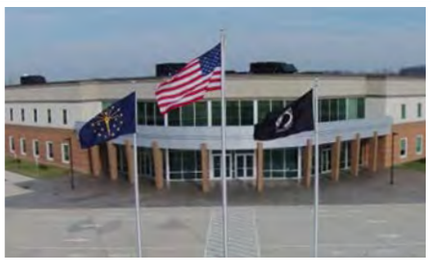
NSA CRANE JOINT LAND USE STUDY



Background Report

NSA CRANE JOINT LAND USE STUDY

Matrix DESIGN GROUP

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NSA CRANE JOINT LAND USE STUDY

Background Report

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February 2017

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Acronyms

A

APZ	Accident Potential Zone
AQ	Air Quality
AT, AT / FP	Anti-Terrorism / Force Protection

B

BCC	Bedford Chamber of Commerce
BIC	Battery Innovation Center
BIO	Biological Resources

C

CA	Comprehensive Agreements
CAA	Clean Air Act
CAAA	Crane Army Ammunition Activity
CDNL	C-Weighted Day-Night Average Levels
CDU	Crane Division University
CFR	Code of Federal Regulations
CIP	Capital Improvement Program
CNRMA	Commander, Navy Regional Mid-Atlantic
CO	Carbon Monoxide
COM	Communication / Coordination
CSRIC	Communication Security, Reliability, and Interoperability Council
CTC	Concurrent Technologies Corporation
CWA	Clean Water Act
CZ	Clear Zone

D

DAR	Defense Access Road Designations
dB	Decibel
dBA	A-weighted Decibel
DLA	Defense Logistics Agency
DNL	Day-Night Sound Level
DOD	Department of Defense
DSS	Dust / Smoke / Steam

E

EA	Environmental Assessment
EAP	Encroachment Action Plan
EGBTC	East Gate Business and Technology Center
EIS	Environmental Impact Study
EM	Electromagnetic
EMS	Environmental Management Systems
EOD	Explosive Ordnance Disposal
EPA	Educational Partnership Agreement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESQD	Explosive Safety Quantity Distance Arcs

F, G

FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FESA	Federal Endangered Species Act
FONSI	Finding of No Significant Impact
FSC	Frequency Spectrum Capacity

H

HA	Housing Availability
HUD	US Department of Housing and Urban Development

I

I&I	Inflow and Infiltration
I-69	Interstate 69
IBC	Indiana Building Code
IC	Indiana Code
ICRMP	Integrated Cultural resources Management Plan
IDP	Installation Development Plan
IE	Infrastructure Extensions
IEPA	Indiana Environmental Policy Act
IGA	Intergovernmental Agreement
IKC	Indiana Karst Conservancy
ILPA	Indiana Land Protection Alliance
INDOT	Indiana Department of Transportation
INRMP	Integrated Natural Resources Management Plan
IODD	Indiana Office of Defense Development
ISDA	Indiana State Department of Agriculture
IU	Indiana University
IUPUI	Indiana University Purdue University Indianapolis

J, K

JLUS	Joint Land Use Study

L

LAS	Land, Air, and Sea Space Competition
LCEGC	Lawrence County Economic Growth Council
LEG	Legislative Initiatives
LG	Light and Glare
LU	Land Use
LUPZ	Land Use Planning Zone

M

MIDLANT	NAVFAC Mid-Atlantic
MOU	Memorandum of Understanding

N

NAAQS	National Ambient Air Quality Standards
NACo	National Association of Counties
NAVFAC	Naval Facilities Engineering Command
NAVSEA	Naval Sea Systems Command
NAVSUP	Naval Supply Systems Command
NEPA	National Environmental Policy Act
NEW	Net Explosive Weight
NGO	Nongovernmental Organization
NHP	Naval Hospital Pensacola
NO2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Noise
NPDES	National Pollutant Discharge Elimination System
NSA	Naval Support Activity
NSWC	Naval Surface Warfare Center
NTIA	National Telecommunications and Information Administration

O

O3	Ozone
OCRA	Indiana Office of Community and Rural Affairs
OEM	Original Equipment Manufacturers
ONMP	Operational Noise Management Plan
OPNAVINST	Chief of Naval Operations Instruction
OSM	Office of Spectrum Management
OTA	Ordnance Test Area

P, Q

P3	Public-Private Partnerships
PAO	Public Affairs Officer
PC	Policy Committee
PM	Particulate Matter
PM10	Course Particles
PM2.5	Fine Particles
PT	Public Trespassing
PWD	Public Works Department

R

RAICUZ	Range Air Installation Compatible Use Zone
RAMICS	Rapid Airborne Mine Clearance System
RC	Roadway Capacity
RCZ	Range Compatibility Zones
RDT&E	Research, Development, Testing, and Evaluation
REMC	Rural Electric Membership Cooperative
RF	Radio Frequency
ROD	Record of Decision

S

SA	Safety
SAIC	Science Applications International Corporation
SDDCTEA	Surface Deployment and Distribution Command, Transportation Engineering Agency
SDZ	Surface Danger Zone
SIP	State Implementation Plan
SO2	Sulfur Dioxide
SOP	Standard Operation Procedure
SPEA	Indiana University's School of Public and Environmental Affairs
SR	State Route
STEM	Science, Technology, Engineering, and Mathematics
STIP	Statewide Transportation Improvement Program
SWC	Southwest Central

T

TBD	To Be Determined
TSC	Technical Services Corporation
TWG	Technical Working Group

U

UDWI REMC	Utilities District of Western Indiana REMC
UFC	Unified Facilities Criteria
URS	URS Corporation
US	United States
US	US Highway
USFWS	US Fish and Wildlife Services

V

V	Vibration

W, X, Y, Z

WQQ	Water Quality / Quantity

Inside Chapter 1 . . .

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1.1 Introduction

Military installations are critical to local, regional, and state economies, generating thousands of jobs and millions of dollars in annual economic activity and tax revenue. In the past, incompatible development has been a factor in the loss of operational capabilities and restructuring of mission-critical components to other military installations. The loss of military missions and closure of military installations have been detrimental to their host communities. To protect the missions of military installations and health of local economies and industries that rely on them, encroachment must be addressed through collaboration and joint planning between installations and local communities. This Joint Land Use Study (JLUS) attempts to mitigate existing compatibility issues, facilitate the prevention of future issues, and improve coordination between the local communities, Naval Support Activity (NSA) Crane, and its Lake Glendora Test Facility (LGTF).

NSA Crane and its LGTF are situated in southwest Indiana. NSA Crane is approximately 70 miles southwest of Indianapolis, 17 miles southwest of Bloomington, Indiana and 90 miles northeast of Evansville, Indiana. The LGTF is approximately 30 miles northwest of NSA Crane and approximately 80 miles southwest of Indianapolis. The JLUS Study Area includes several partner communities including Daviess County, Greene County, Lawrence County, Martin County, and Sullivan County. The local project sponsor / grantee was the Indiana Office of Community and Rural Affairs (OCRA). The local project coordinator for the NSA Crane JLUS was Radius Indiana – a regional partnership representing the economic interests of eight counties and a primary advocate for NSA Crane. This JLUS was developed as a means to promote and coordinate the compatibility of future growth around the installation with military mission activities, an organized communication effort between NSA Crane, the partner communities, and other stakeholder entities that own or manage land and / or resources in the region.

The NSA Crane JLUS is a proactive approach for mitigating existing compatibility issues and preventing future military compatibility issues by facilitating collaboration between local communities, agencies, the public,

and the Navy. This JLUS advocates increased communication for decisions relative to land use regulation, conservation, and natural resource management affecting both the community and the military. This study seeks to prevent conflicts experienced between the United States (US) military and local communities in other areas of the US and throughout the world by engaging the military and local decision-makers in a collaborative multi-agency planning process.

1.2 What Is a Joint Land Use Study?

A JLUS is a planning process accomplished through the collaborative efforts of stakeholders in a defined study area to identify compatible land uses and growth management, within and adjacent to, an active military installation. These stakeholders include local community, state, and federal officials, residents, business owners, nongovernmental organizations, and the military. Through the JLUS process, these parties convene to identify existing and potential future issues, and the potential actions that might be carried out to eliminate, mitigate or avoid compatibility conflicts. In addition, the process is intended to establish and encourage a formal, permanent working relationship between local jurisdictions, agencies, NSA Crane, and the LGTF.

1.3 JLUS Goal and Objectives

The goal of the NSA Crane and LGTF JLUS is to protect the viability of current and future military mission and operations, while simultaneously guiding community growth, sustaining the environmental and economic health of the region, and protecting public health, safety, and welfare.

To achieve this goal, three primary JLUS objectives were identified.

- Understanding. Convene community and military representatives to identify, confirm, and understand compatibility issues and concerns in an open forum, considering both the community and military perspectives and needs. This includes increasing public awareness, education, and opportunities for input organized in a cohesive outreach program.
- Collaboration. Encourage cooperative land use and resource planning among NSA Crane / LGTF and surrounding communities so that future community growth and development are compatible with the military missions and operations, while seeking ways to reduce operational impacts on land within the Study Area.
- Actions. Provide a set of mutually supported tools, activities, and procedures from which local jurisdictions, agencies, NSA Crane, and LGTF can select, prepare, and approve / adopt in order to implement recommendations developed during the JLUS process. The actions include both operational measures to mitigate installation impacts on surrounding communities and local government and agency approaches to reduce community impacts on military operations. These tools help decision makers resolve compatibility issues and prioritize projects within their annual budgeting cycles.

1.4 Why Prepare a Joint Land Use Study?

Although military installations and nearby communities are separated by a defined property boundary, they often share natural and manmade resources such as land use, airspace, water, and infrastructure. Despite the many positive interactions among local jurisdictions, agencies, and the military, and because so many resources are shared, the activities or actions of one entity can create unintended impacts on another, resulting in conflicts. As communities develop and expand in response to growth and market demands, land use approvals have the ability to locate potentially incompatible development closer to military installations and operational

areas. The result can generate new, or exacerbate existing, land use and other compatibility issues, often referred to as encroachment, which can negatively affect community safety, economic development, and sustainment of military activities and readiness. This threat to military readiness is currently one of the military's greatest concerns.

Recognizing the close relationship that should exist between installations and adjacent communities, the Department of Defense (DOD) Office of Economic Adjustment (OEA) implemented the JLUS program to mitigate existing and future conflicts and enhance communication and coordination among all affected stakeholders. This program aims to preserve the sustainability of local communities while protecting current and future research, development, testing, and engineering (RDT&E) missions supported by tenant commands at NSA Crane and its LGTF.

Collaboration and joint planning among military installations, local jurisdictions, and agencies protects the long-term viability of existing and future military missions. Working together also enhances local economies and industries before incompatibility becomes an issue.

1.5 Public Outreach

The JLUS process was designed to create a locally relevant document that builds consensus and garners stakeholder support. To achieve the JLUS goals and objectives, the JLUS process included a public outreach program providing a variety of participation opportunities for interested parties.

Stakeholders

An early step in any planning process is stakeholder identification. Informing and involving them early is instrumental to identifying, understanding, and resolving their most important issues through the development of integrated strategies and measures. Stakeholders include individuals, groups, organizations, and governmental entities interested in, affected by, or affecting the outcome of the JLUS document. Stakeholders identified for the NSA Crane / LGTF JLUS included, but were not limited to, the following:

- Local jurisdictions (counties, cities, and towns)
- DOD officials (including OEA representatives) and military installation personnel
- Local, county, regional, and state planning, regulatory, and land management agencies
- Landholding and regulatory federal agencies
- The public (including residents, businesses, and landowners)
- Environmental advocacy organizations
- Nongovernmental organizations (NGOs)

Policy Committee and Technical Working Group

The development of the JLUS was guided by a Policy Committee and a Technical Working Group comprising community leaders, NSA Crane representatives, Naval Surface Warfare Center (NSWC) Crane Division representatives, Crane Army Ammunition Activity representatives, federal and state agencies, resource agencies, local governments, and other stakeholders.

JLUS Policy Committee (PC). The PC consists of officials from participating jurisdictions, military installation leadership, and representatives from other interested and affected agencies. The PC is responsible for the overall direction of the JLUS, preparation, and approval of the study design, policy recommendations, and draft and final JLUS documents.

JLUS Technical Working Group (TWG). The TWG is responsible for identifying and studying technical issues. Membership includes town and county planners, military base planners, business and development community representatives, natural resource protection organizations, and other subject matter experts as needed to help assist in the development and evaluation of implementation strategies and tools. Items discussed by the TWG were brought before the PC for consideration and action.

The PC and TWG served as liaisons to their respective stakeholder groups, charged with conveying committee activities and information to their organizations and constituencies and relaying their organization's comments and suggestions to both committees for consideration. The PC members were encouraged to conduct meetings with their organizations and / or constituencies to facilitate this input. The responsibilities and list of participants for the JLUS sponsors, the PC, and the TWG are identified in Tables 1-1, 1 2, and 1-3, respectively.

Table 1-1. JLUS Sponsor Responsibilities and Participants

Responsibilities	Participants
■ Coordination ■ Financial Contribution ■ Accountability ■ Grant Management	■ OEA ■ Indiana Office of Defense Development (IODD) ■ OCRA ■ Radius Indiana

Table 1-2. JLUS Policy Committee Responsibilities and Participants

Responsibilities	Participants
■ Policy Direction ■ Study Oversight ■ Monitoring Report Acceptance	■ IODD ■ OCRA ■ Radius Indiana ■ Daviess County Commissioners ■ Greene County Commissioners ■ Lawrence County Commissioners ■ Martin County Commissioners ■ Sullivan County Commissioners ■ WestGate@Crane Authority ■ NSA Crane ■ Naval Surface Warfare Center (NSWC) Crane Division ■ Crane Army Ammunition Activity (CAAA)

Table 1-3. JLUS Technical Working Group Responsibilities and Participants

Responsibilities	Participants
■ Identify issues ■ Provide expertise to address technical issues ■ Evaluate and recommend implementation options to the PC ■ Provide Draft and Final Report recommendations to the PC	■ OCRA ■ Indiana State Department of Agriculture (ISDA) ■ Indiana Department of Transportation (INDOT) ■ Indiana Economic Development Corporation ■ Southern Indiana Development Commission ■ Radius Indiana ■ Daviess County Economic Development Corporation ■ Greene County Economic Development Corporation ■ Lawrence County Growth Council ■ Martin County Alliance for Economic Growth ■ Sullivan County Redevelopment Commission ■ Bloomington Economic Development Corporation ■ City of Bedford Staff ■ Westgate@Crane Authority ■ Bedford Community ■ Indiana University ■ Indiana Farm Bureau ■ Vectren Energy ■ Duke Energy ■ Hoosier Energy ■ AT&T – Indiana ■ Verizon Communications ■ Smithville Digital ■ Indiana Municipal Power Agency ■ NSA Crane ■ Public Works Department (PWD) NSA Crane ■ NSWC Crane Division ■ CAAA

Meetings were held throughout the process to ensure the JLUS identified and appropriately addressed local issues. The meetings conducted are highlighted as follows:

- Kick-Off Meeting # 1 (February 12, 2015). This meeting served as the initial kick-off for both the Policy Committee (PC) and the Technical Working Group (TWG). Two separate meetings were held on the same day with each committee and the same content was presented. During both meetings, the JLUS team provided an overview of the missions conducted at NSA Crane and its LGTF, introduced the JLUS process and participants, and presented information on the compatibility factors evaluated in this JLUS. The purpose of the meetings was to outline a plan of action with milestones and educate all stakeholders about the JLUS and their roles and responsibilities in the JLUS.

- PC Meeting # 2 (August 12, 2015). The second meeting conducted with the PC included an overview of preliminary issues and findings and a discussion of the study area. Next steps were outlined to refine issues, define geographies, and set up future meetings. The meeting also included a review of and feedback from Public Forum #1.

- TWG Meeting # 2 (August 11, 2015). The second meeting conducted with the TWG included a review of potential data gaps, review issues identified to date, and a discussion of the study area. Any additional

issues will be added and summarized along with general notes on issues, goals, and concerns identified to date. The meeting also included a review of and feedback from Public Forum #1.

- PC Meeting #3 (December 16, 2015). This meeting focused on legislative initiatives to support compatibility between NSA Crane and participating JLUS jurisdictions including a review of lessons learned from military communities throughout the country.
- PC Meeting # 4 (February 22, 2016). This meeting included a project status update, review of public outreach activities from Public Forum #1 including the public comments received and lessons learned, presentation of key compatibility issue analyses for NSA Crane and its LGTF, preliminary strategies discussion, and review of next steps. This meeting included a discussion of preliminary findings on future development potential, assessment of future land use conflict, and presentation of preliminary land use compatibility maps.
- TWG Meeting # 3 (February 23, 2016). This meeting included a project status update, review of public outreach activities from Public Forum #1 including the public comments received and lessons learned, presentation of key compatibility issue analyses for NSA Crane and its LGTF, preliminary strategies discussion, and review of next steps. This meeting included a discussion of preliminary findings on future development potential, assessment of future land use conflict, and presentation of preliminary land use compatibility maps.

Public Forums

In addition to the PC and TWG meetings, a series of public forums were held throughout the development of the JLUS. These forums provided an opportunity for the exchange of information with the greater community, assisted in identifying the issues to be addressed in the JLUS, and provided input on the proposed strategies. Each forum included a traditional presentation and a facilitated exercise providing a "hands on," interactive opportunity for the public to participate in the development of the plan. For public convenience, forums were held in three different locations throughout the Study Area. For each of the forums, one was held in the northwestern region of the study area, which related to the Lake Glendora Test Facility. The other forums focused on NSA Crane, with one being held east of the installation and one to the west of the installation. The public forums conducted are highlighted as follows:

- Public Forum # 1 (August 2015). The first public forum was conducted at three different JLUS Study Area locations. The information presented was oriented to the military facility in the region and the regional context. Meetings were held on the following dates at the following locations:
  - August 10, 2015 at the 4-H Fairgrounds in Sullivan County
  - August 11, 2015 at the Stellar Plaza in the City of Bedford
  - August 12, 2015 at the WestGate Academy in Daviess County

  The first public forum introduced the JLUS project and its participants. The JLUS team explained the purpose and function of the JLUS, provided an overview of the military operations at NSA Crane and its LGTF, introduced project participants, and shared the JLUS approach and goals. The format of this meeting included a presentation followed by an interactive working session where attendees were invited and encouraged to share their input on potential JLUS issues using an interactive audience response system that displayed real time results. The JLUS Overview / Compatibility Factors fact sheet was also distributed to enhance the public understanding of the JLUS project.
- Public Forum # 2 (February 2016). The second public forum was conducted at three separate JLUS Study Area locations. The information presented was oriented to the military facility in the region and the regional context. Meetings were held on the following dates at the following locations:

- February 22, 2016 at the WestGate Academy in Daviess County
- February 23, 2016 at the Sullivan Middle School in the City of Sullivan
- February 24, 2016 at the Bedford Area Chamber of Commerce Building in the City of Bedford

During the second forum draft compatibility findings, an overview of future trends (community growth trends, foreseeable military operations), and preliminary implementation actions and compatibility planning tools were presented. The working session gave the public an opportunity to provide input and comment on the issues identified. The public was invited to provide additional issues that they felt were not captured through previous meetings.

Public Forum #2

- Public Forum # 3 (November 2016). The third public forum was conducted at three separate JLUS Study Area locations. The information presented was oriented to the military facility in the region and the regional context. Meetings were held on the following dates at the following locations:

  - November 15, 2016 at Life Tabernacle Church in Lawrence County
  - November 16, 2016 at the WestGate Academy in Daviess County
  - November 17, 2016 at the Sullivan Middle School in the City of Sullivan

This final public forum was conducted to present the Public Draft JLUS to the communities and the citizens. The forum allowed the public to an opportunity to provide feedback to be considered and incorporated in the Final JLUS. The Public Draft JLUS was made available on the project website for download before the forum was held.

Public Outreach Materials

JLUS Overview / Compatibility Factors Fact Sheet / Updates. At the beginning of the JLUS project, a Fact Sheet, or JLUS Update, was developed describing the JLUS program, objectives, and methods for the public to provide input into the process, an overview of the 25 compatibility factors that were analyzed throughout the project, and the proposed NSA Crane JLUS / LGTF Study Area. This Fact Sheet was made available at the workshops for review by interested members of the public and posted on the website for download.

NSA Crane / LGTF JLUS Overview Fact Sheet#1

Website. A project website was developed and maintained to provide stakeholders, the public, and media representatives with access to project information. This website was maintained for the entire duration of the project to ensure information was easily accessible. Information on the website included program points of contact, schedules, documents, maps, public meeting information, and downloadable comment forms. The project website is located at www.cranejlus.com. At the completion of the project, all information on the www.cranejlus.com website will be transferred to OCRA to be maintained and ensure future public access to the information.

NSA Crane / LGTF JLUS Website

1.6 JLUS Study Area

The NSA Crane JLUS Study Area is designed to address all land near NSA Crane and its LGTF that may impact current or future military operations or be impacted by operations. Since the JLUS has been developed for two specific geographic locations, there are two distinct sub-study areas within the overall JLUS Study Area: the NSA Crane Study Area includes Daviess County, Greene County, Lawrence County, Martin County and the Town of Crane. The LGTF Study Area includes Sullivan County and the City of Sullivan. The primary characteristics evaluated in determining the Study Areas were general compatibility factors associated with land use and development – particularly associated with the Interstate 69 corridor and areas immediately west of the LGTF, noise from operations, and the 3-mile notification buffer extending 3 miles beyond the installation boundaries established by state statute. Figure 1-1 illustrates the NSA Crane JLUS Study Area.

JLUS Implementation

It is important to note that once the JLUS process is completed, the final document is not an adopted plan, but a set of recommended strategies to be used by local jurisdictions, agencies, and organizations in the NSA Crane / LGTF JLUS Study Area to guide future land use decisions to attain compatibility. Acceptance of the JLUS by stakeholders (i.e. committees, the public, landowners, and local agencies) will be sought to confirm their collective support for the identified implementation efforts. For instance, local jurisdictions, and counties may use the strategies in this JLUS to guide future subdivision regulation, growth policy, and zoning updates, and to assist in the review of development proposals.

NSA Crane and LGTF will use the JLUS process as a guide for interacting with local jurisdictions on future projects, and managing internal planning processes with a compatibility-based approach. Through this process stakeholders will make the strategies in the JLUS a reality.

The key to the implementation of the strategies presented in this JLUS is the establishment of a JLUS Coordinating Committee that will oversee the execution of the JLUS. Through this Committee, local jurisdictions, the installation, and other interested parties will be able to establish procedures, recommend or refine specific actions for member agencies, and make adjustments to strategies over time.

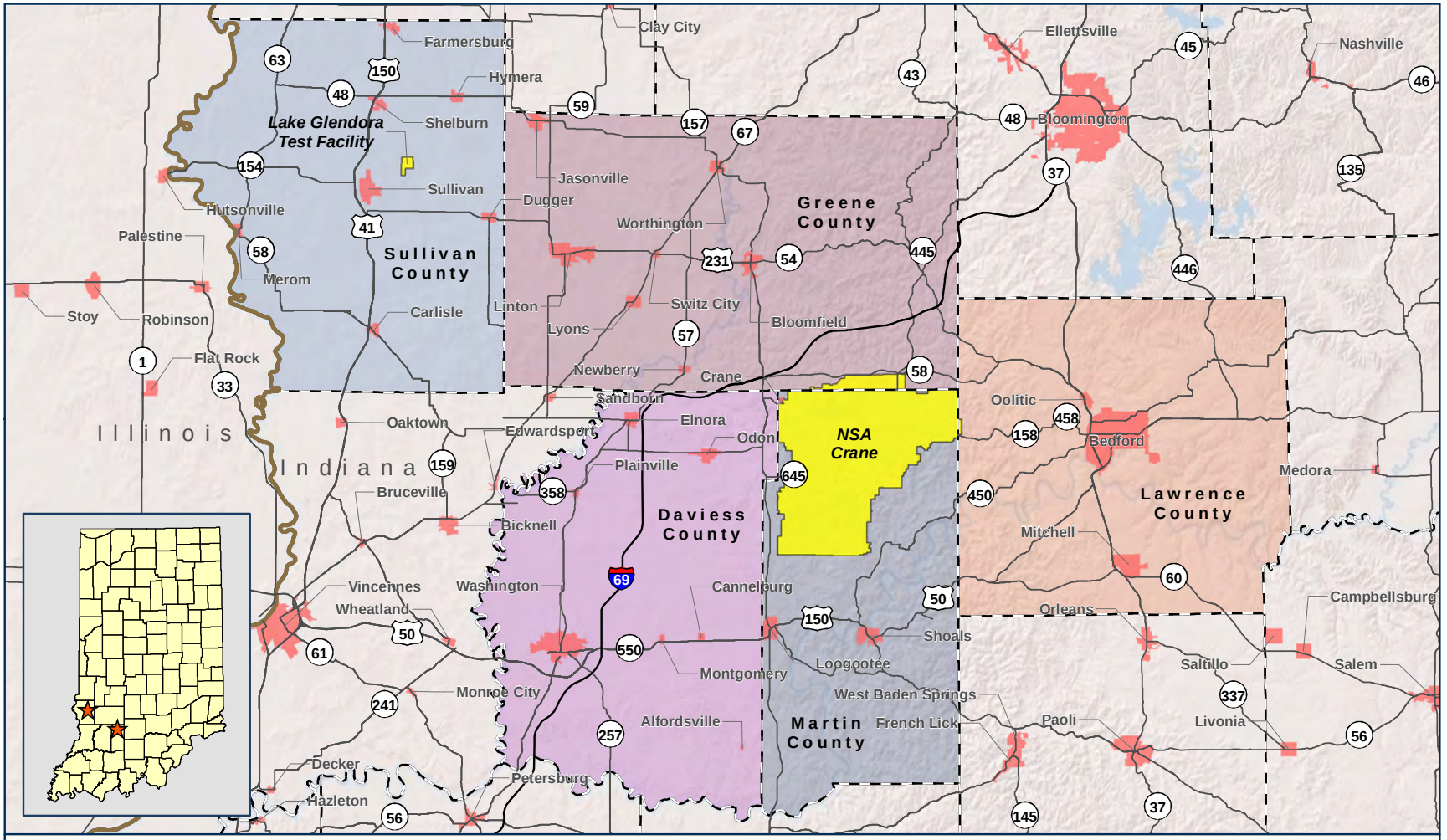
1.7 JLUS Background Report Organization

The following is a brief overview of the organization of the NSA Crane JLUS Background Report, including the contents of each of the five Chapters.

Chapter 1: Introduction. Chapter 1 provides an introduction and overview of the NSA Crane / LGTF JLUS. This chapter describes the working relationships among the organizations, the background and intent of the JLUS, the Study Area objectives to guide development of the JLUS, stakeholders involved in developing the JLUS, public outreach methods, implementation premise, and the organization of the document.

Chapter 2: Community Profile. In developing this JLUS, an informed understanding of local jurisdictions within the study area is necessary. This chapter identifies the local jurisdictions within the study area and includes an overview of the regional growth potential and a profile of the jurisdictions within the Study Area, highlighting population, housing, and transportation characteristics.

Chapter 3: Military Profile. The military profile discusses the military presence and activities within the study area including the military missions and strategic and local importance of NSA Crane and its LGTF. It is important to identify the military operating areas and current and possible future missions that take place in the study area to appreciate how the military operations could potentially impact, or be impacted by, the surrounding communities.



Source: NSA Crane, 2015

Figure 1-1
Study Area

Chapter 4: Existing Compatibility Tools. This chapter provides an overview of the relevant plans, programs, and studies that are or could be used as tools to address compatibility issues in the JLUS Study Area. The applicable tools are reviewed to set a baseline for the evaluation of the effectiveness of each existing plan or program relative to addressing compatibility issues, identified and described in Chapter 5.

Chapter 5: Compatibility Assessment. This chapter provides the compatibility issues and analysis identified for the NSA Crane / LGTF JLUS Study Area. These issues were identified based on input from the PC and TWG, members of the public, existing plans and technical reports, and evaluation by the project team. This chapter enumerates the issues and categorizes them into the following 25 compatibility factors. Factors identified in grey were not identified as a compatibility concern in this JLUS.

- Air Quality
- Anti-Terrorism / Force Protection
- Biological Resources
- Climate Adaptation
- Coordination / Communication
- Cultural / Historic Resources
- Dust, Smoke, and Steam
- Energy Development
- Frequency Spectrum Capacity
- Frequency Spectrum Interference / Impedance
- Housing Availability
- Infrastructure Extensions
- Land and Air Spaces
- Land Use
- Legislative Initiatives
- Light and Glare
- Marine Environments
- Noise
- Public Trespassing
- Roadway Capacity
- Safety
- Scarce Natural Resources
- Vertical Obstructions
- Vibration
- Water Quality / Quantity

Please see next page.

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2.1 Introduction

This section provides information about the communities surrounding Naval Support Activity (NSA) Crane and the Lake Glendora Test Facility (LGTF) and the relationship between these civilian and military areas within the Joint Land Use Study (JLUS) Study Area. Capturing and describing certain characteristics of the participating JLUS communities help provide a baseline context from which informed decisions can be made when assessing compatibility strategies. The goal is to provide information that enables stakeholders to gain an understanding of population and development trends that have the potential to affect operations and the future of NSA Crane and the LGTF, which along with other factors will nurture coherent, informed planning policies about future development and economic growth plans and goals before compatibility issues arise.

Information presented includes general land use, population growth, economic development, housing, and transportation within the region to better appreciate the communities within the Study Area and their relationship to NSA Crane.

The overall objective of this chapter is to foster an understanding about the types of activities occurring “outside the fence” when considering future missions and operations.

2.2 Regional Overview

The NSA Crane JLUS Study Area includes Daviess County, Greene County, Lawrence County, Martin County and the communities within them. The LGTF JLUS Study Area includes Sullivan County and the City of Sullivan. The counties were established in the late 1800s with economies based on agriculture and natural resource extraction. The area has largely maintained its rural nature with small towns located along state routes and multiple parks, wildlife areas, and forests, including the 200,000 acre Hoosier National Forest located southeast of NSA Crane.

The area is mostly served by state highways and roads. However, a new corridor of Interstate 69 (I-69), connecting Evansville to Indianapolis is under construction with the section between Evansville and Bloomington open as of December 2015, the section from Bloomington Martinsville slated for completion in 2017, and the section from Martinsville to Indianapolis scheduled for completion in 2018. The I-69 corridor generally runs a north-south trajectory through Daviess County east of the City of Washington and Elnora, before veering east and northeast, coming within 2 miles of the NSA Crane at its closest to point before continuing northeast to Bloomington. There are four I-69 interchanges within the Study Area – two in Daviess County:

- Intersection at US Highway 150 east of the City of Washington
- Intersection at State Road 58 approximately 3.5 miles west of Odon and two in Greene County:
- Intersection at US Route 231 about 2 miles northwest NSA Crane
- Intersection at State Road 45 approximately 4 miles north of the NSA Crane Bloomington Gate

These interchanges are local points of entry from I-69 and serve as logical nodes for development. Daviess County and the City of Washington have been working to secure development at the US Highway 150 interchange. The US Route 231 interchange is ripe for development given its proximity to the NSA Crane Main Gate and WestGate@Crane Tech Park. Though development at highway interchanges tends to be highway-related commercial, these areas can serve as catalysts for additional growth.

Daviess County

Daviess County had a 2010 population of 31,648 and is home to a large Amish settlement of 725 Old Order Amish families, making up more than ten percent of the population. The county is a major tourist destination for outdoor recreation and festivals hosted throughout the year. There are seven incorporated communities in the county, including the county seat – the City of Washington, and the Town of Odon located approximately four miles west of the NSA Crane property. Proximity to NSA Crane is considered an asset to the town which also expects to benefit from the I-69 corridor interchanges to the west and northeast and the WestGate@Crane Technology Park.

Daviess County was formed in 1817. The northeast portion of the county was originally heavily forested, leading to a large timber industry during the first half of the 1800s. Agriculture was another major element of the county's early economy, with a majority of early settlement along the White River.

A man in a buggy rides down Odon-Cannelburg Road in Daviess County

City of Washington

The City of Washington is the largest city in Daviess County, with a 2010 population of 11,509. The city is located at the intersection of US Highway 50 and State Route (SR) 57 in Daviess County, about 20 miles southwest of NSA Crane. The recently opened portion of I-69 includes an interchange at US Highway 50, 3 miles east of the city.

The City of Washington was established in 1817. One of the first industries developed in the area was sawmills due to the large areas of forested land that needed to be cleared for agricultural use. The arrival of the Erie Canal and railroads created an economic boom in the city. In 1889, the largest railroad repair shop in Indiana was built along the western portion of the railroad in Washington.

Today, the City of Washington is surrounded by cropland growing soybeans, corn, and winter wheat. However, within the incorporated boundary, the city is predominantly urban with some forestland and pasture. Within the city the service sector is the largest employer, followed by the retail and the government sector. Forty-five percent of residents work outside the city and twenty seven percent work outside the county.

Town of Montgomery

Montgomery is the fifth largest town in Daviess County, with a 2010 population of 343 in 2010. The town is located along US Highway 50, east of the City of Washington and approximately 17 miles southwest of NSA Crane.

The town was incorporated in 1870. Montgomery's development depended a great deal on the expansion of the railroad and its population steadily increased as the railway system and local coal industry developed. The town's early economy was based mostly on coal and farming. Beginning in the second half of the 20th century, employment in construction, trade and services began to dominate the economy. In the 1980s and 1990s, surface mining returned as a source of employment in the area. In recent years, Montgomery has seen an increase in construction, manufacturing, retail trade, and tourism.

Town of Odon

The Town of Odon is the second largest town in Daviess County, with a 2010 population of 1,354. State Road 58 runs directly through Odon which connects to US Route 231 to the east and extends past I-69 to Merom in the western portion of Indiana.

The Town of Odon's development depended on its location and the area's rich farmland and timber. The town's primary industries were agricultural in nature. Most farms produced corn and wheat and raised stock. In 1889 the railroad came to Odon, which increased the economic activities downtown. Throughout much of the 20th century, Odon continued to be rooted in the farming community.

In recent years, Odon has seen an increase in construction and manufacturing. Retail trade and tourism have also increased as Odon has showcased its Amish and Mennonite communities.

Source: City of Odon Comprehensive Plan, 2006; Montgomery Comprehensive Plan; Washington Comprehensive Plan, 2009

Greene County

Greene County was established in 1821, the same time five townships within Greene County were established, which included Highland, Richland, Burlingame, Plummer and Stafford. These five townships were subdivided over time to create the existing 15 townships in the county.

In 1820, Greene County's population was only about 400 people, but by 1850 the population grew to just over 12,000 people. Greene County was a common stop for Mormons traveling from Ohio to Illinois. Joseph Smith, the founder of Mormonism, stopped in Cass Township in 1830. In 1851 the Wabash and Erie Canal began operation through Greene County, which supported the iron industry in the area. However, the canal closed in 1859 as railroads were developed, which did not pass through Greene County until 1869. Coal mining began in the county in the 1840s, which progressed from pick and shovel to mine shafts in the late 1880s to strip mining that occurs today.

Along with the coal industry, Greene County has also begun incorporating alternative energy. A 1-megawatt solar panel farm was constructed the summer of 2015 on 14 acres south of the Town of Bloomfield. Hoosier Energy and the Utilities District of Western Indiana Rural Electric Membership Corporation joined together to start the photovoltaic solar array initiative. According to Hoosier Energy, at full capacity the project generates enough electricity for 1,000 homes and businesses.

The county is adjacent to the Bloomington Metropolitan Statistical Area. In 2010 the population was 33,165. Greene County, located north of Martin County, contains approximately 4,000 acres of NSA Crane. Low density development exists along SR 45 north of NSA Crane in Greene County. A majority of the land, 86 percent, is Undeveloped, Agricultural, or Forest land, 6 percent is Public land, and 6 percent is Residential.

Train passing over the Tulip Viaduct in Greene County

Town of Bloomfield

The Town of Bloomfield is located in central Greene County and had a 2010 population of 4,405. The town is located about 10 miles north of NSA Crane, at the intersection of US Route 231 and SR 54.

The town was established in 1824, in a prime location along the Richland Creek and west fork of the White River. Because of its reliable water supply, the town grew quickly and between 1824 and 1885 the courthouse had to be rebuilt three times to increase its capacity. Two railroads served the town, the Bedford and Bloomfield Railroad and the Indianapolis Southern Railway.

In Bloomfield, the government sector is by far the largest employer. There are 1,325 employees in government which makes up 45 percent of the town's employment. The services sector and retail sector together with

government make up 73 percent of Bloomfield's employment. There are several large businesses located in Bloomfield along with smaller locally-owned business around the courthouse square.

Sources: US Census 2010; Greene County Comprehensive Plan, 2009; Bloomfield Comprehensive Plan, 2009

Lawrence County

Lawrence County was founded in 1818. The county became known as "Limestone County" due to the large presence of limestone in the area and its quarrying and carving history that began in the early 1800s. The Bedford, Springville, Owensburg & Bloomfield railroad was built in 1875 and changed the limestone business, attracting capital and industry to the county. Limestone production and the new rail line transformed the small village of Bedford into a city, with a population of 9,000 in 1902. Limestone remains an important part of the county's economy along with manufacturing, tourism, and retail.

The 2010 population of Lawrence County was 46,134. The county has two census-designated places, 38 unincorporated communities, and 9 townships. There are also two cities in Lawrence County, Bedford and Mitchell, and one town, Oolitic. The City of Bedford is the county seat and approximately 15 miles east of NSA Crane. One of the recommendations of the Bedford Comprehensive Plan is to have the Lawrence County Economic Growth Council (LCEGC) and Bedford Chamber of Commerce (BCC) work together to develop more industries associated with NSA Crane and the I-69 corridor. The top priority is attracting industrial and technology companies to the East Gate Business and Technology Center in Bedford.

The Empire Quarry in Lawrence County

The City of Bedford

The City of Bedford is the largest city in Lawrence County with a 2010 population of 13,413. It was incorporated as a city in 1889 and serves as the county seat of Lawrence County.

The City of Bedford, similar to Lawrence County, took advantage of the large amount of limestone in the area which was initially used for foundations and window sills. The stone became popular as a building product after the Great Chicago Fire of 1871 due to the fact that the few remaining buildings after the fire were constructed with limestone. The wide use of limestone brought wealth to the community of Bedford, fostering its growth.

Today the biggest employment sectors are retail trade, services, and manufacturing trade. Some of the largest employers in Bedford include GM Powertrain, Indiana Limestone, Manchester Tank, Stone City Products, St. Vincent Dunn Hospital, and Indiana University (IU) Health.

Sources: City of Bedford Comprehensive Plan, 2009; US Census 2010

Martin County

Martin County was founded in 1820 and has been home to NSA Crane since it was established in 1940 during World War II. Of the 217,863 acres comprising Martin County, NSA Crane covers approximately 60,000 acres. As of 2008, 61 percent of the land in the County consists of agriculture and forest, 36 percent is in government ownership (NSA Crane, Hoosier National Forest, and Martin State Forest), almost two percent is residential and use, and less than one percent is industrial land use.

As of 2010, the Martin County population was 10,328, which is dispersed through the county in unincorporated communities or concentrated in the City of Loogootee and the towns of Shoals and Crane. The county also includes six townships.

The county's economy was historically supported by agriculture; however, the rich natural resources led to multiple economic ventures including stoneware and glass production, tourism associated with the railroad, and mussel harvesting from local rivers used to fabricate buttons.

City of Loogootee

The City of Loogootee had a 2010 population of 2,751. The city is located at the intersection of US Route 231 and US Highway 50, approximately 16 miles south of NSA Crane. The City of Loogootee was incorporated in 1853 and has a similar history to Martin County, based on the various natural resources found in the area along with agriculture.

Martin County Museum in the old Court House (Shoals, Indiana)

Most recently, with the exception of governmental employment associated with NSA Crane, the majority of employment in Martin County is located in Loogootee. The Transportation, Communications, and Utilities sector is the largest employer in the city. There are several large businesses located in and around Loogootee. Frito-Lay, one major employer, is located off of US Route 231, seven miles southeast of the city. Smaller locally-owned businesses can be found primarily in the downtown area along US Route 231 and US Highway 50.

Town of Crane

The Town of Crane is located in northwest corner of Martin County with an area of 0.12 square miles. The town is less than a mile northwest of the Crane Gate and nearby the WestGate@Crane Technology Park. The population was 184 as of the 2010 census.

Town of Shoals

The Town of Shoals is located approximately 5 miles south of NSA Crane, near the intersection of US Highway 50 and US Route 150 with a 2010 population of 756. The town is divided by the East Fork White River, which limits the town's growth due to the river's floodplain. Gypsum mines are the town's major employers, with two mines employing more than 400 workers. Every Fourth of July since 1993 the town has held a Catfish Festival. The festival embraces community pride and the river culture of the town. The town is also known for Jug Rock, the largest free-standing table rock formation in the US east of the Mississippi River.

Community of Burns City

Founded in 1849, Burns City is a small unincorporated community in Martin County with a 2010 population of 117. The community is situated on State Road 645 immediately west of the NSA Crane Burns City Gate which currently operates on a reduced schedule and approximately 12 miles south of the NSA Crane Main Gate.

Padanaram

Padanaram is a settlement of approximately 150 people who live in communal buildings in an area of northeastern Martin County. Located in the Hoosier National Forest, Padanaram is located approximately 0.7 miles east of NSA Crane. The community has existed since 1966 and grown from an area of 86 acres to over 2,400 acres of woods, farmland, and lakes. The group follows five guiding principles and believes in an order of peace and righteousness. Work is done in a variety of areas, including sawmilling, land improvement, bark mulch sales, cooking, creative arts, and other activities.

A school was established in 1972, which was expanded in 1985 to teach children from kindergarten to 12th grade.

Sources: Martin County Comprehensive Plan, 2009; www.visitmartincounty.org; US Census 2010; Photo: The Shoals News, Steve Deckard; City of Loogootee Comprehensive Plan, 2009

Sullivan County

Sullivan County was founded in 1817 had a 2010 population of 21,475. Coal mining has been an important part of the county's economy that continues today. The Bear Run mine which opened in 2010 and operated by Peabody Energy is the largest surface mine in the eastern United States employing approximately 540 workers and adding more than $165 million annually into the economy. Sullivan County is also the home of the Wabash Valley Correctional Facility – one of Indiana's newest and largest correctional facilities approximately seven miles south of the City of Sullivan, and the Merom Power Station – Hoosier Energy's largest power plant approximately five miles southwest of the City of Sullivan.

The Sullivan County Park and Lake is situated on the southwest side of Lake Sullivan. The facility consists of a 461-acre lake constructed in 1968 for swimming, boating, and fishing, and a 460-acre upland park providing areas for camping and recreation including a 9-hole golf course. The majority of Lake Sullivan is located outside the park and contains waterfront property in clustered residential subdivisions.

Throughout the summer different communities hold festivals in different parts of the county often featuring markets, crafts, and food which draw tourists to the county.

NSA Crane's 460-acre LGTF is located in Sullivan County, approximately 2 miles northeast of the City of Sullivan and a little more than a 1/2 mile east of Lake Sullivan. With restricted access to the public and a FAA airspace restriction, the LGTF is a major asset for testing in a controlled environment.

Sullivan County Courthouse

City of Sullivan

The City of Sullivan is the largest city in Sullivan County, with a 2010 population of 4,249. The city shares the same economic history as Sullivan County, which was centered on agriculture and coal mining. The city is home to several historical buildings and landmarks along with two parks. The cultural and natural resources, along with city events and festivals, attract tourists to the community each year.

Sources: Peabody Energy Fact Sheet: Bear Run Mine; City of Sullivan Comprehensive Plan

Higher Education

Indiana University (IU), a major research institution, is located approximately 25 miles northeast of NSA Crane in Bloomington, Indiana. Although located outside of the Study Area, IU is a key attribute of southwest Indiana with over 40,000 students. Indiana University serves as a current and future partner with NSA Crane for mutual success, entering into an Education Partnership in August 2015. The purpose of the Education Partnership Agreement is to aid in the educational experience of Indiana University students by providing a mechanism by which the students can benefit from the NSA Crane's staff expertise, unique facilities and equipment related to the institution's academic disciplines. The partnership encourages and stimulates student interest in public administration, community operations and planning, science, engineering, mathematics, sustainability, and information technology. Students and graduates of IU have also participated in NSWC Crane Division's internship program and recent graduates program.

In April 2015, IU approved a new engineering program to improve both educational opportunities and economic development in the region. The 2014 Study "Strategic Plan for Economic and Community Prosperity in Southwest Central Indiana," recommended the creation of an engineering program. The study noted that the lack of an engineering program at IU makes it more difficult for regional manufacturers to engage the university. The new engineering program has the potential to help advance the relationship between IU and NSA Crane.

Indiana State University (ISU) in Terre Haute, Indiana is another strategic partner with NSA Crane. Indiana State University and NSWC Crane Division participate in an Educational Partnership Agreement (EPA) with a major focus in research and technology testing of unmanned systems sensors and vehicles. The EPA also aids the educational experience of ISU students by providing a mechanism by which the students can benefit from the NSWC Crane Division staff expertise and unique facilities and equipment. Indiana State University faculty and students have the additional benefit of conducting research and training at the LGTF for unmanned systems.

At LGTF, ISU's Center for Unmanned Systems can operate and train students with aerial, land, and marine vehicles.

Source: http://news.iu.edu/releases/iu/2015/04/business-support-for-iu-engineering-programs.shtml; http://www.astateofdefense.com/indiana-state-university.html

WestGate@Crane Technology Park

WestGate@Crane Technology Park is located approximately one mile west of the NSA Crane Gate, immediately north of the Town of Crane. The creation of the technology park was a multijurisdictional effort between Daviess County, Greene County, and Martin County. Other partners associated with the park include the Indiana Economic Development Corporation, the Indiana Office of Defense Development, Radius Indiana, the Southern Indiana Development Commission, the I-69 Innovation Corridor, and NSWC Crane Division.

WestGate@Crane Technology Park is home to over 20 companies, which consist of a growing cluster of defense-related Fortune 500 companies and small businesses serving NSA Crane and its tenant contracts. These companies include AECOM, NAVMAR Applied Sciences Corporation, Technical Services Corporation (TSC), STIMULUS Engineering, Science Applications International Corporation (SAIC), Tri-Star Engineering, Concurrent Technologies Corporation (CTC) and others. The park is equipped with 17 buildings, which include new office, industrial and mixed-used space, as well as high-speed fiber optic connectivity and data security. WestGate@Crane Technology Park features more than a quarter of a million square feet in new construction and has attracted more than $75 million in public and private investments. WestGate@Crane is the only tri-county Certified Technology Park (CTP) in the State of Indiana, and only CTP in the Radius region. The CTP program allows for the local recapture of certain state and local tax revenue which can be invested in the development of the park.

WestGate@Crane is also home to the WestGate Academy, a 64,000 square-foot two-story facility created to attract major university research faculty and conduct national technology conferences. With the completion of all I-69 segments between Evansville and Bloomington in December 2015 and the strategic proximity to NSA Crane, the Academy has the potential to help expand and grow the region.

WestGate Academy

The Greene County Council used economic development bonds to help build a Battery Innovation Center (BIC) at the WestGate@Crane Technology Park. The BIC provides testing and validation services for product development and technology support for the Department of Defense (DOD) and other clients. Prospective member institutions of the BIC include Cummins, Delphi, the University of Notre Dame, Indiana University Purdue University Indianapolis (IUPUI), Purdue University, Ivy Tech Community College, and The Pennsylvania State University (Penn State). Supporters of the project are hopeful that the multi-million dollar facility will make the southern Indiana region the "Silicon Valley" for advanced batteries.

Source: http://www.astateofdefense.com/westgatecrane.html; http://www.astateofdefense.com/battery-innovation-center.html; http://www.astateofdefense.com/the-west-gate-academy.html

East Gate Business and Technology Center

The East Gate Business and Technology Center (EGBTC), similar to WestGate@Crane Technology Park, is an effort to attract and accommodate industries complimentary with NSA Crane. The EGBTC is located in western Bedford, near the intersection of SR 37 and US Highway 50. The Center sits on 72 acres with a 355,000 square foot manufacturing building. The site includes a vibration testing facility, research and development labs, 13 loading docks, high speed internet, and semi-trailer storage.

Source: http://www.egbtc.com/

2.3 Study Area Growth Trends

The following section provides a profile of the counties and communities relative to population growth, housing, median home values, and economic growth trends. This information assists in establishing the context for the JLUS and the potential impacts on compatibility issues. These trends illustrate the type of growth which has occurred in the region surrounding NSA Crane and the LGTF, what may be anticipated to occur in the future, and providing valuable insight of where potential incompatibilities between NSA Crane, the LGTF, and the surrounding communities may develop.

Population Trends and Projections

The population data used below is based on information obtained from the US Census Bureau. Population projections show the overall population trends in specific areas. This trend information assists policymakers to make informed decisions about future planning and infrastructure investments. Table 2-1 shows the population in 2000 and 2010 and the percent increase over the decade.

Table 2-1. Study Area Population from 2000 to 2010

Jurisdiction	2000	2010	2000-2010 Change
Indiana	***6,080,485***	***6,483,802***	***6.6%***
Daviess County	29,820	31,648	6.1%
Greene County	33,157	33,165	.03%
Lawrence County	45,922	46,134	.46%
Martin County	10,369	10,334	-.34%
Sullivan County	21,751	21,475	-1.3%

Source: US Census Bureau, 2000-2010

Population is relatively stable in the Study Area, with most counties either increasing or decreasing slightly. Daviess County is one exception which grew at about the same rate as the State of Indiana. The WestGate@Crane Technology Park is expected to boost Martin County's population by about 594 persons and Greene County's population by another 3,009 persons by the year 2030.

County population growth estimates were prepared by the Indiana Business Research Center. These projections are provided in Table 2-2.

Table 2-2. Study Area Population Projections from 2010 - 2030

Jurisdiction	2010 Population	2020 Projection	2030 Projection	Percent Change (2010-30)
Indiana	***6,483,802***	***6,852,121***	***7,143,795***	***10.2%***
Daviess County	31,648	34,096	36,524	15.4%
Greene County	33,165	32,920	32,321	-2.5%
Lawrence County	46,134	45,815	44,878	-2.7%
Martin County	10,334	10,309	10,120	-2.1%
Sullivan County	21,475	21,011	20,429	-4.9%

Source: US Census Bureau, 2010, Indiana Business Research Center

Population projections show a slight decline in population in most of the counties with the exception of Daviess County, which is expected to increase in population. Sullivan County is expected to decrease in population the most over the next 10 to 15 years, losing about 1,000 people. However, it is undetermined what overall impact the WestGate@Crane Technology Park will have on the future population in the area.

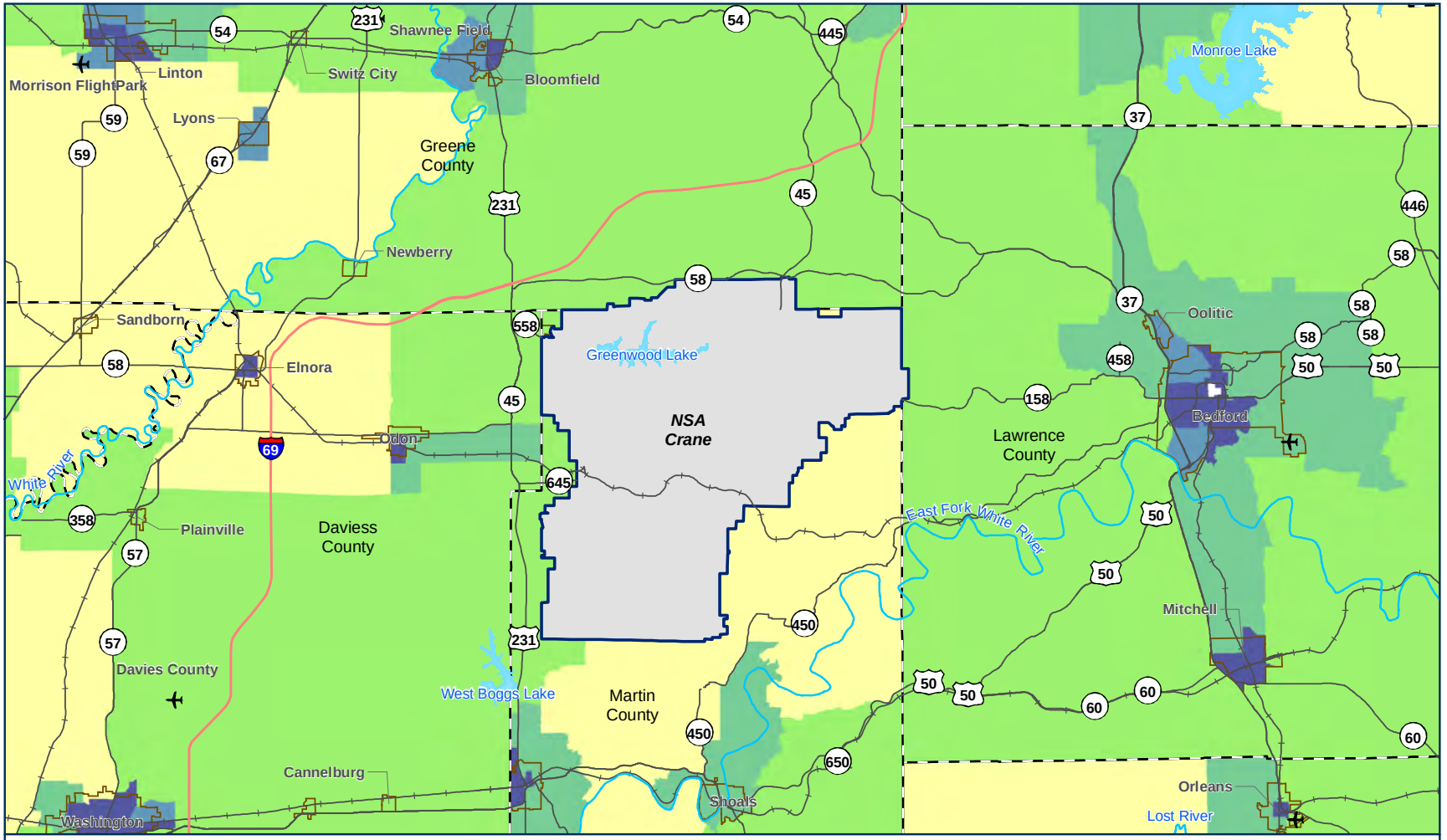
Population density is the amount of people per square mile who live within a defined geographic area. Population density trends provide insight into the potential for increased incompatibility with military operations. Figures 2-1 and 2-2 show the population density for the NSA Crane Study Area, which has remained relatively stable from 2000 to 2010. Figures 2-3 and 2-4 show the population density for the LGTF Study Area, which has also remained steady from 2000 to 2010, with a slight increase in density in southern Sullivan County and western Greene County.

Economic Growth Trends

The historic economic engine of southern Indiana has been the export of agricultural commodities throughout the US, which continues to play a significant role in the local economy. In addition to agriculture, the DOD through NSA Crane is a major area employer, employing about four percent of the Study Area population. NSA Crane provides over $1.5 billion annually in economic benefit to the Study Area. More detail regarding the NSA Crane economic benefit can be found in Chapter 3, Military Profile. While the geography and climate of southern Indiana has been ideal for agriculture, the number of agriculture-based jobs has been in steady decline. The resulting diversification of the economy in recent years has provided alternative sources of employment in the sectors of manufacturing, government, education services, healthcare, social service, and retail trade.

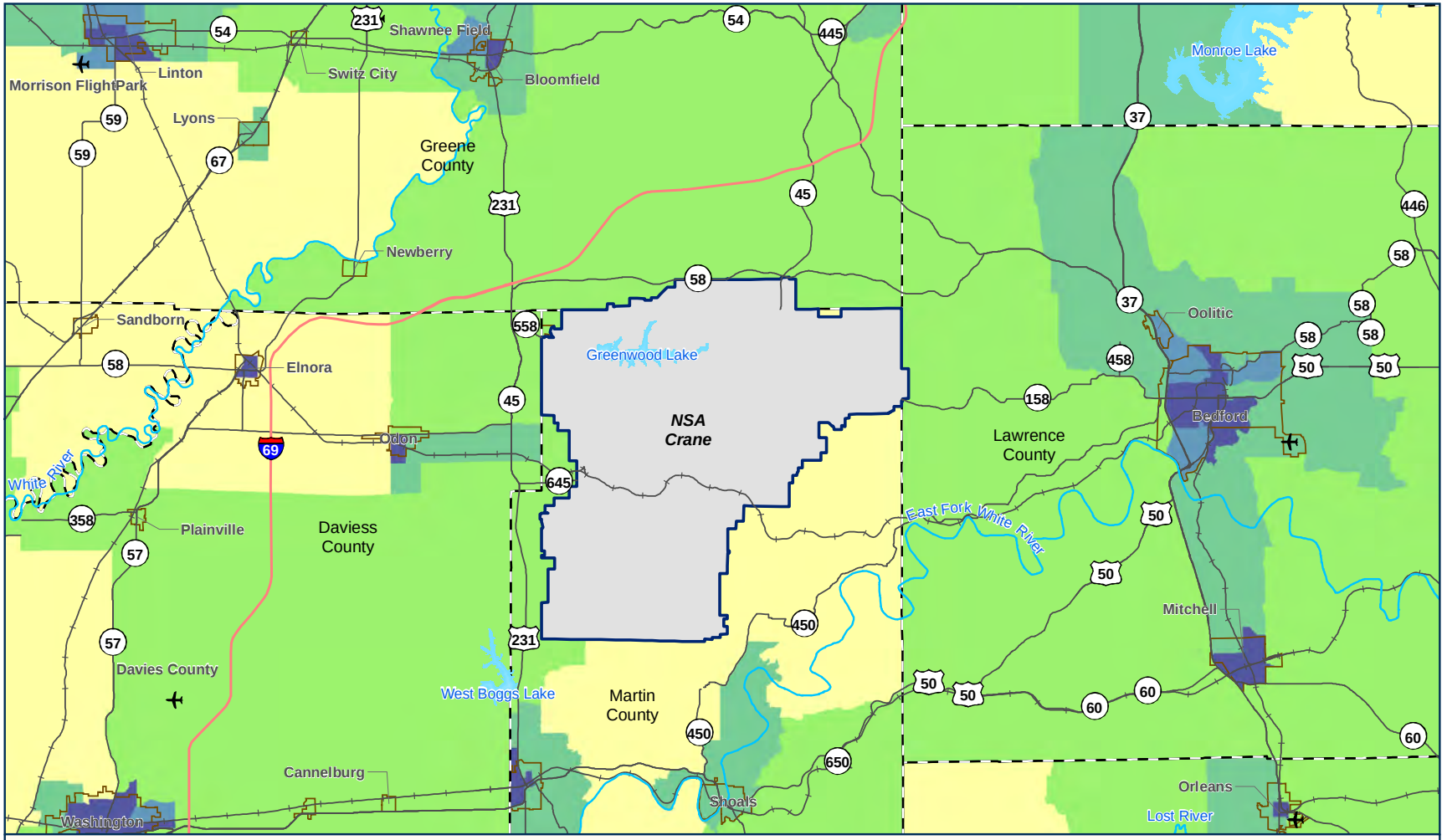
Radius Indiana is a regional partnership representing eight counties in South Central Indiana, including Daviess, Greene, Lawrence, and Martin Counties. Their mission is to lead regional collaboration by leveraging the diverse assets of Southern Indiana to attract and expand businesses, thereby increasing employment, investment opportunities, and quality of life within the region. Radius Indiana focuses on four main sectors – defense, tourism, manufacturing, and education. They focus on key DOD opportunities, such as attracting original equipment manufacturers (OEM) and capitalizing on opportunities related to construction of the I-69 corridor in the region.

Source: radiusindiana.com



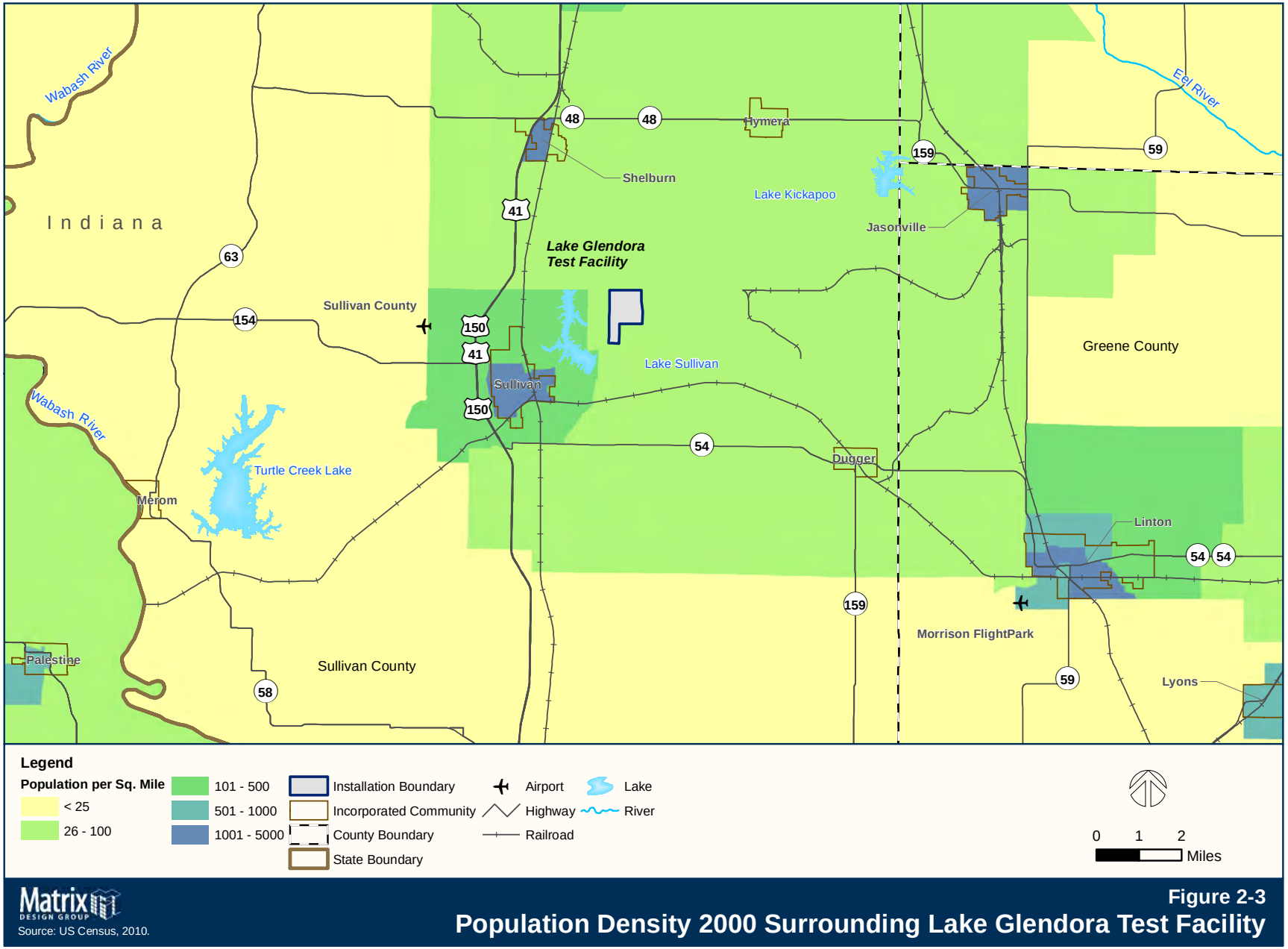
Source: Esri, 2010.

Figure 2-1
Population Density 2000 Surrounding NSA Crane



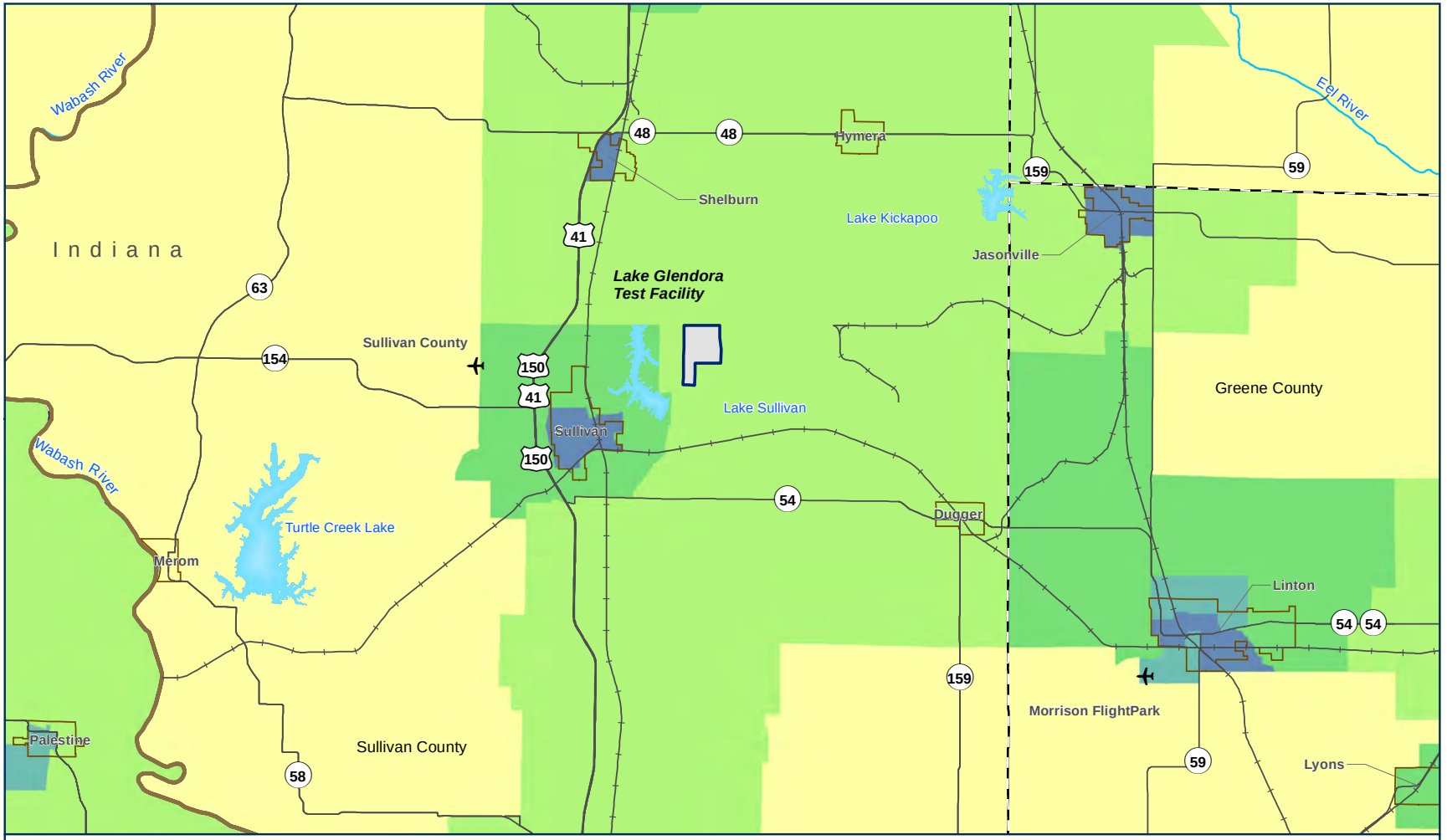
Source: Esri, 2010.

Figure 2-2
Population Density 2010 Surrounding NSA Crane



Source: US Census, 2010.

Figure 2-3
Population Density 2000 Surrounding Lake Glendora Test Facility



Source: US Census, 2010.

Figure 2-4
Population Density 2010 Surrounding Lake Glendora Test Facility

As indicated by the figures in Table 2-3, the Study Area counties have experienced substantial growth in household income between 2000 and 2014, above the state average.

Table 2-3. Median Household Income 2000 to 2014

Jurisdiction	2000 Median Household Income	2014 Median Household Income	Percent Change (2000-14)
Indiana	***$41,567***	***$48,060***	***15.6%***
Daviess County	$34,064	$47,670	39.9%
Greene County	$33,998	$41,077	20.8%
Lawrence County	$36,280	$45,232	24.6%
Martin County	$36,411	$48,381	32.8%
Sullivan County	$32,976	$43,933	33.2%

Source: American Community Survey, 2007-2011; Stats America Indiana Business Research Center

Table 2-4 shows the local labor force for each Study Area county averaged between 2009 and 2013. For this period, unemployment is below the state level in all of the counties. Both Martin and Daviess Counties have low unemployment rates, but Daviess County is the only county with a rate below the national unemployment rate of 5.5 percent.

Table 2-4. Averaged 2009-2013 Labor Force Statistics

Jurisdiction	Labor Force	Employed	Unemployed	% Unemployed
Indiana	***3,279,355***	***2,963,879***	***315,476***	***9.6%***
Daviess County	14,868	14,104	764	5.1%
Greene County	15,600	14,302	1,291	8.3%
Lawrence County	21,380	19,359	1,987	9.3%
Martin County	5,122	4,743	344	6.8%
Sullivan County	8,914	8,176	738	8.3%

Source: Selected Economic Characteristics, American Community Survey 5-Year Estimates, 2009-2013

Daviess County

The primary industries in Daviess County are manufacturing, education, healthcare, and retail. The manufacturing industry comprises of 22.2 percent of the county's workforce. Major employers include Daviess Community Hospital and Boyd & Sons Machinery, located in Washington. Although NSA Crane is not located within Daviess County, the installation supports the county's economy, especially with the WestGate@Crane Technology Park. If the WestGate@Crane Technology Park reaches its full potential of 3,000 employees, nearly 2,100 jobs may be located in the Daviess County portion of the Park. Resident employees of the Park may create another 254 employees, providing retail and personal services to those employees choosing to reside in Daviess County.

There are a number of economic development organizations working to strengthen the county economy including the Daviess County Economic Development Corporation which is committed to enhancing the business climate and improving the standard of living.

Tables 2-5 and 2-6 show the major employers and total jobs per industry sector in Daviess County, respectively.

Source: Daviess County Comprehensive Plan, 2009

Table 2-5. Major Employers in Daviess County

Major Employers	
Daviess Community Hospital	GSG Trucking
Boyd & Sons	Grain Processing Corporation
URS	Jones & Sons
Walmart	North Daviess Elementary
Indiana Log Homes Supply	Peabody Energy

Source: Indiana Department of Workforce Development

Table 2-6. Daviess County Jobs Per Industry Sector

Industry	Estimate	Percent
Agriculture, Forestry, Fishing and Hunting, and Mining	1,089	7.7%
Construction	1,295	9.2%
Manufacturing	3,126	22.2%
Wholesale Trade	149	1.1%
Retail Trade	1,460	10.4%
Transportation and warehousing, and utilities	1,199	8.5%
Information	64	0.5%
Finance and insurance, and real estate and rental and leasing	298	2.1%
Professional, scientific, and management, and administrative and waste management services	690	4.9%
Educational services, and health care and social assistance	2,561	18.2%
Arts, entertainment, and recreation, and accommodation and food services	814	5.8%
Other services, except public administration	501	3.6%
Public administration	858	6.1%

Source: US Census Bureau, American Community Survey, Selected Economic Characteristics, 2010-2012

Greene County

The primary industries in Greene County are education, healthcare, manufacturing, and retail. The education and healthcare industry comprises of 22.2 percent of the county's workforce. Top employers in the county include Walmart, Greene County General Hospital, and SAIC – an information technology company.

The Greene County Economic Development Corporation (GCEDC) was formed when the need for a professionally organized economic development body was recognized. In 1989 GCEDC became the agency responsible for initiating economic development activities on behalf of Greene County. The GCEDC is a private, not-for-profit organization run by an eleven-member board of directors. The GCEDC mission is to enhance the quality of life for Greene County residents by fostering an environment that will create and retain jobs, increase the tax base and promote economic growth.

Tables 2-7 and 2-8 show the major employers and total jobs per industry sector in Greene County, respectively.

Table 2-7. Major Employers in Greene County

Major Employers	
Walmart	Eastern Greene School
Greene County General Hospital	Shakamak School
SAIC	Eastern Greene High School
Glenburn Home	Computer Sciences Corporation
Linton-Stockton School	Linton Stockton Elementary

Source: Indiana Department of Workforce Development

Table 2-8. Greene County Jobs Per Industry Sector

Industry	Estimate	Percent
Agriculture, Forestry, Fishing and Hunting, and Mining	637	4.5%
Construction	1,168	8.2%
Manufacturing	2,079	14.5%
Wholesale Trade	191	1.3%
Retail Trade	1,511	10.6%
Transportation and Warehousing, and Utilities	685	4.8%
Information	190	1.3%
Finance and Insurance, and Real Estate and Rental and Leasing	594	4.2%
Professional, Scientific, And Management, and Administrative and Waste Management Services	1,157	8.1%
Educational Services, and Health Care and Social Assistance	3,178	22.2%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	823	5.8%
Other Services, Except Public Administration	717	5.0%
Public Administration	1,372	9.6%

Source: US Census Bureau, American Community Survey, Selected Economic Characteristics, 2010-2012

Lawrence County

The primary industries in Lawrence County are education, healthcare, manufacturing, and retail. The education and healthcare industry comprises of 23.7 percent of the county's workforce. The mining and limestone industry, along with the cattle industry, are also an important part of the county's economy. In addition, General Motors continues to invest in the GM casting plant in the City of Bedford, which employs approximately 525 employees. Lawrence County's economy has struggled in the past, hit hard by the loss of automobile-related jobs, along with the loss of 685 jobs when Bedford's Visteon plant closed in April 2008.

There are a number of economic development organizations working diligently to attract additional employment opportunities to Lawrence County, as well as strengthen existing businesses, including the Lawrence County Economic Growth Council. The mission of the Lawrence County Economic Growth Council is to collaboratively plan for and guide the economic development of the county, to facilitate the expansion and retention of existing business, to recruit new business, and to support the development of a quality of life that makes Lawrence County a superior place to live, work and operate a business.

Tables 2-9 and 2-10 show the major employers and total jobs per industry sector in Lawrence County, respectively.

Table 2-9. Major Employers in Lawrence County

Major Employers	
IU Health Bedford Hospital	Garden Villa
GM Powertrain	Stone Belt
Dana Corporation	Bedford-North Lawrence High School
Walmart	Indiana Limestone Company
Times-Mail	Tri Star Engineering

Source: Indiana Department of Workforce Development

Table 2-10. Lawrence County Jobs per Industry Sector

Industry	Estimate	Percent
Agriculture, Forestry, Fishing and Hunting, and Mining	281	1.5%
Construction	1,368	7.1%
Manufacturing	3,297	17.0%
Wholesale Trade	583	3.0%
Retail Trade	2,221	11.5%
Transportation and Warehousing, and Utilities	758	3.9%
Information	309	1.6%
Finance and Insurance, and Real Estate and Rental and Leasing	725	3.7%
Professional, Scientific, and Management, and Administrative and Waste Management Services	1,261	6.5%
Educational Services, and Health Care and Social Assistance	4,597	23.7%
Arts, Entertainment, and Recreation, and Accommodation And Food Services	1,792	9.3%
Other Services, Except Public Administration	882	4.6%
Public Administration	1,285	6.6%

Source: US Census Bureau, American Community Survey, Selected Economic Characteristics, 2010-2012

Martin County

The primary industries in Martin County are education, healthcare, manufacturing, and retail. The education and healthcare industry comprises of 17.6 percent of the county's workforce. NSA Crane is the largest contributor to the Martin County economy along with the US Gypsum Company and National Gypsum Company.

Although different sources have anticipated a decrease in manufacturing employment in Martin County, development at the WestGate@Crane Technology Park may increase manufacturing employment in the county by approximately 340 jobs – 238 jobs at WestGate and 102 jobs due to additional resident households. However, there is very little land available in the WestGate@Crane Technology Park that is within Martin County. The majority of available land is located west of Crane in Daviess County.

The Martin County Alliance for Economic Growth works to attract additional employment opportunities to Martin County, as well as strengthen existing businesses. Established in 2010, the Alliance is a local economic development organization committed to the economic growth and vitality of Martin County.

Tables 2-11 and 2-12 show the major employers and total jobs per industry sector in Martin County, respectively.

Table 2-11. Major Employers in Martin County

Major Employers	
NSA Crane	National Gypsum Company
NSWC Crane Division	Shoals Superintendent's Office
Crane Army Ammunition Activity	Shoals Community Elementary
US Gypsum Company	Martin County Healthcare-rehab
Stoll's Lakeview Restaurant	Loogootee Junior High School

Source: Indiana Department of Workforce Development

Table 2-12. Martin County Jobs per Industry Sector

Industry	Estimate	Percent
Agriculture, Forestry, Fishing and Hunting, and Mining	301	6.3%
Construction	342	7.2%
Manufacturing	827	17.4%
Wholesale Trade	68	1.4%
Retail Trade	573	12.1%
Transportation and Warehousing, and Utilities	261	5.5%
Information	67	1.4%
Finance and insurance, and Real Estate and Rental and Leasing	91	1.9%
Professional, Scientific, and Management, and Administrative and Waste Management Services	192	4.0%
Educational Services, and Health Care and Social Assistance	835	17.6%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	384	8.1%
Other Services, Except Public Administration	235	5.0%
Public Administration	567	12.0%

Source: US Census Bureau, American Community Survey, Selected Economic Characteristics, 2010-2012

Sullivan County

The primary industries in Sullivan County are education, healthcare, manufacturing, and retail. The education and healthcare industry comprises of 22.1 percent of the county's workforce. The county's top employers include Raybestos Powertrain – an automobile parts manufacturer, and Sullivan County Community Hospital. The Sullivan County Redevelopment Commission is an economic development organization dedicated to strengthening the economy run by a director and five-member redevelopment commission.

Tables 2-13 and 2-14 show the major employers and total jobs per industry sector in Sullivan County, respectively.

Table 2-13. Major Employers in Sullivan County

Major Employers	
Allomatic Products	Peabody Coal Company
Sullivan County Community Hospital	Miller's Merry Manor
Hoosier Energy Rural Electric	Southwest School Corp.
Raybestos Products	North American Latex
Walmart	McDonald's

Source: Indiana Department of Workforce Development

Table 2-14. Sullivan County Jobs per Industry Sector

Industry	Estimate	Percent
Agriculture, Forestry, Fishing and Hunting, and Mining	664	8.1%
Construction	541	6.6%
Manufacturing	1,166	14.3%
Wholesale Trade	164	2.0%
Retail Trade	1,020	12.5%
Transportation and Warehousing, and Utilities	475	5.8%
Information	100	1.2%
Finance and Insurance, and Real Estate and Rental and Leasing	383	4.7%
Professional, Scientific, and Management, and Administrative and Waste Management Services	418	5.1%
Educational Services, and Health Care and Social Assistance	1,804	22.1%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	523	6.4%
Other Services, Except Public Administration	266	3.3%
Public Administration	652	8.0%

Source: US Census Bureau, American Community Survey, Selected Economic Characteristics, 2010-2012

Housing Trends

Housing trends are an important indicator of economic activity and vitality that demonstrates population growth or decline relative to new residential construction within an area. These trends also represent market decisions relative to home ownership versus rental properties and provide important indicators into the affordability of residential dwellings for military personnel associated with an installation. The rate of housing development is also a strong indicator of the overall rate of development taking place in a region, which may result in potential incompatible land uses relative to operations at NSA Crane and the LGTF. Ultimately, housing trends potentially indicate future development and types of residential and commercial development. The following information illustrates the housing market trend including the value of existing housing units, the number of housing and construction permits issued at the county level with the JLUS Study Area. Table 2-15 shows the change in median monthly gross rents for the region between 2000 and 2013.

Table 2-15. Median Monthly Gross Rent 2000 to 2011

Jurisdiction	2000 Median Rent	2009-13 Median Rent	Percent Change (2000-13)
Indiana	***$521***	***$730***	***40.1%***
Daviess County	$363	$584	60.9%
Greene County	$375	$577	53.9%
Lawrence County	$447	$606	35.6%
Martin County	$356	$542	52.2%
Sullivan County	$375	$611	62.9%

Source: American Community Survey, 2007-2011; US Census Bureau 2000

From 2000 to 2013, the median rent increased by a range of 35 to 60 percent in the Study Area jurisdictions. In the 13 year span, every jurisdiction, except Lawrence County, experienced an increase of greater than 50 percent of the year 2000 value for rent. This trend is also slightly higher than the Indiana increased rate of rental cost and presents an affordability issue on a regional scale.

NSA Crane has 24 units of on-base housing available; indicating most military personnel and all civilian staff resides in off-base housing. For military personnel who seek off-base accommodations, the Basic Allowance for Housing (BAH) is provided to support housing. The BAH is a stipend given to military personnel who choose to live off base or cannot be accommodated in on-base housing and is designed to augment the costs of living associated with private sector arrangements, including home or apartment rent, utilities, and renters' insurance. The BAH rate for the lowest paygrade without dependents is $825, which is above the monthly median rent in all of the counties in the Study Area. The BAH does not apply to civilian employees, which accounts for the preponderance of NSA Crane personnel.

Housing value trends assist in illustrating the changes in land and home values relative to market fluctuations. These fluctuations can be indicative of development activity or inactivity as well as the location or migration patterns of populations. Table 2-16 shows the median housing value trends in the Study Area from 2000 to 2013.

Table 2-16. Median Housing Values from 2000 to 2013

Jurisdiction	2000 Median Housing Value	2009-13 Median Housing Values	Percent Change (2000-13)
Indiana	***94,300***	***122,800***	***30.2%***
Daviess County	70,800	105,500	49.0%
Greene County	66,800	88,800	33.0%
Lawrence County	75,400	98,200	30.2%
Martin County	64,200	88,500	37.9%
Sullivan County	58,900	77,600	31.7%

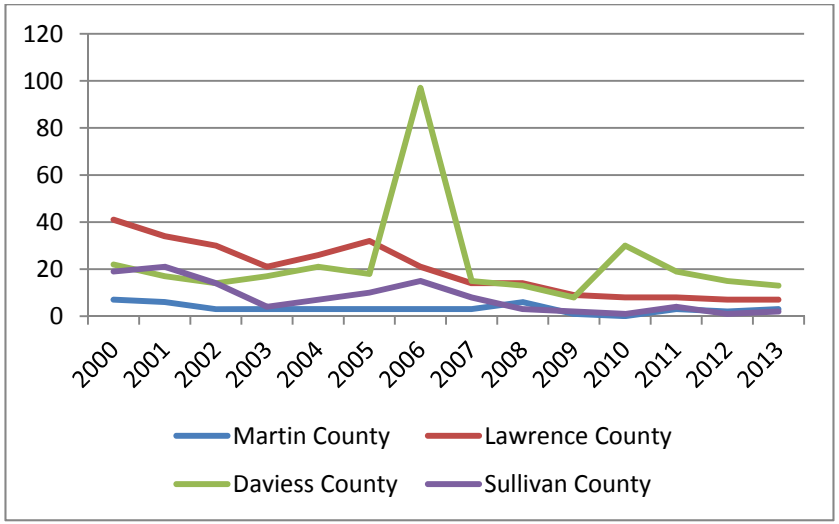
Source: American Community Survey, 2007-2011; US Census Bureau Summary File 3, 2000

Overall, the Study Area has experienced a steady rate of increasing housing values. The rates follow the state trend, with the exception of Daviess County which had a slightly higher increase.

The most significant variable explaining the lower median value of housing and lower median rent in the Study Area versus the state is the type of housing. All of the counties in the Study Area have a higher percentage of mobile homes than the state. Martin County and Greene County have the highest percentage of mobile homes in the Study Area, which contributes to the lower median housing values in those counties versus the state median.

Figure 2-5 shows the supply of newly constructed single family housing units between 2000 and 2013 in the Study Area as reported to the US Census Bureau. Greene County is absent from the data since they have not reported building permits.

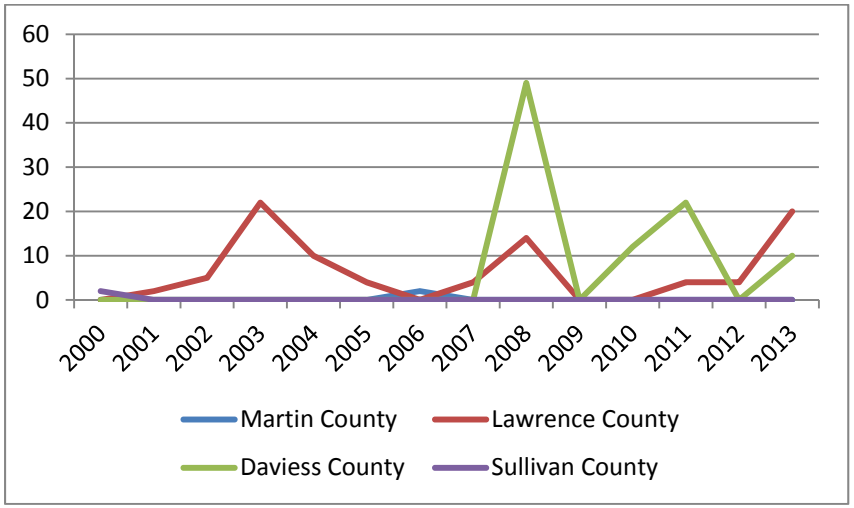
Figure 2-5. Single-Family Building Permits 2000-2013



Source: http://censtats.census.gov/bldg/bldgprmt.shtml

Most of the counties have seen a decline in single-family development, which may be attributed to the US housing bubble. Multi-family housing (housing with two or more units) is another component of housing availability in the Study Area. Figure 2-6 illustrates the trend in multi-family building permits at the county level from 2000-2013.

Figure 2-6. Multi-Family Building Permits 2000 - 2013



Source: http://censtats.census.gov/bldg/bldgprmt.shtml

Despite experiencing a decline in single-family building permits in Lawrence County, there has been some sporadic multi-family construction over the past 13 years. Daviess County has also seen some multi-family development.

Development Overview within the Study Area

Naval Support Activity Crane JLUS Study Area

Land uses throughout the NSA Crane JLUS Study Area range from open space and agriculture to the residential and population centers of Bedford, Odon, Bloomfield, Washington and Loogootee, with varying sizes of employment and population levels.

The area surrounding NSA Crane is a mix of agriculture, rural residential, and recreation / open space uses. Urban development exists in the towns and cities surrounding NSA Crane, including residential, commercial, retail, and industrial uses. Development surrounding NSA Crane is characterized by the following:

North

North of NSA Crane in Greene County, future development is focused along US Route 231, around WestGate@Crane Technology Park, and the I-69 corridor. Future land use opportunities include highway commercial development near the interchange, buildout of uses in the WestGate@Crane Technology Park, and commercial / industrial and residential uses along US Route 231 from SR 54 to Worthington.

East

Directly east of NSA Crane is the Hoosier National Forest which limits future development. Beyond the Hoosier National Forest, is the City of Bedford, which plans to develop and expand into the city's one-mile fringe. Development in the city limits is limited by environmental constraints directing future growth outside of the city. The city may seek permission from Lawrence County to plan within the extraterritorial jurisdiction. The City of Bedford may also pursue annexation of areas that contain terrain appropriate for future commercial and industrial use.

Future plans in Martin County include residential development in scattered locations on the flat un-forested ridges of eastern Martin County. The development would focus where existing residential concentrations exist.

South

The southern border of NSA Crane is bounded by the agriculture, open space, and forests of Martin County. Future growth and development is not currently planned in this area.

West

Future development plans in Martin County are targeted largely around the west side of the county, along US Route 231 near Loogootee and West Boggs Lake and north of the Town of Crane. Future industrial and commercial areas are planned at the WestGate@Crane Technology Park and along US Highway 50, US Route 231, and SR 550 around Loogootee. Future residential areas are planned along US Route 231 north and south of Loogootee and along US Route 231 north of West Boggs Lake.

The WestGate@Crane Technology Park, established in 2006, is located approximately 1 mile west of the NSA Crane Gate, and immediately north of the Town of Crane. The Park has seen steady, consistent growth since 2006, with more than 34 tenants, 17 buildings, and 730 employees in August 2014. WestGate@Crane Technology Park is a tri-county technology park, encompassing parts of Daviess, Greene, and Martin Counties. A nine-member board, the WestGate@Crane Authority, was created to develop and manage the Park while working with the three counties. With the opening of I-69 between Evansville and Bloomington in December 2015, future development and population growth is expected in areas around the Park.

In 2011, Greene County constructed a wastewater treatment facility to support the WestGate@Crane Technology Park and the development of the surrounding area. The plant has a 50,000 gallon per day treatment capacity and serves residents of the community of Scotland and the Greene County sector of the WestGate@Crane Technology Park. The wastewater treatment plant could expand the service area for the district's to include the Town of Crane and the Daviess County and Martin County portions of the Park. The Board of Commissioners in Greene County has created a regional sewer district which will operate the treatment facility and serve area customers including future additional use by commercial enterprise.

In 2013, the Greene County Redevelopment Commission constructed a water tower and supporting water lines at the WestGate @Crane Technology Park to increase water storage and distribution facilities. The new 250,000-gallon-capacity tower is designed to support the demand from growth and buildout of the WestGate @Crane Technology Park.

Source: westgatecrane.com/plans-growth/; Martin County Comprehensive Plan, 2009

Lake Glendora Test Facility Study Area

Land uses throughout the LGTF JLUS Study Area range from open space and agriculture to rural residential and urban. The City of Sullivan to the southwest of the LGTF includes an urban mix of residential, commercial, and industrial uses. Between the LGTF and city to the west is Lake Sullivan – a constructed lake with a public park on the southwest side and pockets of single-family large-lot residential subdivisions, open space and agriculture along the remaining edges. East and southeast of the LGTF was 3,500 acres leased to the Indiana Department of Natural Resources from Peabody Energy designated as the Minnehaha Fish and Wildlife Area. In April 2016 the lease from Peabody Energy was not renewed. Dotted throughout the area surrounding the LGTF are active coalbed methane gas wells.

Utilities

Most residents in the Study Area receive their electricity from a Rural Electric Membership Cooperative (REMC). The REMCs are non-profit electric utilities with rates regulated at the local level as opposed to the state level. The REMCs were established in 1939 to provide reasonably priced electricity to rural areas. Three REMCs operate in the Study Area – the Utilities District of Western Indiana REMC (UDWI REMC), Western Indiana Energy REMC (WIN Energy REMC), and the Daviess-Martin County REMC.

The UDWI REMC is a member of the Hoosier Energy Power Network and the fourth largest electric co-op in southern Indiana, serving all the Study Area counties. The UDWI REMC is part-owner of Hoosier Energy. Hoosier Energy operates numerous coal, natural gas and renewable energy power plants and delivers power through an expansive transmission network. WIN Energy

REMC serves over 16,500 homes and businesses in eight counties, including Greene and Sullivan counties. Daviess-Martin County REMC is a smaller co-op that serves more than 7,000 members in Daviess and Martin counties.

Hoosier Energy has also been working with Sullivan County to generate alternative energy using coalbed methane. Hoosier Energy produces power from coalbed methane at the Osprey Point Renewable Energy Station that opened in mid-2013 on the Merom Station grounds. The project uses coalbed methane from 58 wells drilled in Sullivan County to directly produce electric power.

Transportation

The local roadway system consists of highways, primary arterials, minor arterials, major and minor collectors, and local residential streets. The intent of this local roadway system is to provide mobility and access to the various communities within the JLUS Study Area and to connect them to other communities outside the Study Area. In addition, some of these roadways serve the counties residents and visitors by providing interstate and regional access.

The following is a brief description of the transportation network in the Study Area. Figure 2-7 illustrates the transportation network.

NSA Crane Study Area Transportation

US Highway 50, US Route 231 are two principal arterials in the NSA Crane Study Area. US Route 231 runs north-south in Martin County and Daviess County, tying into I-64 to the south and I-69 to the north. It continues north past I-69 through Greene County, connecting the Town of Bloomfield.
US Highway 50 runs east-west through Daviess County, Martin County and Lawrence County, connecting the City of Washington to the west and City of Bedford to the east. US Highway 50 also connects to I-69 in Daviess County.

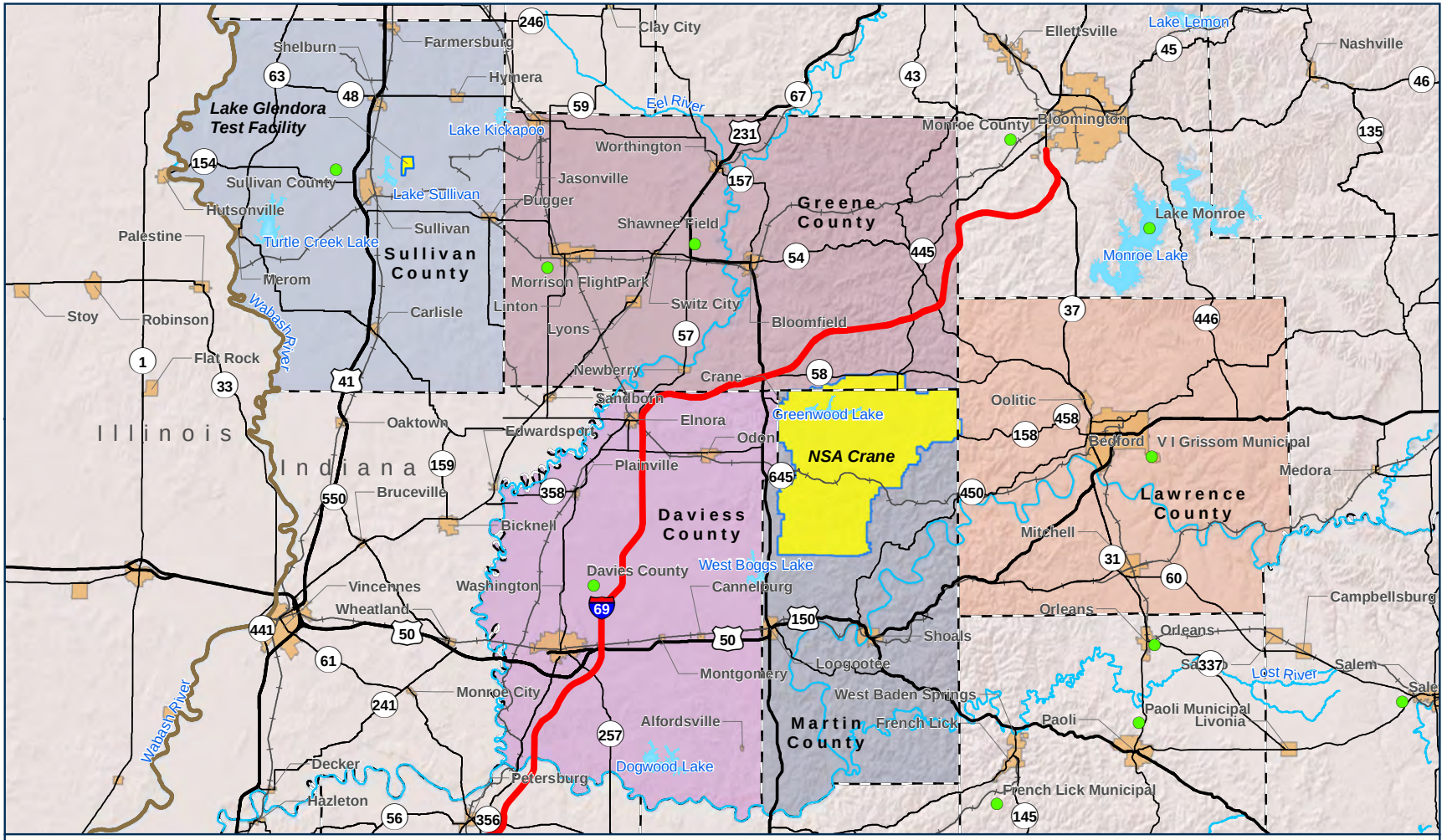
There are also several major collectors throughout the NSA Crane Study Area, including State Routes 45, 54, 58, 158, 450, 645, and many other state and county roads. State Road 45 runs from the intersection of US Route 231 east and parallel to the northern border of NSA Crane where it intersects with State Road 58 near the NSA Crane Bloomington Gate before heading north and east to Bloomington. State Road 58 connects the Town of Odon in Daviess County to US Route 231, providing access from areas west of NSA Crane. State Road 158 connects the City of Bedford in Lawrence County to NSA Crane.

The newest addition to the transportation network in the NSA Crane Study Area is I-69. In 1991, the U.S. Department of Transportation established six Corridors of the Future, designating I-69 as one that would extend from Mexico to Canada. This designation involved extending I-69 from Indianapolis to Evansville, Indiana. In 2003, a Tier 1 Final Environmental Impact Study (EIS) recommended the preferred corridor, Alternative 3C, which was selected by the Federal Highway Administration in 2004. The project was divided into six sections to conduct Tier 2 EISs.

The Tier 2 EISs have been completed for Sections One through Five. Sections One through Four of I-69 – from Evansville to Bloomington are open to traffic. Section Five – between Bloomington and Martinsville is slated for completion in 2017. The Tier 2 EIS for Section Six between Martinsville and Indianapolis is scheduled for completion in 2018.

There have been mixed opinions about the I-69 project. Groups who oppose the project raise concerns about the cost of extending I-69 and environmental issues associated with the project. Supporters of the extension say it is a key component for future economic vitality and will improve access to jobs, healthcare, and education.

Source: http://www.in.gov/indot/projects/i69/



Source: NAS Crane, 2015

Figure 2-7
Transportation

Lake Glendora Study Area Transportation

The main arterial that runs through the LGTF Study Area is US Highway 41 – a 4-lane divided highway which runs north-south through Sullivan County, stretching from the Upper Peninsula of Michigan south to Florida. Routes running east to west are limited to State Roads 54 and 154, and local roads. The LGTF is serviced only by local roads – East County Road 300 North and North County Road 225 East. There is also a limited connectivity to the City of Sullivan from the facility due to the location of Lake Sullivan. The LGTF is accessed by either Chaney Street or Section Street from the City of Sullivan.

Rail

The major railroad that runs through the NSA Crane Study Area is owned by the Indiana Rail Road – a privately-held 500-mile railroad established in March 1986. The company hauls a variety of consumer, energy and industrial products, and serves central and southwest Indiana and central Illinois. They own and operate a line exiting NSA Crane on the west side of the installation running east-west through Martin and Daviess counties before turning north toward the City of Terre Haute through western Greene County. This line intersects with an east-west Indiana Rail Road line connecting Illinois with Bloomington and Indianapolis through Sullivan and Greene counties.

Other rail operators within the Study Area include CSX Transportation and the Indiana Southern Railroad.

Founded in 1827, CSX transportation serves nearly two-thirds of the US population through a network encompassing some 21,000 route miles of track. CSX transportation operates three lines: a line south of NSA Crane running east-west through central Martin and Daviess counties connecting Illinois and the Ohio border, a line running south from Bedford through Lawrence County connecting to Louisville, and a line running north-south through Sullivan County and the City of Sullivan connecting Terre Haute and eastern Illinois with northern Kentucky.

The Indiana Southern Railroad is a short-line railroad established in 1992 owned by Genesee & Wyoming. The railroad operates a single 196-mile line between Indianapolis and Evansville largely serving the commodities market including coal and grain products. This rail line traverses Greene County on a southwest-northeast diagonal and western Daviess County on a general north-south path.

Air Transportation

There are three public use airports within the NSA Crane Study Area – Daviess County Airport in the City of Washington, V.I. Grissom Municipal Airport in the City of Bedford (Lawrence County) and Shawnee Field in the Town of Bloomfield (Greene County). Other public airports can be found in the City of Bloomington (Monroe County), Orange County, Washington County, Warrick County, and Dubois County. Evansville Regional Airport is the closest airport which is certified to handle scheduled air passenger carrier operations. The nearest airport offering a full range of domestic and international flights is the Indianapolis International Airport.

The Sullivan County Airport, the only public use airport in the LGTF Study Area, is a county-owned airport located three nautical miles northwest of the City of Sullivan. The airport has one asphalt runway and a total of 3,792 aircraft operations in 2012. There is also one private use airport in the LGTF Study Area – the Drake Airport. Drake Airport is approximately one nautical mile northwest of the LGTF. The small privately owned airport has one turf runway.

Rails-to-Trails

Rails-to-Trails is a nationwide conservancy program that encourages the transformation of unused rail corridors into public trails for walking, running, and biking. Indiana has increased the miles of trail significantly in the past few years through the program. One of the trails located in the NSA Crane Study Area – the Milwaukee Road Transportation Trail Way, opened in October 2014. The trail currently runs 10.5 miles from Bedford west to Williams. Future phases of the project plan to extend the trail west to Indian Springs at the southeastern edge of NSA Crane. The portion of the abandoned right of way between mileposts 241.35 and 243.10 is abutted by a DOD restricted security area and is off limits to the public, ensuring the trail will end before reaching NSA Crane property.

Cultural and Natural Resources

Land in Indiana is classified into general natural regions based on natural features, including climate, plant and animal distribution, soils, topography and glacial history. Land in Sullivan County, Daviess County, and western Greene County is classified as Wabash Lowland. Eastern Greene County and Martin County land is classified as Crawford Upland. Lawrence County has multiple classifications of land, including Crawford Upland, Mitchell Plateau, and Norman Upland. The Wabash Lowland Section is characterized by low hills and broad valleys and is an area that has the longest growing season and highest average summer temperature in the state. The Crawford Upland Section has distinctive hills with sandstone cliffs and rockhouses. Characteristic soils include silt loams and vegetation mostly consists of an oak-hickory assortment.

Daviess County

There are 13 properties and districts in Daviess County listed on the National Register of Historic Places. Seven of the places are located in the City of Washington, including the Daviess County Court House, Washington Commercial Historic District, the Robert C. Graham House, and the Magnus J. Carnahan House. Other historic properties in the county include County Bridge No. 45, Jefferson Elementary School, the McCall Family Farmstead, and the Glendale Ridge Archaeological Site.

Greene County

The Indiana Department of Natural Resources and Historic Landmarks Foundation have identified 1,109 historic structures in Greene County which are considered worthy of historic preservation. The identification of properties as historic is primarily for informational purposes and, unless placed on a register of historic properties, there are no restrictions on use, rehabilitation, or demolition. There are seven properties and districts listed on the National Register of Historic Places in the county including the Greene County Courthouse and the Osborn Site, both in the Town of Bloomfield, and the Richland-Plummer Creek Covered Bridge and Scotland Hotel, both in Taylor Township.

Lawrence County

Lawrence County contains 12 districts and properties that are listed on the National Register of Historic Places. Many of the sites are located in the City of Bedford, including the Bedford Courthouse Square Historic District, the Indiana Limestone Company Building, Madden School, the C. S. Norton Mansion, Otis Park and Golf Course, the William A. Ragsdale House, and the Zahn Historic District. The Mitchell Downtown Historic District and the Mitchell Opera House are two historic areas in the City of Mitchell.

Indiana's stone belt is a narrow band of limestone about 10 miles wide and 30 miles long that runs through Monroe and Lawrence Counties. Due to the large presence of limestone, the county became known as "Limestone County." Limestone from southern Indiana was used to construct numerous building throughout the county including the Empire State Building and Grand Central Station in New York City, the Pentagon in Washington, DC, and the Biltmore Mansion in Ashville, North Carolina.

Martin County

The Martin County Historical Society identifies 10 sites and 4 structures as historic. The 10 sites include numerous geological sites. The four structures include the Old County Courthouse (currently the Martin County Museum), the Old County Jail, the Houghton House, and the Routt House. The Old County Courthouse is the only historical structure in Martin County listed on the National Register of Historic Places. Located on Capital Avenue in Shoals, it was built in 1875 and is now used for the Martin County Museum. The Old County Jail was built in 1857 from large sandstone blocks and is located in Dover Hill along SR 450. The Routt House and Houghton House were two Stage Coach Houses built in the 1830s.

Coal and Gypsum have been found throughout Martin County. According to 2000 to current data there have been 397 underground mine areas in Martin County beginning in the mid-1800s with the last closing in 1966. Queries showed 61 surface mine areas beginning in 1939 to the current period. The geological composition of the soil in Martin County is ideal for gypsum material. Both National Gypsum and US Gypsum operate plants near the Town of Shoals. The National Gypsum Company is a fully-integrated building

products manufacturer and one of the leading gypsum board producers in the world.

Sullivan County

There are seven places listed on the National Register of Historic Places in Sullivan County including Shakamak State Park – a 1,766 acre state park located approximately 7 miles northeast of the LGTF. The Sullivan County Park and Lake is another important county resource, containing a 461-acre lake with boat launch and beach, and 460-acre park which provides camping, a 9-hole golf course and other recreational activities.

Coal mining has been an important part of Sullivan County's economy that continues today. The Bear Run mine opened in 2010 and is operated by Peabody Energy. It is the largest surface mine in the eastern United States. Sullivan County has also worked with Hoosier Energy to generate alternative energy using coalbed methane. The project uses coal bed methane from 58 wells drilled in Sullivan County to directly produce electric power.

State and Federal Parks

The NSA Crane Study Area is a popular destination for boating, canoeing, kayaking, fishing, camping and picnicking. The counties contain large areas of state and federal parkland, which are described below.

Martin County contains the 7,000 acre Martin State Forest. Most of the land was eroded, abandoned farmland or heavily cut-over woodland when acquired. With years of intensive management, including the planting of thousands of trees, countless hours fighting wildfires and hundreds of acres of selective improvement harvests, the area has been transformed into a lush, healthy, growing forest.

Lawrence County contains the Spring Mill State Park, located about three miles east of the City of Mitchell. The park is the site of an industrial village from the early 1800s which utilized the water flowing from cave spring to power several different mills. There are four interpretive facilities in the park – the Pioneer Village, Nature Center, Grissom Memorial, and Twin Caves Boat Tour.

The Hoosier National Forest covers over 200,000 acres of land in 9 counties in southern Indiana including parts of Martin County and Lawrence County. The property is managed by the US Forest Service and headquartered in the City of Bedford. Wildlife habitat management, such as timber harvests, prescribed burns, wetland development, and other practices are carried out to enhance the forest and provide a diverse mix of opportunities and resources for people to enjoy. The Hoosier National Forest has eight interrelated goals as a framework for forest management:

- Conservation of Threatened and Endangered Species Habitat
- Maintain and Restore Sustainable Ecosystems
- Maintain and Restore Watershed Health
- Protect our Cultural Heritage
- Provide for Visually Pleasing Landscape
- Provide for Recreation Use in Harmony with Natural Communities
- Provide a Useable Landbase
- Provide for Human & Community Development

The Hoosier National Forest offers 266 miles of hiking, mountain bike, and horseback trails, water recreation, camping, and hunting. The forest provides a habitat for white-tailed deer, woodchuck, opossum, gray squirrel, turkey, pileated woodpecker, several neotropical migrant songbirds, and migratory waterfowl. The karst ecosystems include many unusual cave species.

The LGTF Study Area contains state designated park lands which provide recreational opportunities including the Greene-Sullivan State Forest and the Shakamak State Park. The Greene-Sullivan State Forest is located in both

Greene and Sullivan Counties straddling the county borders. The forest was established in 1936 and contains over 9,000 acres and over 120 lakes. The lake offers hunting, fishing, picnicking, and camping opportunities. Shakamak State Park – a 1,766 acre state park, is located approximately 7 miles northeast of the LGTF. Shakamak State Park's main attraction is fishing along with swimming, hiking, boating, camping, and horseback riding.

Source: http://www.fs.usda.gov/main/hoosier/about-forest; http://www.in.gov/dnr/fishwild/3095.htm; http://www.in.gov/dnr/fishwild/3094.htm

Biological Resources

The rural and forested environment creates a biodiverse Study Area. There are numerous endangered and threatened species on both the state and federal lists. Federally endangered mollusks in the JLUS Study Area include the Eastern Fanshell Pearlymussel, the Northern Riffleshell, the Tubercled Blossom, the Snuffbox, the Ring Pink, the Sheepnose, the Clubshell, the Rough Pigtoe, the Fat Pocketbook, and the Rayed Bean. The Indiana Bat and the Northern Long Eared Bat are also federally endangered species in the Study Area. Though no longer on the list of federal threatened and endangered species, the Bald Eagle, which is found in the JLUS Study Area, is still protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act.

Along with the protection of endangered species, it is also important to control populations of nuisance animals. White-Tailed Deer, turkey, birds, and other small animals can interfere with operations at NSA Crane. Regulations and hunting seasons for furbearers (fox, coyote, skunk, raccoon, and opossum), woodland game (wild turkey, deer and squirrel), upland game (pheasant, quail and rabbit) and miscellaneous animals (crow, frog and game turtles), are established by the Indiana Department of Natural Resources and apply throughout the state. Hunting can be conducted on designated federal and state property and private property throughout the Study Area counties. The Department of Natural Resources also works with NSA Crane to implement a natural resources management program.

Please see the next page.

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3.1 Introduction

This chapter provides an overview of the military profile including a brief summary of the history and current operations at Naval Support Activity (NSA) Crane and the Lake Glendora Test Facility (LGTF) within the Joint Land Use Study (JLUS) Study Area.

Identifying and describing the various activities performed on the military installations provide valuable insight into the importance of NSA Crane and the LGTF as strategic national defense assets. This information enables stakeholders to make informed decisions about the future development of NSA Crane, the LGTF, and the economic growth of the communities proximate to the installations, which could potentially impact the existence and future role of the facility.

3.2 Naval Support Activity Crane Economic Benefit

Located in southwest Indiana, the NSA Crane Study Area spans the counties of Daviess, Greene, Martin and Lawrence, while the LGTF Study Area includes Sullivan County and the City of Sullivan. NSA Crane is the second largest employer in southwest Indiana after the Deaconess Hospital in Evansville, resulting in a significant footprint in the local and regional economy.

In addition to its strategic military value, NSA Crane and its LGTF contribute to both the local and regional economy, serving as the largest employer in Martin County and the surrounding area. Commands within NSA Crane generate more than $2 Million a day in local economic benefit.

According to the Economic Impact Assessment, Commander, Navy Region Midwest Final Report, FY 2009, the economic impact of NSA Crane was $1.7 Billion consisting of:

- Navy payroll of $257.4 Million
- Navy expenditures of $505.2 Million
- Direct, indirect, and induced impacts estimated at $985 Million.

Figure 3-1 depicts the FY 2009 economic Impact Assessment.

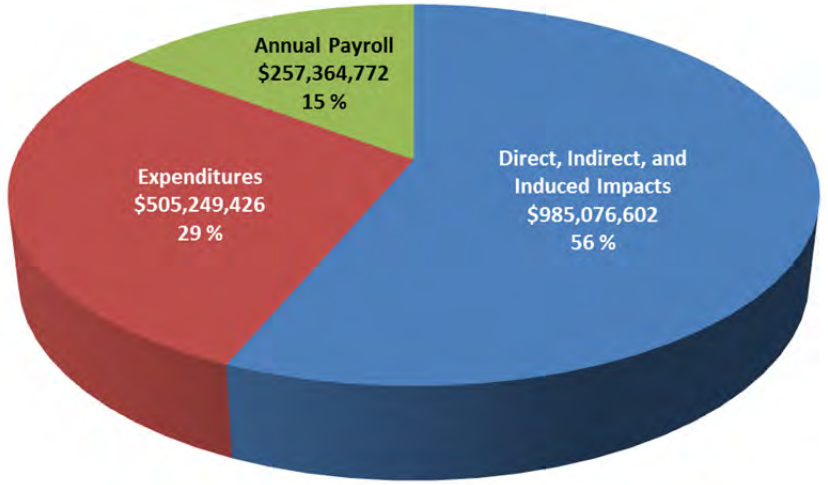
A breakdown of data for the LGTF was unavailable for FY 2009, but available for FY 2014. In FY 2014 the economic impact of the LGTF was approximately $12.5 Million, consisting of:

- $419,000 in fixed personnel salaries
- $11.6 Million in contracts
- Nearly $500,000 in direct customer receipts

Since FY 2012, over $6.5 Million in capital investment has been made in the LGTF.

Source: http://www.radiusindiana.com/news-and-reports/crane-economic-powerhouse; FY14 NSA Crane Economic Impact Report; Team Crane Regional Economic Impact; Sullivan County – Lake Glendora Profile; FY14 Contract Values by County; Economic Impact Assessment, Commander, Navy Region Midwest Final Report, FY 2009

Figure 3-1. Fiscal Year 2009 Economic Impact Assessment of NSA Crane



Source: Economic Impact Assessment, Commander, Navy Region Midwest Final Report, FY 2009

NSA Crane Installation Demographics

As one of the largest Navy installations, NSA Crane and its tenants employ a sizeable workforce. For Fiscal Year 2015, NSA Crane had a total population of more than 5,100 personnel, with less than 100 active duty and military reservists while the remaining being civilian employees – the higher number of civilians due to the nature of the missions at NSA Crane. Military personnel on the base represent approximately 1 percent of the total population.

In Fiscal Year 2014 – the most recent data for personnel location, 2,476 personnel (48 percent) of the population employed by NSA Crane resided within Daviess, Greene, Lawrence and Martin counties with an additional 1,389 (27 percent) residing in Monroe County north of the JLUS Study Area. The remaining personnel resided in a 14 county area spanning the entire southern Indiana region – as far south as counties bordering Kentucky, as far west as counties bordering Illinois, as far east as

counties bordering Ohio, and as far north as central Indiana including Indianapolis. Residential locations of personnel employed specifically at the LGTF have not been quantified.

NSA Crane is a center of innovation and has evolved into a highly-educated workforce, with 72 percent of NSA Crane employees serving as scientists, engineers, and technicians. In the last 3 years, over 130 different agreements for technology transfers, the commercialization of technologies to the private sector, have been produced. NSA Crane's patent portfolio includes over 90 patents issued for licensing, with 180 patent applications in process.

Source: FY 2014 NSA Crane Economic Impact Report; Team Crane Regional Economic Impact 2014; http://www.navsea.navy.mil/nswc/crane/community/default.aspx

Community Activities and Stewardship

NSA Crane and its tenants play an important community role by offering various social and recreational activities. Activities include community outreach programs, professional growth organizations, special events, parades, Boy Scouts of America camping trips, educational science fairs, fire department and police force cross-training and support to local municipalities, blood donations to the Red Cross, significant monetary contributions to area charities, and on-site golfing, fishing, and controlled hunting opportunities. NSA Crane also proactively supports thousands of elementary and high school students in 37 regional schools through tutoring, mentoring, field trips, and participating in science, technology, engineering, and mathematics (STEM) programs. NSA Crane actively engages academic organizations to foster science and technology related relationships and collaboration through a host of programs including funding opportunities, research appointments, student internships and co-ops, and Science, Mathematics and Research for Transformation (SMART) PhD programs. Its continued role in meeting the needs of the military and its good neighbor philosophy has won national recognition and significant environmental and conservation awards.

3.3 Naval Support Activity Crane History

NSA Crane was commissioned under the Bureau of Ordnance in 1941 as the Naval Ammunition Depot for production, testing, and storage of ordnance under the first supplemental Defense Appropriation Act. An ammunition quality evaluation unit was added in the late 1940s to expand its quality control system. Following World War II, the facility developed expertise in engineering and electronics. NSA Crane's activities, capabilities, and expertise expanded in scope as the complexity and sophistication of weapons increased through the 1950s and 1960s. NSA Crane added small arms, surveillance, microwave tubes, missiles, and other scientific and engineering support to its capabilities.

In the 1960s, NSA Crane began providing technical support for weapons systems, including logistics, in-service engineering, repair, overhaul and design. In the 1970s, NSA Crane's support began to include batteries, rotating components, electronic components, failure analysis and standard hardware and new technologies related to night vision systems.

NSA Crane became part of the Naval Sea Systems Command (NAVSEA) in 1974 from the merger of the Naval Ordnance Systems Command and Naval Ship Systems Command. Crane's name was changed to the Naval Weapons Support Center to more accurately reflect the true function of the installation.

In 1977, Crane Army Ammunition Activity (CAAA) became a tenant at NSA Crane, and took over the loading, assembly and storage of ammunition at the installation. In 1987, the Naval Weapons Support Center became Naval Surface Warfare Center Crane Division (NSWC Crane).

In 2009, full command of the installation was passed from NSWC Crane to NSA Crane. CAAA and NSWC Crane's strong partnership continues today as two of the major tenants forming Team Crane.

3.4 Naval Support Activity Crane Installation Setting

NSA Crane is located in southwestern Indiana, approximately 70 miles southwest of Indianapolis and approximately 90 miles northeast of Evansville, Indiana. The installation is the third largest US Naval installation by area in the world covering approximately 97 square miles (62,000 acres), including the 800-acre Lake Greenwood. Approximately 3,200 acres of NSA Crane is in Greene County, 150 acres in Lawrence County, with the remainder in Martin County. NSA Crane occupies the northern third of Martin County, extends into Greene County to the north and Lawrence County to the east, and is adjacent to Daviess County to the west. The installation is relatively secluded in a rural and mostly undeveloped region as indicated in Figure 3-2.

NSA Crane is heavily forested and consists of undulating terrain, six creeks, and the 800-acre Lake Greenwood. There is an expansive transportation network of 124 miles of roadway and 94 miles of railroad used by CAAA to distribute ordnance for storage and demolition. However, NSA Crane has been in the process of removing most of the rail due to maintenance cost.

There are four operational gates into the installation – the Crane (Main) Gate which is open 24 hours a day, Bloomington Gate which is open early morning to midnight, and the Burns City and Bedford Gates which have reduced access schedules. A fifth gate – the Dover Hill Gate has been permanently closed with no plan to reopen the gate. NSA Crane uses a flex start time with employee days starting anywhere from 6:00 am to 9:00 am. This staggered start time helps decrease any traffic stacking outside the gates.

Source: http://www.navsea.navy.mil/Home/WarfareCenters/NSWCCrane/WhoWeAre/History.aspx; MWR-Crane-Info-Guide.pdf

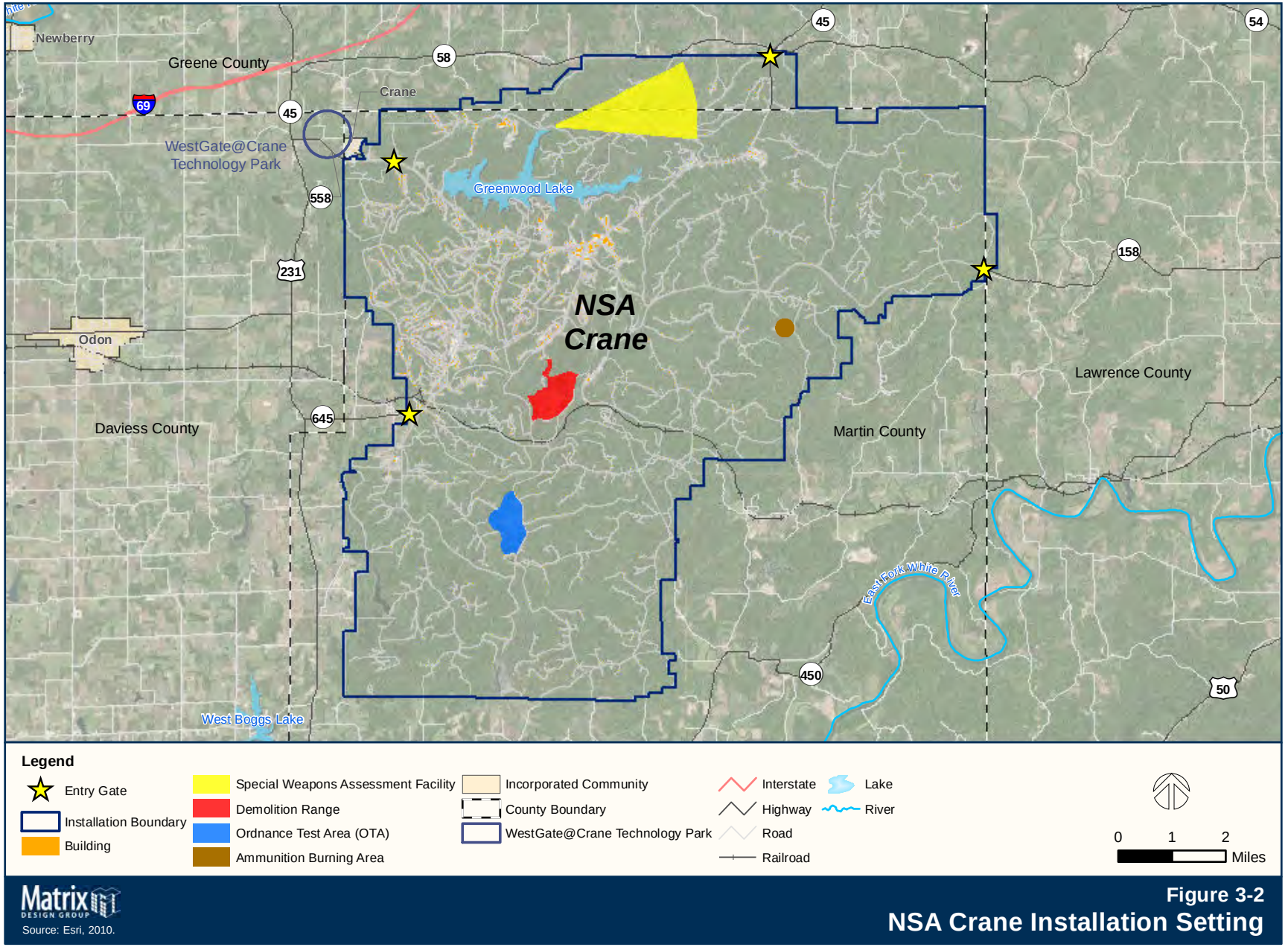
3.5 Naval Support Activity Crane Installation

NSA Crane mostly has numerous facilities for different research and development work conducted by tenants. A majority of the facilities are concentrated in the "downtown area," in the northwestern part of the installation, south of Lake Greenwood. Other areas of the installation include a Special Weapons Assessment Facility, Demolition Range, Ordnance Test Area, and Ammunition Burning Area indicated on Figure 3-2. The CAAA is the largest user of land with ordnance storage covering over 51,000 acres of land, occupying over 80 percent of the total installation.

Special Weapons Assessment Facility

The Special Weapons Assessment Facility operated by NSWC Crane opened in August 2010. The facility allows the rapid and efficient testing and analysis of field weapons and ammunition. The facility features a firing range with the ability to track ballistics in 100-yard increments up to 1,400 yards. In addition, an electronic target acquisition system is integrated to improve the process of analyzing internal and external ballistics data when ammunition is fired. A large concrete wall separates the range into two sections. The facility also includes an internal armory and multiple ammunition magazines. Shooting bays are temperature controlled, which provides the ability to test in different environmental condition. Observation bunkers located at 600, 1,000 and 1,400 yards down range allow workers to quickly and efficiently replace used targets and are equipped with high-definition video recorders to allow for accurate visual records.

Source: http://www.navy.mil/submit/display.asp?story_id=55747



Source: Esri, 2010.

Figure 3-2
NSA Crane Installation Setting

Demolition and Explosive Ordnance Disposal Range

The Demolition and Explosive Ordnance Disposal (EOD) Range consists of an 80-acre area for outdoor detonations. In an effort to be a good neighbor and keep the noise level low, there is a 500-pound self-imposed limit on explosives. The Range is also located in the center of the property to decrease any danger or noise associated with the operations.

Ordnance Test Area

The Ordnance Test (OTA) area consists of 88 acres. The OTA is used to test 5 and 20 lb. ordnance. Testing occurs outdoors in open test pits. Prior to testing, environmental and quality monitoring is conducted.

Ammunition Burning Area

The Ammunition Burning Area occupies about 40 acres at NSA Crane. Burns are conducted using open-air burn pads, incinerator pits, and burn pans. Burning operations on the installation have the same restrictions as the demolition ranges. Water, air, and dirt testing are conducted prior to any burning.

3.6 Naval Support Activity Crane Future Development

Development of currently vacant land at NSA Crane has two major constraints – Explosive Safety Quantity Distance (ESQD) arcs and slopes greater than 15 percent. Three areas have been identified by the Installation Development Plan to expand or add missions including the downtown district, the technology corridor district, and the warehouse district. The plan identified approximately 624 acres of land available for future expansion and redevelopment. Infill development may be possible through the demolition of existing obsolete facilities.

3.7 Lake Glendora Test Facility History

The LGTF was developed from the former AMAX Coal Company Minnehaha Coal Mine and acquired by the Navy due to its remote location and deep water lake. The facility became operational in May 1998 for testing sensitive sonar equipment.

3.8 Lake Glendora Test Facility Installation Setting

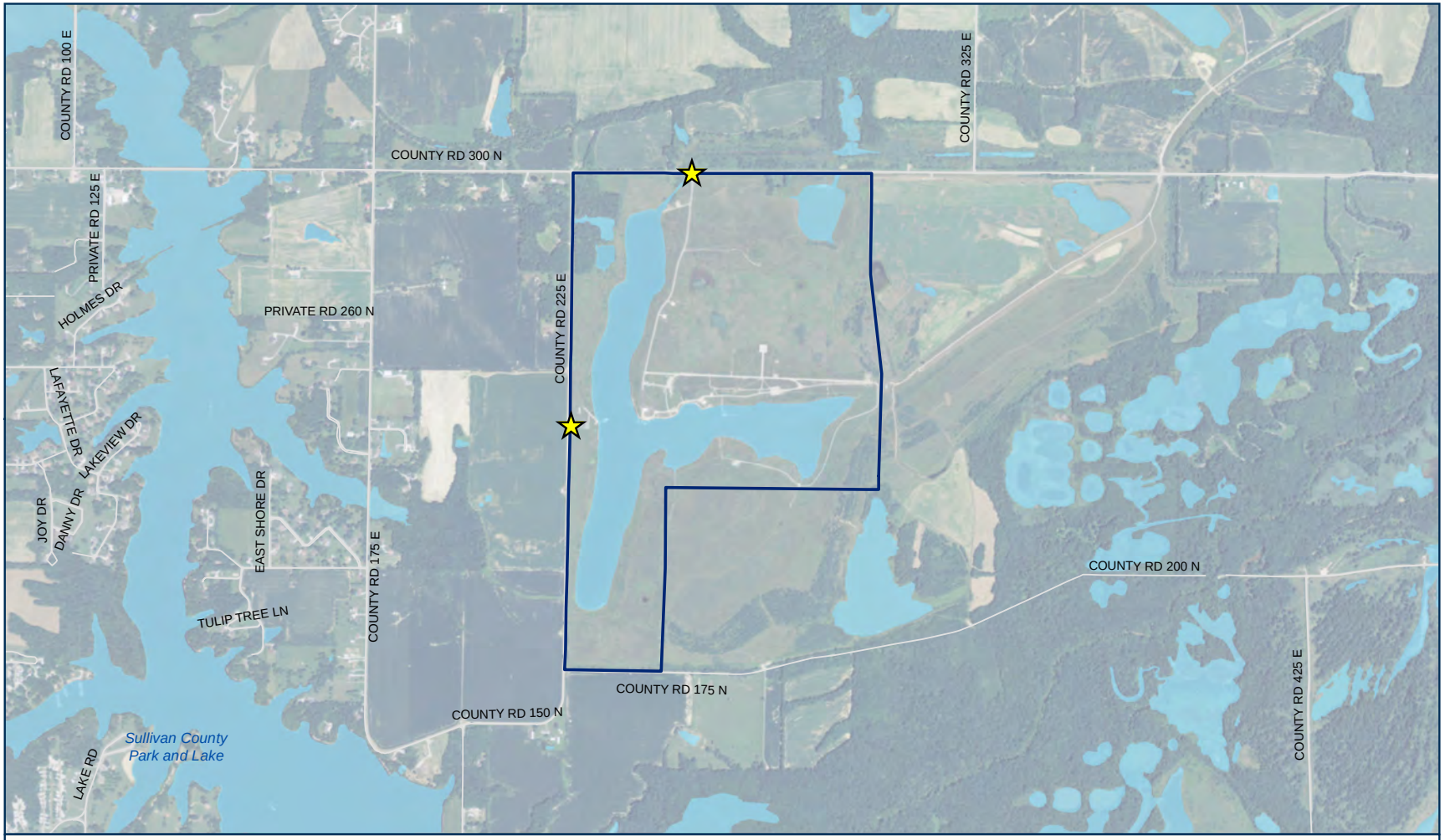
The Lake Glendora Test Facility is part of NSA Crane under the operation of NSWC Crane Division and is located in Sullivan County, approximately 30 miles northwest of NSA Crane. Figure 3-3 illustrates the NSA Crane JLUS Study Area. Located in rural Sullivan County, the LGTF is surrounded by agricultural land, forest, and a small cemetery at the northwest edge of the property as illustrated on Figure 3-3.

Approximately one half-mile west of the LGTF is Lake Sullivan, a local recreational area surrounded by single family residential development and the multi-use Sullivan County Park and Lake.

3.9 Lake Glendora Test Facility Installation

The LGTF contains three different ranges on the lake for a variety of testing purposes. The facility is 460 acres with the lake comprising 100 acres. Though a relatively small facility, there is no public access.

The facility is used for hydro-acoustic testing, underwater explosives testing, and surface burns. It is a unique area in that it has been pre-approved through the environmental assessment process with no constraints, placing it in high demand for testing. The facility is the only government testing facility with environmental, FAA, Electronic Warfare, and Laser Testing approvals or capabilities all at one site. Testing at the LGTF occurs Monday to Friday between 8:00 am and 5:00 pm.



Source: Esri, 2010.

Figure 3-3
Lake Glendora Test Facility Installation Setting

3.10 Lake Glendora Test Facility Future Development

No additional facilities are proposed at the LGTF. An Environmental Assessment (EA) is currently in process to consider expanding testing capability to include an underwater launch program.

3.11 Military Mission and Tenant Commands

Naval Support Activity Crane

NSA Crane is the host for the Activity. The mission of NSA Crane is to enable and sustain sailors and soldiers through operational and family readiness by providing consistent, standardized and reliable shore support to tenant partners. NSA Crane supports its tenant's needs by providing essential base services, including Antiterrorism / Force Protection; Fire and Emergency Services; Emergency Management; Safety; Morale, Welfare and Recreation; Base Communications; Information Technology; and Public Works [in coordination with Naval Facilities Engineering Command (NAVFAC)].

Commander, Navy Region Mid-Atlantic

The Commander, Navy Region Mid-Atlantic (CNRMA) is the regional coordinator for all shore-based naval personnel and shore activities in the Mid-Atlantic region including NSA Crane and the LGTF. The CNRMA provides coordination of base operating support functions for operating forces throughout the region to sustain the fleet, enable the fighter, and support the family.

Primary Tenants

NSA Crane has six primary tenants, including NSWC Crane, CAAA, Public Works Department (PWD) Crane, Defense Logistics Agency (DLA) Distribution, Naval Supply Systems Command Fleet Logistic Center and the Naval Hospital Pensacola Navy Branch Health Clinic. Other tenants at NSA Crane include the Defense Commissary Agency, Explosive Ordnance Disposal (EOD) Mobile Unit, USCG Ordnance Detachment, Naval Exchange, Defense Logistics Agency Disposition Services, Defense Logistics Agency Document Services, United States Marine Corps, and Naval Criminal Investigative Service. The following section provides information related to the primary tenants at NSA Crane.

Naval Surface Warfare Center Crane Division

NSWC Crane is part of the Naval Sea Systems Command (NAVSEA), which is made up of nine warfare centers, including NSWC Crane, four shipyards, and four shipbuilding locations. NAVSEA's primary objective is to engineer, build and support the Navy's fleet of ships and combat systems.

NSWC Crane is the largest tenant at NSA Crane in terms of personnel. With over 2,900 employees, NSWC Crane comprises 57 percent of the installation population. NSWC Crane is the premier naval scientific and engineering institution and the largest mission-oriented supported command at NSA Crane. NSWC Cranes overall mission is:

> *Provide acquisition engineering, in-service engineering and technical support for sensors, electronics, electronic warfare and special warfare weapons. Apply component and system level product and industrial engineering to surface sensors, strategic systems, special warfare devices and electronic warfare/ information operations systems. Execute other responsibilities as assigned by the Commander, Naval Surface Warfare Center.*

NSWC Crane specializes in three focus areas – Special Missions, Strategic Missions, and Electronic Warfare.

Special Missions

NSWC Crane's Special Mission focuses on threat-based capability development, letting the needs of the military drive solutions. NSWC Crane directly addresses these areas of need through its primary areas of technical expertise including specialty small arms weapons and ammunition; expeditionary air command and control systems; specialized hand emplaced

man portable munitions; ground, surface and air surveillance systems; specialized electro-optic visual augmentation sensors, and laser makers; ground, surface and air platform sensors and weapon system integration. Special Missions at NSWC Crane provides expertise in rapid development, evaluation, and fielding of:

- Weapons and ammunition specifically for Special Operations Forces.
- Man-portable anti-personnel and anti-material munitions.
- Electro-optic and visual augmentation sensors and laser markers.
- Explosive detection, and personnel and vehicle scanning.
- Expeditionary command and control systems.

Special Missions supports military forces engaged in Special Operations, Irregular Warfare, and Riverine Operations. NSWC Crane's Special Missions Center is the go-to source for solutions that are expertly delivered to ensure safe and effective missions.

Strategic Missions

Strategic Missions main focus is the support of national strategic assists, specifically the U.S strategic triad. The triad is comprised of intercontinental ballistic missiles, strategic bombers, and submarine-launched ballistic missiles. NSWC Crane ensures operational readiness and effectiveness of missile systems through:

- Designing and testing of critical trusted electronics.
- Ensuring functionality in extreme atmospheric conditions.
- Building anti-tamper capabilities and protecting against counterfeit parts.
- Designing, building, and maintaining highly reliable power and energy systems.

Strategic Missions resources deliver innovative technical solutions encompassing the full range of military activities to alter an enemy's will and ability to attack the US and its interests. With more than 50 years of naval strategic missions, NSWC Crane Strategic Missions Center is dedicated to delivering the best technical solutions in Threat Detection, Integrated Missile Defense, and Global Strike. Under strategic missions, NSWC Crane also has expertise in radar systems, radiation hardened system, interconnect technologies, asset security & access control, and launcher and support systems.

Electronic Warfare

NSWC Crane has been involved with Electronic Warfare for over 60 years and holds the largest naval electronic warfare body of knowledge. Its primary areas of technical expertise are advanced spectrum warfare technologies, infrared countermeasures and seeker exercise support, electronic warfare support and electronic attack, and live-virtual constructive electromagnetic spectrum analysis and evaluation. NSWC Crane provides distinct and essential capabilities in:

- Microwave Technologies Research, Development, Test and Evaluation (RDT&E).
- Radar components sustainment.
- Infrared countermeasures and pyrotechnic RDT&E and sustainment.

Electronic Warfare technology is used to destroy an enemy's combat capability, gather intelligence data, and ensure friendly use of the electromagnetic spectrum. NSWC Crane's highly technical solutions are employed across air, ground, maritime and space domains to ensure safe and effective missions.

Source: http://www.navsea.navy.mil/nswc/crane/aboutus/default.aspx; http://www.in.gov/iodd/2338.htm

Crane Army Ammunition Activity

The CAAA is the largest tenant at NSA Crane in terms of land area, occupying over 80 percent of the installation. Approximately 700 personnel are employed at CAAA. The CAAA maintains ordnance professionals and infrastructure to achieve its mission of receiving, storing, shipping, and manufacturing missiles and ammunition. The focus at CAAA is on safety, quality, teamwork and increased productivity and efficiency. Supporting the nation's defense and wise use of resources remains a top priority.

CAAA functions are broken into depot operations: receiving, storing and shipping ordnance; and manufacturing operations: production, renovation and demilitarization of ordnance. These focus areas have generated the following specializations:

- Receipt, Storage & Shipping of Ammunition
- Segregation & Maintenance of Ammunition Stocks
- Small Lot Production
- Special Projects to Meet Unique Requirements

Source: http://www.navsea.navy.mil/nswc/crane/aboutus/default.aspx

Public Works Department Crane

The PWD Crane employs approximately 300 personnel who administer and direct the design, construction, operations, and maintenance of facilities and utility systems at NSA Crane. The PWD Crane also administers Environmental Management and Protection, Pollution Prevention, Energy Management and Disaster Preparedness programs. The Public Works Division also provides facility planning and programming functions including real estate management and facility disposal.

NSA Crane is semi-autonomous with regard to utility systems, relying on both public and self-generated utilities. The installation provides for all of its water and sewer service requirements and purchases electric, natural gas and fuel oil from regional service providers.

Defense Logistics Agency Distribution

The Defense Logistics Agency (DLA) sources and provides nearly all of the consumable items the military forces need to operate, everything from food, fuel and energy to uniforms, medical supplies and construction materials. The DLA Distribution at NSA Crane is one of 26 distribution sites in the world. Defense Logistics Agency Distribution is a combat support agency responsible for the receipt, storage, issue, packing, preservation and transportation of more than four million items. Approximately 50 civilians are employed by the DLA at NSA Crane.

Naval Supply Systems Command Fleet Logistic Center

The Naval Supply Systems Command (NAVSUP) mission is to deliver sustained global logistics and quality-of-life support to the Navy. They manage supply chains that provide material for Navy aircraft, surface ships, submarines and their associated weapons systems. The Fleet Logistic Center at NSA Crane provides a wide variety of logistics and supply support services. The center employs approximately 30 personnel.

Naval Hospital Pensacola Navy Branch Health Clinic

The Naval Hospital Pensacola (NHP) Naval Branch Health Clinic at NSA Crane provides occupational health care services in support of NSWC's operations. The clinic provides services and treatment of occupational injuries and illnesses are provided to all civilian and military personnel. The clinic also offers wellness and surveillance programs, as well as counseling services. The clinic employs approximately 20 personnel.

3.12 Military Operations

NSA Crane hosts over a dozen tenants, each of which performs different operations to achieve their mission. This section focuses on the operations of the two largest and most active tenants at NSA Crane – NSWC Crane and CAAA. Mission activities include disposal of excess or obsolete ammunition and explosives, use of ordnance, high-powered electromagnetic (EM) energy systems, high-power lasers, and chemical / biological simulants. The disposal

is critical for the safety of the ammunition stockpile and maintaining storage space for current items. The use and testing of these systems helps to ensure their safe operation for the users, while developing and improving better delivery systems and accuracy of weapons.

Naval Surface Warfare Center Crane Division Operations

NSWC Crane's operations include working with power systems and electronic interconnect technology utilizing the High Energy Test Facility and the Electrochemistry Engineering Facility. The strategic mission includes working with technology and infrastructure protection, flight systems, radar systems, platform and launch systems, and power and circuit board technologies. The electronic warfare mission involves support for all airborne, surface, sub-surface, and ground operations. Special missions at NSWC Crane involve working with special munitions and weapons, sensors and communication, mobility and maneuverability, and small arms operations and maintenance training. NSWC Crane has extensive ordnance test capabilities, including ordnance/energetic materials assessment services, engineering analysis and assessment, and maintenance and repair services.

NSWC Crane operates the Ordnance Test Facilities, which is made up of the following facilities:

- Engineering Project Offices
- Heat Flow Calorimetry Laboratory
- Gun Fuze Testing and Evaluation (T&E) Facility
- Strategic Missile Component T&E Facility
- Explosive Sciences Laboratory
- Environmental Test Facility
- Radiographic / NDT Facility
- Missile Fuze T&E Facility
- Ordnance Test Area (OTA) – 88 acres

NSWC Crane conducts numerous types of testing and engineering services. This includes climatic testing, dynamic testing, and material evaluation.

Lake Glendora Test Facility

The LGTF is made up of three independent water ranges. Hydroacoustic testing is conducted throughout the lake to collect acoustic data. Underwater explosive testing is conducted, which includes functional tests of underwater explosives, lot acceptance testing, and static/dynamic testing to stop small watercraft. Surface burns conducted at the facility consist of the testing of various signal flares and marine markers.

A 2007 Environmental Assessment (EA) expanded facility capabilities to include hydroballistic testing, surface burst testing, underwater surface launch testing, less than lethal firing capability, and laser testing. Unmanned aerial vehicles (UAVs) are also tested at LGTF.

Crane Army Ammunition Activity Operations

CAAA operations involve the storage, distribution, demilitarization, and production of munitions, which require specialized equipment and related facilities. CAAA covers over 51,000 acres of land including 94 miles of active rail and 124 miles of paved roads.

CAAA stores 25 percent of the DOD's national ammunition in 1,800 magazines – ammunition storage areas, throughout the installation. It is one of four primary distribution installations within the DOD.

Ammunition distribution is shipped and received by both rail and truck. However, recently CAAA has been shifting its distribution to trucks. CAAA sends out 12,000 trucks a year, which utilize the local roads and highways. The defect rate in the area of manufacturing is closely monitored to ensure that only quality goods are shipped. The CAAA's record for the delivery of munitions to the field is exceptional with a 99 percent on-time delivery rate. They ship a variety of products throughout the world to other military installations, government agencies, and private industry.

Most demilitarization activity involves open detonations, which take place from spring through fall at the Demolition and EOD Range. Demilitarization experts work hard to recycle and reuse as much of the ammunition as possible. The CAAA also maintains the only operational white phosphorous demilitarization conversion plant in North America. The demolition range is

typically active from April to November and restricted daily from a half hour after sunrise to a half house before sunset. Because weather impacts the distance noise travels, range activity is limited to premium weather days when it is sunny and the wind is below a certain limit. There is a limit to two events per day, allowing approximately 120 clear days per year for events. On average, the range is operational 85 days of the year with 85 percent of use between Monday and Thursday.

Production at CAAA involves the manufacturing of pyrotechnic candles, flares, naval smoke and signal devices, along with a variety of other important products. Finished items range from detonators weighing 20 grams to 40,000-pound cast shock test charges.

3.13 Naval Support Activity Crane Mission Footprint

Research and development activities conducted by NSWC Crane and CAAA at NSA Crane generate a number of impacts that can affect the health, safety, and overall quality of life in the surrounding community. Conversely, the military mission is susceptible to hazards created by certain nearby civilian activities and land use development that may obstruct air space, locate noise sensitive uses in high noise zones, locate development in sensitive viewsheds, or allow for the gathering large numbers of people in areas deemed vulnerable to potential safety incidents.

A military mission footprint is described as the area outside the installation boundaries on which military activities can have an impact or be impacted by civilian uses. Several elements or mission profiles comprise the mission footprint that extends outside NSA Crane's boundaries. The following outlines the different elements or mission profiles that contribute to the NSA Crane mission footprint:

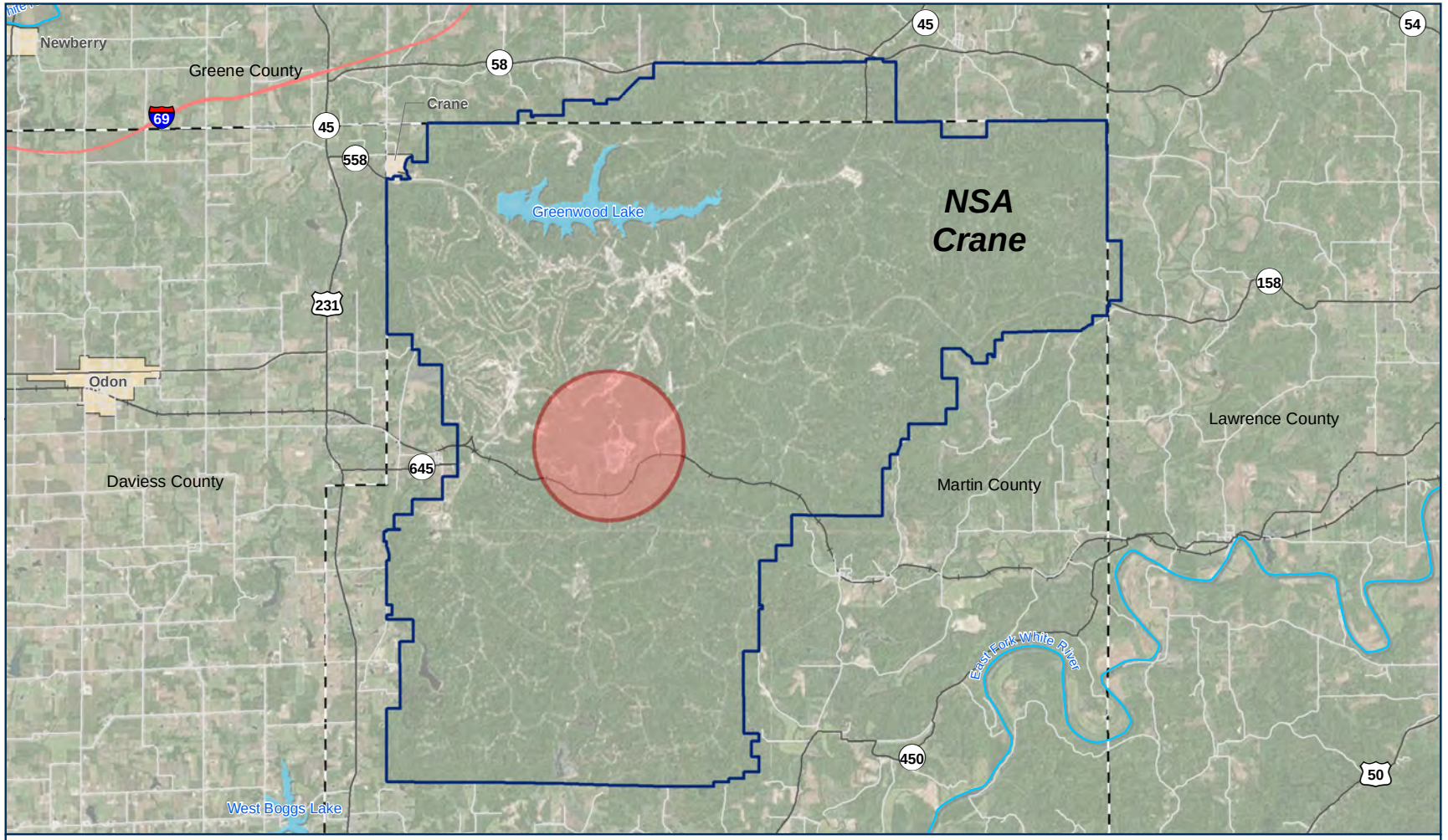
- Special Use Airspace
- Noise Contours for Weapons and Explosive Detonations
- Explosive Safety Quantity Distance (ESQD) Arcs
- Surface Danger Zones

Special Use Airspace

While NSA Crane does not have an airfield and only minimal flight activity (using the onsite helipad), restricted airspace has been established by the Federal Aviation Administration (FAA) above both the Lake Glendora Test Facility and the CAAA Demolition Range.

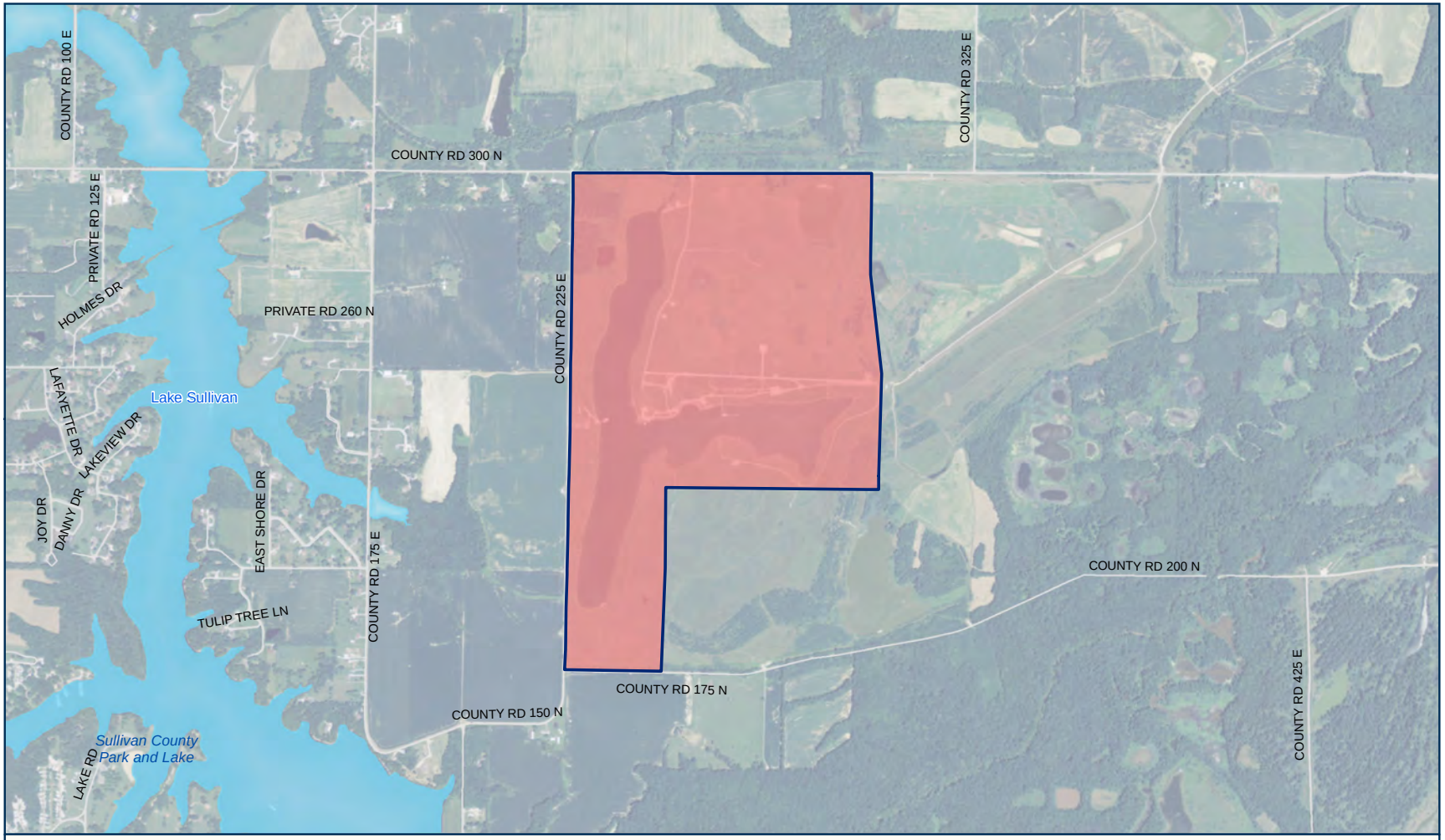
Area R-3404 restricts airspace above the CAAA Demolition Range at NSA Crane. The restricted area covers a 2-mile diameter from the center of the blast area and extends from the surface up to and including 4,100 Mean Sea Level (MSL) as illustrated on Figure 3-4. This restricted airspace protects aircraft from blast fragments generated during the demilitarization of ordnance.

Area R-3405 restricts flight activity over the LGTF. The restricted area covers only the LGTF property and extends from the surface up to and including 1,600 feet MSL as illustrated on Figure 3-5. Though R-3405 has been activated on only a handful of occasions in the past decade, it has been used to deploy a tethered aerostat balloon to deploy radar, cameras, and other sensor packages for testing and operations. This ability to restrict airspace provides capability for testing new technologies.



Source: Esri, 2010.

Figure 3-4
NSA Crane Restricted Airspace



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 3-5
Lake Glendora Test Facility Restricted Airspace

Noise Contours

Naval Support Activity Crane

The main source of noise at NSA Crane is from small and large caliber weapon activity conducted at the Special Weapons Assessment Facility, Demolition and EOD Range, and OTA, and from underwater explosive activity at the LGTF.

The 2014 NSA Crane Operational Noise Consultation illustrates the C-Weighted Day-Night Average Level (CDNL) noise contours and peak blast noise contours expressed in decibels. An explanation of noise is provided in the Noise Compatibility Assessment in Chapter 5.

The CDNL noise contours are classified as:

- Zone III (greater than 70 dB CDNL)
- Zone II (between 62-70 dB CDNL)
- Zone I (less than 62 dB CDNL)
- Land Use Planning Zone (LUPZ) (between 57-62 dB CDNL)

The CDNL noise metric is used for demolition and large caliber weapons to assess the low-frequency energy produced from such activities. The CDNL is an annual average noise from range operations and is intended for long-term land use planning. The CDNL noise is generated from demolition and large caliber weapons activity at the Special Weapons Assessment Facility and demolition range. The CDNL noise contours for NSA Crane are illustrated on Figure 3-6. Though Noise Zone II and III contours do not extend outside the NSA Crane boundary, the LUPZ extends beyond the installation boundary 0.10 miles to the north, 1 mile to the southeast, and 1.5 miles to the west. Current land uses in the LUPZ are predominately forest lands and agricultural lands with scattered residential properties. The small community of Burns City is within the LUPZ west of NSA Crane and the small communities of Indian Springs and Cale are immediately outside the LUPZ east of NSA Crane. Because these noise contours are averaged, there is potential for individual events more extreme than the average level to cause annoyance and possibly generate noise complaints.

The PK15 (met) noise metric is used for impulse noise from an individual event. The PK15 (met) noise contours for NSA Crane are illustrated Figure 3-7.

For small caliber arms activity conducted at the Special Weapons Assessment Facility, peak blast noise contours are classified as

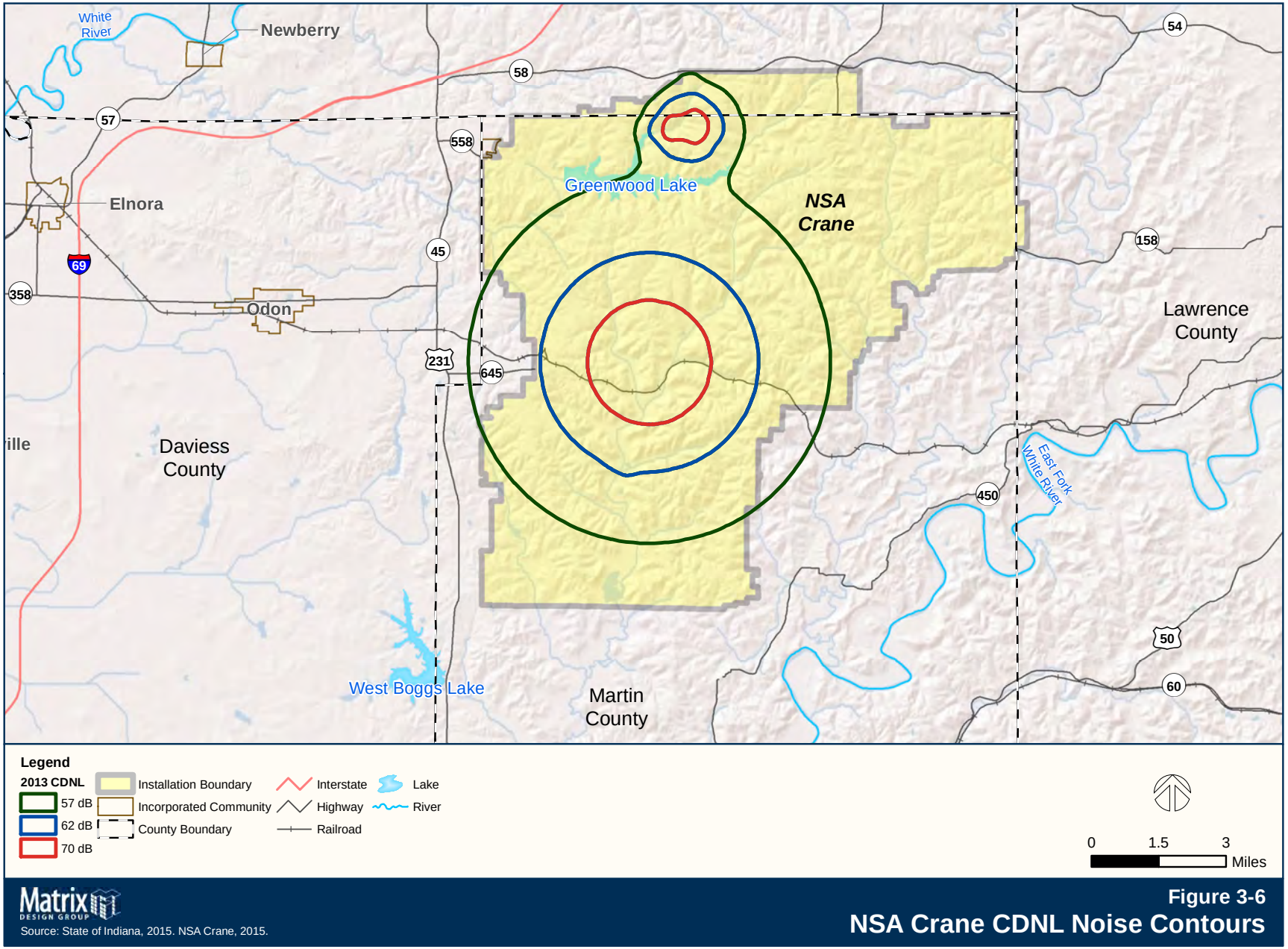
- Zone III [greater than 104 dB PK15(met)]
- Zone II [between 87-104 dB (PK15 (met)]
- Zone I [less than 87 dB PK15 (met)]

Zone III contours do not extend outside the NSA Crane boundary. The Zone II noise contours extend up to 1.5 miles beyond the northern boundary of NSA Crane. This area includes approximately four dozen scattered residential properties.

For large explosions at the Demolition and EOD Range and OTA, peak blast noise contours are used to measure risk complaint potential, which is classified as

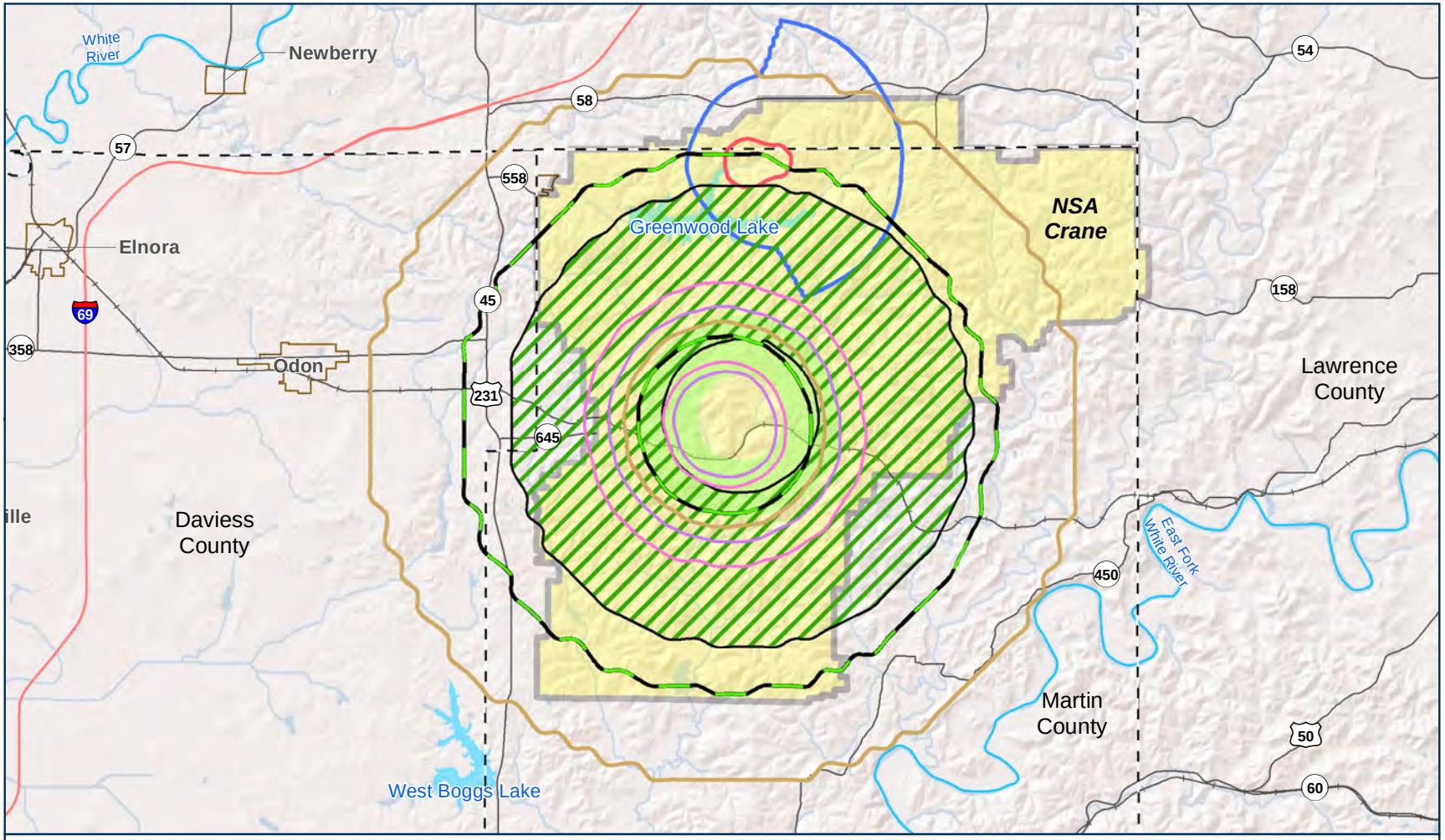
- Low Risk [less than 115 dB PK15 (met)]
- Moderate Risk [between 115-130 dB PK15 (met)]
- High Risk [greater than 130 dB PK15 (met)]

Noise was modeled at NSA Crane for both neutral and unfavorable weather conditions and for both 50 lb. and 500 lb. explosions. Noise contours for both neutral and unfavorable weather conditions are illustrated on Figure 3-7. Because unfavorable conditions represent the worst-case noise scenario with the greatest off-site exposure, this information is presented here and used for the compatibility analysis in Chapter 5. Noise was modeled for explosive charges buried 10 feet below the ground (as is customary at NSA Crane) and also “half-stem” at 5 feet below the ground to reflect scenarios where the ground coverage is not evenly dispersed over the charge.



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 3-6
NSA Crane CDNL Noise Contours



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 3-7
NSA Crane Peak Noise Contours

In all scenarios, the high complaint risk area is contained within the NSA Crane boundary and all complaint risk areas for activity at the OTA are contained within the NSA Crane boundary.

For 50 lb. charges at the Demolition and EOD Range under unfavorable weather conditions the moderate complaint risk area extends up to 1.7 miles beyond the western boundary and approximately 1.5 miles beyond southeastern boundary of NSA Crane. Current land uses in the moderate complaint risk area are predominately forestland and agricultural land with scattered residential properties. The small communities of Burns City, Bramble, Indian Springs, and Cale are within the moderate complaint risk area.

For 500 lb. charges buried at 10 feet under unfavorable weather conditions at the Demolition and EOD Range, the moderate complaint risk extends beyond the western and southeastern NSA Crane boundary up to 2.5 miles. Current land uses in the moderate complaint risk area are predominately forestland and agricultural land with scattered residential properties. The Town of Crane and small communities of Farlen, Burns City, Bramble, Indian Springs, and Cale are within the moderate complaint risk area.

For 500 lb. charges buried at 5 feet under unfavorable weather conditions at the Demolition and EOD Range, the moderate complaint risk extends up to 4.8 miles beyond the western NSA Crane boundary, 4 miles beyond the eastern NSA Crane boundary, and up to 1.5 miles beyond the northern and southern NSA Crane boundaries. Current land uses in the moderate complaint risk area are predominately forestland and agricultural land with scattered residential properties. The Town of Crane and small communities of Doans, Scotland, Farlen, Raglesville, Burns City, Bramble, Dover Hill, Indian Springs, and Cale are within the moderate complaint risk area.

Lake Glendora Test Facility

Due to the infrequent activity and low net explosive weights (NEWs) of charges at the LGTF, CDNL Noise Zones have not been modeled. Because of the frequency of detonations at the LGTF (averaging 8-10 times per year) and the depth of the lake which greatly diminishes audible noise or disturbance, noise levels from activity at the LGTF indicate a low complaint risk.

A 1991 EA conducted for a similar facility at Aberdeen Proving Ground, Maryland included noise measurements for significantly higher NEWs than routinely used at the LGTF. According to the 2014 NSA Crane Operational Noise Consultation, extrapolated noise level data indicates that the residences located 0.5 miles from the LGTF could be exposed to noise levels near 109 dB PK15(met) from charge weights of 7.5 lbs. This low level correlates with the lack of noise complaints from the underwater detonations. Predicted noise levels indicate that detonation charges of 30 lbs. would be required for the minimum range for moderate risk of complaints 0.5 miles from the LGTF and 60 lb. charges would be required for the minimum range for moderate risk of complaints 1 mile from the LGTF. Current land uses within 0.5 miles of the LGTF are predominately forestland and agricultural land with scattered residential properties. Current land uses within 1 mile of the LGTF are predominately forestland and agricultural land with scattered residential properties including those on the eastern shore of Lake Sullivan.

Source: Operational Noise Assessment for Naval Support Activity Crane, September 2013

Explosive Safety Quantity Distance Arcs

Explosive Safety Quantity Distance (ESQD) arcs are normally concentric arcs that provide a safety buffer to mitigate the harm an unplanned detonation could cause to people or structures. The radius of each ESQD arc is determined by the operation, net explosive weight of the material, and location. At NSA Crane and the LGTF, these arcs are associated with the storage of ammunition.

Naval Support Activity Crane

The CAAA produces and stores a large amount of ammunition at NSA Crane with the capacity for the storage of 650,000 tons of ordnance. Over 1,800 storage magazines containing ammunition are located throughout the installation. Due to the large number of magazines, the ESQD arcs occupy large portion of the NSA Crane property. In order to maintain the arcs within in the installation boundary, the storage capacity in certain areas and facilities is administratively restricted by NSA Crane.

Lake Glendora Test Facility

Ammunition at the LGTF is stored in facilities for the purpose of conducting underwater detonations. The ESQD arcs at the LGTF are all contained within the installation.

Sources: NSA Crane Installation Development Plan

Surface Danger Zones

A Surface Danger Zone (SDZ) is an area around a weapon firing range from which the access of all military personnel and civilians is restricted due to the inherent dangers associated with the firing of live munitions. A surface danger zone can include the surface (and subsurface) of land and water, as well as the overhead air space which provides the medium for launched projectiles. A surface danger zone includes the weapons firing position, target impact area and a secondary buffer area, which is an additional distance where errant projectile/munitions fragments may land without risking harm to life or property. The area of a SDZ can vary in size and shape and is specifically dependent on the type of weapon(s) fired, their firing location and projectile trajectory.

The current layout of the ranges at the Special Weapons Assessment Facility are positioned in such a way that all of the SDZs for current weapons systems are contained within the boundaries of NSA Crane to protect the public and neighboring landowners from the risk of ricochet or stray bullets landing on their property. The Demolition and EOD Range and OTA are sufficiently centralized at NSA Crane to contain their associated SDZs.

Please see the next page.

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4.1 Introduction

This section provides an overview of the existing compatibility tools currently used or applied in evaluating and addressing compatibility issues in the Naval Support Activity (NSA) Crane Joint Land Use Study (JLUS) Study Area. Relative to compatibility planning, there are a number of existing plans and programs that are either designed to address compatibility directly or that indirectly address compatibility issues through the topics they cover.

There are three types of planning tools that are evaluated relative to their applicability to address compatibility: permanent, semi-permanent, and conditional. Permanent planning tools include acquisition programs, either fee simple purchase of property or the purchase of development rights. Semi-permanent tools include regulations such as zoning or adopted legislation. Examples of conditional tools include memorandums of understanding (MOU), intergovernmental agreements (IGA), and other policy documents such as comprehensive plans that can be periodically modified. This Chapter provides an overview intended to identify applicable planning tools and determine how each may apply to compatibility, as presented under the compatibility factors discussed in Chapter 5. The overview is organized by level of government, presented in the following order:

- Federal Plans and Programs
- NSA Crane
- State of Indiana
- Daviess County
- Greene County
- Lawrence County
- Martin County
- Sullivan County
- Regional Plans and Tools
- Other References

4.2 Federal

Army Regulation 200-1, Environmental Protection and Enhancement

This regulation implements federal, state, and local environmental laws and Department of Defense (DOD) policies for preserving, conserving, and restoring the environment. This regulation should be used in conjunction with 32 Code of Federal Regulation (CFR) Part 651 (32 CFR 651), which provides Army policies on National Environmental Policy Act requirements, and supplemental program guidance. This regulation also defines Army Environmental Management System (EMS) framework and the five interconnected EMS areas, which are policy, planning and implementation, program management and operation, checking and corrective action and management review.

Clean Air Act

The Clean Air Act (CAA) is the comprehensive federal law that regulates air emissions from stationary and mobile sources in order to control air pollution in the United States. Under the CAA, the U.S. Environmental Protection Agency (EPA) establishes limits on six criteria pollutants through the National Ambient Air Quality Standards (NAAQS). Standards are set to protect public health and public welfare. The CAA also gives EPA the authority to limit emissions of air pollutants coming from sources like chemical plants, utilities, and steel mills. Individual states may have stronger air pollution laws, but they may not have weaker pollution limits than those set by EPA. Under the law, states have to develop State Implementation Plans (SIPs) that outline how each state will control air pollution under the CAA.

Clean Water Act

The Clean Water Act (CWA) governs the management of water resources and controls and monitors water pollution in the U.S. The CWA establishes the goals of eliminating the release of toxic substances and other sources of water pollution to ensure that surface waters meet high quality standards. In so doing, the CWA prevents the contamination of nearshore, underground and surface water sources. Numerous extensions of the Act have been created, including the National Pollution Discharge Elimination System.

Department of Defense Conservation Partnering Initiative

In 2003, Congress amended Title 10 U.S.C. §2684a and §2692a (P.L. 107 314), the National Defense Authorization Act, to give authority to the Department of Defense (DOD) to partner with other federal agencies, states, local governments, and conservation based Non-Governmental Organizations (NGOs) to set aside lands near military bases for conservation purposes and to prevent incompatible development from encroaching on and interfering with military missions. This law provides an additional tool to support conservation and environmental stewardship on and off military installations.

Department of Defense Energy Siting Clearinghouse

Section 358 of the 2011 National Defense Authorization Act pertains to studying the impacts of the development of new energy production facilities on military operations and readiness. The Energy Siting Clearinghouse serves to coordinate the DOD review of existing applications for energy projects. Several key elements of Section 358 include designation of a senior official and lead organization to conduct the review of energy project applications, a 30-day time frame for completion of a hazard assessment associated with an application, specific criteria for DOD objections to projects and a requirement to provide an annual status report to Congress. This legislation facilitates procedural certainty and a predictable process that promotes compatibility between energy independence and military capability.

Department of Housing and Urban Development Noise Regulation

The United States Department of Housing and Urban Development (HUD) has instituted policies through 24 Code of Federal Regulations (CFR) Part 51 designed to promote the creation of controls and standards for community

noise abatement by state and local governments to reduce noise levels for homes. Included among the various policies are:

> *(1) a requirement that noise exposure and sources of noise be given adequate consideration as an integral part of urban environment in connection with all HUD programs, which provide financial support to planning;*
>
> *(2) a withholding of HUD assistance for the construction of new dwelling units on sites (which have or are projected to have unacceptable noise exposure);*
>
> *(3) encouragement of modernization efforts for existing buildings in noise environments; and*
>
> *(4) grants and allowances to state and local governments to provide acoustical privacy in multifamily dwellings through building design and acoustical treatment.*

New housing construction assisted or supported by HUD must meet the exterior noise standards outline in the regulation. HUD funds may also be available to encourage noise abatement planning and acoustical treatment for proposed and existing incompatible land uses.

Approvals of mortgage loans from the Federal Housing Administration and the Veterans Administration are subject to this HUD circular. The circular sets forth a discretionary policy to withhold funds for housing projects when noise exposure is in excess of prescribed levels. Residential construction may be permitted within certain noise contours, provided sound attenuation is accomplished. The added construction expense of sound attenuation, however, may make siting in these noise exposure areas financially less attractive. Because the HUD policy is discretionary, variances may also be permitted, depending on regional interpretation and local conditions. These new structures could then incorporate noise-inhibiting features into their design and construction when using these loans.

Endangered Species Act

The Endangered Species Act (ESA) establishes a program for the conservation of threatened and endangered plants and animals and their habitats. The US Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA) are the lead implementing agencies of the ESA. The ESA requires federal agencies, in consultation with the USFWS and/or the NOAA Fisheries Service, to ensure that actions they "authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species." The law also prohibits any action that causes a taking of any listed species of endangered plant, fish, or wildlife. The ESA provides a platform for the protection of critical habitat and species that may be at risk of extinction.

Integrated Natural Resources Management Plan

The Sikes Act Improvement Act of 1997 requires every DOD installation located in the U.S. to prepare, maintain, and implement an Integrated Natural Resources Management Plan (INRMP). An INRMP is prepared by the secretary of every military service and military installation in cooperation with the USFWS and State fish and wildlife agencies. This collaboration ensures proper consideration of fish, wildlife, and habitat needs. The military mission, protects the ecological condition, and provides for appropriate public use of military-owned and withdrawn lands.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) of 1969 is a federal regulation that established a U.S. national policy promoting the protection and enhancement of the environment and requires federal agencies to analyze and consider the potential environmental impact of their actions. The purpose of NEPA is to promote informed decision-making by federal agencies by making detailed information concerning significant environmental impacts available to both agency leaders and the public.

All projects receiving federal funding require NEPA compliance and documentation. NEPA is applicable to all federal agencies, including the military. Not all federal actions require a full Environmental Impact Statement (EIS). In cases where an action may not cause a significant impact, the agency would prepare an Environmental Assessment (EA).

A NEPA document can serve as a valuable planning tool for local planning officials. An EA or EIS can assist in the determination of potential impacts that may result from changing military actions or operations and their effect on municipal policies, plans and programs, and the surrounding community. Public hearings are required for all EIS documents released under NEPA. An EA requires publishing the draft EA and Finding of No Significant Impact (FONSI) and also allowing public comment for a period of 30 days. An EA can either end in a FONSI, or a Record of Decision (ROD) that concludes there will be a significant impact. The information obtained by the EA / EIS is valuable in planning coordination and policy formation at the local government level.

NEPA mandates that the military analyze the impact of its actions and operations on the environment, including surrounding civilian communities. Inherent in this analysis is an exploration of methods to reduce any adverse environmental impact. The EIS is a public process that encourages participation by the community.

National Pollutant Discharge Elimination System

Pursuant to the CWA, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources such as pipes or man-made ditches that discharge pollutants into US waters. According to the law, individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit; however, industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. Traditionally, NPDES focused on point sources; however, more recently the focus has shifted to nonpoint sources. Nonpoint sources generally include sheet flow runoff from pavement, agricultural fields and lawn areas, which by their nature, are more difficult to regulate.

Navy Encroachment Management Program

An Encroachment Action Plan (EAP) is an important tool that is developed as a blueprint for an installation or range's Encroachment Management Program. An EAP is designed to identify, quantify, assess, and provide recommendations to mitigate or prevent encroachment impacts around Navy installations. An EAP responds to the requirements of the Navy Encroachment Management Program as described in OPNAVINST 11010.40. Encroachment is primarily any non-Navy action planned or executed which inhibits, curtails, or possesses the potential to impede the performance of Navy activities. An EAP provides the host installation with a methodological approach to address existing and potential encroachment that may impact the Navy's mission. This includes regularly sharing information, analysis, and insights relevant to encroachment and the requirements of current and future test and training operations. Each Navy installation utilizes its EAP to support the analysis and implementation of encroachment mitigation efforts.

Noise Control Act of 1972

The Noise Control Act of 1972 determined that noise not adequately controlled has the potential of endangering the health and welfare of the people. It states that all Americans are entitled to an environment free from noise that can jeopardize their general health and quality of life. Along with state, local, and territorial governments, actions from the federal government were needed to ensure that the objectives of the Act were met.

Concurrently, military installations were experiencing the impacts related to encroaching urban development locating adjacent to their boundaries and the resulting complaints regarding noise from military operations. The Navy responded by establishing the Range Air Installation Compatible Use Zones (RAICUZ) program through Chief of Naval Operations Instruction (OPNAVINST) 3550.1A to provide guidance to Navy installations. The RAICUZ program was developed to protect the public and military installation missions by identifying areas impacted by noise and encroaching incompatible land uses. With the RAICUZ guidelines, land encroachment and noise-sensitive development can be minimized.

As communities grow, it is important that the military installation, developers, and the affected communities work together to mitigate the issue of noise and develop ways to coexist compatibly.

US Fish and Wildlife Service Partners for Fish and Wildlife

Indiana originally had over 5.6 million wetland acres which were rapidly drained and cleared following widespread development. The state land base is almost all privately owned, which can limit restoration and preservation efforts. The Partners Program has been active in Indiana since 1988 and is focused on fostering cooperation with private landowners, having worked with more than 2,000 landowners statewide. The Southwestern Lowlands and Southern Bottomlands Natural Regions – a 13 county area in southwestern Indiana, has potential for wetland restoration on private lands with over 1.1 million acres of wetlands primarily along river floodplains.

Source: http://www.in.gov/dnr/fishwild/files/partner.pdf

Readiness and Environmental Protection Integration

This initiative enables DOD to work with state and local governments, nongovernmental organizations, and willing landowners to limit encroachment and incompatible land use through land acquisition by the establishment of conservation easements, land trusts, or the purchase of property. The program provides funding to support these land acquisition efforts to preserve the land around military installations, wildlife habitats, and local communities.

NSA Crane has submitted one proposal in 2012 to receive funding from REPI to prevent incompatible development in the vicinity of the Lake Glendora Test Facility (LGTF). However, it was not selected for funding.

Secretary of the Navy Instruction 2400.1A

Instruction 2400.1A issued by the Secretary of the Navy in December 2014 pertains to electromagnetic spectrum policy and management. The purpose of the instruction is to ensure the Navy is able to develop and/or acquire spectrum dependent systems through an enforceable and controlled system. Under the instruction it is policy the Navy will work to share the Electromagnetic Spectrum with Federal, state, local, tribal, and commercial Electromagnetic Spectrum users, provided sharing is accomplished without degradation of the Navy's mission or loss of Electromagnetic Spectrum required by the Nay.

Chief of Naval Operations Instruction 2400.20F

Instruction 2400.20F issued by the Chief of Naval Operations in July 2007 pertains to electromagnetic spectrum supportability policy and procedures. Under the policy, commanders of Navy installations are responsible for promoting spectrum awareness. Part of that responsibility is ensuring that radio frequencies used within their areas of responsibility are properly coordinated and authorized and that frequency assignments are kept current. Commanders also have the authority to designate an installation spectrum manager or frequency manager to serve as a central point of contact for all frequency use.

Chief of Naval Operations Instruction 3550.1A

Instruction 3550.1A issued by the Chief of Naval Operations and updated in January 2008 pertains to Range Air Installation Compatible Use Zones (RAICUZ). The instruction provides procedures and guidelines for air-to-ground range installations. The Department of the Navy's RAICUZ program is designed to protect public health, safety, and welfare, and to prevent encroachment from degrading the operational capabilities of air-to-ground ranges. The RAICUZ program includes range safety and noise analyses, and provides land use recommendations which will be compatible with Range Compatibility Zones (RCZs) and noise levels associated with the military range operations.

Army Regulation 360-1

Army Regulation 360-1 is the Army's Public Affairs program which establishes policies and procedures for conducting Army public affairs programs. Section 8-1 of the regulation titled, Community relations program and activities, discusses initiated actions for informing the public about the Army and in developing and maintaining a viable relationship with the civilian community. The regulation identifies effective methods of outreach including official and unofficial programs, and opportunities for Commanders to maintain continual liaising with the local community to help resolve common problems and develop cooperation and understanding between the installation and the local community.

Telecommunications Act of 1996 and the Federal Communications Commission

The Telecommunications Act of 1996 was the first comprehensive update to a federal telecommunication law in over 60 years and was in large part intended to open up the marketplace to greater competition. Changes in the means through which information is produced, accessed, stored, and shared made the federal government response imperative. The increasing use and development of personal mobile phones, satellite transmission, high speed fiber optics, and other related factors are often pushing demand beyond the system capacity.

New telecommunication tower siting requires compliance with the Federal Communications Commission's (FCC) environmental review standards and procedures, including NEPA and ESA compliance, National Historic Preservation Act compliance, adherence to any applicable FAA requirements and structure registration with the FCC. The actual approval of physical installations is subject to state and local permits and approvals; however, state and local authority is limited by FCC law. For instance, states and local jurisdictions cannot base their decisions on any purported environmental effects of radio frequency transmissions.

4.3 Naval Support Activity Crane

Encroachment Action Plan

The purpose of the NSA Crane Encroachment Action Plan (EAP), published in September 2011 and as revised in November of 2015, is to identify, analyze, and create a strategic plan to mitigate encroachment issues. The EAP assesses 14 encroachment challenges, which are as follows: Urban Development, Airborne Noise, Competition for Air, Land, and Sea Space, Competition for Scarce Resources, Threatened and Endangered Species, Maritime Issues, Ordnance/Munitions, Safety Arcs and Footprints, Frequency Spectrum, Air Quality, Water Quality, Interpretation of Environmental Regulations, Interagency Coordination, and Legislative Initiatives that Restrict Operations. The plan includes an introduction, the installation background, community context, and an analysis of the 14 encroachment challenges. Each of the encroachment challenges features major findings, impacts, current actions and workarounds, and opportunities for partnerships.

Source: NSA Crane Encroachment Action Plan, 2011

Installation Development Plan

The NSA Crane Installation Development Plan (IDP) was published in November 2015 to guide the installation toward one planning vision and program that will ensure improved safety and security, increased environmental stewardship, and reduced energy consumption. The plan will help achieve those goals while maintaining current missions and ensuring capacity for future mission growth. The IDP serves as the foundation for all future planning decisions and will support the base leadership's vision and all tenant mission requirements. The IDP includes a base overview, planning opportunities and constraints, and planning goals and objectives.

Opportunities and constraints identified by the IDP include natural, environmental, and cultural constraints, such as topography, hydrology, vegetation, threatened and endangered species, and historical sites. Five planning goals are established by the plan, each with its own objectives to accomplish the goal. The goals are as follows:

- Sustain and grow mission while enhancing security and safety.
- Modernization of facilities while optimizing and right-sizing footprints.
- Reduce overall energy consumption.
- Promote sustainable development principles while minimizing environmental impacts.
- Enhance quality of life and improve base circulation.

Source: NSA Crane Installation Development Plan, 2015

Integrated Cultural Resources Management Plan

The NSA Crane Integrated Cultural Resources Management Plan (ICRMP) was published in November 2012 and outlines policies, procedures, and responsibilities for meeting cultural resources compliance and management requirements. It is a broad-based plan of action that provides an inventory of NSA Crane's significant cultural resources, provides specific guidance for their management, and ensures their consideration during the development and execution of projects at the installation. The plan also sets forth specific goals and objectives for the base's historic preservation program.

Goals and objectives were set in the ICRMP to be achieved over the course of the five years period. Several goals of the plan include:

- Continue to conduct archaeological investigations in accordance with Section 106 until installation has completed its inventory of archaeological resources.
- Continue to conduct survey and National Register of Historic Places eligibility evaluations of buildings, structures, objects, and districts as they reach 50 years of age, or in advance of undertakings with potential to impact historic properties.

- Develop Comprehensive Agreements (CA), as needed, with affected Native American tribes regarding mutually acceptable methods for treatment of affiliated cultural materials and sites, should any be found.
- Maintain cemetery listings database, historical records, and any pertinent cemetery documentation.

Source: NSA Crane Integrated Cultural Resources Plan, 2012

Integrated Natural Resources Management Plan

The Integrated Natural Resources Plan (INRMP) is NSA Crane's plan of action for the conservation and management of natural resources entrusted to the U.S. Navy. The plan is for ten years, from 2010 to 2019, but the goal and philosophy of sustainable management of natural resources to support the military mission covers a broader period of time. NSA Crane is committed to making sound natural resource management decisions to support the military mission and the needs of the region. The INRMP contains goals of objectives, department responsibilities, stewardship and compliance, current conditions and use, management strategy and mission sustainability, program elements, and implementation.

The missions at NSA Crane require the use of open space, making natural resource management and important aspect. Specific goals for the management of NSA Crane natural resources include:

- Provide for the conservation, enhancement, and rehabilitation of land and water resources of the installation while supporting the military mission.
- Maintain or increase the diversity and populations of plants and animals under the stewardship of the Department of the Navy through habitat maintenance, enhancement, or rehabilitation activities on NSA Crane that do not detract from the military readiness of the installation.
- Enhance the quality of life of Navy personnel by providing high-quality, accessible, outdoor recreational opportunities that do not degrade the natural resources or detract from the military mission.
- Foster and promote natural resource stewardship among DOD personnel, their dependents, and the public by providing opportunities to participate in natural resource conservation, education, and rehabilitation activities on NSA Crane.

The plan includes a variety of management objectives currently in place, which represent measurable targets to quantify the success of the INRMP.

Source: NSA Crane Integrated Natural Resources Plan, 2010

Operational Noise Assessment

The Operational Noise Assessment was published in September 2013 to assess the noise impacts of activities at NSA Crane and the LGTF. The assessment provides both land use planning guidelines and complaint risk potential.

Land use guidelines are noise zones which are established by the average annual demolition and weapons uses. The guidelines are used to avoid sensitive land uses in areas highly impacted by noise. The noise zones are contained on the installation, however, because it is an average measurement there is still potential for individual events to cause complaints.

Peak noise contours are areas based on the loudest event at each facility. The peak noise contours are used to determine the complaint risk areas. Contours are determined for unfavorable and favorable weather conditions. The assessment concludes that peak noise levels indicate a moderate to high complaint risk potential, yet NSA Crane rarely receives noise complaints.

Per the recommendation of the assessment, NSA Crane established a Noise Management Complaint Program in May 2016. A successful noise complaint management procedure helps reduce the potential of noise complaints by keeping the public informed about what is happening and satisfy complainants so that noise complaints do not escalate.

Installation Noise Complaint Management Program

NSA Crane Instruction 5233.1 established an Installation Noise Complaint Management Program in May 2016. The program is intended to help control operational noise and reduce community annoyance by better monitoring, recording, archiving, and addressing operational noise complaints. The program establishes a noise complaint procedure and actions to take when a noise complaint is received. The procedure ensures the following.

- A noise complaint questionnaire is completed for all noise complaints received.
- Complaints are routed through the activity responsible for the complaint.
- Complaints are investigated and the complainant is contacted without delay.
- If the source of the noise is activity on the installation, and the activity is not classified or sensitive, the complainant shall be made aware of the potential underlying source of the noise and the importance of the activity resulting in the potential noise and the overall installation mission.
- A copy of the completed Complaint Questionnaire and the noise-generating activity's response is provided to Range Control Officers and others as appropriate via the chain of command responsible, and to the installation Community Planning Liaison Officer. If necessary, the complaint or attendant concerns will be forwarded up the installation's chain of command for review.

The instruction designates the Public Affairs Office as the Noise Complaint Program Manager and also applies to the LGTF.

Lake Glendora Test Facility, Environmental Assessment, July 2007

An Environmental Assessment (EA) was prepared in 2007 for the LGTF to expand testing capabilities. A Finding of No Significant Impact (FONSI), indicating that there will not be any significant environmental impacts, was issued by the Department of the Navy in 2007 in support of these activities which include:

- Hydroballistic Testing – Allows high energy non-explosive projectiles to be fired at the lake surface to achieve deep penetration into the lake.
- Surface Burst Testing – Allows test items up to 20 pounds Net Explosive Weight (NEW) to be exploded either on or just above the lake surface.
- Underwater Surface Launch Testing – Allows projectiles to be launched into the air and permitted to descend to the earth while staying on Government-controlled property.
- Less than Lethal Firing Capability – Allows the firing of explosive and nonexplosive, non-lethal rounds at floating targets on the lake from fixed locations.
- Laser Testing – Allows for the firing lasers across the water at various specified targets floating on the surface of the water or at the water's edge.
- Underwater Burst and Surface Burns – Allows underwater burst and surface burns to be performed on the lake: underwater bursts expanded to north and south fingers of the lake; surface burns permitted on the south end of the lake.

The affected area includes some of the surrounding communities in Sullivan County, which are part of the JLUS Study Area. A review of the EA reveals the following areas of interest related to military compatibility:

- When individual tests are conducted, the use of the Rapid Airborne Mine Clearance System (RAMICS) will be audible and identifiable outside of the nearest residence and inside when the windows are open. The noise level from RAMICS will not be intrusive and should not lead to complaints if residents are aware of the test.
- Surface bursts of 20 pounds of high explosive will be audible inside the residence with the windows closed, and noteworthy outside, and can cause some degree of concern if the residents are not aware of the test. Because of the infrequent and short duration of these tests, the noise impact is not significant.
- Noise from test activities will be audible off government property but will not be at a level to impact the health of the public.
- A large percentage of operations occur underwater; thereby, reducing noise levels associated with the operations.

The EA provides clearance for these testing capabilities which are exercised on an as needed basis.

Comprehensive Traffic Engineering Study

The Military Surface Deployment and Distribution Command, Transportation Engineering Agency (SDDCTEA) conducted a Comprehensive Traffic Engineering Study at NSA Crane, completed in April 2014. The assessment provides short-term needs to address existing safety-related deficiencies and long-term gate concepts to accommodate future growth and changes to potential traffic flow patterns that may occur as a result of the of I-69 corridor. It also involves safety assessments of roadways and intersections throughout the base.

4.4 State of Indiana

The State of Indiana has several laws that establish the guidelines for its municipalities and counties to regulate land uses and plan for their future, establish state-wide plans and programs, and establish agencies and organizations to implement those plans and programs. The body responsible for creating, drafting, and enacting legislation to assist in governing Indiana is the General Assembly comprised of the Senate and House of Delegates.

Land Development Tools

Indiana has adopted legislative home rule, whereby local governments may exercise all powers the state legislature is capable of delegating to them, even though the legislature has not delegated the power. The legislature may take certain powers from localities or limit local powers under legislative home rule. If the Indiana legislature sets forth a certain manner in which a power may be exercised by a locality, the locality must follow the legislature's instructions.

Comprehensive Plans

Indiana law requires that a plan commission adopt a comprehensive plan if the municipality wants to exercise zoning powers. The Comprehensive Plan is the foundation for all decision-making in matters involving land use planning and growth management, is considered advisory, and serves as a guide for the physical development of the territory within specific jurisdictional boundaries. Although the Comprehensive Plan itself does not directly regulate land use, the plan does have status as a fundamental instrument of land use control once adopted by the local governing body. Indiana Code (IC) §36-7-4-501 states that:

> *A comprehensive plan shall be approved by resolution in accordance with the 500 series for the promotion of public health, safety, morals, convenience, order, or the general welfare and for the sake of efficiency and economy in the process of development. The plan commission shall prepare the comprehensive plan.*

Indiana Code §36-7-4-502 states that a comprehensive plan must contain at least the following three elements:

- A statement of objectives for the future development of the jurisdiction.
- A statement of policy for the land use development of the jurisdiction.
- A statement of policy for the development of public ways, public places, public lands, public structures, and public utilities.

Source: http://www.in.gov/legislative/ic/2010/title36/ar7/ch4.html (Page 758)

Capital Improvement Program

A local government may establish a Capital Improvement Program (CIP) per IC §36-7-4-512(5). This section specifies that a Comprehensive Plan may contain a short and long range capital improvements program of governmental expenditures so that the development policies established in the comprehensive plan can be carried out and kept up-to-date for all separate taxing districts within the jurisdiction to assure efficient and economic use of public funds.

Source: http://www.in.gov/legislative/ic/2010/title36/ar7/ch4.html (Page 759)

Zoning

Standards authorizing the use of zoning are found in IC §36-7-4-601. The procedures for zoning authorize the local legislative body to take action and adopt a zoning ordinance. Zoning divides a locality into specific districts and establishes regulations concerning the use, placement, spacing and size of land and buildings within the respective districts. Zoning is intended to avoid disruptive land use patterns by preventing activities on one property from generating external effects that are detrimental to other properties. If the municipality wants to exercise zoning powers, it must first adopt a comprehensive plan.

Source: http://www.in.gov/legislative/ic/2010/title36/ar7/ch4.html (Page 764)

Subdivision and Site Plan Regulations

Land subdivision authority is contained in IC §36-7-4-701. The code stipulates that when a legislative body has adopted a zoning ordinance, they are required to determine districts in which subdivision of land may occur. The subdivision ordinance establishes the procedures, platting and design requirements, as well as surety guarantees for public infrastructure improvements, associated with the subdivision of land into parcels or lots of development. Jurisdictions without a zoning ordinance are not subject to the subdivision requirements.

Source: http://www.in.gov/legislative/ic/2010/title36/ar7/ch4.html (Page 784)

Building Code

The Indiana Building Code (IBC) contains the building regulations that must be complied with when constructing a new building or structure, or when adding an addition to an existing building pursuant to Section 675 Indiana Administrative Code (IAC) 12-10-4. It must also be used when maintaining or repairing an existing building or renovating or changing the use of a building or structure. IBC, 2014 Edition, became effective December 1, 2014. The provisions of the IBC are based on nationally recognized model building and fire codes published by the International Code Council, Inc. The model codes are made part of the IBC through a regulatory process known as incorporation by reference. The IBC is divided into three stand-alone pieces: the Indiana Mechanical Code, the Indiana Fire Code and the Fuel Gas Code.

Per 675 IAC 12-10-4 Local building codes of political subdivisions, political subdivisions may incorporate by reference building rules of the commission in local building codes to be enforced at the local level of government.

Source: http://www.in.gov/legislative/iac/T06750/A00120.PDF? (Page 52)

Per 675 IAC 12-6-3 Design release; requirement, no construction shall be done on a Class 1 structure until a design release has been issued by the Indiana Department of Homeland Security Division of Fire and Building Safety Services unless the construction is of a type specifically exempted from the design release requirements. Section 675 IAC 12-6-2 Definitions, defines Class 1 structures as:

- Public buildings.
- Buildings with three or more tenants.
- Buildings occupied by one or more persons acting as the employee or another.
- A site improvement impacting access to a building by a person with physical disabilities.
- Storage facilities, tanks and disposing equipment for flammable or combustible gasses or liquids.
- A structure containing three or more condominium units.

Single-family, two family dwellings and outbuildings are classified as Class 2 structures and regulated under 675 IAC 14-3 2005 Indiana Residential Code and administered only by local ordinance.

In the case of Class 1 and Class 2 structures there are no sound transmission requirements in the state building codes to regulate the transmission of sound from a building exterior to indoor spaces.

Source: http://www.in.gov/legislative/iac/T06750/A00120.PDF? (Page 27); http://iga.in.gov/static-documents/2/3/d/a/23da26e9/TITLE22_title22.pdf (Page 734); http://www.in.gov/legislative/iac/T06750/A00140.PDF? (Page 48); http://www.in.gov/legislative/iac/20140827-IR-675130339FRA.xml.pdf (Page 28)

Planning and Zoning Affecting Military Bases

Per IC §36-7-30.1-2, a jurisdiction is required to notify the commander of the military base before it can take action to plan or regulate a property located within three miles of the perimeter of the base. Activities subject to this notification include the:

- Use, improvement, and maintenance of real property.
- Location, condition, and maintenance of structures and other improvements.
- Platting and subdividing of real property.

The commander must respond to the notice with written recommendations and supporting facts no more than 15 days after receiving the notice. If no response is received after the 15 days, the jurisdiction may presume that the action will have no adverse impacts on the base. A jurisdiction may not take action within three miles of the base if it would have an adverse impact on the operation of the base.

Source: http://www.in.gov/legislative/ic/2010/title36/ar7/ch30.1.pdf (Page 1432)

Military Base Immunity

Military bases are granted immunity for noise pollution and telecommunications interference under IC §34-30-21. Section IC 34-30-21-2 states that a military base, a person employed by a military base, or a person otherwise authorized by a military base to conduct operations on or use the military base is not liable for civil damages relating to noise or noise pollution that:

(1) results from the normal operation or use of the military base, including the destruction of ordnance; and

(2) may be heard within two (2) miles of the perimeter of the military base.

Section IC 34-30-21-3 states that a military base, a person employed by a military base, or a person otherwise authorized by a military base to conduct operations on or use the military base is not liable for civil damages relating to interference with telecommunications that:

(1) results from the normal operation or use of the military base; and

(2) occurs within five (5) miles of the perimeter of the military base.

However, IC 34-30-21-1 does not grant immunity from civil liability to a person who commits an act that:

(1) amounts to gross negligence or willful and wanton misconduct; or

(2) does not comply with an applicable federal law.

Source: https://iga.in.gov/legislative/laws/2015/ic/titles/034/ (Page 436)

Article 31. Nature Preserves

Indiana Code §14-31-1-1 establishes public policy to set aside and preserve any areas of unusual natural significance. These irreplaceable areas serve as laboratories, reservoirs, habitats, and living museums. It is essential that people are able to maintain close contact with and benefit from scientific, esthetic, cultural, and spiritual values of the living communities and environmental systems. Preserving the areas requires a registry of the areas, state acquisition and preservation, and encouragement of other organizations to set aside areas for the common benefit of the people of present and future generations.

Source: http://www.in.gov/legislative/ic/2010/title14/ar31/ch1.html (Page 812)

State Plans and Programs

Public-Private Partnerships

Indiana Code §8-15.7 authorizes the Indiana Finance Authority to enter into public-private partnerships (P3), which involves funding and operating a government service or private business venture through a partnership of government and one or more private sector companies. Indiana's need for development and operation of transportation facilities was not able to be accomplished in a timely manner. The authorization of private entities has improved the availability of transportation facilities in a more efficient and less costly fashion. The first P3 project was the 2006 lease of the Indiana Toll Road in exchange for an upfront payment of $3.8 billion. The second Indiana P3 project is the East End Crossing, a new freeway bridge over the Ohio River linking Indiana State Route 265 in Utica, Indiana, with Kentucky Route 841 in Prospect, Kentucky. The next P3 projects include the I-69 Section 5 in south central Indiana, and the Illiana Corridor – a bi-state east-west expressway project in northwest Indiana.

Source: http://iga.in.gov/legislative/laws/2016/ic/titles/008/ (Page 1275); *http://www.in.gov/indot/3186.htm*

Forest Legacy Program

The Forest Legacy is a program is part of the 1990 Farm Bill established by Congress. Indiana has a state Forest Legacy Program to identify important forests and purchase the development rights from willing sellers to protect them. Once purchased, the development rights are permanently held by the state. Federal funding can be used for up to 75 percent of the purchase price for the development rights. In 1998, six Legacy Areas in Indiana were designated by the Indiana Forest Stewardship Coordinating Committee. The Shawnee Hills-Flatrock Basin includes the southeast portion of Greene County and northwest portion of Lawrence County adjacent to NSA Crane.

Source: http://www.in.gov/dnr/forestry/4569.htm

Chapter 2, Indiana Heritage Trust Program

Administered by the Department of Natural Resources, the Indiana Heritage Trust Program was created in 1995, through IC §14-12-2, to acquire real property or interests in real property that are an example of outstanding natural features and habitats; have historical and archeological significance; and provide areas for conservation, recreation, and the restoration of native biological diversity. The program receives funding from state general fund appropriations and the sales of environmental license plates, along with private contributions.

Source: http://www.in.gov/legislative/ic/2010/title14/ar12/ch2.html (Page 124)

Chapter 5, Residential Real Estate Sales Disclosure

Indiana's Residential Real Estate Disclosure Law, IC §32-21-5-2, requires sellers of residential property to complete a standard form, number 46234. Using this form, sellers need to inform potential buyers about material defects in the house structure and major systems that the seller knows about. Other questions on the form require zoning information, if the

property is in a flood plain, and if the property is within one mile of the airport. The law does not require disclosure of property proximate to a military installation.

Source: http://www.in.gov/legislative/ic/2010/title32/ar21/ch5.html (Page 147)

Chapter 5, Indiana Code, Uniform Conservation Easement Act

Indiana Code §32-23-5 provides for the state's Uniform Conservation Easement Act, which authorizes the creation of permanent easements on real property for conservation and historic preservation purposes. A conservation easement restricts real estate development, commercial and industrial uses, and certain other activities on a property. However, the property remains under ownership of the landowner.

Source: http://www.in.gov/legislative/ic/2010/title32/ar23/ch5.html (Page 181)

The State of Indiana Standard Hazard Mitigation Plan

The Indiana Standard Hazard Mitigation Plan was established in 2008 to evaluate natural hazards that threaten Indiana and select appropriate actions to mitigate the risks from the hazards. The Plan identifies hazards, evaluates the risk of the hazards, and proposes mitigation plans and actions to reduce the risk. Major hazards in the state include flooding, winter storms, tornadoes and windstorms, earthquakes, and man-made hazards.

Source: http://www.in.gov/dhs/3181.htm

Indiana Environmental Policy Act

In 1972, the Indiana General Assembly passed legislation similar to NEPA referred to as the Indiana Environmental Policy Act (IEPA). The act requires state agencies to use a "systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and decision making which may have an impact on man's environment." A detailed statement is required for any major state actions that would significantly affect the quality of the environment. The statement should include:

- The environmental impact of the proposed action.
- Any adverse environmental impacts which cannot be avoided if the proposal is implemented.
- Alternatives to the proposed action.
- The relationship between local short-term use of the environment and the maintenance and enhancement of long-term productivity.
- Any irreversible and irretrievable commitments of resources which would be involved if the proposed action is implemented.

Before making this detailed statement, the responsible official is required to consult with any state agency that has jurisdiction by law or special expertise with respect to any environmental impact involved. The Water Pollution Control Board, the Air Pollution Control Board, and the Solid Waste Management Board, have adopted similar rules for the implementation of IEPA. The rules include the applicability and purpose, as well as environmental assessment forms.

Source: https://iga.in.gov/legislative/laws/2015/ic/titles/013/ (Title 13 is the IEPA in its entirety)

2013-2035 Future Transportation Needs Report

The Indiana 2013-2035 Future Transportation Needs Report replaces the 2007 Long-Range Transportation Plan document. The Indiana Department of Transportation (INDOT) has adopted a non-project specific, needs-based, statewide transportation approach that identifies future transportation needs and describes overarching strategies and opportunities to accomplish future results. This approach provides a flexible and opportunistic framework for addressing transportation issues and needs for the next 20-25 years.

Source: http://www.in.gov/indot/2666.htm

Statewide Transportation Improvement Program

The Statewide Transportation Improvement Program (STIP) is a four year planning document that lists all projects expected to be funded in those four years with Federal funds and those state-funded projects that have been deemed as Regionally Significant. The program includes investments in all modes of transportation, including transit, highways, and bicycle facilities. The purpose of the STIP is to implement the goals and objectives outlines in the Long-Range Transportation Plans. The 2013-2017 STIP includes several projects in the JLUS Study Area jurisdictions, most of which are bridge deck repair and replacements.

Source: http://www.in.gov/indot/files/STIP_STIPDoc_1417.pdf

Agencies and Organizations

Chapter 21, Indiana Code, Military Base Planning Council

The Military Base Planning Council (MBPC) was established under Indiana Code §4-3-21 in 2005 as part of a strategy to protect NSA Crane from Base Realignment and Closure (BRAC) and has expanded to address the continuing need and opportunities to broaden NSA Crane's military and economic value. The Military Base Planning Council is responsible for identifying support necessary to improve mission efficiency, impacts of encroachment, government actions that can minimize impacts and enhance missions, and opportunities for collaboration. Identification of support for the expansion and development of military bases is also a responsibility. Council duties also include review of state policies and study how other entities have addressed issues regarding encroachment and partnership formation. Each year the council submits a report to the governor and Legislative Services Agency. The Council is chaired by the Lieutenant Governor and its membership includes legislators whose districts contain all or part of a military base, representatives of several state agencies, and local government officials.

Source: http://www.in.gov/legislative/ic/2004/title4/ar3/ch21.html (Page 110)

Indiana Office of Defense Development

In January 2013, the Indiana Office of Defense Development (IODD) was established by Executive Order 13-6 and soon after established by Senate Bill 529. The IODD mission involves growing Indiana's defense sector by promoting the defense assets in Indiana. The IODD focuses on creating new products to retain and grow Indiana's military installations along with attracting defense companies. The IODD develops goals and strategies involving installations, industry, and innovation in Indiana.

Source: http://www.in.gov/iodd/

Indiana Office of Energy Development

The Indiana Office of Energy Development (OED) was established to shepherd the state's energy plan. Realizing that sound energy policy has a significant impact on economic development, OED guides efforts to find homegrown energy solutions for our nation's armed forces, as well as assisting and promoting economic development in Indiana in the defense and energy industries. The OED vision statement encourages the department to be a national leader in creating innovative policy solutions for affordable and reliable energy.

Source: http://www.in.gov/oed/

Indiana Land Protection Alliance

The Indiana Land Protection Alliance (ILPA) is a collaboration of land conservation organizations working around the state of Indiana. Their mission is to increase and enhance Indiana's land conservation community. The ILPA members meet quarterly and strive to improve the effectiveness of land protection efforts by land trusts and their partners. Together, the local land trusts in Indiana have protected more than 20,500 acres of natural habitat, farms and forests, and other special areas.

Source: http://www.nature.org/ourinitiatives/regions/northamerica/unitedstates/indiana/partners/indiana-land-protection-alliance.xml

4.5 Local Jurisdictions

The planning tools used by the study area jurisdictions were analyzed and categorized as permanent, semi-permanent, or conditional. In Indiana, authority to regulate land use is delegated by the state to counties and municipalities. The nature of a jurisdiction's authority to regulate local land use depends on that jurisdiction's form of local government.

The following planning tools are discussed for each jurisdiction:

- comprehensive plan;
- zoning (including lighting, height);
- building codes;
- subdivision regulations; and
- other (additional tools, as applicable).

Table 4-1 provides an overview of existing planning tools by jurisdiction and their applicability to military compatibility.

Table 4-1. County Planning Tools

Jurisdiction	Comprehensive Plan	Zoning Code Height Restrictions	Zoning Code Density	Zoning Code Sound Attenuation	Zoning Code Outdoor Lighting	Subdivision Regulations	Special Area Plans	Building Codes
Daviess County, IN	■	■	■	■	■	■	■	■
Greene County, IN	■	■	■	■	■	■	■	■
Lawrence County, IN	■	■	■	■	■	■	■	■
Martin County, IN	■	■	■	■	■	■	■	■
Sullivan County, IN	■	■	■	■	■	■	■	■

Legend:

■ = The tool exists but does not address land use issue(s) related to Military Compatibility.

■ = The tool exists but only partially addresses land use issue(s) related to Military Compatibility.

■ = The tool exists and addresses land use issue(s) related to Military Compatibility.

■ = The tool exists, but does not affect land use issue(s) related to military compatibility as adopted.

■ = The jurisdiction does not employ this tool.

4.6 Local Jurisdiction Tools

The Code of Indiana grants local governments in Indiana the authority to prepare and adopt a comprehensive plan, zoning ordinance, and subdivision regulations. Indiana law does not require localities to adopt zoning ordinances but allows the adoption at the option of the municipality. If adopted, the zoning ordinance must contain the elements set out by the legislature in Indiana Code Section §36-7-4-600.

The primary tools used by county governments in the NSA Crane JLUS Study Area are the comprehensive plan and the zoning ordinance. A comprehensive plan identifies a broad vision for the community, as well as the policies, goals, and strategies deemed necessary to accomplish stated objectives. A zoning ordinance is used to implement comprehensive plan recommendations through development standards, generally organizing community elements in a rational orderly framework.

These tools are supplemented in some jurisdictions by special area plans, where additional development guidelines are established unique to the special conditions or circumstances of a particular geographic area. Building codes provide building-specific regulations to ensure the health, safety and welfare of occupants within a structure and may include performance standards for sound attenuation between the exterior environment and interior spaces.

Daviess County

The following is a review of the existing planning tools (policies, programs and plans) utilized by Daviess County along with a brief analysis identifying their ability to address land use and military compatibility.

Daviess County Comprehensive Plan

The Daviess County Comprehensive Plan is the policy document that guides the long range development plans for the county and established criteria and guidelines for land use regulation and growth policies for the unincorporated areas of the county. The Comprehensive Plan, which was approved in December 2009, contains elements outlining the community setting, an assessment of existing conditions, community issues, a future vision, and recommendations. A review of the Comprehensive Plan reveals the following areas of interest related to military compatibility:

- Build out of the WestGate@Crane Technology Park may result in an additional 1,481 persons, 592 housing and 2,100 jobs in the Daviess County. Park employees living in Daviess County could stimulate another 254 jobs providing retail and personal services.
- Locations for future land use opportunities include:
  - Commercial development in the interchange area of I-69 / US Highway 50 and in the WestGate@Crane Technology Park near the I-69 / US Route 231 interchange;
  - Industrial development along US Route 231 in the WestGate@Crane Technology Park.
- Recommends provision of sanitary sewers, waterline improvements and other utilities to industrial sites at the WestGate@Crane Technology Park so that development is not limited by the capacity of the Crane Naval Weapons Support Center sewage treatment plant.
- During community leader interviews, many respondents mentioned the importance of NSA Crane to area growth and development as well as the opportunities made possible by the new WestGate@Crane Technology Park. Respondents hope for continued growth at the WestGate@Crane Technology Park and the welfare of NSA Crane.

Daviess County Zoning

The Daviess County Zoning Ordinance divides the county into zoning districts that include agricultural, residential, commercial, airport and industrial. Airport zoning includes additional requirements, including but not limited to height requirements. These requirements are necessary due to the proximity of Daviess County Airport.

Although NSA Crane operations are not specifically identified within the County's Zoning Ordinance, the following provisions are relevant to compatibility with NSA Crane.

Height

The maximum height for primary structures for areas zoned Floodplain, Residential Estate, Single-Family Residential, B-1, and Airport is 35 feet. The height restriction for areas zoned Multi-Family Residential, B-2, Light Industrial, Heavy Industrial, and Planned Unit Development are limited to 55 feet. Land zoned Agriculture has no height limits for primary structures.

Telecommunication Facilities

Telecommunication towers are permitted in all of the zoning districts, except for the Airport district, but require a Special Use Permit. An application must be filled out and approved by the Board of Zoning Appeals. Written applications must include, but are not limited to:

- Two copies of all plans drawn to scale with all dimensions and depicting all existing and proposed structures, elevations, landscaping, drainage, lighting, signage, and any other supporting documentation needed to fully understand the proposal.
- List of adjoining property owners certified by the Daviess County Auditor's Office. Notice shall be given to adjoining property owners by certified mail postmarked at least ten days prior to the hearing.

Noise

Noise regulations in Daviess County apply to the transmission of deleterious effects of noise from one property to another. Uses within the Heavy Industrial zoning district are expected to generate some nuisances including noise, but not beyond the district boundary. All applicants, developers, or landowners who construct any dwelling unit with the Rural Estate, Single-Family Residential, Multi-Family Residential, Local Business, and General Business must sign a Notice of Neighboring Agricultural Activity assuring awareness that surrounding agricultural activity may produce noise and odor. No unsafe, uncomfortable, or offensive vibrations, noises, visual effects, odors or air pollutants shall be allowed to radiate across lot lines for land zoned Single-Family and Multi-Family with Dwelling Units.

Outdoor Lighting

For areas in the Planned Unit Development zoning district, the parcels shall be landscaped, and woodlands used to screen lighting, parking areas and loading areas from adjacent residential areas. Illuminated Signs may only be illuminated by lighting that is cast downward and focused on the sign with no lighting cast upward into the sky. No intermittent flashing lights, neon lights, Digital LCD screens, or back lighting are permitted.

Density

All districts have a minimum lot size of two acres, except for Heavy Industrial, which does not have a minimum lot size.

Daviess County Subdivision Ordinance

Daviess County adopted minimum subdivision standards for streets most recently On October 28, 2013. These regulations do not contain provisions specific to military compatibility.

Daviess County Building Code

The 2014 IBC applicable to Class 1 structures is administered by the Indiana Department of Homeland Security Division of Fire and Building Safety Services in Daviess County. Class 2 structures do not require permits in Daviess County. The 2014 IBC does not contain sound transmission requirements to regulate the transmission of sound from a building exterior to indoor spaces.

Town of Odon Comprehensive Plan

The Town of Odon Comprehensive Plan is the policy document that guides the long range development plans for the town and established criteria and guidelines for land use regulation and growth policies. The Comprehensive Plan, which was approved in December 2006, contains elements outlining population, infrastructure, transportation, goals and strategies, land use, and implementation of the plan.

A review of the Comprehensive Plan reveals the following areas of interest related to military compatibility:

- One goal of the comprehensive plan is to take advantage of Odon as a "satellite" community to NSA Crane by promoting the Town of Odon as the ideal hometown.
- WestGate@Crane Technology Park and the future I-69 interchange have the potential expand and impact businesses in the Town of Odon.
- Improve the housing stock and offer a full range of housing opportunities, including high quality housing for professionals working at NSA Crane.

Town of Montgomery Comprehensive Plan

The Town of Montgomery Comprehensive Plan is the policy document that guides the long range development plans for the town and established criteria and guidelines for land use regulation and growth policies. The Comprehensive Plan, which was approved in 2006, contains elements outlining population, infrastructure, transportation, goals and strategies, land use, and implementation of the plan.

A review of the Comprehensive Plan reveals the following areas of interest related to military compatibility:

- One goal of the comprehensive plan is to take advantage of Montgomery as a "satellite" community to NSA Crane by promoting the Town of Montgomery as the ideal hometown.
- Improve the housing stock and offer a full range of housing opportunities, including high quality housing for professionals working at NSA Crane.

Greene County

The following is a review of the existing planning tools (policies, programs and plans) utilized by Greene County along with a brief analysis identifying their ability to address land use and military compatibility.

Greene County Comprehensive Plan

The Greene County Comprehensive Plan is the policy document that guides the long range development plans for the county and established criteria and guidelines for land use regulation and growth policies for the unincorporated areas of the county. The Comprehensive Plan, which was approved in July 2009, contains elements outlining economy, land use, natural resources protection, transportation, and implementation and evaluation of the plan. A review of the Comprehensive Plan reveals the following areas of interest related to military compatibility:

- Severe environmental constraints to expanded urban growth east of the White River due to steep slopes, forests, karst topographic features and wildlife habitats containing threatened and endangered species such as the Indiana Bat.
- The WestGate@Crane Technology Park is projected to add 371 jobs, add 1,932 acres of land for residential and other nonindustrial uses, require 1,537 additional housing units, and add 3,009 people to the county's population by 2030.
- The Comprehensive Plan recommends future industrial and commercial development along the US Route 231 corridor south of I -69.

Greene County Zoning

Greene County has not adopted a zoning ordinance.
Indiana Code 36-7-4-501 requires the adoption of a Comprehensive Plan before the creation of a zoning ordinance. Greene County has adopted a Comprehensive Plan and is therefore able to adopt a zoning ordinance consistent with that Plan.

Greene County Subdivision Ordinance

Greene County has not adopted a Subdivision Ordinance.

Greene County Building Code

The 2014 IBC applicable to Class 1 structures is administered by the Indiana Department of Homeland Security Division of Fire and Building Safety Services in Greene County. Class 2 structures do not require permits in Greene County. The 2014 IBC does not contain sound transmission requirements to regulate the transmission of sound from a building exterior to indoor spaces.

Greene County I-69 Corridor Plan

The I-69 Corridor Plan for Greene County is a framework for future physical development along 4 miles of the I-69 Corridor that was prepared for Greene County and adopted by the Greene County Economic Development Corporation in 2009. The plan addresses the use of land to accommodate future activities, the improvement of the infrastructure to sustain development, the provision of community and recreation facilities to meet the needs of its residents, and the preservation natural and historic amenities to protect the heritage of the community. The plan strives to take advantage of the economic development opportunities through the development of sites with adequate supporting infrastructure while protecting and enhancing manmade and natural environmental features that are unique to Greene County. Highlights from the plan include the following recommendations:

- Future industrial or commercial on parcels in a Tax Increment Financing (TIF) District near the US Route 231 Corridor south of I-69 and WestGate@Crane Technology Park.
- Projects that assist development opportunities around the future I-69 interchanges, especially the US 231 interchange, including the extension of sewer lines, water lines and other utilities to create shovel ready sites.
- Provision of sanitary sewers to the I-69/US 231 interchange area and WestGate at Crane Technology Park (development of wastewater treatment plant at Scotland underway).
- Improvement of waterlines as necessary to serve the I-69 / US 231 interchange area and WestGate at Crane Technology Park.
- Consideration of sewers and waterlines at other proposed I-69 interchanges.
- A land use pattern and development review guidelines that minimize the impact on prime farm land.
- A future land use pattern that protects forested areas.

Since the Corridor Plan was adopted, Greene County constructed a wastewater treatment facility in 2011 to support the WestGate@Crane Technology Park and development of the surrounding area around the I-69/ US highway 231 interchange. In 2013, the Greene County Redevelopment Commission constructed a water tower and supporting water lines at the WestGate @Crane Technology Park to increase water storage and distribution facilities to support the demand from growth and park buildout.

Lawrence County

The following is a review of the existing planning tools (policies, programs and plans) utilized by Lawrence County along with a brief analysis identifying their ability to address land use and military compatibility.

Lawrence County and City of Bedford 2020 Strategic Plan

The Bedford/Lawrence County 2020 Strategic Plan was funded by a grant from the Indiana Department of Transportation's I-69 Community Planning Program and was published in 2009. The strategic plan is based on local efforts to promote and guide future development. The plan addresses the needs of the community, and reflects the unique character and natural features of Lawrence County. The plan's goals and supporting objectives include land use, transportation, public services, natural resource, and culture to help guide future growth and development.

The plan recognizes that NSA Crane has remained a powerful economic engine for the county and highlights the need to work together to ensure NSA Crane remains a stable employer to local residents. Objective Land Use-6 involves capitalizing on existing businesses and resources including taking advantage of the county's proximity to NSA Crane. Objective Public

Facilities-6 includes providing high tech infrastructure throughout the county which could potentially spur economic development that supports NSA Crane.

Land Planning in Lawrence County

The City of Bedford invited Indiana University School of Public and Environmental Affairs students to study land planning in Lawrence County. Lawrence County does not have any type of land-use planning or zoning in its unincorporated areas. Survey results and conversations with local officials indicate that community-wide education and outreach related to land use planning is needed. The report recommends the formation of an advisory plan commission to lead these efforts. In the mid-term, they recommend the creation and adoption of an official Comprehensive Plan.

Lawrence County Subdivision Ordinance

Lawrence County has not adopted a Subdivision Ordinance.

Lawrence County Building Code

The 2014 IBC applicable to Class 1 structures is administered by the Indiana Department of Homeland Security Division of Fire and Building Safety Services in Lawrence County. Class 2 structures do not require permits in Lawrence County. The 2014 IBC does not contain any provisions specific to military compatibility such as sound attenuation requirements for noise from external building sources.

Lawrence County Hazard Mitigation Plan

The Lawrence County Hazard Mitigation Plan is intended to reduce or eliminate long-term risk to human life and property from hazards. The Plan, which was approved in January 2009, addresses 10 different hazards: flooding, tornado, thunderstorms/high winds/hail, hazardous materials release, drought/extreme heat, earthquake, ground failure, severe winter storm, and explosion/fire. A vulnerability analysis and loss estimated was conducted for each hazard. The plan also includes a mitigation plan and plan maintenance.

City of Bedford Comprehensive Plan

The City of Bedford Comprehensive Plan is the policy document that guides the long range development plans for the City and established criteria and guidelines for land use regulation and growth policies for the City. The Comprehensive Plan, which was approved in July 2010, contains elements outlining population, land use, historic structures, housing, economic development, transportation, utilities, and implementation of the Plan.

A review of the Comprehensive Plan reveals the following areas of interest related to military compatibility:

- Part of the Vision Statement for Bedford includes:

  Bedford will capitalize on its strengths while focusing on promoting healthier lifestyle opportunities for all ages, promoting economic development opportunities provided by Crane NSWC and the new interstate and revitalizing the downtown to showcase the unique heritage and character of the community.

- One policy in the plan includes encouraging the exploration of developing or expanding affordable public transportation options that offer service between the city, neighboring communities, and NSA Crane.

- An objective included in the plan directs to explore and benefit from endeavors tied to the NSA Crane Facility.

- The Lawrence County Economic Growth Council (LCEGC) and Bedford Chamber of Commerce (BCC) are working to develop more industries associated with NSA Crane and the future I-69.

City of Bedford Zoning Code

The City of Bedford has adopted zoning regulations to facilitate orderly development including zoning districts with permitted and special uses, and bulk regulations for lot, yard, and height requirements. The regulations include general provisions for nonconforming uses and structures, signage

and parking, site plan approvals, planned unit developments and procedures for appeals and variances.

Although NSA Crane operations are not specifically identified in the City of Bedford Zoning Code, the city does not experience impacts from NSA Crane nor impact operations at the installation.

City of Bedford Building Code

The City of Bedford has adopted the City of Bedford Building Code in Chapter 150 of city code and conducts site and building plan reviews, issues building permits and inspects buildings during and after construction for compliance with state and local law. Although the City of Bedford Building Code does not contain sound transmission requirements to regulate the transmission of sound from a building exterior to indoor spaces, the city does not experience impacts from NSA Crane nor impact operations at the installation.

Martin County

The following is a review of the existing planning tools (policies, programs, and plans) utilized by Martin County along with a brief analysis identifying their ability to address land use and military compatibility, and where potential improvements can be made.

Martin County Comprehensive Plan

The Martin County Comprehensive Plan is the policy document that guides the long range development plans of the county. It contains the goals and objectives upon which the county officials base their long-range decisions regarding development within the county. The most recent comprehensive plan, adopted in July 2009, contains elements outlining population and economy, land use, cultural and natural resources, transportation, community facilities, and services and utilities. The guidelines outlined in the comprehensive plan are important because of their potential impacts on operations at NSA Crane, which is located within the county.

A review of the comprehensive plan has identified the following related to military compatibility:

- A predominance of forestlands in NSA Crane and east of the East Fork of the White River covers 62 percent of the total county.
- Forty percent of managed land (NSA Crane, Hoosier National Forest and Martin State Forest) is exempt from property taxes. Federal and state payments in lieu of property taxes to the county fluctuate over time.
- Endangered species and high quality natural communities are presently protected by publicly managed land areas, such as NSA Crane.
- The WestGate@Crane Technology Park is projected to add 340 jobs, add 92 acres of land for residential and other nonindustrial uses, require 238 additional housing units, and add 594 people to the county's population by 2030.
- Most sanitary sewer systems are at capacity during storm events with significant storm water inflow/infiltration problems, and sanitary sewers must be extended to accommodate growth.
- Locations for future land use opportunities in Martin County are focused around the City of Loogootee, along US Route 231 north of West Boggs Lake and north of the Town of Crane.

Source: Martin County Comprehensive Plan, 2009

Martin County Zoning

Martin County has not adopted a zoning ordinance. Indiana Code 36-7-4-501 requires the adoption of a comprehensive plan before the creation of a zoning ordinance. Martin County has adopted a Comprehensive Plan and is therefore able to adopt a zoning ordinance consistent with that Plan.

Martin County Subdivision Ordinance

Martin County has not adopted a Subdivision Ordinance.

Martin County Building Code

The 2014 IBC applicable to Class 1 structures is administered by the Indiana Department of Homeland Security Division of Fire and Building Safety Services in Martin County. Class 2 structures do not require permits in Martin County. The 2014 IBC does not contain sound transmission requirements to regulate the transmission of sound from a building exterior to indoor spaces.

City of Loogootee Comprehensive Plan

The City of Loogootee Comprehensive Plan is the policy document that guides the long range development plans of the city. It contains the goals and objectives upon which the city officials base their long-range decisions regarding development within the city. The Comprehensive Plan was updated in 2014 and contains elements outlining population and demographics, land use, utilities, economic development, housing, and transportation. A review of the Comprehensive Plan has identified the following related to military compatibility:

- Acknowledges the value of NSA Crane as the largest employer in Martin County, providing high quality jobs and a draw for innovative entrepreneurs along with the WestGate@Crane Technology Park.
- The existing and potential land use map shows the land use within the city and within a two-mile extraterritorial jurisdiction boundary. While the city corporate limits are outside any direct influence of NSA Crane, the two-mile area would be within the three-mile NSA Crane notification area. This area on the map is predominantly identified as Park / Recreation with small pockets of existing single family residential development.

City of Loogootee Building Code

The City of Loogootee has adopted a building code which is administered by the City Building Commissioner. The building code does not contain sound transmission requirements to regulate the transmission of sound from a building exterior to indoor spaces.

Town of Crane Comprehensive Plan

The Town of Crane has not adopted a Comprehensive Plan.

Town of Crane Zoning Code

The Town of Crane has not adopted a zoning code.

Sullivan County

The following is a review of the existing planning tools (policies, programs and plans) utilized by Sullivan County along with a brief analysis identifying their ability to address land use and military compatibility. An evaluation of the City of Sullivan Comprehensive Plan and Zoning Code are also provided.

Sullivan County Comprehensive Plan

Sullivan County has not adopted a Comprehensive Plan.

Sullivan County Zoning

Sullivan County has not adopted a zoning ordinance.
Indiana Code 36-7-4-501 requires the adoption of a Comprehensive Plan before the creation of a zoning ordinance. The City of Sullivan has adopted a Comprehensive Plan and is therefore able to adopt a zoning ordinance consistent with that Plan.

Sullivan County Subdivision Ordinance

Sullivan County has not adopted a Subdivision Ordinance.

Sullivan County Building Code

The 2014 IBC applicable to Class 1 structures is administered by the Indiana Department of Homeland Security Division of Fire and Building Safety Services in Sullivan County. Class 2 structures do not require permits in Sullivan County. The 2014 IBC does not contain sound transmission requirements to regulate the transmission of sound from a building exterior to indoor spaces.

City of Sullivan Comprehensive Plan

The City of Sullivan Comprehensive Plan is the policy document that guides the long range development plans for the city and established criteria and guidelines for land use regulation and growth policies for the city. The

Comprehensive Plan, which was approved in November 2013, contains elements outlining population, land use, housing, economic development, natural resources and recreation, transportation, utilities, and implementation of the plan.

A review of the Comprehensive Plan reveals the following areas of interest related to military compatibility:

- The plan focuses on directing future growth including reacquiring the two-mile fringe and creating design standards and a review and overhaul of the city's zoning code and subdivision control ordinance. The city has a future zoning map that would zone areas currently within the unincorporated county and proximate to the LGTF as Lake Residence, though there are no development standards for this district.

City of Sullivan Zoning Code

The City of Sullivan has adopted a Zoning Code which contains eight zoning districts – four residential districts, two commercial districts, one industrial district and one Flood Plain District. The majority of the city is zoned for single family and duplex residential with general commercial in the city-center and the north end of N Section Street corridor. Industrial zoning is clustered along the rail lines.

Although the city zoning does not acknowledge the LGTF, the city is separated from the LGTF by approximately 2 miles including Lake Sullivan and is largely built out.

City of Sullivan Building Code

The City of Sullivan has adopted a building code which is administered by the City Building Commissioner. The commissioner reviews applications for permits and issues permits appropriately for compliance with state and local codes during remodeling and construction of homes, businesses, developments, and infrastructure within the city limits. The city requires permits for any new construction, relocating existing structures, and remodeling that involves changes to the structure of the home. The 2014 IBC does not contain sound transmission requirements to regulate the transmission of sound from a building exterior to indoor spaces.

4.7 Regional Plans and Tools

Strategic Plan for Economic and Community Prosperity in Southwest Central Indiana

The Strategic Plan for Economic and Community Prosperity in Southwest Central (SWC) Indiana was released in June 2014. The plan examined the dynamics behind SWC Indiana's industrial base, research base, entrepreneurial ecosystem, and regional economic development potential to better understand the region's challenges. Five development challenges were found:

- Industrial growth is being hindered by the lack of sufficient numbers of skilled workers.
- The region has not yet fully taken advantage of the opportunity presented by the development of the I-69 Corridor.
- Lack of robust, value-added relationship between the region's two primary public research engines hinders the region's ability to compete in the global economy, and also puts at risk the ability to retain the institutions' world-class assets in the future.
- Lack of sufficient entrepreneurial culture hinders economic growth, limiting economic diversification and the stability and opportunities such diversity brings to a community.
- Lack of regionalism hinders the coordination of efforts and does not allow for the benefits of critical mass.

The Strategic Plan includes strategies and actions to overcome the existing economic challenges:

- Advance a sense of regionalism.
- Foster a high-value quality of place.
- Advance workforce development/talent through career immersion initiatives aligned with federal, state and local efforts.
- Focus retention, expansion and attraction efforts on those industry clusters that provide the greatest opportunity for economic growth in the region.
- Establish a collaborative applied research environment between Indiana's research universities and Naval Surface Warfare Center Crane to leverage each other's assets to help ensure global relevancy of research and regional economic growth.
- Catalyze a robust entrepreneurial ecosystem and culture.

I-69: Evansville to Indianapolis Tier 1 Environmental Impact Statement

An Environmental Impact Statement (EIS) was prepared for the I-69 connector from Evansville to Indianapolis in Southwest Indiana. The EIS analyzed the impact of five different potential highway corridors and 12 alternatives. After careful consideration of all comments from resource agencies, interest groups and the general public, INDOT recommended that Alternative 3C be selected as the corridor. The Federal Highway Administration selected Alternative 3C for I-69 in its Record of Decision (ROD) dated March 24, 2004.

The purpose of the project is to strengthen the transportation network and economic development in Southwest Indiana. In order to accomplish that purpose the I-69 Community Planning Program (I-69 CPP) was created to enhance the capacity of communities along the new I-69 Corridor to plan for and manage the protection of natural resources, economic development, and general growth. The program includes funding for local planning activities and the development of a planning toolbox.

Six communities in the vicinity of Section 4 were eligible to apply for I-69 CPP grants. The City of Linton, Town of Bloomfield and Greene County opted to team together in their planning efforts, as did the City of Bedford and Lawrence County. The Greene County / Bloomfield / Linton team was awarded $150,000 while the Bedford / Lawrence County team was awarded $100,000. Monroe County was awarded a $50,000 grant.

Regional Economic and Community Development in Southern Indiana

The Regional Economic and Community Development in Southern Indiana Report was conducted by Indiana University. The Report includes a Regional Tourism Development Plan, a Regional Workforce Development Plan, and an IU Rural Center of Excellence. The Tourism Plan includes marketing and mapping strategies to attract visitors to the region. The Workforce Plan involves utilizing existing resources, promoting science, technology, engineering and mathematics (STEM) initiatives, and developing afterschool and summer education programs. The Report also examines the potential for a Rural Center of Excellence at IU. The center would have four focus areas, including business and cooperatives, STEM, health and substance abuse, and technology and broadband.

Radius Indiana Strategic Plan

The Radius Indiana Strategic Plan presents emerging opportunities, Radius Indiana's mission and vision, and actions to be taken by regional leaders. The Plan includes both strategic objectives and actions plans. Strategies and actions in the Plan include, branding and marketing, retention and expansion, attracting new business and entrepreneurships, and increasing regional resources.

Southern Indiana Development Commission Comprehensive Economic Development Strategy

The Southern Indiana Development Commission (SIDC) Comprehensive Economic Development Strategy (CEDS) is a regional strategic planning document prepared annually by the SIDC – a quasi-governmental regional

planning commission serving Daviess, Greene and Lawrence Counties in the JLUS study area. The CEDS serves as a basis for the creation of jobs, fostering more stable and diversified economies, and improving the quality of life in the area comprised of Daviess, Greene, Knox, Lawrence and Martin Counties. The CEDS provides a mechanism for coordinating various groups and organizations who are concerned with economic development. The most recent CEDS update was prepared in 2015 and acknowledges NSA Crane as a primary economic driver within the district and the combined synergies with the WestGate@Crane Technology Park which attracted 32 new companies in seven years.

The CEDS includes several projects targeted to fostering development within the area northwest of Crane including the WestGate technology park and I-69 interchanges including:

- Infrastructure upgrades to roads, water distribution, fire suppression, wastewater collection and treatment, and power utilities to attract development at the WestGate@ Crane Technology Park.
- Working with communities to position areas around the I-69 interchanges for infrastructure development and smart growth.
- Developing financing programs to educate businesses on the potential of working with NSA Crane and its tenants.
- Promoting NSA Crane and its tenants to leverage their technology and industrial capability into economic development opportunities.
- Working with NSA Crane and the WestGate@Crane Authority to enhance the university presence, grow business incubators, and workforce development and training programs.

Some of these initiatives have produced demonstrable results including the infrastructure projects for water and wastewater to serve the WestGate@Crane technology Park.

Indiana Karst Conservancy

The Indiana Karst Conservancy (IKC) is a non-profit organization dedicated to the preservation and conservation of southern Indiana's unique karst features. The IKC was formed by concerned individuals when it became apparent that no similar group was actively protecting such features for their inherent geological, biological, and historical importance. The purposes of the IKC are the management, protection, and acquisition of the karst areas in southern Indiana. The IKC also supports research and promotes education related to karst and its appropriate use.

Sources: http://ikc.caves.org/what-is-the-ikc

Sycamore Land Trust

Sycamore Land Trust is a regional non-profit organization founded in 1990. Their mission is to preserve the disappearing natural and agricultural landscape of southern Indiana. Sycamore preserves and restores the beautiful natural heritage of southern Indiana. As of January 2014, Sycamore has protected more than 82 properties totaling over 8,000 acres. They conserve land through ownership or holding conservation easements to limit harmful uses while allowing land to remain in private ownership. Sycamore also operates an Environmental Education Program that helps connect people of all ages to nature.

Source: http://sycamorelandtrust.org/about

4.8 Other References

In the interest of land use compatibility between the military and the local community, the DOD Office of Economic Adjustment (OEA) and other public interest groups, such as the National Association of Counties (NACo), have prepared educational documents and videos that educate and inform the public about encroachment issues and methods that can be used to address existing or future compatibility concerns. Five resources that have been published to inform the public on land use compatibility are identified as follows:

Guides

The Practical Guide to Compatible Civilian Development near Military Installations (July 2007), OEA

This guide offers general information on community development and civilian encroachment issues. The guide can be found at: http://www.oea.gov/.

Joint Land Use Study Program Guidance Manual (November 2006)

This manual provides guidance on the JLUS program, process, and efforts to support compatible development. This manual can be obtained on the OEA internet site at the following address: http://www.oea.gov/.

Encouraging Compatible Land Use between Local Governments and Military Installations: A Best Practices Guide (April 2007), NACo

This guidebook presents case studies of best practices between the military and communities through communication, regulatory approaches, and Joint Land Use Studies. The guide can be accessed on the NACo internet site at the following address: http://www.naco.org/.

State Policy Options: A Report of the National Conference of State Legislatures Task Force on Military and Veterans Affairs (January 2012)

This report provides state legislators and staff information about the range of policy options available to them to sustain their neighboring military installations and the associated testing and training operations. It is designed to encourage a greater understanding of the roles that state legislators, local government officials, land conservation organizations, and the military play in managing development near military bases and protecting natural resources and the health and safety of citizens. This report can be accessed at the following address: http://www.ncsl.org/documents/environ/NCSL_State_Policy_Options_020112_FINAL.pdf.

Collaborative Land Use Planning: A Guide for Military Installations and Local Governments, International City / County Management Association and the Metropolitan Institute at Virginia Tech

This guide provides essential observations about land use policy and procedures, discusses critical questions, and suggests model practices for military commanders to build stronger relationships with local policymakers and planning officials. This guide can be accessed at the following address: https://www.fedcenter.gov/_kd/Items/actions.cfm?action=Show&item_id=7667&destination=ShowItem.

Working with Local Governments: A Practical Guide for Installations, (May 2012), International City / County Management Association and the National Association of Counties

This guide provides a primer on how local governments operate and what installation personnel can do to engage state and local governments in dialogue on compatibility issues. The guide can be accessed from the following address: https://www.fedcenter.gov/_kd/Items/actions.cfm?action=Show&item_id=6203&destination=ShowItem.

Commander's Guide to Community Involvement (August 2012), Range Commanders Council Sustainability Group

This guide provides tools for proactively addressing compatibility concerns focusing on outreach, land use, urban sprawl and other sustainability areas. The guide includes the latest trends and approaches in community involvement best practices and highlights case studies. This guide can be accessed from the following address: http://www.repi.mil/Portals/44/Documents/Primers/Primer_CommunityInvolvement.pdf.

Local Sustainability Partnering Innovation Lab: Military-Community Partnering for Sustainability at the Local Level (February 2011), Association of Defense Communities (ADC)

This document presents the findings and lessons learned from an "innovation laboratory" conducted at the 2011 ADC Winter Conference. The document reports on this interactive facilitated discussion exercise, focusing on the case study of Camp Bullis, San Antonio, Texas and the collaborative community and military efforts to address local and regional sustainability. This document can be accessed from the following address: http://www.defensecommunities.org/wp-content/uploads/2011/03/ADC-Local-Sustainabilty-Innovation-Lab-Final-After-Action-Report.pdf.

Installation-Community Partnerships: A New Paradigm for Collaborating in the 21st Century, Journal of Defense Communities

The article explores the changes that are prompting military and community leaders to take a closer look at partnerships, and provides a template for

assessing the success of a prospective collaboration. Two case studies are presented — the arrangement under which the city of Monterey, California, provides all facility maintenance at the Presidio of Monterey; and the enhanced use lease at Nellis Air Force Base that resulted in the city of North Las Vegas building a $25 million fitness center for the Air Force. This article can be accessed from the following address: http://www.defensecommunities.org/wp-content/uploads/2012/07/P4_BAH_Journal_final.pdf.

The Base of the Future: A Call for Action by States and Communities (April 2016), Association of Defense Communities

This article examines the common threads that all bases share with their local hosts, and proposes an overarching approach to advise defense communities and states in the development of their own policies regarding adaptation and resilience when dealing with infrastructure, service and economic changes inside and outside the fenceline. Five key components focus on economic development and community planning, expanded sharing of services and infrastructure, mission capability and natural resource conservation, and military involvement and engagement for policy and legislation. This article can be accessed form the following address: http://defensecommunities.org/wp-content/uploads/2015/01/The-Base-of-the-Future_v5.pdf.

Strengthening National Defense: Countering Encroachment through Military-Community Collaboration (2009), National Academy of Public Administration

This report discusses the significant and growing challenges to military readiness created by nearby civilian community growth and proposes recommendations for increased collaboration among key stakeholders—local and state governments, non-profit organizations, the Military Services and installations, and other federal agencies—in order to creatively and effectively address these complex and critical issues. This report can be accessed from the following address: https://ciaonet.org/attachments/26009/uploads.

Videos

The Base Next Door: Community Planning and the Joint Land Use Study Program, OEA

This informative video discusses the issue of encroachment near military installations as urban development occurs within the vicinity. This video can be accessed on the official OEA YouTube channel at: http://www.youtube.com/watch?v=6UiyWDgLeJM.

Managing Growth, Communities Respond, OEA

This video highlights the lessons learned from three communities (Kitsap Naval Base in Bangor, Washington; Fort Drum in Jefferson County, New York; and Fort Leonard Wood in Pulaski County, Missouri) that have successful programs for managing growth near their respective military installations. This video can be accessed on the official OEA YouTube channel at: http://www.youtube.com/watch?v=rea6d3bDp3c.

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Compatibility Assessment

Compatibility, in relation to military readiness, can be defined as the balance or compromise between community needs and interests and military needs and interests. The goal of compatibility planning is to promote an environment where both community and military entities communicate, coordinate, and implement mutually supportive actions that allow both to achieve their respective objectives.

A number of factors assist in determining whether community and military plans, programs, and activities are compatible or in conflict with joint land uses such as community activities and military installations. For this Joint Land Use Study (JLUS), 25 compatibility factors were used to identify, determine, and establish a set of key JLUS compatibility issues. These compatibility factors are listed on the following page.

An action undertaken by either the military or community that minimizes, hinders or presents an obstacle to the action of the other is characterized as an issue. Issues arising on the part of either or both the military and community are grouped according to the relevant factor and listed in this chapter. For each identified issue, a compatibility assessment is provided discussing the nature and cause or source of the issue followed by applicable existing tools currently used or that may be used to mitigate encroachment or prevent the emergence of encroachment in the future including an assessment of their effectiveness.

COMPATIBILITY FACTORS

AQ	Air Quality	LAS	Land / Air / Sea Spaces
AT	Anti-Terrorism / Force Protection	LU	Land Use
BIO	Biological Resources	LEG	Legislative Initiatives
CA	Climate Adaptation	LG	Light and Glare
COM	Coordination / Communication	MAR	Marine Environments
CR	Cultural Resources	NOI	Noise
DSS	Dust / Smoke / Steam	PT	Public Trespassing
ED	Energy Development	RC	Roadway Capacity
FSC	Frequency Spectrum Capacity	SA	Safety Zones
FSI	Frequency Spectrum Impedance / Interference	SNR	Scarce Natural Resources
		VO	Vertical Obstructions
HA	Housing Availability	V	Vibration
IE	Infrastructure Extensions	WQQ	Water Quality / Quantity

Methodology and Evaluation

The methodology for the NSA Crane JLUS consisted of a comprehensive and inclusive discovery process to identify key stakeholder issues associated with the compatibility factors. At the initial Policy Committee (PC) and Technical Working Group (TWG) workshops and public forums, stakeholders were asked to identify the location and type of issue in conjunction with compatibility factors they thought existed today or could occur in the future. As a part of the evaluation phase, the PC, TWG, and the public examined and prioritized the extent of existing and potential future compatibility issues that could impact land within or near the Study Area. Other factors and associated issues were analyzed based on available information and similarity with other community JLUS experiences around the country.

The selection and inclusion of strategies is directly and indirectly affected by the evaluation of issues. Issues were prioritized into four different categories with an associated time frame and presented to the PC and TWG for review. The results of the PC and TWG priorities were used to determine the timeframe for initiating strategies by the primary and partner agencies.

When reviewing the assessment information in this chapter, it is important to note the following:

- This chapter provides a technical background on the factors and issues discussed based on available information. The intent is to provide an adequate context for awareness, education, and development of JLUS recommendations. It is not designed or intended to be utilized as an exhaustive technical evaluation of existing or future conditions within the Study Area.

- Of the 25 compatibility factors considered, 6 were determined to be inapplicable to this JLUS:

    - Climate Adaptation
    - Cultural Resources
    - Energy Development
    - Marine Environments
    - Scarce Natural Resources
    - Vertical Obstructions

- Each issue has an accompanying set of existing tools. These existing tools are meant to illustrate what is currently in place that can be used to mitigate the compatibility issue. Though existing tools may not always directly aid compatibility, they provide a foundation to help create strategies for future implementation.

Please see the next page.

5.1 Air Quality (AQ)

Air quality is defined by numerous components regulated at the federal and state level. For compatibility, the primary concerns are pollutants that limit visibility, such as particulates, ozone, etc. and potential non-attainment of air quality standards that may limit future changes in operations at an installation or the surrounding region.

Key Terms

Attainment Area. An attainment area is a geographic area that meets the National Ambient Air Quality Standards for a criteria pollutant.

Criteria Pollutants. The criteria pollutants are the six principle pollutants harmful to public health and the environment for which the Environmental Protection Agency has set National Ambient Air Quality Standards (NAAQS). The pollutants are: carbon monoxide (CO), lead, nitrogen dioxide (NO2), ozone (O3), particulate matter (PM), and sulfur dioxide (SO2).

National Ambient Air Quality Standards. The NAAQS are standards for outdoor air pollutants established by the Environmental Protection Agency under authority of the Clean Air Act.

Nonattainment Area. A nonattainment area is a geographic area where air pollution levels persistently exceeds NAAQS, or that contributes to ambient air quality in a nearby area that fails to meet standards. Designating an area as nonattainment is a formal rulemaking process made by the Environmental Protection Agency, typically only after air quality standards have been exceeded for several consecutive years.

Technical Background

A number of factors can influence air quality in a region. These include a variety of sources and types of pollutants, topographic conditions, weather, and other factors. Community sources of dust, car emissions and air pollutants can also create adverse impacts on the environment and can potentially limit NSA Crane operations. Permits and funding for important infrastructure projects can be delayed or denied in non-attainment areas, or projects may be subject to mitigation measures that increase the capital cost of projects.

Under the Clean Air Act, the US Environmental Protection Agency (EPA) established NAAQS for air pollutants. The NAAQS have been set for the six criteria air pollutants. Air quality control regions (AQCR) are classified either "attainment" or "nonattainment," according to whether or not the concentrations of criteria pollutants exceed the NAAQS. Nonattainment designation categories are Marginal, Moderate, Serious, Severe, and Extreme.

ISSUE AQ-1	**Regional Air Quality** Though Martin County is in attainment for six air quality criteria pollutants and NSA Crane is in compliance with its Part 70 Title V Air Quality operating Permit, future development has the potential to affect regional air quality.

Compatibility Assessment

Currently, the counties within the Study Area are classified as attainment areas for the six criteria pollutants regulated by the Clean Air Act (CAA), which include ozone, sulfur dioxide, carbon monoxide, lead, particulate matter, and nitrogen dioxide. However, NSA Crane is considered a major source of air pollution under the CAA due to the ordnance demolition that

occurs on the installation – an essential part of NSA Crane's mission which produces airborne pollutants. In order to operate, NSA Crane has been issued a U.S. EPA Part 70 Title V permit by the Indiana Air Pollution Control Board, a division of the Indiana Department of Environmental Management (IDEM). While operating under the permit, NSA Crane environmental personnel must monitor, record, and report the installation's air quality for compliance with state and federal regulations.

NSA Crane was most recently issued a renewal to the Part 70 Title V Permit 101-32904-00005 on April 16, 2015. On December 30, 2015, the Operating Permit was amended for a new emergency diesel generator. The Operating Permit includes emissions limits for various facilities throughout the installation as well as Preventative Maintenance Plans to ensure emissions for each emissions-generating facility do not exceed established thresholds in the Operating Permit. NSA Crane is operating in compliance with the provisions of its Part 70 Operating Permit.

For the purpose of Air Quality, NSA Crane is within the Martin County region. Historic records published by IDEM indicate that pollutants for Martin County have decreased for all six criteria between 1980 and 2009:

- Reduction of 82.52% in Carbon Monoxide (CO).
- Reduction of 79.66% in Nitrogen Oxides (NOx).
- Reduction of 47.98% in Fine Particulate of 2.5 microns in diameter (PM2.5).
- Reduction of 36.11% in Particulate Matter of ten microns in diameter (PM10).
- Reduction of 99.52% in Sulfur Dioxide (SO2).
- Reduction of 53.11% in Volatile Organic Chemicals (VOC).

While Martin County is currently an attainment area and NSA Crane is in compliance with its Part 70 Title V Operating Permit, future development including that associated with Interstate 69 (I-69) should be monitored to ensure regional emissions do not increase above attainment levels.

Existing Tools

Clean Air Act

The Clean Air Act (CAA) is the comprehensive federal law that regulates air emissions from stationary and mobile sources in order to control air pollution in the United States. Under the CAA, the U.S. Environmental Protection Agency (EPA) establishes limits on six criteria pollutants through the National Ambient Air Quality Standards (NAAQS). Standards are set to protect public health and public welfare. The CAA also gives EPA the authority to limit emissions of air pollutants coming from sources like chemical plants, utilities, and steel mills. Individual states may have stronger air pollution laws, but they may not have weaker pollution limits than those set by EPA. Under the law, states have to develop State Implementation Plans (SIPs) that outline how each state will control air pollution under the CAA.

Indiana State Implementation Plan

As required in Section 110 of the CAA, each state must submit a State Implementation Plan (SIP) to the EPA detailing what they will do to accomplish implementation, maintenance and enforcement of National Ambient Air Quality Standards. A SIP details how the state plans to limit air pollution from industrial, mobile, and any other source of pollution in order to protect human health and the environment. The Indiana SIP contains the following:

- A monitoring program to collect air pollutant measurements.
- Air quality calculations and modeling to predict trends, as well as explore different emission reduction strategies.

- An emissions inventory, which includes lists of the amount of air pollution released by sources.
- Control strategies to reduce emissions.
- Formal adoption of measures to ensure necessary emission reduction is achieved.
- Periodic review to evaluate whether those reductions were achieved.

Findings

- Martin County is currently in attainment with six air quality pollutants monitored by IDEM per the CAA.
- NSA Crane is in compliance with its Part 70 Title V Operating Permit.
- Future development within Martin County should be monitored to ensure regional air quality emissions remain in attainment.

Please see the next page.

5.2 Anti-Terrorism / Force Protection (AT)

Anti-Terrorism Force Protection (AT / FP) relates to the safety of personnel, facilities, and information on an installation from outside threats. Security concerns and trespassing can present immediate compatibility concerns for installations. Due to current global conditions and recent events, military installations are required to implement more restrictive standards to address AT / FP concerns. These measures include increased security checks at installation gates and physical changes (such as new gate / entry designs).

The Department of Defense (DOD) AT / FP standards require all DOD components to adhere to design/planning criteria and minimum construction standards to mitigate vulnerabilities and threats to an installation and its occupants. Important aspects of these criteria and standards include minimum standoff distances or required separation between buildings and roadways and parking lots and buildings and trash enclosures. Additional AT / FP considerations include clearances on both sides of an installation perimeter fence to ensure visibility for security monitoring and reducing direct line-of-sight into installations.

Key Terms

Clear Zones. Clear zones are areas established around the fence to provide an unobstructed view to enhance detection and assessment around fences. This is different than the term "clear zone" used to describe suggested land use protections around an airfield.

Fence Line. The term fence line in this section refers to the perimeter fence surrounding NSA Crane. Fence lines are ideally offset and internal from a property line on a military installation if possible.

Sight-lines (lines-of-sight). This refers to the angles of lines-of-sight from off-installation structures to on-installation structures and vice versa. Lines-of-sight are necessary to maintain an unobstructed view of the installation and to ensure that visual access to the installation does not occur where inappropriate and occurs where appropriate such as for communications and frequencies.

ISSUE AT-1	**Line-of-Sight at the Lake Glendora Test Facility** Higher terrain elevations outside the Lake Glendora Test Facility have potential for outside observation of operations creating a security concern.

Compatibility Assessment

Land to the immediate south and southeast of the LGTF is privately-owned. The elevated terrain in this area provides line-of-sight into the LGTF, which allows for unauthorized civilians to observe operations. While it is important for the military to maintain clear lines-of-sight outside the facility for surveilling potential security risks, lines-of-sight that provide viewing and vantage points into the facility create an undesirable security scenario.

According to the Google Maps Elevation Service, at its lowest point, the LGTF property is approximately 480 feet above Mean Sea Level (MSL) over the lake. The privately-owned property to the southeast is approximately 550 feet above MSL at its highest point. The elevation difference of approximately 70 feet between the LGTF and the land to the southeast and the distance between these properties across the lake makes it difficult to establish a visual barrier. Any future development of the privately-owned land could potentially impact current and future mission operations at the LGTF. There are no land use controls in Sullivan County that would guide compatible types of development on the property adjacent to the LGTF or the height of structures to ensure visibility into the LGTF is not exacerbated.

Existing Tools

Unified Facilities Criteria 4-010-01 DOD Minimum Antiterrorism Standards for Buildings

Section 2-4.1.3 of Unified Facilities Criteria (UFC) 4-010-01 states that the fire of weapons from a terrorist is predicated on direct lines of sight and the assumption that weapons could be fired from vantage points outside the control of an installation or facility. Obscuring or screening that minimizes targeting opportunities is the primary means of protecting DOD personnel.

Findings

- Unobstructed sightlines into the LGTF from elevated land southeast of the facility create a potential security risk.
- There is a difference of approximately 70 feet between the lowest point at LGTF and the highest point on the adjacent privately-owned property to the southeast.
- There are no land use controls in Sullivan County that govern uses or structure heights on the property southeast of the LGTF.

ISSUE AT-2

Naval Support Activity Crane Visitor's Center

The NSA Crane Visitor's Center is located in the Town of Crane approximately one mile from the NSA Crane Gate. The location of the Visitor's Center affects access to protection level resources.

Compatibility Assessment

The NSA Crane Visitor's Center is located on Highway 5 (State Road 558), approximately one mile west of the Crane Gate on Navy-owned property in the Town of Crane. The Visitor's Center is a public facility that processes visitors by ensuring they have the proper credentials to access NSA Crane. The location in the town reflects NSA Crane's relationship with the community outside the installation. Because the Visitor's Center is separated from the installation, it does not have the same immediate access to protection-level resources as the Crane Gate to neutralize a potential security threat. Support from the installation would have to travel from the Crane Gate to provide assistance.

Existing Tools

Exercise Solid Curtain / Citadel Shield

Exercise Solid Curtain/Citadel Shield is a regularly scheduled anti-terrorism / force protection exercise conducted by the U.S. Navy to enhance the training and readiness of Navy security forces.

In preparation of the exercise conducted in 2015, the Commander, U.S. Fleet Forces (USFF) exercise director stated that "the exercise provides an opportunity to assess the Navy's ability to respond to and recover from a broad spectrum of antiterrorism threats," and that the exercise will help improve ability to protect Navy equities and "integrate with the emergency responders from the various local communities and establish coordinated response and recovery procedures that are mutually beneficial."

In advance of the exercise, the USFF Public Affairs office issues a press release noting that "measures are taken to minimize disruptions to normal base operations, but may causes increased traffic around bases or delays in base access. Residents near the base may also see increased security activity associated with the exercise."

The exercise was conducted during the first two weeks in February 2016 with frequent updates posted to the NSA Crane Facebook page including gate closures and re-openings.

Unified Facilities Criteria 4-010-01: DOD Minimum Antiterrorism Standards for Buildings

United Facilities Criteria (UFC) 4-010-01 recommends that where visitor processing makes locking visitor entrances during building operating hours impractical, such as the visitor's center, personnel should be provided to control visitor access. The standards also note that activities with large visitor populations provide opportunities for potential aggressors to get near buildings with minimal controls and limit opportunities for early detection of aggressor activity. To limit opportunities for aggressors, the UFC recommends separation distances should be maximized between buildings and areas with large visitor populations.

Unified Facilities Criteria 4-022-01, Security Engineering: Entry Control Facilities / Access Control Points

The UFC 4-022-01, Security Engineering: Entry Control Facilities / Access Control Points, specifies requirements for entry configurations compliant with AT / FP standards and security measures. Per the UFC, Visitors Centers should be located within the contained roadway in the access control zone of the entry control facility (ECF) area but outside the controlled perimeter. The roadway containment area is necessary to prevent inbound vehicles from unauthorized access and must extend from the installation perimeter to the final denial barrier in order to be effective.

Findings

- The NSA Crane Visitor's Center is a public facility located on navy-owned property approximately one mile outside of the Crane Gate entry control point in the Town of Crane.
- The location affects access to protection-level resources.

ISSUE AT-3	**Controlled Perimeter at Lake Glendora Test Facility** The controlled perimeter at the Lake Glendora Test Facility is on the property line at points along the southern and eastern boundaries creating a line-of-sight security concern.

Compatibility Assessment

The LGTF was purchased from a former strip mining operation with a flag-shape lot abutting private property to the south and east. The perimeter fencing at the LGTF is typically internal to the property to provide an unobstructed clear zone both inside and outside the fence for security purposes. At some points along the south and eastern boundary the perimeter fence is on the property line.

Because the fence is not set back from the LGTF property, adjacent properties contain uses that abut the installation property including agriculture uses and an outbuilding. While the LGTF maintains an amicable relationship with its neighbors, the clear zone outside the fence line is critical to ensure a secure perimeter and protect mission operations regardless of adjacent uses. Unified Facilities Criteria 4-002-03: Security Fences and Gates, which provides perimeter security and fencing requirements for DOD properties identifies a Clear Zone as an area free of obstacles, topographical features and vegetation which reduce the

effectiveness of the physical barrier, impede observation or provide cover and concealment of an intruder. Due to the location of the fence on the property line, there is no clear zone outside the fence to meet these security objectives.

Additionally, the lack of land use controls in Sullivan County to govern uses, setbacks for structures from property lines, and placement and height of structures on a parcel of land could potentially result in future situations where the clear zone could be obstructed.

Existing Tools

Unified Facilities Criteria 4-002-03: Security Fences and Gates

Unified Facilities Criteria 4-002-03 provides requirements for security fences and gates at DOD facilities. The UFC states that clear zone areas should be established around the controlled perimeter fencing to provide an unobstructed view and enhance detection and assessment. When required, dimensions of clears zones vary depending on asset being protected and level of protection. For example, outer clear zones (areas outside the fence) may be 30 feet wide and inner clear zones (areas inside the fence) may be 20 feet wide. The UFC recommends that specific facilities such as the LGTF consult with service policies for assets being protected to determine dimensions of required clear zones.

Readiness and Environmental Protection Integration

Congress authorized the Readiness and Environmental Protection Initiative (REPI) in 2004, which allows the military services to participate in the development of buffers around military installations with entities such as local governments, land trusts, and private property owners. The REPI allows DOD to enter into agreements with these entities to acquire conservation easements or other interests in property adjacent to an installation and with the same or similar habitat found on the installation.

When conservation easements or other interests are purchased, the property owner extinguishes development rights associated with their property in return for financial payment and tax benefits. The easement acquisition provides several benefits: protects military readiness by preventing incompatible development adjacent to installations and/or providing additional habitat off an installation for protection and/or advancement of wildlife and plant species of concern, and provides communities buffers from military activities and undeveloped, open areas for natural resources.

NSA Crane most recently submitted a proposal in 2012 to request funding through REPI to prevent incompatible development in the vicinity of the LGTF. However, the request was not funded.

Findings

- The controlled perimeter at the LGTF is located on the property line in some portions along the east and south installation boundary.
- The location of the perimeter fence along these areas does not allow for a required clear zone outside the fence to ensure a secure perimeter and protect mission operations since the area immediately outside the fence is private property.
- Because the area outside the fence in these locations is private property and there are no land use controls in Sullivan County, this area is not protected from encroachment.

ISSUE AT-4	**NSA Crane Visitor's Center Utilities** The NSA Crane Visitor's Center utilities are within the Town of Crane and not part of the NSA Crane infrastructure network.

Compatibility Assessment

The NSA Crane Visitor's Center is located at the intersection of Furlong and Blandy Streets in front of State Road 558, approximately one mile west of the Crane Gate. Due to its location in the Town of Crane, it is connected to the town utility network for water, wastewater, and power. While agreements are in place for utility servicing, the Visitor's Center is dependent on the town and its utility infrastructure to successfully operate. Any interruption to these utilities could impact the operational capability of the Visitor's Center and ultimately NSA Crane.

The only known utility capacity concern for the Town of Crane is their dependence on the NSA Crane Wastewater Treatment Plant which currently treats the town's wastewater, including the Visitor's Center. The concern for this facility to provide future treatment to the town is discussed in Issue WQQ-1 under the Water Quality-Quantity compatibility factor. The specific issue for the Visitor's Center is the ability of the town to provide future wastewater treatment to this critical NSA Crane facility which is necessary for processing inbound civilian, visitor and commercial vehicle traffic and which could impact its future operability and access to the installation.

Existing Tools

As part of this JLUS effort, no existing tools were identified that address this compatibility issue.

Findings

- The NSA Crane Visitor's Center serves a critical function at NSA Crane—processing visitors by ensuring they have the proper credentials for access.
- The NSA Crane Visitor's Center is located in the Town of Crane and connected to their utility network for water, wastewater treatment, and power.
- Any interruptions in utility servicing could impact the operability of the Visitor's Center. Of concern is the future ability of the NSA Crane wastewater treatment plant to serve the Town of Crane and the Visitor's Center.

Please see the next page.

5.3 Biological Resources (BIO)

Biological resources include federal and state listed species (threatened and endangered species) and their habitats. These resources may also include areas such as wetlands and migratory corridors that are critical to the overall health and productivity of an ecosystem. The presence of sensitive biological resources may require special development considerations and should be included early in the planning process.

Key Terms

Critical Habitat. Specific areas found to be essential to the conservation of a threatened or endangered species and which may require special considerations or protection. Under this designation, the US Fish and Wildlife Service (USFWS) must review all federal government activities within a designated critical habitat area to ensure that threatened and endangered species are protected.

Endangered Species. Plant or animal species that have a very small population and are at greater risk of becoming extinct. The presence of threatened and endangered species may require special development considerations, could halt development, and could impact the performance of military missions.

Federal Endangered Species Act (FESA). FESA provides a program for the conservation of threatened and endangered plants and animals and the habitats in which they are found. The lead federal agencies for implementing FESA are the USFWS and the US National Oceanic and Atmospheric Administration (NOAA) Fisheries Service. Species include birds, insects, fish, reptiles, mammals, crustaceans, flowers, grasses, and trees.

Threatened Species. According to the ESA a threatened species is "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range."

ISSUE BIO-1	**Threatened or Endangered Species** Areas at NSA Crane critical to threatened or endangered species such as the Bald Eagle, the Indiana Bat and the Northern Long-Eared Bat have the potential to impact mission operations and capability.

Compatibility Assessment

There are several areas at NSA Crane that act as natural resource related constraints to training opportunities, including significant natural areas and unique communities, buffered riparian areas potentially used by Indiana bats, and areas of special status species. While the installation contains no U.S. Fish and Wildlife Service (USFWS) designated critical habitat, the federally endangered Indiana bat has been documented at NSA Crane. NSA Crane is approximately nine miles south of Ray's Cave in Greene County, which contains the largest known winter population of Indiana Bats in the species' range. Indiana bats are known to forage at least 10 miles from major winter habitats during the fall, which includes NSA Crane. One threat to the population is the loss and degradation of forested habitat, which is plentiful on the installation. During a 2015 inventory conducted at NSA Crane by Indiana State University, 11 Indiana bats and 7 northern long-eared bats were captured. NSA Crane has implemented recommendations from the USFWS with regard to Indiana bat habitat and activities which have had little to no impact on current operations. However, consideration must be given to ensuring mission changes do not affect the Indiana bat at NSA Crane.

In addition to the Indiana Bat, there are 27 state listed endangered species and species of concern documented at NSA Crane. This includes 6 other species of bats, 2 species of shrews, the bobcat, the river otter, 2 species of snakes, and 15 species of birds. Seven of the birds and one of the snakes are considered endangered and the other remaining species are considered species of concern. One bald eagles nest has been identified at

Lake Greenwood, though the bald eagle was delisted from the federal listing in 2008. However, the bald eagle remains listed as a state species of special concern. The 2010 Integrated Natural Resources Management Plan requires NSA Crane to observe a one-quarter mile buffer around the nest, restricting operations within the buffer.

No federally listed species were observed at the LGTF during a 2006 survey. However, two state listed species observed at the property include the state endangered Henslow's sparrow and the state endangered crawfish frog. The Indiana Department of Natural Resources recommendations for LGTF include maintenance of existing habitats, minimal use of pesticides, and more detailed surveys of the property

Some restrictions are imposed on the military mission due to natural resources needs at NSA Crane. Restrictions are generally those associated with regulatory and legal compliance, such as the Endangered Species Act (ESA), the Clean Water Act (CAA), and the National Environmental Policy Act (NEPA). This includes managing operations around habitat areas. While management of natural resources has not greatly impacted the ability of NSA Crane to perform its current mission, regulations can limit the expansion of missions and ability to accommodate potential future missions.

Source: Integrated Natural Resources Management Plan, 2010, http://www.in.gov/dnr/fishwild/files/fw-Endangered_Species_List.pdf

Existing Tools

Integrated Natural Resources Management Plan

The Integrated Natural Resources Management Plan (INRMP), last updated in 2010, is NSA Crane's plan of action for the conservation and management of natural resources. At NSA Crane, compliance with laws and regulations pertaining to the management of natural resources include the following strategies:

- Manage natural resources within the spirit and letter of environmental laws, particularly the Sikes Act upon which this Integrated Natural Resources Management Plan is predicated.
- Protect, restore, and manage sensitive species and wetlands.
- Use procedures within NEPA to make informed decisions that include natural resource considerations and mitigation.
- Implement this INRMP within the framework of Navy policies and regulations.
- Protect and manage threatened and endangered species in accordance with the ESA.
- Allow access to NSA Crane's natural resources within DOD explosives safety guidelines.

The Endangered Species Management Program section of the INRMP offers management recommendations, including retaining forest cover, employing management practices, and collecting wildlife data. Overall, the Navy has five primary requirements under the Endangered Species Act which NSA Crane is committed to:

- Conserving and promoting recovery of listed species.
- Not "jeopardizing" federally listed species.
- "Consulting" and "conferring" with USFWS on any action that may affect a federally listed species.
- Conducting a biological assessment for any project that will result in a taking of a federally listed species or its habitat.
- Not to "take" federally listed fish and wildlife species or removing or destroying federally listed plant species.

To ensure compliance with laws for the protection and management of natural resources, installation projects and actions that may affect regulated resources require consultation with, and/or acquisition of required permitting documentation from appropriate regulatory agencies. The majority of consultations at NSA Crane are informal consultations with the USFWS under the ESA. Due to the presence of the federally endangered Indiana bat, all tree clearing projects involving tree species must be approved by USFWS to ensure no taking of habitat under the Endangered Species Act. In nearly every case, these takings are very small relative to the amount of Indiana bat habitat at NSA Crane.

Indiana Bat Recovery Plan

The Indiana Bat Recovery Plan was developed by the USFWS and the Department of the Interior in April 2007 for the Midwest region. The Plan offers a recovery strategy along with recovery goals and objectives. The recovery program has four broad components:

- Range wide population monitoring.
- Conservation and management of habitat.
- Further research into requirements of and threats to the species.
- Public education and outreach.

Recovery actions include conservation and management of habitat and population, conducting research, and development of a public information and outreach program. Depending on funding and implementation of the recovery actions, a full recovery of the Indiana Bat may occur by 2027.

Findings

- The endangered Indiana Bat is the only federally listed species documented at NSA Crane.
- There are 27 state listed endangered species and species of concern documented at NSA Crane.
- There are no federally listed species at the LGTF but two state listed species.
- Though management of natural resources has not greatly impacted the ability of NSA Crane to perform its current mission, regulations can limit the expansion of missions and ability to accommodate potential future missions.

Please see next page.

5.4 Climate Adaptation (CA)

No compatibility issues were identified for the Climate Adaptation compatibility factor.

Please see the next page.

5.5 Communication / Coordination (COM)

This discussion refers to the programs and plans that promote interagency coordination. Interagency communication serves the general welfare by promoting a more comprehensive planning process inclusive of all affected stakeholders. Interagency coordination also seeks to develop and include mutually beneficial policies for both communities and the military in local planning documents, such as comprehensive plans and regional planning efforts.

ISSUE COM-1	**Public Awareness and Knowledge of NSA Crane / Lake Glendora Test Facility** Need for increased public education of NSA Crane and Lake Glendora Test Facility amongst the local community.

Compatibility Assessment

Jurisdictions in the Study Area recognize the importance of NSA Crane and the Lake Glendora Test Facility (LGTF) and their role in enhancing the regional economy. However, the newcomers to the community and even longtime residents may not be aware of the missions conducted at NSA Crane and the LGTF, the impacts of those missions on the community and the community impact on accomplishing the military missions. Additionally, there is no single point of contact designated for the public to contact about issues or impacts associated with NSA Crane and LGTF operations.

The primary concern is that the public awareness and knowledge of the missions of NSA Crane and the LGTF is minimal and at times, non-existent. Public knowledge is generally limited to the geographic locations of NSA Crane and the LGTF and someone employed at NSA Crane. From a security perspective, it is not important the public know detailed activities, but general lack of knowledge can create gaps in communication and influence support for the military, which can ultimately result in compatibility issues that could be prevented through proactive education and awareness.

Outreach is currently conducted through military speakers at community special ceremonial events, parade participation and media promotion to keep the public informed. However since 9/11, NSA Crane has limited public access for such events as installation tours and open houses. One such example is the Commodore Run – an annual public event at NSA Crane which began in 1986 and only recently returned in October 2015 after a 14-year hiatus. The race featured a half marathon, a 5K run/walk, and a post-race party and awards ceremony for all participants. The October 2015 event had almost 200 participants, and while most runners were NSA Crane personnel, many others were from the general public, including students from Indiana University in Bloomington. Public access to the installation for the run was limited to only participants in the race, who were allowed to bring one guest. The race was held again in October 2016.

In the past, NSA Crane hosted Crane Cyclefest, a charity bike ride event through the installation. The Cyclefest route began and ended at the WestGate@Crane Technology Park. The ride last took place in 2011. While these events provide the opportunity to collaborate on community events, they do not facilitate public understanding of the military missions.

Most recently, the NSA Crane JLUS process has initiated a positive dialog between NSA Crane, its tenants, and community leadership and citizens through public forums and information sharing. Participation from the NSA Crane Commander, tenant leadership, the NSA Crane Community Planning Liaison Officer, and the NSA Crane, NSWC Crane and CAAA Public Affairs Office representatives, and leadership from OCRA and Radius Indiana have played a pivotal role as advocates to educate jurisdiction and community leaders, agency stakeholders, the general public, and JLUS meeting participants about the missions and activities at both NSA Crane and the LGTF.

Public education and awareness reinforces confidence and support in NSA Crane and the LGTF, provides opportunities for understanding the importance and value of the installation, and creates community advocates for future projects and missions changes.

Existing Tools

Social Media

NSA Crane maintains a Facebook page (https://www.facebook.com/NSACrane/) with over 3,600 likes. The Facebook page provides information such as gate closures, safety tips, events, and accomplishments. The target audience for this Facebook page is primarily the internal installation community and employees that work on the installation. However, interested public members are welcome to like and follow the page.

Crane Army Ammunition Activity (CAAA) Public Affairs maintains a Facebook, Twitter, and Flickr account in an effort to keep the internal installation community informed as well as interested public. The Facebook account has over 1,800 likes and the Twitter account has about 80 followers. The CAAA Public Affairs accounts highlight accomplishments and events at the installation.

Naval Surface Warfare Center (NSWC) Crane Division maintains a Facebook account with over 2,300 likes and a Twitter account with over 50 likes and 150 followers. The NSWC Crane Facebook account is similar to the CAAA Facebook account and is updated with accomplishments and events on the installation. This Facebook page is also primarily used for posting internal information directed at personnel employed at the installation.

While the social media outlets are a good source for updating the public and internal installation community on various activities and events, this is not an ideal public awareness and education resource for understanding the military missions. Furthermore, these accounts are designed for NSA Crane, CAAA, and NSWC Crane Division and do not report on activities at the LGTF.

Chambers of Commerce

In other communities across the nation, chambers of commerce organizations have provided advocacy and support for many military installations in the communities and at the state and federal level. Many chambers of commerce organizations have subcommittees with a typical subcommittee in a defense community that includes a military affairs component. This subcommittee provides opportunities for the community leadership—civic and business—and military leadership to interact and discuss issues. This platform also allows for executive level leadership to discuss important matters and understand the military installations missions and needs.

The following paragraphs describe and assess a couple of the area's chambers of commerce for their public engagement opportunities. This brief list is not meant to be exhaustive, but just to provide an overview of the immediate area's chambers of commerce resources.

Daviess County Indiana Chamber of Commerce and Visitors Bureau

The Daviess County Indiana Chamber of Commerce website provides a link to the NSWC Crane Division website (http://www.daviesscounty chamber.com/business-directory/nswc-crane-division/); however, the Chamber's website does not indicate if there is a military affairs subcommittee that provides another linkage between the community and military leaders. The website also does not provide information other than the aforementioned link about the military presence in this area.

Bedford Area Chamber of Commerce

The Bedford Area Chamber of Commerce website (https://bedfordchamber.com/?the-chamber) has a minimal military presence on the website. This could be a very good tool for the executive level leadership of the community, military and interested public.

Findings

- NSA Crane and its tenants conduct some public relations, but there is a lack of interaction and educational opportunities for the public to understand the missions at NSA Crane and the LGTF.
- Social media is used primarily for informing the internal installation community and any interested public that follow the page. There is little to no mention of the LGTF.
- The Study Area's Chambers of Commerce have a minimal military presence on their websites.
- There is no designated single point-of-contact for the military to engage in military-community affairs.

ISSUE COM-2	**Contact and Coordination between NSA Crane / Lake Glendora Test Facility and Surrounding Jurisdictions** Need for enhanced and formal communication between surrounding jurisdictions and NSA Crane personnel / leadership.

Compatibility Assessment

Coordination and communication between NSA Crane, the LGTF and surrounding jurisdictions is the cornerstone of NSA Crane mission viability and economic development in surrounding jurisdictions. Currently, community representatives communicate with NSA Crane informally through interpersonal relationships which can be unreliable and intermittent resulting in information that may be difficult to recall. This informal means of communication can result in inadequate follow-through, unresolved issues, and / or incomplete information, and does not provide consistent opportunities to strengthen and build relationships. The routine military rotation of service members, especially senior leadership, can present challenges and potential missed opportunities for maintaining continuity in communication and coordination without formal procedures in place.

The WestGate@Crane Technology Park is a prime example of how coordination, communication and collaboration between NSA Crane and surrounding jurisdictions can result in demonstrated synergies between the military and defense communities. NSA Crane leadership has supported development of the Technology Park which facilitates the two-way transfer of technology between the federal and private sectors and encourages defense-related businesses and small-businesses with NSA Crane contracts to locate in the park.

This opportunity represents a dual benefit to both the military – by having contractors with immediate access to the installation to support mission needs, and to the community – injecting economic development and associated revenue into the local and regional economy.

Existing Tools

Indiana Code Annotated Title 36, Section 7-30.1: Planning and Zoning Affecting Military Bases

Indiana Code 36-7-30.1-2 requires a unit of government, before taking an action to plan to regulate: a use, improvement, and maintenance of real property; or location, condition, and maintenance of structures and other improvements; or regulate the platting and subdividing of real property; located within three miles of the perimeter of a military base, to notify the commander of a military base of the government's intent to take action to ensure the action will not have an adverse impact on the operation of the military base.

This formal communication and coordination with the military presumes that local jurisdictions will implement procedures to protect both interests of the military and the jurisdictions. The coordination requirement can be used as a springboard and catalyst for engagement on other matters that may be beneficial to both the military and government.

Findings

- There is no formal document such as a memorandum of agreement that delineates points-of-contact for the communities, NSA Crane, and the LGTF.
- Indiana Code 36-7-30.1-2 establishes the precedent and requirement for formal communication and coordination with jurisdictions within three-miles of a military installation.

ISSUE COM-3	**Local Jurisdiction Planning Resources** Need for improved awareness of local jurisdiction planning department structure, resources, and knowledge to facilitate coordination and communication from NSA Crane / Lake Glendora Test Facility.

Compatibility Assessment

There is an overall lack of knowledge of local jurisdiction planning department structure and resources within the JLUS Study Area which can cause fragmented communication with various governmental agencies including NSA Crane.

Due to the rural nature of the JLUS Study Area and limited planning requirements, many jurisdictions do not employ planning staff or resources to facilitate the planning process. Local economic development organizations play a pivotal role in attracting and retaining businesses for each county by promoting assets and facilitating business growth. However, only a handful of jurisdictions within the Study Area have a planning process administered by a planning staff – Daviess County, the City of Sullivan and the City of Washington.

Most planning is conducted and authorized by a county board of commissioners or city / town council – a group of elected officials charged with government administration including oversight for the provision of public services such as septic systems and roads.

Because local planning, planning processes and planning authority varies across the jurisdictions, the proper jurisdiction points of contact for coordinating planning matters are not known. Ideally, planning coordination would occur prior to the expense of developing completed plans and any required public hearing to advance or approve a proposed development.

Existing Tools

Indiana Code Annotated Title 36, Section 7-4-201 Version b: Local Planning and Zoning

As indicated by the Indiana Code Annotated (IC) Title 36, Section 7-4-201 Version b, the state has granted the authority to both the county and the cities to establish either single or unified planning entities to carry out planning on a county-wide basis to effect and provide for the health, safety, and quality of life of county and municipality residents.

Only three jurisdictions within the Study Area have exercised this authority – Daviess County, the City of Sullivan and the City of Washington.

Indiana Code Annotated Title 36, Section 7-4-202: Establishment; authorization

Indiana Code 36-7-4-202 authorizes counties and municipalities to establish an advisory plan commission. The plan commission has the authority to provide for the efficient planning of land uses. The plan commissions require an executive director but have the authority to deem necessary any additional staff members.

Only three jurisdictions within the Study Area have established an advisory plan commission – Daviess County, the City of Sullivan and the City of Washington.

Findings

- Local planning, planning processes and planning authority varies across the jurisdictions resulting in lack of jurisdiction points of contact for coordinating planning matters.
- The state of Indiana has granted the authority to counties and municipalities to establish planning entities; however, only a handful of jurisdictions in the Study Area have exercised this authority.
- Only a handful of Study Area jurisdictions have established an advisory plan commission to advise the elected officials on land use planning.

ISSUE COM-4	**Coordination of Public Safety Resources**
	NSA Crane physical security forces are not authorized to assist jurisdictions with public safety and there is perception that NSA Crane does not want local law enforcement participation on the installation.

Compatibility Assessment

Criminal activity and increased threats to public safety are the concerns for both civilian and military law enforcement agencies. Resources such as money and people are strained in both environments and both civilian and military agencies seek innovative ways to meet increasing demand for services. Working together can help civilian and military police agencies make the most of available resources and provide the expected level of services to their communities.

NSA Crane security forces operate full time, and as a federal entity their jurisdiction is limited to the confines of the military installation. There may be times when a threat on a military installation may require support from external law enforcement agencies. There is a mutual police assistance agreement between the Sullivan County Sheriff and NSA Crane which allows for the Sullivan County Sheriff to render assistance at the LGTF in the event of a terrorist attack, riot, insurrection, or major disaster. Assistance may be provided once declared by proper authorities, through the established channels, at the discretion of the senior officer and subject to availability of equipment and personnel.

Existing Tools

DOD Instruction 3025.21 Defense Support of Civilian Law Enforcement Agencies

DOD Instruction 3025.21 (DODI) 3025.21, Defense Support of Civilian Law Enforcement Agencies, provides instruction clarifying the rules for the involvement of military forces in civilian law enforcement. The instruction establishes DOD policy, assigns responsibilities, and provides procedures for DOD support to federal, state, tribal, and local civilian law enforcement agencies, including responses to civil disturbances within the US. In addition to defining responsibilities for military coordination with local law enforcement, the instruction describes circumstances in which direct participation in civilian law enforcement is permissible. According to Enclosure 3.1(1), such activities include but are not limited to the following:

> *(1) Actions taken for the primary purpose of furthering a DoD or foreign affairs function of the United States, regardless of incidental benefits to civil authorities. This does not include actions taken for the primary purpose of aiding civilian law enforcement officials or otherwise serving as a subterfuge to avoid the restrictions of the Posse Comitatus Act. Actions under this provision may include (depending on the nature of the DoD interest and the authority governing the specific action in question):*
>
> *…*

(d) Protection of classified defense information or equipment or controlled unclassified information (e.g., trade secrets and other proprietary information), the unauthorized disclosure of which is prohibited by law.

(e) Protection of DoD personnel, equipment, and official guests.

…

(3) When permitted under emergency authority in accordance with Reference (c), Federal military commanders have the authority, in extraordinary emergency circumstances where prior authorization by the President is impossible and duly constituted local authorities are unable to control the situation, to engage temporarily in activities that are necessary to quell large-scale, unexpected civil disturbances because:

(a) Such activities are necessary to prevent significant loss of life or wanton destruction of property and are necessary to restore governmental function and public order; or,

(b) When duly constituted Federal, State, or local authorities are unable or decline to provide adequate protection for Federal property or Federal governmental functions. Federal action, including the use of Federal military forces, is authorized when necessary to protect Federal property or functions.

…

Under the Posse Comitatus Act (PCA) of 1878, US military personnel are prohibited from assisting in civilian law enforcement functions such as search and seizure, interdiction of vehicles, arrest and interrogation, surveillance or using force except for self-defense that is specifically directly related to an assigned activity or mission. The PCA directly restricts assistance to local law enforcement in the enforcement of routine events that are not related to federal property, equipment or activities as delineated below:

(d) Using force or physical violence, brandishing a weapon, discharging or using a weapon, or threatening to discharge or use a weapon except in self-defense, in defense of other DoD persons in the vicinity, or in defense of non-DoD persons, including civilian law enforcement personnel, in the vicinity when directly related to an assigned activity or mission.

Note that the Posse Comitatus Act does not prohibit military assistance to protect public safety as opposed to law enforcement. Thus, it does not prohibit the use of Army bomb disposal experts in deactivating and destroying explosives found in civilian communities. And most importantly, the Act does not prohibit development and maintenance of effective working relationships between military police and their civilian counterparts nor the loan to civilian authorities of certain types of equipment.

DOD Instruction 3025.21 Defense Support of Civilian Law Enforcement Agencies, Enclosure 3, Section f (3): Exceptions Based on Military Service

However there is a caveat in this DODI that indicates an exception based on military service including the Navy and the Marine Corps. The DODI 3025.21, Enclosure 3 f (3) gives the authority to the Secretary of Defense on a case-by-case basis to allow for defense security forces to assist civilian law enforcement agencies (LEAs). This section of the DODI prescribes the

situations in which defense security forces may provide assistance to civilian law enforcement:

> *a. Such exceptions shall include requests from the AG for assistance pursuant to section 873(b) of Reference (al).*
>
> *b. Requests for approval of other exceptions should be made by a senior official of the civilian law enforcement agency concerned, who verifies that:*
>
> *(1) The size or scope of the suspected criminal activity poses a serious threat to the interests of the United States and enforcement of a law within the jurisdiction of the civilian agency would be seriously impaired if the assistance were not provided because civilian assets are not available to perform the mission; or*
>
> *(2) Civilian law enforcement assets are not available to perform the mission, and temporary assistance is required on an emergency basis to prevent loss of life or wanton destruction of property.*

In light of this information, the Greene County sheriff's department would have to request assistance from the Attorney General of the United States (AG) and also show that the criminal activity is of such a size and scope that the local LEA does not have the resources to manage the activity or it must show that the LEA does not have the temporary resources to manage the criminal activity. In the July 2012 incident outside the Bloomington Gate, this type of incident most likely would not have qualified for defense security forces to aid the county sheriff's department.

Section 331: National Defense Authorization Act for Fiscal Year 2013

The law establishes the Secretary of the branch of service to enter into intergovernmental agreements with state and local governments to provide, receive or share installation-support services with the intent reducing overall costs to the military service and enhancing military mission readiness by redirecting focus to preparedness rather than support services. The following is excerpted from the law:

> *…(2) Notwithstanding any other provision of law, an intergovernmental support agreement under paragraph (1)—*
>
> *(A) may be entered into on a sole-source basis;*
>
> *(B) may be for a term not to exceed five years; and*
>
> *(C) may use, for installation-support services provided by a State or local government, wage grades normally paid by that State or local government.*
>
> *(3) An intergovernmental support agreement under paragraph (1) may only be used when the Secretary concerned or the State or local government, as the case may be, providing the installation support services already provides such services for its own use.*
>
> *(b) EFFECT ON FIRST RESPONDER ARRANGEMENTS.—The authority provided by this section and limitations on the use of that authority are not intended to revoke, preclude, or otherwise interfere with existing or proposed mutual-aid agreements relating to police or fire protection services or other similar first responder agreements or arrangements.*
>
> *(c) AVAILABILITY OF FUNDS.—Funds available to the Secretary concerned for operation and maintenance may be used to pay for such installation-support services. The costs of agreements under this section for any fiscal year may be*

paid using annual appropriations made available for that year. Funds received by the Secretary as reimbursement for providing installation-support services pursuant to such an agreement shall be credited to the appropriation or account charged with providing installation support.

It should be noted that the NDAA law references the availability of funding but does not specify how much may be used for joint support services or which installation support services may be paid for.

Findings

- NSA Crane's security forces are prohibited from engaging in local LEA activities but not public safety, unless the procedures described above are justified and approved by the Attorney General of the United States or they meet the requirements in DODI 3025.21.
- There is nothing in existing law that precludes the development and maintenance of effective working relationships between military police and their civilian counterparts.
- Existing law does not preclude mutual aid agreements allowing civilian law enforcement from rendering assistance on military installations.

ISSUE COM-5	**NSA Crane / Lake Glendora Test Facility Public Outreach** Need for NSA Crane / Lake Glendora Test Facility public outreach with surrounding jurisdictions.

Compatibility Assessment

Public outreach is a chance to inform the community about the missions at NSA Crane and the LGTF and provide an opportunity for the community to interact and connect with military personnel. Interacting with and informing the public reinforces that NSA Crane and the LGTF are part of a larger community, ensures the understanding of the importance and value of the installation, enhances morale of military members, and helps build community support for the military missions. Effective public outreach must be ongoing and consistent to promote involvement. Maintaining a strong public relationship allows for better communication and feedback regarding future projects and missions changes.

NSA Crane, the Naval Surface Warfare Center Crane Division (NSWC Crane), and the Crane Army Ammunition Activity each have their own public outreach programs administered through their Public Affairs Offices. Despite the separate programs, the NSA Crane PAO supports and represents the installation. Public outreach for the Navy is governed by the Secretary of the Navy Instruction 5720.44C which advocates an open and ambitious public information policy to promote positive relations between the command and local communities. Generally, the PAO maintains a community relations program to:

- Communicate information about military programs, activities, missions and responsibilities through in-person engagements, media publications, and publicly-accessible online websites and social media;

- Inform the community of current events and activities on an installation that will impact areas outside the installation (such as traffic from an airshow)
- Prepare for various events and activities on behalf of the installation commander.

Because there are three PAOs at NSA Crane each representing different organizations, coordinating outreach activities as a single voice for the military is that much more challenging. Though community involvement occurs through regular meetings with state, local government and community organizations; community briefing events; and tours for local elected officials and federal and state dignitaries, these activities are not focused on the general public.

Existing Tools

Secretary of the Navy Instruction 5720.44C: Department of the Navy Public Affairs Policy and Regulation

Secretary of the Navy Instruction 5720.44C provides policy guidance and instruction to communicate effectively with the U.S. public including informing citizens about the full scope of governmental activities. The guiding principles are intended to provide accountability and full disclosure to the general public through an expeditious release of information.

The instruction includes guidance for speaking and writing for commercial purposes, the types of information that may be released to the public and by whom, media relations, use of the internet, community outreach protocols and participation in community outreach events, funding for participation in community-sponsored events, interactions with different groups, and public tours and visitations.

Release of information to the public is addressed at all levels within the Navy hierarchy including the commander's PAO. According to the guidance, the PAO will:

- Facilitate open, timely and uninhibited access to public information, except where restricted by law, security classification, or privacy statutes.
- Communicate information about Navy programs, activities, missions, and responsibilities to both external and internal U.S. audiences.
- Closely collaborate with other military and civilian PAOs as appropriate for coordination or mutual assistance to ensure accuracy and comprehensiveness, and that all spokespersons have the same information.
- Will promote positive relations between the command and local communities.

Department of Defense Instruction 5400.14: Procedures for Joint Public Affairs Operations

Department of Defense Instruction 5400.14 (DODI 5400.14) provides the authority to all military departments to staff and resource a public affairs office—single (unilateral) or joint public affairs office. In this DODI, the Chairman of the Joint Chiefs of Staff and the Office of the Secretary of Defense establishes the guidelines and policies for the operations of PAOs. This DODI also grants authority to the commanders to organize, fund, and equip public affairs staff to operate, whether in the United States (US) or abroad during an operation or exercise.

As prescribed in the DODI 5400.14 Enclosure 3 2(b), commanders will devote the necessary resources for a robust, responsive, and efficient public affairs infrastructure under the provisions set forth in the prevailing DOD public affairs guidance. Commanders are required to ensure adequate, immediately available dedicated personnel, proper and running equipment including transportation and communications resources are able to meet the demands for information.

With this DODI, it appears that there is a gap between the demand for information and the capability of supplying the needed information for the NSA Crane area and jurisdictions.

As delineated in this DODI, the commanders are supposed to plan for and execute community engagement programs that directly support communication with local nationals and resident internationals. This effort requires close communication and coordination with military departments, civil-military operations personnel, or US Embassy country teams, when necessary.

Department of Defense Directive 5410.18: Public Affairs Community Relations Policy

A stated policy in the DOD Directive 5410.18 (DODD 5410.18) and as referenced by DODD 5122.5 that fostering and furthering good relationships with communities at home and abroad is in the best interest of the DOD. In addition, the policy states that well-planned community relations programs help obtain public support and understanding of the military operations, missions, and requirements of the various military services. As such a principal goal of public affairs-community relations programs is to increase mission understanding and exposure to military personnel, facilities, equipment, and programs. While these are stated policies and goals for the DOD PA-community relations programs, there are some caveats that must be considered when allocating resources for public affairs by the commanders, they are but are not limited to the following:

> *4.1.2.3. The support does not interfere with the performance of official duties and does not impair operational, training, or other readiness requirements.*
>
> *4.1.2.4. Adequate and applicable resources are available, and the supporting DoD Component commands or organizations are able and willing to provide similar support to comparable events sponsored by similar non-Federal entities.*
>
> *4.1.2.5. The support provided is funded through annual budget appropriations or other authorized sources and is in accordance with applicable statutes, Executive orders (E.O.), this Directive, and other pertinent guidance.*

The DODD provides the policy guidance for installation commanders to plan for, budget, and staff the PAO. It is also stated that PAs has significant bearing on maintaining and strengthening relationships with the public regarding understanding and support for the mission. It is important to have a strong PAO and robust community relations program for the sustainment and preservation of military readiness for NSA Crane and LGTF.

Army Regulation 360-1 The Army Public Affairs Program

Army Regulation 360-1 is the Army's Public Affairs program which establishes policies and procedures for conducting Army public affairs programs. Section 8-1 of the regulation titled, Community relations program and activities, discusses initiated actions for informing the public about the Army and in developing and maintaining a viable relationship with the civilian community. The regulation identifies effective methods of outreach including official and unofficial programs:

- Active speakers' bureau programs.
- Ongoing liaising with organizations (including those at local, State, and regional events).
- Participation in civic, business, and professional organizations.
- Using exhibits, bands, color guards, and other ceremonial units in the public domain.
- Conducting periodic open houses and an active installation tour program.
- Participating in national holiday observances.
- Unofficial programs that involve direct contact with the community as private persons in local activities and in volunteer activities.

This section also list opportunities for Commanders to maintain continual liaising with the local community to help resolve common problems and develop cooperation and understanding between the installation and the local community:

- Developing an effective two-way channel of communication between the Army and the community.
- Fostering cooperation among all civilian and military agencies.
- Sponsoring joint social activities.
- Providing adequate off-post housing, public facilities, entertainment, and other services to all military personnel and their family members without regard to race, creed, color, sex, national origin, or physical or mental handicap.
- Providing maximum support of Army activities and special events.
- Exchanging clergy and chaplains.
- Providing recreational facilities for service personnel within the community.
- Participating in and hosting civic, professional, and business clubs at regular luncheons with one of the military units at the installation.

The regulation calls out two additional activities to promote community engagement: Organizing an informal community relations council consisting of key military and civilian staff members and subordinate commanders, and conducting community surveys and analysis for developing a sound community relations program.

Findings

- The DOD has established authority and policy to budget for, program, and staff PAOs.
- The DOD's policy for public affairs and community relations programs is that well-planned community relations programs can increase the understanding and support for the military mission and operations.
- There is a perceived lack of community relations between NSA Crane, the LGTF and the JLUS Study Area jurisdictions.
- There is DOD Instruction to establish joint PAOs to share and leverage resources among relevant installations / facilities.

ISSUE COM-6	**Public Notification of Range Activities at NSA Crane and Detonation Activities at the Lake Glendora Test Facility** Need for increased public notification of NSA Crane range activities and detonation activities at the Lake Glendora Test Facility with surrounding jurisdictions.

Compatibility Assessment

Operations at NSA Crane include range activities and explosive ordnance disposal (EOD) while operations at the LGTF include underwater explosive activities. These activities cause noise that impact land uses outside of the installation properties. The primary concern is that there is not adequate notification for the noise events. While a search on the NSA Crane website (http://www.cnic.navy.mil/regions/cnrma/installations/nsa_crane.html) which is hosted by the Commander, Navy Installations Command (CNIC), returns several noise advisories, they are all from other Navy installations.

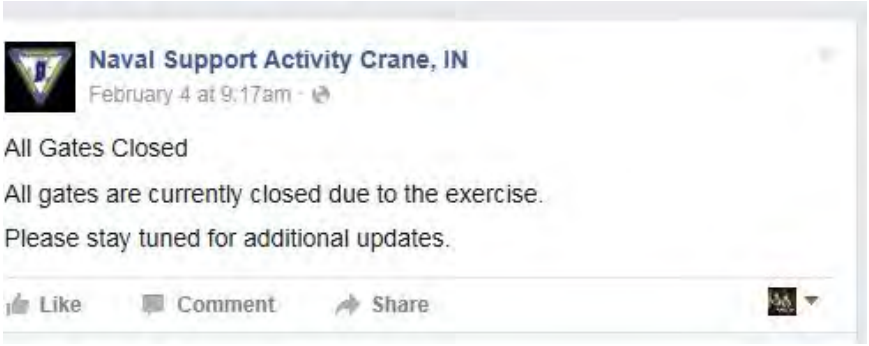
The lack of notification of operational activities and when to expect noise can often increase noise complaints. Conversely, public knowledge of noise events can reduce the number of complaints simply through awareness. In some cases the general public does not know the source of noise and without notification has contacted local government offices and the sheriff's department. One such case occurred on April 27, 2015 when detonations at the LGTF generated such a high call volume from the concerned public to the City of Sullivan mayor's Office that the city posted a notification on their Facebook page that the source of the noise was the LGTF. Public responses to the Facebook page notice included someone noting that they called the Sheriff's Department out of concern, someone didn't know where the LGTF was located, and that the booms shook a house approximately 10 miles from the LGTF in Merom Station and another house in an undisclosed location. The city's Facebook post for this event was shared 67 times.

Facebook post on the City of Sullivan Facebook Page, April 27, 2015 regarding noise and vibration from the Lake Glendora Test Facility

Existing Tools

NSA Crane Facebook Page

NSA Crane maintains a Facebook page (https://www.facebook.com/NSACrane/) posting ceremonial events and pertinent information internal to the installation and its personnel. This is the official Facebook page for NSA Crane and while it primarily targets an audience internal to NSA Crane, it is not a restricted page, so articles, and information is also accessible to the general public. However, if promoted appropriately, this could be a more effective tool in spreading the word about operations and expectations of certain operations. The recent post indicated that all gates were closed due to an exercise occurring, see below:



Facebook post on NSA Crane's Facebook Page on February 4, 2016 about gate closures

Operational Noise Consultation NO. WS.0016043-14 Operational Noise Assessment for Naval Support Activity Crane, Indiana 30 September 2013

The Operational Noise Consultation recommends that NSA Crane should establish a formal Noise Management Program. A successful noise complaint management procedure would assist NSA Crane in avoiding community action against its activities by being proactive. The purpose of the procedure is to reduce the potential of noise complaints by keeping the public informed about what is happening and to satisfy complaints so they do not escalate.

It should be noted that the noise generated that cause some minimal noise complaints occur infrequently. It was noted in this Noise Consultation that these noises do not generate a significant number of noise complaints.

Findings

- There is no official notification to the public about the scheduling of explosive disposal activities at NSA Crane or detonations at the LGTF.
- Social media, particularly the NSA Crane and NSWC Crane Division Facebook pages, already inform the internal installation audience of operational changes such as gate closures due to exercises and operations, making the pages a potential tool for public notification of noise activities.

ISSUE COM-7	**Coordinated Noise Complaint Process** Concern that not all noise complaints generated by public and reported to jurisdiction authorities are conveyed to NSA Crane and the LGTF, creating a gap in the communication of complaints.

Compatibility Assessment

According to the Operational Noise Consultation for NSA Crane and the LGTF, annual average noise levels are compatible with the surrounding environment. However, there is potential for individual events to cause annoyance and possibly generate noise complaints. Under unfavorable weather conditions, activity at the NSA Crane demolition range has a moderate risk of complaints within 2.5 miles of the installation.

Overall, it is reported by host and tenant commands at NSA Crane that community complaints are rare; however, a formal process for documenting and addressing these types of complaints was only recently established in May 2016. Contact information for the NSWC Crane Division and Crane Army Ammunition Activity PAOs are posted on their respective websites, but there is no PAO information listed on the NSA Crane website. None of the websites clearly specify who to contact regarding noise complaints leaving the public to navigate through the website to find a phone number. In the case of calls to NSA Crane for filing a property damage claim, the public is redirected to Fort Knox, Kentucky.

Detonations at the LGTF are conducted infrequently – on average 8 to 10 times per year. Though these occur underwater reducing the noise exposure to the public, noise and vibration do travel outside the facility. During the first and second Public Forums for the Joint Land Use Study, members of the public reported that they experience noise and vibration from testing activities at the LGTF, in some cases up to a half mile away. One documented case occurred on April 27, 2015 where the lack of public awareness of both the installation mission and points of contact resulted in a high call volume to the City of Sullivan Mayor's office out of concern. Whether these calls would have resulted in complaints had the public known who to contact at the LGTF or whether advance notice to the public would have curtailed complaints is a matter of speculation; however, that people turned to the Sheriff's Department and the Mayor's office reflects a lack of communication with the LGTF. Since the city does not have a formal process for documenting and reporting public complaints to the military, whether they are communicated to NSA Crane or the NSWC Crane Division is dependent on whether city staff also knows who to contact when such events occur. Whether any of these calls were formally reported to the LGTF or similar calls made to other jurisdictions are reported to NSA Crane is unknown. However, the under-reporting of complaints to the military can result in lack or consideration of corrective measures since the military would be unaware that the public is adversely affected by noise and can erode support for the military mission if the public does not feel they have a proper channel to notify the military of complaints and concerns. This would also provide NSA Crane an opportunity to identify whether the military is actually the source of the noise and it is not generated from other regional sources.

Existing Tools

Operational Noise Consultation NO. WS.0016043-14 Operational Noise Assessment for Naval Support Activity Crane, Indiana 30 September 2013

The Operational Noise Consultation acknowledges that NSA Crane does not have a formal noise management program for NSA Crane and the LGTF, and recommends establishing one. A successful noise complaint management procedure would provide NSA Crane an opportunity to pinpoint whether military operations are the source of noise reported and gain a better understanding of which operational activities have the greatest impact, where that impact is most experienced and under what environmental conditions on a given day. This information can be used to analyze and refine demilitarization and testing procedures in ways that can reduce the community impact. Proactively addressing noise complaints through clear documentary procedures and maintaining public awareness may reduce the potential for noise complaints.

An effective public awareness and community relations program regarding the noise impacts generated by the various activities at NSA Crane and the LGTF requires that Study Area jurisdictions have a designated point of contact for military affairs so communication can be consistent and reliable.

Installation Noise Complaint Management Program

NSA Crane Instruction 5233.1 established an Installation Noise Complaint Management Program in May 2016. The program is intended to help control operational noise and reduce community annoyance by better monitoring, recording, archiving, and addressing operational noise complaints. The program establishes a noise complaint procedure and

actions to take when a noise complaint is received. The procedure ensures the following.

- A noise complaint questionnaire is completed for all noise complaints received.
- Complaints are routed through the activity responsible for the complaint.
- Complaints are investigated and the complainant is contacted without delay.
- If the source of the noise is activity on the installation, and the activity is not classified or sensitive, the complainant shall be made aware of the potential underlying source of the noise and the importance of the activity resulting in the potential noise and the overall installation mission.
- A copy of the completed Complaint Questionnaire and the noise-generating activity's response is provided to Range Control Officers and others as appropriate via the chain of command responsible, and to the installation Community Planning Liaison Officer. If necessary, the complaint or attendant concerns will be forwarded up the installation's chain of command for review.

While the instruction designates the Public Affairs Office as the Noise Complaint Program Manager, there is no point-of-contact in local jurisdictions to assist in addressing operational noise complaints.

Findings

- NSA Crane does not have a notification process for NSA Crane or the LGTF that informs the public of operations and activities.
- The noise management program that coordinates noise complaints does not have a reciprocal point-of-contact in local jurisdictions to handle and manage this type of information for the communities.

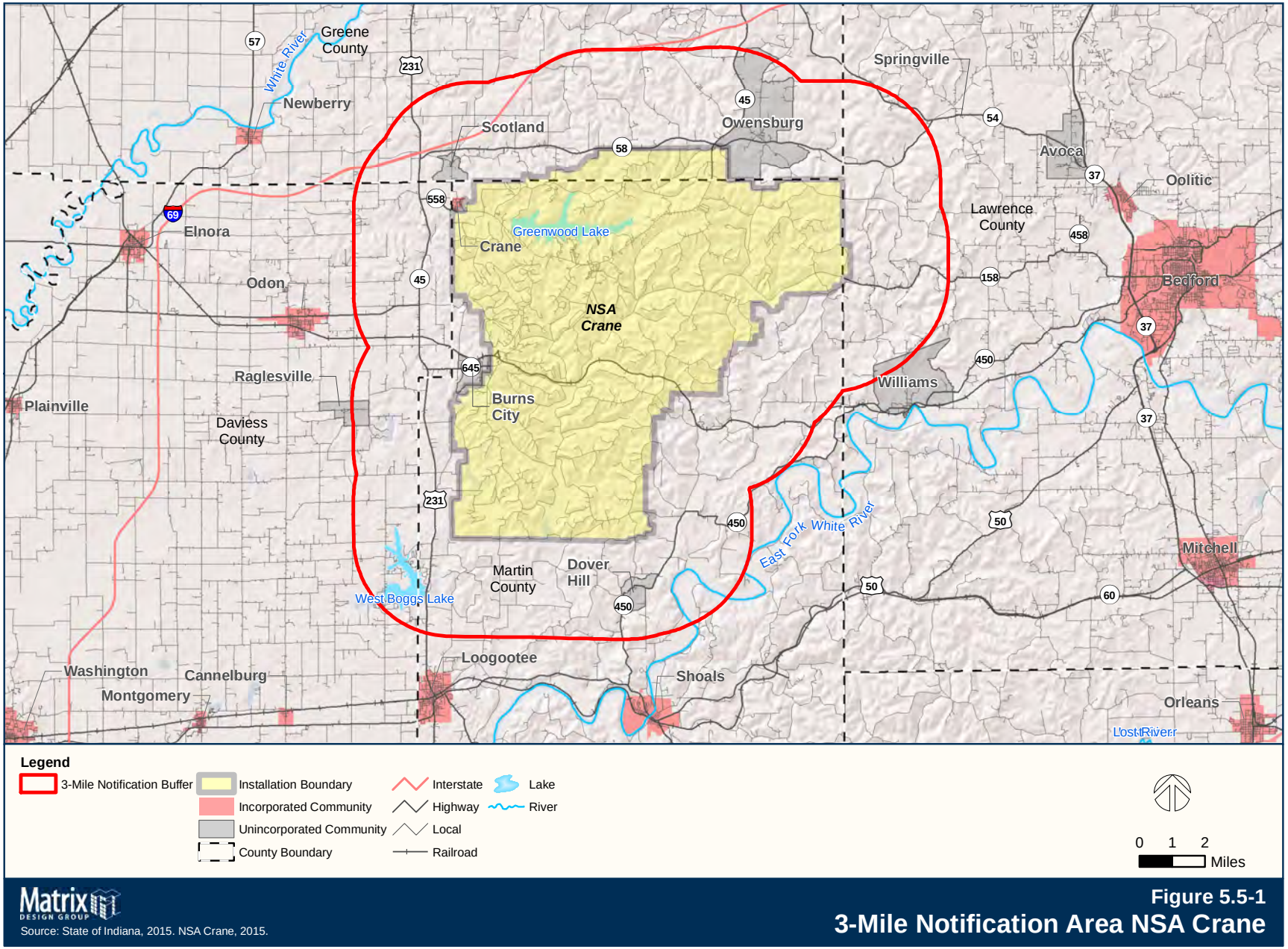
ISSUE COM-8	**Development Notification to NSA Crane / Lake Glendora Test Facility** Lack of coordination to notify NSA Crane of development within 3-mile installation radius despite the state legislative mandate.

Compatibility Assessment

The Indiana Code Annotated Title 36, Section 7-30.1 (IC 36 § 7-30.1) was enacted in 2005 and establishes the formal requirement and authority for jurisdictions within a 3-mile radius of a military base to notify the base commander of any proposed action to:

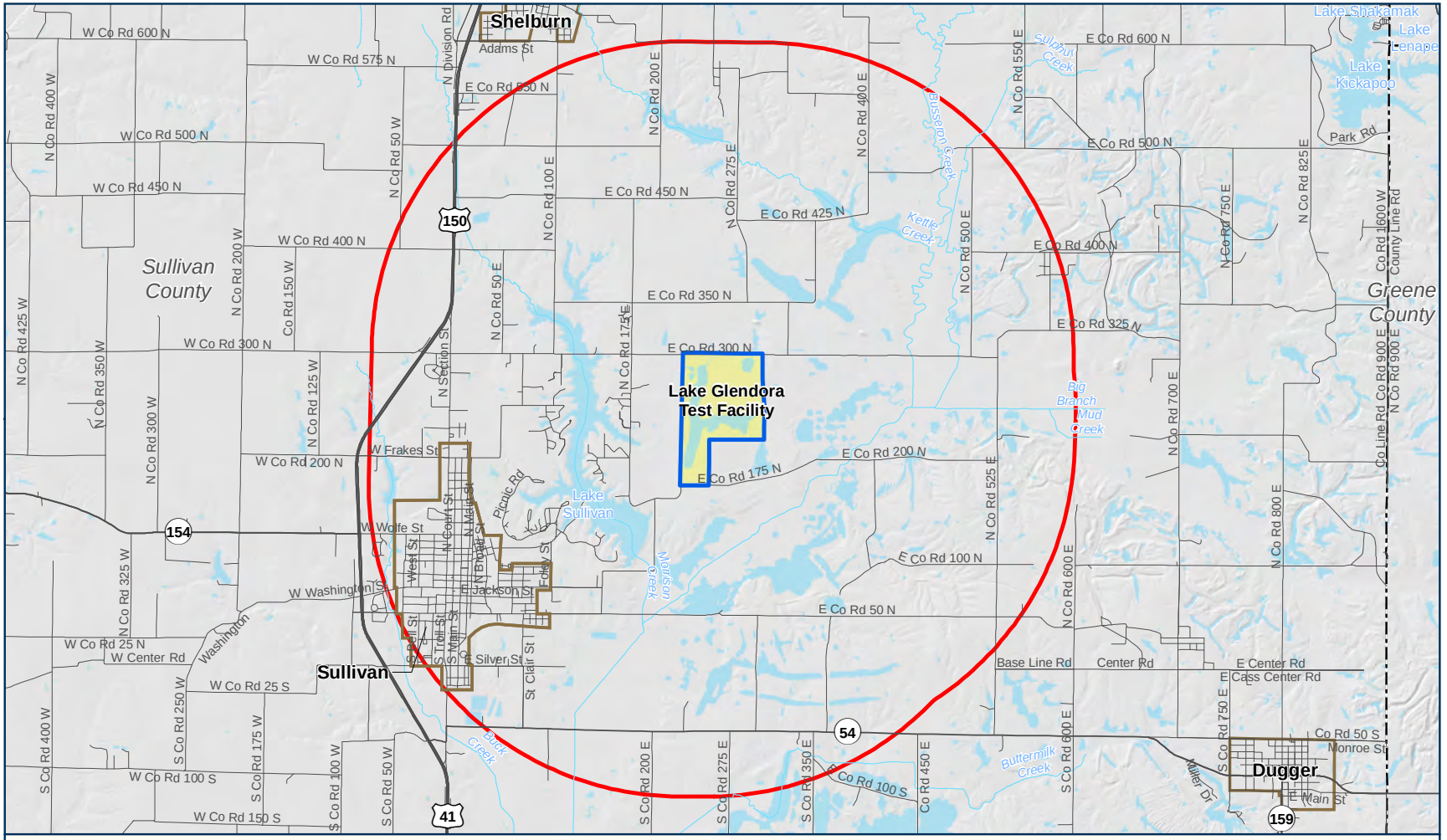
- Plan or regulate the use, improvement and maintenance of real property.
- Plan or regulate the location, condition and maintenance of structures and other improvements.
- Regulate the platting and subdividing of real property.

The legislation provides a base commander the opportunity to respond to whether these actions will have an adverse impact on the operation of the military base. This requires formal communication and coordination with the military to be implemented by county and local jurisdictions. In 2014, the legislation was expanded to include areas larger than 400 acres used for the design, construction, maintenance, and testing of electronic devices and ordnance, which applies to the LGTF. The notification area is illustrated on Figure 5.5-1 for NSA Crane and Figure 5.5-2 for the LGTF. Jurisdictions within the 3-mile notification area surrounding NSA Crane include unincorporated areas of Daviess, Greene, Lawrence, and Martin counties, and the Town of Crane. Both unincorporated Sullivan County and the City of Sullivan are within the 3-mile notification area surrounding the LGTF.



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 5.5-1
3-Mile Notification Area NSA Crane



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 5.5-2
3-Mile Notification Area Lake Glendora Test Facility

The legislation is silent on an enabling mechanism for local governments to facilitate the notification process. Notification to NSA Crane and the LGTF has not been implemented by any of the affected jurisdictions within the notification areas and formalized procedures have not been established by jurisdictions for this purpose. The 3-mile notification area has not been mapped by the jurisdictions and does not appear on any of publicly-accessible online GIS mapping resources for the jurisdictions. Additionally, there is no enforcement mechanism in the state code to address compliance.

The absence of local notification area mapping and implementation procedures combined with a lack of planning resources and tools has created unclear and significant gaps in communication and coordination to implement the military notification.

Existing Tools

Indiana Code Annotated 675 Title 12 Section 10-4 (675 IC 12-10-4): Local Building Codes of Political Subdivisions

This section of the Indiana Code (IC) states that if building codes are incorporated into law it is the responsibility of the local governmental units to enforce them.

The administration of building codes involve regulating the location, condition and maintenance of structures and other improvements which are subject to the military notification requirement. The administration of building codes is one tool that can be used to implement the military notification requirement.

Indiana Code 6-1.1-12.1 Deduction for rehabilitation or redevelopment of real Property in Economic Revitalization Areas

Per Section 6-1.1-12.1 of the Indiana Code, a jurisdiction must designate an economic revitalization area for the purpose of authorizing a tax deduction or abatement on real property, personal property, new construction, property rehabilitation, or equipment. Property subject to the tax abatement request must be within this economic revitalization area. Per IC 6-1.1-12.1-2.5, the jurisdiction must pass a resolution declaring the economic revitalization area. Once the resolution is approved, notice of the adoption is published stating a date when the designating authority will conduct a public hearing to hear any protest or objection from interested persons.

The Study Area jurisdictions offer tax abatement as an incentive to encourage job creation and private investment. Many developers take advantage of this incentive. Because a public hearing is a component of the tax abatement process and occurs prior to any physical development, this may be used as a tool to institute the military notification in the absence of land use planning.

Findings

- None of the Study Area jurisdictions have adopted, by ordinance or resolution, procedures for notifying NSA Crane or the LGTF of applicable activities within the three-mile notification area.

5.6 Cultural Resources (CR)

No compatibility issues were identified for the Cultural Resources compatibility factor.

Please see the next page.

5.7 Dust / Smoke / Steam (DSS)

Dust results from the suspension of particulate matter in the air. Dust (and smoke) can be created by fire (controlled or prescribed burns, agricultural burning, and artillery exercises), ground disturbance (agricultural activities, military operations, grading), industrial activities, or other similar processes. Dust, smoke and steam are compatibility issues if sufficient in quantity to impact flight operations (such as reduced visibility or cause equipment damage).

Key Terms

Fugitive Dust. Fugitive dust is the generation of particulate matter to the extent that some portion of the material escapes beyond the property line or boundaries of the property on which the source is located.

Prescribed Burn. A prescribed burn, as defined by the US Fish and Wildlife Service (USFWS), is a fire intentionally set and allowed to burn under a controlled set of conditions that define a fire prescription. Prescriptions are developed by experienced fire managers and ecologists who work together to create predictable fire characteristics that produce desired results. In the case of species management, fire can be prescribed to control some invasive plant species and promote more desirable vegetation.

Open Burning. Open burning as defined by the state of Indiana is the burning of any materials wherein air contaminants resulting from combustion are emitted directly into the air, without passing through a stack or chimney from an enclosed chamber.

ISSUE DSS-1	**Dust from Demolition Area** Detonations at the NSA Crane Demolition Range can generate fugitive dust impacts outside the installation.

Compatibility Assessment

Part of the mission at NSA Crane involves the use of an open demolition range, which generates dust and debris. The demolition range is located approximately 2.5 miles east of the nearest point on the NSA Crane boundary. In order to reduce noise of the demolition activities, explosives are buried underground. When detonations explode, a plume of dust and debris can be emitted into the air. This plume of dust and debris can be dispersed onto outside land uses impacting adjacent land uses due to weather conditions and variables including wind.

Detonation witnessed by JLUS planning team on June 3, 2015 from WestGate Academy parking lot. Note that no noise was observed from this activity.

Indiana law establishes provisions for the regulation of fugitive dust. Fugitive dust is mentioned in the Title V air quality permit held by NSA Crane. The permit states that the installation is required to mitigate fugitive dust from escaping the installation. The Title V Permit grants NSA Crane authority to fulfill this operation with the specified preventative maintenance plans and response actions to control the emission of particulate matter into the air. Specifically, the permit requires the following:

> *Bomb Finishing Line with a maximum capacity of thirteen (13) units per hour and Projectile Renovation Operations with a maximum capacity of 2.4 pounds of projectile per hour, consisting of the following units:*
>
> *(a) CRN-2728-01-12-N42, using a fabric filter to control particulate matter emissions.*
>
> *(b) CRN-2728-02-12-N42, using a fabric filter to control particulate matter emissions.*
>
> *(c) CRN-2728-03-12-N42, using a fabric filter to control particulate matter emissions.*

In addition to being a temporary nuisance, the primary concern with the control of fugitive dust is that dust and particulate matter (PM) can adversely impact the health of people in the surrounding communities. When inhaled, fine particles can accumulate in the respiratory system causing various respiratory problems including persistent coughs, wheezing and physical discomfort. Additionally, breathing these fine particles can increase susceptibility to respiratory infections and can aggravate existing respiratory diseases such as asthma and chronic bronchitis. Even short term exposure to dust can increase the severity of respiratory problems.

In addition to the adverse health effects that PM and dust can have on the populace, it obviously diminishes overall air quality which can constrain certain activities for both the military and community such as construction activities and transportation activities. If certain elements of air quality reach nonattainment status in the JLUS Study Area, then sanctions may be imposed on local government units including more rigid, stringent controls for construction permits and monies for roadway infrastructure improvements can be withheld until attainment status is achieved or control mechanisms that are put in place control the air quality.

It should be noted that the demolitions at NSA Crane are conducted with the surrounding community in mind and the only impacts documented are due to dust on vehicles and leaves on trees during overcast cloud cover and not from a concern for public health. Demolitions are conducted seasonally (April through November), at a permitted frequency of two events per day. During this period, a number of variables are considered including wind speed and cloud cover prior to any activity.

Existing Tools

Indiana Administrative Code 326 Section 6, Rule 4: Fugitive Dust Emissions

Indiana Administrative Code (IAC) 326 IAC 6-4 and 326 IAC 6-5 stipulate the requirements for fugitive dust emission control in the state, which applies to all sources of dust. However 326 IAC 6-4-6 identifies sources and activities that are not considered in violation of the fugitive dust rules; these include but are not limited to:

> *(1) Release of steam not in combination with any other gaseous or particulate pollutants unless the condensation from said steam creates a nuisance or hazard in the surrounding community.*
>
> *(2) Fugitive dust from publicly maintained unpaved thoroughfares where no nuisance or health hazard is created by its usage or where it is demonstrated to the commissioner that no means are available to finance the necessary road improvements immediately. A reasonable long-range schedule for necessary road improvements*

must be submitted to support the commissioner's granting such an exception.

(3) Fugitive dust from construction or demolition where every reasonable precaution has been taken in minimizing fugitive dust emissions.

As stated in the aforementioned list of sources that are exempt from this law, demolition activities are exempt as long as every possible measure has been implemented to minimize fugitive dust. With that said, the military must adhere to federal and local standards, codes, and regulations. The military must complete National Environment Protection Act (NEPA) reports and assessments before any major construction activity is approved or changes in mission and operations are approved. One of the factors the NEPA reports evaluates is the impacts on the environment including air quality and the emission of various air pollutants. If an action would create a significant adverse impact in the location proposed, then if the action is approved it must have mitigation measures in place before action is executed so as to minimize adverse impacts to the geography.

Findings

- The State has mandated fugitive dust controls; however, this has not been implemented at the local level by the jurisdictions in their zoning ordinances or by resolution.

ISSUE DSS-2	**Smoke from Prescribed Burns** Smoke from prescribed burns at NSA Crane can migrate outside the installation.

Compatibility Assessment

Prescribed burning is proven to be a useful tool at NSA Crane in the regeneration of oak species under the appropriate conditions and is a common forest management tool utilized by NSA Crane. The burning typically occurs between September and April to avoid the possibility of disturbance to the Indiana bat.

The burns are low intensity and are carried out by a combination of personnel from the Indiana Division of Forestry State Fire Control Headquarters, NSA Crane Fire Department and NSA Crane Natural Resources. Open burning at NSA Crane is authorized under their Title V permit from the Indiana Department of Environmental Management (IDEM), which allows the installation to burn up to 400 acres per year. However, due to a number of constraints, NSA Crane typically only burns 40 to 100 acres per year. Although low intensity, the prescribed fires produce smoke, which can travel off of the installation into the community.

The primary concern regarding this issue is the smoke can at times, be emitted into the air and dispersed throughout the surrounding community with variations in natural weather conditions, i.e. wind and low cloud cover. This can cause temporary breathing and vision impairments in people with sensitivity to these conditions if precautions are not taken. Similar to dust, smoke can adversely impact the health of people, especially people in special age groups or are susceptible to respiratory issues. The biggest health threat from smoke comes from fine particles which can get into the eyes and respiratory system, where they can cause temporary burning and illnesses such as bronchitis. Fine particles also can aggravate chronic heart and lung diseases.

Existing Tools

Indiana Administrative Code Title 326, Article 4: Burning Regulations

The Indiana Administrative Code (IAC), Title 326, Article 4 stipulates the open burning regulations for the state. The code delineates the types of burning that are exempted from the regulations referenced in this portion of the code, including but not limited to:

> *(4) Department of natural resources (DNR) burning, to facilitate prescribed burning on DNR controlled properties for wildlife habitat maintenance, forestry purposes, natural area management, and firefighting or prevention; burning by municipalities, county governments, to facilitate prescribed burning for wildlife habitat maintenance, forestry purposes, natural area management, and firefighting or prevention; United States Department of the Interior burning, to facilitate a National Park Service Fire Management Plan for the Indiana Dunes National Lakeshore, for example; and United States Department of Agriculture, Forest Service burning, to facilitate wildlife habitat maintenance, forestry purposes, natural area management, ecosystem management, and firefighting or prevention, and*
>
> *Burning by the U.S. Forest Service for firefighting or prevention is not subject to the conditions in subsection (b) or this subdivision.*
>
> *(7) Burning of vegetation by fire departments and firefighters to create fire breaks for purposes of extinguishing an existing fire. Such burning is not subject to the conditions in subsection (b).*

The IAC allows for prescribed burns by various federal agencies in the state including the Department of the Interior and the Department of Agriculture to engage in such burning activities without conditions prescribed by the law. However other open burning activities are subject to conditions which include the monitoring of the fire during its activity, extinguishing the fire if it becomes a nuisance, hazard, or pollution issue, and not burning if weather conditions make open burning more variable, such weather conditions include high winds, temperature inversions, and air stagnation.

While the State's law prescribes various activities that are permitted, permitted with conditions, and prohibited activities, the Department of Defense (DOD) is not included as a federal agency that is permitted without conditions. Due to the DOD exclusion as an exempted federal agency, NSA Crane performs its prescribed burns under a burning permit obtained and approved by the IDEM.

Findings

- NSA Crane maintains an open burning permit from IDEM to perform prescribed burns.
- As an agency that is not exempted from the conditions of open burning, NSA Crane must comply with the conditions including monitoring a prescribed burn at all times, extinguishing a burn if it becomes a hazard or a pollution issue, and may not perform a burn if weather conditions are not suitable.
- The DOD is not exempted federal agency of the open burning law in Indiana.

5.8 Energy Development (ED)

No compatibility issues were identified for the Energy Development compatibility factor.

Please see the next page.

5.9 Frequency Spectrum Capacity (FSC)

Frequency spectrum refers to the range of electromagnetic waves capable of carrying signals for point-to-point wireless communications. In a defined area, the frequency spectrum is limited and increasing demand for frequency bandwidth from commercial applications such as cellular phones, computer networking, GPS units, and mobile radios, is in direct competition with the capacity necessary for maintaining existing and future missions and communications on installations.

ISSUE FSC-1	**Potential for Decreased Frequency Capacity** As additional personnel and / or missions come to NSA Crane, the frequency availability and bandwidth has the potential to decrease.

Compatibility Assessment

Frequency for radio spectrum has intensified in recent years, particularly in bands that are optimal for mobile systems (approximately 200MHz–4GHz). This factor has had an impact on the perceived (and actual) value of spectrum. Spectrum re-allocation heavily favors the private sector. It is this re-allocation of the bandwidth to the commercial industry that threatens the DOD-allocated capacity to conduct secure communications missions.

Civilian and commercial use of available RF can be an additional concern to operations at NSA Crane. Increased uses of mobile devices can threaten the availability of bandwidth that NSA Crane would need to conduct mission activities. This increased demand and limited availability of the spectrum can reduce mission readiness for the CAAA, NSWC Crane, and other mission critical operations.

In addition new development in the area and large employment centers can create additional demand, which will increase the use of bandwidth by various commercial entities. It is not likely that this increase in devices will have a major impact on operations at NSA Crane, but it should be an awareness issue monitored in the future.

As the demand for wireless application grows, the complexity of the management and regulation of radio frequency (RF) develops. This management and regulation complexity can concern the military in executing their missions and operations.

Existing Tools

Federal Communications Commission

The FCC is the agency responsible for regulating non-governmental interstate and international (which originate or terminate within the US) radio, television, wire, satellite, and cable communications within all 50 states, Washington D.C. and all US territories. It is the entity that licenses non-Federal use of the frequency spectrum through a public process.

National Telecommunications and Information Administration, Office of Spectrum Management

The Office of Spectrum Management (OSM) is a branch of the National Telecommunications and Information Administration (NTIA) that is responsible for managing how the Federal government uses the RF spectrum. Some of the tasks of the OSM are to assist in managing the use of the RF spectrum and include assigning frequencies to government agencies, maintaining spectrum use databases, planning peacetime and wartime use of the spectrum, and participating in Federal government communications regarding emergency readiness. Approximately 70 Federal agencies and departments use the RF spectrum for communications, broadcasting, navigation and other purposes that are crucial to their continued operations. The NTIA maintains a Government Master File of the more than 40 specific radio services and frequency assignments that these agencies and departments use.

The FCC and NTIA executed a Memorandum of Understanding (MOU) on spectrum coordination in January 2003. The MOU established procedures relating to frequency coordination, spectrum planning provisions, and a framework for compliance with the statutory requirements. The Communications Act assigned joint jurisdiction for spectrum management to the FCC and the NTIA. The FCC is responsible for non-federal users and NTIA is responsible for federal users. Because the majority of spectrum is shared between federal and non-federal users, the FCC and NTIA must coordinate spectrum policy.

FCC Communication Security, Reliability, and Interoperability Council

The FCC maintains an active working group to address communications system reliability through its Communication Security, Reliability, and Interoperability Council (CSRIC). The CSRIC's mission is to provide recommendations to the FCC that attempt to "ensure…optimal security and reliability of communications systems, including telecommunications, media, and public safety." Although this program is not specific to NSA Crane or maintain a specific program with the installation, it should be considered an important tool in the management of communications used for emergency response situations.

Federal Aviation Administration Spectrum Engineering Services Office

The Spectrum Engineering Services Office secures, manages, and protects all civil aviation RF spectrum resources. Among other things, this Office is responsible for coordinating and negotiating with other government agencies, industries, and international partners to obtain appropriate spectrum resources for aviation usage and maintaining aviation spectrum resources free from interference from other services.

Spectrum management is conducted by assigning and engineering radio frequencies for the AFB systems, maintaining the aviation spectrum use database, analyzing new FAA systems requirements and certifying that spectrum resources will be providing the necessary technical engineering expertise. This process performs specific spectrum resources available assessments and tests new systems and electronics for compatibility with DOD equipment.

Federal Strategic Spectrum Plan (2008)

The 2008 Federal Strategic Spectrum Plan is a presidential initiative for US spectrum policy in the 21st Century. The Plan's goals are to foster economic growth, ensure national and homeland security, maintain US global leadership in communications technology and services, and satisfy other vital US needs in areas such as public safety, scientific research, Federal transportation infrastructure, and law enforcement. The NTIA initiated strategies within the Plan to address the diverse needs of the spectrum. The document specifically calls out supporting Federal missions while "fostering the commercial systems that underpin the nation's economic growth and technological information."

The Plan sites the increasing spectrum needs of both the Federal Government and commercial users. The plan is oriented towards near and mid-term goals because of the uncertainty of the future needs of the spectrum. The most relevant goals to this issue include:

- **Use of Commercial Services Where Feasible.** Federal regulations require Federal agencies to use commercial communications and spectrum-dependent services where possible. Improvements in technology have made using commercial communications more reliable but certain emergency related Federal uses may be too complex for commercial networks. Federal agencies cannot control commercial capacity directly so a plan to balance commercial and federal use of satellites when needed is proposed.
- **Flexible Approach to Incentives.** Currently, regulatory hurdles prevent Federal and non-Federal spectrum uses from efficiently sharing spectrum. Sharing the spectrum could allow Federal agencies to make underutilized spectrum available to non-Federal entities. This would lead to a more efficient use of the spectrum for all parties involved.

- Spectrum Valuation and Economic Efficiency. The Office of Management and Budget has instructed the Federal agencies to consider the economic value of radio spectrum when developing justifications for new systems. The NTIA has also discussed identifying and establishing incentives to promote more efficient and effective use of the spectrum.
- Technical Efficiency. NTIA engineers are developing more precise methods to improve management of the spectrum. By increasing efficiency and effectiveness of the spectrum, there should be an increase in the amount of time frequency assignments are in use.
- Forecasting Trends. Development of new spectrum management tools will improve quantification of Federal spectrum use and refine estimates of future requirements.

Though long-term use of the spectrum is unclear, steps are being taken by the Federal government to ensure that use of the spectrum is available to all parties while maintaining national security and economic well-being.

Findings

- Management and regulation of RF is a complex issue.
- There is an ever-growing demand for bandwidth for other uses such as mobile electronic devices.
- This spectrum bandwidth issue is managed at the federal level.

Please see next page.

5.10 Frequency Spectrum Impedance / Interference (FSI)

Frequency spectrum is the entire range of electromagnetic frequencies used for communications and other transmissions, which includes communication channels for radio, cellular phones, and television. In the performance of typical operations, the military relies on a range of frequencies for communications and support systems. Similarly, public and private users rely on a range of frequencies in the use of cellular telephones and other wireless devices on a daily basis.

Key Terms

Impedance. Impedance is the interruption of electronic signals due to the existence of a structure or object between the source of the signal and its destination (receptor). Certain structures have the potential to block, or impede, the transmission of signals from antennas, satellite dishes, or other transmission / reception devices affected by line-of-sight requirements.

Interference. Interference is the inability to effectively distribute or receive a particular frequency because of similar frequency competition. As the use of the frequency spectrum increases (such as the rapid increase in cellular phone technology over the last decade) and as development expands near military installations and operational areas, the potential for frequency spectrum interference increases.

Technical Background

The Department of Defense's (DOD) use of frequency spectrum allows for safe operations and the effective delivery of weapons on target without interference. The DOD's frequency spectrum needs for testing and evaluation is constantly increasing, while the spectrum available for DOD use is decreasing. The National Telecommunications Industry Association (NTIA) Office of Spectrum Management (OSM) explains that:

> *…almost every agency of the Federal Government uses the spectrum in performing mandated missions. The DOD uses the spectrum extensively for tactical uses and non-tactical uses. In the United States tactical uses are generally limited to a number of specific testing sites and training facilities, but DOD's non-tactical applications are extensive and include aircraft command and control, mobile communication in and around military bases, and air fields and long distance communications using satellites.*

Frequency interference is related to other transmission sources and can result from a number of factors, including:

- Using a new transmission frequency that is near an existing frequency;
- Reducing the distance between two antennas transmitting on a similar frequency;
- Increasing the power of a similar transmission signal;
- Using poorly adjusted transmission devices that transmit outside their assigned frequency or produce an electromagnetic signal that interferes with a signal transmission; and
- Existing electronic sources and uses created by portable systems affecting entire communities utilizing Wi-Fi broadband systems and industrial sources that produce electronic noise by-product.

The military relies on a range of frequencies for communications and support systems. Since 1993, Congress has been selling federal spectrum bands for reallocation to the private sector, promoting the development of new telecommunications technologies, products and services. The expanding public and commercial use of the frequency spectrum from wireless transmitters to consumer electronics can encroach on the military's use of the frequency spectrum. Increasing community and DOD demands for this important resource can create conflicts for all users.

ISSUE FSI-1	**Frequency Interference From Lake Glendora Test Facility Operations** Frequency interference issues have increased as wireless demands and technology use skyrockets. Residents near Lake Glendora Test Facility have experienced wireless and Global Positioning System (GPS) signal loss.

Compatibility Assessment

Some operations at the LGTF require the use of frequency spectrum for communications and transmission of information to carry out mission activities. One example of this is the use of counter remote control improvised explosive device electronic warfare, in which frequencies are used to stop detonation of devices from a distance. This type of operation involves testing a wide and unpredictable range of frequencies on short notice. These activities are coordinated with the Federal Communications Commission (FCC) and the Federal Aviation Administration (FAA) (the two federal entities that oversee nationwide use of the frequency spectrum) to ensure that the facility does not operate outside of its allocated frequencies.

Though the NSWC Crane Division has indicated that the radio frequency use at the LGTF does not leave the boundaries of the facility with enough power to impact outside users, several property owners at the JLUS Public Forums have stated that they have been impacted by frequency interference or interruptions in electrical service, such as:

- Lost cell phone signals and static when using wireless devices as far as two miles from the LGTF.
- Lost GPS signal across road from the LGTF which interferes with crop planting reliant on GPS.
- Frequent loss of wireless router signal ¾ of a mile from the LGTF.
- Loss of wireless internet and television signals up to two miles from the LGTF.

Whether the activities at the LGTF are the cause of signal interference or simply the wireless coverage in rural setting surrounding the LGTF is currently unknown. Reports from the public indicate that the interference has increased particularly within the past year. Some of the electrical service interruptions may be attributable to problems with the local electrical distribution system noted by a WIN Energy representative in attendance at the second JLUS public meeting in the City of Sullivan, wireless communications supporting gas wells in the Sullivan County area, or burst signals periodically transmitting data.

Future development surrounding the LGTF could increase the number of complaints resulting from frequency interference conflicts and impact activities performed at the LGTF.

Existing Tools

Secretary of The Navy Instruction (SECNAVINST) 2400.1A Electromagnetic Spectrum Policy and Management

This instruction is intended to ensure the ability of the U.S. Navy to develop, acquire and implement frequency spectrum dependent systems with the Department of the Navy including field activities and functions and applicable provisions relating to electromagnetic frequency.

Subsection 5.d.(2) states that it is the Department of the Navy policy to ensure that all spectrum dependent systems it develops and/or acquires receive thorough electromagnetic spectrum risk assessments and comply with applicable standards and procedures to reduce costly electromagnetic interference mitigation.

Subsection 5.d.(4) states that the Department of the Navy shall coordinate with industry and private sector organizations to achieve effective management and use of EMS.

Subsection 5.g. states that the Department of the Navy shall work within existing Federal regulatory procedures and processes to share the EMS with Federal, state, local and commercial electromagnetic spectrum users, provided sharing does not degrade the Department of the Navy's mission, that sharing presents a minimal risk that would result in loss of spectrum required by the Department, and that there is sufficient regulatory provisions to protect current and future use by the U.S. Navy.

Office of the Chief of Naval Operations (OPNAV) Instruction 2400.20F Electromagnetic Environmental Effects (E3) and Spectrum Supportability Policy and Procedures

This instruction establishes U.S. Navy policy and assigns responsibilities for achieving spectrum supportability and ensuring reliable, safe, and mission capable operations of all electrical and communications-electronics equipment, systems and subsystems, devices, ordnance, and fuels within their intended operational electromagnetic environment.

Section 4.c. of the instruction states that frequencies used by the U.S. Navy are per assignment of the National Telecommunications and Information Administration (NTIA).

Subsection d.(1)(c) stipulates that (c) each command, activity, project or program office, laboratory, and facility is individually accountable for the implementation and enforcement of E3 requirements and program considerations and the achievement of electromagnetic compatibility (ECM) within its respective area of responsibility.

Federal Communications Commission

The FCC is the agency responsible for regulating non-governmental interstate and international (which originate or terminate within the US) radio, television, wire, satellite, and cable communications within all 50 states, Washington D.C. and all US territories. It is the entity that licenses non-Federal use of the frequency spectrum through a public process.

National Telecommunications and Information Administration, Office of Spectrum Management

The Office of Spectrum Management (OSM) is a branch of the National Telecommunications and Information Administration (NTIA) that is responsible for managing how the Federal government uses the RF spectrum. Some of the tasks of the OSM are to assist in managing the use of the RF spectrum and include assigning frequencies to government agencies, maintaining spectrum use databases, planning peacetime and wartime use of the spectrum, and participating in Federal government communications regarding emergency readiness. Approximately 70 Federal agencies and departments use the RF spectrum for communications, broadcasting, navigation and other purposes that are crucial to their continued operations. The NTIA maintains a Government Master File of the more than 40 specific radio services and frequency assignments that these agencies and departments use.

The FCC and NTIA executed a Memorandum of Understanding (MOU) on spectrum coordination in January 2003. The MOU established procedures relating to frequency coordination, spectrum planning provisions, and a framework for compliance with the statutory requirements. The Communications Act assigned joint jurisdiction for spectrum management to the FCC and the NTIA. The FCC is responsible for non-federal users and NTIA is responsible for federal users. Because the majority of spectrum is shared between federal and non-federal users, the FCC and NTIA must coordinate spectrum policy.

FCC Communication Security, Reliability, and Interoperability Council

The FCC maintains an active working group to address communications system reliability through its Communication Security, Reliability, and Interoperability Council (CSRIC). The CSRIC's mission is to provide recommendations to the FCC that attempt to "ensure…optimal security and reliability of communications systems, including telecommunications, media, and public safety." This program is not specific to NSA Crane or the LGTF, nor is it specific to any program maintained with the installation. It should be considered as an important tool in the management of communications used for emergency response situations by all study stakeholders.

Federal Aviation Administration Spectrum Engineering Services Office

The Spectrum Engineering Services Office secures, manages, and protects all civil aviation RF spectrum resources. Among other things, this Office is responsible for coordinating and negotiating with other government agencies, industries, and international partners to obtain appropriate spectrum resources for aviation usage and maintaining aviation spectrum resources free from interference from other services.

Spectrum management is conducted by assigning and engineering radio frequencies for the military systems, maintaining the aviation spectrum use database, analyzing new FAA systems requirements and certifying that spectrum resources will be providing the necessary technical engineering expertise. This process performs specific assessments on spectrum resource availability and tests new systems and electronics for compatibility with DOD equipment.

Federal Strategic Spectrum Plan 2008

The 2008 Federal Strategic Spectrum Plan is a presidential initiative for US spectrum policy in the 21st Century. The Plan's goals are to foster economic growth, ensure national and homeland security, maintain US global leadership in communications technology and services, and satisfy other vital US needs in areas such as public safety, scientific research, Federal transportation infrastructure, and law enforcement. The NTIA is responsible for developing a strategy within the plan to address the diverse needs of the spectrum. The document specifically calls out supporting Federal missions while "fostering the commercial systems that underpin the nation's economic growth and technological information."

Continued and growing demand for High Frequency spectrum stands out in agency forecasts for defense, homeland security, public safety and continuity of government operations, both fixed and mobile. The High Frequency Coordination Conference estimates that 850 kHz of additional spectrum between 4 and 10 MHz is required to eliminate the co-channel interference that currently exists.

Findings

- The LGTF utilizes the frequency spectrum to perform its mission operations, sometimes with short notice, that may involve a wide and unpredictable range of frequencies.
- Future development surrounding the LGTF could increase the number of complaints resulting from frequency interference conflicts and impact activities performed at the LGTF.
- Some nearby residents have reported wireless and GPS interference in proximity to the LGTF, though the source of the interference has not been confirmed.

ISSUE FSI-2	**Impacts to NSA Crane Operations** Uses from outside NSA Crane can impact installation operations and affect mission activities.

Compatibility Assessment

The radio frequency spectrum is a critical tool used at NSA Crane to conduct military missions. Additional development around the installation would likely create an increased demand for frequency usage. Frequency generated by uses such as cellular communication towers, Enterprise Land Mobile Radio transmissions, Ultrasonic Frequency broadcasts, and other similar uses can impact electronic warfare testing, and depending on their strength, could potentially interfere with ammunition magazine storage, causing a safety threat known as Hazards of Electromagnetic Radiation to Ordnance (HERO).

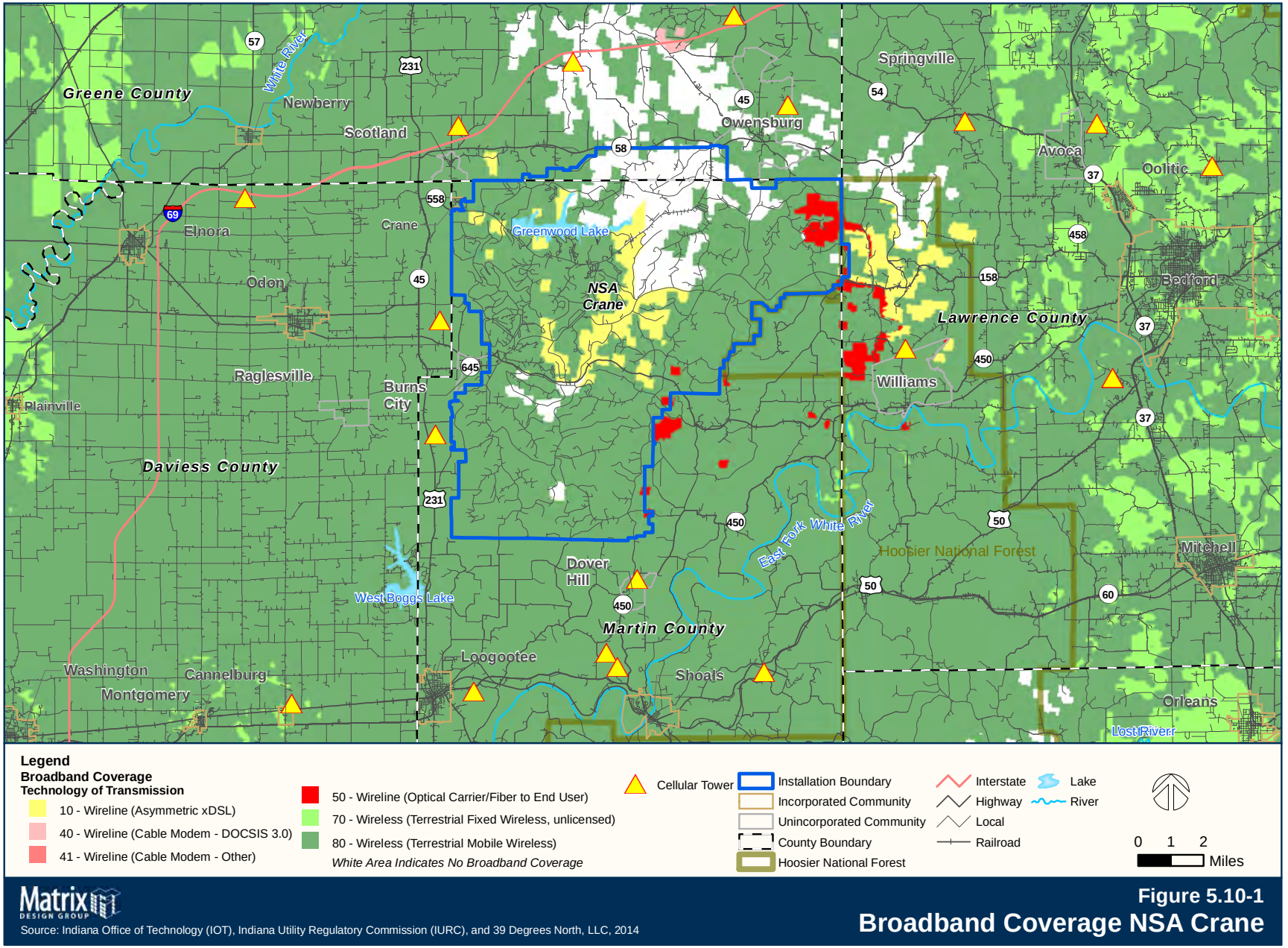
Since there are few jurisdictions with land use controls and coordination of development reviews by jurisdictions with the military within a 3-mile radius of NSA Crane per the statutory requirement is not occurring, there is no surety that infrastructure is being coordinated or deconflicted with the military. The type and extent of any new infrastructure to support frequency demand from additional development and any associated interference would be dependent on the type and scope of that development.

Figure 5.10-1 shows the current broadband coverage and communications towers surrounding NSA Crane. There are two types of broadband surrounding the installation: 1) wired lines consisting of DSL, fiber and cable and 2) wireless – terrestrial fixed wireless and terrestrial mobile wireless. Terrestrial fixed wireless enables wireless broadband service to a specific geographic location using spectrum licensed to the Internet service provider and includes WiFi and other similar technologies. Terrestrial mobile wireless enables wireless broadband services in a specific geographic location using spectrum dedicated to an Internet service provider and targeted for mobile use by consumers within the area. This wireless service is generally offered by cellular phone providers.

The area surrounding NSA Crane is predominantly terrestrial mobile wireless with small pockets of wired DSL in the south central portion of NSA Crane and east of NSA Crane; and wired fiber predominantly east and southeast of NSA Crane.

Areas with no broadband service include large areas of north central NSA Crane, areas north of NSA Crane – north of Indiana State Road 58, areas along State Road 58 east of NSA Crane and areas east of NSA Crane between State Road 58 and Silverville. These areas without any coverage would be most favorable for new broadband infrastructure. New towers in this area have been authorized by the FAA and FCC. Of the existing wireless infrastructure, most communications towers are located greater than 5 miles from NSA Crane in any direction with the exception of the following towers (organized by distance from NSA Crane):

- A tower measuring 319 feet tall, located along US Highway 231 southwest of Burns City, approximately 3,000 feet west of the NSA Crane boundary.
- A tower measuring 314 feet tall, located east of US Highway 231 between Odon and NSA Crane, approximately 1.3 miles west of the NSA Crane property line.
- A tower measuring 234 feet tall, located in the community of Dover Hill, approximately 1.4 miles from the southern boundary of NSA Crane.
- A tower measuring 310 feet tall, located north of I-69 on S County Road 200 E, approximately 1.64 miles north of NSA Crane boundary.



Source: Indiana Office of Technology (IOT), Indiana Utility Regulatory Commission (IURC), and 39 Degrees North, LLC, 2014

Figure 5.10-1
Broadband Coverage NSA Crane

- A tower measuring 307 feet tall located approximately 2.6 miles northeast of the NSA Crane Bloomington Gate, northeast of Owensburg.
- A tower measuring 274 feet tall located in the Hoosier National Forest, approximately 3 miles east of the NSA Crane boundary.
- A tower measuring 310 feet tall approved for construction in November 2015, at I-69, approximately 3.3 miles north of the NSA Crane boundary.
- A tower measuring 310 feet tall, located in Springville near the intersection of State Road 54 and Old Farm Road, approximately 3.3 miles from the northeast boundary of NSA Crane.
- A tower measuring 334 feet tall, located along State Road 450 north of the community of Shoals Overlook approximately 3.6 miles from the southern boundary of NSA Crane.
- A tower measuring 308 feet tall, located north of community of Shoals Overlook on State Road 450, approximately 3.7 miles from the southern boundary of NSA Crane.
- A tower measuring 310 feet tall, approved for construction in May 2015, immediately north of I-69 on State Road 45, approximately 4.2 miles from the NSA Crane Bloomington Gate.
- A tower measuring 325 feet tall, located east of Loogootee on US Highway 50, approximately 4.72 miles from the southwest boundary of NSA Crane.

Source: http://wireless2.fcc.gov/UlsApp/AsrSearch/asrRegistrationSearch.jsp (search by county)

Existing Tools

Please see the existing tools listed under Issue FSI-1.

Findings

- Cellular communication towers and other similar uses can interfere with frequencies used for electronic warfare operations at NSA Crane.
- Current broadband in the area surrounding NSA Crane is a mix of wired and wireless infrastructure. The wireless infrastructure includes none existing communications towers and two approved towers within a five-mile radius of NSA Crane.
- There is a gap in broadband coverage both in the north central portion of NSA Crane and north of the installation. The lack of coverage is consistent with the absence of wireless towers in this area. Growth and development may trigger the demand for a wireless tower to provide coverage to this area.
- The lack of land use regulations for the heights of structures and development coordination by jurisdictions with NSA Crane could result in tower development without coordination or concern for impacts on NSA Crane operations.

Please see the next page.

5.11 Housing Availability (HA)

Housing availability addresses the supply and demand for housing in the region, the competition for housing that may result from changes in quantity of military personnel, and the supply of military family housing provided by the installation.

Key Terms

Affordable Housing. Affordable housing refers to residential properties that were originally built using a tax subsidy and are now required to provide below-market rates for a mortgage or rent for low-income households, persons with disabilities, and / or seniors. Examples include: Low-Income Housing, Disabled Housing, and Senior Housing.

Market Rate Housing. Market-rate housing refers to properties that are rented or owned by households who pay mortgages or rent commensurate with the market value for residential property. There is no subsidy for market rate housing. High quality housing is consistent with market-rate housing.

ISSUE HA-1	**Lack of Housing Availability Proximate to NSA Crane** Need for high quality housing accommodations proximate to NSA Crane to attract and retain personnel in the local area.

Compatibility Assessment

NSA Crane is primarily a civilian installation with a small contingent of military personnel. As of 2014, the installation employed 4,363 personnel comprising military and civilian personnel.

There are 24 housing units at NSA Crane which are managed through a Public Private Venture (PPV) where the units are owned by a private entity and governed by an agreement with the Navy. Because of the limited number of these units, personnel employed at NSA Crane, military or civilian are required to live outside the installation.

Where employees choose to reside is important as they are contributors to the local economy through taxes, indirect jobs and discretionary purchasing power. While some personnel live within the jurisdictions surrounding NSA Crane, others choose to commute from further away, including jurisdictions outside the JLUS Study Area. NSA Crane personnel seek housing in communities further from the installation for a number of reasons including greater choice in market-rate single-family and multi-family housing, and proximity to amenities that may be considered quality of life factors. This is evident in the decreased number of NSA Crane employees residing in Daviess, Greene, Lawrence, and Martin counties and an increase in employees residing in Monroe County and Bloomington. Per the Fiscal Year 2014 (FY14) NSA Crane Economic Impact Report, Monroe County accounted for approximately 32 percent of all NSA Crane employee residences (1,398 of 4,364 total employees), whereas, Daviess County accounted for 9 percent (401 employees), Greene County accounted for 17 percent (749 employees), Lawrence County accounted for 19 percent (825 employees), and Martin County accounted for 11 percent (501 employees).

As shown in Table 5.11-1, the housing stock in the Study Area contains a similar proportion of single-family dwelling units as the overall state average, but far less multi-family housing, with the least amount of multi-family housing in Martin County (three times less than the state average). Additionally, the Study Area contains a higher than average quantity of mobile homes compared to the state percentage, with Martin County having the highest at 21 percent. The lack of multi-family housing limits the housing selection for new personnel, particularly those with families who may be looking at rental options near NSA Crane.

Table 5.11-1. Housing Stock Percentage in the Study Area, 2013

Jurisdiction	Single Family	Multi Family	Mobile Home
Indiana	***72.7%***	***22.1%***	***5.1%***
Daviess County	81.5%	9.1%	9.2%
Greene County	72.9%	7.6%	19.6%
Lawrence County	77.9%	10.2%	11.9%
Martin County	72.3%	6.7%	21.1%

Source: American Community Survey, 2013

One factor of housing affordability is the ratio of housing value to median gross rent. Table 5.11-2 shows the median housing value along with the median gross rent per month for Study Area jurisdictions surrounding NSA Crane. The majority of housing within the Study Area is valued at less than the state median value of $122,800, with Martin, Greene, and Sullivan counties' housing valued at less than $90,000. Though housing values are lower in the Study Area jurisdictions, median gross rents are also lower than the state average. Using a price-to-rent ratio to determine affordability (housing value/(12 X monthly rent), the price-to-rent ratio for the Study Area (ranging from 12.78 to 15.05) is relatively consistent with the state price-to-housing ratio of 14.01.

Table 5.11-2. Median Housing Value within the Study Area, 2013

Jurisdiction	Median Value	Median Gross Rent Per Month	Price-to-Housing Ratio
Indiana	***$122,800***	***$730***	***14.01***
Daviess County	$105,500	$584	15.05
Greene County	$88,800	$577	12.78
Lawrence County	$98,200	$606	13.05
Martin County	$88,500	$542	13.60

Source: American Community Survey, 2013

One indicator of housing choice is household income which reflects the ability to pay for housing and rent. Table 5.11-3 shows the median household incomes for counties surrounding NSA Crane for 2014 and the average annual civilian contractor salary for NSA Crane for FY14. The average NSA Crane employee salary is more than 1 ½ times the median household income for the Study Area counties. With average higher wages for NSA Crane employees and median housing values and rents in the Study Area counties below the state levels, NSA Crane employees can afford higher valued housing than offered within the Study Area which provides additional flexibility over residential location. It is worth noting that in Monroe County, where 32 percent of NSA Crane employees reside as of FY14, the 2013 median housing value and rent were $156,300 and $799, respectively – higher than the state median and Study Area counties, and the price-to-housing ratio was also higher at 16.3. This suggests the role that income plays in residential location for NSA Crane employees.

Table 5.11-3. Median Income in the Study Area, 2014

Jurisdiction	Median Household Income
Indiana	***$48,737***
NSA Crane	**$74,391***
Daviess County	$47,104
Greene County	$43,470
Lawrence County	$44,553
Martin County	$45,113

** 2014 Average annual civilian contractor salary*
Source: American Community Survey, 2014; FY14 NSA Crane Economic Impact Report

The age of housing in a community is a reflection of the community's growth rate and an indicator of the need for housing rehabilitation or replacement. As shown in Table 5.11-4, the average age of most housing in the Study Area is similar to the state, with the majority of homes built between 1960-1979 and 1980-1999 for the exception of Daviess County whose majority housing stock was constructed pre-1979. Of all the Study Area counties, Daviess County has the highest percentage (12.2%) of new housing construction after 2000, while Greene County has lowest percentage (7.2%) of new housing construction after 2000 – almost half the state average.

Table 5.11-4. Age of Housing

Jurisdiction	2000 or Later	1980-1999	1960-1979	1940-1959	1939 or Earlier
Indiana	***14.0%***	***25.3%***	***25.9%***	***17.7%***	***17.0%***
Daviess County	12.2%	21.0%	23.4%	20.3%	23.2%
Greene County	7.2%	29.1%	24.9%	15.4%	23.4%
Lawrence County	11.8%	29.2%	26.1%	16.2%	16.7%
Martin County	11.4%	29.8%	23.6%	18.8%	16.4%

Source: American Community Survey, 2013

Another housing consideration is the number of vacant and rental units available in the Study Area jurisdictions. Table 5.11-5 shows the number of total units, occupied units, vacant units and rental units for counties surrounding NSA Crane. All counties have relatively the same percentage of occupancy as the state, though Greene and Lawrence counties have a slightly higher average number of vacant units. The number of units for rent varies with Daviess and Lawrence counties having close to the state average number of rental units and Greene and Martin counties having an appreciable lower number of rental units relative to the state average.

Table 5.11-5. Housing Vacancies within the Study Area, 2013

Jurisdiction	Total Units	Total Occupied Units	Vacant Units	Total Units for Rent	Rental Units (Percent of Vacant Units)
Indiana	***2,800,895***	***2,481,793 (88%)***	***319,102 (11%)***	***70,186***	***22%***
Daviess County	12,456	11,160 (89%)	1,296 (10%)	287	22%
Greene County	15,154	12,894 (85%)	2,260 (15%)	284	12.5%
Lawrence County	20,976	18,592 (88%)	2,384 (15%)	488	20%
Martin County	4,754	4,146 (87%)	608 (12%)	88	14%

Source: American Community Survey, 2013

While quality of housing relates to the condition, types and availability of housing, the decision to locate within a particular area is also influenced by quality of life factors which are defined and measured subjectively by different people. For some, quality of life is measured by the benefits of relocating close to a place of employment resulting in reduced commute times, reduced time spent on the roadways, decreased costs, e.g. fuel and air pollution, and increased morale. For these people, greater housing options close to NSA Crane can enhance their quality of life and benefit the local economy through local spending. For others, quality of life is measured by access to consumption amenities such as services, shopping, dining and other amenities such as cultural and recreational facilities, and quality of social life. Since studies have indicated that amenities play a more significant factor for young people and workers nearing retirement, attracting and retaining the future workforce to reside in counties surrounding NSA Crane may be dependent on more than simply high quality housing.

Existing Tools

Martin County Comprehensive Plan

One of the housing objectives in the Martin County Comprehensive Plan is addressing decaying and blighted residential properties through a combination of incentive opportunities, such as low cost housing rehabilitation loans, and enforcement, such as building and property condition enforcement targeted at absentee property owners, while ensuring sensitivity to the economic capacity of the property owner. The Plan also recommends that Martin County and the county's individual communities consider developing a dilapidated housing program that requires individual home owners to repair or remove dilapidated housing. The program would be used to identify housing that is in poor condition causing health and safety concerns.

In order to implement these recommendations and objectives, the Plan notes several sources of funding and support for housing rehabilitation programs. These include the Indiana Affordable Housing Fund and several programs from the Indiana Housing and Community Development Authority, including Community Development Block Grants for housing rehabilitation, the Home Investment Partnership Program, and the Neighborhood Assistance Program. These funding programs are geared towards housing rehabilitation and creation of more opportunities for new affordable housing.

In addition, the Martin County Comprehensive Plan includes an objective to rejuvenate blighted housing to maintain the county's affordable housing stock. However, this objective does not address the supply and demand for market-rate housing.

Other Local Jurisdictions Comprehensive Plans

Daviess and Greene Counties also provide similar objectives as Martin County to address housing in the Study Area. While the need to address the blighted, decayed housing stock and provide for rehabilitation opportunities, it is important to maintaining the existing housing stock, it is also necessary to provide market-rate housing options for other potential homebuyers or renters. Counties in the Study Area need a proactive approach to working with developers, realtors and NSA Crane to quantify demand and attract market-rate housing for employees with higher than median incomes. While it appears that there is sufficient housing for the median and low-income households, area jurisdictions need focus on vision, goals, and objectives to attract and retain the above median income households.

Findings

- The Study Area currently lacks a variety of housing, limited to mostly single family housing.
- Housing within the Study Area tends to be older and there are, on average, fewer newer homes available.
- While there is on average the same percentage of vacant housing units as the state, some counties have a lower percentage of rental units as a housing option.
- The Study Area jurisdictions do not include housing visions, goals, and objectives in their Comprehensive Plans that consider higher than average incomes of NSA Crane employees.

Please see the next page.

5.12 Infrastructure Extensions (IE)

This factor covers the extension or provision of infrastructure (i.e., roads, sewer, water, etc.). Infrastructure plays an important, but varied role in land use compatibility. On the positive side, infrastructure can enhance the operations of an installation and community by providing needed services, such as sanitary sewer treatment capacity and transportation systems. On the other hand, infrastructure can become an encroachment issue if enhanced or expanded without consideration for how future development may occur. The extension or expansion of community infrastructure to a military installation or areas proximate to an installation have the potential to induce growth, potentially leading to incompatible uses and conflicts between military missions and civilian communities. Through careful planning, the extension of infrastructure can serve as a mechanism to guide development into appropriate areas, protect sensitive land uses, and improve compatibility of land uses and military missions.

There are several recent infrastructure improvements in proximity to NSA Crane associated with facilitating buildout of the WestGate@Crane Technology Park and supporting development along the I-69 corridor through the JLUS Study Area, particularly at interchanges with local highway and state road exits. These improvements include:

- Water, wastewater, electric service improvements and plans for alternative access to WestGate@Crane Technology Park.
- New wireless broadband communications towers to support development growth along the I-69 corridor within five miles of NSA Crane.
- Plans for alternative roadway access to the WestGate@Crane Technology Park and upgrades to US Highway 231 to grow the logistics sector in southwest Indiana.
- Plans for highway commercial development near the I-69 and US Highway 231 interchange that will support NSA Crane and the WestGate@Crane Technology Park.
- Investments in infrastructure, site development and building construction to induce development at the I-69 and State Road 58 interchange west of the City of Washington. Though greater than 15 miles from the nearest NSA Crane entry, development that brings jobs and a skilled workforce to the region can be a catalyst for additional development.

In some cases this infrastructure can positively benefit the region by providing additional support services and amenities for NSA Crane. As a facilitator and incubator of growth, investment, and job creation – all positive impacts on the region, infrastructure can improve overall quality of life. However, if not developed responsibly, growth can have an impact on NSA Crane.

Because infrastructure extensions are inextricably tied to land use intensification and development expansion, the compatibility assessment of these impacts are incorporated under the land use compatibility factors in the JLUS.

Please see next page.

5.13 Land / Air Spaces (LAS)

The military manages or uses land and air space to accomplish testing, training, and operational missions. These resources must be available and of a sufficient size, cohesiveness, and quality to accommodate effective training and testing. Military and civilian air and sea operations can compete for limited air and sea space, especially when the usage areas are in close proximity to each other. Use of this shared resource can impact future growth in operations for all users.

Key Terms

Approach Surface. The approach surface refers to the area that is longitudinally centered on the extended runway centerline and extends outward and upward, at a 20:1 slope, from each end of the primary surface. The inner width of the approach surface is the same as the primary surface. Each approach surface extends 5,000 feet and splays outward to a width of 1,250 feet.

Conical Surface. The conical surface extends outward from the horizontal surface 4,000 feet at a slope of 20 feet horizontal to every one foot vertical.

Horizontal Surface. The horizontal surface is a horizontal plane 150 feet above the established airport elevation, or 221 feet mean sea level. The perimeter of the Horizontal Surface is constructed by swinging 5,000-foot arcs from the center of the end of each primary surface and by connecting each arc with tangent lines.

Primary Surface. The primary surface refers to the area that is longitudinally centered on the runway or waterlane. This surface extends 200 feet beyond each runway end.

Seaplane. A seaplane refers to a craft that has the speed of an airplane and the utility of a boat. This craft has provided a variety of services which has established it as a valuable means of air transportation. Modern seaplanes are typically light aircraft, amphibious, and of a floatplane design.

Seaplane Base. A seaplane base refers to an area of water specifically designated for the landing and taking off of seaplanes.

Transitional Surface. The transitional surface extend outward and upward at right angles from the primary and approach surfaces at a slope of seven feet horizontal for every one foot vertical up to 221 MSL.

ISSUE LAS-1	**Potential for Seaplane Base on Kayak Lake Near the Lake Glendora Test Facility** Concern that the approval of private seaplane base on Kayak Lake located near Lake Glendora Test Facility could potentially interfere with the restricted airspace.

Compatibility Assessment

Kayak Lake is a 25-acre lake co-owned by two property owners located approximately 1.5 miles northeast of the LGTF. The 120-foot deep lake was formed from a spring-fed, water-filled, surface coal mine with no public access. A private seaplane base at the south-end of the lake has been proposed as an amenity for future residential development around the lake. There is concern that a proposed seaplane base on the lake may be impacted by the special use airspace restricted area associated with operations at LGTF.

Restricted Area (R-3405) is defined as the LGTF boundary and extends from the surface up to and including 1,600 feet mean sea level (MSL). The purpose of the restricted area is to prevent nonparticipating aircraft from interfering with testing and the collision of any aircraft with airborne debris from testing activities. When active, general aviation is prohibited from flying within the restricted area. NSA Crane indicates that R-3405 has been active once in the past decade. There is no restricted area outside the installation perimeter associated with the LGTF mission.

Drake Airport, a private use airfield located approximately 1.5 miles northwest of the LGTF has coexisted with the LGTF since 1990 with no known airspace issues. Pilots observe and avoid the restricted area established over the LGTF. The orientation of the airfield is generally southwest to northeast keeping approaching and departing aircraft outside the perimeter of the LGTF.

Rules governing where seaplanes may depart and land are generally the purview of state and local governments. In Indiana, seaplanes may not land unless the proposed landing area is certified as a seaplane base. An application for a private-use seaplane base must be submitted and approved by the Indiana Department of Transportation (INDOT). The proposed seaplane base at Kayak Lake is in the planning stages and has not been approved. Since the seaplane base is proposed as a private amenity in support of other uses, it is not likely to be developed in the immediate future.

Figure 5.13-1 illustrates the concern regarding this potentially proposed development with the imaginary surfaces radiating out from the seaplane base. If Kayak Lake is approved for a seaplane base, then there could be competition for airspace associated with the seaplane base and the height of structures at the LGTF. If the LGTF wanted to add missions that required construction of structures on any part of the installation outside the southern panhandle of the facility, the structures would be subject to the imaginary surfaces for the seaplane base. There are two imaginary surfaces that overlay the LGTF. The Horizontal Surface is a horizontal plane 150 feet above the existing lake elevation which is 486 feet MSL. Therefore, any structure higher than 636 feet MSL within the Horizontal Surface could be a vertical obstruction. The area of the LGTF impacted by this surface is a small wedge in the northeast corner including Little Lake Glendora. The Conical Surface extends horizontally out 4,000 feet from the outside radius of the Approach Surface to a distance of 9,000 feet at a ratio of 20:1. The height of the Conical Surface ranges from 150 feet (or 636 feet MSL) at the intersection with the Horizontal Surface to 350 feet (836 MSL) at the outer edge. However, because the Conical Surface is a sloping ratio, the height at which a structure could be a vertical obstruction is variable across the Horizontal Surface. Though the Conical Surface from the seaplane base would extend approximately ¾ of a mile inside the LGTF, the Imaginary Surfaces from the Drake Airport, equidistant from the LGTF as Kayak Lake, already extend over the LGTF and generate heights at which structures could be vertical obstructions. This area largely overlaps with the imaginary surfaces of the proposed seaplane base.

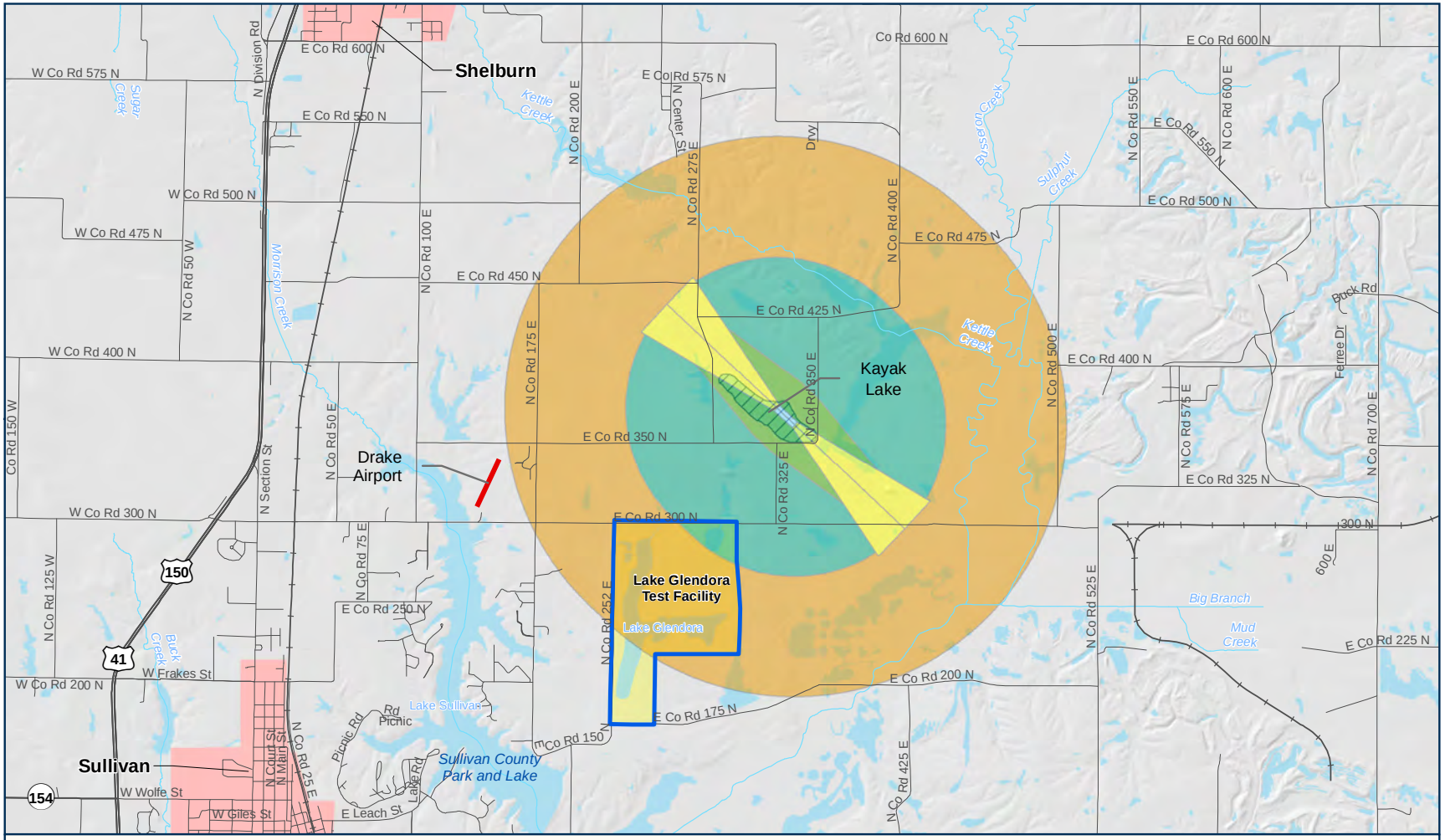
Additionally, the Approach Zones and their northwest/ southeast orientation do not result in a trajectory that would adversely impact the restricted airspace over the LGTF.

Existing Tools

105 Indiana Administrative Code 3-3-17: Requirements for Private-Use Airports

All private and public-use landing facilities, including seaplane bases, are required under 105 IAC 3-3 to be issued a certificate of site approval from the INDOT Aviation Division before they operate. It should be noted that an issuance of a certificate of site approval for a private-use seaplane base will be denied if any of the owners or persons having jurisdiction over the body of water has not given approval for the use of the site as a private-use seaplane base. Public-use landing facilities must also execute annual inspections to be issued a certificate of operating approval. While private-use airports must initially be issued a certificate of site approval, there is no requirement for maintaining an annual inspection and certificate of operating approval.

However, at the discretion of the INDOT, the department may conduct inspections prior to the issuance of a certificate of site approval, to investigate any complaints, to investigate the petition for a waiver, and for any other probable cause.



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 5.13-1

Existing / Potential Flight Facilities Lake Glendora Test Facility

It should be noted that each airport, heliport, and seaplane base is required to have an approved FAA Airspace Determination. The purpose of this regulation is to protect and promote safety in aeronautics, and contribute to the principle of effecting uniform regulations of aeronautics.

14 Code of Federal Regulations Part 157: Notice of Construction, Alteration, Activation, and Deactivation of Airports

In order to establish or modify a seaplane base, notification to FAA by the proponent is required under 14 CFR Part 157 when no federal financial assistance has been requested. This filing requirement applies both to public-use and private-use seaplane bases. For activation of a new private-use seaplane base, after filing the notice of intent, an aeronautical study and an on-site inspection are conducted. If approved, the FAA assigns the seaplane base a Seaplane Base Location Identifier.

FAA Advisory Circular 150/5395-1A: Seaplane Bases

The FAA Advisory Circular150/5395-1A provides guidance to assist operators in planning, designing, and constructing seaplane bases and associated facilities. The FAA recommendations provided in the circular are not mandatory and include criteria for site selection to ensure a safer and more efficient seaplane base. The recommended location for seaplane approach / departure paths is over water, wherever possible. This site selection criterion permits reasonably safer landings during the approach and during the initial takeoff climb in the event of power failure. This selection criteria further helps to avoid flying over populated areas, beaches, and similar shore development. In terms of approach slopes, the ideal approach path is one that is straight and which permits unobstructed approaches over water at an approach slope of at least 20:1 with ample clearance on either side of the path's center line.

Pilot's Handbook of Aeronautical Knowledge

The FAA's Pilot's Handbook of Aeronautical Knowledge provides basic knowledge that is essential for pilots. The handbook explains that restricted areas are areas where operations are hazardous to nonparticipating aircraft and contain airspace within which the flight of aircraft, while not wholly prohibited, is subject to restrictions. Activities within these areas must be confined because of their nature, or limitations may be imposed upon aircraft operations that are not a part of those activities, or both. Restricted areas denote the existence of unusual, often invisible, hazards to aircraft. Penetration of restricted areas without authorization from the using or controlling agency may be extremely hazardous to the aircraft and its occupants. Air Traffic Control facilities apply the following procedures when aircraft are operating on a route which lies within joint-use restricted airspace:

- If the restricted area is not active and has been released to the Federal Aviation Administration, the Air Traffic Control facility allows the aircraft to operate in the restricted airspace without issuing specific clearance for it to do so.
- If the restricted area is active and has not been released to the FAA, the Air Traffic Control facility issues a clearance which ensures the aircraft avoids the restricted airspace.

Findings

- A new private-use seaplane base must be approved by the INDOT Aviation Division and the FAA.
- The imaginary surfaces of the proposed seaplane base extend into the LGTF airspace impacting the height of any tall structures that could be a vertical obstruction to navigable airspace.
- The Drake Airport Imaginary Surfaces already extend into the LGTF airspace generating maximum heights at which structures at the LGTF could be vertical obstructions.
- The imaginary surfaces from Drake Airport and the propose seaplane base largely overlap over the LGTF.
- The orientation of the Drake Airport runway is generally southwest – northeast keeping approaching and departing aircraft outside the perimeter of the LGTF.
- The Approach Zones of the seaplane base are not oriented in a trajectory that would impact the LGTF restricted area.

Please see the next page.

5.14 Land Use (LU)

The basis of land use planning and regulation relates to the government's role in protecting the public's health, safety, and welfare. Local jurisdictions' general plans and land use controls can be the most effective tools for preventing or resolving land use compatibility issues. These tools ensure the separation of land uses that differ significantly in character. Land use separation also applies to properties where the use of one property may adversely impact the use of another. For instance, industrial uses are often separated from residential uses to avoid impacts from noise, odors, lighting.

Key Terms

Land Use Planning. Land use planning stems from the Supreme Court decision of *Euclid vs. Ambler* which enabled jurisdictions to regulate land use through land use controls (zoning) land in order to protect the public's health, safety, morals, and welfare. Land use controls are a tool used by local jurisdictions that generally controls for use, density, intensity, building heights, and setbacks on a parcel or lot. Most states, like California, enacted enabling legislation for local jurisdictions to also create and adopt general or comprehensive plans which are land use documents that broadly establish a vision, goals, policies, and implementation activities for a jurisdiction over a long range period of time, typically ten to twenty years, to promote compatible land use, guide growth and logical development.

Local jurisdictions' general plans and land use controls are the most effective tools to avoid and resolve land use compatibility issues. These tools ensure similar and compatible land uses are properly located and can co-exist while separating land uses that differ significantly in use and potential nuisance.

Sensitive Land Uses. In terms of compatibility assessment, sensitive land uses are uses that are susceptible to, and effected by, nuisances such as noise, dust and air pollution. Sensitive land uses typically include residential areas, hospitals, convalescent homes and facilities, schools, libraries, churches, recreational areas, and other similar land uses.

Technical Background

Land use planning around military installations is similar to the process for evaluating other types of land uses. For instance, local jurisdictions consider compatibility factors such as noise when locating residential developments near commercial or industrial uses. As the land between local municipalities is developed – or the land between a local municipality and the perimeter of a military installation is developed both entities are affected. New residents, tenants, or building owners are typically not fully aware of the implications of locating in close proximity to an active military installation and / or training area.

Among the most pressing factors causing incompatibility with installations containing a military airfield and weapons training are the proximate areas of encroaching development, as well as off-installation light pollution from that development which may impact the military operations. The development of land uses incompatible with the installations military operations threatens that installation's mission success and its continued existence.

ISSUE LU-1	**Future Development Associated with Interstate 69** Potential for incompatible development associated with the development of Interstate 69.

Compatibility Assessment

Interstate 69 (I-69) is a new interstate highway that is intended to connect Canada and Mexico, serving as a catalyst for trade in North America. As such, traffic on this highway will likely include a significant amount of commercial vehicles and large trucks. The interstate will also serve as a regional highway, providing a more direct north-south route in southwestern Indiana. The portion of I-69 that is less than two miles north of NSA Crane was opened in December 2015. This connects the portion of I-69 from Crane to Bloomington, at the interchange with US Highway 231.

The portion of I-69 north of NSA Crane travels east to west through Greene County, but transitions to a north to south trajectory through Daviess County. There are two major interchanges within Daviess County, one with US Highway 50 to the east of the City of Washington, and another with State Route (SR) 58 southeast of the Town of Elnora. There are three major interchanges within Greene County – northwest of the Town of Crane with US Highway 231, at SR 45 north of the unincorporated community of Owensburg, and at SR 445 northeast of the unincorporated community of Cincinnati. The only one of these interchanges with the potential to impact NSA Crane is the I-69 / US Highway 231 interchange, which is the closest interchange to the installation. The other interchanges are far enough away from NSA Crane that future development at these interchanges would not likely impact the NSA Crane mission negatively and could complement the mission if development provides useful services to those with NSA Crane as a destination.

The connection of the new I-69 through the region will provide many benefits for Indiana and the JLUS Study Area. The ease of access afforded by the highway is generally viewed as a positive impact for the economy of the area, but there are some potential compatibility concerns for NSA Crane operations associated with it as well.

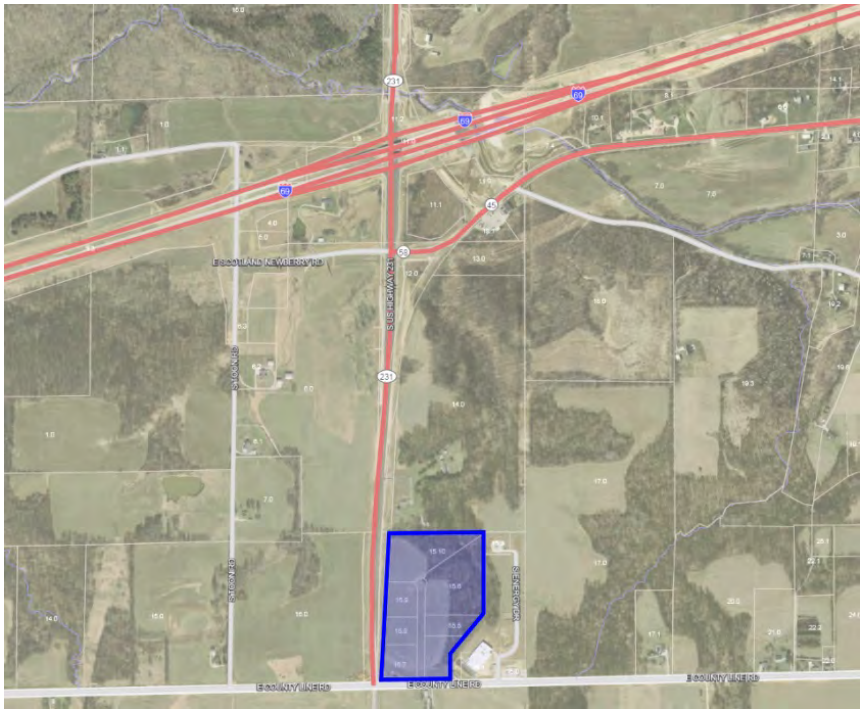
There are many opportunities that I-69 can provide for the Study Area, as well as NSA Crane, mostly stemming from the improved access to the region from other parts of the state and country. Having a major transportation corridor allows better flow of people and goods to support the economy. It also allows NSA Crane to transport shipments to and from the installation more efficiently. In terms of personnel, it provides an improved access for technical personnel, contractors, and civilians to commute to the NSA Crane or to areas outside the installation, such as WestGate@Crane Technology Park to support activities at NSA Crane.

The new interstate also creates potential compatibility concerns particularly from the US Highway 231 interchange close to NSA Crane. Interchanges are often catalysts for development to take advantage of increased traffic and exposure. Traffic counts along US Highway 231 through Greene and Martin counties are anticipated to increase as more vehicles travel this route to reach I-69. The increased traffic volumes for the future are very attractive to potential businesses that cater to travelers. While the area surrounding the interchange is ripe for development, the absence of land use controls in Greene County means future development is regulated only by ability to provide vehicle access and requisite utilities to serve the development. This makes is difficult to plan for precise uses that could develop around the interchange in the future. While typical uses around rural interstate interchanges include hotels, restaurants and highway commercial uses such as truck stops and gas stations which would increase vehicle traffic, there is also the potential, though low, for other uses that that could affect he missions at NSA Crane, such as heavy industrial or manufacturing uses that could potentially create air pollution that may impact air quality in the region.

In June 2014, Battelle Technology Partnership Practice prepared the Strategic Plan for Economic and Community Prosperity in Southwest Central Indiana. This report assessed economic growth and development potential

in southwest central Indiana, including the region around the JLUS Study Area. In particular, one of the areas that it discussed is the vicinity around the US Highway 231 and I-69 interchange and the potential growth needs and factors that could spur development. The report stated that the region has not taken full advantage of the potential economic opportunities presented by the I-69 corridor and identified an existing lack of hospitality and tourism attractions, such as hotels, restaurants, and conveniences, that are likely to be developed as a result of the new access created by the completion of the interchange, as well as the proximity to WestGate@Crane Technology Park, NSA Crane, and other higher education and technical facilities to encourage industry clusters (such as the defense, technology, and education sectors) that might also become catalysts for development. Hotels, restaurants, retail, and shopping are typical developments commonly found at major highway interchanges, so it is valid to predict that these will be future development types at this interchange. In general, these uses would be compatible with operations at NSA Crane, but any additional residential development or other noise sensitive uses that might be spurred by development surrounding the interchange may experience impacts from operations at NSA Crane. Conversely and depending on the location and intensity of development, additional traffic could impact commute times for employees at the installation.

Although there are no developments underway around the interchange, there are plans for development including the Progress Point project – a multi-use plan for a hotel and restaurants in the southeast quadrant of the interchange along US Highway 231 adjacent to the Battery Innovation Center. The area of this development is illustrated in the following graphic.

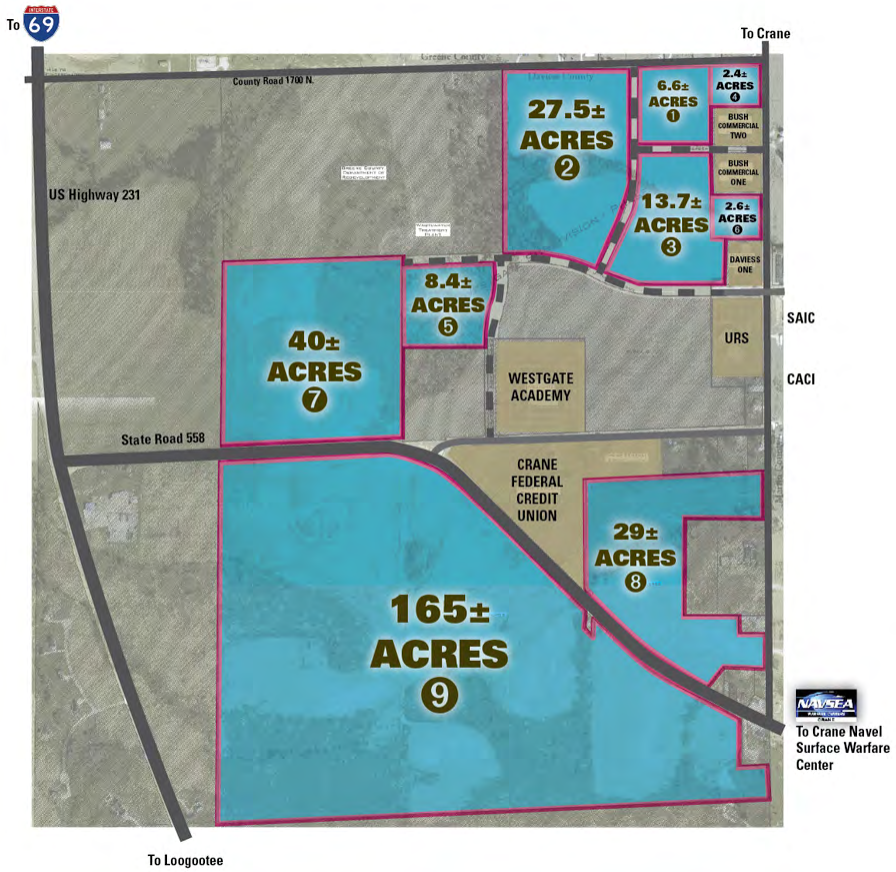


Location of proposed Progress Point project relative to the I-69 and US Highway 231 interchange; Source: Greene County GIS

There is also a plan for a service station closer to the interchange that would provide facilities catering to truck traffic.

Promoting and securing investment surrounding the interchange is the purview of local economic development organizations (LEDOs) such as the Greene County Economic Development Corporation and the Daviess County Economic Development Corporation. While the Progress Point project and

service station are being actively pursued by the Greene County Economic Development Corporation, the Daviess County Economic Development Corporation is actively marketing 9 sites totaling 295.2 acres for development between the interchange and NSA Crane as illustrated in the graphic below.

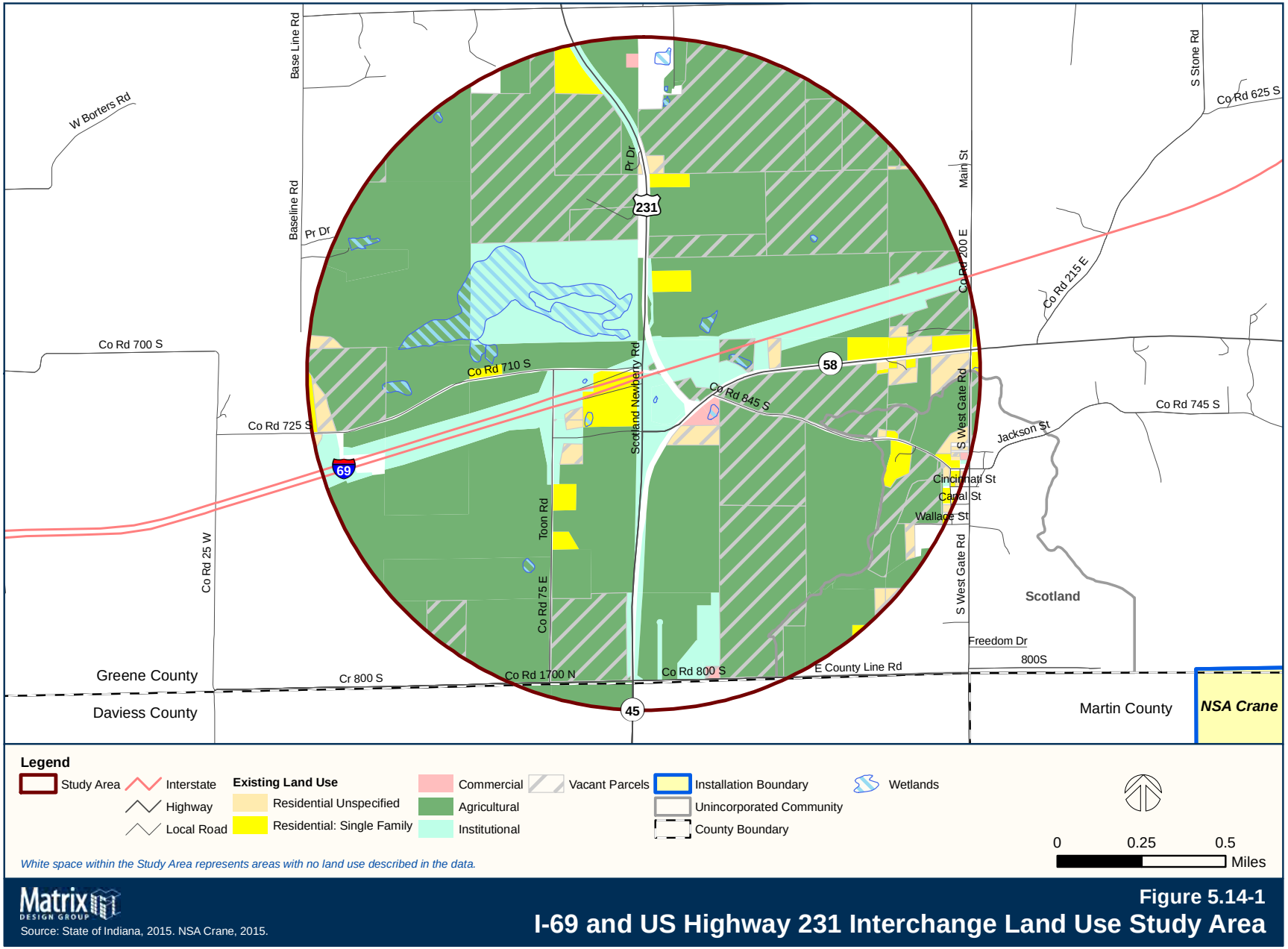


Source: Daviess County Economic Development Corporation

While this indicates there is interest in developing around the interchange, the actual construction will be driven by market-demand as the area responds to the interchange.

One possible disincentive to development near the interchange is a function of proximity to Bloomington – completion of I-69 has reduced the travel time between the city and NSA Crane to approximately 40 minutes. The attractiveness of city amenities and infrastructure within proximity to the I-69 and US Highway 231 interchange will likely be a development factor both for the types of development and development timing.

Hoosier Energy is the electric power provider for the region surrounding the I-69 and US Highway 231 interchange. In preparation of predicted development, Hoosier performs a utility study within a one-mile radius around major highway interchanges to identify future power needs. Figure 5.14-1 shows the one-mile radius around the I-69 and US Highway 231 interchange including the existing land uses and vacant parcels. The majority of the one-mile radius is within Greene County. Uses within this area are primarily agricultural, though there are some scattered single family residential uses to the north, east and south, and commercial use to the southeast. Vacant land within the one-mile area is predominantly agricultural with scattered parcels of unspecified residential uses also identified as vacant. Development in proximity of the interchange will therefore dependent on the conversion of agricultural land. One limitation on the development potential in the area is natural factors. Within the one- mile radius are scattered areas of undevelopable wetlands totaling approximately 57 acres. The majority of the wetlands (36 acres) are located on land to the northwest of the interchange on property owned by the Indiana Forestry Education Foundation and would not likely be developed.



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 5.14-1
I-69 and US Highway 231 Interchange Land Use Study Area

Existing Tools

I-69 Community Planning Program

In order to plan for and manage the general growth of communities along the new I-69 corridor, the I-69 Community Planning Program was created by the Indiana Department of Transportation. The program included grant funding for local planning activities and the development of a planning toolbox.

The City of Linton, Town of Bloomfield and Greene County opted to team together in their planning efforts, the City of Washington and Daviess County, and the City of Loogootee and Martin County. The Greene County team was awarded $150,000, the Daviess County team was awarded $100,000, and the Martin County team was awarded $100,000. With this funding, Greene, Daviess, and Martin counties funded comprehensive plans to help guide future development along the I-69.

Greene County I-69 Corridor Plan

The I-69 Corridor Plan for Greene County is a framework for future physical development along the I-69 Corridor. It addresses the use of land to accommodate future activities, the improvement of the infrastructure to sustain development, the provision of community and recreation facilities to meet the needs of its residents, and the preservation natural and historic amenities to protect the heritage of the community. The corridor plan strives to take advantage of the economic development opportunities through the development of sites with adequate supporting infrastructure while protecting and enhancing manmade and natural environmental features that are unique to Greene County. It is intended as the collective vision for the future of Greene County along the I-69 corridor.

The future vision for the economic development in the proposed I-69 corridor involves the identification of goals and guidelines for the identification, evaluation, and development of economic development sites. The future vision is intended to help define future land use patterns with associated infrastructure and environmental protection measures. The goals and guidelines are intended to be implemented in conjunction with the I-69 corridor future land use map, for determining consistency of proposed development, infrastructure investments and economic development programs with the corridor plan and the Greene County Comprehensive Plan.

Greene County Comprehensive Plan

The recommendations of the I-69 Corridor Plan for future growth and development have been integrated into the Greene County Comprehensive Plan. The Greene County Comprehensive Plan contains a growth management goal to promote appropriate and orderly future development and growth in Greene County. An objective of this goal is to encourage appropriate future commercial and industrial development to locate near proposed I-69 and in the vicinity of incorporated areas. The plan also contains potential future land use opportunities.

Martin County Comprehensive Plan

The Martin County Comprehensive Plan guides public and private decisions relative to land use development and infrastructure improvements to take advantage of the economic development opportunities associated with I-69 and the WestGate@Crane Technology Park. Economic development impact studies have shown that communities that plan ahead and cooperate with other levels of government repeat the benefits of the economic opportunities.

Multiple sources do not project an increase in population or employment for Martin County. However, the completion of I-69, with interchanges at US 231 and US 50/150 just outside of the county, should increase traffic along these highways. Increased traffic through the county makes the county more attractive to businesses and industries. The plan recommends that shovel-ready sites should be made available along these major highways to draw development to the county.

Daviess County Comprehensive Plan

The Daviess County Comprehensive Plan directs the future physical development of the community by serving as the key policy guide and addresses the use of land to accommodate future activities. One of the priorities of the comprehensive plan includes projects that assist development opportunities around the future I-69 interchanges, especially US 50 and US 231. The projects include providing water, sewer, and other utilities to create shovel ready sites, extending water and sewer lines from Washington to serve the I-69 corridor from County Road (CR) 150S to CR 200N, and guiding development of the WestGate@Crane Technology Park including the provision of infrastructure to the Daviess County portion of the park.

Daviess County Zoning Ordinance

There are two I-69 interchanges in Daviess County – at SR 58 and US 150. However, the interchange with US 150 is located within the City of Washington, giving the city control over the development and land use surrounding that interchange. Daviess County has established land use controls surrounding the I-69 and SR 58 interchange, which is designated General Business and General Agriculture and is approximately 11 miles west of NSA Crane.

Daviess County is also located in close proximity to the I-69 interchange with US 231, less than one mile from the county border. This area is designated General Business and General Agriculture, along with small areas designated Rural Estate and Light Industrial. These designations ensure that only permitted or approved special uses are developed in this area. However, there are no regulations associated with compatibility with NSA Crane.

Findings

- The I-69 connection and interchange with US Highway 231 was opened in December 2015.
- The jurisdictions that will be impacted by the I-69 development all have future land use plans to guide the development surrounding the new route. However, Greene and Martin counties do not have any type of land use controls to regulate future development, leaving uncertainty for future development.
- A study was completed in June 2014 to assess the potential for economic growth in southwest central Indiana, including around the US Highway 231 / I-69 interchange and identified a need for hotels, restaurants, and convenience.
- None of the plans mention NSA Crane or any impact future development may have on the installation.

ISSUE LU-2	**Development of WestGate@Crane Technology Park** Need for coordinated development at WestGate@Crane Technology Park to ensure future development is compatible with NSA Crane mission.

Compatibility Assessment

The Westgate@Crane Technology Park is a commercial office park adjacent to NSA Crane which aims to attract defense contractors that support NSA Crane. Long term plans for the Technology Park include the incorporation of commercial uses that support both the businesses at the Park and NSA Crane, including the hospitality uses – lodging, restaurants and retail.

While the WestGate@Crane Technology Park complements NSA Crane by providing a location for local contractor support, it could also cause inadvertent encroachment issues such as increased traffic and uses that conflict with or are impacted by operations at NSA Crane, such as from noise. A major component of the Park is the accessibility of wireless communication technology to users, an essential selling point to businesses with an interest in locating at the Technology Park. Wireless communication

technology could be an encroachment issue if it affects communications systems or testing equipment on NSA Crane.

WestGate@Crane Technology Park is in close proximity to the new I-69 and US Highway 231 interchange, which could increase its appeal, as it has greater access to a broader market. In June 2014 Strategic Plan for Economic and Community Prosperity in Southwest Central Indiana, the Technology Park was identified as a potential growth node and it was suggested that the facility could partner with higher educational institutions, such as University of Southern Indiana or Indiana University-Bloomington to expand its learning technologies and applied information technology research and education capabilities. This could lead to expansion within proximity to NSA Crane. Since education facilities are noise-sensitive uses, they could be impacted by noise events at NSA Crane.

The WestGate@Crane Technology Park is located at the convergence of three different counties, Daviess, Martin, and Greene County. Daviess County recently adopted land use controls in 2013, though Martin and Greene counties lack land use controls to guide and regulate future development. The lack of land use controls in the surrounding counties means that the development of future uses at the WestGate@Crane Technology Park and other uses developed as a result of the Park in proximity to NSA Crane will need to be evaluated for their impacts on the installation and vice versa.

Existing Tools

Daviess County Zoning Ordinance

Daviess County is one of the only counties in the Study Area to have adopted land use controls. The ordinance, passed in 2013, and regulates land uses for property within the county. Daviess County contains WestGate@Crane Technology Park, which is designated General Business. This designation ensures that only permitted or approved special uses are developed in this area. However, there are no regulations associated with compatibility with NSA Crane – requirement to notify an adjacent land owner of development or mission changes that could impact them and notification of development that could impact NSA Crane.

Findings

- While the WestGate@Crane Technology Park complements NSA Crane by providing a location for local contractor support, it could also cause inadvertent encroachment issues such as increased traffic and uses that conflict with missions conducted at NSA Crane.
- The WestGate@Crane Technology Park has been identified as an economic hub that could be expanded through partnering with other universities or technical institutions.
- Two of the counties surrounding the WestGate@Crane Technology Park do not have land use controls, so unregulated growth could occur.

ISSUE LU-3	**Adequate Commercial Rest Facilities and Staging Areas** The lack of adequate commercial truck rest facilities and staging areas outside of NSA Crane has resulted in trucks overnighting in a gravel strip of land opposite of the Town of Crane.

Compatibility Assessment

NSA Crane has a steady stream of commercial trucks accessing the installation to bring in commodities, with anywhere from 30 to 40 trucks per day. Due to the rural nature of the Study Area there are no trucks stops near the installation to accommodate truck drivers who need to stop to rest or relieve their driving duties. Currently, truck drivers utilize a gravel area

near the Town of Crane, across from the NSA Crane Visitors Center. This area has become an unofficial truck stop that generates dust that may impact area residents and interfere with local traffic.

Existing Tools

Daviess County Zoning Ordinance

The I-69 interchange at SR 58 is located in Daviess County approximately 11 miles west of NSA Crane. Land surrounding this interchange is zoned General Business and General Agriculture which allows for uses such as a service station that could cater to overnight trucks and alleviate staging across from the Town of Crane.

Greene County Economic Development Corporation

The Greene County Economic Development Corporation is actively marketing land for a freight truck service station at the I-69 and US Highway 231 interchange. A development of this nature could relieve the overnight trucks and staging across from the Town of Crane.

Findings

- There is currently a lack of commercial truck rest facilities to accommodate the high number of trucks entering and exiting NSA Crane.
- Efforts are being pursued to relieve the overnight trucks and staging outside the Town of Crane.

ISSUE LU-4	**Development Surrounding Lake Glendora Test Facility** Potential for incompatible land uses surrounding the Lake Glendora Test Facility or interference from incompatible uses with mission capabilities.

Compatibility Assessment

Future development surrounding the Lake Glendora Test Facility (LGTF) could lead to incompatible development. Land outside of the LGTF is in unincorporated Sullivan County, which does not have a comprehensive plan or land use controls surrounding the facility.

Indiana State Code 36-7-30.1 requires jurisdictions within three miles of the perimeter of a military installation to notify the installation of certain types of development actions. For the purpose of the JLUS assessment, existing land use within three miles of LGTF was analyzed to identify compatibility concerns. The primary types of uses that could be impacted from activities at the LGTF are residential, schools, religious facilities, and other noise-sensitive uses, though other uses such as recreational hunting and fishing may also be compatibility concerns.

Recreational hunting and fishing occur in the immediate area surrounding the LGTF. This activity occurs on a private property to the southeast of the LGTF. The potential for expansion of this use along with residential development in the immediate area is a potential land use concern. Land to the southeast is at a higher elevation than Lake Glendora, so any development in this area could allow for viewing of testing activities at the LGTF which is a security concern. Because of the higher elevation outside the LGTF, the firing of weapons near the LGTF has the potential for stray bullets to present a safety concern for the LGTF if they entered the facility. Lastly, the development of residential uses in proximity to the LGTF could increase the number of people exposed to noise from testing events and impact their quality of life. The absence of land use controls in

Sullivan County means there is no presiding regulations over the types of uses proximate to the LGTF to limit potential incompatible development.

Existing Land Use

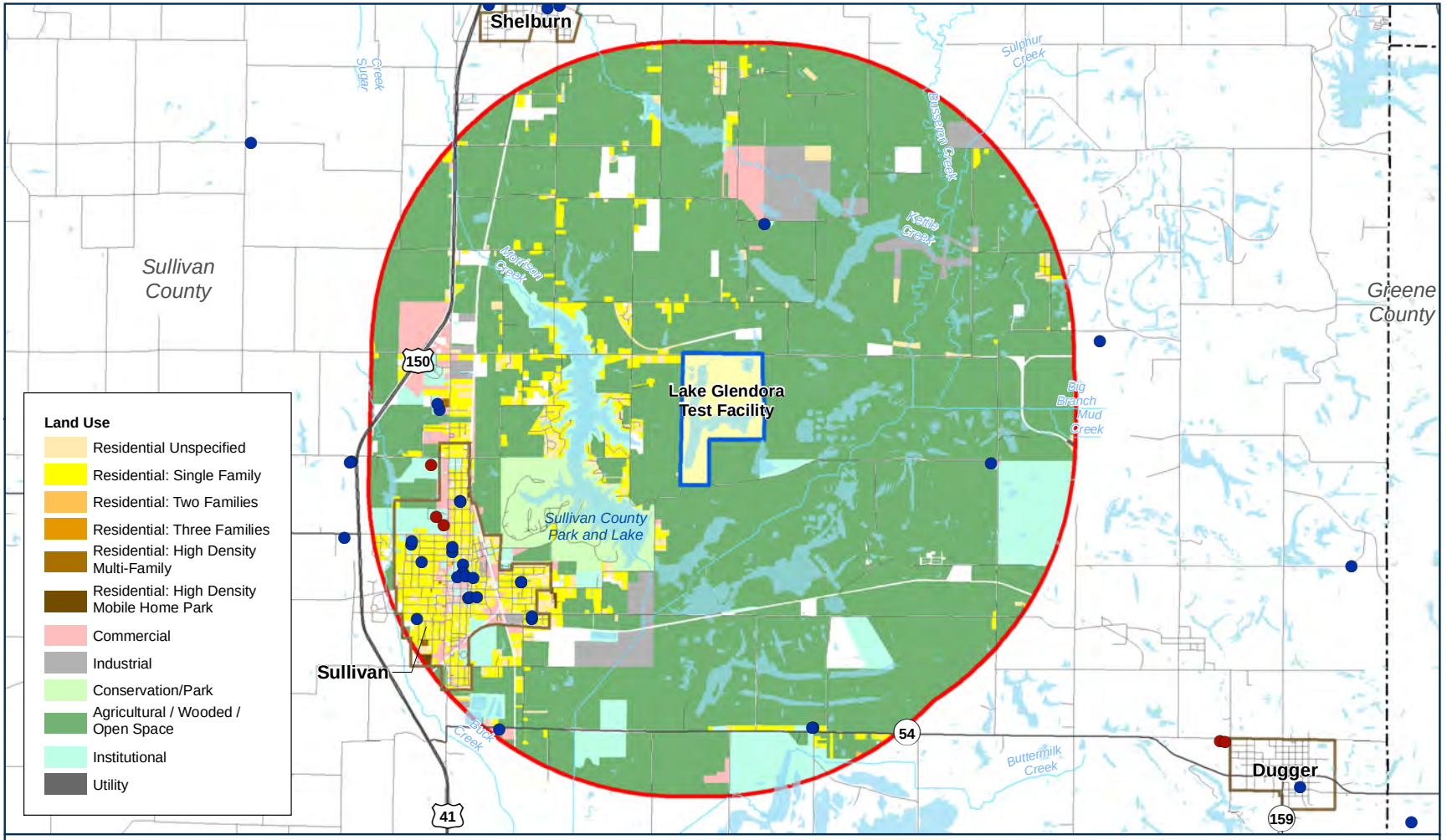
Tables 5.14-1 and 5.14-2 identify the number of acres of each type of existing land use within three miles of the LGTF (the statutory notification area), and Figure 5.14-2 shows their geography. Agriculture is the dominant land use in the area, particularly within one mile around the LGTF. Further from the LGTF, the land to the south is more developed with commercial and residential uses. The majority of the City of Sullivan to the southwest is also located within three miles of the LGTF. The City of Sullivan, and some unincorporated land surrounding Lake Sullivan, are primarily single family residential and are the areas most likely to experience future residential growth. Future development may be amplified around Lake Sullivan – a large manmade lake predominantly surrounded by single family residential subdivisions.

Though existing development has not been identified as a major compatibility issue, future development and the redevelopment of existing uses should be monitored to manage future potential incompatibilities.

Table 5.14-1 Sullivan County Existing Land Use within Three Miles of LGTF

Existing Land Use	Number of Parcels	Number of Acres
[Unknown]	11	108.7
Agricultural	522	13,676.4
Commercial	174	1,798.4
Conservation/Park	2	466.2
Industrial	32	692.8
Institutional	84	1,149.2
Residential Unspecified	450	2,849.4
Residential: High Density Mobile Home Park	3	4.0
Residential: High Density Multi-Family	1	3.1
Residential: Single Family	679	805.0
Residential: Two Families	2	2.3
Utility	1	2.3

Source: State of Indiana, 2015; Matrix Design Group



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 5.14-2
Lake Glendora Test Facility and Existing Land Use

Table 5.14-2 City of Sullivan Existing Land Use within Three Miles of LGTF

Existing Land Use	Number of Parcels	Number of Acres
[Unknown]	1	280.8
Agricultural	22	29.6
Commercial	264	115.6
Conservation/Park	3	60.2
Industrial	11	17.2
Institutional	161	90.9
Residential Unspecified	417	105.5
Residential: High Density Mobile Home Park	4	7.7
Residential: High Density Multi-Family	10	4.1
Residential: Single Family	1,662	476.8
Residential: Three Families	9	1.9
Residential: Two Families	11	2.2

Source: State of Indiana, 2015; Matrix Design Group

Vacant Parcels

While existing land use does not pose a compatibility concern with LGTF operations, vacant land is an important factor to consider for potential development of incompatible uses in the future. Sullivan County does not have a comprehensive plan or any formal land use controls to guide future development, which makes it difficult to predict what uses will occur on vacant land. As shown on Figure 5.14-3, with the exception of the City of Sullivan, the majority of the land within three miles of LGTF is identified as vacant. Much of this land use is used as agriculture and is likely to continue this use in the future. The City of Sullivan is mostly built out, but future development is likely to be residential. The city is far enough away from the LGTF that impacts from the installation on the city and vise-versa are not likely, but they should still be considered for future development.

Table 5.14-3 identifies the number of vacant parcels and acres within three miles of the LGTF as well as constraints to development including wetlands and government managed lands.

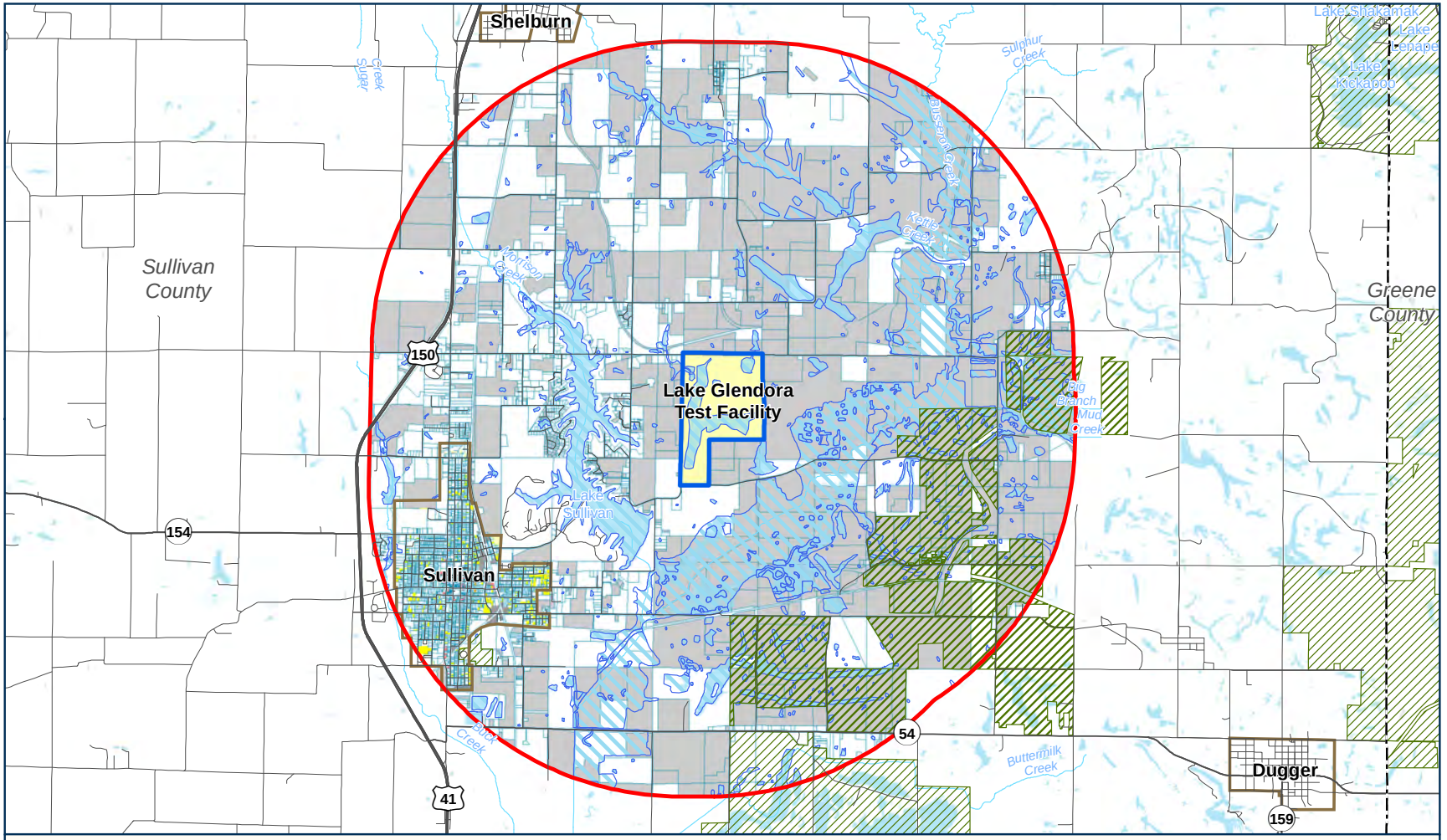
Table 5.14-3 Vacant Parcels within Three Miles of LGTF

Jurisdiction	Number of Parcels	Number of Acres
Sullivan County	833	14,426.4
City of Sullivan	466	120.8

Source: State of Indiana, 2015; Matrix Design Group

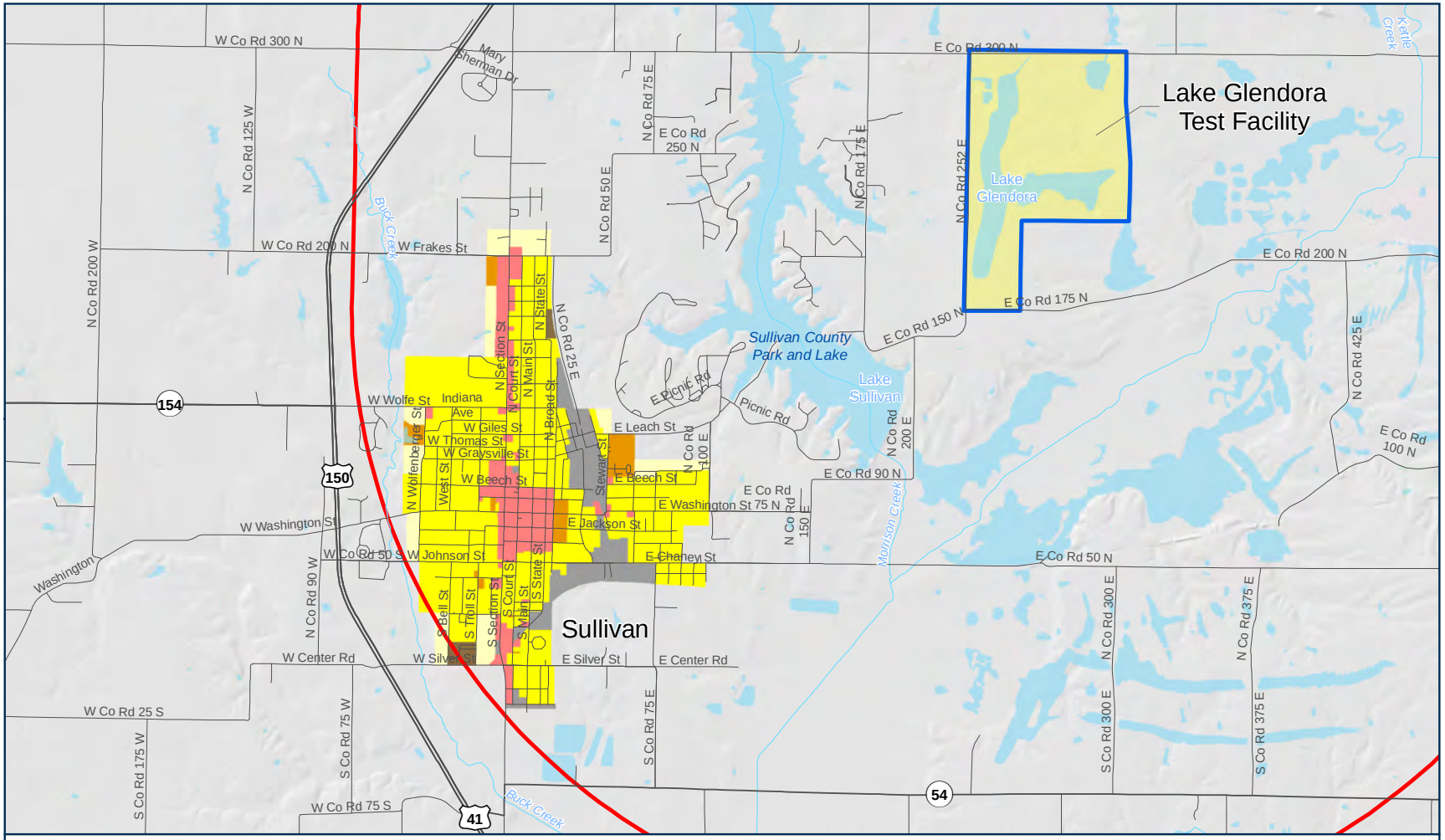
Zoning

The City of Sullivan has adopted land use controls to regulate land use. The majority of the city is designated residential with a commercial core and two industrial corridors. Due to the distance from LGTF, residential development is not likely to be impacted by noise events at the LGTF. Industrial development may pose a concern for regional air quality that could impact LGTF operations, but the scale of industrial development in the city is not likely to be significant enough to have air quality impacts. Figure 5.14-4 illustrates the City of Sullivan land use designations relative to the location of the LGTF.



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 5.14-3
Lake Glendora Test Facility and Vacant Parcels



Source: State of Indiana, 2015. NSA Crane, 2015. City of Sullivan 2015.

Figure 5.14-4

Lake Glendora Test Facility and City of Sullivan Zoning

Existing Tools

Please refer to the existing tools listed under Issue COM-8 in Section 5.5 Coordination / Communication for related information.

Readiness and Environmental Protection Integration

This initiative enables DOD to work with state and local governments, non-governmental organizations, and willing landowners to limit encroachment and incompatible land use through land acquisition by the establishment of conservation easements, land trusts, or the purchase of property. The program provides funding to support these land acquisition efforts to preserve the land around military installations, wildlife habitats, and local communities.

NSA Crane has submitted one proposal in 2012 to receive funding from REPI to prevent incompatible development in the vicinity of the LGTF. However, it was not selected for funding.

Findings

- The majority of the land within three miles of the LGTF is currently agricultural and is compatible with operations at the installation.
- The unincorporated land outside of the LGTF is in Sullivan County, which does not have a comprehensive plan or land use controls. With no control over the land surrounding the facility, incompatible uses could be developed and impact any future as yet unidentified workload which might require expansion of the facility.
- There are no current land uses that are major compatibility concerns with LGTF.
- Future development on vacant parcels, or redevelopment of existing parcels, could be incompatible if not properly monitored.

ISSUE LU-5	**Development Surrounding NSA Crane** Potential for incompatible land uses surrounding the NSA Crane or interference from incompatible uses with mission capabilities.

Compatibility Assessment

Martin, Daviess, Greene, and Lawrence counties all contain land that borders the NSA Crane fence line. While Daviess County adopted land use controls in 2013, Martin, Greene, and Lawrence counties do not have land use controls. However, all of the counties, except Lawrence County, have a comprehensive plan, which is required as a precursor to establishing land use controls.

The absence of county land use controls and planning guidance has a potential impact on the future of NSA Crane operations. Because there are no land use controls in place, a number of incompatible land uses could be developed proximate and adjacent to the installation. Of particularly concern are noise sensitive uses such as residential, religious facilities or schools; uses which have the ability to impact air quality emissions, such as manufacturing or industrial uses; and uses which are large trip generators that might impact traffic on local roads.

Future develop along the fence line is also a concern for NSA Crane. Vacant parcels for sale along the NSA Crane fence line may be purchased with a particular development in mind that is not disclosed until after transfer in ownership. This is a particular concern for increases in residential development surrounding the installation. Because of the lack of land use controls in the surrounding counties, there are no restrictions on the types of development proximate to NSA Crane.

Existing Land Use

In conjunction with Indiana State Code 36-7-30.1, which requires jurisdictions within three miles of the perimeter of a military installation to notify the installation of development activities, this JLUS evaluates existing land use within three miles of NSA Crane, as shown on Figure 5.14-5. This includes land within Daviess, Greene, Lawrence, and Martin counties. Most of the land within three miles of NSA Crane is currently agriculture. The primary operational impact from NSA Crane that would affect land use outside the installation is noise from demolitions. Agriculture uses are unlikely to be impacted by noise. There is some scattered residential development within three miles, particularly in the Town of Crane and unincorporated communities of Burns City, Bramble, Dover Hill, Indian Springs, Owensburg, Scotland, and Williams. No specific existing uses were identified as incompatible with operations at NSA Crane. Tables 5.14-4, 5.14-5, 5.14-6, and 5.14-7 show the number of parcels and acres for each type of land use in Daviess, Greene, Lawrence, and Martin counties, respectively, for all land within three miles of NSA Crane.

Table 5.14-4 Daviess County Existing Land Use within Three Miles of NSA Crane

Existing Land Use	Number of Parcels	Number of Acres
Agricultural	1,008	17,107.8
Commercial	33	64.0
Conservation/Park	36	387.2
Institutional	71	445.9
Residential Unspecified	243	224.5
Residential: Single Family	412	462.9
Residential: Two Families	2	2.5

Source: State of Indiana, 2015; Matrix Design Group

Table 5.14-5 Greene County Existing Land Use within Three Miles of NSA Crane

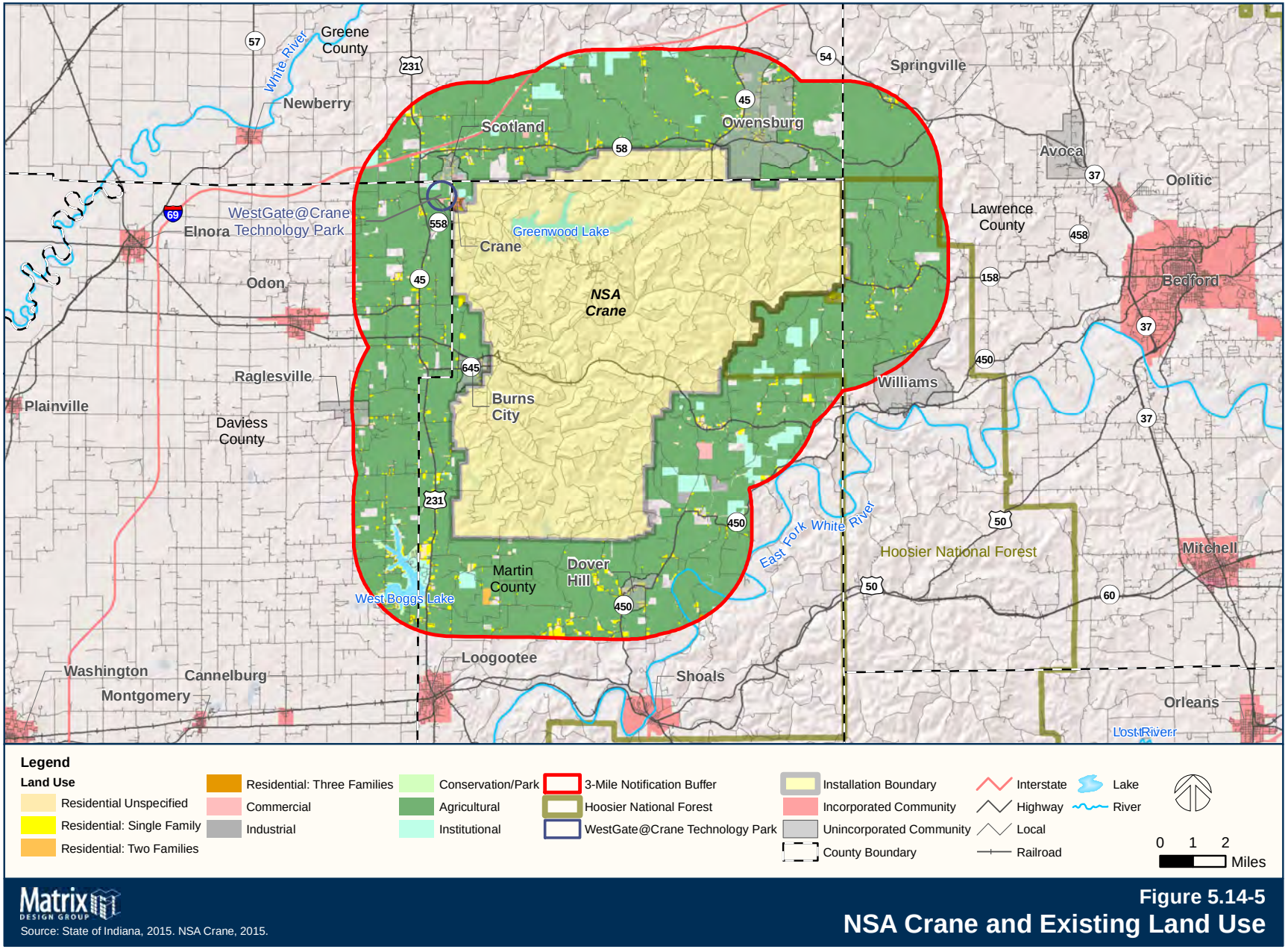
Existing Land Use	Number of Parcels	Number of Acres
[Unknown]	7	4.2
Agricultural	883	23,822.6
Commercial	42	139.0
Institutional	137	1,346.2
Residential Unspecified	292	367.4
Residential: Single Family	358	718.6

Source: State of Indiana, 2015; Matrix Design Group

Table 5.14-6 Lawrence County Existing Land Use within Three Miles of NSA Crane

Existing Land Use	Number of Parcels	Number of Acres
Agricultural	440	15,025.2
Commercial	2	1.8
Institutional	23	28.7
Residential Unspecified	65	66.9
Residential: Single Family	118	215.8

Source: State of Indiana, 2015; Matrix Design Group



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 5.14-5
NSA Crane and Existing Land Use

Table 5.14-7 Martin County Existing Land Use within Three Miles of NSA Crane

Existing Land Use	Number of Parcels	Number of Acres
[Unknown]	24	6.2
Agricultural	1,306	34,909.3
Commercial	28	167.3
Conservation/Park	7	1.2
Industrial	16	251.0
Institutional	122	2,307.0
Residential Unspecified	477	610.7
Residential: Single Family	671	1,330.2
Residential: Three Families	2	10.1
Residential: Two Families	4	84.3

Source: State of Indiana, 2015; Matrix Design Group

Vacant Parcels

Within three miles of NSA Crane, a large majority of the land is identified as undeveloped or vacant, meaning there are no structural improvements on the land. Much of this is currently used as agriculture and is expected to remain as such for the foreseeable future. Figure 5.14-6 identifies the locations of these vacant parcels and government managed land within the Hoosier National Forest, and Table 5.14-8 identifies the number of parcels and acres of vacant land in each of the counties within three miles of NSA Crane. There are three primary concerns for future development that could impact operations at NSA Crane. Residential development close to the installation may be impacted by noise from demolitions; future industrial or manufacturing development could impact regional air quality; and development that increases traffic around NSA Crane could impact employee commute times.

Table 5.14-8 Vacant Parcels within Three Miles of NSA Crane

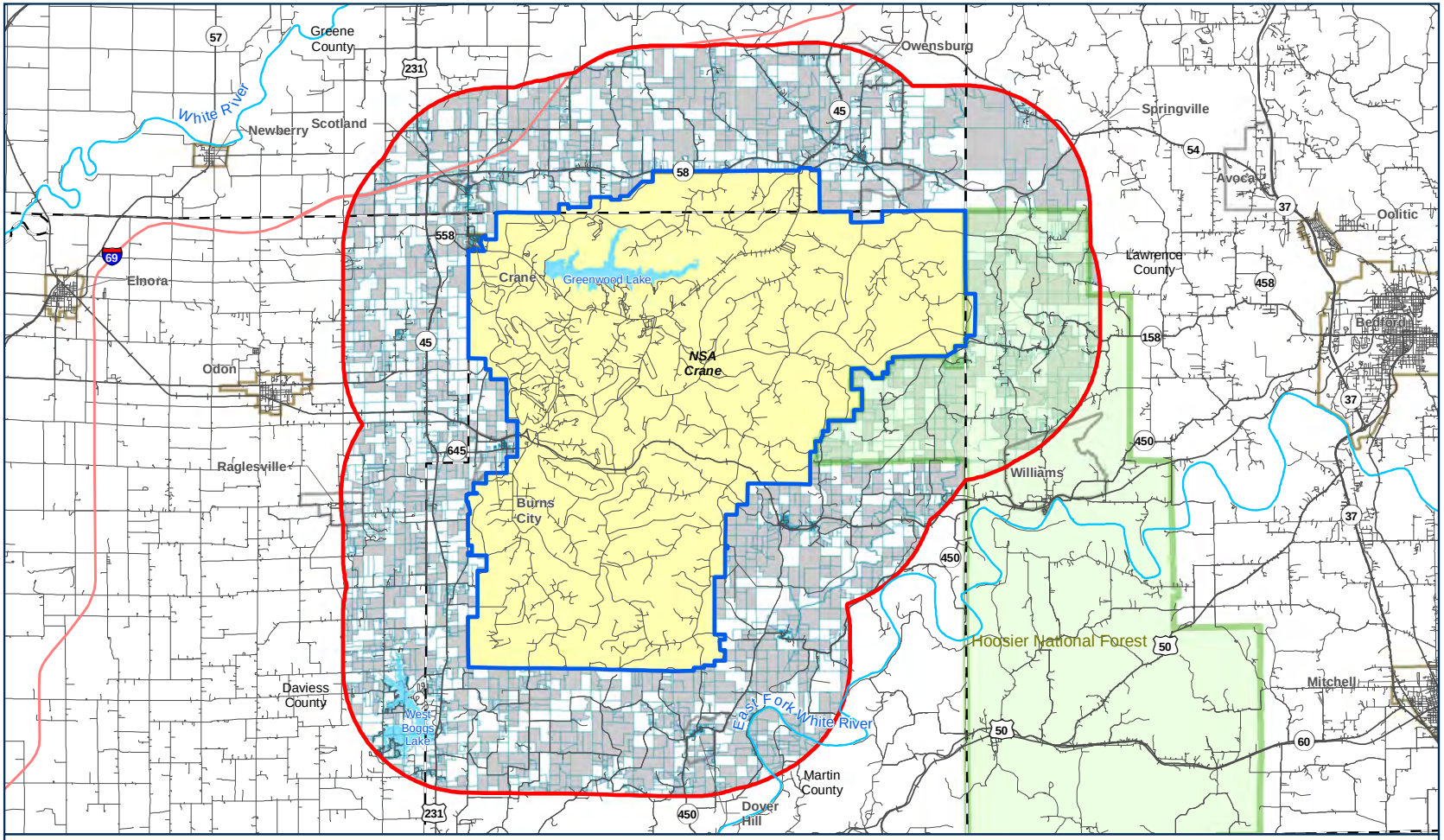
County	Number of Parcels	Number of Acres
Daviess	599	7,756
Greene	725	13,587
Lawrence	292	8,664
Martin	1,296	23,251

Source: State of Indiana, 2015; Matrix Design Group

Land Use Controls

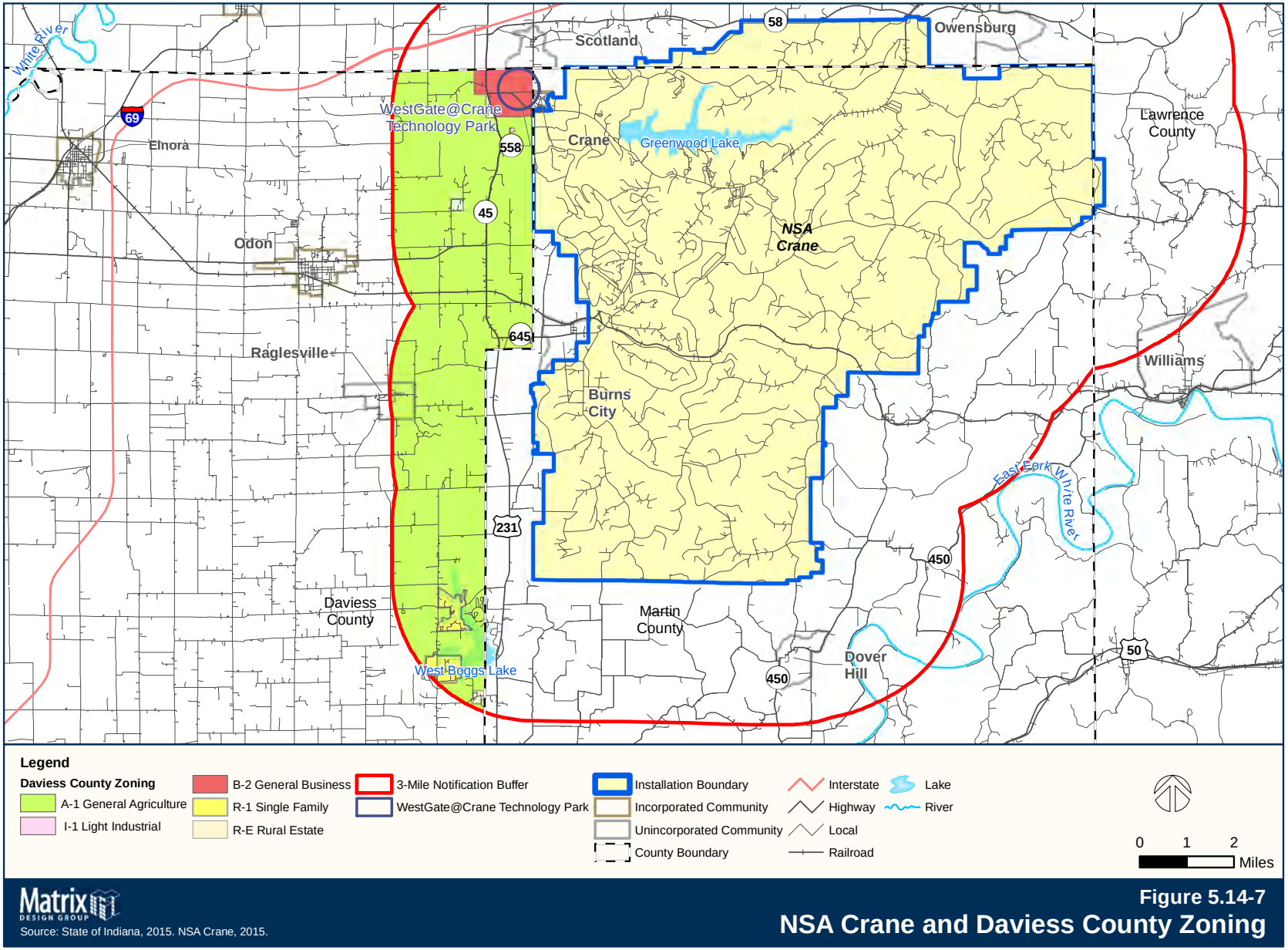
While local officials have explored the possibility of establishing modest land use controls, they remain politically unpopular in the region. Many residents of the southern Indiana counties in the JLUS Study Area are strong proponents of property rights and are concerned that land use controls would result in stringent use restrictions on private property. This view partially stems from the fear of an aggressive zoning ordinance, which residents have witnessed outside the JLUS Study Area in Monroe County to the northeast. However, some views have been slowly changing. In nearby Jackson County, a proposed Confined Animal Feeding Operation (CAFO) sparked debate with people supporting land use controls to restrict certain uses. A similar proposed project in Lawrence County, involving a duck CAFO for foie gras, also created an elevated awareness of how uncontrolled uses can impact adjacent property owners.

Daviess County is the only county surrounding NSA Crane that currently has adopted land use controls. The majority of the land within three miles of NSA Crane is designated General Agriculture as shown on Figure 5.14-7.



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 5.14-6
Vacant Parcels in NSA Crane Notification Area



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 5.14-7
NSA Crane and Daviess County Zoning

Within this district, some low density residential development is permitted, but is discouraged if not related to the operation and maintenance of agricultural uses. There are a few pockets designated residential where there are established communities such as around West Boggs Lake to the south of NSA Crane. There is also a General Business district northwest of NSA Crane near the Crane Gate, intended to support uses that have developed as a result of proximity to the installation. It is unlikely that any land use controls would allow major incompatible uses, but it should be noted that districts and permitted uses within districts can change through an amendment process.

Existing Tools

Please refer to the existing tools listed under Issue COM-8 in Section 5.5 Coordination / Communication for related information.

Planning and Zoning Affecting Military Bases

Military bases are protected from encroachment under Indiana Code §36-7-30.1. A jurisdiction is required to notify the commander of the military base before it can plan or regulate a property located within three miles of the perimeter of the base. The commander must respond to the notice with written recommendations and supporting facts no more than 15 days after receiving the notice. If no response is received after the 15 days, the jurisdiction may presume that the action will have no adverse impacts on the base. A jurisdiction may not take action within three miles of the base if it would have an adverse impact on the operation of the base.

Readiness and Environmental Protection Integration

This initiative enables DOD to work with state and local governments, non-governmental organizations, and willing landowners to limit encroachment and incompatible land use through land acquisition by the establishment of conservation easements, land trusts, or the purchase of property. The program provides funding to support these land acquisition efforts to preserve the land around military installations, wildlife habitats, and local communities.

Daviess County Comprehensive Plan

Locations for future land use opportunities are to be focused inside and an adjacent to the incorporated areas of Washington, Odon, Elnora, Montgomery, Plainville, and Affordsville, along the I-69 corridor near the I-69/US 50 interchange, at the I-69/SR 58 interchange and near the I-69/US 231 interchange to address future land use demands. The plan recommends that residential development should be focused on the north, southwest, and southeast sides of Washington, the east side of Odon, the south side of Elnora, and the south side of Montgomery. Additionally, it suggests commercial development near in the interchange area of I-69/US 50 and in the WestGate@Crane Technology Park near the I-69/US 231 interchange and Industrial development along the I-69 corridor, along SR 58 on the west side of Odon, and along US 231 in the WestGate@Crane Technology Park. The plan recommends improving economic development opportunities by encouraging appropriate future commercial and industrial development to locate near the proposed I-69 interchanges at US 50, US 231 and SR 58.

Daviess County Zoning Ordinance

Daviess County is one of the only counties in the Study Area to have adopted land use controls. The ordinance, passed in 2013, provides regulations, restriction, and prohibitions on the use and occupancy of property within the county. Daviess County borders almost 3 miles of the installation, which is mostly designated General Agriculture. This designation ensures on permitted or approved special uses are developed in this area. However, there are no regulations associated with compatibility with NSA Crane. Additionally, there is no notification to the land owner that the property borders a military installation and there is no notification to NSA Crane of new development.

Martin County Comprehensive Plan

Although the state and federal government own large pieces of land in Martin County, including NSA Crane, Hoosier National Forest, and Martin State Forest, there is plenty of other land available in the county for

potential future development. The plan suggests that any residential development should first occur in the existing incorporated communities of Loogootee, Shoals, and Crane and additional development may locate where existing water and sewer lines have been extended. The plan also recommends that any future commercial or industrial development should first locate along US 231, US 50, and US 150, especially near Loogootee, Shoals, and Crane. Additionally, available land at the WestGate@Crane Technology Park should be used before any other commercial or industrial land is publicly developed. The plan also provides potential future land use opportunities that the county is able to follow for guidance.

Findings

- Martin, Greene, and Lawrence counties currently lack any type of land use controls, which means that incompatible land uses could be developed near NSA Crane.
- Many residents of the southern Indiana counties in the Study Area are strong proponents of property rights and have a strong position on zoning.
- There are no existing land uses identified as a compatibility concern, but vacant lands could be developed with incompatible uses.

5.15 Legislative Initiatives

Legislative initiatives are proposed changes in relevant policies, laws, regulations or programs which could potentially have a significant impact on one or more substantive areas of concern to both the facility and to the stakeholder communities. The focus of this compatibility issue is on initiatives with general and broad implications.

ISSUE LEG-1	**Legislative Tools for Indiana's Military Base Protection Act** Need for implementation tools and enforcement procedures in Indiana Code intended to protect military installations in the state.

Compatibility Assessment

In 2005, a state law was adopted to provide protection of Indiana military bases from encroachment under Indiana Code §36-7-30.1. Planning and Zoning Affecting Military Bases. Under the law, a jurisdiction is required to notify the base commander before taking action within a three-mile radius of an installation to:

- Plan or regulate the use, improvement and maintenance of real property.
- Plan or regulate the location, condition and maintenance of structures and other improvements.
- Regulate the platting and subdividing of real property.

The commander must respond to the notice with written recommendations and supporting facts no more than 15 days after receiving the notice. If no response is received after the 15 days, the jurisdiction may presume that the action will have no adverse impacts on the military installation or operations. In addition, a jurisdiction may not take any action to plan or regulate the use, improvement, maintenance of real property, location, condition, and maintenance of structures and other improvements within three miles of the perimeter of an installation if the action is deemed to have an adverse impact on the operation of the base by the base. This law has been applicable to NSA Crane since it was enacted in 2005 and House Bill 1052 was passed in the 2014 legislative session which added applicability of Indiana Code §36-7-30.1 to the LGTF. It should be noted that local officials were not notified of the passage of House Bill 1052 which suggests a greater need for communication between local officials and their representative state legislators.

The law lacks clarity regarding the applicability of actions requiring notification – specifically the undefined terms "plan" and "regulate." The act of "planning" or "regulating" could be interpreted as establishing a land use plan and regulations to accomplish that plan. Without land use planning as a basis to plan or regulate, the act of a local government simply approving uses in the absence of a land use plan could be interpreted as exempt from the code provisions. While this interpretation would exclude actions regarding approving the use of real property, the improvement, location, condition and maintenance of real property, structures and other improvements falls under the building code which each jurisdiction has adopted and regulates. The example above is provided to illustrate the ambiguity in the law and not to establish a defensible legal interpretation. This partially explains why JLUS Study Area jurisdictions without land use controls have not notified NSA Crane and the LGTF on development within the three-mile buffer.

The law does not allow for collaborative mitigation for proposed activities that may have an adverse impact on NSA Crane. Though the law does not define "adverse" impact, it implies that the term is a discretionary determination by the base. The law is clear that if there is an adverse impact to NSA Crane or the LGTF the proposed activity shall not be approved. This absolute decision with no opportunity to mitigate adverse

impacts could limit the beneficial use of a property and provides no opportunity for the property owner / developer to resolve issues with the planning unit or an appeal process for an unfavorable decision. In some cases, mitigation may be possible and a preferred option over outright denial.

NSA Crane has not received any formal notices of any proposed development or planning actions within the three mile radius of the installation boundary, though notices of plans have been submitted to NSA Crane, on numerous occasions from various sources including Local Economic Development Officials, INDOT, and the WestGate Authority among others. This is most likely caused by several factors including limited local government resources, no formal designated points-of-contact for local governments or NSA Crane, lack of a defined trigger mechanism for the notification, lack of a local land use planning organizational structure, ambiguity in the legislation, and lack of enforcement.

The following deficiencies in Indiana Code §36-7-30.1 are contributing factors as to why implementation of the notification to the military has not been effective:

- The form of the notice is not specified in the legislation. Although the Code specifies what the notice must contain, it does not specify that it must be in writing, the party responsible to provide the notice, or if it is required to be sent certified registered or regular mail. This deficiency allows for multiple interpretations and approaches, some of which may not allow for confirmation that a notice was provided and/or on what date it was provided.
- The manner in which to confirm notification receipt is not specified (as to the date and review/response timeframe). Typically, this is accomplished via a certified mail return receipt. This would also provide the date for starting the required 15-day review period.
- Only 15 days are provided for NSA Crane review and response, which may not be sufficient depending on the location, scale and nature of the intended action. It is likely that certain types of intended "actions" are more complex than others and in such cases a 15-day review period may be insufficient. Likewise, for other types of intended actions, a 15-day review period may be excessive.
- It is unclear if actual plans/documents are required to be provided or simply notification of intent to take action. Given the (potentially) insufficient 15-day review period, if only a notice is provided, additional time will be needed for actually acquiring project or plan documents for review.
- Important terms are not defined, e.g. adverse impact. This lack of specificity invites various interpretations and potential conflict. The use of "adverse impact" in the current code as the basis upon which approval or denial is determined, necessitates that the meaning of the term be clear to all parties. At the very least, the term should be tied to mission critical operations and the relevant attributes of intended actions, e.g. noise, vibration, security, radio frequency, etc.
- There appears to be a mandate imposed on the governmental unit to deny actions deemed adverse by the commander. This language in effect seems to provide "veto" authority to the commander, and taken together with the lack of any specific definition of the term "adverse impact," this broad authority would seem to violate the legitimate rights and prerogatives of the governmental units, based on enabling statutes (e.g. as to comprehensive plans, zoning, building code administration, etc.).
- There are no enforcement mechanisms identified in the event of non-compliance by a governmental unit. While conventional remedies likely exist (appeal of actions to court), the lack of any specific compliance mechanism tied directly to the notice mandate, allows local governments to avoid compliance without risk. In addition, once plan or development or construction approvals have been issued, they generally cannot be revoked after the fact without significant legal implications, especially if beneficiaries have

proceeded in good faith based on these approvals. However, failure to comply with the mandate could also be interpreted as a procedural defect, exposing the governmental unit to administrative appeals by parties having standing (and adverse to the action).

- There is no mediation process identified or provisions to allow for approval of actions subject to appropriate modifications and/or conditions deemed necessary and sufficient to eliminate and/or at least, reduce potential adverse impacts. The military installation and the local governmental unit should be empowered to undertake related discussions and should be afforded sufficient time to resolve concerns.

Existing Tools

Indiana Code 36-7-30.1. Planning and Zoning Affecting Military Bases

This legislation is the subject of the issue with notification and enforcement of proposed actions within the three mile radius of NSA Crane and the LGTF. Amendments to the Code that address the noted deficiencies would serve to facilitate the notification process.

Findings

- Indiana Code 36-7-30.1 is intended to protect military installations in the state of Indiana through notification of actions to plan and regulate use and development.
- Though the Code is very broad in its applicability, addressing actions from use to maintenance, it is also ambiguous in its language referring specifically to actions that plan and regulate versus approve.
- The Code suffers from a number of deficiencies that make implementation confusing and compliance unenforceable.
- The Code assumes that the mechanics of implementation is the purview of local governments and that they will on their own recognizance apply or develop the necessary tools to implement the code requirements.
- No regulating agency is identified in Indiana Code 36-7-30.1 for administration / oversight of the law.

Please see the next page.

5.16 Light and Glare (LG)

This factor refers to man-made lighting (street lights, airfield lighting, building lights) and glare (direct or reflected light) that disrupts vision. Light sources from commercial, industrial, recreational, and residential uses at night can cause excessive glare and illumination impacting the use of military night vision devices and air operations. Conversely, high intensity light sources generated from a military area (such as ramp lighting) may have a negative impact on the adjacent community. In addition, light reflected off of glass surfaces during the daylight hours, i.e. car dealerships can temporarily impair pilots' vision.

Key Terms

Glare. Glare is reflective light that can be visually unpleasant or possibly unsafe due to the potential for temporary blindness or visual impairment.

Glint. Glint is a small flash of light typically generated from light reflecting from shiny surfaces.

ISSUE LG-1	**Solar Farm at NSA Crane** Potential for the future solar farm at the NSA Crane Eagle View Golf Club to create glare impacting adjacent residences in Burns City.

Compatibility Assessment

Duke Energy in collaboration with NSA Crane is proposing a 17-megawatt photovoltaic (PV) solar energy farm at NSA Crane. The ground-mounted facility would include 76,000 solar PV panels assembled in an array, as well as electrical equipment to complete the generation of electricity and connect the solar PV facility to an existing Duke Energy substation on NSA Crane. The proposed 145-acre site is located along the western side of the installation in Martin County, south of the unincorporated community of Burns City. A portion of the solar farm site includes the front 9-holes of the Eagle View Golf Club. There are approximately 11 residential properties with line of sight to the proposed site of the solar farm. The area between the residences and the solar farm site is unobstructed consisting of open space or agricultural use.

Depending on construction materials, solar PV systems can potentially produce glare from reflective or shiny surfaces. However the use of current technologies relative to the panels used for light absorption can maximize the efficiency of the panels while simultaneously reducing the amount of glint or glare. According to studies by the Bureau of Land Management, the potential for solar PV panel glare varies depending on panel orientation, sun angle, viewing angle, viewer distance, and other visibility factors.

The primary concern with this issue is the nuisance factor and potential adverse impacts such as temporary vision impairments when operating vehicles or other machines in the area including aircraft. This temporary vision impairment can increase the risk profile in this area for accidents.

Existing Tools

No existing tools have been identified to address this compatibility issue.

Findings

- Certain measures could be used to further minimize impacts from glint and glare, such as optimizing panel placement and the use of an anti-reflective coating on the solar panels; however, there are no federal government controls stipulating the solar energy development.

Please see the next page.

5.17 Marine Environments (MAR)

No compatibility issues were identified for the Marine Environments compatibility factor.

Please see the next page.

5.18 Noise (NOI)

Sound that reaches unwanted levels is referred to as noise. The central issue with noise is the impact, or perceived impact, on people, animals (wild and domestic), and general land use compatibility. Exposure to high noise levels can have a significant impact on human activity, health, and safety. The decibel (dB) scale is used to quantify sound intensity. To understand the relevance of decibels, a normal conversation often occurs at 60 dB, while an ambulance siren from 100 feet away is about 100 dB. Noise associated with military operations (arrival/departure of military aircraft, firing of weapons, etc.) may create noises in higher dB ranges.

Key Terms

Ambient noise. The total noise associated with an existing environment, which usually comprises sounds from many sources, both near and far.

Attenuation. Reduction in the level of sound resulting from absorption by the surrounding topography, the atmosphere, distance from the source, barriers, construction techniques and materials, and other factors.

A-weighted decibel. The A-weighted decibel (dBA) is the most commonly weighted sound filter used to measure perceived loudness versus actual sound intensity. The human ear responds differently to frequencies. For example, the human hearing system perceives mid-frequency sounds as louder than low and high frequency sounds. To accommodate this condition when measuring sound levels, filters need to be installed into sound meters. The results are a more accurate measurement of sound for the human hearing system.

C-weighted Day-Night Average Sound Level. The C-weighted Day-Night Average Sound Level (CDNL) noise metric is used for demolition and large caliber weapons to assess the low-frequency energy produced from such activities. The CDNL is an annual average noise dose from range operations and is intended for long-term land use planning.

Day-Night Average Sound Level. The Day-Night Average Sound Level (DNL) is an average sound exposure over a 24-hour period. During the nighttime period (10:00 p.m. to 7:00 a.m.), averages are artificially increased by 10 decibel (dB). This weighting reflects the added intrusiveness and the greater disturbance potential of nighttime noise events attributable to the fact that community background noise typically decreases by 10 dB at night.

Noise contours. Noise contours are made by connecting points of equal noise exposure to form an enclosed area in which sound level is generally the same. The Chief of Navy Operations Instruction 11010.36C defines noise zones based on noise contours.

Noise-sensitive uses. Noise-sensitive uses are locations and uses typically more sensitive to noise, including residential areas, hospitals, convalescent homes and facilities, schools, libraries, churches, recreational areas, and other similar land uses.

Peak Sound Level. The Peak Sound Level (dBP) is a flat-weighted scale that can be used to measure noise from small arms (less than or equal to 20 mm) firing, heavy artillery, and explosives. Peak blast noise contours are classified by 115 dBP and 130 dBP. Peak blast noise contours are for single events. Moderate risks of noise complaints are associated with 115 dBP and high risks of noise complaints are associated with 130 dBP.

PK15(met). PK15(met) is the Peak Sound Level, factoring in the statistical variations caused by weather, that is likely to be exceeded only 15 percent of the time (i.e., 85 percent certainty that sound will be within this range). The PK15(met) levels would occur under weather conditions that enhance sound propagation.

Technical Background

Sound is defined as the mechanical energy transmitted by pressure waves in a compressible medium such as air. More simply stated, sound is what we hear. As sounds reach unwanted levels, this is referred to as noise.

The central issue of noise is the impact, or perceived impact, on people, animals (wild and domestic), and general land use compatibility. Exposure to high noise levels can have a negative impact on human activity, health, and safety.

Due to the technical nature of this compatibility factor and its importance to the JLUS process, this section provides a discussion of the characteristics of sound and the modeling process used to evaluate noise impacts.

Characteristics of Sound

It is important to understand that there is no single perfect way of measuring sound, due to variations used by different entities when conducting sound studies or sound modeling. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. The dB scale is used to quantify sound intensity. Because sound pressure can vary by over one trillion times within the range of human hearing, a logarithmic loudness scale (i.e., dB scale) is used to present sound intensity levels in a convenient format.

Since the human ear is not equally sensitive to all frequencies within the entire spectrum, noise measurements are weighted more heavily within those frequencies of maximum human sensitivity in a process called "A-weighting" written as dBA. dBA are units of sound pressure adjusted to the range of human hearing with intensity greater than the ambient or background sound pressure. The threshold of human hearing is approximately zero dBA and normal speech has a sound level of approximately 60 dBA. Sound levels above 120 dBA are typically when discomfort begins to be felt inside the human ear, and sound levels between 130 to 140 dBA and above are felt as pain and may cause permanent damage to the ear.

The human ear can detect changes in sound levels of approximately three dBA under normal conditions. Changes of one to three dBA are typically noticeable under controlled conditions, while changes of less than one dBA are only discernible under controlled, extremely quiet conditions. A change of five dBA is typically noticeable to the general public in an outdoor environment. Figure 5.18-1 summarizes typical A-weighted sound levels for a range of indoor and outdoor activities.

Environmental noise fluctuates over time. While some noise fluctuations are minor, others can be more substantial. These fluctuations include regular and random patterns, how fast the noise fluctuates, and the amount of variation. Weather patterns can have a strong effect on how far sound travels and how loud it is. Certain weather events can change the consistency of the air and either cause sound to travel further and be louder or can reduce the distance at which it can be heard. Temperature and wind velocity are examples of factors that can affect sound travel. Sound tends to travel further in cold temperatures. Specific combinations of temperature and wind direction can create atmospheric refraction, which is when atmospheric conditions bend and/or focus sound waves towards some areas and away from others. When describing noise impacts, it is common to look at the average noise over an average day.

According to the DOD and the FAA, (Airport Noise Compatibility Planning [14 CFR Part 150]) 65 DNL is defined as the threshold for significant noise exposure. Noise exposure within the 55 to 65 DNL noise contours is regarded as moderate and land use controls such as the regulation of types of land uses permitted or the potential use of sound attenuation in buildings should be considered. Federal guidelines have been adopted to guide appropriate development and land use planning for noise contours greater than 65 DNL, and noise sensitive uses such as residential and schools should not be built under these areas without proper sound mitigation.

It is important to recognize that noise contours as depicted on maps are intended as a planning tool and do not represent a clear change in noise threshold at each contour. Changes in sound levels may not be perceptible several hundred feet to either side of a particular contour line and can vary with temperature, humidity, wind, and other environmental factors. It should be noted that the DNL contours represent an average sound level over a 24-hour period and that individual instances may be louder than the noise contour in which they are located. Thus, noise may still cause an annoyance if it is below 65 DNL.

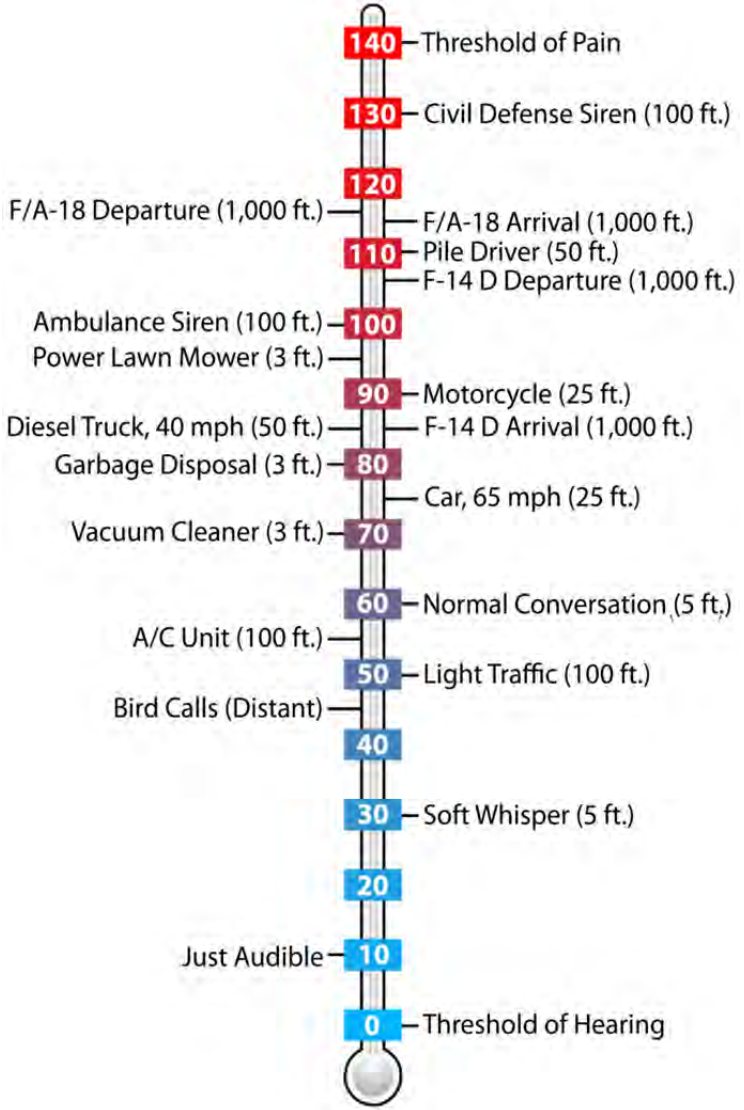


Figure 5.18-1 Sound Levels Comparison in dBA

ISSUE NOI-1	**Noise from NSA Crane Ranges** Noise from the NSA Crane Ranges extends off installation and has the potential to affect noise sensitive land uses.

Compatibility Assessment

Demolition Range Noise

Explosive ordnance disposal (EOD) occurs when explosive ammunition such as grenades, ballistic missiles, artillery, mines, or any other ordnance, are prepared for destruction within designated explosive areas to ensure the secure disposal of the explosive weapon. Noise-generating activities at NSA Crane include the Demolition Range, which is located in the central portion of the Installation approximately 2.5 miles from the closest boundary, the EOD Range which is co-located with the Demolition Range the Ordnance Test Area (OTA) located in the southern half of NSA Crane, approximately 2.5 miles from the closest boundary, and the Special Weapons Assessment Facility (SWAF) located in the northern part of NSA Crane, approximately 0.75 miles from the nearest boundary. Activity at the SWAF includes large and small arms weapons firing.

While the CDNL Noise Zones II and III for demolitions do not extend past the boundaries of NSA Crane, the base does occasionally receive noise complaints. The CDNL Noise Zones are based on an annual average of noise events.

Although annual average sound levels are compatible with the surrounding environment, there is potential for individual events to cause annoyance and possibly generate noise complaints. These individual events are characterized as peak blast noise complaint risk areas. Peak Sound Levels are identified as complaint risk areas of 115 PK15(met) and 130 PK15(met). Table 5.18-1 identifies the estimated complaint risk for different peak levels.

Table 5.18-1 Noise Complaint Risk Guidelines

Perceptibility	dB Peak	Risk of Receiving Noise Complaints
Audible	< 115	Low
Noticeable, distinct	115 - 130	Moderate
Loud, may startle	> 130	High

Source: Operational Noise Consultation for Naval Support Activity Crane, Indiana, September 30, 2013

Peak levels can vary significantly for the same activity dependent on weather conditions. Although NSA Crane plans the demilitarization activity to coincide with favorable weather conditions, weather conditions could change during scheduled detonation times. The extent of the complaint risk area is also dependent upon the depth at which the detonation item is buried or the amount of ground coverage over it. Charges at the Demolition Range are usually buried with 10 feet of dirt, but sometimes this coverage may not provide the anticipated noise level reduction effect if the burial is not evenly dispersed.

The worst case scenario for detonation at the Demolition Range is assessed using unfavorable weather conditions and a coverage of explosives providing half of the anticipated effect (equivalency rating of five foot coverage). Although according to the NSA Crane Operational Noise Consultation, the likelihood of both conditions occurring simultaneously is low, these conditions represent the maximum impact that could be expected in the surrounding community. The other ranges are not assessed because the complaint risk area for the Demolition Range encompasses the complaint risk area of the other ranges.

Under unfavorable weather conditions and irregular burial at the Demolition Range, the moderate complaint risk area extends up to 4.8 miles beyond the western boundary, four miles beyond the eastern boundary, and up to 1.5 miles beyond the northern and southern boundaries as illustrated on

Figure 5.18-2. For this scenario, the entirety of the high complaint risk area [greater than 130 PK15(met)] is contained within the NSA Crane boundary.

The majority of the existing land use within the off-installation noise zones is undeveloped or very low-density residential development. Although these residences are existing noise-sensitive land uses, there is currently not a large risk to community quality of life or mission sustainment. The primary goal is to ensure that future development is unaffected by military noise.

The complaint risk area for neutral weather conditions and irregular burial is much smaller than the above scenario and the moderate complaint risk area only extends outside the NSA Crane boundary to the west approximately a quarter of a mile as illustrated in Chapter 3, Figure 3-7.

Although the moderate noise complaint risk area for the Demolition Range extends several miles around NSA Crane, the installation rarely receives noise complaints.

Existing Land Use

Existing land uses within complaint risk areas within the JLUS Study Area were analyzed to determine areas most likely to be impacted by noise. By determining noise sensitive land uses within the complaint risk areas, jurisdictions can better prevent noise complaints from increasing. Existing land uses within the NSA Crane moderate noise complaint risk area are shown on Figure 5.18-2 and discussed by county as follows. There are no areas of Lawrence County that are within the noise complaint risk area.

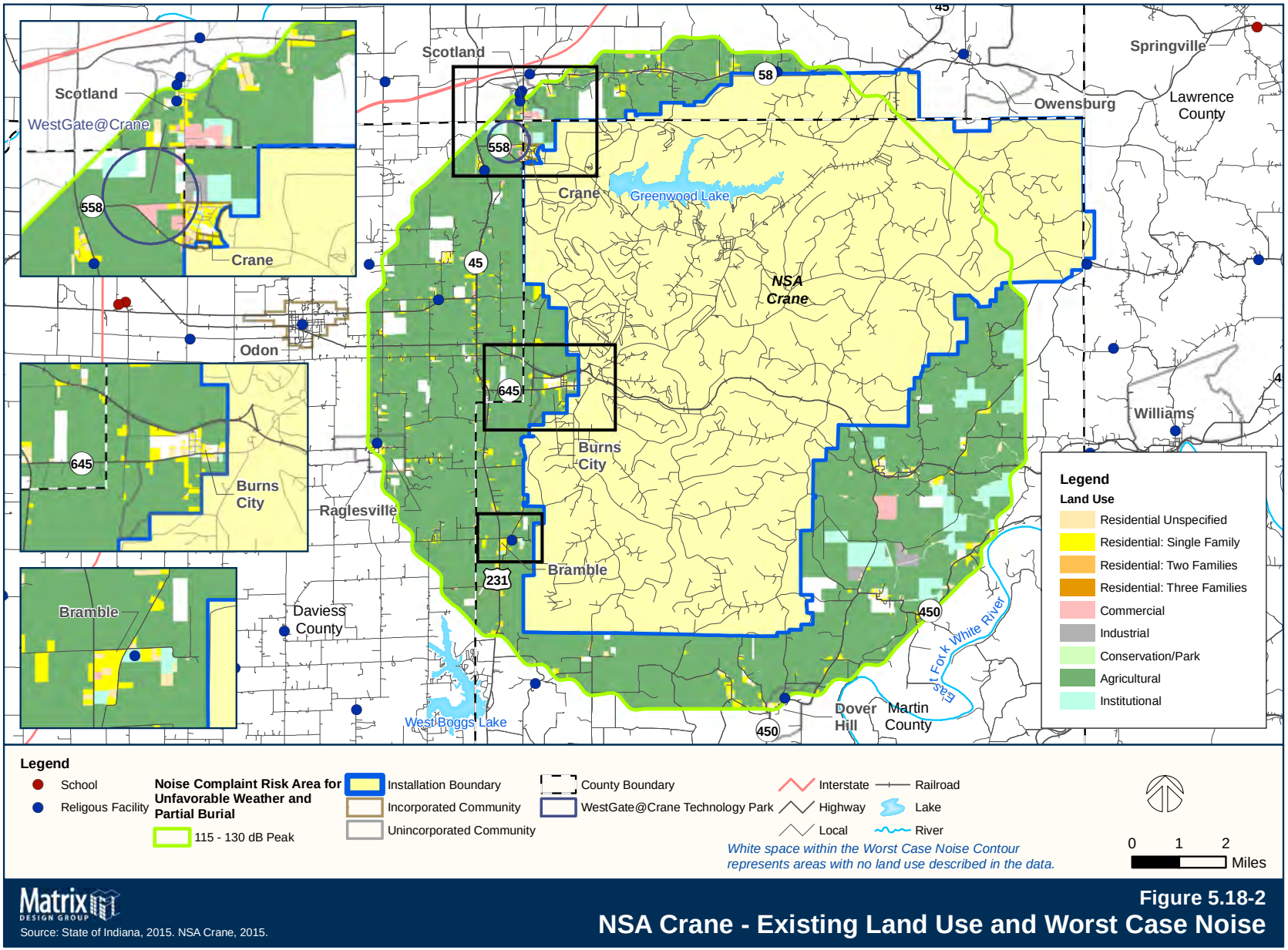
Daviess County

As shown on Figure 5.18-2, the moderate noise complaint risk area extends into eastern Daviess County, west of NSA Crane. Existing land use in Daviess County within the moderate noise complaint risk area [115 PK15(met)] are primarily agricultural, but also include commercial, institutional, unspecific residential, single family residential, and two family residential. Agricultural use is not likely to be impacted from noise events, but if the land is developed with residential or other noise-sensitive uses in the future, it could result in noise complaints. Existing land uses and the corresponding noise contours are described in Table 5.18-2. There are several pockets of residential and institutional, including three religious facilities, which may be affected by noise events. These impacts have the potential to cause adverse effects on the health and quality of life for occupants within the area.

Table 5.18-2 Daviess County Existing Land Use within 115 PK15(met) NSA Crane Noise Complaint Risk Area

Existing Land Use	Number of Parcels	Number of Acres
Agriculture	743	13,291.7
Commercial	33	67.0
Conservation/Park	1	0.6
Institutional	39	73.9
Residential: Unspecific	115	147.7
Residential: Single Family	206	313.7
Residential: Two Families	1	2.3

Source: Operational Noise Consultation for Naval Support Activity Crane, Indiana, September 30, 2013; State of Indiana, 2015; Matrix Design Group



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 5.18-2
NSA Crane - Existing Land Use and Worst Case Noise

Martin County

As shown on Figure 5.18-2 and Table 5.18-3, the majority of land uses within Martin County that are located within the moderate noise complaint risk area are agricultural. The other uses in this area are commercial, industrial, institutional, unspecific residential, single family residential, two family residential, and three family residential. There is a clustering of institutional uses to the southeast of NSA Crane, which could include some noise-sensitive uses and two communities in Martin County close to NSA Crane: Bramble and Burns City. These communities include some clustering of residential uses, which may be impacted by noise events.

Table 5.18-3 Martin County Existing Land Use within 115 PK15(met) NSA Crane Noise Complaint Risk Area

Existing Land Use	Number of Parcels	Number of Acres
Agriculture	850	22,102.2
Commercial	25	150.2
Industrial	10	212.8
Institutional	74	1,629.8
Residential: Unspecific	335	322.9
Residential: Single Family	424	674.5
Residential: Two Families	2	7.0
Residential: Three Families	1	1.9

Source: Operational Noise Consultation for Naval Support Activity Crane, Indiana, September 30, 2013; State of Indiana, 2015; Matrix Design Group

Greene County

As shown on Figure 5.18-2 and in Table 5.18-4, the moderate noise complaint risk area extends into southern Greene County, to the north of NSA Crane. Agriculture is the predominant use in this area, but commercial, institutional, unspecified residential, and single family residential also exist. The community of Scotland is located in the moderate noise complaint risk area and contains residential, institutional, and a few religious facilities, which may be impacted by noise.

Table 5.18-4 Greene County Existing Land Use within 115 PK15(met) NSA Crane Noise Complaint Risk Area

Existing Land Use	Number of Parcels	Number of Acres
Agriculture	173	3,234.8
Commercial	21	55.6
Institutional	18	26.2
Residential: Unspecific	75	91.1
Residential: Single Family	90	165.4

Source: Operational Noise Consultation for Naval Support Activity Crane, Indiana, September 30, 2013; State of Indiana, 2015; Matrix Design Group

Land Use Controls

Compatibility is based on the actual land use, which is determined by the land use (zoning) district the property is within. There is no DOD guidance for land uses within the Peak Blast noise zones. Therefore land use compatibility cannot be determined based on DOD guidance.

Daviess County is the only jurisdiction that has a land use controls within the moderate noise complaint risk area. Figure 5.18-3 illustrates the districts within the moderate noise complaint risk area within Daviess County. Within Daviess County, districts General Agriculture (A-1), Light Industrial (I-1), General Business (B-2), Single Family (R-1), and Rural Estate (R-E) are within the moderate noise complaint risk area, as indicated on Figure 5.18-3.

Within the A-1, R-E, and R-1 districts all noise sensitive uses including churches/synagogues, schools, libraries, hospitals, hotels, residential development, and mobile homes are "sensitive noise receptors" and could lead to a moderate volume of complaints under unfavorable weather conditions. Table 5.18-5 shows the number of acres in each district within the moderate noise complaint risk area.

Table 5.18-5 Daviess County Zoning within 115 PK15(met) NSA Crane Noise Complaint Risk Area

Zoning District	Number of Acres
A-1 General Agriculture	13,919.2
B-2 General Business	618.9
I-1 Light Industrial	5.2
R-1 Single Family	48.7
R-E Rural Estate	75.7

Source: Operational Noise Consultation for Naval Support Activity Crane, Indiana, September 30, 2013; Daviess County, 2013; State of Indiana, 2015; Matrix Design Group

Vacant Parcels

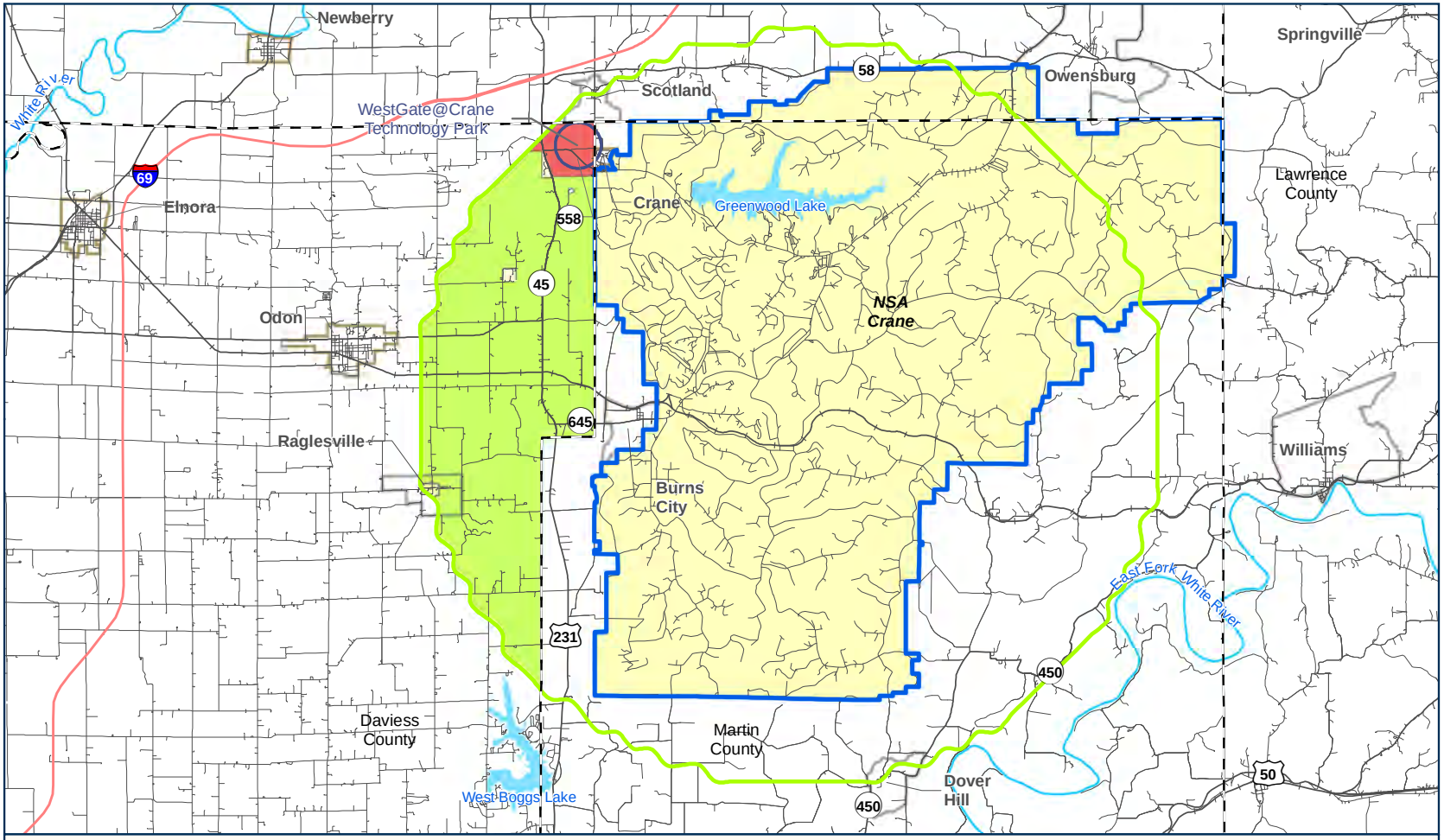
Vacant parcels are important to consider for potential future compatibility issues. In general, undeveloped land is compatible with military operations, in this case noise. The type of development that occurs in the future may be incompatible with noise if it is developed for a noise-sensitive use such as residential, or with medical, religious, or education facilities. There is a large amount of vacant land within the moderate noise complaint risk area as shown on Figure 5.18-4. Table 5.18-6 identifies the number of parcels and acreage of vacant land within the complaint risk area by county. While there are minimal noise complaints currently, future development in these areas may lead to more complaints, which could impact military operations. New development in these areas should be monitored and managed to ensure compatibility.

Table 5.18-6 Vacant Parcels within 115 PK15(met) NSA Crane Noise Complaint Risk Area

County	Number of Parcels	Number of Acres
Daviess	403	5,962.9
Greene	149	1,400.5
Martin	854	14,550.9

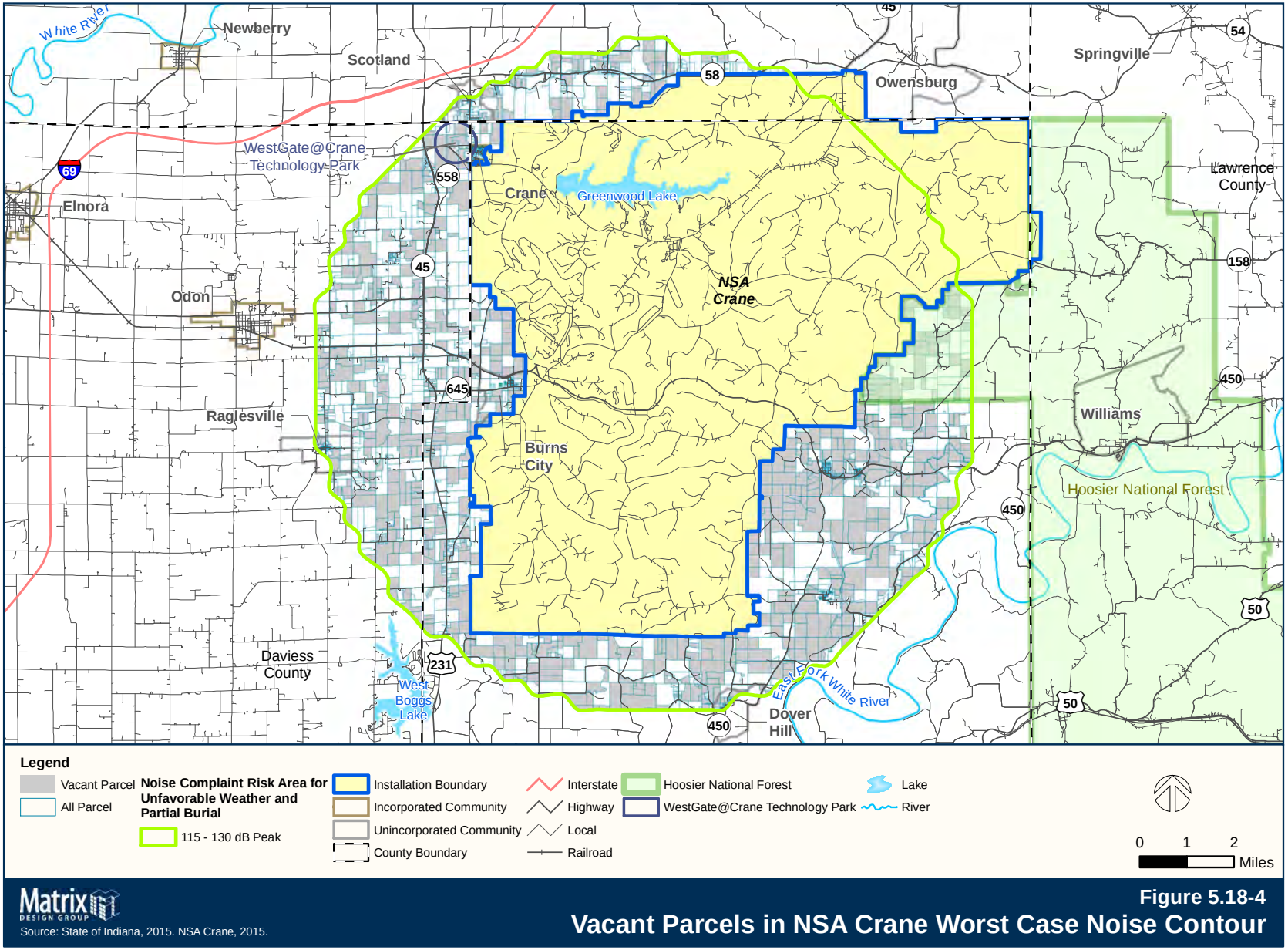
Source: Operational Noise Consultation for Naval Support Activity Crane, Indiana, September 30, 2013; State of Indiana, 2015; Matrix Design Group

As mentioned previously, Daviess County is the only jurisdiction within the moderate noise complaint risk area that has zoning. Table 5.18-7 shows the distribution of vacant land by zoning district within the noise complaint area. The majority of this land is zoned agricultural, which is not likely to be impacted by noise. However, changes in the zoning districts (through zoning amendments) to facilitate development could allow incompatible use if developed as residential or with medical, religious, or education facilities. The zoning of vacant parcels in Daviess County is shown on Figure 5.18-5.



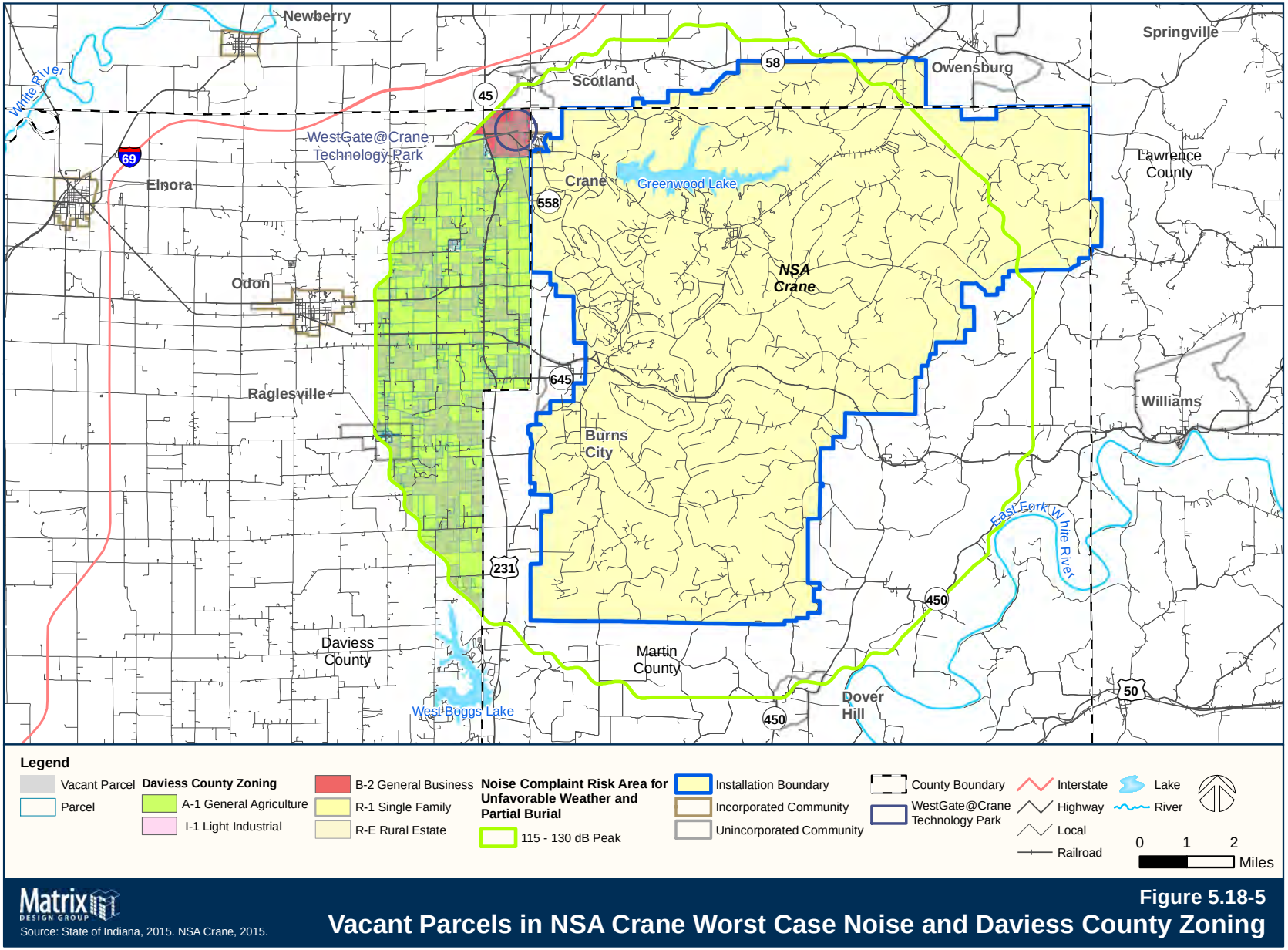
Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 5.18-3
NSA Crane Worst Case Noise and Daviess County Zoning



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 5.18-4
Vacant Parcels in NSA Crane Worst Case Noise Contour



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 5.18-5

Vacant Parcels in NSA Crane Worst Case Noise and Daviess County Zoning

Table 5.18-7 Daviess County Zoning of Vacant Parcels within 115 PK15(met) NSA Crane Noise Complaint Risk Area

Zoning District	Number of Parcels	Number of Acres
I-1 Light Industrial	2	0.4
A-1 General Agriculture	334	5,489.5
B-2 General Business	30	431.5
R-1 Single Family	27	11.2
R-E Rural Estate	25	27.4

Source: Operational Noise Consultation for Naval Support Activity Crane, Indiana, September 30, 2013; Daviess County, 2013; State of Indiana, 2015; Matrix Design Group

Special Weapons Assessment Facility

Large and small caliber weapons firing training occurs at the Special Weapons Assessment Facility (SWAF) range, located in the northern portion of NSA Crane, approximately 0.75 miles south of the installation boundary.

Large Caliber Weapons

Under normal conditions (neutral weather), the risk of noise from large caliber weapons (larger than .50 caliber) at the SWAF is low and extends outside the installation to the north less than a tenth of a mile, with the potential to impact 4.8 acres. This area is within the lowest measured noise contours (57 dB CDNL). Because of the low incidence of noise, there is no prescribed land use guidance for this area.

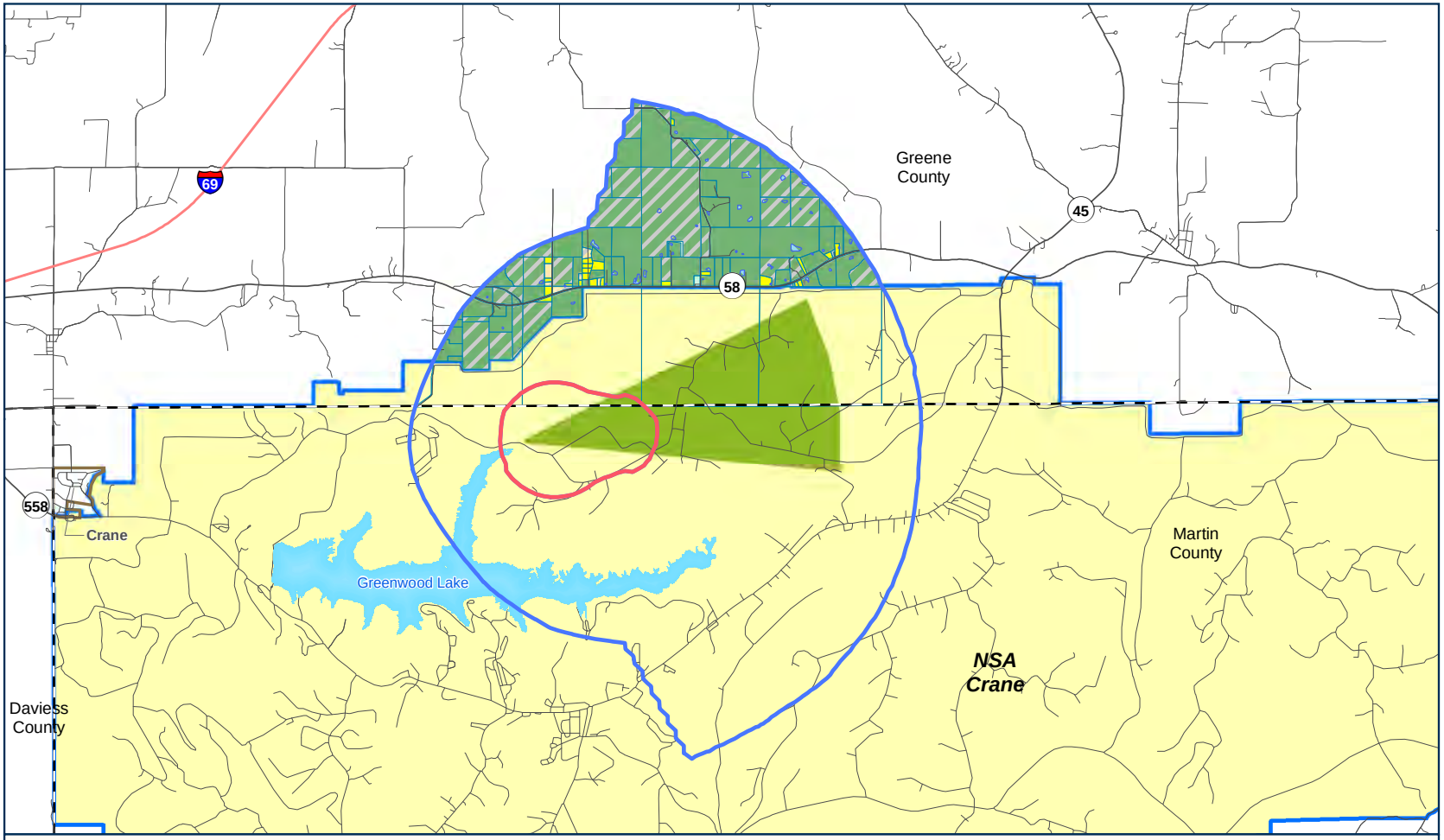
Under unfavorable weather conditions, the moderate risk complaint area extends less than 0.5 miles beyond the northern boundary of NSA Crane. This area is within the 115-130 dB PK15 (met) noise contours where the sound is noticeable, distinct and may cause vibration or rattling. Because this area is within the Small Caliber Weapons impact area where noise impacts are greater, the emphasis of the compatibility analysis is focused on the noise impacts of small caliber weapons.

Small Caliber Weapons

Noise contours for small caliber weapons (those that are .50 caliber and below) are modeled using the US Army's noise simulation program called the Small Arms Range Noise Assessment Model. This program takes into account range layout, terrain, weapons firing points, and includes algorithms to account for weather conditions and wind that increases sound. Small caliber weapons noise is addressed via peak levels and has no assessment period.

Army regulations categorize noise into different zones, or noise contours, based on the level of noise within that zone. For the SWAF, noise was modeled as Zone II and Zone III. Zone III [noise greater than 104 dB PK15(met)], where no noise-sensitive uses are recommended, is located entirely within the boundaries of NSA Crane. As shown on Figure 5.18-6, Noise Zone II, with noise ranging from 87 to 104 dB PK15(met) for the SWAF extends past the northern boundary of NSA Crane up to 1.5 miles into unincorporated Greene County, encompassing approximately 2,162 acres, including roughly four dozen scattered residential properties. Noise-sensitive land uses are strongly discouraged in Noise Zone II and all viable alternatives should be considered to limit development in Zone II to non-sensitive activities such as industry, manufacturing, transportation, and agriculture.

Though all military services recognize the importance of compatible land use with noise, only the Air Force has published specific land use compatibility guidelines for small caliber weapons noise based on the PK15(met) noise measurement in Air Force Instruction AFI 32-7063. Because the intent of the JLUS is to promote land use compatibility regardless of military service and because the recommendations are provided for local governments, the land use compatibility assessment for noise from small caliber weapons is based on these recommendations as a best practice.



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 5.18-6
Small Caliber Weapons Noise and Vacant Parcels NSA Crane

Table 5.18-8 identifies recommended land use compatibility per uses identified in the Department of Transportation Standard Land Use Coding Manual (SLUCM). Land uses which are considered compatible in Noise Zone II are amusements, fishing, mining, other resource production or extraction.

Agriculture, livestock farming, animal breeding and forestry are considered compatible provided that any associated residential use achieves a noise level reduction (NLR) of 30 dB by incorporating noise attenuation in the design and construction of the structure.

Table 5.18-8 Land Use Compatibility Recommended within Noise Zone II

LAND USE		SUGGESTED LAND USE COMPATIBILITY
SLUCM No.	**Land Use Name**	**Noise Zone II 87-104 dBP**
10	**Residential**	
11	Household units	N[1]
11.11	Single units: detached	N[1]
11.12	Single units: semidetached	N[1]
11.13	Single units: attached row	N[1]
11.21	Two units: side-by-side	N[1]
11.22	Two units: one above the other	N[1]
11.31	Apartments: walk-up	N[1]
11.32	Apartment: elevator	N[1]
12	Group quarters	N[1]
13	Residential hotels	N[1]
14	Mobile home parks or courts	N[1]
15	Transient lodgings	25
16	Other residential	N[1]
20	**Manufacturing**	
21	Food and kindred products; manufacturing	Y[2]
22	Textile mill products; manufacturing	Y[2]
23	Apparel and other finished products; products made from fabrics, leather, and similar materials; manufacturing	Y[2]
24	Lumber and wood products (except furniture); manufacturing	Y[2]
25	Furniture and fixtures; manufacturing	Y[2]
26	Paper and allied products; manufacturing	Y[2]
27	Printing, publishing, and allied industries	Y[2]
28	Chemicals and allied products; manufacturing	Y[2]
29	Petroleum refining and related industries	Y[2]
31	Rubber and misc. plastic products; manufacturing	Y[2]
32	Stone, clay and glass products; manufacturing	Y[2]
33	Primary metal products; manufacturing	Y[2]
34	Fabricated metal products; manufacturing	Y[2]

LAND USE		SUGGESTED LAND USE COMPATIBILITY
SLUCM No.	Land Use Name	Noise Zone II 87-104 dBP
35	Professional scientific, and controlling instruments; photographic and optical goods; watches and clocks	25
39	Miscellaneous manufacturing	Y[2]
40	**Transportation, communication and utilities**	
41	Railroad, rapid rail transit, and street railway transportation	Y[2]
42	Motor vehicle transportation	Y[2]
43	Aircraft transportation	Y[2]
44	Marine craft transportation	Y[2]
45	Highway and street right-of-way	Y[2]
46	Automobile parking	Y[2]
47	Communication	25
48	Utilities	Y[2]
49	Other transportation, communication and utilities	25
50	**Trade**	
51	Wholesale trade	Y[2]
52	Retail trade – building materials, hardware and farm equipment	25
53	Retail trade – including shopping centers, discount clubs, home improvement stores, electronics superstores, etc.	25

LAND USE		SUGGESTED LAND USE COMPATIBILITY
SLUCM No.	Land Use Name	Noise Zone II 87-104 dBP
54	Retail trade – food	25
55	Retail trade – automotive, marine craft, aircraft and accessories	25
56	Retail trade – apparel and accessories	25
57	Retail trade – furniture, home, furnishings and equipment	25
58	Retail trade – eating and drinking establishments	25
59	Other retail trade	25
60	**Services**	
61	Finance, insurance and real estate services	25
62	Personal services	25
62.4	Cemeteries	Y[2]
63	Business services	25
63.7	Warehousing and storage	Y[2]
64	Repair services	Y[2]
65	Professional services	25
65.1	Hospitals, other medical facilities	N
65.16	Nursing homes	N
66	Contract construction services	25
67	Government services	25

LAND USE		SUGGESTED LAND USE COMPATIBILITY
SLUCM No.	Land Use Name	Noise Zone II 87-104 dBP
68	Educational services	35
68.1	Child care services, child development centers, and nurseries	35
69	Miscellaneous Services	35
69.1	Religious activities (including places of worship)	35
70	**Cultural, Entertainment and Recreational**	
71	Cultural activities	35
71.2	Nature exhibits	N
72	Public assembly	N
72.1	Auditoriums, concert halls	35
72.11	Outdoor music shells, amphitheaters	N
72.2	Outdoor sports arenas, spectator sports	N
73	Amusements	Y
74	Recreational activities (including golf courses, riding stables, water recreation)	N
75	Resorts and group camps	N
76	Parks	N
79	Other cultural, entertainment and recreation	N
80	**Resource Production and Extraction**	
81	Agriculture (except live- stock)	Y^4
81.5	Livestock farming	Y^4
81.7	Animal breeding	Y^4
82	Agriculture related activities	Y^4
83	Forestry activities	Y^4
84	Fishing activities	Y
85	Mining activities	Y
89	Other resource production or extraction	Y

Table Notes:

SLUCM – Standard Land Use Coding Manual, U.S. Department of Transportation

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.

25, 30, or 35 – The numbers refer to noise level reduction (NLR) levels. NLR (outdoor to indoor) is achieved through the incorporation of noise attenuation into the design and construction of a structure. Land use and related

Note 1:

a. Although local requirements for on- or off-base housing may require noise-sensitive land uses within Noise Zone II, 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 zones. Existing residential development is considered as pre-existing, non-conforming land uses.

b. Where the community determines that these uses must be allowed, measures to achieve outdoor to indoor NLR of at least 30 decibels (dB) in Noise Zone II should be incorporated into building codes and be considered in individual approvals.

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

d. NLR criteria will not eliminate outdoor noise problems. However, building location, site planning, design, and use of berms and barriers can help mitigate outdoor noise exposure particularly from ground level sources. Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces.

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. Residential buildings require an NLR of 30.

5. Residential buildings are not permitted.

Land uses which are considered incompatible in Noise Zone II include all residential uses with the exception of transient lodging which is conditionally compatible provided a NLR of 25 dB is achieved by incorporating noise attenuation in the design and construction of the structure. Other uses considered incompatible with Noise Zone II include hospitals and other medical facilities; nursing homes; nature exhibits; public assembly facilities; outdoor music and sports facilities; outdoor recreation facilities such as golf courses, riding stables, and water recreation; resorts and group camps; parks; and "other" cultural, entertainment, and recreation uses not specifically listed in the table.

Several non-residential uses are conditionally compatible provided a NLR reduction of 25 dB is achieved in public spaces by incorporating noise attenuation in the design and construction of a structure, including:

- Manufacturing (with the exception of facilities with professional scientific and controlling instruments; photographic and optical goods; watches and clocks, which achieve a NLR of 25 dB throughout the structure).
- Transportation and communication utilities (with the exception of communication and other transportation, communication and utilities not listed in the table that achieve a NLR of 25 dB throughout the structure).
- Wholesale trade (all other trade and retail achieving a NLR of 25 dB throughout the structure).
- Services (with the exception of finance, insurance, and real estate services; personal services; business services; professional services; contract construction services; and government services, which achieve a NLR of 25 dB throughout the structure).

Non-residential uses including education facilities, child care facilities, miscellaneous services, and religious facilities are considered conditionally compatible provided a NLR of 35 dB is achieved by incorporating noise attenuation in the design and construction of the structure.

Existing Land Use

Existing land uses within Noise Zone II were analyzed to determine compatibility relative to recommended use guidelines. Existing land uses considered incompatible within Noise Zone II are considered non-conforming though they may continue to be impacted by small caliber noise from NSA Crane. Figure 5.18-6 shows the geographic distribution of land uses in Noise Zone II, while Table 5.18-9 provides a breakdown of these existing land uses. The majority of land within Zone II is agriculture which is considered compatible with the land use guidelines. The institutional use

within this zone is the Pleasant Kentucky Ridge Baptist Church at the intersection of State Road 58 and Black Ankle Rd. Due to the age of this facility, it is unlikely constructed with sound attenuation to achieve a NLR of 35 dB, making it incompatible but nonconforming.

As previously noted, approximately 50 residences are within Noise Zone II which are considered incompatible uses. These uses are primarily located within the first quarter of a mile from the northern NSA Crane boundary, making them more prone to noise exposure than other areas in Noise Zone II.

While no complaints have been documented within Noise Zone II, future development of noise sensitive uses in this area may lead to complaints, which could impact military operations. New development in these areas should be monitored and managed to ensure compatibility.

Table 5.18-9 Existing Land Use within Noise Zone II

Existing Land Use	Number of Parcels	Number of Acres
Agriculture	87	2,053.8
Institutional	6	3.49
Residential: Unspecified	15	19.8
Residential: Single Family	23	47.6
Total	131	2,124.8

Source: Operational Noise Consultation for Naval Support Activity Crane, Indiana, September 30, 2013; State of Indiana, 2015; Matrix Design Group

Vacant Parcels

There are 45 vacant parcels comprising approximately 983 acres in Noise Zone II as shown on Figure 5.18-6. All of these parcels currently contain agricultural uses and no structural improvements. The type of development that occurs in the future may be incompatible with noise if developed with noise-sensitive uses.

Existing Tools

Military Base Noise Immunity

Military bases are granted immunity for noise pollution and telecommunications interference under Indiana Code §34-30-21. However, bases are still subject to federal law and are not immune for negligent or willful misconduct. The military base is not liable for civil damages relating to noise or noise pollution that results from the normal operation or use of the military base, including the destruction of ordnance; and that may be heard within two miles of the perimeter of the military base.

Operational Noise Consultation, 2013

Both the Navy and Army have regulatory requirements to address operational noise, the 2008 Navy Order 3550.1A and Army Regulation (AR) 200-1. The programs are similar as they address noise complaints and noise exposure on communities. The Navy Order states that for blast noise analysis, the Army's noise program criteria should be used. The Army program, AR 200-1, provides land use recommendations to ensure that future development is unaffected by military noise.

- Noise-sensitive land uses are not recommended in Zone III. Examples of noise-sensitive uses include housing, schools, and medical facilities.
- Although local conditions such as availability of developable land or cost may require noise-sensitive land uses in Zone II, this type of land use is strongly discouraged on the installation and in surrounding communities. All viable alternatives should be considered to limit development in Zone II to non-sensitive activities such as industry, manufacturing, transportation, and agriculture.
- Noise-sensitive land uses are generally acceptable within the Zone I. However, though an area may only receive Zone I levels, military operations may be loud enough to be heard or even judged loud on occasion. Zone I is not one of the contours shown on the map; rather it is the entire area outside of the Zone II contour.

- The Land Use Planning Zone (LUPZ) is a subdivision of Zone I. The LUPZ is 5 decibels (dB) lower than the Zone II. Within this area, noise-sensitive land uses are generally acceptable. However, communities and individuals often have different views regarding what level of noise is acceptable or desirable. To address this, some local governments have implemented land use planning measures out beyond the Zone II limits. Additionally, implementing planning controls within the LUPZ can develop a buffer to avert the possibility of future noise conflicts.

Air Force Instruction AFI 32-7063

The Air Force is the only DOD service with specific land use compatibility recommendations for noise from small caliber weapons based on the PK15(met) measurement published in AFI 32-7063. The instruction provides land use compatibility recommendations as they relate to ground training noise sources such as small arms. The land use compatibility recommendations are provided for local governments as well as Air Force for on-base planning.

Findings

- There is potential for individual events to cause annoyance and possibly generate noise complaints.
- The moderate noise complaint risk area at NSA Crane extends several miles outside the base during unfavorable weather conditions.
- The Operational Noise Consultation recommends that NSA Crane establish a formal Noise Management Plan to better address noise complaints from the community.
- Non-sensitive activities such as industry, manufacturing, transportation, and agriculture are recommended uses in Zone II.
- Neither the Army or Navy have specific land use compatibility guidelines for noise generated from small caliber weapons based on the PK15(met) noise measurement.

ISSUE NOI-2	**Noise from Lake Glendora Test Facility** Noise from Lake Glendora Test Facility operations extends outside the property and has the potential to affect noise sensitive land uses.

Compatibility Assessment

The Lake Glendora Test Facility (LGTF) is located approximately 30 miles northwest of NSA Crane focused on a 100-foot deep 100-acre lake used for on or above the surface and underwater testing. Most of the land surrounding the facility is forest or agriculture, but there is scattered residential development nearby, and the City of Sullivan is approximately two miles to the west. The preponderance of noise generated at the LGTF is generated from underwater testing. Underwater detonations at the LGTF are conducted approximately eight to ten times per year. However, the Net Explosive Weight (NEW) is generally five lbs. and below. The minimum depth for all explosive events is ten feet. The depth capabilities at the lake ensure higher charge weights can be detonated well below the required depths to contain blast and fragmentation hazards. This in turn diminishes audible noise or disturbance to the public. Detonations are also conducted at the LGTF on or just above the surface of the lake. These events on average occur four times per year and may include multiple tests typically of 3 lbs. NEW. Due to this infrequency in events, CDNL noise contours have not been established. Using estimates for peak noise levels at certain distances from a noise source, estimated noise contours for 123 dB (at half a mile) and 117 dB (at one mile) based on information provided in the 2013 NSA Crane Noise Consultation.

Existing Land Use

Within half a mile of the LGTF, agriculture is the predominant existing land use, as illustrated on Figure 5.18-7, which is generally compatible with the predicted 123 dB noise contour. Agricultural land may allow for development of residential units, which would possibly be incompatible if not constructed with sound attenuation measures. There is a pocket of residential outside the northwestern boundary of the LGTF, which could be impacted by noise. Table 5.18-10 identifies the number of parcels by land use and corresponding acreage within half a mile of the LGTF.

Table 5.18-10 Existing Land Use within the Predicted 123 dB Noise Contour for Lake Glendora Test Facility

Existing Land Use	Number of Parcels	Number of Acres
Agricultural	50	1067.9
Commercial	4	2.7
Institutional	1	26.6
Residential: Unspecified	12	14.0
Residential: Single Family	18	21.3

Source: Operational Noise Assessment for Naval Support Activity Crane, Indiana, September 30, 2013; State of Indiana, 2015; Matrix Design Group

Though the area from half a mile to one mile around the LGTF is primarily agricultural, single-family residential development has occurred around Sullivan Lake to the west, which could be impacted by noise events. There is some land identified as commercial to the southeast, but it is not heavily developed and not likely to be impacted by noise events. Table 5.18-11 shows the distribution of land use by acres from half a mile to one mile away from the LGTF, within the predicted 117 dB noise contour.

There are no existing schools or religious facilities within one mile of the LGTF, but there is religious facility within 1.5 miles north of the facility. This is outside of the predicted noise contours, but may still be impacted from noise events depending on factors such as weather. Additionally, there are many schools and religious facilities a few miles to the west of the LGTF, in the City of Sullivan.

Table 5.18-11 Existing Land Use within the Predicted 117 dB Noise Contour for Lake Glendora Test Facility

Existing Land Use	Number of Parcels	Number of Acres
Agricultural	76	1498.0
Commercial	12	229.6
Institutional	6	135.4
Residential: Unspecified	84	131.1
Residential: Single Family	125	134.6
Unknown	3	11.8

Source: Operational Noise Assessment for Naval Support Activity Crane, Indiana, September 30, 2013; State of Indiana, 2015; Matrix Design Group

Vacant Parcels

As mentioned, the majority of the existing land within the predicted 117 dB and 123 dB noise contours is agricultural, which is generally compatible. Much of this land is considered vacant since there are no structural improvements on the properties. Vacant land is compatible with the noise contours, but future compatibility will be dependent on whether development occurs and the types of uses developed. Since there is no zoning within the noise contours, predicting future land uses within this area would only be speculation. Figure 5.18-8 indicates that the majority of the land within the noise contours is vacant. Table 5.18-12 identifies the number of parcels and amount of vacant land within the two noise contours.

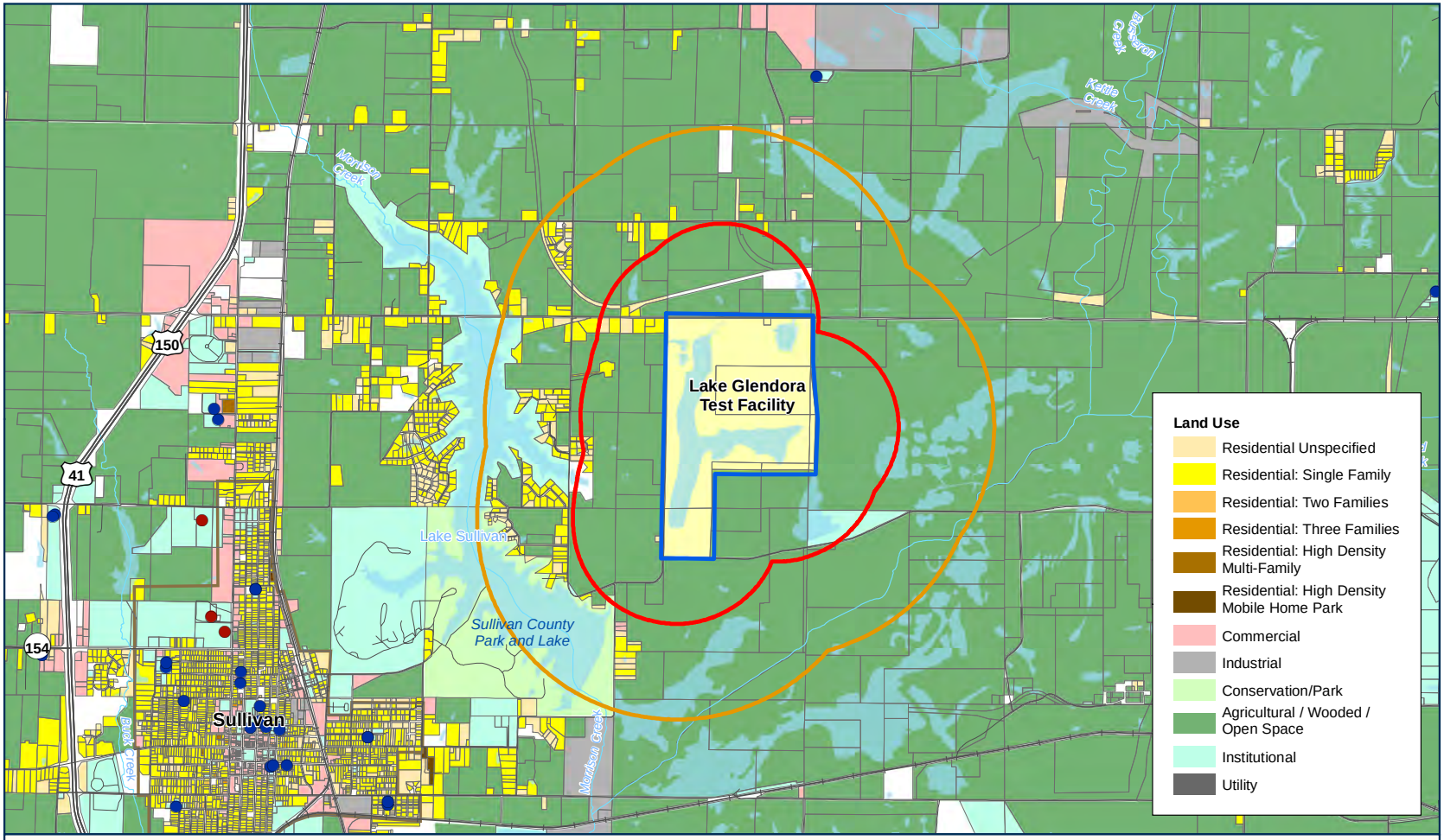


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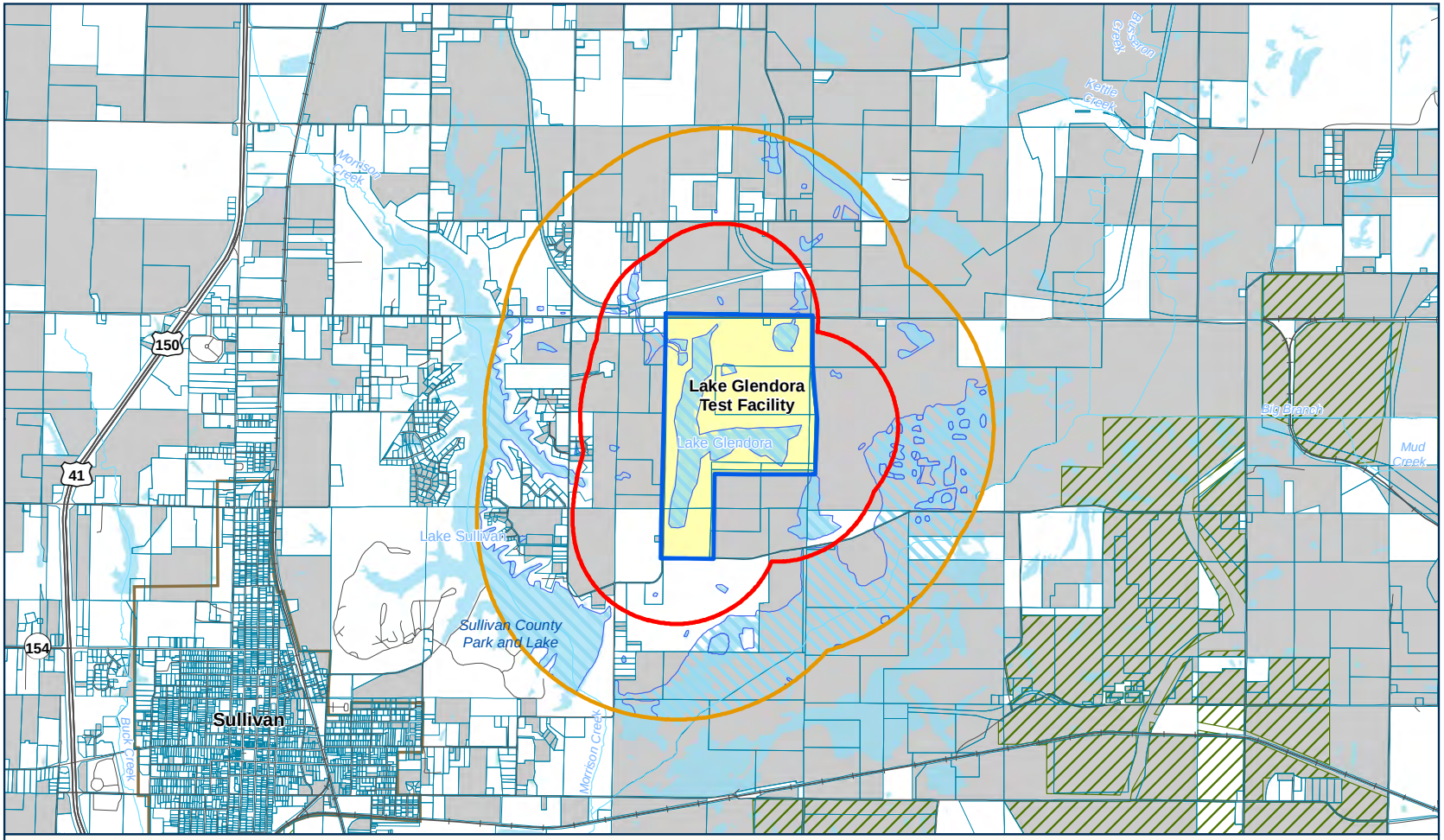
Figure 5.18-7

Existing Land Use and Noise Contours Lake Glendora Test Facility



Matrix DESIGN GROUP

Figure 5.18-8

Vacant Parcels and Noise Contours Lake Glendora Test Facility

Table 5.18-12 Vacant Parcels within the predicted 117 dB and 123 dB Noise Contours for Lake Glendora Test Facility

Noise Contour	Number of Parcels	Number of Acres
117 dB	129	1,475.8
123 dB	50	854.2

Source: Operational Noise Assessment for Naval Support Activity Crane, Indiana, September 30, 2013; State of Indiana, 2015; Matrix Design Group

Existing Tools

See the existing tools identified under Issue NOI-1.

Findings

- Explosive detonations at the LGTF occur eight to ten times per year, which is not enough to develop CDNL noise contours
- Predicted noise contours were developed for half a mile away from the LGTF (123 dB) and one mile away from the LGTF (117 dB) for underwater detonations based on the noise assessment in the 2013 NSA Noise Consultation. Predicted noise contours are predicated on 100 lbs. NEW underwater detonation. Typical underwater detonation operations at the LGTF occur eight to ten times per year at 7.5 lbs. NEW.
- Within these noise contours, the majority of the existing land is agricultural, but some residential exists, which may be impacted by noise events.
- Much of the land in the noise contours is vacant, and there is no zoning to assess potential future development.

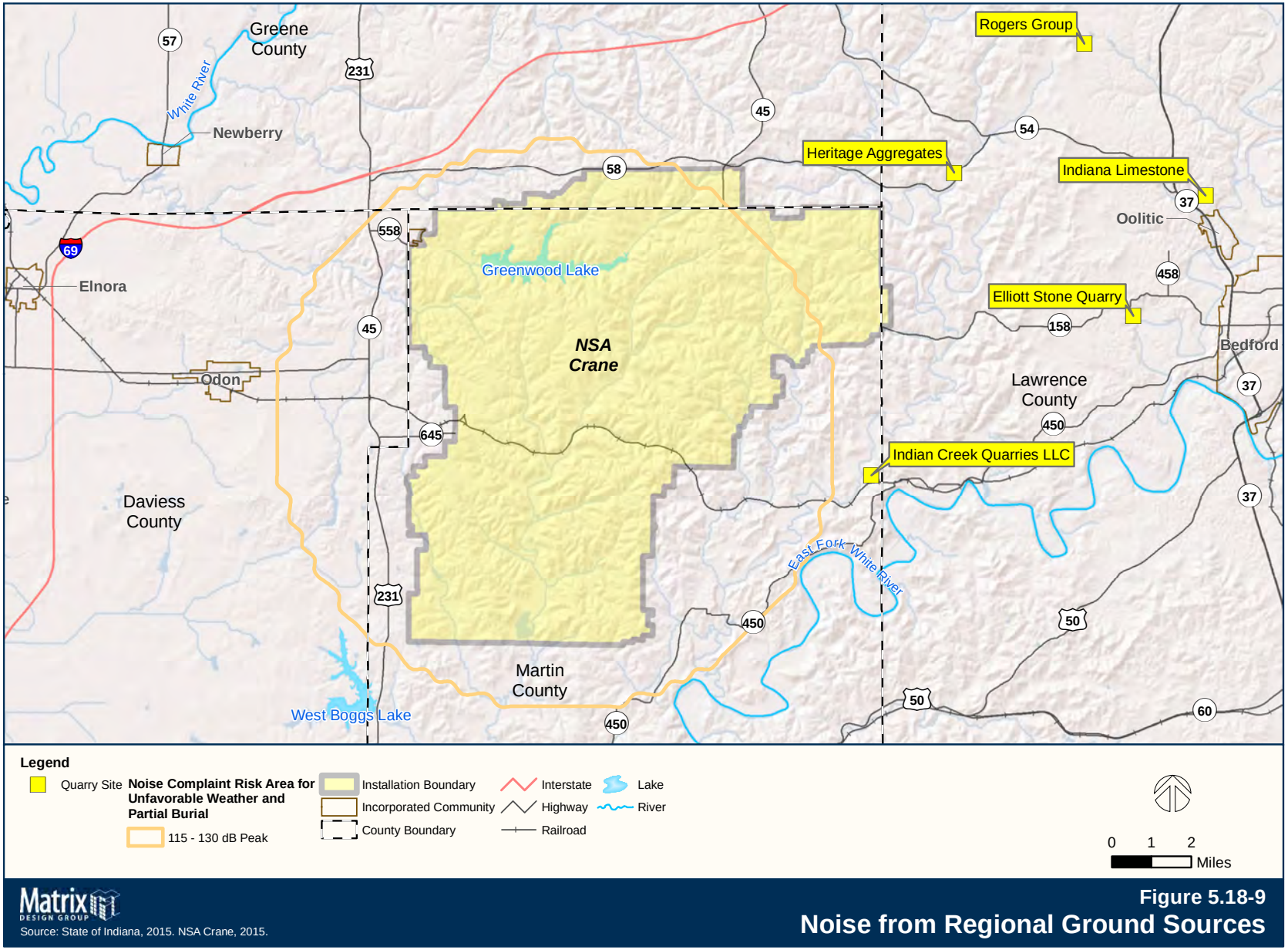
ISSUE NOI-3	**Regional Ground Noise Sources**
	There are other regional sources of noise which can be misattributed to activities at NSA Crane.

Compatibility Assessment

Loud blast noises identified by area residents may not always be due to military operations at NSA Crane. There are occasions where residents may mistake noise disturbances from regional sources for military operations at NSA Crane. Within the JLUS Study Area, there are several quarries that conduct operations including rock blasting that generate noise. These blasting activities may be attributed by residents to NSA Crane and generate inaccurate noise complaints.

As shown on Figure 5.18-9, most quarries in the Study Area run along the east side of the installation in Lawrence County. Three major quarries in the area closest to NSA Crane are Heritage Aggregates, Sieboldt Quarry, and Elliott Stone Quarry. Heritage Aggregates is a US Aggregates quarry, owned by the Heritage Group, located approximately two miles northeast of the NSA Crane border off of State Road 58. The Elliott Stone Quarry is an underground limestone quarry that has been in the area since 1957. The Elliot Stone Quarry is approximately six miles east of the NSA Crane border off of State Road 158, west of the City of Bedford. The Rodgers Group has operated the Sieboldt Quarry since 1970, which is located approximately six miles northeast of the NSA Crane border.

There is another larger quarry located in the area, an Indiana Limestone Company Quarry, which is located further from the installation. The Indiana Limestone Company has four quarry locations in southern Indiana – one located north of the City of Bedford, near the Town of Oolitic. The quarry is approximately 8 miles east of the NSA Crane border, off of State Road 37.



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 5.18-9
Noise from Regional Ground Sources

Because there are limited land use ordinances, these quarries are able to produce extraneous levels of noise without being regulated. In addition, there are no requirements to implement any type of residential buffers. The lack of restrictions allows noise to travel across the Study Area, making it difficult to identify a point source. Hearing loud noises, some residents assume the noise is coming from the installation, when the sound may be from other sources. Often times this can be confirmed by cross referencing the complaint with scheduled activity on the installation. If the installation receives a noise complaint and there was no scheduled demolition activity that day, the noise is likely from another source.

Existing Tools

Installation Noise Complaint Management Program

NSA Crane Instruction 5233.1 established an Installation Noise Complaint Management Program in May 2016. The program is intended to help control operational noise and reduce community annoyance by better monitoring, recording, archiving, and addressing operational noise complaints. The program establishes a noise complaint procedure and actions to take when a noise complaint is received. The procedure states that when a noise complaint is received and if the source of the noise is activity on the installation, and the activity is not classified or sensitive, the complainant shall be made aware of the potential underlying source of the noise.

Findings

- There are several quarries in the Study Area east of NSA Crane that produce noise that is sometimes mistakenly associated with the base.
- With no zoning ordinance in Lawrence County there are no requirements to mitigate noise or create buffers.
- The installation is able to confirm whether or not the noise came from NSA Crane or another source.

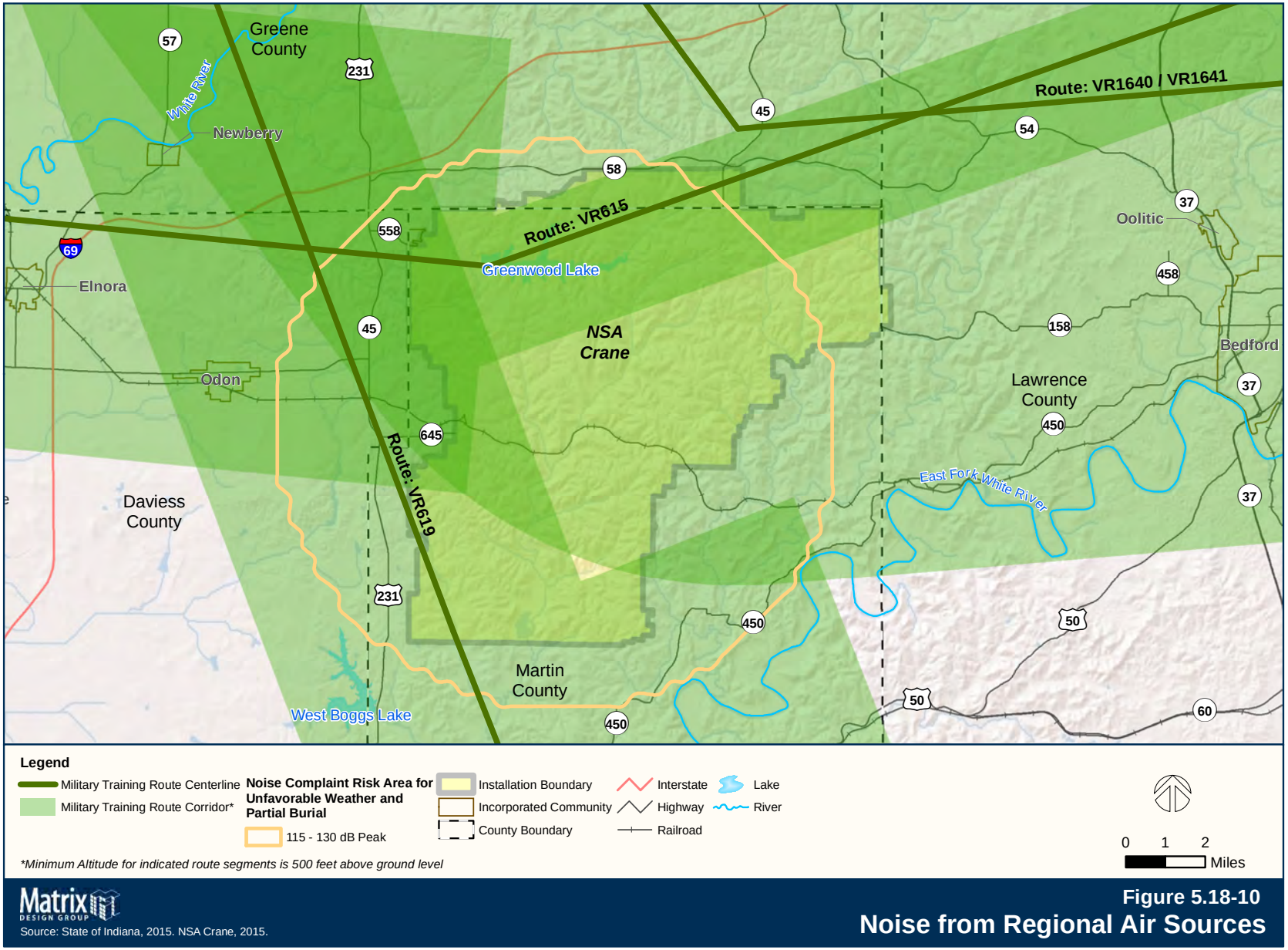
ISSUE NOI-4	**Regional Aircraft Noise Sources** The Indiana Air National Guard flyways in the airspace surrounding NSA Crane are sometimes mistakenly attributed to NSA Crane.

Compatibility Assessment

Some noise complaints that NSA Crane receives are attributed to flight operations conducted by the National Guard. These flight paths, illustrated on Figure 5.18-10, are not affiliated with NSA Crane, as it does not conduct air operations.

One of the military flight routes traversing the JLUS Study Area east of NSA Crane is Segment D to E of military route VR615, a visual flight rules training route. The VR615 segment is runs east-west over Lawrence County north of the City of Bedford. The route is utilized by the 126th Air Refueling Wing (126 ARW), a unit of the Illinois Air National Guard, stationed at Scott Air Force Base in Belleville, Illinois. The 126 ARW aircraft that utilize this route are KC-135 Stratotanker, an aerial refueling aircraft. The route is open to use during daylight hours and the altitude at which aircraft are allowed to maneuver ranges from 500 feet Above Ground Level (AGL) to 1,500 feet AGL, with a width of three nautical miles (NM). A portion of the route goes directly over northern NSA Crane, which may inaccurately lead to the conclusion that a flight operation is associated with the installation.

Another military flight track which passes through the JLUS Study Area to the east of NSA Crane is Segment J to K of military route VR1640, which also operates in the opposite direction as Segment F to G of VR1641. The VR1640 / VR1641 segment runs east-west over Lawrence County north of the City of Bedford. The route is utilized by the 122nd Fighter Wing (122 FW), a unit of the Indiana Air National Guard, stationed at Fort Wayne Air National Guard Station in Fort Wayne, Indiana.



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 5.18-10
Noise from Regional Air Sources

The 122 FW aircraft that utilize this route are Republic A-10 Thunderbolt II, a twin-engine, straight wing jet aircraft. The Republic A-10 Thunderbolt II is utilized for close air support, attacking ground targets. Due to its use, the aircraft is flown close to the ground. The route is open to use from 1:00 PM to 3:00 AM and the altitude at which aircraft are allowed to maneuver ranges from 500 feet AGL to 1,500 feet AGL, with a width of 13 NM. Special operating procedures advise pilots to avoid overflight of cities, towns, and villages to the maximum extent. With a permitted 13 NM width to maneuver, this is can be more easily done in the rural parts of JLUS Study Area.

The last flight track that passes over NSA Crane is segments A to C of military route VR619, which originates from Jefferson Range in Madison, IN. The flight track is used by the Indiana National Guard for various operations to support its units. Within these segments, air operations can occur from 500 to 6,000 feet AGL. The route width is between seven to 12 NM, depending on the segment. A portion of this flight track goes directly over southwestern NSA Crane, which may inaccurately lead to the conclusion that a flight operation is associated with the base.

Existing Tools

As part of this JLUS effort, no existing tools were identified that address this compatibility issue.

Findings

There are two military training route segments located to the east of NSA Crane utilized by low flying National Guard aircraft. The noise generated by the aircraft operations is occasionally wrongly attributed to NSA Crane operations.

Please see the next page.

5.19 Public Trespassing (PT)

This factor addresses public trespassing, either intentional or unintentional, onto a military installation. The potential for trespassing increases when public use areas are in close proximity to the installation.

Military areas that are located on, or adjacent to, public lands owned by other entities (i.e., federal, state, or local) that are designated for public access, recreation, or for livestock grazing often experience issues related to public trespassing into training ranges and other areas with safety hazards related to military operations.

ISSUE PT-1	**Potential for Trespassing Related to Future Milwaukee Road Transportation Trailway** Future Phase 4 of the Milwaukee Road Transportation Trailway will terminate at Indian Springs, Indiana adjacent to the eastern border of NSA Crane raising a concern for trespassing into the installation.

Compatibility Assessment

Rails-to-Trails is a nationwide conservancy program that encourages the transformation of unused rail corridors into public trails for walking, running, and biking. Indiana has increased the miles of trail significantly in the past few years utilizing the program. In the state of Indiana, trails projects are created through the acquisition, management, and improvement of corridors by the Indiana Trails Fund (IFD). One of the trails is located in the Study Area – the Milwaukee Road Transportation Trailway, which will be constructed in 7 phases (0 through 6) along the railroad right-of-way licensed from the Indiana Rail Road Company to the ITF. The first phases opened in October 2014 and currently run 5.2 miles (Phases 0-3) from the City of Bedford west to Williams – an unincorporated community in western Lawrence County. However, the plan includes extending the trail beyond Williams west to Indian Springs (project Phases 3 and 4) with future phases extending to the southeastern boundary of NSA Crane. A condition of the license that ITF agreed to is that the portion of the right-of-way abutting a restricted security area at NSA Crane is off limits to the public. NSA Crane and Indiana Rail Road Company are also partnering on security at points where Indiana Rail Road Company property bisects NSA Crane.

The trail is considered an asset for NSA Crane employees and their friends and family as potential trail users. However there is concern that the Trailway could present a concern for public trespassing at NSA Crane. The completion date for the final phases is contingent on funding availability.

Existing Tools

Unified Facilities Criteria 4-022-03

Unified Facilities Criteria (UFC) 4-022-03 provides DOD guidance for security fences and gates. Security fences and gates are installed and used primarily to define the perimeter of protected areas, such as installation perimeters, and to provide a physical and psychological deterrent to entry and preventing unauthorized personnel from entering a protected area.

The physical security barrier provided by a security fence provides the following functions:

- Gives notice of legal boundary of the outermost limits of the protected area.
- Assists in controlling and screening authorized entries into secured / protected areas by channeling vehicles and personnel to access control points.
- Supports surveillance, detection, assessment, and other security functions by providing a platform for installing intrusion detection equipment.

- Deters casual intruders from penetrating a secured / protected area by presenting a barrier that requires an overt action to enter.
- Causes a delay to obtain access to an installation/facility, thereby increasing the probability of detection.

Perimeter fencing and signage around this area deters and detracts from public trespassing onto the installation.

Findings

- The license between the ITF and Indiana Rail Road Company stipulates that the portion of the right-of-way abutting a restricted security area at NSA Crane is off limits to the public.
- NSA Crane and Indiana Rail Road Company are partnering on security at points where Indiana Rail Road Company property bisects NSA Crane.

ISSUE PT-2	**Cattle Migrations onto NSA Crane**
	Cattle from adjacent farms have the potential to migrate on the installation. Area farmers who enter the property to retrieve their cattle can become a safety risk.

Compatibility Assessment

There are a number of agricultural uses surrounding NSA Crane, due to the rural character of the area. Some of these agricultural uses include the raising of livestock such as cattle. When located close to the perimeter of NSA Crane, these animals can migrate onto the installation, causing destruction to federal property. Typical livestock migration or grazing onto military installations usually results in degradation of federal property including fencing. However in this scenario, cattle trespass is a relatively low risk hazard since the where cattle trespass onto NSA Crane is not near any firing ranges and does not endanger the lives of personnel or equipment. However, when the owners retrieve their livestock, they are also trespassing onto federal property without notice to NSA Crane personnel and can create a safety and security risk.

Existing Tools

See Unified Facilities Criteria 4-022-03 under Existing Tools for Issue PT-1.

Findings

- Cattle trespass creates opportunities for cattle to openly graze and owners to trespass onto NSA Crane to retrieve the livestock, creating a risk for safety, security, and degradation of federal property.

ISSUE PT-3	**Public Trespassing at NSA Crane**
	Safety concern for public trespassing on the eastern side of NSA Crane.

Compatibility Assessment

Military property located near public use and recreation areas, often experiences issues related to the potential for public trespassing into ranges and other areas. Public activity adjacent to military installations can increase the safety and security risk at an installation due to opportunities for trespassing, property damage, and potential liability in the event of public accidents.

The primary concern is that the public including hunters and hikers (in the adjacent Hoosier National Forest) may get lost and unintentionally trespass onto NSA Crane. In some areas, the NSA Crane perimeter fence may not be

entirely visible or signed and the farm-style construction may not be sufficient to alert the public to the boundary of NSA Crane.

While trespassing does not pose an immediate security threat, unauthorized access of federal property for reasons unrelated to official department of defense activities is prohibited and can create opportunities for destruction or degradation of federal property or equipment.

Existing Tools

Unified Facilities Criteria 4-022-03: Security Fences and Gates

Unified Facilities Criteria 4-022-03: Security Fences and Gates (UFC 4-022-03) provide signage criteria for DOD installations. Signs are to be placed at intervals no greater than 200 feet along the entire perimeter of the installation. Signs should be visible from every angle and clearly marked. Suggested language is "US Government Property – No Trespassing."

Findings

- Due to visibility of the fenceline, the public including hunters and hikers may unintentionally trespass onto NSA Crane property.
- While the fencing surrounding NSA Crane complies with the farm-style fencing construction in the UFC 4-022-03, signage does not comply with AT / FP standards.
- Trespassing at NSA Crane can be both a safety risk and an impediment to military testing, training and readiness.

ISSUE PT-4	**Public Recreational Fishing Outside the Lake Glendora Test Facility** Security and safety concern for public trespassing from recreational fishing outside the Lake Glendora Test Facility.

Compatibility Assessment

Little Lake Glendora is located inside the northeastern corner of the LGTF. There is an outfall from this lake that extends off the installation property north and across the public right-of-way north of E County Road 300 N. Based on the Sullivan County GIS data, from the LGTF property line to the edge of the pavement, there is approximately 18 feet of public right-of-way. Though not marked, the LGTF property extends approximately 11 additional feet outside the LGTF fence, i.e. the LGTF fence does not mark the property line; the fence is inside the property line. Department of Defense guidance in Unified Facilities Criteria 4-022-03 provides provisions for outer clear zones from perimeter fences, where required, to provide an unobstructed view and enhance detection and assessment around fences. The location of the perimeter fence at the outfall satisfies this requirement for an outer clear zone.

The outfall in the E County Road 300 N right-of-way is approximately 40 feet wide depending on the rainfall and drought conditions and is regarded by locals as a prime fishing area. While fishing from the public right-of-way is not a trespassing violation, the actual LGTF property is not marked and the public can unknowingly enter the LGTF property while still being outside the fence. Though the concern for trespassing inside the LGTF fence and impacting operations is legitimate, the greater concern is the safety and liability implications that unauthorized entry presents and the potential for damage or degradation of federal property outside the fence.

Existing Tools

Unified Facilities Criteria 4-022-03: Security Fences and Gates

This Department of Defense document provides guidance and instruction on fences and controlled perimeters including appropriate fence types and signage to advise the public of the presence and restricted access on federal government property. While these tools are effective at establishing controlled perimeters and public notification, they are less effective in areas where there is adjacent public use, particularly when outer clear zones are established.

Findings

- UFC 4-022-03 requires signs to be placed at least every 200 feet along the perimeter of the LGTF. The LGTF does not currently meet this requirement.
- Trespassing at LGTF can be both a safety risk and a military testing and readiness impairment.

5.20 Roadway Capacity (RC)

As urban development expands into rural areas, roads once used primarily to provide access for agricultural uses and limited local traffic can become major urban arterial roadways. These once rural roads often become the main transportation corridors for all types of traffic – from residential to commercial trucking – and can assist or impede access to military installations. As transportation systems grow and provide more capacity, these facilities induce and encourage growth as rural areas become more accessible.

Key Terms

Level of Service. A common measurement used by traffic engineers to determine the effectiveness of a traffic system is a grading classification called Level of Service (LOS) which assigns a letter grade from A to F to roadways and intersections based upon traffic flow and safety characteristics. An overview of the Level of Service grades is shown in Table 5.20-1.

Roadway Capacity. Roadway capacity refers to the ability of existing freeways, highway, arterials and local roads to provide adequate mobility and access among military installations and their surrounding communities.

Table 5.20-1. Level of Service of Roadway

LOS		Definition
ACCEPTABLE	A	Represents a free-flow operation. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream.
	B	Represents reasonably free-flow operation. Ability to maneuver within the traffic stream is slightly restricted.
	C	Represents a traffic flow with speeds near or at free-flow speed of the freeway. There is noticeable restricted ability to maneuver within the stream of traffic.
	D	Speeds begin to decline with increased density. Ability to maneuver within the traffic stream is noticeably limited.
UNACCEPTABLE	E	Operation is at capacity. Vehicles are closely spaced within the traffic stream and there are no useable gaps to maneuver.
	F	A breakdown of vehicle flow is present. This condition exists within the queues forming behind the breakdown points.

ISSUE RC-1	**Short Queuing area at Bloomington Gate** The short queuing area at the Bloomington Gate presents a potential safety concern for traffic stacking at intersection of State Roads 45 and 58.

Compatibility Assessment

NSA Crane has five gates to provide access onto the installation:

- Crane Gate
- Bloomington Gate
- Bedford Gate
- Burns City Gate
- Dover Hill Gate (closed)

As of February 2016, the installation only utilizes the Crane Gate for full-time access. The Bedford Gate, Bloomington Gate, and the Burns City Gate have reduced operational hours and are only open during certain times. Reduced access places increased traffic demand on the Bloomington Gate when other gates are not open. The Bloomington Gate is located on the northeastern side of the installation, just south of the intersection of State Roads 45 and 58. This intersection is a four-way stop. The length from the intersection to the vehicle inspection area is approximately 630 feet – approximately one lane for 220 feet before expanding to two lanes for approximately 410 feet before the vehicle inspection area. At 20 feet per vehicle length, this area can accommodate 52 cars of queuing when operating at full capacity and 32 cars when operating with only one vehicle inspection lane open for processing. If a greater number of vehicles line up for queuing to enter NSA Crane and the traffic does not move efficiently, which can happen for a variety of reasons such as times of increased security levels, then vehicles entering the installation can stack at the intersection impacting local traffic using State Roads 45 and 58.

There is also some concern that the recent completion of the I-69 section from Crane to Bloomington will result in increased traffic on State Road 45, with the new interchange at I-69. This interchange is approximately five miles north of the Bloomington Gate. Approximately 51 percent of the NSA Crane workforce in FY14 (32 percent for Monroe County and 19 percent for Lawrence County based on FY14 employee resident locations) is employed in areas north and east of NSA Crane; however, a 2014 traffic study conducted for NSA Crane indicated that only 37 percent of the employee population uses the Bloomington Gate. A 2014 survey conducted for NSA Crane indicated that only 20 percent of employees expected to use I-69 to commute to NSA Crane despite 32 percent living north of the installation in the county where the I-69 corridor is located. There is the potential that these numbers could increase based on efficiencies gained from travelling I-69 and State Road 45 to the Bloomington Gate and that usage could increase from vehicles unaffiliated with NSA Crane leading to more traffic passing through the intersection of State Roads 45 and 58.

When traffic congestion occurs, military mission activities may be delayed, resulting in lost productive hours. Traffic congestion can also affect the surrounding community if vehicle queuing at the Bloomington Gate extends into the intersection which can cause delays, frustration and annoyance for other commuters.

Existing Tools

NSA Crane Comprehensive Traffic Engineering Study

A Comprehensive Traffic Engineering Study was completed in April 2014 to determine how the new I-69 will impact the use of the gates at NSA Crane. As part of the study, employees at NSA Crane were surveyed whether they expected to use I-69 as part of their commute to or from NSA Crane. Of the respondents, 20 percent (288 respondents) said yes and 80 percent (1,172 respondents) said no. They were also surveyed to see which gate they currently used to enter the installation at the start of their workday and which gate they planned to use after I-69 opens.

Thirty-eight percent of respondents said they used the Bloomington Gate. This was the largest percent of all four gates. Results show that after the opening of the I-69, there would be a 2 percent increase in use of the Crane Gate and a 2 percent drop in the use of the Bloomington Gate at 36 percent – still the largest number of users per gate. In addition to the survey results, the study also included counted volumes at each gate, which were closely in-line with the survey results. Table 5.20-2 shows the results of the survey for gate usage.

Table 5.20-2 NSA Crane Morning Peak Hour Inbound Volume Summary

	Crane Gate	Bloom-ington Gate	Burns City Gate	Bedford Gate	Total
Gate currently used	22% (322)	38% (562)	27% (390)	13% (190)	**1,464**
Gate expected to use after completion of I-69	24% (327)	36% (488)	27% (369)	13% (173)	**1,357**
Counted volume	26% (414)	37% (583)	26% (403)	11% (174)	**1,574**

Source: NSA Crane Comprehensive Traffic Engineering Study, April 2014

Staggered Start Times

NSA Crane currently uses flex start time with employee days starting anywhere from 6:00 am to 9:00 am to spread out vehicle loads at the gates and reduce the amount of traffic. This has helped to reduce congestion during peak traffic times. It is unknown what affect I-69 will have on this travel demand management tool.

Findings

- Increased use of the Bloomington Gate due to the new I-69 may impact local traffic if queuing extends outside into the intersection of State Roads 45 and 58.
- Although a 2014 survey of NSA Crane employees indicated a potential decrease in usage at the Bloomington Gate following the opening of I-69, efficiencies from commuting employees from Monroe County could increase resulting in a higher number of NSA Crane employees using the Bloomington Gate.

ISSUE RC-2

Commercial Truck Access

Commercial truck traffic accessing NSA Crane shares the Crane Gate entry with all other vehicles. The lack of a dedicated commercial truck gate for screening inspections can potentially create a security risk.

Compatibility Assessment

Every year 12,000 to 14,000 commercial trucks, about 35 trucks daily, enter and exit NSA Crane in order to transport supplies and ammunitions that are stored at the property to other facilities around the country. These trucks are operated by contractors who are not NSA Crane employees, so they must receive security clearances prior to entering the installation. This traffic can have an impact on operations at NSA Crane, which lacks a

dedicated commercial truck gate to process them. All commercial truck traffic enters the installation through the Crane Gate along with other privately owned vehicles. Commercial trucks are processed in a dedicated area separate from other vehicles which is accessed from a separate commercial traffic lane. The proximity of trucks with ammunition to other commercial truck traffic and employee vehicles at the Crane Gate creates a potential safety concern.

The DOD instruction in UFC 4-022-01 recommends that truck traffic processing occur at a commercial gate – a separate centralized facility or combined into the functions of a commercial or large vehicle entry control facility. The guidance also recommends screening the inspection operations from the remaining portions of the entry control facility to increase safety and shield the inspection procedures from public view to prevent visual surveillance from unauthorized personnel. Though separated from employee vehicle traffic, the Crane Gate lacks screening of the truck inspection area and other improvements that would provide added safety and security.

Because there are four operational gates into NSA Crane and only one authorized for commercial truck traffic, it is important that truck traffic know which point of entry processes commercial trucks. Effective signage is necessary to direct traffic to the appropriate gate. Reports from residents in Burns City have indicated that commercial trucks have missed the turn to the Crane Gate at US Highway 231 and State Road 558 and instead attempt to enter NSA Crane through the Burns City Gate on State Road 645. However, realizing that this is not the commercial gate, trucks are then forced to turn around on narrow rural roads in this residential community. Many of these rural roads are not designed to support commercial truck traffic, the residents may experience travel delays or annoyance from trucks in the area, and the introduce ammunition into the community creating a safety concern.

Existing Tools

Unified Facilities Criteria 4-022-01

Unified Facilities Criteria 4-022-01 provides guidelines for inspection areas for commercial vehicles. An installation large vehicle inspection facility is intended to be the single point of inspection for all large commercial and truck traffic intending to enter the installation. Maintaining a single commercial truck access point ensures that once a vehicle is inspected and authorized to access an installation, the vehicle may be tracked and monitored until it enters and exits the installation. The design should have adequate stacking distances for the anticipated queue and parking for vehicles to be inspected and security vehicles. NSA Crane does not currently have such a facility.

Findings

- Approximately 12,000-14,000 commercial trucks enter NSA Crane annually.
- The screening and inspection process for commercial trucks occurs at the Crane Gate along with other inbound vehicles.
- Though commercial trucks are processed in a separate lane, this area is not screened and exposes trucks with ammunition to other vehicles at the gate.
- The Unified Facilities Criteria recommends a separate commercial entry control facility, which is screened from the rest of the facility to increase security and safety. NSA Crane does not have such a facility.
- A lack of signage along US Highway 231 directing commercial trucks to the Crane Gate has resulted in trucks missing the turn on State Road 558 and traveling through rural communities such as Burns City.

ISSUE RC-3	**Traffic from Newly Completed Interstate 69** Potential traffic impacts on local roadways associated with the completion of Interstate 69.

Compatibility Assessment

The first portion of I-69 in Indiana was constructed in November 1971 and ran from the Michigan state line to Indianapolis. In 1991, the US Department of Transportation established six Corridors of the Future, designating I-69 as one of them to extend from Mexico to Canada. This designation involved extending I-69 from Indianapolis to Evansville, Indiana. In 2003, a Tier 1 Final Environmental Impact Study (EIS) recommended the preferred corridor, Alternative 3C, which was selected by the Federal Highway Administration in 2004. The project was divided into six sections to conduct Tier 2 EISs.

The Tier 2 EISs have been completed for Sections One through Five of I-69. Sections One through Four, from Evansville to Bloomington, have been constructed and are open to traffic. Section Five, from Bloomington to Martinsville, is projected to be open in 2016. The Tier 2 EIS for Section Six is still in progress. Once the last section is complete, the JLUS Study Area will have greater access to / from Indianapolis and other major cities along the corridor.

Section Four is the portion that traverses the JLUS Study Area. It was opened to the public via connection with US Highway 231 in December 2015 and provides an improved vehicular connection to NSA Crane from larger cities to the north and south of the installation, such as the City of Bloomington. These cities, which offer more amenities than the rural areas surrounding the installation, may be more desirable for NSA Crane employees who can access them faster. The commute time from Bloomington is now reduced to approximately 40 minutes as a result of I-69.

The new route is projected to be highly utilized and the Final EIS for I-69 Evansville to Indianapolis suggests that I-69 will reduce existing forecasted traffic congestion in the area.

There is concern that the completion of I-69 will spur new growth around the I-69 / US Highway 231 interchange as discussed in Land Use Issue LU-1 (section 5.14). Issue LU-1 further describes the development potential of the area; however traffic impacts cannot be quantified. Although national studies indicate that there is a positive correlation between transportation improvements and development, they also indicate that efforts to quantify the impacts are very limited, citing that there is seldom any quantitative analysis in studies of the effect a road improvement is likely to have on the future development of land and subsequent demand for the use of the road. Conducting such an analysis requires determining the both the impact of the road improvement on total economic activity and the location of that activity with and without the road improvement. This determination is complicated by other policy factors likely to affect the ability to bring the land into development such as the availability of infrastructure, land use regulations, and suitability of land for development.

What is known is that development is being marketed by area economic development corporations in the vicinity of the I-69 and US Highway 231 interchange near NSA Crane including buildout of the WestGate@Crane Technology Park. This development would bring additional traffic to the area.

US Highway 231 is one of the primary roads used to access the Crane and Burns City gates at NSA Crane. There is an initiative to improve this roadway from its current two lanes to a four-lane fully access-controlled freeway from I-69 south to Jasper as part of the Southwest Regional Logistics Council's strategic plan to grow southwest Indiana's logistics sector. While implementation of this project would certainly increase traffic in the area, it would also increase capacity.

Existing Tools

I-69 Evansville to Indianapolis Tier 2 Final Environmental Impact Statement

The Final EIS for I-69 Evansville to Indianapolis indicates that I-69 has the potential to reduce existing forecasted traffic congestion and improve traffic safety. As a result of the construction of the Build Alternatives, traffic volumes on state highways and local roads in the Section Four Study Area would change as traffic is diverted from these highways to I-69. No adverse traffic flow impacts would occur along the state highways or local roads in the Study Area under the Build Alternatives. However, beneficial traffic impacts would occur under the Build Alternatives. For the design year 2030, I-69 in Section Four is forecasted to have average daily traffic ranging from 23,525 to 29,578 vehicles per day and is projected to operate at Level of Service A from just east of US Highway 231 to SR 37 for the design year 2030.

Findings

- A portion I-69 was recently opened in December 2015 with an interchange at US Highway 231 approximately 2 miles north of NSA Crane and another interchange in Daviess County approximately 11 miles west of NSA Crane at State Road 58.
- I-69 has the potential to improve the commute between the City of Bloomington and NSA Crane, which may incentivize employees to seek housing further away from the installation thus increasing traffic on I-69 and decreasing traffic on other area roads except those necessary to access NSA Crane including US Highway 231 and State Road 45.
- I-69 has the potential to improve the commute between the City of Washington and NSA Crane which may incentivize employees to seek housing west of NSA Crane resulting in decreased traffic on other area roads except those necessary to access NSA Crane including US Highway 231.
- Because of the complexity of the Study Area planning environment, the effect a road improvement is likely to have on the future development of land and subsequent demand for the use of the road is unquantifiable.
- New development is projected around the interchange of US Highway 231 and I-69 which would generate an unquantifiable increase in traffic volumes.
- The Southwest Regional Logistics Council's strategic plan to grow the southwest Indiana logistics sector proposes to improve US Highway 231 to a controlled access freeway which would also increase traffic through the area and also capacity.
- The Final EIS for I-69 Evansville to Indianapolis suggests that I-69 will reduce existing forecasted traffic congestion in the area.

5.21 Safety Zones (SA)

Safety zones are areas in which development should be more restrictive, in terms of use and concentrations of people, due to the higher risks to public safety. Issues to consider include aircraft accident potential zones, weapons firing range safety zones, and explosive safety zones.

Military installations often engage in activities or contain facilities that, due to public safety concerns, require special consideration by local jurisdictions when evaluating compatibility. It is important to monitor land use near military installations to minimize dangers associated with range activities.

Key Terms

Explosive Safety Quantity Distance Arc. Explosive safety quantity distance (ESQD) arcs are calculated to express all areas where it has been identified that there is a potential safety risk should an unlikely explosion occur related to the storage of explosive materials or munitions. The radius of an ESQD arc is determined by both the operation and the net explosive weight of the material at the site and they are usually concentric in shape. ESQD arcs become an encroachment issue when the arcs extend beyond the boundary of the installation.

ISSUE SA-1	**Explosive Safety Quantity Distance Arcs** Concern that ESQD arcs have potential to extend outside of NSA Crane with mission changes.

Compatibility Assessment

Crane Army Ammunition Activity (CAAA) is a tenant at NSA Crane that produces and stores a large amount of ammunition at the installation. The CAAA occupies approximately 80 percent of the land at NSA Crane and operates the Department of Defense's second largest munitions depot, storing 25 percent of their conventional ammunition supply. Its strategic location and infrastructure network allows it to move ammunition out to other bases and coastal areas quickly by rail or highway. There are around 1,800 storage areas, called magazines, containing ammunition located throughout the installation. Each magazine used for storage has an ESQD arc associated with it. Due to the large number of magazines, the ESQD arcs occupy a significant portion of the land at NSA Crane.

NSA Crane administratively controls ordnance storage within magazines so that ESQD arcs do not extend beyond the installation boundary. This can involve reduction or relocation of ordnance from the magazines that are near NSA Crane's boundary. Because the spacing of the magazines and geographic extent of the associated arcs extend to the installation boundary in many locations, any future mission changes will be internally managed by CAAA and NSA Crane to further administrative reduce ammunition stored at certain magazines to keep the ESQD arcs contained inside installation.

Existing Tools

DOD Ammunition and Explosive Safety Standards Manual

The DOD Ammunition and Explosives Safety Standards Manual establishes acceptable levels of protection for accidental explosions of munitions. The purpose of the manual is to establish explosives safety standards designed to manage risks associated with ammunition and explosives. The guidance provides protection criteria intended to minimize serious injury, loss of life, and damage to property.

Findings

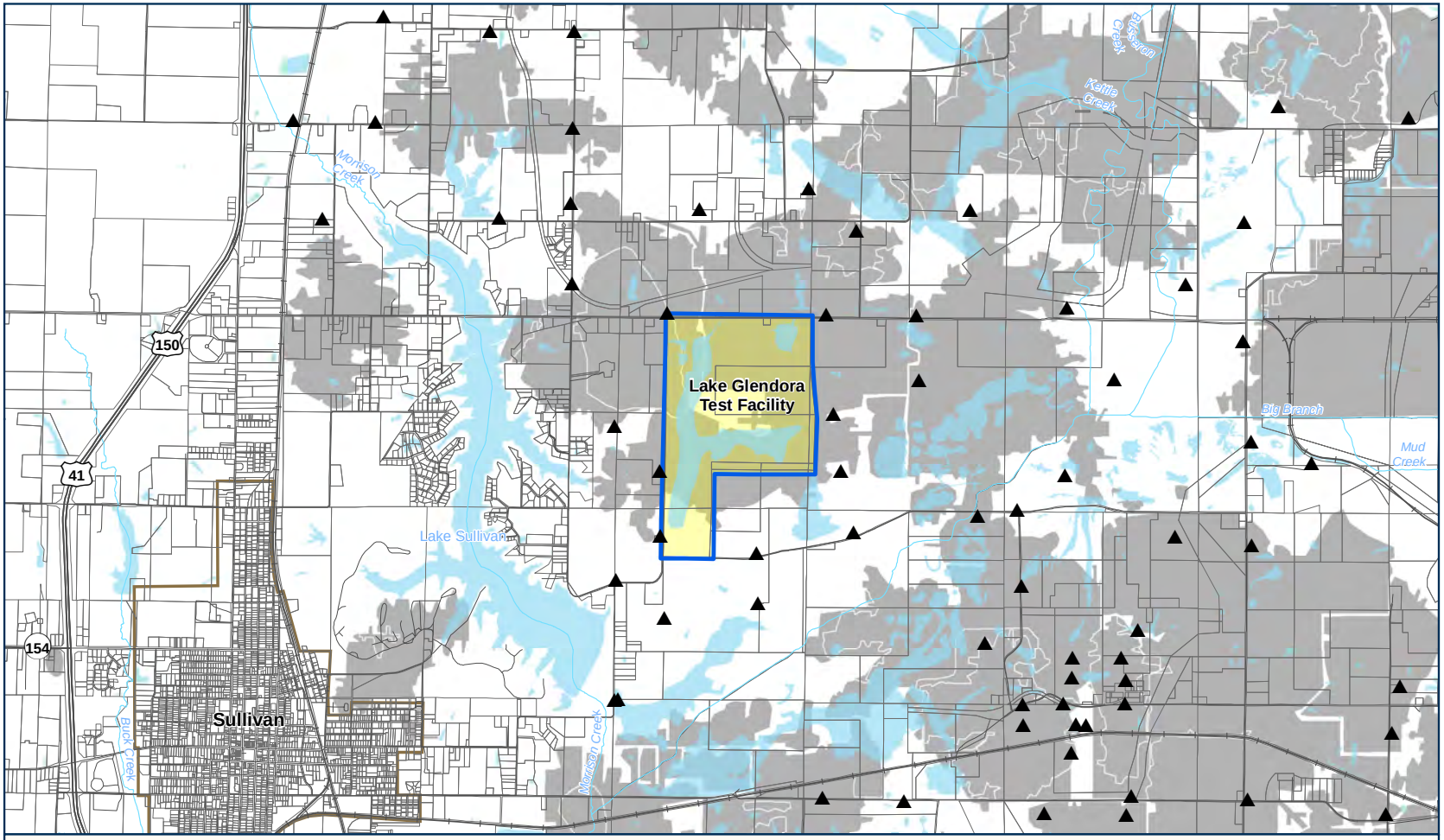
- Crane Army Ammunition Activity is a tenant at NSA Crane that operates the Department of Defense's second largest ammunition depot and stores 25 percent of their ammunition.
- There are approximately 1,800 ammunition storage magazines having ESQD arcs that cover much of NSA Crane.
- As mission parameters and ammunition storage change, administrative reductions sometimes necessitate modifying storage quantities to magazines further inside the NSA Crane to contain the ESQD arcs within the installation boundaries.
- CAAA and NSA Crane will manage future mission changes internally to ensure that ESQD arcs do not extend outside the installation boundary over private property.

ISSUE SA-2	**Methane Gas Wells and Mine Shafts Located Near Lake Glendora Test Facility** There are various methane gas wells and underground mine shafts located near the Lake Glendora Test Facility, including a pipeline that runs along N County Road 225 E connecting gas wells with a pipeline located along E County Road 300 N. Location of several of these wells and mine shafts are unknown.

Compatibility Assessment

The region around the LGTF has a rooted history in mining, particularly coal mining. The land that LGTF occupies today, as well as much of the land around it, was used for both underground and surface coal mining. An intricate network of mines and mining facilities exist in the area and may have built up gases in them that could cause safety concerns.

In recent years, nationwide exploration into the development of coalbed methane (CBM) as an alternative source of natural gas has been on the rise, primarily due to the increase in natural gas prices and an increase in demand for fuel sources. Coalbed methane is produced from abandoned underground coal mines or from unmined coal seams. The locations of underground mines and wells are shown on Figure 5.21-1. Methane is vented and recovered from the mines to be used as a fuel source. This can enhance the safety of underground coal mines by reducing the amount of methane present in the coal. In the past, methane in underground coal mines has caused explosions resulting in the loss of life and considerable economic damage. Methane control during underground mining is now mandated by the Mine Safety and Health Administration, thus increasing safety and providing the added benefit of producing an energy resource.



Source: State of Indiana, 2015. NSA Crane, 2015.

Figure 5.21-1
Wells and Underground Mines Lake Glendora Test Facility

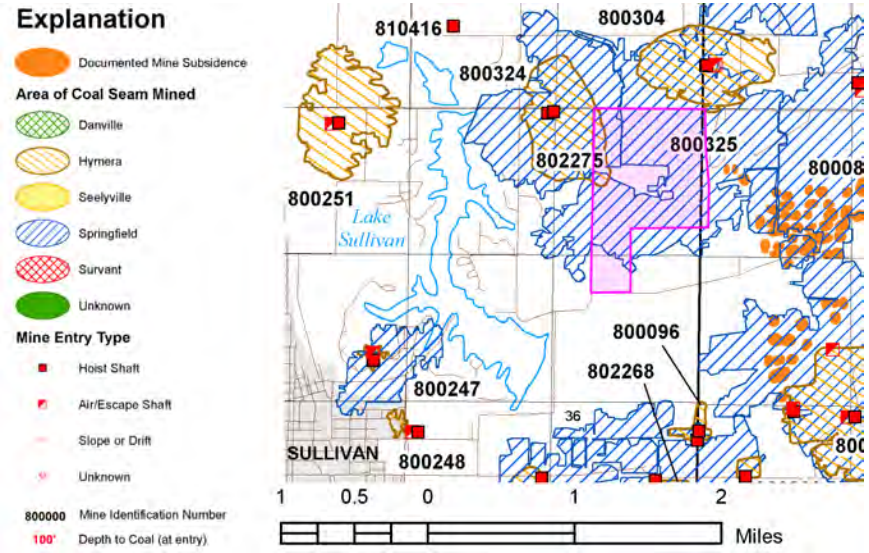
Multiple fields that produce CBM are located in northeastern Sullivan County, some of which are nearby the LGTF. These wells, including a pipeline that runs along N County Road 225 E along the west boundary of the LGTF, are connected to a high pressure pipeline that transports the methane, running along E County Road 300 N, directly north of the LGTF. Methane is extremely flammable and able to form explosive mixtures with air in the presence of an ignition point. While the potential for a buried pipeline leak is low, vibration can cause stresses resulting in ruptures in pipelines.

Though there have been no occurrences of any accidents or disasters from a pipeline explosion near the LGTF and it has been almost 80 years since the last mine explosion in Sullivan County, there is a concern for the low probability of an event to occur and causing harm or damage at the facility.

One additional impact from underground mines is subsidence – the movement of the ground surface due to collapse or failure of underground mine workings. Surface features usually take the form of sinkholes or troughs, both of which occur in areas with room-and-pillar mines – the method of mining in the Sullivan County area. Sinkholes are created from the collapse of the mine roof into a mine opening, resulting in an abrupt depression in the ground surface. The majority of sinkholes usually develop where the amount of cover is less than 50 feet. Sinkholes are generally localized in extent, affecting a relatively small area on the surface. Troughs are usually created from the failure of remnant mine pillars or when the pillars punch into the soft mine floor or roof.

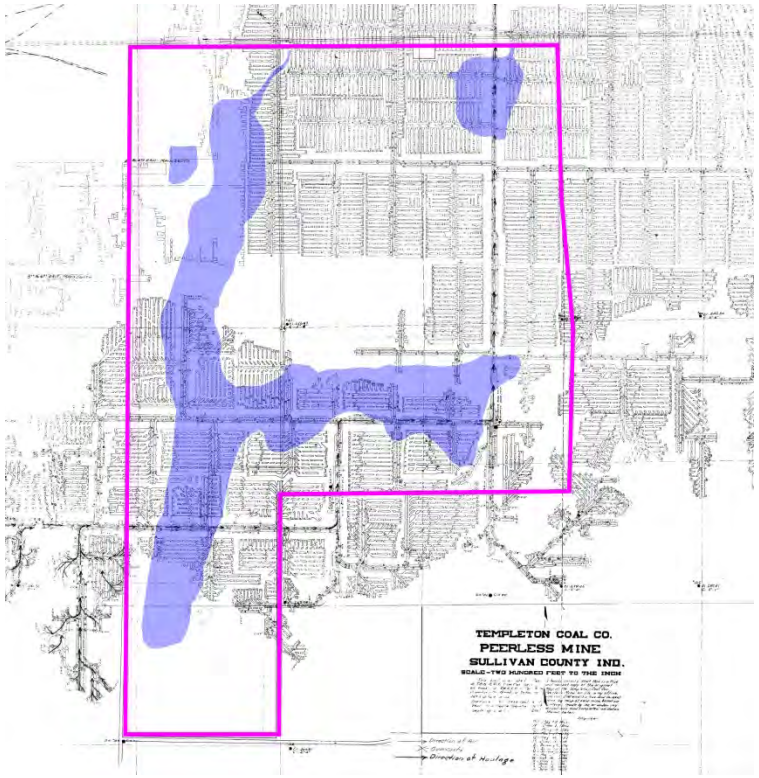
Structures and surface features affected by subsidence tend to experience extensive and costly damages; however, failures from an abandoned mine are difficult if not impossible to predict since they may collapse many decades after the mining is completed if the mine workings were not designed to provide long-term support. Yet, there are some positive effects of vibration on mine subsidence. Vibration is a common method of making wet concrete denser and may cure some instances of mine subsidence in the impacted area.

The following graphic shows documented areas of mine subsidence (in orange) east of the LGTF (in pink). Some of these areas are on property adjacent to the LGTF and as close as 650 feet from the LGTF property line.



Mine Subsidence (orange areas) in Sullivan County surrounding the Lake Glendora Test Facility (identified in pink)
Source: Indiana Coal Mine Information System, coal mine data – December 2010

Mine Number 800325 in the state database was known as Glendora Mine #27 and operated by the Templeton Coal Company between 1920 and 1943 at a depth between 240 and 300 feet. This mine underlays the LGTF and adjacent property where the subsidence has occurred, meaning there is an underground mine under the previous surface mine (lakes) at the LGTF. The following graphic shows the approximate area of overlap between the underground mine and the LGTF showing the lakes where previous surface mining occurred.



Original underground mine map with approximate area of the Lake Glendora Test Facility and present day lakes.
Source: Indiana Coal Mine Information System

Source: Pennsylvania Department of Environmental Protection, Technical Guide to Mine Subsidence; Indiana Coal Mine Information System: https://igs.indiana.edu/CMIS/; https://igs.indiana.edu/CMIS/Counties/Sullivan/Sullivan_underground_mines_web.pdf; http://indnr.maps.arcgis.com/apps/webappviewer/index.html?id=f30ca6a781cb4209b6e614789ca7185b

Existing Tools

30 Code of Federal Regulations Part 75

Part 75 of the Code of Federal Regulations sets mandatory safety standards for underground coal mines. These standards include sections on actions for excessive methane and the installation of methane monitors. Each mine must have a mine ventilation plan to control methane and respirable dust and weekly examination by a certified person is required. Even though each mine is different, these regulations ensure that everything is done to eliminate the dangers of methane in and outside of the mines.

Centers for Disease Control Handbook for Methane Control in Mining

The Centers for Disease Control (CDC) released a Handbook for Methane Control in Mining in 2006, providing effective methods for the control of methane gas in mines and tunnels for the safety of workers in the mines. The handbook contains methane control methods for multiple types of mines and mining equipment and explains that proper ventilation plays the major role in keeping mines free of hazardous methane accumulations. While following the handbook recommendations is not required, it remains a helpful resource for controlling methane.

Coalbed Methane Outreach Program

The Coalbed Methane Outreach Program (CMOP) is a voluntary program operated by the US Environmental Protection Agency. The goal of CMOP is to reduce methane emissions from coal mining activities. Their mission is to promote the profitable recovery and use of CBM. It encourages cooperative development of CBM harvesting between coal companies and related industries to produce a viable form of energy from methane instead of releasing it into the atmosphere where it is harmful. More information about CMOP and how to get involved in its network can be found on its website at http://www3.epa.gov/cmop/.

Indiana Coal Mine Information System

The Indiana Coal Mine Information System provides an online interactive map viewer tool that shows the locations of coal mines in Indiana. The data is prepared by the Indiana Geological Survey, which is an instituted of Indiana University. The data shows both active and former mines and identifies them as surface of underground operations. The mapping tool can be found at the website: http://coalminemaps.indiana.edu/.

Mine Safety & Health Act of 1977

The federal Mine Safety & Health Act of 1977, known as the Mine Act, requires the Mine Safety and Health Administration (MSHA) inspectors to inspect each surface mine at least two times a year and each underground mine at least four times a year to determine whether there is compliance with health and safety standards or with any citation, order, or decision issued under the Mine Act and whether an imminent danger exists. If violations of safety or health standards are found, inspectors will issue citations to the mine operators. During fiscal year 2014, MSHA conducted approximately 19,000 regular mandatory inspections at the 13,000 surface and underground mines in the US.

The MSHA performs other important mandatory activities under the Mine Act. These include, but are not limited to:

- investigating mine accidents, complaints of retaliatory discrimination filed by miners, hazardous condition complaints, knowing or willful violations committed by agents of mine operators, and petitions for modification of mandatory safety standards;
- developing improved mandatory safety and health standards;
- assessing and collecting civil monetary penalties for violations of mine safety and health standards; and
- reviewing for approval mine operators' mining plans and education and training programs.

U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration

The US Department of Transportation Pipeline and Hazardous Material Safety Administration (PHMSA) advances the safe transportation of energy and other hazardous materials by establishing national policy, setting and enforcing standards, education, and conducting research to prevent incidents. The PHMSA also prepares the public and first responders to reduce consequences in the event of an incident. The PHMSA's Office of Pipeline Safety ensures safety in the design, construction, operation and maintenance, and spill response planning of the 2.6 million miles of natural gas and hazardous liquid transportation pipelines within the country. The PHMSA website is located at http://www.phmsa.dot.gov/portal/site/PHMSA.

Findings

- Multiple fields that produce CBM are located in northeastern Sullivan County and transported in a high pressure pipeline close to the LGTF creating a concern since methane is extremely flammable and able to form explosive mixtures with air and from vibration that can cause pipeline leaks.
- Methane control during underground mining is now mandated by the Mine Safety and Health Administration, thus increasing safety and providing the added benefit of producing an energy resource.

ISSUE SA-3	**Hazardous Materials Transportation Routes** There are no designated hazardous materials transportation routes in association with daily shipments to and from NSA Crane. Because the same route is never used in sequence, many local roads are used for transport of hazardous materials.

Compatibility Assessment

Hazardous materials are items that pose a risk to health, safety, and property for a variety of reasons and include explosives, various types of gas, solids, flammable and combustible liquid, and other objects. Transportation and handling of these materials can be dangerous and is usually regulated by a range of levels of government from federal to local. The CAAA ships and receives conventional ammunition and materials by both rail and truck at NSA Crane, operating the second largest ammunition depot in the Department of Defense and storing roughly 25 percent of the Department of Defense ammunition. It is an important asset deploying ammunition to bases around the country using contracted trucks transporting approximately 12,000 to 14,000 shipments per year utilizing local roads and highways.

State agencies are responsible for the establishment, maintenance, and enforcement of hazardous material routes. The Indiana Department of Transportation is the state agency for Indiana that designates hazardous material routes. Currently, the closest hazardous materials transportation routes are in Indianapolis on the I-465 loop around the city and on I-70 and I-65 within the loop. The routes do not travel outside of the City of Indianapolis.

Existing Tools

Title 49 US Code of Federal Regulations

Hazardous materials regulations are found in parts 100-185 of Title 49 of the Code of Federal Regulations (CFR). The common reference for these regulations is 49 CFR 100 - 185. All drivers must be trained in the security risks of hazardous materials transportation. This training must include how to recognize and respond to possible security threats. The regulations also require vehicles transporting certain types or quantities of hazardous materials to display diamond-shaped placard warnings.

Findings

- The Indiana Department of Transportation is responsible for the establishment, maintenance, and enforcement of hazardous material routes, but no hazardous transportation routes have been identified to support NSA Crane.

Please see the next page.

5.22 Scarce Natural Resources (SNR)

No compatibility issues were identified for the Scarce Natural Resources compatibility factor.

Please see the next page.

5.23 Vertical Obstructions (VO)

No compatibility issues were identified for the Vertical Obstructions compatibility factor.

Please see the next page.

5.24 Vibration (V)

Vibration is an oscillation or motion that alternates in opposite directions and may occur as a result of an impact, explosion, noise, mechanical operation, or other change in the environment. Vibration may be caused by military and / or civilian activities.

ISSUE V-1	**Vibration from NSA Crane Demolition Range** Concern that vibration from the Demolition Range activities at NSA Crane cause physical property damage to buildings and infrastructure outside the installation.

Compatibility Assessment

The relationship between sound and vibration is inextricably linked since vibration is the pressure wave usually accompanied by sound (noise) and amplified in the lower frequency ranges. While numerous studies have been conducted to quantify the impacts of noise, very little research has been conducted to correlate vibration from low frequency sound and human response. One common conclusion across studies that have been conducted is that as the frequency decreases, the degree of annoyance or state of irritation from the noise and vibrations increases more rapidly with sound pressure level. A low-frequency signal can go from being audible, to annoying, to oppressive and vibrational with a relatively small change in level and it is not absorbed by the atmosphere or blocked by terrain and buildings as effectively as higher frequencies.

Some residents near NSA Crane have expressed concerns about the vibrations associated with activities at the installation. These ground-borne vibrations are usually the result of explosive detonations that occur as part of the mission at NSA Crane. Vibration impacts have been noted particularly south of the installation in Martin County.

Studies have been conducted regarding the potential for structural damage resulting from vibration. Homeowners typically become concerned about structural damage due to the rattling effect when sound that causes vibration reaches 120 peak decibels (dBP). However, studies by the Department of Defense have demonstrated that structural damage is not likely to occur until a level of 150 dBP or more is achieved. The locations of the Demolition and Explosive Ordnance Disposal Range and Ordnance Test Area where explosives are used at NSA Crane are centrally located in the southern half of the base to maximize distance from private property. This distance acts as a buffer to reduce vibration levels, and while vibrations may be felt off the base they are not likely to cause structural damage.

In general, property owners are concerned about potential damage to their homes or property. Some residents have reported damage to water wells that they have attributed to vibrations from activities at NSA Crane, though it is not confirmed whether the damage from vibrations was caused by NSA Crane or a local quarry. One case was reported during the JLUS stakeholder interviews that windows were damaged in an area church from vibration associated with activities at NSA Crane but that no compensation was sought for the window replacements.

Existing Tools

NSA Crane Facebook Page

NSA Crane maintains a Facebook page (https://www.facebook.com/NSACrane/) posting ceremonial events and pertinent information internal to the installation and its personnel. The Facebook page is not an official page and does not target the general public. However, if promoted appropriately, this could be a more effective tool in spreading the word about operations and expectations of certain operations.

Operational Noise Consultation NO. WS.0016043-14 Operational Noise Assessment for Naval Support Activity Crane, Indiana 30 September 2013

The Operational Noise Consultation recommends that NSA Crane should establish a formal Noise Management Program that could also include educating the public about protocols procedures related to vibration complaints and the damage claims process. This program would assist NSA Crane in avoiding community action against its activities by being proactive. The purpose of the procedure is to reduce the potential of noise and vibration complaints by keeping the public informed about what is happening and to satisfy complaints so they do not escalate.

Installation Noise Complaint Management Program

NSA Crane Instruction 5233.1 established an Installation Noise Complaint Management Program in May 2016. The program is intended to help control operational noise and reduce community annoyance by better monitoring, recording, archiving, and addressing operational noise and vibration complaints. The program establishes a noise and vibration complaint procedure and actions to take when a complaint is received. The procedure states that when a complaint is received and if the source of the noise or vibration is activity on the installation, and the activity is not classified or sensitive, the complainant shall be made aware of the potential underlying source of the noise. Reports of property damage are referred to the appropriate service Office of Counsel for further administration.

Findings

- Residents surrounding NSA Crane have experienced structural damage on their property that they have attributed to the vibration from operation at NSA Crane, but the installation was not confirmed as the source of the damage.

ISSUE V-2	**Vibration from Activities at the Lake Glendora Test Facility** Concern that vibration from testing activities at the Lake Glendora Test Facility causes vibration outside the property.

Compatibility Assessment

Area residents attribute vibrations experienced outside the LGTF to tests involving underwater ordnance detonations. Testing at the LGTF occurs both under the surface of the lake and on / over the surface of the lake. Underwater detonation events at the LGTF occur infrequently approximately 8 – 10 times per year at a minimum depth of 10 feet. Each event may include a number of tests for that given event. Detonations are also conducted on or just above the surface of the lake. These events on average occur four times per year and may include multiple tests. The LGTF is authorized for up to 100 lbs. net explosive weight (NEW) for underwater charges and 10 lbs. NEW for surface charges. On average surface tests are conducted with average charge weights of 3 lbs. NEW at a typical frequency of once per year.

Though the area surrounding the LGTF is primarily rural, there is single family residential development approximately proximate to the LGTF. The majority of this development is situated to the west surrounding Lake Sullivan. Participants at JLUS Public Forums have reported vibration from LGTF testing activities including one case of damage to the foundation of a house in a subdivision approximately 2,000 feet from the LGTF. Future development close to the installation may experience vibrational impacts from the LGTF testing activities.

NSA Crane Instruction 5233.1 established an Installation Noise Complaint Management Program in May 2016. The program is intended to help control operational noise and reduce community annoyance by better monitoring, recording, archiving, and addressing operational complaints,

including vibration. Reports of property damage are referred to the appropriate service Office of Counsel for further administration.

Existing Tools

While vibration impacts are an unavoidable byproduct of the testing conducted at the LGTF, tools that may educate and enhance the public's understanding of these activities and the damage claims process could be beneficial and demonstrate a proactive approach for enhancing public awareness. These existing tools are identified under Vibration Issue V-1.

Findings

- Explosives testing events, both subsurface and above the surface of the lake, occurs infrequently over the course of a year at the LGTF, though each event may consist of multiple tests.
- Though few vibration reports / complaints are communicated to the LGTF, underwater testing activities have been reported to cause vibration at property outside the LGTF from the public at the JLUS Public Forums and on the City of Sullivan Facebook page.
- There is no formal complaint management process for the LGTF.

Please see the next page.

5.25 Water Quality / Quantity (WQQ)

Water quality / quantity concerns include the assurance that adequate water supplies of good quality are available for use by the installation and surrounding communities as the area develops. Water supply for agriculture and industrial use is also considered.

ISSUE WQQ-1	**Shared Use of the NSA Crane Wastewater Treatment Plant** Concern for capacity of NSA Crane wastewater treatment plant to continue serving the Town of Crane.

Compatibility Assessment

The Town of Crane is currently connected to the wastewater treatment plant (WWTP) at NSA Crane which treats wastewater from NSA Crane and the town since the town does not have its own WWTP facility. During periods of significant rain, stormwater from the town infiltrates into the town wastewater conveyance system to NSA Crane Waste Water Treatment System exceeding its capacity. When runoff volumes overwhelm the Waste Water Treatment System capacity, they can discharge untreated sewage into receiving waters creating the potential for environmental violations.

Greene County recently constructed a new WWTP to serve the WestGate@Crane area with a 50,000 gallon per day capacity run by the Greene County Regional Sewer District (GCRSD). It currently operates at 5,000 gallons per day and would be able to serve the Town of Crane.

The Town of Crane has initiated a stormwater improvement project including a new 60-inch reinforced concrete pipe storm sewer with inlets and replacement of a portion of the existing storm sewer to remedy the infiltration into the town's sewer conveyance infrastructure.

The GCRSD has expressed interest in the Town of Crane tying into the new Greene County WWTP and the city has expressed interest in tying into the WWTP. It is believed the Town of Crane stormwater improvement project will enable the transition from the NSA Crane WWTP to the new Greene County WWTP.

With the Town of Crane stormwater improvement project and the reciprocal desire from both the Town of Crane and the GCRSD to connect to the Greene County WWTP, this issue is being addressed.

Existing Tools

There are no tools to address this issue.

Findings

- The Town of Crane currently utilizes the NSA Crane Wastewater Treatment System for wastewater treatment; however, infiltration of stormwater during significant rain events into the town's sewer system conveyance infrastructure can overwhelm the NSA Crane Wastewater Treatment System and create the potential for environmental violations.
- Greene County constructed a new WWTP in the vicinity of the Town of Crane and both the Greene County Regional Sewer Authority and the town would like for the town to tie in to the Greene County WWTP.
- The Town of Crane is currently making improvements to their stormwater infrastructure that will address the infiltration of stormwater into their sewer conveyance infrastructure.

ISSUE WQQ-2	**Stormwater Runoff at Northern Boundary of NSA Crane** Concern for the quality of stormwater runoff flowing into NSA Crane from adjacent land uses along the northern boundary.

Compatibility Assessment

Lake Greenwood, located in the northwestern portion of NSA Crane, is used as a potable water source for the installation and important roosting and feeding areas for migrating waterfowl. During migration an estimated 1,000 geese can be observed at Lake Greenwood. Because of these uses it is necessary for this body of water to remain clean and unpolluted for continued use. Conservation of this resource is achieved in part through protection efforts in areas along the shores of ponds, lakes, and stream banks at NSA Crane. However, NSA Crane does not have any control over water protection outside the installation.

Due to the topography of the area, stormwater runoff – rainfall that flows over the ground surface, generally runs north-to-south into NSA Crane from Greene County into the Lake Greenwood watershed. Runoff from adjacent farming or commercial enterprise activities coupled with potential development of currently undeveloped areas resulting from completion of I-69 north of NSA Crane can impact the water quality of Lake Greenwood. This is a concern since development generally increases stormwater peak flow and total runoff volume, and impervious surfaces associated with development typically accumulate surface pollutants that flow into nearby watersheds. Therefore, without proper management, future land development in Greene County near the northern boundary of NSA Crane could lead to an increase in polluted runoff entering the Lake Greenwood watershed, compromising the quality of the lake.

Existing Tools

Rule 5: Indiana Administrative Code 15-5

Under 327 Indiana Administrative Code (IAC) 15-5, also known as Rule 5, the Indiana Department of Environmental Management (IDEM) administers a general water runoff control permit program that targets construction activities that result in land disturbance of one acre or more. In order to comply with Rule 5, project site owners must do the following:

- Create and Implement a Construction Plan.
- Submit the Construction Plan to the IDEM Plan Review Authority.
- Receive Approval of the Construction Plan.

An integral part of the Construction Plan includes a Storm Water Pollution Prevention Plan. This Plan addresses several issues:

- How erosion and sedimentation will be controlled on the project site to minimize the discharge of sediment off-site or to a water of the state.
- Other pollutants that may be associated with construction activity including disposal of building materials, management of fueling operations, etc.
- Pollutants that will be associated with the post-construction land use. The Construction Plan requirements can be found in 327 IAC 15-5-6.5.

The following soil disturbing activities do not require a general Rule 5 storm water discharge permit:

- Agricultural activities.
- Coal mining (regulated under 327 IAC 15-7).
- Quarries (regulated under 327 IAC 15-6).
- IDEM permitted municipal solid waste landfills.

Additionally, a single family residential dwelling that is not part of a larger common plan of development is excluded from filing a construction plan if the land disturbance is less than five acres.

Rule 6: Indiana Administrative Code 15-6

Under 327 IAC 15-6, also known as Rule 6, the IDEM administers a general water runoff control permit program that targets industrial activities. Industrial facilities are subject to the Rule 6 permitting requirements if run-off from precipitation is exposed to the facility's manufacturing processing activities, raw materials storage areas, or intermediate products storage areas that run-off then leaves the facility from a point source that is discharged into a Municipal Separate Storm Sewer System, or directly into the waters of the state. In order to comply with Rule 6, project site owners must:

- Submit a Notice of Intent to the IDEM Office of Water Quality.
- Develop and Implement a Storm Water Pollution Prevention Plan.
- Implement a Comprehensive Storm Water Monitoring Plan.
- Submit an Annual Report to IDEM.

There are three groups of facilities that may not be subject to Rule 6 requirements:

- Facilities for which an individual National Pollutant Discharge Elimination System Storm Water permit may be required.
- Facilities that can successfully demonstrate eligibility for a conditional no exposure exclusion, which must be granted by IDEM.
- Facilities for which IDEM determines that the general Rule 6 permit requirements would not be sufficient to protect water quality of the receiving stream, or because those facilities have other factors that may require more specific Storm Water control requirements.

Clean Water Act

The Clean Water Act (CWA) governs the management of water resources and controls and monitors water pollution in the U.S. The CWA establishes the goals of eliminating the release of toxic substances and other sources of water pollution to ensure that surface waters meet high quality standards. In so doing, the CWA prevents the contamination of near shore, underground and surface water sources. Numerous extensions of the Act have been created, including the National Pollution Discharge Elimination System.

National Pollutant Discharge Elimination System

Pursuant to the CWA, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources such as pipes or man-made ditches that discharge pollutants into US waters. According to the law, individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge do not need an NPDES permit; however, industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. Traditionally, NPDES focused on point sources however, more recently the focus has shifted to nonpoint sources. Nonpoint sources generally include sheet flow runoff from pavement, agricultural fields and lawn areas, which by their nature, are more difficult to regulate.

Findings

- Runoff from adjacent farming or commercial enterprise activities coupled with potential development could lead to polluted runoff flowing into NSA Crane and entering the Lake Greenwood watershed impacting the water quality of the lake.

- State regulations for runoff help control the discharge of potentially polluted water from industrial facilities and construction sites through permits. However, there are exceptions to these regulations and they do not apply to all land uses.
- Federal regulations regulate larger sources of point source water pollution through the NPDES permit program.

Appendix

The following Appendix is provided as supplemental materials to support the JLUS process, JLUS Recommendations, and final JLUS products. The Appendix contains:

- A Background Report on potential development impacts affecting NSA Crane and the LGTF resulting from I-69 development.
- A summary of each Public Forum including Sign-In Sheets, presentations, handouts and a compilation of comments received during the NSA Crane Public Forums conducted in August 2015, February 2016, and November 2016 which were considered and reflected in the final JLUS documents.

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NSA CRANE
JOINT LAND USE STUDY

Matrix DESIGN GROUP

Photo Credit: Serge Melki, *Brown County Ogle Lake,* CC BY 2.0, Wikimedia Commons

NSA CRANE

Joint Land Use Study

Matrix DESIGN GROUP