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RANGE ENVIRONMENTAL ASSESSMENT FOR B-88 RANGE COMPLEX, TTA I-36 LIVE FIRE MANEUVER AREA, AND C-53A LIGHT DEMOLITION RANGE, EGLIN AIR FORCE BASE, FLORIDA

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DRAFT FINDING OF NO SIGNIFICANT IMPACT (FONSI)

REA FOR B-88 RANGE COMPLEX, TTA I-36, AND C-53A LIGHT DEMOLITION RANGE

AT EGLIN AIR FORCE BASE, FLORIDA

Pursuant to the Council on Environmental Quality (CEQ) regulation for implementing the procedural provisions of the *National Environmental Policy Act* (NEPA), Title 40 of the Code of Federal Regulations (CFR) §§ 1500-1508, and U.S. Air Force (USAF) Environmental Impact Analysis Process (EIAP) regulations 32 CFR § 989, the Air Force has prepared a Range Environmental Assessment (REA) to identify and assess the potential environmental consequences associated with the enhancement of the B-88 Range Complex capabilities with new facility construction, range expansion adjacent to the B-88 Range Complex, and a 25 percent mission surge of operations above the current baseline level at the B-88 Range Complex and the C-53A Light Demolition Range. (REA Figure 1-2, page 1-4; and Figure 1-3, page 1-5).

The Army, in coordination with the Air Force, proposes to construct and maintain new ranges for training operations and to implement a new level of activity for training on the B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolition Range. In support of these activities, the Air Force has prepared this REA, dated May 2020, which is hereby incorporated by reference into this finding.

Purpose and Need (REA Section 1.2, pages 1-1 to 1-2):

The purpose of the Proposed Action is to address the requirements for facility enhancements to the B-88 Range Complex, while authorizing and implementing a level of activity for training operations conducted on the B-88 Range Complex, the proposed TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolition Range at Eglin AFB, for the next five to 10 years. This REA will allow the Air Force to efficiently assess routine training programs that request access to these ranges on a regular basis as well as requests generated during crisis situations.

The potential environmental impacts of the operations conducted on the ranges were last analyzed in the *2005 BRAC EIS* . Changes have occurred that warrant an update of the environmental impact analysis associated with range operations, and include the following:

- B-88 Ranges have new training requirements as a result of emerging threats, changes in doctrine, and new technologies.
- The populations of residential communities near Eglin AFB have increased.
- Federal, state, Air Force, and Army regulations have changed.

The Proposed Action is needed due to the ever-changing threats, to support the Army's primary focus of transitioning from counter-insurgency operations to conventional force-on-force warfare. Range requirements are driven by Standards in Training Commission (STRAC) and the unit's Mission Essential Task List (METL). By updating the environmental impact analysis for operations within the B-88 Range Complex and the C-53A Light Demolition Range, this REA will allow more streamlined and accurate environmental review of requests to conduct operations within these areas. Future operations, routine or otherwise, may be categorically excluded from detailed environmental analyses through the Categorical Exclusion (CATEX) process if they are determined to be similar in scope to those analyzed in this REA.

Description of Proposed Action and Alternatives (REA Section 2.1, pages 2-1 through 2-4):

The Army's Installation Management Command (IMCOM), with the authorization of the Range Configuration Control Committee (RC3), plans to renovate and construct facilities within the B-88 Range

Complex (also known as the "Backyard Ranges"). Operations within the B-88 Range Complex and the C-53A Light Demolition Range will occur in order to prepare soldiers for deployment in support of combat operations around the world. Existing TR facilities within the B-88 Range Complex include:

- B-88A – Hand Grenade Qualification Course
- B-88A1 – Hand Grenade Familiarization Range
- B-88B – Live Fire Exercise Breach Facility
- B-88C – Two-Story Live Fire Shoot House, with Sniper Tower
- B-88C1 – 100m Range
- B-88D – Shotgun Assault Course
- B-88D1 – 25m Range
- B-88E – Urban Assault Course
- B-88F – Dismount Improvised Explosive Device (IED) Lane and IED Training Site

The Light Demolitions Range is the only facility within the C-53A range.

The Army's Proposed Action is to provide facility enhancements to the B-88 Range Complex, while authorizing and implementing a level of activity for training operations conducted on the B-88 Range Complex and the C-53A Light Demolition Range at Eglin AFB. The Region of Influence (ROI) of the Proposed Action is the entire land area within the boundaries of the B-88 Range Complex and the C-53A Light Demolition Range. The B-88 Range Complex and the C-53A Light Demolition Range operations are defined as those that originate, traverse, and/or terminate on the ranges (REA Figure 1-2, page 1-4; and Figure 1-3, page 1-5).

Alternative 1 – Enhancement and Mission Surge

Alternative 1 provides for the enhancement of the B-88 Range Complex and the C-53A Light Demolition Range capabilities with new facility construction, range expansion (TTA I-36 Live Fire Maneuver Area), and a 25 percent mission surge of operations above the current baseline level. Due to ever-changing threats, the Army's primary focus is transitioning from counter-insurgency operations to conventional force-on-force warfare. This transition requires new training facilities at, and adjacent to the B-88 Range Complex, such as the following:

- Combined Arms Collective Training Facility (CACTF) with a Subterranean Military Complex (Military Construction [MILCON] Project)
- Grenade Launcher Range
- After Action Review (AAR) Classroom
- Advanced Drivers Training Course (MILCON Project)
- Red Empire Drop Zone
- Trench Complex
- Tactical Training Area (TTA) I-36: Live Fire Maneuver Area
- Future Minor Construction or Facility Modification

These new training facilities will meet Army specifications and will be operated in compliance with the Army Standards listed in *Training Circular (TC) 25-8 Training Ranges, Army Regulations (AR) 385-63 Range Safety, Department of the Army (DA) Pamphlet (PAM) 385-63 Range Safety*, *U.S. Army Training Range (USATR) Reconnaissance, Selection and Occupation of a Position (RSOP)*, and *Eglin AFB Instruction (EAFBI) 13-212, Range Planning and Operations* (U.S. Army 2016). The proposed facilities would be built

inside the existing 27.5 km^2 of the B-88 Profile, plus an adjacent new Live Fire Maneuver Area (TTA I-36) which would occupy 4.33 km^2 (REA Figure 2-1, page 2-6).

CACTF with a Subterranean Military Complex

Army units require a new facility complex in order to conduct a full spectrum of training operations (non-live fire) from Soldiers to Battalion Task Force leadership (multi-echelon level) in a peer level urban environment. The facility would be used primarily to train commanders and subordinate leaders in coordinated urban environment operations. The expendables to be used at the CACTF would include CCMCK, ECT, detcord, blasting caps, fuse initiators, charges, Arty Sim/Pyro, firing devices, and chemical agents. The total annual expendable quantities estimated for the CACTF are provided in Table 1-1.

This MILCON project would consist of approximately 28 buildings (to be determined) such as a school, church with cemetery, police station/jail, hotel, nine single residences, four businesses, one townhouse complex (five townhomes), bank, warehouse, government building, office building, service station, Subterranean Military Complex, soccer field, shanty town, clinic and a Range Operations and Control Area (ROCA). The Subterranean Military Complex consists of a series of tunnels, underground bunkers, and a subway station. Table 1-2 provides the representative buildings and approximate sizes used for this notional scenario.

A CACTF is considered a complete town development that is likely affected by the environment, population, budget, and purpose of the specific Army units performing the training and is by far, the most complex training facility for construction in DoD. As such, a notional scenario for a CACTF (with a subterranean military complex) is being proposed for this environmental analysis, where building sizes and configurations are approximate, yet reasonably representative of the future CACTF to be constructed.

During the actual design phase, the responsible Army unit may decide to expand or reduce the size and configuration (and appropriate level of resources) for one particular building. As such, buildings may be added, modified, or removed due to actual funding and unit requirements. Additionally, during the landscape configuration, certain environmental issues may compete with the actual tactical requirements for an area, thus requiring a size reduction and/or relocation of a particular building. Further, new mission-related tactics, requirements, or lessons-learned over the next several years may also influence the layout, size, and ultimate configuration.

Table 1-1. CACTF Annual Expendable Quantities

CACTF	Total	Unit Type
40 mm TP	10,000	Rounds
Arty Sim/Pyro	1,500	Single Unit
Chemical Agent(CS gas)	1,500	Single Capsule
Grenade Simulator	1,500	Rounds
Riot Control Agent	300	Rounds
Flashbang	1500	Rounds
Smoke	1500	Rounds
CCMCK	35,000	Single Unit

Source: Eglin AFB, 2019

Table 1-2. Notional CACTF with Representative Facilities and Buildings Sizes

Proposed List of Facilities	Estimated Building Size (Square feet)
School	65,000
Church with Cemetery	45,000
Police Station	50,000
Hotel	60,000
Single Residence (9 total)	18,000
Businesses (4 total)	8,000
Townhouse with 5 Individual Homes with Basements	10,000
Bank	6,000
Government Building	16,000
Office Building	16,000
Service Station	40,000
Subterranean system linking the buildings	180,000
Subway Station	2,500
Soccer Field	60,000
Shanty Town	10,000
Military/POW Station	10,000
Clinic	3,000
Interconnected roads[1]	500,000
Range Operations Center/After Action Review Building	3,000
Operations Storage	1,200
Battery Support	1,200
Latrine	500
Total square footage	**1,105,400**

Source: Eglin AFB, 2019

Note: [1] – May be paved or graveled depending on funding.

The notional CACTF with a subterranean military complex is being proposed for placement within approximately 10 km^2 to the north and west of TR B-88E and TR B-88E1. Due to the potential omnidirectional use of various munitions, and the draft (notional) design phase of the CACTF layout, it is premature to determine specific directions of fire (DOF) or establish a surface danger zone (SDZ) (REA Figure 2-1, page 2-6).

Grenade Launcher Range (GLR)

Army units require a facility to train and test soldiers on the skills necessary to engage and defeat stationary target emplacements with individual 40 mm grenade launcher systems (using 40 mm grenades with TP). The GLR is proposed within the B-88 profile and will be approximately 30 m x 500 m. This project will entail the clearing of trees and construction will be accomplished by the Army Support Activity Range Control. Construction will consist of a window facade at 100 m, two wood bunker facades at 125 m and 175 m respectively, a machinegun position at 200 m, two zero targets at 200 m, five E-Type silhouettes at 250 m and 350 m, and a 30 m x 6 m trench (running north/south) at 300 m. The total annual expendable quantities estimated for the GLR is provided in Table 1-3.

Table 1-3. GRL Annual Expendable Quantities

GRL	Total	Unit Type
40 mm TP	30,000	Rounds

Source: Eglin AFB, 2019

The range would consist of four lanes; two prone positions, one kneeling position, and one midrange standing position. The facility would be located outside the SDZ for hand grenades and outside of the claymore SDZ for bays 1 and 2; no unexploded ordnance (UXO) producing rounds would be used on this facility, only simulation rounds. The predominate DOF is east to west (270 degrees). The hazard area distance (470 m), would be completely contained by this facility, but not the complete hazard area, as dispersion and ricochet will not be encompassed by the GLR facility. Grenade machineguns would not be used on this range. The primary use would be the M203, M79, and M320 grenade launchers. A notional schematic diagram of the GLR is provided, with the proposed location sited southwest of B-88F (REA Figure 2-2, page 2-9; and Figure 2-3, page 2-10).

After Action Review (AAR) Classroom

Army units require a space to conduct classroom training in preparation for, and after action review of, training conducted on TR B-88F. The building would be approximately 1,776 square feet and located in the southeastern corner of TR B-88F. The AAR Classroom will increase facility capability and unit combat capability. Figure 2-5 provides an example of an AAR Classroom, with the proposed location to be sited in the southeast corner of B-88F; this is a non-live fire facility (REA Figure 2-5, page 2-12, and Figure 2-6, page 2-13).

Advanced Drivers Training Course

Army units require a training course that heightens high mobility vehicle skill sets and operator situational awareness. The course will also facilitate maintenance operations allowing mechanics to fully articulate suspension components during road tests. The course would be approximately 0.04 km^2 and will facilitate proficiency training for the Mine-Resistant, Ambush Protected (MRAP) family of vehicles which teams are required to have prior to operational deployments. In addition to the Advanced Drivers Training Course, an unimproved road (with an elevation change) would be constructed as access to the course. Located to the west of the course and providing an important training capability, an approximately 0.08 km^2 skid pad also would also be constructed. A parking lot (approximately 0.01 km^2) with an access road would be constructed southeast of the course. This activity profile is scheduled on a daily basis as part of the 1B allocation for 7 SFG(A) training on the USATRs. No additional impacts to other test and training activities, nor to TR B-88D would be incurred by the addition of this range facility. A notional schematic diagram of the Advanced Drivers Training Course configuration is provided, with the proposed location to be sited northeast of, but not affecting B-88D; this is a non-live fire facility (REA Figure 2-7, page 2-14, and Figure 2-8, page 2-15).

Red Empire Drop Zone (DZ)

Army units require an onsite airborne insertion location. The Red Empire DZ would provide an area for static line and military freefall to support Airborne Training Events. During training events, B-88 Ranges would be closed due to the footprint of the SDZ. The dimensions of the DZ would be approximately 3,000 m x 1,500 m and the entire area would be cleared of trees and all stumps would be removed; however, herbaceous vegetation would be allowed to grow but nothing over 0.61 m in height. The area will need to be mowed once or twice a year to keep trees from re-growing. The total annual expendable quantities estimated for the Red Empire DZ is provided in Table 1-4. Aircraft flight profiles will avoid the North-South Corridor (NSC) and overflight of Camp Rudder as well as TA B-6 and Sontay DZ flight profiles. The proposed location of the Red Empire DZ is in the southern portion of the Restricted Area

for the B-88 Range Complex. Due to the potential omnidirectional use of various munitions, and the draft design phase of the Red Empire DZ layout, it is premature to determine specific DOF or establish an SDZ (REA Figure 2-9, page 2-17).

Table 1-4. Red Empire DZ Annual Expendable Quantities

Red Empire DZ	Total	Unit Type
Arty Sim/Pyro	150	Single Unit
Grenade Simulator	15	Rounds
Riot Control Agent	10	Rounds
Smoke	250	Rounds
CCMCK	35,000	Single Units

Source: Eglin AFB, 2019

Tactical Training Area (TTA) I-36 Live Fire Maneuver Area

The TTA I-36 Live Fire Maneuver Area is designed to support training operations extended from the B-88 Range Complex Area. The TTA I-36 will be used to train and test the skills of soldiers necessary to conduct tactical movement techniques and to detect, identify, engage, and defeat stationary infantry targets in a tactical array similar to the southern area of responsibility (AOR). All targets are fully automated, and the event-specific target scenario is computer-driven and scored using a handheld controller. Army IMCOM, Range Services, Office of Special Projects-Joint, and Safety have collaborated to create a proposal that defines the requirement sufficient to be the basis of a Mutual Indemnification Agreement. This includes definition of training actions, natural environment for training, space or area, construction, protections to include site security and safe operations, tempo, and scheduling. The proposed TTA I-36 would require approximately 4.33 km^2. Initially, the only land changes required would be moderate underbrush clearing. The proposed Trench Complex (Section 2.3.7 below) would be created within TTA I-36. The proposed location of the TTA I-36 is immediately to the west of the current Restricted Area for the B-88 Range Complex. The predominate DOF (all ball ammunition) is west to east (90 degrees) with the projected weapons footprint and SDZ contained within the B-88 Range Complex Restricted Area; CCMCK/SESAMS can be omnidirectional (360 degrees). The 5.56mm SDZ has an 89 to 91+ degree northing and the 7.62mm SDZ has an 89 to 90 degree northing (REA Figure 2-10, page 2-18).

Trench Complex

Army units require a facility to train and test soldiers on the skills necessary to engage and defeat stationary target emplacements within a Trench Complex. Linking trenches will be 2.1 m deep with wood braces and perimeter trenches will be 1.2 m deep and topped with sandbags (REA Figure 2-11, page 2-17). An example of a Trench Complex is provided as a photograph in Figure 2-12. The proposed 500 m x 600 m Trench Complex would be a network with six perimeter bunkers (6 m x 6 m) and a command bunker (12 m x 12 m). The trench system will be constructed with reinforced wood. This project supports the METL [Battle Drill 7] requirement for all Army Special Operations Forces (SOF) and Infantry Units. The expendables to be used at the Trench Complex would include 7.62 mm (and lesser weapon systems [ball]), CCMCK, ECT, detcord, blasting caps, fuse initiators, charges, Arty Sim/Pyro, firing devices, and chemical agents. The predominate DOF (all ball ammunition) is west to east (90 degrees) with the projected weapons footprint and SDZ contained within the B-88 Range Complex Restricted Area; CCMCK/SESAMS can be omnidirectional (360 degrees). The total annual expendable quantities estimated for the Trench Complex and TTA I-36 Live Fire Maneuver Area is provided in Table 1-5 (REA Figure 2-7, page 2-14, and Figure 2-8, page 2-15).

Table 1-5. Trench Complex and TTA I-36 Live Fire Maneuver Area Annual Expendable Quantities

Trench Complex and TTA I-36 Live Fire Maneuver Area	Total	Unit Type
Small Arms 9mm	10,000	Rounds
40 mm TP	200	Rounds
Small Arms 5.56mm blank/sim	150,000	Rounds
Small Arms 5.56mm live	150,000	Rounds
Small Arms 7.62mm blank/sim	75,000	Rounds
Small Arms 7.62mm live	150,000	Rounds
Det Cord	1,500	Feet
Blasting Caps	150	Single Caps
Fuse/Initiator	750	Single Units
Arty Sim/Pyro	150	Single Units
Chemical Agent (CS gas)	10	Single Capsule
Grenade Simulator	200	Rounds
Flashbang	300	Rounds
Smoke	250	Rounds
CCMCK	20,000	Single Units

Source: Eglin AFB, 2019

Future Construction or Facility Modification

This REA will analyze potential environmental impacts of future construction or facility modifications within the B-88 Range Complex (to include the new TTA I-36 Live Fire Maneuver Area). Actions would be located within existing range profiles and all management actions from this REA would be followed. Individual projects would generally be under 0.008 km^2 (2 acres), and presumed to include impervious surface additions. These types of actions would be analyzed for environmental concerns through the Environmental Impact Analysis Process (EIAP) within an AF Form 813. The total area for projects covered would not exceed 0.04 km^2 (10 acres) under this REA.

Mission Surge

Alternative 1 includes the implementation of annual operations at a mission-surge level on the B-88 Range Complex and the C-53A Light Demolitions Range. Tables 1-6 and 1-7 provide the estimated quantities and types of ordnance to be expended on the B-88 Range Complex and TA C-53A, respectively. Mission-surge operations under Alternative 1 are those anticipated to occur during wartime or other significant military involvement that may continue for an indeterminate time. The mission-surge level under Alternative 1 is defined as a 25 percent increase in the baseline annual expendable quantities for the ranges. The mission-surge level is based on input provided by the Army Range Officer.

Table 1-6. Alternative 1 Mission Surge Annual Expendable Quantities for B-88 Range Complex

B-88 Range Complex	B-88A1	B-88B	B-88C	B-88C1	B-88D	B-88D1	B-88E	Total
9 mm	0	0	38,161	574,206	0	574,206	220,853	**1,407,426**
.40 Cal	0	0	238	20,316	0	20,316	1,509	**42,379**
5.56	0	0	169,671	1,029,281	0	1,029,281	359,806	**2,588,040**
7.62	0	0	556	32,468	0	32,468	6,252	**71,743**
.300 WinMag	0	0	36	0	0	0	0	**36**
12 Gauge	0	622	1,740	107	107	1,739	429	**4,744**
Grenades	130	21	464	0	0	0	84	**699**
Blasting Caps	3	2,716	882	0	0	0	54	**3,655**
Fuse/Initiator	0	5,637	274	0	0	0	45	**5,956**
Claymores	35	0	0	0	0	0	0	**35**
Charge	0	214	70	0	0	0	9	**292**
Det Cord (Feet)	0	19,590	2,840	0	0	0	1,450	**23,880**
Arty Sim/Pyro	10	21	493	0	0	4	136	**670**
ECT (Feet)	0	58	124	0	0	0	0	**182**
Firing Device	0	5	20	0	0	0	0	**25**
Chemical Agent	9	0	0	0	0	0	8	**17**

Source: Eglin AFB, 2019

Table 1-7. Alternative 1 Mission Surge Annual Expendable Quantities for TA C-53A

TA C-53A	Total
12 Gauge	**21**
Grenades	**172**
Blasting Caps	**4,739**
Fuse/Initiator	**14,056**
Claymores	**9**
Charge	**4,552**
Det Cord (Feet)	**87,400**
Arty Sim/Pyro	**92**
ECT (Feet)	**1**
Firing Device	**1,095**

Source: Eglin AFB, 2019

Alternative 2 – Mission Surge Only

Alternative 2 is the implementation of annual operations at a mission-surge level within the B-88 Range Complex and the C-53A Light Demolitions Range, and does not include the new facility construction or range expansion. Tables 1-8 and 1-9 provide the estimated quantities and types of ordnances to be expended on the B-88 Range Complex and C-53A, respectively.

Table 1-8. Alternative 2 Mission Surge Annual Expendable Quantities for B-88 Range Complex

B-88 Range Complex	B-88A1	B-88B	B-88C	B-88C1	B-88D	B-88D1	B-88E	Total
9 mm	0	0	38,161	574,206	0	574,206	220,853	**1,407,426**
.40 Cal	0	0	238	20,316	0	20,316	1,509	**42,379**
5.56	0	0	169,671	1,029,281	0	1,029,281	359,806	**2,588,040**
7.62	0	0	556	32,468	0	32,468	6,252	**71,743**
.300 WinMag	0	0	36	0	0	0	0	**36**
12 Gauge	0	622	1,740	107	107	1,739	429	**4,744**
Grenades	130	21	464	0	0	0	84	**699**
Blasting Caps	3	2,716	882	0	0	0	54	**3,655**
Fuse/Initiator	0	5,637	274	0	0	0	45	**5,956**
Claymores	35	0	0	0	0	0	0	**35**
Charge	0	214	70	0	0	0	9	**292**
Det Cord (Feet)	0	19,590	2,840	0	0	0	1,450	**23,880**
Arty Sim/Pyro	10	21	493	0	0	4	136	**670**
ECT (Feet)	0	58	124	0	0	0	0	**182**
Firing Device	0	5	20	0	0	0	0	**25**
Chemical Agent	9	0	0	0	0	0	8	**17**

Source: Eglin AFB, 2019

Table 1-9. Alternative 2 Mission Surge Annual Expendable Quantities for TA C-53A

TA C-53A	Total
12 Gauge	**21**
Grenades	**172**
Blasting Caps	**4,739**
Fuse/Initiator	**14,056**
Claymores	**9**
Charge	**4,552**
Det Cord (Feet)	**87,400**
Arty Sim/Pyro	**92**
ECT (Feet)	**1**
Firing Device	**1,095**

Source: Eglin AFB, 2019

Alternative 3 – No Action Alternative

Alternative 3 is the No Action Alternative of maintaining the B-88 Range Complex and Light Demolitions Range at Test Area C-53A annual operations at the current baseline level, and does not include new facility construction or range expansion. Tables 1-10 and 1-11 provide the estimated quantities and types of ordnance to be expended on the B-88 Range Complex and C-53A, respectively. The current baseline level was determined based on review of the munitions expended on the ranges from 01-01-11 to 12-31-18. The data was obtained from the RFMSS.

Table 1-10. Alternative 3 Current Baseline Annual Expendable Quantities for B-88 Range Complex

B-88 Range Complex	B-88A1	B-88B	B-88C	B-88C1	B-88D	B-88D1	B-88E	Total
9 mm	0	0	30,529	459,365	0	459,365	176,682	**1,125,941**
.40 Cal	0	0	190	16,253	0	16,253	1,207	**33,903**
5.56	0	0	135,737	823,425	0	823,425	287,845	**2,070,432**
7.62	0	0	445	25,974	0	25,974	5,002	**57,394**
.300 WinMag	0	0	29	0	0	0	0	**29**
12 Gauge	0	497	1,392	86	86	1,392	343	**3,795**
Grenades	104	17	372	0	0	0	67	**559**
Blasting Caps	3	2,173	706	0	0	0	43	**2,924**
Fuse/Initiator	0	4,509	219	0	0	0	36	**4,765**
Claymores	28	0	0	0	0	0	0	**28**
Charge	0	171	56	0	0	0	7	**234**
Det Cord (Feet)	0	15,672	2,272	0	0	0	1,160	**19,104**
Arty Sim/Pyro	8	17	395	5	0	3	109	**536**
ECT (Feet)	0	46	99	0	0	0	0	**145**
Firing Device	0	4	16	0	0	0	0	**20**
Chemical Agent	7	0	0	0	0	0	6	**14**

Source: Eglin AFB, 2019

Table 1-11. Alternative 3 Current Baseline Annual Expendable Quantities for TA C-53A

TA C-53A	Total
12 Gauge	**17**
Grenades	**137**
Blasting Caps	**3,791**
Fuse/Initiator	**11,245**
Claymores	**7**
Charge	**3,642**
Det Cord (Feet)	**69,920**
Arty Sim/Pyro	**74**
ECT (Feet)	**0.571429**
Firing Device	**876**

Source: Eglin AFB, 2019

Environmental Consequences

Summary of Findings

The Air Force has concluded that there would be no significant adverse effects to the following resources as a result of implementation of the Proposed Action (Alternative 1 – Range Enhancement and Mission Surge, the Preferred Alternative): air quality; noise; geology and soils; water resources; biological resources; cultural resources; socioeconomic, environmental justice, and protection of

children; and cumulative effects. The Proposed Action was determined to have no effect on several resources; therefore, these resources were eliminated from detailed analysis in this REA.

The resources that were eliminated from detailed analysis include airspace; hazardous materials/waste and solid waste; land use and restricted access; and utilities and transportation. No significant adverse cumulative impacts would result from activities associated with any of the Proposed Action projects when considered with past, present, or reasonably foreseeable future projects at Eglin AFB.

Air Quality (REA Section 3.2)

Implementation of Alternative 1 would have short-term, adverse impacts on ambient air quality. All construction developments from this alternative were assumed to occur in a single year while the increased operations stemming from this alternative assumed to occur throughout the lifetime of the base until future changes occurred. Construction activities would result in temporary, adverse impacts on ambient air quality. Facility construction would involve land clearing, land grading, and building construction. Construction projects would require the use of common construction equipment, all of which would be expected to meet local, state, and Federal air emission regulations. Alternative 1 would result in an increase of approximately 250 new, full time personnel. It was assumed that each of these personnel would commute in their personally owned vehicle (POV) with an average commute of 28 miles round trip. Alternative 1 would result in an increase in training activities at the installation. The increased training includes the expenditure of munitions on training ranges which would result in minor adverse impacts on ambient air quality. Facility munition use consists of various rounds, grenades, charges, fuse/initiators, and chemical agents. The munitions will be used as part of training at current facilities and within the new training facilities proposed for construction.

Implementation of Alternative 1 would have short-term adverse impacts on ambient air quality. Temporary increases in NOx, CO, SO2, VOCs, Lead, PM-10 and PM-2.5 and CO2e are primarily resultant from construction that is presumed to be accomplished during one calendar year. Following this temporary construction and growth, a 25 percent munitions surge is expected to have minor, but permanent, effects from this alternative. The estimated annual steady state air emissions from Alternative 1 would be well below significance thresholds. The limited annual emissions of GHGs would not likely contribute to global warming to any discernible extent. Potential changes to local temperature and precipitation patterns as a result of ongoing global climate change would not affect the ability to implement Alternative 1. Overall, there would be no long-term significant impacts on ambient air quality from the facility construction and no significant impacts on ambient air quality from the munitions surge by implementing Alternative 1.

Alternative 1 is not expected to significantly add to the cumulative effects on air quality of all past, present, and reasonably foreseeable actions. The ROI for evaluating cumulative impacts on air quality is Okaloosa County, which is in attainment for all NAAQS. The emissions generated during the implementation of the Proposed Action would be additive to other emissions generated coincidentally within the region. Compliance with the Florida State Implementation Plan would ensure that implementation of the Alternative 1, in combination with past, present, and future actions, would not result in a permanent increase in existing NAAQS; would not contribute to an increase in the frequency or severity of violations of existing NAAQS; and would not delay the timely attainment of any NAAQS, interim milestones, or other milestones to achieve attainment.

The project proponent would be responsible for adherence to:

- Use explosives, large-caliber weapons, and other large munitions on the training ranges and test areas under neutral (favorable) weather conditions to the extent practicable to minimize the potential for public annoyance from the generated noise. Neutral weather conditions include clear skies and/or low wind, and unfavorable weather conditions include cloudy skies, moderate

to high wind, and/or temperature inversions. Coordinate with the Eglin Weather Office to identify weather conditions and plan operations accordingly.

- Comply with the requirements identified in Section 6.3, Fire Fighting, in Eglin AFBI 13-212, *Range Planning and Operations.*
- Remove munitions debris from the training ranges and test areas on a predetermined schedule in accordance with Air Force regulations.
- Drive vehicles only on existing roads and areas specifically designated/authorized for off-road vehicle use. The Eglin Natural Resources Office must approve areas where off-road vehicle use is proposed.

Noise (REA Section 3.3)

Implementation of Alternative 1 would have short-term, adverse impacts on the noise environment. Alternative 1 (Facility Construction) would have temporary, minor adverse effects primarily due to use of heavy equipment during construction activities. Facility construction would involve land clearing, land grading, and building construction. It was assumed that the time required to complete all construction components of the projects would take approximately 365 days and occur in the year 2020. Depending upon the number, type, and distribution of construction equipment being used, the noise levels near the ROI could temporarily exceed 64 dBA up to 500 feet from the project areas. Once the construction projects are completed, the ambient noise level would return to normal. With Alternative 1 construction projects located within compatible land uses, the noise generated from the daily activities at the building would be typical of existing buildings, and the noise intensity would not increase.

The Alternative 1 (Mission Surge) would present low to moderate risk of concern and complaints in off-base areas. The furthest distance for the largest munition used at the B-88 Complex is at the B-88C test area. The noise from these munitions to attenuate to levels of 115dBP is approximately 6.757 miles, which could potentially result in concern or complaints from sensitive noise receptors in Milligan, FL as well as Crestview, FL. The largest munition used at the C-53A test area would take 22.05 miles to attenuate to 115 dBP, presenting a moderate-to-high risk of concern and complaints in off-base areas; however, these activities are already occurring.

Alternative 1 additionally introduces the implementation of annual munitions use and operations at four new facilities and/or enhanced range areas. Although an additional increase in munitions use would occur at these four range areas, the noise levels (impulsive noise in dBA) would remain relatively the same, as no new (larger new) ordnance types of munitions have been proposed that would result in an increase in the impulsive noise environment. This increase in munitions use would not create appreciable areas of incompatible land use, or increase the off-base areas exposed to munitions noise; however, it would increase the number of events that would raise concerns and solicit complaints by the public. Noise generated by the implementation of Alternative 1 would attenuate at the same noise levels as the current baseline level of operations (No Action Alternative). Overall, there would be no significant noise increase as a result of implementing Alternative 1.

Alternative 1 is not expected to significantly add to the cumulative effects on the noise environment of all past, present, and reasonably foreseeable actions. Past actions resulting in temporary noise increases in and around the B-88 Range Complex and C-53A Light Demolition Range have included munitions use and other building construction within the cantonment. The noise contributions from these actions were temporary, minor, adverse impacts on the noise environment and ceased upon completion of the relevant projects. Past, present, and future actions at and around the B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and C-53A Light Demolition Range are not anticipated to cumulatively affect the noise environment.

All applicable noise laws and guidelines would be followed to reduce effects from noise produced by construction activities. Workers would be required to use proper personal hearing protection in accordance with Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Standard 48-20, Operational Noise and Hearing Conservation Program, to limit exposure. Appropriate noise attenuation equipment would also be used where applicable.

The project proponent would be responsible for adherence to:

- Construction would primarily occur during normal weekday business hours.
- Heavy equipment mufflers would be properly maintained and in good working order.
- Construction personnel, and particularly equipment operators, shall wear adequate personal hearing protection to limit exposure to high levels of noise associated with construction activities and airfield operations as needed.
- Construction equipment would not be permitted to idle for long periods of time.

Geology and Soils (REA Section 3.4)

Implementation of Alternative 1 would have no impacts on geology, but would have long-term, moderate, adverse impacts on soils. Impacts to soils as a result of new facility construction and other range enhancements, and mission surge activities on the B-88 Range Complex and the C-53A Light Demolition Range may occur from physical disturbance as well as the release of hazardous materials.

Implementation of the Alternative 1 has the potential to create ground disturbance and therefore, physical impacts to the soils. While soils would be disturbed by earthmoving and other construction-related activities, impacts would be minor and contained only to within the project footprints. The actions proposed could result in an increase in the amount of excavated soils and exposed rock materials within the project areas, which could result in a temporarily increased threat of soil erosion. The incorporation of best management practices (BMPs) will reduce any potential erosion that may occur during activities associated with construction.

Hazardous materials have the potential to accumulate in the soils of project areas in which munitions will be utilized. These project areas include, but are not limited to the C-53A Light Demolition Range, Grenade Launcher Range, and TTA I-36 Live Fire Maneuver Area. Munitions contain various heavy metals including aluminum, copper, lead, and zinc, as well as organic explosive compounds including trinitrotoluene (TNT) and Research Department Explosive (RDX [cyclotrimethylene trinitramine]) which leach harmful chemicals into the environment, and when found in high enough quantities produce deleterious effects on humans. The predicted concentrations of all munition constituents in the soil on TA C-52N were far lower than the amount necessary to pose a risk to human health. The size of TA C-52N (3,277 acres) is far greater than any of the proposed improvements involved in the B-88 Range Complex enhancement. This would indicate that, within the ROI, the potential of munitions to degrade soil quality (with hazardous materials) to a level adversely affecting human or ecological health is minimal.

Alternative 1 is not expected to significantly add to the cumulative effects on geology and soils of all past, present, and reasonably foreseeable actions. The grading and excavating of soils and removal of geotechnically incompatible soils for construction site preparation would have no impacts on geology, but would have long-term, moderate, adverse impacts on soils, as these soils would be removed from biological activity.

Water Resources (REA Section 3.5)

Implementation of Alternative 1 would have no impact on groundwater resources. Based on the analyses conducted, Alternative 1 has the potential for temporary, minor, adverse impacts (surface water and coastal zone management) on water resources. Impacts on water resources resulting from new facility construction and other range enhancements, and mission surge activities on the B-88 Range Complex and the C-53A Light Demolition Range may occur from physical disturbance, soil erosion, release of hazardous materials, or increase in wildfires.

There is low potential for range expansion and construction to significantly impact water resources; the proposed locations for new facility construction and range enhancements are primarily located outside of water resources. Eglin AFB would use BMPs, however, to minimize impacts to water resources due to soil disturbance or nonpoint source water pollution. The area designated for the CACTF with a subterranean military complex and the Red Empire DZ are both located in proximity to FEMA's 100-year floodplain but these areas have been configured to avoid wetland and floodplain impacts.

There is low potential for munitions or related activities to impact water resources. The overall potential for direct physical impacts to offsite water resources, for example via blast fragmentation, is low, based on the distances between the target areas and the nearest wetlands and streams. Ground disturbance from munitions use has the potential to increase soil erosion, which could indirectly impact offsite water resources through sedimentation. Based on the comparative analysis conducted, munitions use on the B-88 Range Complex, the TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolition Range is not expected to degrade soil quality on the training ranges to a level that would adversely impact human health or ecological receptors. Given that the range expansion does not impact a large area of floodplains, wetlands, or surface waters, the primary means by which the chemical components of munitions could potentially impact water quality is through stormwater runoff or through migration of the components through the soil column. Given that measures to minimize soil erosion are implemented on the ranges, the potential for these operations to impact water resources through soil erosion is low.

Implementation of Alternative 1 construction projects are not anticipated to result in adverse impacts on the coastal zone. Temporary, indirect, adverse impacts from soil disturbance could create nonpoint source water pollution; however, Eglin and FDEP would utilize BMPs to reduce the chance of impacts. With coordination, utilization of BMPs, and proper permitting, the implementation of these projects would be consistent with the Florida Coastal Management Plan (FCMP) and the Coastal Zone Management Act (CZMA).

Alternative 1 is not expected to significantly add to the cumulative effects on water resources of all past, present, and reasonably foreseeable actions. Completed facilities have added to the impervious surface at the B-88 Range Complex and the C-53A Light Demolitions Range which could change the permeability of the drainage basin and increase the flow of water and potentially change flow characteristics.

There are approximately 60 acres of wetlands and some natural surface water bodies on the B-88 Range Complex and the C-53A Light Demolition Range. The following measures apply to wetlands and waters near the boundaries of the training ranges and test areas:

- Do not drive vehicles in wetlands, streams, or ponds. Cross streams only at established stream crossings.
- Locate all new targets at least 200 feet from surface water bodies.
- Prohibit ground disturbing activities within 100 feet of wetlands and surface water bodies.
- Do not use heavy equipment to remove munitions debris from wetlands or surface water bodies.

Biological Resources (REA Section 3.6)

Implementation of Alternative 1 would have short-term, adverse impacts on biological resources. Impacts on biological resources resulting from new facility construction and other range enhancements, and mission surge activities on the B-88 Range Complex and the C-53A Light Demolition Range may occur from habitat alteration and disturbance, noise from munitions and other expendables, personnel and vehicular traffic during small arms training, munition strikes, wildfire starts, and release of hazardous materials.

Potential impacts to wildlife include the physical presence of humans, equipment, and vehicles within foraging habitat; direct strikes from equipment or ammunitions (or fragments); noise and emissions from munitions, aircraft, equipment, humans, and vehicles in foraging habitat; wildfires damaging or destroying habitat (i.e., active and inactive red-cockaded woodpecker [RCW; *Leuconotopicus borealis*] cavity trees); degradation of foraging habitat due to increased difficulty in conducting prescribed fire; land clearing of foraging habitat (i.e., active and inactive RCW cavity trees); and alterations to circadian and circannual rhythms from the effects of artificial lighting.

The quality of wildlife habitat in the immediate vicinity of each of the locations for the new facility construction and range enhancements on the B-88 Range Complex is relatively high since these areas support wildlife habitat that is predominately natural and undisturbed. Most natural communities on the Eglin Reservations provide exceptionally high-quality habitat for wildlife. Proximity of the proposed construction locations to natural communities varies. Wildlife that currently utilize nearby habitats within this area would be able to move to other similar areas on and off the installation. This loss of habitat utilization would not affect the viability of any native species.

Current training activities on the B-88 Range Complex and the C-53A Light Demolition Range are not expected to have significant adverse continuous noise impacts on common or sensitive wildlife species. The types and quantities of munitions currently used on the ranges are comparable to those used during previous years. Therefore, continuous noise impacts on wildlife from current operations are comparable to those from past operations. Wildlife have experienced noise from munitions use on the ranges for many years and, therefore, are acclimated to such noise.

Small arms training has relatively low overall potential to impact biological resources. All personnel who conduct small arms and other ground training exercises on the Eglin Range are instructed on the protection of habitat, wildlife, and sensitive species. Eglin AFBI 13-212, Range Planning and Operations and the U.S. Army Range Certification Briefing identifies the measures that are required to be implemented by users of the Eglin Range to avoid and minimize potential impacts on biological resources, including species-specific measures for the RCW, reticulated flatwoods salamander, Okaloosa darter, gopher tortoise, and other sensitive species.

Fire suppression activities conducted in response to wildfires that are unintentionally caused by munitions use on the B-88 Range Complex and C-53A Light Demolition Range also have the potential to impact certain sensitive species, such as the gopher tortoise and indigo snake. Potential impacts on these species would result primarily from fire suppression equipment physically impacting individuals directly or by collapsing gopher tortoise burrows. Impacts on biological resources, including sensitive species and habitat are avoided to the extent practicable during fire suppression activities at Eglin AFB. Protection measures required to be implemented during wildfire suppression activities are identified in the Eglin AFB INRMP and in Eglin AFBI 13-212, *Range Planning and Operations*.

Based on the analyses conducted, emissions from current testing and training operations on the B-88 Range Complex and the C-53A Light Demolition Range are not expected to impact air quality, soils, or water resources to levels that would adversely impact biological receptors. The overall potential for common wildlife or sensitive species to be adversely impacted via exposure (inhalation or ingestion) to

hazardous materials released during operations on the training ranges and test areas is low based on the types and quantities of hazardous materials released.

Alternative 1 is not expected to significantly add to the cumulative effects on biological resources of all past, present, and reasonably foreseeable actions. If any protected species were documented, coordination with the appropriate Federal and state agencies would occur. Indirect impacts on protected species could include loss or decline in foraging/hunting habitat for transient species such as birds; however, this potential loss or decline in habitat would be minor compared to similar existing habitat located within and outside the Installation. Consultation with the USFWS in accordance with Section 7 of the ESA will be completed with respect to any projects within the IDP prior to beginning any construction. Correspondence supporting the pre-project coordination with the USFWS Section 7 consultation under the RCW programmatic biological opinion (PBO) is provided in Appendix B of the REA.

The project proponent would be responsible for adherence to:

- Comply with the requirements identified in Section 7.2, Natural Resources, in Eglin AFBI 13-212, *Range Planning and Operations.*
- Ensure that all mission personnel are briefed on restrictions regarding sensitive species and habitats; provide Eglin AFB environmental guidebooks and maps to personnel when necessary.
- If any Federal or state-listed species is found dead or injured, notify the Eglin Natural Resources Office (Jackson Guard) immediately by calling (850) 882-4164, 4165, or 4166.
- Follow pertinent requirements from the *RCW Programmatic Biological Opinion* (summarized partially below):
    - Follow *Management Guidelines for the RCW on Army Installations*, (summarized in Eglin AFBI 13-212), unless prior approval has been given by the Chief of Eglin Natural Resources.
    - Allow only transient (lasting less than 2 hours) foot traffic and vehicular traffic on established roads/trails within a 200-foot buffer around marked RCW trees.
    - Check the fire danger rating daily, and follow the Eglin Wildfire Specific Action Guide restrictions for pyrotechnics (flares) use by class day.
    - Immediately notify the Joint Test & Training Operations Control Center (850-882-5800) and Eglin Fire Dispatch (850-882-5856) of any wildfire observed.
    - Cutting of RCW cavity trees or any longleaf pine tree is prohibited without prior written authorization from the Chief of Natural Resources.
    - Coordinate with Eglin Natural Resources prior to target establishment and follow all construction-related requirements in the RCW Programmatic Biological Opinion.
    - Prior to activities that may harass the RCW (military activities within or near stands of mature longleaf pine), coordinate with Eglin Natural Resources regarding any necessary pre/post-surveys.
    - Conduct pre-project coordination with USFWS for any proposed action that may directly take red-cockaded woodpecker individuals, cavity trees, or foraging habitat.
- Follow pertinent requirements from the *Eastern Indigo Snake Programmatic Biological Opinion* (summarized partially below):

- Personnel and vehicle/equipment operators will be directed to avoid gopher tortoises and indigo snakes.
- Avoid gopher tortoise burrows by at least 25 feet.
- If a gopher tortoise burrow cannot be avoided by 25 feet, then the tortoise and commensals (including indigo snakes and gopher frogs) will be relocated in accordance with the protocols listed in Eglin's *Threatened and Endangered Species Component Plan*.

- Avoid Florida burrowing owl burrows by at least 25 feet.

Cultural Resources (REA Section 3.7)

Implementation of Alternative 1 would result in no adverse effects on archaeological resources, architectural resources; cemeteries, sacred sites, or Traditional Cultural Properties (TCPs). Three archaeological sites (8OK00402, 8OK3988, and 8OK01221) have been determined to be eligible for the NRHP and are considered historic properties and significant resources. Only small portions of the archaeological sites overlap with portions of the project footprints. Given the small portions of the mapped archaeological sites within these areas, it is anticipated that these archaeological sites could be avoided by construction or training during design. As a result, no direct impacts to these resources are anticipated from the implementation of the Proposed Action.

Section 106 consultation under the NHPA will be completed prior to the beginning of construction. One architectural or aboveground resource that has not been evaluated has been identified within the visual APE of the CACTF with a Subterranean Military Complex area. No direct physical impacts are anticipated to that resource from the implementation of the Proposed Action. Possible visual impacts to the resource would be avoided during the design of the CACTF. If visual impacts are unavoidable, then additional evaluations of the resource and possible mitigations measures would be implemented through in accordance with the SOPs outlined in the 2019 ICRMP. As a result, no impacts on architectural resources that are eligible for inclusion in the NRHP are anticipated from the implementation of the Proposed Action.

No previously identified cemeteries are located within the proposed construction footprints for new facilities. As a result, no impacts on cemeteries are anticipated from the implementation of the Proposed Action.

No previously identified sacred sites or TCPs are located within the proposed construction footprints for the new facilities. Consultations with Native American tribes to identify any potential TCPs or properties of religious or cultural significance will be conducted as part of the NEPA process. As a result, no impacts on Native American Sacred Sites and TCPs are anticipated from the implementation the Alternative 1.

Alternative 1 is not expected to significantly add to the cumulative effects on cultural resources of all past, present, and reasonably foreseeable actions. The proposed projects will be reviewed by the Cultural Resource Manager of Eglin AFB in accordance with the standard operating procedures (SOPs) contained in the 2019 Integrated Cultural Resources Management Plan (ICRMP) and through consultation with the Florida State Historic Preservation Office (SHPO) and appropriate Native American Tribes. If through those consultations supplemental archaeological surveys are determined to be needed, then they would be conducted within the construction footprint of the new facilities construction to identify any unrecorded archaeological sites.

The project proponent would be responsible for adherence to:

- Comply with the requirements identified in Section 7.3, Cultural Resources, in Eglin AFBI 13-212, Range Planning and Operations.

- Adhere to all restrictions for ground disturbing activity and requirements for avoidance of cultural resources identified in Eglin AFB 13-212 that apply to the training ranges and test areas. For current information, contact the Eglin Cultural Resources Office by calling (850) 882-8459 or (850) 883-5201.
- If cultural materials are inadvertently discovered during operations on the training ranges and test areas, cease all activities in the immediate vicinity of the inadvertent find and notify the Eglin Cultural Resources Office immediately by calling (850) 882-8459 or (850) 883-5201.

Socioeconomics, Environmental Justice, and Protection of Children (REA Section 3.8)

Implementation of Alternative 1 would result in no significant, long-term impacts on socioeconomics, environmental justice, or protection of children. The Proposed Action would result in negligible, long term adverse impacts and temporary, minor beneficial impacts. Adverse impacts related to construction activity or operation and maintenance could include exposure to noise, safety hazards, pollutants and other hazardous materials, and excessive traffic. Minority populations of Okaloosa County, and the two major residential areas closest to Eglin AFB, Crestview City and Fort Walton Beach are below both the minority percentages of the state of Florida and the Nation overall. In addition, all three percentages are below 50 percent.

Construction of the various project components would result in temporary, moderate beneficial impacts in the form of jobs and income for area residents, revenues to local businesses, and sales taxes to Okaloosa County and the State of Florida could be realized if construction materials are purchased locally or local construction workers are hired for repairs and maintenance.

With negligible personnel moving into the region as a result of the Proposed Action, there would be no significant additional demand on housing, schools, or other social services. With no adverse impacts, there would be no disproportionately high adverse human health, economic, or social effects on minority or low-income populations or children.

Alternative 1 is not expected to significantly add to the cumulative effects on socioeconomics, environmental justice, and protection of children of all past, present, and reasonably foreseeable actions.

Public Notice

A notice was published in the *Northwest Florida Daily News* on [insert date], inviting the public to review and comment on the draft final EA and draft Finding of No Significant Impact. The public comment period closed on [insert date], and [insert number] public comments were received. State agency correspondence indicated [insert summary]. Copies of agency correspondence and a copy of the public notice can be found in **Appendix C**, Public Involvement, of the REA.

FINDING OF NO SIGNIFICANT IMPACT

Based on my review of the facts and analyses contained in the attached REA, conducted under the provisions of NEPA, CEQ regulations, and 32 C.F.R. Part 989, I conclude that implementation of the projects identified in the REA would not have a significant environmental impact, either by themselves or cumulatively with other projects at Eglin AFB. Accordingly, an Environmental Impact Statement is not required. The signing of this Finding of No Significant Impact completes the environmental impact analysis process.

MARK A. SCHLUETER, NH-04 DATE
Deputy Director, 96th Civil Engineer Group

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Acronyms and Abbreviations

7 SFG(A)	7th Special Forces Group (Airborne)
96 CEG/CEIEA	96th Civil Engineer Group/Environmental Planning Office
AAR	After Action Review
ADAIR	adversary air
AFB	Air Force Base
AFBI	Air Force Base Instruction
AFI	Air Force Instruction
AFRC	Air Force Reserve Command
AFS	Air Force Station
AIRFA	American Indian Religious Freedom Act
ALT-C	Alternate Qualification Course
AMU	Aircraft Maintenance Unit
AOR	Area of Responsibility
APE	Area of Potential Effects
ARM	Advanced Rifle Marksmanship
ARPA	Archaeological Resources Protection Act
ARTY	Artillery
BA	Biological Assessment
BASH	Bird/wildlife Aircraft Strike Hazard
BMP	best management practices
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CACTF	Combined Arms Collective Training Facility
CATEX	Categorical Exclusion
CCMCK	Close Combat Mission Capability Kit
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO2	carbon dioxide
CO2e	carbon dioxide equivalent
CS	Corson Stoughton
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
dB	decibel
dBA	A-weighted decibel
dBP	peak sound level
DNL	Day-night Sound Level
DOF	Direction of Fire
DoD	Department of Defense
DZ	Drop Zone
EA	Environmental Assessment
EBD	Environmental Baseline Document
EGTTR	Eglin Gulf Test and Training Range
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ERP	Environmental Restoration Program
ESA	Endangered Species Act

ETTC	Eglin Test and Training Complex
FAC	Florida Administrative Code
FARC	Fuerzas Armadas Revolucionarias de Colombia
FCMP	Florida Coastal Management Program
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FNAI	Florida Natural Areas Inventory
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
FTU	formal training unit
FWC	Florida Fish and Wildlife Conservation Commission
GHG	greenhouse gas
GLR	Grenade Launcher Range
HAP	hazardous air pollutant
HQNC	High-Quality Natural Community
ICRMP	Integrated Cultural Resources Management Plan
IED	Improvised Explosive Device
IJTS	Initial Joint Training Site
INRMP	Integrated Natural Resources Management Plan
IMCOM	Installation Management Command
km2	Square Kilometers
Leq	Equivalent Sound Level
METL	Mission Essential Task List
m	meters
MBTA	Migratory Bird Treaty Act
MFH	military family housing
mm	millimeter
MOU	Memorandum of Understanding
MRAP	Mine-Resistant, Ambush Protected
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves and Repatriation Act
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
NSA	National Security Agency
NSC	North-South Corridor
NEW	net explosive weight
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
NPS	National Park Service
NRHP	National Register of Historic Places
NSAv	Non-Standard Aviation
NWFWMD	Northwest Florida Water Management District
OMB	Office of Management and Budget
ONA	Outstanding Natural Area
OSHA	Occupational Safety and Health Administration
PBO	Programmatic Biological Opinion
PM10	particulate matter less than 10 microns in diameter

PM2.5	particulate matter less than 2.5 microns in diameter
POW	Prisoner Of War
PYRO	Pyrotechnics
RC3	Range Configuration Control Committee
RCS	Report Control Symbol
RCW	red-cockaded woodpecker
RDX	Research Department Explosive
REA	Range Environmental Assessment
ROD	Record of Decision
RFMSS	Range Facility Management Support System
ROCA	Range Operations and Control Area
ROI	Region of Influence
RSL	Regional Screening Level
SDZ	Surface Danger Zone
SIM	Simulator
SRTA	Short-Range Training Ammunition
SBS	Significant Botanical Site
SESAMS	Special Effects Small Arms Marking System
SESOIL	Soil Compartment Model
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Office
SOP	Standard Operating Procedures
SSB	Soil Screening Benchmark
STRAC	Standards in Training Commission
SOF	Special Operations Forces
TA	Test Area
TCP	Traditional Cultural Property
TNT	Trinitrotoluene
TP	Training Practice
TTA	Tactical Training Area
tpy	tons per year
TR	Training Range
UAS	unmanned aerial system
USACE	U.S. Army Corps of Engineers
USATR	U.S. Army Training Range
USFWS	U.S. Fish and Wildlife Service
UXO	Unexploded Ordnance
VOC	volatile organic compound
WRCA	Water Resource Caution Areas
WST	Weapons System Trainer

SECTION 1

Purpose and Need for the Proposed Action

1.1 Introduction

Eglin Air Force Base (AFB), located in northwestern Florida, is home to the Eglin Test and Training Complex (ETTC). As a critical part of the Major Range Test Facilities Base, Eglin AFB's primary functions are to support research, development, testing, and evaluation of conventional weapons and electronic systems, and to support multi-service air and ground training of operational units.

In 2005, Base Realignment and Closure (BRAC) was implemented, moving the Army's 7th Special Forces Group (Airborne) (7 SFG[A]) from Fort Bragg, North Carolina, to the ETTC, as well as the beddown of the Joint Strike Fighter (JSF)/F-35 and Initial Joint Training Site (IJTS). The Record of Decision (ROD) for the actions presented in the *Proposed Implementation of the Base Realignment and Closure (BRAC) 2005 Decisions and Related Actions Final Environmental Impact Statement (EIS)* was signed on 05 February 2009, which created a cantonment area and accompanying ranges for the 7 SFG(A) on Eglin AFB. The group requires specific types of ranges to train soldiers and prepare them for global conflicts. BRAC actions analyzed the group's initial movement from Fort Bragg and creation of the then-necessary ranges at Eglin AFB. However, due to an array of new global threats over the last decade, both in terms of scope and type, the training requirements needed to address these latest threats require construction of new range facilities.

The Army, in coordination with the Air Force, proposes to construct and maintain new ranges for training operations and to implement a new level of activity for training on the B-88 Range Complex, Tactical Training Area (TTA) I-36 Live Fire Maneuver Area, and the Light Demolitions Range at C-53A (C-53A Light Demolition Range). In support of these activities, the Air Force has prepared this Range Environmental Assessment (REA) for this Proposed Action. This REA analyzes the potential environmental impacts of anticipated future range development, current operations conducted on the ranges, as well as the potential environmental impacts of a mission surge in operations expected to occur during wartime or other significant military involvement. This REA has been prepared in accordance with the National Environmental Policy Act (NEPA) (Title 42, U.S. Code, Section 4321 et seq.), Air Force implementing regulations (32 Code of Federal Regulations [CFR] Part 989), and Department of Defense (DoD) directives.

1.2 Purpose and Need

The purpose of the Proposed Action is to address the requirements for facility enhancements to the B-88 Range Complex, while authorizing and implementing a level of activity for training operations conducted on the B-88 Range Complex, the proposed TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolition Range at Eglin AFB, for the next five to 10 years. This REA will allow the Air Force to efficiently assess routine training programs that request access to these ranges on a regular basis as well as requests generated during crisis situations.

The potential environmental impacts of the operations conducted on the ranges were last analyzed in the *2005 BRAC EIS* (United States [U.S.] Air Force 2008). Changes have occurred that warrant an update of the environmental impact analysis associated with range operations, and include the following:

- B-88 Ranges have new training requirements as a result of emerging threats, changes in doctrine, and new technologies.
- The populations of residential communities near Eglin AFB have increased.
- Federal, state, Air Force, and Army regulations have changed.

The Proposed Action is needed due to the ever-changing threats, to support the Army's primary focus of transitioning from counter-insurgency operations to conventional force-on-force warfare. Range requirements are driven by Standards in Training Commission (STRAC) and the unit's Mission Essential Task List (METL). By updating the environmental impact analysis for operations within the B-88 Range Complex and the C-53A Light Demolition Range, this REA will allow more streamlined and accurate environmental review of requests to conduct operations within these areas. Future operations, routine or otherwise, may be categorically excluded from detailed environmental analyses through the Categorical Exclusion (CATEX) process if they are determined to be similar in scope to those analyzed in this REA.

1.3 Location of the Proposed Action

The ETTC encompasses approximately 839 square kilometers (km^2) of land in the Florida Panhandle and consists of the Eglin Reservation in Santa Rosa, Okaloosa, and Walton Counties, as well as property on Santa Rosa Island and Cape San Blas (Figure 1-1). Eglin AFB includes land assets, cantonment areas, and the ETTC. The ETTC is composed of the following five components:

- Test Areas (TAs)/sites
- Training ranges (TRs)
- Interstitial areas (areas beyond and between the TAs)
- Eglin Gulf Test and Training Range (EGTTR)
- Airspace (over land and water)
- Estuarine and riverine areas

The B-88 Range Complex and TTA I-36 Live Fire Maneuver Area, are located in the northern part of Eglin AFB near the 7 SFG(A) Cantonment Area (Figure 1-2), while the C-53A Light Demolition Range is located on the eastern part of the range near TA C-52 (Figure 1-3). This document will predominately utilize the Metric System (e.g., meters) for the standard unit of measure associated with military munitions and range descriptions; whereas building and facility descriptions (e.g., square feet), and environmental resource analyses will utilize the Imperial System which is more commonly used in the U.S.

1.4 Applicable Regulatory Requirements

Regulations relevant to NEPA and the resources assessed in this REA include, but are not limited to, the following:

- Title 40 CFR Parts 1500-1508
- Title 42, U.S. Code, Sections 4321-4370f
- Title 32 CFR Part 989, Environmental Impact Analysis Process
- Executive Order (EO) 11988, Floodplain Management, 24 May 1977 (amended by EO 13690)
- EO 11990, Protection of Wetlands, 24 May 1977

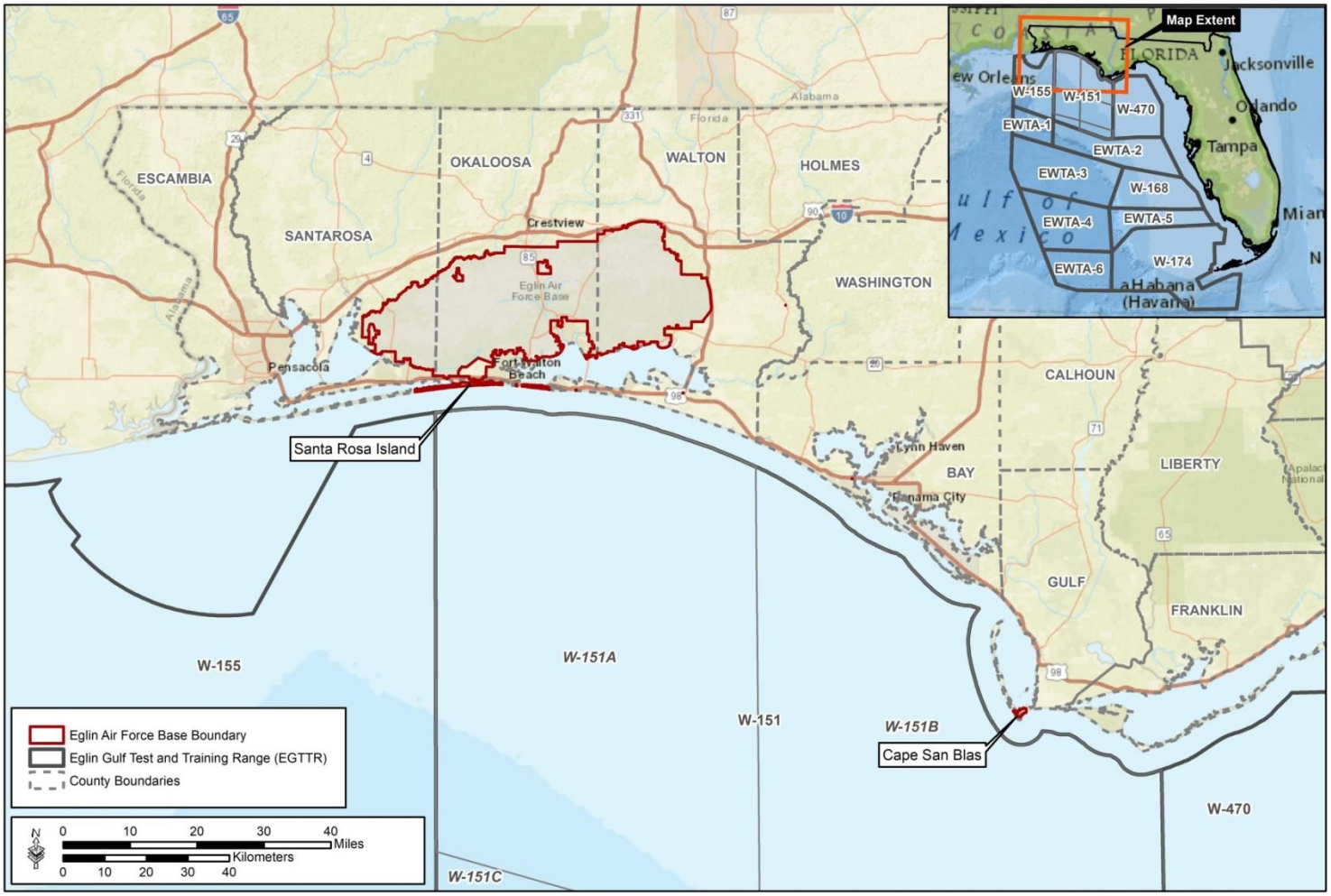

Figure 1-1. Eglin AFB and the EGTTR Vicinity Map

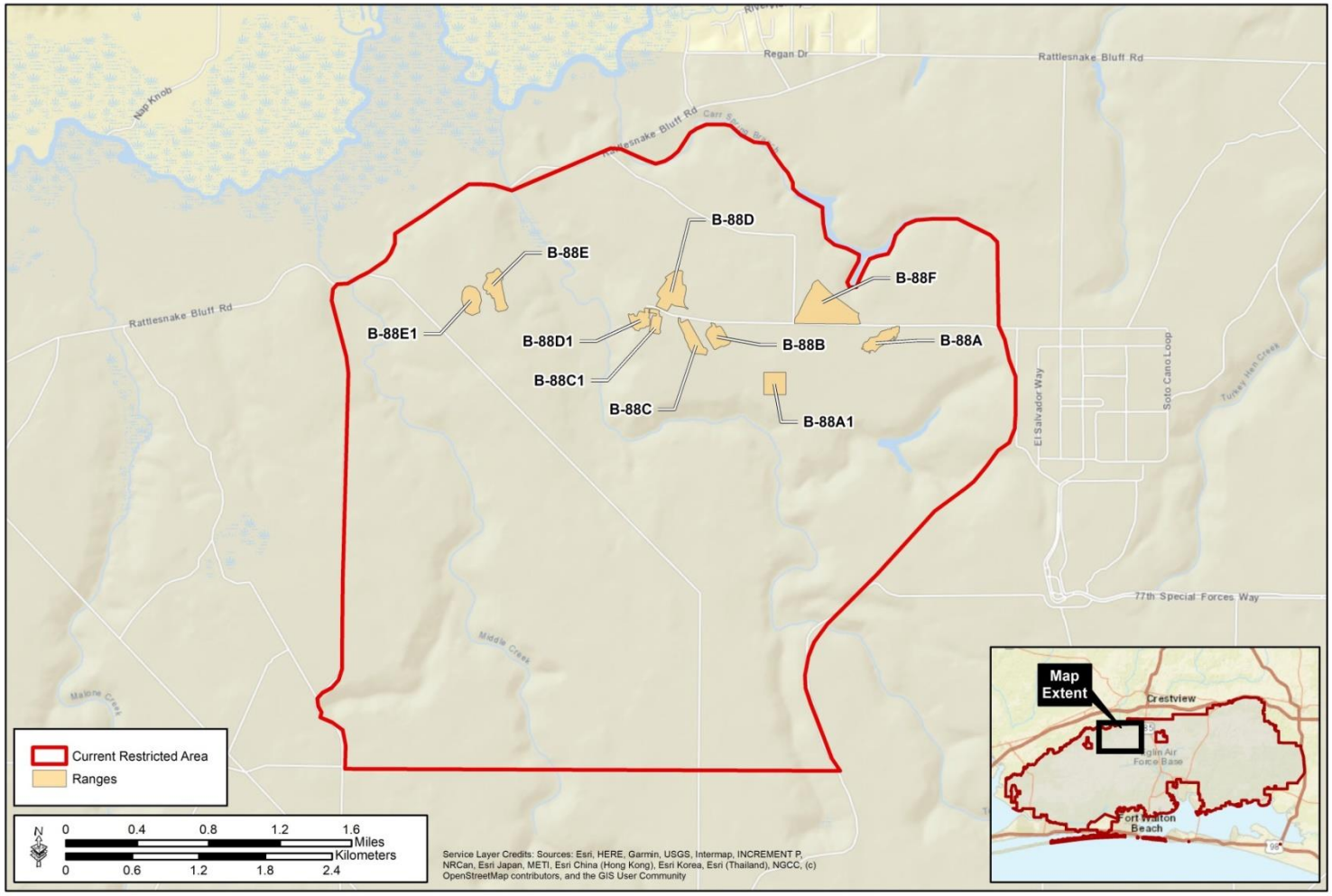

Figure 1-2. Locations of the B-88 Range Complex, Eglin AFB

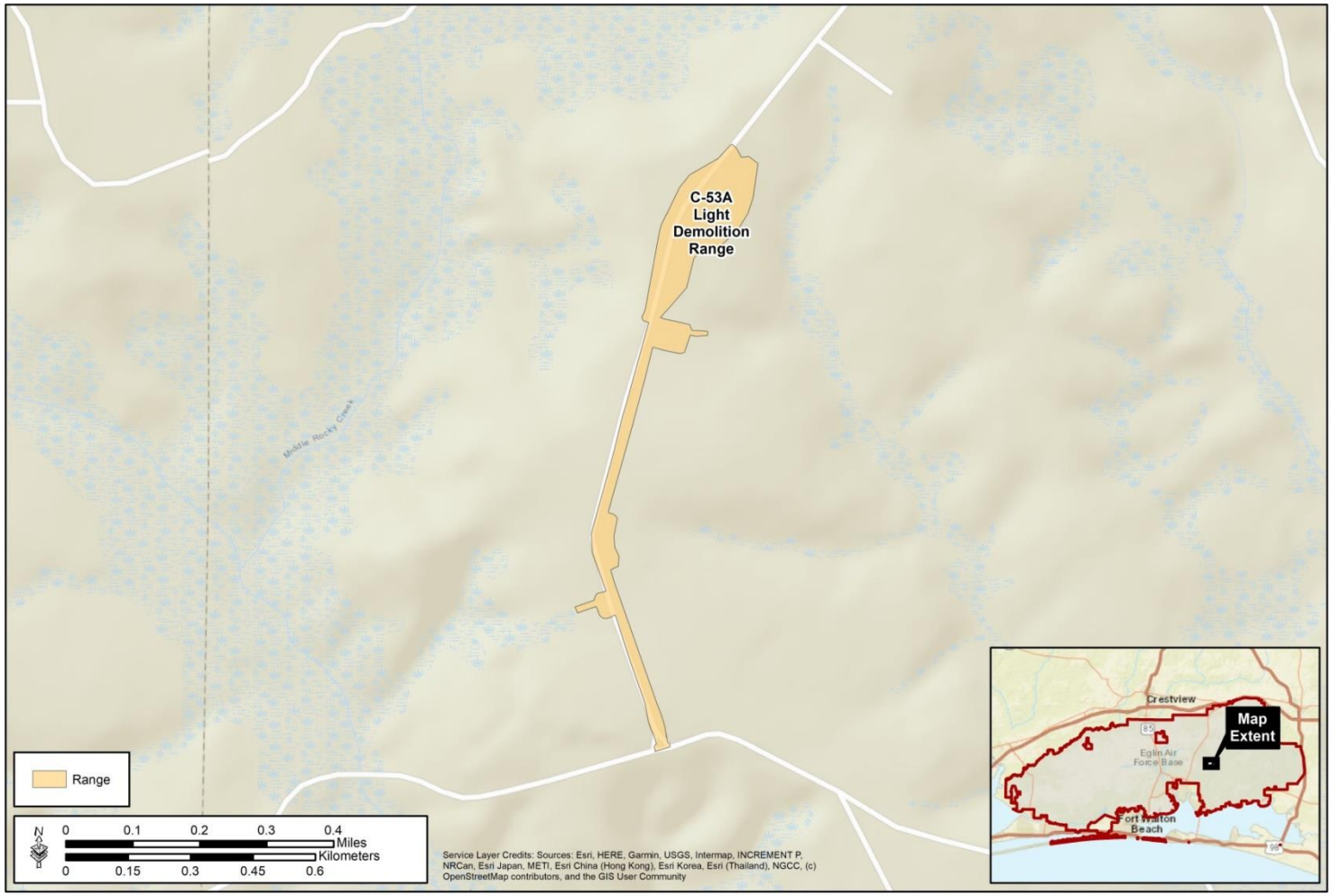

Figure 1-3. Location of the C-53A Light Demolition Range, Eglin AFB

- EO 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input, 30 January 2015 (amended EO 11988)
- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 11 February 1994
- EO 13175, Consultation and Coordination with Indian Tribal Governments, 6 November 2000
- EO 12372, Intergovernmental Review of Federal Programs, 14 July 1982
- DoD Instruction 4715.9, Environmental Planning and Analysis, 3 May 1996
- Air Force Instruction (AFI) 32-7064, Integrated Natural Resources Management, 18 November 2014
- AFI 32-7065, Cultural Resources Management Program, 19 November 2014
- AFI 13-212, Range Planning and Operations, 23 April 2015
- Eglin Air Force Base Instruction (AFBI) 13-212, Range Planning and Operations, 30 April 2015
- Noise Control Act, Title 42, U.S. Code, Sections 4901 et seq.
- Clean Air Act (CAA), Title 42, U.S. Code, Sections 7401 et seq.
- Rivers and Harbors Act, Title 33, U.S. Code, Section 401
- Clean Water Act, Title 33, U.S. Code, Sections 1251 et seq.
- National Historic Preservation Act, Title 16, U.S. Code, Section 470
- Archaeological Resources Protection Act, Title 16, U.S. Code, Section 470
- Endangered Species Act, Title 16, U.S. Code, Section 1531 et seq.
- Migratory Bird Treaty Act, Title 16, U.S. Code, Sections 703-712
- Bald and Golden Eagle Protection Act, Title 16, U.S. Code, Sections 668-668d
- Coastal Zone Management Act (CZMA), Title 16, U.S. Code, Section 1451 et seq.
- Resource Conservation and Recovery Act, Title 42, U.S. Code, Section 6901 et seq.

The Air Force follows 32 CFR Part 989, which specifies the procedural requirements for the implementation of NEPA and requires consideration of environmental consequences as part of the planning and decision-making process. Regulation 32 CFR Part 989.14(g) requires preparation of a Finding of No Practicable Alternative (FONPA) when the alternative selected is located in waters of the U.S. or floodplains.

1.5 Objectives of the Environmental Assessment

The objectives of this REA are as follows:

- Provide sufficient evidence and analysis for determining whether to prepare a Finding of No Significant Impact (FONSI) or an Environmental Impact Statement (EIS) with a ROD.
- Aid in the Air Force's compliance with NEPA when an EIS is not necessary and facilitate preparation of an EIS when necessary.

1.6 Interagency Coordination and Public Involvement

The Air Force invites public participation in the evaluation of the Proposed Action through the NEPA process. Consideration of the views and information of all interested persons promotes open communication and enables better decision-making. The Intergovernmental Coordination Act and EO

35 12372, Intergovernmental Review of Federal Programs, require Federal agencies to cooperate with, and consider, state, local, and other Federal agency views in implementing a Federal proposal.

All agencies, organizations, and members of the public with a potential interest in the Proposed Action will be given an opportunity to provide comments on this REA during a 30-day public review period. At the end of the 30-day public review period, the Air Force will consider all comments received. The Air Force may then execute a FONSI and proceed with the Proposed Action. If it is determined that implementation of the Proposed Action would result in significant environmental impacts, the Air Force will either publish in the *Federal Register* a Notice of Intent to prepare an EIS, revise the Proposed Action to avoid significant environmental impacts, incorporate mitigation to reduce environmental impacts to less than significant, or not take the action.

1.7 Coastal Zone Management Act (CZMA) Consistency

The CZMA provides assistance to states, in cooperation with Federal and local agencies, for developing land and water use programs in coastal zones. According to Section 307 of the CZMA, Federal projects that affect land use, water use, or coastal resources in a state's coastal zone must be consistent, to the maximum extent practicable, with the enforceable policies of that state's federally approved coastal zone management plan.

The Florida Coastal Management Program (FCMP) is based on a network of agencies implementing 24 statutes that protect and enhance Florida's natural, cultural and economic coastal resources. The Florida Department of Environmental Protection (FDEP) implements the FCMP through the Florida State Clearinghouse. The Clearinghouse routes applications for Federal activities, such as Environmental Assessments (EAs), to the appropriate state, regional, and local reviewers to determine Federal agency consistency with the FCMP. Following review of the EA, the FCMP state agencies provide comments and recommendations to the Clearinghouse based on their statutory authorities. Based on an evaluation of the comments and recommendations, FDEP provides a concurrence of the Federal agency's CZMA consistency determination for the proposed Federal activity. Comments and recommendations regarding Federal agency consistency are then forwarded to the applicant in the state clearance letter issued by the Clearinghouse.

Copies of the draft REA, along with the Air Force's Federal CZMA consistency determination (Appendix A), are being sent to the Florida State Clearinghouse to obtain the state's CZMA concurrence of the Air Force's consistency determination for the Proposed Action. The state's CZMA concurrence with the Air Force's consistency determination for the Proposed Action and associated comments will be included in Appendix B and addressed in the final REA. The Air Force will consider all comments received.

1.8 Stakeholders

The Air Force is consulting directly with the U.S. Fish and Wildlife Service (USFWS) on the Proposed Action. Consultation with pertinent state stakeholders is occurring through the Florida State Clearinghouse. Comments from all stakeholders will be included in Appendix B and addressed in the final REA. The Air Force will consider all comments which it receives. The Army's Installation Management Command (IMCOM) is also a stakeholder for this Proposed Action and REA document.

1.9 Public Involvement

A 30-day public review period will be announced in a public Notice of Availability (NOA) – which informs the public of the availability of the draft REA for review and comment – placed in the *Northwest Florida Daily News* newspaper. A copy of the draft REA will be made available for public review on the Eglin AFB public website; www.eglin.af.mil/environmentalassessments.asp. Copies of the NOA and public review correspondence will be included in Appendix C and public comments will be addressed in the final REA. The Air Force will consider all comments which it receives. If you have any questions or require additional assistance please contact Michael Spaits, GS-12, Public Affairs Specialist, 96 TW/PA, 101 W. D Ave, Room 238, Eglin AFB, FL 32542; (850) 882-2836; michael.spaits@us.af.mil.

The Air Force is aware of the potential impact of the ongoing coronavirus (COVID-19) pandemic on the usual methods of access to information and ability to communicate, such as the mass closure of local public libraries and challenges with the sufficiency of an increasingly-overburdened internet. The Air Force seeks to implement appropriate additional measures to ensure that the public and all interested stakeholders have the opportunity to participate fully in this Environmental Assessment process. Accordingly, please do not hesitate to contact us directly at the email address or telephone number provided above; we are available to discuss and help resolve issues involving access to the Draft EA and Proposed FONSI, or the ability to comment.

SECTION 2

Description of the Proposed Action and Alternatives

2.1 Proposed Action

The Army's IMCOM, with the authorization of the Range Configuration Control Committee (RC3), plans to renovate and construct facilities within the B-88 Range Complex (also known as the "Backyard Ranges"). Operations within the B-88 Range Complex and the C-53A Light Demolition Range will occur in order to prepare soldiers for deployment in support of combat operations around the world. Existing TR facilities within the B-88 Range Complex include:

- B-88A – Hand Grenade Qualification Course
- B-88A1 – Hand Grenade Familiarization Range
- B-88B – Live Fire Exercise Breach Facility
- B-88C – Two-Story Live Fire Shoot House, with Sniper Tower
- B-88C1 – 100m Range
- B-88D – Shotgun Assault Course
- B-88D1 – 25m Range
- B-88E – Urban Assault Course
- B-88F – Dismount Improvised Explosive Device (IED) Lane and IED Training Site

The Light Demolitions Range is the only facility within the C-53A range.

The Army's Proposed Action is to provide facility enhancements to the B-88 Range Complex, while authorizing and implementing a level of activity for training operations conducted on the B-88 Range Complex and the C-53A Light Demolition Range at Eglin AFB. The Region of Influence (ROI) of the Proposed Action is the entire land area within the boundaries of the B-88 Range Complex and the C-53A Light Demolition Range. The B-88 Range Complex and the C-53A Light Demolition Range operations are defined as those that originate, traverse, and/or terminate on the ranges.

2.1.1 B-88A – Hand Grenade Qualification Course

Range B-88A consists of an 8.82-acre range with a 7-station hand grenade qualification course that is intended to train and test individual soldiers on the skills necessary to employ hand grenades against stationary targets utilizing practice grenades. Live grenades are not authorized at this location. The maximum ground munitions authorized are Close Combat Mission Capability Kit (CCMCK), Practice Grenades, and Ground Burst and Artillery Simulators. Support facilities include an ammunition issue point, dry vault latrine, covered mess area, classroom, and storage area. The course provides the following qualification stations (U.S. Army 2016):

- Station 1: Engage a group of F-type silhouettes in open 35 meters (m) from 2-man foxhole.
- Station 2: Engage a bunker with two firing ports.
- Station 3: Engage a fortified 81 millimeters [mm] mortar position at a distance of 20 m.
- Station 4: Engage groups of targets behind cover from a distance of 20 m.
- Station 5: Clear an entry point to a trench 25 m away.
- Station 6: Engage troops in halted, open wheeled vehicle at 25 m.
- Station 7: Identify hand grenades by shape, coloring, markings, and capabilities.

2.1.2 B-88A1 – Hand Grenade Familiarization Range

Range B-88A1 consists of a 9.88-acre range with a holding area, Officer in Charge (OIC)/Range Safety Officer (RSO) Observation Bunker and three throwing lanes. This range is used to train individual soldiers in the employment of live fragmentation hand grenades and M18A1 Claymore mines. The maximum ground munitions that are authorized include the M18A1 Claymore Mines and offensive/Fragmentary Hand Grenades; traditional munitions have included blasting caps, grenades, claymores, artillery simulator pyrotechnics (Arty Sim/Pyro), and chemical agents (CS [Corson Stoughton] gas capsules; i.e., tear gas). Support facilities include three throwing bays, an observation bunker, covered staging area, and a parking area. The range provides a single station consisting of one throwing bay per lane with knee high walls. Claymore and hand grenade training are not to be conducted simultaneously (U.S. Army 2016).

2.1.3 B-88B – Live Fire Exercise Breach Facility

Range B-88B consists of a 7.72-acre range encompassing a heavy wall breach area, door and window breach area, vehicle breach area, mechanical breach area, and ballistic door and window breach area. It provides a range facility where initial and sustainment barrier penetration training is conducted such as ballistic, mechanical, and explosive breaching. Independent stations support simultaneous breaches and accommodate concurrent training in the construction of standard and specialized charges. The maximum net explosive weight is 12.81 lbs for heavy wall breach and 0.66 pounds (lbs) for all other breaching. The facility can also accommodate 12 gauge XM1030 breaching rounds at station E only; traditional munition use includes 12 gauge rounds, blasting caps, fuse/initiator, charges, and detonation cord. Support facilities include a classroom, ammunition issue point, storage building, a climate controlled charge construction area, a dry vault latrine, and a parking area. The facility provides the following breach capabilities stations (U.S. Army 2016):

- Station A: Heavy wall breach (three walls)
- Station B: Door and window explosive breaching
- Station C: Vehicle breach area (Mechanical)
- Station D: Mechanical breach area
- Station E: Ballistic wall and window breach (Shotgun)

2.1.4 B-88C – Two Story Live Fire Shoot House with a Sniper Tower

Range B-88C consists of a 2.76-acre range encompassing a 28-room, multi-story, Live Fire Shoot House (LFSH), and a sniper tower. The facilities' primary use is in support of precision close-quarter battle (CQB) training with explosive entry breaching under day or night conditions up to company level with the capability for sniper support. The maximum net explosive weight is 0.66 lbs for breaching. The maximum caliber authorized for use is the .300WIN MAG from the tower, 7.62mm in the LFSH building, and pyrotechnics; traditional munition use includes 9mm, .40 Cal, 5.56 mm, 7.62 mm, .300 WinMag, 12 gauge rounds, practice hand grenades, blasting caps, fuse/initiator, charges, explosive cutting tape (ECT), flash bang grenades, and detonation cord. Support facilities include an ammunition issue point, parking area, after action review building, storage building, and a dry vault latrine (U.S. Army 2016).

2.1.5 B-88C1 – 100m Range

Range B-88C1 consists of a 8.98-acre range. Its primary use is for day or night small arms training to include an Advanced Rifle Marksmanship (ARM), Alternate Qualification Course (Alt-C), stress-fire, reactionary fire, movement-in-depth, and movement-in-width marksmanship training. The maximum caliber authorized for use is 5.56mm for maneuver and 7.62 M80 Ball for stationary; traditional munition use includes 9mm, .40 Cal, 5.56 mm, 7.62 mm, 12 gauge rounds, and pyrotechnics. Support

Facilities include an ammunition issue point, parking area, range pavilion, and a storage building (U.S. Army 2016).

2.1.6 B-88D – Shotgun Assault Course

Range B-88D consists of a 16.17-acre range encompassing 10 stations that are primarily used to train engagement of single and multiple targets at short, intermediate, and long ranges; while moving to include appropriate use of cover and concealment, negotiation of obstacles, urban movement techniques, reloading while moving, and barrier negotiation. Independent stations support snap target engagement drills and determination of shot dispersion patterns. The maximum caliber authorized for use is 12 gauge 00 shot and CCMCK; traditional munition use includes 12 gauge rounds. Support facilities include an ammunition issue point, parking area, range pavilion, and a dry vault latrine. The shotgun assault course provides the following training stations (U.S. Army 2016):

- Station 1: Load Table
- Station 2: Low Wall Obstacle
- Station 3: High Wall Obstacle
- Station 4: Bridge Obstacle
- Station 5: Crawlspace Obstacle
- Station 6: Maze Obstacle
- Station 7: 10-foot High Wall Obstacle
- Station 8: Culvert Obstacle
- Station 9: 10m Shotgun Dispersion Range with 10 Bays
- Station 10: Trap Range with 5 shooting trails starting from 15 to 35 yards

2.1.7 B-88D1 – 25m Range

Range B-88D1 consists of a 6.26-acre, 25-m range with 16 lanes. Its primary use is for day or night small arms training to include ARM, Alt-C, stress-fire, reactionary fire, movement-in-depth, and movement-in-width marksmanship training. The maximum caliber authorized for use is 5.56 mm for maneuver and 7.62 M80 Ball stationary; traditional munition use includes 9 mm, .40 Cal, 5.56 mm, 7.62 mm, and 12 gauge rounds. Support facilities include an ammunition issue point and a parking area (U.S. Army 2016).

2.1.8 B-88E – Urban Assault Course

Range B-88E consists of an 11.65-acre range encompassing 5 stations that are used to train individual soldiers, squads, and platoons on tasks necessary to operate within a built-up urban area. The maximum caliber authorized for use is 7.62mm, M203 40 mm Training Practice (TP) (Station 3), Short-Range Training Ammunition (SRTA) rounds , and Demolitions (.66-lbs NEW); traditional munition use includes 9 mm, .40 Cal, 5.56 mm, 7.62 mm, .300 WinMag, 12 gauge rounds, practice grenades, pyrotechnics, blasting caps, fuse/initiator, detonation cord, charges, and chemical agents (CS gas). Support facilities include an ammunition issue point, parking area, classroom, storage building, and a dry vault latrine (U.S. Army 2016).

2.1.9 B-88E1 – FARC Camp

FARC Camp (B88-E1) is a non-live fire facility, functionally tied to the B-88E Urban Assault Course and a component of the Range Facility Management Support System (RFMSS). The FARC Camp is used to test and train soldiers on their ability to conduct counter drug operations, hostage rescue, and reconnaissance techniques. FARC Camp consists of a wood fabricated, primitive drug lab, prisoner of war (POW) site and has frond-roof shacks, similar to what is found in the Southern AOR. All training is restricted to CCMCK/Special Effects Small Arms Marking System (SESAMS), pyrotechnics, and smoke; ball ammunition is not authorized.

2.1.10 B-88F – Dismount Improvised Explosive Device (IED) Lane and IED Training Site

Training Site B88-F consists of a 33.27-acre site encompassing five patrol lanes where simulated IEDs could be concealed along the routes.

B-88F is used to train soldiers in the identification and defeat of IEDs. There are five lanes to train the soldiers on how to detect in different soil environments and a small mock village to train them how to detect threats in urban environments. There is no live fire and no explosives involved in the training (U.S. Army 2016).

2.1.11 C-53A – Light Demolition Range

Range C-53A consists of a 23.13-acre range encompassing a 6-station, light demolition range. Its primary use is demolition training up to 160-lbs Net Explosive Weight (NEW) including Boosters. Maximum ground munitions authorized for use are bare charges, non-fragment-producing high explosives up to 160 lbs NEW; traditional munitions have included detonation cords, blasting caps, charges, firing devices, fuse/initiators, Arty Sim/Pyro, claymores, and ECT. Support facilities include an ammunition issue point, parking area, dry vault latrine, explosive storage magazine (8 ft x 20 ft) with two separate compartments, and three concrete bunkers (30 ft x 10 ft). The range provides the following training area stations (U.S. Army 2016):

- Station 1: Road Crater Training Area
- Station 2: Mine Field Training Area
- Station 3: Concrete Obstacle Training Area
- Station 4: Steel Cutting Training Area
- Station 5: Wire Obstacle Training Area
- Station 6: Timber Cutting Training Area

2.2 Alternatives Carried Forward for Detailed Analysis

Under NEPA and 32 CFR Part 989, this REA is required to analyze the potential environmental impacts of reasonable alternatives of the Proposed Action, including the No Action Alternative. Reasonable alternatives are those that meet the underlying purpose of, and need for, the Proposed Action, are feasible from a technical and economic standpoint, and, if applicable, meet reasonable screening criteria (selection standards) that are suitable to a particular action. Alternatives that are determined unreasonable can be eliminated from detailed analysis in this REA.

The alternatives carried forward for detailed analysis in this REA were developed by the Army Support Activity - Eglin Range Officer and the 96th Civil Engineer Group/Environmental Planning Office (96 CEG/CEIEA) in coordination with representatives from various Eglin AFB units involved in planning and oversight of testing and training operations at Eglin AFB. The following alternatives are analyzed in detail in this EA:

- Alternative 1: Enhancement and Mission Surge - Enhancing the B-88 Range Complex and the C-53A Light Demolition Range capabilities with new facility construction, range expansion, and a 25 percent mission surge of operations above the current baseline level.
- Alternative 2: Mission Surge Only - A 25 percent mission surge of operations at the B-88 Range Complex and the C-53A Light Demolition Range above the current baseline level with no new facility construction or range expansion.
- Alternative 3: No Action Alternative - Maintaining the B-88 Range Complex and the C-53A Light Demolition Range annual operations at the current baseline level.

2.3 Alternative 1 – Enhancement and Mission Surge

Alternative 1 provides for the enhancement of the B-88 Range Complex and the C-53A Light Demolition Range capabilities with new facility construction, range expansion (TTA I-36 Live Fire Maneuver Area), and a 25 percent mission surge of operations above the current baseline level. Due to ever-changing threats, the Army's primary focus is transitioning from counter-insurgency operations to conventional force-on-force warfare. This transition requires new training facilities at, and adjacent to the B-88 Range Complex, such as the following:

- Combined Arms Collective Training Facility (CACTF) with a Subterranean Military Complex (Military Construction [MILCON] Project)
- Grenade Launcher Range
- After Action Review (AAR) Classroom
- Advanced Drivers Training Course (MILCON Project)
- Red Empire Drop Zone
- Trench Complex
- Tactical Training Area (TTA) I-36: Live Fire Maneuver Area
- Future Minor Construction or Facility Modification

These new training facilities will meet Army specifications and will be operated in compliance with the Army Standards listed in *Training Circular (TC) 25-8 Training Ranges, Army Regulations (AR) 385-63 Range Safety, Department of the Army (DA) Pamphlet (PAM) 385-63 Range Safety*, *U.S. Army Training Range (USATR) Reconnaissance, Selection and Occupation of a Position (RSOP)*, and *Eglin AFB Instruction (EAFBI) 13-212, Range Planning and Operations* (U.S. Army 2016). The proposed facilities would be built inside the existing 27.5 km^2 of the B-88 Profile, plus an adjacent new Live Fire Maneuver Area (TTA I-36) which would occupy 4.33 km^2 (Figure 2-1).

2.3.1 CACTF with a Subterranean Military Complex

Army units require a new facility complex in order to conduct a full spectrum of training operations (non-live fire) from Soldiers to Battalion Task Force leadership (multi-echelon level) in a peer level urban environment. The facility would be used primarily to train commanders and subordinate leaders in coordinated urban environment operations. The expendables to be used at the CACTF would include CCMCK, ECT, detcord, blasting caps, fuse initiators, charges, Arty Sim/Pyro, firing devices, and chemical agents. The total annual expendable quantities estimated for the CACTF are provided in Table 2-1.

This MILCON project would consist of approximately 28 buildings (to be determined) such as a school, church with cemetery, police station/jail, hotel, nine single residences, four businesses, one townhouse complex (five townhomes), bank, warehouse, government building, office building, service station, Subterranean Military Complex, soccer field, shanty town, clinic and a Range Operations and Control Area (ROCA). The Subterranean Military Complex consists of a series of tunnels, underground bunkers, and a subway station. Table 2-2 provides the representative buildings and approximate sizes used for this notional scenario.

A CACTF is considered a complete town development that is likely affected by the environment, population, budget, and purpose of the specific Army units performing the training and is by far, the most complex training facility for construction in DoD. As such, a notional scenario for a CACTF (with a subterranean military complex) is being proposed for this environmental analysis, where building sizes and configurations are approximate, yet reasonably representative of the future CACTF to be constructed.

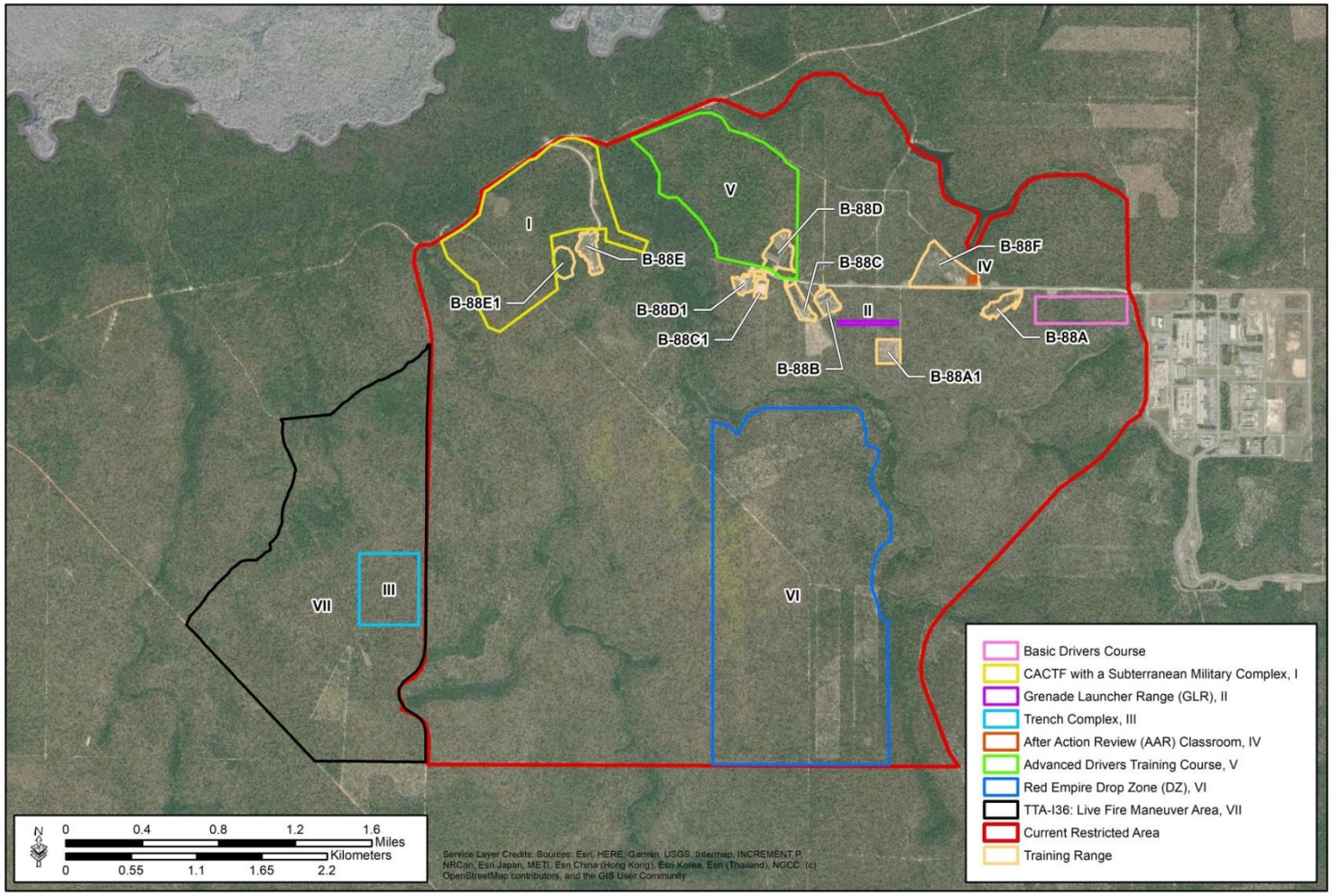

Figure 2-1. Locations of Construction Activities at the B-88 Range Complex and the TTA I-36 Live Fire Maneuver Area, Eglin AFB

Table 2-1. CACTF Annual Expendable Quantities

REA for B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and C-53A Light Demolitions Range

CACTF	Total	Unit Type
40 mm TP	10,000	Rounds
Arty Sim/Pyro	1,500	Single Unit
Chemical Agent(CS gas)	1,500	Single Capsule
Grenade Simulator	1,500	Rounds
Riot Control Agent	300	Rounds
Flashbang	1500	Rounds
Smoke	1500	Rounds
CCMCK	35,000	Single Unit

Source: Eglin AFB, 2019

Table 2-2. Notional CACTF with Representative Facilities and Buildings Sizes

REA for B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and C-53A Light Demolitions Range

Proposed List of Facilities	Estimated Building Size (Square feet)
School	65,000
Church with Cemetery	45,000
Police Station	50,000
Hotel	60,000
Single Residence (9 total)	18,000
Businesses (4 total)	8,000
Townhouse with 5 Individual Homes with Basements	10,000
Bank	6,000
Government Building	16,000
Office Building	16,000
Service Station	40,000
Subterranean system linking the buildings	180,000
Subway Station	2,500
Soccer Field	60,000
Shanty Town	10,000
Military/POW Station	10,000
Clinic	3,000
Interconnected roads[1]	500,000
Range Operations Center/After Action Review Building	3,000
Operations Storage	1,200
Battery Support	1,200
Latrine	500
Total square footage	**1,105,400**

Source: Eglin AFB, 2019

Note: [1] – May be paved or graveled depending on funding.

During the actual design phase, the responsible Army unit may decide to expand or reduce the size and configuration (and appropriate level of resources) for one particular building. As such, buildings may be added, modified, or removed due to actual funding and unit requirements. Additionally, during the landscape configuration, certain environmental issues may compete with the actual tactical requirements for an area, thus requiring a size reduction and/or relocation of a particular building. Further, new mission-related tactics, requirements, or lessons-learned over the next several years may also influence the layout, size, and ultimate configuration. The notional CACTF with a subterranean military complex is being proposed for placement within approximately 10 km2 to the north and west of TR B-88E and TR B-88E1 (Figure 2-2). Due to the potential omnidirectional use of various munitions, and the draft (notional) design phase of the CACTF layout, it is premature to determine specific directions of fire (DOF) or establish a surface danger zone (SDZ).

2.3.2 Grenade Launcher Range (GLR)

Army units require a facility to train and test soldiers on the skills necessary to engage and defeat stationary target emplacements with individual 40 mm grenade launcher systems (using 40 mm grenades with TP). The GLR is proposed within the B-88 profile and will be approximately 30 m x 500 m. This project will entail the clearing of trees and construction will be accomplished by the Army Support Activity Range Control. Construction will consist of a window facade at 100 m, two wood bunker facades at 125 m and 175 m respectively, a machinegun position at 200 m, two zero targets at 200 m, five E-Type silhouettes at 250 m and 350 m, and a 30 m x 6 m trench (running north/south) at 300 m. The total annual expendable quantities estimated for the GLR is provided in Table 2-3.

Table 2-3. GRL Annual Expendable Quantities

REA for B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and C-53A Light Demolitions Range

GRL	Total	Unit Type
40 mm TP	**30,000**	Rounds

Source: Eglin AFB, 2019

The range would consist of four lanes; two prone positions, one kneeling position, and one midrange standing position. The facility would be located outside the SDZ for hand grenades and outside of the claymore SDZ for bays 1 and 2; no unexploded ordnance (UXO) producing rounds would be used on this facility, only simulation rounds. The predominate DOF is east to west (270 degrees). The hazard area distance (470 m), would be completely contained by this facility, but not the complete hazard area, as dispersion and ricochet will not be encompassed by the GLR facility. Grenade machineguns would not be used on this range. The primary use would be the M203, M79, and M320 grenade launchers. A notional schematic diagram of the GLR is provided in Figure 2-3, with the proposed location sited southwest of B-88F (Figure 2-4).

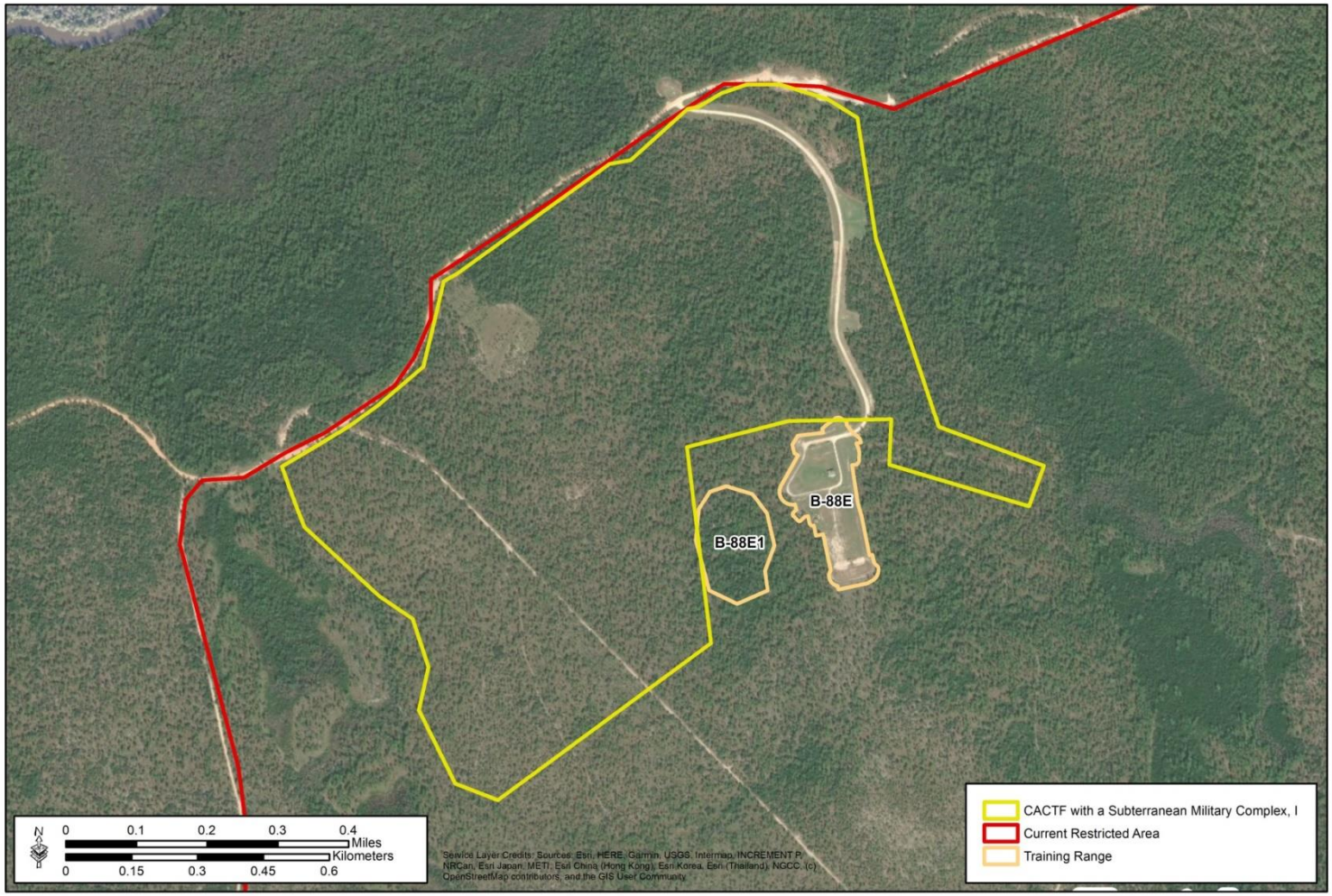

Figure 2-2. Location of the CACTF in Proximity to TR B-88E and TR B-88E1 within the B-88 Range Complex, Eglin AFB

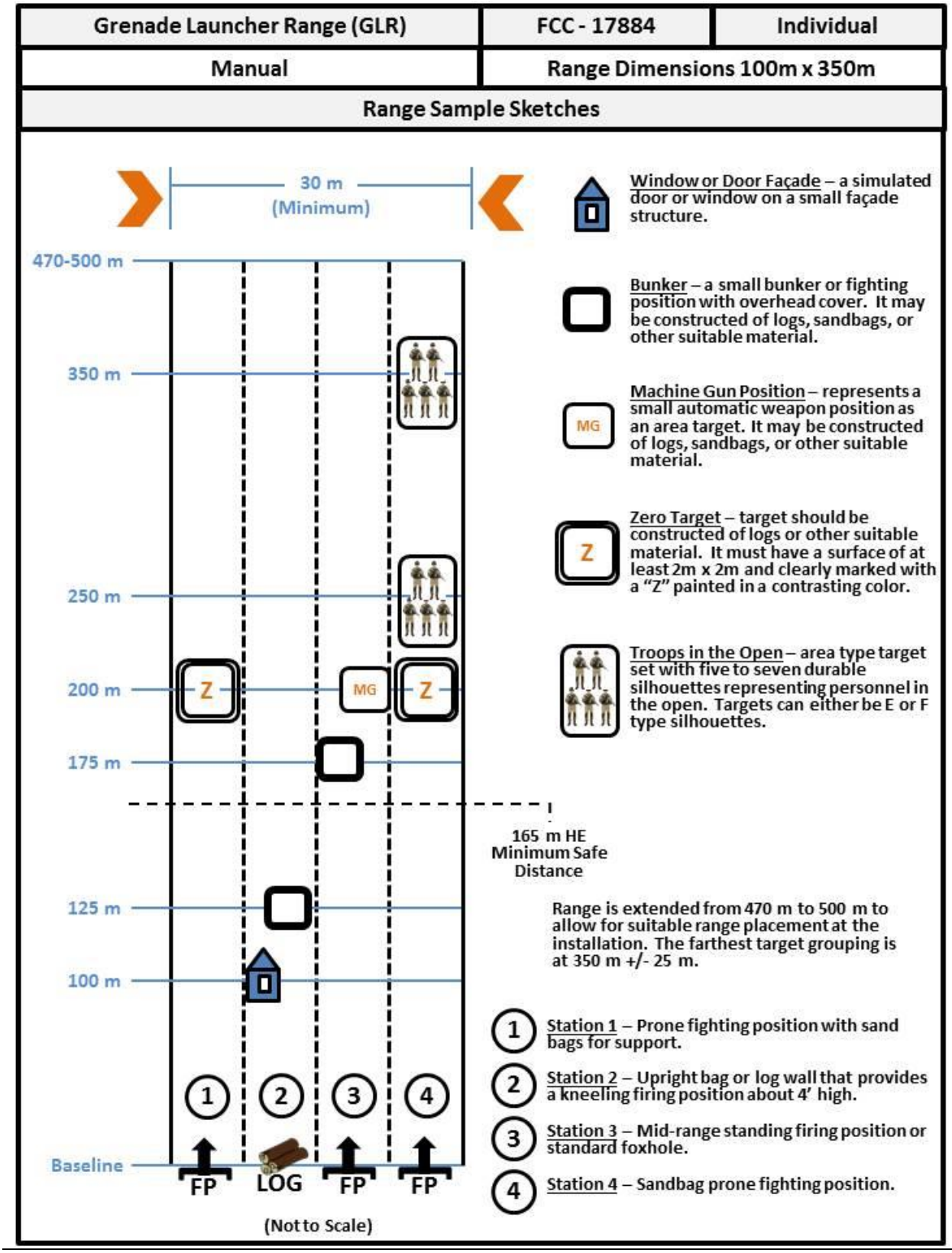

Figure 2-3. Notional Schematic Diagram of the Grenade Launcher Range Configuration

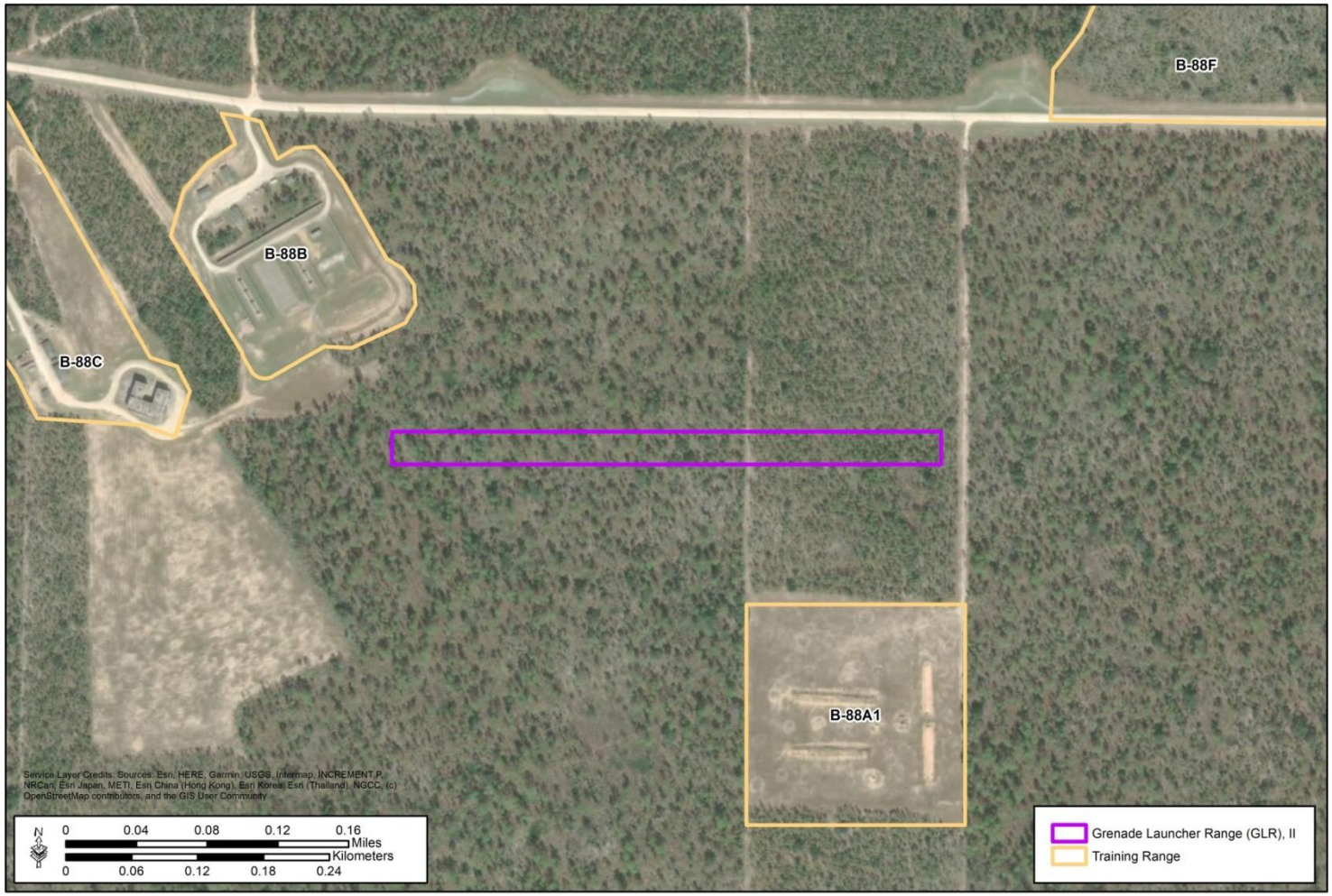

Figure 2-4. Location of the GLR East of TR B-88B within the B-88 Range Complex, Eglin AFB

2.3.3 After Action Review (AAR) Classroom

Army units require a space to conduct classroom training in preparation for, and after action review of, training conducted on TR B-88F. The building would be approximately 1,776 square feet and located in the southeastern corner of TR B-88F. The AAR Classroom will increase facility capability and unit combat capability. Figure 2-5 provides an example of an AAR Classroom, with the proposed location to be sited in the southeast corner of B-88F (Figure 2-6); this is a non-live fire facility.

Figure 2-5. Example of an AAR Classroom to be Constructed on TR B-88F on Eglin AFB

2.3.4 Advanced Drivers Training Course

Army units require a training course that heightens high mobility vehicle skill sets and operator situational awareness. The course will also facilitate maintenance operations allowing mechanics to fully articulate suspension components during road tests. The course would be approximately 0.04 km^2 and will facilitate proficiency training for the Mine-Resistant, Ambush Protected (MRAP) family of vehicles which teams are required to have prior to operational deployments. In addition to the Advanced Drivers Training Course, an unimproved road (with an elevation change) would be constructed as access to the course. Located to the west of the course and providing an important training capability, an approximately 0.08 km^2 skid pad also would also be constructed. A parking lot (approximately 0.01 km^2) with an access road would be constructed southeast of the course. This activity profile is scheduled on a daily basis as part of the 1B allocation for 7 SFG(A) training on the USATRs. No additional impacts to other test and training activities, nor to TR B-88D would be incurred by the addition of this range facility. A notional schematic diagram of the Advanced Drivers Training Course configuration is provided in Figure 2-7, with the proposed location to be sited northeast of, but not affecting B-88D (Figure 2-8) ; this is a non-live fire facility.

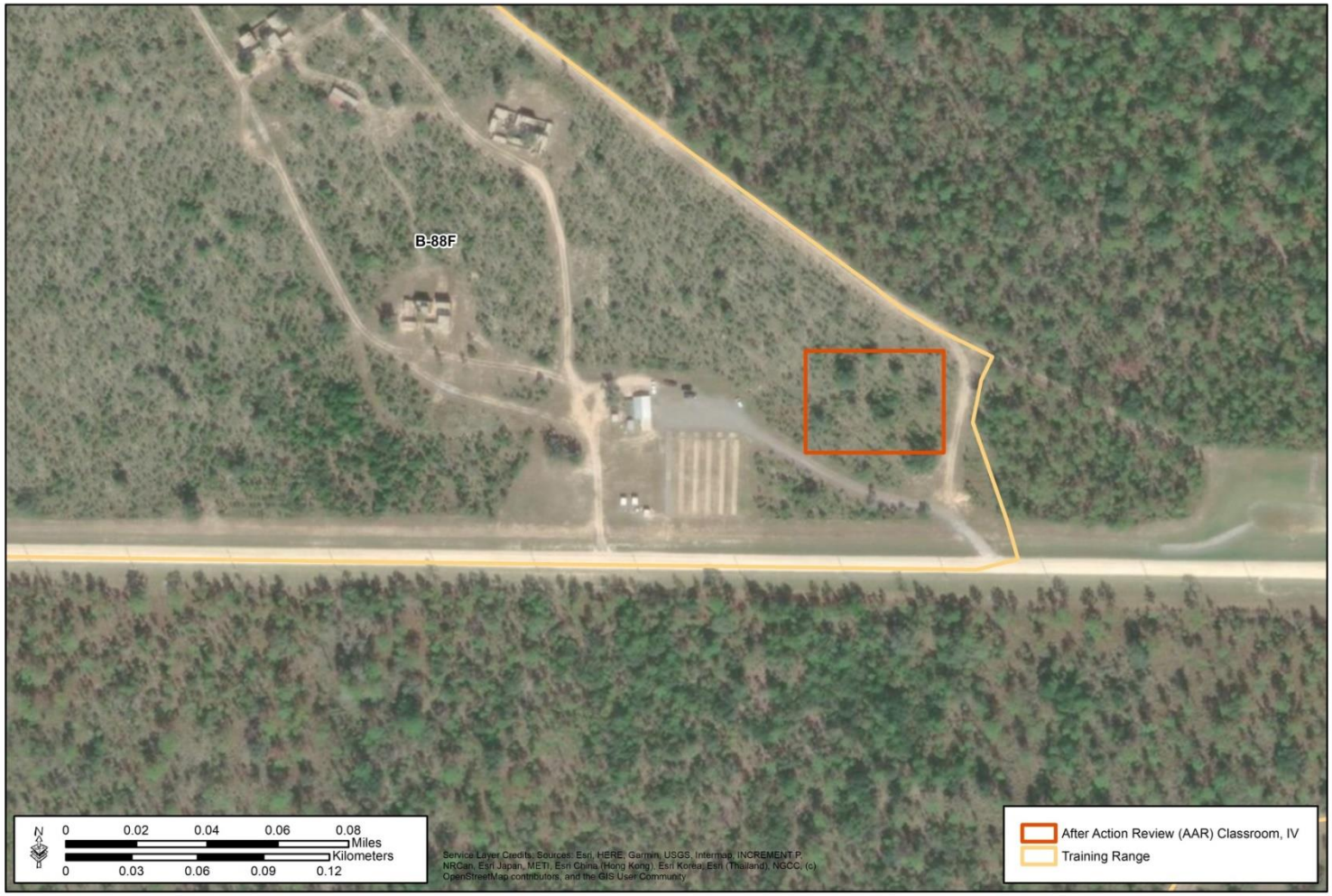

Figure 2-6. Location of the AAR Classroom on TR B-88F within the B-88 Range Complex, Eglin AFB

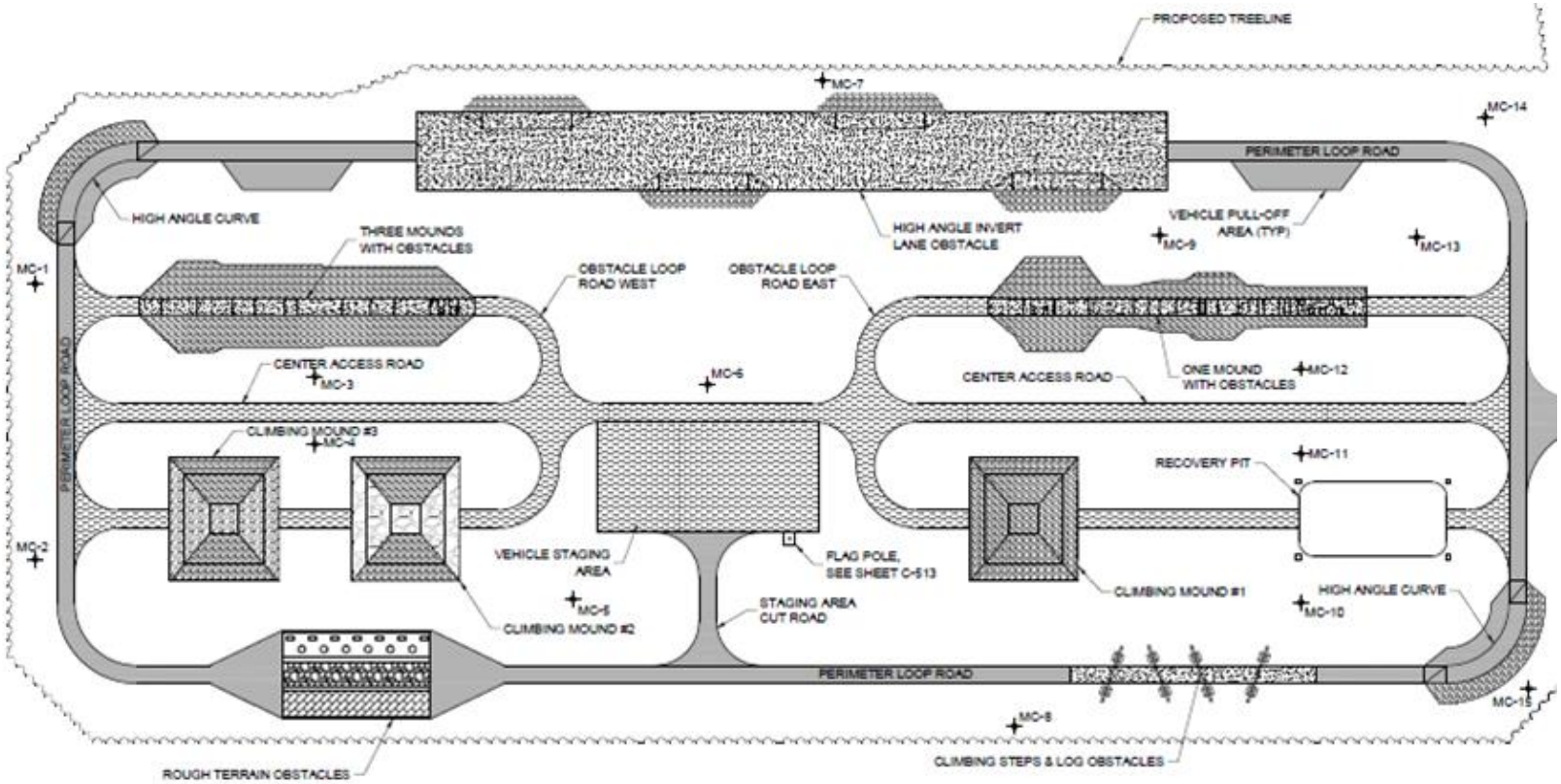

Figure 2-7 Notional Schematic Diagram of the Advanced Drivers Training Course Configuration on Eglin AFB

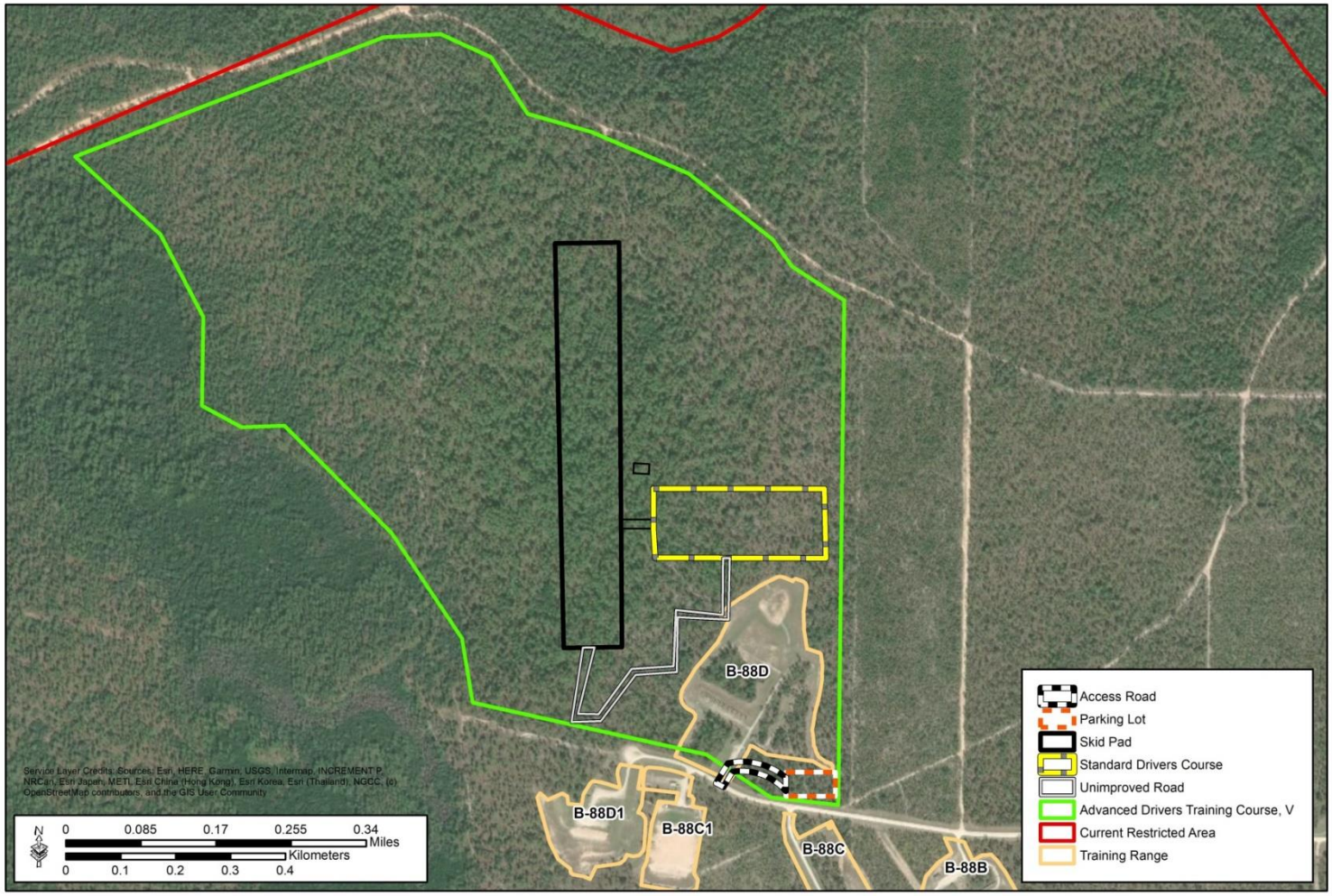

Figure 2-8. Location of the Advanced Drivers Training Course Northwest of TR B-88D within the B-88 Range Complex, Eglin AFB

2.3.5 Red Empire Drop Zone (DZ)

Army units require an onsite airborne insertion location. The Red Empire DZ would provide an area for static line and military freefall to support Airborne Training Events. During training events, B-88 Ranges would be closed due to the footprint of the SDZ. The dimensions of the DZ would be approximately 3,000 m x 1,500 m and the entire area would be cleared of trees and all stumps would be removed; however, herbaceous vegetation would be allowed to grow but nothing over 0.61 m in height. The area will need to be mowed once or twice a year to keep trees from re-growing. The total annual expendable quantities estimated for the Red Empire DZ is provided in Table 2-4. Aircraft flight profiles will avoid the North-South Corridor (NSC) and overflight of Camp Rudder as well as TA B-6 and Sontay DZ flight profiles. Figure 2-9 provides the proposed location of the Red Empire DZ in the southern portion of the Restricted Area for the B-88 Range Complex. Due to the potential omnidirectional use of various munitions, and the draft design phase of the Red Empire DZ layout, it is premature to determine specific DOF or establish an SDZ.

Table 2-4. Red Empire DZ Annual Expendable Quantities

REA for B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and C-53A Light Demolitions Range

Red Empire DZ	Total	Unit Type
Arty Sim/Pyro	150	Single Unit
Grenade Simulator	15	Rounds
Riot Control Agent	10	Rounds
Smoke	250	Rounds
CCMCK	35,000	Single Units

Source: Eglin AFB, 2019

2.3.6 Tactical Training Area (TTA) I-36 Live Fire Maneuver Area

The TTA I-36 Live Fire Maneuver Area is designed to support training operations extended from the B-88 Range Complex Area. The TTA I-36 will be used to train and test the skills of soldiers necessary to conduct tactical movement techniques and to detect, identify, engage, and defeat stationary infantry targets in a tactical array similar to the southern area of responsibility (AOR). All targets are fully automated, and the event-specific target scenario is computer-driven and scored using a handheld controller. Army IMCOM, Range Services, Office of Special Projects-Joint, and Safety have collaborated to create a proposal that defines the requirement sufficient to be the basis of a Mutual Indemnification Agreement. This includes definition of training actions, natural environment for training, space or area, construction, protections to include site security and safe operations, tempo, and scheduling. The proposed TTA I-36 would require approximately 4.33 km^2. Initially, the only land changes required would be moderate underbrush clearing. The proposed Trench Complex (Section 2.3.7 below) would be created within TTA I-36. Figure 2-10 provides the proposed location of the TTA I-36 immediately to the west of the current Restricted Area for the B-88 Range Complex. The predominate DOF (all ball ammunition) is west to east (90 degrees) with the projected weapons footprint and SDZ contained within the B-88 Range Complex Restricted Area; CCMCK/SESAMS can be omnidirectional (360 degrees). The 5.56mm SDZ has an 89 to 91+ degree northing and the 7.62mm SDZ has an 89 to 90 degree northing.

2.3.7 Trench Complex

Army units require a facility to train and test soldiers on the skills necessary to engage and defeat stationary target emplacements within a Trench Complex. Linking trenches will be 2.1 m deep with wood braces and perimeter trenches will be 1.2 m deep and topped with sandbags (Figure 2-11). An example of a Trench Complex is provided as a photograph in Figure 2-12.

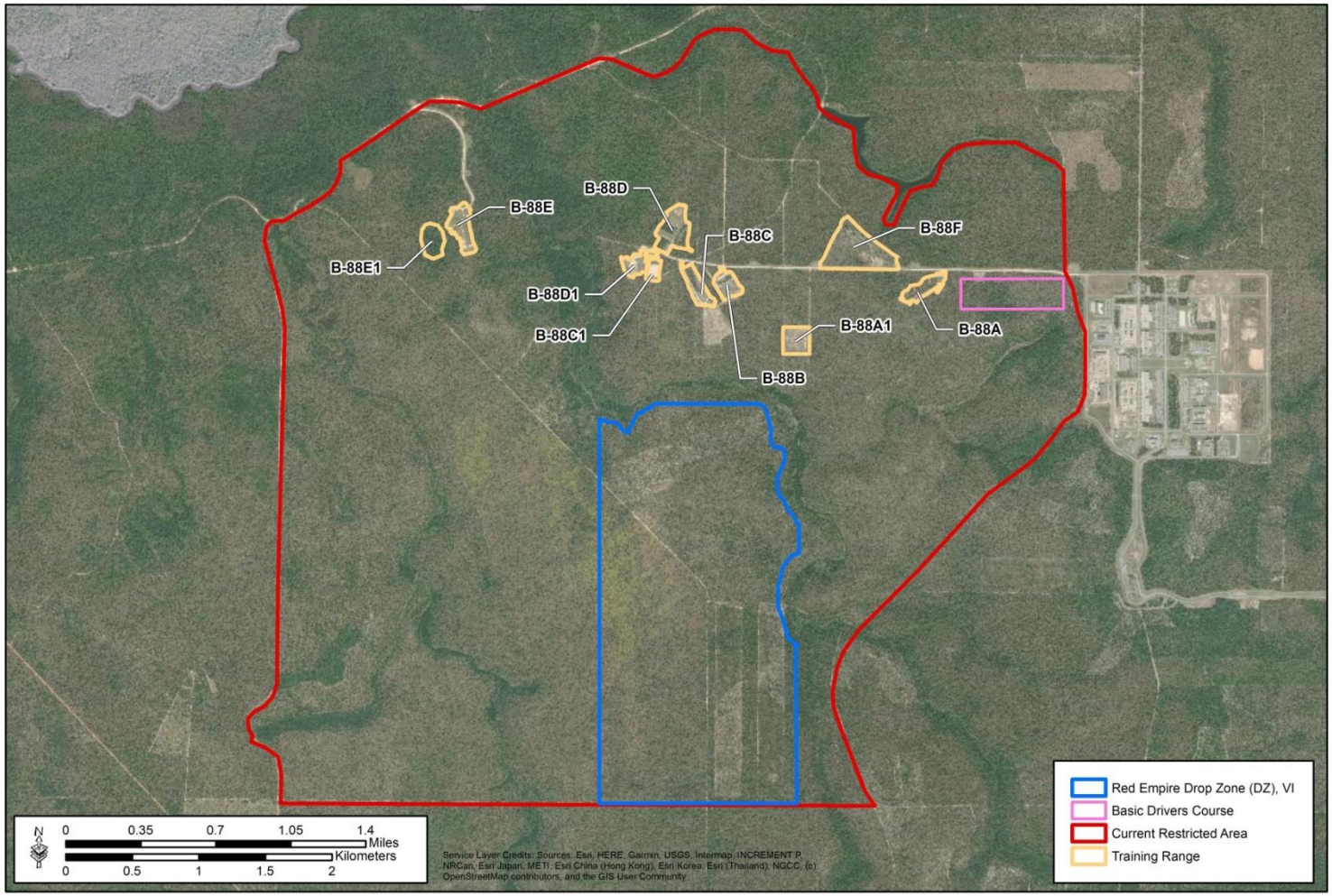

Figure 2-9. Location of the Red Empire Drop Zone (DZ) in the Southern Portion of the B-88 Range Complex, Eglin AFB

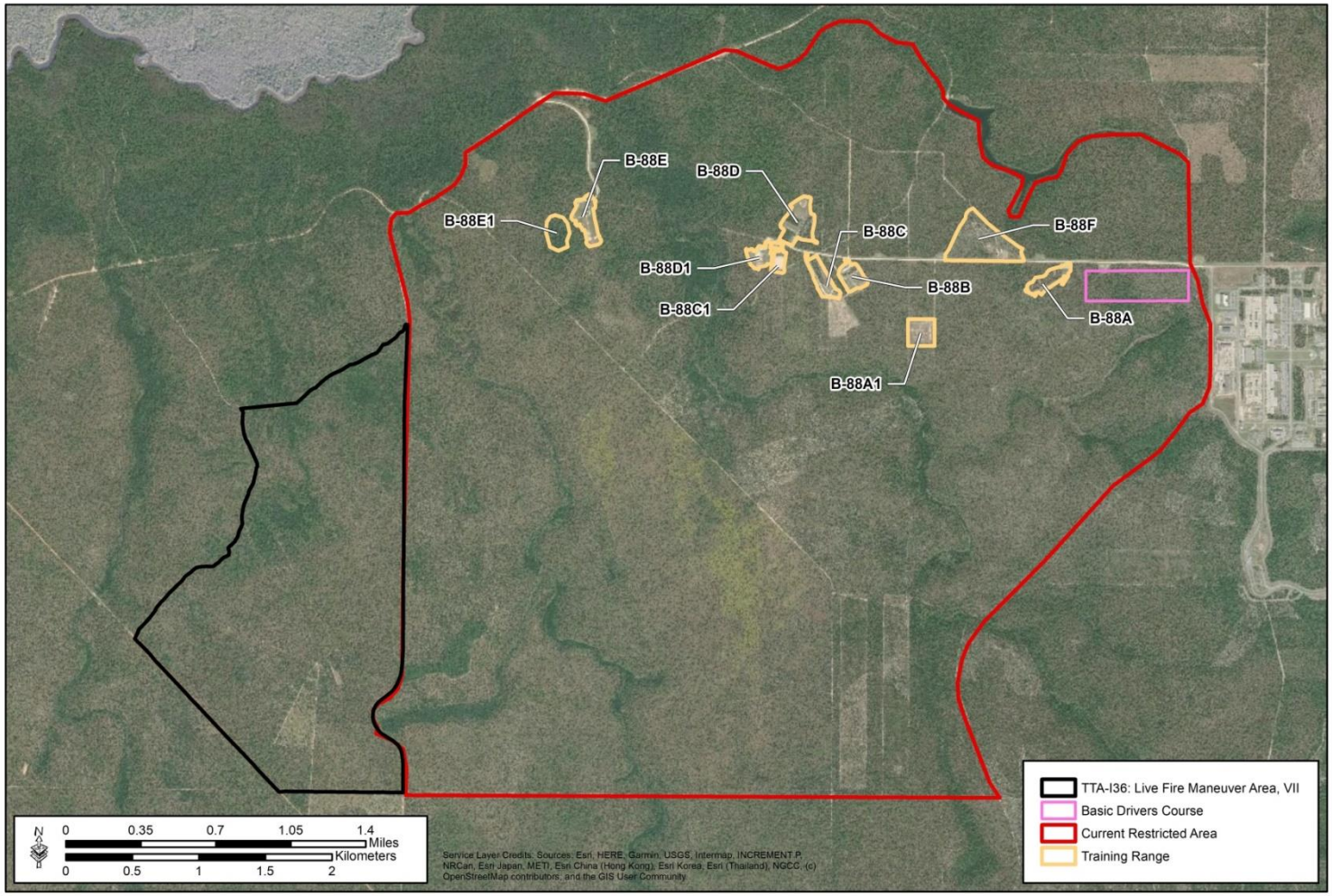

Figure 2-10. Location of the TTA I-36 Live Fire Maneuver Area West of the B-88 Range Complex, Eglin AFB

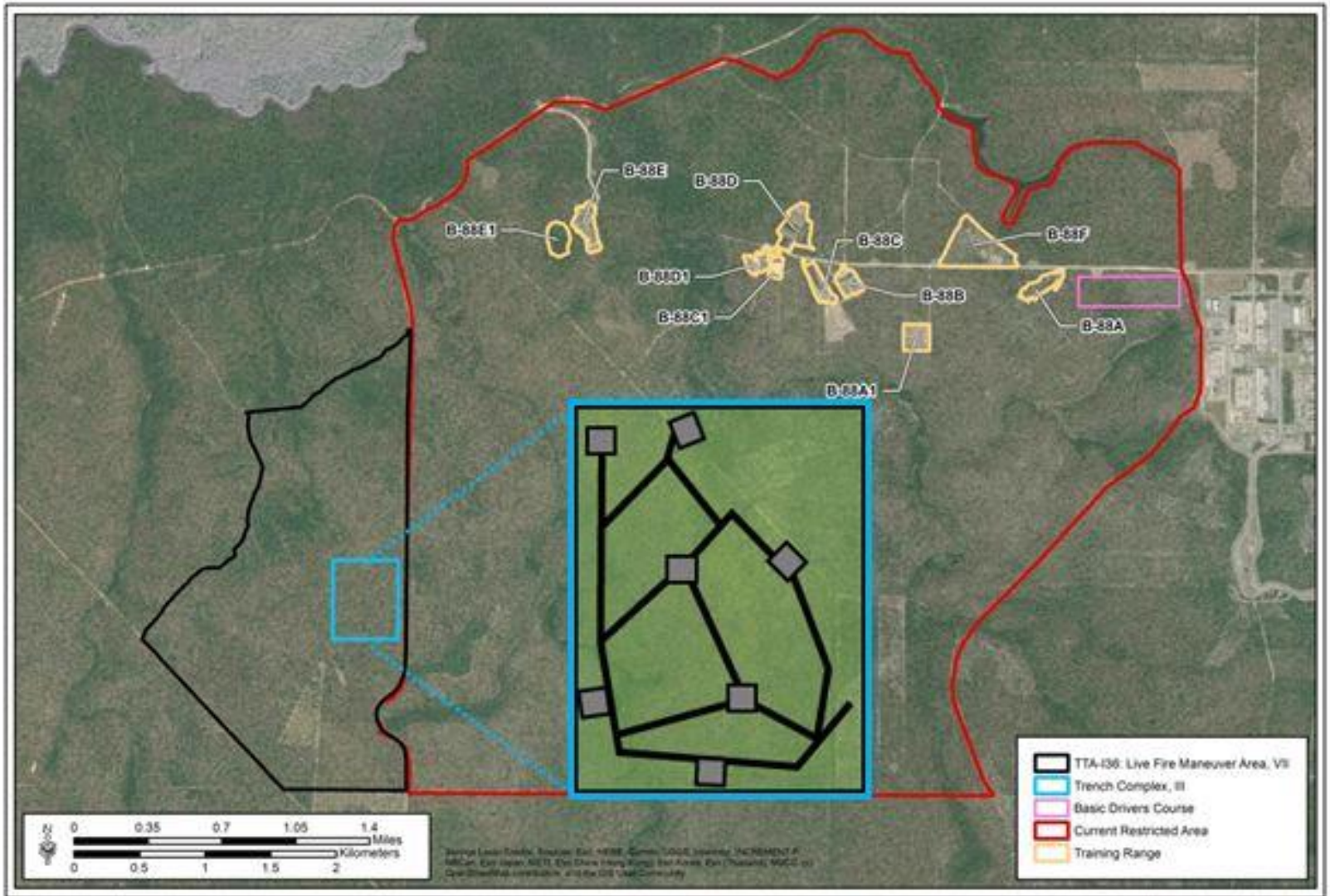

Figure 2-11. Location of the Trench Complex within TTA I-36 Live Fire Maneuver Area West of the B-88 Range Complex, Eglin AFB

Figure 2-12. Example of a Trench Complex to be Constructed on Eglin AFB

The proposed 500 m x 600 m Trench Complex would be a network with six perimeter bunkers (6 m x 6 m) and a command bunker (12 m x 12 m). The trench system will be constructed with reinforced wood. This project supports the METL [Battle Drill 7] requirement for all Army Special Operations Forces (SOF) and Infantry Units. The expendables to be used at the Trench Complex would include 7.62 mm (and lesser weapon systems [ball]), CCMCK, ECT, detcord, blasting caps, fuse initiators, charges, Arty Sim/Pyro, firing devices, and chemical agents. The total annual expendable quantities estimated for the Trench Complex and TTA I-36 Live Fire Maneuver Area is provided in Table 2-5.

Table 2-5. Trench Complex and TTA I-36 Live Fire Maneuver Area Annual Expendable Quantities

REA for B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and C-53A Light Demolitions Range

Trench Complex and TTA I-36 Live Fire Maneuver Area	Total	Unit Type
Small Arms 9mm	10,000	Rounds
40 mm TP	200	Rounds
Small Arms 5.56mm blank/sim	150,000	Rounds
Small Arms 5.56mm live	150,000	Rounds
Small Arms 7.62mm blank/sim	75,000	Rounds
Small Arms 7.62mm live	150,000	Rounds
Det Cord	1,500	Feet
Blasting Caps	150	Single Caps
Fuse/Initiator	750	Single Units
Arty Sim/Pyro	150	Single Units
Chemical Agent (CS gas)	10	Single Capsule
Grenade Simulator	200	Rounds
Flashbang	300	Rounds
Smoke	250	Rounds
CCMCK	20,000	Single Units

Source: Eglin AFB, 2019

The predominate DOF (all ball ammunition) is west to east (90 degrees) with the projected weapons footprint and SDZ contained within the B-88 Range Complex Restricted Area; CCMCK/SESAMS can be omnidirectional (360 degrees).

2.3.8 Future Construction or Facility Modification

This REA will analyze potential environmental impacts of future construction or facility modifications within the B-88 Range Complex (to include the new TTA I-36 Live Fire Maneuver Area). Actions would be located within existing range profiles and all management actions from this REA would be followed (refer to Chapter 4). Individual projects would generally be under 0.008 km^2 (2 acres), and presumed to include impervious surface additions. These types of actions would be analyzed for environmental concerns through the Environmental Impact Analysis Process (EIAP) within an AF Form 813. The total area for projects covered would not exceed 0.04 km^2 (10 acres) under this REA.

2.3.9 Mission Surge

Alternative 1 includes the implementation of annual operations at a mission-surge level on the B-88 Range Complex and the C-53A Light Demolitions Range. Tables 2-6 and 2-7 provide the estimated quantities and types of ordnance to be expended on the B-88 Range Complex and TA C-53A, respectively. Mission-surge operations under Alternative 1 are those anticipated to occur during wartime or other significant military involvement that may continue for an indeterminate time. The mission-surge level under Alternative 1 is defined as a 25 percent increase in the baseline annual expendable quantities for the ranges. The mission-surge level is based on input provided by the Army Range Officer (Ryan 2019, pers. comm.).

Table 2-6. Alternative 1 Mission Surge Annual Expendable Quantities for B-88 Range Complex

REA for B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and C-53A Light Demolitions Range

B-88 Range Complex	B-88A1	B-88B	B-88C	B-88C1	B-88D	B-88D1	B-88E	Total
9 mm	0	0	38,161	574,206	0	574,206	220,853	**1,407,426**
.40 Cal	0	0	238	20,316	0	20,316	1,509	**42,379**
5.56	0	0	169,671	1,029,281	0	1,029,281	359,806	**2,588,040**
7.62	0	0	556	32,468	0	32,468	6,252	**71,743**
.300 WinMag	0	0	36	0	0	0	0	**36**
12 Gauge	0	622	1,740	107	107	1,739	429	**4,744**
Grenades	130	21	464	0	0	0	84	**699**
Blasting Caps	3	2,716	882	0	0	0	54	**3,655**
Fuse/Initiator	0	5,637	274	0	0	0	45	**5,956**
Claymores	35	0	0	0	0	0	0	**35**
Charge	0	214	70	0	0	0	9	**292**
Det Cord (Feet)	0	19,590	2,840	0	0	0	1,450	**23,880**
Arty Sim/Pyro	10	21	493	0	0	4	136	**670**
ECT (Feet)	0	58	124	0	0	0	0	**182**
Firing Device	0	5	20	0	0	0	0	**25**
Chemical Agent	9	0	0	0	0	0	8	**17**

Source: Eglin AFB, 2019

Table 2-7. Alternative 1 Mission Surge Annual Expendable Quantities for TA C-53A

REA for B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and C-53A Light Demolitions Range

TA C-53A	Total
12 Gauge	**21**
Grenades	**172**
Blasting Caps	**4,739**
Fuse/Initiator	**14,056**
Claymores	**9**
Charge	**4,552**
Det Cord (Feet)	**87,400**
Arty Sim/Pyro	**92**
ECT (Feet)	**1**
Firing Device	**1,095**

Source: Eglin AFB, 2019

2.4 Alternative 2 – Mission Surge Only

Alternative 2 is the implementation of annual operations at a mission-surge level within the B-88 Range Complex and the C-53A Light Demolitions Range, and does not include the new facility construction or range expansion. Tables 2-8 and 2-9 provide the estimated quantities and types of ordnances to be expended on the B-88 Range Complex and C-53A, respectively.

Table 2-8. Alternative 2 Mission Surge Annual Expendable Quantities for B-88 Range Complex

REA for B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and C-53A Light Demolitions Range

B-88 Range Complex	B-88A1	B-88B	B-88C	B-88C1	B-88D	B-88D1	B-88E	Total
9 mm	0	0	38,161	574,206	0	574,206	220,853	**1,407,426**
.40 Cal	0	0	238	20,316	0	20,316	1,509	**42,379**
5.56	0	0	169,671	1,029,281	0	1,029,281	359,806	**2,588,040**
7.62	0	0	556	32,468	0	32,468	6,252	**71,743**
.300 WinMag	0	0	36	0	0	0	0	**36**
12 Gauge	0	622	1,740	107	107	1,739	429	**4,744**
Grenades	130	21	464	0	0	0	84	**699**
Blasting Caps	3	2,716	882	0	0	0	54	**3,655**
Fuse/Initiator	0	5,637	274	0	0	0	45	**5,956**
Claymores	35	0	0	0	0	0	0	**35**
Charge	0	214	70	0	0	0	9	**292**
Det Cord (Feet)	0	19,590	2,840	0	0	0	1,450	**23,880**
Arty Sim/Pyro	10	21	493	0	0	4	136	**670**
ECT (Feet)	0	58	124	0	0	0	0	**182**
Firing Device	0	5	20	0	0	0	0	**25**
Chemical Agent	9	0	0	0	0	0	8	**17**

Source: Eglin AFB, 2019

Table 2-9. Alternative 2 Mission Surge Annual Expendable Quantities for TA C-53A

REA for B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and C-53A Light Demolitions Range

TA C-53A	Total
12 Gauge	**21**
Grenades	**172**
Blasting Caps	**4,739**
Fuse/Initiator	**14,056**
Claymores	**9**
Charge	**4,552**
Det Cord (Feet)	**87,400**
Arty Sim/Pyro	**92**
ECT (Feet)	**1**
Firing Device	**1,095**

Source: Eglin AFB, 2019

2.5 Alternative 3 – No Action Alternative

Alternative 3 is the No Action Alternative of maintaining the B-88 Range Complex and Light Demolitions Range at Test Area C-53A annual operations at the current baseline level, and does not include new facility construction or range expansion. Tables 2-10 and 2-11 provide the estimated quantities and types of ordnance to be expended on the B-88 Range Complex and C-53A, respectively. The current baseline level was determined based on review of the munitions expended on the ranges from 01-01-11 to 12-31-18. The data was obtained from the RFMSS.

Table 2-10. Alternative 3 Current Baseline Annual Expendable Quantities for B-88 Range Complex

REA for B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and C-53A Light Demolitions Range

B-88 Range Complex	B-88A1	B-88B	B-88C	B-88C1	B-88D	B-88D1	B-88E	Total
9 mm	0	0	30,529	459,365	0	459,365	176,682	**1,125,941**
.40 Cal	0	0	190	16,253	0	16,253	1,207	**33,903**
5.56	0	0	135,737	823,425	0	823,425	287,845	**2,070,432**
7.62	0	0	445	25,974	0	25,974	5,002	**57,394**
.300 WinMag	0	0	29	0	0	0	0	**29**
12 Gauge	0	497	1,392	86	86	1,392	343	**3,795**
Grenades	104	17	372	0	0	0	67	**559**
Blasting Caps	3	2,173	706	0	0	0	43	**2,924**
Fuse/Initiator	0	4,509	219	0	0	0	36	**4,765**
Claymores	28	0	0	0	0	0	0	**28**
Charge	0	171	56	0	0	0	7	**234**
Det Cord (Feet)	0	15,672	2,272	0	0	0	1,160	**19,104**
Arty Sim/Pyro	8	17	395	5	0	3	109	**536**
ECT (Feet)	0	46	99	0	0	0	0	**145**
Firing Device	0	4	16	0	0	0	0	**20**
Chemical Agent	7	0	0	0	0	0	6	**14**

Source: Eglin AFB, 2019

Table 2-11. Alternative 3 Current Baseline Annual Expendable Quantities for TA C-53A

REA for B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and C-53A Light Demolitions Range

TA C-53A	**Total**
12 Gauge	**17**
Grenades	**137**
Blasting Caps	**3,791**
Fuse/Initiator	**11,245**
Claymores	**7**
Charge	**3,642**
Det Cord (Feet)	**69,920**
Arty Sim/Pyro	**74**
ECT (Feet)	**0.571429**
Firing Device	**876**

Source: Eglin AFB, 2019

2.6 Alternatives Considered but Eliminated from Detailed Analysis

The 96 CEG/CEIEA, in coordination with representatives from various Eglin AFB units, have determined there are no additional alternatives at Eglin AFB that warrant detailed analysis in this REA.

2.7 Identification of the Preferred Alternative

The preferred alternative is Alternative 1 – Proposed Action: Enhancing the B-88 Range Complex and TA C-53A capabilities with new facility construction, range expansion, and a 25 percent mission surge of operations above the current baseline level, as described in Section 2.2.

SECTION 3

Affected Environment and Environmental Consequences

3.1 Introduction

This section addresses the affected environment and environmental consequences of the alternatives of the Proposed Action. The affected environment is the existing condition of each resource for which the alternatives are assessed. The environmental consequences are the potential direct, indirect, and cumulative impacts of the alternatives on each resource.

Direct impacts are those that would result from the alternatives at the same time and in the same place the action is being implemented. Indirect impacts are those that would result from the alternatives at a later time or would be farther removed in distance from the action, but are still reasonably foreseeable. Cumulative impacts are those that would result from the incremental impacts of the alternatives when added to other past, present, and reasonably foreseeable future actions. As appropriate, impacts are further discussed as being temporary, short-term, or long-term. The magnitude of the impact is considered regardless of whether the impact is adverse or beneficial.

Determination of the significance of the impact, as described in 40 CFR 1508.27, requires considerations of both context and intensity. Context considers the geographic extent of the potential impact (local, regional, or greater extent) while intensity considers the severity of the impact. The following terms are used to describe the magnitude of impacts in this REA:

- No Effect: The action would not cause a detectable change.
- Negligible: The impact would be at the lowest level of detection; the impact would not be significant.
- Minor: The impact would be slight but detectable; the impact would not be significant.
- Moderate: The impact would be readily apparent; the impact would not be significant.
- Major: The impact would be clearly adverse or beneficial; the impact has the potential to be significant. The significance of adverse and beneficial impacts is subject to interpretation and should be determined based on the final proposal. In cases of adverse impacts, the impact may be reduced to less than significant by mitigation, design features, and/or other measures that may be taken.

The Proposed Action was determined to have no effect on several resources. Therefore, these resources were eliminated from detailed analysis in this REA. The resources that were eliminated from detailed analysis and the rationale for their elimination are presented in the subsections that follow.

3.1.1 Airspace

Airspace analysis addresses the safe, orderly, and compatible use of the nation's airspace through a system of flight rules and regulations, airspace management actions, and air traffic control procedures. Airspace is regulated in order to protect aircraft operations, promote safe conditions, control traffic and capacity, and ensure national security. No modifications to the existing airspace, introduction of new aircraft, modification of existing aircraft, or increase/change in air operations would occur as a result of the Proposed Action analyzed in this EA. The Proposed Action would have no effect on the classification or parameters of any existing airspace. The airspace that overlies the B-88 Range Complex and the adjacent TTA I-36 Live Fire Maneuver Area is Restricted Area airspace (R-2915A) that is reserved for military operations and cannot be entered by private or commercial aircraft without permission from Eglin AFB, as well as in the NSC Special Rules Airspace. The airspace the overlies that C-53A Light Demolitions Range is also in Restricted Area

airspace (R-2914A). Therefore, the Proposed Action would have no potential to result in non-military airspace restrictions or congestion. No activity under the Proposed Action is expected to impact military use of airspace.

3.1.2 Hazardous Materials/Waste and Solid Waste

Hazardous materials are defined by 49 CFR 171.8 as "hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions" in 49 CFR 173. Hazardous materials have been declared hazardous through federal listings including: Extremely Hazardous Substances listed in 40 CFR Part 355; those listed as hazardous if released, under the Comprehensive Environmental Response, Compensation, and Liability Act in 40 CFR Part 302.4; and by definition of hazardous chemicals by the Occupational Safety and Health Administration (OSHA) in 29 CFR Part 1910.1200. Hazardous waste is any solid, liquid, or contained gas waste that is dangerous or potentially harmful to human health or the environment. All waste that is not hazardous is solid waste.

The U.S. Environmental Protection Agency (EPA) Subchapter I Solid Wastes Part 266; Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Wastes Management Facilities; Subpart M Military Munitions; Title 40 CFR § 266.202 and DoD Manual 4715.26 have been used to determine potential impact, disposal, and mitigation, and will be employed to ensure all requirements are met.

The Environmental Restoration Program (ERP) was developed by DoD to identify, characterize, and remediate contamination from past hazardous waste disposal operations and hazardous materials spills at DoD facilities. A total of 119 ERP sites have been identified on Eglin AFB; all of these sites have remedies in place. There are no ERP sites on or in the immediate vicinity of the B-88 Range Complex or the C-53A Light Demolitions Range.

This REA does not address the management of hazardous materials/waste and solid waste on the B-88 Range Complex, the TTA I-36 Live Fire Maneuver Area, or the C-53A Light Demolitions Range, which is conducted in accordance with all applicable environmental compliance regulations and Eglin AFB environmental management plans. The potential impacts that hazardous materials released during test area operations have on air quality, soils, water resources, and biological resources are assessed in this REA as part of the impact analyses for those resources.

3.1.3 Land Use and Restricted Access

Land use describes the way functions of humans ascribe to land, how it is managed, and the use of resources occurring in different areas. Land is categorized based upon its use, and these categories are used for a variety of purposes, including determining compatibility of adjacent land uses, ascribing boundaries for restricted access, planning for future land use and potential projects, and more. All testing and training operations under the Proposed Action would be confined within the boundaries of the B-88 Range Complex or the C-53A Light Demolitions Range. The Proposed Action would not change the current land use of any on-base or off-base area. The B-88 Range Complex, the TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolitions Range are closed to the public at all times. Certain operations on the B-88 Range Complex or the C-53A Light Demolitions Range, such as the use of live ordnance, would not typically have the potential to result in any temporary closures of areas outside the ranges normally open to the public. However, such closures are relatively seldom, typically of short duration, and applicable to most training ranges and test areas on the Base. For these reasons, the Proposed Action would have no appreciable effect on land use and restricted access.

3.1.4 Utilities and Transportation

Utilities include electrical supply, liquid fuel supply, natural gas supply, potable water supply, solid waste management, sanitary sewer and wastewater systems, stormwater drainage, and communications systems.

The Proposed Action would not involve activity that would impact the local utilities or transportation. All testing and training operations under the Proposed Action would be confined within the boundaries of the B-88 Range Complex, the TTA I-36 Live Fire Maneuver Area, or the C-53A Light Demolitions Range; therefore, the Proposed Action would have no impact on commercial uses or other public transportation activity. For these reasons, the Proposed Action would have no effect on the demand for emergency services (medical, police, and fire-fighting), energy consumption/distribution, potable water consumption/distribution, domestic wastewater distribution/ treatment, or traffic levels/flow.

3.2 AIR QUALITY

3.2.1 Definition of the Resource

The EPA established National Ambient Air Quality Standards (NAAQS) for specific pollutants determined to be of concern with respect to the health and welfare of the general public. Ambient air quality standards are classified as either "primary" or "secondary." The major pollutants of concern, or criteria pollutants, are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than 10 microns (PM-10), particulate matter less than 2.5 microns (PM-2.5), and lead (Pb). NAAQS represent the maximum concentration levels of background pollution that are considered safe, with an adequate margin of safety, to protect the public health and welfare. The NAAQS are included in **Table 3-1**.

Table 3-1. Air Quality Standards and Monitored Data

REA for B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and C-53A Light Demolition Range

Pollutant	**Florida Standards**	**Primary Standards**		**Secondary Standards**	
	Level	**Level**	**Averaging Time**	**Level**	**Averaging Time**
Carbon Monoxide (CO)	9 ppm (10 mg/ cubic meter [m^3])	9 ppm (10 mg/m^3)	8-hour [(1)]	None	None
	35 ppm (40 mg/m^3)	35 ppm (40 mg/m^3)	1-hour [(1)]	None	None
Lead (Pb)	None	0.15 µg/m^3 [(2)]	Rolling 3-Month Average	Same as Primary	Same as Primary
	1.5 µg/m^3	1.5 µg/m^3	Quarterly Average	Same as Primary	Same as Primary
Nitrogen Dioxide (NO_2)	100 µg/m3 (0.05 ppm)	53 ppb [(3)]	Annual (Arithmetic Average)	Same as Primary	Same as Primary
	None	100 ppb	1-hour [(4)]	None	None
Particulate Matter (PM-2.5)	None	12.0 µg/m^3	Annual [(6)] (Arithmetic Average)	15.0 µg/m^3	Annual [(6)] (Arithmetic Average)
	None	35 µg/m^3	24-hour [(7)]	Same as Primary	Same as Primary
Particulate Matter (PM-10)	50 µg/m^3	None	Annual	Same as Primary	Same as Primary
	150 µg/m^3	150 µg/m^3	24-hour [(5)]	Same as Primary	Same as Primary
Ozone (O_3)	None	0.075 ppm (2008 std)	8-hour [(8)]	Same as Primary	Same as Primary
	None	0.070 ppm (2015 std)	8-hour [(9)]	Same as Primary	Same as Primary
	None	0.12 ppm	1-hour [(10)]	Same as Primary	Same as Primary
Sulfur Dioxide (SO_2)	60 µg/m^3 (0.02 ppm)	0.03 ppm	Annual (Arithmetic Average)	None	None
	260 µg/m^3 (0.10 ppm)	0.14 ppm	24-hour [(1)]	None	None
	1300 µg/m^3 (0.5 ppm)	None	3-hour	0.5 ppm	3-hour [(1)]
	None	75 ppb [(11)]	1-hour	None	None

Source: U.S. EPA

Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb - 1 part in 1,000,000,000) by volume, milligrams per cubic meter of air (mg/m^3), and micrograms per cubic meter of air (µg/m^3).

[(1)] Not to be exceeded more than once per year.

(2) Final rule signed October 15, 2008.
(3) The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of clearer comparison to the 1-hour standard
(4) To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective January 22, 2010).
(5) Not to be exceeded more than once per year on average over 3 years.
(6) To attain this standard, the 3-year average of the weighted annual mean PM-2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m3.
(7) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m3 (effective December 17, 2006).
(8) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm (effective May 27, 2008).
(9) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.070 ppm (effective December 28, 2015).
(10) (a) USEPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").
(b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is $\leq$ 1.
(11) (a) Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

Areas that do not meet these NAAQS standards are called non-attainment areas; areas that meet both primary and secondary standards are known as attainment areas. The Federal Conformity Final Rule (40 Code of Federal Regulations [CFR] Parts 51 and 93) specifies criteria or requirements for conformity determinations for Federal projects occurring in non-attainment areas. The rule mandates that a conformity analysis must be performed when a Federal action generates air pollutants in a region that has been designated as a non-attainment or maintenance area for one or more NAAQS.

The General Conformity Rule divides the air conformity process into two distinct areas, applicability and determination. Federal agencies must initially assess if an action is subject to the Conformity Rule (Applicability Analysis) and then if the action conforms to an applicable implementation plan (Conformity Determination). A Conformity Applicability Analysis is the process used to determine whether a Federal action meets the requirements of the general conformity rule. It requires the responsible Federal agency to evaluate the nature of a proposed action and associated air pollutant emissions and calculate emissions as a result of the proposed action. If the emissions exceed established limits, known as de minimis thresholds, the proponent is required to then perform a more detailed Conformity Determination. The CAA provides that Federal actions occurring in non-attainment and maintenance areas should not hinder future attainment with the NAAQS and would conform to the applicable State Implementation Plan (i.e., Florida's State Implementation Plan).

Eglin Air Force Base (AFB) is located in the Florida panhandle and consists of the Eglin Reservation in Santa Rosa, Okaloosa, and Walton Counties, as well as property on Santa Rosa Island and Cape San Blas. However, the area of interest for this REA is located strictly within Okaloosa County. As defined by 40 CFR 81.68, Okaloosa County is part of the Mobile (AL) – Pensacola – Panama City (FL) – Southern Mississippi Interstate Air Quality Control Region. Regional attainment status designations are defined in 40 CFR Part 81, Okaloosa County is considered by the U.S. EPA to be in attainment for all criteria pollutants; therefore, the General Conformity rule does not apply, nor are there any requirements posed by the Florida Department of Environmental Protection (FDEP) for a conformity analysis of the Proposed Action.

Although General Conformity does not apply, the proponent is still required, by NEPA, to evaluate the significance of the emissions increases. In determining the effects of the Proposed Actions, the resulting potential emissions for all compounds, per year, would be compared to significance levels. The Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide – Fundamentals Volume 1 (USAF 2017), Chapter 6 specifies the significance threshold for USAF proposed actions. The EIAP Guide states that, "given the General Conformity de minimis threshold values are the maximum net change an action can acceptably emit in nonattainment and maintenance areas. These threshold values would also be a conservative indicator that

an action's emissions within an attainment area would also be acceptable. In other words, if the threshold is acceptable in nonattainment areas, it must be more than acceptable in an attainment area. If the worst-case annual emissions estimate for each pollutant of concern is below the corresponding de minimis threshold values, this indicates that further assessment is unwarranted. Evaluation is complete upon completing a Record of Air Analysis (ROAA) to document the conclusion." Air quality impacts from the Proposed Actions would be significant if emissions would:

- Increase ambient air pollution concentrations above the NAAQS,
- Contribute to existing violations of the NAAQS,
- Interfere with, or delay timely attainment of, the NAAQS,
- Impair visibility within federally mandated Prevention of Significant Deteriorations Class I areas, or
- Exceed 100 tons per year (tpy) for all criteria pollutants, except lead, for which a significance criteria of 25 tpy is established.

Pollutants considered in this EA are SO_2 and other compounds (i.e., oxides of sulfur or SOx); volatile organic compounds (VOC), which are precursors to O_3; nitrogen oxides (NOx), which are also precursors to O_3, and include NO_2 and other compounds; CO; PM-10; PM-2.5; and Pb. These criteria pollutants are generated by the types of activities (e.g., construction and mobile source operations) associated with the Proposed Action.

3.2.1.1 Greenhouse Gases and Climate Change

The Council on Environmental Quality (CEQ) released a Revised Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts (December 18, 2014) to provide Federal agencies direction on when and how to consider the effects of greenhouse gas (GHG) emissions and climate change in their evaluation of proposed Federal actions. To be in accordance with this guidance, Federal agencies should consider the potential effects of a Proposed Action on climate change as indicated by its GHG emissions and the implications of climate change for the environmental effects of a proposed action.

Global climate change refers to a change in the average weather on the earth. GHGs are gases that trap heat in the atmosphere. They include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), fluorinated gases including chlorofluorocarbons (CFC) and hydrofluorocarbons (HFC), halons, as well as ground-level O_3 (California Energy Commission 2007). The major GHG-producing sectors in society include transportation, utilities (e.g., coal and gas power plants), industry/manufacturing, agriculture, and residential. End-use sector sources of GHG emissions include transportation (40.7 percent), electricity generation (22.2 percent), industry (20.5 percent), agriculture and forestry (8.3 percent), and other (8.3 percent) (California Energy Commission 2007). The main sources of increased concentrations of GHG due to human activity include the combustion of fossil fuels and deforestation (contributing CO_2), livestock and rice farming, land use and wetland depletions, landfill emissions (contributing CH_4), refrigeration system and fire suppression system use and manufacturing (contributing CFC), and agricultural activities, including the use of fertilizers (California Energy Commission 2007). These GHG have varying heat-trapping abilities and atmospheric lifetimes. CO_2 equivalency (CO_2e) is a measuring methodology used to compare the heat-trapping impact from various GHG relative to CO_2. Some gases have a greater global warming potential than others. Nitrogen oxides (NOx), for instance, have a global warming potential that is 310 times greater than an equivalent amount of CO_2, and CH_4 is 25 times greater than an equivalent amount of CO_2. GHGs include CO_2, CH_4, NO_2, HCFCs, perfluorocarbons, nitrogen trifluoride, and sulfur hexafluoride.

3.2.1.2 GHG Threshold of Significance

The CEQ provided draft guidelines for determining meaningful GHG decision-making analysis. On June 26, 2019, the CEQ published the Draft National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions for public comment with all comments required for submittal by August 26, 2019. The CEQ GHG final guidance, issued August 2016 and withdrawn effective April 5, 2017, is currently

undergoing further consideration. While the EO 13783 resulted in revoking CEQ's Guidance on GHG & Climate Change, the EO did not remove the requirement for assessing a proposed action's potential impact to air quality (include GHGs as a regulated pollutant) which is still mandated under NEPA.

Therefore, until official DoD and USAF policy and guidance are established, all air quality NEPA assessments must still include an assessment of GHGs using the USAF's interim guidance. The previous significance guidance of direct emissions of 25,000 metric tons (27,557 U.S. tons) or more of CO_2 GHG emissions on an annual basis is removed, and instead, the GHG emissions from each USAF proposed action/alternative are to be compared against each other in a relative comparison analysis to establish relative significance of each.

3.2.2 Affected Environment

The B-88 Range Complex, the TTA I-36 Live Fire Maneuver Area, and C-53A Light Demolitions Range are located in Okaloosa County in the Florida panhandle, 50 miles east of Pensacola, Florida, and occupy approximately 11 km^2 of land. As defined by 40 CFR Part 81.68, Okaloosa County is part of the Mobile (AL) – Pensacola – Panama City (FL) – Southern Mississippi Interstate Air Quality Control Region. Regional attainment status designations are defined in 40 CFR Part 81, Subpart C. This region is classified as Attainment/Unclassifiable for all criteria pollutants.

Eglin AFB currently operates under Title V Air Operating Permit Renewal number 0910031-022-AV issued by FDEP on May 30, 2019 with an expiration date of May 30, 2022 (FDEP 2019). The purpose of this permit is to renew the recently expired (5/30/19) 0910031-017-AV Title V air operation permit and incorporate the concurrently-processed permit No. 0910031-023-AC. Permit No. 0910031-023-AC authorizes the addition of a paint booth; reclassifies the facility as an area source with respect to hazardous air pollutants (HAPs); establishes facility wide limits for HAPs; and modifies Title V permit No. 0910031-020-AV text, individual permit conditions, and appendices to address corrections, clarifications, and rule updates to be consistent with current operation. The Title V air operation permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Chapters 62-4, 62-210, and 62-213. **Table 3-2** provides a comparison of allowable annual air emissions and the history of actual annual emissions (tpy).

Table 3-2: Comparison of Allowable and History of Actual Annual Emissions (tpy)
REA for B-88 Range Complex and C-53A Light Demolition Range

Pollutants	**Allowable**	**History**				
	2019	**2018**	**2017**	**2016**	**2015**	**2014**
CO	321.24	25.9426	31.0324	26.8205	27.7586	27.0764
HAPS	6.38	5.96978	4.6969	5.31592	5.3068	6.1490
NO_X	230.16	35.8452	47.2852	35.4840	37.3604	37.9170
PB	-	0.0003	0.0003	0.0002	0.0003	0.0002
PM	58.36	2.8020	3.5017	2.9758	3.0613	3.0488
PM_{10}	-	2.8019	3.5017	3.0035	3.1355	3.0712
$PM_{2.5}$	-	2.1083	2.1486	1.96771	2.0205	-
SO_2	5.39	0.9105	1.6253	0.9952	1.2064	1.2704
VOC	198.86	121.5589	101.5795	108.3850	101.2099	101.1820

Source: FDEP 2019

3.2.3 Environmental Consequences

3.2.3.1 Analysis Approach

The purpose of this Air Quality Analysis is to evaluate the potential impacts on ambient air quality from the proposed actions. Criteria pollutant and greenhouse gas emissions from proposed installation construction activities and post-construction installation activities are expected to result from the following activities:

- Direct stationary source emissions (e.g., a new natural gas boiler and emergency generators) from new facilities,
- Indirect mobile source emissions from commuting workers and delivery vehicles during construction (e.g., on-road vehicles),
- Direct mobile source emissions from construction equipment (e.g., off-road equipment), and
- Fugitive dust emissions from land disturbance (e.g., construction) and from vehicles traveling on unpaved roads.

A list of emissions-generating equipment and activities was developed, by project and by alternative, from the information provided in the DOPAA. Expected usage quantities (e.g., mileage, operating hours, etc.) were taken directly from the DOPAA, if available, or were otherwise estimated using best engineering judgement. In developing calculation methodologies for these different emissions sources, the following resources were utilized:

- Air Emissions Guide for Air Force Transitory Sources (July 2018; USAF 2018b), Chapter 4
- Air Emissions Guide for Air Force Mobile Sources (July 2018; USAF 2018c), Chapter 5
- Air Emissions Guide for Air Force Stationary Sources (July 2018; USAF 2018c), Chapters 2, 3, and 19
- Determination of INDOT Highway Construction Production Rates and Estimation of Contract Times (Final Report FHWA/IN/JTRP-2004/11)
- Urban Emissions (URBEMIS) Software 2007 User's Manual Appendix A and Appendix H
- Mass balance and best engineering judgement, where necessary

Pollutants considered in this EA are SO_2 and other compounds (i.e., oxides of sulfur or SO_x); volatile organic compounds (VOC), which are precursors to O_3; nitrogen oxides (NO_x), which are also precursors to O_3, and include NO_2 and other compounds; CO; PM-10; PM-2.5; and Pb. These criteria pollutants are generated by the types of activities (e.g., construction and mobile source operations) associated with the Proposed Action.

In determining the effects of the Proposed Action, the resulting potential emissions for all compounds, per year, would be compared to significance levels. The Air Force Air Quality EIAP Guide – Fundamentals Volume 1 (USAF 2016b) and Volume II (Advance Assessments; USAF 2016c) were referenced in order to perform evaluations of threshold significance (Appendix D).

Because the Mobile, Alabama – Pensacola – Panama City, Florida – Southern Mississippi Interstate Air Quality Control Region is in attainment for all pollutants, General Conformity does not apply; therefore, the significance threshold for all criteria pollutant emissions is 100 tons per year (from both mobile and stationary sources), except for lead, for which the criteria is 25 tons per year.

3.2.3.2 Alternative 1 – Enhancement and Mission Surge

Implementation of Alternative 1 would have short-term, adverse impacts on ambient air quality. All construction developments from this alternative were assumed to occur in a single year while the increased operations stemming from this alternative assumed to occur throughout the lifetime of the base until future changes occurred. **Table 3-3** provides a summary of total estimated emissions from the Proposed Action and a determination of their significance.

Table 3-3. Summary of Emissions from Current and Proposed Activities – Eglin AFB B88 Complex and TA C-53A
REA for B-88 Range Complex and C-53A Light Demolition Range

Emissions (tons/year)							
Pollutant	**Current Training Level**	**Increase from Proposed Construction (2020 only)**	**25% Munitions Surge**	**Total Emissions Year 2020 (Training and Construction)**	**Total Emissions Year 2021 - Beyond (Training)**	**Significance Threshold (tons/yr)**	**Significant Impact (yes/no)**
Oxides of Nitrogen (NOx)	0.40	16.33	0.57	**16.89**	**0.57**	100	**no**
Carbon Monoxide (CO)	4.78	28.89	6.46	**35.37**	**6.46**	100	**no**
Sulfur Dioxide (SO2)	7.0 E-06	0.08	9.0 E-06	**0.08**	**2.31E-05**	100	**no**
Volatile Organic Compounds	0.00096	4.59	0.00121	**4.59**	**3.25E-03**	100	**no**
Lead (Pb)	0.01	3.60	0.01922	**3.62**	**0.02**	25	**no**
Particulate Matter < 10 mm (PM-10)	12.35	144.50	15.83	**163.78**	**15.83**	100	**no**
Particulate Matter < 2.5 mm (PM-2.5)	1.32	1.56	1.71	**3.27**	**1.71**	100	**no**
CO_2 Equivalent[1]	230.83	6,957.14	285.73	**7,242.87**	**285.73**	N/A	**no**

[1]Greenhouse gases are expressed as CO_2 Equivalent with CO_2 having a Global Warming Potential (GWP) = 1, Methane (CH_4) GWP = 25, and Nitrous Oxide (N_2O) GWP = 298 (40 CFR Part 98, Table A-1).

Construction Activities – Construction activities would result in temporary, adverse impacts on ambient air quality. Facility construction would involve land clearing, land grading, and building construction. Construction projects would require the use of common construction equipment, all of which would be expected to meet local, state, and Federal air emission regulations.

Commuter Vehicles – Alternative 1 would result in an increase of approximately 250 new, full time personnel. It was assumed that each of these personnel would commute in their personally owned vehicle (POV) with an average commute of 28 miles round trip.

Munition Activities – Alternative 1 would result in an increase in training activities at the installation. The increased training includes the expenditure of munitions on training ranges which would result in minor adverse impacts on ambient air quality. Facility munition use consists of various rounds, grenades, charges, fuse/initiators, and chemical agents. The munitions will be used as part of training at current facilities and within the new training facilities proposed for construction.

Conclusion

Implementation of Alternative 1 would have short-term, adverse impacts on ambient air quality. Temporary increases in NOx, CO, SO_2, VOCs, Lead, PM-10 and PM-2.5 and CO_2e are primarily resultant from construction that is presumed to be accomplished during one calendar year. Following this temporary construction and growth, a 25 percent munitions surge is expected to have minor, but permanent, effects from this alternative. The estimated annual steady state air emissions from Alternative 1 would be well below significance thresholds. The limited annual emissions of GHGs would not likely contribute to global warming to any discernible extent. Potential changes to local temperature and precipitation patterns as a result of ongoing global climate change would not affect the ability to implement Alternative 1. Overall, there would be no long-term significant impacts on ambient air quality from the facility construction and no significant impacts on ambient air quality from the munitions surge by implementing Alternative 1.

3.2.3.3 Alternative 2 –Mission Surge Only

The Mission Surge Only Alternative implements annual operations at a mission-surge level, a 25 percent increase in munitions, within the B-88 Range Complex and the C-53A Light Demolitions Range and does not include the new facility construction or range expansion. Implementation of this alternative would have minor, but permanent, effects on ambient air quality. Minor increases in NOx, CO, SO_2, VOCs, Pb, and PM are a result of a permanent 25 percent increase in munitions use. The estimated annual air emissions from Alternative 2 would be well below significance thresholds. The limited annual emissions of GHGs would not likely contribute to global warming to any discernible extent. Potential changes to local temperature and precipitation patterns as a result of ongoing global climate change would not affect the ability to implement the Proposed Action. Overall, there would be no significant impacts on ambient air quality from the facility construction and air operations by implementing the Proposed Action. **Table 3-4** provides an estimate of annual air emission as a result of Alternative 2 versus the level required to produce a significant impact on the environment.

Table *3-4.* Total Air Emissions (tons/year) from Alternative 2 versus Significance Levels
REA for B-88 Range Complex and C-53A Light Demolition Range

Pollutant	25 Percent Munitions Surge from Proposed New Training	Significance Threshold (tons/yr)	Significant Impact (yes/no)
Oxides of Nitrogen (NOx)	0.57	100	**no**
Carbon Monoxide (CO)	6.46	100	**no**
Sulfur Dioxide (SO2)	9.0 E-06	100	**no**
Volatile Organic Compounds	0.00121	100	**no**
Lead (Pb)	0.01922	25	**no**
Particulate Matter < 10 mm (PM-10)	15.83	100	**no**
Particulate Matter < 2.5 mm (PM-2.5)	1.71	100	**no**
CO_2 Equivalent[1]	285.73	N/A	**no**

[1]Greenhouse gases are expressed as CO2 Equivalent with CO2 having a Global Warming Potential (GWP) = 1, Methane (CH4) GWP = 25, and Nitrous Oxide (N2O) GWP = 298 (40 CFR Part 98, Table A-1).

Conclusion

A 25 percent munitions surge is expected to have short-term, adverse impacts on ambient air quality. . The estimated annual steady state air emissions from Alternative 2 would be well below significance thresholds. The limited annual emissions of GHGs would not likely contribute to global warming to any discernible extent. Potential changes to local temperature and precipitation patterns as a result of ongoing global climate change would not affect the ability to implement Alternative 2. Overall, no significant impacts on ambient air quality from the munitions surge by implementing Alternative 2.

3.2.3.4 Alternative 3 – No Action

The No Action Alternative implements annual operations at the current baseline level of operations within the B-88 Range Complex and the C-53A Light Demolitions Range and does not include the new facility construction or range expansion. Minor releases of NOx, CO, SO_2, VOCs, Pb, and PM are a result of the permanent baseline level of munitions use.

Table 3-5 provides an estimate of annual air emission as a result of Alternative 3 versus the level required to produce a significant impact on the environment.

Table *3-5.* Total Air Emissions (tons/year) from Alternative 3 versus Significance Levels
REA for B-88 Range Complex and C-53A Light Demolition Range

Pollutant	Current Training Level	Significance Threshold (tons/yr)	Significant Impact (yes/no)
Oxides of Nitrogen (NOx)	0.40	100	no
Carbon Monoxide (CO)	4.78	100	no
Sulfur Dioxide (SO2)	7.0 E-06	100	no
Volatile Organic Compounds	0.00096	100	no
Lead (Pb)	0.01	25	no
Particulate Matter < 10 mm (PM-10)	12.35	100	no
Particulate Matter < 2.5 mm (PM-2.5)	1.32	100	no
CO2 Equivalent1	230.83	N/A	no

[1]Greenhouse gases are expressed as CO2 Equivalent with CO2 having a Global Warming Potential (GWP) = 1, Methane (CH4) GWP = 25, and Nitrous Oxide (N2O) GWP = 298 (40 CFR Part 98, Table A-1).

Conclusion

Implementation of this alternative would have short-term, adverse impacts on ambient air quality. The estimated annual steady state air emissions from Alternative 3 would be well below significance thresholds. The limited annual emissions of GHGs would not likely contribute to global warming to any discernible extent. Potential changes to local temperature and precipitation patterns as a result of ongoing global climate change would not affect the ability to implement Alternative 3. Overall, there would be no long-term significant impacts on ambient air quality from current munitions use.

3.3 NOISE

Noise is commonly defined as unwanted or unwelcome sound. Sound is measured with instruments that record instantaneous sound levels in decibels (dB). Sound level measurements used to characterize sound levels that can be sensed by the human ear are designated as “A-weighted decibels” (dBA). “A-weighted” denotes the adjustment of the frequency content of a noise event to represent the way in which the average human ear responds to the noise event. Equivalent Sound Level (L_{eq}) is the average sound level in dBA.

Noise levels used to characterize community noise effects from such activities as aircraft or building construction are measured in the day-night average of A-weighted sound levels (DNL). The DNL metric accounts for the greater annoyance of noise during nighttime hours and is calculated by averaging hourly sound levels for a 24-hour period and adding a weighting factor to the nighttime values. DNL, when used as a metric for aircraft noise, represents the accumulation of noise energy from all aircraft noise events in 24 hours. Additionally, for all operations between 10:00 PM and 7:00 AM, 10 dB are added each event to account for the intrusiveness of nighttime operations. As is implied in its name, the DNL represents the noise energy present in a daily period. However, because aircraft operations at military airfields fluctuate from day to day, DNL is typically based upon a year’s worth of operations and thus represents annual average daily aircraft events (USAF 2018a). A-weighted DNL is used to assess aircraft noise, and C-weighted DNL is use for demolition and heavy artillery noise.

3.3.1 Definition of the Resource

3.3.1.1 Common Noise

Sound varies by both intensity and frequency. Sound pressure level, described in dB, is used to quantify sound intensity. The dB is a logarithmic unit that expresses the ratio of a sound pressure level to a standard reference level. Hertz are used to quantify sound frequency. The human ear responds differently to different frequencies. A-weighing, measured in dBA, approximates a frequency response expressing the perception of sound by humans. Sounds encountered in daily life and their dBA levels are presented in **Table 3-6**.

Table *3-6. Common Sound Levels*
REA for B-88 Range Complex and C-53A Light Demolition Range

Outdoor	Sound Level (dBA)	Indoor
Motorcycle	100	Subway train
Tractor	90	Garbage disposal
Noisy restaurant	85	Blender
Downtown (large city)	80	Ringing telephone
Freeway traffic	70	TV audio
Normal conversation	60	Sewing machine
Rainfall	50	Refrigerator
Quiet residential area	40	Library

Notes: dBA = A-weighted decibel
Source: Harris, 1998.

Noise levels occurring at night generally cause a greater community annoyance than do the same levels occurring during the day. An dBA is a single measure of noise at a given, maximum level or constant state level, but weighted to approximate the response of the human ear with respect to frequencies. It is generally agreed that people perceive intrusive noise at night as being 10 dBA louder than during the day. This perception occurs largely because background environmental sound levels at night in most areas are also approximately 10 dBA lower than those during the day. Acceptable noise levels have been established by the U.S. Department of Housing and Urban Development (HUD) for construction activities in residential areas (HUD, 1984).

Acceptable (not exceeding 65 dBA) – The noise exposure may be of some concern, but common building construction would make the indoor environment acceptable, and the outdoor environment would be reasonably pleasant for recreation and play.

Normally Unacceptable (above 65 but not greater than 75 dBA) – The noise exposure is more severe; barriers may be necessary between the site and prominent noise sources to make the outdoor environment acceptable; special building construction may be necessary to ensure that people indoors are sufficiently protected from outdoor noise.

Unacceptable (greater than 75 dBA) – The noise exposure at the site is so severe that the construction costs to make the indoor noise environment acceptable may be prohibitive, and the outdoor environment would still be unacceptable.

Typical day-night average outdoor noise levels (see Table 3-6) range from 40 dBA in a quiet, residential setting to 100 dBA for a motorcycle on the freeway. As a general rule of thumb, noise generated by a stationary noise source, or “point source,” will decrease by approximately 6 dB over hard surfaces and 9 dB over soft surfaces for each doubling of the distance. For example, if a noise source produces a noise level of

85 dBA at a reference distance of 50 feet over a hard surface, then the noise level will be 79 dBA at a distance of 100 feet from the noise source, 73 dBA at a distance of 200 feet, and so on (Occupational Safety and Health Administration [OSHA] 2019). To estimate the attenuation of the noise over a given distance, the following relationship is utilized:

Equation 1: $dBA_2 = dBA_1 - 20 \log^{(d2/d1)}$
Where:

dBA_2 = dBA at distance 2 from source (predicted)
dBA_1 = dBA at distance 1 from source (measured)
d_2 = Distance to location 2 from the source
d_1 = Distance to location 1 from the source
Source: California Department of Transportation 1998.

3.3.1.2 Operational Impulsive Noise

Noise generated by munitions use on military installations can potentially travel great distances, depending on the weather conditions, and propagate into surrounding communities. The use of explosives and large-caliber weapons are common causes of complaint among people living near military installations. Community annoyance due to steady-state noise is typically assessed by averaging noise levels over a protracted period; however, this approach can be misleading because it does not assess community noise effects due to relatively infrequent, yet loud, impulsive noise such as noise produced by explosives. For example, on ranges where several hundred charges are detonated each year, peak pressure levels can exceed 140 decibels in peak pressure (dBP), while annual average values indicate that the noise is suitable for residential land use.

Table 3-7 identifies effects from single impulsive acoustical events, such as the detonation of explosives and firing of large-caliber weapons. Peak sound levels convey the potential level of concern and possibility of complaints among people living near the boundary of an installation after an individual event. Peak sound levels less than 115 dBP have been shown to cause minimal public annoyance and are considered to have a low risk of noise complaints, and peak sound levels between 115 and 130 dBP are considered to have a moderate risk of noise complaints. A peak sound level of 140 dBP is the threshold for physical injury to humans in the form of temporary loss of hearing.

Table *3-7. Effects from Single Impulsive Acoustical Events*
REA for B-88 Range Complex and C-53A Light Demolition Range

Level of Noise	Effects	Peak Sound Level (dBP)
Audible but Distant	Low Risk of Noise Complaints	< 115
Clearly Audible to Loud	Moderate Risk of Noise Complaints	115 to 130
Loud	High Risk of Noise Complaints	130 to 140
Very Loud	Threshold for Physical Injury to Humans and Damage to Structures	> 140

Sources: U.S. Army, 2008; U.S. Air Force, 2013a; U.S. Army, 1994; Bureau of Mines, 1980; Siskind, 1989

3.3.2 Affected Environment

The Noise Control Act of 1972 (Public Law 92-574) directs federal agencies to comply with applicable Federal, state, and local noise control regulations, and specifically exempts military activities such as aircraft operations and munitions use. Eglin AFB is required to comply with local noise control regulations for off-base areas for activities that are not specifically exempted by the Noise Control Act. **Table 3-8** presents an overview of the Okaloosa, Santa Rosa, and Walton County noise ordinances. All three counties limit noise from construction activities to daytime hours. Okaloosa County sets strict not-to-exceed noise levels for specific land use categories.

Table 3-8. Overview of County Noise Ordinances
REA for B-88 Range Complex and C-53A Light Demolition Range

County	Maximum Permitted Sound Level	Hours that Construction is Exempt
Okaloosa	60 dBA	7:00 a.m.-10:00 p.m.
Santa Rosa	No strict not-to-exceed level	6:00 a.m.-9:00 p.m.
Walton	No strict not-to-exceed level	6:30 a.m.-7:00 p.m.

Notes: dBA = A-weighted decibel
Sources: Okaloosa County Ordinance 87-33, Article 2, § 1; Santa Rosa County Ordinance 98-01, § 2; Walton County Ordinance 2014-16, § 1.

3.3.2.1 Background Noise Levels

Existing sources of noise at Eglin AFB include military aircraft operations, munitions use, commercial and private aircraft overflights, road traffic, forestry operations, lawn maintenance, and construction. Non-military background noise levels (L_{eq} and DNL) were estimated for the surrounding areas using the techniques specified in the *American National Standard Institute (ANSI) - Quantities and Procedures for Description and Measurement of Environmental Sound, Part 3: Short-term Measurements with an Observer Present* (ANSI, 2013). **Table 3-7** presents the estimated background noise levels for the noise sensitive areas nearest to the B-88 Range Complex and C-53 Light Demolition Range.

Table 3-9. Estimated Background Noise Levels for Noise Sensitive Areas Nearest to the B-88 Range Complex and C-53 Light Demolition Range
REA for B-88 Range Complex and C-53A Light Demolition Range

Range Area	Nearest Noise Sensitive Area			Estimated Background Sound Levels (dBA)[a]		
	Distance (miles)	Direction	Type	DNL	L_{eq} (Daytime)	L_{eq} (Nighttime)
B-88	1.52	Northeast	Residential	55	53	47
C-53A	5.37	Southwest	Residential	55	53	47

Notes: dBA = A-weighted decibel; DNL = Day-night Sound Level; L_{eq} = Equivalent Sound Level
[a] Source: ANSI, 2013

The Noise Control Act of 1972 (PL 92-574) directs Federal agencies to comply with applicable Federal, state, and local noise control regulations, and specifically exempts military training activities such as munitions and demolition training, and aircraft operations. Eglin AFB is required to comply with local noise control regulations only for areas outside the installation. As construction would be confined to on-base areas, local noise ordinances would not apply.

3.3.3 Environmental Consequences

3.3.3.1 Analysis Approach

In addition to the significance criteria established at the beginning of this section, the following thresholds were used to determine if an impact on the noise environment would be significant:

- Conflicts with applicable Federal, state, interstate, or local noise control regulations; or
- Results in continuous and long-term noise levels at 85 dB and above, which is the threshold of hearing damage with prolonged exposure.
- Noise levels from construction are considered significant only if levels would exceed 65 dBA, which are normally unacceptable, without attenuating to acceptable levels for nearby public recreation and play (HUD 1984).
- Impulsive noise levels from munitions are considered significant if emissions would exceed 115 dBA.

The Noise Analysis Approach evaluates the potential noise impacts that the proposed action has on surrounding sensitive receptors (Appendix E). Current operations at Eglin AFB include maintaining the annual operations at the B-88 Range Complex and the C-53A Light Demolitions Range at the current baseline level, which does not include new facility construction or range expansion. Noise from current operations results from baseline munitions usage at both training range areas.

3.3.3.2 Alternative 1 – Enhancement and Mission Surge

Noise emissions from proposed Alternative 1 – Enhancement and Mission Surge installation construction activities and post-construction installation training activities are expected to result from the following activities:

- One year of noise from construction equipment (e.g., off-road equipment) and land disturbance (e.g., construction), and
- A 25 percent mission surge munitions use from increased training activities
- Increased munitions use from four new training ranges post-construction.

3.3.3.3 Range Enhancement – Facility Construction

Alternative 1 (Facility Construction) would have temporary, minor adverse effects on the existing noise environment. Short-term effects would be primarily due to use of heavy equipment during construction activities. Facility construction would involve land clearing, land grading, and building construction.

It was assumed that the time required to complete all construction components of the projects would take approximately 365 days and occur in the year 2020. Construction noise would not occur over the entire project corridor during the entire construction period but would be limited to segments of the ROI while site grading, paving, and building construction occurred. Most of the ROI is surrounded by forested shrub as well as the B-88 Range Complex facilities. **Table 3-10** describes noise emission levels for construction equipment expected to be used during the proposed construction activities which range from 76 dBA to 84 dBA at 50 feet (Federal Highway Administration [FHWA] 2006). Construction projects would require the use of common construction equipment, all of which would be expected to meet local, state, and Federal noise regulations. Depending upon the number, type, and distribution of construction equipment being used, the noise levels near the ROI could temporarily exceed 64 dBA up to 500 feet from the project areas.

Table 3-10. dBA Sound Levels of Construction Equipment and Modeled Attenuation at Various Distances[1]
REA for B-88 Range Complex and C-53A Light Demolition Range

Noise Source	50 feet	100 feet	200 feet	500 feet	1000 feet
Backhoe	78	72	68	58	52
Crane	81	75	69	61	55
Dump truck	76	70	64	56	50
Excavator	81	75	69	61	55
Front-end loader	79	73	67	59	53
Concrete mixer truck	79	73	67	59	53
Pneumatic tools	81	75	69	61	55
Auger drill rig	84	78	72	64	58
Bulldozer	82	76	70	62	56
Generator	81	75	69	61	55

Source: FHWA 2007 and GSRC
Note: 1The dBA at 50 feet is a measured noise emission. The 100- to 1,000-foot results are GSRC-modeled estimates.

Anticipated sound levels at 50 feet from the source range from 76 dBA to 84 dBA based on data from the FHWA (FHWA, 2006). As a general rule, the sound intensity decreases 6 dBA with each doubling of the distance from the source (USEPA, 1971). There are no sensitive noise receptors (i.e. single-family homes, churches, schools, hospitals) within 450 feet of the construction project. Construction noise will not affect the entire construction corridor throughout the project. Noise generated by the construction activities will be intermittent and last for approximately 365 days over the span of the entire project corridor, after which noise levels will return to ambient levels.

Equipment and machinery utilized on the project area would be expected to meet all local, state, and Federal noise regulations. Construction activities would be conducted during daylight hours to minimize impacts.

Once the construction projects are completed, the ambient noise level would return to normal. With Alternative 1 construction projects located within compatible land uses, the noise generated from the daily activities at the building would be typical of existing buildings, and the noise intensity would not increase. No long-term impacts on the ambient noise level would occur as a result of implementing this portion of Alternative 1.

3.3.3.4 Mission Surge

The Alternative 1 - Mission Surge would result in a long-term, moderate, adverse impacts on the noise environment. The Mission Surge implements annual operations at a 25 percent increase in munitions use over the current operational level (No Action Alternative), within the B-88 Range Complex and the C-53A Light Demolitions Range.

Although the number of associated individual acoustical events from munitions use under Alternative 1 would be 25% greater than current operational levels, the implementation of this alternative would have minor effects on noise emissions. The increase in operational tempo under Alternative 1 would not create appreciable areas of incompatible land use, or increase the off-base areas exposed to munitions noise; however, it would increase the number of events that would raise concerns and solicit complaints by the public. Given that Alternative 1 would have the same single-event noise effects as current operational use, the 115-dBP, 130-dBP, and 140-dBP contours for the B-88 Range Complex and C-53A Light Demolition Range areas shown on **Figures 3-1** through **Figure 3-6** would not change from the current operational use (No Action Alternative). The risk of concern and complaint in off-base areas under Alternative 1 would be similar to Alternative 2 and 3, with the associated effects on the public under Alternative 1 being more frequent. The estimated annual noise effects from Alternative 2 would attenuate to acceptable thresholds before affecting sensitive noise receptors.

The U.S. Army Public Health Command has developed guidance tables to assist in predicting the potential for annoyance to the local community, and the potential for military activities generating noise complaints. **Table 3-11** describes noise emission levels for munition equipment at current baseline levels. Noise levels were estimated by using the largest munition proposed for use at each of the individual range areas based on the net explosive weight (NEW) of that munition. Peak levels above 140 dBP represent the threshold for permanent physiological damage to unprotected human ears and structural damage claims (Department of the Army 2007). It is widely recognized that structural damage is improbable below 140 dBP (DOD Noise Working Group 2013a).

Peak levels in the low 120 dBs may cause the rattling of windows or loose ornaments (e.g., pictures on walls) which can annoy occupants, but are below levels necessary to cause structural damage (DOD Noise Working Group 2013a).

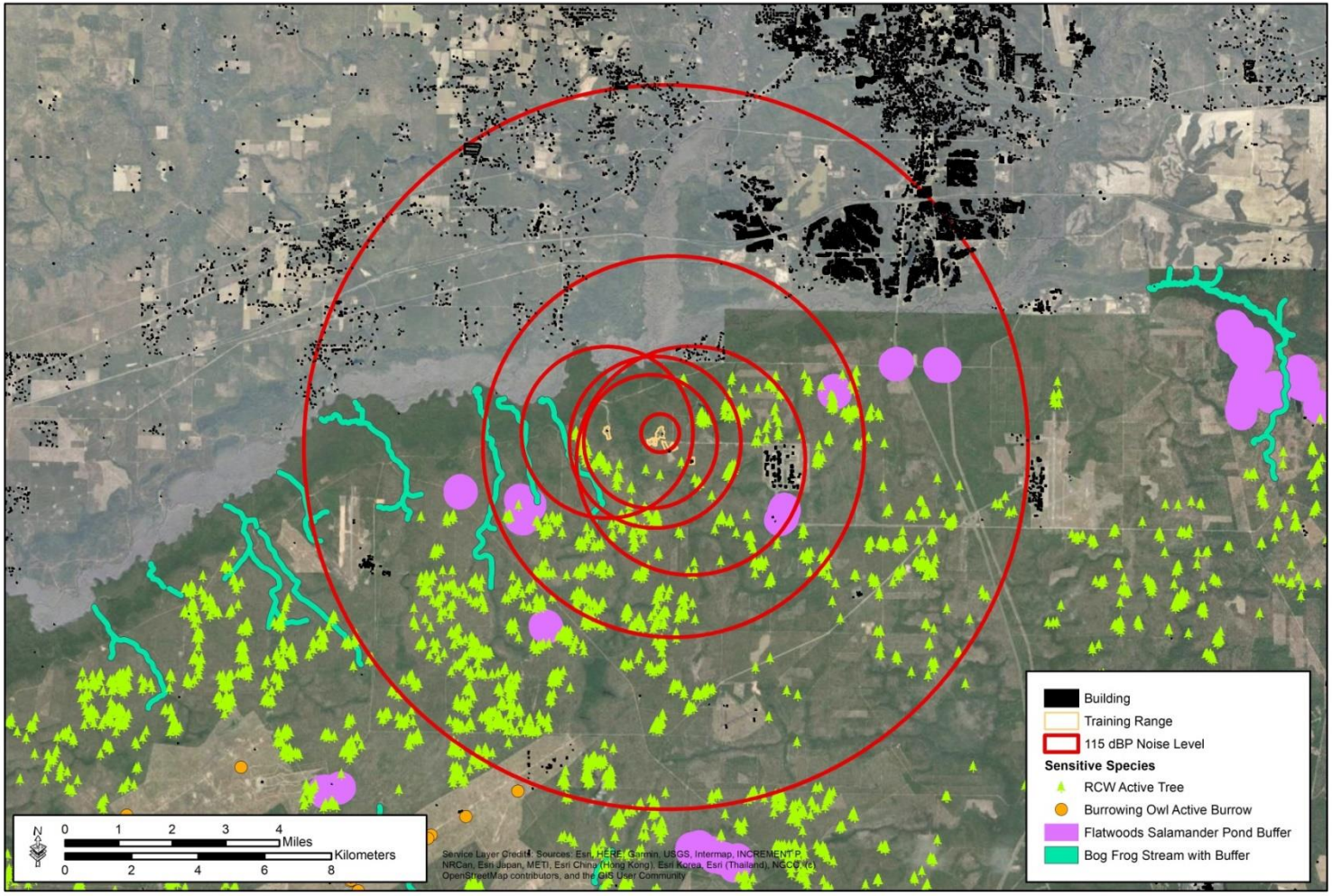

Figure 3-1. 115-dBP Noise Contours for the B-88 Range Complex, Eglin AFB

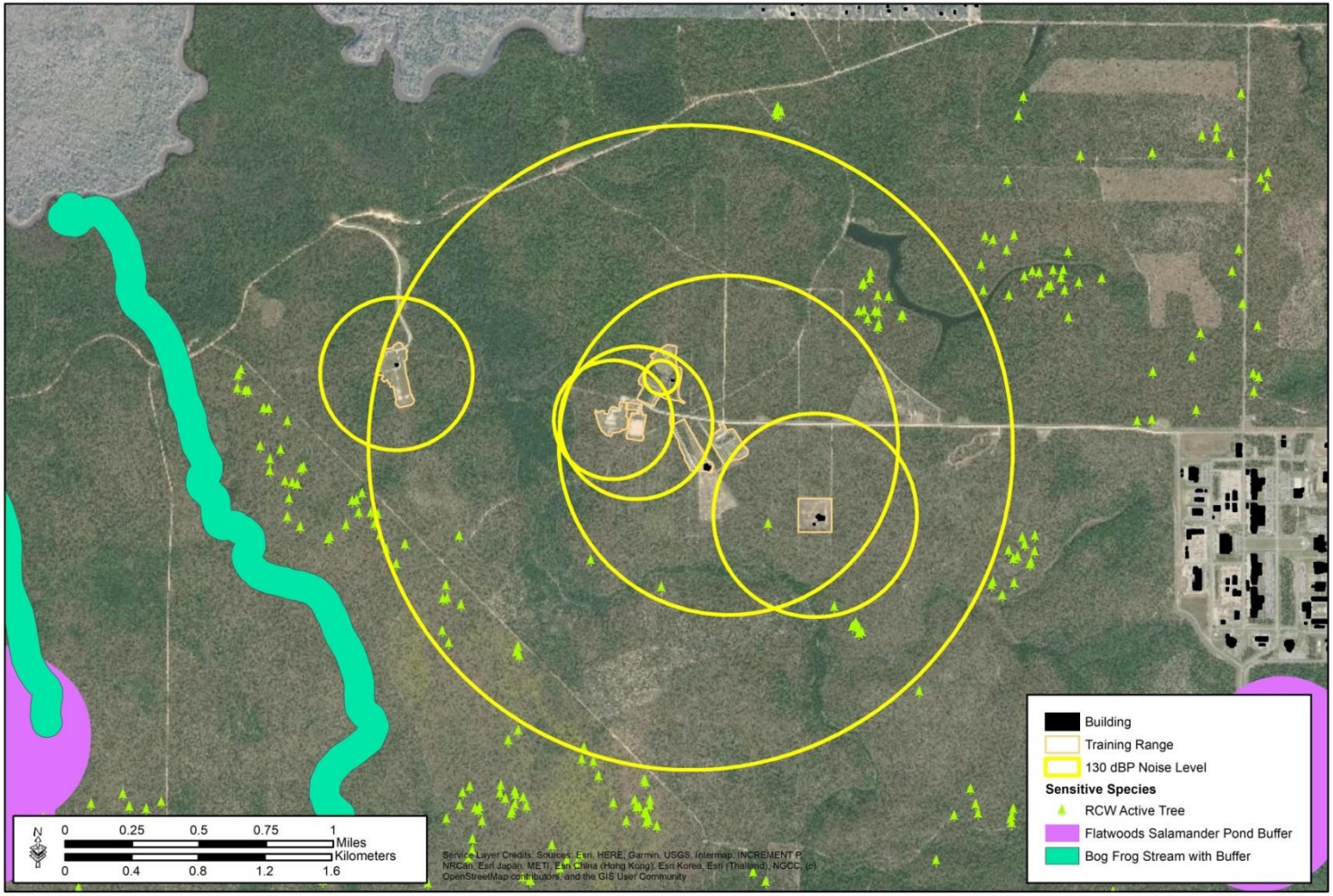

Figure 3-2. 130-dBP Noise Contours for the B-88 Range Complex, Eglin AFB

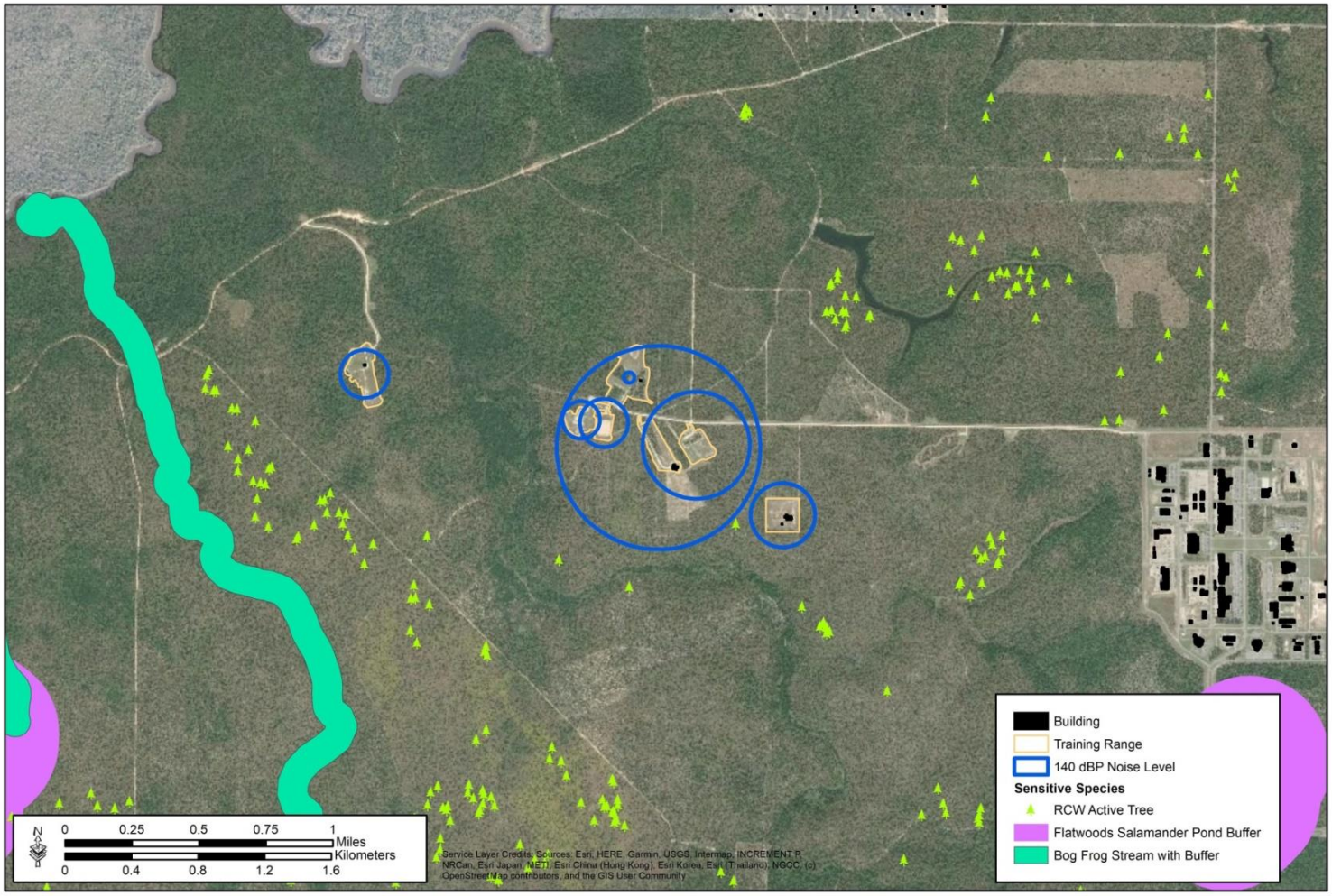

Figure 3-3. 140-dBP Noise Contours for the B-88 Range Complex, Eglin AFB

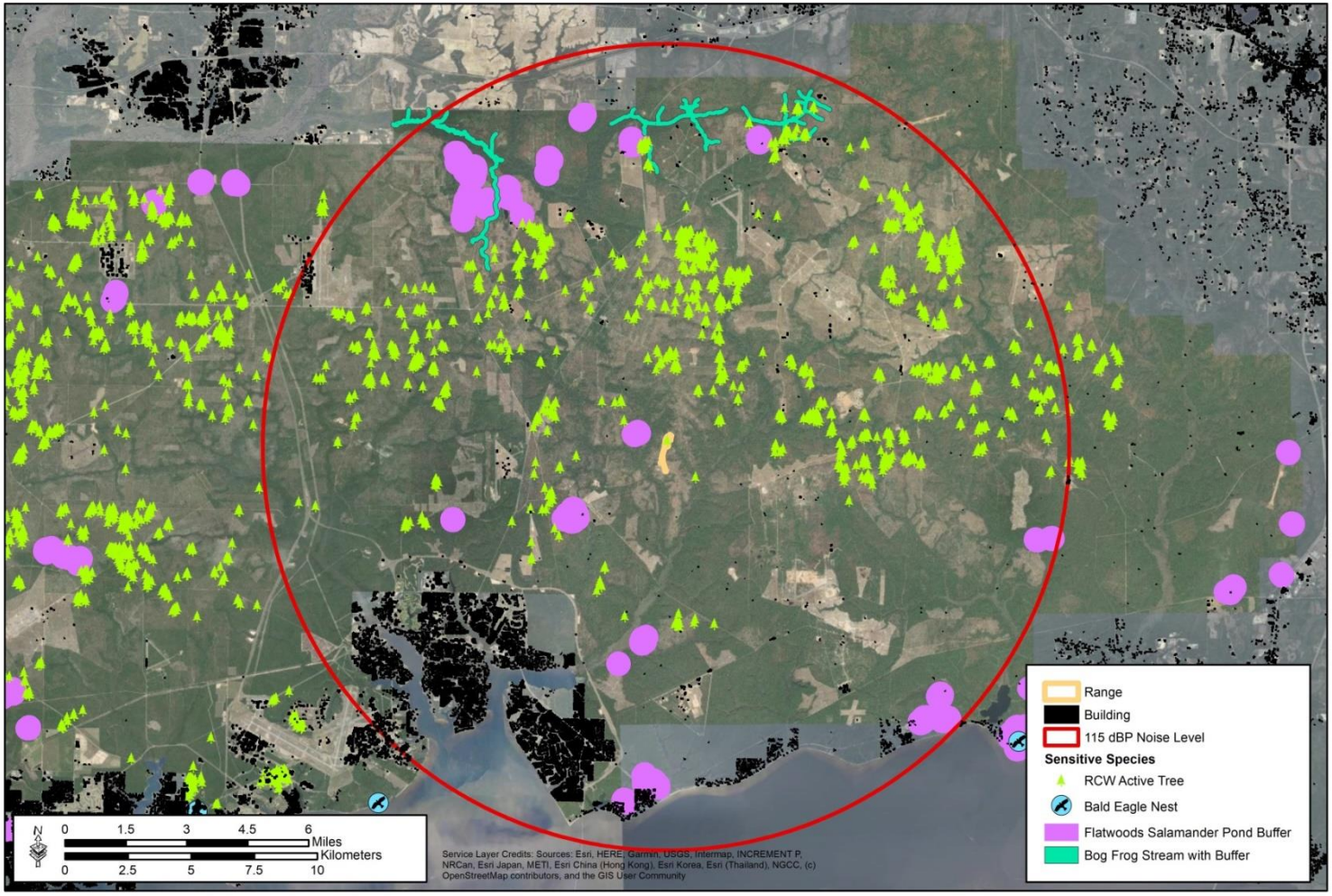

Figure 3-4. 115-dBP Noise Contours for the C-53A Light Demolition Range, Eglin AFB

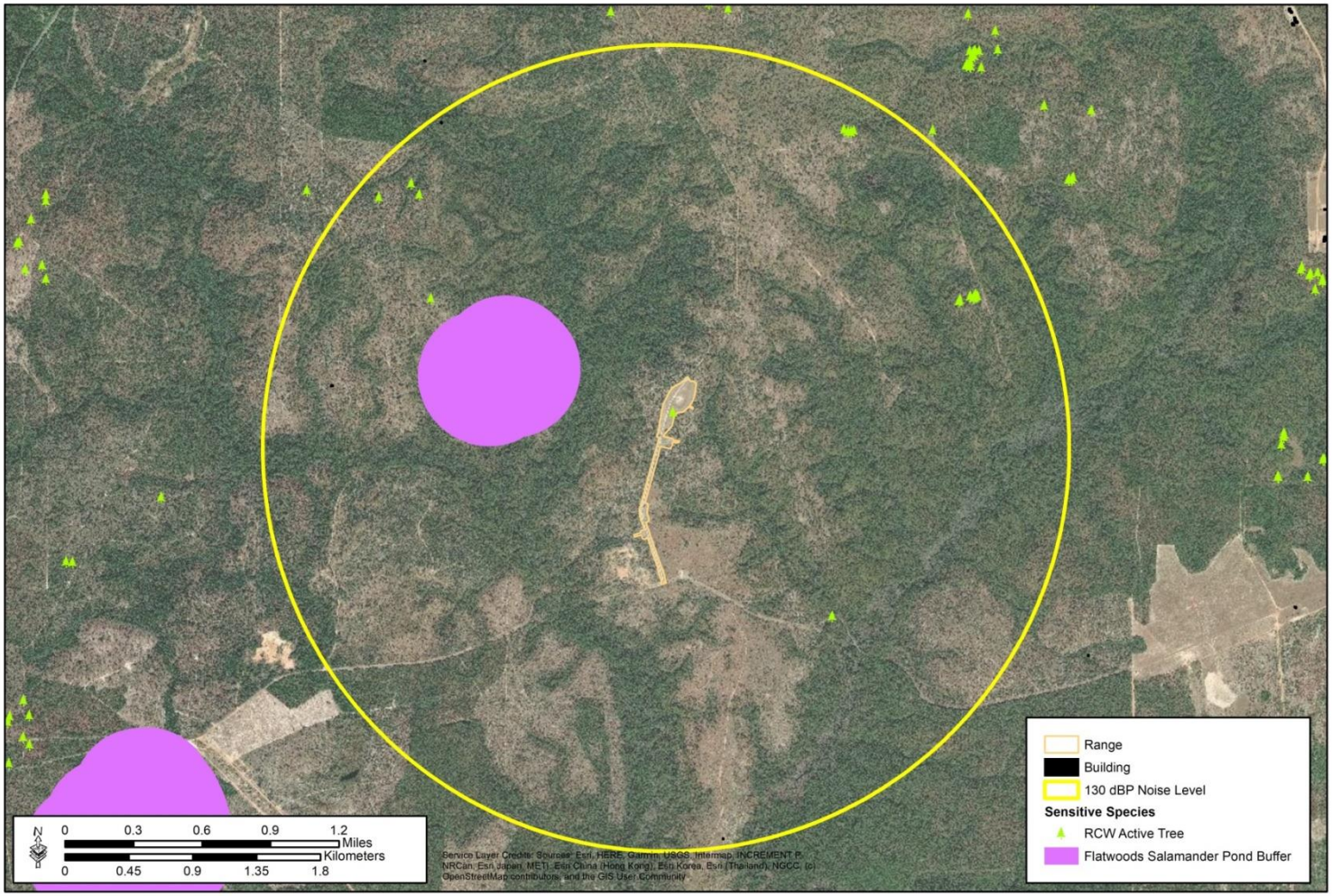

Figure 3-5. 130-dBP Noise Contours for the C-53A Light Demolition Range, Eglin AFB

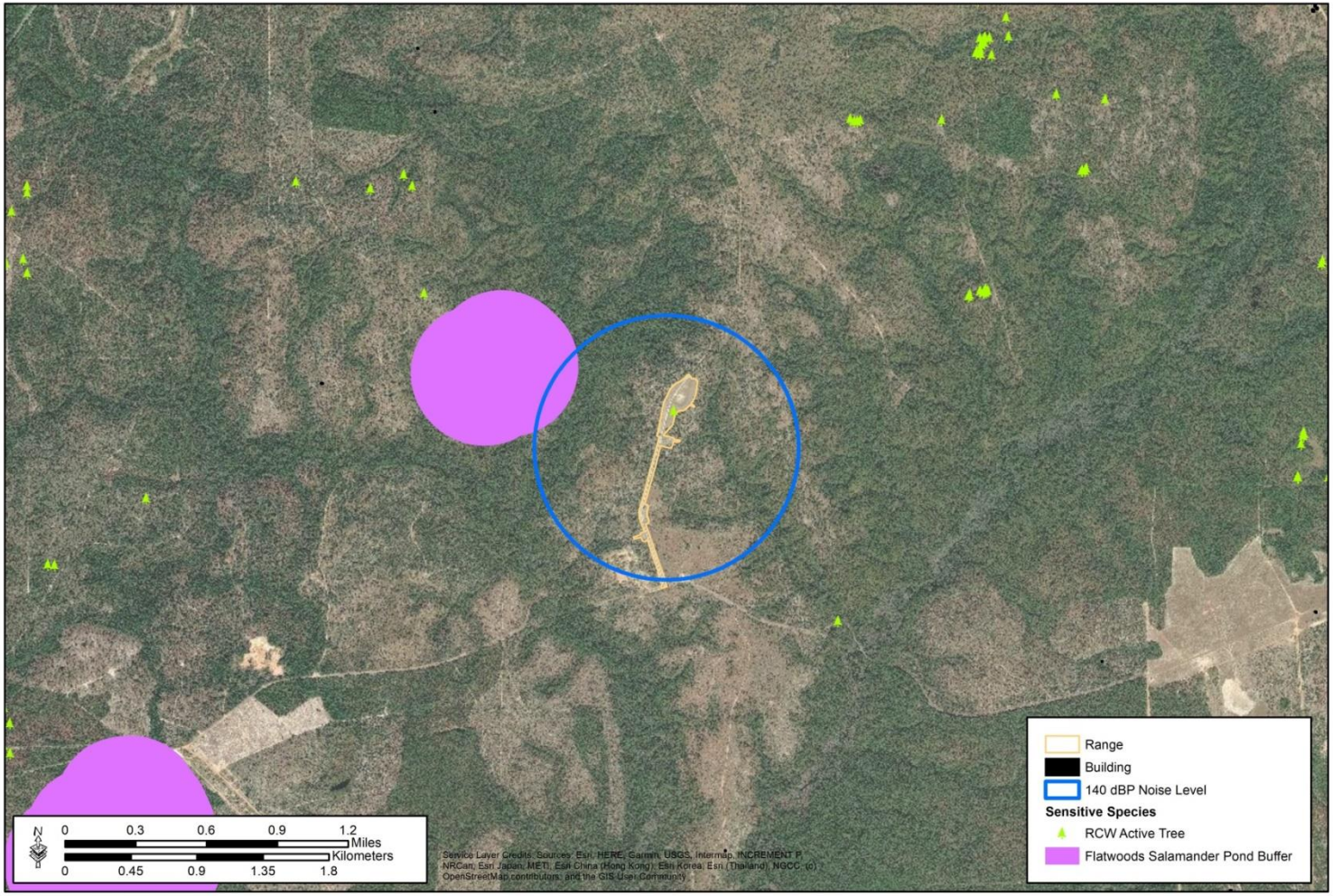

Figure 3-6. 140-dBP Noise Contours for the C-53A Light Demolition Range, Eglin AFB

Table 3-11. Effects of Munitions Noise from Alternative 1 - Mission Surge Munition Use
REA for B-88 Range Complex and C-53A Light Demolition Range

Range Areas	Largest Munition Used	NEW (Kilograms)	Distance to 115 dBP[b] (miles)	Distance to 130 dBP[b] (miles)	Risk of Concern and Complaints in Off-Base Areas	Distance 140 dBP[c] (miles)
B-88A1	G900 GRENADE, HAND INC TH-3 AN-M14	0.7711	2.134	0.3795	Low	0.12
B-88B	M614 CORD, DET (1377)	3.2836	3.556	0.6325	Low	0.20
B-88C	M046 CHG, DEMO FLEX LINEAR MK8-2, 3	22.6796	6.757	1.2017	Moderate	0.38
B-88C1	G955 GRENADE, HAND SMK VIO M18	0.3266	1.60	0.2846	Low	0.09
B-88D	A011 CTG, 12 GAGE #00 BUCKSHOT M19/XM/M162	0.0017	0.3557	0.0633	Low	0.02
B-88D1	L314 SIGNAL, ILLUM GRN STAR CLSTR M125/A1/E1	0.126	1.245	0.2214	Low	0.07
B-88E	G955 GRENADE, HAND SMK VIO M18	0.3266	1.60	0.2846	Low	0.09
C-53A	M025 CHG, DEMO FLEX LINEAR M58/A1	72.575	9.91	1.7622	Moderate	0.56

Notes: dBP = peak sound level ; mm = millimeter
a) Source: CERL, 2007.
b) Noise Attenuation Calculator, California Department of Transportation 1998 - $dBA_2 = dBA_1 – 20 \log^{(d2/d1)}$
c) IATG 01.80 - Formulae for Ammunition Management - Clause 9.4, Distance (miles) = $(215(NEQ)^{1/3})$

The Alternative 1 - Mission Surge would present low to moderate risk of concern and complaints in off-base areas. The furthest distance for the largest munition used at the B-88 Complex is at the B-88C test area. The noise from these munitions to attenuate to levels of 115dBP is approximately 6.757 miles, which could potentially result in concern or complaints from sensitive noise receptors in Milligan, FL as well as Crestview, FL. The largest munition used at the C-53A test area would take 22.05 miles to attenuate to 115 dBP, presenting a moderate-to-high risk of concern and complaints in off-base areas; however, these activities are already occurring.

Alternative 1 additionally introduces the implementation of annual munitions use and operations at four new facilities and/or enhanced range areas. Although an additional increase in munitions use would occur at these four range areas, the noise levels (impulsive noise in dBA) would remain relatively the same, as no new (larger new) ordnance types of munitions have been proposed that would result in an increase in the impulsive noise environment. **Table 3-12** describes noise emission levels for munition use at the four new facilities and/or enhanced range areas.

Although the number of associated individual acoustical events from munitions use would increase, annual munitions use and operations at four new facilities and/or enhanced range areas would have minor effects on noise emissions. This increase in munitions use would not create appreciable areas of incompatible land use, or increase the off-base areas exposed to munitions noise; however, it would increase the number of events that would raise concerns and solicit complaints by the public.

Table 3-12. Effects of Munitions Noise from Alternative 1 - New Enhanced Range Areas
REA for B-88 Range Complex and C-53A Light Demolition Range

Range Areas	Largest Munition Used	NEW (Kilograms)	Distance to 115 dBP[b] (miles)	Distance to 130 dBP[b] (miles)	Risk of Concern and Complaints in Off-Base Areas	Distance 140 dBP[c] (miles)
CACTF	L594 SIMULATOR, PROJ GRND BURST M115A2	0.0463	0.889	0.158	Low	0.05
GLR	B519 CTG, 40MM TP M781 SNGL RD	0.0004	0.178	0.032	Low	0.01
Trench Complex/ TTA I-36	M670 FUSE, BLAST TIME M700 (U/I FT) (1375)	0.1588	1.24	0.221	Low	0.07
RDZ	L594 SIMULATOR, PROJ GRND BURST M115A2	0.0463	0.889	0.158	Low	0.05

Notes: dBP = peak sound level ; mm = millimeter
a) Source: CERL, 2007.
b) Noise Attenuation Calculator, California Department of Transportation 1998 - $dBA_2 = dBA_1 – 20 \log^{(d2/d1)}$
c) IATG 01.80 - Formulae for Ammunition Management - Clause 9.4, Distance (miles) = $(215(NEQ)^{1/3})$

Conclusion

Noise generated by the implementation of Alternative 1 – Enhancement and Mission Surge would attenuate at the same noise levels as the current baseline level of operations (No Action Alternative). Therefore, the noise impacts from Alternative 1 construction activities and additional munitions activity are considered not significant. Overall, there would be no significant noise increase as a result of implementing Alternative 1.

3.3.3.5 Alternative 2 – Mission Surge Only

Noise emissions from proposed Alternative 2 – Mission Surge Only training activities are expected to result from the following activities:

- A 25 percent mission surge munitions use from increased training activities.

The Alternative 2 - Mission Surge Only would result in long-term, minor, adverse impacts on the noise environment. The Mission Surge Only implements annual operations at a 25 percent increase in munitions use over the current operational level (No Action Alternative), within the B-88 Range Complex and the C-53A Light Demolitions Range.

Although the number of associated individual acoustical events from munitions use under Alternative 2 would be 25 percent greater than current operational levels, the implementation of this alternative would have minor effects on noise emissions. The increase in operational tempo under Alternative 2 would not create appreciable areas of incompatible land use, or increase the off-base areas exposed to munitions noise; however, it would increase the number of events that would raise concerns and solicit complaints by the public. **Table 3-13** describes noise emission levels for munition use at a 25% surge over the current baseline.

Given that Alternative 2 would have the same single-event noise effects as current operational use, the 115-dBP, 130-dBP, and 140-dBP contours for the range areas shown on Figures 3-1 through 3-6 would not change from the current operational use (No Action Alternative). The risk of concern and complaint in off-base areas under Alternative 2 would be similar to Alternative 1, with the associated effects on the public under

Alternative 2 being more frequent. The estimated annual noise effects from Alternative 2 would attenuate to acceptable thresholds before affecting sensitive noise receptors.

Table 3-13. Effects of Munitions Noise from Alternative 2 - Mission Surge Only Munition Use
REA for B-88 Range Complex and C-53A Light Demolition Range

Range Areas	Largest Munition Used	NEW (Kilograms)	Distance to 115 dBP[b] (miles)	Distance to 130 dBP[b] (miles)	Risk of Concern and Complaints in Off-Base Areas	Distance 140 dBP[c] (miles)
B-88A1	G900 GRENADE, HAND INC TH-3 AN-M14	0.7711	2.134	0.3795	Low	0.12
B-88B	M614 CORD, DET (1377)	3.2836	3.556	0.6325	Low	0.20
B-88C	M046 CHG, DEMO FLEX LINEAR MK8-2, 3	22.6796	6.757	1.2017	Moderate	0.38
B-88C1	G955 GRENADE, HAND SMK VIO M18	0.3266	1.60	0.2846	Low	0.09
B-88D	A011 CTG, 12 GAGE #00 BUCKSHOT M19/XM/M162	0.0017	0.3557	0.0633	Low	0.02
B-88D1	L314 SIGNAL, ILLUM GRN STAR CLSTR M125/A1/E1	0.126	1.245	0.2214	Low	0.07
B-88E	G955 GRENADE, HAND SMK VIO M18	0.3266	1.60	0.2846	Low	0.09
C-53A	M025 CHG, DEMO FLEX LINEAR M58/A1	72.575	9.91	1.7622	Moderate	0.56

Notes: dBP = peak sound level ; mm = millimeter
a) Source: CERL, 2007.
b) Noise Attenuation Calculator, California Department of Transportation 1998 - $dBA_2 = dBA_1 – 20 \log^{(d2/d1)}$
c) IATG 01.80 - Formulae for Ammunition Management - Clause 9.4, Distance (miles) = $(215(NEQ)^{1/3})$

The Alternative 2 - Mission Surge Only would present low to moderate risk of concern and complaints in off-base areas. The furthest distance for the largest munition used at the B-88 Complex is at the B-88C test area. The noise from these munitions to attenuate to levels of 115dBP is approximately 6.757 miles, which could potentially result in concern or complaints from sensitive noise receptors in Milligan, FL as well as Crestview, FL. The largest munition used at the C-53A test area would take 22.05 miles to attenuate to 115 dBP, presenting a moderate-to-high risk of concern and complaints in off-base areas; however, these munition types are already being deployed with the current operations.

Conclusion

Noise generated by the implementation of Alternative 2 –Mission Surge Only would attenuate at the same noise levels as the current baseline level of operations (No Action Alternative). Therefore, the noise impacts from Alternative 2 additional munitions activity are considered not significant. Overall, there would be no significant noise increase as a result of implementing Alternative 2.

3.3.3.6 Alternative 3 – No Action Alternative

Noise emissions from proposed Alternative 3 – No Action Alternative training activities are expected to result from the following activities:

- Current baseline level of munitions use from training activities.

The Alternative 3 – No Action Alternative would result in a long-term, moderate, adverse impact on the noise environment. This alternative implements a continued level of annual operations in munitions use within the B-88 Range Complex and the C-53A Light Demolitions Range.

The Alternative 3 – No Action Alternative would present low to moderate risk of concern and complaints in off-base areas. Given that Alternative 3 would have the same single-event noise effects as Alternatives 1 and 2, the 115-dBP, 130-dBP, and 140-dBP contours for the range areas shown on Figures 3-1 through 3-6 would not change. The continued deployment of munitions used would not create appreciable areas of incompatible land use, or increase the off-base areas exposed to munitions noise. The number of events that would raise concerns and solicit complaints by the public would remain the same.

Conclusion

Noise generated by the implementation of Alternative 3 –No Action Alternative would continue to attenuate at the same noise levels as currently experienced. Therefore, the noise impacts from Alternative 3 munitions activity are considered not significant. Overall, there would be no noise increase as a result of implementing Alternative 3.

3.4 GEOLOGY and SOILS

3.4.1 Definition of the Resource

Geology is a science concerned with the physical history of Earth, the materials with which it is composed, and the processes which alter its composition over time. The geological characteristics of any given habitat are one of the fundamental features that will determine its ability to support life. Geological resources consist of surface and subsurface materials and their properties. Geological resources included as part of this assessment are soils and prime farmland, along with topography, geology, and geologic hazards.

Soils are composed of organic matter and variable amounts of mineral particles. They serve as habitat for certain types or organisms as well as provide a means of water storage and a medium for plant growth. Soils can be formed through a combination of physical, chemical, and biological processes such as weathering and erosion of parent material, organic matter buildup, and biochemical leaching of minerals. Soils analyzed in this EA are limited to those that occur in the B-88 Range Complex and C-53A Light Demolition Range of the Eglin Reservation.

Soils. Soils are unconsolidated materials overlying bedrock or another parent material. Soils are typically described in terms of their complex type, slope, physical characteristics, and relative compatibility or constraining properties regarding construction activities and types of land use.

Topography. Topography is the change in elevation over the surface of a land area. Topography includes surface elevations, slope, and distinct physiographic features (e.g., valleys, mountains) and their influence on human activities and natural- and human-made changes to landforms.

Prime Farmland. Protected under the Farmland Protection Policy Act of 1981, Prime Farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. The land could be cropland, pasture, rangeland, or other land, but not urban built-up land or water. Federal government action should minimize impact to such lands. There are no soils within the B-88 Range Complex or the C-53A Light Demolition Range areas identified by the Natural Resources Conservation Service as Prime Farmland (USAF 2016a). As a result, there is no further analysis for this land.

Geologic Hazards. Geologic hazards are natural geologic events that can cause damage or loss of property and life. Geologic hazards of concern at and near the B-88 Range Complex or the C-53A Light Demolition Range areas include karsts, sinkholes, and earthquakes.

Geology. Geology is the study of the Earth's composition and provides information on the structure and configuration of surface and subsurface features.

3.4.2 Affected Environment

The Eglin AFB Integrated Natural Resources Management Plan (INRMP) (USAF 2017) provides information on the primary soil types that occur on Eglin AFB. The soils on Eglin AFB originated from the Citronelle Formation as well as from alluvium deposition from low lying areas (USAF 2017). Eglin AFB is composed of unnamed Holocene and Pliocene sands. These sands, part of the Citronelle Formation, are predominately non-marine quartz sands, and extend approximately 250 feet below the surface. Below the Citronelle Formation is the Pensacola confining bed, an impermeable bed of clays and clayey sands which inhibits the movement of water from the Floridan aquifer found below it (USAF 2012).

Soils that occur within Eglin AFB developed from the Citronelle Formation as well as alluvium deposited from the floodplains of surrounding lowland areas. The primary soil types found on Eglin AFB belong to the Lakeland Association (**Table 3-14**).

Table 3-14. Soils Present at the B-88 Range Complex Restricted Area
REA for B-88 Range Complex and C-53A Light Demolition Range

Description	Acres
Chipley and Hurricane soils, 0 to 5 percent slopes	91.59
Dorovan muck, frequently flooded	274.60
Foxworth sand, 0 to 5 percent slopes	3.75
Lakeland sand, 0 to 5 percent slopes	4,889.82
Lakeland sand, 5 to 12 percent slopes	1,207.74
Lakeland sand, 12 to 30 percent slopes	99.44
Udorthents, nearly level	8.18
Troup sand, 0 to 5 percent slopes	83.73
Troup sand, 5 to 8 percent slopes	37.75
Troup sand, 8 to 12 percent slopes	48.23
Troup sand, 12 to 25 percent slopes	15.46
Water	10.27

Source: GSRC generated

These soils are typified by surface layers of drained, brownish-yellow sands and sandy subsoils more than 80 inches in depth. Also prevalent throughout the area are Dorovan-Pamlico mucks. Soils of this type are poorly drained and acidic with water at or near the surface for the majority of the year. A complete listing of soil types found within each project area can be found in **Table 3-15**.

The area designated for the Combined Arms CACTF with a Subterranean Military Complex comprises an area of 308.4 acres the majority of which is composed of Lakeland sand, 0 to 5 percent. Other soil types present include Lakeland sand, 5 to 12 percent; Udorthents, nearly level; Troup sand, 0 to 5 percent; Troup sand, 5 to 8 percent; Troup sand, 8 to 12 percent; and Dorovan muck, frequently flooded (**Figure 3-7**). The CACTF, however, is only proposed to occupy 21.3 acres.

The Grenade Launcher Range (GLR; **Figure 3-8**) and the After Action Review (AAR; **Figure 3-9**) Classroom are proposed to be constructed in areas occupying 12.11 and 43.21 acres, respectively, and are comprised entirely of Lakeland sand, 0 to 5 percent.

The Advanced Drivers Training Course is proposed for an area of 281.2 acres containing primarily Lakeland sand, 0 to 5 percent. Soils also present include Lakeland sand, 5 to 12 percent; Troup sand, 0 to 5 percent; Troup sand, 5 to 8 percent; Chipley and Hurricane soils, 0 to 5 percent; and Dorovan muck, frequently flooded (**Figure 3-10**). The Advanced Drivers Training Course, however, is only proposed to require 36.7 acres, to include access roads (1.4 acres), parking lot (3.56 acres), skid pad (20.5 acres), standard drivers course (9.7 acres), and unimproved roads (1.8 acres) within this larger designated area.

Table 3-15. Soil Composition by Project at the B-88 Range Complex and TTA I-36 Light Demolition Range
REA for B-88 Range Complex and C-53A Light Demolition Range

Name	Description	Acres
Advanced Drivers Training Course	Lakeland sand, 0 to 5 percent slopes	199.25
	Lakeland sand, 5 to 12 percent slopes	16.21
	Troup sand, 0 to 5 percent slopes	60.20
	Troup sand, 5 to 8 percent slopes	5.15
	Chipley and Hurricane soils, 0 to 5 percent slopes	0.41
	Dorovan muck, frequently flooded	0.02
After Action Review (AAR) Classroom	Lakeland sand, 0 to 5 percent slopes	43.21
CACTF with a Subterranean Military Complex	Lakeland sand, 0 to 5 percent slopes	237.95
	Lakeland sand, 5 to 12 percent slopes	28.75
	Udorthents, nearly level	7.59
	Troup sand, 0 to 5 percent slopes	23.53
	Troup sand, 5 to 8 percent slopes	4.23
	Troup sand, 8 to 12 percent slopes	6.08
	Dorovan muck, frequently flooded	0.22
C-53A Light Demolition Range	Lakeland sand, 0 to 5 percent slopes	21.47
	Troup sand, 0 to 5 percent slopes	1.66
Grenade Launcher Range (GLR)	Lakeland sand, 0 to 5 percent slopes	12.11
Red Empire Drop Zone (DZ)	Lakeland sand, 0 to 5 percent slopes	1,016.61
	Lakeland sand, 5 to 12 percent slopes	34.61
	Chipley and Hurricane soils, 0 to 5 percent slopes	0.04
Trench Complex	Lakeland sand, 0 to 5 percent slopes	74.10
TTA I-36: Live Fire Maneuver Area	Lakeland sand, 0 to 5 percent slopes	917.48
	Lakeland sand, 5 to 12 percent slopes	30.45
	Troup sand, 0 to 5 percent slopes	3.47
	Chipley and Hurricane soils, 0 to 5 percent slopes	77.79
	Dorovan muck, frequently flooded	29.67
	Foxworth sand, 0 to 5 percent slopes	5.21

Source: GSRC generated

The Red Empire Drop Zone (DZ) is designated in an area of 1,051.3 acres comprised almost entirely of Lakeland sand, 0 to 5 percent. Also present are Lakeland sand, 5 to 12 percent, and Chipley and Hurricane soils, 0 to 5 percent (**Figure 3-11**). The New TTA I-36 Live Fire Maneuver Area is an area of 1,064.1 acres located in predominately Lakeland sand, 0 to 5 percent with Lakeland sand, 5 to 12 percent; Troup sand, 0 to 5 percent; Chipley and Hurricane soils, 0 to 5 percent; Dorovan muck, frequently flooded; and Foxworth sand, 0 to 5 percent, also present. The Trench Complex (74.1 acres) is to be located within the TTA I-36 Live Fire Maneuver Area, and consists entirely of Lakeland sand, 0 to 5 percent (**Figure 3-12**). The C-53A Light Demolition Range (23.1 acres) contains Lakeland sand, 0 to 5 percent; and Troup sand, 0 to 5 percent (**Figure 3-13**). Neither new facility construction, nor range enhancement activities are proposed for this area.

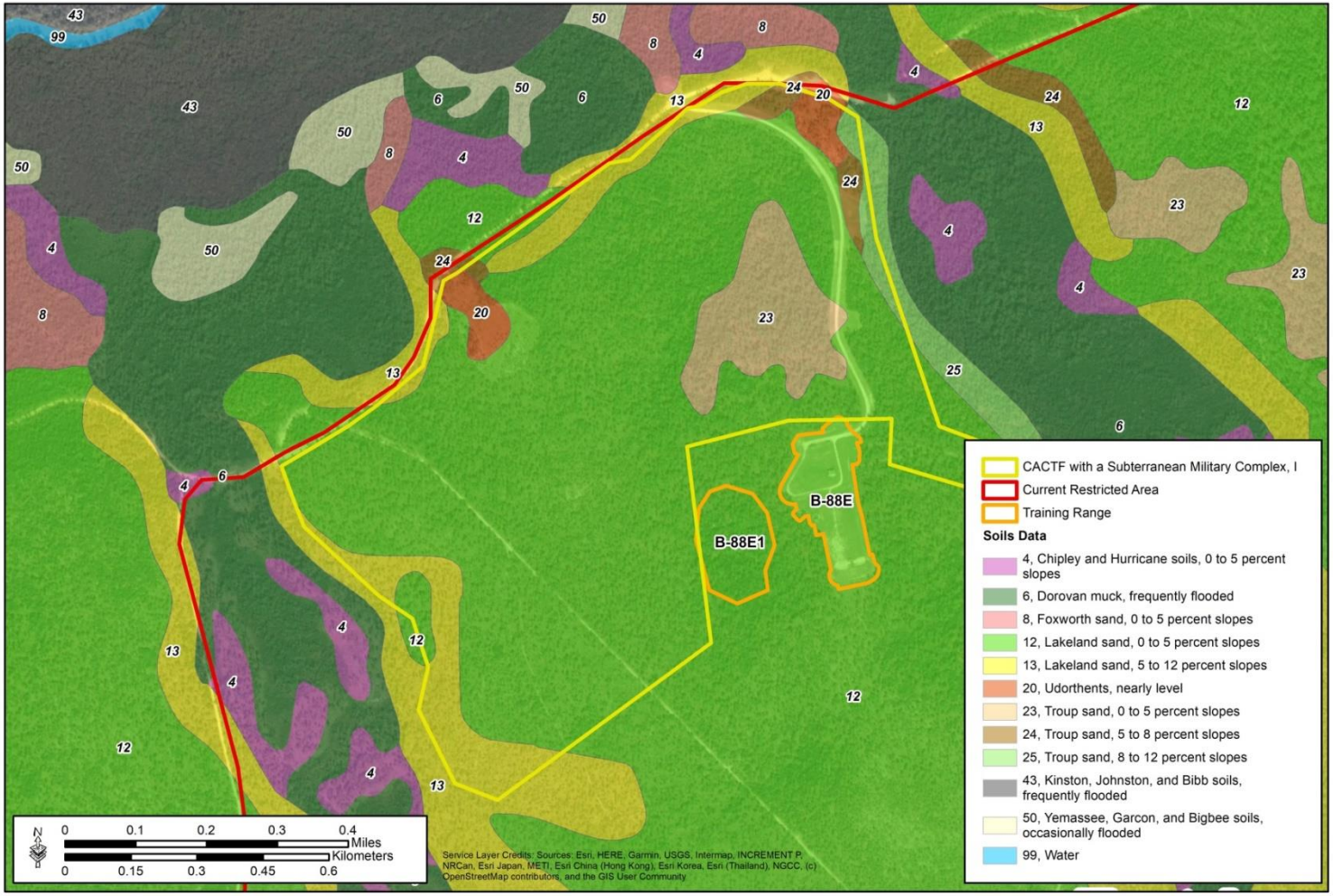

Figure 3-7. Soils Profile of the CACTF with a Subterranean Military Complex at the B-88 Range Complex, Eglin AFB

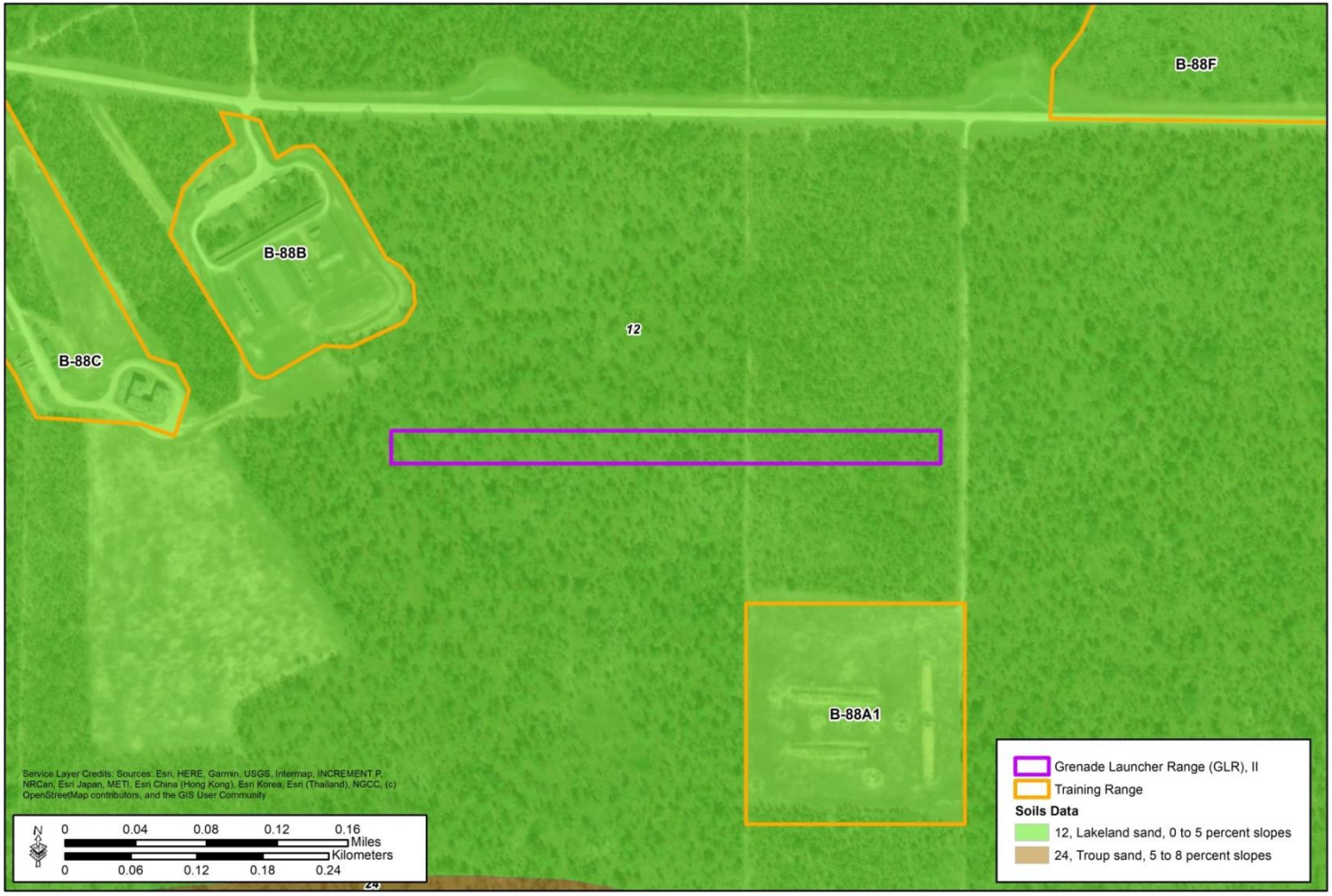

Figure 3-8. Soils Profile of the GLR at the B-88 Range Complex, Eglin AFB

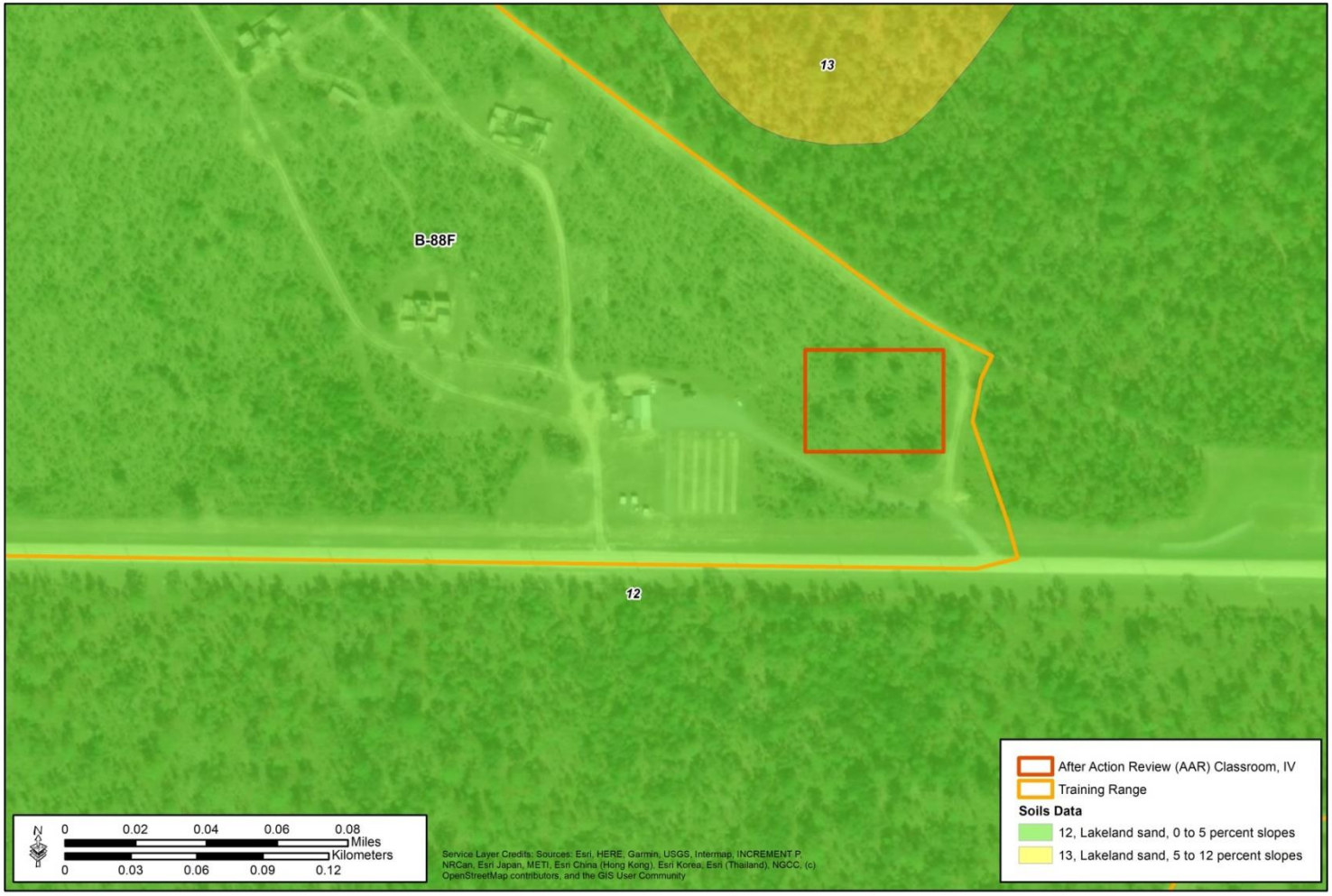

Figure 3-9. Soils Profile of the AAR Classroom at the B-88 Range Complex, Eglin AFB

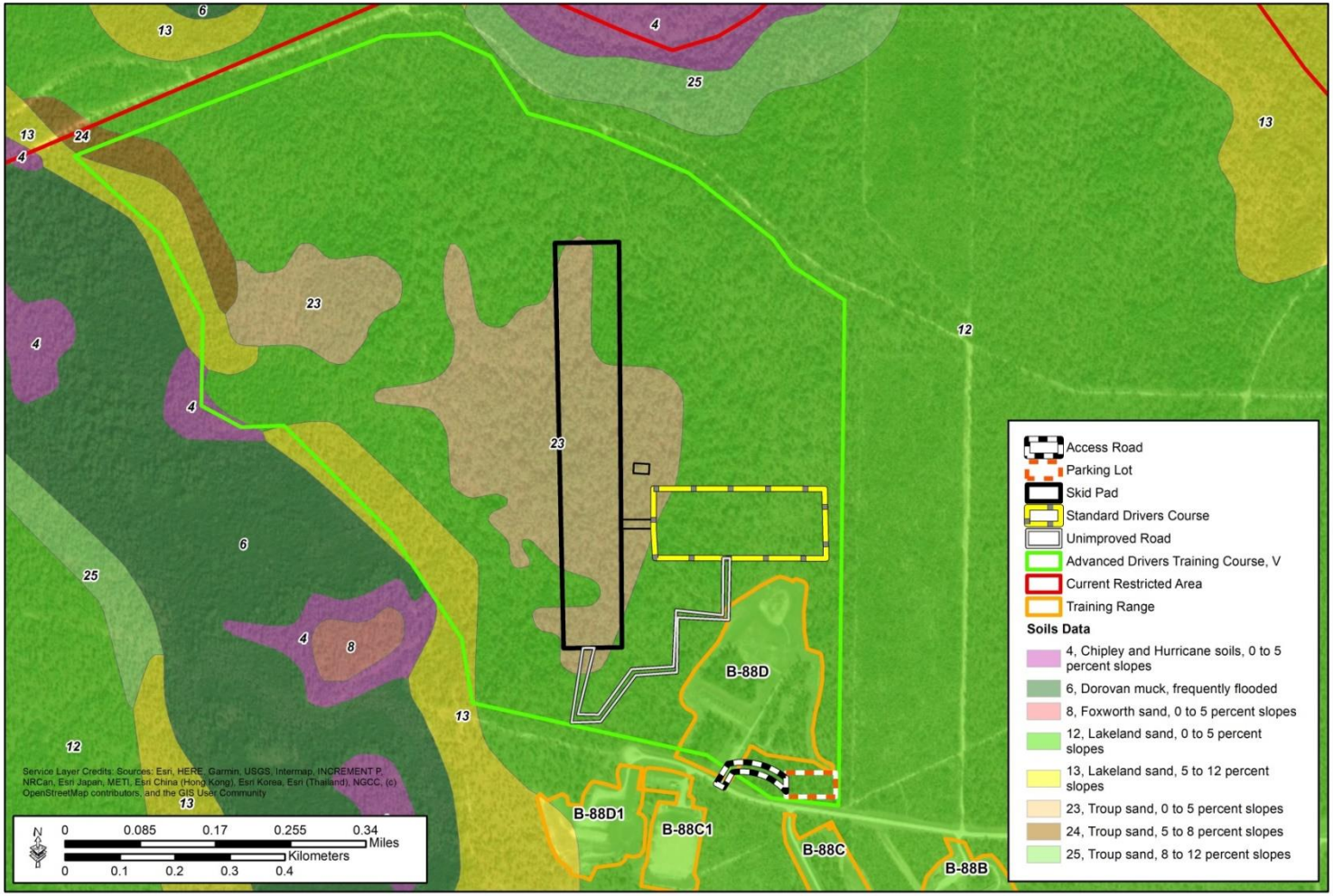

Figure 3-10. Soils Profile of the Advanced Drivers Training Course at the B-88 Range Complex, Eglin AFB

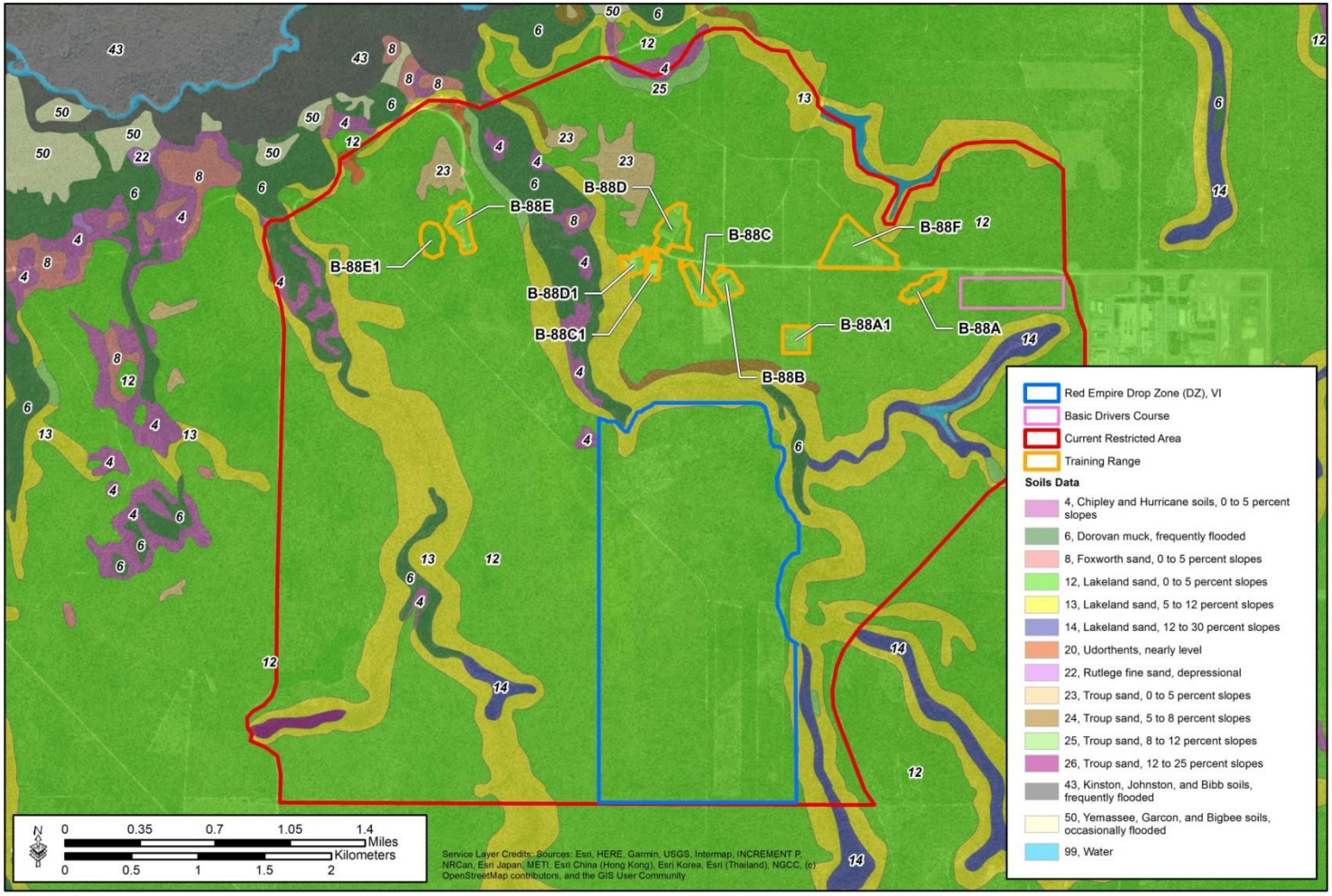

Figure 3-11. Soils Profile of the Red Empire Drop Zone at the B-88 Range Complex, Eglin AFB

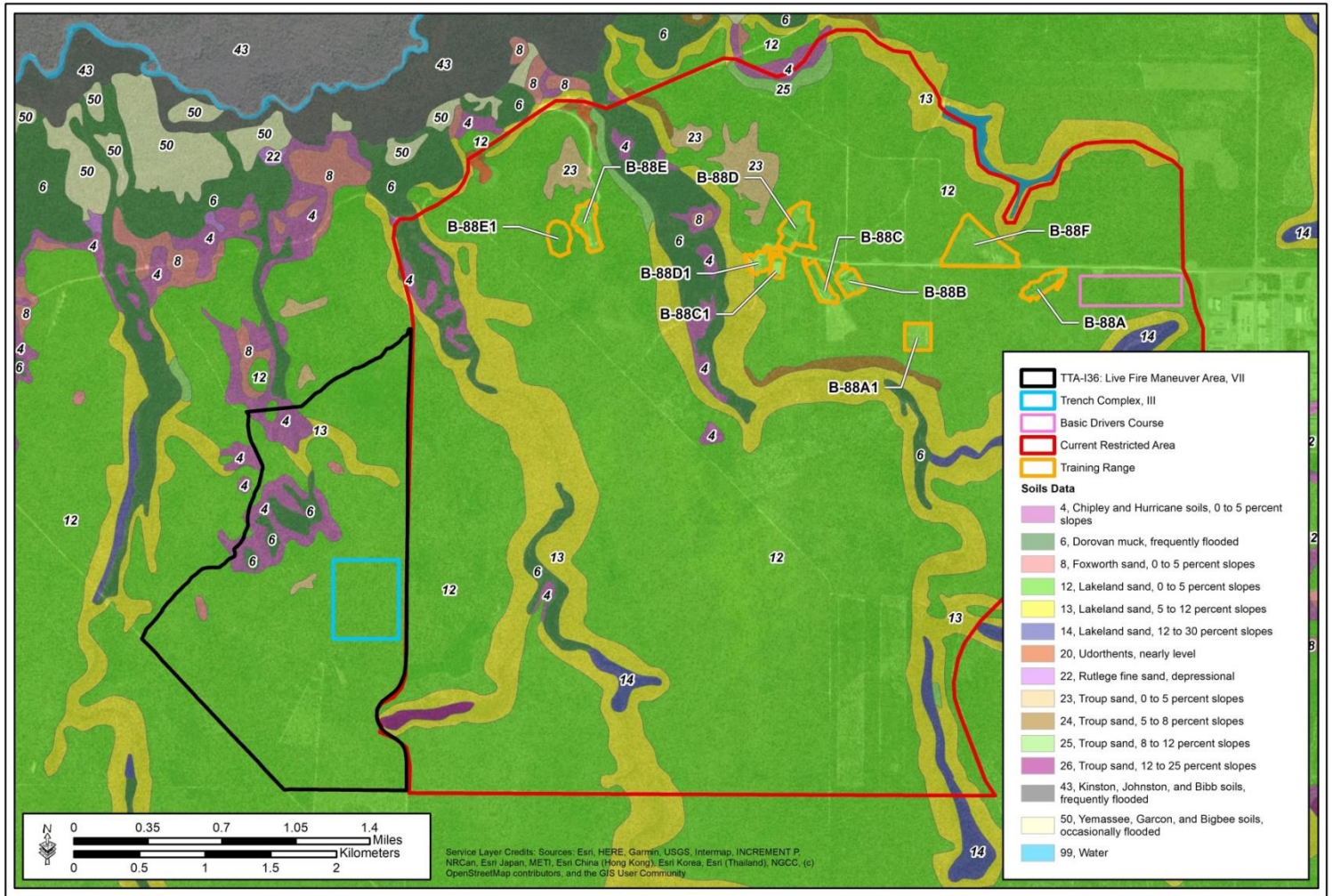

Figure 3-12. Soils Profile of the B-88 Range Complex and the TTA I-36 Live Fire Maneuver Area, Eglin AFB

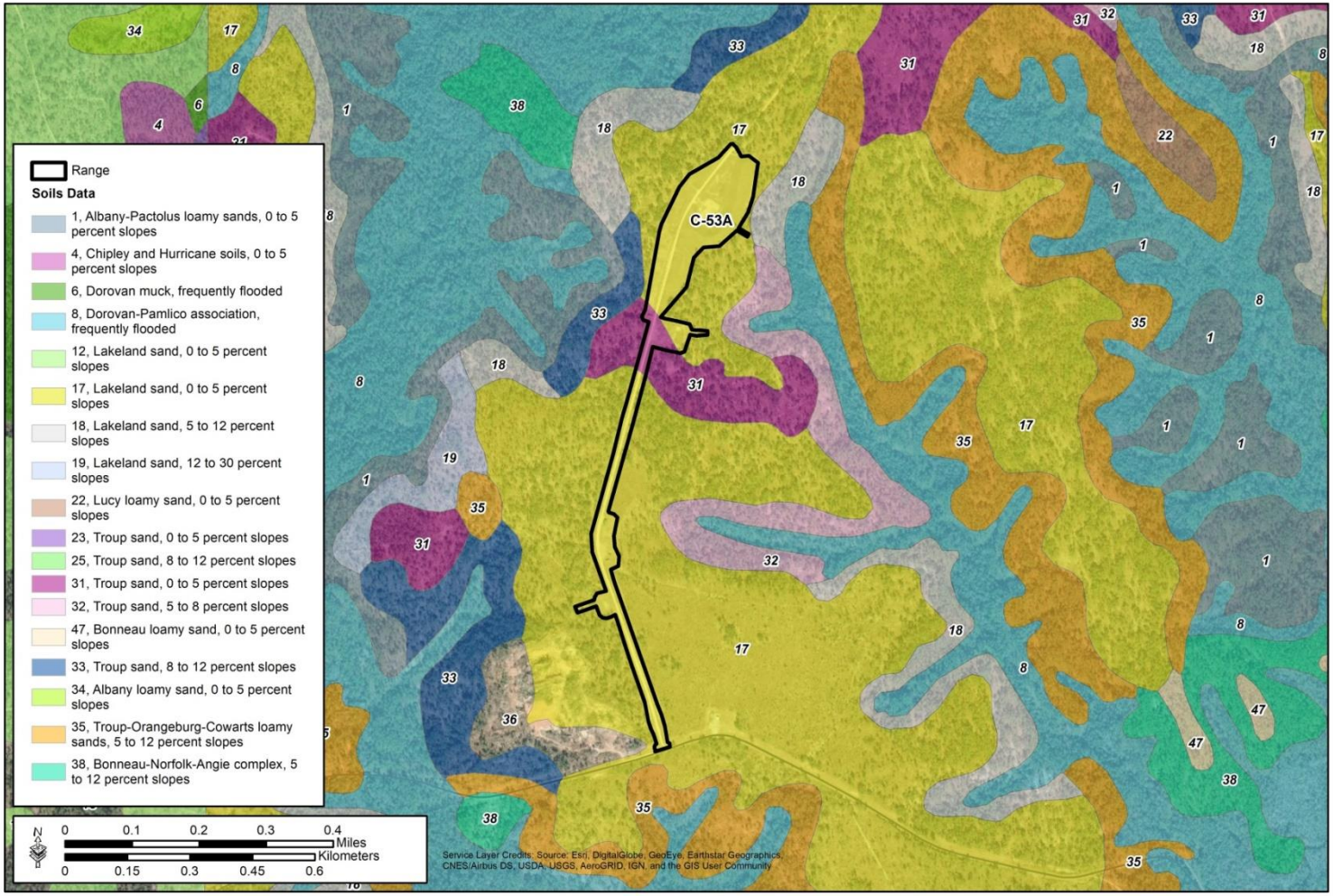

Figure 3-13. Soils Profile of the C-53A Light Demolition Range, Eglin AFB

3.4.3 Environmental Consequences

3.4.2.1 Analysis Approach

In addition to the significance criteria established at the beginning of this section, the following thresholds were used to determine if an impact on soils would be significant:

- Actions could lead to potential increases in erosion, siltation, or other geologic hazards (e.g. landslides)
- Actions may result in humans, structures, or the environment to be exposed to major geological hazards

3.4.2.2 Alternative 1 – Enhancement and Mission Surge

Alternative 1 includes enhancement of the B-88 Range Complex and the C-53A Light Demolition Range capabilities with new facility construction, range expansion (TTA I-36 Live Fire Maneuver Area), and a 25 percent mission surge of operations above the current baseline level. Impacts to soils as a result of new facility construction and other range enhancements, and mission surge activities on the B-88 Range Complex and the C-53A Light Demolition Range may occur from physical disturbance as well as the release of hazardous materials.

3.4.2.3 Physical Disturbance

Implementation of the Alternative 1 range enhancement activities has the potential to create ground disturbance and therefore, physical impacts to the soils. While soils would be disturbed by earthmoving and other construction-related activities, impacts would be minor and contained only to within the project footprints. The actions proposed could result in an increase in the amount of excavated soils and exposed rock materials within the project areas, which could result in a temporarily increased threat of soil erosion. The incorporation of best management practices (BMPs) will reduce any potential erosion that may occur during activities associated with construction.

3.4.2.4 Hazardous Materials

Hazardous materials have the potential to accumulate in the soils of project areas in which munitions will be utilized. These project areas include, but are not limited to the C-53A Light Demolition Range, Grenade Launcher Range, and TTA I-36 Live Fire Maneuver Area. Munitions contain various heavy metals including aluminum, copper, lead, and zinc, as well as organic explosive compounds including trinitrotoluene (TNT) and Research Department Explosive (RDX [cyclotrimethylene trinitramine]) which leach harmful chemicals into the environment, and when found in high enough quantities produce deleterious effects on humans.

Soil sampling and modeling data are not available for the project area currently. However, the extent in which munition constituents can accumulate in soils over an extended period of use has been previously assessed in a comparable area. The C-52 Complex of Eglin AFB shares the same dominant soil type (Lakeland Association) as many of the range areas being evaluated in this REA. The 2005 TA C-52 Complex Environmental Baseline Document (EBD) (USAF 2005) used the Seasonal Soil Compartment Model (SESOIL) Version 3.1 (SAIC 2003) to analyze the types and amounts of chemical constituents of munitions that accumulate in soils on the C-52 Complex. DoD's Toxic Release Inventory-Data Delivery System was used to quantify the chemical constituents for input into the SESOIL model. The cumulative amounts of chemical constituents from various ordnance (live bombs, missiles, gun ammunition, and small arms ammunition), chaff, and flares on TAs C-52C, C-52N, and C-52W resulting over a period of 10 consecutive years were modeled. To provide the most conservative estimate of annual chemical quantities, the model used the years with the greatest amount of each munition type. These estimates were then compared to EPA human-health risk (soil-industrial) Regional Screening Levels (RSLs). **Table 3-16** presents the predicted concentrations of munitions constituents in soil on TA C-52N resulting from 10 years of accumulation. Additionally, the table

also presents the predicted maximum depths to which the constituents migrate into the soil, and identifies the current human-health risk and ecological screening criteria for the constituents.

Table 3-16. Predicted Concentrations of Munitions Constituents in Soil on Test Area C-52N Resulting from 10 Years of Accumulation
REA for B-88 Range Complex and C-53A Light Demolition Range

Constituent	Test Area C-52Na (mg/kg)	Maximum Soil Migration Depth[a] (meters)	Human-Health Risk RSL[b] (mg/kg)	Ecological SSB[c] (mg/kg)
Inorganic Metals				
Aluminum	19	0.1	1,100,000	50
Barium	0.0467	3.1	220,000	165
Cadmium	0.2758	1.9	980	1.6
Copper	27	3.6	47,000	40
Lead	1	0.2	800	50
Zinc	11	0.2	350,000	50
Organic Explosive Compounds				
RDX	<0.0001	N/A	28	None
TNT	0.0137	14.3	96	None

Notes:
mg/kg = milligrams per kilogram
N/A = not applicable
RDX = Research Department Explosive (cyclotrimethylene trinitramine).
RSL = Regional Screening Level
SSB = Soil Screening Benchmark
TNT = trinitrotoluene
[a] Data from 2005 Test Area C-52 Complex Environmental Baseline Document (USAF 2005)
[b] U.S. Environmental Protection Agency (EPA) human-health risk (soil-Industrial) RSL (EPA 2019)

[c] EPA Region 4 Ecological SSB (Risk Assessment Information System 2020)

Physical disturbance of the soils resulting from the implementation of Alternative 1 –Enhancement and Surge (construction) would result in negligible impacts on the topography and geology of the B-88 Range Complex areas, as no significant alteration of surface landforms or subsurface geological features are anticipated. As a result, long-term impacts on soils and geological resources would be negligible.

As can be seen in **Table 3-16**, the predicted concentrations of all munition constituents in the soil on TA C-52N were far lower than the amount necessary to pose a risk to human health. The size of TA C-52N (3,277 acres) is far greater than any of the proposed improvements involved in the B-88 Range Complex enhancement. This would indicate that, within the ROI, the potential of munitions to degrade soil quality (with hazardous materials) to a level adversely affecting human or ecological health is minimal.

Overall, there would be no significant soil disturbance or soil quality degradation impacts from the implementation of Alternative 1.

3.4.2.5 Alternative 2 – Mission Surge Only

Increased munitions use on the B-88 Range Complex and the C-53A Light Demolition Range under Alternative 2 would increase the potential for soil erosion on the range areas. However, provided that the current soil erosion controls continue to be implemented during a mission surge, soil erosion impacts under Alternative 2 are not expected to be significantly adverse. Although the annual quantities of munitions would increase under Alternative 2, there would be no change in the types of munitions used on the training ranges.

The overall quantities of munitions that would be used on the B-88 Range Complex and the C-53A Light Demolition Range during a mission surge would still be lower than the munitions quantities analyzed for TA C-

52N in 2005. Therefore, based on the analysis conducted for Alternative 1, a mission-surge increase in munitions use is not expected to degrade soil quality on the range areas to a level that would adversely impact human health or ecological receptors. Based on the analysis conducted, Alternative 2 would have a minor impact on soils. Overall, there would be no significant soil disturbance or soil quality degradation impacts from the implementation of Alternative 2.

3.4.2.6 Alternative 3 – No Action Alternative

Continued use of munitions at the current baseline level on the B-88 Range Complex and the C-53A Light Demolition Range under Alternative 3 would continue the potential for soil erosion on the range areas. However, provided that the current soil erosion controls continue to be implemented, soil erosion impacts under Alternative 3 are not expected to be significantly adverse. The annual quantities of munitions would remain at the same levels under Alternative 3, and there would be no change in the types of munitions used on the training ranges.

The overall quantities of munitions that would be used on the B-88 Range Complex and the C-53A Light Demolition Range under the No Action Alternative current baseline levels would still be lower than the munitions quantities analyzed for TA C-52N in 2005. Therefore, based on the analysis conducted for Alternative 1, a continued munitions use is not expected to degrade soil quality on the range areas to a level that would adversely impact human health or ecological receptors. Based on the analysis conducted, Alternative 3 would have a minor impact on soils. Overall, there would be no significant soil disturbance or soil quality degradation impacts from the implementation of Alternative 3.

3.5 Water Resources

3.5.1 Definition of the Resource

Water resources include those waters that are above and below the surface of the Earth. Water resources for this EA include floodplains, surface waters (waters of the U.S. and wetlands), groundwater, and coastal zone management. Surface and groundwater resources are protected by Federal and state laws and regulations, including the Clean Water Act (CWA) (Sections 401, 402, and 303[d]), the Safe Drinking Water Act, Section 438 of the Energy Independence and Security Act, and the USEPA's National Pollutant Discharge Elimination System (NPDES), administered by the FDEP.

3.5.1.1 Floodplains

Floodplains are lands bordering rivers and streams that normally are dry but are covered with water during floods. They occur in both inland and coastal areas. Risk of flooding typically hinges on local topography, the frequency of precipitation events, size of the watershed above the floodplain, and in the case of coastal areas, storm surge intensity. The direct function of a floodplain is to absorb water and energy from storms. Indirect benefits include groundwater recharge from stormwater absorption, nutrient cycling, waste disposal, carbon sequestration, wildlife habitat, vegetative diversity, and aesthetic qualities.

EO 11988, Floodplain Management –EO 11988 requires Federal agencies to avoid direct or indirect support or development within or affecting the 1 percent annual chance Special Flood Hazard Area (SFHA) (i.e., the 100-year floodplain) and within the 0.2 percent annual chance SFHA (i.e., the 500-year floodplain) whenever there is a practicable alternative for Critical Actions. EO 11988 further directs all Federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. The Federal Emergency Management Agency's (FEMA) regulations for complying with EO 11988 are found in 44 CFR Part 9, Floodplain Management and Protection of Wetlands (1980).

3.5.1.2 Wetlands, Waters of the United States, and Surface Water

Wetlands are transitional areas of land between well-drained uplands and permanently flooded or aquatic systems. They include swamps, marshes, and bogs and are found in both coastal and inland settings. Their

soils are typically hydric, and the water table is commonly at or near land surface for much of the year. Wetlands filter water to remove nutrients, contaminants, and sediment, thereby improving water quality. They recharge water supplies, reduce risk of flood because of storage capacity, and provide important habitat for fish and wildlife. Wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR § 328.3[b]) (USACE 1987).

Surface water is water collected on the ground. It is any body of water at land's surface and includes natural features such as wetlands, swamps, streams, rivers, ponds, lakes, marshes, bayous, and oceans. Man-made surface waters include impoundments, canals, drainage ditches, and stormwater catchments (but not necessarily waters of the U.S). Section 303(d) of the CWA requires states to develop a list of waters that do not meet established water quality standards and to develop corrective action plans for those waters on the list. Surface waters that do not meet established water quality standards are designated as being "impaired".

Relevant sections of the CWA and other regulations concerning water resources are described in the following sections.

Section (§) 401 of the CWA - Section 401 of the CWA requires state certification of all Federal licenses and permits in which there is a "discharge of fill material into navigable waters". The certification process is used to determine whether an activity, as described in the Federal license or permit, would impact established site-specific water quality standards. A water quality certification from the issuing state, the FDEP in this case, is required prior to the issuance of the relevant Federal license or permit. The most common Federal license or permit requiring certification is the United States Army Corps of Engineers (USACE) CWA § 404 Permit.

§ 402 of the Clean Water Act - The NPDES program was created by § 402 of the CWA. This program authorizes the EPA to issue permits for the point-source discharge of pollutants into waters of the U.S. The NPDES permitting program controls water pollution by regulating point sources that discharge pollutants into waters of the U.S.

§ 404 of the Clean Water Act - The USACE, through its permit program, regulates the discharge of dredged or fill material into waters of the U.S., including wetlands, pursuant to § 404 of the CWA. In addition, the EPA has regulatory oversight of the USACE permit program, allowing the agency under § 404c to veto USACE–issued permits where there are unacceptable environmental impacts. On October 22, 2019, the EPA and Department of the Army published a final rule (Step One) to repeal the 2015 Rule defining "waters of the United States" and re-codify the regulatory text that existed prior to the 2015 Rule. The final Step One rule became effective on December 23, 2019. The Step One rule will be replaced by the Navigable Waters Protection Rule upon its effective date, 60 days after publication in the Federal Register. On January 23, 2020, the EPA and the Department of the Army (Army) finalized the Navigable Waters Protection Rule to define "waters of the United States" (WOTUS). Under the final "Step 2" rule, four clear categories of waters are federally regulated:

- The territorial seas and traditional navigable waters,
- Perennial and intermittent tributaries to those waters,
- Certain lakes, ponds, and impoundments, and
- Wetlands adjacent to jurisdictional waters

The final rule also details 12 categories of exclusions, features that are not "waters of the United States," such as features that only contain water in direct response to rainfall (e.g., ephemeral features);

groundwater; many ditches; prior converted cropland; and waste treatment systems. The final rule clarifies key elements related to the scope of federal Clean Water Act jurisdiction, including:

- Providing clarity and consistency by removing the proposed separate categories for jurisdictional ditches and impoundments.
- Refining the proposed definition of "typical year," which provides important regional and temporal flexibility and ensures jurisdiction is being accurately determined in times that are not too wet and not too dry.
- Defining "adjacent wetlands" as wetlands that are meaningfully connected to other jurisdictional waters, for example, by directly abutting or having regular surface water communication with jurisdictional waters.

§ 10 of the Rivers and Harbors Act of 1899 - Section 10 of the Rivers and Harbors Act of 1899 regulates structures or work in or affecting navigable waters. Navigable waters under this statute are defined as "those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce" (33 CFR § 329.4). The USACE implements a permit program to evaluate impacts on navigable waters and their navigable capacity under § 10 (jointly with § 404 of the CWA when a discharge of fill material is also involved). Regulated structures include such objects as buoys, piers, docks, bulkheads, and jetties, while work includes dredging or filling activities.

EO 11990 – Protection of Wetlands - EO 11990 directs Federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the values of wetlands for Federally funded projects. FEMA regulations for complying with EO 11990 are found at 44 CFR § 9, Floodplain Management and Protection of Wetlands (1980).

AFI 32-7064 - AFI 32-7064 directs that installations shall develop and maintain current inventories of wetlands in order to plan for long-term protection or mitigation.

Stormwater from construction sites that would result in a disturbance of 1 acre or more are regulated under the FDEP NPDES, *Generic Permit for Stormwater Discharge from Large and Small Construction Activities* (FDEP 2015; stormwater construction permit). Additionally, the Energy Independence and Security Act (EISA) Section 438 requires Federal agencies to replicate the pre-development hydrology of facility construction and demolition activities in order to protect and preserve both the water resources onsite and those downstream (USEPA 2009).

3.5.1.3 Groundwater

Groundwater is defined as subsurface water that occurs beneath the water table in soils and geologic formations that are fully saturated (i.e., the pore spaces in the subsurface materials are completely filled with water). It is part of the hydrologic cycle, originating as precipitation that infiltrates or seeps into the subsurface and then moves toward surface water bodies, where it discharges to complete the hydrologic cycle.

The potable water system at Eglin AFB is permitted and regulated through the FDEP, under the authority of Chapter 403, Part IV, Florida Statutes. FDEP also monitors and regulates drinking water standards under the authority of Chapter 62.550, FAC. A number of facilities and all family housing units use potable water from the Floridan aquifer for lawn watering and irrigation.

3.5.1.4 Coastal Zone Management

The coastal zone includes those coastal lands or water uses governed by the FDEP, pursuant to the Federal CZMA. The outer boundary of Florida's coastal zone is the limit of state waters, which for the Gulf of Mexico coast of Florida is 9 nautical miles from shore. The CZMA (16 United States Code [U.S.C]. 1451 et seq., as

amended) was enacted to preserve, protect, develop, and, where possible, restore and enhance the resources of the Nation's coastal zone. Federal agency activities affecting a state's coastal zone must be consistent to the maximum extent practicable with the enforceable policies of the state's coastal management program. The CZMA allows coastal states to develop a Coastal Zone Management Plan (CZMP) whereby it designates permissible land and water use within the state's coastal zone. The FCMP was approved by NOAA in 1981 and is codified in Chapter 380, Part II, Florida Statutes. FCMP consists of a network of 24 Florida statutes administered by eight state agencies and five water management districts. Coordination of the program is managed by FDEP.

FDEP is given the authority by Congress to review certain Federal activities that have reasonably foreseeable effects on any land use, water use, or natural resources in its coastal zone to make sure that the Federal actions are consistent with the enforceable policies of Florida's Federally approved FCMP. This authority is referred to as "Federal consistency." Some examples of "coastal land or water uses" include such activities as public access, recreation, fishing, historic or cultural preservation, development, energy infrastructure and use, hazards management, marinas, floodplain management, scenic and aesthetic enjoyment, and resource creation or restoration.

A CZMA review of Federal agency activities is conducted and proceeds with a submittal of either a Consistency Determination or a Negative Determination. As detailed in 15 CFR 930, state agencies, such as the FCMP, have 60 days from receipt of this document in which to concur with or object to a Consistency Determination, or to request an extension in writing. The Federal agency may presume state agency concurrence if the state agency's response is not received within 60 days from receipt of the Federal agency's Consistency Determination and supporting information.

3.5.2 Affected Environment

3.5.2.1 Floodplains

Two of the areas proposed for new facility construction, the CACTF with a Subterranean Military Complex, and the Red Empire DZ have small areas that are located within the designated 100-year floodplain. Approximately two acres of floodplains could be impacted; 0.53 acre within the CACTF (**Figure 3-14**) and 1.49 acres within the DZ (**Figure 3-15**).

3.5.2.2 Wetlands, Waters of the United States, and Surface Water

Eglin AFB lies in the East Gulf Coastal Plain physiographic region, which is characterized by a high percentage of land area in wetlands, a diversity of river and stream systems, and ecologically important estuarine and tidal system (LandScope 2019). The B-88 Range Complex supports approximately 340 acres of various wetland classifications (forested, scrub-shrub, and unconsolidated bottom), which are influenced by seasonal fluctuations in precipitation, overland or near surface flow, shallow groundwater, or some combination of these hydrologic processes.

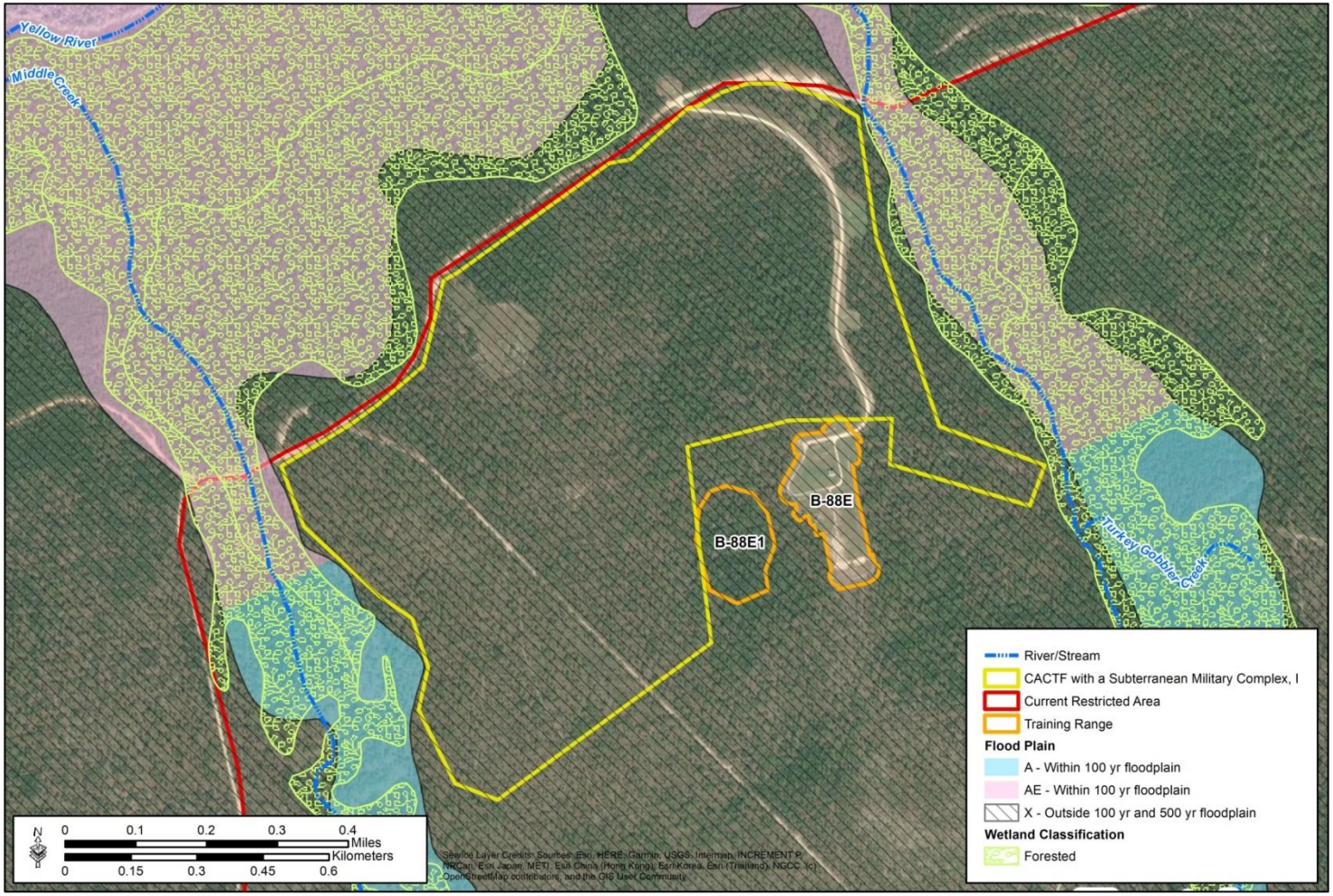

Figure 3-14. Water Resources within the CACTF with a Subterranean Military Complex at the B-88 Range Complex, Eglin AFB

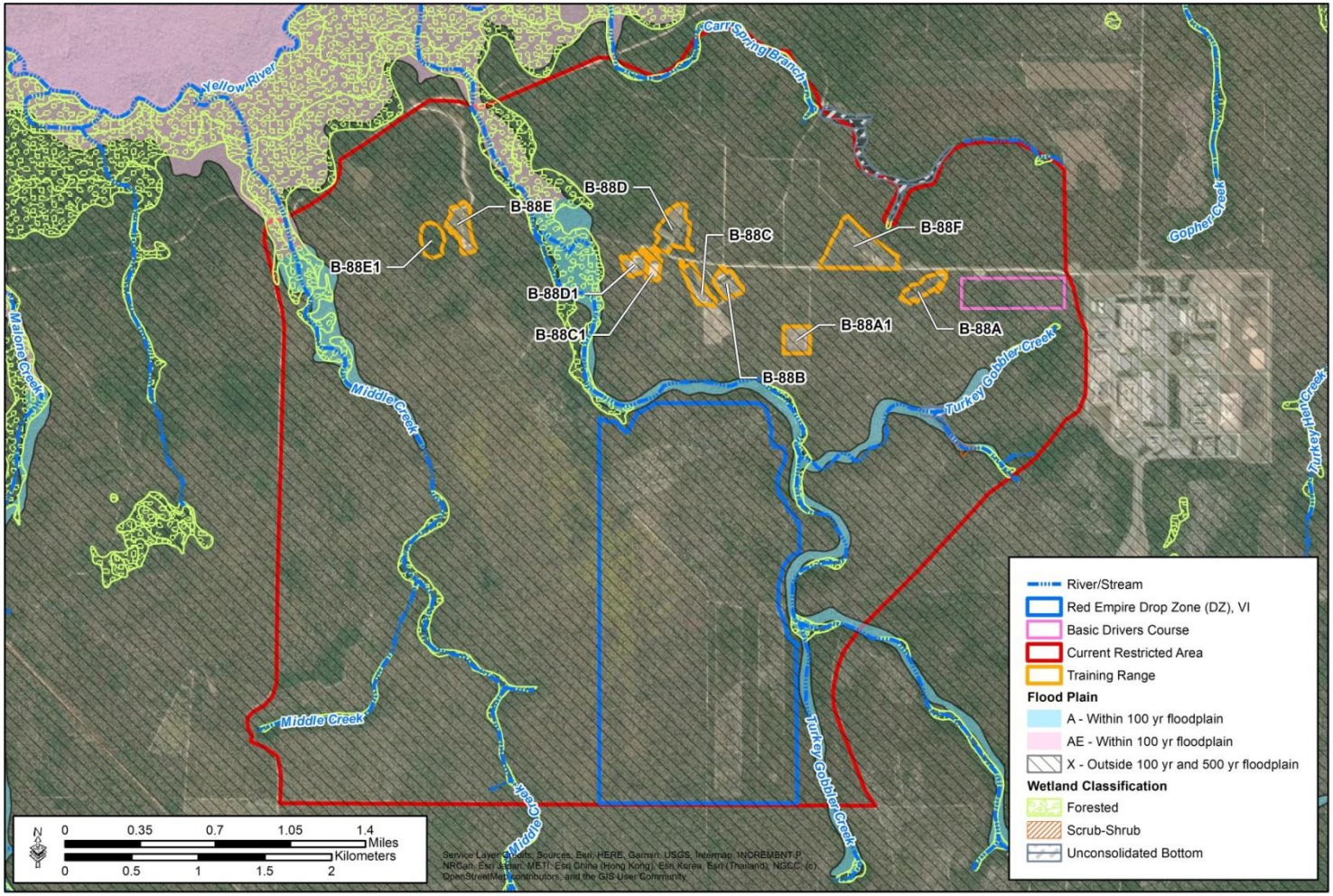

Figure 3-15. Water Resources within the Red Empire DZ at the B-88 Range Complex, Eglin AFB

Additionally, there are 60 acres of forested wetlands located within the TTA I-36 Live Fire Maneuver Area (**Figure 3-16**) southwest of the B-88 Range Complex area, as well as several new project areas being located within proximity to wetlands (i.e., C-53 range, Advanced Drivers Training Course, and the CACTF).

Eglin AFB is located within two different watersheds; the Pensacola Bay watershed and the Choctawhatchee River and Bay watershed (Northwest Florida Water Management District [NWFWMD] 2017a and 2017b). More specifically, the B-88 Range Complex is located within the Pensacola Bay watershed while the C-53A Light Demolition Range is located within the Choctawhatchee River and Bay watershed. The Yellow River, considered a major river within the Pensacola Bay watershed, lies approximately one mile north of the B-88 Range Complex enhancement projects. The Yellow River drainage basin covers approximately 1,365 square miles (NWFWMD 2017b). In addition to the Yellow River, several smaller tributaries are also located close to the range enhancements project areas, including Middle Creek, Turkey Gobbler Creek, and Carr Spring Branch (see **Figure 3-16**). The Yellow River is listed as impaired in both Okaloosa and Walton counties for several contaminants including E.coli and fecal coliform (FDEP 2020a).

There are no major rivers located near the C-53A Light Demolition Range; however there are several small tributaries that are located in close proximity (less than one mile) including Fox Branch, Rocky Creek, Middle Rocky Creek, and Little Rocky Creek (**Figure 3-17**).

3.5.2.3 Groundwater

Eglin AFB is located within two separate aquifers; the sand and gravel aquifer and the Floridan aquifer (NWFWMD 2018). The Floridan aquifer is located below the sand and gravel aquifer and extends beneath peninsular Florida. Both Okaloosa and Walton counties obtain water primarily from the Floridan aquifer. Groundwater withdrawals along the northwestern coast of Florida peaked in 2000 and caused a depression in the Floridan aquifer and induced saltwater intrusion (NWFWMD 2018). Following this, several water supply development projects have been implemented and withdrawals in the area have been reduced. Increasing concerns about the existing and anticipated water supply in Florida have resulted in the designation of Water Resource Caution Areas (WRCA).

Although both the B-88 Range Complex and the C-53A Light Demolition Range are not located within a WRCA, the closest WRCA is the western panhandle region of Florida (including sections of Santa Rosa, Okaloosa, and Walton counties), which is located adjacent to and to the south of the Main Eglin Base (FDEP 2020b). The WRCA designation by the NWFWMD requires withdrawal permittees to implement water conservation measures and maximize their water use efficiency. In addition, permittees in the WRCA are subject to increased water use reporting requirements. The WRCA designation also prohibits the use of the Floridan aquifer for non-potable purposes (NWFWMD 2018).

3.5.2.4 Coastal Zone Management

Based upon the geography of Florida and the legal basis for the state program, the entire state of Florida is included within the coastal zone. Geographically, Florida has low land elevation, a generally high water table, and an extensive coastline with many rivers emptying into coastal waters. Few places in Florida are more than 70 miles from either the Atlantic Ocean or the Gulf of Mexico. The result is an interrelationship between the land and coastal waters, which makes it difficult to establish a boundary that would exclude inland areas. Because of this interrelationship, the state boundaries include the entire area encompassed by the state's 67 counties and its territorial seas. All of the B-88 Range Complex, the TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolition Range areas are located within Florida's Coastal Zone, as defined by the FCMP.

While Federal lands such as the B-88 Range Complex, the TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolition Range are statutorily excluded from Florida's coastal zone, Federal approval of the FCMP elicits Section 307 of the CZMA and mandates that activities on Federal lands that have the potential to affect coastal resources or uses on non-Federal lands comply to the maximum extent practicable with the

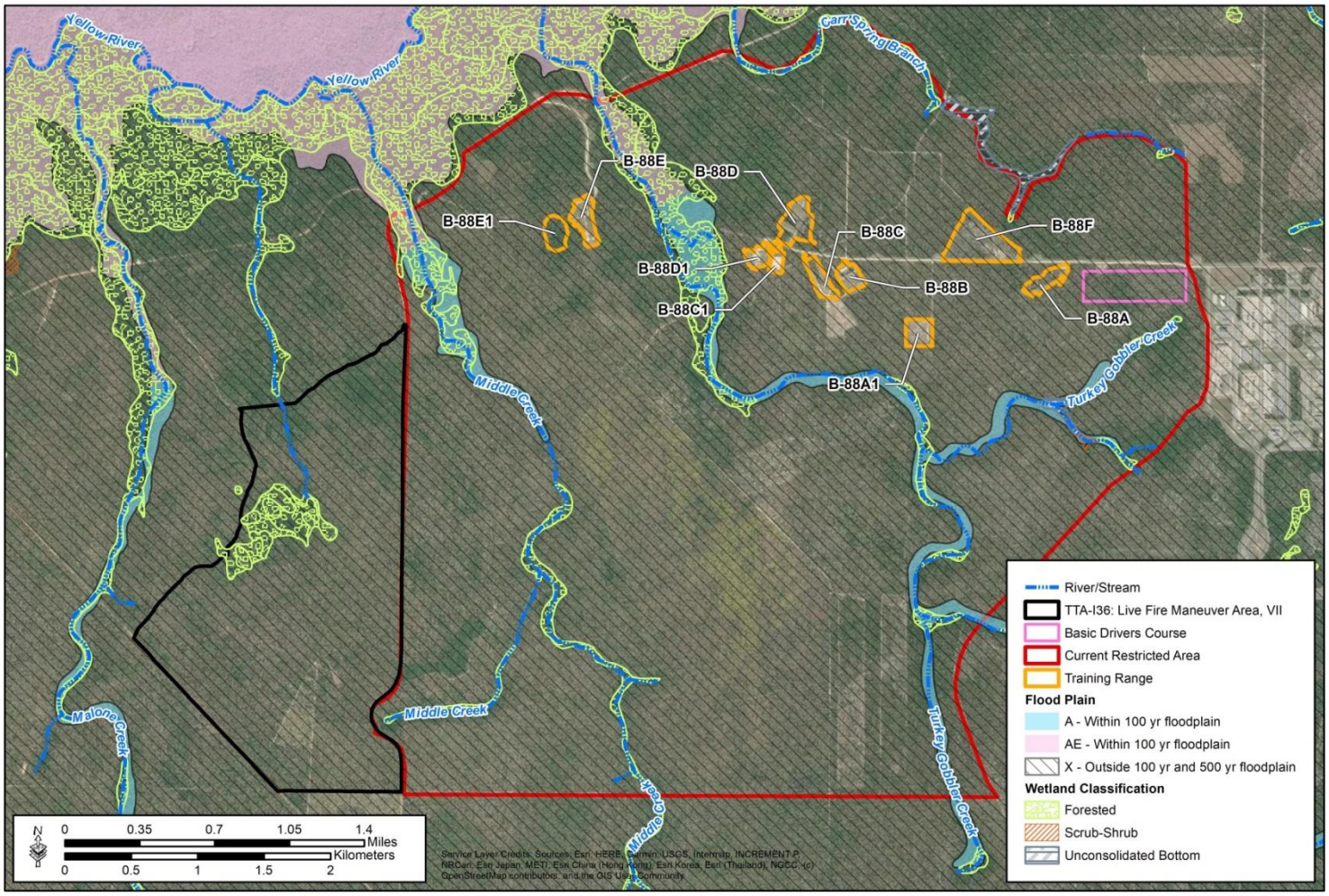

Figure 3-16. Water Resources within the B-88 Range Complex and the TTA I-36 Live Fire Maneuver Area, Eglin AFB

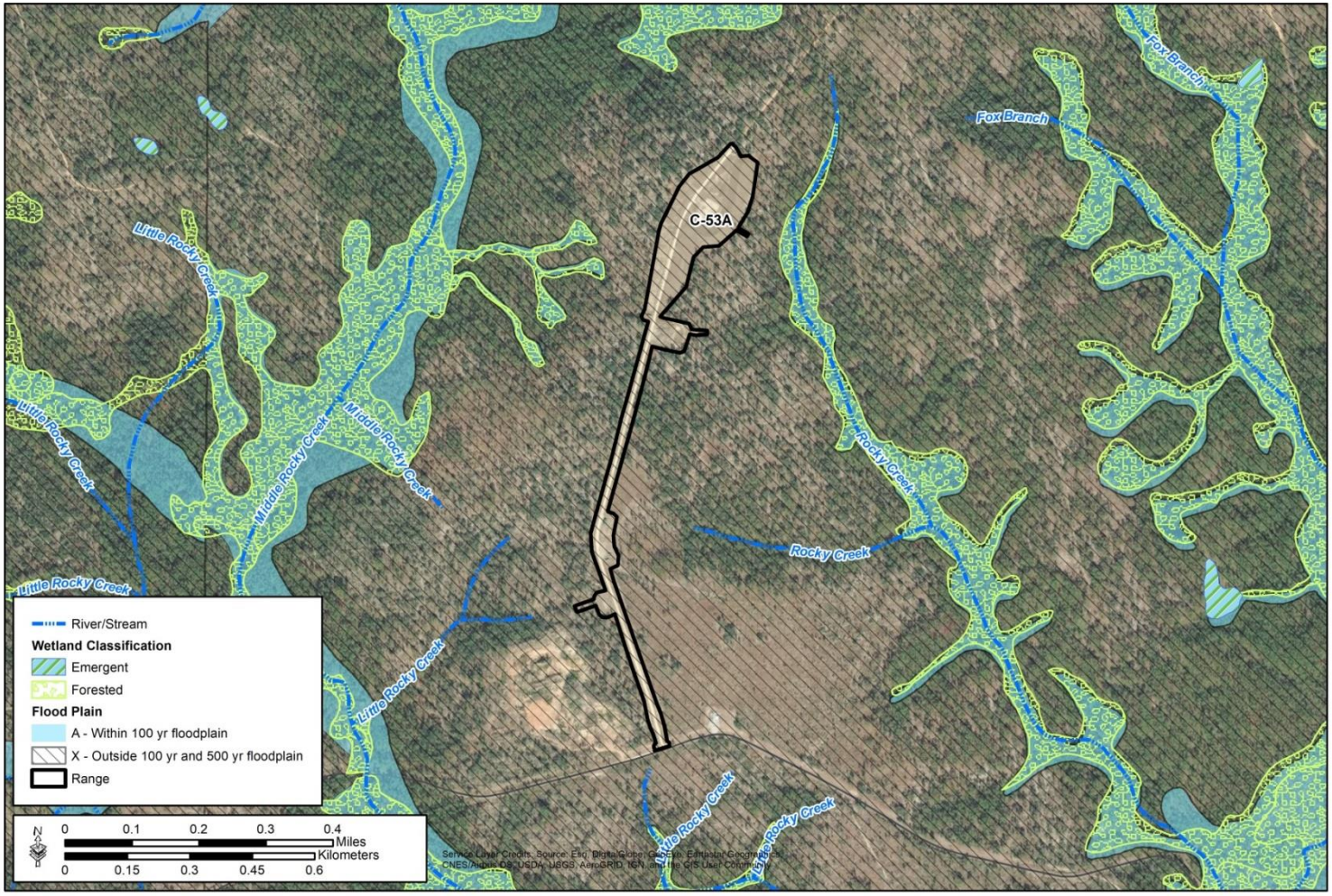

Figure 3-17. Water Resources within the C-53A Light Demolition Range, Eglin AFB

enforceable policies of the FCMP. Florida's CZMP includes the 24 enforceable policies (statutory authorities) incorporated into the Federally approved FCMP.

As appropriate, the Air Force (i.e., Eglin's NRO) would submit either an analysis of the CZMA Consistency Determination or prepare a CZMA Negative Determination under 15 CFR 930, and request a Concurrence of these determinations from the Florida State Clearinghouse for the construction actions. The determination and request for Concurrence would state that this activity would not have an effect on the Florida coastal zone concerning water resources. Eglin AFB management policies provide for the sustainable water management and the conservation of surface water and groundwater for full beneficial use.

3.5.3 Environmental Consequences

3.5.3.1 Analysis Approach

In addition to the significance criteria established at the beginning of this section, the following thresholds were used to determine if an impact on water resources would be significant:

- USACE has authority for delineating jurisdictional wetlands and evaluating wetland impacts not avoidable under Section 404 of the CWA. Impacts would be significant if they violate Federal or state surface water protection laws;
- Impacts constitute a substantial risk to aquatic animals and/or humans or contamination poses secondary health risks during the project life;
- Impacts would eliminate or sharply curtail existing aquatic life or human uses dependent on in-stream flows or water withdrawals during the project life;
- Impacts would place facilities or structures within a 100-year flood hazard area which violate Federal, state, or local floodplain regulations; or
- Impacts would expose people or structures to a substantial risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.

3.5.3.2 Alternative 1 – Enhancement and Mission Surge

Alternative 1 includes enhancement of the B-88 Range Complex, the TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolition Range capabilities with new facility construction, range expansion, and a 25 percent mission surge of operations above the current baseline level. Impacts on water resources resulting from new facility construction and other range enhancements, and mission surge activities on the B-88 Range Complex and the C-53A Light Demolition Range may occur from physical disturbance, soil erosion, release of hazardous materials, or increase in wildfires.

3.5.3.3 Physical Disturbance and Soil Erosion

There is low potential for range expansion and construction to significantly impact water resources; the proposed locations for new facility construction and range enhancements are primarily located outside of water resources. The area designated for the CACTF with a subterranean military complex and the Red Empire DZ are both located in proximity to FEMA's 100-year floodplain but these areas have been configured to avoid wetland and floodplain impacts. The majority of proposed facility construction (2,758.92 acres) would be located in Zone X, and is located outside of the 100- and 500-year floodplains. There are approximately 60 acres of forested wetlands located within the TTA I-36 Live Fire Maneuver Area; however, these would only be minimally impacted by foot traffic from troop movement.

There is low potential for munitions or related activities to impact water resources. The overall potential for direct physical impacts to offsite water resources, for example via blast fragmentation, is low, based on the distances between the target areas and the nearest wetlands and streams. Ground disturbance from munitions use has the potential to increase soil erosion, which could indirectly impact offsite water resources through sedimentation. Given that measures to minimize soil erosion are implemented on the ranges, the potential for these operations to impact water resources through soil erosion is low. Fire suppression activities conducted in response to wildfires that are unintentionally caused by munitions use on the training areas and test areas also have the potential to indirectly impact offsite wetlands and waters via soil disturbance. Potential impacts to wetlands and waters from fire suppression activities at Eglin AFB are minimized to the extent practicable through restrictions on plow operations and other measures to control erosion and sedimentation. Any unavoidable impacts to aquatic habitats resulting from fire suppression activities in emergency situations are mitigated by the Eglin Natural Resources Office through appropriate restoration measures. Implementation of the wildfire minimization measures identified in Eglin AFBI 13-212, Range Planning and Operations, throughout the Eglin Range minimizes the potential for inadvertent wildfires and their potential impacts on water resources.

Munitions debris is manually removed on a predetermined schedule in accordance with AFI 13-212, Range Planning and Operations, and Eglin AFBI 13-212, Range Planning and Operations. Removed debris include shrapnel (bombs, missiles, rockets, and other explosives), flare cartridges, munitions casings, and other debris that accumulates where munitions are used. Munitions use does not occur within or in the immediate vicinity of wetlands or surface waters; therefore, associated debris impacts to wetlands and surface waters are negligible. Any debris removal necessary within wetlands and surface waters is conducted without the use of heavy equipment to minimize disturbance to these resources.

3.5.3.4 Hazardous Materials

Based on the comparative analysis conducted in Section 4.4, munitions use on the B-88 Range Complex, the TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolition Range is not expected to degrade soil quality on the training ranges to a level that would adversely impact human health or ecological receptors. Given that the range expansion does not impact a large area of floodplains, wetlands, or surface waters, the primary means by which the chemical components of munitions could potentially impact water quality is through stormwater runoff or through migration of the components through the soil column. There is low overall potential for munitions components under Alternative 1 to adversely impact water quality in water bodies outside the training ranges through stormwater runoff given how low the concentrations of the components are expected to be in the soils on the training ranges. In addition, most metals readily adsorb onto inorganic colloids and organic matter in soils; therefore, most of the metal components that could potentially enter water bodies through stormwater runoff would likely be chemically bound to soil particles and readily settle out of the water column. Any unbound metals would likely readily adsorb onto inorganic or organic material in the water column or sediments. Lastly, the distances between the test area targets and water bodies, and the relatively flat topography and well drained soils of the area limit the potential for stormwater runoff to transport munitions constituents over land into water bodies.

The inorganic (metal) components of munitions tend to remain in the uppermost layer of the soil (0.1 to 4 meters) and, therefore, have little potential to impact groundwater quality. Based on the model and published environmental fate and transport information, the organics RDX and TNT show a greater propensity to migrate through the soil column. Only TNT was determined to have the potential to

migrate more than 40 feet through the soil column over time. Although these organic munitions components have the potential to reach the groundwater table, they are not expected to adversely impact groundwater quality given how low their expected concentrations are in soil on the range areas (see **Table 3-14**).

Conclusion

Implementation of Alternative 1, Enhancement and Mission Surge, could result in temporary, indirect, and negligible adverse impacts on surface water and coastal zone resources. Alternative 1 construction activities would avoid, and therefore have no adverse impacts on floodplains and wetlands. There are approximately 60 acres of dome swamp, mixed forest – wetland, and/or wet flatwood areas within the TTA I-36 Live Fire Maneuver Area, including the Trench Complex. Since the execution of Alternative 1 would not involve "construction" in a wetland as defined in Executive Order (EO) 11990, Protection of Wetlands; or undertake an action in a floodplain as defined under EO 11988, Floodplain Management; a Finding of No Practicable Alternative (FONPA) would not be required nor prepared in conjunction with the FONSI.

Although the proposed construction plans are to avoid wetlands, depending on future modifications or use of this area, an Environmental Resource Permit (ERP) for the project may be necessary from the Northwest Florida Water Management District (NWFWMD) and a Section 404 Permit from USACE. Alternative 1 would be implemented in strict compliance with the conditions specified in the respective permits, in coordination with the Army, and in accordance with all Eglin AFB environmental plans and policies pertaining to the protection of wetlands. BMPs and erosion/sedimentation controls would be implemented during any construction (i.e., the Trench Complex) period to minimize potential indirect impacts on wetlands. Eglin AFB may also have to obtain an Florida Department of Environmental Protection (FDEP) National Pollutant Discharge Elimination System (NPDES) stormwater construction permit and would implement an associated stormwater pollution prevention plan (SWPPP). The BMPs and erosion/sedimentation controls that would be implemented for the project would be discussed in the SWPPP.

Alternative 1 is expected to have no impact on groundwater resources. Based on the analyses conducted, Alternative 1, Enhancement and Mission Surge, has the potential for temporary, minor, adverse impacts (surface water and coastal zone management) on water resources. Eglin AFB would use BMPs to minimize impacts to water resources due to soil disturbance or nonpoint source water pollution. The construction designs have not yet been finalized; however, no appreciable increases in groundwater demand are expected. Overall, there would be no significant impacts on water resources as a result of implementing Alternative 1.

3.5.3.5 Alternative 2 – Mission Surge Only

Alternative 2 includes a 25 percent mission surge of operations at the B-88 Range Complex and the C-53A Light Demolition Range above the current baseline level with no new facility construction or range expansion. Although the annual quantities of munitions would increase under Alternative 2, there would be no change in the types of munitions used on the ranges. Under Alternative 2, there also would be no range enhancement activities, and as such, there would be no munitions or expendables deployed on the CACTF, GLR, Red Empire DZ, the TTA I-36 Live Fire Maneuver Area, and the Trench Complex range areas. Munitions use on the range areas under Alternative 2 would increase the potential associated fire suppression activity. All measures discussed for Alternative 1 to avoid and minimize potential wildfire starts and impacts of fire suppression activities would be implemented during all missions on the B-88 Range Complex and the C-53A Light Demolition Range under Alternative 2; therefore,

associated impacts on water resources under Alternative 2 are not expected to be significantly adverse. Based on the analysis conducted for Alternative 1, a mission-surge only action in munitions use is not expected to degrade water quality.

Conclusion

Implementation of Alternative 2 - Mission Surge Only would result in permanent, negligible, adverse impacts on water resources due to increased hazardous materials. Overall, there would be no significant impacts on water resources as a result of implementing Alternative 2.

3.5.3.6 Alternative 3: No Action Alternative

Alternative 3 includes maintaining the B-88 Range Complex and the C-53A Light Demolition Range annual operations at the current baseline level, and does not include new facility construction or range expansion. Alternative 3 would not include any range enhancement activities, and as such, there would be no munitions or expendables deployed on the CACTF, GLR, Red Empire DZ, the New TTA I-36 Live Fire Maneuver Area, and the Trench Complex range areas.

Conclusion

Implementation of Alternative 3 - No Action Alternative would not result in significant impacts on water resources.

3.6 Biological Resources

3.6.1 Definition of the Resource

Biological resources analyzed in this REA generally include the plants, animals, and habitats that occur in the B-88 Range Complex, the TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolition Range areas of the Eglin Reservation. Specific areas exist that are unique due to their high-quality examples of natural communities or presence of rare species. Termed “High-Quality Natural Communities,” the Florida Natural Areas Inventory (FNAI) has identified these areas as sites distinguished by the uniqueness of the community, ecological condition, species diversity, and presence of rare species. FNAI also identified special habitats that support rare plants on Eglin called Significant Botanical Sites (SBSs), as well as larger-scale landscapes containing complexes of these High-Quality Natural Communities and rare species, which FNAI named Outstanding Natural Areas (ONAs) (FNAI 1997). Sensitive biological resources are defined as those plant and animal species listed as Threatened or Endangered, or proposed as such, by the USFWS. Plant and animal species that are Federally listed as Endangered or Threatened are afforded legal protection under the Endangered Species Act (ESA). Florida’s imperiled species are fish and wildlife species that meet criteria to be listed as Federally Endangered, Federally Threatened, state threatened, or Species of Special Concern (FAC Rule 68A-27.003). While the USFWS has primary responsibility for Florida species that are Federally Endangered or Threatened, the Florida Fish and Wildlife Conservation Commission (FWC) works in partnership with USFWS to help conserve these species.

The Migratory Bird Treaty Act (MBTA) makes it illegal to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid Federal permit (50 CFR 10.13). EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, was issued on January 10, 2001. The EO directs Federal

agencies that take actions that either directly or indirectly affect migratory birds to develop a Memorandum of Understanding (MOU), and to work with the USFWS and other Federal agencies to promote the conservation of migratory bird populations.

Although air operation missions are not specifically associated with the actions of this EA, the use of the Red Empire DZ would utilize air operations associated with other missions. Aircraft mishaps caused by mid-air collisions with bird-aircraft strikes are a primary concern to military training flights. Mishaps have the potential to cause serious damage to aircraft as well as the loss of human life of aircrews and passengers. The goal of the Bird/wildlife Aircraft Strike Hazard (BASH) program is the preservation of war fighting capabilities through the reduction of wildlife hazards to aircraft operations. The BASH program is managed by the Wing Flight Safety Office, which has the primary responsibility for monitoring and implementing the installation's BASH Plan (USAF 2015). This organization coordinates and develops policy, collects and analyzes wildlife strike data through the Air Force Safety Automated System (AFSAS), and coordinates for BASH equipment approval. Wildlife on or near flightlines at Eglin AFB is actively discouraged through landscaping and vegetation management techniques for the purpose of reducing BASH. The USAF Mishap Prevention Program (AFI 91-202) provides guidance for the development of a BASH Plan to address and reduce potential bird/wildlife strikes to aircraft. Eglin AFB's Natural Resources Office reviews and incorporates the BASH Plan into the INRMP as directed by AFI 32-7064. As such, Eglin's 2017 INRMP contains the BASH Plan as an Associated Component Plan in Tab 1 and includes a wildlife/bird hazard assessment of Eglin AFB airfields. Additionally, in order to maintain a clear airfield, Eglin's support of the BASH program does result in take of wildlife which is covered in the 2017 INRMP (USAF 2017).

3.6.2 Affected Environment

3.6.2.1 Vegetation

There are 34 distinct natural vegetative communities that have been identified on Eglin AFB, which have been grouped into four broad ecological associations: sandhill matrix, flatwoods matrix, wetland/ riparian matrix, and barrier island matrix (USAF 2017). Other ecological associations on Eglin AFB include open grasslands/shrublands and urban/landscaped areas, which are artificially maintained vegetative communities. The ecological associations on the B-88 Range Complex and on the C-53A Light Demolition Range are shown in **Figure 3-18** and **Figure 3-19**, respectively. Further information on the ecological associations that occur on Eglin AFB can be found in the Integrated Natural Resources Management Plan (INRMP), Eglin AFB (USAF 2017).

- The most extensive natural community type on Eglin AFB is the sandhill matrix, which accounts for approximately 80 percent of the total area of the AFB. This upland community has a canopy dominated by longleaf pine (*Pinus palustris*), a sparse midstory of turkey oak (*Quercus laevis*) and other hardwoods, and a ground layer covered by a high diversity of herbaceous species. The sandhill community is highly adapted to— and dependent on—fire, which maintains its vegetative structure and composition.
- The flatwoods matrix is an upland community that has a canopy typically dominated by slash pine (*Pinus elliottii*) and an understory dominated either by shrubs or herbaceous vegetation. Pine flatwoods occur on flat, moderately well drained soils, and have higher groundwater tables than sandhills. Like sandhill communities, pine flatwoods at Eglin AFB are adapted to recurrent fires.

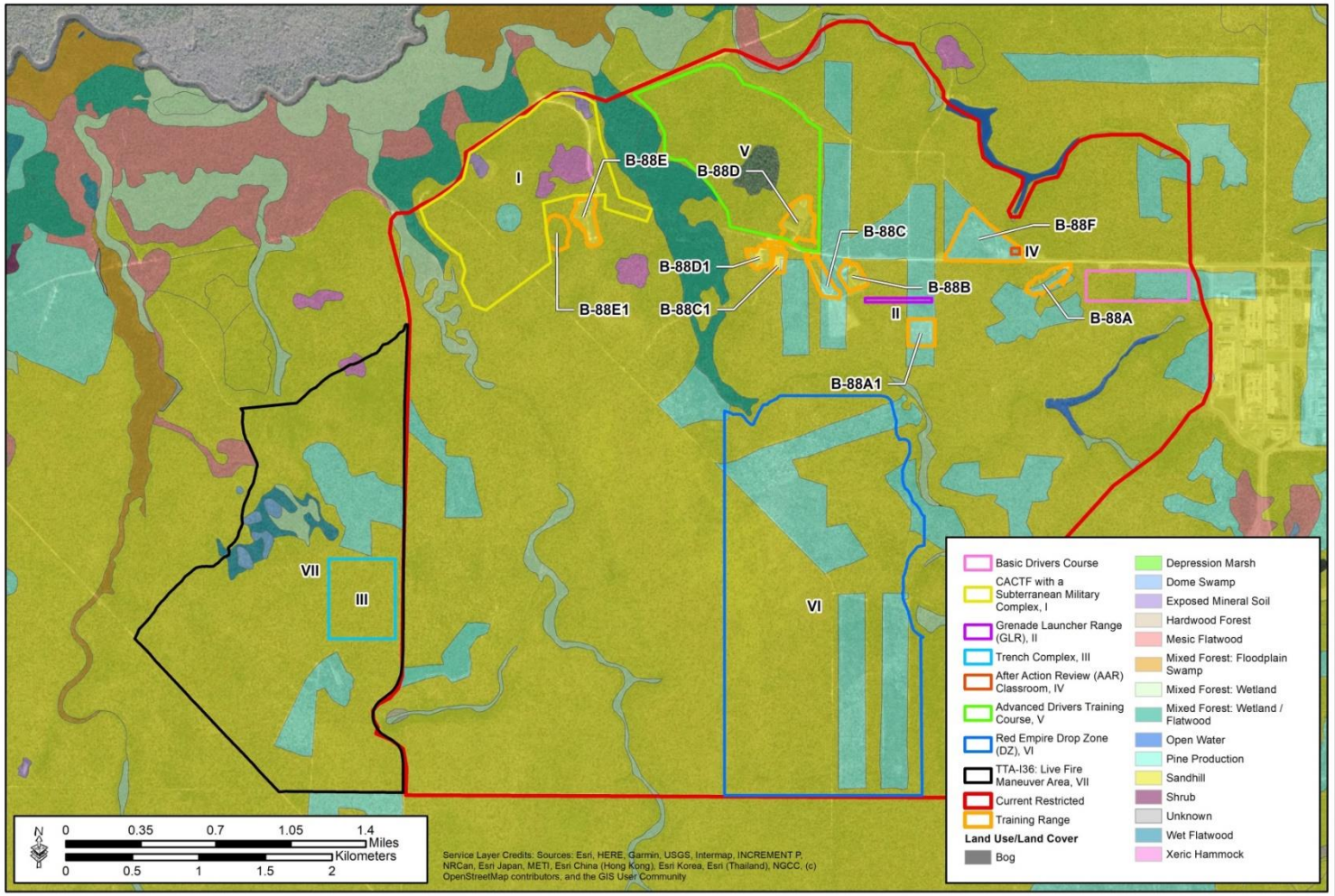

Figure 3-18. Ecological Associations on the B-88 Range Complex and the TTA I-36 Live Fire Maneuver Area, Eglin AFB

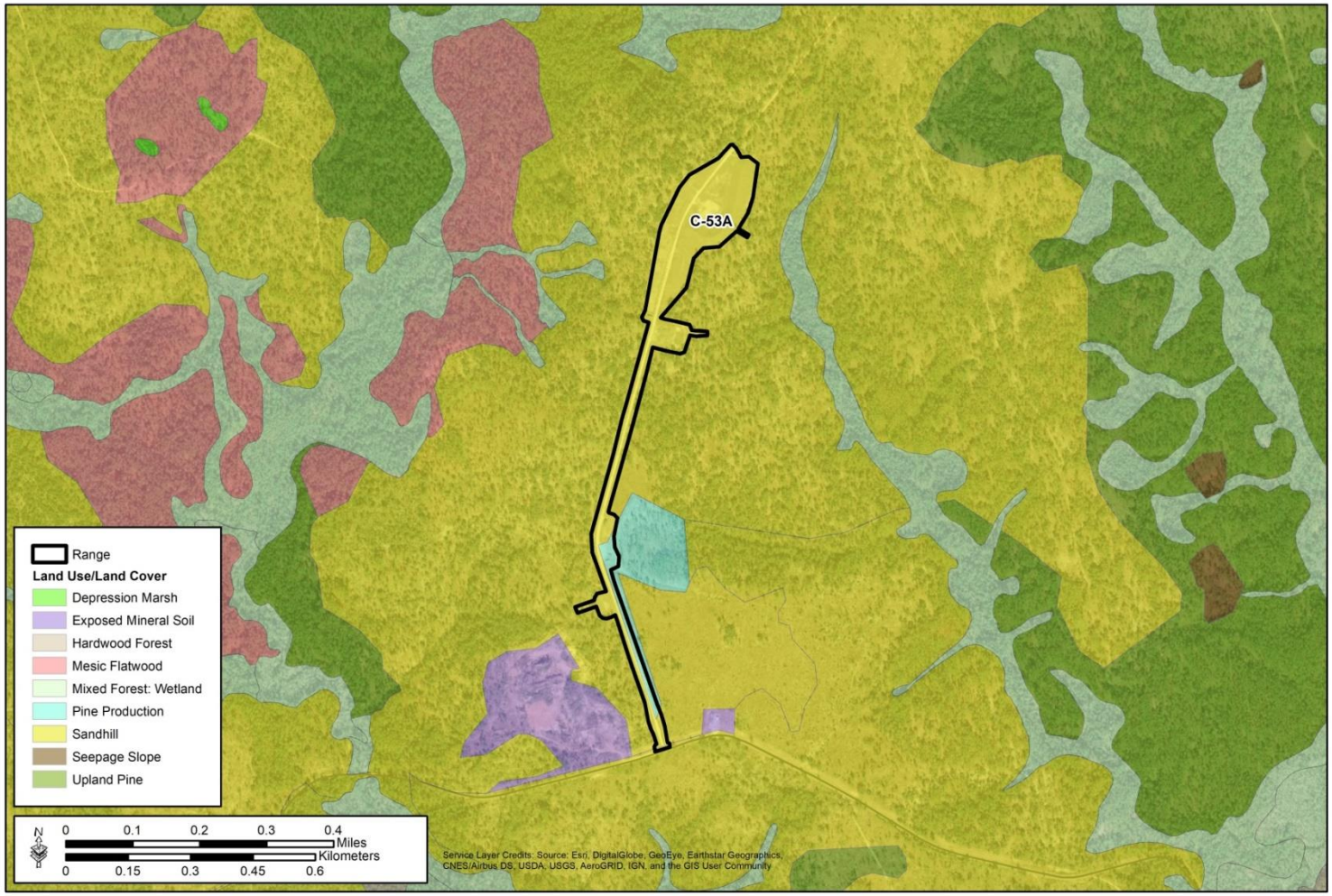

Figure 3-19. Ecological Associations on the C-53A Light Demolition Range, Eglin AFB

- The wetland/riparian matrix at Eglin AFB includes wetlands, surface water bodies, and riparian areas, which are land corridors adjacent to rivers, streams, and creeks. Wetland types within this matrix include depression wetlands, seepage slopes, and floodplain wetlands. Surface water bodies within this matrix include seepage streams, spring-fed streams, blackwater streams, alluvial rivers, and lakes. The communities of the wetland/riparian matrix vary in hydrological regime, substrate, and vegetative composition. Wetlands and riparian areas are typically densely vegetated while vegetative cover in surface water bodies is relatively sparse, and often limited to emergent vegetation within shallow littoral zones and submerged and floating vegetation within the deeper portions of the water bodies.
- Grasslands/shrublands at Eglin AFB are disturbed communities that occur primarily on active training ranges and test areas. Many of these communities were originally natural sandhills. They consist primarily of grasses and low shrubs, which are maintained by mechanical cutting or prescribed fire.
- Urban/landscaped areas at Eglin AFB include improved and semi-improved areas that contain turf grasses and landscaping vegetation. These communities occur primarily in cantonment areas and other portions of the Base that are developed or otherwise used for testing and training operations.

3.6.2.2 Wildlife

Eglin AFB provides habitat for a wide variety of mammal, bird, reptile, amphibian, and fish species. Common wildlife that occur in upland communities on the Eglin Reservation include, but are not limited to, white-tailed deer (*Odocoileus virginianus*), Eastern cottontail rabbit (*Sylvilagus floridanus*), gray fox (*Urocyon cinereoargenteus*), various rodent species, Virginia opossum (*Didelphis virginiana*), fox squirrel (*Sciurus niger*), northern bobwhite (*Colinus virginianus*), great horned owl (*Bubo virginianus*), various songbird species, six-lined racerunner (*Aspidoscelis sexlineata*), Eastern diamondback rattlesnake (*Crotalus adamanteus*), common five-lined skink (*Plestiodon fasciatus*), and green anole (*Anolis carolinensis*).

Wetland and freshwater aquatic communities on the Eglin Reservation provide habitat for raccoon (*Procyon lotor*), American beaver (*Castor canadensis*), American alligator (*Alligator mississippiensis*), various frogs, various wading birds, largemouth bass (*Micropterus salmoides*), and sailfin shiner (*Pteronotropis hypselopterus*). Upland habitats on Santa Rosa Island, including the dune systems, provide habitat for a number of the same wildlife species that occur on the Eglin Reservation. Sea turtles and numerous species of shorebirds, seabirds, and wading birds occur on the beaches of Santa Rosa Island. Further information on fish and wildlife species that occur at Eglin AFB can be found in the Eglin AFB INRMP (USAF 2017).

3.6.2.3 Sensitive Species and Habitats

Plant and animal species that are Federally listed as Endangered or Threatened are afforded legal protection under the ESA. The ESA requires Federal agencies to ensure that the actions they authorize, fund, or carry out will not likely jeopardize the continued existence of Federally listed species, or result in the destruction or adverse modification of designated critical habitat of such species. Critical habitat is defined by the ESA as specific areas within or outside the geographical area occupied by a listed species that contain physical or biological features essential to the species' conservation, and that may require special management considerations or protection. The ESA also requires that Federal agencies implement measures to conserve, protect, and, where possible, enhance any Federally listed species and their habitats. The ESA is administered by the USFWS and the National Marine Fisheries Service (NMFS). Generally, USFWS manages land and freshwater species and NMFS manages marine and anadromous species, which are species that breed in freshwater but live most of their lives in the sea.

Section 7 of the ESA requires that Federal actions determined to potentially impact Federally listed species be consulted with USFWS or NMFS.

Animal species in Florida may also be awarded state listing and associated regulatory protection in accordance with Rule 68A-27, F.A.C. The FWC maintains the state's list of such animal species. Animal species that are not Federally listed, but which are determined to be at risk of extinction in the state, are state-listed as Threatened. Species that are considered vulnerable and have the potential to become threatened are state-listed as Species of Special Concern. Plant species in Florida may also be awarded state listing and associated regulatory protection in accordance with Chapter 5B-40, F.A.C. The Florida Department of Agriculture and Consumer Services (FDACS) maintains the state's list of such plant species.

Sensitive species also include species not ESA-listed or state-listed but which are protected under the Marine Mammal Protection Act, Bald and Golden Eagle Protection Act, or MBTA. The Eglin Natural Resources Office has primary responsibility for the management of sensitive species and habitats, including evaluation of potential impacts to the species and habitats by proposed actions, at Eglin AFB (USAF 2017). The Eglin AFB INRMP (USAF 2017) includes guidance on the management and protection of sensitive species and habitat at Eglin AFB. The Federal and state-listed species having the potential to occur within the ROI are identified in **Table 3-17**.

Table 3-17: Federal and State-Listed Species Having Potential to Occur Within the Region of Influence
REA for B-88 Range Complex and C-53A Light Demolition Range

Common Name	Scientific Name	Federal Status	State Status	Location within ROI
Fish				
Okaloosa darter	*Etheostoma okaloosae*	T	FT	ER
Amphibians and Reptiles				
Eastern indigo snake	*Drymarchon couperi*	T	FT	ER
Florida bog frog	*Lithobates okaloosae*		T	ER
Florida pine snake	*Pituophis melanoleucus mugitus*		T	ER
Gopher tortoise	*Gopherus polyphemus*	C	T	ER
Birds				
Red-cockaded woodpecker	*Picoides borealis*	E	FE	ER
Southeastern American kestrel	*Falco sparverius paulus*		T	ER

Notes:
ER – Eglin Reservation

Federal Status
E = Endangered: species in danger of extinction throughout all or a significant portion of its range; T = Threatened: species likely to become Endangered within the foreseeable future throughout all or a significant portion of its range; C = Candidate for Federal listing

State Status

FE = Federally listed as Endangered; FT = Federally listed as Threatened; T = State listed as Threatened. Defined as a species, subspecies, or isolated population which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat is decreasing in area at a rapid rate and as a consequence is destined or very likely to become an endangered species within the foreseeable future.

Table 3-17 species have been documented to occur seasonally or year-round in the ROI. The wood stork (*Mycteria americana*) has been documented to occur on or near Eglin AFB only during its seasonal migration. The Federally listed American alligator is common on Eglin AFB but is not included in Table 3.17 because it is Federally listed solely due to its resemblance to the Federally listed American crocodile (*Crocodylus acutus*), which does not occur on Eglin AFB. The bald eagle (*Haliaeetus leucocephalus*), which is not Federally listed but protected under the Bald and Golden Eagle Protection Act, also occurs on Eglin AFB. The following four Federally listed freshwater mussel species do not occur on Eglin AFB, but have habitat ranges that border Eglin AFB: southern sandshell (*Hamiota australis*), Choctaw bean (*Villosa choctawensis*), fuzzy pigtoe (*Pleurobema strodeanum*), and narrow pigtoe (*Fusconaia escambia*) (USAF 2017).

The state-listed gopher tortoise, which is a candidate for Federal listing, occurs primarily in sandhills and grasslands/shrublands on the installation. The Federally listed eastern indigo snake (*Drymarchon couperi*) and the state-listed Florida pine snake (*Pituophis melanoleucus mugitus*) are commensal species of the gopher tortoise that may occur on the Eglin Reservation; however, no eastern indigo snakes have been observed on Eglin in over 25 years. The eastern indigo snake occurs in a wide range of upland and lowland habitat types including mesic pine flatwoods, scrubby flatwoods, longleaf pine sandhills, oak scrub, sand pine scrub, dry prairie, tropical hardwood hammocks, freshwater and saltwater marshes and swamps, coastal dunes, and some human-altered habitats (USFWS 2019). These species benefit from their association with the gopher tortoise, specifically by their use of gopher tortoise burrows for shelter. Other state-listed species that occur on the Eglin Reservation include the Florida bog frog, Florida burrowing owl, Southeastern American kestrel, and several wading bird species, including the little blue heron, reddish egret, and tricolored heron. Nearly all the bird species known to occur on the Eglin Reservation are protected under the MBTA (USAF 2017).

The locations of sensitive species on the B-88 Range Complex and TTA I-36 Live Fire Maneuver Area are shown in **Figure 3-20**. The locations of sensitive species and on the C-53A Light Demolition Range are shown in **Figure 3-21**.

3.6.2.4 High-Quality Habitats

Most of the natural habitat of Eglin AFB supports high biodiversity. Such areas have been identified by FNAI and they are known as High-Quality Natural Communities (HQNCs), SBSs, and ONAs. HQNCs encompass approximately 75,266 acres or 16 percent of Eglin AFB, and SBSs and ONAs combined, encompass approximately 43,210 acres or 9 percent of the base installation (USAF 2017).

The locations of High Quality Habitats on the B-88 Range Complex and TTA I-36 Live Fire Maneuver Area are shown in **Figure 3-22**. The locations of High Quality Habitats on the C-53A Light Demolition Range are shown in **Figure 3-23**.

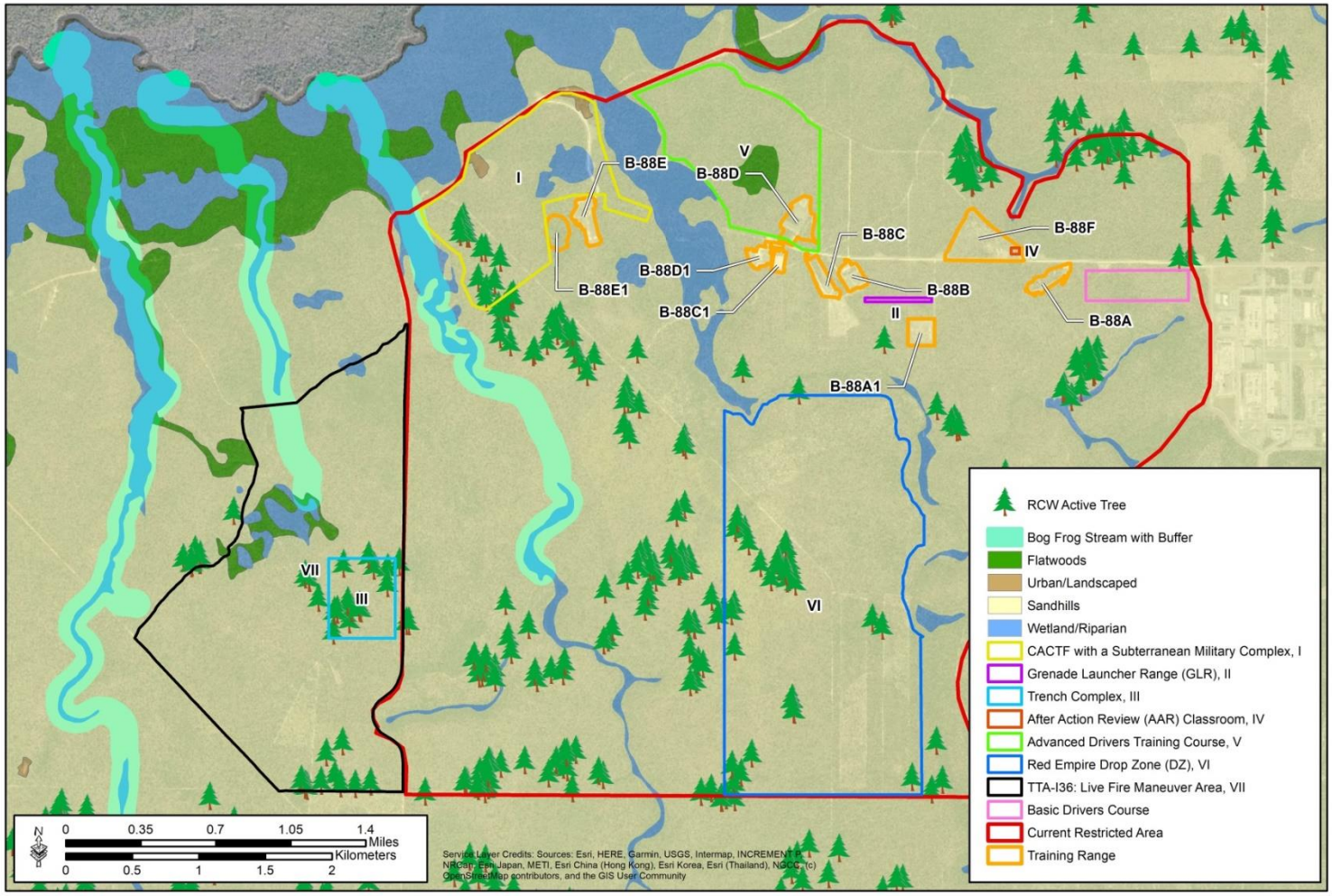

Figure 3-20. Sensitive Species on the B-88 Range Complex and the TTA I-36 Live Fire Maneuver Area, Eglin AFB

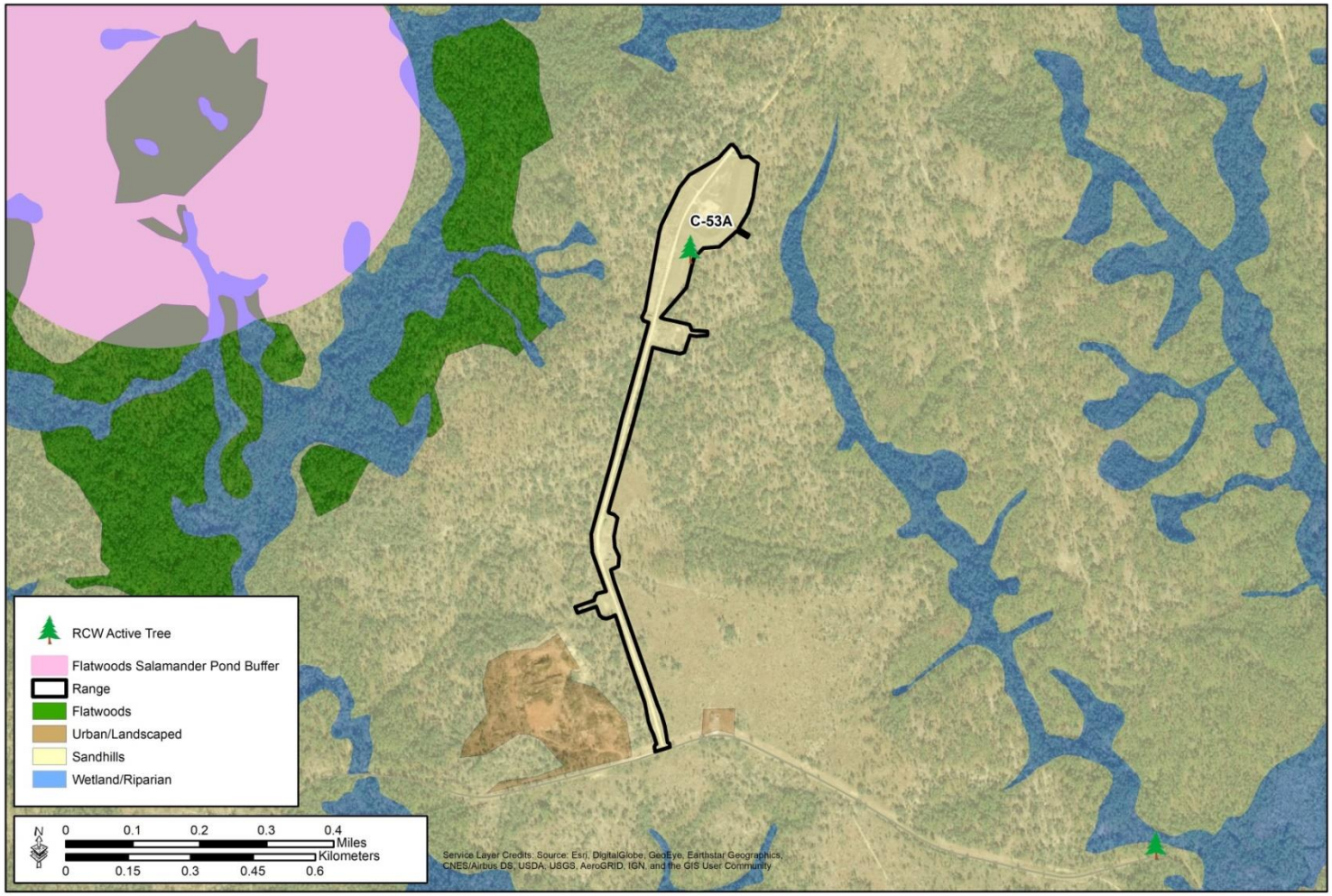

Figure 3-21. Sensitive Species on the C-53A Light Demolition Range, Eglin AFB

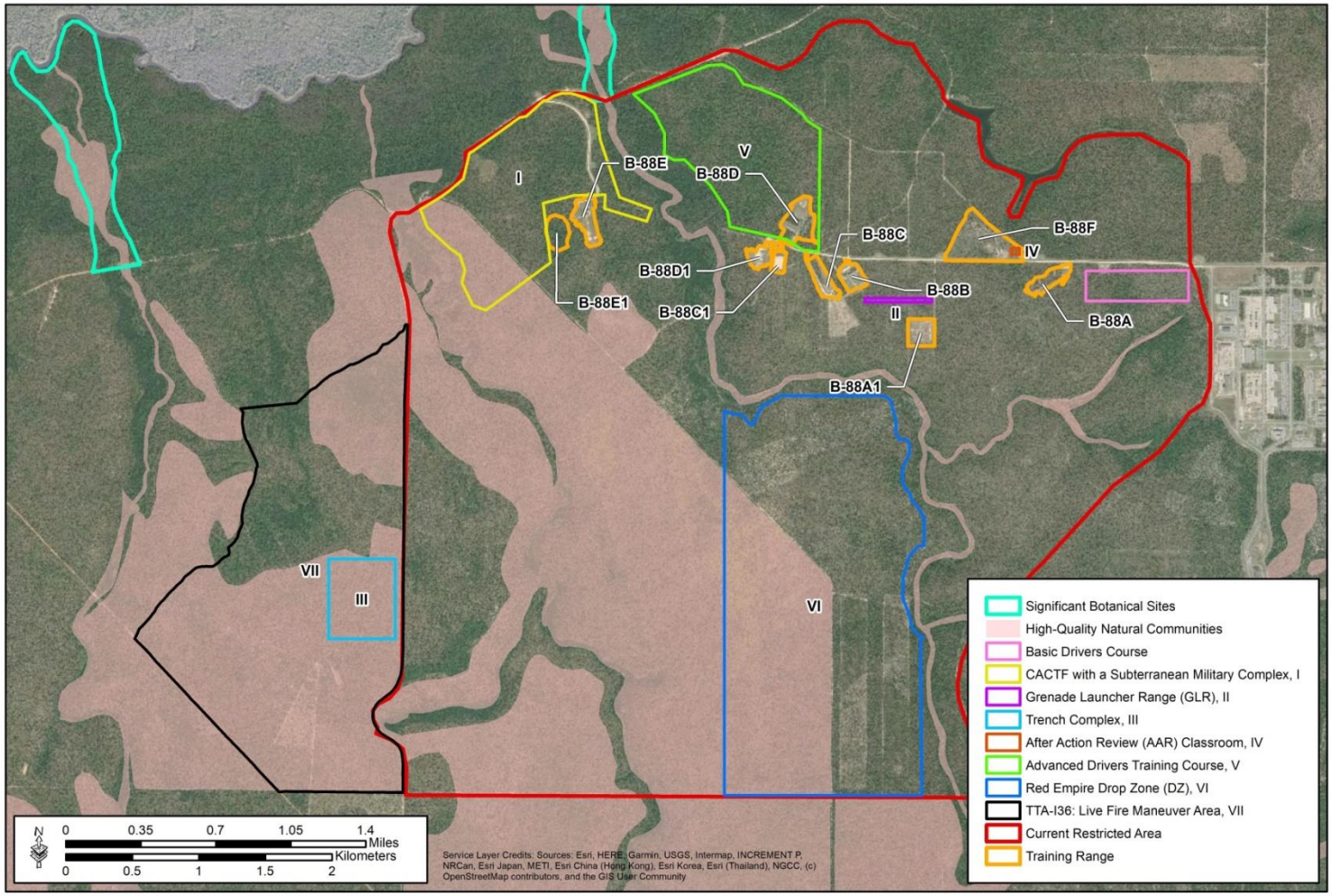

Figure 3-22. High Quality Habitats on the B-88 Range Complex and the TTA I-36 Live Fire Maneuver Area, Eglin AFB

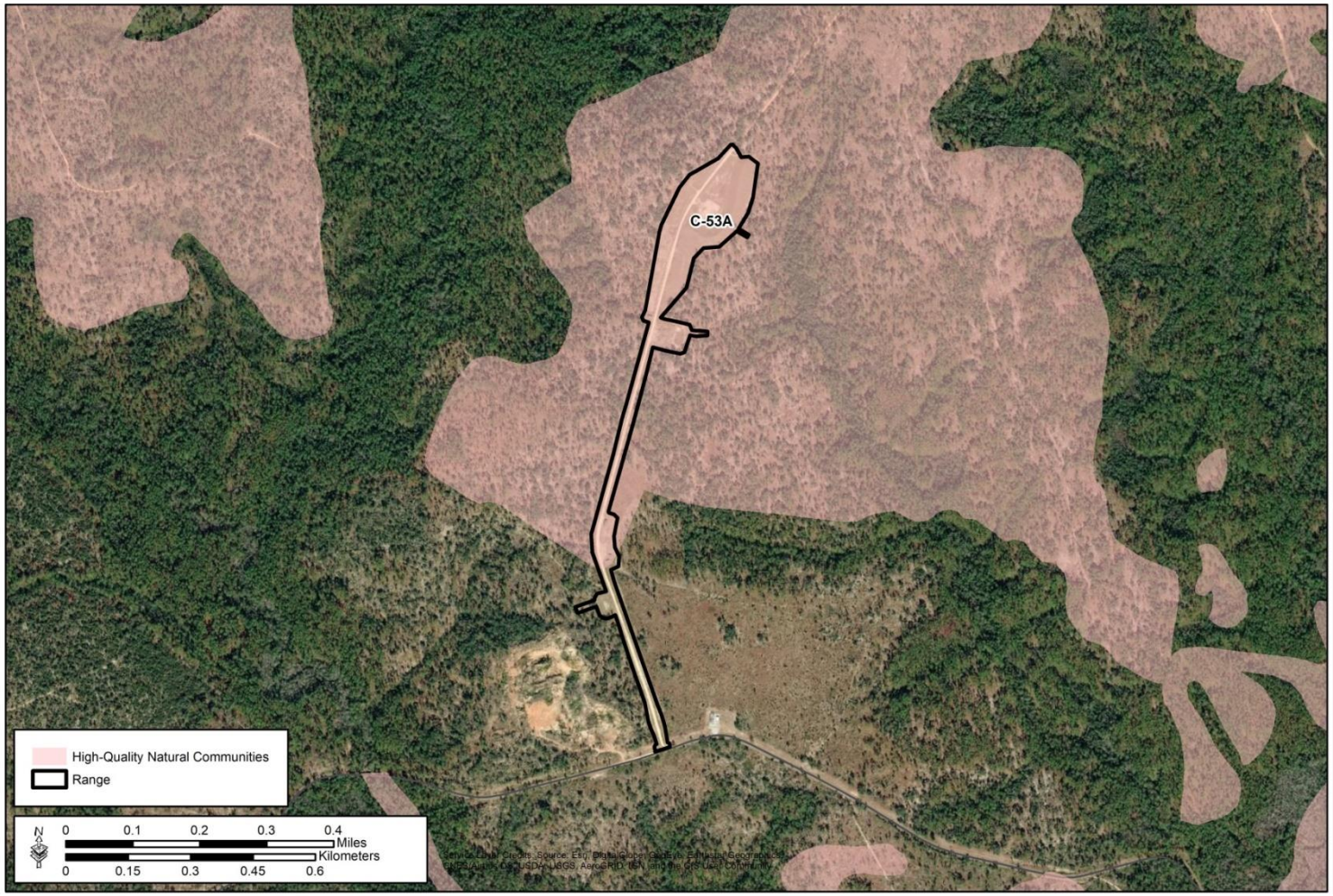

Figure 3-23. High Quality Habitats on the C-53A Light Demolition Range, Eglin AFB

3.6.3 Environmental Consequences

3.6.3.1 Analysis Approach

In addition to the significance criteria established at the beginning of this section, the following thresholds were used to determine if an impact on biological resources would be significant:

- Impacts on native communities would be detectable, and compulsory movement of species could extend outside the natural range of variability for long periods of time or in perpetuity;
- Population numbers or structure, genetic variability, and other demographic factors for species might have significant, short-term declines, with long-term population numbers significantly depressed;
- Frequent responses to disturbance by some individuals would be expected, with negative impacts on feeding, reproduction, or other factors resulting in a long-term decrease in population levels;
- Loss of habitat might affect the viability of at least some native species; or
- Actions could jeopardize the continued existence of a Federally listed species within or outside the B-88 Range Complex and the C-53A Light Demolition Range boundaries.

3.6.3.2 Alternative 1 – Enhancement and Mission Surge

Alternative 1 includes enhancement of the B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolition Range capabilities with new facility construction, range expansion, and a 25 percent mission surge of operations above the current baseline level. Impacts on biological resources resulting from new facility construction and other range enhancements, and mission surge activities on the B-88 Range Complex and the C-53A Light Demolition Range may occur from habitat alteration and disturbance, noise from munitions and other expendables, personnel and vehicular traffic during small arms training, munition strikes, wildfire starts, and release of hazardous materials.

Potential impacts to wildlife include the physical presence of humans, equipment, and vehicles within foraging habitat; direct strikes from equipment or ammunitions (or fragments); noise and emissions from munitions, aircraft, equipment, humans, and vehicles in foraging habitat; wildfires damaging or destroying habitat (i.e., active and inactive RCW cavity trees); degradation of foraging habitat due to increased difficulty in conducting prescribed fire; land clearing of foraging habitat (i.e., active and inactive RCW cavity trees); and alterations to circadian and circannual rhythms from the effects of artificial lighting (USFWS 2013). Correspondence supporting the pre-project coordination with the USFWS Section 7 consultation under the RCW PBO is provided in Appendix B.

3.6.3.3 Habitat Alteration and Disturbance

The proposed locations for the new facility construction and range enhancements are located on or adjacent to areas where the vegetation is predominately natural and undisturbed. The area designated for the CACTF with the Subterranean Military Complex comprises an area of 308.4 acres that are predominately characterized by vegetative communities of sandhill with some wetland flatwood, and a small portion of shrub. The CACTF, however, is only proposed to occupy 21.3 acres of this larger designated area (Section 2; Page 2-7). Specifically, this community contains 8.7 acres of exposed mineral soil, 0.2 acre of mixed forest - wetland/flatwood, with 7.8 acres of pine production, 269 acres of sandhill and 22.7 acres of xeric hammock.

The GLR would occupy an area of 12.1 acres of sandhill (7.5) and pine production (4.7 acres). Similarly, the AAR Classroom would occupy 0.7 acre of pine production. These projects would entail the clearing of nearly all trees within these designated areas. The Advanced Drivers Training Course is proposed for an area mostly characterized by 281.2 acres sandhill community. The Advanced Drivers Training Course, however, is only proposed occupy 36.7 acres, to include access roads (1.4 acres), parking lot (3.56 acres), skid pad (20.5 acres), standard drivers course (9.7 acres), and unimproved roads (1.8 acres) within this larger designated area.

Specifically, this sandhill community contains 259.1 acres of sandhill, 22.2 acres of scrubby flatwood, and 0.1 acre of mixed forest - wetland/flatwood.

The Red Empire DZ is designated in an area comprised of 1,051.3 acres of mostly of sandhill (749.9 acres) and pine production (301.4 acres) community. In preparation of the Red Empire DZ, the entire area would be cleared of trees and all stumps would have to be removed; however, all other vegetation habitat would be undisturbed. This vegetation community contains 877.1 acres of sandhill, 123.4 acres of pine production, 30.5 acres of wetland flatwood, 15.8 acres of mixed forest - wetland/ flatwood, 15.8 acres of mixed forest – wetland, 13.7 acres of dome swamp, and 3.5 acres of xeric hammock. The TTA I-36 Live Fire Maneuver Area would be located in predominately a sandhill community. The Trench Complex (74.1 acres) is to be located within the TTA I-36 Live Fire Maneuver Area, and consists entirely of 74.1 acres of sandhill community. In preparation of the Trench Complex, only limited areas would be cleared of vegetation and trees (including stumps) to accommodate the actual trench and bunker footprint, as only approximately 10 percent (7.41 acres) of the area is anticipated to be modified.

The C-53A Light Demolition Range (23.1 acres) consists predominately of disturbed vegetative areas within a sandhill community, with a small portion of pine production. Neither new facility construction, nor range enhancement activities are proposed for this range.

Implementation of the Alternative 1 range enhancement activities would represent only a negligible change (145.0 acres or approximately 2 percent) to the vegetation communities in comparison to the total acreage (6,770.6 acres) of vegetation communities that are available within the overall Restricted Area of the B-88 Range Complex. The new facility construction and range enhancements are anticipated, however, to have long-term, minor, adverse impacts on that small portion of the vegetation communities within the B-88 Range Complex. Additionally, negligible, short-term, adverse impacts on vegetation communities within the B-88 Range Complex are anticipated from the Future Minor Construction or Facility Modification activities.

The quality of wildlife habitat in the immediate vicinity of each of the locations for the new facility construction and range enhancements on the B-88 Range Complex is relatively high since these areas support wildlife habitat that is predominately natural and undisturbed. Most natural communities on the Eglin Reservations provide exceptionally high-quality habitat for wildlife. Proximity of the proposed construction locations to natural communities varies. Wildlife that currently utilize nearby habitats within this area would be able to move to other similar areas on and off the installation. This loss of habitat utilization would not affect the viability of any native species. While wildlife that occurs on many of the already developed areas of the B-88 Range Complex are accustomed to human activity such as vehicular traffic and human presence, construction noise does not occur regularly and therefore has a possibility to impact wildlife. The animals would likely vacate the area during construction events; however, once construction has ceased, they are anticipated to return. As the new facility construction and range enhancements would be temporary, no decrease in wildlife population levels would occur based on this temporary disturbance. Utilization of the Red Empire DZ would not be expected to result in any increase in the current number of annual aircraft operating hours or training missions. Although aircraft operations would continue to adhere to all established flight safety guidelines and protocol, the bird-aircraft strikes will likely continue at current levels; however, these levels would not result in long-term (i.e., population-level) impacts on birds at the B-88 Range Complex.

The proposed locations for the new facility construction and range enhancement activities are predominately located on or adjacent to upland sites and, therefore, are not located within Okaloosa darter streams, freshwater mussel critical habitat, bog frog streams, or reticulated flatwoods salamander ponds. The Red Empire Drop DZ is proposed for an area with a bog located in the middle section of the new DZ area. The proposed locations for the CACTF, Red Empire DZ, and the new TTA I-36 Live Fire Maneuver Area do contain active red-cockaded woodpecker (RCW) clusters and cavity trees with suitable foraging habitat for the RCW. These areas, however, would be entirely avoided during construction activities. The gopher tortoise and the

Florida pine snake occur on the B-88 Range Complex and, therefore, have the potential to occur near sites proposed for the new facility construction and range enhancements. Coordination with Eglin Natural Resources Office would be required prior to any ground disturbing activities. A gopher tortoise survey and red-cockaded woodpecker survey may also be required. If a gopher tortoise burrow is located within any of the project areas and cannot be avoided, the tortoise would be relocated in accordance with FWC guidelines. If an RCW cavity tree is found and anticipated to be negatively impacted within any of the project areas, Terms and Conditions from the completed ESA Section 7 consultation from 2013, 'Red-cockaded Woodpecker Programmatic Biological Opinion [for] Eglin Air Force Base, NE Gulf of Mexico[,] Walton, Okaloosa, and Santa Rosa Counties, Florida' will be followed. Consultation pursuant to Section 7 of the ESA with State and Federal wildlife agencies has been conducted in accordance with NEPA and the intergovernmental coordination procedures established for Eglin AFB.

Many of the range enhancement construction activities are planned for areas occupied by hardwood forest habitat. Long-term, negligible, adverse impacts would be expected on migratory birds due to an expected loss of nesting habitat from activities related to construction activities. Migratory bird airstrikes may continue to occur within the airspace over the Red Empire DZ. Based on the final rule on take of migratory birds by the Armed Forces (50 CFR 14 § 21) and the 2003 NDAA, the Armed Forces are authorized (with limitations) for the incidental taking of migratory birds occurring during military readiness.

The newly proposed CACTF, Red Empire DZ, TTA I-36 Live Fire Maneuver Area, and Trench Complex however, have designated boundaries that do contain significant acreage of HQNCs. The facility construction activities would avoid, however, any SBSs, ONAs, or HQNCs to the greatest extent possible. The Trench Complex, however, is proposed to be sited in an area containing significant acreage of HQNCs.

3.6.3.4 Noise

A variety of munitions and expendables are proposed for use for the first time at the newly proposed CACTF, GLR, Red Empire DZ, the New TTA I-36 Live Fire Maneuver Area, and the Trench Complex range areas. These expendables are predominately small arms, TP, and simulator rounds. In addition to the use of firearms, small arms training may involve personnel movement on foot, equipment use, and vehicle use. Small arms training has relatively low overall potential to impact biological resources, particularly vegetative communities. As such, the mission surge training activities and munition expendables on the B-88 Range Complex area would have negligible, short-term impacts on vegetation communities. Similarly, the mission surge training activities on the C-53A Light Demolition Range would have negligible, short-term impacts on vegetation communities.

The effects of noise on wildlife are not well understood and are mostly based on observations of behavioral responses. Animals rely on hearing for a variety of functions, including obtaining food, mating, and predator avoidance; noise may mask or interfere with these functions. A general behavioral reaction by some wildlife species when exposed to noise is the startle response. Startle responses in animals include flight, jumping, running, or movement of the head in the apparent direction of the noise source (Manci et al. 1988). Animal response to noise has been shown to vary with species. For example, amphibians do not exhibit a well-developed acoustic startle response and are generally considered to not be susceptible to noise impacts (Manci et al. 1988). Direct physiological effects of noise on wildlife are difficult to measure in the field, but may include some health effects, depending on the noise levels. Serious effects, such as decreased reproductive success, depend on the species, the characteristics of the noise, and many other factors.

Although many studies have examined the behavioral responses of wildlife to aircraft noise, there is little information on the effects of impulsive noise such as noise produced by explosives. Due to the lack of information on wildlife responses to noise from explosives detonations, impulsive noise thresholds for humans are typically used in impact analyses for wildlife. A peak sound level of 140 dB is the general impulsive noise threshold used for human hearing protection (see Section 3.3.1.2).

Based on the locations of active RCW trees shown on Figure 3-4 and Figure 3-5, use of these munitions on the training ranges during neutral weather conditions on average is not expected to produce noise levels greater than 140 dBP in the nearest areas containing active RCW cavity trees. There is potential for flying or foraging RCWs, as well other sensitive and common wildlife species that may occur on or near the training ranges, to be exposed to noise levels of 140 dBP or greater during use of such large munitions. However, the potential exposure would be limited as these large munitions are used infrequently. The existence of active RCW cavity trees in the vicinity of the range areas itself suggests that RCWs in these locations are not adversely affected by the noise generated by munitions use on the training ranges or test areas. Under unfavorable weather conditions (cloudy and windy), the predicted 140 dBP contours extend further out from the range areas and, therefore, have greater potential to impact wildlife.

Current training activities on the B-88 Range Complex and the C-53A Light Demolition Range are not expected to have significant adverse continuous noise impacts on common or sensitive wildlife species. The types and quantities of munitions currently used on the ranges are comparable to those used during previous years. Therefore, continuous noise impacts on wildlife from current operations are comparable to those from past operations. Wildlife have experienced noise from munitions use on the ranges for many years and, therefore, are acclimated to such noise.

Alternative 1 - mission surge activities are not expected to have significantly adverse noise impacts on wildlife, including any sensitive species. Based on the expected noise levels and a review of the available literature (USACE 2002) on animal responses to noise, noise impacts on common and sensitive wildlife species under Alternative 1 are expected to be largely limited to temporary startle responses in some species. The associated startle responses are not expected to result in adverse effects on the health or reproduction of any species.

3.6.3.5 Small Arms Training

Small arms and other munitions training is intermittently conducted on specific range areas on the B-88 Range Complex, the TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolition Range by various DoD components using a wide variety of small arms, and TP and simulator munitions and expendables. In addition to the use of firearms, small arms training on the B-88 Range Complex; C-53A Light Demolition Range; as well as on the newly proposed CACTF, GLR, Red Empire DZ, the New TTA I-36 Live Fire Maneuver Area, and the Trench Complex range areas; may involve personnel movement on foot, equipment use, and vehicle use.

Munitions, ordnance, and shrapnel have the potential to damage or kill foraging habitat (i.e., active RCW cavity trees) and the slight risk of harming or killing individual wildlife, including birds. This potential can be reduced by modifying or shielding the range layout in order to protect RCW trees and foraging habitat. Additionally, use of pyrotechnics and munitions have a slight potential to impact wildlife health if ingested or accumulated in soils and water. Potential effects on wildlife, and RCWs in particular, from the use of arty sims/pyrotechnics, chemical agents (CS gas), riot control agents, and smokes are inhalation of ash and fumes and ingestion of, or contact with, the chemical constituents of these munitions. The toxic effects of flare ash residue were tested on mammals, plants, and fish with concentrations of flare ash representing the high range that would be found in a pyrotechnic test area. Results indicated that the effects of flare ash residue are very minimal and not particularly dangerous to the environment (USAF 1997). The resultant addition of chemical constituents of flares is not of sufficient quantities to change soil, water, or air chemistry.

Exposure to dye-colored smoke through inhalation, ingestion, direct contact, or bioconcentration presents a slight effect immediately after the smoke has dispelled, but wildlife including birds are anticipated to leave the area during training exercises due to disturbance. The likelihood of direct exposure to toxic levels of emissions is low. Ingesting or inhalation of particles in sufficient amounts to cause harm is unlikely due to the wind-driven distribution of smoke particles (USFWS 2013).

Land clearing activities associated with range enhancements within RCW habitat cause direct impacts to RCW foraging habitat, and in some cases, active cavity trees. Because surveys are required prior to any tree clearing to check for the presence of RCWs, no direct physical impacts to birds are anticipated from tree clearing. Land clearing may affect not only the clusters within the cleared areas but also neighboring groups and possibly further fragment the eastern and western populations. Clearings may prevent or impede dispersal between clusters and may isolate small groups of clusters. Pre-planning efforts with Natural Resources Office and the USFWS will allow consideration of these issues in attempts to reduce their effects to the extent possible.

Small arms training has relatively low overall potential to impact biological resources. All personnel who conduct small arms and other ground training exercises on the Eglin Range are instructed on the protection of habitat, wildlife, and sensitive species. Eglin AFBI 13-212, *Range Planning and Operations* and the U.S. Army Range Certification Briefing identifies the measures that are required to be implemented by users of the Eglin Range to avoid and minimize potential impacts on biological resources, including species-specific measures for the RCW, reticulated flatwoods salamander, Okaloosa darter, gopher tortoise, and other sensitive species. The various measures that are required to be implemented during small arms and other ground training activities/maneuvers to avoid and minimize impacts on biological resources at Eglin AFB are identified in Section 4.

In addition to the live fire munitions and other ordnance use at the B-88 Range Complex and the C-53A Light Demolition Range, Alternative 1 also includes new live fire munitions and ordnance use at the new TTA I-36 Live Fire Maneuver Area/Trench Complex. Live munition rounds at this new location is estimated at 310,000 and only represents approximately 7.0 percent of the total live rounds to be expended between the B-88 Range Complex and the TTA I-36 Live Fire Maneuver Area/Trench Complex. Where this additional activity does potentially pose an increase risk to wildlife strike from the live munition use, the strict adherence to AFBI 13-212 instructions will aid in the avoidance and minimization of impacts on biological resources. Further, the establishment of the TTA I-36 Live Fire Maneuver Area has been strategized to lower, if not remove the some requests for live fire maneuvers on C52, and thus lower or minimize the potential for wildlife strike at C-52.

The overall potential for common or sensitive wildlife species to be physically struck by live or inert munitions on the B-88 Range Complex; C-53A Light Demolition Range; as well as on the newly proposed CACTF, GLR, Red Empire DZ, the New TTA I-36 Live Fire Maneuver Area, and the Trench Complex range areas, either by the munition itself or by fragmented shrapnel/debris from the munition or detonation, is relatively low. Blast fragmentation on these range areas has the potential to strike wildlife; however, the overall probability for associated physical impacts on wildlife, especially sensitive species, is low. Although munition strikes on wildlife cannot be completely ruled out, the overall potential for associated adverse impacts on common wildlife or sensitive species under Alternative 1 is considered to be relatively low.

3.6.3.6 Wildfires

Use of certain types of munitions and pyrotechnics (flares) on the B-88 Range Complex; C-53A Light Demolition Range; as well as on the newly proposed CACTF, GLR, Red Empire DZ, the New TTA I-36 Live Fire Maneuver Area, and the Trench Complex range areas has the potential to start wildfires. The overall potential for a wildfire to be caused by operations on these range areas is influenced by the type, amount, and dryness of the vegetation in the area, and weather conditions such as relative humidity and wind speed and direction. Fire is beneficial to many of the natural communities on Eglin AFB. For example, the sandhill community, which is the dominant natural community type on Eglin AFB, is highly adapted to, and dependent on fire, which maintains its vegetative structure and composition. However, wildfires also have the potential to adversely affect habitats and species on Eglin AFB if they are uncontrolled and of high intensity.

Eglin AFB has an advanced wildfire management program that includes all aspects of fire prevention, detection, suppression, readiness, fire line rehabilitation, and training. The program is implemented by the Eglin Wildland Support Module, which is stationed at the Eglin Natural Resources Office (Jackson Guard) and staffed by the Air Force Wildland Fire Branch. Due to the presence of UXO, certain portions of the Eglin Range have restrictions on wildfire suppression. None of the areas on the B-88 Range Complex or the C-53A Light Demolitions Range, including the proposed CACTF, GLR, Red Empire DZ, the New TTA I-36 Live Fire Maneuver Area, and the Trench Complex range are designated with any fire suppression restrictions (Peters 2020, pers. comm.). Areas designated as No Suppression and Minimum Impact Suppression Tactics have specific protocols on how wildfires are to be managed. Specific protection measures are implemented during wildfire suppression in biologically sensitive areas on Eglin AFB. For example, plows are not used off range roads for fire suppression, except in extreme conditions, in or near streams, riparian buffers, wetlands, high-quality natural areas, or listed species habitats. Prescribed burning is prioritized and conducted on species-specific intervals in areas known to contain sensitive species such as the RCW.

Uncontrolled, high-intensity wildfires caused by munitions use on these range areas have the potential to impact RCWs that nest in the vicinity of both training ranges via harassment or mortality of RCWs, damage or mortality of RCW cavity trees, and/or loss of RCW foraging habitat. Wildfire impacts to habitat and RCWs were not specifically addressed in the 8 November 2019 response letter prepared by the UFWS in reply to 22 October 2019 “Pre-project coordination notice under Eglin RCW PBO” email supporting informal consultation from the 96 CEG/CEIEA for the B-88 Range Complex; C-53A Light Demolition Range; as well as on the newly proposed CACTF, GLR, Red Empire DZ, the New TTA I-36 Live Fire Maneuver Area, and the Trench Complex range areas at Eglin AFB. However, impacts associated with wildfires were recently addressed in the REA for Test Areas B-71 and B-82, which concluded that wildfires caused by operations on the training ranges and test areas are likely to adversely affect the RCW and that potential wildfire impacts on the RCW would be minimized by implementation of the conservation measures identified in the Biological Assessment (BA) and applicable terms and conditions from the RCW Programmatic Biological Opinion (PBO); any take of RCWs would be covered under the RCW PBO (see Section 3.6.3.2). These consultation documents and associated USFWS concurrence are provided in Appendix E.

Fire suppression activities conducted in response to wildfires that are unintentionally caused by munitions use on the B-88 Range Complex and C-53A Light Demolition Range also have the potential to impact certain sensitive species, such as the gopher tortoise and indigo snake. Potential impacts on these species would result primarily from fire suppression equipment physically impacting individuals directly or by collapsing gopher tortoise burrows. Impacts on biological resources, including sensitive species and habitat are avoided to the extent practicable during fire suppression activities at Eglin AFB. Protection measures required to be implemented during wildfire suppression activities are identified in the Eglin AFB INRMP and in Eglin AFBI 13-212, *Range Planning and Operations*. Given that these measures are strictly adhered to, the overall potential for fire suppression activities to adversely impact biological resources under Alternative 1 is considered to be relatively low.

These planned activities for Alternative 1 would not result in any additional or greater disturbance to wildlife (primarily from noise effects) than what is currently experienced at the B-88 Range Complex or the C-53A Light Demolition Range. The new facility construction and range enhancement activities are anticipated to have short-term, minor, adverse impacts on wildlife at the B-88 Range Complex. Similarly, the Mission Surge activities proposed for the C-53A Light Demolition Range are anticipated to have negligible, short-term, adverse impacts on wildlife.

3.6.3.7 Hazardous Materials

Based on the analyses conducted in Sections 3.2.3, 3.4.2, and 3.5.2, emissions from current testing and training operations on the B-88 Range Complex and the C-53A Light Demolition Range are not expected to impact air quality, soils, or water resources to levels that would adversely impact biological receptors. The

overall potential for common wildlife or sensitive species to be adversely impacted via exposure (inhalation or ingestion) to hazardous materials released during operations on the training ranges and test areas is low based on the types and quantities of hazardous materials released. Associated impacts on air quality and water quality are expected to be negligible, and degradation of soil quality is expected to be minor and largely limited to the target areas on the training ranges and test areas, which provide low to moderate habitat quality for wildlife and have relatively low potential for sensitive species occurrence. Overall potential exposure of wildlife to released hazardous materials is also reduced by operational noise and activity, which discourages most wildlife from remaining in the immediate vicinity of the target areas during operations. Eglin AFBI 13-212, *Range Planning and Operations* identifies the measures that are required to be implemented by users of the Eglin Range to avoid and minimize potential exposure of biological resources to hazardous materials. Although not applicable to active, operational ranges, the Army is familiar with EPA's 1997 Military Munitions Rule (aka the Range Rule) and EPA's July 2010 Interim Munitions Response Guideline (OSWER Directive 9200.1-101).

Conclusion

Implementation of Alternative 1 - Enhancement and Mission Surge would result in long-term, minor, adverse impacts on vegetative communities, and would represent only a negligible change to the vegetation communities in comparison to the total acreage of vegetation communities that are available. Alternative 1 is expected to have only short-term, minor, adverse impacts on wildlife, as abundant habitat is available elsewhere in the vicinity of the B-88 Range Complex or the C-53A Light Demolition Range areas. Alternative 1 is not likely to adversely affect any Federally listed species in the vicinity of the B-88 Range Complex or the C-53A Light Demolition Range. Alternative 1 is expected to have only short-term, minor, adverse impacts on sensitive species and high-quality habitats as abundant habitat is available elsewhere for these species in the vicinity of the B-88 Range Complex or the C-53A Light Demolition Range. Based on the analyses conducted, Alternative 1 – Enhancement and Mission Surge has the potential for long-term (vegetation) and short-term (wildlife, sensitive species and habitats), minor, adverse impacts on biological resources. Overall, there would be no significant impacts on biological resources as a result of implementing Alternative 1.

3.6.3.8 Alternative 2 – Mission Surge Only

Alternative 2 includes a 25 percent mission surge of operations at the B-88 Range Complex and the C-53A Light Demolition Range above the current baseline level with no new facility construction or range expansion. As such, the annual quantities of munitions would not increase under Alternative 2, and there would be no change in the types of munitions used on the ranges. Under Alternative 2, there also would be no range enhancement activities, and as such, there would be no munitions or expendables deployed on the CACTF, GLR, Red Empire DZ, the New TTA I-36 Live Fire Maneuver Area, and the Trench Complex range areas.

Based on the analyses conducted for Alternative 1, overall noise impacts from munitions use on common and sensitive wildlife species under Alternative 2 are not expected to be significantly adverse. Alternative 2 would involve the same level of munitions and expendables training activity on the B-88 Range Complex and the C-53A Light Demolition Range as described in Alternative 1, less the munitions use on the CACTF, GLR, Red Empire DZ, the TTA I-36 Live Fire Maneuver Area, and the Trench Complex range areas. Alternative 2 would also not include the potential noise associated with the range expansion activities on the B-88 Range Complex. Alternative 2, therefore, would have the potential to have the same continuous noise impacts on wildlife as Alternative 1. Although mission-surge activity under Alternative 2 would produce the same continuous noise, the associated impacts would be temporary and are expected to be largely limited to startle responses in some wildlife species. The associated startle responses are not expected to result in adverse effects on the health or reproduction of any species.

The overall potential for common wildlife or sensitive species to be physically struck by live or inert munitions on the B-88 Range Complex and the C-53A Light Demolition Range under Alternative 2 is still very low. Small arms training activity under Alternative 2 is not expected to result in significantly adverse impacts on

biological resources as personnel would be required to strictly adhere to Eglin AFB's established protection measures for habitat, wildlife, and sensitive species. Munitions use on the range areas under Alternative 2 would increase the potential for wildfire starts and associated fire suppression activity. All measures discussed for Alternative 1 to avoid and minimize potential wildfire starts and impacts of fire suppression activities would be implemented during all missions on the B-88 Range Complex and the C-53A Light Demolition Range under Alternative 2; therefore, associated impacts on wildlife and sensitive species under Alternative 2 are not expected to be significantly adverse. Based on the analysis conducted for Alternative 1, a mission-surge only action in munitions use is not expected to degrade air, soil, or water quality to a level that would adversely impact biological receptors.

Conclusion

Implementation of Alternative 2 - Mission Surge Only would result in short-term, negligible, adverse impacts on vegetative communities, wildlife, and sensitive species and habitats on the B-88 Range Complex, as the Alternative 1 range enhancement and additional munitions use on the CACTF, GLR, Red Empire DZ, the New TTA I-36 Live Fire Maneuver Area, and the Trench Complex range areas would not occur. Alternative 2 is not likely to adversely affect any Federally listed species in the vicinity of the B-88 Range Complex or the C-53A Light Demolition Range. Overall, there would be no significant impacts on biological resources as a result of implementing Alternative 2.

3.6.3.9 Alternative 3: No Action Alternative

Alternative 3 includes maintaining the B-88 Range Complex and the C-53A Light Demolition Range annual operations at the current baseline level. Alternative 3 would not include any range enhancement activities, and as such, there would be no munitions or expendables deployed on the CACTF, GLR, Red Empire DZ, the New TTA I-36 Live Fire Maneuver Area, and the Trench Complex range areas. Alternative 3, therefore, would have the potential to have the similar but less continuous noise impacts on wildlife as Alternative 2. The current baseline level of munitions use with Alternative 3 would produce continuous noise, but the associated impacts would be temporary and are expected to be largely limited to startle responses in some wildlife species. The associated startle responses are not expected to result in adverse effects on the health or reproduction of any species.

Conclusion

Implementation of Alternative 3 - No Action Alternative would result in temporary, negligible, adverse impacts on vegetative communities, wildlife, and sensitive species and habitats on the B-88 Range Complex and the C-53A Light Demolition Range areas. Alternative 3 is not likely to adversely affect any Federally listed species in the vicinity of the B-88 Range Complex or the C-53A Light Demolition Range. Overall, there would be no significant impacts on biological resources as a result of implementing Alternative 3.

3.7 Cultural Resources

Cultural Resources include historic properties, as defined by the National Historic Preservation Act (NHPA), cultural items as defined by the Native American Graves and Repatriation Act (NAGPRA), archaeological resources as defined by the Archaeological Resources Protection Act (ARPA), sites and sacred objects to which are afforded access under the American Indian Religious Freedom Act (AIRFA), and archaeological collections along with their associated records as defined in 36 CFR 79, Curation of Federally Owned and Administered Archeological Collections.

The Eglin AFB Integrated Cultural Resources Management Plan (ICRMP) provides guidance on how to identify, evaluate, and treat cultural resources on Eglin AFB managed lands, and integrate cultural resources management with mission activities and other Eglin AFB management programs (USAF 2019). Development and approval requirements for the ICRMP are included in Air Force Policy Directive 32-70, *Environmental*

Quality, and AFI 32-7065, *Cultural Resources Management*. The Eglin Cultural Resources Office (96 CEG/CEIEA) has primary responsibility for the management of cultural resources at Eglin AFB, including evaluation of potential impacts to cultural resources by proposed actions. If the Proposed Action is determined to have potential to impact cultural resources, Eglin cultural resources staff coordinates the action with the Florida State Historic Preservation Office (SHPO). If the Proposed Action is determined to adversely affect a historic property, a plan to avoid or mitigate the impact is developed and implemented in consultation with the SHPO.

3.7.1 Definition of the Resource

3.7.1.1 National Historic Preservation Act

The NHPA instructs Federal agencies to take a leadership role in the preservation of the Nation's historic resources and to make informed decisions about the administration of Federally owned or controlled historic properties. As a result, the NHPA and its implementing regulations provide the basis for Eglin AFB's overall cultural resources management policy. Historic properties are defined by the NHPA as any prehistoric or historic district site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historical Places (NRHP), including artifacts, records, and material remains relating to the district, site, building, structure, or object (National Park Service [NPS] 2006a). To be considered eligible for the NRHP, a property would need to possess integrity of location, design, setting, materials, workmanship, feeling, and association and must also meet at least one of four criteria (NPS 2002):

- Be associated with events that made a significant contribution to the broad pattern of our history;
- Be associated with the lives of significant persons in our past;
- Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- Have yielded, or be likely to yield, information important in history or prehistory.

A Traditional Cultural Property (TCP) is a specific type of historic property that is eligible for inclusion in the NRHP because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining and continuing the cultural identity of the community (Parker and King, 1998). Given the broad range in types of historic properties, historic properties can often include other types of cultural resources such as cultural items, archaeological resources, sacred sites, and archaeological collections.

3.7.1.2 Native American Graves and Repatriation Act

NAGPRA was enacted to ensure the protection and rightful disposition of Native American cultural items located on Federal or Native American lands in the Federal government's possession or control. Cultural items, as defined by NAGPRA, are defined as human remains, as well as both associated and unassociated funerary objects, sacred objects, and objects of cultural patrimony or objects that have an ongoing historical, traditional, or cultural importance to a Native American group or culture (NPS, 2006b).

3.7.1.3 Archaeological Resources Protection Act

The ARPA updates and refines a previously enacted piece of legislation, the Antiquities Act, and establishes a permitting system for the excavation or removal of archaeological resources by qualified researchers, as well as legal penalties for the unauthorized excavation, removal, damage, alteration, or defacement of any archaeological resource that is over 100 years in age on Federal lands. Archaeological resources, as defined by the ARPA, consist of any material remains of past human life or activities that are of archaeological interest and are at least 100 years of age. Such items include, but are not limited to, pottery, basketry,

bottles, weapons, weapon projectiles, tools, structures or portions of structures, pit houses, rock paintings, rock carvings, intaglios, graves, human skeletal remains, or any portion or piece of those items (NPS, 2006c).

3.7.1.4 American Indian Religious Freedom Act

The AIRFA provides Federal protection of traditional Native American religious freedoms. A subsequent EO 13007 defines Indian Sacred Sites as any specific, discrete, narrowly delineated location on Federal land that is identified by a Native American tribe or Native American individual determined to be an appropriately authoritative representative of a Native American religion as sacred by virtue of its established religious significance, or for ceremonial use by, a Native American religion, provided that the tribe or appropriately authoritative representative of a Native American religion has informed the Federal land-owning agency of the existence of such a site (NPS, 1996).

3.7.1.5 Curation of Federally Owned and Administered Archeological Collections, 36 CFR 79

These regulations were implemented in 1990 as required by the NHPA, the Reservoir Salvage Act, and the ARPA, and provide minimum standards for the long-term management and care of archaeological collections, including any associated records or reports related to the collection. It also establishes the responsibility of Federal agencies to fund the long-term care of collections that are recovered on lands that they own or manage. Archaeological collections are defined by 36 CFR Part 79 as material remains that are excavated or removed during a survey, excavation, or other study of a prehistoric or historic resource, as well as the associated records that are prepared or assembled in connection with the survey, excavation, or other study. Material remains are artifacts, objects, specimens and other physical evidence that are excavated or removed in connection with efforts to locate, evaluate, document, study, preserve, or recover a prehistoric or historic resource (U.S. Government Printing Office, 2016).

3.7.2 Affected Environment

The Area of Potential Effects (APE) outlines the region affected by proposed activities for cultural resources under the Proposed Action and is defined by the project footprints for archaeological resources and the visual APE of 0.5 mile for aboveground or built environment resources such as structures.

Table 3-18 summarizes the archaeological resources within the project component footprints of the proposed action and the aboveground or built environment resources that are within the 0.5 mile visual APE of the proposed project components. A total of 18 archaeological resources fall within the footprints of the Proposed Action and two aboveground or architectural resources fall within the visual APE of the Proposed Action. Of the archaeological resources, 11 represent archaeological sites while the remaining seven represent isolated finds. Isolated finds represent minimal finds of cultural material that do not meet the minimum require of an archaeological site. In their very nature they are not considered historic properties as defined by the NHPA and are not significant resources. Of the 11 archaeological sites that fall within the footprints of the proposed project components, the vast majority (n=9) have been determined to be not eligible for inclusion in the NRHP under any criteria. As a result, these nine archaeological sites are not considered historic properties as defined by the NHPA and are not considered significant resources. The remaining two archaeological resources have been determined to be eligible for the NRHP.

The archaeological resources that have been determined eligible for the NRHP are considered historic properties as defined by the NHPA and are considered significant resources. Archaeological surveys have been conducted of the portions of the project areas which have a high probability for the presence of cultural resources. This represents approximately 51 percent of the total area of all the project components and encompasses 100 percent of the area of the AAR Classroom, Trench Complex, and GLR. The remaining project component areas contain portions of their footprints that have not been surveyed for cultural resources. The total number of unsurveyed areas is 1,388 acres.

Consultation is ongoing with the State Historic Preservation Officer to assess the need for additional surveys to adequately assess the potential impacts to cultural resources within the areas that have not been subject to archaeological and historic resource surveys.

Table 3-18. Summary of Resources Potentially impacted by Project Components.
REA for B-88 Range Complex and C-53A Light Demolition Range

Resource Number	Resource Type	NRHP Eligibility	Distance
C-53A			
IF-03570	Isolated Find	Ineligible	Within Footprint
008920	Historic Building	Ineligible	Within 0.5 mile
Combined Arms Collective Training Facility (CACTF) with a Subterranean Military Complex (MILCON Project)			
8OK00143	Archaeological Site	Determined Ineligible	Within footprint
8OK00402	Archaeological Site	National Register Eligible	Within footprint
8OK02626	Archaeological Site	Determined Ineligible	Within footprint
012205	Historic Building	Not Evaluated	Within 0.5 mile.
Grenade Launcher Range			
None	None	None	None
After Action Review (AAR) Classroom			
None	None	None	None
Advanced Drivers Training Course (MILCON Project)			
None	None	None	None
Red Empire Drop Zone			
None	None	None	None
TTA I-36: Live Fire Maneuver Area, VII			
8OK01221	Archaeological Site	National Register Eligible	Within footprint
8OK3988	Archaeological Site	National Register Eligible	Within footprint
Trench Complex, III			
8OK3988	Archaeological Site	National Register Eligible	Within footprint

Source: Eglin AFB, 2019

3.7.3 Environmental Consequences

3.7.3.1 Analysis Approach

In addition to the significance criteria established at the beginning of this section, the following thresholds were used to determine if an impact on cultural resources would be significant:

Once historic properties have been identified, an eligibility determination is made according to the criteria set forth in NHPA. The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and must also meet at least one of four criteria (NPS 2002) identified previously on page 3-68.

- are associated with events that have made a significant contribution to the broad patterns of our history; or
- are associated with the lives of persons significant in our past; or
- embody distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- have yielded, or may be likely to yield, information important in prehistory or history (NPS, 2002).

Significance evaluation is the process by which resources are assessed relative to significance criteria for scientific or historic research, for the public, and for traditional cultural groups. Only cultural resources determined to be significant (i.e., eligible for the NRHP) are protected under the NHPA.

Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts may occur by 1) physically altering, damaging, or destroying all or part of a resource; 2) altering the characteristics of the surrounding environment that contribute to resource significance; 3) introducing visual, audible, or atmospheric elements that are out of character with the property or alter its setting; or 4) neglecting the resource to the extent that it is deteriorated or destroyed. Aboveground or architectural resources such as structures are more sensitive to changes in the characteristics of the surrounding environment and the introduction of visual, audible or atmospheric elements that are out of character of the property or setting. Because of this, the APE of architectural or aboveground resources is extended to include a 0.5-mile visual APE.

Direct impacts can be assessed by identifying the types and locations of Proposed Action and determining the exact locations of cultural resources that could be affected. Indirect impacts primarily result from the effects of project-induced population increases and the resultant need to develop new housing areas, utilities services, and other support functions necessary to accommodate population growth. These activities and facilities' subsequent use can disturb or destroy cultural resources.

3.7.3.2 Alternative 1 – Range Enhancement and Mission Surge

Historic Properties – Three archaeological sites (8OK00402, 8OK3988, and 8OK01221) have been determined to be eligible for the NRHP and are considered historic properties and significant resources. Only small portions of archaeological sites 8OK00402 and 8OK01221 overlap with portions of the CACTF with a Subterranean Military Complex and TTA I-36: Live Fire Maneuver Area project footprints respectively. Archaeological site 8OK3988 is also located within the TTA I-36: Live Fire Maneuver Area and Trench Complex. Given the small portions of the mapped archaeological sites within these areas, it is anticipated that these archaeological sites could be avoided by construction or training during design. As a result, no direct impacts to these resources are anticipated from the implementation of the Proposed Action. Surveys have been conducted for approximately 51 percent of the proposed project component areas, including 100 percent of the AAR Classroom, Trench Complex, and GLR. While 49 percent of the remaining project component areas have not been surveyed for cultural resources, these areas are considered to have a low potential for cultural resources. As a result, there is a low probability that unrecorded significant resources are located within these areas. The proposed project will be reviewed by the Cultural Resource Manager of Eglin AFB in accordance with the SOPs contained in the 2019 ICRMP and through consultation with the Florida SHPO and appropriate Native American Tribes. If through those consultations supplemental archaeological surveys are determined to be needed, then they would be conducted within the construction footprint of the new facilities construction to identify any unrecorded archaeological sites. As a result, no archaeological resources would be adversely impacted from the implementation of the Proposed Action.

Architectural Resources - Section 106 consultation under the NHPA will be completed prior to the beginning of construction. One architectural or aboveground resource that has not been evaluated has been identified within the visual APE of the CACTF with a Subterranean Military Complex area. No direct physical impacts are anticipated to that resource from the implementation of the Proposed Action. Possible visual impacts to the resource would be avoided during the design of the CACTF. If visual impacts are unavoidable, then additional evaluations of the resource and possible mitigations measures would be implemented through in accordance with the SOPs outlined in the 2019 ICRMP. As a result, no impacts on architectural resources that are eligible for inclusion in the NRHP are anticipated from the implementation of the Proposed Action.

Cemeteries - No previously identified cemeteries are located within the proposed construction footprints for new facilities. As a result, no impacts on cemeteries are anticipated from the implementation of the Proposed Action.

Sacred Sites and TCPs - No previously identified sacred sites or TCPs are located within the proposed construction footprints for the new facilities. Consultations with Native American tribes to identify any potential TCPs or properties of religious or cultural significance will be conducted as part of the NEPA process. Consultation with Native American tribes will be completed prior to the project being implemented. All information provided by Native American tribes during the course of consultation will be considered in the environmental analysis. As a result, no impacts on Native American Sacred Sites and TCPs are anticipated from the implementation the Alternative 1.

Conclusion

Implementation of Alternative 1 – Range Enhancement and Mission Surge would result in no adverse effects on archaeological resources, architectural resources; cemeteries, sacred sites, or TCPs. Overall, there would be no significant adverse effects on cultural resources as a result of implementing Alternative 1.

3.7.3.3 Alternative 2 – Mission Surge Only

Archaeological Resources - Alternative 2 is limited to a 25 percent increase in operations at the B-88 Range Complex and the C-53A Light Demolition range above the current baseline level of those ranges. No new facility construction or range expansion would be conducted under Alternative 2. Current operation of the ranges under baseline levels do not have any adverse impacts on archaeological resources if they are done in accordance with the SOPs that are outlined within the 2019 ICRMP. While the amount of ordnance that is expended at each of the existing ranges would increase, the direct area of impact would not increase. Since no additional infrastructure would be constructed as part of this alternative, no impacts from construction are anticipated. As a result, no adverse impacts to archeological resources are anticipated from the implementation of Alternative 2.

Architectural Resources – No additional construction would be implanted under Alternative 2. As a result, there are no potential impacts, either direct or visual, from implementation of this Alternative. While the amount of ordnance expended at the ranges would increase, the impact footprint for that expenditure would not change. Current operation of the ranges under baseline levels does not have any adverse impacts on architectural resources if they are done in accordance with the SOPs that are outlined within the 2019 ICRMP. While the amount of ordnance expended at the current ranges would increase, the direct area of impact would not. As a result, no adverse impacts to architectural resources are anticipated from the implementation of Alterative 2.

Cemeteries - No previously identified cemeteries are located within the proposed construction footprints for new facilities. As a result, no impacts on cemeteries are anticipated from the implementation of the Alternative 2.

Sacred Sites and TCPs - No previously identified sacred sites or TCPs are located within the B-88 Range Complex or the C-53A Light Demolition Range. As a result, no impacts on Native American Sacred Sites and TCPs are anticipated from the implementation the Alternative 2.

Conclusion

Implementation of Alternative 2 –Mission Surge Only would result in no adverse effects on archaeological resources, architectural resources; cemeteries, sacred sites, or TCPs. Overall, there would be no significant adverse effects on cultural resources as a result of implementing Alternative 2.

3.7.3.4 Alternative 3 - No Action Alternative

Under the No-Action Alternative, no construction of additional infrastructure nor any mission surge increases would occur. As a result, the ranges would continue to operate with munitions use at the current baseline levels. Compliance with the SOPs provided in the 2019 ICRMP ensures that the current level of operations and training within the range does not have an adverse impact on archaeological resources, architectural or aboveground resources, cemeteries, sacred sites, or TCPs.

Conclusion

Implementation of Alternative 3 – No Action Alternative would result in no adverse effects on archaeological resources, architectural resources; cemeteries, sacred sites, or TCPs. Overall, there would be no significant adverse effects on cultural resources as a result of implementing Alternative 3.

3.8 Socioeconomics, Environmental Justice, and Protection of Children

3.8.1 Definition of the Resource

3.8.1.1 Socioeconomic Resources

Socioeconomics is defined as the basic attributes and resources associated with the human environment, particularly characteristics of population and economic activity. Economic activity typically encompasses employment, personal income, and industrial or commercial growth. Changes in these fundamental socioeconomic indicators often result in changes to additional socioeconomic indicators, such as housing availability and the provision of public services. Socioeconomic data at county, state, and national levels permit characterization of baseline conditions in the context of regional, state, and national trends.

Demographic, employment, and housing occupancy status data provide key insights into socioeconomic conditions that might be affected by a proposed action. Demographics identify the population levels and the changes in population levels of a region over time. Demographic data also identify a region's characteristics in terms of race, ethnicity, poverty status, and other broad indicators.

Socioeconomic data shown in this section are presented at the county, state, and national levels to characterize baseline socioeconomic conditions in the context of regional and state trends. The Proposed Action does not involve the relocation of personnel to or from Eglin AFB; however, the construction has the potential for impacts in surrounding communities and the county if the construction workforce is drawn from the local community, equipment is leased locally, or construction materials are purchased locally.

Environmental Justice - EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was signed on 11 February 1994 by President Clinton. The EO was created to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income. The EO directs Federal agencies to make achieving environmental justice part of their missions

by identifying and addressing, as appropriate, disproportionately high adverse human health, environmental, economic, and social effects of their programs, policies, and activities on minority and/or low-income populations. A Presidential Transmittal Memorandum issued with the EO states that "each Federal agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by the NEPA 42 U.S.C. Section 4321, et seq."

Analysis of demographic data on race, ethnicity and poverty provides information on minority and low-income populations that could be affected by the Proposed Action at Eglin AFB. Minority populations are those persons who identify themselves as Black, Hispanic, Asian American, American Indian/Alaskan Native, Pacific Islander, or Other. Poverty status is used to define low income. Following the Office of Management and Budget's (OMB) Statistical Policy Directive 14, the Census Bureau uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. If a family's total income is less than the family's threshold, then that family and every individual in it is considered in poverty. The official poverty thresholds do not vary geographically, but they are updated for inflation using the Consumer Price Index (CPI-U). The official poverty definition uses money income before taxes and does not include capital gains or noncash benefits (such as public housing, Medicaid, and food stamps) (U.S. Census Bureau 2019a). Poverty thresholds are dollar amounts to determine poverty status and the Census Bureau assigns each person or family one out of 48 possible established poverty thresholds. The 48 possible poverty thresholds are outlined in the Table Poverty Thresholds (U.S. Census Bureau 2019b). A potential disproportionate impact may occur when the percentages of minority or low-income populations in the ROI exceeds 50 percent or when the percentages of minority or low-income in the ROI are greater than those in the community of comparison (U.S. Air Force 1997).

Protection of Children - EO 13045 requires each Federal agency "to identify and assess environmental health risks and safety risks that may disproportionately affect children" and "ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks." This EO was prompted by the recognition that children, still undergoing physiological growth and development, are more sensitive to adverse environmental health and safety risks than adults.

3.8.2 Affected Environment

Eglin AFB consists of the Eglin Reservations and occupies portions of Santa Rosa, Okaloosa, and Walton counties, Florida, near the population centers of Crestview City and Fort Walton Beach. Since only short-term, minor increases in demographics are anticipated, particularly during the construction of any new facilities and during periods of mission surge training, the ROI used for analysis is limited to the land areas within the boundaries of the B-88 complex and the C-53A Light Demolition Range. The range complex itself is within Okaloosa County. Socioeconomic and environmental justice baseline conditions are presented for Okaloosa County; as well as for Crestview City, Fort Walton Beach, Florida, and the U.S. for comparison purposes. The military installations, including Eglin AFB, are one of the most important economic influencers in the region.

The Defense Support Initiatives Committee (DSI) notes that 2015 Florida Defense Handbook reported the annual economic impact of the military installations in the tri-county area of northwest Florida exceeds $10,007,000,000, topping $9 billion in Okaloosa County alone and supporting over 72,000 jobs (DSI 2019).

3.8.2.1 Population Demographics

U.S. Census Bureau estimates the 2018 population in Okaloosa County to be 207,269. The population of Okaloosa County grew at an average annual rate of 1.3 percent from 2010-2015, with the average annual growth rate doubling to 2.6 percent in recent years for the 2015-2018 time period (**Table 3-19**).

Table 3-19. Local, County, State, and U.S. Population.
REA for B-88 Range Complex and C-53A Light Demolition Range

				Average Annual Growth Rate	
Geographic Area	**2010**	**2015**	**2018**	**2010 to 2015**	**2015 to 2018**
Crestview City	20,978	22,524	24,664	1.5%	2.0%
Fort Walton Beach	19,507	20,767	22,284	1.3%	2.4%
Okaloosa County	180,822	192,237	207,269	1.3%	2.6%
Florida	18,801,310	19,645,772	21,299,325	0.9%	2.8%
United States	308,745,538	316,515,021	327,167,434	0.5%	1.1%

Source: U.S. Census Bureau 2019c, 2019d

A similar pattern of average annual growth rates are seen from Crestview City and Fort Walton Beach which increased from 1.5 percent and 1.3 percent to 2.0 percent and 2.4 percent respectively. From 2010-2015, the average annual growth rates in Okaloosa County (1.3 percent), Crestview City (1.5 percent), and Fort Walton Beach (1.3 percent) were greater than the growth rate for Florida (0.9 percent) and were more than double that of the U.S. (0.5 percent). The average annual growth rates for Crestview City (2.0 percent), Fort Walton Beach (2.4 percent), and Okaloosa County (2.6 percent) continued to increase from 2015 to 2018 and were more than double that of the U.S. (1.1 percent), but lagged slightly behind the average annual growth rate of Florida (2.8 percent).

U.S. Census Bureau data on race and ethnicity from 2018 estimates (**Table 3-20**) show that Okaloosa County is approximately 26.9 percent minority, a much lower percent minority than Florida and the U.S., which are 46.5 percent and 39.6 percent, respectively. The population centers of Crestview City and Fort Walton Beach both have higher percent minority populations compared to Okaloosa County but are still below the percentages of the State of Florida and the U.S.

Table 3-20: Local, County, State, and U.S. Race and Ethnicity
REA for B-88 Range Complex and C-53A Light Demolition Range

Geographical Area	White Not Hispanic	Black or African American	American Indian/ Alaska Native	Asian	Native Hawaiian/ Pacific Islander	Hispanic	Total Minority
Crestview City	69.3%	17.3%	0.1%	2.3%	0.2%	6.9%	30.7%
Fort Walton Beach	69.8%	11.9%	0.2%	3.6%	0%	10.5%	30.2%
Okaloosa County	73.1%	10.3%	0.7%	3.3%	0.2%	9.7%	26.9%
Florida	53.5%	16.9%	0.5%	3.0%	0.1%	26.1%	46.5%
United States	60.4%	13.4%	1.3%	5.9%	0.2%	18.3%	39.6%

Source: U.S. Census Bureau 2019c

Housing

U.S. Census estimates show that there are 18,973 vacant housing units in Okaloosa County in 2018. The 19.7 percent of housing units that are vacant is above the national estimate of 12.2 percent vacant (**Table 3-21**). The percentage of vacant housing units for both Crestview City (12.3 percent) and Fort Walton Beach (10.8 percent) are both lower than the percentage of vacant housing units for Okaloosa County and are nearly equal to or lower than national percent vacant. Median gross rent from 2008 to 2014 was $987 in Crestview City and $956 in Fort Walton Beach. These numbers are lower than that for the Okaloosa County ($1,101), Florida ($1,128), and the U.S. ($1,023) (U.S. Census Bureau 2019e).

Table 3-21: Local, County, State, and U.S. Housing Units and Vacancies
REA for B-88 Range Complex and C-53A Light Demolition Range

Geographic Area	Total Units	Vacant Units	Percent Vacant
Crestview City	9,508	1,172	12.3
Fort Walton Beach	10,454	1,133	10.8
Okaloosa County	96,376	18,973	19.7
Florida	9,348,689	1,726,929	18.5
United States	136,384,292	16,654,164	12.2

Source: U.S. Census Bureau 2019e

Employment

The annual average labor force in 2018 in Okaloosa County was 96,270. The 2018 average unemployment rate of 2.9 percent in Okaloosa County was below the average unemployment rate for Florida (3.6 percent) and the U.S. (3.9 percent) (U.S. Bureau of Labor Statistics [BLS] 2019a and 2019b). U.S. Bureau of Economic Analysis (BEA) data show that employment in Okaloosa County is dominated by the Federal Government, which represents a much higher percentage of employment in Okaloosa County than in Florida. The Federal Government accounted for approximately 10.1 percent of total employment in 2018, compared to 1.6 percent in Florida. (BLS 2019c).

Income and Poverty

Median household income for Okaloosa County in 2014 ($55,768) was approximately 104 percent of the U.S. median household income of $53,482 (U.S. Census Bureau 2015b). The poverty rate in Okaloosa County (13.7 percent) is below the poverty rate for Florida (16.7 percent) and the U.S. (15.6 percent). Only one of the census tracts adjacent to B-88 Range Complex (Census Tract 209) has a higher poverty rate than Okaloosa County (**Table 3-22**).

Table 3-22: Local, County, State, and U.S. Income and Poverty (in 2018 dollars)
REA for B-88 Range Complex and C-53A Light Demolition Range

Geographical Area	Median Household Income	Median Household Income (Percent of U.S.)	Percent of the Population Below Poverty Level
Crestview City	$54,630	90.6	15.7
Fort Walton Beach	$50,666	84.0	16.6
Okaloosa County	$62,048	102.9	12.7
Florida	$53,267	88.3	13.6
United States	$60,293	100.0	11.8

Source: U.S. Census Bureau 2019a

3.8.2.2 Environmental Justice and Protection of Children

Okaloosa County, which is the smallest governmental or geopolitical entity that encompasses the impact footprint, is the Community of Comparison (COC) for the environmental justice analysis. **Table 3-23** presents data on minority and low-income populations for Okaloosa County, as well as Florida, Crestview City, Fort Walton Beach, and the U.S. for comparison.

Table 3-23: Environmental Justice Comparison for Minority and Low-Income Populations
REA for B-88 Range Complex and C-53A Light Demolition Range

Geographic Unit	Percent Minority	Disproportionate	Percent Low-Income	Disproportionate
U.S.	39.6%	--	11.8	--
Florida	46.5%	--	13.6	--
Okaloosa County (COC)	26.9%	--	12.7	--
Crestview City	30.7%	--	15.7	--
Fort Walton Beach	30.2%	--	16.6	--

Sources: U.S. Census Bureau 2019a

3.8.3 Environmental Consequences

3.8.3.1 Analysis Approach

The following thresholds were used to determine if an impact on socioeconomics would be significant:

- Impacts cause substantial gains or losses in population or the composition of the populations
- Impacts cause extensive relocation or disruption of community businesses creating an economic hardship for surrounding communities
- Impacts cause disequilibrium in the housing market, such as severe housing shortages or surpluses, resulting in substantial property value changes
- Impacts cause changes to accessibility of community services or change demands in such a way that the current system cannot accommodate the change

3.8.3.2 Alternative 1 – Range Enhancement and Mission Surge

Socioeconomic impacts resulting from the implementation of the proposed action would result in negligible, long term adverse impacts and temporary, minor beneficial impacts. Approximately 1,105,400 square feet of facility construction would occur under the Proposed Action. Utilizing a commercial estimate of construction of $100 per square foot, this would result in over $110 million in construction costs. Construction of the various project components would result in temporary, moderate beneficial impacts in the form of jobs and income for area residents, revenues to local businesses, and sales taxes to Okaloosa County and the State of Florida could be realized if construction materials are purchased locally or local construction workers are hired for repairs and maintenance. Noise impacts from construction of the project components would be limited to the training range and would not encompass any residential areas or sensitive receptors within populated areas.

A limited amount of permanent jobs associated with the operation of the new training areas would be created, particularly for the CACTF and Trench facility. It is estimated that 14 additional personnel would be required for the operation of these facilities. This is a negligible increase when compared to the 2018 estimated population of Okaloosa County (207,269). This additional personnel and construction employment associated with this alternative would likely be accommodated by labor resources already in the region. With negligible personnel moving into the region as a result of the Proposed Action, there would be no significant additional demand on housing, schools, or other social services, so no permanent socioeconomic impacts would be anticipated as a result of this alternative.

Training activities during Mission Surge operations would result in an estimated 25 percent increase of soldiers coming into the area temporarily for training, over the FY 2019 training numbers. This would equal an estimated additional 5,877 soldiers that would be coming to Eglin during Mission Surge training. This would result in a minor temporary increase in population (~3 percent) in the overall population of Okaloosa County. The soldiers that would be coming into the area during mission surge training would be housed both

on and off base, depending on the amount of units currently training at the base as well as mission surge requirements for the soldiers. A worst case scenario would see the total estimated number of soldiers temporarily being required to be housed off-base. While vacant housing units for the County overall would be able to handle a temporary influx of 5,877 soldiers, the available vacant housing units in the closest two population centers of Crestview and Fort Walton Beach combined would not be able to handle the influx. As a result, increased pressure on the demands of housing, local services, and traffic would be most felt in these areas resulting in moderate adverse impacts to housing costs, particularly rent, as well as traffic and local services. Rent within the two population centers is currently lower when compared to rent of the County, State of Florida, and U.S. overall. While spikes in demand could happen during mission surge training, these are expected to be short-term impacts, so no permanent socioeconomic impacts would be anticipated as a result of this mission surge increases in soldiers.

Adverse impacts related to construction activity or operation and maintenance could include exposure to noise, safety hazards, pollutants and other hazardous materials, and excessive traffic. Minority populations of Okaloosa County, and the two major residential areas closest to Eglin AFB, Crestview City and Fort Walton Beach are below both the minority percentages of the state of Florida and the Nation overall. In addition, all three percentages are below 50 percent. In contrast, percentages of low-income populations in Okaloosa County, Crestview City, and Fort Walton all exceed the percentage of low income populations of the Nation, and the two population centers, Crestview City and Fort Walton exceed the percentage of the State of Florida. None of the percentages of low income populations in Okaloosa County, Crestview City and Fort Walton Beach are 50 percent or above. Given the construction and training activities would be limited to the training range, no adverse impacts are to be expected off the installation. With no adverse impacts, there would be no disproportionately high adverse human health, economic, or social effects on minority or low-income populations or children.

Conclusion

Overall, there would be no significant, long-term impacts on socioeconomics, environmental justice, or protection of children as a result of implementing Alternative 1 – Range Enhancement and Mission Surge.

3.8.3.3 Alternative 2 – Mission Surge Only

Under Alternative 2, there would be no construction. As a result, all impacts associated with construction under Alternative 1 would not occur under Alternative 2. Mission surge training would occur under Alternative 2. As under Alternative 1, training activities during mission surge operations would result in an estimated 25 percent increase of soldiers coming into the area temporarily for training, over the FY 2019 training numbers. This would equal an estimated additional 5,877 soldiers that would be coming to Eglin during mission surge training. This would result in a minor temporary increase in population (~3 percent) in the overall population of Okaloosa County. The soldiers that would be coming into the area during mission surge training would be housed both on and off base, depending on the amount of units currently training at the base as well as mission surge requirements for the soldiers. A worst case scenario would see the total estimated number of soldiers temporarily being required to be housed off-base. While vacant housing units for the County overall would be able to handle a temporary influx of 5,877 soldiers, the available vacant housing units in the closest two population centers of Crestview and Fort Walton Beach combined would not be able to handle the influx. As a result, increased pressure on the demands of housing, local services, and traffic would be most felt in these areas resulting in moderate adverse impacts to housing costs, particularly rent, as well as traffic and local services. Rent within the two population centers is currently lower when compared to rent of the County, State of Florida, and U.S. overall. While spikes in demand could happen during mission surge training, these are expected to be short-term impacts, so no permanent socioeconomic impacts would be anticipated as a result of this mission surge increases in soldiers.

Adverse impacts related to mission surge activities could include exposure to noise, safety hazards, pollutants and other hazardous materials, and possibly excessive traffic. Minority populations of Okaloosa

County, and the two major residential areas closest to Eglin AFB, Crestview City and Fort Walton Beach are below both the minority percentages of the state of Florida and the Nation overall. In addition, all three percentages are below 50 percent. In contrast, percentages of low-income populations in Okaloosa County, Crestview City, and Fort Walton all exceed the percentage of low income populations of the Nation, and the two population centers, Crestview City and Fort Walton exceed the percentage of the State of Florida. None of the percentages of low income populations in Okaloosa County, Crestview City and Fort Walton Beach are 50 percent or above. Given the training activities would be limited to the training range, no adverse impacts are to be expected off the installation. With no adverse impacts, there would be no disproportionately high adverse human health, economic, or social effects on minority or low-income populations or children.

Conclusion

Under Alternative 2, no construction of additional infrastructure would occur. Overall, there would be no significant, long-term impacts on socioeconomics, environmental justice, or protection of children as a result of implementing Alternative 2 –Mission Surge Only.

3.8.3.4 Alternative 3 - No Action Alternative

Conclusion

Under the No-Action Alternative, no construction of additional infrastructure nor any mission surge increases would occur. As a result, the ranges would continue to operate at their current baseline levels. Overall, there would be no significant, long-term impacts on socioeconomics, environmental justice, or protection of children as a result of implementing Alternative 3.

3.9 Cumulative Effects

3.9.1 Introduction

This section of the EA addresses the potential cumulative impacts associated with the implementation of the alternatives and other projects/programs that are planned for the region. The CEQ defines cumulative impacts as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 CFR 1508.7). This CEQ section continues: “Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” by various agencies (Federal, state, and local) or individuals. Informed decision making is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

By Memorandum dated June 24, 2005, from the Chairman of the CEQ to the Heads of Federal agencies, entitled “Guidance on the Consideration of Past Actions in Cumulative Effects Analysis”, CEQ made clear its interpretation that “…generally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions…” and that the “…CEQ regulations do not require agencies to catalogue or exhaustively list and analyze all individual past actions.”

This cumulative impact analysis summarizes expected environmental effects from the combined impacts of past, current, and reasonably foreseeable future projects within the ROI. The Air Force reviewed available environmental documentation regarding known current and past Federal and non-Federal actions associated with the resources analyzed in Chapter 3. In addition, projects in the planning phase were also reviewed if they had the potential to interact with the proposed B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolition Range actions of this REA and if the projects were considered reasonably

foreseeable (not speculative). The level of information available for the different projects varies but the best available science is used in the cumulative impact analysis.

The EPA suggests that analysis of cumulative impacts should focus on specific resources and ecological components that can be affected by the incremental effects of the proposed actions and other actions in the same geographic area. This can be determined by considering:

- Whether the resource is especially vulnerable to incremental effects;
- Whether the Proposed Action is one of many similar actions in the same geographic area;
- Whether other activities in the area have similar effects on the resource;
- Whether these effects have been historically significant for this resource; and
- Whether other analyses in the area have identified cumulative effects.

Additionally, the analysis should consider whether geographic and time boundaries large enough to include all potentially significant effects on the resources of concern have been identified. Geographic boundaries should be delineated and include natural ecological boundaries and the time period of the project's effects. The adequacy of the cumulative impact analysis depends upon how well the analysis considers impacts that are due to past, present, and reasonably foreseeable actions. This can be best evaluated by considering whether the environment has been degraded (and to what extent), whether ongoing activities in the area are causing impacts, and the trend for activities and impacts in the area.

The Proposed Action analyzed in this REA would not make radical changes to the environment in and around the B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolition Range area. Rather, the Proposed Action would result in some minor but permanent impacts and mostly temporary impacts on the environment. As such, there is limited potential for the affected resources of the Proposed Action to interact with the affected resources of past, present, or reasonably foreseeable actions. The environmental impacts resulting from the facility construction projects captured in this REA would not result in significant impacts on, or cause permanent changes to, the 100-year floodplain or wetlands. The facility construction projects would result in negligible-to-minor impacts on, yet only temporary changes to, the noise environment and air quality. Potential interactions with other past, present, or reasonably foreseeable actions would generally be those actions that may also have temporary effects on the noise environment and air quality within the B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolition Range areas. Specific projects that have occurred, those currently taking place, and those projected for the future are identified in subsequent subsections.

3.9.2 Past, Present, and Foreseeable Future Projects

Various types of past, present, and reasonably foreseeable actions not related to the Proposed Action have the potential to affect the resources identified in Chapter 3 of the EA. The overview of these actions in this section emphasizes components of the activities that are relevant to the impact analysis also identified in Chapter 3. Geographic distribution, intensity, duration, and historical effects of similar activities are considered when determining whether a particular activity may contribute cumulatively and significantly to the impacts of the Proposed Action on the resource areas identified in the EA.

Based on a review of past, present, and reasonably foreseeable actions at the B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolition Range area, and the region (Okaloosa County), it was determined that several actions would be considered when analyzing the potential cumulative impacts of the actions. The projects listed in this section are those that have the potential to cumulatively impact the resources assessed in this EA. These projects are described below and the impacts of these projects, in combination with the impacts of the Proposed Action, are described in this section.

3.9.3 Past Actions

The Air Force has not identified any specific individual, past actions that are relevant to the current Proposed Action at Duke Field. Past actions are those actions, and their associated impacts, that occurred within the geographical extent of cumulative effects that have shaped the current environmental conditions of the project areas. CEQ regulations do not require the consideration of the individual effects of all past actions to determine the present effects of past actions. As such, the effects of past actions are now part of the existing environment and are included in the affected environment described in Section 3.0. Recent past actions with ongoing effects germane to cumulative impacts are, however, discussed with present and reasonably foreseeable future actions.

The addition of 59 F-35 aircraft to the Base's aircraft inventory constitutes one of the primary actions associated with Eglin AFB's mission over the last five years. As such, a number of facilities have been recently constructed at the Installation to support the beddown of the F-35 aircraft. Various projects involving improvements to existing on-base facilities, roads, and utility systems, and construction of new infrastructure have been conducted over the years as needed to support Eglin AFB's mission. Other examples of recently completed infrastructure projects at Eglin AFB include the 2017 on-base solar array farm, as well as the completed construction of new military housing at Eglin AFB and Hurlburt Field as part of the Air Force's military housing privatization initiative (MHPI). Infrastructure improvements will continue to be needed to support Eglin AFB's mission, and they constitute the primary foreseeable future mission-support actions at the Installation.

Another recent mission-related action at Eglin AFB has been the addition of Black Dart testing events. The annual two-week Black Dart testing event involves the use of munitions, lasers, and high-power microwaves to counter and defeat Unmanned Aerial Systems(UASs). A number of Eglin AFB test areas and water ranges are used for Black Dart testing. The potential environmental impacts of Black Dart testing have been analyzed in the EA prepared for Black Dart events at Eglin AFB.

3.9.4 Present and Reasonably Foreseeable Future Actions

The ongoing development of Eglin AFB's cantonment areas, establishment of the JSF IJTS at Eglin AFB, and any additional, yet-unscheduled construction and renovation projects that will be needed to support Eglin AFB's continued growth were also considered as present and reasonably foreseeable future actions to occur at Eglin AFB. Continuing construction activities associated with Hurlburt's MHPI would also be anticipated.

Additionally, the USAF recently (2016) proposed to establish a C-146A aircraft squadron at Duke Field on Eglin AFB. The 524 SOS would relocate to Duke Field and operate the C-146A aircraft under the Air Force Special Operations Air Warfare Center, in a USAF Non-Standard Aviation (NSAv) classic association with the 919 SOW under the Air Force Reserve Command (AFRC). This ongoing action includes the relocation and beddown of an additional 18 C-146A aircraft and approximately 169 personnel from Cannon AFB to Duke Field beginning in FY16, which would result in a total of 23 C-146A aircraft at Duke Field. This action also required the construction of a C-146A one-bay hangar and collocated aircraft maintenance unit (AMU) facility; a squadron operations facility for the 524 and 859 SOS; and a temporary (and ultimately a permanent) WST facility for C-146A aircraft.

In order to respond to a pilot manning crisis exacerbated by Hurricane Michael, the USAF has temporarily beddown F-22 aircraft and associated T-38 Talon aircraft at Eglin AFB from Tyndall AFB in nearby Bay County, Florida. This interim beddown has temporarily restored training of replacement pilots for the F-22 FTU at Eglin AFB while the USAF completed an Environmental Impact Statement for the F-22 FTU's permanent beddown. A Record of Decision (ROD) was signed on April 25, 2019 for the Special Environmental Assessment (SEA) for Emergency Aircraft Beddown that Comprise the F-22 FTU. A temporary increase of up

to 933 additional active duty military, civilian, and contractor personnel has occurred at Eglin AFB, equating to up to 2,985 new persons temporarily added to the area surrounding Eglin AFB. However, this would only result in a net increase of about 751 persons compared to the no action alternative analyzed in the 2014 *SEIS for F-35 Beddown at Eglin AFB, Florida* (the "2014 SEIS").

In response to the devastating impacts from Hurricane Michael to Tyndall AFB, the USAF consulted with the CEQ and requested emergency alternative arrangements for compliance with NEPA, in accordance with CEQ Regulation 40 CFR 1506.11. The USAF proposes to permanently beddown 5th generation FTU fighter aircraft at Langley AFB, Virginia and/or Eglin AFB, Florida. The alternative arrangements also required the USAF to undertake an EIS for the permanent beddown of the F-22 FTU as soon as possible and to issue a NOI to prepare an EIS by no later than April 1, 2019. In addition to the permanent beddown of the F-22 FTU, this proposed action also includes optimization of the 5th Generation (at Eglin AFB this refers to the expected addition of more F-35s once the F-22s leave for Langley AFB) fighter FTU operations to ensure adequate training ranges, facilities, and airspace necessary to effectively produce qualified combat pilots. The USAF issued the NOI in the Federal Register (FR) on March 26, 2019.

Eglin AFB is also proposing to provide dedicated contract adversary air (ADAIR) flying missions (for a total of 30,000 annual sorties of which 2,400 are proposed for Eglin) to improve the quality of training and readiness of pilots of the 33 FW at Eglin AFB, Florida. As a shared resource, other units assigned to Eglin AFB such as the 96 TW and 53rd Wing may use contract ADAIR to support activities provided they are legitimate training requirements (e.g., a large force exercise undertaken to allow aircrews to train alongside other aircraft, providing realistic training scenarios involving multi-aircraft operation. The contract ADAIR support would employ adversary tactics across the training spectrum from basic fighter maneuvers to higher-end, advanced, simulated, combat training missions. The objective is to increase the quality of training for 5th generation F-35 fighter pilots by filling the "near peer" capacity and capability gap currently present in the 5th generation training enterprise. Additionally, other USAF (4th generation) units that may have been tasked to provide ADAIR training support at Eglin AFB may now recapitalize valuable flying hours to focus on increasing their own levels of proficiency and readiness.

A non-Federal project is proposed to elevate at the Crestview junction of three major highways: United States Highway 90 (US 90), SR 85, and Interstate 10 (I-10). The project area is for a new interchange to be located along I-10 near Antioch Road/PJ Adams Parkway; 8.6 miles east of Log Lake Road and 2.6 miles west of SR 85. This is a much needed second interchange for Crestview that will open approximately 300 acres within the City of Crestview for commercial economic development as well as 1,800 acres for residential development. Additionally, it will provide acceleration of critically needed transportation improvements and drastically improve safety on both SR 85 and I-10.

Table 3-24 provides a summary list of the past, present, and foreseeable future projects occurring at Eglin AFB.

Table 3-24: Past, Present, and Foreseeable Future Projects occurring at Eglin AFB
REA for B-88 Range Complex and C-53A Light Demolition Range

Past Projects
Beddown of 59 F-35 Aircraft at Eglin AFB
Installation Support for the Beddown of the F-35 Aircraft
On-base Solar Array Farm at Eglin AFB
Military Housing at Eglin AFB and Hurlburt Field
Black Dart Testing at Eglin AFB and Tyndall AFB
Present and Future Projects
AvFID Growth at Duke Field
Installation Support for the AvFID Growth at Duke Field

Beddown of C-146A Aircraft Squadron (18 aircraft and 169 personnel) at Duke Field
Installation Support for the C-146A Aircraft Squadron at Duke Field
Temporarily Beddown of F-22 Aircraft and Associated T-38 Talon Aircraft at Eglin AFB
5th Generation FTU Optimization at Eglin AFB
New Interchange Along I-10 near Antioch Road/PJ Adams Parkway

3.9.5 Cumulative Effects Analysis

Other military and agency actions in the region may overlap in space or time with the EA Proposed Action, but with the absence of specificity in knowledge of their timing and location, cumulative effects analysis is a challenge. Overlaps of other military actions, however, have historically been handled through intense, coordinated scheduling. This scheduling would not result in significant cumulative impacts. There is potential interaction with some ongoing and recent projects, described above, to have the potential to either increase or offset possible environmental consequences.

The following analysis examines the impact on the environment that would result from the incremental impact of the Proposed Action in addition to other past, present, and reasonably foreseeable future actions. This analysis assesses the potential for an overlap of impacts with respect to project schedules or affected areas. Specific information on all the projects considered in this analysis is not available, so the cumulative impacts of these actions cannot yet be quantified. Therefore, this section presents a qualitative analysis of the cumulative impacts, based on significant activities anticipated for each project.

To determine the significance of each of the cumulative impacts of the Proposed Action and other actions, significance was determined according to Section 1508.27 of the Environmental Quality Improvement Act of 1970, as amended [43 CFR 56003, Nov. 29, 1978]. The primary factors considered for each resource area in determining significance as used in NEPA requires considerations of both context and intensity.

Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole, the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

- Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that the effect would be beneficial.
- The degree to which the Proposed Action affects public health or safety.
- Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
- The degree to which the effects on the quality of the human environment are likely to be highly controversial.
- The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
- The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

- Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.
- The degree to which the action may adversely affect districts, sites, buildings, structures, or objects listed in or eligible for listing in the NRHP or may cause loss or destruction of significant scientific, cultural, or historical resources.
- The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the ESA of 1973.
- Whether the action threatens a violation of Federal, state, or local law or requirements imposed for the protection of the environment.

Based on the assessment of ongoing and reasonably foreseeable actions at the B-88 Range Complex and the C-53A Light Demolition Range, the Proposed Action would result in some cumulative impacts as a result of the various projects, as described below.

3.9.5.1 Air Quality

Alternative 1 – Range Enhancement and Mission Surge – Alternative 1 is not expected to significantly add to the cumulative effects on air quality of all past, present, and reasonably foreseeable actions. The ROI for evaluating cumulative impacts on air quality is Okaloosa County, which is in attainment for all NAAQS. The emissions generated during the implementation of the Proposed Action would be additive to other emissions generated coincidentally within the region. Compliance with the Florida State Implementation Plan would ensure that implementation of the Alternative 1, in combination with past, present, and future actions, would not result in a permanent increase in existing NAAQS; would not contribute to an increase in the frequency or severity of violations of existing NAAQS; and would not delay the timely attainment of any NAAQS, interim milestones, or other milestones to achieve attainment.

Future B-88 Range Complex and C-53A Light Demolition Range and non-Federal actions would also generate emissions. The proposed range enhancement and munitions surge use would cause temporary increases in pollutant emissions from temporary construction of facilities and increased munitions use at the B-88 Range Complex and C-53A Light Demolition Range. Following this temporary construction, a 25 percent munitions surge is expected to have minor, but permanent, effects. Future Duke Field actions would also generate emissions. The proposed beddown projects supporting the C-146A aircraft squadron at Duke Field would cause temporary increases in pollutant emissions from temporary construction of facilities and increased air operations at Duke Field. Other actions include the continued IJTS and the Black Dart testing events at Eglin AFB, as well as the proposed 5th Generation FTU Optimization at Eglin AFB. The actual timing of these proposed future projects is essential in estimating any future permanent increases pollutant emissions. The MHPI on Hurlburt Field would include the construction of 484 units and amenities; however, the timing of the implementation of the MHPI on Hurlburt Field is uncertain.

Emissions from Alternative 1 are not expected to significantly add to the cumulative impacts on existing air quality of all past, present, and reasonably foreseeable actions. This is because existing levels of criteria pollutants and GHG emissions are low, and emissions from Alternative 1 would cause localized, temporary, minor adverse impacts on ambient air quality. Future point sources would be required to control emissions and the level and the type of development that would occur in the reasonably foreseeable future would not produce substantial emissions and occur over a 5-year period. Similarly, no mitigation measures or development of adaptive measures for sea-level rise are necessary in order to mitigate for potential climate change (revoked by EO 13783) impacts for years 2046 to 2065 due to Alternative 1 or any of the other past, present, and reasonably foreseeable actions. As with Alternative 1, pollutant and GHG emissions associated

with these other present and future demolition and construction activities would result in short-term, minor, adverse impacts on air quality and would cease upon completion of the projects.

Impacts from the addition of the ADIAR, F-22, and T-38 aircraft operations would not be anticipated to exceed 250 tpy. GHG emissions would be minimal in terms of annual national GHG emissions and well below 75,000 metric tons (82,673 tons). Any potential air quality impacts resulting from construction activities associated with the new interchange along I-10 are anticipated to be consistent with regional air quality standards, and anticipated to be appropriately managed and mitigated by Florida Department of Transportation (FDOT).

The estimated annual steady state air emissions from Alternative 1 would be well below significance thresholds. The limited annual emissions of GHGs would not likely contribute to global warming to any discernible extent. Potential changes to local temperature and precipitation patterns as a result of ongoing global climate change would not affect the ability to implement Alternative 1. Overall, there would be no long-term significant impacts on ambient air quality.

Alternative 2 – Mission Surge Only – This alternative implements annual operations at a mission-surge level, a 25 percent increase in munitions, within the B-88 Range Complex and the C-53A Light Demolitions Range and does not include the new facility construction or range expansion. Implementation of this alternative would have minor, but permanent, effects on ambient air quality. Other actions include the future Duke Field actions, continued IJTS and the Black Dart testing events at Eglin AFB, as well as the proposed 5th Generation FTU Optimization at Eglin AFB. Overall, there would be no long-term significant impacts on ambient air quality.

Alternative 3 - No Action Alternative - The No Action Alternative implements annual operations at that current baseline level of operations within the B-88 Range Complex and the C-53A Light Demolitions Range and does not include the new facility construction or range expansion. Other actions include the future Duke Field actions, continued IJTS and the Black Dart testing events at Eglin AFB, as well as the proposed 5th Generation FTU Optimization at Eglin AFB. Overall, there would be no long-term significant impacts on ambient air quality.

3.9.5.2 Noise Environment

Alternative 1 – Range Enhancement and Mission Surge – This alternative is not expected to significantly add to the cumulative effects on the noise environment of all past, present, and reasonably foreseeable actions. Most past, present, and future actions have generated, are generating, or would generate some type of noise, either from a facility itself, from vehicles traveling to and from a site, or from humans. Noise is typically a nuisance factor for sensitive receptors such as residences, hospitals, or parks—where quiet conditions are important—and may also affect acoustically dependent non-human species. Proximity to high sound levels can result in physiological problems or hearing damage. Over time, the trend has been for noise levels to increase as development has occurred, particularly during daytime hours when activity levels are highest.

Past actions resulting in temporary noise increases in and around the B-88 Range Complex and C-53A Light Demolition Range have included munitions use and other building construction within the cantonment. The noise contributions from these actions were temporary, minor, adverse impacts on the noise environment and ceased upon completion of the relevant projects. Past, present, and future actions at and around the B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and C-53A Light Demolition Range are not anticipated to cumulatively affect the noise environment. Permanent increases in airborne noise from past actions have resulted from increases in aircraft and vehicle traffic, and noise from these sources dominates the current daytime ambient noise environment. Current actions which may affect ambient noise include existing aircraft, vehicle, and traffic from commercial, recreational, and military activities, munitions use, day-to-day airfield activities, routine cantonment maintenance activities, and training operations.

Future B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and C-53A Light Demolition Range and non-Federal actions would also generate noise. The proposed munitions surge of 25% over the current baseline level of munitions would continue to add to the noise environment but would not significantly impact the noise environment. The proposed beddown projects at Duke Field would increase airborne noise from temporary construction of facilities and increased traffic at Duke Field. Other actions include the continued IJTS and the Black Dart testing events at Eglin AFB, as well as the proposed 5th Generation FTU Optimization at Eglin AFB. The actual timing of these proposed future projects is essential in estimating any future permanent increases in airborne noise. The MHPI on Hurlburt Field would include the construction of 484 units and amenities; however, the timing of the implementation of the MHPI on Hurlburt Field is uncertain. Noise impacts associated with ADAIR training and the relocating aircraft (F-22 and T-38) from Tyndall AFB could include annoyance, activity interruption, hearing loss, and potentially non-auditory health effects.

The type of noise and noise levels produced by these actions would be dependent on the specific project, and the impact of these noise sources would depend on their location relative to sensitive receptors. It is likely that some of these future actions would produce nuisance noise. There are requirements to limit the level of noise produced by residential, commercial, or industrial land uses. Thus, some future development would have requirements to provide soundproofing measures. As with Alternative 1, noise associated with these other present and future demolition and construction activities would result in short-term, minor, adverse impacts on the noise environment and would cease upon completion of the projects. Any potential noise impacts resulting from the construction activities associated with the new Interchange along I-10 are anticipated to be appropriately managed and mitigated by FDOT.

Overall, no significant adverse cumulative effects on the noise environment would be anticipated.

Alternative 2 – Mission Surge Only – This alternative implements annual operations at a mission-surge level, a 25% increase in munitions, within the B-88 Range Complex and the C-53A Light Demolitions Range and does not include the new facility construction or range expansion. Implementation of this alternative would have minor, but permanent, effects on the noise environment. Other actions include the future Duke Field actions, continued IJTS and the Black Dart testing events at Eglin AFB, as well as the proposed 5th Generation FTU Optimization at Eglin AFB. Overall, no significant adverse cumulative effects on the noise environment would be anticipated.

Alternative 3 - No Action Alternative - The No Action Alternative implements annual operations at that current baseline level of operations within the B-88 Range Complex and the C-53A Light Demolitions Range and does not include the new facility construction or range expansion. Overall, no significant adverse cumulative effects on the noise environment would be anticipated.

3.9.5.3 Geology and Soils

Alternative 1 – Range Enhancement and Mission Surge – This alternative is not expected to significantly add to the cumulative effects on geology and soils of all past, present, and reasonably foreseeable actions. The grading and excavating of soils and removal of geotechnically incompatible soils for construction site preparation would have no impacts on geology, but would have long-term, moderate, adverse impacts on soils, as these soils would be removed from biological activity.

The range enhancement projects proposed for the B-88 Range Complex or the TTA I-36 Live Fire Maneuver Area would have no impacts on geology, but would have long-term, moderate, adverse impacts on approximately 145 acres. The cumulative ground disturbance of soils would be approximately 145 acres. These cumulative impacts on soils would not be readily apparent and would not result in a change to the character of the resource over a relatively wide area. Further, no mitigation measures would be necessary to offset adverse impacts on soils. The B-88 Range Complex and TTA I-36 Live Fire Maneuver Area actions would ensure that BMPs are employed during these activities to minimize effects on soil and prevent erosion and sediment runoff. All activities would comply with the Installation's SWPPP and would employ erosion-

control techniques, such as silt fencing, sediment traps, and application of water sprays. In addition, B-88 Range Complex actions would revegetate, according to the current landscape management plan, which helps with erosion control and soil stability. Grading, excavation, and recontouring of soil materials would adhere to all Federal, state, and local regulations.

Based on the analysis conducted for Alternative 1, a mission-surge increase in munitions use would have a minor impact on soils and is not expected to degrade soil quality on the range areas to a level that would adversely impact human health or ecological receptors. Overall, there would be no significant soil disturbance or soil quality degradation impacts from the implementation of Alternative 1. Any potential impacts on geology and soils due to the construction activities associated with the new interchange along I-10 are anticipated to be appropriately managed and mitigated by FDOT.

Overall, no significant adverse cumulative impacts on geology and soils are anticipated.

Alternative 2 – Mission Surge Only – This alternative does not include the new facility construction or range expansion. Implementation of this alternative would have no effects on geology and minimal effects on soils. Other future actions with the potential to impact soils include the future Duke Field construction and demolition projects, as well as the proposed construction activities associated with the new interchange along I-10 are anticipated to be appropriately managed and mitigated by FDOT.

Overall, no significant adverse cumulative impacts on geology and soils are anticipated.

Alternative 3 - No Action Alternative - The No Action Alternative implements annual operations at that current baseline level of operations within the B-88 Range Complex and the C-53A Light Demolitions Range and does not include the new facility construction or range expansion. Overall, no significant adverse cumulative impacts on geology and soils are anticipated.

3.9.5.4 Water Resources

Alternative 1 – Range Enhancement and Mission Surge – This alternative is not expected to significantly add to the cumulative effects on water resources of all past, present, and reasonably foreseeable actions. Completed facilities have added to the impervious surface at the B-88 Range Complex and the C-53A Light Demolitions Range which could change the permeability of the drainage basin and increase the flow of water and potentially change flow characteristics.

The collective acreage (145) affected by Alternative 1 would be minimal when compared to the available acreage in the drainage basin. No significant adverse cumulative impacts on the drainage basin would be anticipated.

None of the areas proposed for new facility construction have any areas that are located within the designated 100-year floodplain. No floodplain acreage is anticipated to be affected by the Duke Field construction projects supporting the C-146A or the proposed 5th Generation FTU Optimization at Eglin AFB. Specific locations for each of the MHPI on Hurlburt Field projects and thus whether floodplains would be affected cannot be determined at this time. If there is no practicable alternative to constructing these projects within floodplains, then the construction would conform to applicable floodplain protection standards and accepted flood-proofing and protection measures in accordance with EO 11988 (as amended) and the National Flood Insurance Program. No significant adverse cumulative impacts on floodplains would be anticipated.

The B-88 Range Complex supports approximately 340 acres of various wetland classifications (forested, scrub-shrub, and unconsolidated bottom), which are influenced by seasonal fluctuations in precipitation, overland or near surface flow, shallow groundwater, or some combination of these hydrologic processes. Additionally, there are 60 acres of forested wetlands located within the TTA I-36 Live Fire Maneuver Area (Figure 3-16) southwest of the B-88 Range Complex area, as well as several new project areas being located

within proximity to wetlands (i.e., C-53 range, Advanced Drivers Training Course, and the CACTF); however, these would only be minimally impacted by foot traffic from troop movement. No wetland acreage is anticipated to be affected by the Duke Field actions or the proposed 5th Generation FTU Optimization at Eglin AFB. As such, no wetland areas would be affected that are designated as FDEP and USACE jurisdictional wetlands. Specific locations for each of the MHPI on Hurlburt Field projects and thus whether wetlands would be affected cannot be determined at this time. If there is no practicable alternative to constructing these projects within wetlands, then the agency must comply with procedures and practices outlined in EO 11988, 44 CFR 9.6, AFI 32-7064 and 32 CFR 989 as detailed in Section 3.5. No significant adverse cumulative impacts on wetlands would be anticipated.

The collective groundwater usage and increase for landscape irrigation affected by Alternative 1, the Duke Field construction, or the proposed 5th Generation FTU Optimization at Eglin AFB would be minimal compared to Eglin's maximum permitted daily withdraw. The number of new housing and thus new groundwater requirements associated with the Hurlburt Field MHPI projects cannot be determined at this time. No significant adverse cumulative impacts on groundwater would be anticipated.

Eglin currently has Concurrence on their Consistency Determination from the Florida State Clearinghouse covering facility construction, demolition activities in cantonment areas, including the B-88 Range Complex, and other proposed actions identified in this Cumulative Effects Section.

Implementation of Alternative 1, the MHPI on Hurlburt Field projects, and the Duke Field construction projects are not anticipated to result in adverse impacts on the coastal zone. Short-term, indirect, adverse impacts from soil disturbance could create nonpoint source water pollution; however, Eglin and FDEP would utilize BMPs to reduce the chance of impacts. With coordination, utilization of BMPs, and proper permitting, the implementation of these projects would be consistent with the FCMP and CZMA. No significant adverse cumulative impacts on the coastal zone would be anticipated. Any potential water resources impacts resulting from the construction activities associated with the new interchange along I-10 are anticipated to be appropriately managed and mitigated by FDOT.

Overall, no significant adverse cumulative impacts on water resources would be anticipated.

Alternative 2 – Mission Surge Only – This alternative does not include the new facility construction or range expansion. Implementation of this alternative would have minimal effects on water resources. Other future actions with the potential to impact water resources include the future Duke Field construction and demolition projects, as well as the proposed construction activities associated with the new interchange along I-10 are anticipated to be appropriately managed and mitigated by FDOT.

Overall, no significant adverse cumulative impacts on water resources are anticipated.

Alternative 3 - No Action Alternative - The No Action Alternative implements annual operations at that current baseline level of operations within the B-88 Range Complex and the C-53A Light Demolitions Range and does not include the new facility construction or range expansion. Overall, no significant adverse cumulative impacts on water resources are anticipated.

3.9.5.5 Biological Resources

Alternative 1 – Range Enhancement and Mission Surge – This alternative is not expected to significantly add to the cumulative effects on biological resources of all past, present, and reasonably foreseeable actions. Implementation of some of Alternative 1, the MHPI on Hurlburt Field projects, the Black Dart testing events at Eglin AFB, and the Duke Field beddown construction projects are anticipated to occur and result in short-term, minor, adverse cumulative impacts on natural communities.

The quality of wildlife habitat in the immediate vicinity of each of the locations for the new facility construction and range enhancements on the B-88 Range Complex and the TTA I-36 Live Fire Maneuver Area

are relatively high since these areas support wildlife habitat and vegetative communities that are predominately natural and undisturbed. Implementation of the Alternative 1 range enhancement activities would represent only a negligible change (145.0 acres or approximately 2 percent) to the vegetation communities in comparison to the total acreage (6,770.6 acres) of vegetation communities that are available within the overall Restricted Area of the B-88 Range Complex. The new facility construction and range enhancements are anticipated, however, to have long-term, minor, adverse impacts on that small portion of the vegetation communities within the B-88 Range Complex.

The quality of wildlife habitat in the immediate vicinity of each of the locations for the new facility construction at Duke Field is low due to land disturbance and human activity; wildlife habitat quality improves with distance from the sites. Wildlife that currently utilize nearby habitat within these areas would be able to move to other similar areas on and off the Installation. This loss of habitat utilization would not affect the viability of any native species. While wildlife that occurs on the B-88 Range Complex and C53-A Light Demolition Range are accustomed to human activity such as noise from munitions use, vehicular traffic, and human presence, construction noise does not occur regularly and, therefore, has a possibility to impact wildlife. The animals would likely vacate the areas during construction events; however, once construction has ceased, they would return to the general area. As construction activity would be temporary, no decrease in population levels would occur based on disturbance. The new construction is anticipated to have short-term, minor, adverse cumulative impacts on wildlife.

New construction on the B-88 Range Complex is not anticipated to disturb or displace any protected species. The proposed locations for the CACTF, Red Empire DZ, and the TTA I-36 Live Fire Maneuver Area do contain active RCW clusters and cavity trees with suitable foraging habitat for the RCW. These areas, however, would be entirely avoided during construction activities. The gopher tortoise, eastern indigo snake, Florida pine snake, and Florida burrowing owl occur on the B-88 Range Complex and, therefore, have the potential to occur near sites proposed for the new facility construction and range enhancements. Coordination with Eglin Natural Resources Office would be required prior to any ground disturbing activities. A gopher tortoise survey and RCW survey may also be required. If a gopher tortoise burrow is located within any of the project areas and cannot be avoided, the tortoise would be relocated in accordance with FWC guidelines. If an RCW cavity tree is found and anticipated to be negatively impacted within any of the project areas, Terms and Conditions from the completed ESA Section 7 consultation from 2013, 'Red-cockaded Woodpecker Programmatic Biological Opinion [for] Eglin Air Force Base, NE Gulf of Mexico[,] Walton, Okaloosa, and Santa Rosa Counties, Florida' will be followed. Consultation pursuant to Section 7 of the ESA with State and Federal wildlife agencies has been conducted in accordance with NEPA and the intergovernmental coordination procedures established for Eglin AFB.

Transient listed species could occasionally occur on the Installation. All native birds are protected by the MBTA and project disturbance would be minimized through BMPs. If any protected species were documented, coordination with the appropriate Federal and state agencies would occur. Indirect impacts on protected species could include loss or decline in foraging/hunting habitat for transient species such as birds; however, this potential loss or decline in habitat would be minor compared to similar existing habitat located within and outside the Installation. Consultation with the USFWS in accordance with Section 7 of the ESA will be completed with respect to any projects within the Project Area prior to beginning any construction. The new construction is not anticipated to have adverse cumulative impacts on protected species.

Any potential biological resources impacts resulting from the construction activities associated with the new interchange along I-10 are anticipated to be appropriately managed and mitigated by FDOT.

Overall, no significant adverse cumulative impacts on biological resources would be anticipated.

Alternative 2 – Mission Surge Only – This alternative does not include the new facility construction or range expansion. Implementation of this alternative would have minimal effects on biological resources. Other

future actions with the potential to impact biological resources include the future Duke Field construction and demolition projects, as well as the proposed construction activities associated with the new interchange along I-10 are anticipated to be appropriately managed and mitigated by FDOT.

Overall, no significant adverse cumulative impacts on biological resources are anticipated.

Alternative 3 - No Action Alternative - The No Action Alternative implements annual operations at that current baseline level of operations within the B-88 Range Complex and the C-53A Light Demolitions Range and does not include the new facility construction or range expansion. Overall, no significant adverse cumulative impacts on biological resources are anticipated.

3.9.5.6 Cultural Resources

Alternative 1 – Range Enhancement and Mission Surge – This alternative is not expected to significantly add to the cumulative effects on cultural resources of all past, present, and reasonably foreseeable actions. Of the 11 archaeological sites recorded across the footprints of the proposed project components, only three (8OK00402, 8OK3988, and 8OK01221) have been determined to be eligible for the NRHP and are considered significant resources. Only small portions of archaeological sites 8OK00402 and 8OK01221 overlap with portions of the CACTF with a Subterranean Military Complex and TTA I-36: Live Fire Maneuver Area project footprints respectively. Archaeological site 8OK3988 is also located within the TTA I-36: Live Fire Maneuver Area and Trench Complex. Given the small portions of the mapped archaeological sites within these areas, it is anticipated that these archaeological sites could be avoided by construction and training during design. As a result, no direct impacts to these resources are anticipated from the implementation of the Proposed Action. Surveys have been conducted for approximately 51 percent of the proposed project component areas, including 100 percent of the AAR Classroom, Trench Complex, and GLR. While 49 percent of the remaining project component areas have not been surveyed for cultural resources, these areas are considered to have a low potential for cultural resources. As a result, there is a low probability that unrecorded significant resources are located within these areas. The proposed project will be reviewed by the Cultural Resource Manager of Eglin AFB in accordance with the SOPs contained in the 2019 ICRMP and through consultation with the Florida SHPO and appropriate Native American Tribes. If through those consultations supplemental archaeological surveys are determined to be needed, then they would be conducted within the construction footprint of the new facilities construction to identify any unrecorded archaeological sites. As a result, no archaeological resources would be adversely impacted from the implementation of Alternative 1.

Section 106 consultation under the NHPA will be completed prior to the beginning of construction. One architectural or aboveground resource that has not been evaluated has been identified within the visual APE of the CACTF with a Subterranean Military Complex area. No direct physical impacts are anticipated to that resource from the implementation of Alternative 1. Possible visual impacts to the resource would be avoided during the design of the CACTF. If visual impacts are unavoidable, then additional evaluations of the resource and possible mitigations measures would be implemented through in accordance with the SOPs outlined in the 2019 ICRMP. As a result, no impacts on architectural resources that are eligible for inclusion in the NRHP are anticipated from the implementation of Alternative 1.

No previously recorded archaeological resources, identified cemeteries, sacred sites, or TCPs are located within the proposed construction footprints of the MHPI on Hurlburt Field projects and the construction projects for B-88 Range Complex or the proposed 5th Generation FTU Optimization at Eglin AFB. Supplemental archaeological surveys may be conducted within the construction footprints of the new facility construction to identify any unrecorded archaeological sites, as determined through consultation between the Eglin AFB Cultural Resource Management (CRM), the Florida SHPO, appropriate Native American Tribes, and other interested parties. If any cultural resources are discovered during the archaeological surveys or during the implementation of these projects, work would cease, and the Eglin AFB CRM would avoid or

mitigate any potential impacts through consultation with the Florida SHPO, appropriate Native American Tribes, and other interested parties. The new construction and renovation projects are not anticipated to have adverse cumulative impacts on archaeological resources.

Pursuant to Section 106 of the NHPA, Duke Field will make a reasonable and good faith effort to carry out appropriate efforts to identify historic properties in consultation with the Florida SHPO and the tribes consistent with 36 CFR 800.4(b)(1). Consultation with the SHPO in accordance with Section 106 of the NHPA will be completed with respect to any projects prior to beginning any construction. Additionally, information gathered in this process will be shared with the tribes prior to beginning any construction to facilitate a productive ongoing consultation process and allow for a timely and thorough review of the project sites to determine whether any archaeological or cultural resources are present.

Any potential cultural resources impacts resulting from the construction activities associated with the new interchange along I-10 are anticipated to be appropriately managed and mitigated by FDOT.

Overall, no significant adverse cumulative effects to cultural resources would be anticipated.

Alternative 2 – Mission Surge Only – This alternative does not include the new facility construction or range expansion. Implementation of this alternative would have minimal effects on cultural resources. Other future actions with the potential to impact cultural resources include the future proposed construction activities associated with the new interchange along I-10 are anticipated to be appropriately managed and mitigated by FDOT.

Overall, no significant adverse cumulative effects to cultural resources are anticipated.

Alternative 3 - No Action Alternative - The No Action Alternative implements annual operations at that current baseline level of operations within the B-88 Range Complex and the C-53A Light Demolitions Range and does not include the new facility construction or range expansion. Overall, no significant adverse cumulative effects to cultural resources are anticipated.

3.9.5.7 Socioeconomics, Environmental Justice, and Protection of Children

Alternative 1 – Range Enhancement and Mission Surge – This alternative is not expected to significantly add to the cumulative effects on socioeconomics, environmental justice, and protection of children of all past, present, and reasonably foreseeable actions. Adverse impacts related to construction activity could include exposure to noise, safety hazards, pollutants and other hazardous materials, and excessive traffic. Socioeconomic impacts resulting from Alternative 1 construction projects would be temporary and minor. Noise impacts resulting from the implementation of Alternative 1 would be minor and only during daylight hours, by temporarily extending to residential or other areas near noise-sensitive receptors. For the MHPI on Hurlburt Field, noise impacts could temporally extend to residential or other areas near noise-sensitive receptors.

Minority populations of Okaloosa County, and the two major residential areas closest to Eglin AFB, Crestview City and Fort Walton Beach are below both the minority percentages of the state of Florida and the Nation overall. In addition, all three percentages are below 50 percent. In contrast, percentages of low-income populations in Okaloosa County, Crestview City, and Fort Walton all exceed the percentage of low income populations of the Nation, and the two population centers, Crestview City and Fort Walton exceed the percentage of the State of Florida. None of the percentages of low income populations in Okaloosa County, Crestview City and Fort Walton Beach are 50 percent or above. Given the construction and training activities would be limited to the training range, no adverse impacts are to be expected off the installation. With no adverse impacts, there would be no disproportionately high adverse human health, economic, or social effects on minority or low-income populations or children.

There are no low-income or minority populations located in proximity to Duke Field. All construction for the Duke Field actions, the MHPI on Hurlburt Field projects, and proposed 5th Generation FTU Optimization at Eglin AFB would be on the Installation, with substantial buffer zones between the construction sites and residences in local census tracts. As a result, there are no adverse impacts expected off the Installation for these projects. With no adverse impacts, there would be no disproportionately high adverse human health, economic, or social effects on minority or low-income populations or children.

There would be no permanent jobs associated with these cumulative projects, and construction employment associated with this alternative would likely be accommodated by labor resources already in the region. With the additional personnel moving into the region as a result, there would be small additional demand on housing, schools, or other social services, however, no permanent socioeconomic impacts would be anticipated. Minor beneficial temporary impacts in the form of jobs and income for area residents, revenues to local businesses, and sales taxes to Okaloosa County and the State of Florida could be realized if construction materials are purchased locally or local construction workers are hired for repairs and maintenance.

The number of personnel associated with the relocating of aircraft from Tyndall AFB would increase by 1.00 to 1.47 percent. It is estimated that the housing market in the ROI would be able to support the demand. In addition, direct jobs, demand for public services, and student enrollment would increase under both scenarios. Noise impacts associated with aircraft could potentially have adverse impacts on property values. There would be no additional disproportionate impacts to minority and low-income populations. Children and elderly populations would be affected by noise from the addition of ADAIR, F-22, and T-38 missions.

Any potential socioeconomics, environmental justice, and protection of children concerns with the construction activities associated with the new interchange along I-10 are anticipated to be appropriately managed and mitigated by FDOT.

Overall, no significant adverse cumulative impacts on socioeconomics, environmental justice, and protection of children would be anticipated.

Alternative 2 – Mission Surge Only – This alternative does not include the new facility construction or range expansion. Implementation of this alternative would have minimal effects on socioeconomics, environmental justice, and protection of children. Other future actions with the potential to impact these resources include the future proposed construction activities associated with the new interchange along I-10 which are anticipated to be appropriately managed and mitigated by FDOT. Overall, no significant adverse cumulative impacts on socioeconomics, environmental justice, and protection of children would be anticipated.

Alternative 3 - No Action Alternative - The No Action Alternative implements annual operations at that current baseline level of operations within the B-88 Range Complex and the C-53A Light Demolitions Range and does not include the new facility construction or range expansion. Overall, no significant adverse cumulative impacts on socioeconomics, environmental justice, and protection of children would be anticipated.

SECTION 4

Management Actions

4.1 Introduction

The following management actions focus on avoidance and minimization of impacts to the resources analyzed in detail in this REA. They do not address all the standard procedures and measures required to be implemented for operations conducted on the Eglin Range, which include those specified in AFI 13-212, *Range Planning and Operations*, Eglin AFBI 13-212, *Range Planning and Operations*, and other applicable range operation regulations and guidance documents. All personnel involved in training operations on the B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolitions Range are expected to implement these management actions.

4.1.1 General

- Use explosives, large-caliber weapons, and other large munitions on the training ranges and test areas under neutral (favorable) weather conditions to the extent practicable to minimize the potential for public annoyance from the generated noise. Neutral weather conditions include clear skies and/or low wind, and unfavorable weather conditions include cloudy skies, moderate to high wind, and/or temperature inversions. Coordinate with the Eglin Weather Office to identify weather conditions and plan operations accordingly.
- Comply with the requirements identified in Section 6.3, Fire Fighting, in Eglin AFBI 13-212, *Range Planning and Operations.*
- Remove munitions debris from the training ranges and test areas on a predetermined schedule in accordance with Air Force regulations.
- Drive vehicles only on existing roads and areas specifically designated/authorized for off-road vehicle use. The Eglin Natural Resources Office must approve areas where off-road vehicle use is proposed.

4.1.2 Air Quality

- Construction activities shall comply with all the applicable requirements in the Eglin AFB Title V permit.
- Construction/access roads would be routinely watered to reduce fugitive dust emissions during the construction phases of the Proposed Action. All construction equipment would be maintained in proper working condition according to the manufacturer's specifications; vehicles would be maintained and inspected on a weekly basis in order to ensure good operating conditions.
- During construction activities, vehicles will not idle for long periods of time and equipment will be shut down when not in use.

4.1.3 Noise

- Construction would primarily occur during normal weekday business hours.
- Heavy equipment mufflers would be properly maintained and in good working order.
- Construction personnel, and particularly equipment operators, shall wear adequate personal hearing protection to limit exposure to high levels of noise associated with construction activities and airfield operations as needed.
- Construction equipment would not be permitted to idle for long periods of time.

4.1.4 Water Resources

- There are approximately 60 acres of wetlands and some natural surface water bodies on the B-88 Range Complex and the C-53A Light Demolition Range. The following measures apply to wetlands and waters near the boundaries of the training ranges and test areas:
  - Do not drive vehicles in wetlands, streams, or ponds. Cross streams only at established stream crossings.
  - Locate all new targets at least 200 feet from surface water bodies.
  - Prohibit ground disturbing activities within 100 feet of wetlands and surface water bodies.
  - Do not use heavy equipment to remove munitions debris from wetlands or surface water bodies.

4.1.5 Biological Resources

- Comply with the requirements identified in Section 7.2, Natural Resources, in Eglin AFBI 13-212, *Range Planning and Operations.*
- Ensure that all mission personnel are briefed on restrictions regarding sensitive species and habitats; provide Eglin AFB environmental guidebooks and maps to personnel when necessary.
- If any Federal or state-listed species is found dead or injured, notify the Eglin Natural Resources Office (Jackson Guard) immediately by calling (850) 882-4164, 4165, or 4166.
- Follow pertinent requirements from the *RCW Programmatic Biological Opinion* (USFWS, 2013) (summarized partially below):
  - Follow *Management Guidelines for the RCW on Army Installations* (U.S. Army, 2007), (summarized in Eglin AFBI 13-212), unless prior approval has been given by the Chief of Eglin Natural Resources.
  - Allow only transient (lasting less than 2 hours) foot traffic and vehicular traffic on established roads/trails within a 200-foot buffer around marked RCW trees.
  - Check the fire danger rating daily, and follow the Eglin Wildfire Specific Action Guide restrictions for pyrotechnics (flares) use by class day.
  - Immediately notify the Joint Test & Training Operations Control Center (850-882-5800) and Eglin Fire Dispatch (850-882-5856) of any wildfire observed.
  - Cutting of RCW cavity trees or any longleaf pine tree is prohibited without prior written authorization from the Chief of Natural Resources.
  - Coordinate with Eglin Natural Resources prior to target establishment and follow all construction-related requirements in the RCW Programmatic Biological Opinion.
  - Prior to activities that may harass the RCW (military activities within or near stands of mature longleaf pine), coordinate with Eglin Natural Resources regarding any necessary pre/post-surveys.
  - Conduct pre-project coordination with USFWS for any proposed action that may directly take red-cockaded woodpecker individuals, cavity trees, or foraging habitat.
- Follow pertinent requirements from the *Eastern Indigo Snake Programmatic Biological Opinion* (USFWS, 2009) (summarized partially below):
  - Personnel and vehicle/equipment operators will be directed to avoid gopher tortoises and indigo snakes.
  - Avoid gopher tortoise burrows by at least 25 feet.

  - If a gopher tortoise burrow cannot be avoided by 25 feet, then the tortoise and commensals (including indigo snakes and gopher frogs) will be relocated in accordance with the protocols listed in Eglin's *Threatened and Endangered Species Component Plan*.

- Avoid Florida burrowing owl burrows by at least 25 feet.

4.1.6 Cultural Resources

- Comply with the requirements identified in Section 7.3, Cultural Resources, in Eglin AFBI 13-212, Range Planning and Operations.
- Adhere to all restrictions for ground disturbing activity and requirements for avoidance of cultural resources identified in Eglin AFB 13-212 that apply to the training ranges and test areas. For current information, contact the Eglin Cultural Resources Office by calling (850) 882-8459 or (850) 883-5201.
- If cultural materials are inadvertently discovered during operations on the training ranges and test areas, cease all activities in the immediate vicinity of the inadvertent find and notify the Eglin Cultural Resources Office immediately by calling (850) 882-8459 or (850) 883-5201.

SECTION 5

List of Primary Preparers

Name	Organization	Primary Responsibility
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SECTION 6

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SECTION 7

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APPENDIX A
FEDERAL AGENCY CZMA CONSISTENCY DETERMINATION

FEDERAL AGENCY COASTAL ZONE MANAGMEENT ACT (CZMA) CONSISTENCY DETERMINATION FOR THE STATE OF FLORIDA

INTRODUCTION

This document provides the State of Florida with the Department of the Air Force (Air Force) Consistency Determination under CZMA 16 U.S.C. § 1456 Section 307 (c) (1) [or (2)] and 15 Code of Federal Regulations (CFR) § 930 (c), for the B-88 Range Complex, Tactical Training Area (TTA) I-36 Live Fire Maneuver Area, and C-53A Light Demolition Range at Eglin Air Force Base, Florida. The information in this Consistency Determination is provided pursuant to 15 CFR § 930.39 and is based on the Preferred Alternative supporting the Proposed Action identified in the *Draft Range Environmental Assessment for B-88 Range Complex and C-53A Light Demolition Range at Eglin Air Force Base, Florida* (Enclosure 1).

PROPOSED FEDERAL AGENCY ACTION

Eglin Air Force Base (AFB), located in northwestern Florida, is home to the Eglin Test and Training Complex (ETTC). As a critical part of the Major Range Test Facilities Base, Eglin AFB's primary functions are to support research, development, testing, and evaluation of conventional weapons and electronic systems, and to support multi-service air and ground training of operational units.

In 2005, Base Realignment and Closure (BRAC) was implemented, moving the Army's 7th Special Forces Group (Airborne) (7 SFG[A]) from Fort Bragg, North Carolina, to the ETTC, as well as the beddown of the Joint Strike Fighter (JSF)/F-35 and Initial Joint Training Site (IJTS). The Record of Decision (ROD) for the actions presented in the *Proposed Implementation of the Base Realignment and Closure (BRAC) 2005 Decisions and Related Actions Final Environmental Impact Statement (EIS)* was signed on 05 February 2009, which created a cantonment area and accompanying ranges for the 7 SFG(A) on Eglin AFB. The group requires specific types of ranges to train soldiers and prepare them for global conflicts. BRAC actions analyzed the group's initial movement from Fort Bragg and creation of the then-necessary ranges at Eglin AFB. However, due to an array of new global threats over the last decade, both in terms of scope and type, the training requirements needed to address these latest threats require construction of new range facilities.

The Army, in coordination with the Air Force, proposes to construct and maintain new ranges for training operations and to implement a new level of activity for training on the B-88 Range Complex, TTA I-36 Live Fire Maneuver Area, and the C-53A Light Demolition Range. In support of these activities, the Air Force has prepared this Range Environmental Assessment (REA) for this Proposed Action. This REA analyzes the potential environmental impacts of anticipated future range development, current operations conducted on the ranges, as well as the potential environmental impacts of a mission surge in operations expected to occur during wartime or other significant military involvement. This REA has been prepared in accordance with the National Environmental Policy Act (NEPA) (Title 42, U.S. Code, Section 4321 et seq.), Air Force implementing regulations (32 Code of Federal Regulations [CFR] Part 989), and Department of Defense (DoD) directives.

The Army's IMCOM, with the authorization of the Range Configuration Control Committee (RC3), plans to renovate and construct facilities within and adjacent to the B-88 Range Complex (also known as the "Backyard Ranges"). Operations within the B-88 Range Complex and the C-53A Light Demolition Range will occur in order to prepare soldiers for deployment in support of combat operations around the world. Existing training range facilities within the B-88 Range Complex include:

- B-88A – Hand Grenade Qualification Course
- B-88A1 – Hand Grenade Familiarization Range
- B-88B – Live Fire Exercise Breach Facility
- B-88C – 2 Story Live Fire Shoot House, with Sniper Tower
- B-88C1 – 100M Range
- B-88D – Shotgun Assault Course
- B-88D1 – 25M Range
- B-88E – Urban Assault Course
- B-88F – Dismount Improvised Explosive Device (IED) Lane and IED Training Site

The C-53A Light Demolitions Range is the only facility within the C-53A range.

The Army's Proposed Action provides for the enhancement of the B-88 Range Complex and the C-53A Light Demolition Range capabilities with new facility construction, range expansion (adjacent to the B-88 Range Complex), and a 25 percent mission surge of operations above the current baseline level. Due to ever-changing threats, the Army's primary focus is transitioning from counter-insurgency operations to conventional force-on-force warfare. This transition requires new training facilities at and adjacent to the B-88 Range Complex, such as the following:

- Combined Arms Collective Training Facility (CACTF) with a Subterranean Military Complex (Military Construction [MILCON] Project)
- Grenade Launcher Range
- After Action Review (AAR) Classroom
- Advanced Drivers Training Course (MILCON Project)
- Red Empire Drop Zone
- Trench Complex
- Tactical Training Area (TTA) I-36: Live Fire Maneuver Area
- Future Minor Construction or Facility Modification

The proposed facilities would be built inside the existing 27.5 km^2 of the B-88 Profile, plus an adjacent new Live Fire Maneuver Area (TTA I-36) 4.33 km^2. The Region of Influence (ROI) of the Proposed Action is the entire land area within the boundaries of the B-88 Range Complex and the C-53A Light Demolition Range. The B-88 Range Complex and the C-53A Light Demolition Range operations are defined as those that originate, traverse, and/or terminate on the ranges.

The ETTC encompasses approximately 839 km^2 of land in the Florida Panhandle and consists of the Eglin Reservation in Santa Rosa, Okaloosa, and Walton Counties, as well as property on Santa Rosa Island and Cape San Blas (Figure 1). Eglin AFB includes land assets, cantonment areas, and the ETTC. The B-88 Range Complex is located in the northern part of Eglin AFB near the 7 SFG(A) Cantonment Area (Figure 2), while the C-53A Light Demolition Range is located on the eastern part of the range near Test Area (TA)-52 (Figure 3).

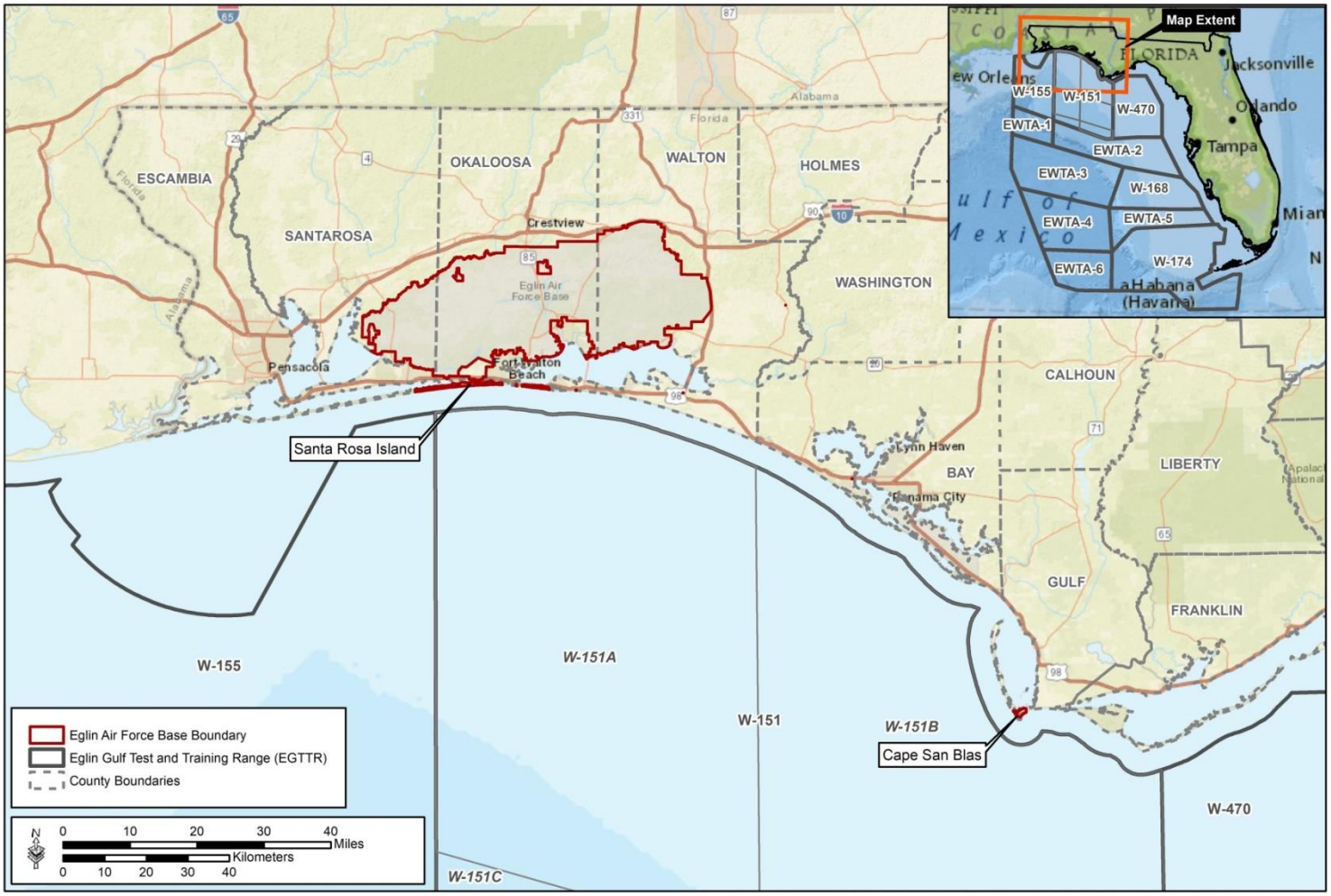


Figure 1-1. Eglin AFB and the EGTTR Vicinity Map

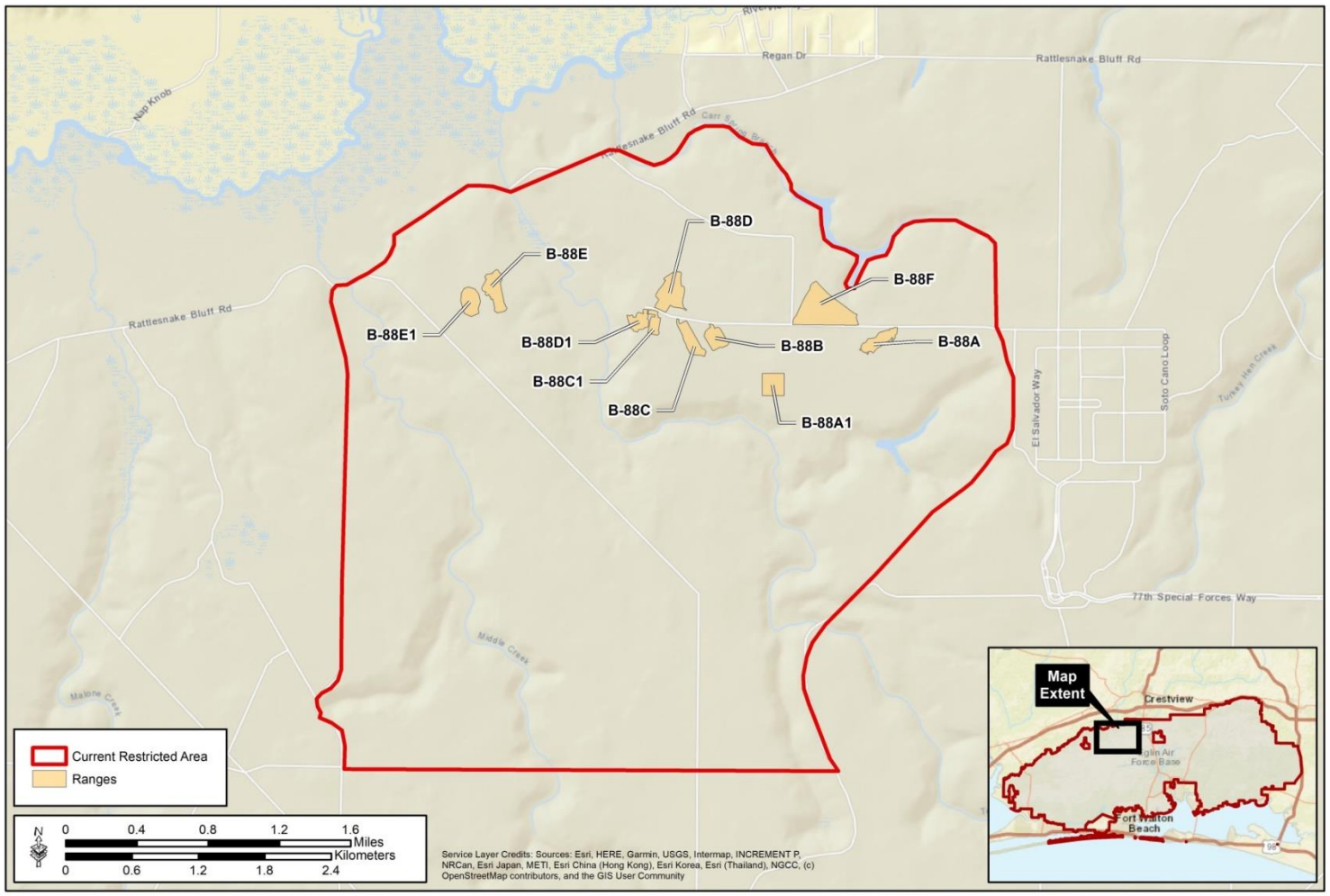


Figure 1-2. Locations of the B-88 Range Complex, Eglin AFB

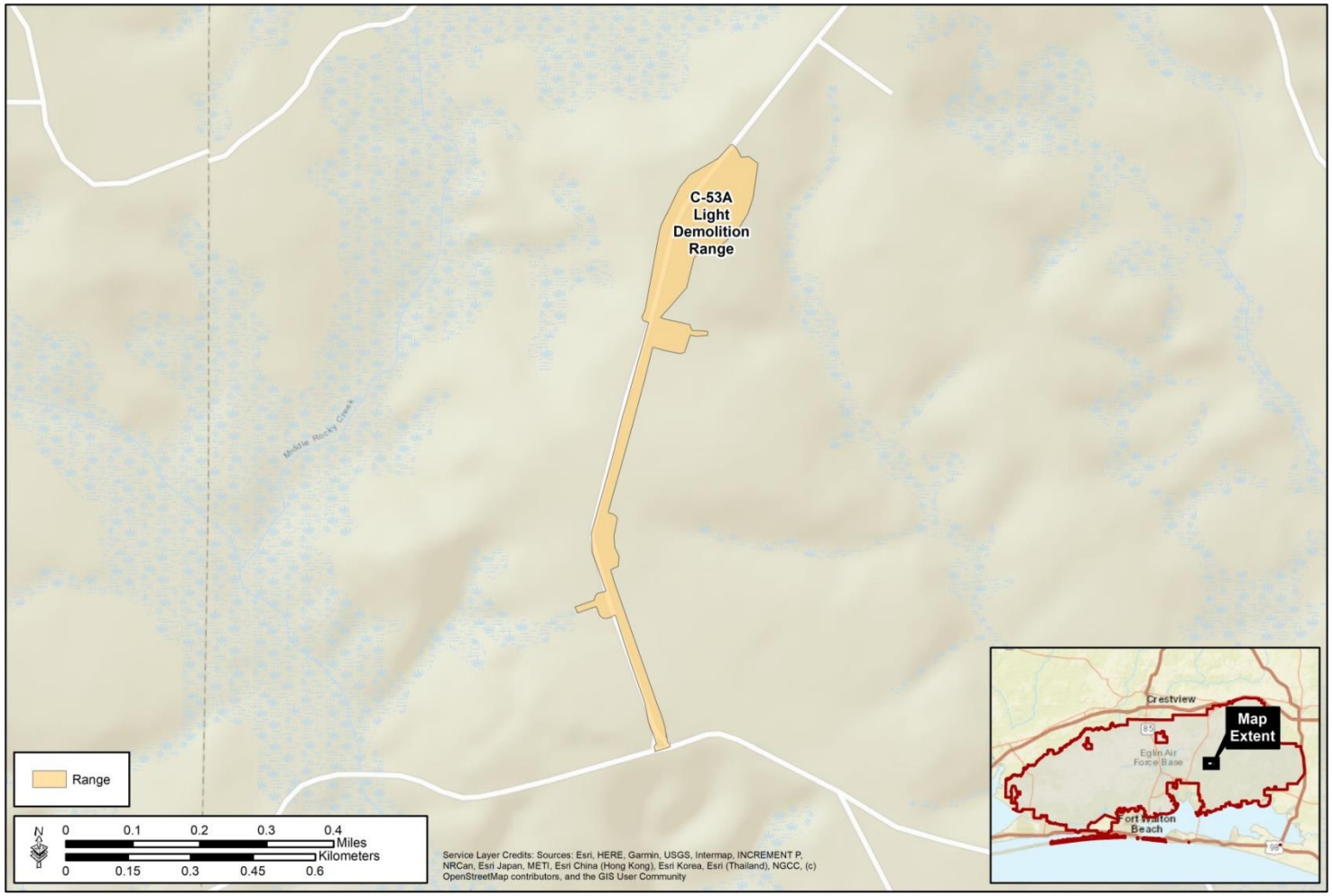


Figure 1-3. Location of the C-53A Light Demolition Range, Eglin AFB

Federal Consistency Review

Florida's Coastal Management Plan (FCMP) is composed of state statutes, which constitute the enforceable policies of the FCMP. Statutes addressed as part of the FCMP Consistency review and considered in the analysis of the Proposed Action are discussed in Table 1, below. The U.S. Air Force has determined that the proposed facility construction, air operations, and personnel growth at Duke Field are consistent to the maximum extent practicable with the enforceable policies of the FCMP based on the following information, data, and analysis (given as a summary in Table 1) and presented as a comprehensive analysis in Chapter 3 of the Draft REA (Enclosure 1).

Pursuant to 15 CFR § 930.41, the State of Florida has 60 days from the receipt of this letter in which to concur with or object to this Consistency Determination, or to request an extension under 15 CFR § 930.41(b). Florida's concurrence will be presumed if its response is not received by the USAF by the sixtieth day from receipt of this determination. Florida's response should be sent to Ms. Kelly Knight, Environmental Planning Office (Environmental), 96 CEG/CEIEA, Environmental Assets Section, 501 DeLeon, Suite 101, Eglin AFB, Florida 32542-9906; (850) 882-7691.

Table A-1. Florida Coastal Management Program Consistency Review

Florida Statute	Legal Scope	Consistency Evaluation
Chapter 161 *Beach and Shore Preservation*	Authorizes the Bureau of Beaches and Coastal Systems within Department of Environmental Protection (DEP) to regulate construction on or seaward of the state's beaches.	The Proposed Action would not adversely affect beach and shore management, specifically as it pertains to: • The Coastal Construction Permit Program. • The Coastal Construction Control Line Program (CCCL). • The Coastal Zone Protection Program. The Proposed Action would not occur seaward of the CCCL and would occur within the B-88 Range Complex and C-53A Light Demolition Range areas.
Chapter 163, Part II *Growth Policy; County and Municipal Planning; Land Development Regulation*	Requires local governments to prepare, adopt, and implement comprehensive plans that encourage the most appropriate use of land and natural resources in a manner consistent with the public interest.	The Proposed Action would not affect local (municipal or county) government comprehensive plans.
Chapter 186 *State and Regional Planning*	Details state level planning requirements. Requires the development of special statewide plans governing water use, land development, and transportation.	The Proposed Action would not affect Florida state- or regional-level planning requirements.
Chapter 252 *Emergency Management*	Provides for planning and implementation of the state's response to, efforts to recover from, and the mitigation of natural and man-made disasters.	The Proposed Action would not have an effect on the ability of the state to respond to or recover from natural or manmade disasters.
Chapter 253 *State Lands*	Addresses the state's administration of public lands and property of this state and provides direction regarding the acquisition, disposal, and management of all state lands.	The Proposed Action would occur entirely within the B-88 Range Complex and C-53A Light Demolition Range areas. No state lands would be disturbed during the new facility construction, renovations, infrastructure construction, or demolitions and therefore, would not be affected.
Chapter 258 *State Parks and Preserves*	Addresses administration and management of state parks and preserves.	The Proposed Action would not impact the administration or management of state parks and preserves.
Chapter 259 *Land Acquisition for Conservation or Recreation*	Authorizes acquisition of environmentally endangered lands and outdoor recreation lands.	The Proposed Action would not have an effect on the acquisition of environmentally endangered and outdoor recreation lands.
Chapter 260 *Recreational Trails System*	Authorizes acquisition of land to create a recreational trails system and to facilitate management of the system.	The Proposed Action would not have an impact on the acquisition of land to create a recreational trails system.
Chapter 267 *Historical Resources*	Addresses management and preservation of the state's archaeological and historical resources.	The Proposed Action would not affect cultural resources of the State of Florida, as no known sites have been identified within the proposed project footprints. However, should any cultural resources be discovered during new facility construction or infrastructure construction, the activity would cease and the discovery would be immediately reported to the Eglin AFB's Environmental Director and the Florida State Historic Preservation Officer.
Chapter 288 *Commercial Development and Capital Improvements*	Provides the framework for promoting and developing the general business, trade, and tourism components of the state economy.	The Proposed Action would not have an effect on commercial development or capital improvements.
Chapter 334 *Transportation Administration*	Addresses the state's policy concerning transportation administration.	The Proposed Action would not have an impact on the state's transportation administration policies.
Chapter 339 *Transportation Finance and Planning*	Addresses the finance and planning needs of the state's transportation system (Chapter 339).	The Proposed Action would not have an effect on the finance and planning needs of the state's transportation system.
Chapter 373 *Water Resources*	Addresses the state's policy concerning water resources.	The Proposed Action would have no impacts on groundwater, floodplains, or wetlands resources; however, the construction activities have the potential for temporary, minor, adverse impacts (surface water and coastal zone management) on water resources. Eglin AFB would use BMPs to minimize impacts to water resources due to soil disturbance or nonpoint source water pollution. The construction designs have not yet been finalized; however, no appreciable increases in groundwater demand are expected. Overall, there would be no significant impacts on water resources as a result of the Proposed Action, and therefore is consistent with the state's policy concerning water resources.
Chapter 375 *Outdoor Recreation and Conservation Lands*	Develops comprehensive multipurpose outdoor recreation plan to document recreational supply and demand, describe current recreational opportunities, estimate need for additional recreational opportunities, and propose means to meet the identified needs.	The Proposed Action would not impact the state's development or evaluation of multipurpose outdoor recreation plans.
Chapter 376 *Pollutant Discharge Prevention and Removal*	Regulates transfer, storage, and transportation of pollutants, and cleanup of pollutant discharges.	All required permits would be procured, and established procedures for transport, storage, and handling of hazardous materials would be followed. The Air Force does not anticipate the discharge of any pollutants in the marine environment or upon surface or ground waters. In the event of a spill, a written Spill Prevention, Control, and Countermeasure Plan would be followed. BMPs would be incorporated to minimize impacts to water quality, and therefore is consistent with the state's policy concerning transfer, storage, and transportation of pollutants, and cleanup of pollutant discharges.

Florida Statute	Legal Scope	Consistency Evaluation
Chapter 377 *Energy Resources*	Addresses regulation, planning, and development of energy resources of the state.	The Proposed Action would not have an impact on oil and gas exploration. The DoD collaborates with institutional and commercial interests for alternative energy development within the Project Area.
Chapter 379 *Fish and Wildlife Conservation*	Addresses management and protection of fish and wildlife in the state.	The Proposed Action would result in short-term, minor, adverse impacts on vegetation, wildlife, and sensitive species and habitats. The proposed locations for the new facility construction and range enhancement activities are predominately located where the vegetation is predominately natural and undisturbed. The newly proposed CACTF, Red Empire DZ, TTA I-36 Live Fire Maneuver Area, and Trench Complex, however, have designated boundaries that do contain significant acreage of High-Quality Natural Communities. The facility construction activities would avoid, however, any Significant Botanical Sites, Outstanding Natural Areas, or High-Quality Natural Communities to the greatest extent possible. The Trench Complex, however, is proposed to be sited in an area containing significant acreage of High-Quality Natural Communities. The locations are, however, on or adjacent to upland sites and therefore are not located within Okaloosa darter streams, freshwater mussel critical habitat, bog frog streams, or reticulated flatwoods salamander ponds. The proposed locations for the CACTF, Red Empire DL, and the new TTA I-36 Live Fire Maneuver Area do contain active red-cockaded woodpecker (RCW) clusters and cavity trees with suitable foraging habitat for the RCW. These areas, however, would be entirely avoided during construction activities. The gopher tortoise and the Florida pine snake occur on the B-88 Range Complex and, therefore, have the potential to occur near sites proposed for the new facility construction and range enhancements. Coordination with Eglin Natural Resources Office would be required prior to any ground disturbing activities. A gopher tortoise survey and red-cockaded woodpecker survey may also be required. If a gopher tortoise burrow is located within any of the project areas and cannot be avoided, the tortoise would be relocated in accordance with FWC guidelines. If an RCW cavity tree is found and anticipated to be negatively impacted within any of the project areas, Terms and Conditions from the completed ESA Section 7 consultation from 2013, 'Red-cockaded Woodpecker Programmatic Biological Opinion [for] Eglin Air Force Base, NE Gulf of Mexico[,] Walton, Okaloosa, and Santa Rosa Counties, Florida' will be followed. Consultation pursuant to Section 7 of the ESA with State and Federal wildlife agencies has been conducted in accordance with NEPA and the intergovernmental coordination procedures established for Eglin AFB. Correspondence supporting the pre-project coordination with the USFWS Section 7 consultation under the RCW PBO is provided in Appendix B of the REA. Therefore, the Proposed Action is consistent with the state's policy concerning the management and protection of fish and wildlife in the State of Florida.
Chapter 380 *Land and Water Management*	Establishes land and water management policies to guide and coordinate local decisions relating to growth and development.	The Proposed Action would not have an impact on the development of : • State lands with regional (i.e., more than one county) concerns; • Areas of Critical State Concern, or • Areas with approved state resource management plans. The Proposed Action activities do not provide for or affect changes to coastal infrastructure, or require state funds for infrastructure planning, designing, or construction.
Chapter 381 *Public Health, General Provisions*	Establishes public policy concerning the state's public health system.	The Proposed Action does not involve the construction of an on-site sewage treatment and disposal system. Construction activities associated with the Proposed Action are governed by regulations established in the Air Force Safety and Occupational Health Program and the Occupational Safety and Health Administration. The B-88 Range Complex and C-53A Light Demolition Range areas are restricted from general public access. Therefore, the Proposed Action is consistent with public policy concerning the state's public health system.
Chapter 388 *Mosquito Control*	Addresses mosquito control efforts in the state.	The Proposed Action would not affect mosquito control efforts of the State of Florida.
Chapter 403 *Environmental Control*	Establishes public policy concerning environmental control in the state.	The Proposed Action would comply with applicable state regulations for air and water quality, solid and hazardous waste management, pollution prevention, and ecosystem management. The Air Force would obtain and comply with all applicable permits as required by law. Therefore, the Proposed Action is consistent with public policy concerning the environmental control in the State of Florida.
Chapter 553 *Building Construction Standards*	Provides a mechanism for the uniform adoption, updating, amendment, interpretation, and enforcement of a single, unified state building code, to be called the Florida Building Code. Obtain a permit from the appropriate enforcing agency.	The Proposed Action would not affect the Building Construction Standards of the State of Florida. The Air Force would obtain and comply with all applicable permits as required by law.
Chapter 582 *Soil and Water Conservation*	Provides for the control and prevention of soil erosion.	A B-88 Range Complex Stormwater Program Management Plan and a Stormwater Pollution Prevention Plan would be developed and followed, and BMPs addressing erosion and sediment controls would be implemented to minimize impact to soils and water quality. The Proposed Action would be consistent with the current characteristic features of the area and landscape and would not result in any changes to land use.

Florida Statute	Legal Scope	Consistency Evaluation
Chapter 597 *Aquaculture*	Establishes public policy concerning the cultivation of aquatic organisms.	The Proposed Action has no activities related to the cultivation of marine species in the Project Area. The Proposed Action activities would not affect aquaculture.

APPENDIX B
STAKEHOLDER CONSULTATION

From: FELIX, RODNEY K JR CIV USAF AFMC 96 CEG/CEIEA
To: Lisa Yarbrough
Subject: Pre-project coordination notice under Eglin RCW PBO
Date: Tuesday, October 22, 2019 1:00:00 PM
Attachments: Fig1.jpg
Fig2.jpg
Fig3.jpg
Fig4.jpg

Dear Lisa,

According to the Incidental Take Statement issued to Eglin AFB within "Red-cockaded Woodpecker Programmatic Biological Opinion [for] Eglin Air Force Base, NE Gulf of Mexico Walton, Okaloosa, and Santa Rosa Counties, Florida" (FWS Log No.: 04EF3000-2013-F-0143), Eglin Natural Resources Office (NRO) is submitting the following for pre-project coordination:

Via Eglin NRO, US Army's 7th Special Forces Group (7 SFG[A]) proposes construction of six training ranges to be added to the existing B-88 Range Complex, four of which may impact either red-cockaded (RCW) potential breeding groups (PBGs) or red-cockaded woodpecker foraging habitat (Figure 1, attached). Both the Grenade Launcher Range (GLR) and Advanced Drivers Training Course (ADTC) will impact neither RCW foraging habitat nor PBGs. The Combined Arms Collective Training Facility (CACTF) with Subterranean Military Complex may impact both RCW foraging habitat and PBGs. The Live Fire Maneuver Area (LFMA) may impact both RCW foraging habitat and PBGs. The Trench Complex (TC) will impact RCW foraging habitat but will not impact PBGs. The Red Empire Drop Zone (DZ) will impact both RCW foraging habitat and PBGs. These ranges are all elements of an environmental assessment, in preparation, "Range Environmental Assessment for B-88 Range Complex and C-53A Light Demolition Range, Eglin AFB, Florida."

From the EA, "The GLR. . . will be approximately 98 m x 500 m. This project will entail the clearing of trees. . . Construction will consist of a window facade at 100 m, two wood bunker facades at 125 m and 175 m respectively, a machinegun position at 200 m, two zero targets at 200 m, five E-Type silhouettes at 250 m and 350 m, and a 30 m x 6 m trench (running north/south) at 300 m. The range would consist of four lanes; two prone positions, one kneeling position, and one midrange standing position." (Figure 1.)

The ADTC ". . . would be approximately 0.04 km2 (approximately 10 ac.) and will facilitate proficiency training for the Mine-Resistant, Ambush Protected (MRAP) family of vehicles. . ." It will include a 0.08 km2 skid pad (approximately 20 ac.) and a 0.01 km2 parking lot (approximately 2.5 ac.) that also require tree-clearing and grubbing. These three surfaces will be impervious (Figure 2).

The CACTF ". . . will consist of approximately 28 buildings (to be determined) such as a school, church with cemetery, police station/jail, hotel, nine single residences, four businesses, one townhouse complex (five townhomes), bank, warehouse, government building, office building, service station, Subterranean Military Complex, soccer field, shanty town, clinic and a Range Operations and Control Area (ROCA). The Subterranean Military Complex consists of a series of tunnels, underground bunkers, and a subway station." While the total square-footage estimated to accommodate the structures is 1,105,400 (approximately 25 ac.), and tree-clearing will be necessary to connect this infrastructure in a way that will simulate real-world conditions, "during the landscape configuration, certain environmental issues may compete with the actual tactical requirements for an area, thus requiring a size reduction and/or relocation of a particular building." (Figure 2.) As these buildings are more or less simulations, the only utilities that may be connected to them are fiber communications and electricity. The CACTF may remove a maximum of 216.1 acres of RCW

foraging habitat and may remove 1 RCW PBG. However, Eglin and 7 SFG(A) will coordinate the development of this range to minimize both effects, and to approach that minimum 25 ac. needed as close as possible.

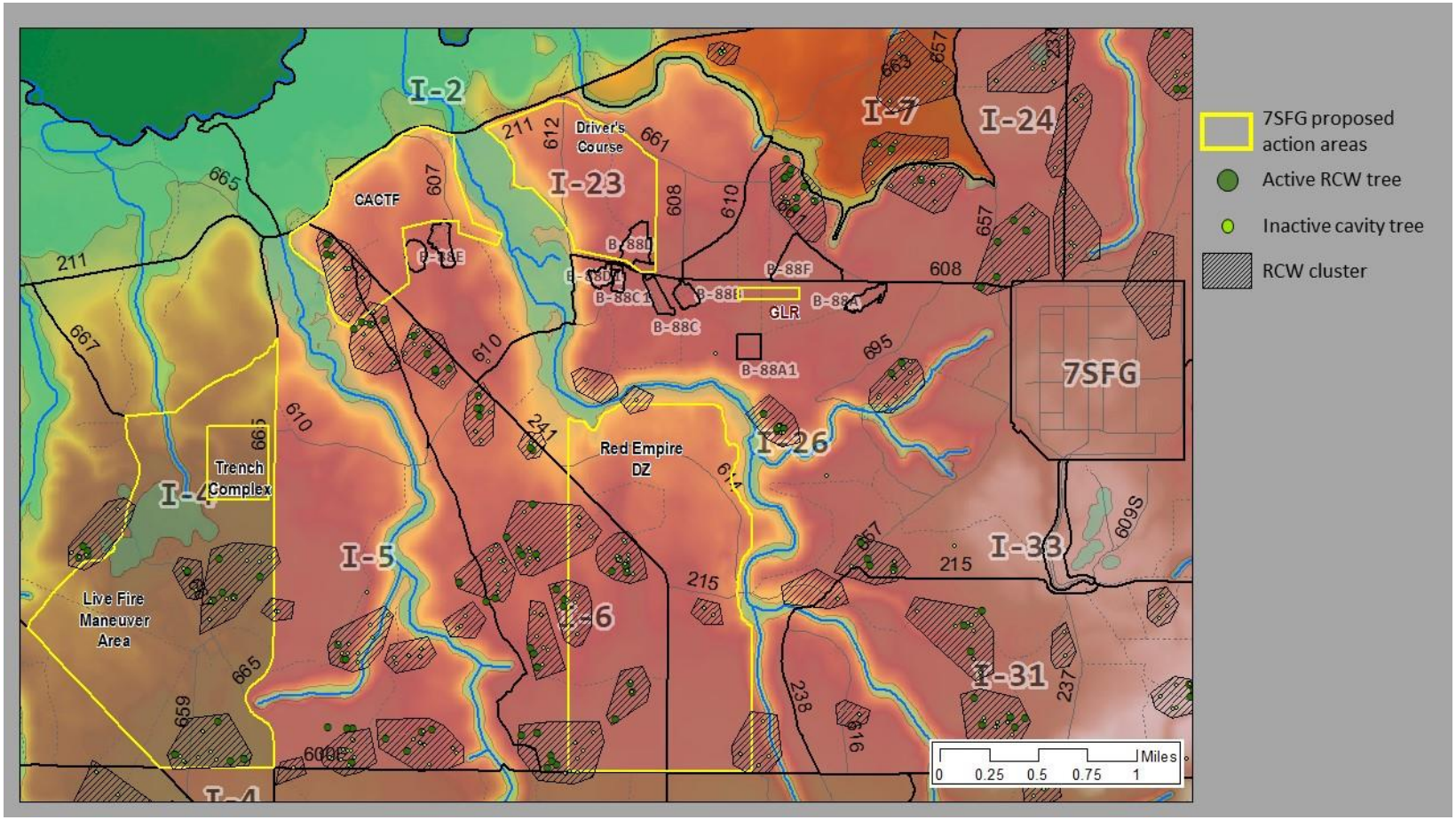
The LFMA will be an approximately 4.33 km2 area (approximately 1,100 ac.) within which portable Stationary Infantry Targets (SITs) will be arranged per mission to train personnel to detect, identify, engage, and defeat adversaries through tactical movements in conditions that simulate those encountered within the 7 SFG(A) area of responsibility. Personnel will coordinate small-caliber live fire (5.56 mm and 7.62 mm NATO) at the SITs. "Initially, the only land changes required would be moderate underbrush clearing." Within the LFMA will be constructed the TC. "The proposed 500 m x 600 m [approximately 74 ac.] Trench Complex would be a network of trenches with six perimeter bunkers (6 m x 6 m) and a command bunker (12 m x 12 m). The trench system will be constructed with reinforced wood. Linking trenches will be 2.1 m deep with wood braces and perimeter trenches will be 1.2 m deep and topped with sandbags. The expendables to be used at the Trench Complex would include 7.62 mm (and lesser weapon systems [ball]), CCMCK, ECT, detcord, blasting caps, fuse initiators, charges, Arty Sim/Pyro, firing devices, and chemical agents." (Figure 3.) No trees are proposed for removal for the LFMA, and it will be operated according to the RCW PBO/"Management guidelines for the red-cockaded woodpecker on U.S. Army installations (2007)" to minimize take. Eglin and 7 SFG(A) will coordinate the implementation of this range to further minimize its impacts. However, should its operation exceed those 2007 guidelines for duration and intensity of permitted training activities, and PBGs are affected, Eglin will re-initiate consultation. The TC may require removal of select longleaf pines to configure it according to the needs of 7 SFG(A) (approximately 0.09 ac. for all bunkers), but it will be constructed well outside 200-foot buffers of active RCW clusters/PBGs.

The DZ will be a clear-cut and grubbing of 1,112 acres. Vegetation will be allowed to re-grow, but will be maintained at heights no greater than 0.61 m through periodic mowing. The DZ will remove 894 ac. of RCW foraging habitat and will remove 2 RCW PBGs from 2 active clusters (Figure 4). Eglin NRO intends to relocate all PBGs elsewhere on Eglin beginning post-breeding 2020, and will begin drilling cavities to create recruitment clusters to do so in fall 2019. Young-of-year from these PBGs will also be targeted for relocation elsewhere on Eglin or for translocation to US National Forests within the region similarly in 2020. 7 SFG(A) and Eglin NRO will coordinate RCW surveys beginning winter 2019/2020, and will then coordinate the initiation (May 2020 at the earliest) and progression of timbering operations so that RCW clusters and their sufficient sheltering and foraging buffers remain in place as long as possible (up to the relocations). The surveys will verify Eglin's current RCW population data; Eglin NRO will report updated take to the Service based on the survey results. Given the predicted duration of an approximate-1100 ac. logging and grubbing operation, 3 - 6 months as estimated by Eglin NRO Forestry Section, Eglin NRO anticipates the timber operations progression will be able to accommodate removal and relocation of PBGs during the appropriate window of late-summer/early-fall. Furthermore, Eglin NRO will not authorize timber operations to begin until it is assured grubbing will immediately follow completion of tree-clearing or can be phased appropriately so that minimal time will lapse between deforestation and implementation of military airborne/DZ operations.

Tangential to the RCW-related work will be Eglin NRO's compliance with the "Indigo Snake Programmatic Biological Opinion [for] Eglin Air Force Base, Florida (2009)," whereby Eglin NRO will survey for and relocate any eastern indigo snakes and gopher tortoises found within areas to be cleared and grubbed. Such clearing and grubbing will occur at certain areas of the ADTC, CACTF, and

the TC, and over the entire DZ. Surveying the DZ alone for gopher tortoises is predicted to take 40 days based on current staffing level and observed maximum survey rates of about 30 acres per day. Eglin NRO will trap concurrently with the survey to minimize the additional time needed to trap. In total, this proposed action may take a maximum of approximately 1,110 ac. of RCW foraging habitat and 3 PBGs. Eglin PBGs in 2019 numbered 489 range-wide, with 111 east of SR 85 and 378 west of SR 85. We look forward to the Service's response we hope will address whether this proposed action and Eglin NRO's take estimate warrants re-initiation of consultation under ESA Section 7. Please let me know if you require additional information.
As always, thanks!
--Rodney

Rodney K Felix Jr
Endangered Species Biologist
Eglin AFB Natural Resources Office - Wildlife Section
850 883-1153 Desk | 850 951-3713 Cell | 875-1153 DSN


I-2
I-23
I-7
I-24
I-26
I-5
I-6
I-33
I-31
I-4
7SFG
CACTF
Driver's Course
Red Empire DZ
Trench Complex
Live Fire Maneuver Area
B-88D
B-88F
B-88C1
B-88C
B-88A1
GLR
B-88A
B-18E
7SFG proposed action areas
Active RCW tree
Inactive cavity tree
RCW cluster
Miles
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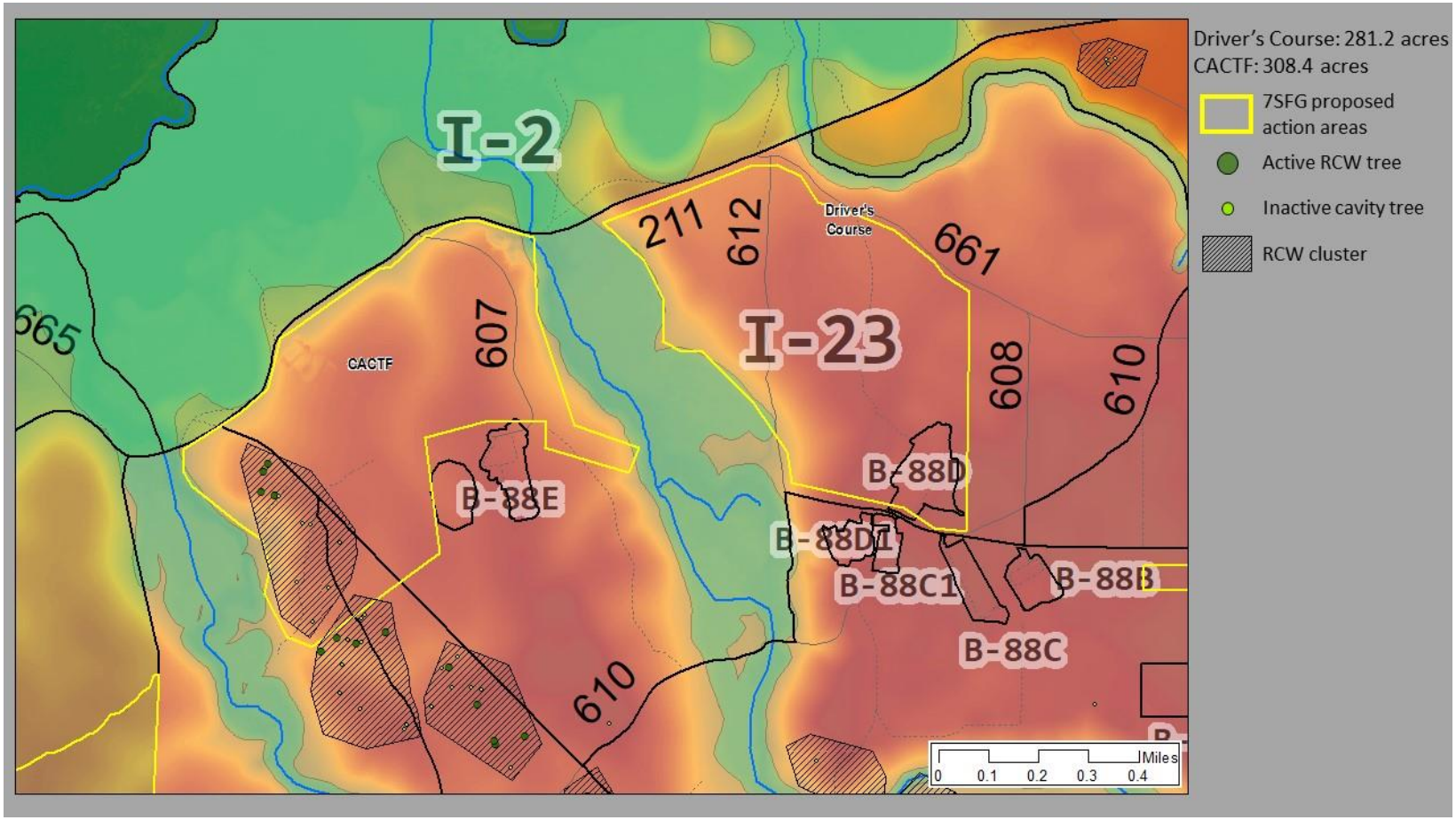
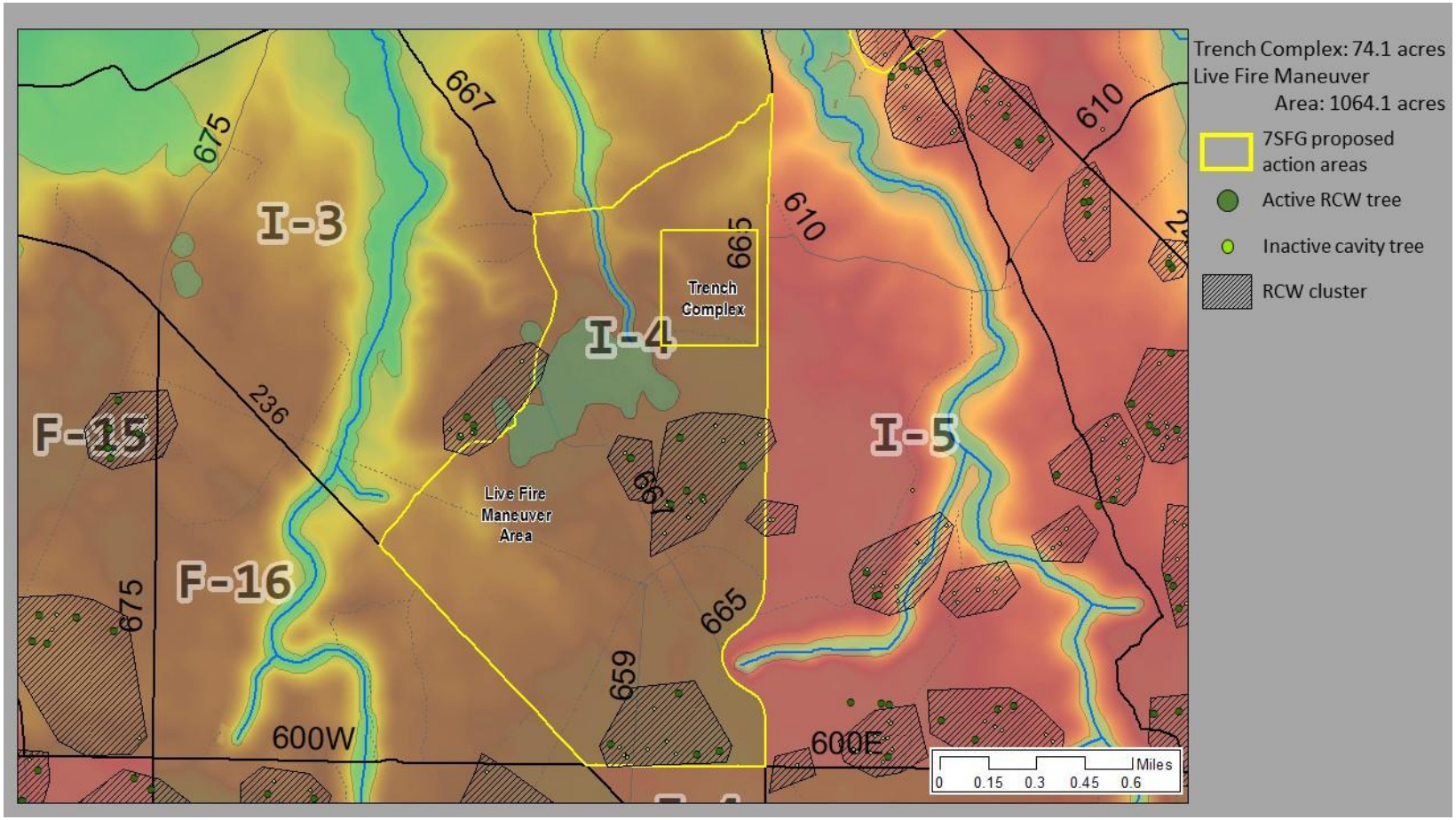
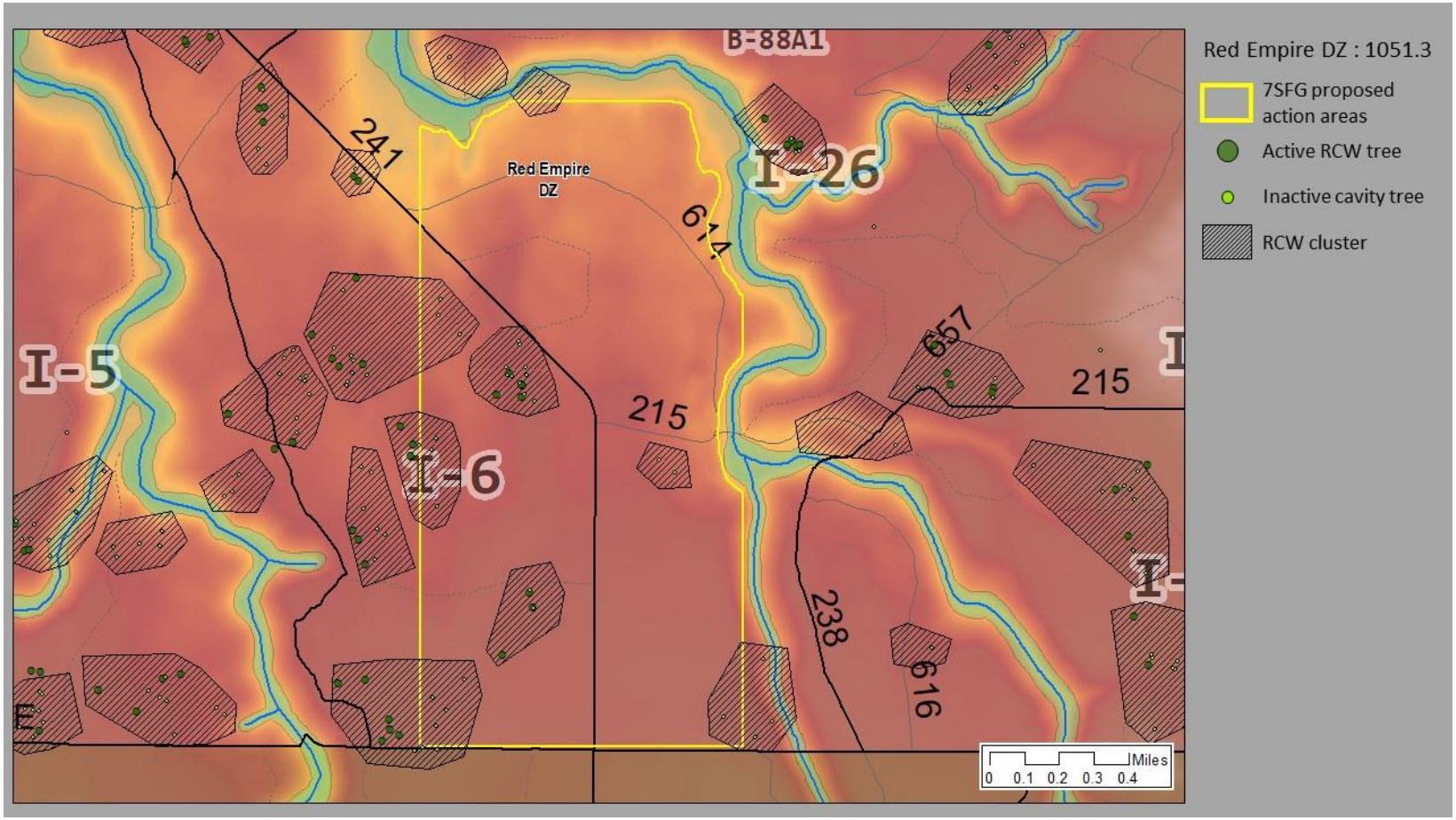
0.5
0.75
1


Driver's Course: 281.2 acres
CACTF: 308.4 acres
7SFG proposed action areas
Active RCW tree
Inactive cavity tree
RCW cluster
I-2
I-23
CACTF
Driver's Course
211
612
661
607
608
610
665
610
B-88E
B-88D
B-88D1
B-88C1
B-88B
B-88C
Miles
0
0.1
0.2
0.3
0.4


Trench Complex: 74.1 acres
Live Fire Maneuver
Area: 1064.1 acres
7SFG proposed action areas
Active RCW tree
Inactive cavity tree
RCW cluster
I-3
I-4
I-5
F-15
F-16
Trench Complex
Live Fire Maneuver Area
675
667
665
610
236
659
600W
600E
Miles
0 0.15 0.3 0.45 0.6


Red Empire DZ : 1051.3
7SFG proposed action areas
Active RCW tree
Inactive cavity tree
RCW cluster
B-88A1
Red Empire DZ
241
614
I-26
657
215
I-5
I-6
238
616
Miles
0 0.1 0.2 0.3 0.4

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Panama City Field Office
1601 Balboa Ave
Panama City, FL 32405

Tel: (850) 769-0552
Fax: (850) 763-2177

November 8, 2019

Mr. Bruce Hagedorn
Chief, Eglin AFB Natural Resources Office
96th CEG/CEIEA
501 De Leon Street, Suite 101
Eglin AFB, FL 32542-5133

Re: FWS Log #04EF3000-2013-F-0143
Red-Cockaded Woodpecker Programmatic
7th Special Forces Group –
New Construction of Six Training Ranges
Eglin AFB, Okaloosa, Florida

Dear Mr. Hagedorn:

This letter acknowledges the receipt of Eglin Air Force Bases (AFB) email, dated October 22, 2019, requesting 7th Special Forces Group (7 SFG) new training ranges construction coverage under the existing Red-cockaded Woodpecker Programmatic Biological Opinion (PBO [2013-F-0143]). This response is provided in accordance with provisions of Section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.) and the Sikes Act of 1960, (16 U.S.C. 670a et seq.).

Eglin AFB 7th Special Forces Group is proposing to construct six (6) new training ranges to be added to the existing B-88 Range Complex and C-53A Light Demolition Range. The training ranges include a grenade launcher range, advanced drivers training course, a combined arms collective training facility with subterranean military complex, live fire maneuver area, a trench complex, and a drop zone.

The grenade launcher range will requiring the clearing of trees for the construction of a window facade at 100 m, two wood bunker facades at 125 m and 175 m respectively, a machinegun position at 200 m, two zero targets at 200 m, five E-Type silhouettes at 250 m and 350 m, and a 30 m x 6 m trench (running north/south) at 300 m. The range would consist of four lanes; two prone positions, one kneeling position, and one midrange standing position. The grenade

Mr. Hagedorn

launcher range is not expected to impact the Red-cockaded Woodpecker (*Picoides borealis* [RCW]).

The advanced drivers training course will require the clearing of trees for the driving course. This training is designed to facilitate proficiency in the Mine-Resistant, Ambush Protected family of vehicles and it is not expected to impact the RCW.

The combined arms collective training facility with subterranean military complex will consist of approximately 28 buildings (to be determined) and a Range Operations and Control Area. The subterranean military complex consists of a series of tunnels, underground bunkers, and a subway station. The tree-clearing will be necessary to connect this infrastructure in a way that will simulate real-world conditions and may impact both RCW foraging habitat and potential breeding groups PBGs) within the proposed complex footprint.

The live fire maneuver area (approximately 1,100 ac.) will have portable stationary infantry targets will be arranged to train personnel to detect, identify, engage, and defeat adversaries through tactical movements in conditions that simulate those encountered within the 7 SFG(A) area of responsibility. Within the live fire maneuver area, the trench complex will be constructed and includes a network of trenches with six perimeter bunkers and a command bunker. The trench system will be constructed with reinforced wood and topped with sandbags. No trees are proposed for removal for the live fire maneuver area, and it will be operated according to the RCW PBO/"Management guidelines for the red-cockaded woodpecker on U.S. Army installations (2007)" to minimize take. The drop zone will include the clear-cut and grubbing of 1,100 acres.

The proposed project may take approximately 1,110 acres of RCW foraging habitat and 3 RCW PBGs. Eglin Natural Recourse office (NRO) intends to relocate all PBGs elsewhere on Eglin beginning post-breeding 2020, and will begin drilling cavities to create recruitment clusters to do so in fall 2019. Young-of-year from these PBGs will also be targeted for relocation elsewhere on Eglin or for translocation to US National Forests within the region similarly in 2020.

The US Fish and Wildlife, Panama City Ecological Services Field Office, agrees the above described training range construction actions occurring on B-88 Range Complex and C-53A Light Demolition Range are covered under the 2013 Eglin AFB Red-cockaded Woodpecker Programmatic Biological Opinion.

Thank you for your cooperation in the effort to conserve fish and wildlife resources. Should you have any questions or require clarification regarding this letter, please contact Lisa Yarbrough x225 or lisa_yarbrough@fws.gov).

Sincerely,

SEAN BLOMQUIST

Digitally signed by SEAN BLOMQUIST
Date: 2019.11.12 10:06:55 -06'00'

Dr. Sean Blomquist
Acting Field Supervisor

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 96TH TEST WING (AFMC)
EGLIN AIR FORCE BASE FLORIDA

Maria D. Rodriguez
Chief, Environmental Management Branch
96 CEG/CEIE
501 DeLeon Street, Suite 100
Eglin AFB FL 32542-5105

Timothy A. Parsons, Division Director
State Historic Preservation Officer
Division of Historic Resources
R.A. Gray Building
500 South Bronough Street
Tallahassee FL 32399-0250

Re: 8OK3988 Section106 Site Evaluation

Dear Mr. Parsons

Please find the attached documents for your review and concurrence. Eglin Air Force Base (AFB) conducted section 106 documentation of historic weapons testing observation structures in support of expanded range use proposals. This site, 8OK3988, is located in Township 2 North, Range 24 West, in within the northeast, southeast and southwest 1/4 section. Positioned on level uplands, the remains of 8OK3988 is situated at elevation of 140 feet above mean sea level. 8OK3988 is 'T' shaped and represents the remains of a ballistic camera station, phototheodolite and associated calibration targets designated Loci A-E (enclosure 1).

At the center of the site, Loci A, is complex of structural remains that consists of a cinder block structure identified as A-22 Ballistic Camera Station, the foundation of A-08 phototheodolite and what is believed to be a P1 camera station (enclosure 2). The ballistic camera station is somewhat intact; however, the structure has been stripped of all electrical components and is abandoned in place (enclosure 3). All that remains of the phototheodolite is the concrete foundation (enclosure 4). Camera Station P1 consists of a concrete pillar and a series of small concrete foundations used to hold the superstructure that is no longer present (enclosure 5).

Loci B-D represent calibration in various states of disrepair. Loci B is the most intact with upright poles and guywires still in place, while Loci C and D are merely scattered remains (enclosure 6). It is unclear what Loci E represents. The area consists of a series of four small concrete pillars with attached metal brackets and scattered lumber (enclosure 7).

Site 8OK3988 represents one of two ballistic camera stations; built in the early 1950's in support of Range A, now Range B70 on Eglin AFB. These stations were located outside range boundaries, on the bombing release line 18,000 feet to the northwest and southeast of the control station. 8OK3988 represents the camera station to the northwest of the range control.

The evaluation of this site is not eligible for listing on the National Register of Historic Places (Attachment 1). Eglin AFB is again pleased to work with you in protecting the cultural resources of the base and the state of Florida. If your office does not respond within 30 days, it is assumed you concur with the determinations and recommendations presented here. My point of contact for this site documentation is Mr. W. Shawn Arnold, 96 CEG/CEIA, (850) 882-3324, William.arnold.22@us.af.mil.

Sincerely

RODRIGUEZRODRIGUEZ.MARIA.D.1182946024 Digitally signed by RODRIGUEZRODRIGUEZ.MARIA.D.1182946024 Date: 2020.05.27 15:20:34 -05'00'

MARIA D. RODRIGUEZ, NH-04
Chief, Environmental Management Branch

Attachment:
1. CR-19-0015_A08-A22 Report_Final_Reduced

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 96TH TEST WING (AFMC)
EGLIN AIR FORCE BASE FLORIDA

Maria D. Rodriguez
Chief, Environmental Management Branch
96 CEG/CEIE
501 DeLeon Street, Suite 100
Eglin AFB FL 32542-5105

Timothy A. Parsons, Division Director
State Historic Preservation Officer
Division of Historic Resources
R.A. Gray Building
500 South Bronough Street
Tallahassee FL 32399-0250

Re: B-88 Range Complex and C-53A Light Demolition Range Renovation and Construction, Eglin Air Force Base (AFB), Okaloosa County, Florida (CR-19-0015)

Dear Mr. Parsons

The Army's Installation Management Command (IMCOM) proposes to renovate and construct facilities within the B-88 Range Complex (also known as the "Backyard Ranges"). Operations within the B-88 Range Complex and the C-53A Light Demolition Range will prepare soldiers for deployment in support of combat operations around the world. The Army's proposed renovation is to provide facility enhancements to the B-88 Range Complex, while authorizing and implementing a level of activity for training operations conducted on the B-88 Range Complex and the C-53A Light Demolition Range at Eglin AFB. This transition requires new training facilities within and adjacent to the B-88 Range Complex, which will potentially include:

- Combined Arms Collective Training Facility (CACTF) with a Subterranean Military Complex (Military Construction [MILCON] Project)
- Grenade Launcher Range
- After Action Review (AAR) Classroom
- Advanced Drivers Training Course (MILCON Project)
- Red Empire Drop Zone
- Trench Complex
- Tactical Training Area (TTA) I-36: Live Fire Maneuver Area
- Future Minor Construction or Facility Modification

Eglin Cultural Resources Management (96 CEG/CEIEA) has reviewed the proposed plans for renovation and construction of facilities within the B-88 Range Complex and the C-53A Light Demolition Range in accordance with Section 106 of the *National Historic Preservation Act of 1966*, as amended (NHPA) and determined this action to be an undertaking with the potential to cause effects to historic properties.

The Area of Potential Effects (APE) for the proposed undertaking is defined by the project footprints of the various infrastructure projects for archaeological resources and the visual APE of 0.5 mile for aboveground or built environment resources such as structures (Attachments 1 to 3). Both the B-88 Range Complex and the C-53A Light Demolition Range are located with the Eglin Test and Training Complex (ETTC), which encompasses 839 square kilometers (km2) of land in the Florida Panhandle. The B-88 Range Complex is in the northern part of Eglin AFB near the 7 SFG(A) Cantonment Area, while the C-53A Light Demolition Range is located on the eastern part of the range near TA C-52.

There are three historic properties near the footprint of the proposed APE. 8OK00402 is a pre-contact historic property interpreted as a campsite which contained lithics and ceramics. In 2011 a boundary consisting of metal "T" posts and painted bands around tress was established at a 50 meters buffer. The trees were repainted in 2019. 8OK01221is an American 20th historic homestead associated with the Carr family, agriculture/farming and with the Naval Stores Turpentine operations. In 2013 a boundary consisting of painted bands around trees was established at 50 meters buffer and repainted in 2019. Only small portions of archaeological sites 8OK00402 and 8OK01221 overlap with portions of the CACTF Subterranean Military Complex and TTA-136: Live Fire Maneuver Area project footprints, respectively. Both archaeological sites will be avoided by construction. As a result, no direct impacts to these resources are anticipated from the implementation of the Proposed Undertaking.

The third site is 8OK3988. This is a historic property consisting of multiple loci containing the dilapidated remains of range observation and calibration equipment. The majority of 8OK3988 is located within the proposed TTA. It is anticipated that the structural remains will be utilized as training objectives and will not be demolished or damaged during training activities.

Eglin AFB conducted archaeological surveys of the high probability areas within the APE. These surveys cover approximately 51 percent of the total area of all the project components and encompasses 100 percent of the area of the After-Action Review (AAR) Classroom, Trench Complex and Grenade Launcher Range. While 49 percent of the remaining project component areas have not been surveyed, these areas are considered to have a low potential for historic properties. No historic properties were identified in the low probability area surveys. Standard inadvertent discovery procedures will be applicable to any archaeological discoveries during construction activities.

At this time no Traditional Cultural Properties (TCPs) or other properties of religious or cultural significance has been identified within the APE of the proposed projects during the previous consultations with Native American Tribal entities that have a cultural or historic affinity to Eglin AFB. Eglin AFB requested from applicable tribes that if any known TCPs or properties of religious or cultural significance are present within the APE of the proposed undertaking that they help identify them so that potential adverse effects to these properties can be evaluated.

Given the above stipulations, 96 CEG/CEIEA has determined that the proposed undertaking will have No Adverse Effect on historic properties within the APE.

Eglin AFB is again pleased to work with you in protecting the cultural resources of the base and the state of Florida. If your office does not respond within 30 days, it is assumed you concur with the determinations and recommendations presented here. My points of contact for this

undertaking are Mr. W. Shawn Arnold, 96 CEG/CEIEA, william.arnold.22@us.af.mil and Ms. Lynn Shreve, 96 CEG/CEIEA, rhena.shreve.1@us.af.mil.

Sincerely

RODRIGUEZRODRIGUEZ.MARIA.D.1182946024 Digitally signed by RODRIGUEZRODRIGUEZ.MARIA.D.1182946024 Date: 2020.06.03 14:44:50 -05'00'

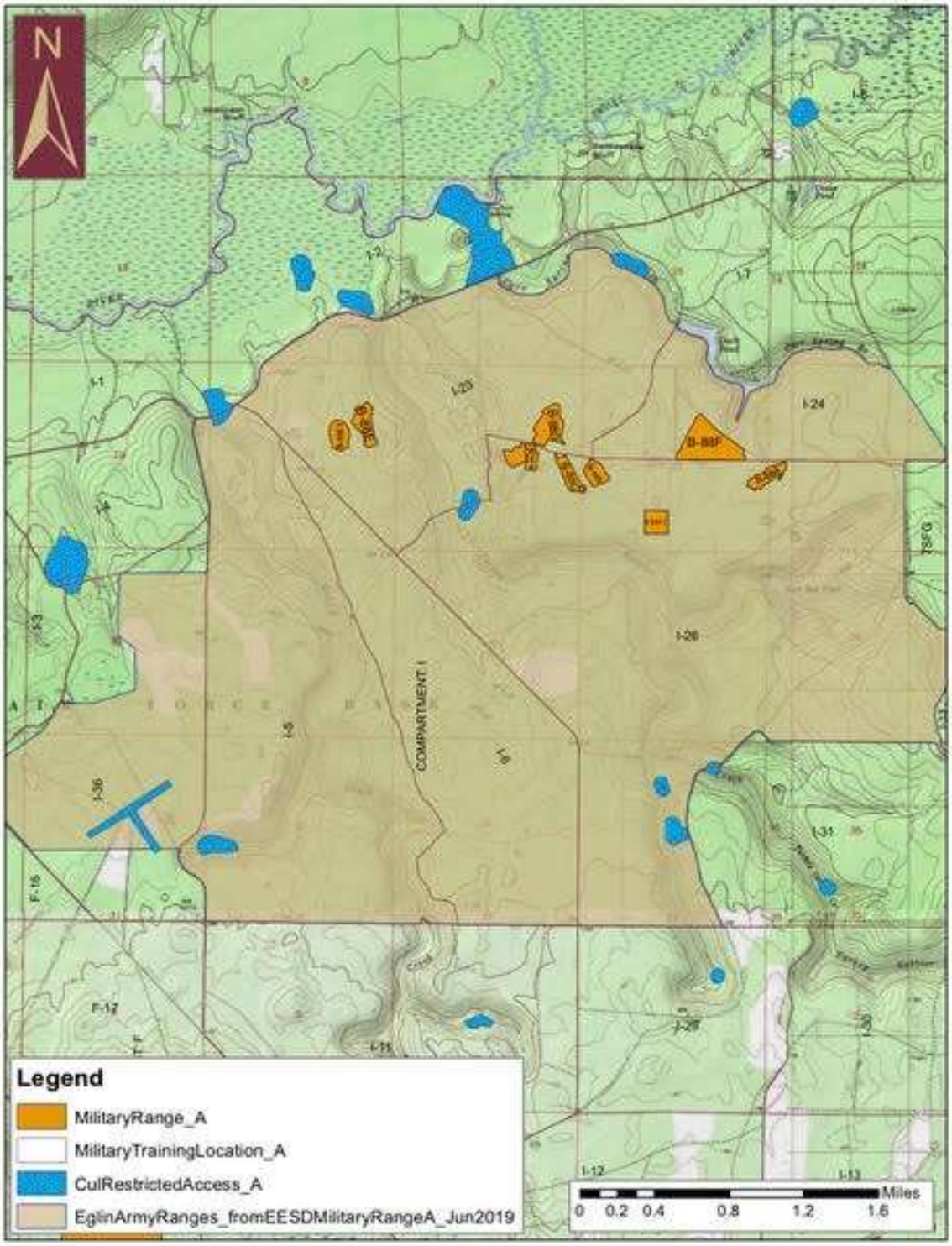
MARIA D. RODRIGUEZ, NH-04
Chief, Environmental Management Branch

3 Attachments:
1. Location of the B-88 Range Complex on Eglin AFB
2. Location of the C-53A Light Demolition Range on Eglin AFB
3. Locations of the Proposed Undertaking Facility Construction within and adjacent to the B-88 Range Complex

Sent via email to:

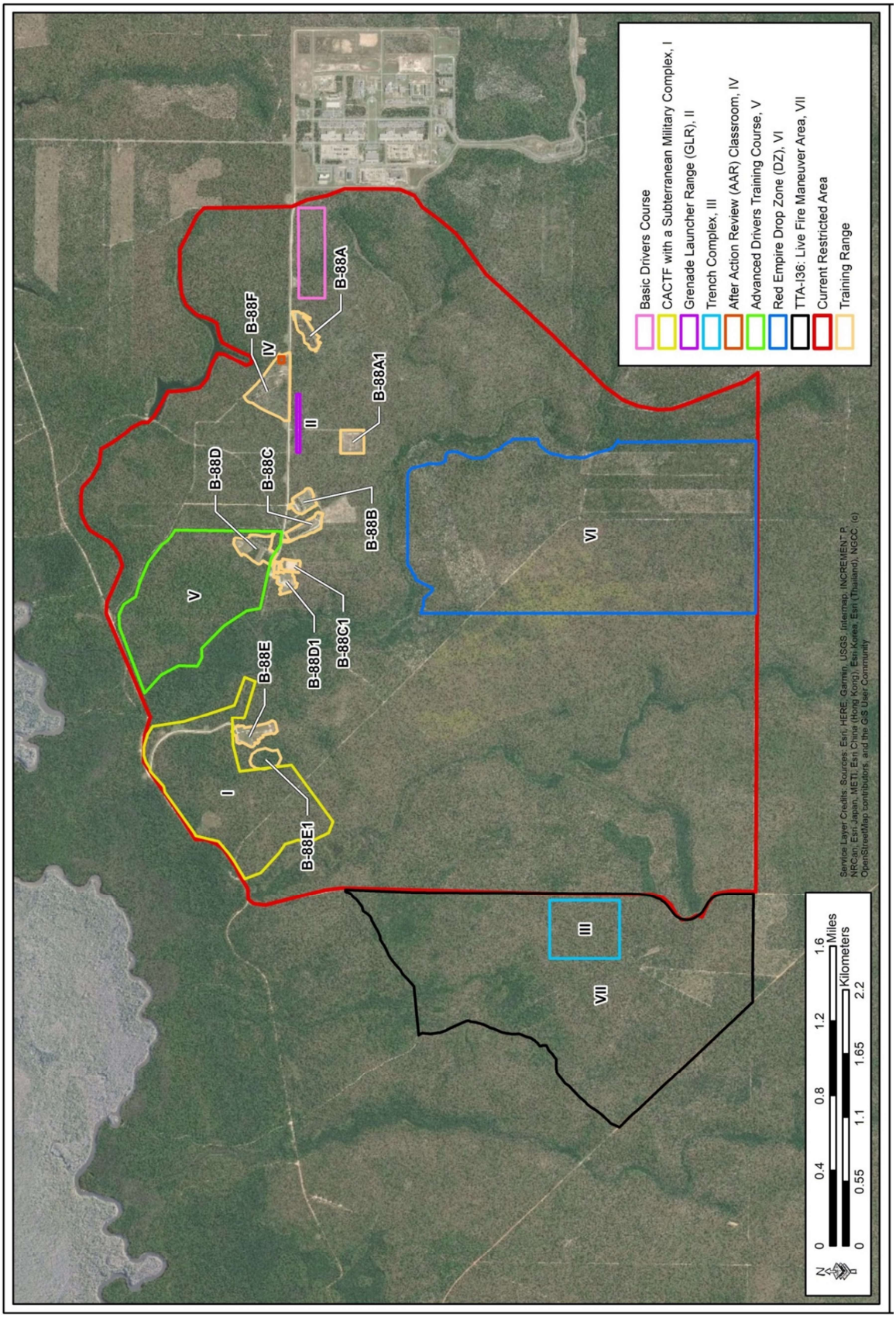
Timothy.Parsons@dos.myflorida.com
Jason.Aldridge@dos.myflorida.com

Attachment 1: Location of the B-88 Range Complex on Eglin AFB



Attachment 2: Location of the C-53A Light Demolition Range on Eglin AFB

Attachment 3: Locations of the Proposed Undertaking Facility Construction within and adjacent to the B-88 Range Complex



APPENDIX C
PUBLIC INVOLVEMENT

APPENDIX D
AIR QUALITY ANALYSIS

Appendix A - Usage Quantities for Emissions Generating Equipment and Activities

Area	Source Type	Total Annual Usage	
		2021+	2020
B-88 Range Complex	9mm	1,407,426	1,125,940
	.40 Cal	42,379	33,904
	5.56	2,588,040	2,070,432
	7.62	71,743	57,395
	.300 WinMag	36	29
	12 Gauge	4,744	3,796
	Grenades	699	560
	Blasting Caps	3,655	2,924
	Fuse/Initiator	5,956	4,765
	Claymores	35	28
	Charge	292	234
	Det Cord (feet)	23,880	19,104
	Arty Sim/Pyro	670	536
	ECT (feet)	182	146
	Firing Device	25	20
	Chemical Agent	17	14
C-53A Light Demolitions Range	9mm	0	0
	.40 Cal	0	0
	5.56	0	0
	7.62	0	0
	.300 WinMag	0	0
	12 Gauge	21	21
	Grenades	194	155
	Blasting Caps	4,739	3791
	Fuse/Initiator	14,056	11,245
	Claymores	9	7
	Charge	4,552	3642
	Det Cord (feet)	87,400	69,920
	Arty Sim/Pyro	21	16
	ECT (feet)	1	0.571429
	Firing Device	1,095	476
	Chemical Agent	0	0
Notional CACTF	Pavers	1	0
	Paving Equipment	2	0
	Roller	2	0
	Crane	1	0
	Electric Welders	1	0
	Forklift	3	0
	Generator Sets	1	0
	Tractor/Loader/Backhoe	6	0
	Rubber Tired Dozers	1	0
	Excavators	1	0
	Graders	1	0
	Scrapers	3	0
	Water Truck	1	0
	.40 Cal	10,000	0
	Arty Sim/Pyro	1,500	0

Area	Source Type	Total Annual Usage	
		2021+	2020
	Chemical Agent(CS gas)	1,500	0
	Grenade Simulator	1,500	0
Notional CACTF (cont'd)	Riot Control Agent	300	0
	Flashbang	1500	0
	Smoke	1500	0
	CCMCK	35,000	0
	.40 Cal	10,000	0
	Arty Sim/Pyro	1,500	0
	Chemical Agent (CS gas)	1,500	0
	Grenade Simulator	1,500	0
	Riot Control Agent	300	0
	Flashbang	1500	0
	Smoke	1500	0
	CCMCK	35,000	0
GLR	.40 Cal	30,000	0
Trench Complex/TTA I-36	9mm	10,000	0
	.40 Cal	200	0
	5.56 blank/sim	150,000	0
	5.56 live	150,000	0
	7.62 blank/sim	75,000	0
	7.62 live	150,000	0
	Det Cord	1,500	0
	Blasting Caps	150	0
	Fuse/Initiator	750	0
	Arty Sim/Pyro	150	0
	Chemical Agent (CS gas)	10	0
	Grenade Simulator	200	0
	Flashbang	300	0
	Smoke	250	0
	CCMCK	20,000	0
RDZ	Arty Sim/Pyro	150	0
	Grenade Simulator	150	0
	Riot Control Agent	10	0
	Smoke	250	0
	CCMCK	35,000	0
Construction - All Other Buildings in Proposed Action (Grenade Launcher Range, AAR Classroom, Advanced Drivers Training Course, DZ, I-36 Live Fire Maneuver Area, Trench Complex with TTA)	Crane	1	0
	Electric Welders	3	0
	Forklift	2	0
	Generator Sets	1	0
	Tractor/Loader/Backhoe	4	0
	Rubber Tired Dozers	1	0
	Excavators	1	0
	Graders	2	0
	Scrapers	2	0
	Water Truck	2	0

Appendix C - Emissions Summary - Current and Proposed - by Source Category				
Source Category	Pollutant	Emissions (tons/year)		
		Current	2020	2021+
Asphalt On-Road Roundtrip Emissions	Oxides of Nitrogen (NOx)	N/A	0.04152	N/A
	Carbon Monoxide (CO)	N/A	0.01644	N/A
	Sulfur Dioxide (SO2)	N/A	0.00013	N/A
	Volatile Organic Compounds	N/A	0.00376	N/A
	Lead (Pb)	N/A	0.00000	N/A
	Particulate Matter < 10 mm (PM-10)	N/A	0.00173	N/A
	Particulate Matter < 2.5 mm (PM-2.5)	N/A	0.00159	N/A
	CO_2 Equivalent[1]	N/A	15.49609	N/A
Construction On-Road Round Trip Emissions	Oxides of Nitrogen (NOx)	N/A	0.04482	N/A
	Carbon Monoxide (CO)	N/A	0.01775	N/A
	Sulfur Dioxide (SO2)	N/A	0.00014	N/A
	Volatile Organic Compounds	N/A	0.00406	N/A
	Lead (Pb)	N/A	0.00000	N/A
	Particulate Matter < 10 mm (PM-10)	N/A	3.73695	N/A
	Particulate Matter < 2.5 mm (PM-2.5)	N/A	0.00172	N/A
	CO_2 Equivalent[1]	N/A	16.72849	N/A
Site Grading On-Road Round Trip Emissions	Oxides of Nitrogen (NOx)	N/A	1.33131	N/A
	Carbon Monoxide (CO)	N/A	0.52723	N/A
	Sulfur Dioxide (SO2)	N/A	0.00415	N/A
	Volatile Organic Compounds	N/A	0.12056	N/A
	Lead (Pb)	N/A	0.00000	N/A
	Particulate Matter < 10 mm (PM-10)	N/A	0.05550	N/A
	Particulate Matter < 2.5 mm (PM-2.5)	N/A	1.37135	N/A
	CO_2 Equivalent[1]	N/A	247.21756	N/A
Worker Commutes for Paving Operations	Oxides of Nitrogen (NOx)	N/A	0.00179	N/A
	Carbon Monoxide (CO)	N/A	0.02679	N/A
	Sulfur Dioxide (SO2)	N/A	0.00002	N/A
	Volatile Organic Compounds	N/A	0.00204	N/A
	Lead (Pb)	N/A	0.00000	N/A
	Particulate Matter < 10 mm (PM-10)	N/A	0.00004	N/A
	Particulate Matter < 2.5 mm (PM-2.5)	N/A	0.00003	N/A
	CO_2 Equivalent[1]	N/A	252.06488	N/A
Worker Commutes for Site Grading Operations	Oxides of Nitrogen (NOx)	N/A	0.12808	N/A
	Carbon Monoxide (CO)	N/A	1.91972	N/A
	Sulfur Dioxide (SO2)	N/A	0.00111	N/A
	Volatile Organic Compounds	N/A	0.14622	N/A
	Lead (Pb)	N/A	0.00000	N/A
	Particulate Matter < 10 mm (PM-10)	N/A	0.00288	N/A
	Particulate Matter < 2.5 mm (PM-2.5)	N/A	0.00243	N/A
	CO_2 Equivalent[1]	N/A	172.59210	N/A
Worker Commutes for Construction Operations	Oxides of Nitrogen (NOx)	N/A	0.07957	N/A
	Carbon Monoxide (CO)	N/A	1.66905	N/A
	Sulfur Dioxide (SO2)	N/A	0.00096	N/A
	Volatile Organic Compounds	N/A	0.12713	N/A
	Lead (Pb)	N/A	0.00000	N/A
	Particulate Matter < 10 mm (PM-10)	N/A	0.00250	N/A
	Particulate Matter < 2.5 mm (PM-2.5)	N/A	0.00212	N/A
	CO_2 Equivalent[1]	N/A	150.05578	N/A
Site Grading Fugitive Dust	Particulate Matter < 10 mm (PM-10)	N/A	138.66000	N/A
Vendor Trip Emissions for Building Construction	Oxides of Nitrogen (NOx)	N/A	0.07207	N/A
	Carbon Monoxide (CO)	N/A	0.02854	N/A
	Sulfur Dioxide (SO2)	N/A	0.00022	N/A
	Volatile Organic Compounds	N/A	0.00653	N/A
	Lead (Pb)	N/A	0.00000	N/A
	Particulate Matter < 10 mm (PM-10)	N/A	0.00300	N/A
	Particulate Matter < 2.5 mm (PM-2.5)	N/A	0.00276	N/A
	CO_2 Equivalent[1]	N/A	26.89886	N/A
Paving Off-Gassing	Volatile Organic Compounds	N/A	0.01827	N/A
	Oxides of Nitrogen (NOx)	N/A	0.49178	N/A

Paving Off-Road Emissions	Carbon Monoxide (CO)	N/A	0.45024	N/A
	Sulfur Dioxide (SO2)	N/A	0.00107	N/A
	Volatile Organic Compounds	N/A	0.08040	N/A
	Lead (Pb)	N/A	0.00000	N/A
	Particulate Matter < 10 mm (PM-10)	N/A	0.03149	N/A
	Particulate Matter < 2.5 mm (PM-2.5)	N/A	0.03149	N/A
	Volatile Organic Compounds	N/A	0.00000	N/A
Construction Equipment Emissions (off-road)	Oxides of Nitrogen (NOx)	N/A	13.39396	N/A
	Carbon Monoxide (CO)	N/A	13.60234	N/A
	Sulfur Dioxide (SO2)	N/A	0.04245	N/A
	Volatile Organic Compounds	N/A	2.08467	N/A
	Lead (Pb)	N/A	0.00000	N/A
	Particulate Matter < 10 mm (PM-10)	N/A	0.57270	N/A
	Particulate Matter < 2.5 mm (PM-2.5)	N/A	0.57270	N/A
	Volatile Organic Compounds	N/A	N/A	N/A
Site Grading Off-Road Emissions	Oxides of Nitrogen (NOx)	N/A	0.74013	N/A
	Carbon Monoxide (CO)	N/A	10.63413	N/A
	Sulfur Dioxide (SO2)	N/A	0.02912	N/A
	Volatile Organic Compounds	N/A	1.99258	N/A
	Lead (Pb)	N/A	0.00000	N/A
	Particulate Matter < 10 mm (PM-10)	N/A	0.28454	N/A
	Particulate Matter < 2.5 mm (PM-2.5)	N/A	0.28454	N/A
	Volatile Organic Compounds	N/A	N/A	N/A
Unpaved Roads Fugitive Emissions (POV)	Particulate Matter < 10 mm (PM-10)	12.28453	12.28453	13.82010
	Particulate Matter < 2.5 mm (PM-2.5)	1.21898	1.21898	1.37135
Paved Roads Fugitive Emissions (POV)	Particulate Matter < 10 mm (PM-10)	0.01820	0.01820	0.02048
	Particulate Matter < 2.5 mm (PM-2.5)	0.00439	0.00439	0.00494
Unpaved Roads Fugitive Emissions (GOV)	Particulate Matter < 10 mm (PM-10)	2.16651	2.16651	2.70814
	Particulate Matter < 2.5 mm (PM-2.5)	0.21665	0.21665	0.27081
Paved Roads Fugitive Emissions (GOV)	Particulate Matter < 10 mm (PM-10)	0.00352	0.00352	0.00440
	Particulate Matter < 2.5 mm (PM-2.5)	0.00087	0.00087	0.00108
POV Commuter Emissions	Oxides of Nitrogen (NOx)	0.00246	0.00246	0.00308
	Carbon Monoxide (CO)	0.02827	0.02827	0.03534
	Sulfur Dioxide (SO2)	0.00002	0.00002	0.00002
	Volatile Organic Compounds	0.00260	0.00260	0.00325
	Particulate Matter < 10 mm (PM-10)	0.00007	0.00007	0.00008
	Particulate Matter < 2.5 mm (PM-2.5)	0.00006	0.00006	0.00008
	CO_2 Equivalent[1]	2.59	2.59	3.24
Munitions	Oxides of Nitrogen (NOx)	0.40	0.40	0.56
	Carbon Monoxide (CO)	4.77	4.77	6.44
	Lead (Pb)	0.01	0.01	0.02
	Particulate Matter < 10 mm (PM-10)	7.47	7.47	9.68
	Particulate Matter < 2.5 mm (PM-2.5)	0.84	0.84	1.10
	CO_2 Equivalent[1]	227.28	227.28	284.52

Construction Emissions Summary

Task	Pollutant								
	CO	VOC	NOx	SO2	PM10	PM2.5	CO2e	NH3	GHG
Asphalt Roundtrip Truck Emissions (on-road)	32.89	7.52	83.04	0.26	3.46	3.18	30992.18	0.56	N/A
Construction Round Trip Emissions (on-road)	35.50	8.12	89.64	0.28	3.74	3.44	33456.98	0.60	N/A
Site Grading Round Trip Emissions (on-road)	1054.46	241.13	2662.62	8.29	111.00	102.07	494435.13	8.89	N/A
Worker Commutes for Paving Operations	53.58	4.08	3.57	0.03	0.08	0.07	504129.76	9.26	N/A
Worker Commutes for Construction Operations	3338.099006	254.261747	159.140032	1.92331125	5.00060925	4.23128475	300111.5641	18.07912575	N/A
Worker Commutes for Site Grading Operations	3839.435744	292.448378	256.168852	2.21216625	5.75163225	4.86676575	345184.2095	20.79436275	N/A
Site Grading Fugitive Dust	N/A	N/A	N/A	N/A	277,320	N/A	N/A	N/A	N/A
Vendor Trip Emissions for Building Construction	57.08	13.05	144.14	0.45	6.01	5.53	53797.73	0.97	N/A
Paving Off-Gassing	N/A	36.55	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paving Off-Road Emissions	900.48	160.80	983.56	2.14	62.98	62.98	N/A	N/A	151462.34
Building Construction Emissions	27,204.68	4169.35	26787.93	84.91	1145.40	1145.40	N/A	N/A	6191206.81
Site Grading Off-Road Emissions	21,268.26	3985.15	1480.26	58.24	569.09	569.09	N/A	N/A	5809511.60
Unpaved Roads Fugitive Emissions (POV)	N/A	N/A	N/A	N/A	13.82	2742.700284	N/A	N/A	N/A
Paved Roads Fugitive Emissions (POV)	N/A	N/A	N/A	N/A	0.02	9.89	N/A	N/A	N/A
Unpaved Roads Fugitive Emissions (GOV)	N/A	N/A	N/A	N/A	2.71	541.6262829	N/A	N/A	N/A
Paved Roads Fugitive Emissions (GOV)	N/A	N/A	N/A	N/A	4.40E-03	2.17	N/A	N/A	N/A
POV Emissions	0.04	3.25E-03	3.08E-03	2.31E-05	8.49E-05	7.72E-05	3.24	0.00	N/A
	57784.49	9172.46	32650.08	158.74	279249.05	5197.22	1762110.79	59.15	12152180.76 Total Emissions (lbs)
	28.89224725	4.58623138	16.325039	0.07936796	139.6245265	2.59861059	881.0553968	0.029575287	6076.090379 Total Emissions (tons)

Munitions Usage

	Alternative 3 (Baseline)		
	DODIC	Nomenclature	Quantity Fired
B-88A1	MN88	CAP, BLASTING: IN-LINE INITIATOR, NON-ELECTRIC, 500 FT. MINI	10
	MN86	DUAL NONELECTRIC BLASTING CAP ASSEMBLY M19	8
	GG20	GRENADE, HAND DIVERSIONARY MK13-0 BTV-1 EL	20
	G955	GREN HAND SMK VIOL (M18)	10
	G950	GREN HAND SMK RED (M18)	12
	G915	GRENADE, HAND PRAC, DELAY M30	4
	G900	GREN HAND INC AN-M14 (THERMITE)	4
	G888	GREN HAND FRAG M33	60
	G881	GREN HAND FRAG M67	640
	FZ14	GRENADE, RIOT CONTROL CS L96	3
	K143	MINE AP DIR M18A1 CLAYMORE	40
	J007	M18A1 CLAYMORE MINE	154
	L601	SIM HAND GREN M116 SERIES	5
	L594	SLIM PROJ GRND BRST M115A2	5
	K765	RIOT CNTRL AGENT CS CAPSULE	52
	AB54	12 GA BREACHING ROUND	440
	AA54	BREACHING ROUND (M1030)	1,863
	A024	12 GAG MK246MD0	80
	A020	CTG 12 GAGE SHOTGUN #4 BUCKSHOT SPEC	250
	A017	12GA #9 SHOT	739
	A011	12GA SHOTGUN 00 BUCKSHOT	110
	X618	DET, NONEL 200 FT CLEAR MINI-T	11
	X608	DET, NONEL 2M CLEAR MINI-TUBE	53
	X605	DET, NONEL 40 FT CLEAR MINI-TU	23
	X604	DET, NONEL 20 FT CLEAR MINI-TU	13
	X471	9FT DET CORD 1IN BLAST CAP 3.8 SEC DELAY	77
	X455	40FT INSTANT DET CORD	118
	MU42	CORD DETONATINGR.	456
	MU40	CORD DETONATINGR.	150
	MS91	CORD,DETONATING FCDC	725
	MN75	BOOSTER DEMO CHG PRAC 30FT	105
	MN69	BOOSTER DEMO 30FT DET CORD M15	155
	MN68	BOOSTER DEMO 10FT DET CORD M15	487
	M614	CORD, DET	1,140
	M613	CORD, DET	515
	M457	CORD, DET, 1000 FT SPOOL 2000 FT/B	3,445
	M456	CORD DET REINFORCED	101,883
	M455	CORD DETON REINFOR	350
	X477	ECT, 900 GR/FT	20
	X476	ECT, 450 GR/FT	2
	MM24	ECT, 300 GR/FT	300

	Alternative 3 (Baseline)		
	DODIC	Nomenclature	Quantity Fired
B-88B	L601	SIM HAND GREN M116 SERIES	16
	GG09	M84 NON LETHAL STUN GRENADE (M84)	100
	X467	INTEGRAL FIRING DEVICE, 14 FT	6
	ML03	FIRING DEV MULTIPURPOSE M142	22
	MN90	CAP, BLASTING: IN-LINE INITIATOR, NON-ELECTRIC, 1000 FT. MIN	2,714
	MN88	CAP, BLASTING: IN-LINE INITIATOR, NON-ELECTRIC, 500 FT. MINI	365
	MN86	DUAL NONELECTRIC BLASTING CAP ASSEMBLY M19	491
	MN41	CAP.BLS NON-ELE DELY M18	68
	MN39	CAP BLAST NON-ELEC 10FT	340
	MN36	CAPBLST NON-E M11 30F SHKTUB	5
	MN07	CAPBLST NN-ELCDLYM15 70FT	306
	MN06	CAPBLST DELAY M14 (SHOCK TUBE)	453
	MN03	CAPBLST NON-E M13 W 1000FT (SHOCK TUBE)	1,029
	MN02	CAPBLST NON-E M12 W 500FT (SHOCK TUBE)	818
	ML83	CAP, BLASTING, ELEC MK11	26
	ML47	CAPBLST NON-E M11W11FT	2,081
	M855	CAP, BLASTING ELEC	20
	M810	PRIMER PERC CAP M2	210
	M131	CAP BLAST NONELEC M7	5,370
	M130	CAP BLAST ELEC M6	284
	M121	CAP BL ELEC NO 8	7
	M110	CAP BL ELEC	536
	M101	CAP, BLASTING ELEC NO 1 DELAY	55
	M078	CAP BLAST ELEC ASSY F/M18A1 MINE	30
	MN08	IGNBLST FUSM81 S/TUB CPBLTY	7,124
	M881	CANISTER, CTG ACTUATED M13	10
	M766	IGNITER FUSE BL TIME M60	170
	M701	INITIATOR, CTG ACTUATED MK11 MOD 0	1,025
	M670	FUSE BLASTING TIME M700	22,876
	M647	CTG, IMPULSE ANEROID	60
	M077	CTG, POWDER ACTUATED TOOL .27 CAL	300
	MM28	CHARGE, DEMOLITION	20
	M980	CHG, DEMO SHEET 38 FT	893
	M591	DYNAMITE MILITARY M1	15
	M081	CHG, DEMO EXPL SHEET 14 OZ	50
	M029	CHG DEMO LINEAR FLEX	10
	M023	CHG DEMO C4 1-1/4LB	208
	AA49	CARTRIDGE, 9MM BALL M882	25,060
	AA21	9MM, FX MARKING CARTRIDGE. BLUE IN	91,152
	AA12	9MM, FX MARKING CARTRIDGE. RED IN	56,048
	A363	9MM BALL PISTOL (NEW)	41,440
	X196	CTG, CAL .40 STANDARD 1.25"	1,330
	ZZZ3	5.56MM SESAMS (M16)	528

	Alternative 3 (Baseline)		
	DODIC	Nomenclature	Quantity Fired
B-88C	X132	5.56 SPECIAL BALL 77GRAIN	36,841
	AZ44	5.56MM SESAMS	2,000
	AB58	M855A1	300
	AB57	M855A1	5,000
	AB16	5.56 UTM	23,750
	AB10	5.56 UTM	308,401
	AB09	5.56MM UTM SINGLE SHOT	231,574
	AA68	5.56 SRTA ROUND	35,677
	AA53	CTG 5.56MM.BALL MOLY COATED	2,128
	AA48	CTG 5.56MM BALLM855 C PAK-LF	800
	AA45	CTG 5.56MM BALL M855,10/CLP-LF	45
	AA33	5.56MM BALL COMMER PACK, CTG	9,460
	A080	5.56MM BLK F M16A1/A2	2,290
	A071	5.56MM BALL (M16) 10/CLIP	37,958
	A068	5.56MM TR RIFLE F/M16	21,320
	A065	5.56MM PLASTIC M862	41,840
	A059	5.56MM BALL F/M16A2	190,248
	AA11	CTG 7.62MM M118 L RANGE	700
	A136	7.62MM BALL (SNIPER)	13
	A111	7.62MM BLNK LNKD (MILES)	2,400
	A191	.300 WINCHESTER MAGNUM	252
	AB54	12 GA BREACHING ROUND	5,410
	AA54	BREACHING ROUND (M1030)	2,941
	A024	12 GAG MK246MD0	20
	A019	CTG 12 GAGE SHOTGUN FLECHETTE	175
	A017	12GA #9 SHOT	589
	A011	12GA SHOTGUN 00 BUCKSHOT	610
	X699	FLASH BANG, 9-BANG SOUND FLASH	1,534
	X696	FLASHBANG, 2 BANG SOUND FLASH	924
	L601	SIM HAND GREN M116 SERIES	50
	GG17	M84 STUN GRENADE (FUSE)	70
	GG09	M84 NON LETHAL STUN GRENADE (M84)	23
	G950	GREN HAND SMK RED (M18)	89
	G940	GREN SMK GRN (MILES) (M18)	12
	G811	DDI, GRND BDY PRAC M69	60
	X608	DET, NONEL 2M CLEAR MINI-TUBE	35
	X605	DET, NONEL 40 FT CLEAR MINI-TU	16
	X604	DET, NONEL 20 FT CLEAR MINI-TU	70
	X471	9FT DET CORD 1IN BLAST CAP 3.8 SEC DELAY	1,368
	X455	40FT INSTANT DET CORD	108
	M614	CORD, DET	320
	M613	CORD, DET	600
	M458	DDI, CORD DETONATING	200
	M457	CORD, DET, 1000 FT SPOOL 2000 FT/B	6,216

	Alternative 3 (Baseline)		
	DODIC	Nomenclature	Quantity Fired
	M456	CORD DET REINFORCED	6,971
	MN88	CAP, BLASTING: IN-LINE INITIATOR, NON-ELECTRIC, 500 FT. MINI	59
	MN86	DUAL NONELECTRIC BLASTING CAP ASSEMBLY M19	50
	MN39	CAP BLAST NON-ELEC 10FT	8
	MN08	IGNBLST FUSM81 S/TUB CPBLTY	1,359
	MN07	CAPBLST NN-ELCDLYM15 70FT	66
	MN06	CAPBLST DELAY M14 (SHOCK TUBE)	152
	MN02	CAPBLST NON-E M12 W 500FT (SHOCK TUBE)	30
	ML65	DET PERCUSSION W/175 MILSEC	200
	ML47	CAPBLST NON-E M11W11FT	324
	M855	CAP, BLASTING ELEC	550
	M138	CAP, BLASTING ELEC HIGH ALTITUDE E81	6
	M131	CAP BLAST NONELEC M7	787
	M130	CAP BLAST ELEC M6	145
	M110	CAP BL ELEC	30
	M108	CAP, BLASTING ELEC NO 6 DELAY	40
	M104	CAP, BLASTING ELEC NO 4 DELAY	1,135
	MN11	FD DTD M147 48/BX (firing device)	10
	M617	FIRING DEVICE, DEMO ASSORTED DELAY	100
	MM24	ECT, 300 GR/FT	695
	M766	IGNITER FUSE BL TIME M60	20
	M670	FUSE BLASTING TIME M700	1,515
	M046	CHG, DEMO LINEAR MK8 50 LB COMP A-3	30
	M041	CHG, DEMO BLOCK MK4 .5 LB COMP C-2	250
	M030	CHG DEMO TNT 1/4 LB	110
	AA49	CARTRIDGE, 9MM BALL M882	2,461,842
	AA12	9MM, FX MARKING CARTRIDGE. RED IN	200
	A363	9MM BALL PISTOL (NEW)	669,514
	AA12	9MM, FX MARKING CARTRIDGE. RED IN	200
	A363	9MM BALL PISTOL (NEW)	669,514
	X196	CTG, CAL .40 STANDARD 1.25"	113,770
	ZZZ3	5.56MM SESAMS (M16)	700
	Z200	OP-4, 5.45 X 39 BALL	4,000
	X132	5.56 SPECIAL BALL 77GRAIN	176,710
	AB77	5.56MM BALL M855A1	42,400
	AB58	M855A1	275,944
	AB57	M855A1	196,295
	AB09	5.56MM UTM SINGLE SHOT	1,700
	AA53	CTG 5.56MM.BALL MOLY COATED	13,520
	AA45	CTG 5.56MM BALL M855,10/CLP-LF	12,000
	AA33	5.56MM BALL COMMER PACK, CTG	480,088
	A080	5.56MM BLK F M16A1/A2	9,680
B-88C1	A071	5.56MM BALL (M16) 10/CLIP	612,935

	Alternative 3 (Baseline)		
	DODIC	Nomenclature	Quantity Fired
	A065	5.56MM PLASTIC M862	1,400
	A064	5.56MM BALL TR 4/1 F/SAW	15,480
	A063	5.56MM TR F/M16A2	14,880
	A062	5.56MM BALL LKD F/SAW	15,723
	A059	5.56MM BALL F/M16A2	3,890,520
	Z203	OP-4, 7.62 X 39 BALL	4,000
	AA11	CTG 7.62MM M118 L RANGE	11,501
	A165	7.62MM 4 BALL-1TR F/MINI GUN	1,700
	A152	7.62MM NATO BALL M80	320
	A146	7.62MM TRCR LNKD	2,000
	A139	7.62MM BALL NATO M59	14,600
	A136	7.62MM BALL (SNIPER)	113,660
	A131	7.62MM LNKD 4 BALL-1TR	15,677
	A130	7.62MM BALL F/M14	7,700
	A128	7.62MM BALL LNKD	10,660
	G955	GREN HAND SMK VIOL (M18)	32
B-88D	A024	12 GAG MK246MD0	50
	A023	CTG.12 GAUGE	50
	A011	12GA SHOTGUN 00 BUCKSHOT	500
	A017	12GA #9 SHOT	350
	A011	12GA SHOTGUN 00 BUCKSHOT	250
B-88D1	AA49	CARTRIDGE, 9MM BALL M882	2,058,534
	AA12	9MM, FX MARKING CARTRIDGE. RED IN	200
	A363	9MM BALL PISTOL (NEW)	669,514
	X196	CTG, CAL .40 STANDARD 1.25"	113,770
	ZZZ3	5.56MM SESAMS (M16)	700
	Z200	OP-4, 5.45 X 39 BALL	4,000
	X132	5.56 SPECIAL BALL 77GRAIN	176,710
	AB77	5.56MM BALL M855A1	42,400
	AB58	M855A1	275,944
	AB57	M855A1	196,295
	AB09	5.56MM UTM SINGLE SHOT	1,700
	AA53	CTG 5.56MM.BALL MOLY COATED	13,520
	AA45	CTG 5.56MM BALL M855,10/CLP-LF	12,000
	AA33	5.56MM BALL COMMER PACK, CTG	480,088
	A080	5.56MM BLK F M16A1/A2	9,680
	A071	5.56MM BALL (M16) 10/CLIP	612,935
	A065	5.56MM PLASTIC M862	1,400
	A064	5.56MM BALL TR 4/1 F/SAW	15,480
	A063	5.56MM TR F/M16A2	14,880
	A062	5.56MM BALL LKD F/SAW	15,723
	A059	5.56MM BALL F/M16A2	3,890,520
	Z203	OP-4, 7.62 X 39 BALL	4,000
	AA11	CTG 7.62MM M118 L RANGE	11,501

	Alternative 3 (Baseline)		
	DODIC	Nomenclature	Quantity Fired
	A165	7.62MM 4 BALL-1TR F/MINI GUN	1,700
	A152	7.62MM NATO BALL M80	320
	A146	7.62MM TRCR LNKD	2,000
	A139	7.62MM BALL NATO M59	14,600
	A136	7.62MM BALL (SNIPER)	113,660
	A131	7.62MM LNKD 4 BALL-1TR	15,677
	A130	7.62MM BALL F/M14	7,700
	A128	7.62MM BALL LNKD	10,660
	AA54	BREACHING ROUND (M1030)	7,520
	A017	12GA #9 SHOT	2,146
	A011	12GA SHOTGUN 00 BUCKSHOT	75
	L314	SIG ILLUM GRN STAR M125A1	24
	AA49	CARTRIDGE, 9MM BALL M882	502,027
	AA21	9MM, FX MARKING CARTRIDGE. BLUE IN	92,823
	AA12	9MM, FX MARKING CARTRIDGE. RED IN	43,167
	A363	9MM BALL PISTOL (NEW)	503,539
	X196	CTG, CAL .40 STANDARD 1.25"	8,450
	X132	5.56 SPECIAL BALL 77GRAIN	56,800
	AZ45	5.56MM SESAMS LINKED	400
	AZ44	5.56MM SESAMS	1,800
	AB77	5.56MM BALL M855A1	5,240
	AB58	M855A1	41,140
	AB57	M855A1	77,620
	AB16	5.56 UTM	3,400
	AB10	5.56 UTM	45,815
	AB09	5.56MM UTM SINGLE SHOT	54,241
	AA68	5.56 SRTA ROUND	14,180
	AA53	CTG 5.56MM.BALL MOLY COATED	37,945
	AA48	CTG 5.56MM BALLM855 C PAK-LF	500
	AA33	5.56MM BALL COMMER PACK, CTG	80,250
	A080	5.56MM BLK F M16A1/A2	16,043
	A075	5.56MM BLANK LKD F/SAW	3,800
	A071	5.56MM BALL (M16) 10/CLIP	95,161
	A068	5.56MM TR RIFLE F/M16	5,900
	A066	5.56MM BALL M193 FOR RIF	12,460
	A065	5.56MM PLASTIC M862	500
	A064	5.56MM BALL TR 4/1 F/SAW	26,400
	A063	5.56MM TR F/M16A2	4,500
	A062	5.56MM BALL LKD F/SAW	3,200
	A059	5.56MM BALL F/M16A2	1,427,618
	AA11	CTG 7.62MM M118 L RANGE	5,433
	A143	7.62MM BALL LNKD F/MG	2,900
	A136	7.62MM BALL (SNIPER)	178
	A131	7.62MM LNKD 4 BALL-1TR	19,200

	Alternative 3 (Baseline)		
	DODIC	Nomenclature	Quantity Fired
B-88E	A130	7.62MM BALL F/M14	1,600
	A111	7.62MM BLNK LNKD (MILES)	5,700
	AB54	12 GA BREACHING ROUND	95
	AA54	BREACHING ROUND (M1030)	175
	AA31	12 GAGE FIN STAB RUBBER	2,000
	A017	12GA #9 SHOT	130
	X699	FLASH BANG, 9-BANG SOUND FLASH	101
	X696	FLASHBANG, 2 BANG SOUND FLASH	43
	L601	SIM HAND GREN M116 SERIES	1
	G982	HAND GRENADE SMOKE TNG M83 (TEREPHTHALIC ACID [TA])	32
	G955	GREN HAND SMK VIOL (M18)	10
	G950	GREN HAND SMK RED (M18)	90
	B519	40MM PRAC M781	323
	MN90	CAP, BLASTING: IN-LINE INITIATOR, NON-ELECTRIC, 1000 FT. MIN	20
	MN88	CAP, BLASTING: IN-LINE INITIATOR, NON-ELECTRIC, 500 FT. MINI	2
	MN86	DUAL NONELECTRIC BLASTING CAP ASSEMBLY M19	20
	MN36	CAPBLST NON-E M11 30F SHKTUB	74
	M855	CAP, BLASTING ELEC	40
	M131	CAP BLAST NONELEC M7	120
	M130	CAP BLAST ELEC M6	25
	MN08	IGNBLST FUSM81 S/TUB CPBLTY	194
	M881	CANISTER, CTG ACTUATED M13	8
	M701	INITIATOR, CTG ACTUATED MK11 MOD 0	30
	M670	FUSE BLASTING TIME M700	20
	M613	CORD, DET	300
	M457	CORD, DET, 1000 FT SPOOL 2000 FT/B	1,300
	M456	CORD DET REINFORCED	6,520
	M030	CHG DEMO TNT 1/4 LB	50
	L603	SIM FLSH ART MGT XM24	60
	L596	SIM ARTY FLASH M110	3
	L594	SLIM PROJ GRND BRST M115A2	100
	K765	RIOT CNTRL AGENT CS CAPSULE	45
		TOTAL	23,238,789
	DWEE	PAN ALUMINUM SLUG	26
	DWED	PAN CUSTOM STEEL SLUG	25
	DWEC	PAN ENHANCED BLANK	25
	AA66	PAN COMM BLACK POWDER BLANK	10
	AA64	PAN LOW VELOCITY BLANK POPPER	10
	AA63	PAN AVON ROUND	10
	AA62	PAN ULTRA VELOCITY SLUG	10
	MN90	CAP, BLASTING: IN-LINE INITIATOR, NON-ELECTRIC, 1000 FT. MIN	1,566

	Alternative 3 (Baseline)		
	DODIC	Nomenclature	Quantity Fired
C53A	MN89	CAP,BLASTING: IN-LINE INITIATOR,NON-ELECTRIC,500 FT MINITUBE	76
	MN88	CAP, BLASTING: IN-LINE INITIATOR, NON-ELECTRIC, 500 FT. MINI	2,334
	MN86	DUAL NONELECTRIC BLASTING CAP ASSEMBLY M19	1,498
	MN41	CAP.BLS NON-ELE DELY M18	342
	MN39	CAP BLAST NON-ELEC 10FT	189
	MN38	CAPBLST NON-E M15 70F SHK TB	60
	MN07	CAPBLST NN-ELCDLYM15 70FT	1,504
	MN06	CAPBLST DELAY M14 (SHOCK TUBE)	391
	MN03	CAPBLST NON-E M13 W 1000FT (SHOCK TUBE)	569
	MN02	CAPBLST NON-E M12 W 500FT (SHOCK TUBE)	240
	ML47	CAPBLST NON-E M11W11FT	724
	ML45	HLDR BLST CP S/TUBM9	51
	M541	DET PERC M2A1 8SEC	50
	M153	CAP, BLASTING ELEC SPEC STRENGTH E108	43
	M131	CAP BLAST NONELEC M7	15,135
	M130	CAP BLAST ELEC M6	1,528
	M121	CAP BL ELEC NO 8	20
	M110	CAP BL ELEC	70
	M104	CAP, BLASTING ELEC NO 4 DELAY	150
	L601	SIM HAND GREN M116 SERIES	270
	G982	HAND GRENADE SMOKE TNG M83 (TEREPHTHALIC ACID [TA])	38
	G955	GREN HAND SMK VIOL (M18)	3
	G950	GREN HAND SMK RED (M18)	14
	G945	GREN HAND SMK YEL (M18)	32
	G940	GREN SMK GRN (MILES) (M18)	34
	G930	GREN HAND SMK HC (AN-M8)	1
	G910	GREN HAND OFF MK3A2	8
	G900	GREN HAND INC AN-M14 (THERMITE)	684
	MN69	BOOSTER DEMO 30FT DET CORD M15	518
	MN68	BOOSTER DEMO 10FT DET CORD M15	1,748
	M613	CORD, DET	300
	M458	DDI, CORD DETONATING	23,257
	M457	CORD, DET, 1000 FT SPOOL 2000 FT/B	30,141
	M456	CORD DET REINFORCED	433,474
	MN82	CHARGE, DEMO .5LB SEMTEX A	3
	MN28	SELECTABLE LIGHTWEIGHT ATTACK,	29
	MM30	CHARGE, DEMOLITION	3
	MM16	MUNITION, ATTACK, DEMOLITION	3
	ML05	CUTTER,MK 24-0	4
	M986	CHG, DEMO SHEET 9 FT	14
	M980	CHG, DEMO SHEET 38 FT	2,300
	M591	DYNAMITE MILITARY M1	1,891

Alternative 3 (Baseline)		
DODIC	**Nomenclature**	**Quantity Fired**
M421	CHG DEMO SHAPED 40 LB M3	51
M420	CHG DEMO SHAPED 15 LB M2A4	69
M236	DESTRUCTOR, EXPL LGM 25	20
M060	CHG DEMO ROLL	2
M039	CHG DEMO 40LB CRATERING	251
M038	CHG DEMO 1-1/4 LB	40
M037	CHG DEMO 1-1/4 LB	393
M032	CHG DEMO TNT 1 LB	1,671
M031	TNT 1/2 LB M1A4	283
M030	CHG DEMO TNT 1/4 LB	2,355
M029	CHG DEMO LINEAR FLEX	1
M028	DEMO KIT BANG TORPEDO	18
M026	DEMO KIT BANG TORP	30
M025	CHG, DEMO LINEAR M58 COMP C-4	210
M024	CHG DEMO BLK M118 PETN 2LB	20
M023	CHG DEMO C4 1-1/4LB	15,830
MN14	FIRING DEVICE, DEMOLITION MK54	19
MN11	FD DTD M147 48/BX	1
ML03	FIRING DEV MULTIPURPOSE M142	187
M630	FIRING DEVICE DEMO PULL TYPE	5,275
M620	FIRING DEVICE DEMO 45-115 MI	400
M327	COUPLING BASE FRNG DEVICE	250
MN08	IGNBLST FUSM81 S/TUB CPBLTY	9,664
M703	INITIATOR, CTG ACTUATED M31	700
M701	INITIATOR, CTG ACTUATED MK11 MOD 0	150
M670	FUSE BLASTING TIME M700	68,080
M308	CTG CARGO REL 20 SEC DELAY	4
M202	CTG, DELAY MK35 MOD 0	5
M156	FASTENER UNIT, POWDER ACTUATED TOOL	99
M145	CTG, POWDER ACTUATED TOOL .38 CAL	11
L600	SIM BOOBYTRAP WHIS M119	31
L598	SIM BOOBYTRAP FLASH M117	61
L594	SLIM PROJ GRND BRST M115A2	11
L495	FLARE SURFACE TRIP M49A1	11
L306	SIG ILLUM RS CLUSTER M158A1	1
K143	MINE AP DIR M18A1 CLAYMORE	36
K139	DDI, MINE APERS M68 PRAC	12
X479	ECT, 3600 GR/FT	4
	TOTAL	**89,274**

M781 (40 mm tpt)	40MM PRAC	10,000	Rounds
L594 (Arty Sim/Pyro)	SLIM PROJ GRND BRST M115A2	1,500	Single Unit
K765 Chemical Agent(CS gas)	RIOT CNTRL AGENT CS CAPSULE	1,500	Single Capsule

	Alternative 3 (Baseline)			
	DODIC	Nomenclature	Quantity Fired	
CACTF	L601 (Grenade Simulator)	SIM HAND GREN M116 SERIES	1,500	Rounds
	K765 (Riot Control Agent)	RIOT CNTRL AGENT CS CAPSULE	300	Rounds
	GG09 (Flashbang)	M84 NON LETHAL STUN GRENADE (M84)	1500	Rounds
	G982 (Smoke)	HAND GRENADE SMOKE TNG M83 (TEREPHTHALIC ACID [TA])	1500	Rounds
	AB09 (CCMCK)	5.56MM UTM SINGLE SHOT	35,000	Single Units
			TOTAL 52,800	
GLR	M781 (40 mm tpt)	40MM PRAC	30,000	Rounds
			TOTAL 30,000	
Trench Complex/ TTA I-36	A363 (Small Arms 9mm)	9MM BALL PISTOL (NEW)	10,000	Rounds
	M781 (40 mm tpt)	40MM PRAC	200	Rounds
	A080 (Small Arms 5.56mm blank/sim)	5.56MM BLK F M16A1/A2	150,000	Rounds
	A059 (Small Arms 5.56mm live)	5.56MM BALL F/M16A2	150,000	Rounds
	A111 (Small Arms 7.62mm blank/sim)	7.62MM BLNK LNKD (MILES)	75,000	Rounds
	A143 (Small Arms 7.62mm live)	7.62MM BALL LNKD F/MG	150,000	Rounds
	MN68 (Det Cord)	BOOSTER DEMO 10FT DET CORD M15	1,500	Feet
	M130 (Blasting Caps)	CAP BLAST ELEC M6	150	Single Caps
	(M670) Fuse/Initiator	FUSE BLASTING TIME M700	750	Single Units
	L594 (Arty Sim/Pyro)	SLIM PROJ GRND BRST M115A2	150	Single Unit
	K765 Chemical Agent(CS gas)	RIOT CNTRL AGENT CS CAPSULE	10	Single Capsule
	L601 (Grenade Simulator)	SIM HAND GREN M116 SERIES	200	Rounds
	GG09 (Flashbang)	M84 NON LETHAL STUN GRENADE (M84)	300	Rounds
	G982 (Smoke)	HAND GRENADE SMOKE TNG M83 (TEREPHTHALIC ACID [TA])	250	Rounds

	Alternative 3 (Baseline)			
	DODIC	Nomenclature	Quantity Fired	
	AB09 (CCMCK)	5.56MM UTM SINGLE SHOT	20,000	Single Units
		TOTAL	558,510	
RDZ	L594 (Arty Sim/Pyro)	SLIM PROJ GRND BRST M115A2	150	Single Unit
	L601 (Grenade Simulator)	SIM HAND GREN M116 SERIES	150	Rounds
	K765 (Riot Control Agent)	RIOT CNTRL AGENT CS CAPSULE	10	Rounds
	G982 (Smoke)	HAND GRENADE SMOKE TNG M83 (TEREPHTHALIC ACID [TA])	250	Rounds
	AB09 (CCMCK)	5.56MM UTM SINGLE SHOT	35,000	Single Units
		TOTAL	35,560	

Munition Emission Factors

B-88 Complex									
Nomenclature	DODIC	Quantity Fired	Units	NOx	CO	Pb	PM10	PM2.5	GHG
12GA SHOTGUN 00 BUCKSHOT	A011	1,545	lb/item	4.20E-05	1.50E-03	2.00E-05	7.40E-05	6.70E-05	1.63E-03
12GA #9 SHOT	A017	3,954	lb/item	2.10E-05	1.00E-03	7.40E-06	2.10E-05	2.00E-05	1.11E-03
CTG 12 GAGE SHOTGUN FLECHETTE	A019*	175	lb/item	2.10E-05	1.00E-03	7.40E-06	2.10E-05	2.00E-05	1.11E-03
CTG 12 GAGE SHOTGUN #4 BUCKSHOT SPEC	A020*	250	lb/item	4.20E-05	1.50E-03	2.00E-05	7.40E-05	6.70E-05	1.63E-03
CTG.12 GAUGE	A023*	50	lb/item	2.10E-05	1.00E-03	7.40E-06	2.10E-05	2.00E-05	1.11E-03
12 GAG MK246MD0	A024*	150	lb/item	2.10E-05	1.00E-03	7.40E-06	2.10E-05	2.00E-05	1.11E-03
5.56MM BALL F/M16A2	A059	9,398,906	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03
5.56MM BALL LKD F/SAW	A062*	34,646	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03
5.56MM TR F/M16A2	A063	34,260	lb/item	6.50E-05	1.40E-03	2.70E-06	4.90E-05	3.30E-05	9.18E-04
5.56MM BALL TR 4/1 F/SAW	A064*	57,360	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03
5.56MM PLASTIC M862	A065	45,140	lb/item	1.90E-05	4.00E-04	3.10E-06	1.10E-05	1.00E-05	3.75E-04
5.56MM BALL M193 FOR RIF	A066	12,460	lb/item	5.60E-05	1.80E-03	1.30E-05	3.80E-05	3.20E-05	1.33E-03
5.56MM TR RIFLE F/M16	A068	27,220	lb/item	1.70E-05	1.60E-03	2.80E-06	6.70E-05	5.10E-05	1.14E-03
5.56MM BALL (M16) 10/CLIP	A071*	1,358,989	lb/item	6.50E-05	1.40E-03	2.70E-06	4.90E-05	3.30E-05	9.18E-04
5.56MM BLANK LKD F/SAW	A075*	3,800	lb/item	2.00E-05	2.80E-04	9.70E-07	6.90E-06	6.00E-06	0.00E+00
5.56MM BLK F M16A1/A2	A080	37,693	lb/item	2.00E-05	2.80E-04	9.70E-07	6.90E-06	6.00E-06	0.00E+00
7.62MM BLNK LNKD (MILES)	A111	8,100	lb/item	4.40E-05	6.80E-04	2.60E-06	1.70E-05	1.50E-05	0.00E+00
7.62MM BALL LNKD	A128*	21,320	lb/item	9.70E-05	2.30E-03	4.90E-06	5.10E-05	3.80E-05	3.80E-05
7.62MM BALL F/M14	A130*	17,000	lb/item	4.40E-05	6.80E-04	2.60E-06	1.70E-05	1.50E-05	0.00E+00
7.62MM LNKD 4 BALL-1TR	A131	50,554	lb/item	4.30E-05	2.80E-03	7.80E-06	9.10E-05	5.80E-05	5.80E-05
7.62MM BALL (SNIPER)	A136	227,511	lb/item	4.10E-05	3.00E-03	6.20E-06	6.20E-05	4.70E-05	4.70E-05
7.62MM BALL NATO M59	A139*	29,200	lb/item	9.70E-05	2.30E-03	4.90E-06	5.10E-05	3.80E-05	3.80E-05
7.62MM BALL LNKD F/MG	A143	2,900	lb/item	9.70E-05	2.30E-03	4.90E-06	5.10E-05	3.80E-05	3.80E-05
7.62MM TRCR LNKD	A146*	4,000	lb/item	9.70E-05	2.30E-03	4.90E-06	5.10E-05	3.80E-05	3.80E-05
7.62MM NATO BALL M80	A152*	640	lb/item	9.70E-05	2.30E-03	4.90E-06	5.10E-05	3.80E-05	3.80E-05
7.62MM 4 BALL-1TR F/MINI GUN	A165*	3,400	lb/item	4.30E-05	2.80E-03	7.80E-06	9.10E-05	5.80E-05	0.00E+00
.300 WINCHESTER MAGNUM	A191*	36	lb/item	9.70E-05	2.30E-03	4.90E-06	5.10E-05	3.80E-05	3.80E-05
9MM BALL PISTOL (NEW)	A363	2,553,521	lb/item	1.50E-05	3.10E-04	6.80E-06	2.40E-05	2.00E-05	2.00E-05
CTG 7.62MM M118 L RANGE	AA11*	29,135	lb/item	9.70E-05	2.30E-03	4.90E-06	5.10E-05	3.80E-05	3.80E-05
9MM, FX MARKING CARTRIDGE. RED IN	AA12*	99,815	lb/item	1.50E-05	3.10E-04	6.80E-06	2.40E-05	2.00E-05	2.00E-05
9MM, FX MARKING CARTRIDGE. BLUE IN	AA21*	183,975	lb/item	1.50E-05	3.10E-04	6.80E-06	2.40E-05	2.00E-05	2.00E-05
12 GAGE FIN STAB RUBBER	AA31*	2,000	lb/item	4.20E-05	1.50E-03	2.00E-05	7.40E-05	6.70E-05	1.63E-03
5.56MM BALL COMMER PACK, CTG	AA33*	1,049,886	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03
CTG 5.56MM BALL M855,10/CLP-LF	AA45*	24,045	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03
CTG 5.56MM BALLM855 C PAK-LF	AA48*	1,300	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03
CARTRIDGE, 9MM BALL M882	AA49*	8,259,831	lb/item	1.50E-05	3.10E-04	6.80E-06	2.40E-05	2.00E-05	2.00E-05
CTG 5.56MM.BALL MOLY COATED	AA53*	67,113	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03
BREACHING ROUND (M1030)	AA54*	12,499	lb/item	4.20E-05	1.50E-03	2.00E-05	7.40E-05	6.70E-05	1.63E-03
5.56 SRTA ROUND	AA68*	49,857	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03
5.56MM UTM SINGLE SHOT	AB09*	289,215	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03
5.56 UTM	AB10*	354,216	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03
5.56 UTM	AB16*	27,150	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03
12 GA BREACHING ROUND	AB54*	5,945	lb/item	4.20E-05	1.50E-03	2.00E-05	7.40E-05	6.70E-05	1.63E-03
M855A1	AB57*	475,210	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03
M855A1	AB58*	593,328	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03
5.56MM BALL M855A1	AB77*	90,040	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03

5.56MM SESAMS	AZ44*	3,800	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03
5.56MM SESAMS LINKED	AZ45*	400	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03
40MM PRAC M781	B519	323	lb/item	3.60E-05	3.50E-04	6.70E-06	2.60E-05	2.30E-05	2.60E-04
GRENADE, RIOT CONTROL CS L96	FZ14*	3	lb/item	6.70E-04	8.00E-04	1.10E-02	7.00E-02	4.90E-02	2.13E-02
DDI, GRND BDY PRAC M69	G811*	60	lb/item	6.70E-04	8.00E-04	1.10E-02	7.00E-02	4.90E-02	2.13E-02
GREN HAND FRAG M67	G881	640	lb/item	1.10E-03	1.70E-02	5.00E-04	3.10E-02	1.70E-02	2.47E-01
GREN HAND FRAG M33	G888*	60	lb/item	6.70E-04	8.00E-04	1.10E-02	7.00E-02	4.90E-02	2.13E-02
GREN HAND INC AN-M14 (THERMITE)	G900	4	lb/item	6.70E-04	8.00E-04	1.10E-02	7.00E-02	4.90E-02	2.13E-02
GRENADE, HAND PRAC, DELAY M30	G915*	4	lb/item	6.70E-04	8.00E-04	1.10E-02	7.00E-02	4.90E-02	2.13E-02
GREN SMK GRN (MILES) (M18)	G940	12	lb/item	1.20E-04	1.20E-02	3.40E-05	1.30E-01	1.00E-01	8.40E-02
GREN HAND SMK RED (M18)	G950	191	lb/item	4.20E-04	7.70E-02	1.90E-05	1.40E-01	1.20E-01	7.70E-02
GREN HAND SMK VIOL (M18)	G955	52	lb/item	4.90E-04	1.40E-02	1.60E-05	1.20E-01	1.00E-01	4.30E-02
HAND GRENADE SMOKE TNG M83 (TEREPHTHALIC ACID [TA])	G982	32	lb/item	3.50E-04	1.80E-02	5.80E-05	3.60E-02	2.80E-02	1.30E-01
M84 NON LETHAL STUN GRENADE (M84)	GG09	123	lb/item	4.10E-04	1.50E-05	9.00E-07	4.60E-03	3.30E-03	1.70E-03
M84 STUN GRENADE (FUSE)	GG17*	70	lb/item	6.70E-04	8.00E-04	1.10E-02	7.00E-02	4.90E-02	2.13E-02
GRENADE, HAND DIVERSIONARY MK13-0 BTV-1 EL	GG20*	20	lb/item	6.70E-04	8.00E-04	1.10E-02	7.00E-02	4.90E-02	2.13E-02
M18A1 CLAYMORE MINE	J007*	154	lb/item	6.70E-04	8.00E-04	1.10E-02	7.00E-02	4.90E-02	2.13E-02
MINE AP DIR M18A1 CLAYMORE	K143*	40	lb/item	1.80E-06	1.00E-05	0.00E+00	3.20E-05	2.90E-05	9.00E-05
RIOT CNTRL AGENT CS CAPSULE	K765	97	lb/item	1.80E-06	1.00E-05	0.00E+00	3.20E-05	2.90E-05	9.00E-05
SIG ILLUM GRN STAR M125A1	L314	24	lb/item	1.70E-03	1.00E-02	2.00E-06	6.60E-02	0.00E+00	1.40E-01
SLIM PROJ GRND BRST M115A2	L594	105	lb/item	5.50E-03	2.10E-03	4.10E-06	1.90E-01	0.00E+00	3.40E-03
SIM ARTY FLASH M110	L596	3	lb/item	2.00E-03	6.80E-03	1.10E-05	4.50E-02	0.00E+00	2.50E-01
SIM HAND GREN M116 SERIES	L601	72	lb/item	5.60E-03	3.70E-04	1.40E-06	1.20E-01	0.00E+00	4.10E-03
SIM FLSH ART MGT XM24	L603*	60	lb/item	2.00E-03	6.80E-03	1.10E-05	4.50E-02	0.00E+00	2.50E-01
CHG DEMO C4 1-1/4LB	M023	208	lb/item	7.90E-03	2.60E-02	1.70E-04	2.60E-02	1.90E-02	8.30E-01
CHG DEMO LINEAR FLEX	M029*	10	lb/item	1.80E-02	1.10E-02	3.40E-05	4.60E-02	2.10E-02	1.21E+00
CHG DEMO TNT 1/4 LB	M030	160	lb/item	3.00E-03	5.00E-03	1.40E-04	1.20E-02	4.60E-03	3.41E-01
CHG, DEMO BLOCK MK4 .5 LB COMP C-2	M041*	250	lb/item	7.90E-03	2.60E-02	1.70E-04	2.60E-02	1.90E-02	8.30E-01
CHG, DEMO LINEAR MK8 50 LB COMP A-3	M046*	30	lb/item	1.80E-02	1.10E-02	3.40E-05	4.60E-02	2.10E-02	1.21E+00
CTG, POWDER ACTUATED TOOL .27 CAL	M077*	300	lb/item	1.80E-06	1.00E-05	0.00E+00	3.20E-05	2.90E-05	9.00E-05
CAP BLAST ELEC ASSY F/M18A1 MINE	M078*	30	lb/item	6.70E-04	8.00E-04	1.10E-02	7.00E-02	4.90E-02	2.13E-02
CHG, DEMO EXPL SHEET 14 OZ	M081*	50	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CAP, BLASTING ELEC NO 1 DELAY	M101*	55	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CAP, BLASTING ELEC NO 4 DELAY	M104*	1,135	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CAP, BLASTING ELEC NO 6 DELAY	M108*	40	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CAP BL ELEC	M110*	566	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CAP BL ELEC NO 8	M121*	7	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CAP BLAST ELEC M6	M130	454	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CAP BLAST NONELEC M7	M131	6,277	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CAP, BLASTING ELEC HIGH ALTITUDE E81	M138*	6	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CORD DETON REINFOR	M455*	350	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
CORD DET REINFORCED	M456	115,374	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
CORD, DET, 1000 FT SPOOL 2000 FT/B	M457*	10,961	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
DDI, CORD DETONATING	M458*	200	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
DYNAMITE MILITARY M1	M591	15	lb/item	2.40E-03	5.40E-03	1.50E-04	8.90E-03	3.50E-03	3.32E-01

CORD, DET	M613*	1,415	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
CORD, DET	M614*	1,460	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
FIRING DEVICE, DEMO ASSORTED DELAY	M617*	100	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CTG, IMPULSE ANEROID	M647*	60	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
FUSE BLASTING TIME M700	M670	24,411	lb/item	7.70E-02	9.50E-02	0.00E+00	3.40E-02	3.50E-02	4.15E-01
INITIATOR, CTG ACTUATED MK11 MOD 0	M701*	1,055	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
IGNITER FUSE BL TIME M60	M766	190	lb/item	1.80E-06	2.40E-06	2.60E-06	3.60E-06	2.90E-06	1.07E-05
PRIMER PERC CAP M2	M810*	210	lb/item	1.80E-06	2.40E-06	2.60E-06	3.60E-06	2.90E-06	1.07E-05
CAP, BLASTING ELEC	M855*	610	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CANISTER, CTG ACTUATED M13	M881*	18	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CHG, DEMO SHEET 38 FT	M980*	893	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
FIRING DEV MULTIPURPOSE M142	ML03	22	lb/item	1.20E-06	3.80E-06	5.00E-06	8.80E-06	7.70E-06	0.00E+00
CAPBLST NON-E M11W11FT	ML47	2,405	lb/item	4.50E-05	3.10E-04	1.30E-04	4.60E-04	2.90E-04	2.50E-03
DET PERCUSSION W/175 MILSEC	ML65*	200	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CAP, BLASTING, ELEC MK11	ML83*	26	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
ECT, 300 GR/FT	MM24*	995	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CHARGE, DEMOLITION	MM28*	20	lb/item	7.90E-03	2.60E-02	1.70E-04	2.60E-02	1.90E-02	8.30E-01
CAPBLST NON-E M12 W 500FT (SHOCK TUBE)	MN02	848	lb/item	1.20E-04	2.90E-03	5.30E-05	2.20E-04	1.20E-04	1.14E-02
CAPBLST NON-E M13 W 1000FT (SHOCK TUBE)	MN03	1,029	lb/item	2.70E-04	6.50E-03	5.50E-05	2.50E-04	1.60E-04	2.41E-02
CAPBLST DELAY M14 (SHOCK TUBE)	MN06	605	lb/item	5.70E-04	1.80E-03	3.80E-05	2.30E-03	2.03E-03	1.11E-02
CAPBLST NN-ELCDLYM15 70FT	MN07	372	lb/item	4.20E-05	5.70E-04	1.80E-04	3.70E-04	2.70E-04	2.08E-03
IGNBLST FUSM81 S/TUB CPBLTY	MN08	8,677	lb/item	1.90E-06	2.80E-06	4.40E-06	5.40E-06	4.70E-06	9.98E-06
FD DTD M147 48/BX (firing device)	MN11*	10	lb/item	1.80E-06	1.00E-05	0.00E+00	3.20E-05	2.90E-05	9.00E-05
CAPBLST NON-E M11 30F SHKTUB	MN36*	79	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CAP BLAST NON-ELEC 10FT	MN39*	348	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CAP.BLS NON-ELE DELY M18	MN41*	68	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
BOOSTER DEMO 10FT DET CORD M15	MN68	487	lb/item	9.20E-05	1.20E-03	1.10E-04	7.30E-04	6.10E-04	4.50E-03
BOOSTER DEMO 30FT DET CORD M15	MN69*	155	lb/item	9.20E-05	1.20E-03	1.10E-04	7.30E-04	6.10E-04	4.50E-03
BOOSTER DEMO CHG PRAC 30FT	MN75*	105	lb/item	9.20E-05	1.20E-03	1.10E-04	7.30E-04	6.10E-04	4.50E-03
DUAL NONELECTRIC BLASTING CAP ASSEMBLY M19	MN86*	569	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CAP, BLASTING: IN-LINE INITIATOR, NON-ELECTRIC, 500 FT. MINI	MN88*	436	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CAP, BLASTING: IN-LINE INITIATOR, NON-ELECTRIC, 1000 FT. MIN	MN90*	2,734	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CORD,DETONATING FCDC	MS91*	725	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
CORD DETONATINGR.	MU40*	150	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
CORD DETONATINGR.	MU42*	456	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
5.56 SPECIAL BALL 77GRAIN	X132*	447,061	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03
CTG, CAL .40 STANDARD 1.25"	X196*	237,320	lb/item	9.70E-05	2.30E-03	4.90E-06	5.10E-05	3.80E-05	3.80E-05
40FT INSTANT DET CORD	X455*	226	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
INTEGRAL FIRING DEVICE, 14 FT	X467*	6	lb/item	7.70E-02	9.50E-02	0.00E+00	3.40E-02	3.50E-02	4.15E-01
9FT DET CORD 1IN BLAST CAP 3.8 SEC DELAY	X471*	1,445	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
ECT, 450 GR/FT	X476*	2	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00

ECT, 900 GR/FT	X477*	20	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
DET, NONEL 20 FT CLEAR MINI-TU	X604*	83	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
DET, NONEL 40 FT CLEAR MINI-TU	X605*	39	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
DET, NONEL 2M CLEAR MINI-TUBE	X608*	88	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
DET, NONEL 200 FT CLEAR MINI-T	X618*	11	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
FLASHBANG, 2 BANG SOUND FLASH	X696*	967	lb/item	7.70E-02	9.50E-02	0.00E+00	3.40E-02	3.50E-02	4.15E-01
FLASH BANG, 9-BANG SOUND FLASH	X699*	1,635	lb/item	7.70E-02	9.50E-02	0.00E+00	3.40E-02	3.50E-02	4.15E-01
OP-4, 5.45 X 39 BALL	Z200*	8,000	lb/item	7.70E-02	9.50E-02	0.00E+00	3.40E-02	3.50E-02	4.15E-01
OP-4, 7.62 X 39 BALL	Z203*	8,000	lb/item	7.70E-02	9.50E-02	0.00E+00	3.40E-02	3.50E-02	4.15E-01
5.56MM SESAMS (M16)	ZZZ3*	1,928	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03

TA C-53A

Nomenclature	DODIC	Quantity Fired	Units	NOx	CO	Pb	PM10	PM2.5	GHG
PAN ULTRA VELOCITY SLUG	AA62*	10	lb/item	4.20E-05	1.50E-03	2.00E-05	7.40E-05	6.70E-05	1.63E-03
PAN AVON ROUND	AA63*	10	lb/item	4.20E-05	1.50E-03	2.00E-05	7.40E-05	6.70E-05	1.63E-03
PAN LOW VELOCITY BLANK POPPER	AA64*	10	lb/item	4.20E-05	1.50E-03	2.00E-05	7.40E-05	6.70E-05	1.63E-03
PAN COMM BLACK POWDER BLANK	AA66*	10	lb/item	4.20E-05	1.50E-03	2.00E-05	7.40E-05	6.70E-05	1.63E-03
PAN ENHANCED BLANK	DWEC*	25	lb/item	4.20E-05	1.50E-03	2.00E-05	7.40E-05	6.70E-05	1.63E-03
PAN CUSTOM STEEL SLUG	DWED*	25	lb/item	4.20E-05	1.50E-03	2.00E-05	7.40E-05	6.70E-05	1.63E-03
PAN ALUMINUM SLUG	DWEE*	26	lb/item	4.20E-05	1.50E-03	2.00E-05	7.40E-05	6.70E-05	1.63E-03
GREN HAND INC AN-M14 (THERMITE)	G900	684	lb/item	6.70E-04	8.00E-04	1.10E-02	7.00E-02	4.90E-02	2.13E-02
GREN HAND OFF MK3A2	G910*	8	lb/item	6.70E-04	8.00E-04	1.10E-02	7.00E-02	4.90E-02	2.13E-02
GREN HAND SMK HC (AN-M8)	G930	1	lb/item	1.00E-03	4.60E-02	4.70E-04	6.80E-01	1.10E-01	3.30E-02
GREN SMK GRN (MILES) (M18)	G940	34	lb/item	1.20E-04	1.20E-02	3.40E-05	1.30E-01	1.00E-01	8.40E-02
GREN HAND SMK YEL (M18)	G945	32	lb/item	7.80E-05	4.00E-03	1.50E-05	0.00E+00	0.00E+00	7.70E-02
GREN HAND SMK RED (M18)	G950	14	lb/item	4.20E-04	7.70E-02	1.90E-05	1.40E-01	1.20E-01	7.70E-02
GREN HAND SMK VIOL (M18)	G955	3	lb/item	4.90E-04	1.40E-02	1.60E-05	1.20E-01	1.00E-01	4.30E-02
HAND GRENADE SMOKE TNG M83 (TEREPHTHALIC ACID [TA])	G982	38	lb/item	3.50E-04	1.80E-02	5.80E-05	3.60E-02	2.80E-02	1.30E-01
DDI, MINE APERS M68 PRAC	K139*	12	lb/item	1.80E-06	1.00E-05	0.00E+00	3.20E-05	2.90E-05	9.00E-05
MINE AP DIR M18A1 CLAYMORE	K143*	36	lb/item	1.80E-06	1.00E-05	0.00E+00	3.20E-05	2.90E-05	9.00E-05
SIG ILLUM RS CLUSTER M158A1	L306	1	lb/item	3.30E-03	8.80E-03	1.70E-06	8.90E-02	0.00E+00	1.80E-01
FLARE SURFACE TRIP M49A1	L495	11	lb/item	2.90E-03	5.30E-04	9.90E-06	1.30E-01	0.00E+00	5.20E-02
SLIM PROJ GRND BRST M115A2	L594	11	lb/item	5.50E-03	2.10E-03	4.10E-06	1.90E-01	0.00E+00	3.40E-03
SIM BOOBYTRAP FLASH M117	L598	61	lb/item	5.00E-05	5.30E-05	2.30E-06	2.50E-03	0.00E+00	0.00E+00
SIM BOOBYTRAP WHIS M119	L600	31	lb/item	6.60E-05	1.40E-03	0.00E+00	2.40E-03	0.00E+00	4.10E-03
SIM HAND GREN M116 SERIES	L601	270	lb/item	5.60E-03	3.70E-04	1.40E-06	1.20E-01	0.00E+00	4.10E-03
CHG DEMO C4 1-1/4LB	M023	15,830	lb/item	7.90E-03	2.60E-02	1.70E-04	2.60E-02	1.90E-02	8.30E-01
CHG DEMO BLK M118 PETN 2LB	M024*	20	lb/item	1.80E-02	1.10E-02	3.40E-05	4.60E-02	2.10E-02	1.21E+00
CHG, DEMO LINEAR M58 COMP C-4	M025*	210	lb/item	1.80E-02	1.10E-02	3.40E-05	4.60E-02	2.10E-02	1.21E+00
DEMO KIT BANG TORP	M026*	30	lb/item	1.80E-02	1.10E-02	3.40E-05	4.60E-02	2.10E-02	1.21E+00
DEMO KIT BANG TORPEDO	M028*	18	lb/item	1.80E-02	1.10E-02	3.40E-05	4.60E-02	2.10E-02	1.21E+00
CHG DEMO LINEAR FLEX	M029*	1	lb/item	1.80E-02	1.10E-02	3.40E-05	4.60E-02	2.10E-02	1.21E+00
CHG DEMO TNT 1/4 LB	M030	2,355	lb/item	3.00E-03	5.00E-03	1.40E-04	1.20E-02	4.60E-03	3.41E-01

TNT 1/2 LB M1A4	M031	283	lb/item	7.40E-03	1.10E-02	1.10E-04	6.70E-02	6.40E-03	7.20E-01
CHG DEMO TNT 1 LB	M032	1,671	lb/item	1.30E-02	4.80E-03	2.00E-04	2.50E-02	1.40E-02	1.20E+00
CHG DEMO 1-1/4 LB	M037*	393	lb/item	7.90E-03	2.60E-02	1.70E-04	2.60E-02	1.90E-02	8.30E-01
CHG DEMO 1-1/4 LB	M038*	40	lb/item	7.90E-03	2.60E-02	1.70E-04	2.60E-02	1.90E-02	8.30E-01
CHG DEMO 40LB CRATERING	M039*	251	lb/item	1.30E-02	4.80E-03	2.00E-04	2.50E-02	1.40E-02	1.20E+00
CHG DEMO ROLL	M060*	2	lb/item	1.30E-02	4.80E-03	2.00E-04	2.50E-02	1.40E-02	1.20E+00
CAP, BLASTING ELEC NO 4 DELAY	M104*	150	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CAP BL ELEC	M110*	70	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CAP BL ELEC NO 8	M121*	20	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CAP BLAST ELEC M6	M130	1,528	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CAP BLAST NONELEC M7	M131	15,135	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CTG, POWDER ACTUATED TOOL .38 CAL	M145*	11	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CAP, BLASTING ELEC SPEC STRENGTH E108	M153*	43	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
FASTENER UNIT, POWDER ACTUATED TOOL	M156*	99	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CTG, DELAY MK35 MOD 0	M202*	5	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
DESTRUCTOR, EXPL LGM 25	M236*	20	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CTG CARGO REL 20 SEC DELAY	M308*	4	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
COUPLING BASE FRNG DEVICE	M327	250	lb/item	7.00E-07	5.50E-06	6.70E-06	1.70E-05	1.50E-05	1.10E-05
CHG DEMO SHAPED 15 LB M2A4	M420	69	lb/item	7.00E-02	6.40E-02	3.80E-02	3.50E-01	1.50E-01	1.30E+01
CHG DEMO SHAPED 40 LB M3	M421*	51	lb/item	1.30E-02	4.80E-03	2.00E-04	2.50E-02	1.40E-02	1.20E+00
CORD DET REINFORCED	M456	433,474	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
CORD, DET, 1000 FT SPOOL 2000 FT/B	M457*	30,141	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
DDI, CORD DETONATING	M458*	23,257	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
DET PERC M2A1 8SEC	M541*	50	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
DYNAMITE MILITARY M1	M591	1,891	lb/item	2.40E-03	5.40E-03	1.50E-04	8.90E-03	3.50E-03	3.32E-01
CORD, DET	M613*	300	lb/item	7.00E-03	4.70E-02	7.30E-05	1.60E-01	1.10E-02	5.00E+00
FIRING DEVICE DEMO 45-115 MI	M620*	400	lb/item	7.60E-07	6.30E-06	6.90E-06	1.60E-05	5.90E-06	5.40E-06
FIRING DEVICE DEMO PULL TYPE	M630	5,275	lb/item	7.60E-07	6.30E-06	6.90E-06	1.60E-05	5.90E-06	5.40E-06
FUSE BLASTING TIME M700	M670	68,080	lb/item	7.70E-02	9.50E-02	0.00E+00	3.40E-02	3.50E-02	4.15E-01
INITIATOR, CTG ACTUATED MK11 MOD 0	M701*	150	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
INITIATOR, CTG ACTUATED M31	M703*	700	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CHG, DEMO SHEET 38 FT	M980*	2,300	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CHG, DEMO SHEET 9 FT	M986*	14	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
FIRING DEV MULTIPURPOSE M142	ML03	187	lb/item	1.20E-06	3.80E-06	5.00E-06	8.80E-06	7.70E-06	0.00E+00
CUTTER,MK 24-0	ML05	4	lb/item	1.90E-02	2.30E-02	1.10E-03	6.60E-02	2.90E-02	1.51E+00
HLDR BLST CP S/TUBM9	ML45*	51	lb/item	4.50E-05	3.10E-04	1.30E-04	4.60E-04	2.90E-04	2.50E-03
CAPBLST NON-E M11W11FT	ML47	724	lb/item	4.50E-05	3.10E-04	1.30E-04	4.60E-04	2.90E-04	2.50E-03
MUNITION, ATTACK, DEMOLITION	MM16*	3	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CHARGE, DEMOLITION	MM30*	3	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CAPBLST NON-E M12 W 500FT (SHOCK TUBE)	MN02	240	lb/item	1.20E-04	2.90E-03	5.30E-05	2.20E-04	1.20E-04	1.14E-02
CAPBLST NON-E M13 W 1000FT (SHOCK TUBE)	MN03	569	lb/item	2.70E-04	6.50E-03	5.50E-05	2.50E-04	1.60E-04	2.41E-02
CAPBLST DELAY M14 (SHOCK TUBE)	MN06	391	lb/item	5.70E-04	1.80E-03	3.80E-05	2.30E-03	2.03E-03	1.11E-02
CAPBLST NN-ELCDLYM15 70FT	MN07	1,504	lb/item	4.20E-05	5.70E-04	1.80E-04	3.70E-04	2.70E-04	2.08E-03
IGNBLST FUSM81 S/TUB CPBLTY	MN08	9,664	lb/item	1.90E-06	2.80E-06	4.40E-06	5.40E-06	4.70E-06	9.98E-06
FD DTD M147 48/BX	MN11*	1	lb/item	1.80E-06	1.00E-05	0.00E+00	3.20E-05	2.90E-05	9.00E-05
FIRING DEVICE, DEMOLITION MK54	MN14*	19	lb/item	1.80E-06	1.00E-05	0.00E+00	3.20E-05	2.90E-05	9.00E-05

SELECTABLE LIGHTWEIGHT ATTACK,	MN28*	29	lb/item	1.80E-06	1.00E-05	0.00E+00	3.20E-05	2.90E-05	9.00E-05
CAPBLST NON-E M15 70F SHK TB	MN38*	60	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CAP BLAST NON-ELEC 10FT	MN39*	189	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CAP.BLS NON-ELE DELY M18	MN41*	342	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
BOOSTER DEMO 10FT DET CORD M15	MN68	1,748	lb/item	9.20E-05	1.20E-03	1.10E-04	7.30E-04	6.10E-04	4.50E-03
BOOSTER DEMO 30FT DET CORD M15	MN69*	518	lb/item	9.20E-05	1.20E-03	1.10E-04	7.30E-04	6.10E-04	4.50E-03
CHARGE, DEMO .5LB SEMTEX A	MN82*	3	lb/item	9.20E-05	1.20E-03	1.10E-04	7.30E-04	6.10E-04	4.50E-03
DUAL NONELECTRIC BLASTING CAP ASSEMBLY M19	MN86*	1,498	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CAP, BLASTING: IN-LINE INITIATOR, NON-ELECTRIC, 500 FT. MINI	MN88*	2,334	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CAP,BLASTING: IN-LINE INITIATOR,NON-ELECTRIC,500 FT MINITUBE	MN89*	76	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CAP, BLASTING: IN-LINE INITIATOR, NON-ELECTRIC, 1000 FT. MIN	MN90*	1,566	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
ECT, 3600 GR/FT	X479*	4	lb/item	7.10E-05	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04

CACTF									
Nomenclature	DODIC	Quantity Fired	Units	NOx	CO	Pb	PM10	PM2.5	GHG
40MM PRAC	B519	10,000	lb/item	3.60E-05	3.50E-04	6.70E-06	2.60E-05	2.30E-05	2.60E-04
SLIM PROJ GRND BRST M115A2	L594	1,500	lb/item	5.50E-03	2.10E-03	4.10E-06	1.90E-01	0.00E+00	3.40E-03
RIOT CNTRL AGENT CS CAPSULE	K765	1,500	lb/item	1.80E-06	1.00E-05	0.00E+00	3.20E-05	2.90E-05	9.00E-05
SIM HAND GREN M116 SERIES	L601	1,500	lb/item	5.60E-03	3.70E-04	1.40E-06	1.20E-01	0.00E+00	4.10E-03
M84 NON LETHAL STUN GRENADE (M84)	GG09	1,500	lb/item	4.10E-04	1.50E-05	9.00E-07	4.60E-03	3.30E-03	1.70E-03
HAND GRENADE SMOKE TNG M83 (TEREPHTHALIC ACID [TA])	G982	1,500	lb/item	3.50E-04	1.80E-02	5.80E-05	3.60E-02	2.80E-02	1.30E-01
5.56MM UTM SINGLE SHOT	AB09*	35,000	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03

GLR									
Nomenclature	DODIC	Quantity Fired	Units	NOx	CO	Pb	PM10	PM2.5	GHG
40MM PRAC	B519	30,000	lb/item	3.60E-05	3.50E-04	6.70E-06	2.60E-05	2.30E-05	2.60E-04

Trench Complex/ TTA I-36									
Nomenclature	DODIC	Quantity Fired	Units	NOx	CO	Pb	PM10	PM2.5	GHG
9MM BALL PISTOL (NEW)	A363	10,000	lb/item	1.50E-05	3.10E-04	6.80E-06	2.40E-05	2.00E-05	2.00E-05
40MM PRAC	B519	200	lb/item	3.60E-05	3.50E-04	6.70E-06	2.60E-05	2.30E-05	2.60E-04
5.56MM BLK F M16A1/A2	A080	150,000	lb/item	2.00E-05	2.80E-04	9.70E-07	6.90E-06	6.00E-06	0.00E+00
5.56MM BALL F/M16A2	A059	150,000	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	8.70E-04
7.62MM BLNK LNKD (MILES)	A111	75,000	lb/item	4.40E-05	6.80E-04	2.60E-06	1.70E-05	1.50E-05	0.00E+00
7.62MM BALL LNKD F/MG	A143	150,000	lb/item	9.70E-05	2.30E-03	4.90E-06	5.10E-05	3.80E-05	3.80E-05
BOOSTER DEMO 10FT DET CORD M15	MN68	1,500	lb/item	9.20E-05	1.20E-03	1.10E-04	7.30E-04	6.10E-04	4.50E-03
CAP BLAST ELEC M6	M130	150	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
FUSE BLASTING TIME M700	M670	750	lb/item	7.70E-02	9.50E-02	0.00E+00	3.40E-02	3.50E-02	4.15E-01
SLIM PROJ GRND BRST M115A2	L594	150	lb/item	5.50E-03	2.10E-03	4.10E-06	1.90E-01	0.00E+00	3.40E-03
RIOT CNTRL AGENT CS CAPSULE	K765	10	lb/item	1.80E-06	1.00E-05	0.00E+00	3.20E-05	2.90E-05	9.00E-05
SIM HAND GREN M116 SERIES	L601	200	lb/item	5.60E-03	3.70E-04	1.40E-06	1.20E-01	0.00E+00	4.10E-03

M84 NON LETHAL STUN GRENADE (M84)	GG09	300	lb/item	4.10E-04	1.50E-05	9.00E-07	4.60E-03	3.30E-03	1.70E-03
HAND GRENADE SMOKE TNG M83 (TEREPHTHALIC ACID [TA])	G982	250	lb/item	3.50E-04	1.80E-02	5.80E-05	3.60E-02	2.80E-02	1.30E-01
5.56MM UTM SINGLE SHOT	AB09*	20,000	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03

RDZ									
Nomenclature	**DODIC**	**Quantity Fired**	**Units**	**NOx**	**CO**	**Pb**	**PM10**	**PM2.5**	**GHG**
SLIM PROJ GRND BRST M115A2	L594	150	lb/item	5.50E-03	2.10E-03	4.10E-06	1.90E-01	0.00E+00	3.40E-03
SIM HAND GREN M116 SERIES	L601	150	lb/item	5.60E-03	3.70E-04	1.40E-06	1.20E-01	0.00E+00	4.10E-03
RIOT CNTRL AGENT CS CAPSULE	K765	10	lb/item	1.80E-06	1.00E-05	0.00E+00	3.20E-05	2.90E-05	9.00E-05
HAND GRENADE SMOKE TNG M83 (TEREPHTHALIC ACID [TA])	G982	250	lb/item	3.50E-04	1.80E-02	5.80E-05	3.60E-02	2.80E-02	1.30E-01
5.56MM UTM SINGLE SHOT	AB09*	35,000	lb/item	8.50E-05	1.60E-03	5.10E-06	3.90E-05	2.80E-05	1.11E-03

Notes: EPA AP-42 does not contain emission factors for all DODICs. Munitions with an asterisk were given emission factors from known munitions based on assumptions.

Table A-3 Munitions Annual Emissions

Alternative 3 (Baseline) -- Emissions (TPY)

B-88 Complex

Nomenclature	DODIC	Quantity Fired	Units	NOx	CO	Pb	PM10	PM2.5	GHG
12GA SHOTGUN 00 BUCKSHOT	A011	221	lb/item	9.28E-03	3.32E-01	4.42E-03	1.64E-02	1.48E-02	3.60E-01
12GA #9 SHOT	A017	565	lb/item	1.19E-02	5.65E-01	4.18E-03	1.19E-02	1.13E-02	6.27E-01
CTG 12 GAGE SHOTGUN FLECHETTE	A019	25	lb/item	5.25E-04	2.50E-02	1.85E-04	5.25E-04	5.00E-04	2.78E-02
CTG 12 GAGE SHOTGUN #4	A020	36	lb/item	1.51E-03	5.40E-02	7.20E-04	2.66E-03	2.41E-03	5.87E-02
CTG.12 GAUGE	A023	8	lb/item	1.68E-04	8.00E-03	5.92E-05	1.68E-04	1.60E-04	8.88E-03
12 GAG MK246MD0	A024	22	lb/item	4.62E-04	2.20E-02	1.63E-04	4.62E-04	4.40E-04	2.44E-02
5.56MM BALL F/M16A2	A059	1342701	lb/item	1.14E+02	2.15E+03	6.85E+00	5.24E+01	3.76E+01	1.49E+03
5.56MM BALL LKD F/SAW	A062	4950	lb/item	4.21E-01	7.92E+00	2.52E-02	1.93E-01	1.39E-01	5.49E+00
5.56MM TR F/M16A2	A063	4895	lb/item	3.18E-01	6.85E+00	1.32E-02	2.40E-01	1.62E-01	4.49E+00
5.56MM BALL TR 4/1 F/SAW	A064	8195	lb/item	6.97E-01	1.31E+01	4.18E-02	3.20E-01	2.29E-01	9.10E+00
5.56MM PLASTIC M862	A065	6449	lb/item	1.23E-01	2.58E+00	2.00E-02	7.09E-02	6.45E-02	2.42E+00
5.56MM BALL M193 FOR RIF	A066	1780	lb/item	9.97E-02	1.80E-03	1.30E-06	6.84E-08	4.15E-11	2.37E+00
5.56MM TR RIFLE F/M16	A068	3889	lb/item	6.61E-02	6.22E+00	1.09E-02	2.61E-01	1.98E-01	4.43E+00
5.56MM BALL (M16) 10/CLIP	A071	194142	lb/item	1.26E+01	2.72E+02	5.24E-01	9.51E+00	6.41E+00	1.78E+02
5.56MM BLANK LKD F/SAW	A075	543	lb/item	1.09E-02	1.52E-01	5.27E-04	3.75E-03	3.26E-03	N/A
5.56MM BLK F M16A1/A2	A080	5385	lb/item	1.08E-01	1.51E+00	5.22E-03	3.72E-02	3.23E-02	N/A
7.62MM BLNK LNKD (MILES)	A111	1158	lb/item	5.10E-02	7.87E-01	3.01E-03	1.97E-02	1.74E-02	N/A
7.62MM BALL LNKD	A128	3046	lb/item	2.95E-01	7.01E+00	1.49E-02	1.55E-01	1.16E-01	1.16E-01
7.62MM BALL F/M14	A130	2429	lb/item	1.07E-01	1.65E+00	6.32E-03	4.13E-02	3.64E-02	N/A
7.62MM LNKD 4 BALL-1TR	A131	7222	lb/item	3.11E-01	2.02E+01	5.63E-02	6.57E-01	4.19E-01	4.19E-01
7.62MM BALL (SNIPER)	A136	32502	lb/item	1.33E+00	9.75E+01	2.02E-01	2.02E+00	1.53E+00	1.53E+00
7.62MM BALL NATO M59	A139	4172	lb/item	4.05E-01	9.60E+00	2.04E-02	2.13E-01	1.59E-01	1.59E-01
7.62MM BALL LNKD F/MG	A143	415	lb/item	4.03E-02	9.55E-01	2.03E-03	2.12E-02	1.58E-02	1.58E-02
7.62MM TRCR LNKD	A146	572	lb/item	5.55E-02	1.32E+00	2.80E-03	2.92E-02	2.17E-02	2.17E-02
7.62MM NATO BALL M80	A152	92	lb/item	8.92E-03	2.12E-01	4.51E-04	4.69E-03	3.50E-03	3.50E-03
7.62MM 4 BALL-1TR F/MINI GUN	A165	486	lb/item	2.09E-02	1.36E+00	3.79E-03	4.42E-02	2.82E-02	N/A
.300 WINCHESTER MAGNUM	A191	36	lb/item	3.49E-03	8.28E-02	1.76E-04	1.84E-03	1.37E-03	1.37E-03
9MM BALL PISTOL (NEW)	A363	364789	lb/item	5.47E+00	1.13E+02	2.48E+00	8.75E+00	7.30E+00	7.30E+00
CTG 7.62MM M118 L RANGE	AA11	4163	lb/item	4.04E-01	9.57E+00	2.04E-02	2.12E-01	1.58E-01	1.58E-01
9MM, FX MARKING CARTRIDGE, RED IN	AA12	14260	lb/item	2.14E-01	4.42E+00	9.70E-02	3.42E-01	2.85E-01	2.85E-01
9MM, FX MARKING CARTRIDGE, BLUE IN	AA21	26283	lb/item	3.94E-01	8.15E+00	1.79E-01	6.31E-01	5.26E-01	5.26E-01
12 GAGE FIN STAB RUBBER	AA31	286	lb/item	1.20E-02	4.29E-01	5.72E-03	2.12E-02	1.92E-02	4.66E-01
5.56MM BALL COMMER PACK, CTG	AA33	149984	lb/item	1.27E+01	2.40E+02	7.65E-01	5.85E+00	4.20E+00	1.66E+02
CTG 5.56MM BALL M855,10/CLP-LF	AA45	3435	lb/item	2.92E-01	5.50E+00	1.75E-02	1.34E-01	9.62E-02	3.81E+00
CTG 5.56MM BALLM855 C PAK-LF	AA48	186	lb/item	1.58E-02	2.98E-01	9.49E-04	7.25E-03	5.21E-03	2.06E-01
CARTRIDGE, 9MM BALL M882	AA49	721097	lb/item	1.08E+01	2.24E+02	4.90E+00	1.73E+01	1.44E+01	1.44E+01
CTG 5.56MM.BALL MOLY COATED	AA53	9588	lb/item	8.15E-01	1.53E+01	4.89E-02	3.74E-01	2.68E-01	1.06E+01
BREACHING ROUND (M1030)	AA54	1786	lb/item	7.50E-02	2.68E+00	3.57E-02	1.32E-01	1.20E-01	2.91E+00
5.56 SRTA ROUND	AA68	7123	lb/item	6.05E-01	1.14E+01	3.63E-02	2.78E-01	1.99E-01	7.91E+00
5.56MM UTM SINGLE SHOT	AB09	41317	lb/item	3.51E+00	6.61E+01	2.11E-01	1.61E+00	1.16E+00	4.59E+01
5.56 UTM	AB10	50603	lb/item	4.30E+00	8.10E+01	2.58E-01	1.97E+00	1.42E+00	5.62E+01
5.56 UTM	AB16	3879	lb/item	3.30E-01	6.21E+00	1.98E-02	1.51E-01	1.09E-01	4.31E+00
12 GA BREACHING ROUND	AB54	850	lb/item	3.57E-02	1.28E+00	1.70E-02	6.29E-02	5.70E-02	1.39E+00
M855A1	AB57	67888	lb/item	5.77E+00	1.09E+02	3.46E-01	2.65E+00	1.90E+00	7.54E+01
M855A1	AB58	84762	lb/item	7.20E+00	1.36E+02	4.32E-01	3.31E+00	2.37E+00	9.41E+01
5.56MM BALL M855A1	AB77	12863	lb/item	1.09E+00	2.06E+01	6.56E-02	5.02E-01	3.60E-01	1.43E+01
5.56MM SESAMS	AZ44	543	lb/item	4.62E-02	8.69E-01	2.77E-03	2.12E-02	1.52E-02	6.03E-01
5.56MM SESAMS LINKED	AZ45	58	lb/item	4.93E-03	9.28E-02	2.96E-04	2.26E-03	1.62E-03	6.44E-02
40MM PRAC M781	B519	47	lb/item	1.69E-03	1.65E-02	3.15E-04	1.22E-03	1.08E-03	1.22E-02

GRENADE, RIOT CONTROL CS L96	FZ14	1	lb/item	6.70E-04	8.00E-04	1.10E-02	7.00E-02	4.90E-02	2.13E-02
DDI, GRND BDY PRAC M69	G811	9	lb/item	6.03E-03	7.20E-03	9.90E-02	6.30E-01	4.41E-01	1.92E-01
GREN HAND FRAG M67	G881	92	lb/item	1.01E-01	1.56E+00	4.60E-02	2.85E+00	1.56E+00	2.27E+01
GREN HAND FRAG M33	G888	9	lb/item	6.03E-03	7.20E-03	9.90E-02	6.30E-01	4.41E-01	1.92E-01
GREN HAND INC AN-M14 (THERMITE)	G900	1	lb/item	6.70E-04	8.00E-04	1.10E-02	7.00E-02	4.90E-02	2.13E-02
GRENADE, HAND PRAC, DELAY M30	G915	1	lb/item	6.70E-04	8.00E-04	1.10E-02	7.00E-02	4.90E-02	2.13E-02
GREN SMK GRN (MILES) (M18)	G940	2	lb/item	2.40E-04	2.40E-02	6.80E-05	2.60E-01	2.00E-01	1.68E-01
GREN HAND SMK RED (M18)	G950	28	lb/item	1.18E-02	2.16E+00	5.32E-04	3.92E+00	3.36E+00	2.16E+00
GREN HAND SMK VIOL (M18)	G955	8	lb/item	3.92E-03	1.12E-01	1.28E-04	9.60E-01	8.00E-01	3.44E-01
HAND GRENADE SMOKE TNG M83 (TEREPHTHALIC ACID TA1)	G982	5	lb/item	1.75E-03	9.00E-02	2.90E-04	1.80E-01	1.40E-01	6.50E-01
M84 NON LETHAL STUN GRENADE (M84)	GG09	18	lb/item	7.38E-03	2.70E-04	1.62E-05	8.28E-02	5.94E-02	3.06E-02
M84 STUN GRENADE (FUSE)	GG17	10	lb/item	6.70E-03	8.00E-03	1.10E-01	7.00E-01	4.90E-01	2.13E-01
GRENADE, HAND DIVERSIONARY MK13-0 BTV-1 EL	GG20	3	lb/item	2.01E-03	2.40E-03	3.30E-02	2.10E-01	1.47E-01	6.39E-02
M18A1 CLAYMORE MINE	J007	22	lb/item	1.47E-02	1.76E-02	2.42E-01	1.54E+00	1.08E+00	4.69E-01
MINE AP DIR M18A1 CLAYMORE	K143	6	lb/item	1.08E-05	6.00E-05	0.00E+00	1.92E-04	1.74E-04	5.40E-04
RIOT CNTRL AGENT CS CAPSULE	K765	14	lb/item	2.52E-05	1.40E-04	0.00E+00	4.48E-04	4.06E-04	1.26E-03
SIG ILLUM GRN STAR M125A1	L314	4	lb/item	6.80E-03	4.00E-02	8.00E-06	2.64E-01	0.00E+00	5.60E-01
SLIM PROJ GRND BRST M115A2	L594	15	lb/item	8.25E-02	3.15E-02	6.15E-05	2.85E+00	0.00E+00	5.10E-02
SIM ARTY FLASH M110	L596	1	lb/item	2.00E-03	6.80E-03	1.10E-05	4.50E-02	0.00E+00	2.50E-01
SIM HAND GREN M116 SERIES	L601	11	lb/item	6.16E-02	4.07E-03	1.54E-05	1.32E+00	0.00E+00	4.51E-02
SIM FLSH ART MGT XM24	L603	9	lb/item	1.80E-02	6.12E-02	9.90E-05	4.05E-01	0.00E+00	2.25E+00
CHG DEMO C4 1-1/4LB	M023	30	lb/item	2.37E-01	7.80E-01	5.10E-03	7.80E-01	5.70E-01	2.49E+01
CHG DEMO LINEAR FLEX	M029	2	lb/item	3.60E-02	2.20E-02	6.80E-05	9.20E-02	4.20E-02	2.42E+00
CHG DEMO TNT 1/4 LB	M030	23	lb/item	6.90E-02	1.15E-01	3.22E-03	2.76E-01	1.06E-01	7.84E+00
CHG, DEMO BLOCK MK4 .5 LB COMP C-2	M041	36	lb/item	2.84E-01	9.36E-01	6.12E-03	9.36E-01	6.84E-01	2.99E+01
CHG, DEMO LINEAR MK8 50 LB COMP A-3	M046	5	lb/item	9.00E-02	5.50E-02	1.70E-04	2.30E-01	1.05E-01	6.05E+00
CTG, POWDER ACTUATED TOOL .27 CAL	M077	43	lb/item	7.74E-05	4.30E-04	0.00E+00	1.38E-03	1.25E-03	3.87E-03
CAP BLAST ELEC ASSY F/M18A1 MINE	M078	5	lb/item	3.35E-03	4.00E-03	5.50E-02	3.50E-01	2.45E-01	1.07E-01
CHG, DEMO EXPL SHEET 14 OZ	M081	8	lb/item	5.68E-04	2.32E-03	2.08E-03	3.92E-03	2.72E-03	7.60E-03
CAP, BLASTING ELEC NO 1 DELAY	M101	8	lb/item	6.16E-04	2.56E-03	1.20E-03	3.20E-03	1.92E-03	6.66E-03
CAP, BLASTING ELEC NO 4 DELAY	M104	163	lb/item	1.26E-02	5.22E-02	2.45E-02	6.52E-02	3.91E-02	1.36E-01
CAP, BLASTING ELEC NO 6 DELAY	M108	6	lb/item	4.62E-04	1.92E-03	9.00E-04	2.40E-03	1.44E-03	5.00E-03
CAP BL ELEC	M110	81	lb/item	6.24E-03	2.59E-02	1.22E-02	3.24E-02	1.94E-02	6.75E-02
CAP BL ELEC NO 8	M121	1	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CAP BLAST ELEC M6	M130	65	lb/item	5.01E-03	2.08E-02	9.75E-03	2.60E-02	1.56E-02	5.41E-02
CAP BLAST NONELEC M7	M131	897	lb/item	6.37E-02	2.60E-01	2.33E-01	4.40E-01	3.05E-01	8.52E-01
CAP, BLASTING ELEC HIGH ALTITUDE E81	M138	1	lb/item	7.70E-05	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
CORD DETON REINFOR	M455	50	lb/item	3.50E-01	2.35E+00	3.65E-03	8.00E+00	5.50E-01	2.50E+02
CORD DET REINFORCED	M456	16482	lb/item	1.15E+02	7.75E+02	1.20E+00	2.64E+03	1.81E+02	8.24E+04
CORD, DET, 1000 FT SPOOL 2000 FT/B	M457	1566	lb/item	1.10E+01	7.36E+01	1.14E-01	2.51E+02	1.72E+01	7.83E+03
DDI, CORD DETONATING	M458	29	lb/item	2.03E-01	1.36E+00	2.12E-03	4.64E+00	3.19E-01	1.45E+02
DYNAMITE MILITARY M1	M591	3	lb/item	7.20E-03	1.62E-02	4.50E-04	2.67E-02	1.05E-02	9.96E-01
CORD, DET	M613	203	lb/item	1.42E+00	9.54E+00	1.48E-02	3.25E+01	2.23E+00	1.02E+03
CORD, DET	M614	209	lb/item	1.46E+00	9.82E+00	1.53E-02	3.34E+01	2.30E+00	1.05E+03
FIRING DEVICE, DEMO ASSORTED DELAY	M617	15	lb/item	1.16E-03	4.80E-03	2.25E-03	6.00E-03	3.60E-03	1.25E-02
CTG, IMPULSE	M647	9	lb/item	6.93E-04	2.88E-03	1.35E-03	3.60E-03	2.16E-03	7.50E-03
FUSE BLASTING TIME M700	M670	3488	lb/item	2.69E+02	3.31E+02	0.00E+00	1.19E+02	1.22E+02	1.45E+03

INITIATOR, CTG ACTUATED MK11 MOD 0	M701	151	lb/item	1.16E-02	4.83E-02	2.27E-02	6.04E-02	3.62E-02	1.26E-01
IGNITER FUSE BL TIME M60	M766	28	lb/item	5.04E-05	6.72E-05	7.28E-05	1.01E-04	8.12E-05	3.00E-04
PRIMER PERC CAP M2	M810	30	lb/item	5.40E-05	7.20E-05	7.80E-05	1.08E-04	8.70E-05	3.21E-04
CAP, BLASTING ELEC	M855	88	lb/item	6.78E-03	2.82E-02	1.32E-02	3.52E-02	2.11E-02	7.33E-02
CANISTER, CTG ACTUATED M13	M881	3	lb/item	2.31E-04	9.60E-04	4.50E-04	1.20E-03	7.20E-04	2.50E-03
CHG, DEMO SHEET 38 FT	M980	128	lb/item	9.09E-03	3.71E-02	4.68E-03	6.27E-02	4.35E-02	1.22E-01
FIRING DEV MULTIPURPOSE M142	ML03	4	lb/item	4.80E-06	1.52E-05	9.00E-05	3.52E-05	3.08E-05	0.00E+00
CAPBLST NON-E M11W11FT	ML47	344	lb/item	1.55E-02	1.07E-01	2.34E-03	1.58E-01	9.98E-02	8.60E-01
DET PERCUSSION W/175 MILSEC	ML65	29	lb/item	2.06E-03	8.41E-03	4.68E-03	1.42E-02	9.86E-03	2.76E-02
CAP, BLASTING, ELEC MK11	ML83	4	lb/item	2.84E-04	1.16E-03	4.68E-03	1.96E-03	1.36E-03	3.80E-03
ECT, 300 GR/FT	MM24	143	lb/item	1.02E-02	4.15E-02	4.68E-03	7.01E-02	4.86E-02	1.36E-01
CHARGE, DEMOLITION	MM28	3	lb/item	2.37E-02	7.80E-02	3.06E-03	7.80E-02	5.70E-02	2.49E+00
CAPBLST NON-E M12 W 500FT (SHOCK TUBE)	MN02	122	lb/item	1.46E-02	3.54E-01	9.54E-04	2.68E-02	1.46E-02	1.39E+00
CAPBLST NON-E M13 W 1000FT (SHOCK TUBE)	MN03	147	lb/item	3.97E-02	9.56E-01	9.90E-04	3.68E-02	2.35E-02	N/A
CAPBLST DELAY M14 (SHOCK TUBE)	MN06	87	lb/item	4.96E-02	1.57E-01	6.84E-04	2.00E-01	1.77E-01	9.66E-01
CAPBLST NN-ELCDLYM15 70FT	MN07	54	lb/item	2.27E-03	3.08E-02	3.24E-03	2.00E-02	1.46E-02	1.12E-01
IGNBLST FUSM81 S/TUB CPBLTY	MN08	1240	lb/item	2.36E-03	3.47E-03	7.92E-05	6.70E-03	5.83E-03	1.24E-02
FD DTD M147 48/BX (firing device)	MN11	2	lb/item	3.60E-06	2.00E-05	0.00E+00	6.40E-05	5.80E-05	1.80E-04
CAPBLST NON-E M11 30F SHKTUB	MN36	12	lb/item	8.52E-04	3.48E-03	4.68E-03	5.88E-03	4.08E-03	1.14E-02
CAP BLAST NON-ELEC 10FT	MN39	50	lb/item	3.55E-03	1.45E-02	4.68E-03	2.45E-02	1.70E-02	4.75E-02
CAP.BLS NON-ELE DELY M18	MN41	10	lb/item	7.10E-04	2.90E-03	4.68E-03	4.90E-03	3.40E-03	9.50E-03
BOOSTER DEMO 10FT DET CORD M15	MN68	70	lb/item	6.44E-03	8.40E-02	1.98E-03	5.11E-02	4.27E-02	3.15E-01
BOOSTER DEMO 30FT DET CORD M15	MN69	23	lb/item	2.12E-03	2.76E-02	1.98E-03	1.68E-02	1.40E-02	1.04E-01
BOOSTER DEMO CHG PRAC 30FT	MN75	15	lb/item	1.38E-03	1.80E-02	1.98E-03	1.10E-02	9.15E-03	6.75E-02
DUAL NONELECTRIC BLASTING CAP ASSEMBLY M19	MN86	82	lb/item	5.82E-03	2.38E-02	4.68E-03	4.02E-02	2.79E-02	7.79E-02
CAP, BLASTING: IN-LINE INITIATOR, NON-ELECTRIC, 500 FT, MINI	MN88	63	lb/item	4.47E-03	1.83E-02	4.68E-03	3.09E-02	2.14E-02	5.99E-02
CAP, BLASTING: IN-LINE INITIATOR, NON-ELECTRIC, 1000 FT, MIN	MN90	391	lb/item	2.78E-02	1.13E-01	4.68E-03	1.92E-01	1.33E-01	3.71E-01
CORD,DETONATING FCDC	MS91	104	lb/item	7.28E-01	4.89E+00	1.31E-03	1.66E+01	1.14E+00	5.20E+02
CORD DETONATINGR.	MU40	22	lb/item	1.54E-01	1.03E+00	1.31E-03	3.52E+00	2.42E-01	1.10E+02
CORD DETONATINGR.	MU42	66	lb/item	4.62E-01	3.10E+00	1.31E-03	1.06E+01	7.26E-01	3.30E+02
5.56 SPECIAL BALL 77GRAIN	X132	63866	lb/item	5.43E+00	1.02E+02	9.18E-05	2.49E+00	1.79E+00	7.09E+01
CTG, CAL .40 STANDARD 1.25"	X196	33903	lb/item	3.29E+00	7.80E+01	8.82E-05	1.73E+00	1.29E+00	1.29E+00
40FT INSTANT DET CORD	X455	33	lb/item	2.31E-01	1.55E+00	1.31E-03	5.28E+00	3.63E-01	1.65E+02
INTEGRAL FIRING DEVICE, 14 FT	X467	1	lb/item	7.70E-02	9.50E-02	0.00E+00	3.40E-02	3.50E-02	4.15E-01
9FT DET CORD 1IN BLAST CAP 3.8 SEC DELAY	X471	207	lb/item	1.45E+00	9.73E+00	1.31E-03	3.31E+01	2.28E+00	1.04E+03
ECT, 450 GR/FT	X476	1	lb/item	7.00E-03	4.70E-02	1.31E-03	1.60E-01	1.10E-02	5.00E+00
ECT, 900 GR/FT	X477	3	lb/item	2.10E-02	1.41E-01	1.31E-03	4.80E-01	3.30E-02	1.50E+01
DET, NONEL 20 FT CLEAR MINI-TU	X604	12	lb/item	8.40E-02	5.64E-01	1.31E-03	1.92E+00	1.32E-01	6.00E+01
DET, NONEL 40 FT CLEAR MINI-TU	X605	6	lb/item	4.20E-02	2.82E-01	1.31E-03	9.60E-01	6.60E-02	3.00E+01
DET, NONEL 2M CLEAR MINI-TUBE	X608	13	lb/item	9.10E-02	6.11E-01	1.31E-03	2.08E+00	1.43E-01	6.50E+01
DET, NONEL 200 FT CLEAR MINI-T	X618	2	lb/item	1.40E-02	9.40E-02	1.31E-03	3.20E-01	2.20E-02	1.00E+01
FLASHBANG, 2 BANG SOUND FLASH	X696	139	lb/item	1.07E+01	1.32E+01	0.00E+00	4.73E+00	4.87E+00	5.77E+01
FLASH BANG, 9-BANG SOUND FLASH	X699	234	lb/item	1.80E+01	2.22E+01	0.00E+00	7.96E+00	8.19E+00	9.71E+01
OP-4, 5.45 X 39 BALL	Z200	1143	lb/item	8.80E+01	1.09E+02	0.00E+00	3.89E+01	4.00E+01	4.74E+02
OP-4, 7.62 X 39 BALL	Z203	1143	lb/item	8.80E+01	1.09E+02	0.00E+00	3.89E+01	4.00E+01	4.74E+02

5.56MM SESAMS (M16)	ZZZ3	276	lb/item	2.35E-02	4.42E-01	9.18E-05	1.08E-02	7.73E-03	3.06E-01
	TOTAL EMISSIONS (lbs)			8.02E+02	5.32E+03	2.02E+01	3.39E+03	5.21E+02	1.00E+05
	TOTAL EMISSIONS (tons			4.01E-01	2.66E+00	1.01E-02	1.69E+00	2.61E-01	5.00E+01

TA C-53A									
Nomendature	DODIC	Quantity Fired	Units	NOx	CO	Pb	PM10	PM2.5	CO2e
PAN ULTRA VELOCITY SLUG	AA62	2	lb/item	8.40E-05	3.00E-03	4.00E-05	1.48E-04	1.34E-04	3.26E-03
PAN AVON ROUND	AA63	2	lb/item	8.40E-05	3.00E-03	4.00E-05	1.48E-04	1.34E-04	3.26E-03
PAN LOW VELOCITY BLANK POPPER	AA64	2	lb/item	8.40E-05	3.00E-03	4.00E-05	1.48E-04	1.34E-04	3.26E-03
PAN COMM BLACK POWDER BLANK	AA66	2	lb/item	8.40E-05	3.00E-03	4.00E-05	1.48E-04	1.34E-04	3.26E-03
PAN ENHANCED BLANK	DWEC	4	lb/item	1.68E-04	6.00E-03	8.00E-05	2.96E-04	2.68E-04	6.52E-03
PAN CUSTOM STEEL SLUG	DWED	4	lb/item	1.68E-04	6.00E-03	8.00E-05	2.96E-04	2.68E-04	6.52E-03
PAN ALUMINUM SLUG	DWEE	4	lb/item	1.68E-04	6.00E-03	8.00E-05	2.96E-04	2.68E-04	6.52E-03
GREN HAND INC AN-M14 (THERMITE)	G900	98	lb/item	6.57E-02	7.84E-02	1.08E+00	6.86E+00	4.80E+00	2.09E+00
GREN HAND OFF	G910	2	lb/item	1.34E-03	1.60E-03	2.20E-02	1.40E-01	9.80E-02	4.26E-02
GREN HAND SMK HC (AN-M8)	G930	1	lb/item	1.00E-03	4.60E-02	4.70E-04	6.80E-01	1.10E-01	3.30E-02
GREN SMK GRN (MILES) (M18)	G940	5	lb/item	6.00E-04	6.00E-02	1.70E-04	6.50E-01	5.00E-01	4.20E-01
GREN HAND SMK YEL (M18)	G945	5	lb/item	3.90E-04	2.00E-02	7.50E-05	0.00E+00	0.00E+00	3.85E-01
GREN HAND SMK RED (M18)	G950	2	lb/item	8.40E-04	1.54E-01	3.80E-05	2.80E-01	2.40E-01	1.54E-01
GREN HAND SMK VIOL (M18)	G955	1	lb/item	4.90E-04	1.40E-02	1.60E-05	1.20E-01	1.00E-01	4.30E-02
HAND GRENADE SMOKE TNG M83 (TEREPHTHALIC ACID TA1)	G982	6	lb/item	2.10E-03	1.08E-01	3.48E-04	2.16E-01	1.68E-01	7.80E-01
DDI, MINE APERS M68 PRAC	K139	2	lb/item	1.08E-05	2.00E-05	0.00E+00	6.40E-05	5.80E-05	1.80E-04
MINE AP DIR M18A1 CLAYMORE	K143	6	lb/item	1.08E-05	6.00E-05	0.00E+00	1.92E-04	1.74E-04	5.40E-04
SIG ILLUM RS CLUSTER M158A1	L306	1	lb/item	1.98E-02	8.80E-03	1.70E-06	8.90E-02	0.00E+00	1.80E-01
FLARE SURFACE TRIP M49A1	L495	2	lb/item	1.74E-02	1.06E-03	1.98E-05	2.60E-01	0.00E+00	1.04E-01
SLIM PROJ GRND BRST M115A2	L594	2	lb/item	3.30E-02	4.20E-03	8.20E-06	3.80E-01	0.00E+00	6.80E-03
SIM BOOBYTRAP FLASH M117	L598	9	lb/item	3.00E-04	4.77E-04	2.07E-05	2.25E-02	0.00E+00	0.00E+00
SIM BOOBYTRAP WHIS M119	L600	5	lb/item	3.96E-04	7.00E-03	0.00E+00	1.20E-02	0.00E+00	2.05E-02
SIM HAND GREN M116 SERIES	L601	39	lb/item	3.36E-02	1.44E-02	5.46E-05	4.68E+00	0.00E+00	1.60E-01
CHG DEMO C4 1-1/4LB	M023	2262	lb/item	4.74E-02	5.88E+01	3.85E-01	5.88E+01	4.30E+01	1.88E+03
CHG DEMO BLK M118 PETN 2LB	M024	3	lb/item	1.08E-01	3.30E-02	1.02E-04	1.38E-01	6.30E-02	3.63E+00
CHG, DEMO LINEAR M58 COMP C-4	M025	30	lb/item	1.08E-01	3.30E-01	1.02E-03	1.38E+00	6.30E-01	3.63E+01
DEMO KIT BANG TORP	M026	5	lb/item	1.08E-01	5.50E-02	1.70E-04	2.30E-01	1.05E-01	6.05E+00
DEMO KIT BANG TORPEDO	M028	3	lb/item	1.08E-01	3.30E-02	1.02E-04	1.38E-01	6.30E-02	3.63E+00
CHG DEMO LINEAR FLEX	M029	1	lb/item	1.08E-01	1.10E-02	3.40E-05	4.60E-02	2.10E-02	1.21E+00
CHG DEMO TNT 1/4 LB	M030	337	lb/item	1.80E-02	1.69E+00	4.72E-02	4.04E+00	1.55E+00	1.15E+02
TNT 1/2 LB M1A4	M031	41	lb/item	4.44E-02	4.51E-01	4.51E-03	2.75E+00	2.62E-01	2.95E+01
CHG DEMO TNT 1 LB	M032	239	lb/item	7.80E-02	1.15E+00	4.78E-02	5.98E+00	3.35E+00	2.87E+02
CHG DEMO 1-1/4 LB	M037	57	lb/item	4.74E-02	1.48E+00	9.69E-03	1.48E+00	1.08E+00	4.73E+01
CHG DEMO 1-1/4 LB	M038	6	lb/item	4.74E-02	1.56E-01	1.02E-03	1.56E-01	1.14E-01	4.98E+00
CHG DEMO 40LB CRATERING	M039	36	lb/item	7.80E-02	1.73E-01	7.20E-03	9.00E-01	5.04E-01	4.32E+01
CHG DEMO ROLL	M060	1	lb/item	7.80E-02	4.80E-03	2.00E-04	2.50E-02	1.40E-02	1.20E+00
CAP, BLASTING ELEC NO 4 DELAY	M104	22	lb/item	4.62E-04	7.04E-03	3.30E-03	8.80E-03	5.28E-03	1.83E-02
CAP BL ELEC	M110	10	lb/item	4.62E-04	3.20E-03	1.50E-03	4.00E-03	2.40E-03	8.33E-03
CAP BL ELEC NO 8	M121	3	lb/item	4.62E-04	9.60E-04	4.50E-04	1.20E-03	7.20E-04	2.50E-03
CAP BLAST ELEC M6	M130	219	lb/item	4.62E-04	7.01E-02	3.29E-02	8.76E-02	5.26E-02	1.82E-01
CAP BLAST NONELEC M7	M131	2163	lb/item	4.26E-04	6.27E-01	5.62E-01	1.06E+00	7.35E-01	2.05E+00
CTG, POWDER ACTUATED TOOL .38 CAL	M145	2	lb/item	4.62E-04	6.40E-04	3.00E-04	8.00E-04	4.80E-04	1.67E-03
CAP, BLASTING ELEC SPEC STRENGTH E108	M153	7	lb/item	4.62E-04	2.24E-03	1.05E-03	2.80E-03	1.68E-03	5.83E-03
FASTENER UNIT, POWDER ACTUATED TOOL	M156	15	lb/item	4.62E-04	4.80E-03	2.25E-03	6.00E-03	3.60E-03	1.25E-02

CTG, DELAY MK35 MOD 0	M202	1	lb/item	4.62E-04	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
DESTRUCTOR, EXPL LGM 25	M236	3	lb/item	4.62E-04	9.60E-04	4.50E-04	1.20E-03	7.20E-04	2.50E-03
CTG CARGO REL 20 SEC DELAY	M308	1	lb/item	4.62E-04	3.20E-04	1.50E-04	4.00E-04	2.40E-04	8.33E-04
COUPLING BASE FRNG DEVICE	M327	36	lb/item	4.20E-06	1.98E-04	2.41E-04	6.12E-04	5.40E-04	3.96E-04
CHG DEMO SHAPED 15 LB M2A4	M420	10	lb/item	4.20E-01	6.40E-01	3.80E-01	3.50E+00	1.50E+00	1.30E+02
CHG DEMO SHAPED 40 LB M3	M421	8	lb/item	7.80E-02	3.84E-02	1.60E-03	2.00E-01	1.12E-01	9.60E+00
CORD DET REINFORCED	M456	61925	lb/item	4.20E-02	2.91E+03	4.52E+00	9.91E+03	6.81E+02	3.10E+05
CORD, DET, 1000 FT SPOOL 2000 FT/B	M457	4306	lb/item	4.20E-02	2.02E+02	3.14E-01	6.89E+02	4.74E+01	2.15E+04
DDI, CORD DETONATING	M458	3323	lb/item	4.20E-02	1.56E+02	2.43E-01	5.32E+02	3.66E+01	1.66E+04
DET PERC M2A1 8SEC	M541	8	lb/item	4.20E-02	3.76E-01	5.84E-04	1.28E+00	8.80E-02	4.00E+01
DYNAMITE MILITARY M1	M591	271	lb/item	1.44E-02	1.46E+00	4.07E-02	2.41E+00	9.49E-01	9.00E+01
CORD, DET	M613	43	lb/item	4.20E-02	2.02E+00	3.14E-03	6.88E+00	4.73E-01	2.15E+02
FIRING DEVICE DEMO 45-115 MI	M620	58	lb/item	4.56E-06	3.65E-04	4.00E-04	9.28E-04	3.42E-04	3.13E-04
FIRING DEVICE DEMO PULL TYPE	M630	754	lb/item	4.56E-06	4.75E-03	5.20E-03	1.21E-02	4.45E-03	4.07E-03
FUSE BLASTING TIME M700	M670	9292	lb/item	4.62E-01	8.83E+02	0.00E+00	3.16E+02	3.25E+02	3.86E+03
INITIATOR, CTG ACTUATED MK11 MOD 0	M701	22	lb/item	4.62E-04	7.04E-03	3.30E-03	8.80E-03	5.28E-03	1.83E-02
INITIATOR, CTG ACTUATED M31	M703	100	lb/item	4.62E-04	3.20E-02	1.50E-02	4.00E-02	2.40E-02	8.33E-02
CHG, DEMO SHEET 38 FT	M980	329	lb/item	4.26E-04	9.54E-02	8.55E-02	1.61E-01	1.12E-01	3.13E-01
CHG, DEMO SHEET 9 FT	M986	2	lb/item	4.26E-04	5.80E-04	5.20E-04	9.80E-04	6.80E-04	1.90E-03
FIRING DEV MULTIPURPOSE M142	ML03	27	lb/item	7.20E-06	1.03E-04	1.35E-04	2.38E-04	2.08E-04	0.00E+00
CUTTER,MK 24-0	ML05	1	lb/item	1.14E-01	2.30E-02	1.10E-03	6.60E-02	2.90E-02	1.51E+00
HLDR BLST CP S/TUBM9	ML45	8	lb/item	2.70E-04	2.48E-03	1.04E-03	3.68E-03	2.32E-03	2.00E-02
CAPBLST NON-E M11W11FT	ML47	104	lb/item	2.70E-04	3.22E-02	1.35E-02	4.78E-02	3.02E-02	2.60E-01
MUNITION, ATTACK, DEMOLITION	MM16	1	lb/item	4.26E-04	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CHARGE, DEMOLITION	MM30	1	lb/item	4.26E-04	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
CAPBLST NON-E M12 W 500FT (SHOCK TUBE)	MN02	35	lb/item	7.20E-04	1.02E-01	1.86E-03	7.70E-03	4.20E-03	3.99E-01
CAPBLST NON-E M13 W 1000FT (SHOCK TUBE)	MN03	82	lb/item	1.62E-03	5.33E-01	4.51E-03	2.05E-02	1.31E-02	1.98E+00
CAPBLST DELAY M14 (SHOCK TUBE)	MN06	56	lb/item	3.42E-03	1.01E-01	2.13E-03	1.29E-01	1.14E-01	6.22E-01
CAPBLST NN-ELCDLYM15 70FT	MN07	215	lb/item	2.52E-04	1.23E-01	3.87E-02	7.96E-02	5.81E-02	4.47E-01
IGNBLST FUSM81 S/TUB CPBLTY	MN08	1381	lb/item	1.14E-05	3.87E-03	6.08E-03	7.46E-03	6.49E-03	1.38E-02
FD DTD M147 48/BX	MN11	1	lb/item	1.08E-05	1.00E-05	0.00E+00	3.20E-05	2.90E-05	9.00E-05
FIRING DEVICE, DEMOLITION MK54	MN14	3	lb/item	1.08E-05	3.00E-05	0.00E+00	9.60E-05	8.70E-05	2.70E-04
SELECTABLE LIGHTWEIGHT	MN28	5	lb/item	1.08E-05	5.00E-05	0.00E+00	1.60E-04	1.45E-04	4.50E-04
CAPBLST NON-E M15 70F SHK TB	MN38	9	lb/item	4.26E-04	2.61E-03	2.34E-03	4.41E-03	3.06E-03	8.55E-03
CAP BLAST NON-ELEC 10FT	MN39	27	lb/item	4.26E-04	7.83E-03	7.02E-03	1.32E-02	9.18E-03	2.57E-02
CAP.BLS NON-ELE DELY M18	MN41	49	lb/item	4.26E-04	1.42E-02	1.27E-02	2.40E-02	1.67E-02	4.66E-02
BOOSTER DEMO 10FT DET CORD M15	MN68	250	lb/item	5.52E-04	3.00E-01	2.75E-02	1.83E-01	1.53E-01	1.13E+00
BOOSTER DEMO 30FT DET CORD M15	MN69	74	lb/item	5.52E-04	8.88E-02	8.14E-03	5.40E-02	4.51E-02	3.33E-01
CHARGE, DEMO .5LB SEMTEX A	MN82	1	lb/item	5.52E-04	1.20E-03	1.10E-04	7.30E-04	6.10E-04	4.50E-03
DUAL NONELECTRIC BLASTING CAP ASSEMBLY M19	MN86	214	lb/item	4.26E-04	6.21E-02	5.56E-02	1.05E-01	7.28E-02	2.03E-01
CAP, BLASTING: IN-LINE INITIATOR, NON-ELECTRIC, 500 FT, MINI	MN88	334	lb/item	4.26E-04	9.69E-02	8.68E-02	1.64E-01	1.14E-01	3.17E-01
CAP,BLASTING: IN-LINE INITIATOR,NON-ELECTRIC,500 FT MINITUBE	MN89	11	lb/item	4.26E-04	3.19E-03	2.86E-03	5.39E-03	3.74E-03	1.05E-02
CAP, BLASTING: IN-LINE INITIATOR, NON-ELECTRIC, 1000 FT, MIN	MN90	224	lb/item	4.26E-04	6.50E-02	5.82E-02	1.10E-01	7.62E-02	2.13E-01

ECT, 3600 GR/FT	X479	1	lb/item	4.26E-04	2.90E-04	2.60E-04	4.90E-04	3.40E-04	9.50E-04
	TOTAL EMISSIONS (lbs)			2.474	4223.65804	8.1549134	11551.72789	1151.891042	354581.6585
	TOTAL EMISSIONS (tons)			1.24E-03	2.11	4.08E-03	5.78	0.58	177.2908293

CACTF									
Nomendature	DODIC	Quantity Fired	Units	NOx	CO	Pb	PM10	PM2.5	CO2e
40MM PRAC	M781 (40 mm tpt)	10,000	lb/item	3.60E-01	3.50E+00	6.70E-02	2.60E-01	2.30E-01	2.60E+00
SLIM PROJ GRND BRST M115A2	L594 (Arty Sim/Pyro)	1,500	lb/item	8.25E+00	3.15E+00	6.15E-03	2.85E+02	0.00E+00	5.10E+00
RIOT CNTRL AGENT CS CAPSULE	K765 Chemical Agent(CS gas)	1,500	lb/item	2.70E-03	1.50E-02	0.00E+00	4.80E-02	4.35E-02	1.35E-01
SIM HAND GREN M116 SERIES	L601 (Grenade Simulator)	1,500	lb/item	8.40E+00	5.55E-01	2.10E-03	1.80E+02	0.00E+00	6.15E+00
M84 NON LETHAL STUN GRENADE (M84)	GG09 (Flashbang)	1,500	lb/item	6.15E-01	2.25E-02	1.35E-03	6.90E+00	4.95E+00	2.55E+00
HAND GRENADE SMOKE TNG M83 (TEREPHTHALIC ACID [TA])	G982 (Smoke)	1,500	lb/item	5.25E-01	2.70E+01	8.70E-02	5.40E+01	4.20E+01	1.95E+02
5.56MM UTM SINGLE SHOT	AB09 (CCMCK)	35,000	lb/item	2.98E+00	5.60E+01	1.79E-01	1.37E+00	9.80E-01	3.89E+01
	TOTAL EMISSIONS (lbs)			21.1277	90.2425	0.3421	527.573	48.2035	250.385
	TOTAL EMISSIONS (tons)			0.01056385	0.04512125	0.00017105	0.2637865	0.02410175	0.1251925

GLR									
Nomendature	DODIC	Quantity Fired	Units	NOx	CO	Pb	PM10	PM2.5	CO2e
40MM PRAC	M781 (40 mm tpt)	30,000	lb/item	1.08E+00	1.05E+01	2.01E-01	7.80E-01	6.90E-01	7.80E+00
	TOTAL EMISSIONS (lbs)			1.08	10.5	0.201	0.78	0.69	7.8
	TOTAL EMISSIONS (tons)			0.00054	0.00525	0.0001005	0.00039	0.000345	0.0039

Trench Complex/ TTA I-36									
Nomendature	DODIC	Quantity Fired	Units	NOx	CO	Pb	PM10	PM2.5	CO2e
9MM BALL PISTOL (NEW)	A363 (Small Arms 9mm)	10,000	lb/item	1.50E-01	3.10E+00	6.80E-02	2.40E-01	2.00E-01	2.00E-01
40MM PRAC	M781 (40 mm tpt)	200	lb/item	7.20E-03	7.00E-02	1.34E-03	5.20E-03	4.60E-03	5.20E-02
5.56MM BLK F M16A1/A2	A080 (Small Arms 5.56mm blank/sim)	150,000	lb/item	3.00E+00	4.20E+01	1.46E-01	1.04E+00	9.00E-01	0.00E+00
5.56MM BALL F/M16A2	A059 (Small Arms 5.56mm live)	150,000	lb/item	1.28E+01	2.40E+02	7.65E-01	5.85E+00	4.20E+00	1.31E+02
7.62MM BLNK LNKD (MILES)	A111 (Small Arms 7.62mm blank/sim)	75,000	lb/item	3.30E+00	5.10E+01	1.95E-01	1.28E+00	1.13E+00	0.00E+00
7.62MM BALL LNKD F/MG	A143 (Small Arms 7.62mm live)	150,000	lb/item	1.46E+01	3.45E+02	7.35E-01	7.65E+00	5.70E+00	5.70E+00
BOOSTER DEMO 10FT DET CORD M15	MN68 (Det Cord)	1,500	lb/item	1.38E-01	1.80E+00	1.65E-01	1.10E+00	9.15E-01	6.75E+00
CAP BLAST ELEC M6	M130 (Blasting Caps)	150	lb/item	1.16E-02	4.80E-02	2.25E-02	6.00E-02	3.60E-02	1.25E-01
FUSE BLASTING TIME M700	(M670) Fuse/Initiator	750	lb/item	5.78E+01	7.13E+01	0.00E+00	2.55E+01	2.63E+01	3.11E+02

SLIM PROJ GRND BRST M115A2	L594 (Arty Sim/Pyro)	150	lb/item	8.25E-01	3.15E-01	6.15E-04	2.85E+01	0.00E+00	5.10E-01
RIOT CNTRL AGENT CS CAPSULE	K765 Chemical Agent(CS gas)	10	lb/item	1.80E-05	1.00E-04	0.00E+00	3.20E-04	2.90E-04	9.00E-04
SIM HAND GREN M116 SERIES	L601 (Grenade Simulator)	200	lb/item	1.12E+00	7.40E-02	2.80E-04	2.40E+01	0.00E+00	8.20E-01
M84 NON LETHAL STUN GRENADE (M84)	GG09 (Flashbang)	300	lb/item	1.23E-01	4.50E-03	2.70E-04	1.38E+00	9.90E-01	5.10E-01
HAND GRENADE SMOKE TNG M83 (TEREPHTHALIC ACID [TA])	G982 (Smoke)	250	lb/item	8.75E-02	4.50E+00	1.45E-02	9.00E+00	7.00E+00	3.25E+01
5.56MM UTM SINGLE SHOT	AB09 (CCMCK)	20,000	lb/item	1.70E+00	3.20E+01	1.02E-01	7.80E-01	5.60E-01	2.22E+01
	TOTAL EMISSIONS (lbs)			**95.512268**	**791.1616**	**2.215005**	**106.37052**	**47.88089**	**511.11785**
	TOTAL EMISSIONS (tons)			**0.047756134**	**0.3955808**	**0.0011075**	**0.05318526**	**0.023940445**	**0.255558925**

RDZ									
Nomenclature	**DODIC**	**Quantity Fired**	**Units**	**NOx**	**CO**	**Pb**	**PM10**	**PM2.5**	**CO2e**
SLIM PROJ GRND BRST M115A2	L594 (Arty Sim/Pyro)	150	lb/item	8.25E-01	3.15E-01	6.15E-04	2.85E+01	0.00E+00	5.10E-01
SIM HAND GREN M116 SERIES	L601 (Grenade Simulator)	150	lb/item	8.40E-01	5.55E-02	2.10E-04	1.80E+01	0.00E+00	6.15E-01
RIOT CNTRL AGENT CS CAPSULE	K765 (Riot Control Agent)	10	lb/item	1.80E-05	1.00E-04	0.00E+00	3.20E-04	2.90E-04	9.00E-04
HAND GRENADE SMOKE TNG M83 (TEREPHTHALIC ACID [TA])	G982 (Smoke)	250	lb/item	8.75E-02	4.50E+00	1.45E-02	9.00E+00	7.00E+00	3.25E+01
5.56MM UTM SINGLE SHOT	AB09 (CCMCK)	35000	lb/item	2.98E+00	5.60E+01	1.79E-01	1.37E+00	9.80E-01	3.89E+01
	TOTAL EMISSIONS (lbs)			**4.727518**	**60.8706**	**0.193825**	**56.86532**	**7.98029**	**72.4759**
	TOTAL EMISSIONS (tons)			**0.002363759**	**0.0304353**	**9.6913E-05**	**0.02843266**	**0.003990145**	**0.03623795**

Emissions (TPY)						
Activity	**NOx**	**CO**	**Pb**	**PM10**	**PM2.5**	**GHG**
Alternative 1 and 2						
B-88 25% Munitions Surge	0.501	3.326	0.013	2.117	0.326	62.489
C53A 25% Munitions Surge	1.55E-03	2.64	5.10E-03	7.22	0.72	221.61
CACTF 25% Munitions	1.06E-02	4.51E-02	1.71E-04	2.64E-01	2.41E-02	1.25E-01
GLR 25% Emissions	5.40E-04	5.25E-03	1.01E-04	3.90E-04	3.45E-04	3.90E-03
Trench Complex/ TTA I-36 25% Emissions	4.78E-02	3.96E-01	1.11E-03	5.32E-02	2.39E-02	2.56E-01
RDZ 25% Emissions	2.36E-03	3.04E-02	9.69E-05	2.84E-02	3.99E-03	3.62E-02
Alternative 3						
B-88 Baseline	0.40	2.66	0.01	1.69	0.26	49.99
C53A Baseline	1.24E-03	2.112	4.08E-03	5.776	0.576	177.291

APPENDIX E
NOISE ANALYSIS

Effects of Munitions Noise from Test Areas at Baseline Level

Test Area	Largest Munition Used	Net Explosive Weight for Quantity Distance Purposes in Kilograms (NEWQDKG)	Distance to 115 dBP[b] (miles)	Distance to 130 dBP[b] (miles)	Risk of Concern and Complaints in Off-Base Areas	Distance to Physical Injury to Humans -140 dBP[c] (miles)
B-88 Range Complex						
B-88A1	G900 GRENADE, HAND INC TH-3 AN-M14	0.7711	2.134	0.3795	Low	0.12
B-88B	M614 CORD, DET (1377)	3.2836	3.556	0.6325	Low	0.20
B-88C	M046 CHG, DEMO FLEX LINEAR MK8-2, 3	22.6796	6.757	1.2017	Moderate	0.38
B-88C1	G955 GRENADE, HAND SMK VIO M18	0.3266	1.60	0.2846	Low	0.09
B-88D	A011 CTG, 12 GAGE #00 BUCKSHOT M19/XM/M162	0.0017	0.3557	0.0633	Low	0.02
B-88D1	L314 SIGNAL, ILLUM GRN STAR CLSTR M125/A1/E1	0.126	1.245	0.2214	Low	0.07
B-88E	G955 GRENADE, HAND SMK VIO M18	0.3266	1.60	0.2846	Low	0.09
C-53A						
C-53A	M025 CHG, DEMO FLEX LINEAR M58/A1	72.575	9.91	1.7622	Moderate	0.56

Notes:
dBP = peak sound level
mm = millimeter

a) Source: CERL, 2007.
b) Noise Attenuation Calculator, California Department of Transportation 1998 - $dBA_2 = dBA_1 - 20 \log^{(d2/d1)}$
c) IATG 01.80 - Formulae for Ammunition Management - Clause 9.4, Distance (miles) = $(215(NEQ)^{1/3})$

Effects of Munitions Noise from Test Areas at 25% Mission Surge

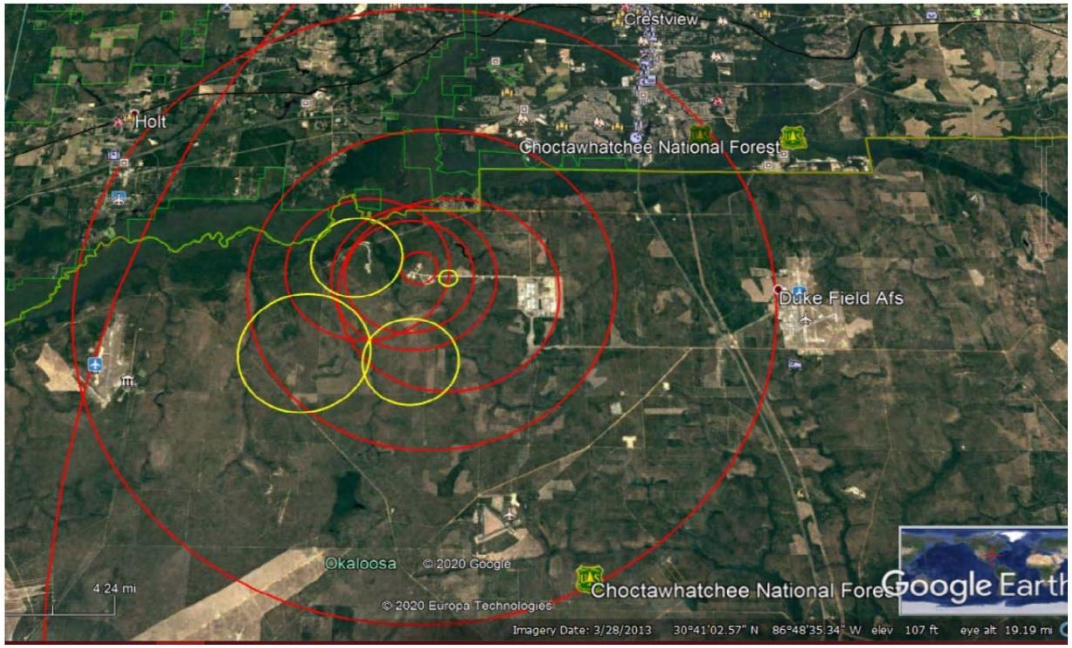
Test Area	Largest Munition Used	Net Explosive Weight for Quantity Distance Purposes in Kilograms (NEWQDKG)	Distance to 115 dBP[b] (miles)	Distance to 130 dBP[b] (miles)	Risk of Concern and Complaints in Off-Base Areas	Distance to Physical Injury to Humans -140 dBP[c] (miles)
B-88 Range Complex						
B-88A1	G900 GRENADE, HAND INC TH-3 AN-M14	0.7711	2.134	0.3795	Low	0.12
B-88B	M614 CORD, DET (1377)	3.2836	3.556	0.6325	Low	0.20
B-88C	M046 CHG, DEMO FLEX LINEAR MK8-2, 3	22.6796	6.757	1.2017	Moderate	0.38
B-88C1	G955 GRENADE, HAND SMK VIO M18	0.3266	1.60	0.2846	Low	0.09
B-88D	A011 CTG, 12 GAGE #00 BUCKSHOT M19/XM/M162	0.0017	0.3557	0.0633	Low	0.02
B-88D1	L314 SIGNAL, ILLUM GRN STAR CLSTR M125/A1/E1	0.126	1.245	0.2214	Low	0.07
B-88E	G955 GRENADE, HAND SMK VIO M18	0.3266	1.60	0.2846	Low	0.09
C-53A						
C-53A	M025 CHG, DEMO FLEX LINEAR M58/A1	72.575	9.91	1.7622	Moderate	0.56

Notes:
dBP = peak sound level
mm = millimeter
a) Source: CERL, 2007.
b) Noise Attenuation Calculator, California Department of Transportation 1998 - $dBA_2 = dBA_1 - 20 \log^{(d2/d1)}$
c) IATG 01.80 - Formulae for Ammunition Management - Clause 9.4, Distance (miles) = $(215(NEQ)^{1/3})$

Effects of Munitions Noise from Proposed Buildings

Test Area	Largest Munition Used	Net Explosive Weight for Quantity Distance Purposes in Kilograms (NEWQDKG)	Distance to 115 dBP[b] (miles)	Distance to 130 dBP[b] (miles)	Risk of Concern and Complaints in Off-Base Areas	Distance to Physical Injury to Humans -140 dBP[c] (miles)
B-88 Range Complex						
CACTF	L594 SIMULATOR, PROJ GRND BURST M115A2	0.0463	0.889	0.158	Low	0.05
GLR	B519 CTG, 40MM TP M781 SNGL RD	0.0004	0.178	0.032	Low	0.01
Trench Complex/TTA I-36	M670 FUSE, BLAST TIME M700 (U/I FT) (1375)	0.1588	1.24	0.221	Low	0.07
RDZ	L594 SIMULATOR, PROJ GRND BURST M115A2	0.0463	0.889	0.158	Low	0.05

Notes:
dBP = peak sound level
mm = millimeter
a) Source: CERL, 2007.
b) Noise Attenuation Calculator, California Department of Transportation 1998 - $dBA_2 = dBA_1 - 20 \log^{(d2/d1)}$
c) IATG 01.80 - Formulae for Ammunition Management - Clause 9.4, Distance (miles) = $(215(NEQ)^{1/3})$



Red	Current Munition Noise Levels
Yellow	Noise levels from Alternative 1