

APPENDIX E: NOISE REPORT

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

MCHB-IP-EON

MEMORANDUM FOR U.S. Army Installation Management Command, (Ms. McDowell),
11711 North IH 35, Suite 110, San Antonio, TX 78234

SUBJECT: Addendum to Operational Noise Consultation, 52-EN-0EB2-11, Operational
Noise Contours for Proposed Infantry Platoon Battle Course at Pohakuloa Training
Area, HI, 19 May 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, Environmental Protection Specialist 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.

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U.S. ARMY PUBLIC HEALTH COMMAND (Provisional)

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

ADDENDUM TO OPERATIONAL NOISE
 CONSULTATION
 NO. 52-EN-0EB2-11
 OPERATIONAL NOISE ASSESSMENT
 PROPOSED INFANTRY PLATOON
 BATTLE COURSE DEVELOPMENT
 POHAKULOA TRAINING AREA, HI
 19 MAY 2011

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

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 June 2011. U.S. Army Installation Management Command,
 (Ms. McDowell), 11711 North IH 35, Suite 110, San Antonio, TX
 78234

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

MCHB-IP-EON

EXECUTIVE SUMMARY
ADDENDUM TO OPERATIONAL NOISE CONSULTATION
NO. 52-EN-0EB2-11
OPERATIONAL NOISE ASSESSMENT
PROPOSED INFANTRY PLATOON
BATTLE COURSE DEVELOPMENT
POHAKULOA TRAINING AREA, HI
19 MAY 2011

1. PURPOSE. To provide a noise assessment for National Environmental Policy Act (NEPA) documentation for aerial gunnery activity at the proposed Infantry Platoon Battle Course at Pohakuloa Training Area (PTA).
2. CONCLUSIONS AND RECOMMENDATIONS.
 - a. The noise levels from proposed aerial gunnery training would be compatible with Army guidelines. The proposed aerial gunnery activity would not have a noise impact beyond the PTA boundary or on any installation noise-sensitive areas.
 - b. The overflight levels indicate that aircraft flying along the perimeter road to the proposed range may generate noise levels high enough to annoy people in the vicinity of the PTA boundary. However, currently the adjacent area along the perimeter road is zoned Forest Reserve and is undeveloped.
 - c. Include the information from this consultation in the appropriate NEPA documentation.

Addendum Operational Noise Consultation No. 52-EN-0EB2-11, 19 May 11

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ADDENDUM OPERATIONAL NOISE CONSULTATION
NO. 52-EN-0EB2-11
OPERATIONAL NOISE ASSESSMENT
PROPOSED INFANTRY PLATOON
BATTLE COURSE DEVELOPMENT
POHAKULOA TRAINING AREA, HI
19 MAY 2011

1. REFERENCES. A list of the references used in this consultation is in Appendix A. A glossary of terms and abbreviations used within this report is in Appendix B.
2. AUTHORITY. The Army Environmental Command, San Antonio, TX funded this consultation under Military Interdepartmental Purchase Request (MIPR) number MIPR10048884 to support Operational Noise Programs at multiple sites.
3. PURPOSE. To provide a noise assessment of the proposed aerial gunnery activity at the proposed Infantry Platoon Battle Course (IPBC) at Pohakuloa Training Area (PTA), Hawaii.
4. UPDATED NOISE ASSESSMENT.
 - a. The proposed IPBC facility was addressed in an March 2011 Operational Noise Consultation (U.S. Army 2011). The consultation concluded that the proposed IPBC small caliber activity would not have a noise impact beyond the PTA boundary or on any installation noise-sensitive areas.
 - b. PTA requested an analysis of hardening the targets at the proposed IPBC to support aerial gunnery training. The hardening of the targets would permit the firing of inert (non-high explosive) rounds for the 2.75 inch Rocket.
 - c. The proposed aerial gunnery activity would also include the firing of 7.62mm and .50 caliber rounds. The addition of the elevated firing of these rounds would not change the projected small caliber noise contours presented in the March 2011 consultation (Figure 1).
 - d. The projected number days per year that aerial gunnery operations would be conducted is three per year.

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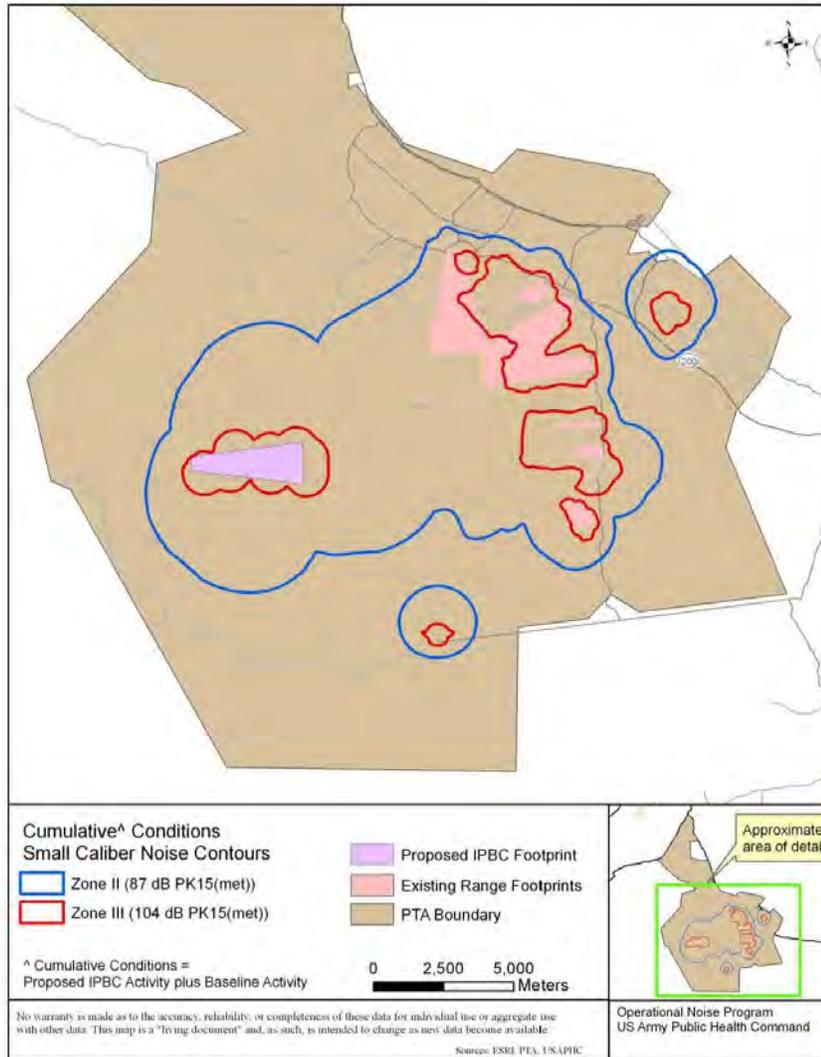


FIGURE 1. PROPOSED CUMULATIVE SMALL CALIBER NOISE CONTOURS.

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5. DEMOLITION AND LARGE CALIBER NOISE EVALUATION.

a. General. The noise simulation program used to assess demolition and large caliber weapons (20mm and greater) noise is the Blast Noise Impact Assessment (BNOISE2) program (U.S. Army 2009). The BNOISE2 program 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 PTA C-weighted Day-Night average sound Level (CDNL) contours was 250 days.

b. Baseline Conditions. The baseline demolition and large caliber noise contours are shown in Figure 2. These contours are contained within the 2010 U.S. Army Hawaii Statewide Operational Noise Management Plan. The baseline contours were developed utilizing 2008 operations data (Appendix C).

c. Projected Cumulative Conditions.

(1) The hardening of the proposed IPBC targets would permit the firing of inert (non-high explosive) 2.75 inch Rockets. Table 1 lists the projected annual ammunition expenditure allocated to the IPBC. The expenditure was developed based on Standards in Training Commission requirements.

TABLE 1. ANNUAL IPBC LARGE CALIBER AMMUNITION EXPENDITURE.

	Day-time (0700-2200)	Nighttime (2200-0700)
2.75" Rocket, Inert	443	0

NOTE: Inert is defined as any round that does not make noise upon impact, (i.e. Smoke, Illum, TP)

(2) Figure 3 shows the noise contours for the proposed IPBC large caliber activity plus the baseline conditions. The cumulative conditions are based on Table 1 plus the data in Appendix C. The addition of the aerial gunnery activity would not have a noise impact beyond the PTA boundary or on any installation noise-sensitive areas.

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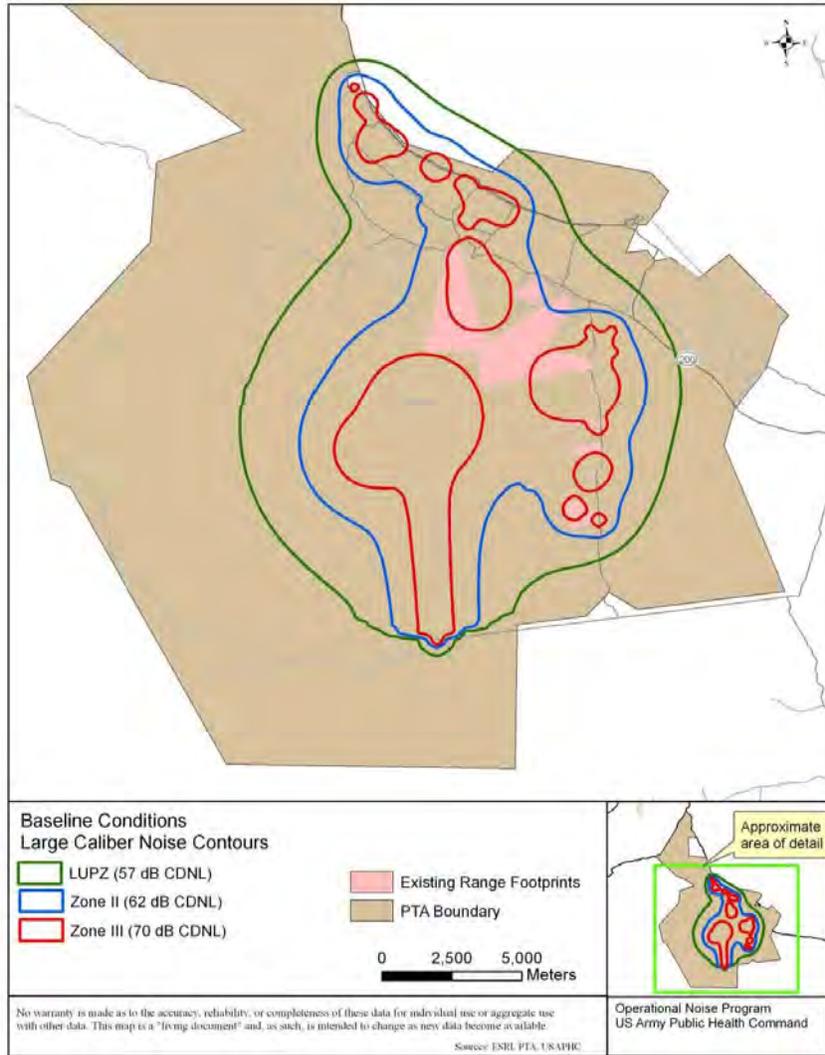


FIGURE 2. BASELINE DEMOLITION AND LARGE CALIBER NOISE CONTOURS.

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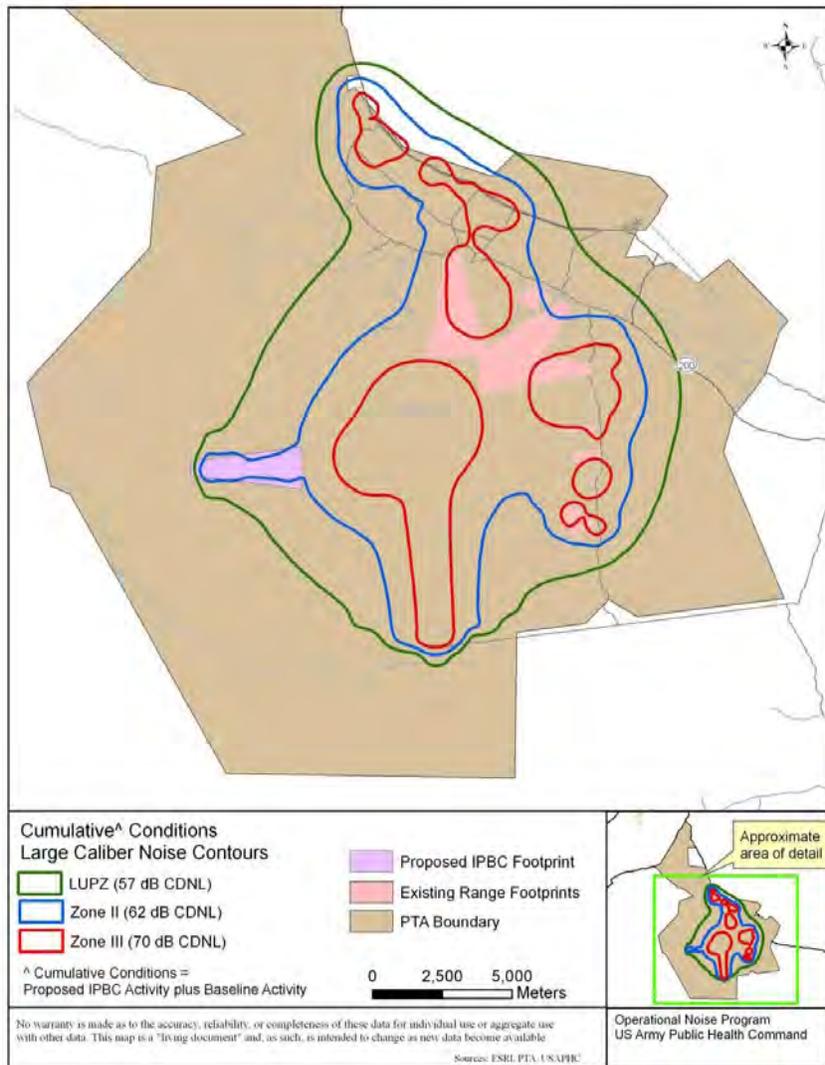


FIGURE 3. PROJECTED CUMULATIVE DEMOLITION AND LARGE CALIBER NOISE CONTOURS.

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6. PROJECTED HELICOPTER ACTIVITY.

a. General. Hardening of the IPBC targets would permit aerial gunnery firing from the UH-60 Blackhawk and OH-58 Kiowa helicopters. The projected activity would occur 3 times a year, with 2 helicopters on the range at a time. To access the range, the helicopters would either follow the perimeter road into the area or transition across the PTA training lands. For noise abatement procedures, helicopters flying along the perimeter road route fly at less than 100 feet altitude Above Ground Level (AGL).

b. Overflight Noise Assessment.

(1) Although the aviation activity would not generate noise counters that indicate incompatible land use, there is still potential that individual aircraft overflights could annoy people near the flight tracks and generate complaints.

(2) Scandinavian Studies (Rylander 1974 and Rylander 1988) have found a good predictor of annoyance at airfields with 50 to 200 operations per day is the maximum level of the 3 loudest events. The SELCalc2 Program (U.S. Air Force 2005) was used to calculate the maximum A-weighted (dBA) noise levels. The levels are listed in Table 2. These maximum levels are compared with levels listed in Table 3 to determine the percent of population that would consider itself highly annoyed.

TABLE 2. MAXIMUM NOISE LEVELS OF AIRCRAFT.

Slant Distance (feet)	Maximum Level, dBA	
	OH-58	UH-60
50	99	100
100	93	94
200	87	88
500	79	80
1,000	72	73

TABLE 3. PERCENTAGE OF POPULATION HIGHLY ANNOYED FROM AIRCRAFT NOISE. (Rylander 1974)

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

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(3) Table 4 indicates the percent of population that would consider itself highly annoyed correlated with maximum noise levels for overflights. The correlation is based on the Rylander studies which investigated airfields with 50 to 200 operations per day. Also based on Rylander's results, Figure 4 depicts the percent of population which would be annoyed by a UH-60 overflight. If the receivers are directly under a UH-60 at 100 foot AGL, +35 percent of the population would consider itself highly annoyed. If the receivers are 1/4 of a mile to the side, less than 1 percent of the population would consider itself highly annoyed.

TABLE 4. ROTARY WING OVERFLIGHT ANNOYANCE POTENTIAL¹.

Source	Ground Track Distance ²	dBA Maximum ³	Population Highly Annoyed ⁴
OH-58 – 50' AGL	0'	99	+35%
	1320' (1/4 mile)	71	7%
	1760' (1/3 mile)	66	<1%
OH-58 – 100' AGL	0'	93	+35%
	1320' (1/4 mile)	65	<1%
	1760' (1/3 mile)	60	<1%
UH-60 – 50' AGL	0'	100	+35%
	1320' (1/4 mile)	72	8%
	1760' (1/3 mile)	67	1%
UH-60 – 100' AGL	0'	94	+35%
	1320' (1/4 mile)	66	<1%
	1760' (1/3 mile)	61	<1%

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 3
 + 35% The Rylander studies did not include sampling in excess of 90 dBA.

c. The overflight levels indicate there is a potential that aircraft flying along the perimeter road to the proposed range may annoy those alongside the PTA boundary. However, the low number of operations, minimum flight altitudes, and standoff distance imposed greatly minimize this potential. Additionally, the area off-post along the perimeter road is zoned Forest Reserve and is undeveloped and will continue to be.

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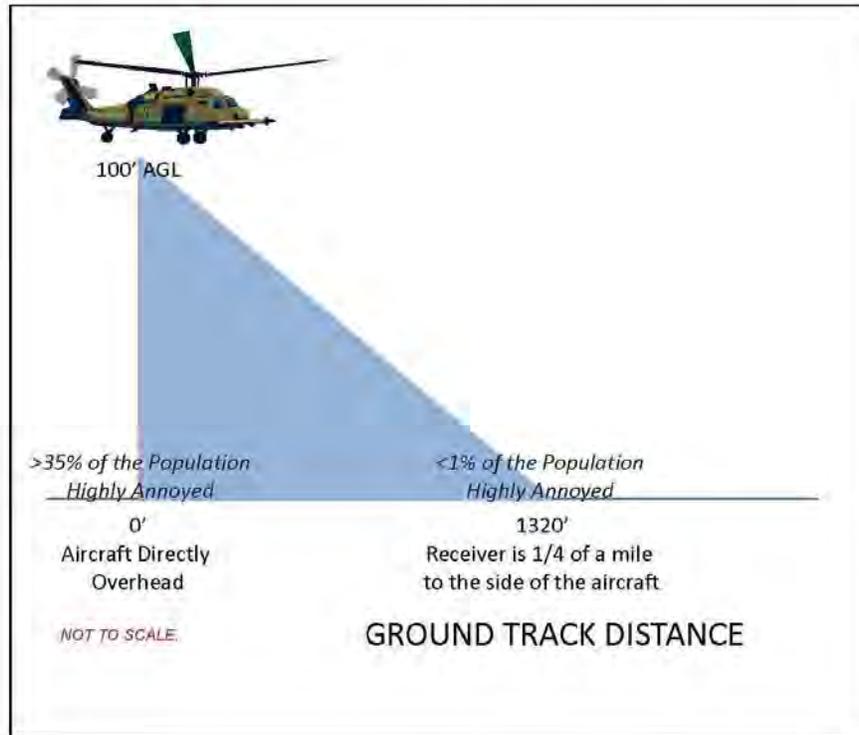


FIGURE 4. UH-60 OVERFLIGHT ANNOYANCE POTENTIAL.
(More than 50 Daily Overflights).

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7. CONCLUSIONS AND RECOMMENDATIONS.

- a. The proposed small caliber aerial gunnery activity would not change the noise contours.
- b. The proposed aerial gunnery rocket activity would not have a noise impact beyond the PTA boundary or on any installation noise-sensitive areas.
- c. Though the overflight levels indicate there is a potential that aircraft flying along the perimeter road to the proposed range may annoy those alongside the PTA boundary, the area along the perimeter road is zoned Forest Reserve and is undeveloped.
- d. Include the information from this consultation in the National Environmental Policy Act documentation.

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APPENDIX A

REFERENCES

1. 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.
2. Rylander and Bjorkman, 1988, "Maximum Noise Levels as Indicators of Biological Effects", *Journal of Sound and Vibration*, Volume 127, pages 555 – 563.
3. U.S. Air Force, 2005, SELcalc2 Noise Model, Wright-Patterson Air Force Base, OH.
4. U.S. Army, 2007, Army Regulation 200-1, Environmental Protection and Enhancement, Chapter 14 Operational Noise.
5. U.S. Army, 2009, U.S. Army Construction Engineering Research Laboratories, BNOISE2 Computer Model, Version 1.3.2009-11-30.
6. U.S. Army, 2011, Army Institute of Public Health, Operational Noise Consultation, 52-EN-0EB2-11, Operational Noise Contours for Proposed Infantry Platoon Battle Course at Pohakuloa Training Area, HI, 1 February 2011.

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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.

B-1

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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.

AGL	Above Ground Level
CDNL	C-weighted average Day Night Level
dB	Decibels
dBA	Decibels, A-weighted
IPBC	Infantry Platoon Battle Course
MAX	Maximum sound level

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APPENDIX C

DEMOLITION AND LARGE CALIBER AMMUNITION BASELINE UTILIZATION

C-1

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RANGE	WEAPON	DAYTIME (0700-2200)	NIGHTTIME (2200-0700)
PTA FP 401/9	105mm Howitzer, Inert	51.3	5.7
	105mm Howitzer, HE	1552.5	172.5
	155mm Howitzer, HE	174.6	19.4
PTA FP 402/9	105mm Howitzer, Inert	270.9	30.1
	105mm Howitzer, HE	602.1	66.9
	155mm Howitzer, HE	108.9	12.1
PTA FP 405/9	155mm Howitzer, Inert	11.7	1.3
	155mm Howitzer, HE	297	33
PTA FP 409/9	155mm Howitzer, HE	38.7	4.3
PTA FP 410/12	155mm Howitzer, Inert	46.8	5.2
	155mm Howitzer, HE	153	17
PTA FP 411/9	155mm Howitzer, Inert	31.5	3.5
	155mm Howitzer, HE	114.3	12.7
PTA FP 420/12	155mm Howitzer, Inert	107.1	11.9
	155mm Howitzer, HE	489.6	54.4
PTA FP 424/12	105mm Howitzer, Inert	16.2	1.8
	105mm Howitzer, HE	100.8	11.2
PTA FP 431/15	155mm Howitzer, Inert	11.7	1.3
	155mm Howitzer, HE	350.1	38.9
PTA FP 435/15	155mm Howitzer, Inert	99	11
	155mm Howitzer, HE	383.4	42.6
PTA FP 436/15	155mm Howitzer, Inert	10.8	1.2
	155mm Howitzer, HE	48.6	5.4
PTA FP 438/15	105mm Howitzer, Inert	426.6	47.4
	105mm Howitzer, HE	321.3	35.7
	155mm Howitzer, Inert	42.3	4.7
	155mm Howitzer, HE	218.7	24.3
PTA FP 442M/9	60mm Mortar, Inert	164	0
	60mm Mortar, HE	232	0
	81mm Mortar, Inert	1072	0
	81mm Mortar, HE	2729	0
	120mm Mortar, Inert	177	0
	120mm Mortar, HE	68	0
	90mm Gun, HE	15	0
PTA FP 501/16	105mm Howitzer, HE	108	12
	155mm Howitzer, Inert	24.3	2.7
	155mm Howitzer, HE	292.5	32.5
PTA FP 503/16	155mm Howitzer, HE	36.9	4.1
PTA FP 801M	60mm Mortar, Inert	6	0
	120mm Mortar, Inert	441	0
	120mm Mortar, HE	197	0

NOTE: Inert is defined as any round that does not make noise upon impact, (i.e. Smoke, Illum, Training Practice)

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RANGE	WEAPON	DAYTIME (0700-2200)	NIGHTTIME (2200-0700)
PTA FP 802M	60mm Mortar, Inert	32	0
	60mm Mortar, HE	666	0
	81mm Mortar, Inert	875	0
	81mm Mortar, HE	235	0
	120mm Mortar, Inert	7	0
	120mm Mortar, HE	78	0
	Demolition, MK74 (M832), 0.31 lbs	22	0
PTA FP 804M	60mm Mortar, Inert	96	0
	60mm Mortar, HE	1389	0
	120mm Mortar, Inert	902	0
	120mm Mortar, HE	22	0
PTA FP 807M	60mm Mortar, Inert	193	0
	60mm Mortar, HE	898	0
PTA POW CAMP	Simulator, Ground Burst M115A2	5	0
PTA RG 01 DEF	2.75 IN Rocket, HE	21	0
	Demolition Sheet, 38 Ft 0.5 lbs/Ft	2	0
PTA RG 01 OFF	Simulator, Hand Grenade M116	20	0
	Demolition, 1 lbs	400	0
PTA RG 03	40mm Grenade, HE	1772	0
PTA RG 05	Hand Grenade, Fragmenting	1696	0
PTA RG 05A	Hand Grenade, Fragmenting	206	0
PTA RG 08A	AT4 Rocket, HE	9	0
	Dragon Rocket, HE	4	0
	TOW Missile, HE	20	0
PTA RG 09	Bangalore, Kit (M1A1)	36	0
	Bangalore, Kit (M1A2)	5	0
	Cratering Charge, 40 lbs	5	0
	Demolition, 1 lbs	142	0
	Demolition, 1.25 lbs	202	0
	Demolition, 2 lbs	2	0
	Demolition, 2.25 lbs	2	0
	Demolition, 2.5 lbs Block M5	45	0
	Demolition, 2.5 lbs Block M2	6	0
	Demolition Flex Linear, 0.1926 lbs (MM46)	1	0
	Demolition Flex Linear, 0.44 lbs (MM30)	4	0
	Demolition Kit, 1.25 lbs (M757)	150	0
	Demolition Sheet, 25 Ft 0.8 lbs/Ft	32	0
	Mine, Claymore M18A1	25	0
	Shape Charge, 15 lbs	6	0
Shape Charge, 40 lbs	5	0	

NOTE: Inert is defined as any round that does not make noise upon impact, (i.e. Smoke, Illum, Training Practice)

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RANGE	WEAPON	DAYTIME (0700-2200)	NIGHTTIME (2200-0700)
PTA RG 10	Simulator, Ground Burst M115A2	1	0
PTA RG 10 OFF	60mm Mortar, HE	48	0
	81mm Mortar, Inert	2	0
	AT4 Rocket, Inert	57	0
	AT4 Rocket, HE	57	0
	Hand Grenade, Fragmenting	107	0
	40mm Grenade, HE	96	0
PTA RG 13	105mm Howitzer, Inert	163.8	18.2
PTA RG 13A	AT4 Rocket, Inert	41	0
	AT4 Rocket, HE	11	0
	40mm Grenade, HE	2284	0
	Demolition, 0.25 lbs	64	0
	Demolition Kit, APOBS (MN79)	8	0
PTA RG 15	2.75 IN Rocket, Inert	7133	0
	Hellfire Missile, HE	38	0
PTA RG 16	20mm Gun, Inert	2600	0
	20mm Gun, HE	200	0
	30mm Gun, HE	400	0
	Bomb, CBU-59A/B (E016)	6	0
	Bomb, MK82 500 lbs.	181	0
	Bomb, MK83 1000 lbs.	22	0
	Bomb, 2000 lbs. (E756)	16	0
	Bomb, Practice 9 lbs. (E962)	34	0
	Bomb, Practice 25 lbs. (E969)	10	0
	2.75 IN Rocket, Inert	36	0
PTA RG 20	2.75 IN Rocket, Inert	91	0
	Hellfire Missile, HE	19	0
PTA RG 8C SHOOTHOUSE	Simulator, Hand Grenade M116	15	0

NOTE: Inert is defined as any round that does not make noise upon impact, (i.e. Smoke, Illum, Training Practice)