



DEPARTMENT OF THE ARMY
US ARMY INSTITUTE OF PUBLIC HEALTH
5158 BLACKHAWK ROAD
ABERDEEN PROVING GROUND, MD 21010-5403

MCHB-IP-EON

10 NOV 2011

MEMORANDUM FOR Environmental Division (IMWE-CAR-PWE/Mr. Wayne Thomas),
NEPA and Cultural Management, Directorate of Public Works, 1626 O'Connell Blvd, Fort
Carson, CO 80913

SUBJECT: Operational Noise Consultation, 52-EN-0FKB-12, Operational Noise
Assessment, Heavy Combat Aviation Brigade Stationing, Fort Carson, CO,
06 October 2011

1. We are enclosing a copy of the consultation.
2. Please contact us if this consultation or any of our services did not meet your needs or expectations.
3. The point of contact is Ms. Kristy Broska or Ms. Catherine Stewart, Program Manager, Operational Noise, Army Institute of Public Health, at DSN 584-3829, Commercial (410) 436-3829, or email: kristy.broska@us.army.mil or catherine.stewart@us.army.mil.

FOR THE DIRECTOR:

Encl

Handwritten signature of William J. Bettin in black ink.

WILLIAM J. BETTIN

LTC, MS

Portfolio Director, Environmental Health
Engineering

CF:

AEC, (IMAE-TSP/Ms. Lindy McDowell)

AEC, (IMAE-TSP/Ms. Pamela Klinger)

PHCR-West (MCHB-AW-EH/Ms. Elisabeth Hardcastle)



DEPARTMENT OF THE ARMY
US ARMY INSTITUTE OF PUBLIC HEALTH
5158 BLACKHAWK ROAD
ABERDEEN PROVING GROUND, MD 21010-5403

MCHB-IP-EON

8 MAR 2012

MEMORANDUM FOR Environmental Division (IMWE-CAR-PWE/Mr. Wayne Thomas),
NEPA and Cultural Management, Directorate of Public Works, 1626 O'Connell Blvd, Fort
Carson, CO 80913

SUBJECT: Errata Operational Noise Consultation, 52-EN-0FKB-12, Operational Noise
Assessment, Heavy Combat Aviation Brigade Stationing, Fort Carson, CO,
06 October 2011

1. Enclosed is page 12 with corrected information regarding aviation activity. Use corrected version as replacement for page 12 of Operational Noise Consultation, 52-EN-0FKB-12, Operational Noise Assessment, Heavy Combat Aviation Brigade Stationing dated 10 Nov 2011.
2. Please contact us if we can be of further assistance.
3. The point of contact is Ms. Kristy Broska or Ms. Catherine Stewart, Program Manager, Operational Noise, Army Institute of Public Health, at DSN 584-3829, Commercial (410) 436-3829, or email: kristy.broska@us.army.mil or catherine.stewart@us.army.mil.

FOR THE DIRECTOR:

Encl


WILLIAM J. BETTIN
LTC, MS
Portfolio Director, Environmental Health
Engineering

CF:
AEC, (IMAE-TSP/Ms. Lindy McDowell)
AEC, (IMAE-TSP/Ms. Pamela Klinger)
PHCR-West (MCHB-AW-EH/Ms. Elisabeth Hardcastle)



U.S. ARMY PUBLIC HEALTH COMMAND

5158 Blackhawk Road, Aberdeen Proving Ground, Maryland 21010-5403

OPERATIONAL NOISE CONSULTATION
NO. 52-EN-0FKB-12
OPERATIONAL NOISE ASSESSMENT
HEAVY COMBAT AVIATION
BRIGADE STATIONING
FORT CARSON, CO
06 OCTOBER 2011

CHPPM/PHC FORM 433-E (MCHB-CS-IP), SEP 10

Distribution authorized to U.S. Government agencies only; protection of privileged information evaluating another command; November 2011. Environmental Division (IMWE-CAR-PWE/Mr. Wayne Thomas), NEPA and Cultural Management, Directorate of Public Works, 1626 O'Connell Blvd, Fort Carson, CO 80913

Preventive Medicine Survey: 40-5f1

DESTRUCTION NOTICE - Destroy by any method that will prevent disclosure of contents or reconstruction of the document.



DEPARTMENT OF THE ARMY
US ARMY INSTITUTE OF PUBLIC HEALTH
5158 BLACKHAWK ROAD
ABERDEEN PROVING GROUND, MD 21010-5403

MCHB-IP-EON

EXECUTIVE SUMMARY
OPERATIONAL NOISE CONSULTATION
NO. 52-EN-0FKB-12
OPERATIONAL NOISE ASSESSMENT
HEAVY COMBAT AVIATION BRIGADE STATIONING
FORT CARSON, CO
06 OCTOBER 2011

1. PURPOSE. To provide an assessment of the noise impacts from the Heavy Combat Aviation Brigade (CAB) stationing at Fort Carson, CO.

2. FINDINGS.

a. Aviation Activity. Based on Army Regulation 200-1, the baseline and projected annual average noise levels attributable to the aviation activity is compatible with surrounding land use. Though the annual average noise levels are compatible, there is potential for individual overflights to cause annoyance and possibly generate noise complaints.

b. Weapon Activity.

(1) The large caliber weapon activity attributed to the projected CAB activity was acoustically insignificant and did not change the large caliber noise contours.

(2) For the baseline and projected large caliber weapon activity, the on-post Zone II encompasses most of the Wilderness Road Complex (WRC). Limiting or relocating the artillery firing occurring in Training 07 would lessen the large caliber weapon noise levels in the WRC.

(3) As small caliber noise contours are based on peak noise levels, the addition of the CAB activity does not change the noise contours.

3. RECOMMENDATIONS. Incorporate this noise assessment into the National Environmental Policy Act documentation for the proposed CAB stationing.

TABLE OF CONTENTS

Paragraph	Page
1. REFERENCES.....	1
2. AUTHORITY	1
3. PURPOSE.....	1
4. BACKGROUND.....	1
5. NOISE ASSESSMENT PROCEDURES	2
6. REGULATORY REQUIREMENTS.....	3
7. AIRFIELD AVIATION ACTIVITY	4
a. Existing Activity	4
b. Projected Activity.....	5
8. AIRFIELD NOISE MODELING RESULTS	7
9. OVERFLIGHT NOISE ASSESSMENT.....	10
10. WEAPON NOISE ASSESSMENT.....	14
a. Small Caliber Ranges.....	14
b. Demolition and Large Caliber Weapon Ranges	17
11. CONCLUSIONS AND RECOMMENDATIONS	20
Appendices	
A - References	A-1
B - Glossary of Terms, Acronyms and Abbreviations	B-1
C - U.S. Army Noise Zone Descriptions	C-1
D – Airfield Contour Comparison.....	D-1
E – Weapon Expenditure	E-1

List of Figures

Figure 1. BAAF Baseline Annual Average Noise Contours	8
Figure 2. BAAF Projected Annual Average Noise Contours.....	9
Figure 3. Fort Carson Small Caliber Noise Contours	15
Figure 4. PCMS Small Caliber Noise Contours	16
Figure 5. Fort Carson Baseline Demolition and Large Caliber Noise Contours.....	18
Figure 6. Fort Carson Projected Demolition and Large Caliber Noise Contours	19

List of Tables

Table 1. Noise Zone Decibel Levels.....	3
Table 2. BAAF Tower Count	4
Table 3. Baseline Annual Aviation Activity	5
Table 4. Baseline Average Daily Aviation Activity	5
Table 5. Heavy CAB Critical Flying Hours, Full Spectrum Operations Training Strategy	6
Table 6. Projected Annual CAB Aviation Activity.....	6
Table 7. Projected Average Daily CAB Aviation Activity.....	7
Table 8. Maximum Noise Levels of Aircraft	10
Table 9. Percentage of Population Highly Annoyed From Aircraft Noise	10
Table 10. Overflight Annoyance Potential	11
Table 11. Projected Helicopter ADNL.....	13
Table 12. Attack Battalion STRAC Requirements	17

OPERATIONAL NOISE CONSULTATION
NO. 52-EN-0FKB-12
OPERATIONAL NOISE ASSESSMENT
HEAVY COMBAT AVIATION BRIGADE STATIONING
FORT CARSON, CO
06 OCTOBER 2011

1. REFERENCES. A list of the references used in this consultation is in Appendix A. A glossary of terms and abbreviations used are in Appendix B. Appendix C contains the regulatory requirements.
2. AUTHORITY. The Army Environmental Command, San Antonio, TX funded this consultation to support Operational Noise Programs at multiple sites.
3. PURPOSE. To provide an assessment of the noise impacts from the Heavy Combat Aviation Brigade (CAB) stationing at Fort Carson, CO. The CAB activity would include aviation flights, small arms firing, and aerial gunnery activity.
4. BACKGROUND.
 - a. In March 2011, the Army announced its decision to activate a new CAB and stand it up at Fort Carson, resulting in a total growth in Army forces and equipment of approximately 2,700 Soldiers and 113 helicopters. Implementation of the stationing decision will include construction of new facilities at Fort Carson, as well as CAB training operations at Fort Carson and Piñon Canyon Maneuver Site (PCMS). This decision is documented in the *Record of Decision for the Realignment, Growth, and Stationing of Army Aviation Assets*, signed by the Assistant Deputy Chief of Staff, G-3/5/7, on March 25, 2011.
 - b. Noise impacts related to the proposed CAB activity were previously addressed in:
 - February 2011 *Final Programmatic Environmental Impact Statement (PEIS) for the Realignment, Growth, and Stationing of Army Aviation Assets*.
 - February 2009 *Final Environmental Impact Statement (FEIS) for Implementation of Fort Carson Grow the Army Stationing Decisions*.
 - c. The proposed action includes construction of CAB facilities at the Wilderness Road Complex (WRC) located west of Butts Army Airfield (BAAF). The CAB complex would include headquarters, barracks, company operations, classrooms, and vehicle maintenance facilities.

5. NOISE ASSESSMENT PROCEDURES.

a. Aviation Activity.

(1) The noise simulation program used to assess annual aircraft noise is NoiseMap/Baseops (U.S. Air Force 2009). The NoiseMap/Baseops program requires operations data including type of aircraft, altitude, flight tracks, and number of operations. Aviation noise is assessed using A-weighted Yearly Day-Night average Levels (A-YDNL). For land use planning, the A-YDNL is averaged over a year and therefore includes days of heavy, light and no flight schedules.

(2) The noise simulation program used to assess individual aircraft noise is SelCalc (U.S. Air Force 2005). The SelCalc program is a subset of the NoiseMap/Baseops program.

b. Demolition and Large Caliber Weapons. The noise simulation program used to assess demolition and large caliber weapons (20mm and greater) is the Blast Noise Impact Assessment (BNOISE2) program (U.S. Army 2009). The BNOISE2 model requires operations data concerning the types of weapons fired from each range or firing point (including demolitions), the number and types of ammunition fired from each weapon, the location of targets for each range or firing point and the amount of propellant used to reach the target. Existing range utilization records along with reasonable assumptions were used as BNOISE2 inputs. The assessment period used to create the Fort Carson C-weighted Day-Night average sound Level (CDNL) contours was 250 days. The CDNL noise metric is used for demolition and large caliber weapons to capture the low-frequency energy produced from such activities. The CDNL is an annual average noise dose from range operations and is intended for long-term land use planning.

c. Small Caliber Weapons. The noise simulation program used to assess small caliber weapons (.50 caliber and below) noise is the Small Arms Range Noise Assessment Model (SARNAM) (U.S. Army 2003). The SARNAM program requires operations data concerning types of weapons and range layout. The SARNAM calculation algorithms assume weather conditions or wind direction that favors sound propagation. Small caliber weapon noise is addressed utilizing peak levels and therefore has no assessment period.

6. REGULATORY REQUIREMENTS.

a. Army Regulation (AR) 200-1 partitions noise into zones, each representing an area of increasing decibel level. The AR lists housing, schools, and medical facilities as examples of noise-sensitive land uses (U.S. Army 2007). The program defines four Noise Zones:

- Noise-sensitive land uses are not recommended in *Zone III*.
- Although local conditions such as availability of developable land or cost may require noise-sensitive land uses in *Zone II*, this type of land use is strongly discouraged on the installation and in surrounding communities. All viable alternatives should be considered to limit development in *Zone II* to non-sensitive activities such as industry, manufacturing, transportation and agriculture.
- Noise-sensitive land uses are generally acceptable within the *Zone I*. However, though an area may only receive *Zone I* levels, military operations may be loud enough to be heard - or even judged loud on occasion. *Zone I* is not one of the contours shown on the map; rather it is the entire area outside of the *Zone II* contour.
- The *Land Use Planning Zone (LUPZ)* is a subdivision of *Zone I*. The *LUPZ* is 5 dB lower than the *Zone II*. Within this area, noise-sensitive land uses are generally acceptable. However, communities and individuals often have different views regarding what level of noise is acceptable or desirable. To address this, some local governments have implemented land use planning measures out beyond the *Zone II* limits. Additionally, implementing planning controls within the *LUPZ* can develop a buffer to avert the possibility of future noise conflicts.

b. The following table summarizes each zone and its appropriate weighting by type of operation;

TABLE 1. NOISE ZONE DECIBEL LEVELS. (AR 200-1)

Noise Zone	Aviation (ADNL)	Small Arms (PK15(met))	Large Arms, Demolitions, Etc. (CDNL)
Land Use Planning Zone (LUPZ)	60-65	N/A	57 – 62
Zone I	<65	<87	<62
Zone II	65-75	87 – 104	62 – 70
Zone III	>75	>104	>70

7. AIRFIELD AVIATION ACTIVITY.

a. EXISTING ACTIVITY.

(1) From Oct 10 to Sep 11, BAAF airfield reported 103,199 operations (Table 2). The tower count includes aircraft assigned to Fort Carson as well as visiting units. The number and type of aircraft operations varies from day to day and month to month. The average daily movement on the airfield was 283. The number of movements is based upon aircraft that utilized the airfield, not aircraft just passing through the BAAF airspace or aircraft under flight following conditions.

TABLE 2. BAAF TOWER COUNT.

Month	FY11 Tower Count
Oct 2010	5,876
Nov 2010	4,507
Dec 2010	6,580
Jan 2011	9,101
Feb 2011	10,147
Mar 2011	9,941
Apr 2011	11,784
May 2011	11,878
Jun 2011	9,623
Jul 2011	8,929
Aug 2011	10,794
Sep 2011	4,039
TOTAL	103,199

(2) BAAF is utilized primarily by rotary aircraft. The number of daily operations (take offs or landings) varies throughout the year according to Fort Carson or visiting unit training requirements. During peak training periods, the number of operations at the airfield can be as high as 300 operations daily.

(3) The traffic control tower logs do not separate activity by type or model of aircraft, nor do the logs indicate the time of day or flight route of the aircraft. For the purpose of noise modeling, 80% of military flights were estimated to occur during the daytime (0700-2200). Airfield personnel estimated that 50% of activity was AH-64, 35% UH-60, 5% CH47, 5% UH-1, and 5% other aircraft. Other aircraft include OH-58; Bell 407; civilian medical rotary aircraft; and occasional U.S. Air Forces Academy pilot training with small fixed wing aircraft.

(4) Table 3 lists the existing average yearly activity by aircraft type. Table 4 lists the existing average daily aviation activity. The numbers were rounded to prevent fractional numbers of flights.

TABLE 3. BASELINE ANNUAL AVIATION ACTIVITY.

	Baseline Annual Operations (FY11)
AH-64	51,600
UH-60	36,120
CH-47	5,160
UH-1	5,160
Other aircraft	5,160
TOTAL	103,199

Note: An operation is defined as either an arrival or a departure or a closed traffic pattern.

TABLE 4. BASELINE AVERAGE DAILY AVIATION ACTIVITY.

	Daytime Operations (0700 – 2200 hours)	Nighttime Operations (2200 – 0700 hours)
AH-64	113	28
UH-60	79	20
CH-47	11	3
UH-1	11	3
Other aircraft	11	3
TOTAL	226	57

Note: An operation is defined as either an arrival or a departure or a closed traffic pattern.

b. PROJECTED ACTIVITY.

(1) The CAB to be stationed at Fort Carson would consist of approximately 113 helicopters (48 AH-64D, 12 CH-47, 38 UH-60, 15 UH-60/HH-60). To maintain proficiency, a specific number of flight hours are required to be logged by applicable Soldiers and units. Flight hours are based upon a model that includes all aviation

training required to meet individual aviator qualification training, aircrew training, and collective training at the flying company and battalion level. The required flight hours for a Heavy CAB are noted in Table 5. Actual average flying hours by CAB Soldiers in and around Fort Carson and PCMS are expected to be lower as some CAB units would typically be deployed.

TABLE 5. HEAVY CAB CRITICAL FLYING HOURS, FULL SPECTRUM OPERATIONS TRAINING STRATEGY. (U.S.Army 2011a)

Combat Aviation Brigade Critical Flying Hours, Full Spectrum Operations Training Strategy				
Unit (aircraft)	Training Year			Average
	Year 1	Year 2	Year 3	
AHB (UH-60)	4,422	6,017	5,726	5,388
ARB (AH-64D)	8,718	11,568	10,972	10,419
GSAB-CAC (UH-60)	1,343	1,831	1,739	1,638
GSAB-Hvy Hel Co (CH-47)	1,940	2,651	2,518	2,370
GSAB-MEDEVAC (15 UH-60)	2,524	3,551	3,352	3,142
Total	18,947	25,618	24,307	22,957

(2) The projected annual number of flights is based on three flight hours per aircraft type for the average flight hours, Table 5. A projected schedule of three flight hours per mission is consistent with the activity at other installations that have a CAB. The projected average daily activity is 41 flights, Table 6. The addition of the CAB would increase the average number of daily flights from 283 to 324. It was assumed 80% of flights occurred between 0700 – 2200 hours.

TABLE 6. PROJECTED ANNUAL CAB AVIATION ACTIVITY.

Aircraft	Average Flight Hours	Projected Annual Number of Flights*
UH-60	7,026	2,342
AH-64D	10,419	3,473
CH-47	2,370	790
UH-60/HH-60	3,142	1,047
Total	22,957	7,652

NOTE: One flight consists of a departure and an arrival.

TABLE 7. PROJECTED AVERAGE DAILY CAB AVIATION ACTIVITY.

	Daytime Operations (0700 – 2200 hours)	Nighttime Operations (2200 – 0700 hours)
AH-64	10	2
UH-60	15	4
CH-47	4	1
UH-60/HH-60	4	1
TOTAL	33	8

Note: An operation is defined as either an arrival or a departure or a closed traffic pattern.

8. AIRFIELD NOISE MODELING RESULTS.

a. Figure 1 contains the noise contours for the existing operations at BAAF (based on Table 3). The Noise Zones remain relatively localized to the airfield and do not extend beyond Fort Carson’s boundary. On-post, the operations generate a LUPZ (60-65 dB A-YDNL) which extends along 04/22 approach and departure track into an industrial portion of the WRC. The Zone II (65 – 75 dB A-YDNL) remains localized to the airfield and small arms range area.

Appendix D contains an explanation of the changes between the PEIS and FEIS airfield contours and the contours in this consultation.

b. Figure 2 contains the noise contours for the existing operations plus the projected CAB operations at BAAF (based on Tables 3 & 6). The additional CAB activity does not significantly change the airfield noise contours. The Noise Zones still remain within Fort Carson’s boundary. On-post, the operations generate a slightly larger LUPZ (60-65 dB A-YDNL) along the 04/22 approach and departure track into the WRC. Additionally, a large portion of the LUPZ extends into the small arms range area.

c. Based on AR 200-1, the existing and projected annual average noise levels attributable to the BAAF activity is compatible with surrounding land use, both on and off-post. Though the Noise Zones indicate that annual average noise levels are compatible with the surrounding environment, there is potential for individual overflights to cause annoyance and possibly generate noise complaints.

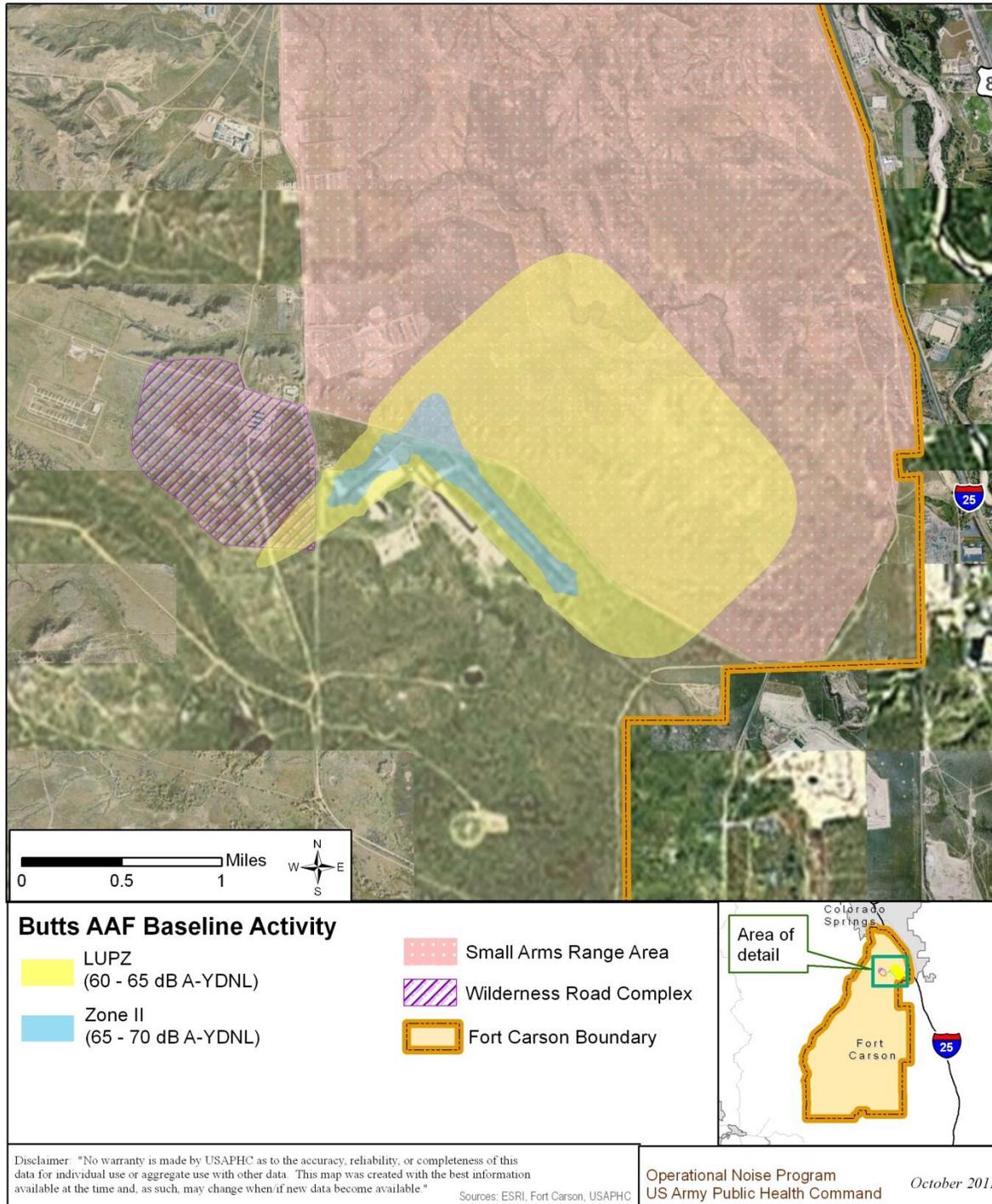


FIGURE 1. BAAF BASELINE ANNUAL AVERAGE NOISE CONTOURS.

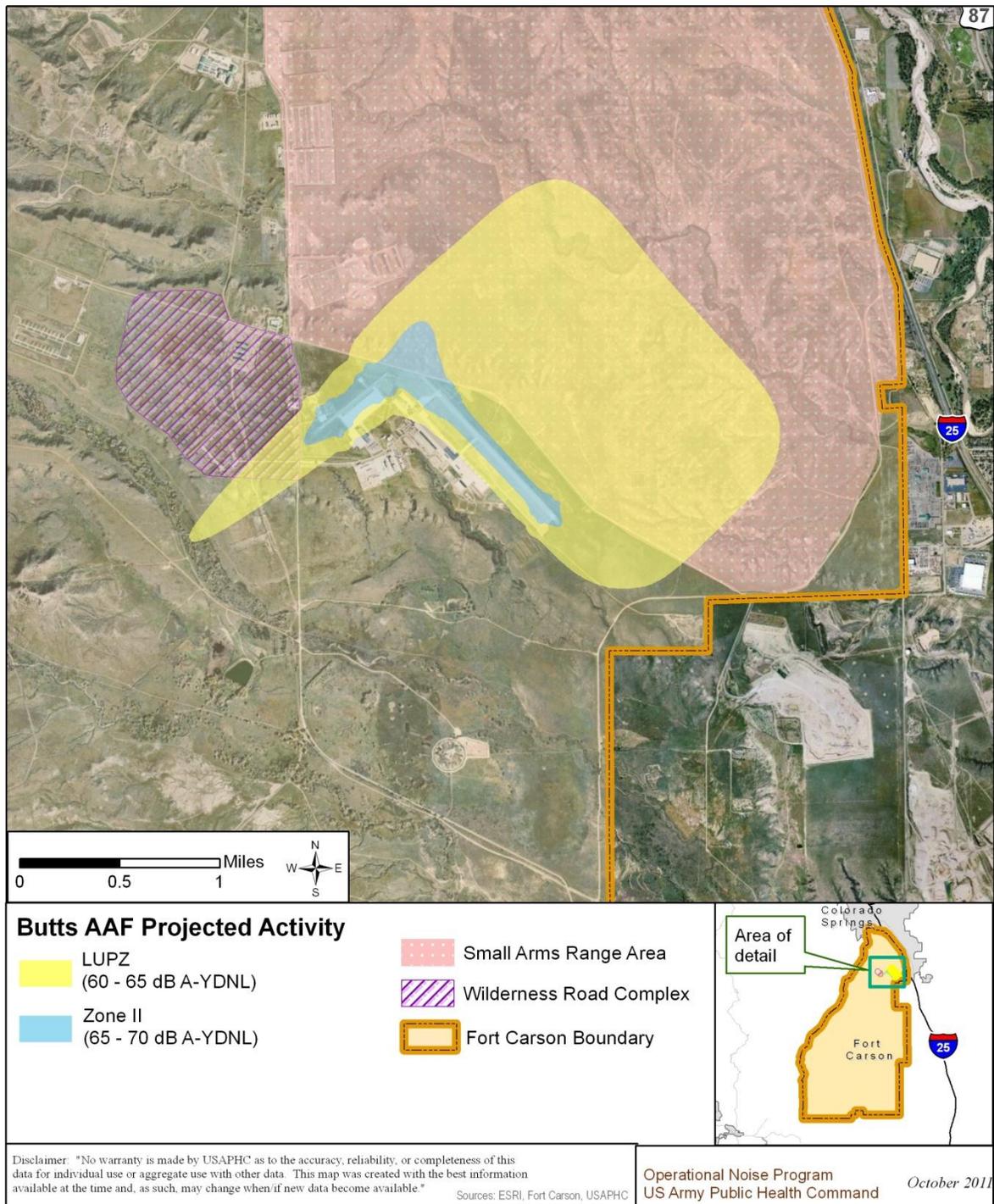


FIGURE 2. BAAF PROJECTED ANNUAL AVERAGE NOISE CONTOURS.

9. OVERFLIGHT NOISE ASSESSMENT.

a. Although the existing and projected annual average noise levels attributable to the BAAF activity is compatible with surrounding land use, both on and off-post, the helicopter overflights would generate levels that some individuals might find disruptive and/or annoying.

b. ANNOYANCE POTENTIAL.

(1) Scandinavian Studies (Rylander 1974 and Rylander 1988) have found that a good predictor of annoyance at airfields with 50 to 200 operations per day is the maximum level of the 3 loudest events. The maximum noise levels for the primary aircraft at BAAF are listed in Table 8. These maximum levels are compared with the levels listed in Table 9 to determine the percent of the population that would consider itself highly annoyed. Table 10 indicates the percent of the population that would consider itself highly annoyed correlated with maximum noise levels for specific aircraft overflights.

TABLE 8. MAXIMUM NOISE LEVELS OF AIRCRAFT.

Slant Distance (feet)	Maximum Level, dBA				
	AH-64	CH-47	OH-58	UH-60	UH-1
200	92	92	87	88	91
500	83	84	79	80	83
1,000	77	78	72	73	76
1,500	73	74	68	69	73
2,000	70	71	65	66	70
2,500	67	68	62	63	68

TABLE 9. PERCENTAGE OF POPULATION HIGHLY ANNOYED FROM AIRCRAFT NOISE. (Rylander 1974)

Maximum, dBA	Highly Annoyed
90	35%
85	28%
80	20%
75	13%
70	5%

TABLE 10. OVER FLIGHT ANNOYANCE POTENTIAL¹.

Source	Ground Track Distance ²	dBA Maximum ³	Population Highly Annoyed ⁴
AH-64 – 1000’ AGL	0’	77	16%
	1320’ (1/4 mile)	71	7%
	1760’ (1/3 mile)	69	4%
	2640’ (1/2 mile)	65	<1%
AH-64 – 2000’ AGL	0’	70	5%
	1320’ (1/4 mile)	68	2%
CH-47 – 1000’ AGL	0’	77	16%
	1320’ (1/4 mile)	72	8%
	1760’ (1/3 mile)	70	5%
	2640’ (1/2 mile)	66	<1%
CH-47 – 2000’ AGL	0’	64	<1%
	1320’ (1/4 mile)	62	<1%
OH-58 – 1000’ AGL	0’	72	8%
	1320’ (1/4 mile)	67	1%
	1760’ (1/3 mile)	64	<1%
UH-60 – 1000’ AGL	0’	73	10%
	1320’ (1/4 mile)	68	2%
	1760’ (1/3 mile)	65	<1%
UH-1– 1000’ AGL	0’	76	14%
	1320’ (1/4 mile)	71	7%

¹ Percent annoyance shown is based upon 50 to 200 overflights per day. (Rylander 1974)

² Distance between receiver and the point on Earth at which the aircraft is directly overhead.

³ Obtained via SelCalc Program (U.S. Air Force 2005)

⁴ Calculated percentage based upon regression using the known values in Table 9.

(2) Fort Carson Regulation 95-1 prescribes specific noise abatement requirements for aviation personnel, including minimum off-post altitudes, minimum slant range distances from sensitive areas and restricted areas. Helicopters routinely fly from Fort Carson to PCMS, though not all aircraft will fly the same pattern or route. However, all aircraft will comply with the local flying rules per Fort Carson 95-1 and AR 95-1, as well as all FAA guidelines under 14 CFR 91.155 for visual flight rules and AC 91-36D VFR operations for noise-sensitive areas. All aircraft will avoid over-flight of heavily inhabited areas and endangered species designated areas unless directed to do so in the performance of their mission. For Fort Carson and Colorado Springs, this means all rotary-wing aircraft will maintain a minimum of 1,000 feet (304.8 m) Above Ground Level (AGL), and 0.25 mile (0.4 km) standoff outside Fort Carson while flying

through the mountain passes until clear of inhabited areas (weather permitting), unless they are operating in a designated low-level or Nap-of-the-Earth (NOE) training route.¹

(3) Annoyance Potential Summary. Based on Table 10 and the noise abatement procedures, generally less than 2% of the population would consider itself highly

This original page 12 replaced with errata (on next page) per 09 Mar 2012 memo.

c. Helicopters routinely fly from Fort Carson to PCMS. The area between Fort Carson and PCMS does not have established air corridors. The only restriction is that aircraft must maintain a minimum altitude of 700 feet AGL unless they are operating in a designated low-level or NOE training route. The flights between Fort Carson and PCMS were addressed in a 2008 Noise Consultation (U.S. Army 2008). The key points are summarized below:

- There is one low-level flight training route, Route Hawk, between Fort Carson and PCMS that is used for NOE training. While utilizing Route Hawk, aircraft avoid all houses, buildings, people, livestock, and moving vehicles by a minimum slant range of ½ nautical miles (0.43 statute miles). Fort Carson may lower the typical altitude flown in Route Hawk from 100 feet AGL to 50 feet AGL.
- While in Route Hawk, maintaining a ½ nautical mile slant distance from buildings, people, livestock, and moving vehicles, the annoyance risk should remain low even if the allowed minimum flight altitude is lowered from 100 to 50 feet AGL within the route.
- Helicopters flying from Fort Carson to PCMS, outside of Route Hawk, should maintain a slant distance 1,760 feet (0.29 nautical miles/0.3 statute miles) from buildings, people, livestock, and moving vehicles to reduce the potential for annoyance.

d. The helicopter flights occurring off-post (transitioning to PCMS or other training areas, utilizing Route Hawk) would not generate a Zone II levels. The altitudes vary depending upon the mission and the location of the overflight in relation to the surrounding environment (i.e., buildings, livestock, populated areas).

(1) The following explains how DNL is calculated. The A-weighted Sound Exposure Level (ASEL) of an AH-64 at 1,000 feet AGL is 85.3 decibels (dBA).

¹ Final CAB PEIS_2010

through the mountain passes until clear of inhabited areas (weather permitting), unless they are operating in a designated low-level or Nap-of-the-Earth (NOE) training route.¹

(3) Annoyance Potential Summary. Based on Table 10 and the noise abatement procedures, generally less than 2% of the population would consider itself highly annoyed from the OH-58 and UH-60 helicopter overflights above 1,000 feet AGL and approximately 8% of the population would consider itself highly annoyed from the AH-64, CH-47, and UH-1 overflights at 1,000 feet AGL.

c. Helicopters routinely fly from Fort Carson to PCMS. The area between Fort Carson and PCMS does not have established air corridors. Aircraft must maintain a minimum altitude of 500 feet AGL off-post unless they are flying per an exception listed in Fort Carson Regulation 95-1. Exceptions include, among others, maintaining visual flight rules due to weather conditions, meeting specific mission requirements such as search and rescue, and operating in a designated low-level training route. The flights between Fort Carson and PCMS were addressed in a 2008 Noise Consultation (U.S. Army 2008). The key points are summarized below:

- There is one low-level flight training route, Route Hawk, between Fort Carson and PCMS. While utilizing Route Hawk, aircraft avoid all houses, buildings, people, livestock, and moving vehicles by a minimum slant range of ½ nautical miles (0.43 statute miles).
- While in Route Hawk, maintaining a ½ nautical mile slant distance from buildings, people, livestock, and moving vehicles, the annoyance risk should remain low.
- Helicopters flying from Fort Carson to PCMS, outside of Route Hawk, should maintain a slant distance 1,760 feet (0.29 nautical miles/0.3 statute miles) from buildings, people, livestock, and moving vehicles to reduce the potential for annoyance.

d. The helicopter flights occurring off-post (transitioning to PCMS or other training areas, utilizing Route Hawk) would not generate a Zone II levels. The altitudes vary depending upon the mission and the location of the overflight in relation to the surrounding environment (i.e., buildings, livestock, and populated areas).

¹ Final CAB PEIS_2010

The SEL is sound normalized to one second. If there is only one flight per day, the A-weighted average sound Level (ADNL) can be calculated by subtracting a constant representing 10 times the logarithm of the 86,400 seconds in a 24 hour day, which is 49.4 dB. So, for one AH-64 flyover at 1,000 feet (85.3 dB ASEL), the ADNL would be 35.9 dB ADNL. The ADNL increases 3 dB for every doubling of operations, so the ADNL for 2 flights would be 38.9 dB ADNL, 4 flights per day would equal 41.9 dB ADNL, and 8 flights per day would equal 44.9 dB ADNL. By continuing these calculations, it would take 256 AH-64 flights occurring over *one location* within a 24-hour period to achieve a 59.9 dB ADNL.

(2) Table 11 lists the DNL for various attitudes for the most common helicopters at Fort Carson.

TABLE 11. PROJECTED HELICOPTER ADNL.

NUMBER OF SORTIES	ADNL							
	AH-64 100' AGL	AH-64 500' AGL	AH-64 1000' AGL	CH-47 500' AGL	CH-47 1000' AGL	UH-60 100' AGL	UH-60 500' AGL	UH-60 1000' AGL
1	51.1	40.7	35.9	43	38.4	48.3	38.4	33.1
2	54.1	43.7	38.9	46	41.4	51.3	41.4	36.1
4	57.1	46.7	41.9	49	44.4	54.3	44.4	39.1
8	60.1	49.7	44.9	52	47.4	57.3	47.4	42.1
16	63.1	52.7	47.9	55	50.4	60.3	50.4	45.1
32	66.1	55.7	50.9	58	53.4	63.3	53.4	48.1
64	69.1	58.7	53.9	61	50.4	66.3	56.4	51.1

(3) Based upon the existing and projected operational parameters, the number of aircraft and the large amount of airspace available, it is unlikely that noise levels would ever reach 60 dB ADNL for any area off-post subject to overflights (other than directly under the flight path to the airfield).

e. The annoyance potential information provided is primarily for off-post information. The annoyance potential may not be applicable to the WRC and other on-post noise-sensitive areas as the studies were based on the civilian community response.

10. WEAPON NOISE ASSESSMENT. Live-fire training of CAB units is primarily small arms weapons (rifles with 5.56mm munitions; 9mm pistols; 7.62mm and .50 caliber machine guns). The AH-64 Apache longbow helicopter, fires the 30mm gun, 2.75-inch rockets and Hellfire guided missiles as part of live-fire training activities.

a. Small Caliber Ranges.

(1) All Soldiers qualify with their individual weapon (rifle or pistol) at least twice annually. The ranges required include a 25-Meter Zero, Modified Record Fire, Combat Pistol Qualification Course, and the Multi-purpose Machine Gun Range. Training would take place on existing ranges at either Fort Carson or PCMS.

(2) Per AR 200-1 (U.S. Army 2007), small arms operations were analyzed using PK15(met). The analysis depicts the predicted peak levels for individual rounds (metric term is PK15(met)). Since the contours are based on peak levels rather than a cumulative or average level, the size of the contours will not change if the number of rounds fired increases or decreases. Appendix E contains the operations data used to model the small caliber noise contours.

(3) Fort Carson. The small caliber weapons noise contours at the Fort Carson small arms impact area are shown in Figure 3. The Zone II [PK15(met) 87 dB] extends beyond the eastern boundary less than 700 meters, entering the city of Fountain. The Zone III [PK15(met) 104 dB] extends slightly beyond the eastern boundary into the undeveloped area between the Fort Carson boundary and Interstate 25. On-post the Zone II extends into a small area of the WRC. Based on the current WRC design, there is one noise-sensitive structure within the Zone II area (an Operational Readiness Training Complex barrack).

(4) PCMS. Due to the distance of the ranges from the installation boundary and any noise-sensitive land uses, only Ranges 1, 3, and 7 were addressed. The noise contours for these small arms operations are shown in Figure 4. The Zone II [PK15(met) 87 dB] extends beyond the western boundary less than 650 meters. The Zone III [PK15(met) 104 dB] does not extend beyond the installation boundary.

(5) The addition of the CAB activity does not change the small caliber noise contours.

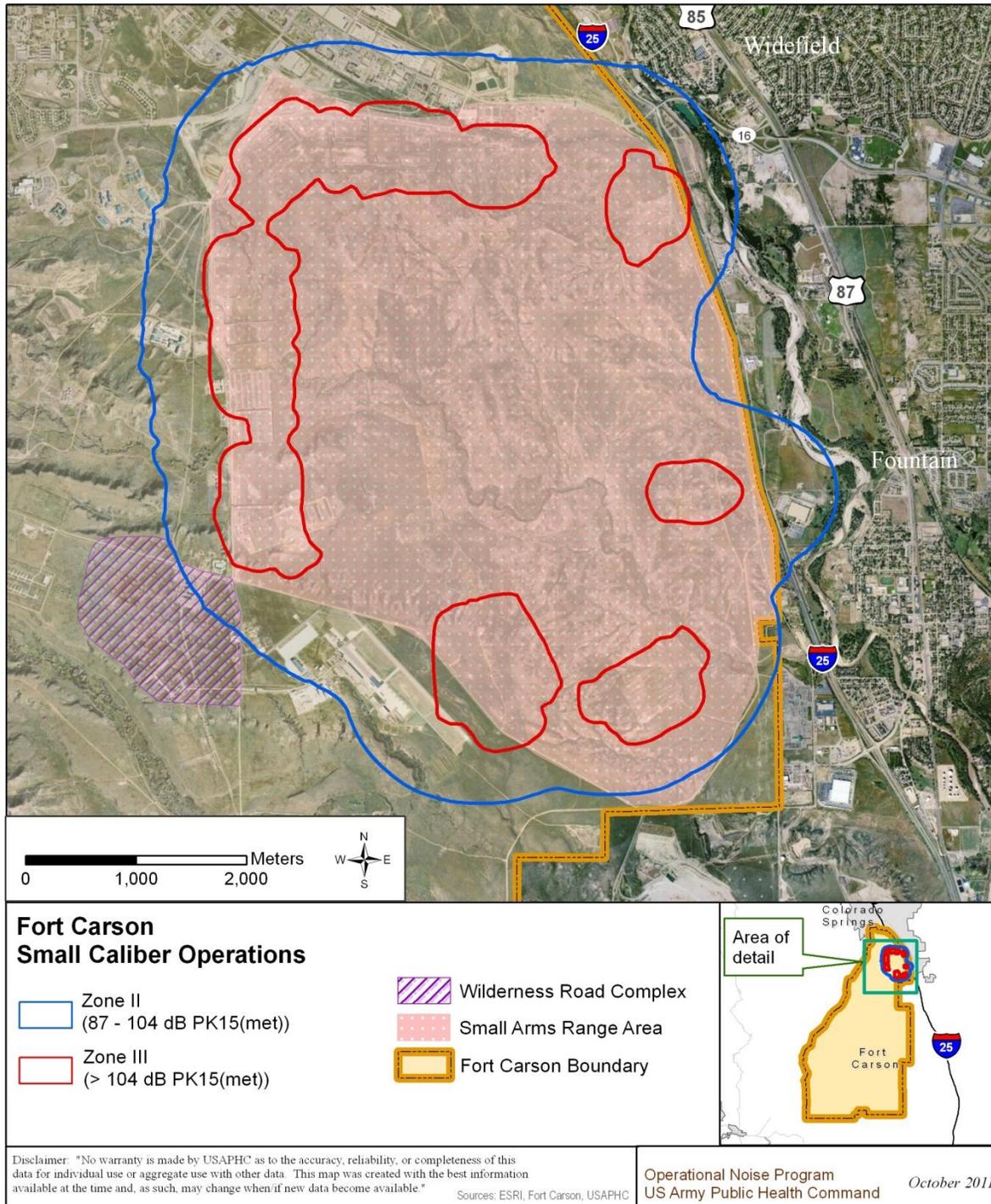


FIGURE 3. FORT CARSON SMALL CALIBER NOISE CONTOURS.

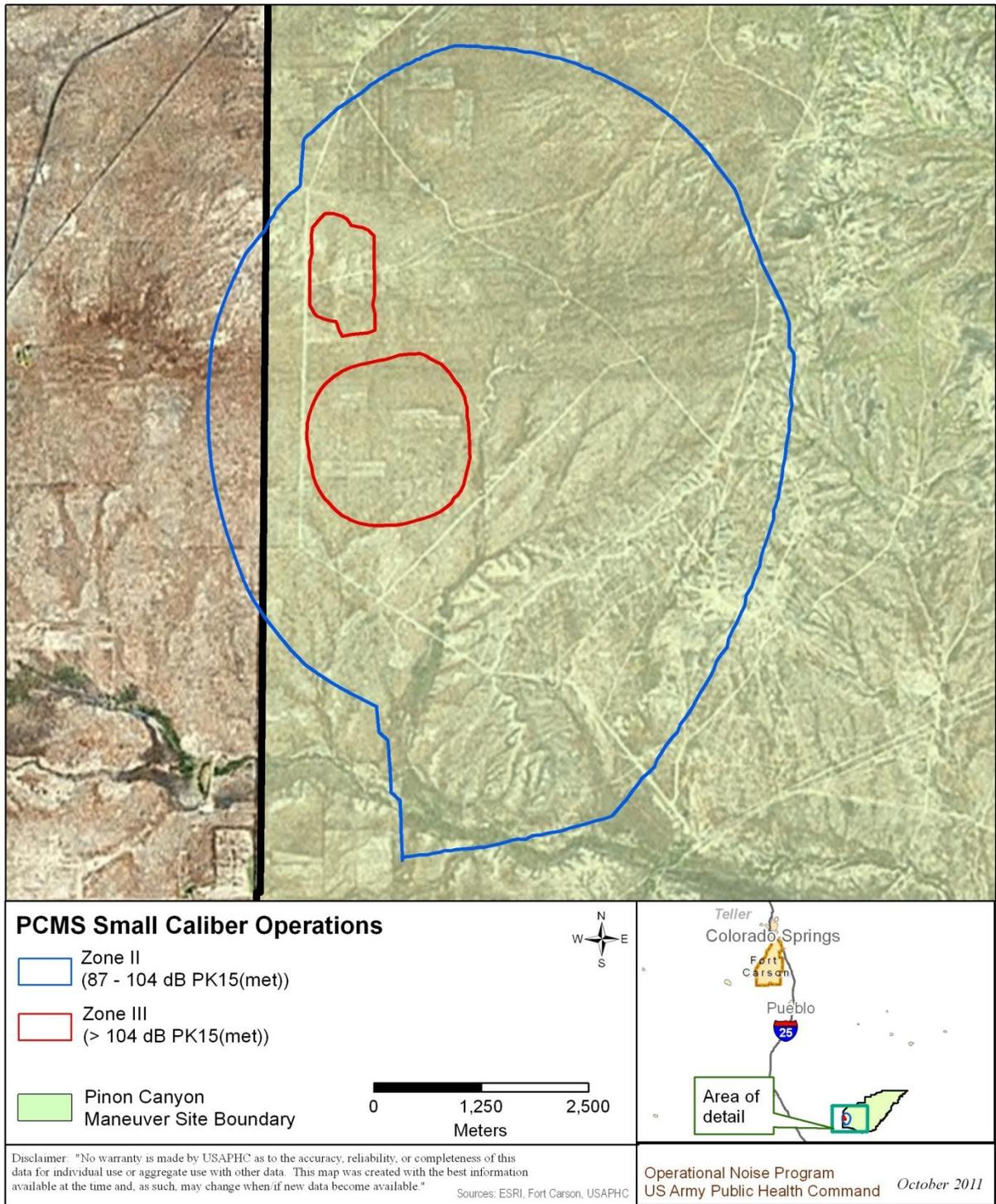


FIGURE 4. PCMS SMALL CALIBER NOISE CONTOURS.

b. Large Caliber Weapon Ranges.

(1) The CAB training would include aerial gunnery, integrated aviation, and ground maneuver qualification ranges. Training would take place on existing ranges at Fort Carson; such as the Multi-Purpose Range Complex, Aerial Gunnery Range, Combined Arms Collective Training Facility and/or Urban Operations Training Range. The projected weapon activity includes 2.75-inch rockets, Hellfire guided missiles, and 30mm Gun.

(2) Table 12 lists the standard ammunition requirements for an AH-64 attack battalion as shown in DA PAM 350-38, Standards in Training Commission (STRAC) (U.S. Army 2010). As a Heavy CAB consists of two attack battalions, the values in the table were doubled when analyzed. Appendix E contains the operations data used to model the demolition and large caliber noise contours.

TABLE 12. ATTACK BATTALION STRAC REQUIREMENTS.

Weapon/Ammunition	Annual Number of Rounds per Aviation Battalion
2.75-inch Rocket, Inert	2,736
Hellfire, Inert	144
30mm Gun, Inert	24,720

NOTE: *Inert is defined as any round that does not explode upon impact (i.e. smoke, TP, illum).*

(3) Figure 5 depicts the demolition and large caliber weapons noise contours for Fort Carson. The LUPZ (57 CDNL) extends beyond the eastern boundary beyond Interstate 25, encompassing El Rancho, Midway Ranches, and the best part of the city of Fountain. The LUPZ extends into an undeveloped area to the south and beyond the western boundary encompassing Turkey Canyon Ranch. Zone II (62 CDNL) extends into El Rancho and Midway Ranches; and slightly into the Turkey Canyon Ranch. Zone III (70 CDNL) extends slightly into undeveloped areas of Fountain, El Rancho, and Turkey Canyon Creek. On-post Zone II encompasses most of the WRC. Limiting or relocating the artillery firing occurring in Training 07 would lessen the large caliber weapon noise levels in the WRC.

(4) The existing operations at Fort Carson are in excess of 532,000 events annually. The 55,200 rounds attributed to the projected CAB activity were acoustically insignificant; therefore the addition of the CAB activity does not change the demolition and large caliber noise contours, Figure 6.

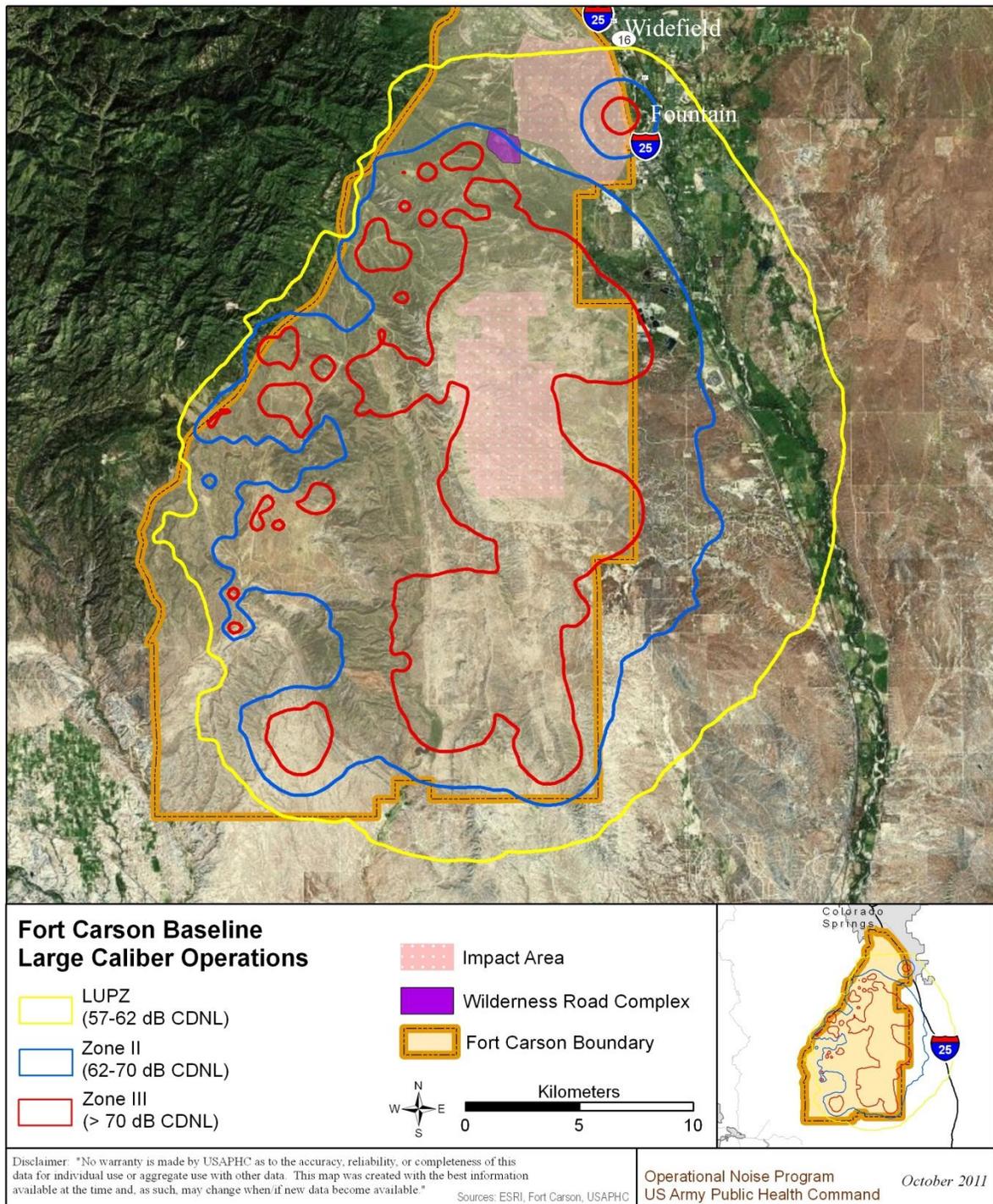


FIGURE 5. FORT CARSON BASELINE DEMOLITION AND LARGE CALIBER NOISE CONTOURS.

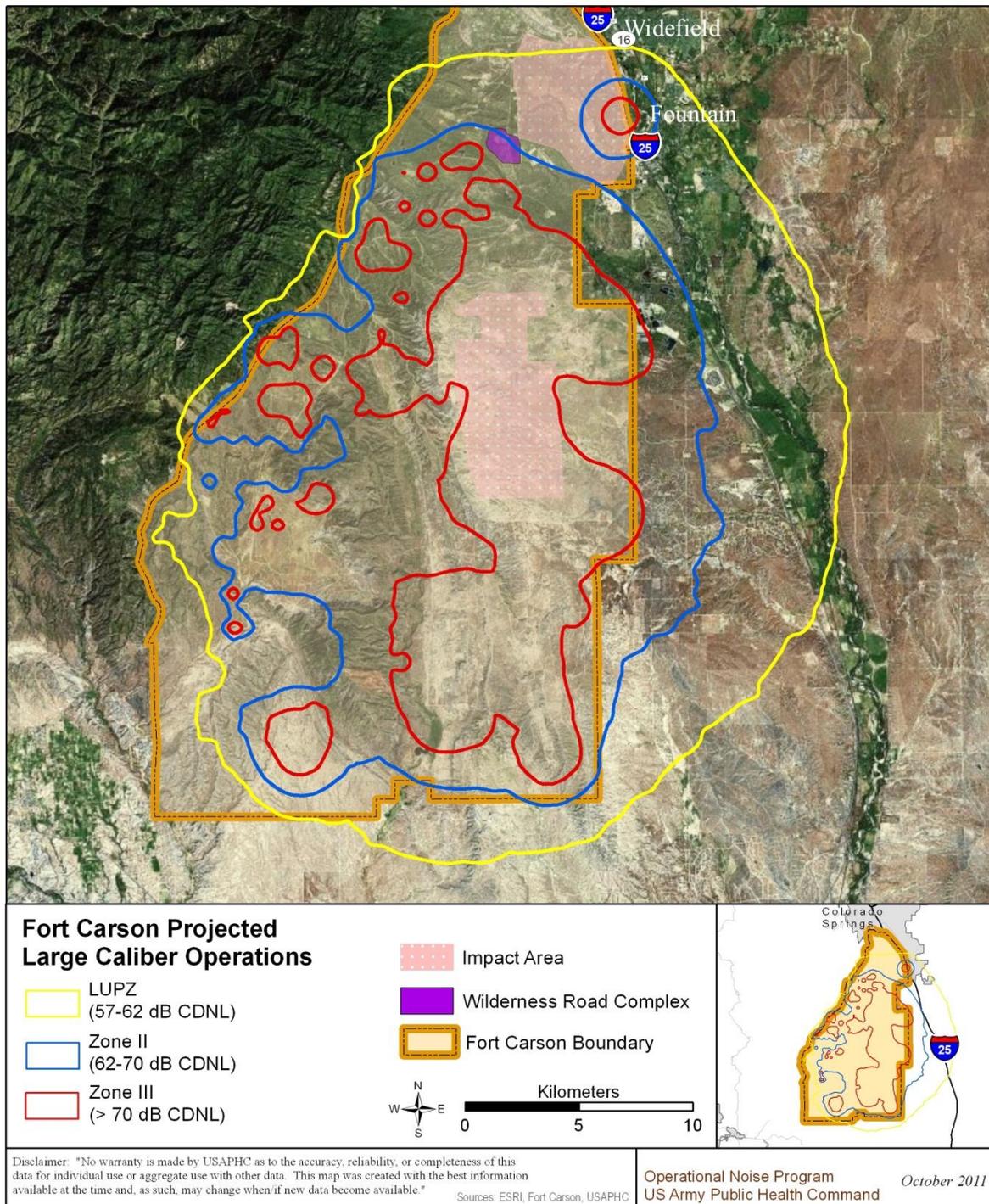


FIGURE 6. FORT CARSON PROJECTED DEMOLITION AND LARGE CALIBER NOISE CONTOURS.

11. CONCLUSIONS AND RECOMMENDATIONS.

a. Aviation Activity.

(1) The existing and projected annual average noise levels attributable to the BAAF activity is compatible with surrounding land use, both on and off-post. Though the Noise Zones indicate that annual average noise levels are compatible with the surrounding environment, there is potential for individual overflights to cause annoyance and possibly generate noise complaints.

(2) Measures are in place to mitigate the effects of aircraft noise at Fort Carson. However, there is always the possibility that an individual overflight could lead to a complaint. Fort Carson should continue implementing fly-neighborly programs that adjust aircraft training times and routes to lower the impact on the community to the greatest extent possible given mission requirements.

b. Weapon Activity.

(1) The existing operations at Fort Carson are in excess of 532,000 events annually. The 55,200 rounds attributed to the projected CAB activity were acoustically insignificant. The addition of the CAB activity does not change the demolition and large caliber noise contours.

(2) As small caliber weapons are evaluated on peak levels, the additional activity of the CAB does not change the noise contours.

c. Wilderness Road Complex.

(1) The Zone II from demolition and large caliber weapon activity encompasses most of the WRC. Limiting or relocating the artillery firing occurring in Training 07 would lessen the large caliber weapon DNL in the WRC.

(2) Though the WRC is located in an area where BAAF noise levels are compatible with residential land use, there is potential for an individual overflight to cause annoyance.

(3) In the WRC, incorporating Noise Level Reduction methods in building construction would not be effective for large caliber noise mitigation, but may be effective in mitigating aviation activity noise.

(4) When/if the preliminary plan for a child development center and/or chapel north of Wilderness Road become further defined, Fort Carson should analyze the projects in accordance with National Environmental Policy Act.



KRISTY BROSKA
Environmental Protection Specialist
Operational Noise

APPROVED:



CATHERINE STEWART
Program Manager
Operational Noise

APPENDIX A

REFERENCES

1. Fort Carson, 2009. Final Environmental Impact Statement for Implementation of Fort Carson Grow the Army Stationing Decisions, February 2009.
2. Rylander, et. al., 1974, "Re-Analysis of Aircraft Noise Annoyance Data Against the dBA Peak Concept", Journal of Sound and Vibration, Volume 36, pages 399 - 406.
3. Rylander and Bjorkman, 1988, "Maximum Noise Levels as Indicators of Biological Effects", Journal of Sound and Vibration, Volume 127, pages 555 - 563.
4. U.S. Air Force, 2005, SELcalc2 Noise Model, Wright-Patterson Air Force Base, OH.
5. U.S. Air Force, 2009, NOISEMAP/BASEOPS, Wright-Patterson Air Force Base, OH.
6. U.S. Army, 2003, U.S. Army Construction Engineering Research Laboratories, SARNAM Computer Model, Version 2.6.2003-06-06.
7. U.S. Army, 2007, Army Regulation 200-1, Environmental Protection and Enhancement, Chapter 14 Operational Noise.
8. U.S. Army, 2008, U.S. Army Center for Health Promotion and Preventive Medicine, Addendum to Operational Noise Consultation 52-ON-046N-06, Operational Noise Contours for Fort Carson, CO, April 2006. Dated 16 October 2008.
9. U.S. Army, 2009, U.S. Army Construction Engineering Research Laboratories, BNOISE2 Computer Model, Version 1.3.2009-11-30.
10. U.S. Army, 2010, Department of Army Pamphlet 350-38, Standards in Training Commission, FY11.
11. U.S. Army, 2011a. Final Programmatic Environmental Impact Statement (PEIS) for the Realignment, Growth and Stationing of Army Aviation Assets, February 2011.
12. U.S. Army, 2011b. Record of Decision for the Realignment, Growth, and Stationing of Army Aviation Assets, March 25, 2011.

APPENDIX B

GLOSSARY OF TERMS, ACRONYMS & ABBREVIATIONS

B-1. GLOSSARY OF TERMS.

Above Ground Level – distance of the aircraft above the ground.

A-weighted Sound Level – the ear does not respond equally to sounds of all frequencies, but is less efficient at low and high frequencies than it is at medium or speech range frequencies. Thus, to obtain a single number representing the sound pressure level of a noise containing a wide range of frequencies in a manner approximating the response of the ear, it is necessary to reduce, or weight, the effects of the low and high frequencies with respect to the medium frequencies. Thus, the low and high frequencies are de-emphasized with the A-weighting. The A-scale sound level is a quantity, in decibels, read from a standard sound-level meter with A-weighting circuitry. The A-scale weighting discriminates against the lower frequencies according to a relationship approximating the auditory sensitivity of the human ear. The A-scale sound level measures approximately the relative “noisiness” or “annoyance” of many common sounds.

Average Sound Level – the mean-squared sound exposure level of all events occurring in a stated time interval, plus ten times the common logarithm of the quotient formed by the number of events in the time interval, divided by the duration of the time interval in seconds.

C-weighted Sound Level – a quantity, in decibels, read from a standard sound level meter with C-weighting circuitry. The C-scale incorporates slight de-emphasis of the low and high portion of the audible frequency spectrum.

Day-Night Average Sound Level (DNL) – the 24-hour average frequency-weighted sound level, in decibels, from midnight to midnight, obtained after addition of 10 decibels to sound levels in the night from midnight up to 7 a.m. and from 10 p.m. to midnight (0000 up to 0700 and 2200 up to 2400 hours).

Decibels (dB) – a logarithmic sound pressure unit of measure.

Ground Track Distance – the distance between the receiver and the point on the Earth at which the aircraft is directly overhead.

Noise – any sound without value.

PK15(met) – the maximum value of the instantaneous sound pressure for each unique sound source, and applying the 15 percentile rule accounting for meteorological variation.

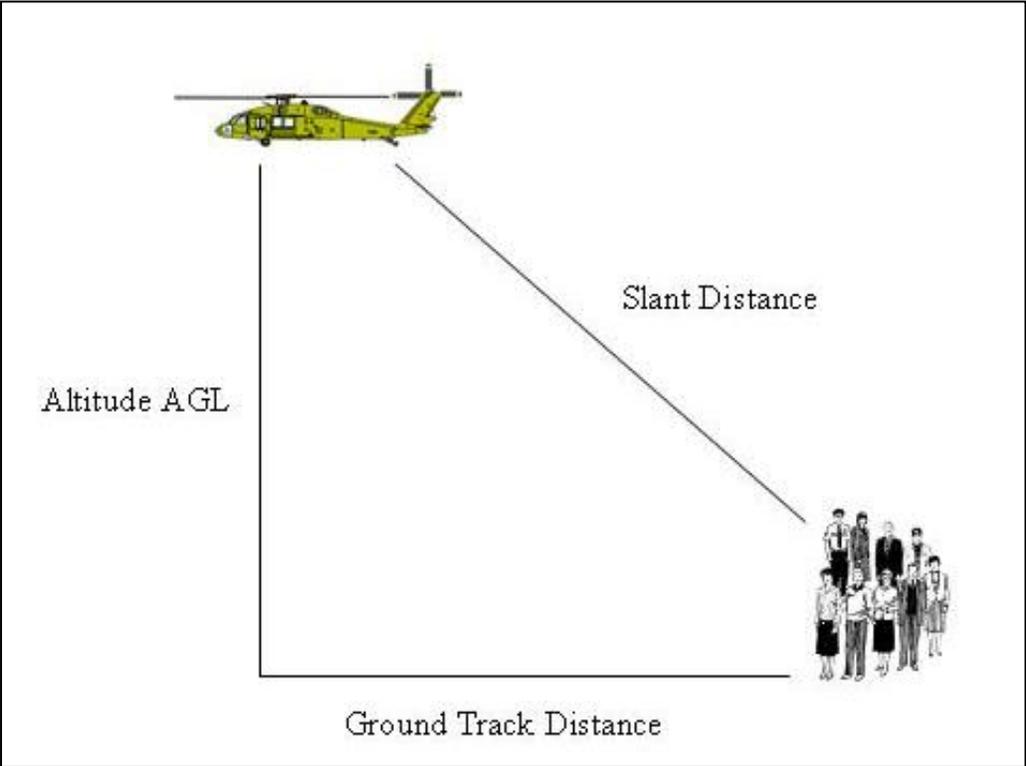
Slant Distance – the line of sight distance between the receiver and the aircraft. The slant distance is the hypotenuse of the triangle represented by the altitude AGL of the aircraft and the distance between the receiver and the aircraft’s ground track distance.

B-2. GLOSSARY OF ACRONYMS AND ABBREVIATIONS.

A-YDNL	A-weight Yearly Day-Night average Level
AGL	Above Ground Level
ASEL	A-weighted Sound Exposure Level
BAAF	Butts Army Airfield
BNOISE2	Blast Noise Impact Assessment
CAB	Combat Aviation Brigade
CDNL	C-weighted Day Night average Level
dB	Decibels
dBA	Decibels, A-weighted
LUPZ	Land Use Planning Zone
MAX	Maximum sound level
NEPA	National Environmental Policy Act
PK15(met)	Unweighted Peak, 15% Metric
SARNAM	Small Arms Range Noise Assessment Model
WRC	Wilderness Road Complex

ANNEX B

GRAPHICAL DESCRIPTION OF AIRCRAFT TERMINOLOGY



APPENDIX C

U.S. ARMY NOISE ZONE DESCRIPTIONS

C-1. REFERENCE. The U.S. Army, 2007, Army Regulation 200-1, Environmental Protection and Enhancement, Chapter 14 Operational Noise.

C-2. For a detailed explanation of Noise Zone Descriptions and Land Use Guidelines see Army Regulation 200-1, Chapter 14 (U.S. Army 2007).

C-3. Day Night Level (DNL). DNL is used to describe the cumulative or total noise exposure during a prescribed time period (aviation 365 days; demolition and large caliber weapons 250 days for active Army). DNL is the energy average noise level calculated with a 10 decibel penalty for operations occurring between 2200 and 0700. The 10-decibel penalty considers that people are more sensitive to noise during these hours. Additionally, sounds may seem louder since background noise levels are generally lower at night. *Note: as DNL is averaged over a prescribed time period the contours include days of no, light, and heavy training schedules.*

C-4. PK15(met) Noise Contour Description. PK15(met) is the peak sound level, factoring in the statistical variations caused by weather, that is likely to be exceeded only 15 percent of the time (i.e., 85 percent certainty that sound will be within this range). This “85 percent solution” gives the installation and the community a means to consider the areas impacted by training noise without putting stipulations on land that would only receive high sound levels under infrequent weather conditions that greatly favor sound propagation. PK15(met) does not take the duration or the number of events into consideration, so the size of the contours will remain the same regardless of the number of events.

C-5. The AR lists housing, schools, and medical facilities as examples of noise-sensitive land uses (U.S. Army 2007). The program defines four Noise Zones:

- Noise-sensitive land uses are not recommended in *Zone III*.
- Although local conditions such as availability of developable land or cost may require noise-sensitive land uses in *Zone II*, this type of land use is strongly discouraged on the installation and in surrounding communities. All viable alternatives should be considered to limit development in *Zone II* to non-sensitive activities such as industry, manufacturing, transportation and agriculture.
- Noise-sensitive land uses are generally acceptable within the *Zone I*. However, though an area may only receive *Zone I* levels, military operations may be loud enough to be heard- or even judged loud on occasion. *Zone I* is not one of the contours shown on the map; rather it is the entire area outside of the *Zone II* contour.
- A *Land Use Planning Zone (LUPZ)* is a subdivision of *Zone I*. The *LUPZ* is 5 dB lower than the *Zone II*. Within this area, noise-sensitive land uses are generally acceptable. However, communities and individuals often have different views regarding what level of noise is acceptable or desirable. To address this, some local governments have implemented land use planning measures out beyond the *Zone II* limits. Additionally, implementing planning controls within the *LUPZ* can develop a buffer to avert the possibility of future noise conflicts.

C-6. See Table C for land use guidelines.

TABLE C. NOISE ZONE DECIBEL LEVELS (AR 200-1).

Noise Zone	Aviation (ADNL)	Small Arms (PK15(met))	Large Arms, Demolitions, Etc. (CDNL)
Land Use Planning Zone (LUPZ)	60-65	N/A	57 – 62
Zone I	<65	<87	<62
Zone II	65-75	87 – 104	62 – 70
Zone III	>75	>104	>70

APPENDIX D

AIRFIELD NOISE CONTOUR COMPARISON

D-1. REFERENCES.

- a. Fort Carson, 2009. Final Environmental Impact Statement (FEIS) for Implementation of Fort Carson Grow the Army Stationing Decisions, February 2009.
- b. U.S. Army, 2008, U.S. Army Center for Health Promotion and Preventive Medicine, Addendum to Operational Noise Consultation 52-ON-046N-06, Operational Noise Contours for Fort Carson, CO, April 2006. Dated 16 October 2008.
- c. U.S. Army, 2011. Final Programmatic Environmental Impact Statement (PEIS) for the Realignment, Growth and Stationing of Army Aviation Assets, February 2011.

D-2. PREVIOUS AIRFIELD CONTOUR.

- a. The airfield contours presented in the FEIS and PEIS are shown in Figure D. These contours were originally developed in 1999 based on 64,884 flights over 180 days (actual operating days) and the majority of the activity (rotary-wing) utilizing Runway 04/22. Table D indicates the flight activity.

TABLE D. BUTTS ARMY AIRFIELD OPERATIONS (1999).

Aircraft Type	Number of Flights	Average Number of Flights per Day (based on 180 operating days)
AH-1	15,290	85
AH-64	17,066	95
C-130	230	1
CH-47	160	<1
DHC-6	30	<1
OH-58	16,505	<1
T-41	53	92
UH-1	135	<1
UH-60	15,415	86

b. Based on the 1999 contours, Zone III (>75 ADNL) did not extend beyond the installation boundary or into any noise sensitive land uses on Fort Carson. The Zone II (65-75 ADNL) and the LUPZ (60 – 65 ADNL) extended beyond the western boundary. However, these apparent “off-post” contours were artifacts resulting from entering the exact prescribed flight tracks into the NOISEMAP computer program. The computer program treated each aircraft as passing over the exact same points so the sound energy was treated as if concentrated along a line. In reality, aircraft fan out in different directions along the western boundary and many of the aircraft turn back into Fort Carson before they pass over the boundary.

c. During intervening years, the original inputs were reviewed to determine if enough variables had changed to warrant a reanalysis. During the 2007 calendar year, there were 28,725 operations. Since the low number of operations was due to deployments, the 1999 contours were kept as baseline to represent normal non-deployment operational levels.

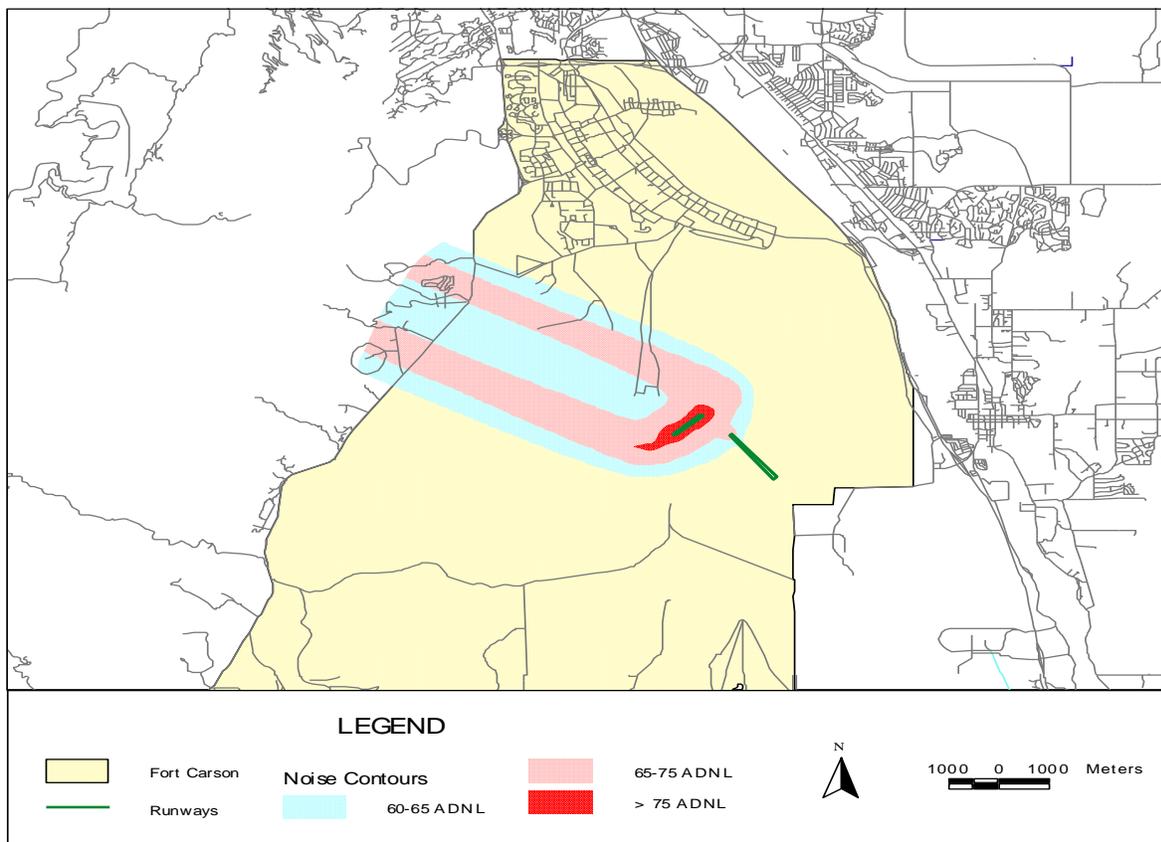


FIGURE D. BUTTS AAF AIRFIELD CONTOURS.

D-3. CURRENT AIRFIELD CONTOURS. Due to several factors, a new modeling analysis was completed for this consultation. Changes to modeling parameters included:

- Based on Fiscal Year 2011 operations, the number of flights increased to 103,199.
- Per Federal Aviation Administration and Army policy, contours are based on a Yearly Day-Night average Noise Level.
- Increased flight corridor altitudes.
- Changes in frequency of use for approach/ departure and closed-pattern routes.
- Changes in aircraft.

APPENDIX E

WEAPON EXPENDITURE

FORT CARSON SMALL CALIBER RANGE OPERATIONS

	PISTOL, 9 MM, LIVE	RIFLE, 5.56 MM, LIVE	MACHINE GUN, 7.62 MM, LIVE	SHOTGUN, 12 GAUGE, NONLETHAL
RANGE 3 - MILITARY POLICE QUALIFICATION COURSE	X			
RANGE 5 - COMBAT PISTOL QUALIFICATION COURSE	X			
RANGE 7A - KNOWN DISTANCE RANGE		X	X	
RANGE 9 - SF MUTLIPLIE USE RANGE		X	X	
RANGE 13A - ZERO RANGE		X		
RANGE 15 - MACHINE GUN ZERO RANGE			X	
RANGE 29 - CLOSE QUARTERS COMBAT RANGE		X		
RANGE 37 - SCALED MORTAR RANGE				X
RANGE 43 - SF MULTIPLE USE RANGE		X		
RANGE 45 - KNOW DISTANCE RANGE			X	
RANGE 49 - AUTOMATED RECORD FIRE RANGE		X		
RANGE 51 - ZERO RANGE		X		
RANGE 55 - AUTOMATED FIELD FIRE RANGE		X		
RANGE 57 - AUTOMATED RECORD FIRE RANGE		X		
RANGE 63 - ZERO RANGE		X		
RANGE 65 - ZERO RANGE		X		
RANGE 69 - AUTOMATED RECORD FIRE		X		

PINON CANYON MANEUVER SITE SMALL CALIBER RANGE OPERATIONS

	PISTOL, 9 MM, LIVE	RIFLE, 5.56 MM, LIVE	MACHINE GUN, 7.62 MM, LIVE	MACHINE GUN, .50 CAL, LIVE
RANGE 1 - COMBAT PISTOL QUALIFICATION COURSE	X			
RANGE 3 - AUTOMATED RECORD FIRE		X		
RANGE 7 - MULTI PURPOSE MACHINE GUN		X	X	X

APPENDIX F
FORT CARSON DEMOLITION AND LARGE CALIBER WEAPON EXPENDITURE

Firing Location	Weapon and Ammunition Type	BASELINE ACTIVITY		PROJECTED ACTIVITY	
		DayShots 0700-2200	NightShots 2200-0700	DayShots 0700-2200	NightShots 2200-0700
Hellfire North	Hellfire Missile, HE	145	35	145	35
	Hellfire Missile, Inert	0	0	144	0
Hellfire South	Hellfire Missile, HE	145	35	145	35
	Hellfire Missile, Inert	0	0	144	0
Mortar Point 02	120mm Mortar, HE	250	13	250	13
	120mm Mortar Inert	1173	62	1173	62
	60mm Mortar, HE	95	5	95	5
	60mm Mortar, Inert	472	25	472	25
	81mm Mortar, HE	78	4	78	4
	81mm Mortar, Inert	212	3	212	3
Mortar Point 03	120mm Mortar, HE	250	14	250	14
	120mm Mortar, Inert	1173	62	1173	62
	60mm Mortar, HE	95	5	95	5
	60mm Mortar, Inert	472	25	472	25
	81mm Mortar, HE	24	1	24	1
	81mm Mortar, Inert	66	2	66	2
Mortar Point 16	120mm Mortar, HE	249	13	249	13
	120mm Mortar, Inert	1172	61	1172	61
	60mm Mortar, HE	107	5	107	5
	60mm Mortar, Inert	471	24	471	24
	81mm Mortar, HE	51	3	51	3
Mortar Point 17	120mm Mortar, HE	250	13	250	13
	120mm Mortar, Inert	1173	62	1173	62
	60mm Mortar, HE	95	5	95	5
	60mm Mortar, Inert	471	25	471	25
	81mm Mortar, HE	261	14	261	14
	81mm Mortar, Inert	706	11	706	11
Mortar Point 20	120mm Mortar, HE	249	13	249	13
	120mm Mortar, Inert	1172	61	1172	61
	60mm Mortar, HE	539	14	539	14
	60mm Mortar, Inert	471	24	471	24
	81mm Mortar, HE	336	18	336	18
	81mm Mortar, Inert	907	14	907	14

Operational Noise Consultation, No. 52-EN-0FKB-12, 06 Oct 11

Firing Location	Weapon and Ammunition Type	BASELINE ACTIVITY		PROJECTED ACTIVITY	
		DayShots 0700-2200	NightShots 2200-0700	DayShots 0700-2200	NightShots 2200-0700
Mortar Point 24	120mm Mortar, HE	250	13	250	13
	120mm Mortar, Inert	1173	62	1173	62
	60mm Mortar, HE	95	5	95	5
	60mm Mortar, Inert	471	25	471	25
	81mm Mortar, HE	833	44	833	44
	81mm Mortar, Inert	2253	33	2253	33
Mortar Point 25	120mm Mortar, HE	250	13	250	13
	120mm Mortar, Inert	1172	62	1172	62
	60mm Mortar, HE	95	5	95	5
	60mm Mortar, Inert	471	25	471	25
	81mm Mortar, HE	192	10	192	10
	81mm Mortar, Inert	520	7	520	7
Range 35B	Hand Grenade, M67, HE	10500	0	10500	0
Range 103	40mm Grenade, HE	46482	2446	46482	2446
Range 105	120mm Tank, Inert	1261	0	1261	0
	25mm Gun, Inert	11588	0	11588	0
Range 109	120mm Tank, Inert	277	119	277	119
	25mm Gun, Inert	42745	10686	42745	10686
Range 111 DMPTR	120mm Tank, Inert	3164	1185	3164	1185
	25mm Gun, Inert	21779	11237	21779	11237
	2.75" Rocket, Inert	0	0	1824	0
	30mm Gun, Inert	0	0	16480	0
Range 115A	40mm Grenade HE	9986	526	9986	526
Range 121A	Bangalore	36	0	36	0
	Crater Charge 40 lbs	214	0	214	0
	Demolition, C4 1.25 lbs	23594	0	23594	0
	Demolition, PETN 2 lbs	21	0	21	0
	Demolition, TNT 1 lb	1257	0	1257	0
	Demolition, TNT 1/4 lb	1163	0	1163	0
	M15 Mine	125	0	125	0
	M181A1 Mine	252	0	252	0
	M19 Mine	121	0	121	0
	M21 Mine	207	0	207	0
Shape Charge 40 lbs	428	0	428	0	
Range 123	20mm Gun, Inert	6602	0	6602	0
	25mm Gun, Inert	183	0	183	0
	30mm Gun, Inert	95450	0	95450	0
Range 125	TOW Missile, Inert	115	0	115	0
Range 127 IPBC	25mm Gun, Inert	24395	6099	24395	6099

Note: Inert is defined as any round that does not create noise upon impact.
Projected increase is highlighted.

Operational Noise Consultation, No. 52-EN-0FKB-12, 06 Oct 11

Firing Location	Weapon and Ammunition Type	BASELINE ACTIVITY		PROJECTED ACTIVITY	
		DayShots 0700-2200	NightShots 2200-0700	DayShots 0700-2200	NightShots 2200-0700
Range 139	AT4 Rocket, Inert	735	0	735	0
	LAW Rocket, Inert	231	0	231	0
Range 141	155mm Howitzer, HE	18	0	18	0
	155mm Howitzer, Inert	1	0	1	0
	Dragon Rocket, Inert	44	0	44	0
Range 143 DMPRC	120mm Tank, Inert	9303	3252	9303	3252
	25mm Gun, Inert	75847	27779	75847	27779
	TOW Missile, Inert	421	0	421	0
	2.75" Rocket, Inert	0	0	1824	0
	30mm Gun, Inert	0	0	16480	0
Range 145	120mm Tank, Inert	952	389	952	389
	25mm Gun, Inert	21779	11237	21779	11237
Range 149	Stinger Missile, HE	72	0	72	0
Range 151	20mm Gun, Inert	228	0	228	0
	25mm Gun, Inert	101	0	101	0
Range 155 CALFEX	120mm Tank, Inert	842	0	842	0
	25mm Gun, Inert	6271	0	6271	0
	155mm Howitzer, HE	203	50	203	50
	155mm Howitzer, Inert	761	299	761	299
	2.75" Rocket, Inert	0	0	1824	0
	30mm Gun, Inert	0	0	16480	0
Range 155E	120mm Mortar, HE	608	32	608	32
	120mm Mortar, Inert	722	70	722	70
	60mm Mortar, HE	319	17	319	17
	60mm Mortar, Inert	67	3	67	3
	81mm Mortar, HE	611	32	611	32
	81mm Mortar, Inert	285	15	285	15
	Demolition, C4 1.25 lbs	1151	0	1151	0
	Crater Charge, 40 lbs	29	0	29	0
	Shape Charge, 40 lbs	20	0	20	0
	Training Area 07	155mm Howitzer, HE	1026	237	1026
155mm Howitzer, Inert		15	266	15	266
Training Area 09	155mm Howitzer, HE	86	21	86	21
	155mm Howitzer, Inert	1	1	1	1
Training Area 10	155mm Howitzer, HE	370	100	370	100
	155mm Howitzer, Inert	7	46	7	46
Training Area 11	155mm Howitzer, HE	425	106	425	106
	155mm Howitzer, Inert	7	178	7	178
Training Area 12	155mm Howitzer, HE	433	104	433	104
	155mm Howitzer, Inert	6	23	6	23

Note: Inert is defined as any round that does not create noise upon impact.
Projected increase is highlighted.

Operational Noise Consultation, No. 52-EN-0FKB-12, 06 Oct 11

Firing Location	Weapon and Ammunition Type	BASELINE ACTIVITY		PROJECTED ACTIVITY	
		DayShots 0700-2200	NightShots 2200-0700	DayShots 0700-2200	NightShots 2200-0700
Training Area 14	155mm Howitzer, HE	71	18	71	18
	155mm Howitzer, Inert	1	22	1	22
Training Area 16	155mm Howitzer, HE	144	36	144	36
	155mm Howitzer, Inert	2	22	2	22
Training Area 17	155mm Howitzer, HE	1404	351	1404	351
	155mm Howitzer, Inert	22	397	22	397
Training Area 18	155mm Howitzer, HE	213	52	213	52
	155mm Howitzer, Inert	3	57	3	57
Training Area 20	155mm Howitzer, HE	420	105	420	105
	155mm Howitzer, Inert	6	103	6	103
Training Area 21	155mm Howitzer, HE	748	187	748	187
	155mm Howitzer, Inert	12	103	12	103
Training Area 24	155mm Howitzer, HE	1343	337	1343	337
	155mm Howitzer, Inert	21	675	21	675
Training Area 25	155mm Howitzer, HE	75	19	75	19
	155mm Howitzer, Inert	1	18	1	18
Training Area 27	155mm Howitzer, HE	33	9	33	9
	155mm Howitzer, Inert	1	8	1	8
Training Area 28	155mm Howitzer, HE	37	10	37	10
	155mm Howitzer, Inert	1	1	1	1
Training Area 30	155mm Howitzer, HE	63	15	63	15
	155mm Howitzer, Inert	1	46	1	46
Training Area 31	155mm Howitzer, HE	62	15	62	15
	155mm Howitzer, Inert	1	19	1	19
Training Area 40	155mm Howitzer, HE	64	16	64	16
	155mm Howitzer, Inert	1	1	1	1
Training Area 41	155mm Howitzer, HE	60	15	60	15
	155mm Howitzer, Inert	1	1	1	1

Note: Inert is defined as any round that does not create noise upon impact.
Projected increase is highlighted.