3.7 Noise

No Action Alternative

Under the No Action Alternative, the 1999 Congressional land withdrawal of 201,933 acres from public domain (Public Law 106-65) would expire on November 5, 2021, and military training activities requiring the use of these public lands would cease. Expiration of the land withdrawal would terminate the Navy's authority to use nearly all of the Fallon Range Training Complex's (FRTC's) bombing ranges, affecting nearly 62 percent of the land area currently available for military aviation and ground training activities in the FRTC.

Alternative 1 – Modernization of the Fallon Range Training Complex

Under Alternative 1, the Navy would request Congressional renewal of the 1999 Public Land Withdrawal of 202,864 acres, which is scheduled to expire in November 2021. The Navy would request that Congress withdraw and reserve for military use approximately 618,727 acres of additional Federal land and acquire approximately 65,153 acres of non-federal land. Range infrastructure would be constructed to support modernization, including new target areas, and expand and reconfigured existing Special Use Airspace (SUA) to accommodate the expanded bombing ranges. Implementation of Alternative 1 would potentially require the reroute of State Route 839 and the relocation of a portion of the Paiute Pipeline. Public access to B-16, B-17, and B-20 would be restricted for security and to safeguard against potential hazards associated with military activities. The Navy would not allow mining or geothermal development within the proposed bombing ranges or the Dixie Valley Training Area (DVTA). Under Alternative 1, the Navy would use the modernized FRTC to conduct aviation and ground training of the same general types and at the same tempos as analyzed in Alternative 2 of the *2015 Military Readiness Activities at Fallon Range Training Complex, Nevada, Final Environmental Impact Statement* (EIS). The Navy is not proposing to increase the number of training activities under this or any of the alternatives in this EIS.

Alternative 2 – Modernization of Fallon Range Training Complex with Managed Access

Alternative 2 would have the same withdrawals, acquisitions, and SUA changes as proposed in Alternative 1. Alternative 2 would continue to allow certain public uses within specified areas of B-16, B-17, and B-20 (ceremonial, cultural, or academic research visits, land management activities) when the ranges are not operational and compatible with military training activities (typically weekends, holidays, and when closed for maintenance). Alternative 2 would also continue to allow grazing, hunting, off-highway vehicle (OHV) usage, camping, hiking, site and ceremonial visits, and large event off-road races at the DVTA. Additionally under Alternative 2, hunting would be conditionally allowed on designated portions of B-17, and geothermal and salable mineral exploration would be conditionally allowed on the DVTA. Large event off-road races would be allowable on all ranges subject to coordination with the Navy and compatible with military training activities.

Alternative 3 – Bravo-17 Shift and Managed Access (Preferred Alternative)

Alternative 3 differs from Alternative 1 and 2 with respect to the orientation, size, and location of B-16, B-17, B-20 and the DVTA, and is similar to Alternative 2 in terms of managed access. Alternative 3 places the proposed B-17 farther to the southeast and rotates it slightly counter-clockwise. In conjunction with shifting B-17 in this manner, the expanded range would leave State Route 839 in its current configuration along the western boundary of B-17 and would expand eastward across State Route 361 potentially requiring the reroute of State Route 361. The Navy proposes designation of the area south of U.S. Route 50 as a Special Land Management Overlay rather than proposing it for withdrawal as the DVTA. This Special Land Management Overlay would define two areas, one east and one west of the existing B-17 range. These two areas, which are currently public lands under the jurisdiction of BLM, would not be withdrawn by the Navy and would not directly be used for land-based military training or managed by the Navy.

Environmental Impact Statement

Fallon Range Training Complex Modernization

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3.7 Noise

This discussion of noise includes the types or sources of noise and the effects of noise on people. Noise in relation to biological resources and wildlife species is discussed in Biological Resources (Section 3.10). This section does not address noise from Naval Air Station (NAS) Fallon as none of the action alternatives change the type or number of airfield operations.

3.7.1 Methodology

3.7.1.1 Region of Influence

The region of influence for noise includes the lands on and within the Fallon Range Training Complex (FRTC) land and special use airspace (SUA) where noise may interfere with normal human activities. The region of influence is within western and central Nevada and includes all or portions of the following counties: Churchill, Elko, Eureka, Lander, Lyon, Mineral, Nye, Pershing, and Washoe Counties.

This region is largely rural and is composed of private and public land as well as Native American reservations. Public land within the region of influence includes land managed by the Bureau of Land Management (BLM), Bureau of Reclamation, U.S. Fish and Wildlife Service (USFWS), U.S. Forest Service, Department of Energy, and the Department of Defense (DoD), including the U.S. Department of the Navy (Navy). As such, the region is comprised of a wide variety of land uses, including agricultural (cropland and livestock grazing), residential, commercial, industrial, renewable energy development, mining and mineral exploration and development, conservation, military, and recreational.

3.7.1.2 Regulatory Framework and Management Practices

Per DoD Instruction 4165.57 (U.S. Department of Defense, 2017), noise contours are used for recommending land uses that are compatible with aircraft noise levels. The joint instruction, Chief of Naval Operations Instruction (OPNAVINST) 11010.36C and Marine Corps Order 11010.16, *Air Installations Compatible Use Zones (AICUZ) Program* (U.S. Department of the Navy, 2008a), provides guidance administering the Air Installations Compatible Use Zones program which recommends land uses that are compatible with aircraft noise levels. OPNAVINST 3550.1A and Marine Corps Order 3550.11 (U.S. Department of the Navy, 2008b) provide guidance for a similar program, Range Air Installations Compatible Use Zones. This program includes range safety and noise analyses, and provides land use recommendations that will be compatible with Range Compatibility Zones and noise levels associated with military range operations.

3.7.1.3 Introduction to Sound

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. Sound is all around us. The perception and evaluation of sound involves three basic physical characteristics:

- Intensity – the acoustic energy, which is expressed in terms of sound pressure, in decibels (dB)
- Frequency – the number of cycles per second the air vibrates, in Hertz (Hz)
- Duration – the length of time the sound can be detected

Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. The primary human response to noise is annoyance, which is defined by the U.S. Environmental Protection Agency (EPA) as any negative subjective reaction on the part of an individual or group (U.S. Environmental Protection Agency, 1974). The response of different individuals to similar noise events is diverse and is influenced by the type of noise, perceived importance of the noise, its appropriateness in the setting, time of day, type of activity during which the noise occurs, and sensitivity of the individual. While aircraft are not the only sources of noise in an urban or suburban environment, they are readily identified by their noise output and are given special attention in this Environmental Impact Statement (EIS).

3.7.1.3.1 Basics of Sound and Weighted Sound Levels

The loudest sounds that can be detected comfortably by the human ear have intensities that are a trillion times higher than those of sounds that can barely be heard. Because of this vast range, it is unwieldy to use a linear scale to represent the intensity of sound. As a result, a logarithmic unit known as the decibel (dB) represents the intensity of a sound, also referred to as the sound level. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above 120 dB begin to be felt inside the human ear as discomfort. Sound levels between 130 and 140 dB are felt as pain (Berglund, 1995).

All sounds have a spectral content, which means their magnitude or level changes with frequency, where frequency is measured in cycles per second or Hz. To mimic the human ear's non-linear sensitivity and perception of different frequencies of sound, the spectral content is weighted. For example, environmental noise measurements are usually on an "A-weighted" scale, which places less weight on very low and very high frequencies in order to replicate human hearing sensitivity. The general range of human hearing is from 20 to 20,000 cycles per second, or Hz; humans hear best in the range of 1,000–4,000 Hz. A-weighting is a frequency-dependent adjustment of sound level used to approximate the natural range and sensitivity of the human auditory system. Table 3.7-1 provides a comparison of how the human ear perceives changes in loudness on the logarithmic scale.

Table 3.7-1: Subjective Responses to Changes in A-Weighted Decibels

Change	*Change in Perceived Loudness*
3 dB	Barely perceptible
5 dB	Quite noticeable
10 dB	Dramatic – twice or half as loud
20 dB	Striking – fourfold change

Note: dB = decibel(s)

Figure 3.7-1 provides a chart of A-weighted sound levels from typical noise sources (Cowan, 1994; Harris, 1979). Some noise sources (e.g., air conditioner, vacuum cleaner) are continuous sounds that maintain a constant sound level for some period of time. Other sources are time-varying events and reach a maximum sound level during an event, such as a vehicle passing by. Sounds can also be part of the ambient environment (e.g., urban daytime, urban nighttime) and are described by averages taken over extended periods. A variety of noise metrics has been developed to describe noise, particularly aircraft noise, in different contexts and over different time periods.

Aircraft noise varies with time. During an overflight, noise starts at the background level, rises to a maximum level as the aircraft flies above the receiver, then returns to the background level as the aircraft recedes into the distance. A number of metrics can be used to describe aircraft operations—from a particular individual aircraft event to the cumulative noise effect of all aircraft events over time.

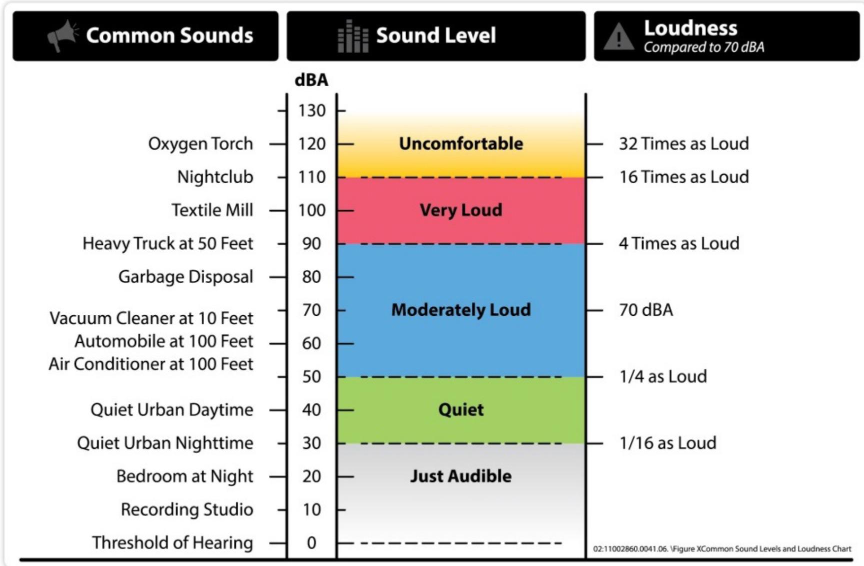

Figure 3.7-1: A-Weighted Sound Levels from Typical Sources

The C-weighting scale approximates the ear's sensitivity at high sound levels and weighs sound energy levels equally across the frequency range of human hearing, while discounting some of the very high and very low frequencies at each end of the range. Accordingly, the C scale closely resembles the actual sound pressure level received by sound level meters, and is often used to calibrate sound meters. The analysis of low-frequency sounds such as artillery and detonations also often uses C-weighted sound levels. Sound measurements thus adjusted are termed "C-weighted" sound levels, denoted as dB(C) or simply dBC.

Impulsive sound is measured and expressed in peak decibels (dBP). Peak impulsive sound weighting is used for single-event sound, or impulsive sound events that last less than one second in duration, such as gun noise. Peak sound does not correlate directly with time-averaged ambient sound standards. The peak sound values presented in this analysis are PK-15, or the calculated peak sound level expected to be exceeded 15 percent of the time. PK-15 accounts for statistical variation in the peak sound level due to weather conditions (U.S. Army & Center for Health Promotion and Preventive Medicine, 2005; U.S. Department of the Army, 2005). The PK-15 sound value is conservative and is considered to represent meteorological conditions that favor atmospheric transmission of sound.

3.7.1.3.2 Noise Metrics and Modeling

A "metric" is a system for measuring or quantifying a particular characteristic of a subject. Since noise is a complex physical phenomenon, different noise metrics help to quantify the noise environment. The noise metrics used in this EIS are described in summary format below.

Day-Night Average Sound Level

The Day-Night Level (DNL) metric is the energy-averaged sound level measured over a 24-hour period, with a 10 dB nighttime adjustment to account for heightened human sensitivity to noise when ambient sound levels are low, such as when sleep disturbance could occur. DNL does not represent a sound level heard at any given time but instead represents long-term exposure. Scientific studies have found good correlation between the percentages of groups of people highly annoyed and the level of their average noise exposure measured in DNL (U.S. Department of the Navy et al., 1978; U.S. Environmental

Protection Agency, 1999). As such, DNL has been determined to be a reliable measure of long-term community annoyance with aircraft noise and has become the standard noise metric used by the U.S. Department of Housing and Urban Development, Federal Aviation Administration (FAA), the EPA, and U.S. DoD for assessing aircraft noise exposure.

DNL values are average quantities, mathematically representing the continuous sound level that would be present if all of the variations in sound level that occur over a 24-hour period were averaged to have the same total sound energy. The DNL metric quantifies the total sound energy received and is therefore a cumulative measure, but it does not provide specific information on the number of noise events or the individual sound levels that occur during the 24-hour day. The DNL metric also adds an additional 10 dB to nighttime (10:00 p.m. to 7:00 a.m., also known as "acoustic night") sound levels to account for heightened human sensitivity to noise when ambient sound levels are low, such as when sleep disturbance could occur.

The results of the modeling are DNL noise contours, or lines connecting points of equal value, usually in 5 dB increments (e.g., 65 dB DNL and 70 dB DNL). The modeled DNL contours are depicted on noise contour maps, which provide a visual depiction of the overall geographic area covered by the different levels of noise.

Per OPNAVINST 11010.36C, NOISEMAP is to be used for developing DNL contours. Noise exposure in DNL contours is typically analyzed within contour bands, or ranges of DNL exposure, which cover the land areas between two contour lines. Below are listed the DNL noise contour ranges used in this analysis:

- 60 to less than 65 dB DNL
- 65 to less than 70 dB DNL
- 70 to less than 75 dB DNL
- Greater than or equal to 75 dB DNL

Per DoD Instruction 4165.57 (U.S. Department of Defense, 2017), DNL noise contours are used for recommending land uses that are compatible with aircraft noise levels. Studies of community annoyance in response to numerous types of environmental noise show that DNL correlates well with impact assessments (Schultz, 1978). A consistent relationship exists between DNL and the level of annoyance experienced (refer to Supporting Study - Noise Study available at http://www.frtcmodernization.com). DoD recommends land use controls beginning at the 65 dB DNL level. Research has indicated that about 87 percent of the population is not highly annoyed by outdoor sound levels below 65 dB DNL (Federal Interagency Committee on Noise, 1992). Most people are exposed to sound levels of 50 to 55 DNL or higher on a daily basis. Therefore, the 65 dB DNL contour helps determine compatibility of military aircraft operations with local land use, particularly for land use surrounding airfields, and is the lower threshold for this analysis.

While the DNL noise metric is the federal standard for analyzing the cumulative noise exposure from all aircraft operations, the DoD has developed additional metrics to supplement the noise analysis. These supplemental metrics and analysis tools provide more detailed noise exposure information for the decision process and improve the discussion regarding noise exposure. The DoD Noise Working Group technical bulletin *Using Supplemental Noise Metrics and Analysis Tools* (U.S. Department of Defense, 2009) was used to determine the appropriate metrics and analysis tools for this EIS.

Equivalent Sound Level

The Equivalent Sound Level (L_{eq}), measured in dB, is a cumulative noise metric that represents the average sound level (on a logarithmic basis) over a specified period of time—for example, an hour, a school day, daytime, nighttime, weekend, facility rush periods, or a full 24-hour day (i.e., the L_{eq} for a full 24-hour day is similar to the DNL metric but for the fact that the DNL metric includes the additional 10 dB for those events during acoustic night). In this EIS, the effect of noise interference in the school classroom is analyzed using L_{eq}, which describes the cumulative noise environment based on the noise events (i.e., aircraft overflights) that occur in an eight-hour school day.

Sound Exposure Level

The Sound Exposure Level (SEL) metric is a composite metric that represents both the intensity of a sound and its duration. Individual time-varying noise events (e.g., aircraft overflights) have two main characteristics: a sound level that changes throughout the event and a period of time during which the event is heard. SEL provides a measure of total sound energy of the entire acoustic event, but it does not directly represent the sound level heard at any given time. During an aircraft overflight, SEL captures the total sound energy for the noise event, meaning as the noise level starts at the ambient or background noise level, rises to the maximum level as the aircraft flies closest to the observer, and returns to the background level as the aircraft recedes into the distance. The total sound energy from the entire event is then condensed into a one-second period, and the metric represents the total sound exposure received. The SEL has proven to be a good metric to compare the relative exposure of transient sounds, such as aircraft overflights, and is the recommended metric for sleep disturbance analysis (U.S. Department of Defense, 2009). In this EIS, SEL is used in aircraft comparison and sleep disturbance analyses.

Maximum Sound Level

The highest A-weighted decibel (dBA) level measured during a single event where the sound level changes value with time (e.g., an aircraft overflight) is called the maximum A-weighted sound level or L_{max}. During an aircraft overflight, the noise level starts at the ambient or background noise level, rises to the maximum level as the aircraft flies closest to the observer, and returns to the background level as the aircraft recedes into the distance. L_{max} defines the maximum sound level occurring for a fraction of a second. For aircraft noise, the "fraction of a second" over which the maximum level is defined is generally one-eighth of a second (American National Standards Institute, 1988). For sound from aircraft overflights, the SEL is usually greater than the L_{max} because an individual overflight takes seconds and the L_{max} occurs instantaneously. In this EIS, the effects of noise on speech interference, including speech in the classroom and potential effects on recreation or biology, are evaluated using L_{max}.

Noise Modeling

Aircraft noise levels are represented in this EIS by various noise metrics that are generated by a computer model and not actual noise measurements at the FRTC. Computer modeling provides a tool to describe the noise environment and assess noise exposure. The noise environment for this EIS was modeled using programs called NOISEMAP, MR_NMAP, BooMap96, and Blast Noise Prediction (BNOISE). NOISEMAP draws from a library of actual aircraft noise measurements obtained in a controlled environment. It then incorporates all of the site-specific operational data (types of aircraft, number of operations, flight tracks, altitude, speed of aircraft, engine power settings, and engine maintenance run-ups), environmental data (average humidity and temperature), and surface hardness and terrain that contribute to the noise environment. The DoD uses NOISEMAP as the accepted standard noise modeling program for assessing potential noise exposure from fixed-wing aircraft. NOISEMAP is routinely updated and validated through extensive study to provide the best possible noise modeling results for these applications. It also encompasses the most extensive database of actual military aircraft noise measurements, which are validated through subsequent testing and used for installation-specific noise analyses.

NOISEMAP is generally used when analyzing aircraft operations' well-defined flight tracks, such as around airfields or target areas (see Supporting Study: Noise Study, available at http://www.frtcmodernization.com). When the aircraft flight tracks are not well defined, but are distributed over a wide area, such as in Military Operations Area (MOA), Range/Restricted Areas, and Military Training Routes with wide corridors, noise is assessed using the MOA and Range Noise Model (MR_NMAP). These models are the approved DoD computer noise models for estimating the aircraft noise exposures. See Supporting Study: Noise Study (available at http://www.frtcmodernizationeis.com) for additional details on the models used. Of note, the special use airspace boundaries are often used to define the area for modeling and for aircraft operations. When operations are uniformly distributed within those boundaries for modeling, the resultant contours often follow the special use airspace boundary as well.

Depending on the elevation, flight path, and maneuver of an aircraft, supersonic flight can cause a sonic boom (an impulsive sound) to be heard on the ground. BooMap96 is a program that computes C-weighted DNL contours in military air combat maneuver training airspaces for supersonic activities. C-weighted DNL contours in air combat maneuver arenas follow an elliptical pattern that depends on the size of the airspace and the sortie rate.

Noise from ordnance deliver (blast noise) is impulsive in nature and of short duration. Blast noise contours are developed using the DoD's BNOISE program. See Supporting Study: Noise Study (available at http://www.frtcmodernizationeis.com) for additional details on the models used.

3.7.1.3.3 Noise Effects

Speech Interference (Indoor). Speech interference associated with aircraft noise is a primary cause of annoyance for communities. Speech interference can cause disruption of routine activities, such as enjoyment of radio or television programs, telephone use, or family conversation, giving rise to frustration or irritation. In extreme cases, speech interference may cause fatigue and vocal strain to individuals who try to communicate over the noise. In this EIS, speech interference is measured by the number of daily indoor events (from 7 a.m. to 10 p.m.) that exceed 50 dB L_{max} at selected locations. This metric also accounts for noise level reduction provided by buildings with windows open or closed.

Classroom/Learning Interference. There has been limited research in the area of aircraft noise effects on children and classroom/learning interference. Research suggests that environments with sustained high background noise can have a variety of effects on children, including effects on learning and cognitive abilities and various noise-related physiological changes. Research on the impacts of aircraft noise, and noise in general, on the cognitive abilities of school-aged children has received more attention in recent years. Several studies suggest that aircraft noise can affect the academic performance of school children. Physiological effects in children exposed to aircraft noise and the potential for health effects have been the focus of limited investigation. Two studies have been conducted, both in Germany, that examined potential physiological effects on children from noise. One examined the relationship between stress hormone levels and elevated blood pressure in children residing around the Munich airport. The other study was conducted in diverse geographic regions and evaluated potential physiological changes (e.g., change in heart rate and muscle tension) related to noise. The studies showed that there may be some relationship between noise and these health factors; however, the researchers noted that further study is needed in order to differentiate the specific cause and effect to understand the relationship (U.S. Department of Defense, 2013).

This EIS assesses the magnitude of classroom interference using an NA (number of events above a level) metric. For this analysis, the DoD Noise Working Group recommends that an interior noise level of 50 dB L_{max} be used because this represents a level at which a person with normal hearing can clearly hear someone (i.e., a teacher) speaking at a level of 50 dB indoors in a classroom setting (U.S. Department of Defense, 2009). Normal conversation is about 60 dB, but this is assumed to be for up-close, person-to-person conversation; therefore, the level of 50 dB is used for classroom/learning interference to account for children who may be sitting in the back of the classroom.

Sleep Disturbance. Disturbance of sleep is a major concern for communities exposed to nighttime aircraft noise. The DoD guidelines for evaluating sleep disturbance are based upon the methodology and standards developed by the American National Standards Institute and the Acoustical Society of America in 2008 (American National Standards Institute, 1988; U.S. Department of Defense, 2009). In this EIS, the effect of aircraft noise on sleep is evaluated using an indoor SEL noise metric (the sound exposure level inside a building from a noise outside the building. This metric represents the probability of awakening at least once during a night of average aircraft noise activities. The SELs are based upon the particular type of aircraft, flight profile, power setting, speed, and altitude relative to the receptor. The results are then presented as a percent probability of awakening (U.S. Environmental Protection Agency, 1974).

Outdoor Speech Interference, Potential Noise Effects on Recreation and Outdoor Activities. Outdoor speech interference, similar to indoor speech interference, can disrupt routine outdoor activities, such as hiking, participating in or being a spectator at ball games, or camping in a park. In this EIS, the analysis of outdoor speech interference is based on the number of events per daytime hour (7:00 a.m. to 10:00 p.m.) that are greater than the instantaneous maximum sound level of 65 dB L_{max} outdoors. The assumption is this noise level would be above background and normal conversation sound levels and may cause disturbance for recreationists.

Potential Hearing Loss. Hearing loss is generally interpreted as a decrease in the ear's sensitivity or acuity to perceive sound (i.e., a shift in the hearing threshold to a higher level). This change can be either a temporary threshold shift or a permanent threshold shift. The 1982 EPA Guidelines for Noise Impact Analysis provides that people who experience continuous, daily exposure to high noise in the workplace over a normal working lifetime of 40 years, with exposure lasting eight hours per day for five days per week, beginning at an age of 20 years old, may be at risk for a type of hearing loss called Noise Induced Permanent Threshold Shift (NIPTS). NIPTS defines a permanent change in hearing level, or threshold, caused by exposure to noise (U.S. Environmental Protection Agency, 1982). NIPTS can result from repeated exposure to high noise levels, during which the ears are not given adequate time to recover. A temporary threshold shift can eventually become a NIPTS over time with repeated exposure to high noise levels. Even if the ear is given time to recover from temporary threshold shift, repeated occurrence may eventually lead to permanent hearing loss. The point at which a temporary threshold shift results in a NIPTS is difficult to identify and varies with a person's sensitivity to noise. According to the EPA, changes in hearing level of less than 5 dB are generally not considered noticeable (U.S. Environmental Protection Agency, 1982). No known evidence exists that an NIPTS of less than 5 dB is perceptible or has any practical significance for the individual affected, which is supported by the fact that the variability in audiometric testing is generally assumed to be plus or minus 5 dB.

As stated previously, NIPTS is stated in terms of the average threshold shift at several frequencies that can be expected from daily exposure to noise over a normal working lifetime. This workplace exposure standard is not intended to accurately describe the impact of intermittent noise events such as periodic aircraft overflights but is presented as a "worst-case" analytical tool. This analysis assumes that individuals are outdoors at the location of their residence for at least 8 hours per day, every day, for 40 years. To put the conservative nature of this analysis into context, the national average of time spent indoors is approximately 87 percent (or almost 21 hours of the day). Nonetheless, this analysis is provided per DoD policy directive to support informed decision-making.

DoD policy directive requires that hearing loss risk be estimated for the at-risk population, defined as the population exposed to a DNL greater than or equal to 80 dB (U.S. Department of Defense, 2009). To assess the potential for NIPTS, the Navy generally uses the 80 dB DNL contour (i.e., areas with high noise levels) as an initial threshold to identify the population to be analyzed for possible hearing loss (U.S. Department of Defense, 2013). Within this contour, the analysis identifies individuals subject to specific levels of sound using the 24-hour Equivalent Sound Level (L_{eq}[24]). L_{eq}(24) is used instead of DNL because characterizing noise exposure in terms of DNL will usually overestimate the assessment of hearing loss risk, particularly at night. DNL includes an artificial 10 dB weighting factor for aircraft operations occurring between 10:00 p.m. and 7:00 a.m. However, this added 10 dB is not sound actually heard by the public.

Nonauditory Health Effects. Studies have been conducted to examine the nonauditory health effects of aircraft noise exposure, focusing primarily on stress response, blood pressure, birth weight, mortality rates, and cardiovascular health. Exposure to noise levels higher than those normally produced by aircraft in the community can elevate blood pressure and also stress hormone levels. However, the response to such loud noise is typically short in duration: after the noise goes away, the physiological effects reverse and levels return to normal. In the case of repeated exposure to aircraft noise, the connection is not as clear. The results of most cited studies are inconclusive, and it cannot be conclusively stated that a causal link exists between aircraft noise exposure and the various type of nonauditory health effects that were studied (U.S. Department of Defense, 2009).

No studies have shown a definitive causal and significant relationship between aircraft noise and health. Inconsistent results from studies examining noise exposure and cardiovascular health have led the World Health Organization to conclude that there was only a weak association between long term noise exposure and hypertension and cardiovascular effects (Ludlow & Sixsmith, 1999). A later study also concluded that the relationship between noise exposure and heart disease was inconclusive (Federal Aviation Administration, 2016). More recently, major studies have been conducted in an attempt to identify an association between noise and health effects, develop a dose-response relationship, and identify a threshold below which the effects are minimal. These studies have produced inconsistent results for associations between aircraft noise and heart health, ranging from no statistical significance to marginal statistical significance. In some cases, the studies did not control for variables that could impact conclusions such as smoking and poor diet, both of which can contribute to cardiovascular disease.

Several researchers have examined pooled results from multiple studies examining noise exposure effects on heart health. The outcomes of these pooled studies have also produced inconsistent results. Two such studies found that an exposure-response relationship could not be established for the association between aircraft noise and cardiovascular risk due to methodological differences between studies (Bureau of Land Management & Department of Energy; Sonner, 2016). A third pooled study suggested that aircraft noise could contribute to hypertension, but it noted that the relationship was inconclusive due to limitations in study populations, exposure characterization, and control of confounding variables (Ely Gold, 2017). Finally, Federal Aviation Administration (2016) found that the risk of heart disease per 10 dB increase in noise exposure had marginal statistical significance, but the relationship between noise exposure and mortality from heart disease was not statistically significant.

Vibration Effects from Aircraft Operations. Depending on the aircraft operation, altitude, heading, power settings, and the structure, certain vibration effects may be observed. Typically, the structural elements that are most susceptible to vibration from aircraft noise are windows and sometimes walls or ceilings. Conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components of a building (Nevada Division of Environmental Protection, 2011). Noise-induced structural vibration may cause annoyance to dwelling occupants because of induced secondary vibrations, or "rattle," of objects within the dwelling, such as hanging pictures, dishes, plaques, and bric-a-brac. Loose window panes may also vibrate noticeably when exposed to high levels of airborne noise, which could cause homeowners to fear breakage.

3.7.1.4 Approach to Analysis

Noise contours for aviation activity and ordnance noise were generated for activities performed under the Action Alternatives (see supporting Study: Noise Analysis, available at www.frtcmodernization.com). The contours for activities performed under the Action Alternatives were compared to the contours for activities performed under the environmental baseline. The DNL from each alternative was overlaid on the DNL contour map for the environmental baseline. Overlaying the maps created a "difference" map, which shows areas where the DNL may increase or decrease. Any such increases or decreases in DNL within a particular area were taken into account in conjunction with baseline DNLs.

Contours for construction or transportation noise supporting construction or infrastructure were not generated, but were calculated using established noise metrics for construction or transportation noise.

Noise contours for aviation activity and ordnance noise, and calculations for construction or transportation noise for each of the alternatives, were examined to determine whether they would produce one or more of the following effects:

- An increase in the DNL at any sensitive receptor of 5 or more dB, which is a notable change to the receiver and would indicate a substantial degradation in the noise environment.
- An increase in the number or intensity of intrusive noise events on nearby public or private lands, which would indicate an associated increase in distraction and interference with noise-sensitive activities. This includes the potential for annoyance, speech interference, classroom/learning interference, sleep disturbance, effects on recreation, or potential hearing loss.
- Impulse noise that would result in a high risk of noise complaints.

Additionally, since the FAA may utilize this EIS to fulfill requirements to establish the proposed MOAs and for the reconfiguration of the FRTC airspace, an additional level of analysis was performed to compare DNLs under each alternative with the DNL under the environmental baseline. This analysis included the following considerations:

- Areas experiencing an increase in DNL of 1.5 dB or more into or within the DNL 65 dB noise exposure when compared to the environmental baseline for the same timeframe (aerial maps of the areas were inspected for residences or other sensitive receptors (such as schools, libraries, hospitals, etc.) within the 65 and 70 dB contours) were considered a significant change in the noise environment. If DNLs did not increase 1.5 dB or more because of implementation of an Action Alternative (or dropped), this was considered a non-significant change in the noise environment.

In addition to contour generation, the Navy selected 20 locations throughout the FRTC to model additional noise metrics. These locations (points of interest) and metrics were used in addition to the contours described above to evaluate the potential for annoyance, speech interference, classroom/learning interference, sleep disturbance, effects on recreation, or potential hearing loss.

3.7.1.5 Public Scoping Concerns

The public identified several concerns regarding noise, most notably regarding sonic booms and noise from low-level aircraft overflights, as well as concerns regarding potential vibrational impacts to structures from aviation and ordnance noise. Potential vibrational impacts to cultural buildings or sites are discussed in 3.11 (Cultural Resources) and noise effects to biological resources are discussed in 3.10 (Biological Resources). Public commenters also indicated the need to include compiled data from any noise complaints that have occurred throughout the region. For further information regarding comments received during the public scoping process, please refer to Appendix D, Public Involvement.

3.7.2 Affected Environment

The predominant noise sources within the FRTC consist of aircraft operations, both at and around NAS Fallon, as well as in the airspace and on ranges. Other components include range operations and noise from ordnance use, noise from construction, aircraft ground support equipment for maintenance purposes, and vehicle traffic, but such noise generally represents a transitory and negligible contribution to the average noise level environment. Response to noise varies, depending on the type and characteristics of the noise, the distance between the noise source and whoever hears it (the receptor), the receptor's sensitivity, and the time of day.

The number of aircraft events in the affected environment commonly varies day to day. Due to the sporadic characteristic of SUA activity, noise assessments for the DNL noise metric are normally conducted for the busiest month of activities. The busiest month sorties are the basis for the modeling of aircraft operations within SUA throughout the analysis in this EIS. Overall, aircraft overflights would create discrete brief noise events that, while noticeable because they would exceed the ambient background sound level, would contribute very little to the DNL.

Military aircraft utilizing SUA under the environmental baseline (Alternative 2 of the *2015 Military Readiness Activities at Fallon Range Training Complex, Nevada Final Environmental Impact Statement*), such as Military Training Routes, MOAs, and Restricted Areas/Ranges, generate a noise environment that is somewhat different from that associated with airfield operations. As opposed to patterned or more continuous noise environments associated with airfields, flight activity in SUAs is highly sporadic and often seasonal, ranging from 10 flights per hour to less than one per week. Airfield operations at NAS Fallon (i.e., takeoffs and landings, pattern work, etc.) are not analyzed in this document as the number of operations would not change. The environmental impacts of operations at NAS Fallon that have been analyzed in separate National Environmental Policy Act (NEPA) documentation remain valid.

3.7.2.1 Sensitive Receptors

Sensitive receptors are those areas where noise interferes with normal activities associated with its use. The FRTC SUA overlies portions of Washoe, Lyon, Churchill, Pershing, Mineral, Nye, Elko, Lander, and Eureka counties (Figure 3.7-2). Most of the lands under the FRTC airspace are public lands administered by the Bureau of Land Management. Sensitive receptors on these lands include residential, educational, health, and religious structures and sites; parks; recreational areas (including areas with wilderness characteristics); tribal reservations; wildlife refuges; and cultural and historical sites. In the context of noise from explosives firing ranges, sensitive receptors may include areas in the immediate vicinity of operations. Users of designated recreational areas are considered sensitive receptors.

Additionally, FRTC operators are aware of a number of locations, either as coordinate points or areas defined by 5 nautical mile buffers from coordinate points, as shown in Figure 3.7-2 and labelled as noise sensitive areas. As a noise abatement measure, pilots overflying these areas are instructed to maintain altitudes of no lower than 3,000 feet above ground level to minimize potential noise impacts to these areas.

3.7.2.2 Noise Zones and Compatibility

3.7.2.2.1 Small Arms and Aviation Land Use Zones

OPNAVINST 3550.1 (U.S. Department of the Navy, 2008b) provides suggested compatibility criteria for various land uses (Table 3.7-2) exposed to aircraft noise at certain DNL levels. Army Regulation 200-1 defines the land use planning zones to classify the compatibility of small arms noise (less than 20 calibers – these are used on B-16) with residential or noise-sensitive areas. Compatible land use means the use of land that is identified as normally compatible with the outdoor sound environment (or an adequately attenuated sound level reduction for any indoor activities involved) at the location because the DNL is at or below those identified for that land use. The Navy utilizes these land use planning zones for small arms and aviation noise as well. The three noise zones are described below.

- Noise Zone I includes all areas in which the A-weighted DNL (ADNL) from small arms or aviation activities is less than 65 dBA. Noise Zone I is the zone farthest from the sound source and includes all areas not within the other two Noise Zones. Zone I is generally acceptable with any residential or noise-sensitive uses.
- Noise Zone II includes all areas in which the ADNL is between 65 and 75 dBA. Sound exposure in this zone is substantial, and recommended land uses include manufacturing, warehousing, and transportation. Residential development in this zone is not normally recommended.
- Noise Zone III includes all areas in which the ADNL is above 75 dBA. Noise-sensitive land uses, such as housing, schools, churches, and medical facilities, are not compatible with this zone.

Table 3.7-2: Noise Zones and Compatibility Levels for Small Arms and Aviation A-Weighted Day-Night Levels

Zone	Small Arms/Aviation A-weighted DNL	Compatibility with Residential/ Noise-Sensitive Land Uses
I	< 65 dBA	Compatible
II	65–75 dBA	Normally Incompatible[1]
III	> 75 dBA	Incompatible

[1] Sensitive receptors include residences, mobile home parks, transient lodging, schools, hospitals, and churches

Notes: dBA = A-weighted decibels, DNL = Day-Night Average Sound Level

Source: OPNAVINST 3550.1 (U.S. Department of the Navy, 2008b) and A.R. 200-1 (U.S. Army & Center for Health Promotion and Preventive Medicine, 2005)

3.7.2.2.2 Impulse Sound

The U.S. Army Public Health Command has defined the following three land use planning zones (Table 3.7-3) for explosive/impulse noise in its *Operational Noise Manual: An Orientation for Department of Defense Facilities* (U.S. Army & Center for Health Promotion and Preventive Medicine, 2005), which the Navy uses for land planning recommendations:

- Noise Zone I includes all areas in which the C-weighted DNL from explosives is below 62 dBC. Noise Zone I is the zone farthest from the sound source and includes all areas not within the other two Noise Zones. This area is suitable for all types of land uses.
- Noise Zone II includes all areas in which the C-weighted DNL is between 62 and 70 dBC. Sound exposure in this zone is substantial, and allowable land uses include manufacturing, warehousing, and transportation. Residential development in this zone is not normally recommended.
- Noise Zone III includes all areas in which the C-weighted DNL is above 70 dBC. Sound-sensitive land uses, such as housing, schools, churches, and medical facilities, are not recommended within this zone.

For reference, noise from munitions (blast noise) is impulsive in nature and of short duration. The C-weighted DNL is used when employing sound sources that are impulsive in nature, less than one second in duration, but are not small arms related (e.g., larger munitions, explosive detonations). C-weighted sound levels are often used for the analysis of low-frequency sounds such as artillery and detonations.

Additionally, community annoyance from impulsive noise can be assessed using C-weighted DNL. The relationship between C-weighted DNL and annoyance has been estimated, based on community reaction to impulsive noises over several years (Federal Interagency Committee on Noise, 1992). Whereas occupational sound levels are assessed in terms of hearing loss, environmental sound levels are assessed in terms of their potential to interfere with personal, workplace, and community activities, and in terms of their potential to annoy occupants of nearby land uses.

Table 3.7-3: Noise Zones and Compatibility Levels for Impulse and Large Arms Day-Night Levels

Zone	Explosives Day-Night Average C-weighted DNL	Compatibility with Residential/Noise-Sensitive Land Uses
I	< 62 dBC	Compatible
II	62–70 dBC	Normally Incompatible
III	> 70 dBC	Incompatible

Notes: dBC = C-weighted decibels, DNL = Day-Night Average Sound Level

Source: AR 200-1 (U.S. Army & Center for Health Promotion and Preventive Medicine, 2005)

The DoD's Noise Working Group indicates that impulse noises should be considered separately when the peak sound level exceeds 110 dB. The effects of impulse noises should be determined based on C-weighted DNL (U.S. Department of Defense, 2013). Table 3.7-4 presents DoD guidelines for evaluating the effects of impulsive gun noise on the community. The DoD developed metrics to evaluate the complaint potential from impulsive noise. This set of metrics, developed by the Naval Surface Warfare

Center, Dahlgren, Virginia, are based on over 10 years' experience using meteorological forecasts. The table below shows the guidelines.

These levels resulted from the best compromise between cost, efficiency of range operations, and good community relations. The metrics are presented in Table 3.7-4, expressed in dBP rather than dBC, and correspond to areas of low-to-high risk of noise complaints (U.S. Army & Center for Health Promotion and Preventive Medicine, 2005). These impulsive noise levels are an additional metric used to assess the extent of impulsive effects on the region.

Table 3.7-4: Impulse and Large Arms Complaint Prediction Guidelines

Predicted Sound Level (dBP)	Risk of Complaints	Action
< 115	LOW	Fire all programs
115–130	MODERATE	Fire important tests Postpone non-critical testing if possible
130–140	HIGH	Only extremely important tests should be fired.
> 140	HIGH (risk of physiological and structural damage claims)	Postpone all explosive activities

Notes: (1) For rapid-fire test programs or programs that involve many repetitions of impulse sound, reduce allowed sound levels by 15 dBP; (2) dBP = peak decibels
Source: U.S. Department of Defense (2013)

Schromer (2005) suggests that "regular" impulse sounds be given a 5 dBP penalty to properly account for their characteristics, and penalties of 12–15 dBP are suggested for highly energetic impulsive sound. As Table 3.7-4 indicates, the Naval Surface Warfare Center recommends a 15 dBP weighting for rapid-fire impulse sound. Such an adjustment potentially moves a sound source up one risk category.

3.7.2.3 Bravo-16

Land surrounding B-16 is used for farming, ranching, mining, and recreation (e.g., trail use, hunting, and off-highway vehicle use). The existing B-16 is approximately 9 miles southwest of the NAS Fallon Main Station (Figure 3.7-2). The closest offsite sensitive receptors (residences) are located approximately 0.25 mi. northeast of B-16.

3.7.2.3.1 Existing Aircraft Noise

Figure 3.7-3 shows the DNL levels for a "busy month" for B-16 based on the number of activities listed in the environmental baseline as described in Supporting Study: Noise Study (available at http:www.frtcmodernization.com). As displayed in Figure 3.7-3, under the environmental baseline, approximately 110 acres to the west of the existing B-16 are within the 65 dBA (and above) noise contour. Approximately 926 acres are within the 75 dBA contour (but not above 80 dBA). Visual inspection of aerial maps of the areas within regions where the DNL is above 65 dBA reveals no sensitive receptors (e.g., residences, lodging, or medical facilities).

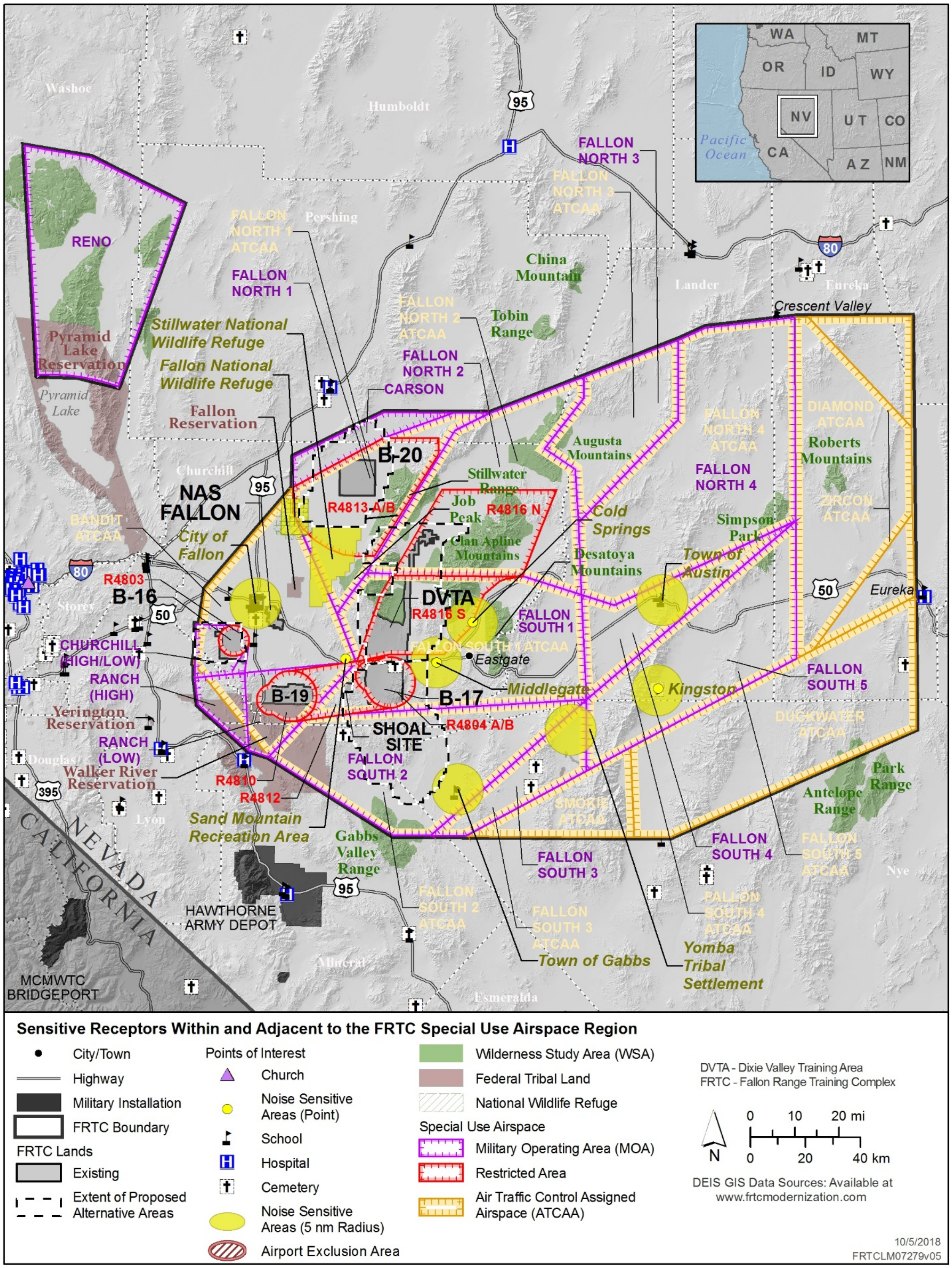

Figure 3.7-2: Sensitive Receptors Within and Adjacent to the FRTC Special Use Airspace Region

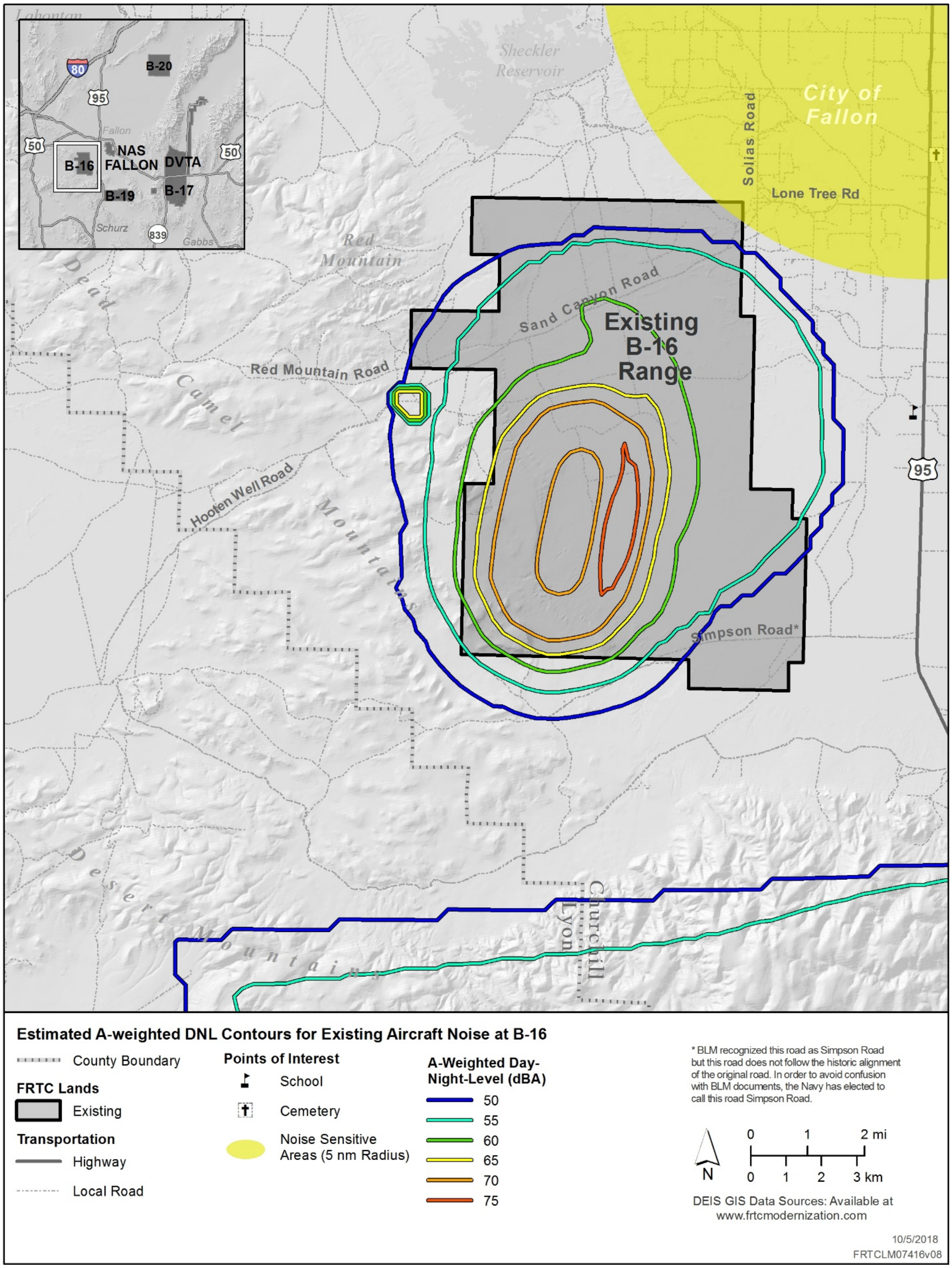

Figure 3.7-3: Estimated A-weighted DNL Contours for Existing Aircraft Noise at B-16

3.7.2.3.2 Existing Munitions Noise

Small arms use on B-16 under the environmental baseline is restricted to .50 caliber, 5.56 millimeters (mm), 7.62 mm, and 9 mm. Contours for small arms munitions were not created; instead, Table 3.7-5 displays the maximum noise levels from various small arms at various distances from firing points to illustrate how far noise levels propagate. Distances to sensitive receptors at B-16 are such that noise levels do not significantly contribute to the noise environment, as received noise levels near the range boundary from these activities would be at or near ambient levels. Further, noises from small arms would likely be subsumed by noises from large-caliber weapons use on B-16.

Table 3.7-5: Maximum Noise Levels (A-Weighted Decibels) at Various Distances Generated by Small Arms Weapons Firing

Munition Type	Distance from Source[1]			
	500 m (1,640 ft.)	1,000 m (3,281 ft.)	2,000 m (6,562 ft.)	3,000 m (9,842 ft.)
5.56 mm	*	65	55	48
7.62 mm	71	62	54	49
.50 caliber	92	85	78	*

[1] Noise Level in the direction of fire
* Not presented in source material
Notes: ft. = feet, m = meters, mm = millimeters
Source: U.S. Army Environmental Command (2012)

While small arms are utilized at B-16, large-caliber weapons (defined as weapons projectiles with diameters larger than 20 mm) are also used. Figure 3.7-4 shows 57, 62, and 70 C-weighted DNL levels from existing bombing activities at B-16. Activities at these locations do not affect surrounding areas or sensitive receptors because the 62 dB contour does not extend beyond the range boundary. Additionally, Figure 3.7-5 presents the existing peak decibel levels from existing munitions use at B-16. Neither the 115 nor 130 dBP values extend past the boundary of the existing range.

3.7.2.4 Bravo-17

The existing and proposed B-17 range is south and southeast of Fallon, Nevada (Figure 3.7-6). This area includes portions of southern Churchill County as well as northern Mineral County and northeastern Nye County. BLM land surrounds B-17 with unconnected private parcels located south and west of the range as well as north of Fairview Peak. The surrounding land is primarily used for livestock grazing, recreation (e.g., hunting and off-highway vehicle racing), and mining and geothermal development. B-17 is just south of U.S. Route 50 and is flanked on the west by the Sand Spring Mountains and State Route 839 and on the east by Fairview Peak.

3.7.2.4.1 Existing Aircraft Noise

Aircraft use B-17 in Area B for Close Air Support, Gunnery Exercise (Air-to-Ground), Missile Exercise (Air-to-Ground), and Bombing Exercise (Air-to-Ground) activities. As shown on Figure 3.7-6, a small portion of the 65 dBA contour is contained within the existing range boundary. However, a larger portion of the 65 dBA contour extends onto lands outside of the northern boundary of B-17. The 75 dBA contour exists outside the B-17 eastern boundary. Visual inspection of aerial maps indicated no sensitive receptors (e.g., residences, lodging, medical facilities) in this area.

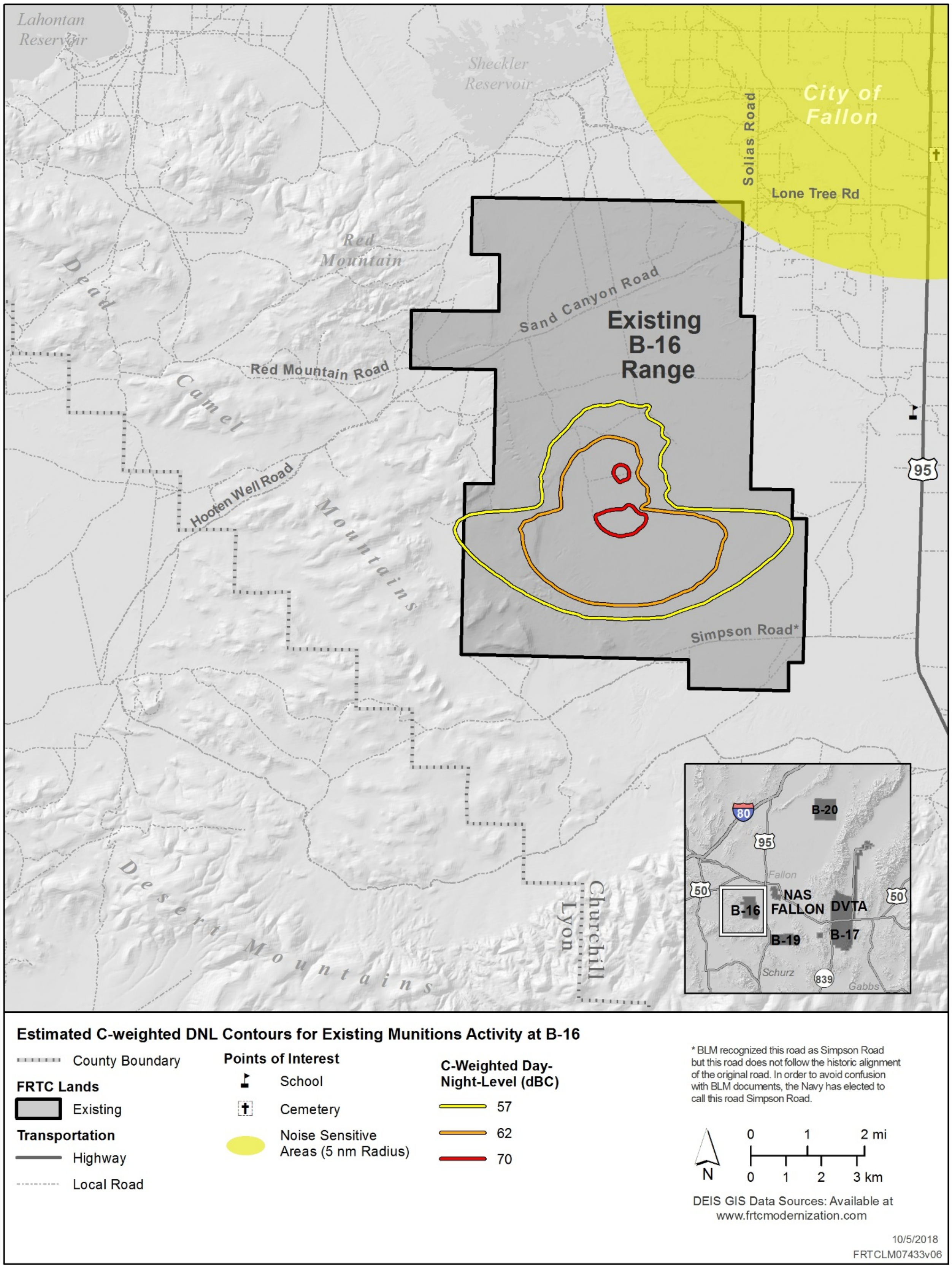

Figure 3.7-4: Estimated C-weighted DNL Contours for Existing Munitions Activity at B-16

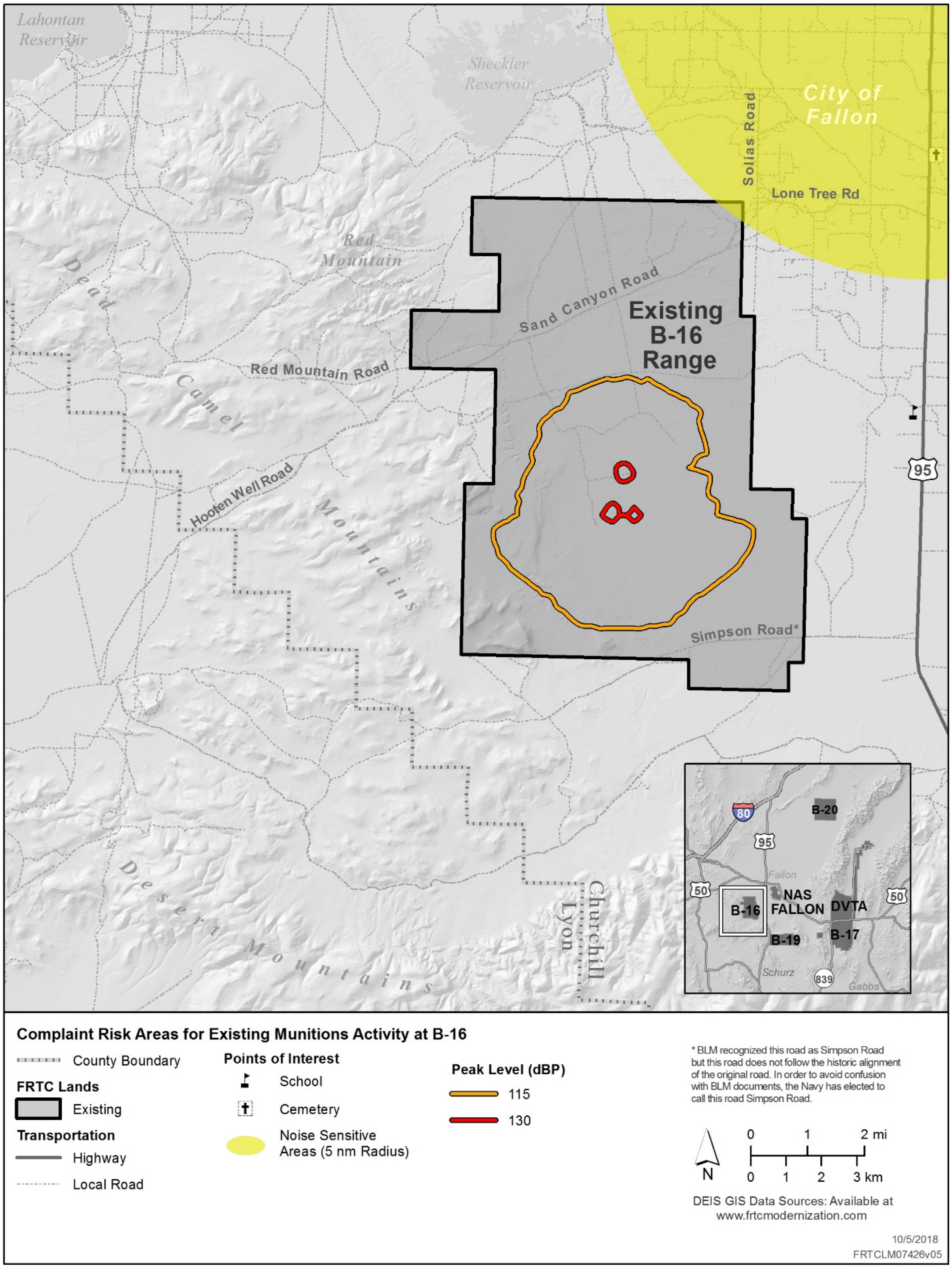

Figure 3.7-5: Complaint Risk Areas for Existing Munitions Activity at B-16

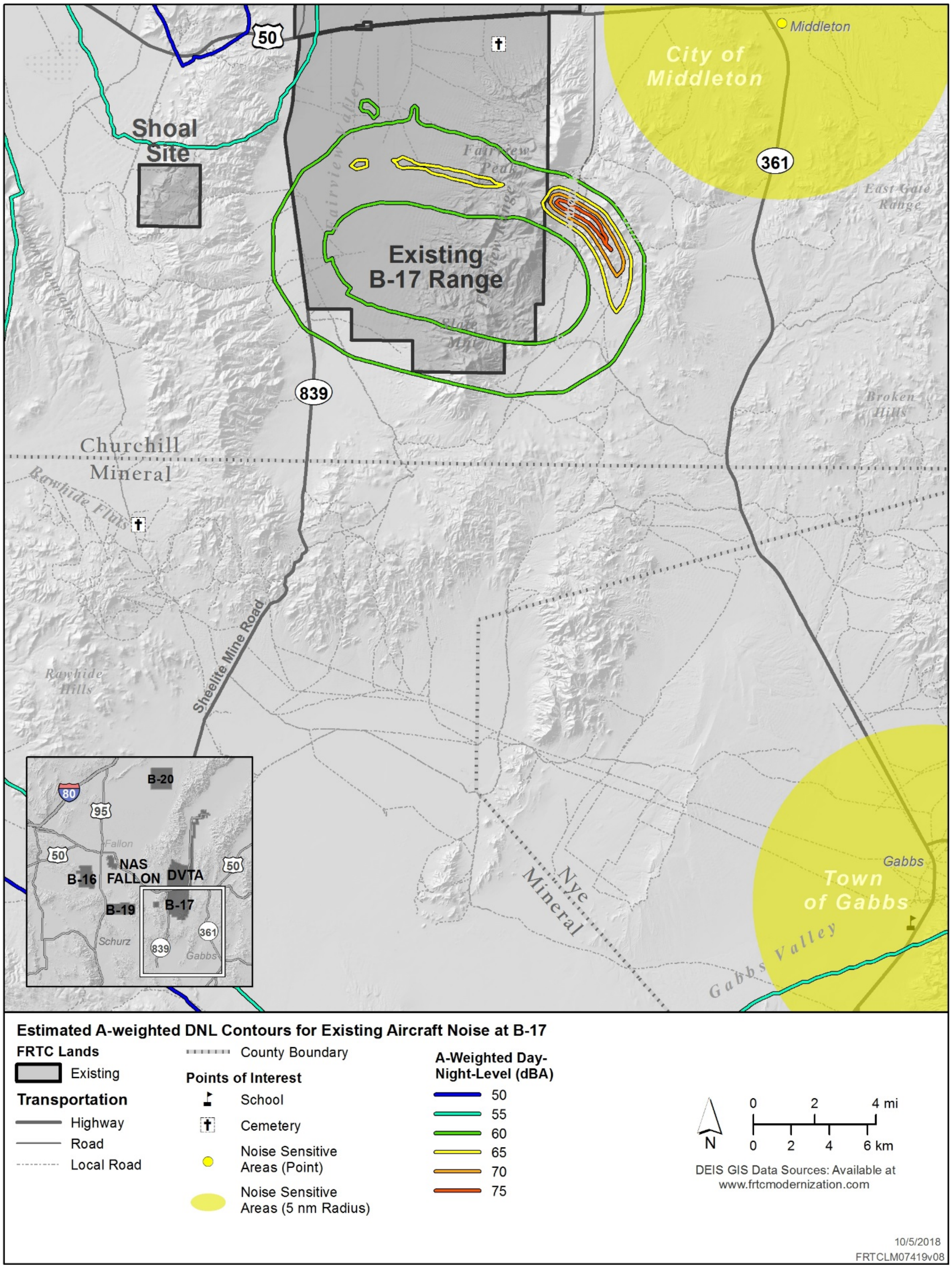

Figure 3.7-6: Estimated A-weighted DNL Contours for Existing Aircraft Noise at B-17

3.7.2.4.2 Existing Munitions Noise

Noise contours were developed for the environmental baseline using the DoD's BNOISE program. Noise-generating events from munitions training within B-17 are intermittent. Figure 3.7-7 shows 57, 62, and 70 C-weighted DNL levels from existing bombing activities at B-17 and Figure 3.7-8 shows the C-weighted DNL levels form existing high-energy munitions at B-27. Neither the 62 dBC nor 70 dBC contours extend past the existing range boundary, and they do not affect surrounding areas or sensitive receptors. Additionally, Figure 3.7-9 presents the existing peak decibel levels from existing munitions use at B-17. Neither the 115 nor 130 dBP values extend past the boundary of the existing range.

3.7.2.5 Bravo-20

B-20 is located approximately 15 miles northeast of Fallon, Nevada (Figure 3.7-10). The area around the existing and proposed B-20 includes the northern portion of Churchill County and the southern portion of Pershing County. This area is predominated by the Carson Sink, which is a largely un-vegetated alkali flat between the Stillwater Range and Humboldt Mountains.

Private lands near the existing B-20 range include agricultural and vacant land northwest and northeast of B-20. The rest of the private land use is vacant/open space. Public lands within the proposed B-20 expansion area include lands managed or controlled by the Navy (B-20), BLM, Bureau of Reclamation, USFWS (i.e., Stillwater Wildlife Refuge Complex), and Churchill County.

3.7.2.5.1 Existing Aircraft Noise

Under the environmental baseline, aircraft use B-20 for Bombing Exercises (Air-to-Ground), Gunnery Exercises (Air-to-Ground), and Missile Exercises (Air-to-Ground). Only the 60 dBA contour extends past the range boundaries on the west, east, and south sides of B-20.

Aerial imagery reveals no sensitive receptors (e.g., residences, lodging, or medical facilities) within the areas where DNLs are above 60 dBA. Lands to the east and south of B-20 are a mixture of privately owned parcels, or BLM-managed lands, none of which are currently developed. The Stillwater Range Wilderness Study Area is immediately to the east of B-20, but the 65-dBA contour does not extend to the Wilderness Study Area boundary.

3.7.2.5.2 Existing Munitions Noise

Noise contours were developed for the environmental baseline using the DoD's BNOISE. Noise-generating events from training are intermittent. Figure 3.7-11 shows 57, 62, and 70 C-weighted DNL levels from existing bombing activities at B-20, and Figure 3.7-12 shows the C-weighted DNL levels form existing high-energy munitions at B-20. Neither the 62 nor 70 dBC extend past the existing range boundary, and they do not affect surrounding areas or sensitive receptors. Additionally, Figure 3.7-13 presents the existing peak decibel levels from existing munitions use at B-20. Neither the 115 nor 130 dBP values extend past the boundary of the existing range.

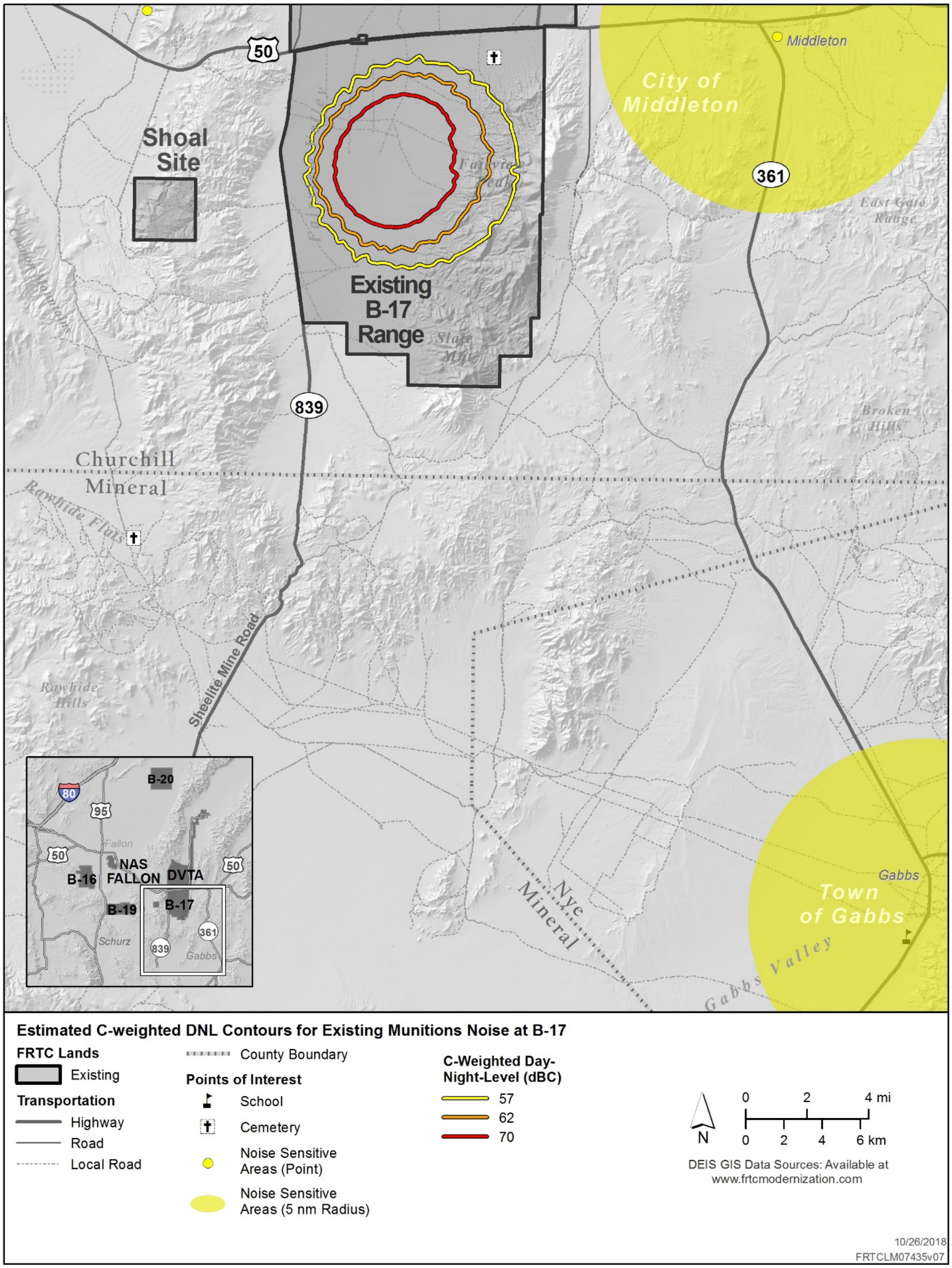

Figure 3.7-7: Estimated C-weighted DNL Contours for Existing Munitions Noise at B-17

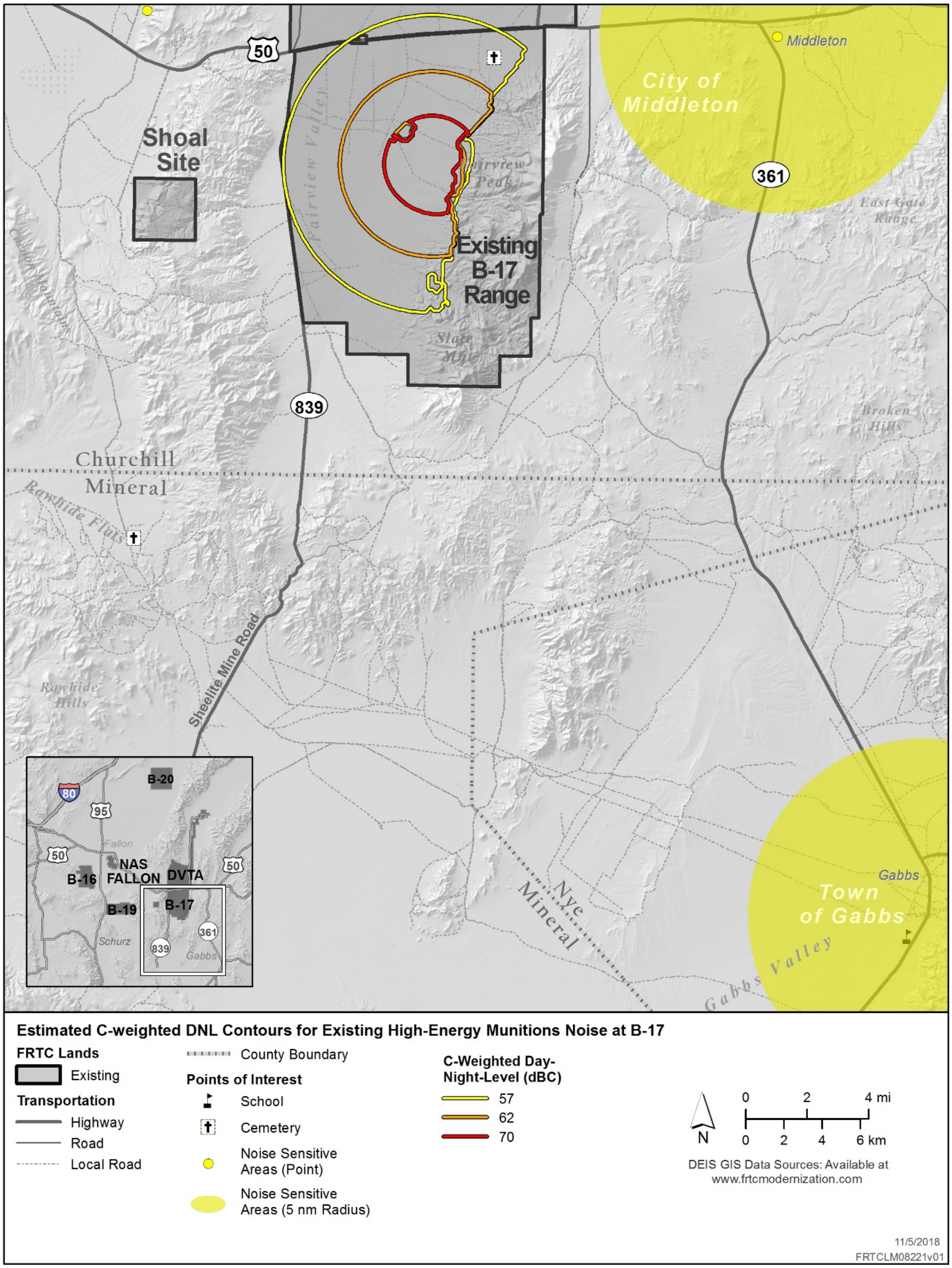

Figure 3.7-8: Estimated C-weighted DNL Contours for Existing High-Energy Munitions Noise at B-17

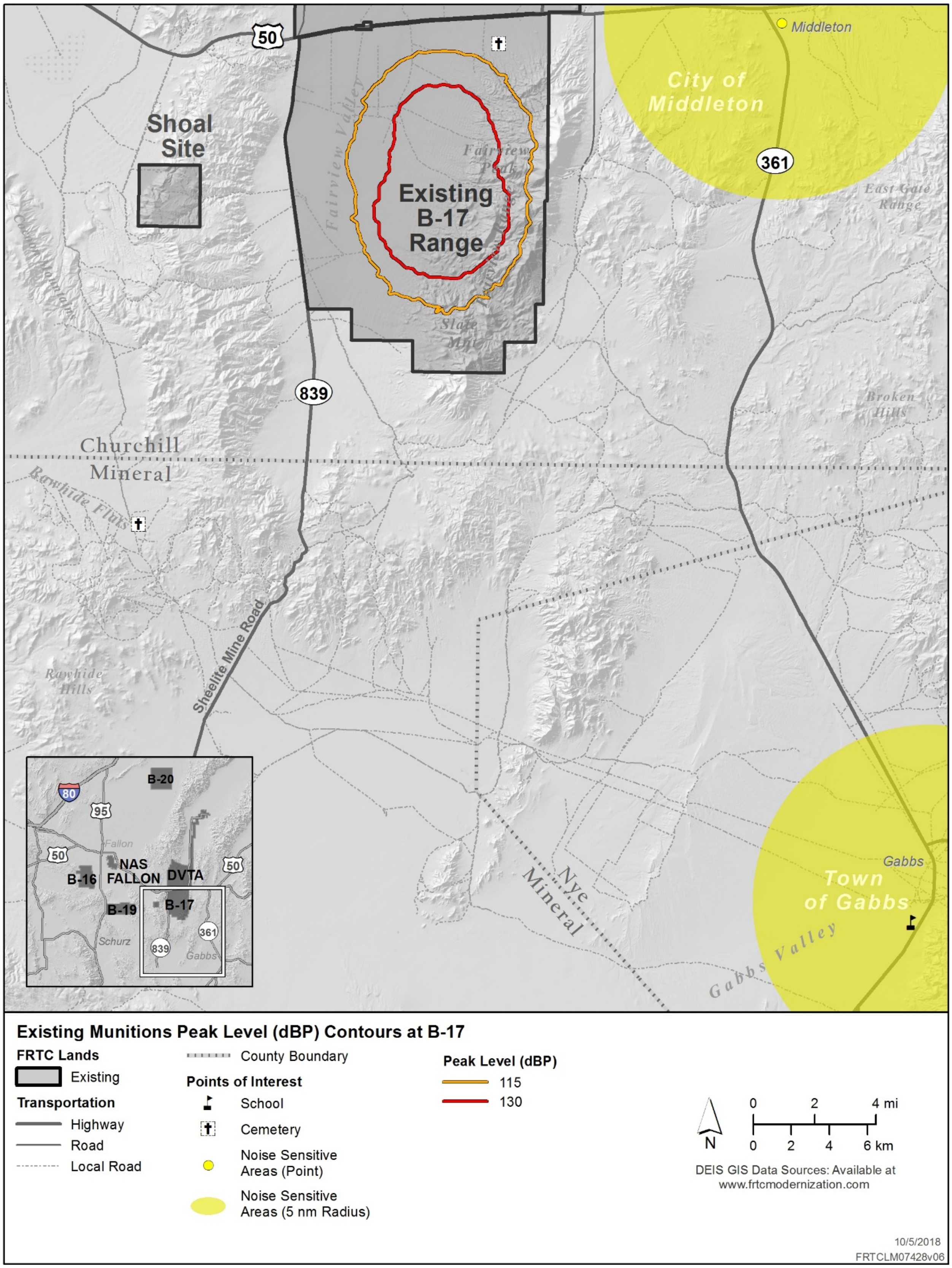

Figure 3.7-9: Existing Munitions Peak Level (dBP) Contours at B-17

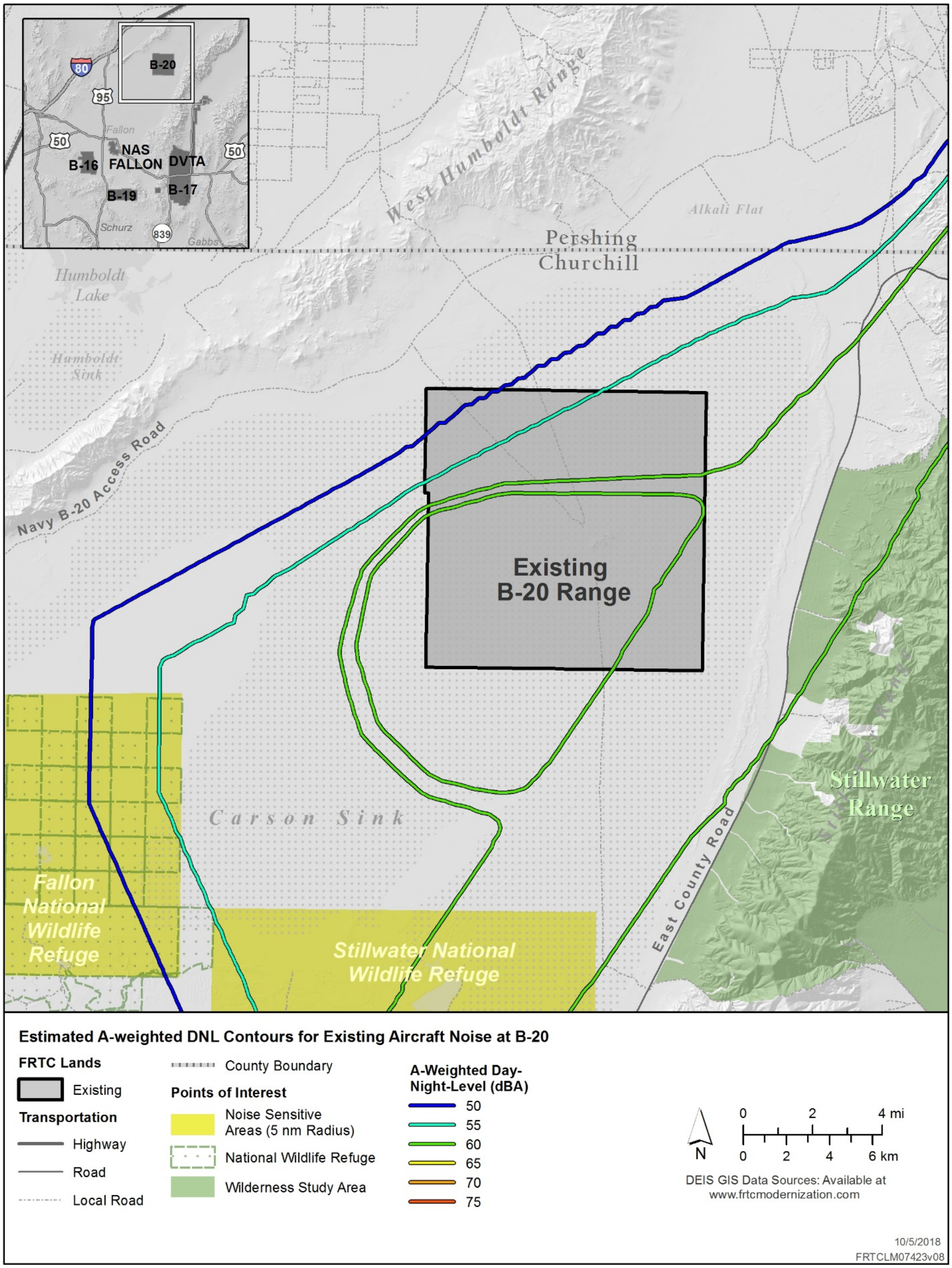

Figure 3.7-10: Estimated A-weighted DNL Contours for Existing Aircraft Noise at B-20

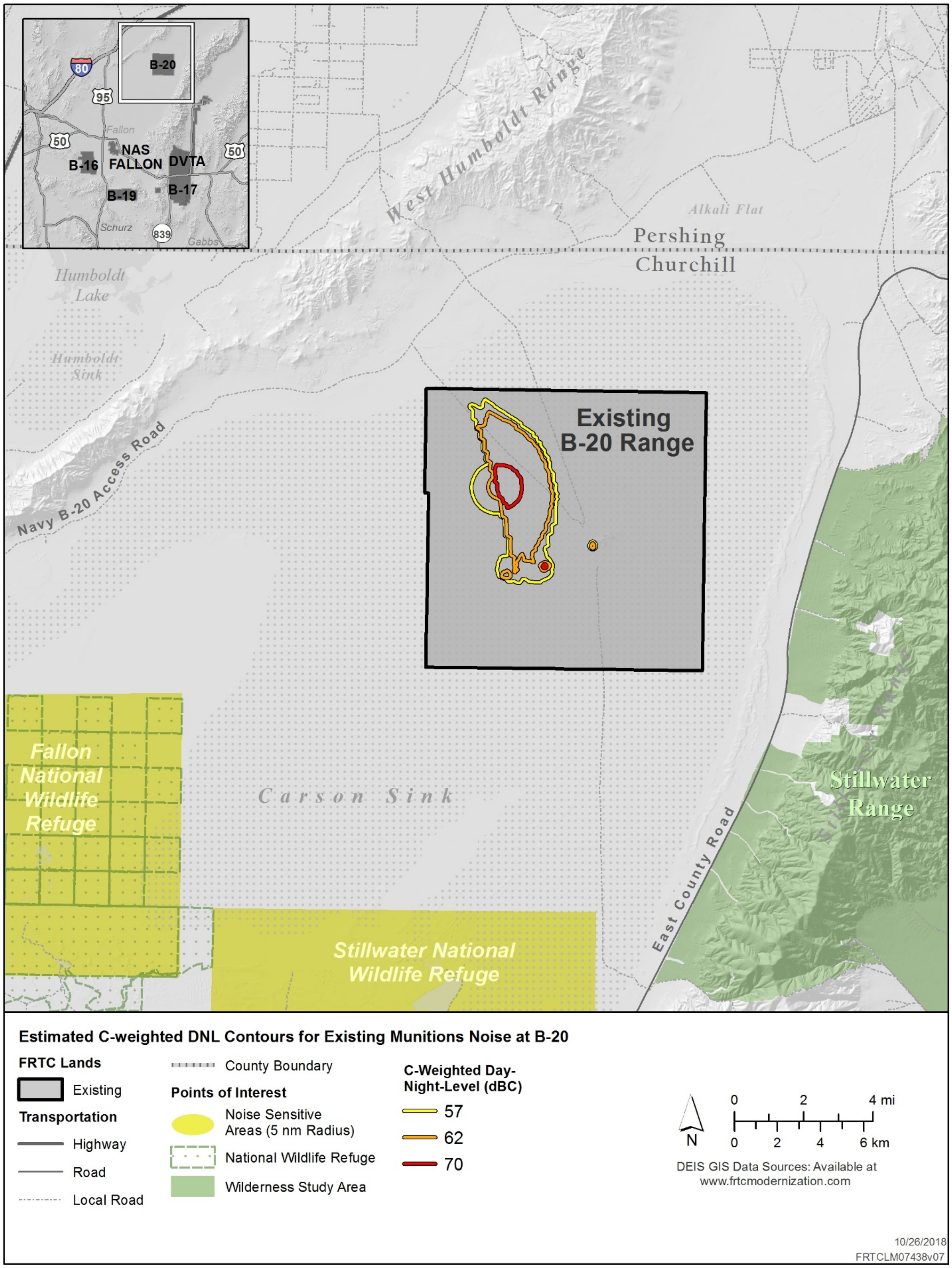

Figure 3.7-11: Estimated C-weighted DNL Contours for Existing Munitions Noise at B-20

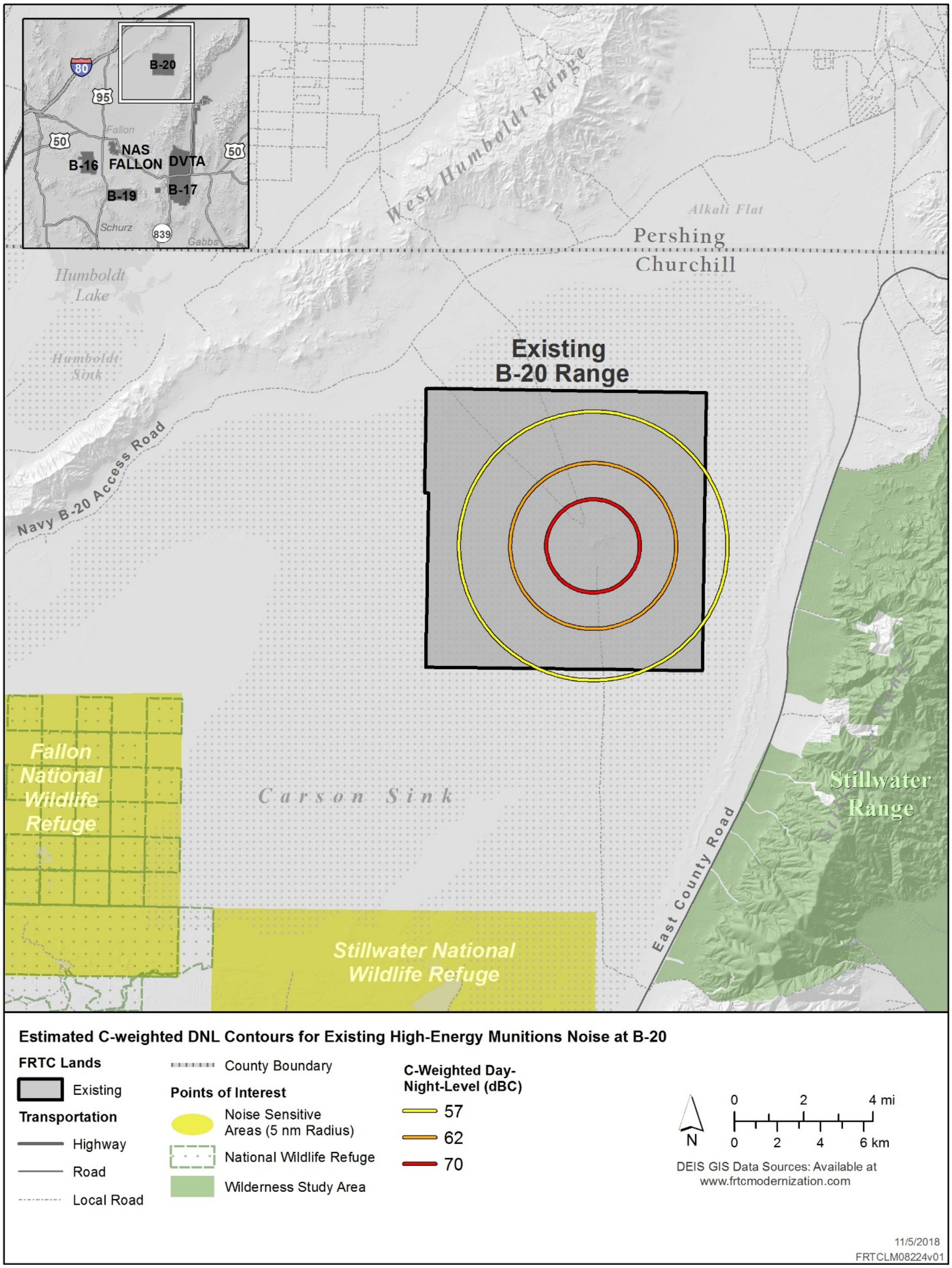

Figure 3.7-12: Estimated C-weighted DNL Contours for Existing High-Energy Munitions Noise at B-20

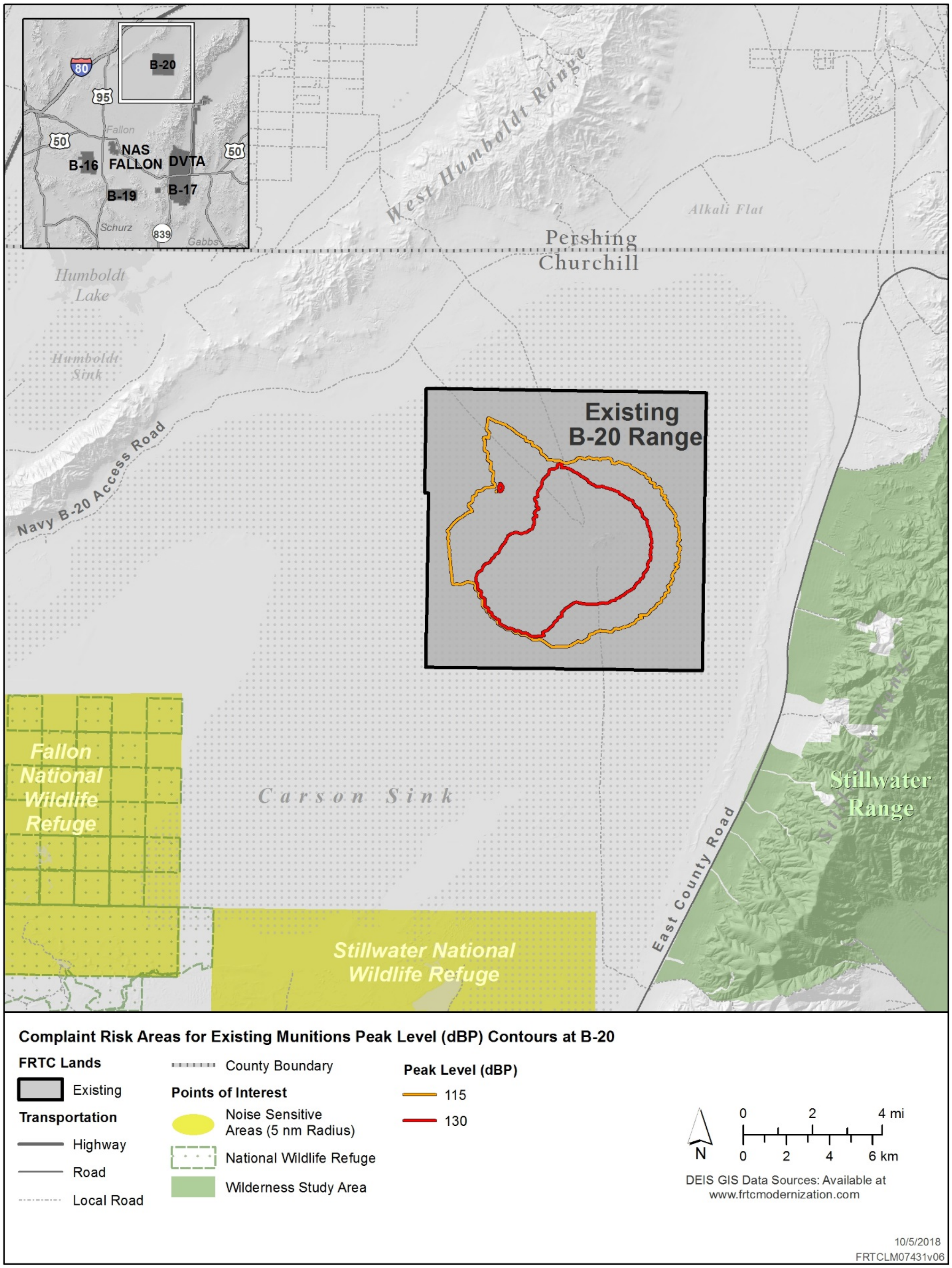

Figure 3.7-13: Complaint Risk Areas for Existing Munitions Peak Level (dBP) Contours at B-20

3.7.2.6 Dixie Valley Training Area

The existing Dixie Valley Training Area (DVTA) is located north of U.S. Route 50, less than 20 miles east of Fallon (Figure 3.7-14). This area is in Churchill County, Nevada. Dixie Valley is an alluvial valley between the Clan Alpine Mountains in the east and the Stillwater Range in the west. The BLM manages the majority of the land within the proposed DVTA boundaries; however, this area also includes a few private parcels. Although there are no wilderness areas within the DVTA, the Clan Alpine Mountains, Job Peak, and Stillwater Range Wilderness Study Areas are adjacent to the DVTA.

The DVTA is open to the public. U.S. Route 50 is south of the DVTA. State Route 121 is the main access road to the DVTA, which is a public road that intersects U.S. Route 50 and runs north to south through Dixie Valley. State Route 121 also connects to Dixie Valley Road. The DVTA is also accessible by Frenchman Flat Road. This road intersects with Mountain Wells Road, which provides public access to the Stillwater Mountains west of the DVTA. There are also several unnamed and named roads within Area D, which may be used by the public.

3.7.2.6.1 Existing Aircraft Noise

Under the environmental baseline, most of the aircraft noise that does occur over the DVTA is a result of transit routes aircraft use within the FRTC SUA, described in the following section. Noise levels between 60 dBA and 65 dBA occur over the entire DVTA (Figure 3.7-14).

3.7.2.6.2 Existing Munitions Noise

Munitions are not used in the DVTA. Therefore, no munitions noise occurs at the DVTA.

3.7.2.7 FRTC Special Use Airspace

FRTC SUA overlies approximately 10.4 million acres of land, including large portions of Churchill, Lander, and Eureka Counties as well as portions of Pershing, Nye, Mineral, Lyon, Eureka, Elko, and Washoe Counties. Metropolitan areas under this airspace include the City of Fallon and the communities of Austin, Crescent Valley, and Gabbs among numerous others. FRTC SUA also overlaps portions of the following Native American reservations: Walker River Paiute Indian Reservation, Fallon Paiute-Shoshone Reservation, Pyramid Lake Reservation, Duckwater Reservation, and Yomba Indian Reservation. Approximately 94 percent of the lands beneath the FRTC SUA are federally managed public lands, including BLM land, USFWS refuges (e.g., Stillwater Wildlife Refuge Complex), and U.S. Forest Service land (e.g., the Humboldt-Toiyabe National Forest). The Humboldt-Toiyabe National Forest includes 23 wilderness areas. Within FRTC SUA, this includes portions of the Arc Dome Wilderness Area (120,556 acres), which is Nevada's largest Wilderness Area; the Alta Toquima Wilderness Area (35,860 acres), which includes Mount Jefferson, the tallest peak in Nevada; and the Table Mountain Wilderness Area (92,485 acres).

3.7.2.7.1 Existing Aircraft Noise

Existing aircraft operations in the previous sections focused on activity in and around the Bravo training ranges that commonly utilizes ground targets. A significant portion of range operations do not focus on the Bravo ranges but instead utilize much larger portions of FRTC. This includes the utilization of multiple contiguous areas as single flight areas. A typical busiest month for these large area operations would include the first three weeks of Navy Fighter Weapons School (TOPGUN) and four weeks of Carrier Air Wing (CVW) training.

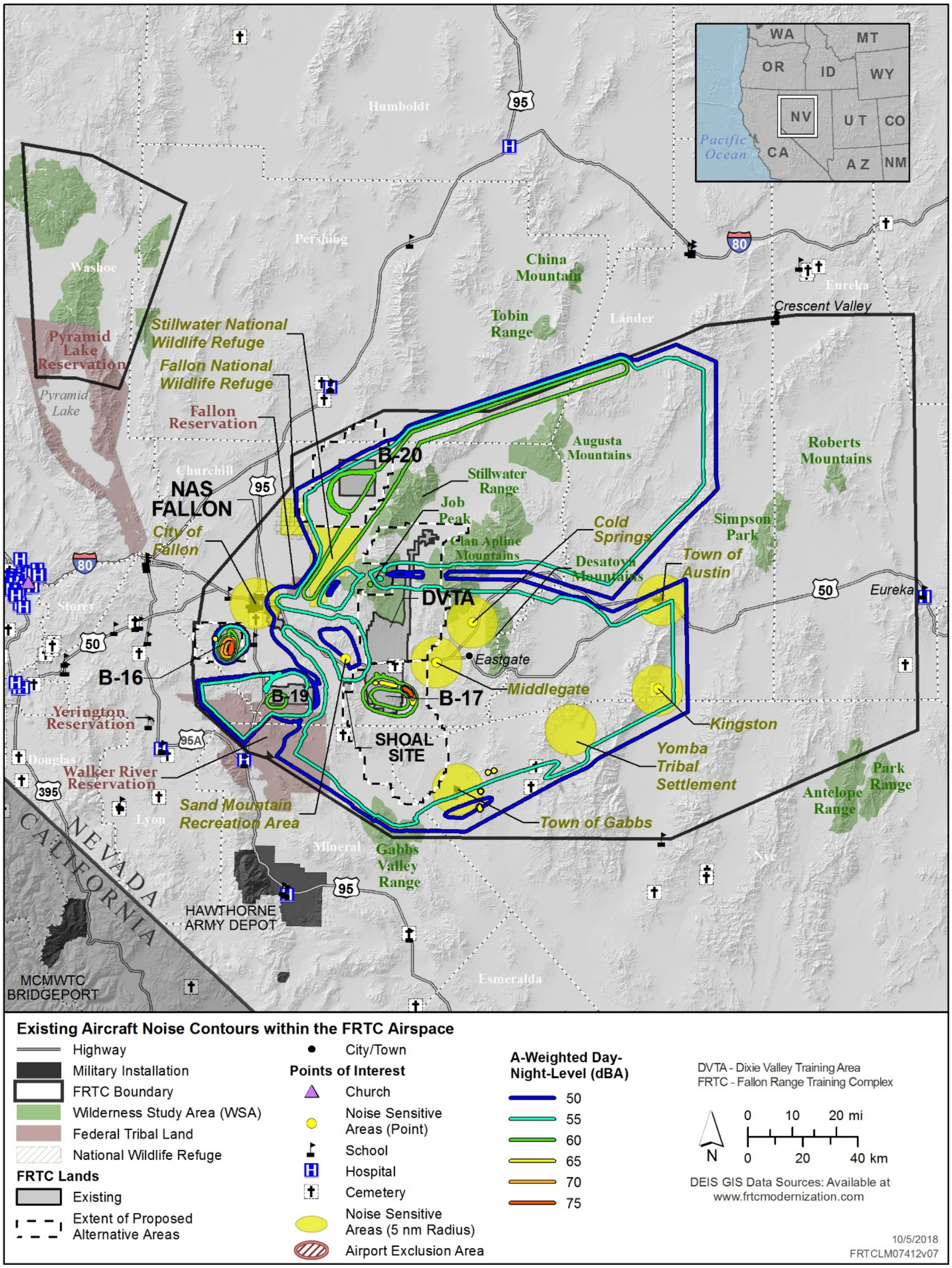

Figure 3.7-14: Existing Aircraft Noise Contours Within the FRTC Airspace

The TOPGUN and CVW training often utilizes large portions of FRTC that extend beyond individual MOAs. The TOPGUN students, flying F/A-18 aircraft, typically set up in the staging area in the east (south of Crescent Valley). The instructors operate F-5, F-16, and F/A-18 aircraft to represent enemy aircraft, referred to as “bandits,” and set up in the Bandit area, northwest of NAS. Once all aircraft are in the proper initial locations, the simulated combat begins with air-to-air combat in the engagement area to the east of B-17 and B-20. The CVW air-to-air combat training is conducted in a similar manner with students initiating in the east while instructors operating F-5 or other adversarial aircraft begin in the west.

In order to utilize the four Bravo training ranges, aircraft typically follow predetermined routes (“course rules routes”) for access into (ingress) and out of (egress) the training ranges. Four ingress and five egress routes are identified for fixed- and rotary-wing aircraft. Aircraft typically originate at NAS Fallon for training in FRTC but may also arrive from other air stations such as NAS Lemoore.

Using this information, MR_NMAP was used to calculate the DNL contours, in 5 dB increments, for all FRTC aircraft operations within the SUA under the environmental baseline. Figure 3.7-14 plots the resulting DNL contours for all FRTC aircraft operations within the SUA. With the exception of higher DNLs concentrated around bombing ranges (described above), aircraft operations do not result in DNL contours above 65 dBA.

Supersonic Activities

In addition to the ranges and SUA discussed in the previous sections, the FRTC includes two Supersonic Operating Areas (SOAs) to support high-speed training activities and maneuvers in excess of the speed of sound. Figure 1-1 shows the SOAs, with a minimum altitude of 11,000 feet mean sea level (MSL) for supersonic flight in SOA A, and above 30,000 feet MSL in SOA B.

When a vehicle moves through the air, it pushes the air out of its way. At subsonic speeds, the displaced air forms a pressure wave that disperses rapidly. At supersonic speeds, the vehicle is moving too quickly for the wave to disperse, so it remains as a coherent wave. This wave is a sonic boom. When heard at ground level, a sonic boom consists of two shock waves (one associated with the forward part of the vehicle, the other with the rear part) of approximately equal strength and (for fighter aircraft) separated by 100 to 200 milliseconds. When plotted, this pair of shock waves and the expanding flow between them has the appearance of a capital letter “N,” so a sonic boom pressure wave is usually called an “N-wave.” An N-wave has a characteristic "bang-bang" sound that can be startling. Figure 3.7-15 shows the sonic boom pattern for a vehicle in steady, level supersonic flight. The boom forms a cone that trails behind the plane and where that cone intersects the ground is usually called a sonic boom “carpet” under the flight track. Since aircraft fly supersonically with relatively low horizontal angles, the boom is directed toward the ground.

The intensity and width of a sonic boom path depends on the physical characteristics of the aircraft (siza, shape, and weight) and how it is operated (trajectory and speed). In general, the greater an aircraft's altitude, the lower the overpressure on the ground. Greater altitude also increases the boom's lateral spread, exposing a wider area to the boom. Overpressures in the sonic boom impact area, however, will not be uniform. The boom levels (measured in pound per square foot [psf] vary along the lateral extent of the “carpet” with the highest levels directly underneath the flight track and decreasing as the lateral distance increases to the cut-off edge of the “carpet.” Additionally, aircraft maneuvering can cause distortions in shock wave patterns. Some maneuvers—pushovers, acceleration and "S" turns—can amplify the intensity of the shock wave. Hills, valleys and other terrain features can create multiple reflections of the shock waves and affect intensity.

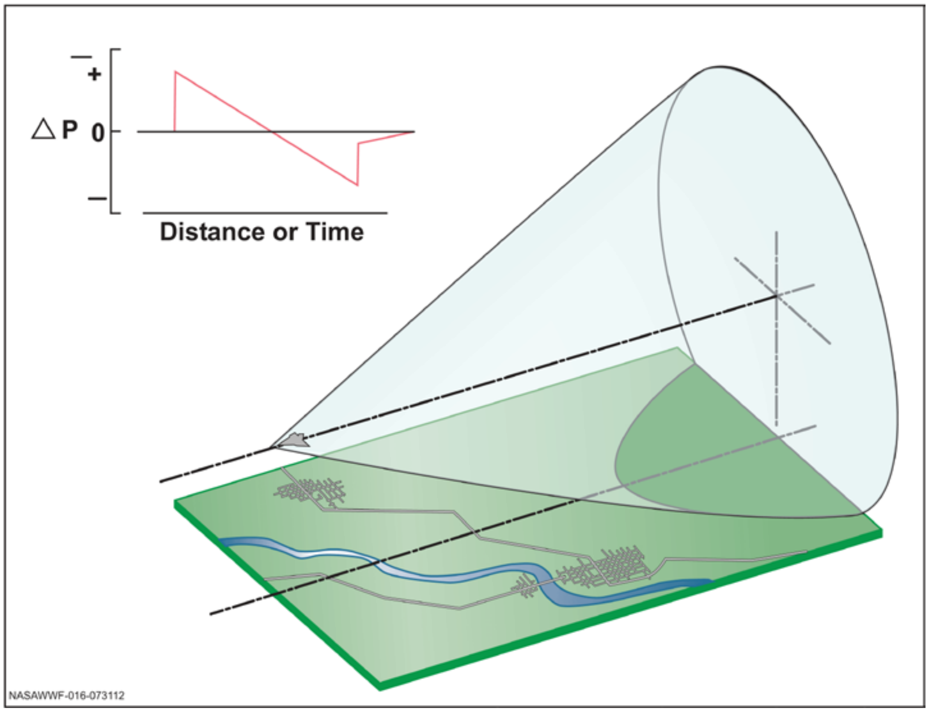

Figure 3.7-15. Sonic boom carpet for a vehicle in steady flight

As discussed earlier, to determine the land use compatibility when employing noise sources that are impulsive in nature, less than 1 second in duration, but are not small arms related (e.g., sonic booms), the C-weighted DNL is used. The C-weighted DNL is the primary metric for assessing impacts from cumulative sonic booms from supersonic flights. The maximum C-weighted DNL of 57 dB calculated by the area-based BooMap96 model occurs near the center of SOA A, but does not exceed 62 dBC (Figure 3.7-16). With respect to Day-Night Levels, C-weighted DNLs calculated from supersonic activities do not represent a degradation of the noise environment.

While the C-weighted DNL is the primary metric for assessing cumulative impacts from sonic booms, sensitive receptors experience sonic booms per occurrence. To analyze potential sonic boom impacts from single supersonic trajectories (structural damage) the peak overpressure metric (psf) is a supplemental metric used. Figure 3.7-17 and Figure 3.7-18 present general sonic boom “footprints” from F-16s and F-18s at various altitudes and velocities. While supersonic flight can occur anywhere within the Supersonic Operating Areas, these figures present individual tracks for illustrative purposes. Aircraft flying supersonically operate well within the supersonic airspace limits. However, their resulting sonic booms propagate and may be experienced outside of the SOAs and even the FRTC airspace boundaries. The proximity of the aircraft trajectory to the border of the airspace would affect how much area outside of the FRTC airspace could be impacted by a sonic boom. The sonic boom heard outside of the boundaries will generally be less than 2 psf, which is below the potential structural damage threshold for sonic booms (see Supporting Study: Noise Study, available at http://www.frtcmodernization.com). To minimize the individual booms that could be experienced at sensitive receptors, Navy pilots avoid flying supersonic above the areas defined for noise abatement (Figure 3.7-2, labelled as noise-sensitive areas).

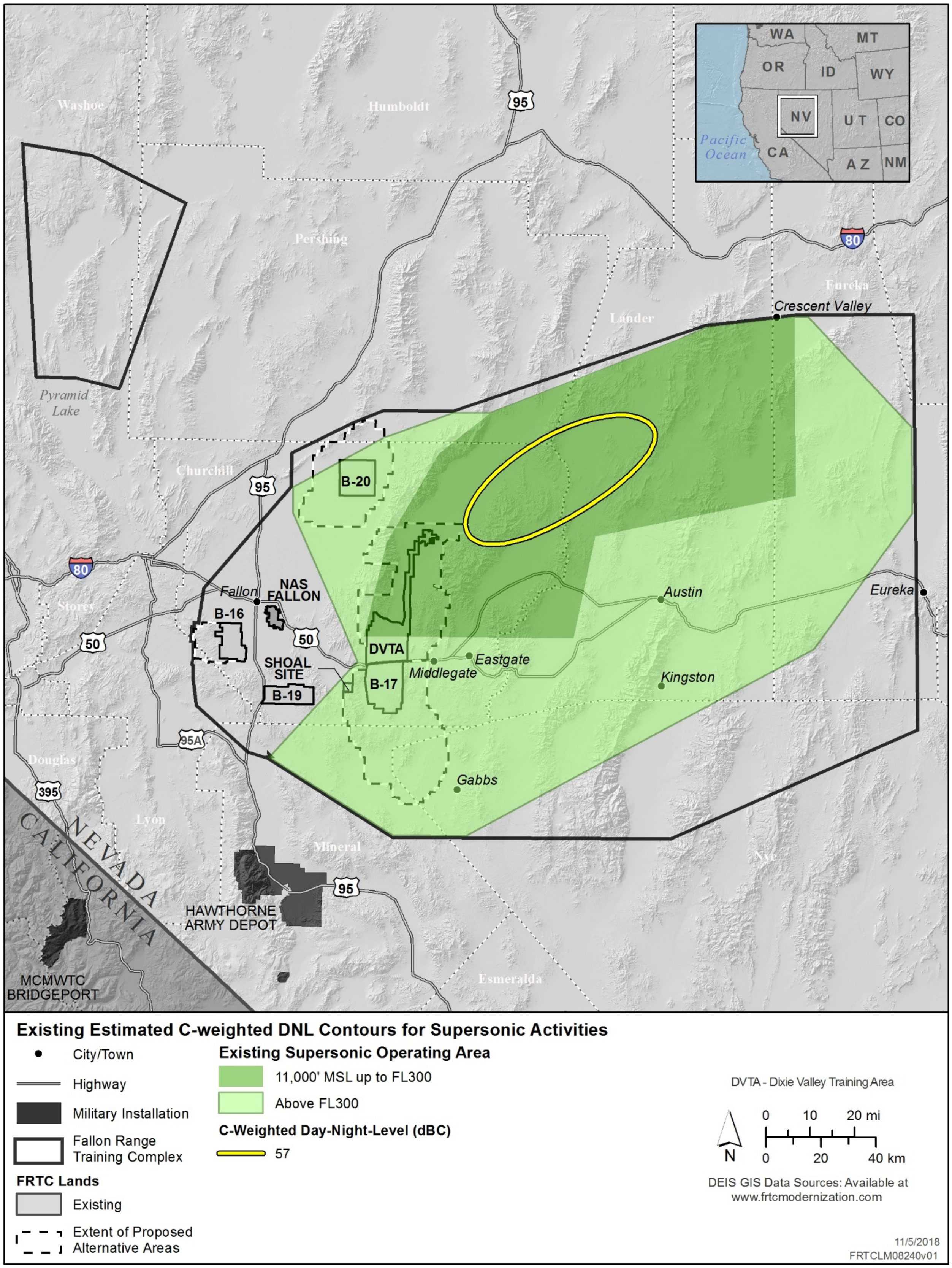

Figure 3.7-16: Existing Estimated C-weighted DNL Contours for Supersonic Activities

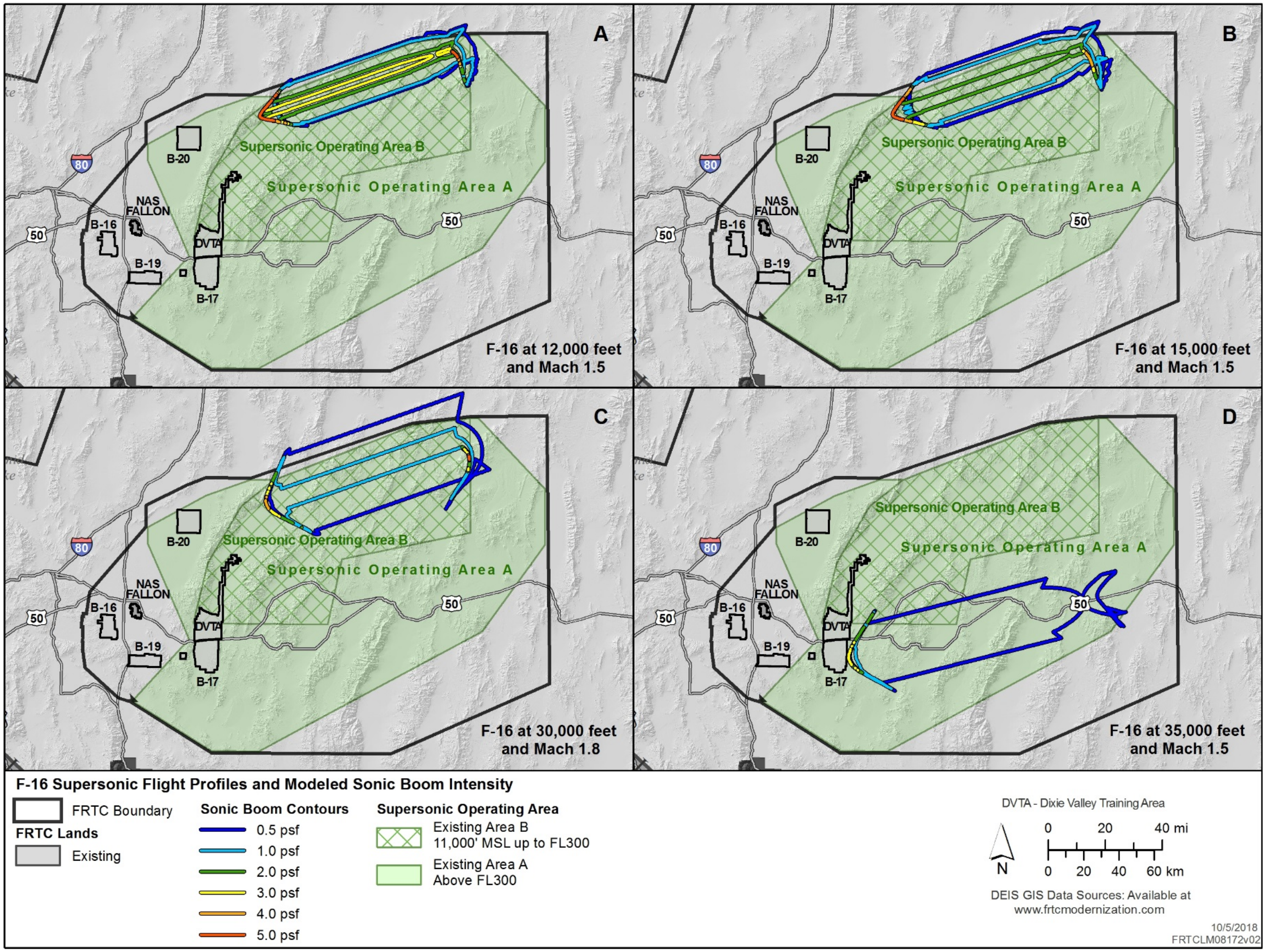

Figure 3.7-17: F-16 Supersonic Flight Profiles and Modeled Sonic Boom Intensity

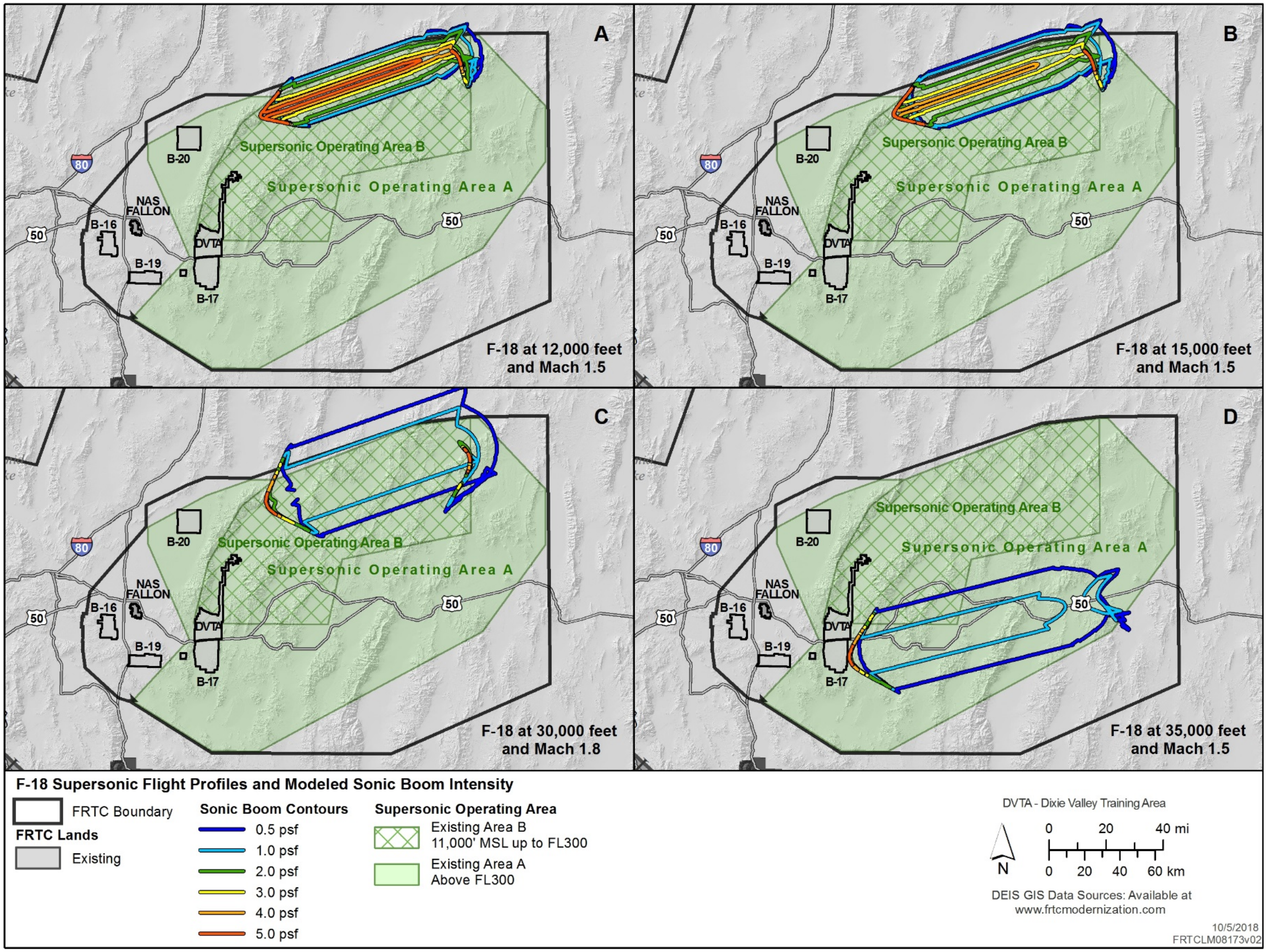

Figure 3.7-18: F-18 Supersonic Flight Profiles and Modeled Sonic Boom Intensity

3.7.2.7.2 Existing Munitions Noise

Outside of the existing ranges, there is no ordnance use. No munitions noise occurs on non-range lands underneath the FRTC Special Use Airspace.

3.7.3 Environmental Consequences

Analysis of potential noise impacts includes estimating likely noise levels from Action Alternatives and determining potential effects to sensitive receptors. A summary of the potential impacts with implementation of the No Action Alternative or any of the three action alternatives (Alternatives 1, 2, and 3) is provided at the end of this section (see Section 3.7.3.6, Summary of Effects and Conclusions).

3.7.3.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur and the existing legislative withdrawals would expire on November 5, 2021. In comparison to the environmental baseline, training activities under the No Action Alternative requiring the use of aviation or ground range munitions would likely cease and there would not be a significant increase in the noise environment. With the potential reincorporation of the existing withdrawn and acquired lands into the public domain, and the potential removal of all ground sites supporting training and tracking systems, the airspace of the FRTC would likely no longer support existing Navy training. FAA guidance on the validity of restricted airspace would no longer apply, and the Navy would likely take steps to coordinate with the FAA to remove all restricted areas, disestablish all MOAs, and potentially return all of the FRTC airspace to the FAA for full integration into the commercial national airspace.

If the airspace no longer supported FRTC training and airspace was released into the commercial national airspace, Naval activities would likely no longer generate noise at B-16, B-17, or B-20. Noise levels near air-to-ground ranges could decrease, but predicting noise levels for lands under the remaining SUA would be speculative as use of remaining airspace would need to be evaluated prior to development of noise contours. Generally speaking, the two approach corridors into Naval Air Station Fallon could continue to be used but would likely be used less than that described in the *2015 Military Readiness Activities at Fallon Range Training Complex, Nevada Final Environmental Impact Statement* (U.S. Department of the Navy, 2015) potentially decreasing the extent of the noise contours in the area. Additionally, with the cessation of aviation or ground based munitions use, noise associated with their use could also cease.

Therefore, any reduction in activities as a result of the reevaluation of the FRTC and the NAS Fallon's mission would also reduce associated noise from those activities. Under the above described potential cessation of activities, there would be no significant noise increases (as described in Section 3.7.1.4, Approach to Analysis) from military training activities under the No Action Alternative.

3.7.3.2 Alternative 1: Modernization of the Fallon Range Training Complex

Under Alternative 1, the Navy would renew its current public land withdrawal at the FRTC. The Navy would also withdraw and acquire additional land to be reserved for military use. Alternative 1 would close public access to approximately 390,775 acres for expanding the Bravo ranges. As presented in the sections below, Alternative 1 would create a significant increase in the noise environment, particularly underneath the newly established MOAs in the eastern portion of the FRTC airspace.

3.7.3.2.1 Bravo-16

Alternative 1 would expand B-16 to approximately 59,560 acres, which is an increase of approximately 32,201 acres from existing conditions (Table 2-1). The expansion of B-16 under Alternative 1 would be used for the Navy SEAL Tactical Ground Mobility Course, Naval Aviation basic air-to-surface training, and Helicopter Gunnery Training Range (Figure 2-1). It is important to note that while the locations of activities change (become more widely distributed), actual numbers of activities do not increase under any Action Alternative.

Aircraft Noise

Figure 3.7-19 shows the DNL levels from aircraft activities for B-16 under Alternative 1. Because the targets used by aircraft under Alternative 1 remain the same as the environmental baseline (for a detailed explanation, see Section 2.4, Environmental Baseline [Current Training Activities and Affected Environment]), the general shape of the noise contours also remains the same. Contours for 65 dBA and above do not extend past the boundary of the existing and proposed B-16 range. Visual inspection of aerial maps of the areas within regions where the noise contours exceed 65 dBA reveals no sensitive receptors (e.g., residences, lodging, or medical facilities).

Munitions Noise

Contours for small arms munitions were not created for Alternative 1, as new firing locations at B-16 are at greater distances from the proposed range boundaries than under the environmental baseline. Distances to sensitive receptors at B-16 are expected to be great enough such that noise levels would not significantly contribute to the noise environment, as received noise levels from these activities would be at or near ambient levels.

Under Alternative 1, DNLs from air gunnery activities create localized areas between 62 and 70 dBC, (Figure 3.7-20). A portion of this area is within the 70 dBC contour. However, neither of these contours extend past the proposed and existing boundary of B-16. Further, the peak noise levels from air gunnery operations would not extend past the proposed expanded B-16 boundary (Figure 3.7-21).

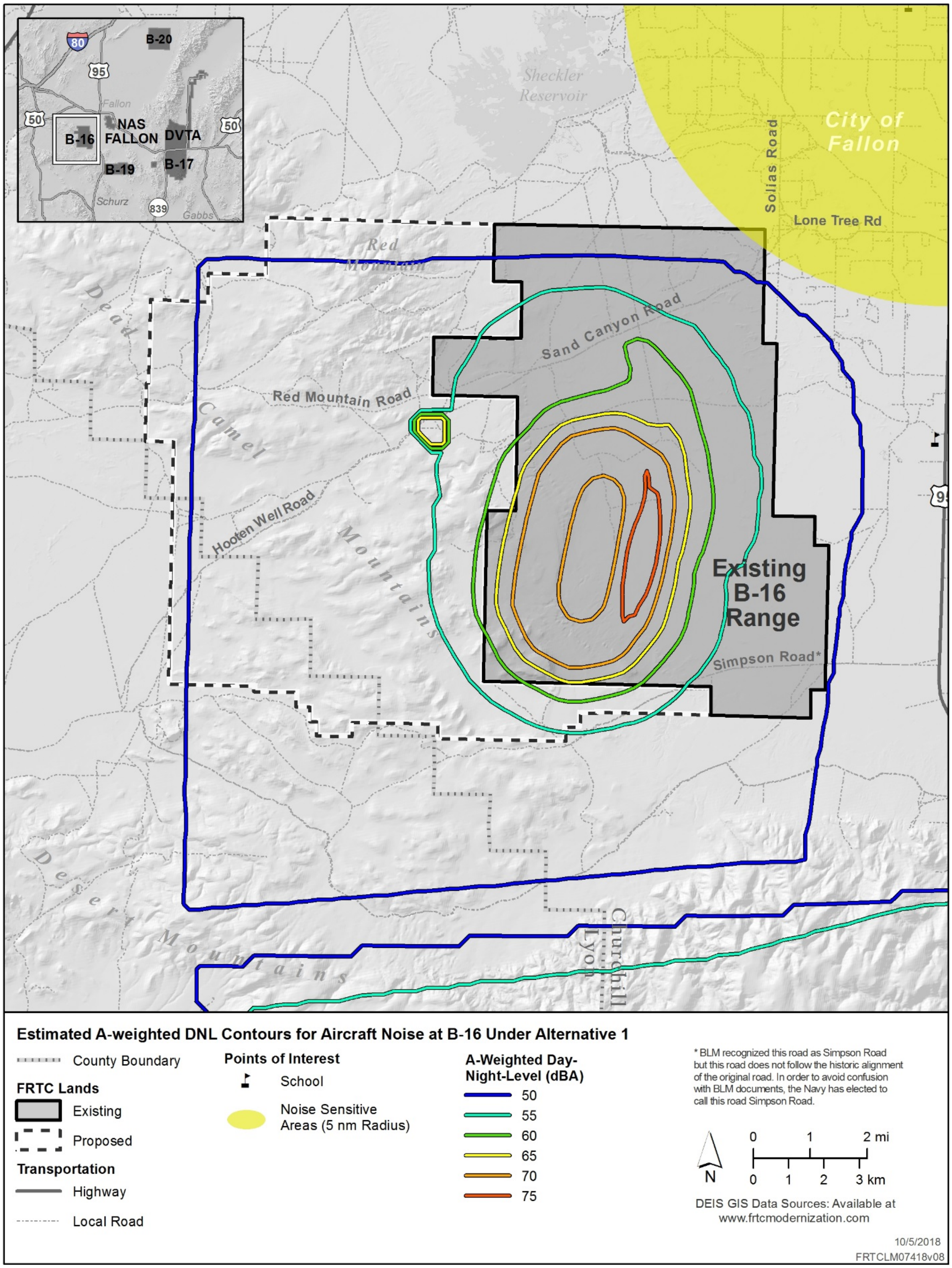

Figure 3.7-19: Estimated A-weighted DNL Contours for Aircraft Noise at B-16 Under Alternative 1

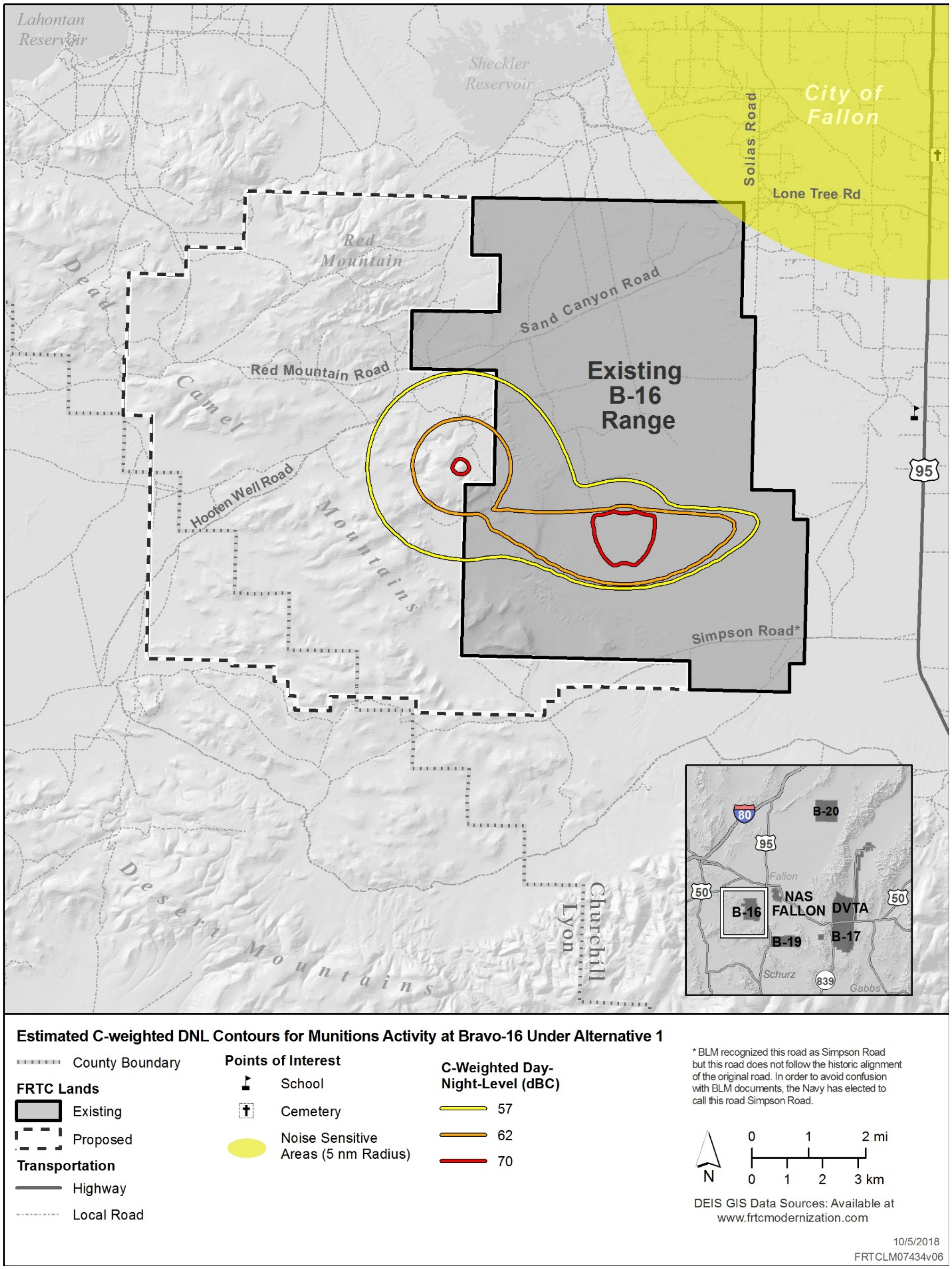

Figure 3.7-20: Estimated C-weighted DNL Contours for Munitions Activity at B-16 Under Alternative 1

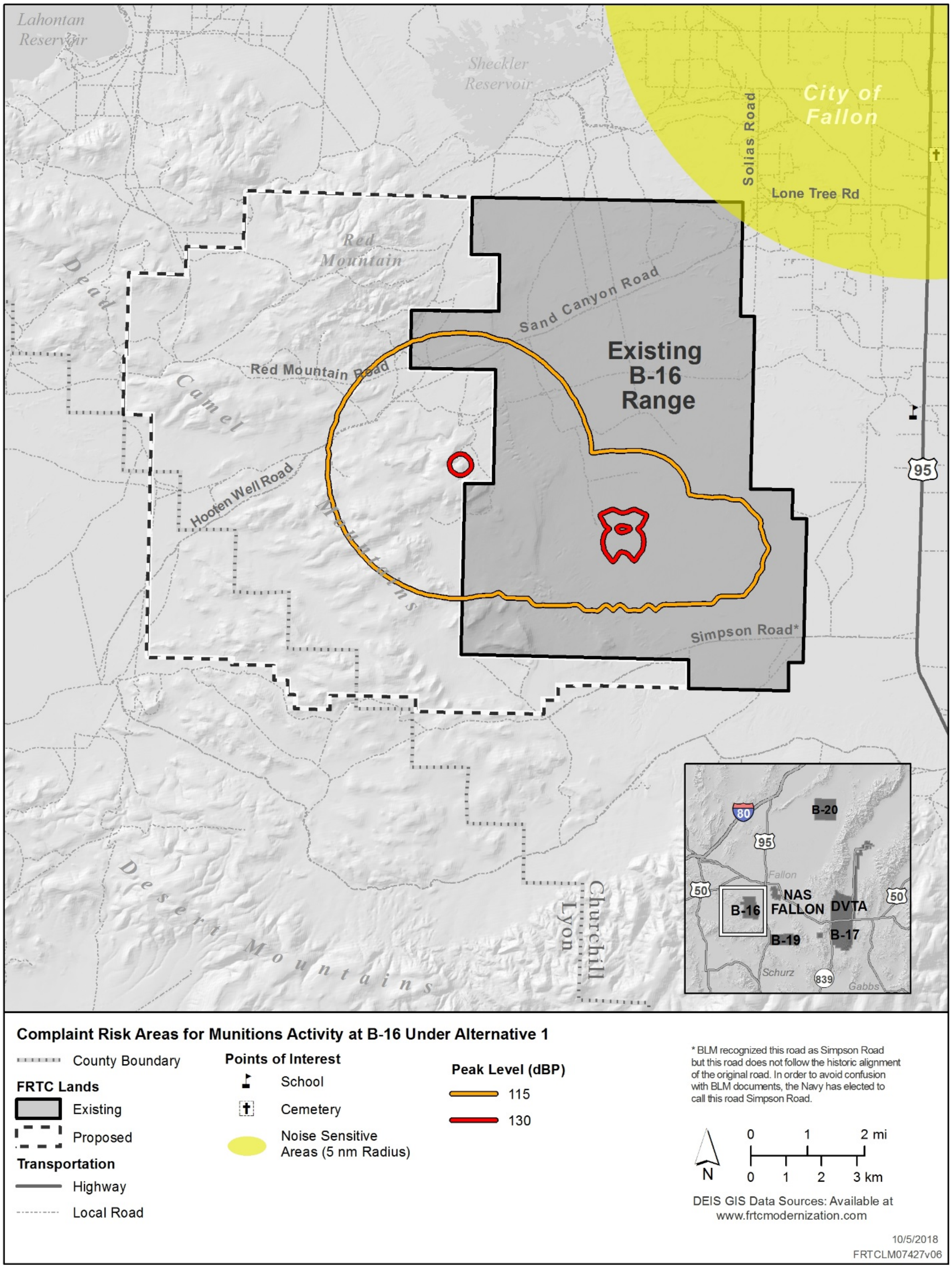

Figure 3.7-21: Complaint Risk Areas for Munitions Activity at B-16 Under Alternative 1

3.7.3.2.2 Bravo-17

Under Alternative 1, B-17 range would expand to the south, with the entire range closed and restricted from public use. The portion of Highway 839 that overlaps with the proposed area would be closed and re-routed outside of the closed lands. The southern boundary of the proposed expanded B-17 is approximately 10 miles northwest of Gabbs. Approximately 3,000 acres would be utilized for convoy routes, military vehicle training routes, or ground target areas (Figure 2-1). Alternative 1 would continue to use the existing targets on B-17.

Aircraft Noise

Figure 3.7-22 shows the DNL levels from aircraft activities for B-17 under Alternative 1. Under Alternative 1, the 60 dBA DNL contour covers almost the entire range. As displayed in Figure 3.7-22, the 65 dBA contour and above do not extend beyond the existing and proposed B-17 range. Visual inspection of aerial maps of the areas within regions where the contours are 65 dBA and above reveals no sensitive receptors (e.g., residences, lodging, or medical facilities) or incompatibility with current land use.

Munitions Noise

Under Alternative 1, the DNL contours from large arms explosions would not extend past the proposed expanded B-17 range boundary (Figure 3.7-23). Additionally, peak noise levels from air gunnery operations would not extend past the proposed expanded B-17 boundaries (Figure 3.7-25).

Road Construction and Infrastructure In Support of Alternative 1

With the expansion of B-17, approximately 24 miles of State Route 839 would potentially no longer be available for public use. Under Alternative 1, one of three notional relocation corridors would be developed to an asphalt surface. The State Route 839 replacement road would be constructed by mechanically removing vegetation and grading native soils. The Navy anticipates that typical road construction equipment would be used during the route replacement, and that noise from such equipment would temporarily exist in the region of construction. However, prior to implementation of this alternative, site-specific NEPA would be performed on this action, which would include a noise analysis for the potential relocation of the state route.

Alternative 1 would also include the potential relocation of the Paiute Pipeline that runs through the southern area of the proposed B-17 expansion area. Similar equipment would likely be used to relocate the pipeline as is used in the relocation of State Route 839. Given typical propagation of noise away from a point source, the loudest equipment used during the pipeline replacement would be audible only in the immediate vicinity of construction activities. However, prior to implementation of this alternative, site-specific NEPA would be performed on this action, which would include a noise analysis for the relocation of the state route.

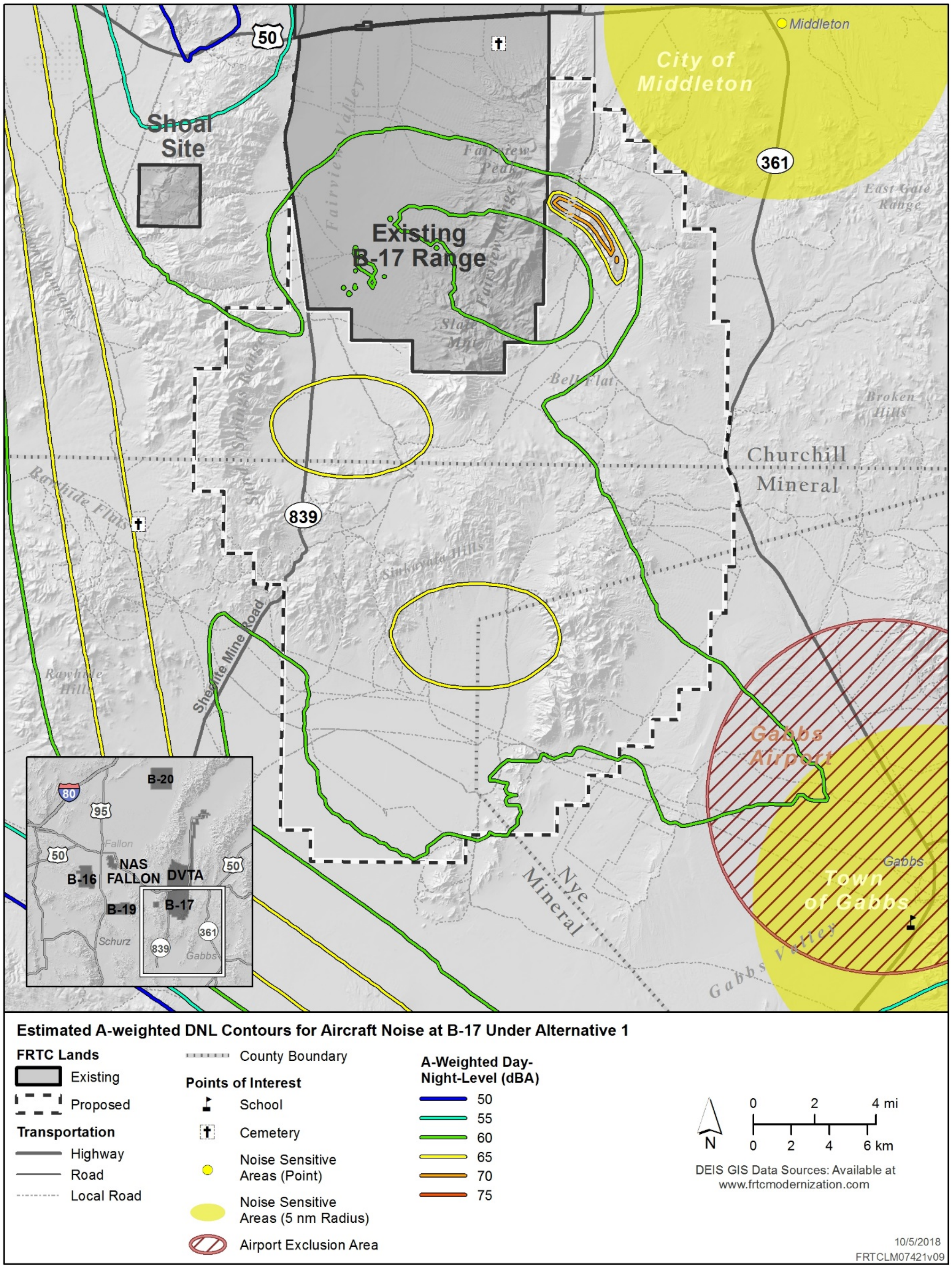

Figure 3.7-22: Estimated A-weighted DNL Contours for Aircraft Noise at B-17 Under Alternative 1

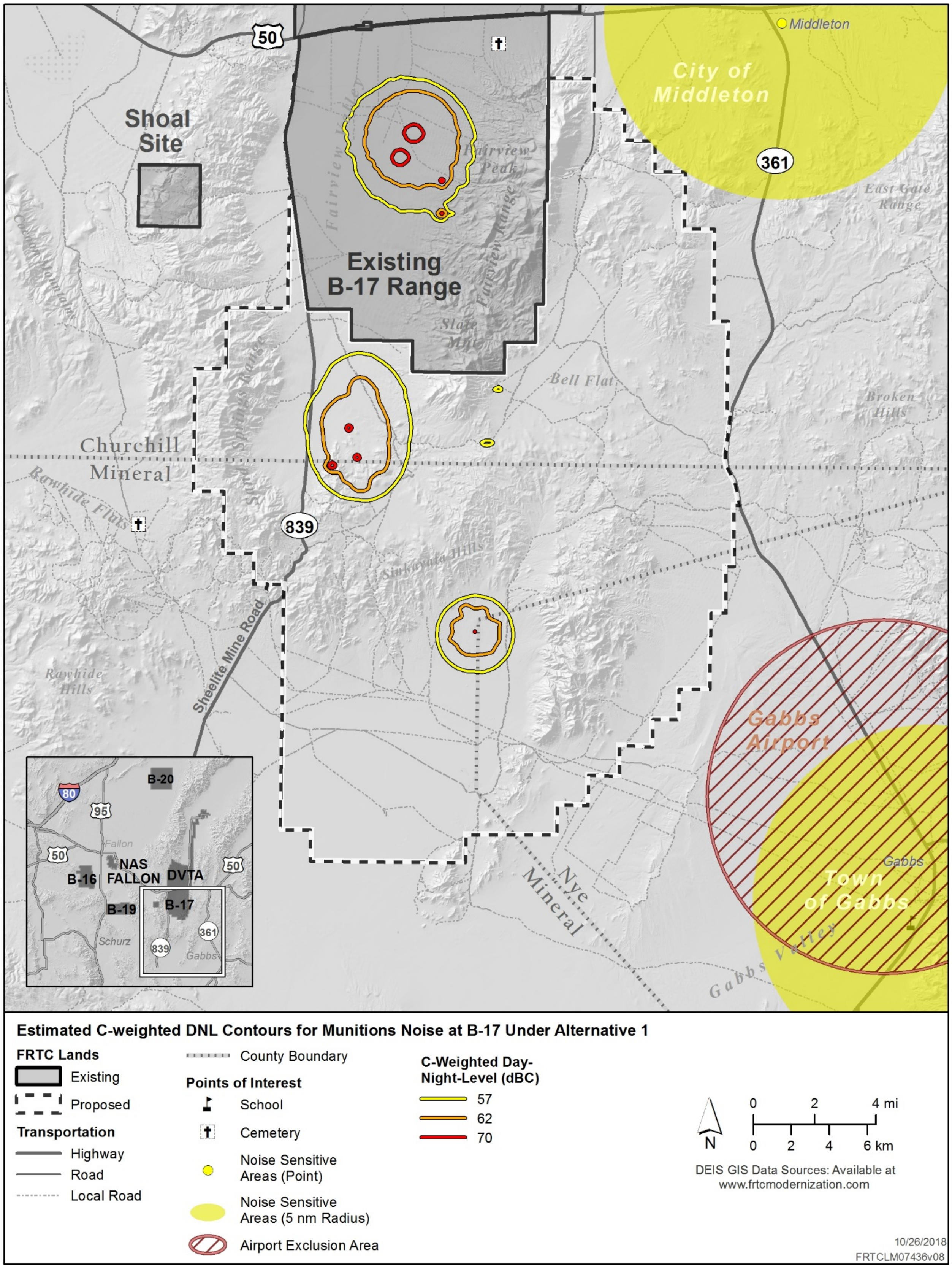

Figure 3.7-23: Estimated C-weighted DNL Contours for Munitions Noise at B-17 Under Alternative 1

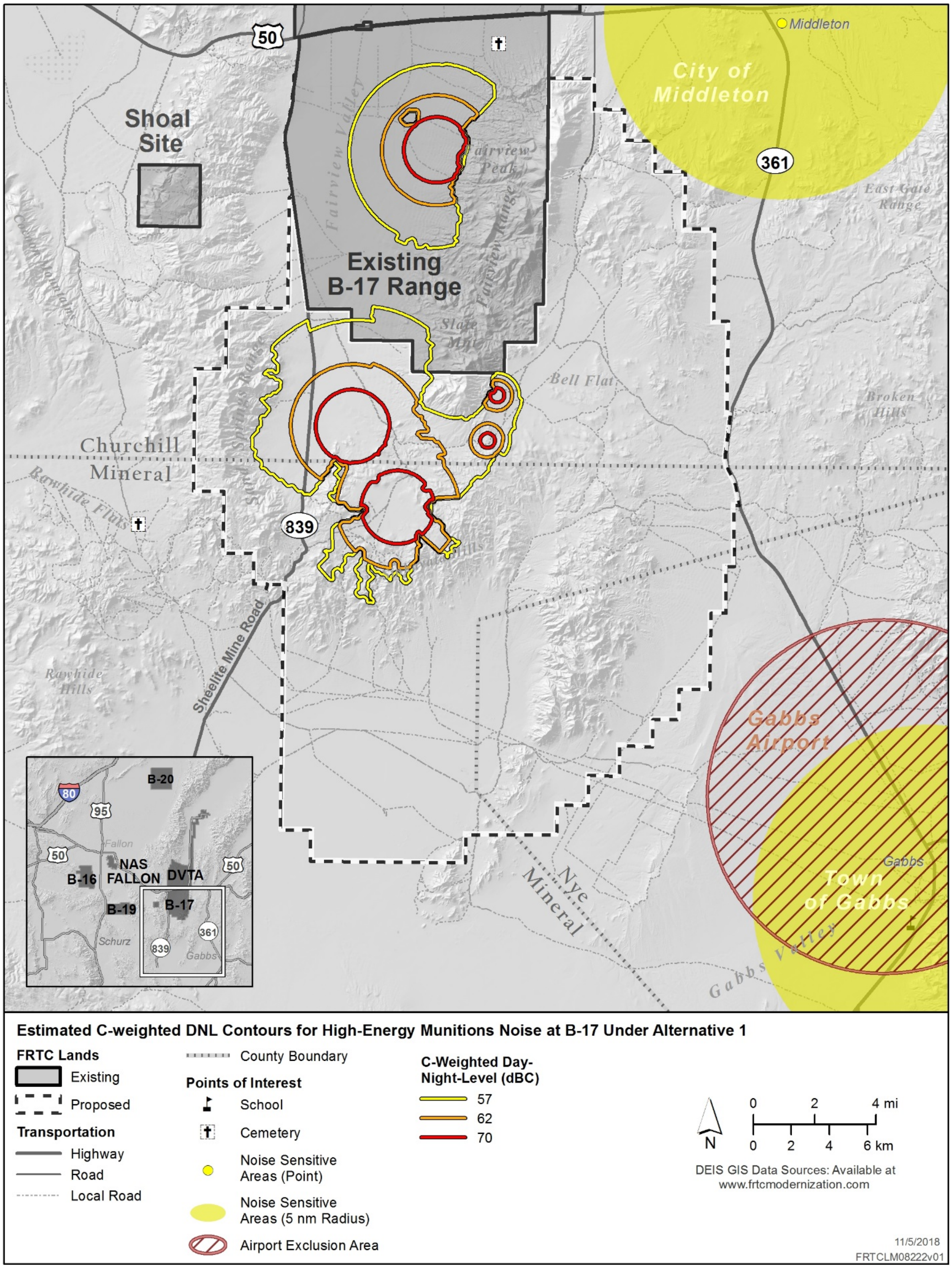

Figure 3.7-24: Estimated C-weighted DNL Contours for High-Energy Munitions Noise at B-17 Under Alternative 1

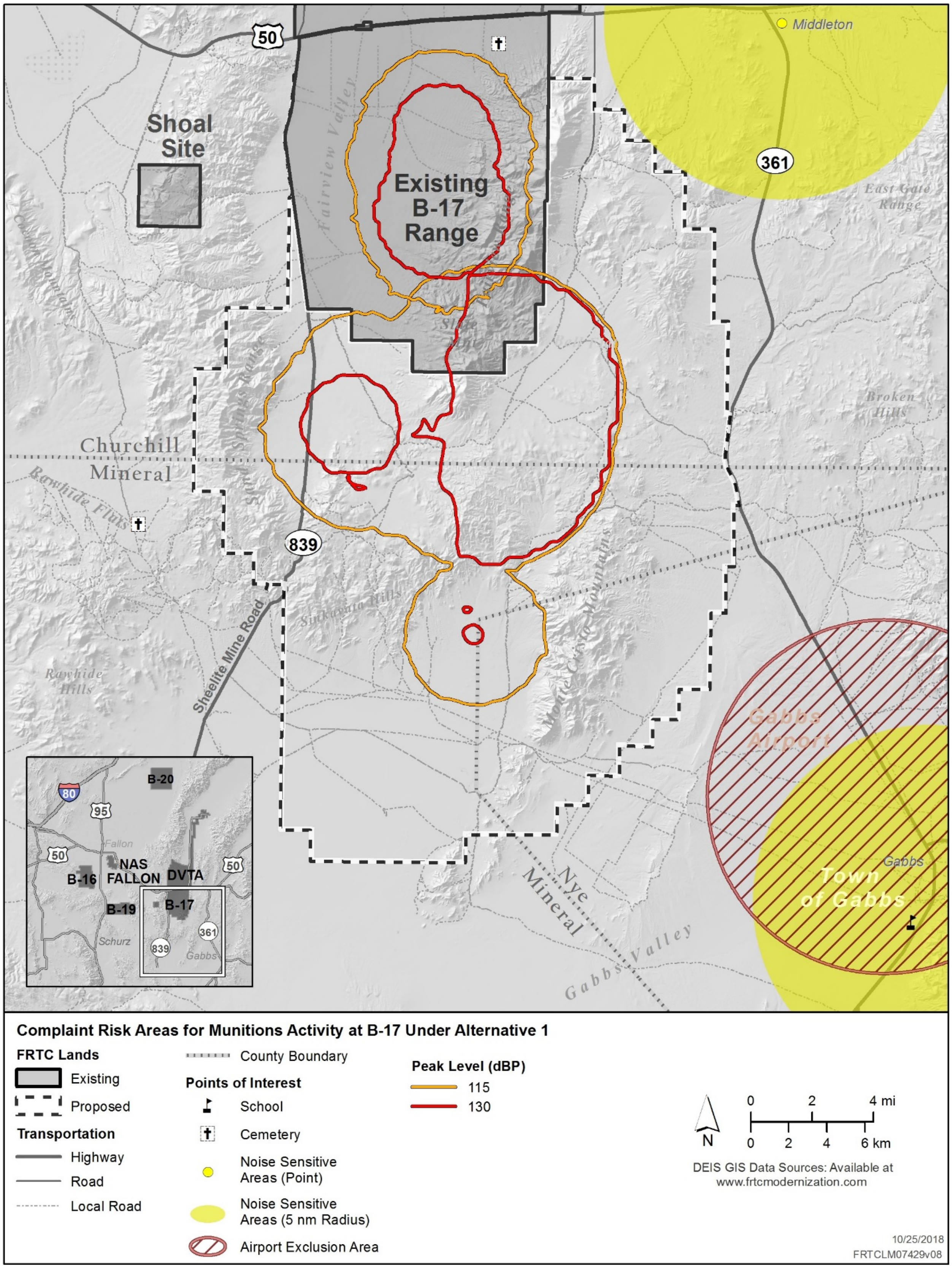

Figure 3.7-25: Complaint Risk Areas for Munitions Activity at B-17 Under Alternative 1

3.7.3.2.3 Bravo-20

Under Alternative 1, B-20 range would expand in all directions, with the majority of the range closed and restricted from public use except for Navy-authorized activities. The proposed expanded B-20 would overlap and abut the Fallon National Wildlife Refuge in the southwest and directly abut the Stillwater National Wildlife Refuge to the south. Additionally, the northern boundary of the proposed expansion area lies approximately 3.35 miles southeast of residences associated with agricultural activities south of Lovelock, and approximately 9 miles southeast of Lovelock itself.

Aircraft Noise

Figure 3.7-27 shows the DNL levels from aircraft activities for B-20 under Alternative 1. Under Alternative 1, the 60 dBA DNL contour covers the southwest portion range, which is an increase from the environmental baseline. This is a result of direct activities over B-20, as well as general use of the airspace. Under Alternative 1, there are no noise contours greater than 65 dBA at B-20.

Munitions Noise

Under Alternative 1, the DNLs from large arms explosions would not extend past the proposed expanded B-20 range boundary (Figure 3.7-21). Under Alternative 1, the peak noise levels from air gunnery operations would not extend past the proposed expanded B-20 boundaries (Figure 3.7-30).

3.7.3.2.4 Fallon Range Training Complex Special Use Airspace

Alternative 1 would include the reconfiguration of the existing SUA within the overall horizontal and vertical boundaries, with the planned extension of a minor shelf to accommodate the required restricted airspace over the expanded B-20 bombing range. Under Alternative 1, and with the exception of slight changes concentrated around bombing ranges (described in each ranges section above), the western portion of the SUA remains similar in terms of DNL contours. The creation of the eastern MOAs and associated increase aircraft overflights would create discrete brief noise events, which are short term and localized (such as a single jet overflight), that is not part of the continuous, ambient noise of the area, and would be noticeable because they would exceed the ambient background sound level. The DNL in the eastern portion of the SUA increases as a result of the creation of MOAs, with contours above 55 dBA, but not above 60 dBA (Figure 3.7-31). These DNLs from aircraft activities are compatible with land uses such as residences, transient lodging, and medical facilities.

The DNL from Alternative 1 was overlaid on the DNL contour map for the environmental baseline. By overlaying the maps, a “difference” or “delta” map was created, which shows areas where the DNL may rise or drop as a result of implementation of Alternative 1 (Figure 3.7-32). In relation to the environmental baseline there are there are four regions where the DNLs increase significantly (an increase in the average hourly sound level at any sensitive receptor of 5 dBA or more). These four areas include areas around B-16, B-17, and B-20 as well as on lands underneath the newly created MOAs in the eastern portion of the FRTC SUA. The expansion of the B-16 to the west results in an increase in DNL contours over the requested withdrawal lands. With the slight shift in activities to the west, the contours over the existing B-16 decrease. This change in DNL occurs at the B-17 and B-20 ranges as well, with DNLs increasing over new target areas, and slight decreases over existing target areas, as activities shift and redistribute to utilize the new targets. For these three ranges, even though the DNLs increase in comparison with the environmental baseline, these elevated DNLs are contained within the proposed range boundaries. This is reflected in the Point of Interest noise estimates of DNL shown in Table 3.7-6, where changes in DNL are most notable near B-16 and B-20. With the exception of B-16, and B-20, DNLs for a busy month do not appreciably change from the environmental baseline under Alternative 1. Figure 3.7-26 shows the 24 locations that were selected for modeling DNL levels that are listed in Table 3.7-6.

Table 3.7-6: Modeled Day-Night Levels (dBA) at selected Points of Interest Under Alternative 1

Point of Interest		***Day Night Level (dBA)***		
ID	**Name**	**Baseline**	**Alternative 1**	**Change from Environmental Baseline**
1	Fallon	<45	<45	N/A
2	Lovelock/B-20	<45	<45	N/A
3	Eureka	<45	<45	N/A
4	Walker River Paiute Tribe	48.6	50.3	1.7
5	Middlegate	56.8	58.5	1.7
6	Gabbs	56.3	57.8	1.5
7	Yomba	55.7	57.4	1.7
8	Austin	54	54.9	0.9
9	Fallon National Wildlife Refuge/B-20	52.2	53.7	1.5
10	Fallon/B-16	<45	<45	N/A
11	Red Mountain/B-16	<45	50.9	5.9
12a	Upland Scrub Community A	57	58.5	1.5
12b	Upland Scrub Community B	56.6	57.6	1
13	Stillwater National Wildlife Refuge	62.8	66.7	3.9
14	Unpopulated Mountainous Area	61.4	62.5	1.1
15	Fairview Peak	59	59.5	0.5
16	Unpopulated Mountainous Area #2	51.8	53.3	1.5
17	Fallon Paiute Shoshone Tribe	46.8	47.4	0.6
18	Schurz	<45	<45	N/A
19	North DVTA	58.4	59.6	1.2
20	Crescent Valley	<45	<45	N/A
21	Reno MOA - Pyramid Lake	<45	<45	N/A
22	Gerlach	45.4	46.9	1.5
23	Kingston	56.1	57.1	1
24	Reese River	58	59.2	1.2

Notes: dBA = A-weighted decibels, NC = No Change

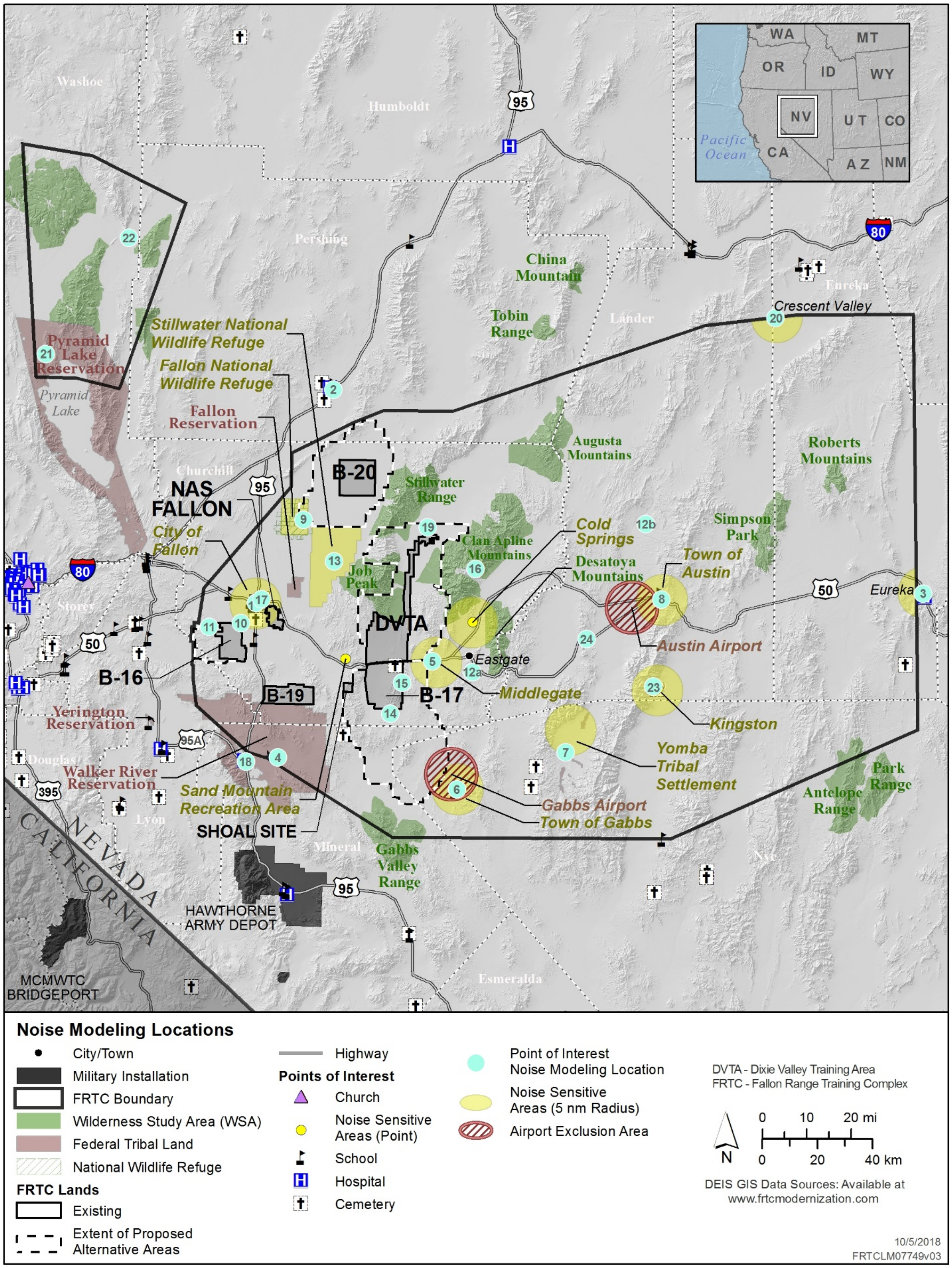

Figure 3.7-26: Noise Modeling Locations

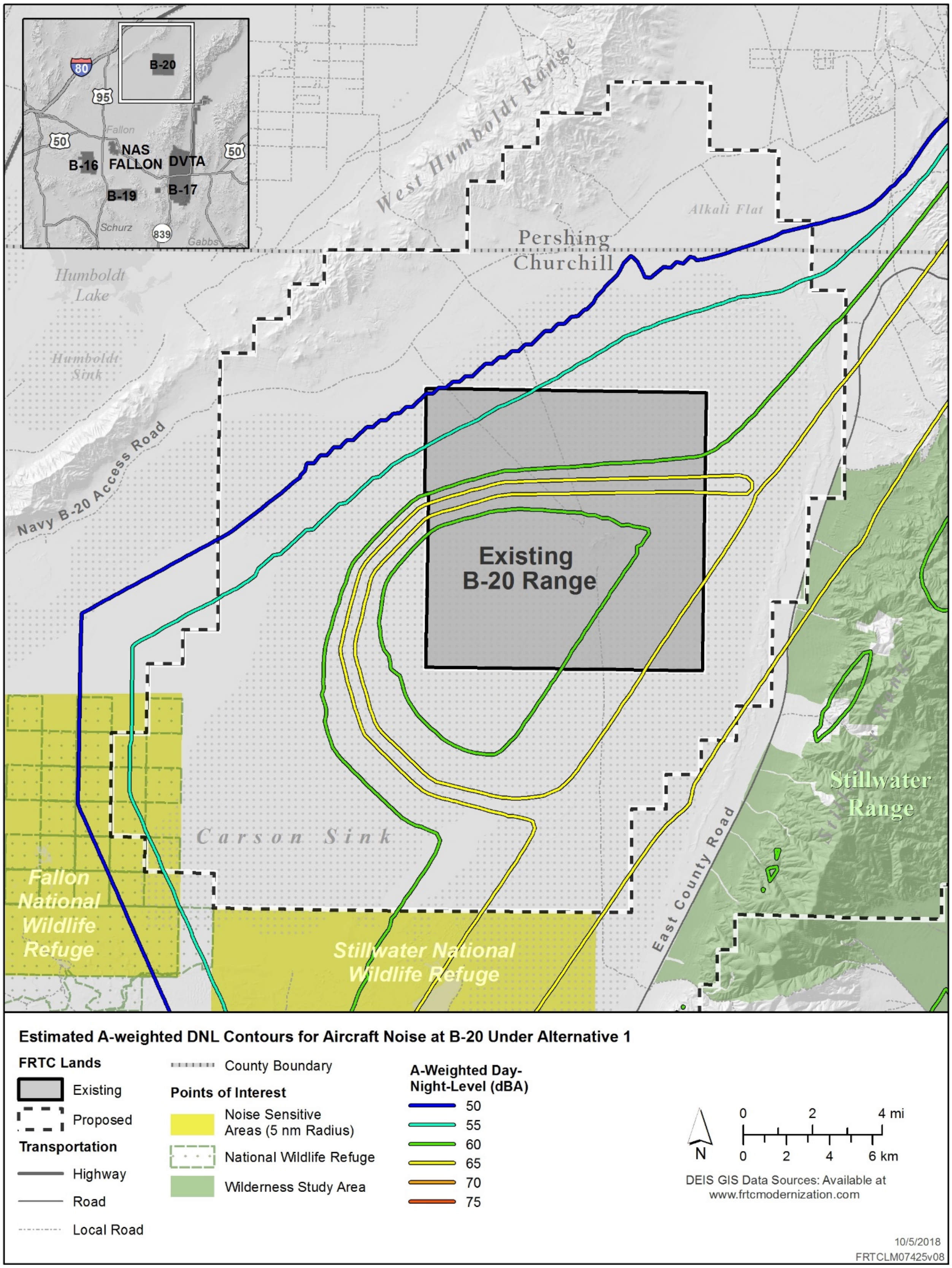

Figure 3.7-27: Estimated A-weighted DNL Contours for Aircraft Noise at B-20 Under Alternative 1

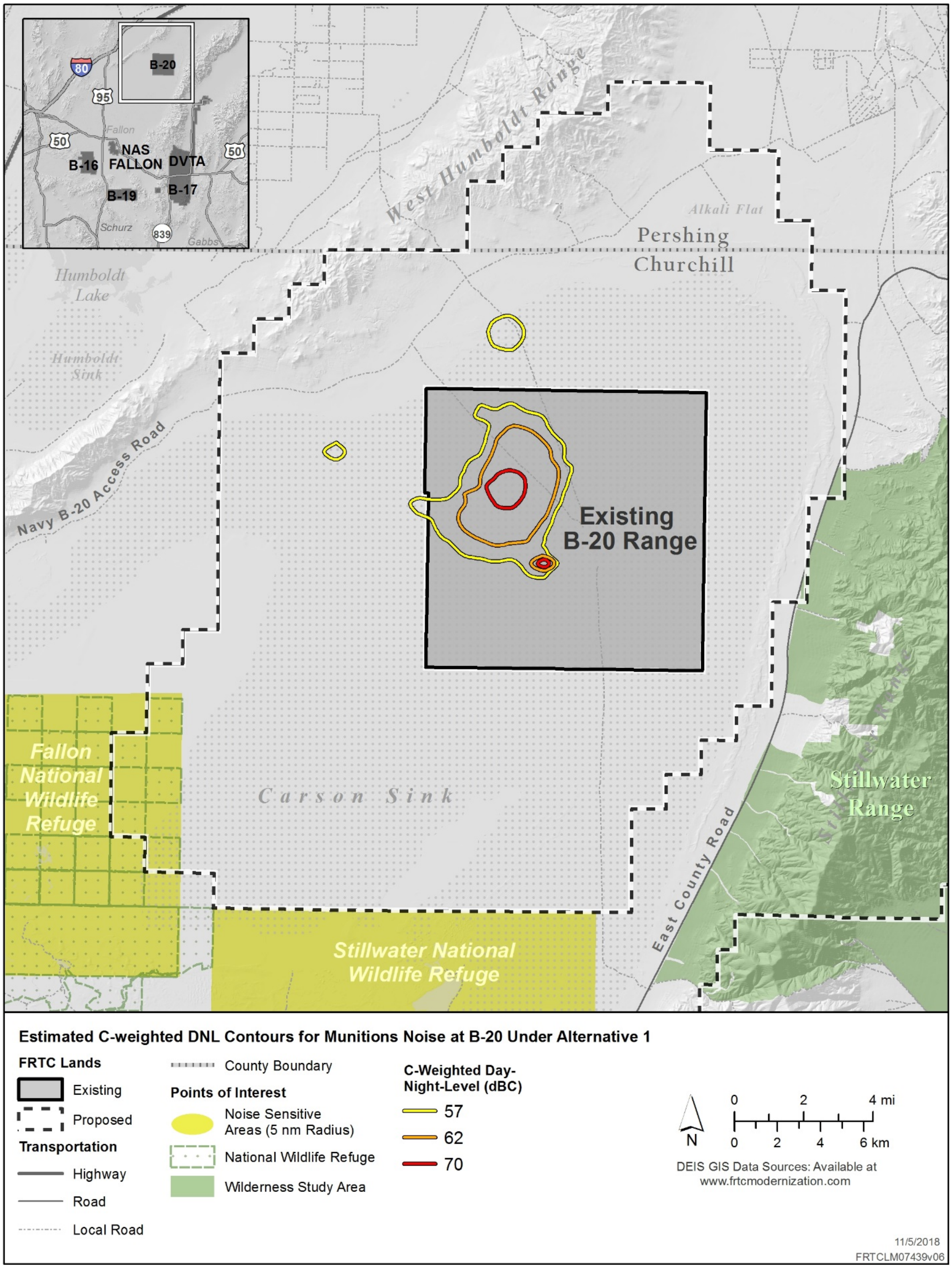

Figure 3.7-28: Estimated C-weighted DNL Contours for Munitions Noise at B-20 Under Alternative 1

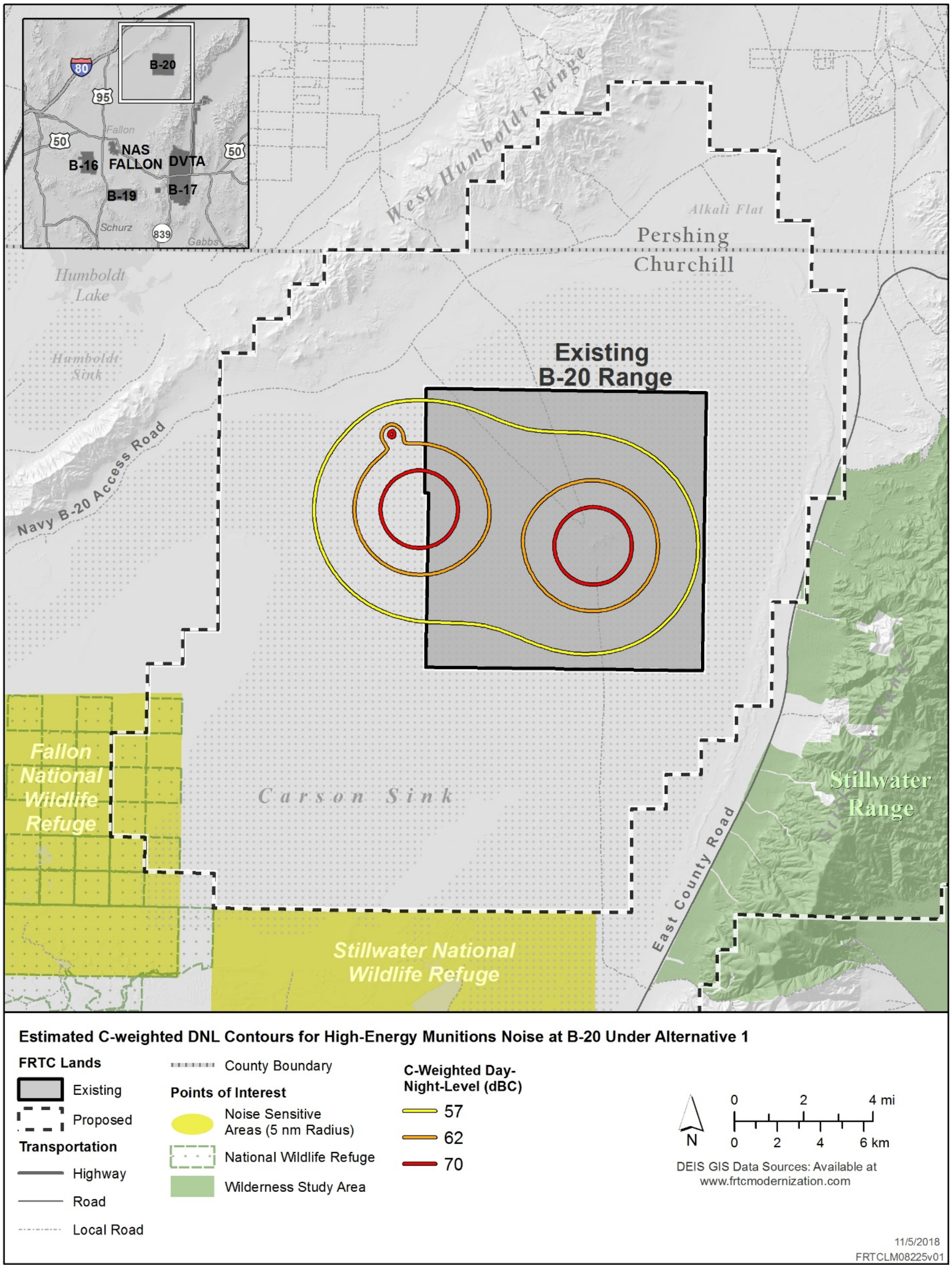

Figure 3.7-29: Estimated C-weighted DNL Contours for High-Energy Munitions Noise at B-20 Under Alternative 1

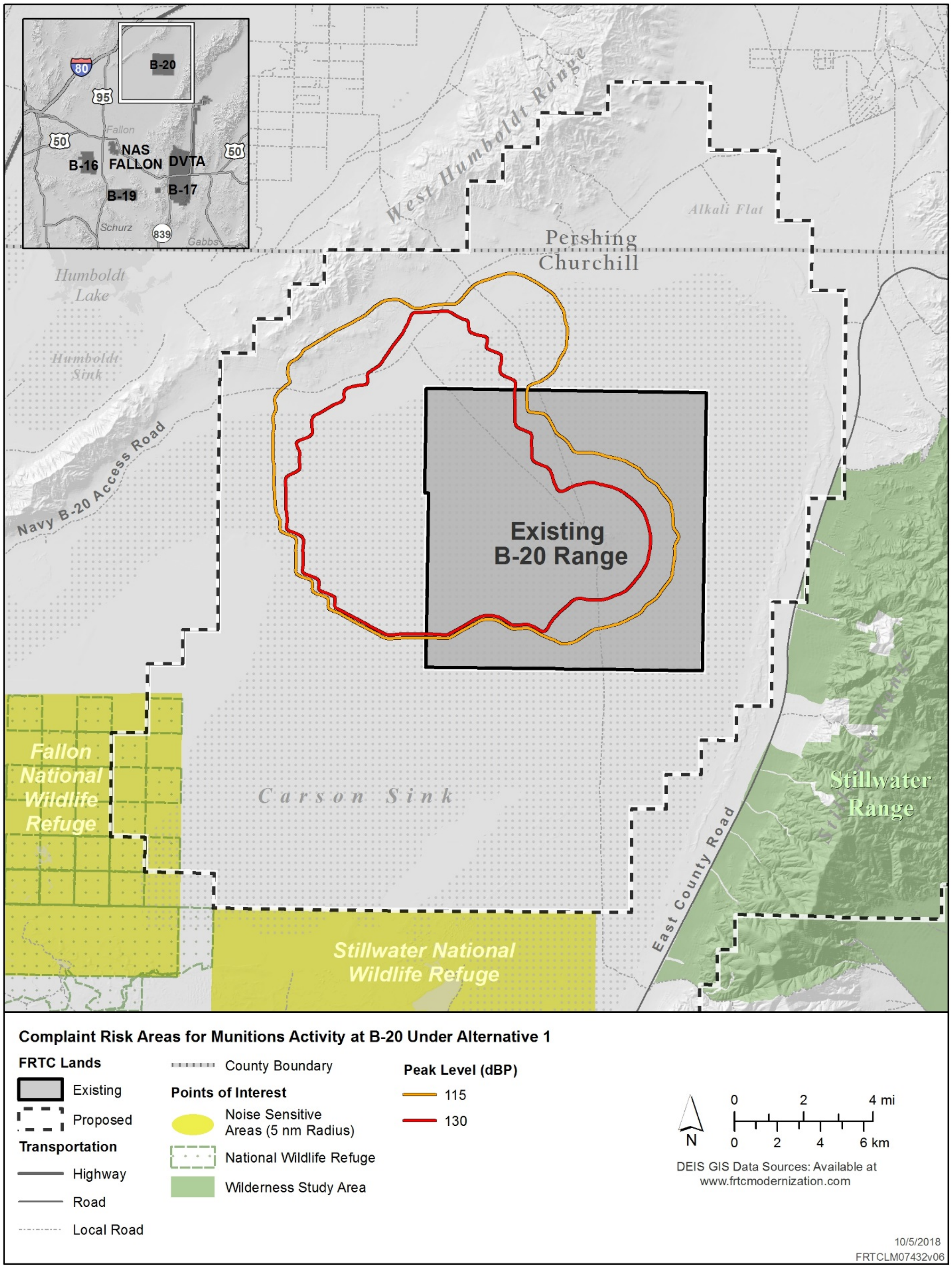

Figure 3.7-30: Complaint Risk Areas for Munitions Activity at B-20 Under Alternative 1

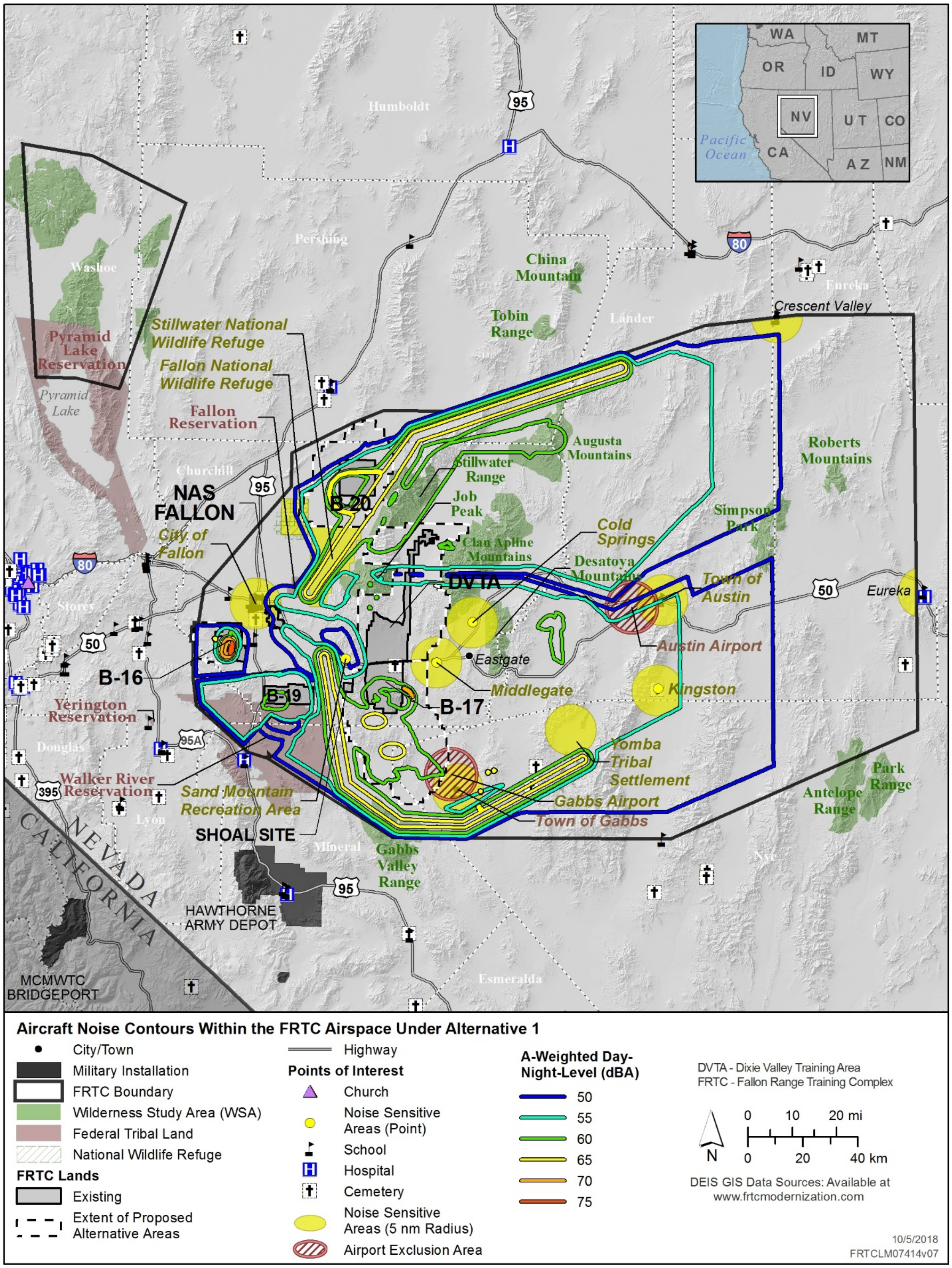

Figure 3.7-31: Aircraft Noise Contours Within the FRTC Airspace Under Alternative 1

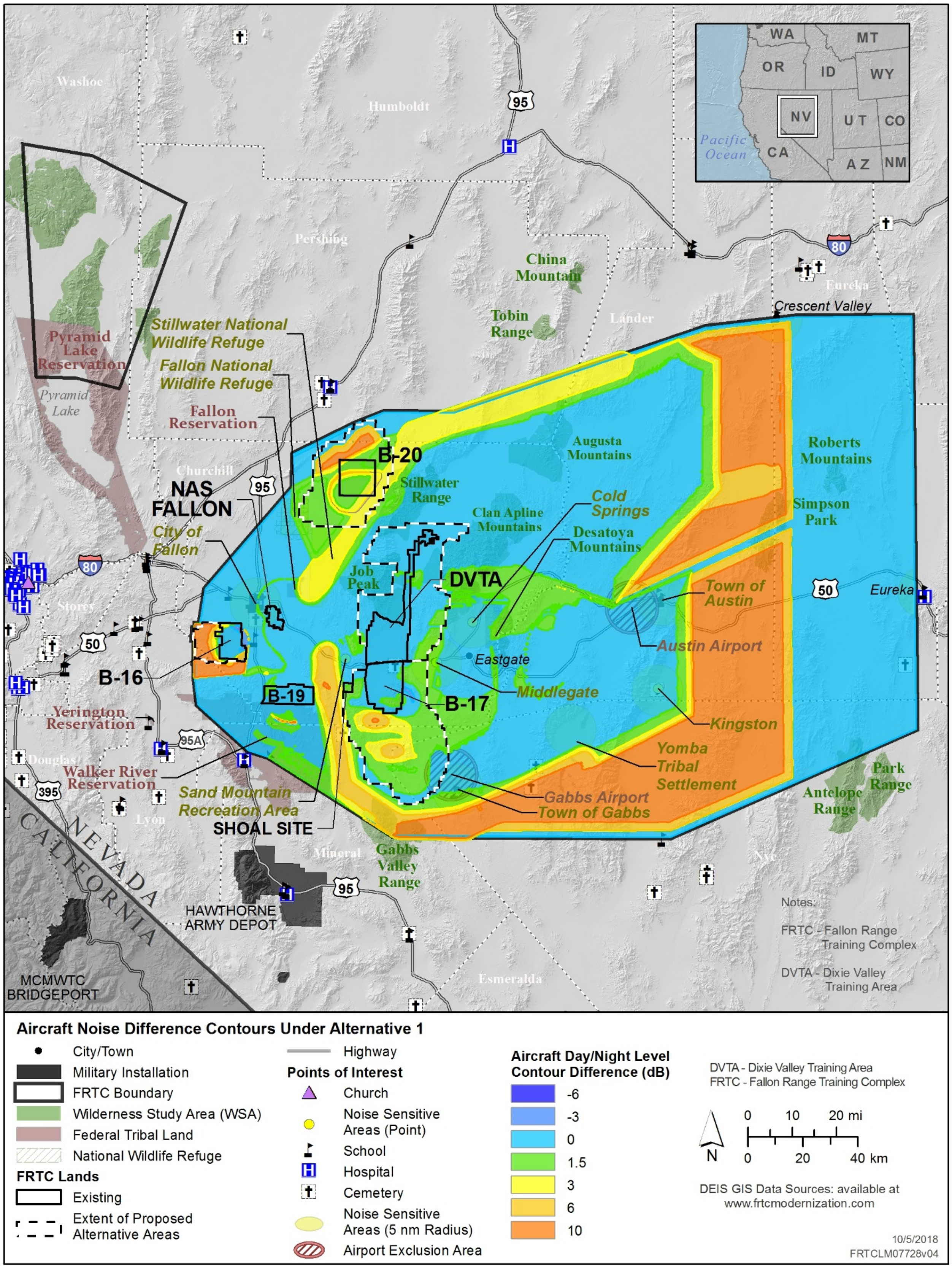

Figure 3.7-32: Aircraft Noise Difference Contours Under Alternative 1

The last region where noise increases significantly is in the eastern portion of the FRTC SUA, on lands under the newly proposed MOAs (Zircon, Ruby, Diamond, Duckwater, and Smokie). Under the environmental baseline, military activities do not contribute much to the DNL, and these areas are typically quiet. Under Alternative 1, aircraft overflights would occur in these new MOAs, and DNLs would increase 10 – 20 dBA. While the noise contours themselves do not exceed 65 dBA, a change in DNL of 10-20 dBA would be considered a significant change in the noise environment. As a noise abatement measure, the Navy proposes to create avoidance areas over towns underneath the eastern SUA (Crescent Valley and Eureka) and implement elevation restrictions (no lower than 3,000 feet above ground level) to reduce the overall noise in these areas and decrease the difference between the environmental baseline and Alternative 1.

As presented in Section 2.3.2.5 (Special Use Airspace Modifications), the supersonic areas would be extended to the east. Supersonic operating area A (above 30,000 feet MSL) would extend into the Duckwater Air Traffic Control Assigned Airspaces and supersonic operating area B (11,000–30,000 feet MSL) would be extended to the east horizontally, into the Zircon and Ruby MOA/Air Traffic Control Assigned Airspaces (though in the Ruby MOA/Air Traffic Control Assigned Airspace the ceiling is proposed to be 28,000 feet MSL). The Reno MOA would also be modified to support supersonic activities above 30,000 feet MSL.

Under Alternative 1, supersonic activities would occur throughout the expanded SOAs. Given the wider area of use, it is expected that areas in the east and south would experience more sonic booms than current levels. Similarly, with redistribution of activities throughout the expanded SOAs, a greater area within the FRTC airspace would experience direct overflights of a supersonic aircraft. However, the sonic boom analysis indicates that, the C-weighted DNL would be very similar to that reported under the environmental baseline (Figure 3.7-33). It is important to note that DNL noise metric is used to reflect a person's cumulative exposure to sound over a 24-hour period rather than exposure to a single instance The redistribution of supersonic events over a wider area results in either no change, or a reduction in the C-weighted DNL contours (Figure 3.7-33). Communities in Gabbs, Yomba, Austin, and Crescent Valley would experience an increase in the C-weighted DNL, which indicates that enough sonic booms could be heard in these areas to change the 24-hour period noise level (DNL). However, this would be an increase of not more than 4 dBC DNL. As described in Section 3.7.2.2.2 (Impulse Noise), the Navy uses the C-weighted DNL to determine where activities could impact human activities, with C-weighted DNLs below 62 dBC generally considered compatible with most land uses. Other regions may experience slightly higher changes in the C-weighted DNL, but are removed from population centers (although they are in locations where recreational activities could occur) and are also below the 62 dBC threshold. While supersonic activities would occur in the Reno MOA, there would not be enough supersonic activities to generate DNL contours above 57 dBC DNL, nor would there be a notable change in the C-weighted DNL presented in Table 3.7-7.

Under Alternative 1, supersonic activities would be redistributed throughout the expanded SOAs and larger area within the FRTC airspace would experience direct overflights of a supersonic aircraft. While a greater area may be subject to sonic booms with the expansion of the SOAs, there is no proposed increase in the number of supersonic activities, therefore the chance of experiencing a sonic boom in any one location would actually be lower than under current conditions. Under Alternative 1, sonic booms would be heard in a greater area anywhere within and adjacent to the expanded SOAs under Alternative 1, based on direction of flight and atmospheric pressure. Figure 3.7-34 presents a comparison of existing supersonic flight tracks and associated sonic booms with flight tracks that could occur under Alternative 1.

As indicated above, the Navy proposes to create avoidance areas over towns underneath the eastern SUA (Crescent Valley and Eureka) and implement elevation restrictions (no lower than 3,000 feet above ground level) to reduce the overall noise in these areas and decrease the difference between the environmental baseline and Alternative 1.

While sonic booms could be heard within and adjacent to the expanded SOA, the C-weighted DNL would be very similar to that reported under the environmental baseline (Figure 3.7-33) and would not represent a significant degradation of the noise environment.

Table 3.7-7: Modeled C-Weighted Day-Night Levels (dBC) from Sonic Booms at selected Points of Interest Under Alternative 1, 2, and 3

Point of Interest		***C-Weighted Day Night Level (dBC)***		
ID	**Name**	**Baseline**	**Alternative 1, 2, and 3**	**Change from Environmental**
1	Fallon	<35	<35	NC
2	Lovelock/B-20	<35	<35	NC
3	Eureka	<35	<35	NC
4	Walker River Paiute Tribe	41.4	39.8	-1.6
5	Middlegate	50	49.8	-0.2
6	Gabbs	46.7	49.2	2.5
7	Yomba	44.9	48.7	3.8
8	Austin	40.9	43.4	2.5
9	Fallon National Wildlife Refuge/B-20	<35	<35	NC
10	Fallon/B-16	<35	<35	NC
11	Red Mountain/B-16	<35	<35	NC
12a	Upland Scrub Community	51.3	50.9	-0.4
12b	Upland Scrub Community	48.4	53.6	5.2
13	Stillwater National Wildlife Refuge	43.4	44.1	0.7
14	Unpopulated Mountainous Area	50.1	49.2	-0.9
15	Fairview Peak	49.6	49	-0.6
16	Unpopulated Mountainous Area #2	55	54.7	-0.3
17	Fallon Paiute Shoshone Tribe	<35	<35	NC
18	Schurz	38.2	37.2	-1
19	North DVTA	53.9	54.1	0.2
20	Crescent Valley	42.7	45.1	2.4
21	Reno MOA - Pyramid Lake	<35	<35	NC
22	Gerlach	<35	<35	NC
23	Kingston	45.9	46.5	0.6
24	Reese River	46.9	46.1	-0.8

Notes: dBC = C-weighted decibels, NC = No Change

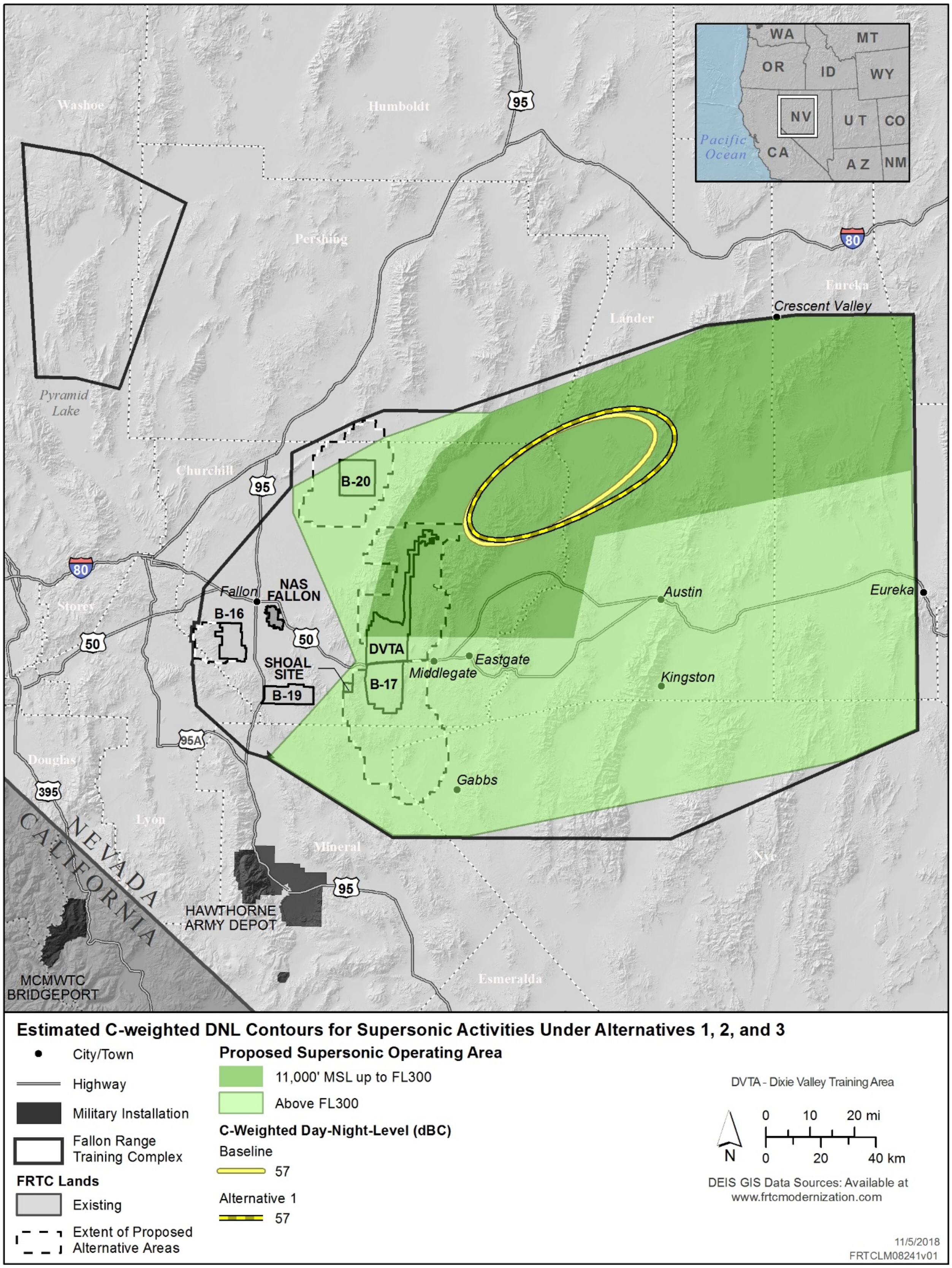

Figure 3.7-33: Estimated C-weighted DNL contours for Supersonic activities Under Alternatives 1, 2, and 3

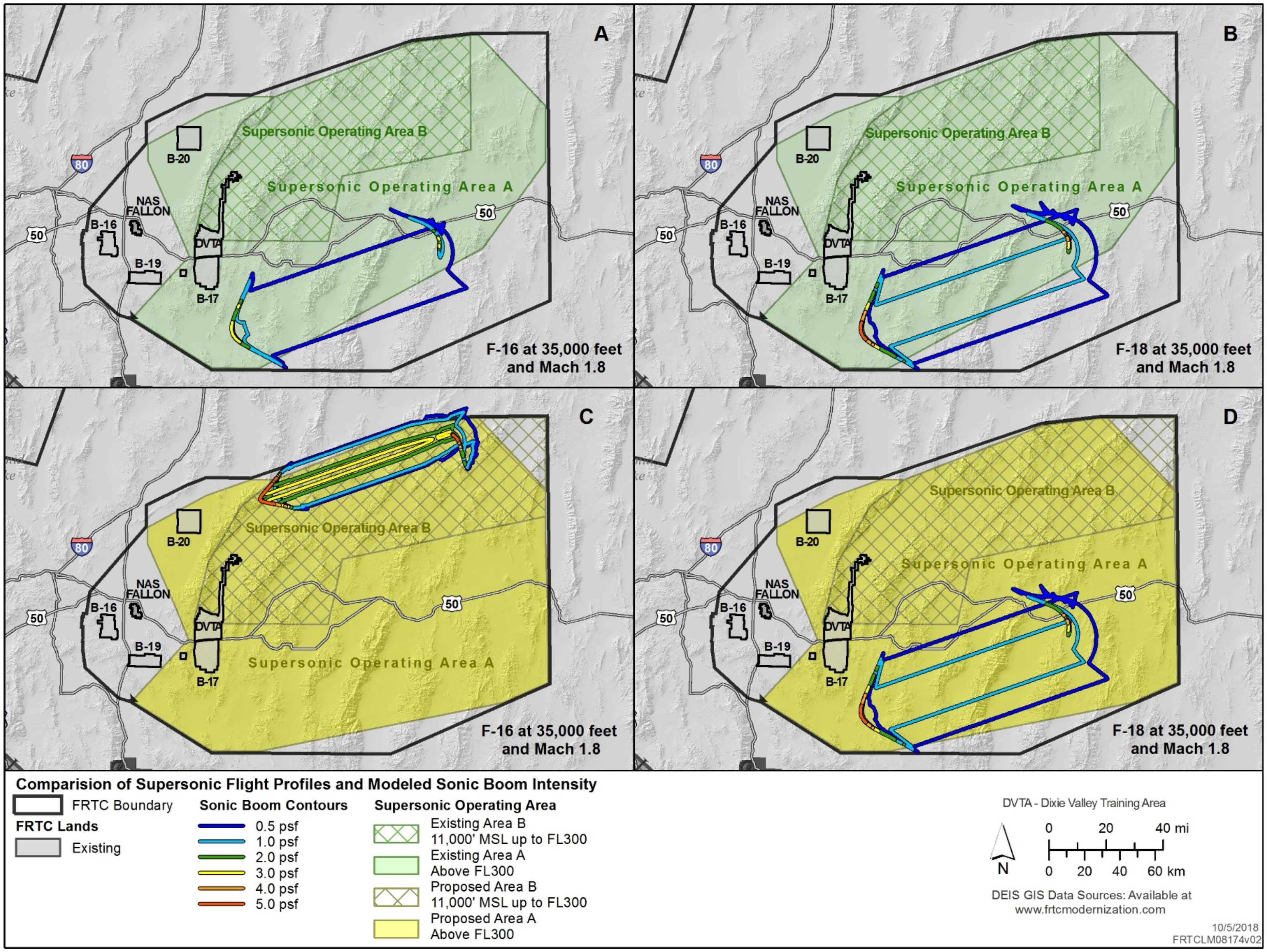

Figure 3.7-34: Comparison of Supersonic Flight Profiles and Modeled Sonic Boom Intensity

3.7.3.2.5 Supplemental Noise Analysis at Points of Interest

In addition to the DNL modeling for aviation activities and sonic boom activities, the Navy also modeled the maximum SEL from selected aircraft at 24 locations throughout the FRTC (Table 3.7-8).

To reiterate, SEL metric is a composite metric that represents both the intensity of a sound and its duration. Individual time-varying noise events (e.g., aircraft overflights) have two main characteristics: a sound level that changes throughout the event and a period of time during which the event is heard. The total sound energy from the entire event is then condensed into a one-second period, and the metric represents the total sound exposure received.

Table 3.7-8: Modeled Maximum A-Weighted Sound Exposure Levels (SEL dBA) from Selected Aircraft at Selected Points of Interest Under Alternative 1

Point of Interest		*A-Weighted Sound Exposure Level (SEL dBA)*					
ID	**Name**	**Baseline**			**Alternative 1**		
		F/A-18E/F	**F-35A**	**HH-60**	**F/A-18E/F**	**F-35A**	**HH-60**
1	Fallon	81	N/A	<35	81	76.8	<35
2	Lovelock/B-20	<35	N/A	<35	<35	<35	<35
3	Eureka	<35	N/A	<35	<35	<35	<35
4	Walker River Paiute Tribe	42.8	N/A	<35	46.5	41.9	<35
5	Middlegate	71.7	N/A	<35	71.7	79.8	<35
6	Gabbs	78.2	N/A	79.2	78.2	67.8	79.2
7	Yomba	51.3	N/A	<35	55	49.8	<35
8	Austin	66.8	N/A	<35	66.8	80.4	<35
9	Fallon National Wildlife Refuge/B-20	46.2	N/A	<35	49.9	44.7	<35
10	Fallon/B-16	79.9	N/A	64.6	79.9	76.5	64.6
11	Red Mountain/B-16	<35	N/A	<35	49.5	42.5	<35
12a	Upland Scrub Community	72.6	N/A	<35	72.6	81.2	<35
12b	Upland Scrub Community	81.4	N/A	<35	81.4	76.2	<35
13	Stillwater National Wildlife Refuge	50.6	N/A	<35	54.3	49.3	<35
14	Unpopulated Mountainous Area	99.5	N/A	<35	104.5	108.5	<35
15	Fairview Peak	94.7	N/A	40.1	94.7	98	37.7
16	Unpopulated Mountainous Area #2	79.8	N/A	<35	79.8	77.7	<35
17	Fallon Paiute Shoshone Tribe	83.5	N/A	<35	83.5	73.2	<35
18	Schurz	<35	N/A	<35	<35	<35	<35
19	North DVTA	70.3	N/A	75.5	70.3	83.6	75.5
20	Crescent Valley	<35	N/A	<35	<35	<35	<35
21	Reno MOA - Pyramid Lake	<35	N/A	N/A	<35	<35	N/A
22	Gerlach	42.2	N/A	N/A	42.2	<35	N/A
23	Kingston	58.9	N/A	<35	58.9	76.9	<35
24	Reese River	68.1	N/A	<35	68.1	76.2	<35

Notes: dBA = A-weighted decibels

3.7.3.2.6 Speech Interference

Compared to the environmental baseline, Alternative 1 would result in additional events at representative sensitive receptors during which conversations or indoor speech would be interrupted, though those activities would be intermittent. Notably, these locations include the town of Gabbs, which would experience an increase in aircraft overflights using the new targets at B-17, and sensitive receptors underneath the newly created MOAs in the eastern SUA. However, there are also several sensitive receptors at which no change would occur under any of the scenarios compared to the environmental baseline. Given the information presented in Table 3.7-6, Table 3.7-7, and Table 3.7-8, the number of events that could impact speech interference would not change appreciably from the environmental baseline.

3.7.3.2.7 Classroom/Learning Interference

The potential for classroom interference from single aircraft events generating sound levels inside classrooms greater than 50 dB L_{max} would increase under Alternative 1 by compared to the environmental baseline, though those activities would be intermittent. Notably, these locations include the town of Gabbs, which would experience an increase in aircraft overflights using the new targets at B-17, and sensitive receptors underneath the newly created MOAs in the eastern SUA. As explained under Special Use Airspace above, the 55-60 dBA extends to the east under Alternative 1, and schools east of the existing SUA would be expected to experience additional events of classroom/learning interference, with most being unchanged from the environmental baseline. However, many modern schools have central air conditioning and heating systems; therefore, it is more likely that classroom windows would remain closed the majority of the time, and classroom interference would be the same as under the environmental baseline.

3.7.3.2.8 Sleep Disturbance

Under Alternative 1, SELs remain the same for the majority of populated lands underneath the SUA, with the exception of the Yomba area. In these locations and during normal operating hours, sensitive receptors underneath the SUA could experience an increase in the percent probability of awakening during nights of average aircraft activity. These locations are removed from bombing ranges, and the only noise from training activities would be aircraft overflight noise. Additionally, the maximum SELs modeled for the Yomba area are less than 60 dBA. These SEL values are measured outside, and attenuation from structures would reduce this SEL level such that the SEL inside a building is much less than what is experienced outside.

3.7.3.2.9 Effects on Recreation

Under Alternative 1, the data a show a slight increase for some sensitive receptors where there would be additional daytime events during which a recreationist may experience outdoor speech interference. Again, this is most notable near the town of Gabbs and the eastern portions of the FRTC SUA (Figure 3.7-31). For many of the sensitive receptors and based on typically decreasing DNL levels, there is no change from the environmental baseline. The data show that there is a range of potential outdoor speech interference that may disturb individuals participating in outdoor recreational activities depending on the location of the sensitive receptor relative to the airfields and flight tracks.

3.7.3.2.10 Potential Hearing Loss

According to the EPA, changes in hearing level of less than 5 dB are generally not considered noticeable. The level at which there may be a noticeable NIPTS would be at the 84 to 85 dB DNL range and above.

The 80 dB DNL noise contour (i.e., potential at-risk population) that overlaps with sensitive receptors does not increase under Alternative 1.

3.7.3.2.11 Nonauditory Health Effects

Per studies noted, the data and research are inconclusive with respect to the linkage between potential nonauditory health effects of aircraft noise exposure. As outlined within the analysis of DNL contours and supplemental metrics presented within this section, the data show that Alternative 1 would result in both an increase in the number of people exposed to noise as well as those individuals exposed to higher levels of noise. However, research conducted to date has not made a definitive connection between intermittent military aircraft noise and nonauditory health effects. The results of most cited studies are inconclusive and cannot identify a causal link between aircraft noise exposure and the various type of nonauditory health effects that were studied. An individual's health is greatly influenced by many factors known to cause health issues, such as hereditary factors, medical history, and life style choices regarding smoking, diet, and exercise. Research has demonstrated that these factors have a larger and more direct effect on a person's health than aircraft noise. It is important to note that the highest levels of noise would be contained within expanded range boundaries which would be closed to the public. Areas getting occasional flyovers would be very different than a range getting a lot of noise in a short period of time. The occasional flyover is unlikely to cause health effects.

3.7.3.2.12 Vibration Effects

In addition to the noise effects on the population outlined above, structural vibration may result from certain aircraft operations. Depending on the aircraft operation, altitude, heading, power settings, and the structure, certain vibration effects may be observed. Typically, the structural elements that are most susceptible to vibration from aircraft noise are windows and sometimes walls or ceilings. Conservatively, only sounds lasting more than one second above a sound level of 130 dB are potentially damaging to structural components of a building. Noise-induced structural vibration may cause annoyance to dwelling occupants because of induced secondary vibrations, or "rattle," of objects within the dwelling, such as hanging pictures, dishes, plaques, and bric-a-brac. Loose window panes may also vibrate noticeably when exposed to high levels of airborne noise, causing homeowners to fear breakage. The data show that implementation of Alternative 1 would result in an increase in area/structures exposed to noise. However, as shown on Figure 3.7-21, Figure 3.7-25, and Figure 3.7-30, L_{max} values above 115 dBP are contained within range boundaries, and therefore sound levels damaging to structural components of buildings are not likely to occur.

3.7.3.2.13 Summary of Effects and Conclusions

Overall, Alternative 1 would have not have significant noise impacts in the areas surrounding the Bravo training ranges. With the exception of B-16, all DNL contours from aircraft overflights are contained within the range boundaries. At B-16, the area that the contours with DNLs in excess of 65 dBA reach off range are similar to the environmental baseline, and do not overlap any sensitive receptors. Under Alternative 1, there would be a slight increase in the number of incidents of indoor and outdoor speech interference, classroom interference, and a slightly higher probability of awakening, especially for sensitive receptors under the newly created MOAs. However, with intermittent aircraft operations coupled with the time most people spend indoors, it is very unlikely that individuals would experience noise exposure that would result in hearing loss. The population potentially at risk for potential hearing loss would not change under Alternative 1. Implementation of this action alternative would result in significant impacts on the noise environment.

3.7.3.3 Alternative 2: Modernization of Fallon Range Training Complex and Managed Access

The difference between Alternative 1 and Alternative 2 is that Alternative 2 would allow certain categories of users to access B-16, B-17, and B-20 when the ranges are not operational (i.e., typically weekends, holidays, and when closed for scheduled maintenance). Similar to Alternative 1, Alternative 2 would create a significant increase in the noise environment, particularly underneath the newly established MOAs in the eastern portion of the FRTC airspace.

3.7.3.3.1 Bravo-16

Alternative 2 would have the same impacts on noise levels at B-16 as Alternative 1. For B-16, the difference between Alternative 2 and Alternative 1 is that Alternative 2 would not allow the public to access B-16 for any purpose other than for racing events, land management activities, and traditional ceremonial site visits. Changes regarding public access would not change the proposed distribution of military training activities within and above B-16 from Alternative 1.

3.7.3.3.2 Bravo-17

Alternative 2 would have the same impacts on noise levels at B-17 as Alternative 1. For B-17, the difference between Alternative 2 and Alternative 1 is that Alternative 2 would not allow the public to access B-17 for any purpose other than for hunting, racing events, land management activities, and traditional ceremonial site visits. Changes regarding public access would not change the proposed distribution of military training activities within and above B-17 from Alternative 1.

3.7.3.3.3 Bravo-20

Alternative 2 would have the same impacts on noise levels at B-20 as Alternative 1. For B-20, the difference between Alternative 2 and Alternative 1 is that Alternative 2 would not allow the public to access B-20 for any purpose other than for traditional ceremonial site visits or land management activities. Changes regarding public access would not change the proposed distribution of military training activities within and above B-20 from Alternative 1.

3.7.3.3.4 Dixie Valley Training Area

Alternative 2 would have the same impacts on noise levels as Alternative 1. Changes regarding public access would not change the proposed distribution of military training activities within the DVTA from Alternative 1.

3.7.3.3.5 Fallon Range Training Complex Special Use Airspace

Alternative 2 would have the same impacts on noise levels as Alternative 1. Changes regarding public access would not change the proposed distribution of military training activities within the FRTC Special Use Airspace from Alternative 1.

3.7.3.3.6 Summary of Effects and Conclusions

Implementation of this action alternative would result in significant impacts on the noise environment and impacts would be the same as Alternative 1.

3.7.3.4 Alternative 3: Bravo-17 Shift and Managed Access (Preferred Alternative)

Alternative 3 is similar to Alternative 1 and Alternative 2, but B-17 would be moved further southeast and tilted. This alternative would have the same access restrictions and Controlled Access Program as Alternative 2. As presented in the sections below, Alternative 3 would create a significant increase in the noise environment, particularly underneath the newly established MOAs in the eastern portion of the FRTC airspace.

3.7.3.4.1 Bravo-16

Alternative 3 would have the same impacts on noise levels as Alternative 1. For B-16, the difference between Alternative 3 and Alternative 1 is that Alternative 3 would not allow the public to access B-16 for any purpose other than for racing events, land management activities, and traditional ceremonial site visits. Changes regarding public access would not change the proposed distribution of military training activities within and above B-16 from Alternative 1. There are no reconfigurations of the B-16 range proposed under Alternative 3.

3.7.3.4.2 Bravo-17

Under Alternative 3, B-17 would be shifted to the south and east and tilted (rather than the north-south orientation under Alternatives 1 and 2). Additionally, instead of the numerous target areas proposed under Alternative 1, all targets and convoy routes (moving targets) would be situated in three large target areas, and existing targets on B-17 would continue to be used.

Aircraft Noise

Figure 3.7-35 shows the DNL levels from aircraft activities for B-17 under Alternative 3. Under Alternative 3, the 60 dBA DNL contour covers the entire range, similar to the environmental baseline. With the exception of approximately 810 acres along the eastern portion of the proposed B-17 range, and within this area, only approximately 235 acres would have DNLs greater than 65 dBA (Noise Zone II).

Munitions Noise

Under Alternative 3, the DNL contours from large arms explosions would not extend past the proposed expanded B-17 range boundary (Figure 3.7-36). A small portion of the 115 dB peak noise contour from air gunnery operations extends past the western portion of the proposed expanded B-17 boundaries (Figure 3.7-38).

Road Construction and Infrastructure In Support of Alternative 3

With the expansion of B-17, approximately 12 miles of State Route 361 would no longer be available for public use. Under Alternative 3, one of two notional relocation corridors would potentially be developed to an asphalt surface. The Navy would fund construction of a new road corridor outside of the requested withdrawal area. The State Route 361 replacement road would be constructed by mechanically removing vegetation and grading native soils. The Navy anticipates that typical road construction equipment would be used during the route replacement, and that noise from such equipment would temporarily exist in the region of construction. However, prior to implementation of this alternative, site-specific NEPA would be performed on this action, which would include a noise analysis for the relocation of the state route.

Alternative 3 would also potentially include relocation of the Paiute Pipeline that runs through the southern area of the proposed B-17 expansion area. Similar equipment would likely be used to relocate the pipeline as is used in the potential relocation of State Route 361. Given typical propagation of noise away from a point source, the loudest equipment used during the pipeline replacement would be audible only in the immediate vicinity of construction activities. However, prior to implementation of this alternative, site-specific NEPA would be performed on this action, which would include a noise analysis for the relocation of the state route.

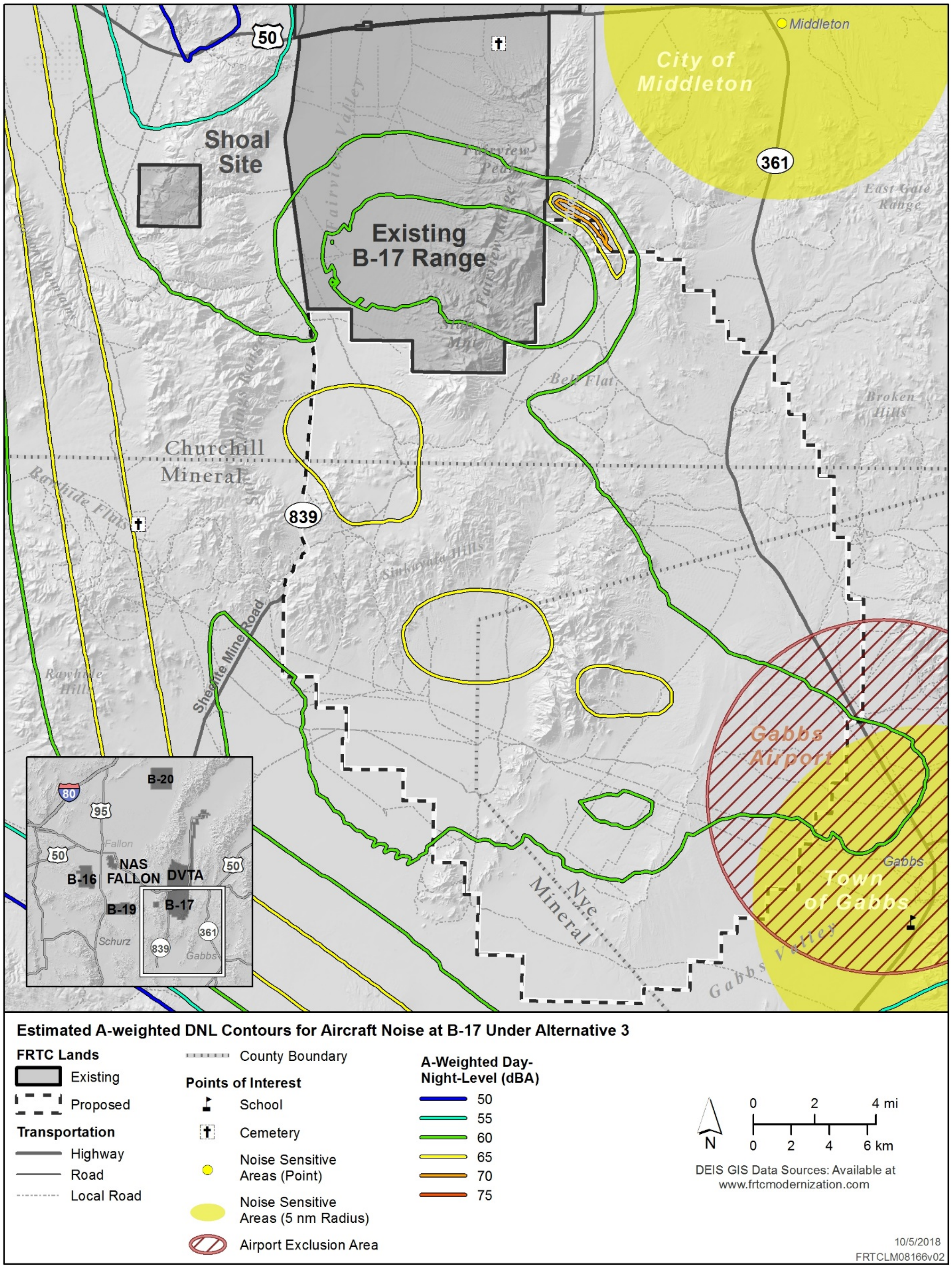

Figure 3.7-35: Estimated A-weighted DNL Contours for Aircraft Noise at B-17 Under Alternative 3

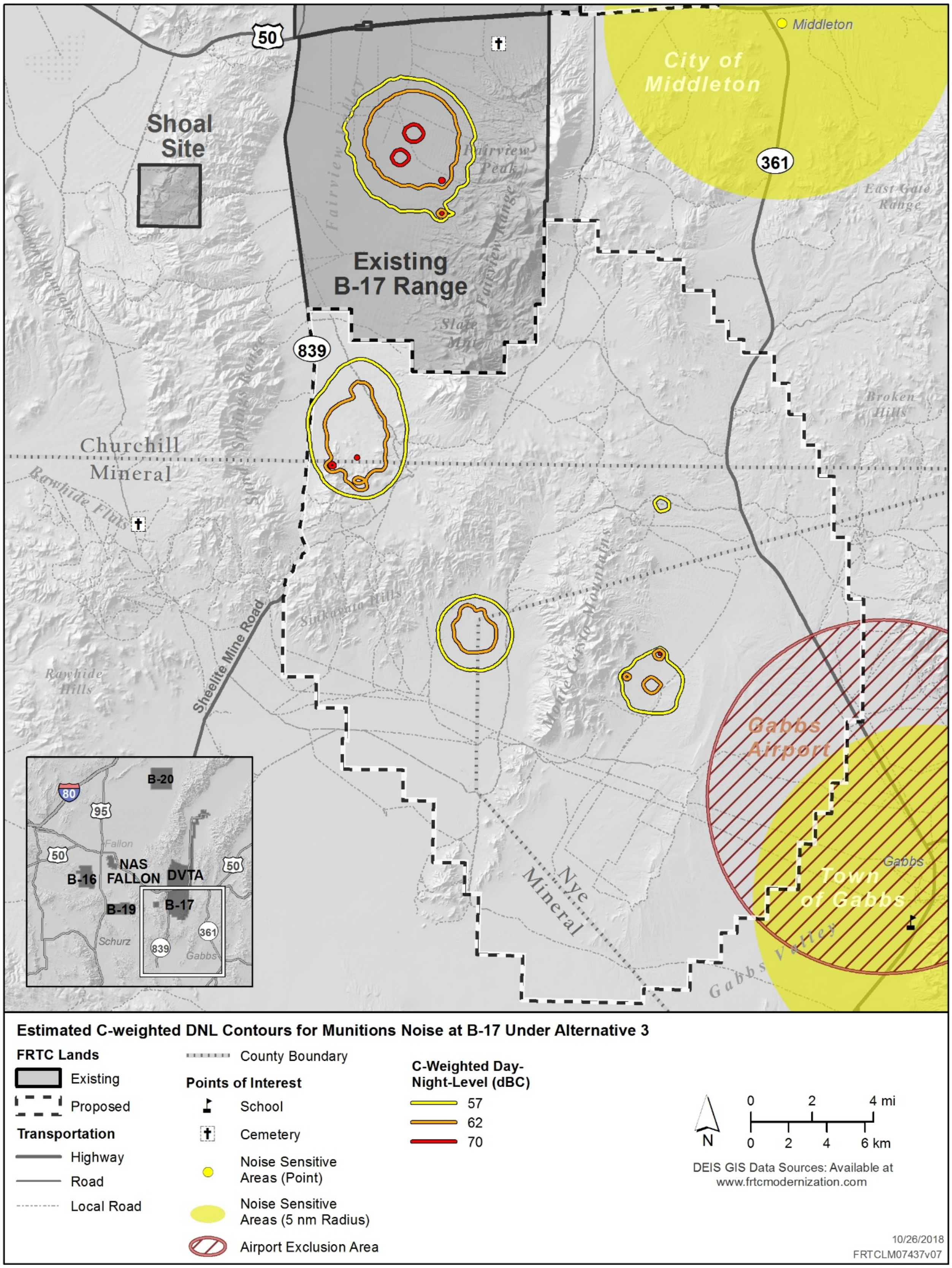

Figure 3.7-36: Estimated C-weighted DNL Contours for Munitions Noise at B-17 Under Alternative 3

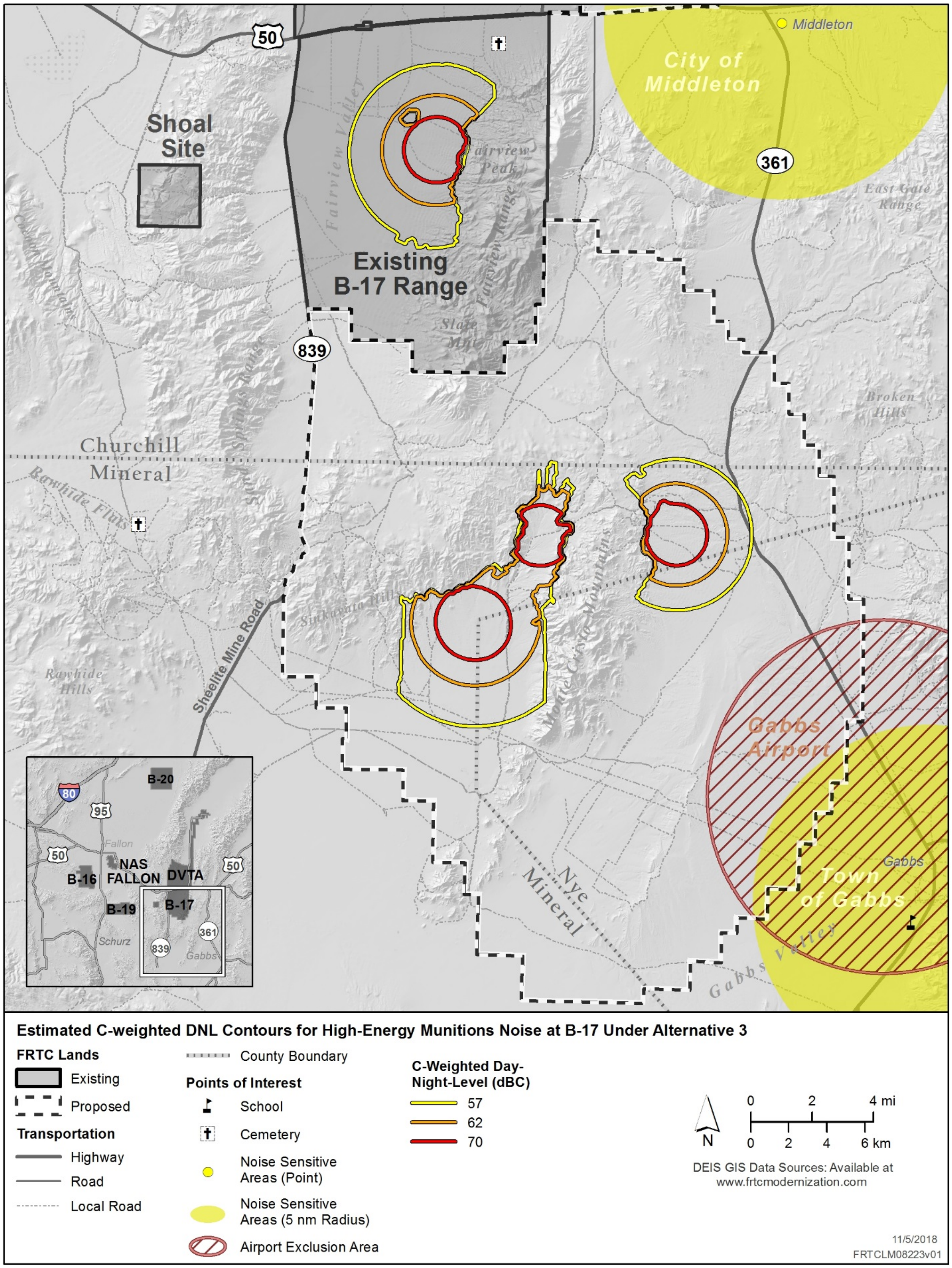

Figure 3.7-37: Estimated C-weighted DNL Contours for High-Energy Munitions Noise at B-17 Under Alternative 3

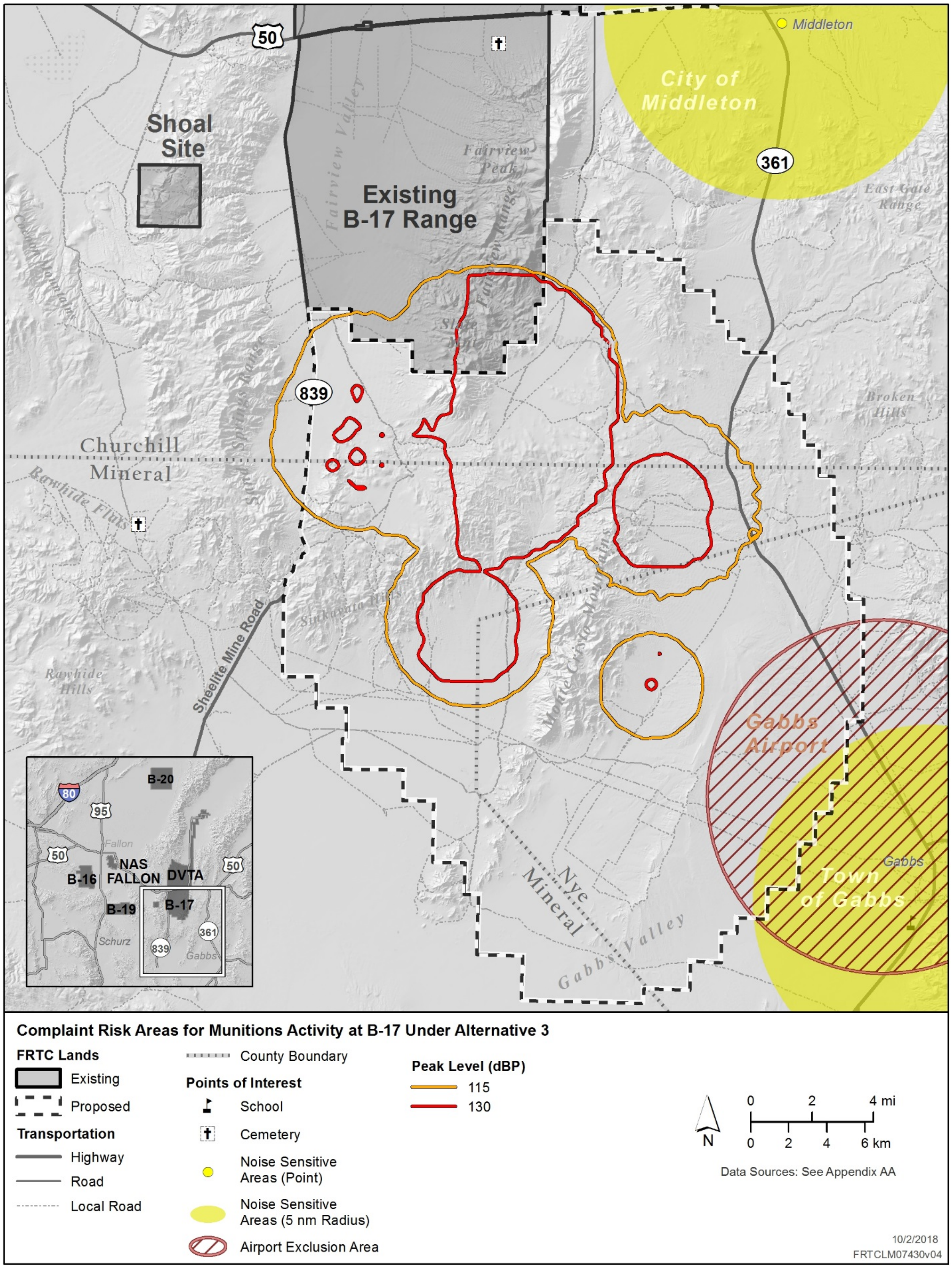

Figure 3.7-38: Complaint Risk Areas for Munitions Activity at B-17 Under Alternative 3

3.7.3.4.3 Bravo-20

Alternative 3 would have the same impacts on noise levels as Alternative 1. For B-20, the difference between Alternative 3 and Alternative 1 is that Alternative 3 would not allow the public to access B-20 for any purpose other than for racing events, land management activities, and traditional ceremonial site visits. Changes regarding public access would not change the proposed distribution of military training activities within and above B-20 from Alternative 1.

3.7.3.4.4 Dixie Valley Training Area

Changes regarding public access would not change the proposed distribution of military training activities within the DVTA from Alternative 1. Alternative 3 would have the same impacts on noise levels as Alternative 1.

3.7.3.4.5 Fallon Range Training Complex Special Use Airspace

Changes regarding public access would not change the proposed distribution of military training activities within the majority of FRTC Special Use Airspace from Alternative 1. With the shift and tilt of the B-17 range, approach routes into B-17 would also shift and tilt accordingly, though C-weighted DNL contours are not expected to extend past the range boundaries (Figure 3.7-39). Aircraft overflights would create discrete brief noise events that, while noticeable because they would exceed the ambient background sound level, would contribute very little to the DNL. DNL noise contours below 65 dBA from aircraft activities are compatible with land uses such as residences, transient lodging, and medical facilities. Therefore, no significant impacts on the sound environment would occur.

The DNL from Alternative 3 was overlaid on the DNL contour map for the environmental baseline. Alternative 3 would have similar impacts on noise levels as Alternative 1 (Figure 3.7-40, Table 3.7-9). In relation to the environmental baseline there are there are four regions where the DNLs increase significantly (a change in the DNL of 5 dB or more). These four areas include areas around B-16, B-17, and B-20 as well as on lands underneath the newly created MOAs in the eastern portion of the FRTC SUA. The expansion of the B-16 to the west results in an increase in DNL contours over the requested withdrawal lands. With the slight shift in activities to the west, the contours over the existing B-16 decrease. This change in DNL occurs at the B-17 and B-20 ranges as well, with DNLs increasing over new target areas, and slight decreases over existing target areas, as activities shift and redistribute to utilize the new targets. For these three ranges, even though the DNLs increase in comparison with the environmental baseline, DNL noise contours exceeding 65 dBA are contained within the proposed range boundaries.

The last region where noise increases significantly is in the eastern portion of the FRTC SUA, on lands under the newly proposed MOAs (Zircon, Ruby, Diamond, Duckwater, and Smokie). Under the environmental baseline, military activities do not contribute much to the DNL, and these areas are typically quiet. Under Alternative 3, aircraft overflights would occur in these new MOAs, and DNLs would increase 10–20 dBA, which is noted for Crescent Valley in Table 3.7-9. While the noise contours themselves do not exceed 65 dBA, a change in DNL of 10-20 dBA would be considered a significant change in the noise environment.

Similar to Alternative 1, supersonic areas would be extended to the east. Supersonic operating area A (above 30,000 feet MSL) would extend into the Zircon and Duckwater Air Traffic Control Assigned Airspaces and supersonic operating area B (11,000–30,000 feet MSL) would be extended to the east horizontally, into the Zircon and Ruby MOA/Air Traffic Control Assigned Airspaces. BooMap96 was used to calculate the 57 dBC through 85 dBC C-weighted DNL contours, in 5 dB increments, for Alternative 1, as well as C-weighted DNLs for specific points of interest, as indicated in Table 3.7-7.

The sonic boom analysis indicates that while the supersonic operating areas are expanded to the east, the redistribution of supersonic events over a wider area results in either no change, or a reduction in the C-weighted DNL. However, communities in Gabbs, Yomba, Austin, and Crescent Valley would experience an increase in the C-weighted DNL, though not more than 4 dBC.

Because sound radiates outward from its source, sonic booms could be heard outside the Supersonic Operating Area, based on direction of flight and atmospheric pressure. It should be noted that noise modeling indicates that while sonic booms could be heard outside (and under) SOA, the C-weighted DNL is very similar to that reported under the environmental baseline.

Table 3.7-9: Modeled Day-Night Levels (dBA) at Selected Points of Interest Under Alternative 3

Point of Interest		*Day Night Level (dBA)*		
ID	**Name**	**Alternative 3**	**Change from Environmental Baseline**	**Change from Alternative 1**
1	Fallon	<45	NC	NC
2	Lovelock/B-20	<45	NC	NC
3	Eureka	<45	NC	NC
4	Walker River Paiute Tribe	50.3	1.7	NC
5	Middlegate	58.5	1.7	NC
6	Gabbs	57.9	1.6	1.1
7	Yomba	57.4	1.7	NC
8	Austin	54.9	0.9	NC
9	Fallon National Wildlife Refuge/B-20	53.7	1.5	NC
10	Fallon/B-16	<45	NC	NC
11	Red Mountain/B-16	50.9	5.9	NC
12a	Upland Scrub Community A	58.5	1.5	NC
12b	Upland Scrub Community B	57.6	1	NC
13	Stillwater National Wildlife Refuge	66.7	3.9	NC
14	Unpopulated Mountainous Area A	61.8	0.4	-0.8
15	Fairview Peak	59.2	0.2	-0.3
16	Unpopulated Mountainous Area B	53.3	1.5	NC
17	Fallon Paiute Shoshone Tribe	47.4	0.6	NC
18	Schurz	<45	NC	NC
19	North DVTA	59.6	1.2	NC
20	Crescent Valley	<45	NC	NC
21	Reno MOA - Pyramid Lake	<45	NC	NC
22	Gerlach	46.9	1.5	NC
23	Kingston	57.1	1	NC
24	Reese River	59.2	1.2	NC

Notes: dBA = A-weighted decibels, NC = No Change

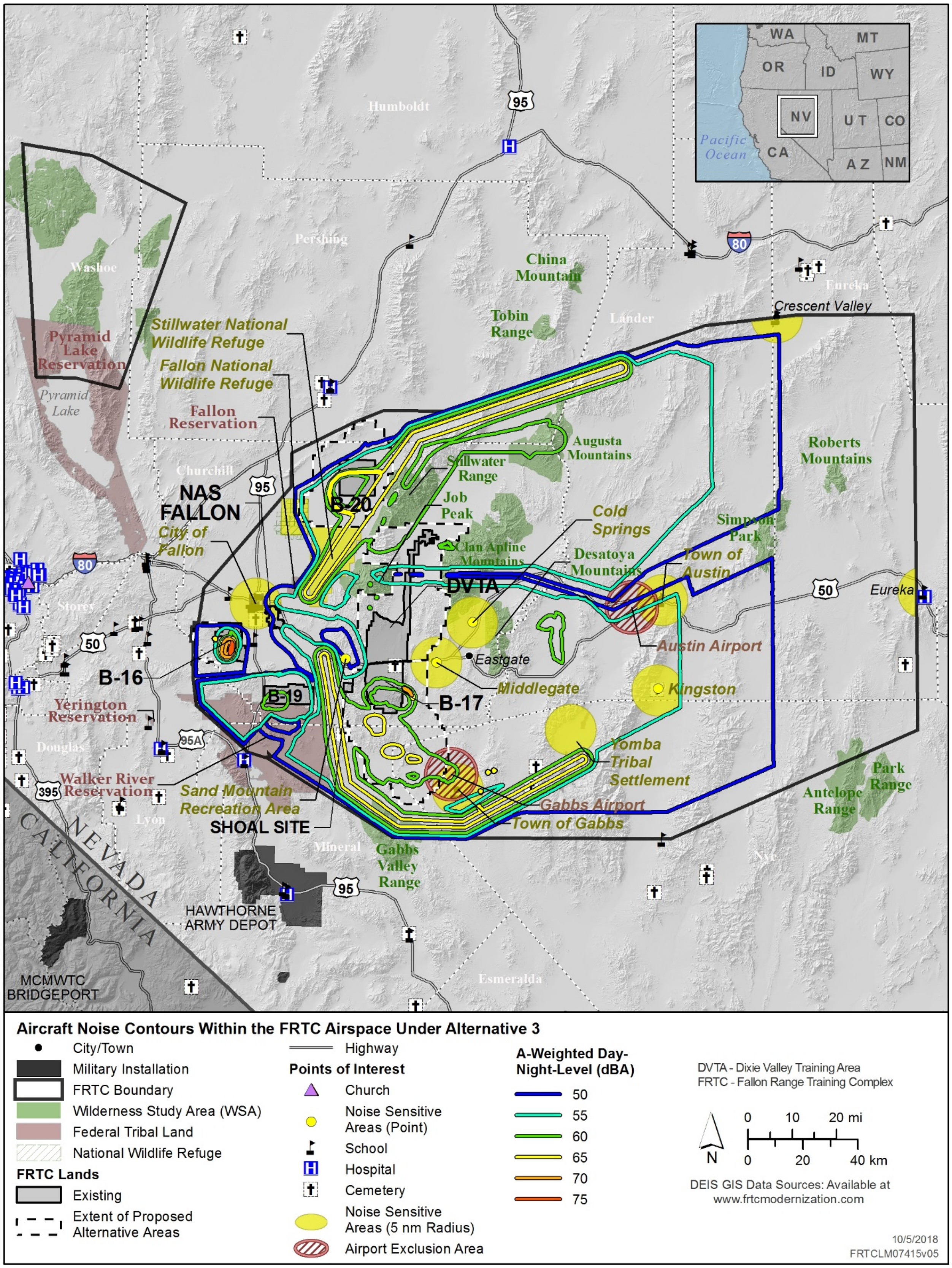

Figure 3.7-39: Aircraft Noise Contours Within the FRTC Airspace Under Alternative 3

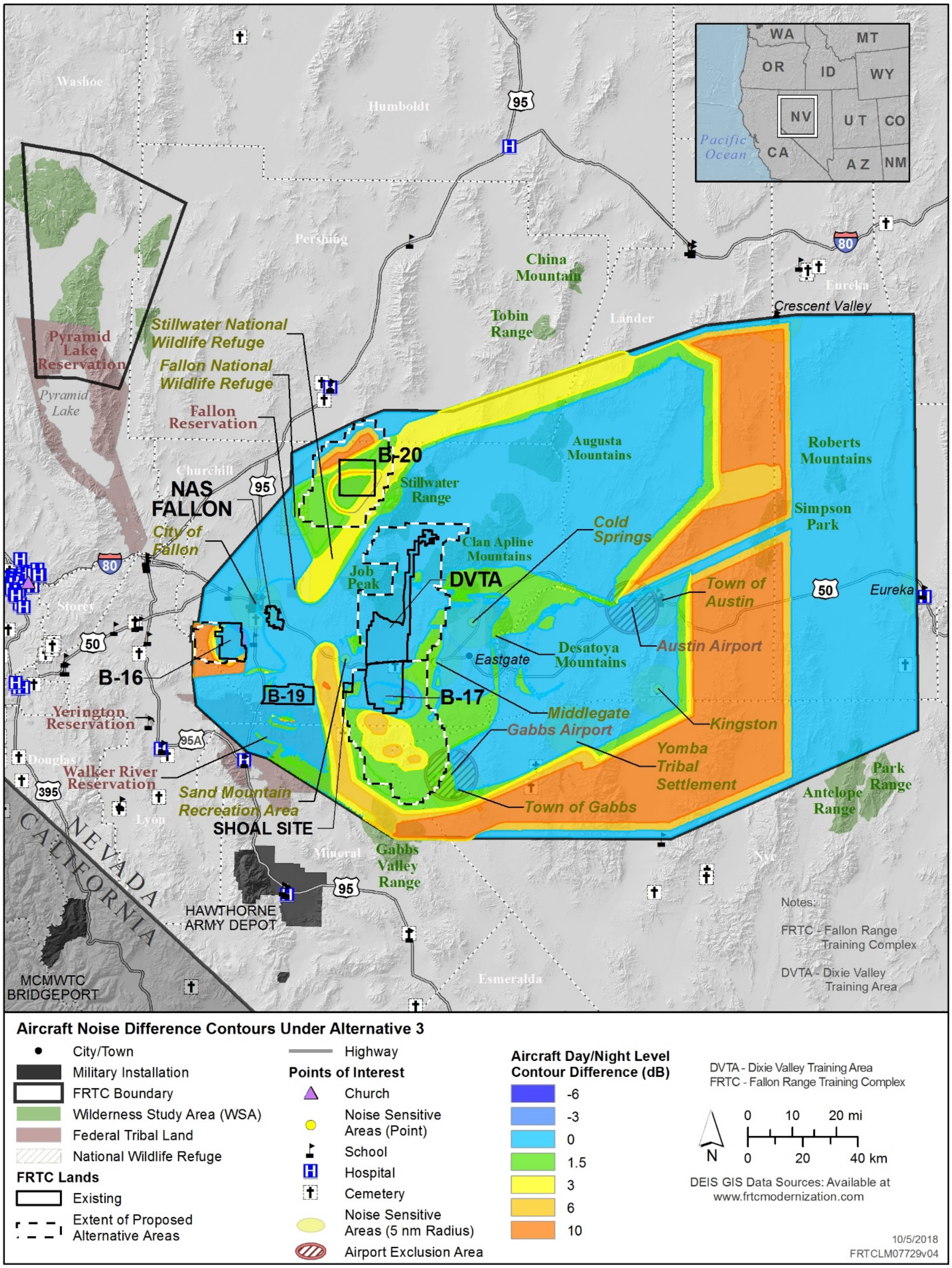

Figure 3.7-40: Aircraft Noise Difference Contours Under Alternative 3

3.7.3.4.6 Noise Modeling Location Data

Similar to Alternative 1, the SEL of selected aircraft were modeled for 24 locations throughout the FRTC. Under Alternative 3, there are no notable changes from SELs experienced in populated areas as presented in Table 3.7-10 with one exception. Modeled SELs of aircraft near Gabbs would increase approximately 20 dBA as aircraft approach targets on the expanded B-17 bombing range.

Table 3.7-10: Modeled A-Weighted Sound Exposure Levels (SEL dBA) from Selected Aircraft at Selected Points of Interest Under Alternative 3

Point of Interest		*A-Weighted Sound Exposure Level (SEL dBA)*					
ID	**Name**	**Alternative 1**			**Alternative 3**		
		F/A-18E/F	**F-35A**	**HH-60**	**F/A-18E/F**	**F-35A**	**HH-60**
1	Fallon	81	76.8	<35	81	76.8	<35
2	Lovelock/B-20	<35	<35	<35	<35	<35	<35
3	Eureka	<35	<35	<35	<35	<35	<35
4	Walker River Paiute Tribe	46.5	41.9	<35	42.8	38.2	<35
5	Middlegate	71.7	79.8	<35	71.7	79.8	<35
6	Gabbs	78.2	67.8	79.2	91.9	95.1	79.2
7	Yomba	55	49.8	<35	51.3	46.1	<35
8	Austin	66.8	80.4	<35	66.8	80.4	<35
9	Fallon National Wildlife Refuge/B-20	49.9	44.7	<35	46.2	41	<35
10	Fallon/B-16	79.9	76.5	64.6	79.9	76.5	64.6
11	Red Mountain/B-16	49.5	42.5	<35	47.8	42.5	<35
12a	Upland Scrub Community A	72.6	81.2	<35	72.6	81.2	<35
12b	Upland Scrub Community B	81.4	76.2	<35	81.4	76.2	<35
13	Stillwater National Wildlife Refuge	54.3	49.3	<35	50.6	45.7	<35
14	Unpopulated Mountainous Area A	104.5	108.5	<35	104.5	108.5	<35
15	Fairview Peak	94.7	98	37.7	94.7	98	37.7
16	Unpopulated Mountainous Area B	79.8	77.7	<35	79.8	77.7	<35
17	Fallon Paiute Shoshone Tribe	83.5	73.2	<35	83.5	73.2	<35
18	Schurz	<35	<35	<35	<35	<35	<35
19	North DVTA	70.3	83.6	75.5	70.3	83.6	75.5
20	Crescent Valley	<35	<35	<35	<35	<35	<35
21	Reno MOA - Pyramid Lake	<35	<35	N/A	<35	<35	N/A
22	Gerlach	42.2	<35	N/A	42.2	<35	N/A
23	Kingston	58.9	76.9	<35	58.9	76.9	<35
24	Reese River	68.1	76.2	<35	68.1	76.2	<35

Notes: dBA = A-weighted decibels

3.7.3.4.7 Speech Interference

Alternative 3 would have similar interference impacts as listed for Alternative 1, with the exception of the region around B-17. With the shift of the range to the south, sensitive receptors nearer to the range boundary (including the town of Gabbs) would experience slightly louder noise from aircraft overflights and ordnance use at the new targets at B-17. Given the information presented in Table 3.7-9, Table 3.7-10, and Table 3.7-7, the number of events that could impact speech interference would not change appreciably from the environmental baseline or from Alternative 1, except for Gabbs where an increase in the number of events that could impact speech interference would increase.

3.7.3.4.8 Classroom/Learning Interference

The potential for classroom interference from single aircraft events generating sound levels inside classrooms greater than 50 dB L_{max} would be the same as Alternative 1 with the exception of town of Gabbs, which would experience an increase in aircraft overflights using the new targets at B-17. Schools near Gabbs would be expected to experience additional events of classroom/learning interference, with most being unchanged from the environmental baseline. However, many modern schools have central air conditioning and heating systems; therefore, it is more likely that classroom windows would remain closed the majority of the time, and classroom interference would be the same as under the environmental baseline.

3.7.3.4.9 Sleep Disturbance

Similar to Alternative 1, under Alternative 3, SELs remain the same for the majority of populated lands underneath the SUA, with the exception of the Gabbs area. These SEL values are measured outside, and attenuation from structures would reduce this SEL level such that the SEL inside a building is much less than what is experienced outside. However, in these locations and during normal operating hours, sensitive receptors underneath the SUA could experience an increase in the percent probability of awakening during nights of average aircraft activity. These locations are removed from bombing ranges, and the only noise from training activities would be aircraft overflight noise.

3.7.3.4.10 Effects on Recreation

Under Alternative 3, the data a show a slight increase for some sensitive receptors where there would be additional daytime events during which a recreationist may experience outdoor speech interference. Again, this is most notable near the town of Gabbs (Figure 3.7-31). For many of the sensitive receptors, there is no change from Alternative 1. The data show that there is a range of potential outdoor speech interference that may disturb individuals participating in outdoor recreational activities depending on the location of the sensitive receptor relative to the airfields and flight tracks.

3.7.3.4.11 Potential Hearing Loss

According to the EPA, changes in hearing level of less than 5 dB are generally not considered noticeable. The level at which there may be a noticeable NIPTS would be at the 84 to 85 dB DNL range and above. There is no increase in the population within the 80 dB DNL noise contour (i.e., potential at-risk population) that overlaps with sensitive receptors under Alternative 3.

3.7.3.4.12 Nonauditory Health Effects

Similar to Alternative 1, Alternative 3 would result in both an increase in the number of people exposed to noise as well as those individuals exposed to higher levels of noise. However, research conducted to date has not made a definitive connection between intermittent military aircraft noise and nonauditory health effects. The results of most cited studies are inconclusive and cannot identify a causal link between aircraft noise exposure and the various type of nonauditory health effects that were studied. An individual's health is greatly influenced by many factors known to cause health issues, such as hereditary factors, medical history, and life style choices regarding smoking, diet, and exercise. Research has demonstrated that these factors have a larger and more direct effect on a person's health than aircraft noise.

3.7.3.4.13 Vibration Effects

Similar to Alternative 1, Alternative 3 would result in an increase in the number of area/structures exposed to noise. However, as shown on Figure 3.7-21, Figure 3.7-25, and Figure 3.7-30, almost all peak values above 115 dBP are contained within range boundaries and therefore sound levels damaging to structural components of buildings are not likely to occur.

3.7.3.4.14 Summary of Effects and Conclusions

Overall, Alternative 3 would not have significant noise impacts in the areas surrounding the Bravo training ranges. With the exception of B-16, all DNL contours from aircraft overflights are contained within the range boundaries. At B-16, the area that the elevated DNLs reach off range are similar to the environmental baseline, and do not overlap any sensitive receptors. DNLs would however, increase significantly on lands under the eastern portion of the FRTC SUA. Under Alternative 3, there would be a slight increase in the number of incidents of indoor and outdoor speech interference, classroom interference, and a slightly higher probability of awakening, especially for sensitive receptors near Gabbs. However, with intermittent aircraft operations coupled with the time most people spend indoors, it is very unlikely that individuals would experience noise exposure that would result in hearing loss. The population potentially at risk for potential hearing loss would not change under Alternative 3.

Implementation of this action alternative would result in significant impacts on the noise environment.

3.7.3.5 Proposed Management Practices, Monitoring, and Mitigation

3.7.3.5.1 Proposed Management Practices

Existing policies and procedures would continue to be implemented to ensure proper use of the FRTC airspace and munitions release rules. The Air Operations Office logs noise complaints at NAS Fallon. The office records information about the time, location, and nature of the complaint; and initiates investigation of what airspace operations were occurring. If the caller requests, range personnel will follow up with a return phone call to explain the resolution of the complaint. No additional management practices are warranted for noise based on the analysis presented in Section 3.7.3 (Environmental Consequences).

3.7.3.5.2 Proposed Monitoring Measures

No monitoring measures are warranted for the noise environment based on the analysis presented in Section 3.7.3 (Environmental Consequences).

3.7.3.5.3 Proposed Mitigation

Based on the analysis presented in Section 3.7.3 (Environmental Consequences), it is recommended that the Navy revise their range operations manual to include additional noise abatement locations. Due to the extension of MOAs in the eastern portion of the FRTC SUA, the Navy proposes to implement a five nautical mile buffer around the towns of Crescent Valley and Eureka.

Additionally, the Navy is proposing to implement an airspace exclusion area over Gabbs airport. Though established for airspace separation, this will serve as an additional means to reduce low-level overflights near Gabbs.

3.7.3.6 Summary of Effects and Conclusions

Table 3.7-11 summarizes the effects of the alternatives on the noise environment.

Table 3.7-11: Summary of Effects for Noise

Summary of Effects and National Environmental Policy Act Determinations	
No Action Alternative	
Summary	• All training activities within FRTC that require ground ranges or restricted airspace would likely cease following the expiration of the land withdrawal in November 2021. • Some range activities that only require MOAs that are independent of the land withdrawal (e.g., non-firing air combat maneuvers, search and rescue, close air support) could still be performed.
Impact Conclusion	• Any reduction in activities as a result of the reevaluation of the FRTC and the NAS Fallon's mission would also reduce associated noise from those activities. There would be no significant noise increases from military training activities under the No Action Alternative.
Alternative 1	
Summary	• Would create new areas of noise exposure on lands under the eastern portion of the FRTC SUA. • DNL noise contours exceeding 65 dBA near bombing ranges are contained by expanded range boundaries. • Visual inspection of aerial maps of impacted areas (regions where the DNL contours are in excess of 65 dBA) reveals no sensitive receptors (e.g., residences, lodging, or medical facilities) or incompatibility with current land use. The noise from training activities at the FRTC would not interfere with normal activities in these areas.
Impact Conclusion	• Alternative 1 would result in significant impacts on the acoustic environment.
Alternative 2	
Summary	• Access rule changes would not impact noise exposure areas. • Noise contours would not change under Alternative 2, as compared to Alternative 1.
Impact Conclusion	Alternative 2 would result in significant impacts on the acoustic environment.
Alternative 3	
Summary	• Would be similar to Alternative 1 with the exception of noise contours around B-17. • Would create new areas of noise exposure on lands under the eastern portion of the FRTC SUA. • DNL noise contours exceeding 65 dBA near bombing ranges are contained by expanded range boundaries. • Visual inspection of aerial maps of impacted areas (regions where the DNL contours are in excess of 65 dBA) reveals no sensitive receptors (e.g., residences, lodging, or medical facilities) or incompatibility with current land use. In these areas, during busy months of training activities at the FRTC, noise would not interfere with normal activities associated with its use.
Impact Conclusion	Alternative 3 would result in significant impacts on the acoustic environment.

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