DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
2000 NAVY PENTAGON
WASHINGTON DC 20350-2000

OPNAVINST 3550.1B CH-1
N4
17 Oct 2023

OPNAV INSTRUCTION 3550.1B CHANGE TRANSMITTAL 1

From: Chief of Naval Operations

Subj: RANGE INSTALLATION COMPATIBLE USE ZONES PROGRAM

Encl: (1) Revised Page ii
(2) Revised Page A-2

1. Purpose. To transmit new pages ii and A-2, which corrects both an error and an omission.

2. Action. Removes pages ii and A-2 of the basic instruction and insert enclosures (1) and (2), respectively.

3. Records Management

a. Records created as a result of this instruction, regardless of format or media, must be maintained and dispositioned per the records disposition schedules located on the Department of the Navy (DON) Assistant for Administration, Directives and Records Management Division portal page at https://portal.secnav.navy.mil/orgs/DUSNM/DONAA/DRM/Records-and-Information-Management/Approved%20Record%20Schedules/Forms/AllItems.aspx.

b. For questions concerning the management of records related to this instruction or the records disposition schedules, please contact the local records manager or the OPNAV Records Management Program (DNS-16).

S. T. GOODFELLOW
Deputy Chief of Naval Operations
(Fleet Readiness and Logistics)
PTDO

Releasability and distribution:
This change transmittal is cleared for public release and is available electronically only via Department of the Navy Issuances website, https://www.secnav.navy.mil/doni/default.aspx.

OPNAVINST 3550.1B
22 Aug 2023

RANGE AIR INSTALLATIONS COMPATIBLE USE ZONES PROGRAM

DEPARTMENT OF THE NAVY
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From: Chief of Naval Operations

Subj: RANGE AIR INSTALLATIONS COMPATIBLE USE ZONES PROGRAM

Ref: (a) ASN (EI&E), Delegation of Authority to Manage Compatible Use Programs of 8 July 2021 (NOTAL)
(b) OPNAVINST 11010.36D
(c) 10 U.S.C.
(d) DoDI 5200.48, Controlled Unclassified Information, March 2020
(e) OPNAVINST 3770.2L
(f) OPNAVINST 5100.27B
(g) OPNAV-M 5090.1
(h) USDOT, Federal Highway Administration, Standard Land Use Coding Manual, March 1965 (NOTAL)
(i) E.O. 13327
(j) SECNAVINST 11011.47D
(k) OPNAVINST 11010.40A

1. Purpose. Per reference (a), this policy is established to provide procedures and guidelines for implementation of the Chief of Naval Operations' Range Air Installations Compatible Use Zones (RAICUZ) program.

2. Cancellation. OPNAVINST 3550.1A.

3. Background. The Navy's RAICUZ program is designed to protect public health, safety and welfare and to prevent incompatible land use encroachment from degrading the operational capabilities of air-to-ground operational ranges. This program is similar to the Air Installations Compatible Use Zones (AICUZ) program issued by reference (b). The RAICUZ program includes range safety and noise analyses and provides land use recommendations that will be compatible with Range Compatibility Zones (RCZ) and noise levels associated with the military range operations. Program implementation procedures are contained in chapters 1 through 7.

4. Policy. The RAICUZ program depends upon the air to-ground-range installation commander's efforts to collaborate with the nearby communities and other Federal, State and local agencies and Federally recognized Native American tribes to prevent incompatible land use adjacent to military training and testing range installations. The RAICUZ process involves four steps:

a. Develop and maintain updates to RAICUZ studies for each air-to-ground range installation to quantify RCZs and aircraft noise contours; consult with stakeholders to develop strategies for lands affected by potentia1 weapons or noise impacts, both on and off the range installation; prepare a compatible land use plan for the air-to-ground range installation and surrounding areas; and develop a strategy to promote compatible development on land within these areas.

b. Develop a near-term RAICUZ analysis to illustrate impacts of known future missions on RAICUZ implementation.

c. Implement the RAICUZ study for the air-to-ground range installation including coordination with Federal, State and local officials to maintain public awareness of RAICUZ.

d. Identify and program land acquisition in critical areas where actions to achieve compatibility within the RAICUZ through local land controls appears unlikely.

5. Scope and Applicability. This instruction applies to Navy operational ranges located within the confines of the United States, its territories, trusts and possessions that are air-to-ground range installations (excluding islands). RAICUZ studies or portions thereof, may be developed for U.S. activities on operational ranges in foreign countries, provided that such studies are (1) following international agreements with the foreign country where the RAICUZ study is to be performed; and (2) are completed in a manner that meets U.S. facility planning goals, based on the standards set forth in this instruction.

6. Execution. The Deputy Chief of Naval Operations, Fleet Readiness and Logistics (CNO N4) is responsible for RAICUZ policy, resourcing and oversight of the U.S. Navy RAICUZ program. Chapter 1 assigns Navy RAICUZ program roles and responsibilities.

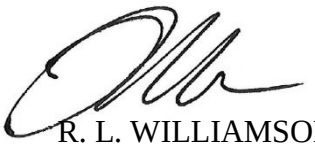
7. Records Management.

a. Records created as a result of this instruction, regardless of format or media, must be maintained and dispositioned per the records disposition schedules located on the Department of the Navy (DON) Assistant for Administration, Directives and Records Management Division portal page at https://portal.secnav.navy.mil/orgs/DUSNM/DONAA/DRM/Records-and-Information-Management/Approved%20Record%20Schedules/Forms/AllItems.aspx.

b. For questions concerning the management of records related to this instruction or the records disposition schedules, please contact the local records manager or the OPNAV Records Management Program (DNS-16).

8. Review and Effective Date. Per OPNAVINST 5215.17A, CNO N4 will review this information annually around the anniversary of its issuance date to ensure applicability, currency and consistency with Federal, Department of Defense, Secretary of the Navy and Navy policy

and statutory authority using OPNAV 5215/40 Review of Instruction. This instruction will be in effect for 10 years, unless revised or cancelled in the interim, and will be reissued by the 10-year anniversary date if it is still required, unless it meets one of the exceptions in OPNAVINST 5215.17A, paragraph 9. Otherwise, if the instruction is no longer required, it will be processed for cancellation as soon as the need for cancellation is known following the guidance in OPNAV Manual 5215.1 of May 2016.



R. L. WILLIAMSON
Deputy Chief of Naval Operations
(Fleet Readiness and Logistics)

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TABLE OF CONTENTS

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CHAPTER 1
RAICUZ PROGRAM RESPONSIBILITIES

1. On behalf of the Chief of Naval Operations, CNO N4 will:

a. Provide policy, resources, structures and mechanisms to meet readiness requirements of Navy operating forces and their associated shore installations, including range installations;

b. Plan and program resources for all Navy RAICUZ studies, RAICUZ updates, the Weapon Danger Zone (WDZ) Tool and WDZ Tool program manpower;

c. Provide oversight to ensure the RAICUZ program adequately addresses encroachment, readiness sustainment and compatibility concerns and is coordinated with Navy environmental planning and compliance programs; and

d. Coordinate with Director, Innovation, Technology Requirements and Test and Evaluation (CNO N94) and other Deputy Chiefs of Naval Operations, Secretary of the Navy (SECNAV), Office of the Secretary of Defense and other Service headquarters with respect to environmental and encroachment issues associated with range air installations to include the RAICUZ program.

2. CNO N94, as the resource sponsor for major range and test facility base-aligned test and evaluation ranges and fleet training ranges (FTR), will review RAICUZ policy to ensure compatibility with fleet training and test and evaluation requirements.

3. Commander, Navy Installations Command (CNIC), as the RAICUZ program executive agent, will:

a. Establish and execute the U.S. Navy RAICUZ program requirements and responsibilities for all Navy range air installations;

b. Fund RAICUZ studies, technical reviews and noise studies (subject to available resources);

c. Develop an Integrated Priority List (IPL) for RAICUZ studies, technical reviews, noise studies and updates in conjunction with mission component commands and Commander, Naval Facilities Engineering Systems Command (COMNAVFACSYSCOM), as required;

d. Coordinate the RAICUZ IPL with the AICUZ IPL for consideration, where applicable and within available resources, concurrently develop RAICUZ and AICUZ studies and updates;

e. Approve final RAICUZ studies and RAICUZ footprint changes;

f. Ensure range air installation planning proposals are consistent with RAICUZ-recommended land uses, RCZs and noise contours, prior to approval:

g. Provide an annual RAICUZ program review brief to CNO N4 on the status of RAICUZ documents and funding execution, with a summary of completed RAICUZ study recommendations;

h. Provide CNO N4 with electronic copies of final RAICUZ studies for situational awareness; and

i. Promote a RAICUZ education program for the Navy and other cognizant Department of Defense (DoD) and non-DoD individuals, in coordination with COMNAVFACSYSCOM.

4. COMNAVFACSYSCOM will:

a. Integrate the Navy RAICUZ planning process into installation development plans (IDP) and other land and facilities planning documents;

b. Provide technical direction and planning support for the reduction of noise emanating from aircraft flight and weapons firing on Navy range installations;

c. Ensure that program tools are available; and

d. Establish subject matter experts to coordinate Navy RAICUZ issues with regional commanders, mission component commands and installations within their area of responsibility.

5. Navy regions will:

a. Provide implementation guidance, priorities and recommendations in RAICUZ studies submitted under their cognizance;

b. Coordinate with mission component commands who establish operational requirements;

c. Ensure that ranges within their area of responsibility have current RAICUZ studies; and

d. Ensure that any approved operational changes to their range are included within the RAICUZ study and local range operating instructions.

6. Commander, United States Fleet Forces Command (COMUSFLTFORCOM), which is responsible for programming resources for FTRs under its cognizance, will:

a. Serve as the mission component command for FTRs under its cognizance;

b. Develop and approve all operational requirements for COMUSFLTFORCOM FTRs;

c. Provide subordinate commanders assistance in identifying future training requirements that may require additional range operational and training resources;

d. Review and approve all new WDZs for COMUSFLTFORCOM FTRs;

e. Approve weapon safety analysis studies for COMUSFLTFORCOM FTRs, which will directly feed RAICUZ studies and possible follow-on National Environmental Policy Act (NEPA) documentation (if required);

f. Review and endorse all applicable Navy RAICUZ studies for COMUSFLTFORCOM FTRs;

g. Serve as the executive agent for the Navy's WDZ Tool Program; and will:

(1) In partnership with the other signatories of the Multi-Service Range Managers Tool Kit (RMTK) WDZ Tool Memorandum of Agreement, fund the Navy's portion of the Multi-Service WDZ Tool Program, to include the Navy's WDZ Program Manager, the development and sustainability of the WDZ Tool and any other applicable RMTK program tools and associated user training and technical support;

(2) In coordination with other Navy Range mission component commands, publish guidance on Navy WDZ Tool Program procedures and provide expertise, support and management of the Navy WDZ Tool Program; and

(3) Approve all waiver requests for alternative modeling methodologies and WDZs and develop guidance for alternative WDZ modeling methodologies for the Navy.

7. Commander, United States Pacific Fleet (COMPACFLT), which is responsible for programming resources for FTRs under its cognizance, will:

a. Serve as the mission component command for FTRs under its cognizance;

b. Develop and approve all operational requirements for COMPACFLT FTRs;

c. Provide subordinate commanders assistance in identifying future training requirements that may require additional range operational and training resources;

d. Review and endorse all new WDZs for COMPACFLT FTRs;

e. Approve weapon safety analysis studies for COMPACFLT FTRs, which will directly feed RAICUZ studies and possible follow-on NEPA documentation (if required); and

f. Review and endorse all applicable Navy RAICUZ studies for COMPACFLT FTRs.

8. Commander, Naval Air Systems Command (COMNAVAIRSYSCOM) will:

a. Develop and approve all operational requirements for COMNAVAIRSYSCOM ranges;

b. Review and endorse all applicable Navy RAICUZ studies for COMNAVAIRSYSCOM ranges;

c. Approve weapon safety analysis studies for COMNAVAIRSYSCOM range air installations, which will directly feed RAICUZ studies and possible follow-on NEPA documentation, if required; and

d. Program for the acquisition of data needed to model WDZs for new, modified and upgraded weapons; coordinating with the fleet commanders and the Navy's WDZ Program Manager to clarify data requirements.

9. The Naval Aviation Warfighting Development Center (NAVAVNWARDEVCEN), Fallon, NV, will:

a. Develop and approve all Strike Warfare tactics, techniques and procedures employed on Navy ranges; and

b. Develop and approve all operational requirements for the Fallon Range Training Complex.

10. Range control and range safety officials must determine the appropriate positioning of range structures, personnel and troops conducting training and testing on range air installations.

CHAPTER 2
RAICUZ PROGRAM OBJECTIVES, REQUIREMENTS AND APPROACH

1. RAICUZ Program and Objectives. The objective of the RAICUZ program is to achieve compatibility between air-to-ground operational ranges (henceforth, referred to as "air-to-ground range installations," "air-to-ground ranges," or "ranges") and existing and proposed land use and airspace in the vicinity of the air-to-ground range installation by meeting the primary objectives:

a. Minimizing public exposure to hazards and noise associated with air-to-ground ranges;

b. Protecting Navy investment by safeguarding the current and potential operational capabilities of those air-to-ground ranges;

c. Promoting compatible land use near air-to-ground ranges;

d. Informing the public about the RAICUZ program and seeking cooperative efforts to minimize potential safety and noise impacts in the vicinity of the air-to-ground ranges; and

e. Establishing working relationships between the air-to-ground range installation and appropriate local, regional and State community councils, commissions, Native American tribes and planning and zoning departments to mutually communicate proposed actions that could affect public health, safety and welfare, as well as operational and training capabilities and compatible land use recommendations, within the RAICUZ footprint.

2. Requirements.

a. Each Navy air-to-ground range will have a RAICUZ study including a detailed analysis of current and future range utilization, special use airspace (SUA), range compatibility use zones, aircraft noise, ordnance noise and land use compatibility. For air-to-ground ranges without a RAICUZ study, a Technical Review must be conducted.

b. The Technical Review is the first step to conducting a RAICUZ study and includes the conduct or review of weapons safety analysis, or both, and laser safety analysis to develop RCZs (Chapter 3); noise analysis, including the modeling of aircraft and ordnance-firing related noise, to generate noise contours (Chapter 4); and subsequent development of the RAICUZ footprint, as well as noise-reduction strategies for impacted lands, both on and off the range. Technical reviews are not intended for public release, as they typically contain sensitive operational data and consideration should be taken to apply appropriate security markings.

c. For air-to-ground ranges with a RAICUZ Study, on a triennial basis, the Region Community Planning and Liaison Officer or Community Planning and Liaison Officer (CPLO), along with range managers and a COMNAVFACSYSCOM RAICUZ subject matter expert, will validate the RAICUZ Study. The validation will include a letter for the record, endorsed by the

installation or range commanding officer, to document any changes that may have occurred that would potentially affect the RAICUZ. These changes include the use of new or changed aircraft, weapons, tactics or special circumstances or training requirements. The letter should determine whether the current RAICUZ is still valid or if a Technical Review is required. No standardized letter is required, but a recommended template is available upon request from Naval Facilities Engineering Systems Command Headquarters.

3. Approach. Subparagraphs 3(a) through 3(i) provide the general approach and areas of consideration when conducting a Technical Review, initial RAICUZ study or RAICUZ study update.

a. Project Team Selection and Kick-Off. The Technical Review, RAICUZ study or RAICUZ study update can be prepared by the RAICUZ project manager, with assistance from a government subject matter expert or by a contractor.

b. Data Collection and Validation. For the Technical Review, appropriate range installation operational data need to be collected from historical records, as well as forecasts in support of readiness and capability requirements of the applicable mission component command. Historical data may be used as a foundation for determining potential and probable mission requirements, typically provided by current and potential range user components. The complete data package must be reviewed for accuracy, relevance and appropriateness, validated via the applicable operational chain of command and approved by the range installation's supported mission component command. Data gathered from certain systems (such as Data Collection and Scheduling Tool or Sierra Hotel Aviation Readiness Program) may be sensitive and determined to be defense critical infrastructure information, per reference (c) section 130e and should be appropriately marked and maintained per that designation. Additionally, per reference (d) and Navy regulation, all DoD controlled unclassified information must be marked and controlled until authorized for public release.

c. RAICUZ Study Development. Developing the RAICUZ study requires establishing RCZs and noise contours for the air-to-ground range installation by conducting a Technical Review. A RAICUZ study uses the RCZs and noise contours that are the products of the Technical Review to make land use recommendations that are compatible with air-to-ground range installation operations. RCZs are determined by conducting a weapon safety analysis; modeling all applicable WDZs using the collected and forecast operational data. In addition, the resultant WDZs are used to complete a risk analysis of any areas of critical concern. Excessive risk ratings for areas of critical concerns within modeled WDZs (on or off range) may require adjustments to operational data parameters or restrictions (weapons or targets or both, allowed) to help ensure safety. Should the WDZ footprint extend beyond the range boundary or excessive noise levels present an unacceptable potential impact to off-range sites, the RAICUZ study will require an analysis of alternatives to achieve land use compatibility. Alternatives must balance changes in potential weapons and noise impacts with effects on safety, operational capability, training and testing requirements. Upon completion of the Technical Review, the echelon 2 fleet

command or systems command (SYSCOM), as the range mission owner, will endorse a validation letter to document the results of the Technical Review. CNIC, as executive agent for the Navy's RAICUZ program, will approve whether an initial RAICUZ study or RAICUZ study update is warranted based upon the Technical Review results.

d. Airspace Considerations. SUA associated with air-to-ground ranges includes restricted areas for ordnance delivery and military operations areas for high-speed air combat maneuvering. In addition, low-level military training routes (MTR) and altitude reservations are sometimes established and used to provide ingress and egress to the training ranges. This airspace is critical to flight safety to ensure the proper degree of separation exists between non-participating aircraft and hazardous operations. To ensure that sufficient range and airspace capacity will be available to support existing and future mission requirements, an analysis of SUA may need to be conducted for each air-to-ground range-to-range complex per reference (e).

e. Laser Analysis. The use of lasers within the air-to-ground range, training and testing area and the associated Laser Safety Danger Zones (LSDZ) are determined through the range's laser certification process, in compliance with the Navy Laser Hazard Control Program, per reference (f).

f. Surrounding Land-Use Compatibility Analysis. In all cases, the RAICUZ land use recommendations must consider the allowed aircraft operating altitudes in the corresponding airspace and preclude uses or that would pose a safety hazard to aircraft operations. This includes conducting a review of: (1) current or planned uses near and around the range that could obscure pilot and range safety personnel vision; (2) direct, reflected and indirect lighting that could interfere with pilot vision; (3) activities that may cause electromagnetic interference (EMI) with aircraft navigation; (4) uses that may affect aircraft radar or low-level training capability, communication or weapons systems; and (5) uses that may attract birds and other wildlife.

g. NEPA. Potential changes in operational procedures or aircraft activity at the air-to-ground range may require preparation of a RAICUZ study or an update. These operational changes may constitute a major Federal action requiring the action proponent to prepare appropriate NEPA documentation per reference (g). Proposals for new ranges or use of new platforms, weapons or tactics that could result in a change to the environmental status quo (such as increases in off range noise, size or location of RCZs) require preparation of NEPA documentation prior to implementation.

h. RAICUZ Study Endorsement and Approval. The final RAICUZ study will be routed via the range installation operational chain of command for endorsements up to the applicable echelon 2 mission component command. It will also be reviewed and endorsed via the Navy Region supporting chain of command up to CNIC. Approval by CNIC, as executive agent for the Navy's RAICUZ program, and endorsement by the echelon 2 Fleet command or SYSCOM, as the range mission owner, are required prior to implementation.

i. Implementation. RAICUZ implementation must be a continuous effort at each air-to-ground range installation. Respective range installation commanders should support the personnel responsible for working toward achieving compatible land uses between the air-to-ground range and the surrounding area; this is the CPLO or other officials, as appropriate. The responsible personnel should consider available strategies including land use controls, compatible zoning, land acquisition in fee or restrictive easements, special use permits, encroachment partnering and withdrawal of public domain lands. As a means of accomplishing compatibility, local commands are encouraged to participate in partnering efforts with adjacent landowners, users, community councils, commissions and planning and zoning agencies. Range installation commanders have the primary responsibility to provide input to the local community on air-to-ground range installation activities that might impact them, such as from noise emanating from military aircraft and training or testing ordnance over and within the air-to-ground range. Successful implementation of a RAICUZ study involves coordination with Federal, State, regional and local agencies and federally recognized Native American tribes, as appropriate.

CHAPTER 3
RANGE COMPATIBILITY ZONES

1. General. A principal component of the RAICUZ study is a compatible land use plan specifically tailored for each air-to-ground range. For land use planning purposes, RCZs define areas based on a level of protection to public health, safety and welfare and to recommend compatible land uses to prevent encroachment from degrading the operational capability of the air-to-ground ranges. RCZs are not predictors of safety hazards but depict areas where mishaps are likely to occur, if they occur.

2. Development of RCZs. RCZs translate aviation safety and ordnance-delivery safety concerns into recommended compatible land use zones. RCZ size is not affected by the number of annual range operations, but is based upon the types of operations performed as outlined in current local range operations manuals or instructions. RCZs are used as the basis for designating types of compatible land use with the public's safety in mind both on and off the air-to-ground range. RCZ land use recommendations are more stringent than those for noise impacts because the possible consequences of incompatible development are more serious. For land use planning purposes, the RCZs are divided into three zones: RCZ-1, RCZ-2 and RCZ-3.

3. RCZ 1.

a. RCZ-1 is a composite footprint of the Surface Danger Zones (SDZ), WDZs and LSDZs. RCZ-1 defines the area of the greatest potential safety hazard and designates the minimum range surface area needed to contain all ordnance and lasers delivered at Navy ranges. RCZ-1 is the most restrictive of the three RCZs; there are no compatible land uses permitted within the RCZ-1 (see Appendix C).

b. SDZs and WDZs identify hazardous areas that result from the ground and surface firing or air-to-ground delivery of weapons and ordnance on operational ranges, respectively. LSDZs depict where laser radiation levels may exceed maximum permissible exposure levels, thereby requiring control during laser operations. For air-to-ground operational ranges where no ground firing of weapons or ordnance occurs, there would be no SDZ and the RCZ-1 would reflect a composite footprint of WDZs and LSDZs only.

c. SDZs identify the minimum area necessary for vertical and lateral containment of projectiles, fragments, debris and components resulting from the firing, launching or detonation of surface-based weapon systems, to include ammunition, explosives and demolition explosives. All SDZs are developed to ensure a containment factor of 1:1,000,000 (99.9999 percent). Munitions will not be fired or employed on a range outside of SDZs that have been developed and maintained for the air-to-ground range.

d. WDZs identify the minimum area necessary for lateral and vertical containment of projectiles, fragments, debris and components resulting from the firing, launching or detonation

of aviation-delivered ordnance. It reflects the minimum land and air requirement, to include terrain mitigation, needed to safely employ a given weapon. The WDZ accounts for inaccuracy, failures, ricochets, broaching and proposing of a specific weapon or munition type delivered by a specific aircraft type. The individual WDZ "footprint" is based on weapon characteristics, type of delivery being executed, platform (aircraft) delivering the ordnance, target and soil characteristics, terrain and Navy-approved level of containment for the applicable weapon type: 1:100,000 (99.999 percent) for strafing and 1:10,000 (99.99 percent) for all other aviation-delivered ordnance.

e. Laser use and the associated LSDZ will be determined through the range's laser certification process in compliance with the Navy Laser Hazard Control Program, per reference (f). LSDZs must be contained within the certified laser range area and never extend from the air-to-ground range.

f. If specific situations require the permanent establishment of the RCZ-1 outside the air-to-ground range boundary, efforts to either acquire the necessary property or negotiate a use agreement with the owner or agent controlling the land should be made and forwarded for approval to CNIC, as program executing agent, and relevant fleet command or SYSCOM, as range mission owner. When establishing new ranges, operations may not commence until the land has either been acquired or had use agreements put in place.

4. RCZ 2.

a. RCZ-2 defines the area of aircraft armed over-flight outside of the RCZ-1, typically along the entry and exit paths to and from the range installation, where an aircraft conducting air-to-ground ordnance training is in an armed condition.

b. RCZ-2 is less restrictive than RCZ-1 and supports compatible land use (see Appendix C). However, RCZ-2 still poses a level of potential safety concern and does come with recommended land use restrictions. Land uses that have the potential to attract congregations of people are not recommended with RCZ-2.

5. RCZ 3. RCZ-3 includes all portions of designated SUA, such as restricted airspace and military operations areas, associated with the range air-to-ground installations outside RCZ-1 and RCZ-2. RCZ-3 identifies the minimum level of safety concern and recognizes airspace that is restricted for safety of flight. Areas within RCZ-3 provide access to and from the target, allow for safely separating participating and non-participating aircraft and provide the range user with tactical maneuvering room for initial alignment for target acquisition. While RCZ-3 correlates to airspace, it is the land use underlying the range complex airspace that is considered for compatible land use recommendations. MTRs will be addressed to the extent that the modeling indicates that the RCZ-3 overlaps an MTR.

6. Compatible Land Use Guidelines.

a. RCZ land use compatibility information and general guidance, listed by land use category, is presented in Appendix C for use by local governments in their land use planning and zoning deliberations. Consistency in the application of these land use recommendations at the air-to-ground range is important. Further amplification is available from reference (h). Where a specific local land use is not adequately described in the standard guidance document, refinement and interpretation of the basic data is encouraged, within the constraints of accepted land use planning practice and with the approval of CNIC.

b. Where local authorities have adopted specific land use recommendations that are more stringent than the criteria herein provided, the RAICUZ study may incorporate and support the specific local criteria. However, land use planning recommendations proposed for publication in RAICUZ documents that vary from Appendix C require CNIC approval prior to public dissemination. In all cases, the land use recommendations must consider the allowed aircraft operating altitudes in the corresponding airspace and preclude uses or building or structure heights that would pose a safety hazard to aircraft operations.

7. Height and Obstruction Concerns.

a. This instruction addresses recommended compatible land use with respect to aircraft noise and potential safety concerns. Land uses in the vicinity of air installations, including air-to-ground ranges, are also subject to aircraft safety clearances, height restrictions and other obstruction concerns. Within the RCZs, any buildings, towers or other structures taller than 100 feet above ground level are coordinated with range safety officials to ensure compatibility. Any structures exceeding 199 feet above ground level should also be coordinated with the Federal Aviation Administration (FAA), per FAA guidelines.

b. Additionally, subparagraphs 6(b)(1) through 6(b)(5) describes land uses that should be examined for compatibility within the range installation environs:

(1) Uses that may cause smoke, dust or steam that could obscure pilot and range safety personnel vision;

(2) Direct and indirect lighting that could interfere with pilot vision, including, but not limited to solar panels, searchlights, lasers and fireworks;

(3) Uses that may cause EMI with aircraft navigation, radar altimeters, communication or weapons systems such as Photovoltaic solar farm power inverters, 5G cellular transmitters or wind turbines;

(4) Uses that may attract birds, such as landfills, waste transfer stations, wastewater treatment facilities, dredge disposal sites and seafood processing plants; and

(5) Uses that may affect aircraft radar or low-level training capability such as with the increasing height and dispersal of wind turbine farms.

CHAPTER 4
NOISE EXPOSURE CONTOURS

1. General. In addition to RCZs, the RAICUZ study should consider potential noise impacts in the vicinity of the air-to-ground range installation. For air-to-ground ranges where adjacent or nearby noise-sensitive land uses exist or the potential for development is present, a detailed noise impact analysis is warranted. Such noise analysis should address aircraft noise, ordnance (blast, firing, impact and detonation noise) and supersonic operations, if applicable.

2. Development of Noise Exposure Contours.

a. Part of the RAICUZ study includes preparation of a noise study to develop noise exposure contours and compare them to prior noise contours published in the last approved RAICUZ document. The noise contours are developed by a computerized simulation of aircraft activity at the range and reflect site-specific conditions (e.g., terrain, operational data (e.g., flight tracks, type and mix of aircraft, aircraft profiles (airspeed, altitude, power settings)), number and types of weapons employed and the frequency and times of operations. RAICUZ program experience indicates that future-year planning is necessary to consider the effects of expected changes in mission, aircraft and range operational levels. Therefore, in addition to the current-year analysis of operations, RAICUZ updates will include an analysis of projected operations. The resultant noise contours will be referred to as the "proposed" noise contours. Projections of aircraft and range operations will be based upon currently available unclassified estimates of future mission requirements. Where such estimates are not available or where little or no change is expected in the next five to 10 years, the current-year noise contours may also be used as the proposed noise contours. Noise impacts from aircraft and ordnance operations will be graphically portrayed and operational alternatives that could reduce noise impact on the range air installation and on the nearby community should be evaluated when practicable from the perspectives of aircraft safety and ability to maintain operational and training requirements. The activity must recommend the most appropriate noise footprints for approval by CNIC.

b. Since land use compatibility guidelines are based on yearly average noise levels, noise contours should be developed based on Average Annual Day operations. The operations level on an Average Annual Day is calculated by dividing the total annual air-to-ground range operations by 365 days.

c. Noise Contours and Noise Models.

(1) Day-Night Average Sound Level (DNL) must be used in all RAICUZ studies except at California ranges, which will use Community Noise Equivalent Level (CNEL). Where applicable, noise contours 60, 65, 70, 75, 80 and 85 must be plotted on maps for Navy ranges as part of RAICUZ studies. Contours below 60 DNL and CNEL are not required but may be provided if local conditions warrant discussion of lower noise levels or where significant noise complaints have been received in areas outside DNL and CNEL 60.

(2) Currently, the DoD NOISEMAP program or military operations areas Range Noise Map Program (MR_NMAP) may be used for developing noise contours for fixed-wing aircraft and the Rotorcraft-Noise Model (RNM) program will be used for developing noise contours for rotary-wing and tilt-rotor aircraft operations. In the future, pending DoD approval, Advanced Acoustic Model will replace NOISEMAP and RNM.

(3) For ranges with a fixed run-in heading, NOISEMAP will be used.

(4) For ranges with variable run-in headings, MR_NMAP will be used.

(5) For low-level MTRs to and from the range, MR_NMAP will be used.

(6) Noise from ordnance (blast and delivery) is impulsive in nature and of short duration. Blast and delivery noise is often a source of discomfort for people and their households. In addition, the resulting vibrations of buildings and structures may contribute to increased annoyance. Noise contours in the vicinity of a range will be developed using the latest version of the DoD Blast Noise Impact Assessment program for modeling heavy weapons and noise from ordnance delivery (anything 20 millimeters (mm) and greater, such as blast noise and explosives). The DoD Small Arms Range Noise Assessment Model (SARNAM) program will be used for modeling small arms noise (.50 caliber or less).

(7) The C-weighted average sound level (CDNL) provides an appropriate noise metric to represent the effects of blast noise from air-to-ground ranges using live ordnance. All technical reviews and noise analyses conducted using Blast Noise Impact Assessment and SARNAM (including initial analysis input data) must be coordinated with the U.S. Army Public Health Center. Blast noise C-weighted contours of 57, 62 and 70 CDNL should be included.

(8) Supplemental metrics can also help explain special situations (e.g., noise at a school during school hours, noise at certain peak periods of the year when a major exercise is conducted). Approval of use of supplemental metrics must be obtained from CNIC.

d. Noise-Reduction Strategies. Each Technical Review must include an analysis and evaluation of operational alternatives for noise reduction when high noise contours extend outside the range boundary. This analysis describes changes to operations that have been implemented since the previous RAICUZ study or could be implemented to manage or minimize noise impact on the installation and the nearby community. The alternatives analysis should consider altering flight tracks, run-ins, target placement, operational parameters (altitude, dive angle, airspeed), without compromising flight safety or mission requirements to examine impacts of high noise. Proposed changes to operational procedures require documentation by the local command as to the reasons for the change. Environmental documentation in compliance with NEPA may be required.

e. Selection of Final Noise Contours to be Used in the RAICUZ Study. The selection criteria and rationale for the noise contours (e.g., current-year or proposed timeframe used to reflect aircraft noise and blast noise must be documented in the request for approval of the RAICUZ study) must be made by the range air installation, concurred with by the chain of command and approved by CNIC.

3. Compatible Land Use Guidelines.

a. At a minimum, aircraft noise contours for DNL and CNEL 60, 65, 70, 75, 80 and 85 decibels (dB) must be plotted on maps for Navy ranges as part of RAICUZ studies. Other areas, such as ingress and egress routes to and from training ranges, are recommended to have land use controls. Appendix C, Table 1 provides compatibility guidelines for aircraft noise contours.

b. Blast noise contours in CDNL of 57, 62 and 70 CDNL must be included, along with a supplemental analysis using peak noise values and distances for representative events. For small arms ranges, noise contours must include the areas exposed to unweighted peak noise values <87 dB; 87 dB to 104 dB; and >104 dB. For large-caliber weapons and impulsive sound, supplemental information noise contours will reflect the decibel peak (dBP) value <115 dB; 115-130 dB; and ≥130 dB. Single-event peak noise levels are not measured or used for aircraft noise. Appendix C, tables 2 and 3 provide compatibility guidelines for small arms and artillery and explosives contours, respectively.

c. Where specific local land uses are not adequately described in the standard guidance documents, refinement and interpretation of the basic data is encouraged, within the constraints of accepted land use planning practice and with prior coordination with CNIC.

CHAPTER 5
RAICUZ STUDY

1. General. A RAICUZ study uses the RCZs and noise contours to make land use recommendations that are compatible with air-to-ground range installation operations.

2. Study Content. The study should include the sections and content show in subparagraphs 2(a) through 2(j).

a. Executive Summary. A concise summary of the findings, conclusions and recommendations of the RAICUZ study will be included in the Executive Summary. This section will also include a brief discussion of any extenuating or mitigating requirements necessary for safe range operations.

b. Introduction. The Introduction includes a discussion of the RAICUZ program and provides the user with a familiarity of the operational aspects of the air-to-ground range. Information relating to the RAICUZ program will include a general description of the purpose, scope, authority, objectives, program history and roles and responsibilities for implementing the RAICUZ program. Range-specific information will include the mission that this range air installation fulfills and how its role supports fleet or Joint Service air-to-ground weapons delivery training or testing; a description of applicable NEPA documentation; a list of any assumptions that were used and software(s) and versions used to complete RCZ modeling; and changes in operations, aircraft or weapons that have occurred or are proposed to occur that necessitate an update of the previous RAICUZ study.

c. Air-to-Ground Range and Airspace Overview.

(1) This section includes a discussion and appropriate figures to depict the location of the air-to-ground range, associated SUA, MTRs and other local features of concern that may affect range utilization such as nearby airfields, towers or other man-made or natural features that may be of concern. It also includes a description of the air-to-ground range itself, including whether the Navy owns or leases the land, features of importance, impact areas, targets, restrictions, types and numbers of annual, current and future operations, users of the air-to-ground range, normal days and times of operations and range utilization. Other pertinent information that may add value to the overall analysis and land planning should be included as well. This may include information relating to locations of past aircraft mishaps, locations of off-range ordnance drops, history of the area (especially if air-to-ground range boundaries have changed over time) and use of lasers and footprints or safety considerations that they introduce.

(2) All airspace matters must be coordinated through the appropriate Regional Airspace Coordinator per reference (e).

d. RCZs. This section introduces RCZs and how they are developed. For updates to an existing RAICUZ study, this section should compare the new RCZs to the RCZs presented in the previously approved RAICUZ study and describe the notable differences.

e. Noise Analysis. This section describes the methodology to develop noise contours and provide the aircraft and ordnance noise contours as appropriate. Contours presented should reflect operations into the future as best available data allows. Inclusion of the long-range proposed noise contours should minimize the requirement to update the study as often. This is important as most State or local planning offices update their plans on long-term intervals and range air installations should strive to coordinate their planning with these agencies for best results. As necessary, any single-event noise analyses should be prepared and the appropriate rationale should be developed to incorporate this information into the study. Alternatives considered to minimize off-site noise impacts should be discussed, if appropriate. A discussion of other local factors that may influence noise such as natural geographic conditions, local weather anomalies or other items should be included, as well as how these may influence range operations. A discussion of noise complaints that have been received, associated with range operations, should be provided. For updates to an existing RAICUZ study, this section should include a comparison of new noise contours to contours presented in the previous approved RAICUZ study, with a description of the differences.

f. Alternative Noise Analysis. Alternatives analysis is normally presented when high noise impacts are outside the range boundary. The alternatives analysis should consider altering flight tracks, run-ins, target placement and operational parameters (altitude, dive angle and airspeed), without compromising flight safety or essential mission requirements to examine impacts of high noise. Alternatives must balance changes in potential weapons and noise impacts with effects on safety, operational capability, training and testing requirements.

g. Land Use Compatibility Analysis. This section must include a map and description of existing land uses in the study area; discuss land use compatibility guidelines for the RCZ and noise contours; discuss any incompatibilities of existing land uses; and identify local planning authorities and existing measures, tools or regulations available to control zoning or land use. This section should also discuss the conclusions or recommendations from any existing planning studies, development plans, comprehensive plans or any similar types of studies or plans that may be applicable.

h. Land Use Recommendations. This section should provide conclusions and recommendations to implement the RAICUZ program for the range. Recommendations for specific land use changes, zoning amendments, residential disclosures and implementation of other strategies should be presented. These recommendations should include specific roles, responsibilities and expectations for each stakeholder that has a role in implementation of the RAICUZ program. Installations should review existing incompatible land uses at the time of publication of a RAICUZ study, in coordination with local government agencies, to recommend

specific land use controls, such that future uses or changes to the parcel are made in a manner that is compatible with the RAICUZ footprint.

i. Appendices. Appendices should include any pertinent information, such as existing land use agreements that do not fit into the body of the study but add valuable information to users of the study.

j. Information Handling. Data determined to be defense critical infrastructure information pursuant to reference (f) and DoD controlled unclassified information must be appropriated marked, maintained and controlled, as delineated in Chapter 2, subparagraph 3b.

3. Study Review and Approval. Once the RAICUZ study or update has been prepared, it must be reviewed and approved by CNIC prior to any release of data contained therein outside of DoD and prior to implementation. Information developed, such as noise or RCZ footprints, should not be shared with other agencies including local government agencies and planning offices until the new RAICUZ study has been formally approved by CNIC. Once prepared, the range air installation must submit the study, requesting approval from CNIC via the chain-of-command. The study must be reviewed and endorsed by the appropriate Navy Region and the echelon 2 fleet command or SYSCOM range mission owner, prior to CNIC approval. Once the study has been approved by CNIC, a letter acknowledging approval of the study must be sent by CNIC to the associated installation command, air-to-ground range command and echelon 2 fleet command or SYSCOM. The letter of approval must be inserted in the front of the RAICUZ study prior to final printing and dissemination.

4. Study Distribution. After CNIC approval of the RAICUZ study, an appropriate number of copies of the study should be printed and distributed. Public distribution of initial or updated RAICUZ information requires CNIC Headquarters approval. In addition, information developed in support of the preparation of the study will be delivered on a CD-ROM, DVD-ROM, external hard drive (as approved by the COMNAVFACSYSCOM Command Information Officer) or secure digital transfer (such as DoD Safe) including the Word document, an Adobe PDF version of the complete study and Geographic Information System (GIS) data formatted to meet the Office of the Secretary of Defense Spatial Data Standards for Facilities, Infrastructure and Environment and Navy Data Model specifications and Federal Geographic Data Committee metadata standards. GIS data layers will be captured using guidelines published in the COMNAVFACSYSCOM Data Collection Guide. The RCZ and noise footprints along with any land use layers will be incorporated into the CNIC and COMNAVFACSYSCOM Regional Shore Installation Management System GIS. Because the intent of this study is to implement a successful RAICUZ program with other Federal, State and local agencies, copies of the study (printed or electronic) will be distributed to the appropriate agencies for information purposes.

CHAPTER 6
RAICUZ IMPLEMENTATION

1. General. Once a study is completed, the range air installation command activates their RAICUZ program by making use of the information gained from the study to identify and implement measures for long-term range sustainment. Appendix A contains a list of operational ranges with active RAICUZ programs. Active RAICUZ program implementation includes but is not limited to, partnering with appropriate Federal, State and local government agencies to promote compatible land use near and around operational ranges; considering operational alternatives as necessary; implementing a complaint response program for the surrounding communities; and developing strategies to protect the long-term viability of the range while maintaining a high degree of public safety.

2. Community Implementation.

a. The DON's RAICUZ policy is predicated on promoting compatibility between air-to-ground range installations, neighboring communities, States, other Federal agencies and Native American tribes responsible for land management in the vicinity of Navy ranges. This policy recognizes the local governments' responsibility to protect public health, safety and welfare through controls like zoning ordinances, building codes, subdivision regulations, building permits and disclosure statements. Local government implementation of RAICUZ land use recommendations, through their local land use planning and zoning processes, allow areas within and surrounding established RCZs and noise contours to develop as compatible uses. Successful implementation of the RAICUZ program depends on a close working relationship between the range installation and local community.

b. Pursuit of an acquisition or withdrawal of land near the range may be appropriate if local, regional or State initiatives to prevent incompatible development prove unsuccessful or where alternatives analysis indicates other alternatives are not practicable to prevent encroachment. The activity should on a regular basis inform local governments, State governments, Native American tribes, other Federal agencies, citizens groups and the general public on (a) the requirements of military aviation; (b) air-to-ground range operations; (c) the efforts underway and planned to reduce potential off-range weapons impacts and noise; and (d) the Navy's recommendation on specific land use issues.

c. Range installation representatives, primarily commanders and their range manager or CPLO, should meet with and make presentations to local governments, particularly the planning and zoning agencies, about the RAICUZ study. To most effectively communicate Navy requirements and have open discussions with various agencies, tribes and community organizations, it is recommended that each range or installation commander take actions to create a Land Use Planning Partnering Team. Partnering teams should meet on a regular basis to discuss current topics of concern or interest and present information to other team members on foreseeable actions that may be occurring within the affected areas.

d. Although the emphasis of the RAICUZ implementation effort must be on areas within the RAICUZ footprint (noise contours and RCZs), the air-to-ground range installation can comment on land use issues outside the footprint, which might impact on it (e.g., large-scale developments near the RAICUZ footprint) or transportation system or utility corridor developments that could make the RAICUZ area more desirable for development. The range commanding officer should convey to the local land use agencies that the range is a major land use in the local community and merits special consideration and protection. Development that occurs near the RCZs and noise contours could prevent mission changes or expansion in the future. Therefore, commanders through their staffs should monitor proposed development beyond the RCZs and noise contours and, if needed, present those concerns in appropriate local forums. CNIC and designated subject matter experts can provide assistance as needed.

e. It is important that potential buyers, renters or lessees be notified of possible noise and safety issues associated with range operations. This disclosure is strongly encouraged for property within noise contours greater than 65 DNL (or 65 CNEL) and RCZs and encouraged within the general vicinity of the air-to-ground range, where air operations may result in public annoyance.

3. Documentation of Local Efforts. Records of important discussions, negotiations, testimony, etc., with and before local officials, boards, etc., should be maintained by the local command for at least seven years. This will ensure that documentation is available to indicate reasonable and prudent efforts were made to preclude incompatible land use through cooperation with local and State government officials and other Federal agencies as appropriate and that recourse to such actions has been exhausted.

CHAPTER 7
REAL PROPERTY GUIDANCE

1. Acquisition Policy. When threats to operational integrity from incompatible land use (encroachment) are anticipated and when local communities are unwilling or unable to take the initiative in combating the threat via their own authority, consideration can be given to pursue land acquisition or withdrawal of public lands when appropriate. Documentation of community unwillingness or inability will be required to support acquisition projects. Where the mission of the air-to-ground range is imminently threatened, acquisition of fee title or restrictive easements over the impacted lands in any RCZ or noise contour may be appropriate to maintain operational integrity.

2. Encroachment Indicators. The importance of the air-to-ground range having sensitivity to long-range encroachment indicators cannot be overemphasized. Local community capital improvement plans and long-range land use plans provide clues far in advance of actual encroachment actions. These plans address land areas far greater than the RAICUZ and must be evaluated to determine their influence on the RCZs and noise contours either directly or indirectly.

3. Real Property Utilization.

a. Reference (i) describes a process for evaluating real property for potential disposal. Installations should avoid disposal of lands associated with range use. To avoid the disposal of lands required for the protection of the range from encroachment, ranges will coordinate with the mission proponent to ensure that required lands or easements are fully justified and then coordinate with COMNAVFACSYSCOM to commemorate that justification in documents such as memoranda for the record, AICUZ and RAICUZ studies, IDP and encroachment action plans. Where disposal is directed, those rights and interests required for the protection of the future operational integrity of the range air installation through restrictions, to ensure compatible land use, will be retained through appropriate real estate instruments (e.g., perpetual easements or deed restrictions); but, range managers and encroachment managers should recognize that enforcement by the Department of Justice is subject to resource constraints and is not guaranteed.

b. Particular attention must be paid to property located outside of RCZ-2, an area of armed overflight, which, if excessed, would attract uses that would induce incompatible developments within the RAICUZ area (e.g., water, sewer or highway development). Additionally, the prior history of RAICUZ areas and potential growth should be fully considered. Once property rights are relinquished, they are not easily, if ever, regained. The dynamic nature of Navy operational needs must be evaluated in encroachment protection decisions.

4. Guidelines for Acquisition and Retention of Real Estate within RAICUZ. This instruction must not be used as the sole justification for either the acquisition or the retention of owned

interests beyond the minimum required to protect the Navy's military readiness mission. Detailed procedural requirements related to the Navy's real estate program are set forth in reference (j).

5. Real Estate Interests to be Considered for RAICUZ.

a. When it is necessary for the DON to acquire interests in land, a careful assessment must be made of the type of interest to be acquired either in the form of restricted use easements or in fee simple. In deciding what interest to acquire, the following factors are examined: the minimum interest necessary to protect the Navy's mission; when the property is needed; available funds; type of acquisition (e.g., fee versus restrictive easements); and environmental considerations (e.g., contaminated property, NEPA).

b. Real property interests to be considered for acquisition include, but are not limited to making low and frequent over flights; making high aircraft noise; prohibiting light emissions that interfere with pilot vision; prohibiting electromagnetic and radio frequency emissions that interfere with aircraft communication or navigation equipment; controlling the height of buildings, structures, towers, trees or other obstructions that interfere with aircraft operations and access by government representatives; and prohibiting entry of non-authorized persons.

6. Encroachment Partnering. Per references (c) section 2684a and (k), is a specific land acquisition authority that can be used to reduce or eliminate current encroachment or prevent future restrictions on military operations. The statute authorizes the military departments to execute agreements with and leverage funds from eligible entities to acquire interests in land (usually a restrictive use easement or conservation easement) from willing property owners to preserve areas of compatible land uses and natural habitats near the installation. Use of condemnation authority is not permitted under the encroachment-partnering program.

7. Real Property Management. Regional commanders and range installation commanding officers must be responsible for the administration, use and management of real property assets as related to the readiness and effectiveness of DON ranges. This responsibility is particularly relevant to documentation, oversight and enforcement of Navy interests in land outside the installation boundary as encroachment protection, whether that land is acquired through fee, easement or local zoning actions. Range air installation commanders must develop a real property management plan to establish standard operating procedures to maintain Navy control of acquired property interests. This plan should also include updated base mapping incorporating RAICUZ areas containing land use restrictions.

APPENDIX A
NAVY OPERATIONAL RANGES WITH ACTIVE RAICUZ PROGRAMS

1. Commander, U.S. Pacific Fleet (COMUSPACFLT).

a. Naval Weapons Systems Training Complex Boardman (managed by Naval Air Station (NAS) Whidbey Island):

R-5701/5706

b. Fallon Range Training Complex (managed by NAVAVNWARDEVCEN):

R-4803 B-16
R-4804 B-17
R-4810 B-19
R-4802/R-4813 B-20

c. Naval Air Facility El Centro Range Complex (managed by FACSFAC), San Diego):

R-2512 Inkey Barley/Kitty Baggage
R-2510 Shade Tree/Loom Lobby

2. Commander, U.S. Fleet Forces Command (COMUSFLTFORCOM).

a. Navy Dare County Bombing Range Complex (managed by FACSFAC Virginia Capes):

R-5313 Long Shoal Naval Ordnance Area (Stumpy Point)
R-5314 Navy Dare County Bombing Range

b. Pinecastle Range Complex (managed by NAS Jacksonville):

R-2906 Rodman Range
R-2907 Lake George Range
R-2910 Pinecastle Range

3. Commander, Naval Air Systems Command (COMNAVAIRSYSCOM). Atlantic Test Range (managed by Naval Air Warfare Center Aircraft Division):

R-4002
R-4005
R-4006
R-4007
R-4008

R-6609

4. Chief of Naval Air Training Command (CNATRA)

R-4404 Noxubee County Target Range, Searay (managed by NAS Meridian)
R-6312 McMullen Range Complex (managed by NAS Kingsville):

Yankee Target
Dixie Target

5. Commander, Naval Special Warfare Command (COMNAVSPECWARCOM)

R-4403 Naval Special Warfare Riverine Training Range Complex, including air-to-ground impact areas, Stennis, MS

Note: COMNAVSPECWARCOM's RAICUZ Study was conducted under separate agreement, based upon Navy's ownership of the land.

APPENDIX B
GLOSSARY

AICUZ	Air Installations Compatible Use Zones
ASN (EI&E)	Assistant Secretary of the Navy (Energy, Installations and Environment)
CDNL	C-Weighted Average Sound Level
CNEL	Community Noise Equivalent Level
CNIC	Commander, Navy Installations Command
CNO N4	Deputy Chief of Naval Operations, Fleet Readiness and Logistics
COMNAVAIRSYSCOM	Commander, Naval Air Systems Command
COMNAVFACSYSCOM	Commander, Naval Facilities Engineering Systems Command
COMNAVSPECWARCOM	Commander, Naval Special Warfare Command
COMPACFLT	Commander, United States Pacific Fleet
COMUSFLTFORCOM	Commander, United States Fleet Forces Command
CPLO	Community Planning and Liaison Officer
dB	Decibel(s)
dBP	Decibel (Peak)
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DON	Department of the Navy
EMI	Electromagnetic Interference
FAA	Federal Aviation Administration
FACSFAC	Fleet Area Control and Surveillance Facility
FTR	Fleet Training Range

GIS	Geographic Information System
IDP	Installation Development Plans
IPL	Integrated Priority List
LSDZ	Laser Surface Danger Zone
mm	Millimeter
MR_NMAP	Military Operations Area Range Noise Map Program
MTR	Military Training Route
N	No
NAS	Naval Air Station
NAVAVNWARDEVCEN	Naval Aviation Warfighting Development Center
NEPA	National Environmental Policy Act
NLR	Noise Level Reduction
OPNAV	Office of the Chief of Naval Operations
OPNAVINST	Office of the Chief of Naval Operations Instruction
RAICUZ	Range Air Installations Compatible Use Zones
RCZ	Range Compatibility Zone
RMTK	Range Managers Tool Kit
RNM	Rotorcraft-Noise Model
SARNAM	Small Arms Range Noise Assessment Model
SECNAV	Secretary of the Navy
SECNAVINST	Secretary of the Navy Instruction
SDZ	Surface Danger Zone
SLUCM	Standard Land Use Coding Manual
SUA	Special Use Airspace
SYSCOM	Systems Command
U.S.C.	United States Code
WDZ	Weapons Danger Zone
Y	Yes

Figure 1: Abbreviations and Acronyms

2. Definitions. These terms and their definitions are for the purposes of this instruction.

a. A-Weighted. An expression of the relative loudness of sounds in air as perceived by the human ear where the dB values of sounds at low frequencies are reduced. By contrast, unweighted dBs make no correction for audio frequency.

b. Areas of Critical Concern. An area outside the RAICUZ footprint where land use controls may be desirable to protect long-term mission capability. The development of the final boundary of areas of critical concerns must also consider natural and man-made features.

c. CNEL. A noise descriptor used in California to discuss the aircraft noise environment around air installations. Like DNL, CNEL represents an average noise environment. In addition to a 10-dB penalty for nighttime noise (10:00 p.m. to 7:00 a.m.), CNEL includes a 5-dB penalty for each aircraft operation during evening hours (7:00 p.m. to 10:00 p.m.).

d. DNL. A noise descriptor used to discuss the aircraft noise environment around air installations. DNL is the standard Federal metric used to describe the cumulative exposure of individuals to noise. It is the 24-hour average sound level in dB, derived from all aircraft operations during a 24-hour period that represents an airfield's average annual operational day. DNL adds a 10-dB noise penalty to each aircraft operation occurring during the nighttime hours of 10:00 p.m. to 7:00 a.m.

e. MTRs. Low-altitude routes of flight designated by the FAA whereby a speed waiver is granted to allow military aircraft to train at tactical speeds using terrain masking. MTRs generally lead to or away from a range air installation.

f. Mission Component Command. Administrative units within the Navy and Marine Corps to which Service members are routinely assigned when mobilized to various assignments. These commands are the end users of range air installations that are the subject of encroachment-prevention activities founded on the RAICUZ program. Examples include U.S. Fleet Forces Command, COMPACFLT, Naval Special Warfare Command, Naval Reserve Forces and COMNAVAIRSYSCOM.

g. RAICUZ Footprint. The combined area of the RCZs and noise contours.

h. RAICUZ Study. Conducted at all Navy range air installations (excluding islands) to analyze aircraft noise, weapons and laser safety, land use compatibility and recommended strategies to address existing and potential conflicts between land use and military missions.

i. RAICUZ Study Update. A full study update released to the public. If a major change in operations has necessitated an environmental review through NEPA, a RAICUZ study update is conducted upon the completion of a Technical Review and normally issued subsequent to the completion of NEPA documentation.

j. RCZ-1. The area of the greatest potential safety hazard and designates the minimum range surface area needed to contain all ordnance and lasers delivered at Navy range air installations.

k. RCZ-2. The area of aircraft armed over flight.

l. RCZ-3. The area under the restricted airspace used by aircraft for tactical training and maneuvering near and above the range air installation.

m. Standard Land Use Coding Manual (SLUCM). A manual that reflects generic land use categories for illustrating a basic and high-level understanding of land use compatibility across some common land use types. In 1965, the Federal Highway Administration and the Department of Housing (then the Bureau of Public Roads and the Urban Renewal Administration, respectively) published the SLUCM. The manual provided a detailed listing of land use categories with numeric codes assigned to them. The categories were based on the Standard Industrial Classification system. This coding procedure became the typically accepted standard method for land use coding in urban areas throughout the country (Source: American Planning Association).

n. SUA. Airspace designated by the FAA for military use to separate non-participating aircraft for safety purposes such as dynamic maneuvering in a military operations areas and weapons releases in restricted areas.

o. Technical Review. The internal technical assessment of operational data to quantify aircraft noise exposure and identify RCZs; assessment of operational alternatives and noise-reduction strategies for impacted lands, both on- and off- installation; development of an on-station implementation plan; and other internal efforts that are undertaken to keep the RAICUZ program current and accurate. Technical reviews are conducted to determine if an initial RAICUZ study or RAICUZ study Update is required. It is not intended for public release.

APPENDIX C
RECOMMENDED LAND USE COMPATIBILITY GUIDELINES

1. Land Use Compatibility in Noise Contours.

a. Recommended land use compatibility guidelines in noise contours are shown in tables 1 through 3. Table 1 provides compatibility recommend at ions for aircraft noise, Table 2 for small arms (.50 caliber or less) and Table 3 for artillery and explosives (20 mm or greater). The primary objective is to discourage noise-sensitive land uses in areas of higher noise exposure. These land use compatibility recommendations are intended to support land use planning on- and off-range. They do not constitute a Federal determination of whether a use of land is acceptable under local zoning.

b. The tables are organized based on SLUCM categories detailed in reference (h). However, the categories vary from SLUCM as the coding system does not differentiate based on noise-sensitivity. Some uses warrant additional evaluation due to potential for annoyance and activity interference. General notes and specific footnotes at the bottom of the table provide additional information and considerations for compatibility determinations. Additions to some land use categories have been incorporated into the table subsequent to issuance of the SLUCM, published in 1977, to reflect additional land uses and to clarify the categorization of certain uses.

c. Compatibility designations in tables 1 through 3 generally refer to the principal use of the site. If other uses with greater sensitivity to noise are proposed or a site has mixed uses, the compatibility recommendations should be based on the use that is most adversely affected by noise and has the most restrictive recommendations.

d. When appropriate, noise level reduction (NLR) may be necessary to achieve compatibility. NLR (outdoor to indoor) is achieved through the incorporation of sound attenuation into the design and construction of a structure. Measures to achieve an indoor noise reduction do not necessarily solve noise issues outside the structure and additional evaluation may be warranted. Normal permanent construction can be expected to provide an NLR of 20 dB, thus the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation, upgraded sound transmission class ratings in windows and doors and closed windows year-round. Additional consideration should be given to modifying NLR levels based on peak noise levels or vibrations. Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces. Note that NLR does not address low-frequency vibration from blast noise and is not considered in Table 3.

e. Land uses below 65 dB DNL are generally compatible. However, localities, when evaluating the application of these guidelines, should consider possible annoyance tied to land uses that involve predominately outdoor activities or where quiet is a basis for the use.

f. Land use that involves outdoor activities in areas above 80dB DNL are not recommended, but if the community allows such activities, hearing protection devices should be worn when noise sources are present. Long-term exposure (multiple hours per day over many years) to high noise levels can cause hearing loss in some unprotected individuals.

LAND USE NAME and SLUCM CATEGORY	A-Weighted DNL and CNEL Levels					
	<65 dB	65-70 dB	70-75 dB	75-80 dB	80-85 dB	85+ dB
RESIDENTIAL USE GROUP (SLUCM CATEGORY 10)						
And Residential uses, inclusive of all residential units, i.e., any type of single- or multiple-dwelling units.	Y	N[1]	N[1]	N	N	N
Mobile home parks or courts	Y	N	N	N	N	N
Transient lodgings	Y	N[1]	N[1]	N[1]	N	N
MANUFACTURING USE GROUP (SLUCM CATEGORIES 20 AND 30)						
Manufacturing and industrial uses	Y	Y	Y[2]	Y[3]	Y[4]	N
Precision manufacturing	Y	Y	Y[2]	Y[3]	N	N
TRANSPORTATION, COMMUNICATION AND UTILITIES USE GROUP (SLUCM CATEGORY 40)						
Rail, motor vehicle, aircraft, marine and other transportation and communication systems and utilities	Y	Y	Y[2]	Y[3]	Y[4]	N
Highway and street right-of-way; automobile parking	Y	Y	Y	Y	Y	N
Telephone, cellular and radio communication	Y	Y	Y[2]	Y[3]	N	N
TRADE (SLUCM CATEGORY 50)						
Wholesale trade	Y	Y	Y[2]	Y[3]	Y[4]	N
Building materials, hardware and farm equipment sales	Y	Y	Y[2]	Y[3]	Y[4]	N
Mass retailing, super stores, strip malls, shopping centers, discount clubs, home improvement stores, etc.; eating and drinking establishments	Y	Y	Y[2]	Y[3]	N	N
SERVICES (SLUCM CATEGORY 60)						
Finance, insurance, real estate services; personal, professional and miscellaneous services; religious activities	Y	Y	Y[2]	Y[3]	N	N
Cemeteries	Y	Y	Y[2]	Y[3]	Y[4]	Y[5]
Warehousing, storage and repair services	Y	Y	Y[2]	Y[3]	Y[4]	N

LAND USE NAME and SLUCM CATEGORY	A-Weighted DNL and CNEL Levels					
	<65 dB	65-70 dB	70-75 dB	75-80 dB	80-85 dB	85+ dB
Hospitals, medical, child care and development services; educational facilities	Y	Y[2]	Y[3]	N	N	N
Nursing homes	Y	N[1]	N[1]	N	N	N
Governmental	Y	Y	Y[2]	Y[3]	N	N
CULTURAL, ENTERTAINMENT AND RECREATIONAL (SLUCM CATEGORY 70)						
Cultural activities, auditoriums and concert halls	Y	Y[2]	Y[3]	N	N	N
Nature exhibits	Y	Y	N	N	N	N
Public assembly	Y	Y	N	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Outdoor sports arenas, spectator sports	Y	Y[6]	Y[6]	N	N	N
Amusements	Y	Y	Y	N	N	N
Outdoor recreational activities	Y	Y	Y[2]	Y[3]	N	N
Resorts, camps, parks; other culture, entertainment and recreation	Y	Y	Y[2]	N	N	N
RESOURCE PRODUCTION AND EXTRACTION (SLUCM CATEGORY 80)						
Agriculture and forestry	Y	Y[7]	Y[8]	Y[9]	Y[9]	Y[9]
Livestock farming; animal breeding	Y	Y[7]	Y[8]	N	N	N
Fishing, mining and other resource production or extraction	Y	Y	Y	Y	Y	Y

KEY TO TABLE 1

Y (Yes) – Land use and related structures compatible without restrictions.

N (No) – Land use and related structures are not compatible and should be prohibited.

Y^x – Yes, with restrictions. The land use and related structures generally are compatible. However, see note(s) indicated by the superscript.

N^x – No, with exceptions. The land use and related structures are generally incompatible. However, see note(s) indicated by the superscript.

TABLE 1 NOTES FOR ALL USES

1. Compatibility designations in Table 1 generally refer to the principal use of the site. If other uses with greater sensitivity to noise are proposed, a determination of compatibility should be

based on the use that is most adversely affected by noise and its contribution to the successful use of the property.

2. Where a proposed development falls within two DNL and CNEL noise zones, the land use recommendations of the higher noise should be used. For example, if a proposed development is exposed to 70 dB DNL and CNEL, land use recommendation s for the 70-75 DNL and CNEL noise zones should be applied.

3. When appropriate, NLR may be necessary to achieve compatibility. NLR (outdoor to indoor) is achieved through the incorporation of sound attenuation into the design and construction of a structure. Measures to achieve an indoor noise reduction do not necessarily solve noise issues outside the structure and additional evaluation may be warranted. Building location, site planning, design and use of berms and barriers can help mitigate outdoor noise exposure, particularly from aircraft ground maintenance run-ups. Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces.

4. Land uses below 65 dB DNL are generally compatible. However, localities, when evaluating the application of these guidelines, should consider possible annoyance tied to land uses that involve predominately outdoor activities or where quiet is a basis for the use.

5. Land use that involves outdoor activities in areas above 80 dB DNL are not recommended.

TABLE 1 NOTES SPECIFIC TO CERTAIN USES

1. Residential

a. Although local conditions regarding the need for housing may require residential use in these zones, residential use is discouraged in DNL 65-70 and strongly discouraged above DNL 70. The absence of viable alternative development options should be determined and an evaluation should be conducted locally prior to local approvals. These evaluations should clearly demonstrate that the community's need for additional residential property could not be met if development were prohibited in these zones and that the expense of additional noise attenuation will not undermine affordable housing goals.

b. Where the community determines that these uses must be allowed, measures to achieve outdoor to indoor NLR of at least 25 dB in DNL 65-70 and 30 dB in DNL 70-75 should be incorporated into building codes and be considered in individual approvals; for transient housing, an NLR of at least 35 dB should be incorporated in DNL 75-80.

c. Normal permanent construction can be expected to provide an NLR of 20 dB; thus the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation, upgraded sound transmission class ratings in windows and doors

and closed windows year-round. Additional consideration should be given to modifying NLR levels based on peak noise levels or vibrations. 2. Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low. 3. Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low. 4. Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low. 5. Buildings where public is received are not recommended. 6. Land use is compatible provided special sound reinforcement systems are installed. 7. Where residences are permitted, measures to achieve outdoor to indoor NLR of at least 25 dB should be incorporated into the design. 8. Where residences are permitted, measures to achieve outdoor to indoor NLR of at least 30 dB should be incorporated into the design. 9. Residences are not compatible.

Table 1. Land Use Compatibility in Aircraft Noise Contours

LAND USE	SUGGESTED LAND USE COMPATIBILITY	
LAND USE NAME AND SLUCM CATEGORY	87-104 dBP	>104 dBP
RESIDENTIAL USE GROUP (SLUCM CATEGORY 10)		
Residential use, inclusive of all residential units, i.e., any type of single or multiple dwelling units	N[1]	N
Mobile home parks or courts	N	N
Transient lodging	N[1]	N
MANUFACTURING USE GROUP (SLUCM CATEGORIES 20 AND 30)		
Manufacturing and Industrial (food and kindred products; textiles; apparel; lumber and wood products; printing; furniture and fixtures; chemical and allied products; petroleum industries; rubber and plastics, stone, glass, clay and metal products)	Y[2]	Y[3]
Precision manufacturing (professional scientific and controlling instruments; photographic and optical goods; watches and clocks)	Y[2]	Y[3]
TRANSPORTATION, COMMUNICATION AND UTILITIES USE GROUP (SLUCM CATEGORY 40)		
Rail, motor vehicle, aircraft, marine craft and other transportation systems	Y[2]	Y[3]
Highway and street right-of-way; automobile parking	Y[2]	Y
Telephone, cellular and radio communications; utilities	Y[2]	Y[3]
TRADE USE GROUP (SLUCM CATEGORY 50)		
Wholesale trade	Y[2]	Y[3]
Retail trade: building materials, hardware and farm equipment	Y[2]	Y[3]
Retail trade: mass retail, shopping centers, discount clubs, home improvement stores, superstores, etc.; food and beverage establishments; automotive; apparel; home furnishings and equipment	Y[2]	Y[3]
SERVICES USE GROUP (SLUCM CATEGORY 60)		
Finance, insurance and real estate services; personal, professional or miscellaneous services	Y[2]	Y[3]
Cemeteries	Y[2]	Y[3]
Warehousing and storage; repair services	Y[2]	Y[3]
Hospitals, medical facilities, nursing homes; child care and development services	N	N
Governmental	Y[2]	Y[3]
Educational services	Y[2]	N

LAND USE	SUGGESTED LAND USE COMPATIBILITY	
LAND USE NAME AND SLUCM CATEGORY	87-104 dBP	>104 dBP
CULTURAL, ENTERTAINMENT AND RECREATIONAL USE GROUP (SLUCM CATEGORY 70)		
Cultural activities (including religious activities)	Y[3]	N
Nature exhibits	N	N
Public assembly	N	N
Auditoriums, concert halls	Y[3]	N
Outdoor music shells, amphitheaters	N	N
Outdoor sports arenas, spectator sports	N	N
Amusements	Y	N
Outdoor recreational activities	N	N
Resorts, camps, parks; other cultural, entertainment and recreation	N	N
RESOURCE PRODUCTION AND EXTRACTION[6] USE GROUP (SLUCM CATEGORY 80)		
Agriculture and forestry	Y[4]	Y[5]
Livestock farming and animal breeding	Y[4]	N
Fishing activities	Y	Y
Mining and other resource production or extraction	Y	Y

KEY TO TABLE 2

SLUCM – Standard Land Use Coding Manual

dBP – unweighted peak decibel level

Y (Yes) – Land use and related structures compatible without restrictions.

N (No) – Land use and related structures are not compatible and should be prohibited.

Y^x – Yes, with restrictions. The land use and related structures generally are compatible. However, see note(s) indicated by the superscript.

N^x – No, with exceptions. The land use and related structures are generally incompatible. However, see note(s) indicated by the superscript.

TABLE 2 NOTES

1. Although local demand for on- or off-installation housing may support noise-sensitive land uses within the 87-104 dBP contour, such land use is generally not recommended. The absence

of viable alternative development options should be determined and an evaluation should be conducted locally prior to local approvals indicating that a demonstrated community need for the residential use would not be met if development were prohibited in these contours. Where the community determines that these uses must be allowed, measures to achieve outdoor to indoor NLR of at least 30 dB in the 87-104 dBP contour should be incorporated into building codes and be considered in individual approvals. Existing residential development is considered as pre-existing, non-conforming land uses.

2. Measures to achieve NLR of 25 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

3. Measures to achieve NLR of 30 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low.

4. Where residences are permitted, measures to achieve outdoor-to-indoor NLR of at least 30 should be incorporated into the design.

5. Residences are not compatible.

6. The land uses within this category include necessary associated resource management activities, for example, wildfire management activities for forestry.

Table 2. Land Use Compatibility in Small Arms Noise

LAND USE	SUGGESTED LAND USE COMPATIBILITY		
LAND USE NAME AND SLUCM CATEGORY	CDNL and CNEL 57-62	CDNL and CNEL 62-70	CDNL and CNEL 70+
RESIDENTIAL USE GROUP (SLUCM CATEGORY 10)			
Residential use, inclusive of all residential units, i.e., any type of single- or multiple-dwelling units	Y[1]	N[2,3]	N[3]
Mobile home parks or courts	Y[1]	N[2,3]	N[3]
Transient lodging	Y	Y	N
MANUFACTURING USE GROUP (SLUCM CATEGORIES 20 AND 30)			

LAND USE	SUGGESTED LAND USE COMPATIBILITY		
LAND USE NAME AND SLUCM CATEGORY	CDNL and CNEL 57-62	CDNL and CNEL 62-70	CDNL and CNEL 70+
Manufacturing and industrial (food and kindred products; textiles; apparel; lumber and wood products; printing; furniture and fixtures; chemical and allied products; petroleum industries; rubber and plastics, stone, glass, clay and metal products)	Y	Y[4]	Y[4]
Precision manufacturing (professional scientific and controlling instruments; photographic and optical goods; watches and clocks	Y	N	N
TRANSPORTATION, COMMUNICATION AND UTILITIES USE GROUP (SLUCM CATEGORY 40)			
Rail, motor vehicle, aircraft, marine craft and other transportation systems	Y	Y	Y[4]
Highway and street right-of-way; automobile parking	Y	Y	Y
Communications	Y	N	N
Utilities	Y	Y	Y[4]
Other transportation, communication and utilities	Y	Y	N
TRADE USE GROUP (SLUCM CATEGORY 50)			
Wholesale trade	Y	Y	N
Retail trade: building materials, hardware and farm equipment	Y	Y	N
Retail trade: mass retail, shopping centers, discount clubs, home improvement stores, superstores, etc., food and beverage establishments; automotive; apparel; home furnishings and equipment	Y	Y	N
SERVICES USE GROUP (SLUCM CATEGORY 60)			
Finance, insurance and real estate services; personal, professional and miscellaneous services	Y	Y	N
Cemeteries	Y	Y	Y
Warehousing and storage	Y	Y[4]	Y[4]
Repair services	Y	Y	N

Hospitals, medical facilities, nursing homes; child care and development services	Y[1]	N	N
Governmental	Y	Y	N
Educational services	Y	Y	N
CULTURAL, ENTERTAINMENT AND RECREATIONAL USE GROUP (SLUCM CATEGORY 70)			
Cultural activities (including religious activities)	Y[1]	N	N
Nature exhibits	Y[1]	N	N
Public assembly	Y[1]	N	N
Auditoriums, concert halls	Y[1]	N	N
Outdoor music shells, amphitheaters	Y[1]	N	N
Outdoor sports arenas, spectator sports	Y	N	N
Amusements	Y	Y	N
Outdoor recreational activities	Y	N	N
Resorts, camps, parks; other culture, entertainment and recreation	Y	N	N
RESOURCE PRODUCTION AND EXTRACTION[5] USE GROUP (SLUCM CATEGORY 80)			
Agriculture and forestry	Y	Y	Y
Livestock farming and animal breeding	Y	N	N
Fishing activities	Y	Y	Y
Mining and other resource production or extraction	Y	Y	Y

KEY TO TABLE 3

SLUCM – Standard Land Use Coding Manual

CDNL – C-weighted Day-Night Average Sound Level

CNEL – Community Noise Equivalent Level (normally within a very small decibel difference of DNL)

Y (Yes) – Land use and related structures compatible without restrictions

N (No) – Land use and related structures are not compatible and should be prohibited

Y^x – Yes, with restrictions. The land use and related structures generally are compatible; however, see note(s) indicated by the superscript

N^x – No, with exceptions. The land use and related structures are generally incompatible; however, see note(s) indicated by the superscript

TABLE 3 NOTES**:**

1. The CDNL and CNEL 57-62 noise contour functions as a buffer for the CDNL and CNEL 62-70 contour. Communities and individuals often have different views regarding acceptable or desirable levels of noise. To address this, some local governments have implemented land use planning measures in areas below 62 dB CDNL. In addition to mitigating current noise impacts, implementing land use controls within the CDNL and CNEL 57-62 noise contour can create a buffer to prevent the possibility of future noise conflicts.

2. Although local demand for on- or off-installation housing may support noise-sensitive land uses within CDNL and CNEL 62-70 contour, such land use is generally not compatible within CDNL and CNEL 62-70. Measures to achieve overall NLR inside structures do not solve noise difficulties outside the structure. Barriers are not effective reducing the noise from blasts and explosives. Additionally, NLR inside structures does not mitigate the vibration generated by the low-frequency energy of large caliber weapons firing and detonations.

3. Existing noise-sensitive land uses are considered as pre-existing incompatible land uses. In most cases these uses are not a risk to mission sustainment or a community's quality of life. Most long-term community members near installations or range activities acknowledge hearing military operations and activities and are usually not alarmed or bothered by the noise. However, landowners, occupants or other users may change over time, therefore the comfort or familiarity with military noise will not remain permanent or constant. Effort should be made to limit further incompatible development, seek mitigation efforts and where practicable to roll back pre-existing incompatible land uses.

4. Although noise levels may be compatible, exercise caution in siting any activity that may be sensitive to vibration.

5. The land uses within this category include necessary associated resource management activities, for example, wildfire management activities for forestry.

Table 3. Land Use Compatibility in Artillery and Explosives Noise

2. Recommended Land Use Compatibility in RCZ.

LAND USE	RCZ-1	RCZ-2	RCZ-3
RESIDENTIAL: SINGLE-FAMILY, DUPLEX, MULTI-FAMILY, MOBILE HOMES	N	N	Y[2,3]
TRANSIENT LODGING	N	N	Y[2,3]
SCHOOL CLASSROOMS, LIBRARIES, PLACES OF WORSHIP	N	N	Y[2,3]
HOSPITALS	N	N	Y[2,3]
NURSING HOME	N	N	Y[2,3]
AUDITORIUMS, CONCERT HALLS	N	N	Y[2]
OFFICE BUILDINGS: PERSONAL, BUSINESS, PROFESSIONAL	N	N	Y[2]
COMMERCIAL, RETAIL	N	N	Y[2]
MANUFACTURING	N	N	Y[2]
UTILITIES	N	N	Y[6]
PLAYGROUNDS, NEIGHBORHOOD PARKS	N	N	Y[2]
GOLF COURSES, RIDING STABLES, WATER RECREATION, CEMETERIES	N	Y[2,4]	Y[2]
OUTDOOR SPECTATOR SPORTS	N	N	Y[2]
INDUSTRIAL, WAREHOUSE, SUPPLIES	N	N	Y
LIVESTOCK, FARMING, ANIMAL BREEDING	N	Y[1,2]	Y[2]
AGRICULTURAL (EXCEPT LIVESTOCK), FORESTRY, MINING, FISHING	N	Y[1,5]	Y[5]
RECREATIONAL AREAS, PARKS, WILDERNESS AREAS	N	Y[2,5]	Y[2,5]

TABLE 4 NOTES

1. RCZ-2 is an area of armed overflight. Land uses that have the potential to attract congregations of people are not compatible. For scored targets, no development within 500 feet either side of the run-in line centerline. For tactical targets, further analysis is required. Factors to be considered: labor intensity, structural coverage, aircraft type, frequency, ordnance load and altitude (weapons dispersion).

2. Incompatible when the training mission requires low altitude overflight (less than 500 feet).

3. Suggested maximum density in RCZ-3: 2 dwelling units per acre.

4. Clubhouses, chapels and other facilities where people congregate are not compatible in RCZ-2. 5. The land uses within this category include necessary associated resource management activities; for example, wildfire management activities for forestry. 6. Energy infrastructure and tall towers, including wind turbines, geothermal facilities, communications towers and utility lines of sufficient height may impact military operations within SUA and MTRs. Each new development must be analyzed for compatibility issues on a case-by-case basis and must consider both the proposal and potentially affected mission. Structure height restrictions may be appropriate, as well as other considerations for EMI, glint and glare impacts and structure lighting and marking.

Table 4. Land Use Compatibility in RCZ

APPENDIX D

1. Figure 2 indicates what products and what important steps of the RAICUZ process require endorsement by echelon 2 fleet command or SYSCOM and approval by CNIC.

	CHAPTER	ACTION
1	Chapter 2 (2.b)	Technical Review
2	Chapter 3 (3.f)	Permanent establishment of RCZ-1 outside of range boundary
3	Chapter 3 (6.a)	Refinement and interpretation of data for specific land uses
4	Chapter 3 (6.b)	Recommendations proposed for publication in RAICUZ documents that vary from Appendix C
5	Chapter 4 (2.a)	Noise footprint approval
6	Chapter 4 (2.c.(8))	Use of supplemental noise metrics
7	Chapter 4 (2.e)	Selection of final noise contours
8	Chapter 2 (3.c, 3.h); Chapter 5 (3)	RAICUZ study approval
9	Chapter 5 (4)	Public distribution of initial or updated RAICUZ information

Figure 2: Approval Matrix