Historic District) within 1.0 mile of the project tract. The Browning House is located outside the project tract and future TNARNG training will not affect the resource. The Milan Army Ammunition Plant Historic District is located within the project tract; however, no further management is required due to 2006 Program Comments.

Background research also revealed four previously recorded archaeological sites within the project tract (40CL52, 40CL53, 40GB134, and 40GB152). Sites 40CL52 and 40CL53 were previously documented as prehistoric artifact scatters and Site 40GB134 was documented as a historic hamlet based on surface inspection only. Site 40GB152 was previously documented as an open habitation site. Brockington revisited these sites and covered each with systematic surface and subsurface investigations. Artifacts and cultural material were identified at three of these sites (40CL52, 40CL53, and 40GB134). However, due to the low density of artifacts and overall level of disturbance, all three sites are recommended not eligible for the NRHP (Table i). No artifacts were encountered at the previously documented location of Site 40GB152. Based on the absence of artifacts and the presence of eroded and disturbed soils, Brockington asserts that Site 40GB152 was originally documented in an approximate location and is not present within the tested area, or the site has been destroyed.

In October and November 2022, Brockington personnel completed an intensive archaeological survey within 1,167 acres of High/Moderate Potential areas and select Low Potential areas at the newly acquired MLAAP property (survey area). Field investigation identified 17 new archaeological sites (40CL129-40CL137; 40CL139-40CL145; 40GB218) and 13 isolated finds (Isolates 1-13) (see Table i). Newly identified sites include nineteenth- to twentieth-century house sites and artifact scatters and one historic church and cemetery (40CL145). Several of the sites also have small unknown prehistoric lithic scatter components. Due to the low density of artifacts and the overall level of disturbance, 15 of these sites are recommended not eligible for the NRHP. Brockington recommends that no further management of these sites is necessary. Likewise, the 13 isolated finds are recommended not eligible for the NRHP and require no additional management.

The NRHP eligibility of one historic house site (40CL143) is unknown pending additional testing. Site 40CL143 is a late nineteenth- to early twentieth-century house site with several intact features (well, privy, house foundation, cellar, and road cut). The site may be able to reveal significant information regarding late nineteenth- to early twentieth-century life in the region. Therefore, site avoidance is recommended. If the proposed use of the property for heavy and light maneuver training cannot be designed to avoid this site, Brockington recommends more extensive Phase II archaeological testing to determine its NRHP eligibility.

Brockington also identified 17 historic cemeteries (including Site 40CL145) within or directly adjacent to the project tract (see Table i). These cemeteries were documented, photographed, and recorded as historic resources. However, additional information is needed to determine their NRHP eligibility. Brockington recommends the NRHP eligibility of all 17 cemeteries as unknown pending additional Phase II research and documentation. Additionally, all cemeteries in Tennessee are protected by state burial laws (TCA 39-17-311 to 312; TCA 46-4-101 to 104; TCA 46-8-101 to 103; TCA 68-3-508 and Rule 1200-7-1-.08). Therefore, Brockington recommends all 17 cemeteries be avoided. If the proposed use of the property for heavy and light maneuver training cannot be designed to avoid these resources, Brockington recommends additional Phase II research and documentation to determine their NRHP eligibility and consultation with TN SHPO regarding any possible cemetery relocation efforts.

Table i. Summary of archaeological resources within the project area.

Resource No./ Name	Field ID	Cultural Affiliation	Description	Location (Probability Model)	NRHP Recommendation
40CL52	40CL52	Middle/Late Archaic; Woodland	Prehistoric Open Habitation	Within Project Tract (High/Moderate Potential)	Not Eligible
40CL53	40CL53	Middle Woodland; Unknown Historic	Prehistoric Open Habitation; Historic Isolated Find	Within Project Tract (High/Moderate Potential)	Not Eligible
40CL129	FS1	Late Nineteenth to Early Twentieth Century	Historic House Site	Within Project Tract (High/Moderate Potential)	Not Eligible
40CL130	FS2	Early Twentieth Century	Historic Artifact Scatter	Within Project Tract (High/Moderate Potential)	Not Eligible
40CL131	FS3	Late Nineteenth to Early Twentieth Century	Historic House Site	Within Project Tract (High/Moderate Potential)	Not Eligible
40CL132	FS5	Late Nineteenth to Early Twentieth Century	Historic Artifact Scatter	Within Project Tract (High/Moderate Potential)	Not Eligible
40CL133	FS6	Late Nineteenth to Early Twentieth Century	Historic House Site	Within Project Tract (High/Moderate Potential)	Not Eligible
40CL134	FS7	Late Nineteenth to Early Twentieth Century	Historic House Site	Within Project Tract (High/Moderate Potential)	Not Eligible
40CL135	FS8	Late Nineteenth to Early Twentieth Century	Historic House Site	Within Project Tract (High/Moderate Potential)	Not Eligible
40CL136	FS10	Unknown Prehistoric; Late Nineteenth to Early Twentieth Century	Prehistoric Isolated Find; Historic House Site	Within Project Tract (High/Moderate Potential)	Not Eligible
40CL137	FS11	Mid- to Late Twentieth Century	Historic Military Housing Complex	Within Project Tract (High/Moderate Potential)	Not Eligible
40CL139	FS13	Late Nineteenth to Early Twentieth Century	Historic House Site	Within Project Tract (High/Moderate Potential)	Not Eligible
40CL140	FS14	Late Nineteenth to Early Twentieth Century	Historic House Site	Within Project Tract (High/Moderate Potential)	Not Eligible

Resource No./ Name	Field ID	Cultural Affiliation	Description	Location (Probability Model)	NRHP Recommendation
40CL141	FS15	Early Twentieth Century	Historic Artifact Scatter	Within Project Tract (High/Moderate Potential)	Not Eligible
40CL142	FS16	Unknown Prehistoric; Late Nineteenth to Early Twentieth Century	Prehistoric Lithic Scatter; Historic House Site	Within Project Tract (Low Potential)	Not Eligible
40CL143	FS17	Unknown Prehistoric; Late Nineteenth to Early Twentieth Century	Prehistoric Lithic Scatter; Historic House Site	Within Project Tract (High/Moderate Potential)	Unknown; Additional Phase II Testing Needed
40CL144	FS18	Unknown Prehistoric; Late Nineteenth to Early Twentieth Century	Prehistoric Isolated Find; Historic House Site	Within Project Tract (Low Potential)	Not Eligible
40CL145/Shiloh Methodist Church and Cemetery	SMCem	Mid-Nineteenth Century to Present (European American)	Historic Cemetery	Partially within Project Tract (Low Potential)	Unknown; Additional Phase II Research and Documentation Needed; Protected by Tennessee burial laws
40GB134/West	40GB134	Late Nineteenth to Early Twentieth Century	Historic Hamlet	Partially within Project Tract (High/Moderate Potential)	Unknown; Not Eligible Within Project Tract
40GB152	40GB152	Unknown	Open Habitation	Within Project Tract (High/Moderate Potential)	Not Eligible
40GB218	FS12	Late Nineteenth to Early Twentieth Century	Historic Artifact Scatter	Within Project Tract (High/Moderate Potential)	Not Eligible
Friendship Cemetery	Cem 4	Mid-Nineteenth Century to Present (European American)	Historic Cemetery	Within Project Tract	Unknown; Additional Phase II Research and Documentation Needed; Protected by Tennessee burial laws
Killen Cemetery	Cem 5	Unknown Historic	Historic Cemetery	Within Project Tract	Unknown; Additional Phase II Research and Documentation Needed; Protected by Tennessee burial laws
Moore Cemetery	Cem 6	Unknown Historic	Historic Cemetery	Within Project Tract	Unknown; Additional Phase II Research and Documentation Needed; Protected by Tennessee burial laws
Blankenship Cemetery	Cem 7	Mid-Nineteenth to Early Twentieth Century (European American)	Historic Cemetery	Within Project Tract	Unknown; Additional Phase II Research and Documentation Needed; Protected by Tennessee burial laws
Elam Family Cemetery	Cem 8	Mid- to Late Nineteenth Century (European American)	Historic Cemetery	Within Project Tract	Unknown; Additional Phase II Research and Documentation Needed; Protected by Tennessee burial laws
Elam Cemetery	Cem 9	Unknown Historic (African American)	Historic Cemetery	Within Project Tract	Unknown; Additional Phase II Research and Documentation Needed; Protected by Tennessee burial laws

Resource No./ Name	Field ID	Cultural Affiliation	Description	Location (Probability Model)	NRHP Recommendation
Williams Cemetery	Cem 10	Unknown Historic	Historic Cemetery	Within Project Tract	Unknown; Additional Phase II Research and Documentation Needed; Protected by Tennessee burial laws
Lavinia/Strayhorn Cemetery	Cem 11	Late Nineteenth to Early Twentieth Century (African American)	Historic Cemetery	Within Project Tract	Unknown; Additional Phase II Research and Documentation Needed; Protected by Tennessee burial laws
Barksdale Cemetery	Cem 12	Unknown Historic	Historic Cemetery	Within Project Tract	Unknown; Additional Phase II Research and Documentation Needed; Protected by Tennessee burial laws
Cooke Cemetery	Cem 13	Unknown Historic	Historic Cemetery	Within Project Tract	Unknown; Additional Phase II Research and Documentation Needed; Protected by Tennessee burial laws
Burrow Cemetery	Cem 14	Unknown Historic (African American)	Historic Cemetery	Within Project Tract	Unknown; Additional Phase II Research and Documentation Needed; Protected by Tennessee burial laws
Achison Cemetery	Cem 15	Late Nineteenth to Early Twentieth Century (African American)	Historic Cemetery	Within Project Tract	Unknown; Additional Phase II Research and Documentation Needed; Protected by Tennessee burial laws
Sires Cemetery	Cem 16	Unknown Historic	Historic Cemetery	Within Project Tract	Unknown; Additional Phase II Research and Documentation Needed; Protected by Tennessee burial laws
Haynes Cemetery	Cem 17	Mid-Nineteenth Century (European American)	Historic Cemetery	Within Project Tract	Unknown; Additional Phase II Research and Documentation Needed; Protected by Tennessee burial laws
Hope Hill Cemetery	Cem 19	Mid-Nineteenth Century to Present (European American)	Historic Cemetery	Within Project Tract	Unknown; Additional Phase II Research and Documentation Needed; Protected by Tennessee burial laws
Hope Hill Cemetery 2	HHCem2	Late Nineteenth Century to Present (African American)	Historic Cemetery	Partially Within Project Tract	Unknown; Additional Phase II Research and Documentation Needed; Protected by Tennessee burial laws
Isolate 1	ISO1	Unknown Prehistoric	1 Artifact	Within Project Tract (High/Moderate Potential)	Not Eligible
Isolate 2	ISO2	Late Nineteenth to Early Twentieth Century	1 Artifact	Within Project Tract (High/Moderate Potential)	Not Eligible
Isolate 3	ISO3	Twentieth Century	1 Artifact	Within Project Tract (High/Moderate Potential)	Not Eligible

Resource No./ Name	Field ID	Cultural Affiliation	Description	Location (Probability Model)	NRHP Recommendation
Isolate 4	ISO4	Unknown Prehistoric	1 Artifact	Within Project Tract (High/Moderate Potential)	Not Eligible
Isolate 5	ISO5	Nineteenth to Twentieth Century	1 Artifact	Within Project Tract (High/Moderate Potential)	Not Eligible
Isolate 6	ISO6	Unknown Prehistoric	1 Artifact	Within Project Tract (High/Moderate Potential)	Not Eligible
Isolate 7	ISO7	Nineteenth to Twentieth Century	2 Artifacts	Within Project Tract (High/Moderate Potential)	Not Eligible
Isolate 8	ISO8	Nineteenth to Twentieth Century	1 Artifact	Within Project Tract (Low Potential)	Not Eligible
Isolate 9	ISO9	Unknown Historic	1 Artifact	Within Project Tract (Low Potential)	Not Eligible
Isolate 10	ISO10	Nineteenth to Twentieth Century	1 Artifact	Within Project Tract (Low Potential)	Not Eligible
Isolate 11	ISO11	Unknown Prehistoric	1 Artifact	Within Project Tract (Low Potential)	Not Eligible
Isolate 12	FS4	Nineteenth to Twentieth Century	4 Artifacts + 80g brick	Within Project Tract (High/Moderate Potential)	Not Eligible
Isolate 13	FS9	Late Nineteenth to Early Twentieth Century	2 Artifacts + 5g brick	Within Project Tract (High/Moderate Potential)	Not Eligible

Environmental Condition of Property Report

Milan Army Ammunition Plant
Milan, Tennessee
(March 2020)

FINAL

Environmental Condition of Property Report, Milan Army Ammunition Plant Milan, Tennessee

Prepared for

Milan Army Ammunition Plant
2280 Highway 104 West
Milan, Tennessee 38358

March 2020

SUBJECT: Environmental Condition of Property Report for Milan Army Ammunition Plant, Milan, Tennessee

To the best of my knowledge and belief, based upon this Environmental Condition of Property report and facts presented to me, the conditions of the property described within this document are true at this time, and this report is in general accordance with the U.S. Department of Defense requirements for completion of an Environmental Condition of Property report.

_____ _____

Andrew B Evens PG Date

Army Corps of Engineers

Contents

Section Page

Contents v

Acronyms and Abbreviations ix

Summary xii

1 Introduction 1-1
1.1 Purpose 1-1
1.2 Scope of Services 1-1
1.3 Report Content 1-2
1.4 Environmental Condition of Property Evaluation 1-2
1.5 Assumptions and Limitations 1-3

2 Property Description 2-4
2.1 Development of Study Sections 2-4
2.2 Visual Site Inspection Methodology 2-4
2.3 Location Description 2-5
2.4 Property and Vicinity General Characteristics 2-6
2.5 Property Description Details 2-6
2.5.1 Section 1 - Northern Property Boundary to State Route 104 (Figure 2-2) 2-7
2.5.2 Section 2 - State Route 104 to Route 54 (Figure 2-3) 2-7
2.5.3 Section 3 - Route 54 to Route 24 (Figure 2-4) 2-7
2.5.4 Section 4 - Route 24 to Route 2 (Figure 2-5) 2-8
2.5.5 Section 5 - Route 2 to Southern Property Boundary (Figure 2-6) 2-8

3 Environmental Records Review 3-1
3.1 Standard Environmental Record Sources 3-1
3.1.1 Summary of Databases Reviewed 3-1
3.1.2 State and Tribal Databases 3-8
3.2 Additional Environmental Record Sources 3-12
3.2.1 Local Lists of Registered Storage Tanks 3-12
3.2.2 Records of Emergency Release Reports 3-13
3.3 Other Ascertainable Records 3-13
3.3.1 RCRA Non-Generators/No Longer Regulated (NonGen/NLR) List 3-13
3.3.2 Department of Defense 3-15
3.3.3 EPA 2020 Corrective Action Program List 3-15
3.3.4 Toxic Chemical Release Inventory System (TRIS) 3-16
3.3.5 Record of Decision (ROD) 3-16
3.3.6 Potentially Responsible Parties (PRP) 3-17
3.3.7 PCB Activity Database System (PADS) 3-17
3.3.8 Integrated Compliance Information System (ICIS) 3-18
3.3.9 Material Licensing Tracking System (MLTS) 3-19
3.3.10 Aerometric Information Retrieval System (AIRS) Facility Subsystem 3-19
3.3.11 Facility Index System (FINDS)/Facility Registry System 3-20
3.3.12 Unexploded Ordnance (UXO) Sites 3-21
3.3.13 Hazardous Waste Compliance Docket Listing (Docket HWC) 3-22
3.3.14 Enforcement and Compliance History (ECHO) 3-23

3.3.15 Tennessee AIRS 3-24
3.3.16 Tennessee National Pollutant Discharge Elimination System (NPDES) 3-25
3.3.17 Manifests 3-26
3.4 EDR High-Risk Historical Records 3-26
3.4.1 Historical Auto Stations 3-26
3.4.2 Historical Cleaners 3-27
3.5 Recovered Government Archives 3-27
3.5.1 Tennessee Recovered Government Archive Solid Waste Facilities List 3-27
3.6 Topographic Maps 3-28
3.7 Aerial Photographs 3-28
3.8 Previous Investigations and Reports 3-28
3.9 Interviews 3-29
3.10 Current Uses of the Adjoining Properties 3-29

4 Property Operations and Environmental Setting 4-1
4.1 Current and Historical Land Use 4-1
4.1.1 Current Use 4-1
4.1.2 Historical Use 4-1
4.2 Installation Utilities 4-3
4.2.1 Potable Water Supply, Source, and Distribution System 4-3
4.2.2 Industrial and Sanitary Sewers and Treatment Plants 4-5
4.2.3 Groundwater Treatment Plants and Groundwater Extraction Systems 4-6
4.2.4 Stormwater System 4-7
4.2.5 Septic Systems 4-7
4.2.6 Electrical System 4-8
4.2.7 Other Wells 4-8
4.3 Environmental Setting—Natural and Physical Environment 4-9
4.3.1 Climate 4-9
4.3.2 Topography 4-9
4.3.3 Surface Water Hydrology 4-9
4.3.4 Geology and Soils 4-9
4.3.5 Hydrogeology 4-10
4.3.6 Wetlands 4-11
4.3.7 Flood Zones 4-11
4.3.8 Demography and Land Use 4-11
4.4 Biological and Cultural Resources Summary 4-13
4.4.1 Biological Resources 4-13
4.4.2 Cultural and Archeological Resources 4-14
4.4.3 Natural Resources 4-15

5 Environmental Condition Overview 5-1
5.1 Introduction 5-1
5.2 Environmental Permits/Licenses 5-2
5.2.1 CERCLA Status 5-2
5.2.2 RCRA Status 5-2
5.2.3 Engineering and Land Use Controls 5-3
5.2.4 Solid Waste Permits 5-7
5.2.5 Underground Storage Tank/Aboveground Storage Tank Permits 5-8
5.2.6 NPDES Permits 5-9
5.2.7 Drinking Water Permits 5-9
5.2.8 Air Permits 5-9

5.2.9 NRC Licenses 5-10
5.2.10 Other Permits/Licenses 5-10
5.3 Environmental Regulatory Cleanup 5-10
5.3.1 Installation Restoration Program 5-10
5.3.2 Military Munitions Response Program 5-11
5.3.3 Previous Environmental Baseline Investigations 5-11
5.4 Hazardous Substances 5-11
5.5 Petroleum Products and Polychlorinated Biphenyls 5-14
5.6 Asbestos-Containing Materials 5-14
5.7 Lead-Based Paint 5-15
5.8 Pesticides 5-15
5.9 Other Identified Concerns 5-15

6 Summary and Conclusions 6-1

7 References 6-1

Summary Tables

S-1 Draft Investigation Study Area Summary xii
S-2 Documents Used in Preparing the Environmental Condition of Property Report xvii

Figures

1-1 Property Location Map
2-1 Property Boundary Map
2-2 Property Detail Map, Northern Property Boundary to Route 104
2-3 Property Detail Map, Route 104 to Route 54
2-4 Property Detail Map, Route 54 to Route 24
2-5 Property Detail Map, Route 24 to Route 2
2-6 Property Detail Map, Route 2 to Southern Property Boundary
2-7 Property Operable Units Map
2-8 Horizontal Distribution of RDX in Site-Wide Groundwater
2-9 Horizontal Distribution of TNT in site-Wide Groundwater
2-10 Environmental Condition of Property (ECP) Soil Category Type Map
2-11 Environmental Condition of Property (ECP) Groundwater Category Type Map

Appendixes

A Detailed Line and Area
B EDR Database
C Topographic Maps
D Aerial Photographs
E MLAAP Building Inventory
F Miscellaneous Regulatory Documentation

Document Text Reference Tables

3-1 Summary of Databases Reviewed 3-1
3-2 NPL Listing within AMSD of Property 3-3
3-3 SEMS Listing within AMSD of Property 3-3
3-4 SEMS-ARCHIVE Site within AMSD of Property 3-4
3-5 RCRA Corrective Action Tracking System Facilities Site within AMSD of Property 3-5
3-6 RCRA Non-CORRACTS TSD Site within AMSD of Property 3-5

3-7 RCRA Generator Sites within AMSD of Property 3-6
3-8 Federal Institutional Control/Engineering Control Registries Sites within AMSD of Property 3-7
3-9 Emergency Response Notification System Sites within AMSD of Property 3-8
3-10 State and Tribal Equivalent NPL Hazardous Waste Sites within AMSD of Property 3-9
3-11 State and Tribal Solid Waste Sites within AMSD of Property 3-9
3-12 State and Tribal Leaking Storage Tank Sites within AMSD of Property 3-10
3-13 State and/or Tribal Registered Storage Tanks within AMSD of Property 3-10
3-14 State and/or Tribal Registered Voluntary Cleanup Program Sites within AMSD of Property 3-11
3-15 Local List of Registered USTs within AMSD of Property 3-12
3-16 SPILLS Site within AMSD of Property 3-13
3-17 RCRA NonGen/NLR Sites within AMSD of Property 3-14
3-18 Department of Defense Site within AMSD of Property 3-15
3-19 2020 Corrective Action Site within AMSD of Property 3-16
3-20 TRIS Sites within AMSD of Property 3-16
3-21 Record of Decision Site within AMSD of Property 3-17
3-22 Potentially Responsible Parties Site within AMSD of Property 3-17
3-23 PCB Activity Database System Site within AMSD of Property 3-18
3-24 Integrated Compliance Information System Sites within AMSD of Property 3-18
3-25 Material Licensing Tracking System Sites within AMSD of Property 3-19
3-26 Aerometric Information Retrieval System Facility Subsystem Sites within AMSD of Property 3-19
3-27 Facility Index System/Facility Registry System Sites within AMSD of Property 3-20
3-28 Unexploded Ordnance Sites within AMSD of Property 3-22
3-29 Hazardous Waste Compliance Docket Listing within AMSD of Property 3-22
3-30 Enforcement & Compliance History Information Sites within AMSD of Property 3-23
3-31 Tennessee AIRS Sites within AMSD of Property 3-24
3-32 Tennessee NPDES Sites within AMSD of Property 3-25
3-33 Manifest Sites within AMSD of Property 3-26
3-34 Historic Auto Stations within AMSD of Property 3-26
3-35 Historic Cleaners within AMSD of Property 3-27
3-36 Tennessee Recovered Government Archive Solid Waste Facilities within AMSD of Property 3-27
3-37 Topographic Maps Summary 3-28
3-38 Summary of Personnel Interviewed or Contacted 3-29
3-39 Summary of Surrounding Property Use 3-29
4-1 Results of Water System Sampling for Lead and Copper 4-3
4-2 Property Septic Systems 4-8
4-3 State-Listed Threatened, Endangered, or Species in Need of Management 4-13
5-1 Land Use Control Areas 5-3

Acronyms and Abbreviations

°F	degrees Fahrenheit
ABA	Ammunition Burnout Area
ACM	asbestos-containing material
ADA	Ammunition Destruction Area
AIRS	Aerometric Information Retrieval System
AMSD	approximate minimum search distance
amsl	above mean sea level
AO	American Ordnance, LLC
AST	Aboveground Storage Tank
BLS	Below Land Surface
CER	computerized environmental report
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Act System
CERFA	Community Environmental Response Facilitation Act
CESQG	Conditionally Exempt Small Quantity Generator
CORRACTS	Corrective Action Tracking System
DARCOM	Department of Army Materiel Development and Readiness Command
DOCKET HWC	Hazardous Waste Compliance Docket Listing
DoD	Department of Defense
ECC	Environmental Chemical Corporation
ECHO	Enforcement and Compliance Docket Information
ECP	environmental condition of property
EDR	Environmental Data Resources
EPA	U.S. Environmental Protection Agency
ERNS	Emergency Response Notification System
FEMA	Federal Emergency Management Agency
FINDS	Facility Index System/Facility Registry System
GWTP	groundwater treatment plant
ICIS	Integrated Compliance Information System
IRP	Installation Restoration Program
kg	kilogram
LAP	loading, assemble, and pack
LQG	Large Quantity Generator

1	LTM	Long Term Monitoring
2	LUC	land use control
3	LUST TRUST	Tennessee Petroleum UST Fund
4	MCL	Maximum Contaminant Level
5	MEC	Munitions and Explosives of Concern
6	MEV	million-electron-volt
7	mg/L	milligrams per liter
8	MLAAP	Milan Army Ammunition Plant
9	MLTS	Material Licensing Tracking System
10	mm	millimeter
11	MMRP	Military Munitions Response Program
12	N/A	not applicable
13	NonGen/NLR	Non-Generators/No Longer Regulated
14	NPDES	National Pollutant Discharge Elimination System
15	NPL	National Priorities List
16	NRC	Nuclear Regulatory Commission
17	NRCS	National Resources Conservation Service
18	NRHP	National Register of Historic Places
19	OBG	Open Burning Ground
20	OU	operable unit
21	P&GDC	Proctor and Gamble Defense Corporation
22	PADS	PCB Activity Database System
23	PCB	polychlorinated biphenyl
24	PDS	PCB Activity Database
25	PFAS	perfluorooctanoic acid
26	PFOS	perfluorooctanoic sulfonate acid
27	ppm	parts per million
28	PRP	potentially responsible party
29	PWEOP	Potable Water Emergency Operations Plan
30	RCRA	Resource Conservation and Recovery Act
31	RCRIS	Resource Conservation and Recovery Act Information System
32	RDX	cyclotrimethylenetrinitramine
33	REC	recognized environmental condition
34	ROD	Record of Decision
35	SEMS	Superfund Enterprise Management System

1	SQG	Small Quantity Generator
2	SR	state route
3	SRP	State Remediation Program
4	TDEC	Tennessee Department of Environment and Conservation
5	Tetryl	2,4,6-trinitrophenylmethyl-nitramine
6	TNT	2,4,6-trinitrotoluene
7	TRIS	Toxic Release Inventory System
8	TSD	treatment, storage, and disposal
9	US AIRS	Aerometric Information Retrieval System Facility Subsystem
10	USACE	U.S. Army Corps of Engineers
11	USGS	U.S. Geological Survey
12	UST	underground storage tank
13	UXO	unexploded ordnance
14	WWTP	wastewater treatment plant

Summary

US Army Corps of Engineers prepared this environmental condition of property (ECP) report[1] for use by the U.S. Army Corps of Engineers (USACE) and the Milan Army Ammunition Plant (MLAAP) for the 22,351-acre MLAAP facility, hereafter referred to as "the Property." The Property is located in Gibson and Carroll Counties, Tennessee. American Ordnance, LLC (AO) is the MLAAP operating contractor. MLAAP opened in 1942 for wartime munitions production, which continued until 2012 when it was moved to the Iowa Army Ammunition Plant (AAP). Select production areas at the Property were laid away for future surge capacity until August 2019, when it was determined by the Commanding General of the Joint Munitions Command that the Property was no longer needed for any mission. The Property has no current military mission. Current uses of the property consists of preparing the Property for transfer and/or disposal to other entities and maintaining the status quo of leases by private industry for purposes such as manufacturing and storage.. The location of the Property is shown on Figure 1-1.

An environmental baseline survey was conducted in general conformance with ASTM International's ASTM D6008-96(2014), *Standard for Conducting Environmental Baseline Surveys*. This ECP investigation was performed to collect reasonably ascertainable information regarding the environmental condition of the Property in order to evaluate the Property's suitability for use. This ECP provides a military environmental-condition-of-property area type in accordance with Army Regulation 200-1, Section 15-6(b). Additionally, this ECP report classifies the Property area types as defined in ASTM D5746-98(2016), *Standard Classification of Environmental Condition of Property Area Types for Defense Base Closure and Realignment Facilities*.

The ECP investigation revealed recognized environmental conditions (RECs), *de minimis* conditions, and other potential environmental concerns associated with several of the 51 separate subdivided areas assessed during this ECP investigation. Information obtained during the ECP investigation was then used to subdivide the Property into seven types, as discussed in ASTM D5746-98 (2016) and presented in Section 1.4 of this ECP Report. A summary of findings is provided in each of the 51 separate subdivided area sections in Appendix A. Investigation findings and subsequent ECP Category Types are summarized in Table S-1; a spreadsheet detailing the reports and documents are provided as Table S-2.

[1] The ECP is required to conform to ASTM D 6008-96 (2014), *Standard Practice for Conducting Environmental Baseline Surveys*. Terminology used throughout this report is intended to comply with ASTM D 6008-96 (2014) usage, except where specifically noted.

Appendix C

Affected Environment Resource Tables

FORMAT PAGE

Table C1. Soil Types at Volunteer Training Site – Milan

Soil Name	Acres
Calloway silt loam[a]	273.6
Calloway silt loam, 1 to 3 percent slopes, eroded[a]	112.9
Center silt loam, 0 to 3 percent slopes[a]	28.1
Collins silt loam, 0 to 2 percent slopes, occasionally flooded, brief duration[a]	1803.7
Falaya silt loam, frequently flooded	916.4
Falaya silt loam, occasionally flooded[a]	574.1
Grenada silt loam, 2 to 5 percent slopes[a]	510.9
Grenada silt loam, 2 to 5 percent slopes, moderately eroded[a]	123.1
Grenada silt loam, 2 to 5 percent slopes, severely eroded	40.7
Grenada silt loam, 5 to 8 percent slopes, severely eroded	847.6
Lexington silt loam, 2 to 5 percent slopes[a]	2069.3
Lexington silt loam, 2 to 5 percent slopes, moderately eroded[a]	2484.2
Lexington silt loam, 5 to 8 percent slopes, moderately eroded	878.6
Lexington silt loam, 5 to 8 percent slopes, severely eroded	573.3
Lexington silt loam, 8 to 12 percent slopes, eroded	298.0
Lexington silt loam, 8 to 12 percent slopes, severely eroded	74.8
Lexington, Smithdale and Providence soils, 12 to 30 percent slopes, severely eroded	2020.7
Loring-Urban land complex, 2 to 8 percent slopes[a]	31.9
Loring silt loam, 2 to 5 percent slopes[a]	383.9
Loring silt loam, 2 to 5 percent slopes, moderately eroded	405.8
Loring silt loam, 2 to 5 percent slopes, severely eroded	97.8
Loring silt loam, 5 to 8 percent slopes, severely eroded	257.0
Loring silt loam, 8 to 12 percent slopes, severely eroded	309.7
Providence silt loam, 2 to 5 percent slopes, eroded[a]	509.7
Providence silt loam, 2 to 5 percent slopes, severely eroded	351.7
Providence silt loam, 5 to 8 percent slopes, severely eroded	453.5
Providence silt loam, 8 to 15 percent slopes, severely eroded	126.6
Rosebloom, Waverly silt loams and frequently flooded soils	9.9
Routon silt loam, 0 to 2 percent slopes[a]	154.1
Routon silt loam, rarely ponded, 0 to 2 percent slopes	168.0
Smithdale fine sandy loam, 12 to 20 percent slopes, severely eroded	401.9
Smithdale fine sandy loam, 12 to 25 percent slopes	496.9
Smithdale fine sandy loam, 8 to 12 percent slopes, eroded	558.1
Udorthents-Smithdale complex, gullied	91.2
Udorthents, loamy, steep	12.1
Waverly silt loam, 0 to 2 percent slopes, frequently flooded, long	4.9
Waverly silt loam, 0 to 2 percent slopes, occasionally flooded, long	102.7

[a] Prime Farmland Soil

Table C2. Forestry Best Management Practices for Volunteer Training Site – Milan

Forestry Practice	Activity / Resource	Best Management Practice
Forest Roads	Locating Roads	Use soil surveys and topographic maps to develop plan.
		Use existing roads to minimize length of road construction.
		Locate roads as far from water bodies as possible.
		Avoid locating roads at confluence of streams.
		Avoid building roads in streamside management zones and sensitive areas.
		Avoid or minimize stream crossings. When that is not possible, crossings should be constructed at right angles.
		Locate roads on upper slopes near ridge crests to promote drainage, but avoid tops of ridges.
		Fit roads to topography by following natural contours and keep grade between 2 and 12 percent. Avoid road sections with 0 percent grade.
Forest Roads	Constructing Roads	Complete construction several weeks in advance of use by logging traffic to allow road bed time to settle.
		Avoid construction during wet weather.
		Construct grades on 2 to 12 percent slopes where possible. Steeper slopes should be used for only short distances where adequate drainage structures are provided.
		Runoff from roads should not directly discharge into streams.
		Minimize runoff at stream crossings.
		Control drainage from roads by using appropriate design techniques: varying grades, crowning, outsloping, wing ditches, sediment control structures, broad-based dips, water bars, water turnouts, and/or cross-drain culverts.
		Push cleared trees and brush to downhill side of roads to assist in trapping sediment.
		Maximize sunlight exposure to road surface.
		Minimize road width, right-of-way, and stream crossings to minimize soil disturbance.
		Revegetate exposed soils in potential problem areas that could generate sediment.
Forest Roads	Road Retirement	Construct water bars or other drainage structures immediately after active logging has ceased.
		If logging will be delayed, construct temporary drainage and erosion control structures.
		Remove temporary bridges, culverts, and pole fords.
		Remove sediment and debris from dips, ditches, and culverts.
		Use mulch and/or see with lime and fertilizer to prevent soil erosion.
Streamside Management Zones (SMZ)	Perennial and Intermittent Streams	Streamside Management Zone planning should be done before beginning timber harvest.
		Mark SMZ boundary prior to harvest.
		SMZ width should be a minimum of 50 feet between disturbed area and top bank, with 20 additional feet for each additional 10% of slope. This applies to both sides of the stream.
		If trees are harvested in SMZ, maintain 50 percent canopy cover.
		Do not use stream channels as roadways for equipment.
		Avoid equipment operation within SMZ; harvested trees should be cabled or winched out.
SMZ	Ephemeral Streams or Wet Weather Conveyances	Avoid skidding within drains during wet conditions.
		Avoid locating roads in drains except when necessary for crossings.
		Do not empty road runoff into drains.
		Minimize soil exposure and compaction to protect ground vegetation.
SMZ	Sensitive Areas	Avoid skidding in these areas.

Forestry Practice	Activity / Resource	Best Management Practice
		Avoid locating roads in these areas.
		Do not empty road runoff into drains.
		Minimize soil exposure and compaction to protect ground vegetation.
Stream Crossings	Crossings	Avoid or minimize stream crossings. When that is not possible, crossing should be constructed at right angles to the stream.
		Locate crossings on straightest stream sections.
		Avoid locating crossings at confluences of streams.
		Design to minimize disruption of movement of aquatic life.
		Approaches should be graveled and should rise away from streams to minimize erosion.
		Install broad-based dips and wing ditch turnouts to turn water off roads before entering stream.
Stream Crossings	Fords	Use fords for haul roads only, not for skid trails.
		Locate fords where stream banks are low.
		Fords should have a solid bottom.
		Where necessary, use gravel to establish low water crossing.
Stream Crossings	Culverts	Permanent culverts should be sized to accommodate the area to be drained.
		Temporary culverts may be smaller, but must be removed after completion of logging.
		Install culverts in a manner that minimizes disturbance of stream. Stabilize fill material with riprap and/or vegetation.
		Inspect culverts periodically to ensure they are free of blockages.
		Install culverts on grade with bottom of channel to allow movement of aquatic life.
Stream Crossings	Bridges	Locate bridges across narrow points of stream and on firm soils.
		Protect banks from sloughing during construction.
		Remove temporary bridges.
		Do not cover bridges with soil.
		Use temporary bridges for skid trails to prevent equipment and logs from entering stream channels.
Log Landings	Log Landings	Locate landings outside of SMZs and away from streams and sensitive areas.
		Slope landings 2-5 percent to allow for drainage.
		Prevent debris and fuels/lubricants from being washed by runoff into streams.
		Revegetate landings after use if they pose a potential water quality problem.
		Install drainage and sediment control structures to divert runoff.
Skid Trails	Skid Trails	Minimize number of skid trails by using existing trails.
		Locate skid trails on slope 2 to 30 percent. Steeper slopes can be used for short distances if water control/drainage structures are provided.
		Runoff from skid trails should not discharge into a stream.
		Control runoff by varying trail grade, water bars, wing ditches, and/or sediment control structures.
		Prevent runoff associated with stream crossings.
		Avoid skidding across streams, drains, and sensitive areas.
		Use culverts or temporary crossing structures.
		Do not use fords to skid across streams.
		Do not operated equipment in streams
		Avoid skidding directly up or down hill, but follow contours or “zigzag” if possible.
		Use low ground pressure tires on skidders when available and concentrate skidding as much as possible on a few primary skid trails to minimize site disturbance and soil compaction.
		After completing logging, remove temporary bridges and culverts, sediment and debris from dips, ditches, and culverts, and revegetate problem areas.

Forestry Practice	Activity / Resource	Best Management Practice
		Use mulch and/or see with appropriate amounts of lime and fertilizer when needed to prevent soil erosion.
		Avoid ruts that risk channeling water into a stream.
Logging Debris	Deposition of Debris	Trees should not be felled in or across streams.
		Pull treetops far enough from waterways to prevent them from being washed in during high water.
		Do not drag trees and tops through a stream channel.
		Do not remove stumps and roots from stream banks.
Servicing and Maintaining Equipment	Oils and Fuels	Prevent oil and fuel spills. If a spill occurs, clean up all spilled materials and contaminated soils and dispose of both properly. Notify TDEC of spill incident.
Site Preparation for Tree Planting	Mechanical	Choose site preparation method that will expose and disturb as little bare soil as possible.
		Establish SMZs to minimize sediment entering streams.
		Carry out all mechanical site preparation operations and tree planting along the contour of the land.
		Slopes over 30 percent should be hand planted and should not be subjected to mechanical site preparation.
Site Preparation for Tree Planting	Chemical	Favor chemical methods to control undesirable vegetation over mechanical methods on steep slopes and erodible soils.
		Follow all EPA label instructions.
		Never apply pesticides directly to water except when registered for application over water.
		Establish SMZs to minimize chemicals entering streams.
		Avoid use of chemicals in or near sensitive areas.
		Consider weather conditions and equipment capabilities to avoid herbicide drift.
		Calibrate spray equipment to apply chemicals uniformly and in correct quantities.
		Prevent chemical leaks from equipment and check equipment.
		Mix and load chemicals outside of SMZs and sensitive areas.
		Rinse spray equipment and discharge rinse water only in areas that are part of the application site. Never rinse tanks or sprayers in or near streams.
		Dispose of chemical containers according to label instructions.
Prescribed Fire	Preparation	Locate windrows well away from drains to prevent materials from being washed into streams.
		Construct fire lines on the contour in advance of prescribed burning.
		Plow fire lines only as deep and wide as necessary to control the spread of the prescribed fire to minimize soil disturbance.
		Construct water bars and wing ditches at appropriate intervals on firelines to turn water into adjacent undisturbed areas.
Fertilization	Application and Clean Up	Determine appropriate amounts and types of fertilizer needed before application.
		Consider weather conditions and equipment capabilities to avoid drift into SMZs.
		Conduct all on-site fertilizer handling away from waterbodies, wells, ditches, and sensitive areas.
		Clean up and/pr contain all fertilizer spills immediately.
		Dispose of fertilizer containers and/or excess fertilizer according to applicable governmental regulations and label requirements.

Source: Volunteer Training Site – Milan (VTS-M) 2019

Table C3. Vegetation Communities at Volunteer Training Site – Milan

Community	Alliance	Description
Vegetated, Tree Dominated, Closed Tree Canopy, Evergreen	*Juniperus virginiana* Forest Alliance	Small, pure or nearly pure stands of eastern redcedar occur where it has colonized former openings on dry uplands.
Vegetated, Tree Dominated, Closed Tree Canopy, Evergreen	*Pinus taeda* Forest Alliance	Numerous loblolly pine plantations of various ages are found on VTS-M. They were established as pure stands, but a variety of species have invaded the understory and midstory, including red maple, sweetgum, American elm, slippery elm, eastern redcedar, black gum, black cherry, and southern red oak.
Vegetated, Tree Dominated, Closed Tree Canopy, Deciduous	*Liquidambar styraciflua – Betula nigra*/*Acer rubrum* Forest Alliance	This alliance is dominated by sweetgum and occupies moist soils along the creeks. River birch is a common sub-dominant species, and red maple is found in the understory and midstory. Boxelder, sycamore, ash, black gum, American elm, slippery elm, American holly, dogwood, and hackberry are common constituents. Much of this alliance on VTS-M has an herbaceous layer dominated by the invasive *Microstegium vimineum*, or Nepalese browntop.
Vegetated, Tree Dominated, Closed Tree Canopy, Deciduous	*Liquidambar styraciflua* Forest Alliance	This alliance is also dominated by sweetgum, but it occupies somewhat drier sites than the previous alliance. Birch and red maple are less common, but oaks may be present, and other species include boxelder, sycamore, ash, blackgum, American elm, slippery elm, American holly, dogwood, and hackberry. Nepalese browntop and Japanese honeysuckle are both common in the understory.
Vegetated, Tree Dominated, Closed Tree Canopy, Deciduous	*Quercus alba – Quercus falcata – Carya* spp. Forest Alliance	This is a diverse alliance occurring on dry upland sites, such as in Training Area C. White oak is the dominant species, but a variety of other oaks – southern red oak, black oak, post oak, and blackjack oak – are present. Other common canopy trees include shagbark, mockernut, pignut, and bitternut hickories, yellow-poplar, and red maple. The mid-story typically consists of dogwood, hackberry, sassafras, American holly, and the elms. Poison ivy and Japanese honeysuckle are common in the understory.
Vegetated, Tree Dominated, Closed Tree Canopy, Deciduous	*Quercus falcata – Quercus velutina – Liquidambar styraciflua* Forest Alliance	This extensive alliance is dominated by southern red and black oaks with a strong component of sweetgum and a variety of other upland hardwood species. It occupies the level to gently sloped “ridges” of the training site. White oak and post oak may also be present, depending on the dryness of the site.
Vegetated, Tree Dominated, Closed Tree Canopy, Deciduous	*Robinia pseudo-acacia* Forest Alliance	One stand in the southern portion of the VTS-M is nearly pure black locust. This is typical for this shade intolerant species colonizing an open area.
Vegetated, Tree Dominated, Closed Tree Canopy, Mixed Evergreen-Deciduous Pinus	*Pinus taeda – Quercus* (*alba, falcata, stellata*) Forest Alliance	This alliance is typically at least 50% loblolly pine with a variable mixture of oaks, eastern redcedar, and sweetgum. Southern red oak was almost always present. This community was generally found on the drier upland sites.
Vegetated, Herb Dominated, Herbaceous Vegetation, Perennial Graminoid Vegetation	*Andropogon gerardii – Schizachyrium scoparium – Lespedeza cuneata* Herbaceous Alliance	This alliance is found on portions of the training site where efforts have been made to reintroduce native grasses. Big and little bluestem have been very successful and share dominance with the previously established, invasive *Sericea lespedeza*. *Kobe lespedeza* and partridge pea are also common constituents.
Vegetated, Herb Dominated, Herbaceous Vegetation, Perennial Graminoid Vegetation	*Bouteloua dactyloides* Herbaceous Alliance	Buffalo grass was seeded into the M-203 firing range in Training Area B in an attempt to displace the non-native fescue with a low-growing, native warm season grass. Establishment of the buffalo grass has been somewhat successful, and it shares space with yellow foxtail, green foxtail, *Kobe lespedeza*, and partridge pea.
Vegetated, Herb Dominated, Herbaceous Vegetation, Perennial Graminoid Vegetation	*Cynodon dactylon* Herbaceous Alliance	Bermudagrass dominates the heavily-maintained parts of the cantonment area where it was planted in most “lawn” settings for ease of care and suitability to the west Tennessee heat.
Vegetated, Herb Dominated, Herbaceous Vegetation,	*Digitaria sanguinalis – Cynodon dactylon* Herbaceous Alliance	In places where the crabgrass has become well-established, it co-occurs with bermudagrass. This is common around the cantonment and those portions of Training Area A that are maintained with

Perennial Graminoid Vegetation		regular low mowing. A variety of "lawn" weeds such as Johnson grass, spotted spurge, green foxtail, and dandelion occur in this alliance.
Vegetated, Herb Dominated, Herbaceous Vegetation, Perennial Graminoid Vegetation	*Sorghum halepense – Cynodon dactylon* Herbaceous Alliance	This alliance occurs in Training Area B. In addition to Johnson grass and bermudagrass, a variety of species were present, including foxtail, partridge pea, Maryland meadow beauty, *Kobe lespedeza*, and white clover.
Vegetated, Herb Dominated, Herbaceous Vegetation, Perennial Forb Vegetation	*Ambrosia artemisiifolia – Digitaria sanguinalis* Herbaceous Alliance	This short-term community of annual ragweed and crabgrass was found in a small area that had been recently graded.
Vegetated, Herb Dominated, Herbaceous Vegetation, Perennial Forb Vegetation	*Kummerowia striata* var. *Kobe – Lespedeza cuneata* Herbaceous Alliance	*Kobe lespedeza* dominates this alliance with *Sericea lespedeza* as a lesser constituent. This alliance is found in a small area of Training Area B where it is maintained by periodic bush-hogging.
Vegetated, Herb Dominated, Herbaceous Vegetation, Perennial Forb Vegetation	*Lespedeza cuneata – Sorghum halepense* Herbaceous Alliance	The exotic sericea lespedeza and Johnson grass are very common in openings throughout VTS-M. The invasive-dominated alliance also includes partridge pea, green and yellow foxtail, *Kobe lespedeza*, white clover, fescue, self-heal, and dandelion. These areas are maintained by periodic bush-hogging.
Vegetated, Herb Dominated, Herbaceous Vegetation, Perennial Forb Vegetation	*Lespedeza cuneata* Herbaceous Alliance	*Sericea lespedeza* is found throughout the VTS-M. It occurs as the dominant alliance in several openings in both Training Areas A and B. Partridge pea is a common constituent. These openings are maintained by periodic bush-hogging.

Source: VTS-M 2019

Table C4. Invasive Plant Species Observed at Volunteer Training Site – Milan

Scientific Name	Common Name	TNEPPC Rank	Abundance at VTS-M
Ailanthus altissima	Tree-of-heaven	Severe threat	Present at isolated locations
Albizia julibrissin	Mimosa	Severe threat	Present at isolated locations
Alternanthera sessilis	Sessile joyweed	Severe threat	Sparse and less than 5% of plots
Bromus tectorum	Cheatgrass	Severe threat	Sparse and less than 5% of plots
Celastrus orbiculatus	Oriental bittersweet	Severe threat	Sparse at on isolated location
Cirsium arvense	Canada thistle	Significant threat	Present along edges & openings
Cirsium vulgare	Bull thistle	Significant threat	Scattered throughout in 25% plots
Dioscorea oppositifolia	Air potato	Severe threat	Sparse at isolated location
Elaeagnus umbellate	Autumn olive	Severe threat	Sparse to present
Euonymus fortunei	Wintercreeper	Severe threat	Present to dominant in several locations
Fallopia japonica	Japanese knotweed	Severe threat	One isolated location
Hypericum perforatum	Goatweed	Severe threat	Low concentrations in dispersed locations
Kummerowia stipulaceae	Korean clover	Severe threat	High concentrations in few locations
Lespedeza bicolor	Bicolor lespedeza	Severe threat	Scattered throughout, in 25% of plots
Lespedeza cuneata	Sericea	Severe threat	Present pervasively throughout
Ligustrum sinense or L. vulgare	Privet	Severe threat	Present to dominant throughout
Lonicera japonica	Japanese honeysuckle	Severe threat	Present pervasively throughout
Lonicera mackii, L. morrowii, L. x bella, or L. tatarica	Bush honeysuckle	Severe threat	Sparse in several locations
Microstegium vimineum	Nepalese browntop	Severe threat	Dominant throughout
Paulownia tomentosa	Princess tree	Severe threat	Present at isolated locations
Pueraria montana	Kudzu	Severe threat	Dominant at isolated locations
Rosa multiflora	Multiflora rose	Severe threat	Present throughout
Sorghum halepense	Johnson grass	Severe threat	Present throughout
Verbascum thapsus	Wooly mullein	Significant threat	Sparse at one isolated location
Vinca major	Large periwinkle	Significant threat	Sparse and less than 5% of plots
Vinca minor	Common periwinkle	Significant threat	Sparse at one isolated location

TNEPPC – Tennessee Exotic Pest Plant Council; **VTS-M** – Volunteer Training Site - Milan

Table C5. Mammal Species Observed at MLAAP (1999 through 2013)

Scientific Name	Common Name
American beaver	*Castor canadensis*
American mink	*Neovison vison*
Big brown bat	*Eptesicus fuscus*
Bobcat	*Lynx rufus*
Brown rat	*Rattus norvegicus*
Cotton deermouse	*Peromyscus gossypinus*
Coyote	*Canis latrans*
Eastern chipmunk	*Tamias striatus*
Eastern cottontail	*Sylvilagus floridanus*
Eastern fox squirrel	*Sciurus niger*
Eastern gray squirrel	*Sciurus carolinensis*
Eastern harvest mouse	*Reithrodontomys humulis*
Eastern mole	*Scalopus aquaticus*
Eastern red bat	*Lasiurus borealis*
Eastern woodrat	*Neotoma floridana*
Evening bat	*Nycticeius humeralis*
Golden mouse	*Ochrotomys nuttalli*
Gray bat*	*Myotis grisescens*
Gray fox	*Urocyon cinereoargenteus*
Hispid cotton rat	*Sigmodon hispidus*
Hoary bat	*Lasiurus cinereus*
House mouse	*Mus musculus*
Marsh oryzomys	*Oryzomys palustris*
Meadow jumping mouse	*Zapus hudsonius*
Nine-banded armadillo	*Dasypus novemcinctus*
North American deermouse	*Peromyscus maniculatus*
North American least shrew	*Cryptotis parva*
North American river otter	*Lontra canadensis*
Prairie vole	*Microtus ochrogaster*
Raccoon	*Procyon lotor*
Red fox	*Vulpes vulpes*
Seminole bat	*Lasiurus seminolus*
Southeastern myotis	*Myotis austroriparius*
Southeastern shrew	*Sorex longirostris*
Southern flying squirrel	*Glaucomys volans*
Southern short-tailed shrew	*Blarina carolinensis*
Striped skunk	*Mephitis mephitis*
Swamp rabbit	*Sylvilagus aquaticus*
Tricolored bat	*Perimyotis subflavus*
Virginia opossum	*Didelphis virginiana*
White-footed deermouse	*Peromyscus leucopus*
White-tailed deer	*Odocoileus virginianus*
Woodchuck	*Marmota monax*
Woodland vole	*Microtus pinetorum*

Source: MLAAP 2019

* This species is not considered to occur on MLAAP. Because of extensive effort and no additional capture, the single specimen (captured, identified, and released) is considered to represent an extremely rare incidental occurrence of this species in this area of Tennessee.

Table C6. Amphibians and Reptiles Collected at MLAAP (2004 through 2009)

Scientific Name	Common Name
Amphibians	
American bullfrog	*Lithobates catesbeiana*
Barking treefrog	*Hyla gratiosa*
Bird-voiced treefrog	*Hyla avivoca*
Gray treefrog complex	*Hyla chrysocelis/versicolor*
Green frog	*Lithobates clamitans*
Green treefrog	*Hyla cinerea*
Northern cricket frog	*Acris crepitans*
Southern leopard frog	*Lithobates spenocephata*
Spring peeper	*Pseudacris crucifer*
Upland chorus frog	Upland chorus frog
Pseudacris feriarum	*Pseudacris feriarum*
Eastern spadefoot	Eastern spadefoot
Eastern narrow-mouthed toad	*Gastrophryne carolinensis*
Fowler's toad	*Anaxyrus fowleri*
Eastern newt	*Notophthalmus viridescens*
Eastern tiger salamander	*Ambystoma tigrinum*
Lesser siren	*Siren intermedia*
Long-tailed salamander	*Eurycea longicauda*
Marbled salamander	*Ambystoma opacum*
Mississippi slimy salamander	*Plethodon mississippi*
Mole salamander	*Ambystoma talpoideum*
Small-mouthed salamander	*Ambystoma texanum*
Spotted salamander	*Ambystoma maculatum*
Reptiles	
Broad-headed skink	*Plestiodon laticeps*
Common five-lined skink	*Plestiodon fasciatus*
Eastern fence lizard	*Sceloporus undulatus*
Little brownskink	*Scincella lateralis*
Six-lined racerunner	*Cnemidophorus sexlineatus*
Common gartersnake	*Thamnophis sirtalis*
Copperhead	*Agkistrodon contortrix*
Corn snake	*Pantherophis guttata*
Cottonmouth	*Agkistrodon piscivorus*
DeKay's brown snake	*Storeria dekayi*
Eastern wormsnake	*Carphophis amoenus*
Gray ratsnake	*Pantherophis spiloides*
North American racer	*Coluber constrictor*
Northern redbellied snake	*Storeria occipitomaculata*
Northern watersnake	*Nerodia sipedon*
Plain-bellied watersnake	*Nerodia erythrogaster*
Ring-necked snake	*Diadophis punctatus*
Western smooth earthsnake	*Virginia valeriae elegans*
Yellow-bellied kingsnake	*Lampropeltis calligaster*
Eastern box turtle	*Terrapene carolina*
Eastern mud turtle	*Kinosternon subrubrum*
Eastern musk turtle	*Sternotherus odoratus*
Painted turtle	*Chrysemys picta*
Pond slider	*Trachemys scripta*
Snapping turtle	*Chelydra serpentina*

Source: MLAAP 2019

Table C7. Bird Species Observed at MLAAP (1999 through 2016)

Common Name	Scientific Name	Observation Period
Acadian Flycatcher	*Empidonax virescens*	1999-2012, 2016
American Crow	*Corvus brachyrhynchos*	1999-2012, 2016
American Goldfinch	*Spinus tristis*	1999-2012, 2016
American Kestrel	*Falco sparverius*	1999-2012
American Redstart	*Setophaga ruticilla*	1999-2012
American Robin	*Turdus migratorius*	1999-2012, 2016
American Tree Sparrow	*Spizella arborea*	1999-2012
American Woodcock	*Scolopax minor*	1999-2012
Baltimore Oriole	*Icterus galbula*	1999-2012
Bank Swallow	*Riparia riparia*	1999-2012
Barn Owl	*Tyto alba*	1999-2012
Barn Swallow	*Hirundo rustica*	1999-2012
Barred Owl	*Strix varia*	1999-2012, 2016
Belted Kingfisher	*Megaceryle alcyon*	1999-2012
Black Vulture	*Coragyps atratus*	1999-2012
Black-and-white Warbler	*Mniotilta varia*	1999-2012
Black-billed Cuckoo	*Coccyzus erythropthalmus*	1999-2012
Blue Grosbeak	*Passerina caerulea*	1999-2012
Blue Jay	*Cyanocitta cristata*	1999-2012, 2016
Blue-gray Gnatcatcher	*Polioptila caerulea*	1999-2012, 2016
Brewer's Blackbird	*Euphagus cyanocephalus*	1994-1995
Broad-winged Hawk	*Buteo platypterus*	1999-2012
Brown Thrasher	*Toxostoma rufum*	1999-2012, 2016
Brown-headed Cowbird	*Molothrus ater*	1999-2012, 2016
Carolina Chickadee	*Poecile carolinensis*	1999-2012, 2016
Carolina Wren	*Thryothrorus ludovicianus*	1999-2012, 2016
Cattle Egret	*Bubulcus ibis*	1999-2012
Cedar Waxwing	*Bombycilla cedrorum*	1999-2012
Cerulean Warbler	*Setophaga cerulean*	1999-2012
Swift	*Chaetura pelagica*	1999-2012
Chipping Sparrow	*Spizella passerina*	1999-2012, 2016
Chuck-will's-widow	*Antrostomus carolinensis*	1999-2012
Cliff Swallow	*Petrochelidon pyrrhonota*	1999-2012
Common Grackle	*Quiscalus quiscula*	1999-2012, 2016
Common Nighthawk	*Chordeiles minor*	1999-2012
Common Yellowthroat	*Geothlypis trichas*	1999-2012, 2016
Cooper's Hawk	*Accipiter cooperii*	1999-2012
Dark-eyed Junco	*Junco hyemalis*	1994-1995
Dickcissel	*Spiza americana*	1999-2012, 2016
Downy Woodpecker	*Picoides pubescens*	1999-2012, 2016
Eastern Bluebird	*Sialia sialis*	1999-2012, 2016
Eastern Kingbird	*Tryrannus tyrannus*	1999-2012, 2016
Eastern Meadowlark	*Sturnella magna*	1999-2012, 2016
Eastern Phoebe	*Sayornis phoebe*	1999-2012, 2016
Eastern Screech-owl	*Megascops asio*	1999-2012
Eastern Towhee	*Pipilo erythrophthalmus*	1999-2012, 2016
Eastern Whip-poor-will	*Antrostomus vociferus*	1999-2012
Eastern Wood-pewee	*Contopus virens*	1999-2012, 2016
European Starling	*Sturnus vulgaris*	1999-2012, 2016
Field Sparrow	*Spizella pusilla*	1999-2012, 2016
Fish Crow	*Corvus ossifragus*	1999-2012
Golden-crowned Kinglet	*Regulugs satrapa*	1994-1995
Grasshopper Sparrow	*Ammodramus savannarum*	1999-2012
Gray Catbird	*Dumetella carolinensis*	1999-2012, 2016
Great Blue Heron	*Ardea herodias*	1999-2012, 2016
Great Crested Flycatcher	*Myiarchus crinitus*	1999-2012, 2016

Great Egret	*Ardea alba*	1999-2012
Green Heron	*Butorides virescens*	1999-2012
Hairy Woodpecker	*Picoides villosus*	1999-2012, 2016
Hermit Thrush	*Catharus guttatus*	1999-2012
Horned Lark	*Eremophila alpestris*	1999-2012
House Sparrow	*Passer domesticus*	1999-2012
Indigo Bunting	*Passerina cyanea*	1999-2012, 2016
Kentucky Warbler	*Geothlypis formosa*	1999-2012, 2016
Killdeer	*Charadrius vociferous*	1999-2012, 2016
Loggerhead Shrike	*Lanius ludovicianus*	1999-2012
Louisiana Waterthrush	*Parkesia motacilla*	2016
Magnolia Warbler	*Setophaga magnolia*	1994-1995
Mallard	*Anas platyrhynchos*	1999-2012
Mississippi Kite	*Ictinia mississippiensis*	1999-2012
Mourning Dove	*Zenaida macroura*	1999-2012, 2016
Northern Bobwhite	*Colinus virginianus*	1999-2012, 2016
Northern Cardinal	*Cardinalis cardinalis*	1999-2012, 2016
Northern Flicker	*Colaptes auratus*	1999-2012
Northern Harrier	*Circus cyaneus*	1994-1995
Northern Mockingbird	*Mimus polyglottos*	1999-2012, 2016
Northern Parula Warbler	*Setophaga americana*	1999-2012, 2016
Northern Rough-winged Swallow	*Stelgidteryx serripennis*	1999-2012
Orchard Oriole	*Icterus spurius*	1999-2012, 2016
Ovenbird	*Seiurus aurocapilla*	1999-2012, 2016
Pileated Woodpecker	*Dryocopus pileatus*	1999-2012, 2016
Pine Warbler	*Setophaga pinus*	1999-2012, 2016
Prairie Warbler	*Setophaga discolor*	1999-2012, 2016
Prothonotary Warbler	*Protonotaria citrea*	1999-2012, 2016
Purple Martin	*Progne subis*	1999-2012
Red-bellied Woodpecker	*Melanerpes carolinus*	1999-2012, 2016
Red-eyed Vireo	*Vireo olicaceus*	1999-2012, 2016
Red-headed Woodpecker	*Melanerpes erythrocephalus*	1999-2012, 2016
Red-shouldered Hawk	*Buteo lineatus*	1999-2012, 2016
Red-tailed Hawk	*Buteo jamaicensis*	1999-2012
Red-winged Blackbird	*Agelaius phoeniceus*	1999-2012, 2016
Rock Pigeon	*Columba livia*	1999-2012
Ruby-throated Hummingbird	*Archilochus colubris*	1999-2012, 2016
Savannah Sparrow	*Passerculus sandwichensis*	1999-2012
Scarlet Tanager	*Piranga olivacea*	1999-2012, 2016
Sharp-shinned Hawk	*Accipiter striatus*	1994-1995
Song Sparrow	*Melospiza melodia*	1994-1995
Summer Tanager	*Piranga rubra*	1999-2012, 2016
Swainson's Warbler	*Limnothlypis swainsonii*	1999-2012, 2016
Swamp Sparrow	*Melospiza georgiana*	1994-1995
Tree Swallow	*Tachycineta bicolor*	1999-2012
Tufted Titmouse	*Baeolophus bicolor*	1999-2012, 2016
Turkey Vulture	*Cathartes aura*	1999-2012
Veery	*Catharus fuscescens*	1999-2012
White-breasted Nuthatch	*Sitta carolinensis*	1999-2012, 2016
White-eyed Vireo	*Vireo griseus*	1999-2012, 2016
White-throated Sparrow	*Zonotricha albicollis*	1994-1995
Wild Turkey	*Meleagris gallopavo*	1999-2012, 2016
Wood Duck	*Aix sponsa*	1999-2012, 2016
Wood Thrush	*Hylocichla mustelina*	1999-2012, 2016
Worm-eating Warbler	*Helmitheros vermivorum*	1999-2012
Yellow Warbler	*Setophaga petechia*	1999-2012
Yellow-bellied Sapsucker	*Sphyrapicus varius*	1994-1995
Yellow-billed Cuckoo	*Coccyzus americanus*	1999-2012, 2016

Yellow-breasted Chat	*Icteria virens*	1999-2012, 2016
Yellow-rumped Warbler	*Setophaga coronata*	1994-1995
Yellow-throated Vireo	*Vireo flavifrons*	1999-2012, 2016
Yellow-throated Warbler	*Dendroica dominica*	2016

Source: MLAAP 2019

Table C8. Fish Collected at MLAAP

Common Name	Scientific Name
Blackspotted topminnow	*Fundulus olivaceus*
Blacktail redhorse	*Moxostoma poecilurum*
Blacktail shiner	*Cyprinella venusta*
Bluegill	*Lepomis macrochirus*
Bluntface shiner	*Cyprinella camura*
Bluntnose minnow	*Pimephales notatus*
Bowfin	*Amia calva*
Brighteye darter	*Etheostoma lynceum*
Brindled madtom	*Noturus miurus*
Brown madtom	*Noturus phaeus*
Bullhead minnow	*Pimephales vigilax*
Central mudminnow	*Umbra limi*
Channel catfish	*Ictalurus punctatus*
Creek chub	*Semotilus atromaculatus*
Creek chubsucker	*Erimyzon oblongus*
Dusky darter	*Percina sciera*
Emerald shiner	*Notropis atherinoides*
Flier	*Centrarchus macropterus*
Golden shiner	*Notemigonus crysoleucas*
Goldenstripe darter	*Etheostoma parvipinne*
Grass pickerel	*Esox americanus*
Green sunfish	*Lepomis cyanellus*
Gulf darter	*Etheostoma swaini*
Johnny darter	*Etheostoma nigrum*
Lake chubsucker	*Erimyzon sucetta*
Largemouth bass	*Micropterus salmoides*
Least brook lamprey	*Lampetra aepytera*
Least madtom	*Noturus hildebrandi*
Longnose gar	*Lepisosteus osseus*
Mississippi silvery minnow	*Hybognathus nuchalis*
Mosquito fish	*Gambusia affinis*
Pirate Perch	*Aphredoderus sayanus*
Redear sunfish	*Lepomis microlophus*
Redfin shiner	*Lythrurus umbratilis*
Ribbon shiner	*Lythrurus fumeus*
Slough darter	*Etheostoma gracile*
Spotted bass	*Micropterus punctulatus*
Spotted sucker	*Minytrema melanops*
Warmouth	*Lepomis gulosus*
Yellow bullhead	*Ameiurus natalis*

Source: MLAAP 2019

Table C9. Population Trends within the Region of Influence

Location	2010 Population	2019 Population	Change (2010-2019)	Percent Change (2010-2019)	People per Household (2019)	Population Density (2019 people per square mile)
ROI	176,476	174,884	-1,592	-1%	2.5	99
Carroll County	28,486	27,767	-719	-3%	2.5	46
Gibson County	49,687	49,133	-554	-1%	2.5	82
Madison County	98,303	97,984	-319	-<1%	2.5	176
United States	308,758,105	328,239,523	19,481,418	6%	2.6	93
Tennessee	6,346,276	6,829,174	482,898	8%	2.5	166

Source: U.S. Census Bureau 2021a

Table C10. Employment by Industry within the Region of Influence

Industry	Number of Employed (2019)	Percent of Total Employment
Farm employment	2,443	2%
Non-farm employment	105,426	98%
Private employment	87,600	81%
Forestry, fishing, mining, utilities	325	<1%
Construction	5,909	5%
Manufacturing	12,788	12%
Wholesale trade	2,886	3%
Retail trade	12,140	11%
Transportation and warehousing	1,656	2%
Information	759	1%
Finance and insurance	3,922	4%
Real estate and rental and leasing	3,309	3%
Professional, scientific, and technical services	2,425	2%
Management of companies and enterprises	169	<1%
Administrative, support, waste management services	7,491	7%
Educational services	2,045	2%
Healthcare and social assistance	9,342	9%
Arts, entertainment, and recreation	1,128	1%
Accommodation and food services	7,743	7%
Other services (except government)	6,122	6%
Government and government enterprises	17,826	17%
TOTAL	107,869	NA

Source: BEA 2020a

Table C11. Employment and Unemployment Trends within the Region of Influence

Location	Employment (2010)	Employment (2019)	Change (2010-2019)	Percent Change (2010-2019)	Unemployment Rate (2010)	Unemployment Rate (2019)
ROI	76,066	80,629	4,563	6%	11.3%	3.9%
Carroll County	11,813	11,582	-231	-2%	14.6%	4.8%
Gibson County	20,890	21,320	430	2%	12.0%	4.2%
Madison County	43,363	47,727	4,364	10%	10.0%	3.6%
United States	139,064,000	157,538,000	18,474,000	13%	9.6%	3.7%
Tennessee	2,792,063	3,231,501	439,438	16%	9.7%	3.4%

Source. Bureau of Labor Statistics 2021

Table C12. Income Trends within the Region of Influence

Location	Total Personal Income (2010)	Total Personal Income (2019)	Percent Change (2010-2019)	Per Capita Personal Income (2010)	Per Capita Personal Income (2019)	Per Capita Personal Income Change (2010-2019)
ROI	$5,733,703,000	$7,326,647,000	28%	$32,498	$41,894	29%
Carroll County	$867,994,000	$1,042,068,000	20%	$30,505	$37,529	23%
Gibson County	$1,542,458,000	$1,960,020,000	27%	$31,016	$39,892	29%
Madison County	$3,323,251,000	$4,324,559,000	30%	$33,825	$44,135	30%
United States	$12,541,995,000,000	$18,542,262,000,000	48%	$40,547	$56,490	39%
Tennessee	$226,586,583,000	$332,472,653,000	47%	$35,653	$48,684	37%

Source. BEA 2020b

Table C13. 2015 – 2019 Housing Data within the Region of Influence

Location	Total Number of Housing Units	Vacant Housing Units	Percent Vacant	Vacant Units for Rent or Sale	Vacant Units for Seasonal, Recreational, or Occasional Use
ROI	78,973	10,747	14%	2,359	634
Carroll County	13,257	2,295	17%	353	217
Gibson County	22,592	3,272	15%	476	213
Madison County	43,124	5,180	12%	1,530	204

Source: U.S. Census Bureau 2021b