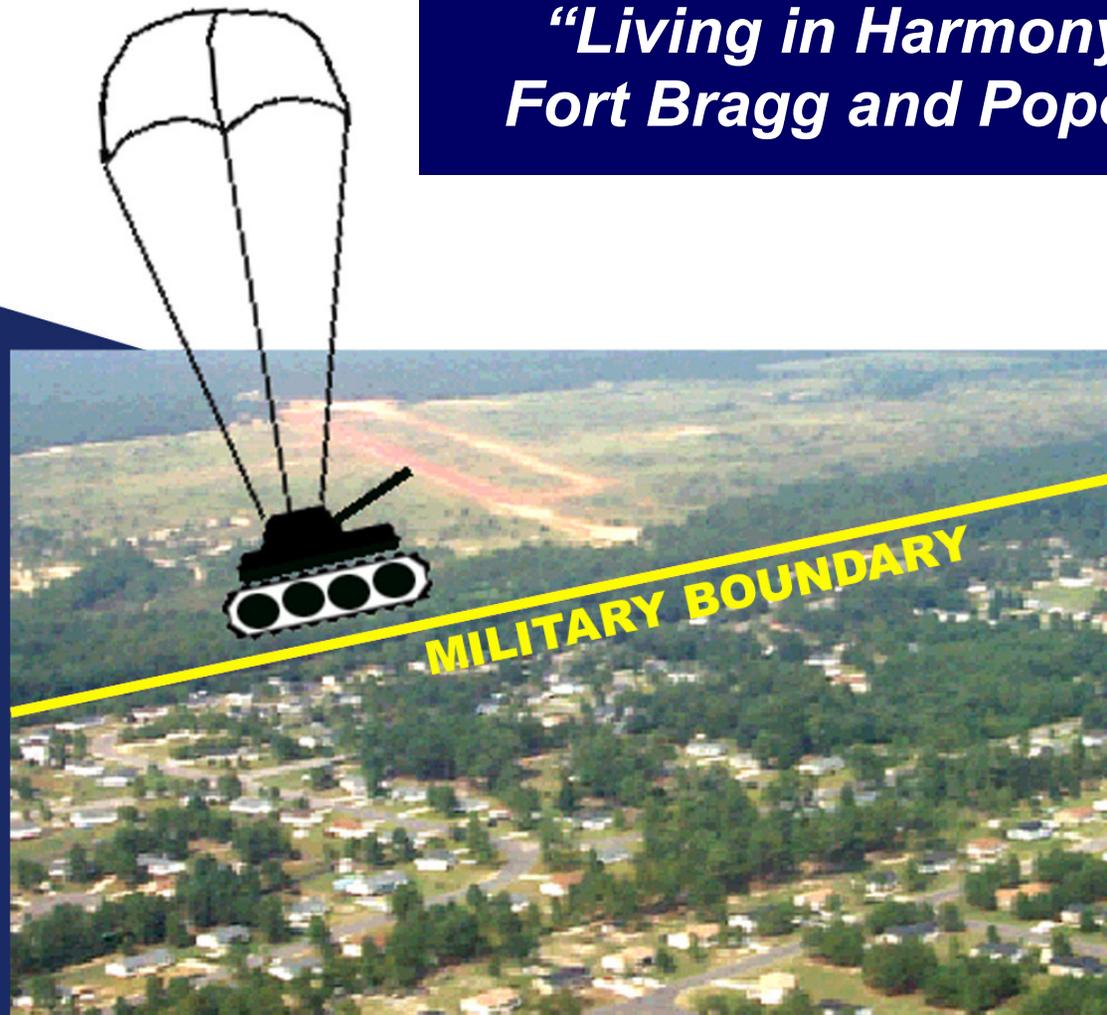


***“Living in Harmony with  
Fort Bragg and Pope AFB”***

**Fort Bragg/  
Pope Air  
Force Base  
Joint Land Use  
Study**



**SPONSORED BY:  
The Fort Bragg/Pope AFB Regional Land Use Advisory Commission**

**May 2003**

# **“Living in Harmony with Fort Bragg and Pope AFB”**

## **Fort Bragg Pope / Air Force Base Joint Land Use Study**

**Prepared for  
Fort Bragg / Pope Air Force Base  
Regional Land Use Advisory Commission (RLUAC)**

### **RLUAC Member Counties**

Cumberland  
Harnett  
Hoke  
Moore  
Richmond  
Sampson  
Scotland

### **RLUAC Member Municipalities**

Aberdeen  
Fayetteville  
Hamlet  
Hope Mills  
Laurinburg  
Pinehurst  
Raeford  
Spring Lake  
Southern Pines  
Vass  
Wagram

### **RLUAC Military Members**

Fort Bragg  
Pope Air Force Base

**May 2003**

**Prepared by  
NC Department of Commerce, Division of Community Assistance,  
Southeast Regional Office**

*Jim Dougherty, Chief Planner  
Kirk Rutkofske, GIS Coordinator*

*Jason Epley, AICP, Senior Planner  
Rebecca Stricklin, Administrative Assistant*

## EXECUTIVE SUMMARY

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Following completion of the “*Joint Compatible Land Use Policy*” Study in January 1991, the Fort Bragg/Pope Air Force Base Regional Land Use Advisory Commission (RLUAC) was established, while Fort Bragg and virtually all of the participating local governments adopted the study’s recommendations. However, with the passage of time the study and its recommendations became dated and nearly forgotten. By the summer of 2000, the RLUAC was on hiatus, implementation activities had largely ceased, and urban development continued to encroach upon the military boundaries -- threatening the military training mission, the health and safety of the civilian population, and the integrity of the Long Leaf Pine Ecosystem.

The Fort Bragg / Pope Air Force Base Regional Land Use Advisory Commission was reactivated in the summer of 2000 and immediately initiated a new Joint Land Use Study (JLUS) process.

This new JLUS effort began with an attempt to document the initial study’s implementation successes in stemming the tide of incompatible urban development along the military boundaries. Completed questionnaires revealed that, at best, only limited local government implementation successes had occurred over the past decade.

Another thrust of the JLUS was to build a credible regional GIS database. The completed database, prepared by the North Carolina Center for Geographic and Information Analysis (CGIA), provided an opportunity to conduct a thorough analysis of the development activities and growth patterns for the one-mile study area surrounding the military reservation. A methodology was developed to identify the rural and urban lands. As of the year 2000, only nineteen percent of the land within a mile of Fort Bragg/Pope Air Force Base/Camp Mackall boundaries had been developed, while the remaining eighty-one percent was still rural.

The JLUS then examined the existing levels of protection afforded to the rural lands within the one-mile study area. Twenty-six percent of the rural lands had a high level of protection, five percent a moderate level of protection, thirty-six percent a low level of protection, and thirty-four percent of the land had no protection at all.

Elements such as high noise areas, aircraft accident potential zones, critical habitats for endangered natural species, and prime farm lands were examined to determine the level of protection needed for the rural lands laying within a mile of the military reservation. Utilizing this information, twenty-six percent of the land is deemed protected, seventeen percent of the land needs no immediate protection, thirty-two percent of the land is important to protect, and twenty-five percent of the land is critical to protect.

Recommendations were developed to permanently protect the rural land, within a mile of the military reservation, which was identified as both “critical” and “important” in this JLUS. The critical preservation lands accounted for nearly 18% (almost

18,000 acres) of the total one-mile area, while the important preservation lands represented approximately 17% (over 16,000 acres) of the total one-mile region acreage (99,017 total acres in the one-mile area). Several of the recommendations require action by the North Carolina General Assembly. These suggestions include:

- The requirement for real estate disclosure statements,
- Low density zoning, banning of water and sewer lines in “critical” and “important” areas,
- Establishment of a trust fund to purchase property or development rights from willing sellers,
- Creation of tax credits to encourage property owners to sell their land or development rights, and
- The establishment of a trust fund to compensate local governments for the potential loss of future tax base.

Other recommendations dealing with proposed changes in land use and training activities, creation of a multi-use recreational trail, and follow up studies requiring action by both the military and local governments are also described.

In addition to the recommendations, actions are outlined to facilitate successful implementation activities.

*“The Governors also believe that the federal government should work together with the states and local governments to reduce potential conflict between expanding development near federal military installations and the activities on the base. Incompatible development, often called encroachment, may threaten public safety as well as the ability of the base to carry out its mission. Governors support states and the Department of Defense and the military services taking actions to assist local governments to develop and implement better long-term planning for compatible land uses near military bases, particularly air fields, training facilities, routes, and ranges. The aim is not to prevent growth or limit any state or local authority but to encourage land uses that avoid encroachment and are consistent with both the scope of military activities at a particular base and the needs and safety of the neighboring community.”*

**National Governors Association – Policy on Encroachment and Military Activities. Adopted February 25, 2003**

\*North Carolina Governor **Michael F. Easley** introduced the above policy statement.

*The Fort Bragg-Pope AFB military complex should be viewed as both a constraint and a stimulus to future development. It is a geographic constraint due to its permanent location northwest of Fayetteville, thus limiting the growth of the urban area in that direction. The installation is a stimulus to development in that by virtue of its huge size and employment, it is a boon to the Region’s population and economy. The once rural areas around the post are now under considerable development pressure, both in Harnett and Cumberland counties. Many military exercises are carried out at Bragg/Pope which are incompatible with urban types of land uses which might occur in the vicinity. There is thus a danger that development tightening around the installation could choke the base, resulting in possible cutbacks in military activity or the removal of major activities to more isolated posts elsewhere in the country. To insure that such an eventuality does not occur, both local officials and the military should analyze the impact that the installation has beyond its borders and plan now to prevent potentially incompatible uses from occurring in a buffer zone beyond the base’s perimeters.*

**Cumberland, Harnett and Bladen – Region “M”: Toward 2000 (June, 1977)**

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# 1 INTRODUCTION

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Compatible military and local government land use planning has been a serious issue in the Fort Bragg / Pope Air Force Base region for more than fourteen years. Beginning in November 1988, Fort Bragg, Pope Air Force Base, nine counties, and nineteen municipalities participated in the military's largest ever Joint Land Use Study process. This effort, coordinated by the North Carolina Division of Community Assistance, produced several important studies for the region, which included:

- ***“Fort Bragg - Pope Air Force Base Impact Assessment”***, September 1990
- ***“Joint Compatible Land Use Policy -- Recommendations to Military Jurisdictions and Local Governments in the Fort Bragg Region”***, January 1991
- ***“Fort Bragg / Pope Air Force Base Military-Civilian Joint Compatible Land Use Study: A Case Study”***, January 1992
- ***“The Impacts of Compatible Land Use at Fort Bragg-Pope Air Force Base”***, November 1992.

The studies provided valuable information and offered numerous recommended actions for the Fort Bragg / Pope Air Force Base military complex and the participating counties and municipalities. The recommendations focused on the need to shield the military training areas from incompatible urban encroachment and to protect the surrounding civilian populations from intensive artillery / aircraft noise and accident potential zones.

One of the most significant accomplishments, resulting from the Joint Land Use Study process, was the creation of the Fort Bragg / Pope Air Force Base Regional Land Use Advisory Commission (RLUAC) in 1991. The Commission, composed of military representatives and official local government appointees, actively met on a bi-monthly basis for nearly eight years -- until 1998. Throughout its active life, the Commission sought to promote positive communication and cooperation between the military entities and the local governments. During this period three counties (Harnett, Hoke, and Moore) adopted countywide zoning ordinances; the City of Fayetteville, the Town of Spring Lake and Cumberland County revised their land use plans to reflect the studies' recommendations; and Fort Bragg purchased the ten-thousand acre Rockefeller estate and the McLean-Thompson tract to provide additional training areas, protect endangered species and insulate surrounding communities from excessive noise levels and aircraft hazards.

Following a nearly two year hiatus, the RLUAC was reactivated in the Summer of 2000 with a new membership composed of Fort Bragg, Pope Air Force Base, seven counties, and eleven municipalities. The Commission immediately initiated a process of seeking financial support from the Department of Defense, Office of Economic Adjustment (\$25,000 monetary), the State of North Carolina (\$55,000 in-kind), and the local governments (\$20,000 monetary and in-kind) to update the decade old Joint Land Use Study.



Figure 1.1: November 2001 RLUAC Meeting



Figure 1.2: March 2003 RLUAC Meeting

The renewed RLUAC sponsored Joint Land Use Study process, which commenced in the Fall of 2001, included three phases:

**Phase I: Scoping/Background Research Stage** - The purpose of this phase was a) to review the initial JLUS reports and recommendations, b) to survey the local governments to determine level of success in implementing the JLUS recommendations, and c) to consolidate existing digital mapping and aerial photography for the entire Fort Bragg/Pope AFB region.

**Phase II: Public Information Stage** - The intention of this phase was to hold a series of public information meetings to re-inform citizens and community officials about the importance of protective land use controls (especially in areas affected by military training activities) and to seek public input into the study process.

**Phase III: Draft/Final Plan Stage** - The aim of the third phase was a) to assemble and analyze all of the information gathered in the earlier two phases, b) to formulate a draft plan, c) to present the draft plan to the RLUAC for review and approval, and d) to conduct a second round of public information meetings to generate support for the process and the study's recommendations.

The following chapters contain an analysis of the information gathered through this detailed planning process and provide a list of balanced recommendations designed to both protect the military training areas from urban encroachment and the civilian populations from loud and/or dangerous areas, which pose a threat to their health and safety.

# BACKGROUND RESEARCH

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## A. INTRODUCTION

---

With the completion of the Joint Land Use Study (JLUS), the establishment of the Fort Bragg / Pope Air Force Base Regional Land Use Advisory Commission (RLUAC), and the conduct of the Gulf War in 1991, there was initially much support for the adoption of the JLUS and implementation of its recommendations. By the summer of 1991, Fort Bragg and most of the participating county and municipal governments had formally adopted the study and pledged to execute its recommendations.

However, with the passage of time and possibly a lack of permanent staffing to support the RLUAC, interest in and commitment to the JLUS recommendations began to wane. By the middle of 1998 the RLUAC had ceased meeting and had become inactive.

In the spring of 2000 a renewed interest in the RLUAC had begun to emerge. However, with the Commission's reactivation, it became obvious that the information contained in the original 1991 Joint Land Use Study was badly dated. Further, a mechanism had never been developed to track the efforts of the military and local governments to implement the study's recommendations.

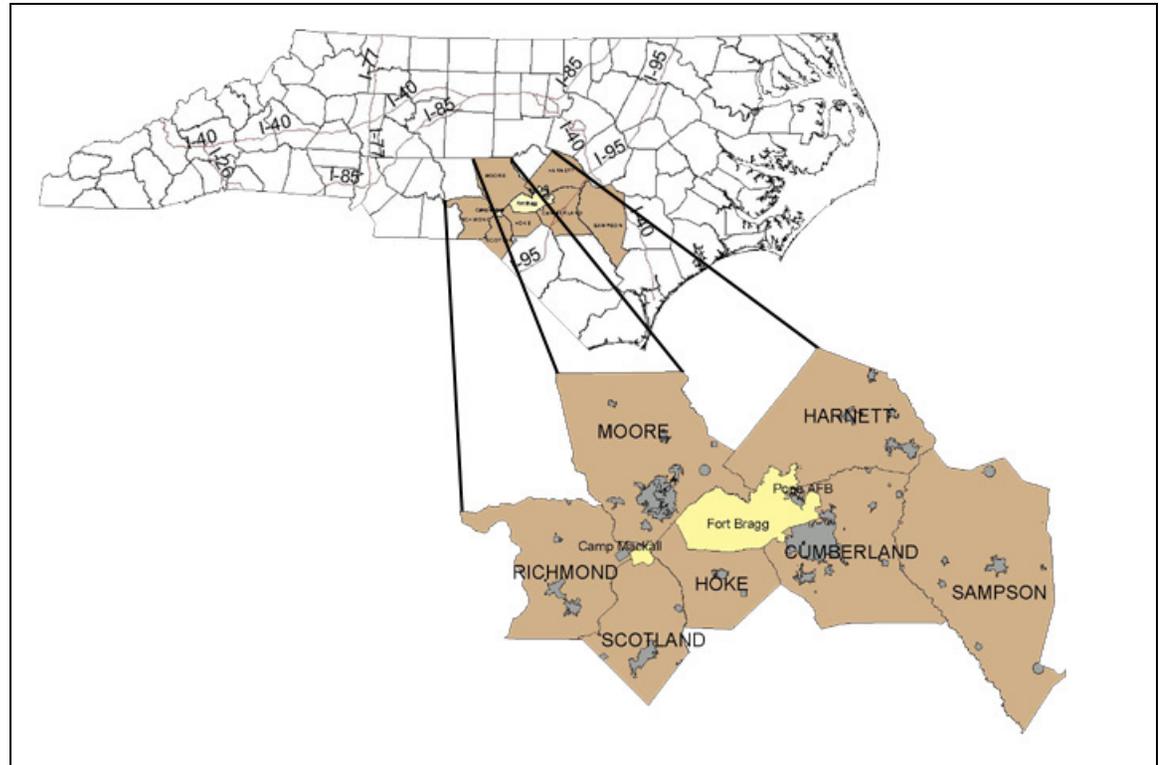
Funding was secured and efforts were launched in the fall of 2001 to prepare a major revision of the 1991 Joint Land Use Study. A major focus of this effort has been to analyze the land surrounding the Military Reservation through use of GIS data, revise the dated land use information and to survey the implementation successes of the prior JLUS recommendations for the military installations and local governments.

This new JLUS process has several uniquely different elements that were not a part of the 1991 JLUS. The first new element is the comprehensive GIS database that will be discussed in detail in Section four. The GIS database includes over 130 data layers used in the analysis of the region. The second new element includes the creation of a GIS Planner position that will provide the necessary staff to support the RLUAC efforts. This position is located in the Southeastern Regional Office of the Division of Community Assistance and is funded through the US Fish and Wildlife service for year one and the Department of Defense through years two, three and four.

## B. JLUS REGION DEFINED

The Fort Bragg / Pope Air Force Base Joint Land Use Study region includes the following seven counties: Cumberland, Harnett, Hoke, Moore, Richmond, Sampson, and Scotland. The expanse completely surrounds Fort Bragg, Camp Mackall, and Pope Air Force Base. The area is located in North Carolina's Southern Piedmont and Northern Coastal Plain regions and includes a district that is known as the North Carolina Sandhills.

Although Sampson County is a member of the Fort Bragg / Pope Air Force Base Regional Land Use Advisory Commission (RLUAC), it lies considerably beyond the one mile impact area. It is therefore not included in all of the detailed analysis, which follows.



**Figure 2.1: Joint Land Use Study Region**

This Joint Land Use Study has produced numerous detailed Geographic Information Systems (GIS) data layers and other information for the entire seven county, RLUAC region. However, the most detailed land use analysis focuses on the area located within one mile of the Fort Bragg / Pope Air Force Base / Camp Mackall boundaries.

## C. PUBLIC INFORMATION MEETINGS

---

From January through June 2002 more than 200 people participated in a series of ten public information meetings, which were held throughout the seven-county, Joint Land Use Study (JLUS) area. The purpose of these meetings was to provide public education about the Joint Land Use Study and to seek public input into the process. Sampson County chose not to host a meeting.

**Table 2.1**  
**PUBLIC INFORMATION MEETINGS**

<b>Location</b>	<b>Date</b>	<b>No. of Attendees</b>
Hoke County - Raeford	January 17th	16
Scotland County - Laurel Hill Presbyterian Church	January 24th	31
Moore County - Carthage	January 31st	20
Cumberland County - Fayetteville	February 28th	6
Harnett County - Ben Haven Elementary School	March 14th	13
Richmond County - Rockingham	April 18th	11
Fayetteville - Chamber of Commerce	April 8th	25
Fayetteville - City Council	April 22nd	50
N.C. Sandhills Conservation Partnership	May 30th	10
Spring Lake - City Council	June 10th	30
<b>Total Attendees</b>		<b>212</b>

*For a complete listing of questions and responses raised at each public information meeting please refer to the Appendices.*

A digital slide presentation was developed and presented at each of the meetings. It described the growing encroachment issue plaguing many of the U.S. military installations, the creation of the Joint Land Use Study process established by the Department of Defense, Office of Economic Adjustment to address the problem, and the elements included in this JLUS. The presentation was followed by a discussion period, which was designed to answer questions and to encourage suggestions.

Although attendance was disappointing at several of the sessions, coverage by the local press was excellent. Following the meetings, positive news stories ran in the Raeford-Hoke News Journal, the Laurinburg Exchange, the Pilot (Southern Pines),

the Richmond Daily Journal (Rockingham), the Fayetteville Observer, and the Harnett County News -- greatly increasing the number of people who had the opportunity to read and learn about the JLUS process.

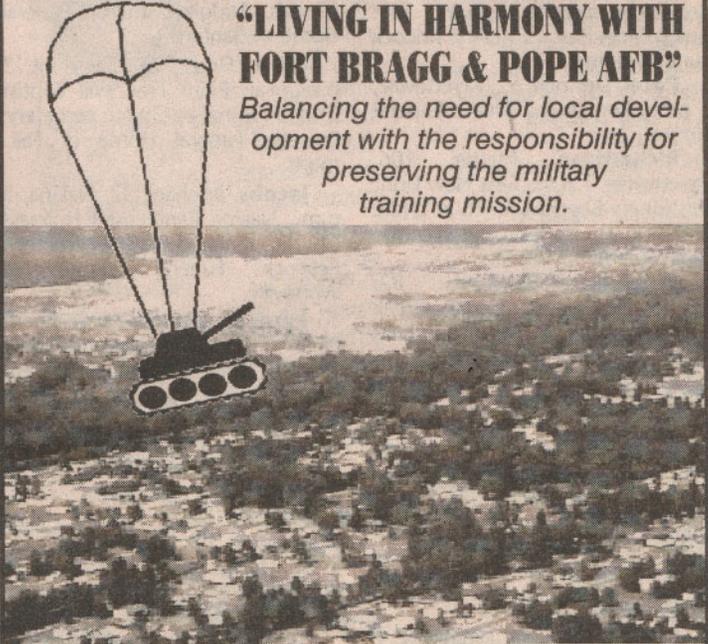
Issues and concerns raised by the participants varied from meeting to meeting and place-to-place. Residents of Cumberland County (Fayetteville and Spring Lake) were most interested in the military impact on the local economy. Participants in Scotland County were alarmed about the rumored possibility of losing their hunting privileges on Fort Bragg, Camp Mackall, and the Sandhills Game Lands. Scotland County participants also expressed concern about development encroachment adjacent to the game lands. Moore and Hoke County residents living near the military reservations were concerned about the closure of several gates, which provided access to popular trans-post arterial highways. Participants in Harnett County expressed concern about the potential negative impact on the private housing market by competition from the proposed new military housing.

Surprisingly, little concern was expressed by the participants about the small arms / artillery noise and the aircraft low-level flight patterns generated by the military. In many military communities these are the issues that cause the greatest distress and which lead to numerous complaints. The lack of expressed concern regarding the noise could be the result of broad public acceptance of the military training activities in this region. However, the low complaints are probably attributed to the lack of urban density population along portions of the undeveloped

perimeter of the military reservation where potential exposure to noise from military training activities exists.



**“LIVING IN HARMONY WITH  
FORT BRAGG & POPE AFB”**  
*Balancing the need for local development with the responsibility for preserving the military training mission.*



**PUBLIC HEARING**  
**February 28, 2002**  
**Fayetteville State University Shaw Auditorium**  
**School of Business & Economics**  
**Fayetteville, NC**  
**7:00 PM**  
**PUBLIC ATTENDANCE IS ENCOURAGED**  
SPONSORED BY: The Fort Bragg/Pope AFB Regional Land Use Advisory Commission  
For information, call (910) 829-6384 1781430t

**Figure 2.2: JLUS Public Hearing Add for the Cumberland County Region**

## **D. 1991 JOINT LAND USE STUDY: LAND USE POLICY RECOMMENDATIONS**

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This section lists the major recommendations contained in the 1991 Joint Land Use Study. They were organized into four parts. The first three (noise and accident potential zones, limitations on tall structures, and noise associated with low-level aircraft flights) were connected with major adverse affects associated with military training activities. The fourth part addressed institutional arrangements, especially intergovernmental coordination. The tables, figures and other information referenced in this section can be viewed in the original JLUS. Copies of the original 1991 JLUS are available upon request from the NC Department Of Commerce's Division of Community Assistance, Southeast Regional Office in Fayetteville. It must be noted that the brief recommendations below are bullet points from the original document, which contains detailed explanations of the recommendations.

### **1. Noise exposure and accident potential zones emanating from aircraft and artillery.**

The study proposed six noise and accident potential zones (NAPZ's): Clear zone, NAPZ 1, 2, 3, 4 and 5.

### **2. Limitations on tall structures, which can interfere with aircraft maneuvers and create danger.**

The study proposed height restrictions or height obstruction zones: A, B, C, D, E, F, G, H.

### **3. Noise and startle effects of low-level flights in the approach-escape corridors north of Fort Bragg drop zones.**

The study proposed low-level flight corridors: Zones A, B, and C

### **4. Regional scale and intergovernmental approaches.**

The study proposed creation of a regional land use commission (RLUAC).

### **5. Local Government / Military Implementing Policies.**

The study proposed a series of land use control recommendations for the local governments and military installations. The 1991 recommendations are listed on the following pages by county or municipality.

## **(A) Cumberland County Recommendations - 1991 JLUS**

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### Land Use Plan

- Adopt height restrictions under height obstruction zones (Table 4.1 and Figures 4.3 & 4.4)
- Adopt the racket and accident policy zones (Figure 4.7)

### Zoning Ordinance Revisions

- Actions recommended in Tables 4.2 and 4.3 should be adopted, and prohibitions on objects that protrude the surfaces defined in the height obstruction zones.
- Adopt overlay zones to require outside-to-inside noise level reductions.

### Subdivision Ordinance Revisions

- Require dedication of avigation easements
- Require disclosure statements
- Retrofit noise reduction incentives
- Adopt a voluntary development rights acquisition program

### Building Code Revisions

- Adopt standards to reinforce the requirement for noise level reduction.

## **(B) Spring Lake Recommendations - 1991 JLUS**

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### Land Use Plan

- Update and revise its 1981 Land Use Plan to incorporate the policies associated with the general recommendations.
- Adopt the noise and accident policy zones (Figure 4.8).

### Zoning Ordinance Revisions

- After digital zoning maps are completed by the county, determine specific areas of conflict between suitable uses and uses allowed by current zoning. Use the information for rezoning decisions.
- Adopt overlay zones to require outside-to-inside noise level reductions.

### Subdivision Ordinance Revisions

- Require dedication of avigation easements.
- Require disclosure statements.
- Retrofit noise reduction incentives.
- Adopt a voluntary development rights acquisition program.

### Building Code Revisions

- Adopt standards to reinforce the requirement for noise level reduction.

### Special Situations

Priority attention including acquisition of the land needed to widen the Clear Zone to a full 3,000 feet, relocation of mobile homes located in any of the NAPZ areas, and the phasing out of mobile home development in all NAPZs.

### Benchmarking Recommendations

All development activity (e.g. building permits, parcel subdivisions, etc.) and regulatory changes (e.g. changes to the land use plan, rezoning, variances, etc.) occurring in the vicinity of the noise, accident, and height hazard areas should be compiled in a digital map once a year through a joint effort by the county's Tax Office, Planning and Inspection's Department.

## **(C) Fayetteville Recommendations - 1991 JLUS**

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### Land Use Plan

- Incorporate Table 4.1 policy guidelines and consider Tables 4.10, 4.11 and Figures 4.9 in any plan revisions.
- Adopt the noise and accident policy zones (Figure 4.9).

### Zoning Ordinance Revisions

- After digital zoning maps are completed by the county, determine specific areas of conflict between suitable uses and uses allowed by current zoning. Use the information for rezoning decisions.
- Adopt overlay zones to require outside-to-inside noise level reductions.

### Subdivision Ordinance Revisions

- Require dedication of avigation easements.
- Require disclosure statements.
- Retrofit noise reduction incentives.
- Adopt a voluntary development rights acquisition program.

### Building Code Revisions

- Adopt standards to reinforce the requirement for noise level reduction.

### Benchmarking Recommendations

All development activity (e.g. building permits, parcel subdivisions, etc.) and regulatory changes (e.g. changes to the land use plan, rezoning, variances, etc.) occurring in the vicinity of the noise, accident, and height hazard areas should be compiled in a digital map once a year through a joint effort by the county's Tax Office, Planning and Inspection's Department.

## **(D) Hoke County Recommendations - 1991 JLUS**

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### Land Use Plan

- Incorporate Table 4.1 policy guidelines and consider Tables 4.12, 4.13 and Figures 4.4, 4.5 and 4.10 in any plan revisions.
- Adopt the noise and accident policy zones (Figure 4.10).

### Zoning Ordinance Revisions

- Adopt zoning for all areas within the NAPZ exposure areas that is consistent with Table 4.1.

### Subdivision Ordinance Revisions

- Require dedication of avigation easements.
- Require disclosure statements.
- Retrofit noise reduction incentives.
- Adopt a voluntary development rights acquisition program.

### Building Code Revisions

- Adopt standards to reinforce the requirement for noise level reduction.

### Benchmarking Recommendations

All development activity (e.g. building permits, parcel subdivisions, etc.) and regulatory changes (e.g. changes to the land use plan, rezoning, variances, etc.) occurring in the vicinity of the noise, accident, and height hazard areas should be compiled in a digital map once a year through a joint effort of the county's land records, building inspector's and planning departments.

## **(E) Scotland County Recommendations - 1991 JLUS**

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### Land Use Plan

- Incorporate Table 4.1 policy guidelines and consider Tables 4.14, 4.15 and Figures 4.5 and 4.11 in any plan revisions.
- Adopt the noise and accident policy zones (Figure 4.11).

### Zoning Ordinance Revisions

- Revise zoning for all areas within the NAPZ exposure areas making it consistent with Table 4.1.
- Adopt overlay zones to require outside-to-inside noise level reductions.

### Subdivision Ordinance Revisions

- Require dedication of avigation easements.
- Require disclosure statements.
- Retrofit noise reduction incentives.
- Adopt a voluntary development rights acquisition program.

### Building Code Revisions

- Adopt standards to reinforce the requirement for noise level reduction.

### Benchmarking Recommendations

All development activity (e.g. building permits, parcel subdivisions, etc.) and regulatory changes (e.g. changes to the land use plan, rezoning, variances, etc.) occurring in the vicinity of the noise, accident, and height hazard areas should be compiled in a digital map once a year through a joint effort of the county's land records, building inspector's and planning departments.

## **(F) Richmond County Recommendations - 1991 JLUS**

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### Land Use Plan

- Incorporate Table 4.1 policy guidelines (NAPZs & height restrictions) and consider Tables 4.16, 4.17 and Figure 4.11 in any plan revisions.
- Adopt the noise and accident policy zones (Figure 4.11).

### Zoning Ordinance Revisions

- Revise zoning for all areas within the NAPZ exposure areas making it consistent with Table 4.1.
- Adopt overlay zones to require outside-to-inside noise level reductions.

### Subdivision Ordinance Revisions

- Require dedication of avigation easements.
- Require disclosure statements.
- Retrofit noise reduction incentives.
- Adopt a voluntary development rights acquisition program.

### Building Code Revisions

- Adopt standards to reinforce the requirement for noise level reduction.

### Benchmarking Recommendations

All development activity (e.g. building permits, parcel subdivisions, etc.) and regulatory changes (e.g. changes to the land use plan, rezoning, variances, etc.) occurring in the vicinity of the noise, accident, and height hazard areas should be compiled in a digital map once a year through a joint effort of the county's land records, building inspector's and planning departments.

## **(G) Moore County Recommendations - 1991 JLUS**

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### Land Use Plan

- Incorporate Table 4.1 policy guidelines (NAPZs, height restrictions, and Military Overflight Zones) and consider Tables 4.18, 4.19 and Figures 4.6 and 4.11 in any plan revisions.
- Adopt the noise and accident policy zones (Figure 4.11).

### Zoning Ordinance Revisions

- Revise zoning for all areas within the NAPZ exposure areas making it consistent with Table 4.1.
- Adopt overlay zones to require outside-to-inside noise level reductions.
- Adopt Military Overflight Zone encouraging low-density development that corresponds with Figure 4.6.

### Subdivision Ordinance Revisions

- Require dedication of aviation easements.
- Require disclosure statements.
- Retrofit noise reduction incentives.
- Adopt a voluntary development rights acquisition program.

### Building Code Revisions

- Adopt standards to reinforce the requirement for noise level reduction.

### Benchmarking Recommendations

All development activity (e.g. building permits, parcel subdivisions, etc.) and regulatory changes (e.g. changes to the land use plan, rezoning, variances, etc.) occurring in the vicinity of the noise, accident, and height hazard areas should be compiled in a digital map once a year through a joint effort of the county's land records, building inspector's and planning departments.

## **(H) Harnett County Recommendations - 1991 JLUS**

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### Land Use Plan

- Incorporate Table 4.1 policy guidelines and consider Tables 4.20, 4.21 and Figures 4.6 and 4.12 in any plan revisions.
- Adopt the noise exposure, height restrictions, and low-level overflight areas as defined in Figure 4.6.

### Zoning Ordinance Revisions

- Revise zoning for all areas within the NAPZ exposure areas making it consistent with Table 4.1.
- Adopt overlay zones to require outside-to-inside noise level reductions.
- Adopt Military Overflight Zone encouraging low-density development that corresponds with Figure 4.6.

### Subdivision Ordinance Revisions

- Require dedication of aviation easements.
- Require disclosure statements.
- Retrofit noise reduction incentives.
- Adopt a voluntary development rights acquisition program.

### Building Code Revisions

- Adopt standards to reinforce the requirement for noise level reduction.

### Benchmarking Recommendations

All development activity (e.g. building permits, parcel subdivisions, etc.) and regulatory changes (e.g. changes to the land use plan, rezoning, variances, etc.) occurring in the vicinity of the noise, accident, and height hazard areas should be compiled in a digital map once a year through a joint effort of the county's land records, building inspector's and planning departments.

## **(I) Fort Bragg and Pope Air Force Base Recommendations - 1991 JLUS**

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### Pope AFB Runway 23

- Conduct an immediate study of extending the runway to the south-southwest to reduce the portion of Spring Lake exposed to noise and accident potential associated with NAPZ-1 and NAPZ-2.
  - Extension will enable the full 3000 feet recommended by FAA for the clear zone.
- Also, study should include projected changes in NAPZ zones on and off-post.
- If extension is not feasible, purchase land to enlarge clear zone to the recommended full extent.
- Begin a program of land and easement purchase in the NAPZ-1 and NAPZ-2 zones within Spring Lake.

### Land Use on the Bases

- Master Plans for physical development should reflect the NAPZs and general recommendations in Table 4.1.
- Incompatible uses with the zones and recommendations should be identified.
- Incorporate actions to structurally modify or utilize those existing structures for non-noise sensitive activities.
- New land development should be consistent with Table 4.1 recommendations so that the land uses will be consistent with projected NAPZs and the overall recommendations
- Pope AFB should adopt a more formal master plan, with text, analysis, maps, and recommended goals and policies that are consistent with the recommendations for Fort Bragg and which reflect the general recommendations.

The following section was developed to document the local government and military successes in implementing the 1991 JLUS recommendations.

## **E. LOCAL GOVERNMENT AND MILITARY SURVEY RESULTS - 2002**

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As part of the study two detailed surveys were designed and directed to the local governments and military entities that participated in the 1991 JLUS. This was done in an effort to determine how effective the JLUS recommendations had been in protecting the military training mission and in encouraging appropriate urban development patterns during the past decade.

A General Recommendations Survey was designed for Aberdeen, Hamlet, Hope Mills, Laurinburg, Pinehurst, Raeford, Sampson County, and Southern Pines since the 1991 JLUS offered only broad actions for them to take.

Specific Recommendations Surveys were directed to Cumberland County, Fayetteville, Harnett County, Hoke County, Moore County, Richmond County, Scotland County, and Spring Lake since the 1991 JLUS recommended a number of specific actions for them to implement.

**The following is a list of local government implementation successes, which have occurred over the past decade:**

### **1. Land Use Plan Revisions**

Spring Lake, Cumberland County and Fayetteville incorporated 1991 JLUS recommendations into their land use plans.

### **2. Zoning Ordinance Revisions**

Spring Lake adopted Noise and Accident Potential Zones.

Fayetteville adopted Noise and Accident Potential Zones in 1993.

Moore County has adopted low-density zoning in the noise and accident potential zones.

### **3. Subdivision Ordinance Revisions**

Cumberland County implemented a site plan review process with Ft Bragg/Pope Air Force Base.

### **4. Special Situations**

Spring Lake has begun phasing out old mobile homes through zoning.

### **5. Benchmarking**

None of the local governments surveyed have a current analysis of land use development near the military reservation.

Hoke and Scotland Counties would have difficulty collecting data to benchmark due to the lack of technological capabilities.

**The following is a list of military implementation successes since 1991.**

**1. Noise Monitoring Program**

Fort Bragg began a program to regularly monitor and update its noise contour information.

**2. New Construction Policy**

All new construction at Fort Bragg is now coordinated with Pope Air Force Base air space experts to avoid encroaching upon noise and accident potential areas.

New barracks are now constructed only in areas outside of the accident potential zones.

Only compatible land uses are now constructed on Fort Bragg.

A new \$7,000,000 warehouse was relocated away from the Pope Air Force Base runway.

**3. Property Purchases**

Fort Bragg purchased the McLean-Thompson Property in 1995 to protect Simmons Army Airfield from urban encroachment.

Fort Bragg purchased the Rockefeller Estate (Overhills) in 1997 to both expand its training areas and to protect Fort Bragg and Pope AFB from urban encroachment, and provide additional conservation lands for environmental protection and restoration.

**4. Protective Buffers**

Fort Bragg created a permanent buffering “green belt” area along the southern edge of its urban (or cantonment) area to protect the endangered red cockaded woodpeckers.

Although the 1991 JLUS produced a number of important implementation successes, the overall effort fell far short of the lofty goals of protecting the military reservation from urban encroachment and the surrounding civilian populations from noise and accident potential.

### 3 ISSUES DEFINED

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#### A. FORT BRAGG AND POPE AFB ECONOMIC IMPACTS

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Fort Bragg, home of the XVIII Airborne Corps and its approximately 45,000 soldiers, is a major dynamo, driving the economy of the seven county JLUS region. According to the 1990 *Fort Bragg - Pope Air Force Base Impact Assessment* report, the annual economic impact of Fort Bragg and Pope AFB was in the magnitude of \$1,164,066,000 in spending for goods and services and an additional \$383,890,000 in earnings.<sup>1</sup> Factoring the US Department of Commerce's Consumer Price Index inflation rate of thirty-four and four tenths percent (34.4%) for the 1989 through 1999 period, those amounts equal \$1,564,504,704 and \$515,948,160 respectively in 1999 dollar values.<sup>2</sup> That is assuming a flat rate of spending by the military installations over the past decade -- an unlikely scenario.

According to a more recent study conducted in 2000 by the Center for Entrepreneurship at Methodist College in Fayetteville, North Carolina, the annual economic effect of the bases was \$3.5 billion<sup>3</sup>

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<sup>1</sup> "Fort Bragg - Pope Air Force Base Impact Assessment", Department of City and Regional Planning, University of North Carolina at Chapel Hill, September 1990.

<sup>2</sup> US Department of Commerce, Consumer Price Index Inflation Calculator -- The most current figure available when this study was prepared in December 2002.

<sup>3</sup> "An Analysis of the Economic Impact of Fort Bragg and Pope Air Force Base", Dr. Sid Gautam and R. Akkihal.

#### B. FORT BRAGG TRAINING AFFECTS

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In addition to its significant economic benefits, Fort Bragg also generates a number of off base impacts, which can have a negative influence on the region -- most notably helicopter and artillery/small arms noise. However, the impacts are currently less than were originally reported in the 1991 *Joint Compatible Land Use Policy Report*.

At the time of the earlier study, computer simulation models of helicopter noise suggested that 65 + decibel noise levels were experienced from the end of the Simmons Army Airfield, across Fayetteville's College Lakes Subdivision and Methodist College, and extending nearly to Interstate 95 -- east of the Cape Fear River. Another significant area of projected helicopter noise was along the southern boundary of Fort Bragg -- extending from Cumberland County through Hoke County.

Since then Fort Bragg has commissioned a couple of on-the-ground noise monitoring studies and determined that the offending noise impact area is significantly less than was originally modeled.

Situated in the heart of Fort Bragg are four large impact areas, which consume hundreds of acres of land -- McPherson, Coleman, MacRidge and Manchester Danger Areas. It is into these areas that the Army's artillery and some small arms fire is directed. Due to the vast size of Fort Bragg and the strategic placement of these impact areas, nearly all of the serious artillery and small arms noise levels are contained within the boundaries of the military property. The most notable exceptions occur in Hoke County and portions of Cumberland County, along the southern boundary of the fort.

According to the 1991 *Fort Bragg - Pope Air Force Base Impact Assessment* report, 6,400 acres of land were located within Zone II noise contours (62 to 70 decibels C-weighted scale) and 240 acres were located within Zone III noise contours (>70 decibels C-weighted scale).<sup>4</sup> Aircraft noise greater than 65 decibels and artillery greater than 62 decibels are considered to be incompatible with residential development. (Please refer earlier reports for noise data methodology.)



**Figure 3.1: Artillery Field Operations**

<b>Fort Bragg Demographic Profile</b>	<b>Number</b>
Active Duty Military	45,232
Annual Reserve Components	30,466
Temporary Duty Students	2,780
Mobilized Soldiers Assigned	2,742
Civilian Employees (APF, NAF, etc.)	7,956
Contract Employees	1,843
Active Duty Family Members	73,420
Retirees & Family Members	89,131
<b>Total Population Supported</b>	<b>253,570</b>

**Table 3.1: Fort Bragg Demographic Profile**

More recently the noise levels were monitored and contours remapped in 2001 by the Department of Defense's Environmental Noise Program. For a number of reasons, including less available ammunition and more simulated weapons firing exercises, the serious noise levels of 62 and higher decibels have actually decreased in area from those identified in the 1991 study. In fact, it is now reported that noise levels exceeding 62 decibels escape Fort Bragg primarily in three small areas along its southern boundary in eastern Hoke County. Even at these locations noise is measured at levels, which do not exceed 70 decibels.

<sup>4</sup> Fort Bragg - Pope Air Force Base Impact Assessment, Department of City and Regional Planning, University of North Carolina at Chapel Hill, September 1990.

Following the release of the new noise monitoring study results in August 2001, the Fort Bragg / Pope Air Force Base Regional Land Use Advisory Commission (RLUAC) unanimously voted to retain the older, more expansive artillery noise contours as its base-line for making land use planning decisions. This determination was based upon the likely prospect of continued long-term growth and expansion of the military training needs and the enlargement of the Fayetteville and Aberdeen / Pinehurst / Southern Pines metro areas into more rural noise sensitive areas. However, the new Simmons Army Airfield and Camp Makall noise contours were used because there was not a concern of major changes in their respective training activities.

### C. POPE AIR FORCE BASE IMPACTS AND TRAINING AFFECTS

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Pope Air Force Base is a major component of the Fort Bragg/Pope AFB complex. Rightfully so, the base makes the claim that it puts the “air” in the Army’s airborne units. Not only are the base and its aircraft essential to the continued success of the Army’s airborne mission, it also makes an enormous positive impact on the region’s economy (which the Air Force defines as the area within a fifty mile radius of the base). According to its 1997 Economic Impact Statement Pope AFB, along with its 7,634 civilian and active duty military personnel, has an estimated annual economic impact of \$201.6 million on the region’s economy.<sup>5</sup>

**Table 3.2**  
**POPE AFB PERSONNEL BY CLASSIFICATION AND HOUSING**

Classification	Living On-base	Living Off-base	Total
Active Duty Military	945	3,900	4,845
Traditional Guardsmen/Reserve	0	0	0
<b>Total Military</b>	<b>945</b>	<b>3,900</b>	<b>4,845</b>
Active Duty Dependents			2,467
Appropriated Funds Civilian			322
<b>Total Civilian Personnel</b>			<b>2,789</b>
<b>Grand Total</b>			<b>7,634</b>

Source: *Air Installation Compatible Use Zone (AICUZ) Study for Pope Air Force Base, North Carolina, September 1999, Page 7*

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<sup>5</sup> *Air Installation Compatible Use Zone (AICUZ) Study for Pope Air Force Base, North Carolina, September 1999, Page 6.*

Along with the base's economic advantages come the dual negative impacts of off-base aircraft noise and accident potential -- especially in the area of Spring Lake and beyond. The primary approach to Pope AFB's 7,501-foot runway is over both the Deerfield residential subdivision and the northwestern portion of Spring Lake. Averaged day-night noise levels (DNL) ranging from 65 to 70 decibels are experienced in this area as C-130 and the A-10 military aircraft conduct their daily training missions.<sup>6</sup>



**Figure 3.2: C-130 Aircraft**

During 1998, the "Average Busy Day Aircraft Operations" at Pope AFB was 282.28 daily operations. According to Pope AFB officials, the "Average Busy Day" has increased by about sixty operations since that time. The "Average Busy Day" is a concept in which the annual operations are averaged over the number of flying days per year.

Weekends and holidays are considered non-flying days for aircraft based at Pope AFB, which typically fly five days per week. On the other hand transient aircraft operations occur on a 360-days-per-year basis, or nearly seven days per week. What this means for residents of the Deerfield Subdivision and the other areas constructed within the Pope AFB runway approach is that on any given week day approximately 195 aircraft takeoffs and landings take place over their homes during the hours of 6:00 a.m. to 11:00 p.m. -- averaging eleven per hour.



**Figure 3.3: A-10 Aircraft**

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<sup>6</sup> Ibid., Page 31.

**Table 3.3  
AVERAGE BUSY DAY AIRCRAFT OPERATIONS AT POPE AFB FOR 1998**

<b>Aircraft Type</b>	<b>Daily Arrival / Departure Operations</b>	<b>Daily Closed Pattern Operations</b>	<b>Total Daily Operations</b>
<b>Based:</b>			
C-130	67.20	52.20	119.40
A-10	50.58	13.16	63.74
CASA	7.70	0.00	7.70
F-27	0.80	0.00	0.80
UV-18	1.60	0.00	1.60
U-20	1.60	0.00	1.60
<b>subtotal</b>	<b>129.48</b>	<b>65.36</b>	<b>194.84</b>
<b>Transient:</b>			
A-10	2.16	0.00	2.16
C-5	1.42	0.02	1.44
C-9	1.58	0.00	1.58
C-12	2.32	0.00	2.32
C-17	2.88	0.02	2.90
C-21	1.22	0.00	1.22
C-130	22.92	30.44	53.36
C-141	9.68	0.10	9.78
Cessna	2.76	0.00	2.76
Ceech	1.00	0.00	1.00
UH-60	2.82	0.00	2.82
OH-58	2.22	0.00	2.22
Other Transients	3.88	0.00	3.88
<b>subtotal</b>	<b>56.86</b>	<b>30.58</b>	<b>87.44</b>
<b>Total</b>	<b>186.34</b>	<b>95.94</b>	<b>282.28</b>
<p>Note: An aircraft operation is defined as one takeoff/departure, one approach /landing, or half a closed pattern. A closed pattern consists of two portions, a takeoff/departure and an approach/landing. A sortie is a single military aircraft flight from the initial takeoff through termination landing. The minimum number of airfield operations for one sortie is two operations, one takeoff (departure) and one landing (approach).</p>			

Source: Pope AFB, 1998

To protect both the safety of a growing population and the integrity of the nation's Air Force bases, the US Air Force has developed the Air Installation Compatible Use Zone Study (AICUZ) process. Identified within these studies is detailed information regarding the base's economic impact on a region's economy, aircraft composition, flight operations, aircraft noise contours, and accident potential areas. In September 1999, Pope AFB completed efforts to revise its AICUZ. As indicated above, the study clearly enumerates an area of land use incompatibility, which extends from the Pope AFB runway through an area of northwestern Spring Lake and over the Deerfield residential subdivision. This area contains urban density residential and commercial development, even though it lies within both accident potential zones and noise sensitive areas. Spring Lake's willingness to regulate low-density development in the impacted area (through its zoning regulations) has helped prevent any significant expansion of the incompatible development over the past decade.

## **D. URBAN GROWTH AND ENCROACHMENT**

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The Fort Bragg / Pope Air Force Base military complex was created in 1918 near the conclusion of World War I. As with most other U.S. military installations, a deliberate effort was made to purchase enough land to sustain military training well into the distant future.

At the time of its origins, Fort Bragg was nearly ten miles from its closest neighbor -- a small village named Fayetteville, which had a population of only 8,900 people. At that time it would have been nearly impossible to imagine the transformation, which would occur at the military reservation and in the surrounding areas in just over eighty years. Since its creation Fort Bragg has become one of the world's premier military installations, with facilities to train and support nearly 45,000 soldiers and their family members. Fort Bragg's spectacular evolution has also spurred phenomenal population growth and development in the surrounding areas -- particularly in Fayetteville /Cumberland County.

Expansion did not immediately follow Bragg's creation, however. With the end of World War I and the country's desire to return to "normalcy", Congress provided only limited funding to develop the facilities at the new fort during its first twenty years of existence. Not until the country began mobilizing for our involvement in World War II did significant population growth begin to occur at Bragg and within the surrounding counties. As an example, from 1940 (just before the United States became involved in World War II) to 1960 Cumberland County's population grew by 150 percent (from 59,320 to 148,418 people). For the following twenty-year period (1960 to 1980), the population grew by an additional sixty-seven percent (from 148,418 to 247,160 people). Although the Fort Bragg / Pope Air Force Base region as a whole continued to experience population growth during the past twenty years (+22.6%), the rate of increase has dramatically declined with the conclusion of the Vietnam War era military buildup and the stabilization of the troop strength -- 45,000+ soldiers.

Today the Fort Bragg / Pope Air Force Base military complex is no longer positioned within a remote long-leaf pine forest -- it literally joins Fayetteville with a common boundary along its eastern edge. By the year 2000 several municipalities were beginning to encroach upon Fort Bragg's boundary in a number of locations.



Figure 3.4: Urban Encroachment



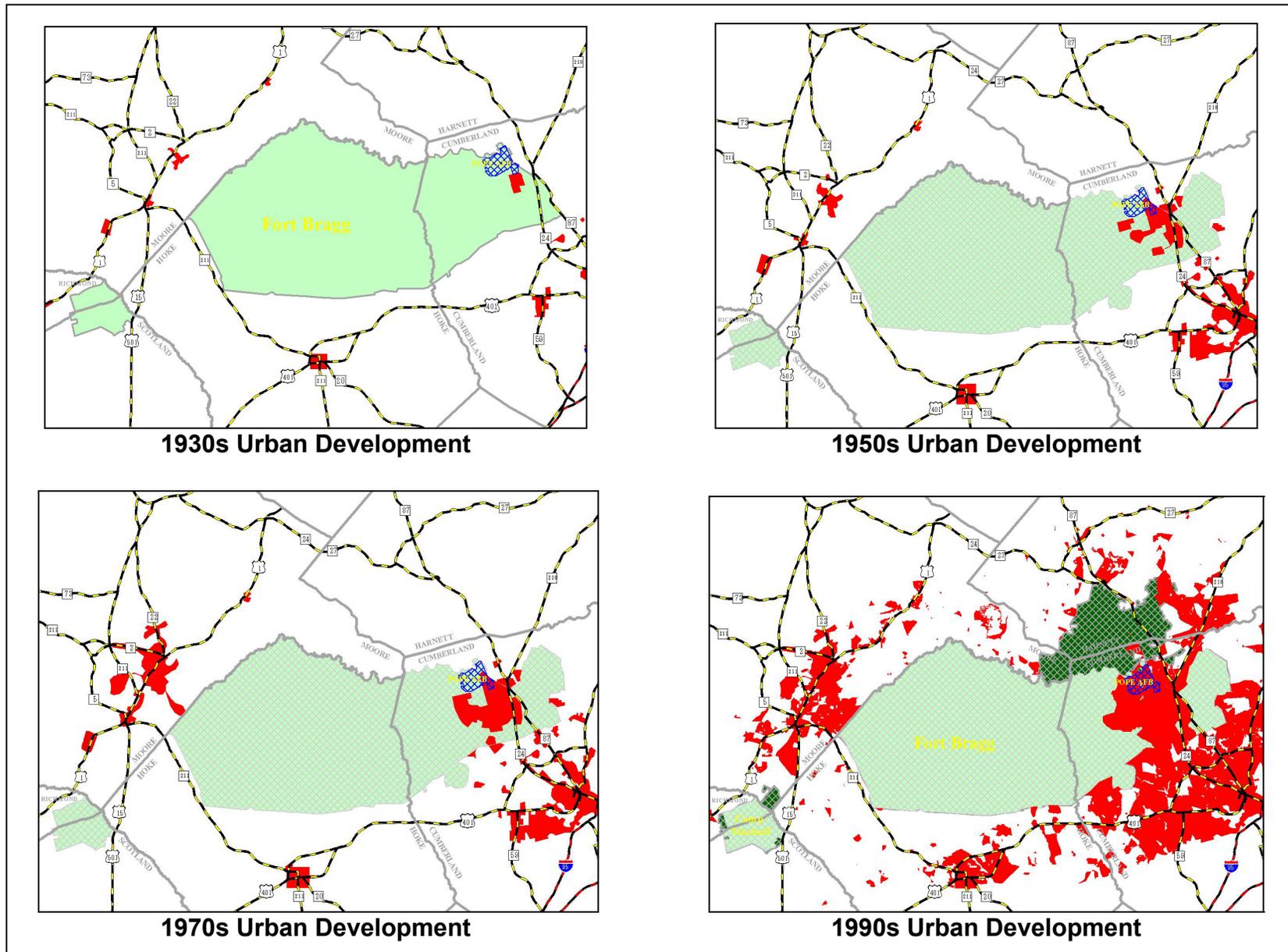
Figure 3.5: Urban Encroachment

The most notable examples of encroachment have occurred in Cumberland County as a result of the expanding populations of Spring Lake and Fayetteville. Fortunately for the military, this infringement is largely compatible with the military cantonment (or built) areas, which are located at the eastern edge of the military reservation boundary.

New development pressure is continuing to grow in Harnett County, along North Carolina Highway 87 north of Spring Lake, in the Aberdeen/Pinehurst/Southern Pines and Woodlake Country Club areas of Moore County, and along the southern boundary of Fort Bragg in Hoke County. The historical urban development is documented following page in Figure 3.6.

As a direct result of development, which has been permitted to expand in Hoke County near Fort Bragg's St. Mere Eglise Drop Zone, the Army has been forced to drastically modify its training activities in the area. Prior to the creation of the residential neighborhoods, St. Mere Eglise was utilized for heavy equipment drops from C-130 cargo planes. Now, because of the concentration of homes in the area and the presence of a large population, the drop zone can be utilized only for paratrooper landings. Heavy equipment drops must take place at more remote locations elsewhere on the Fort.

Although nearly eighty-one percent of the land in the Fort Bragg / Pope Air Force Base one-mile study area is still classified a rural as noted in the chapter four, encroachment and sustainability are no longer issues which can be ignored.

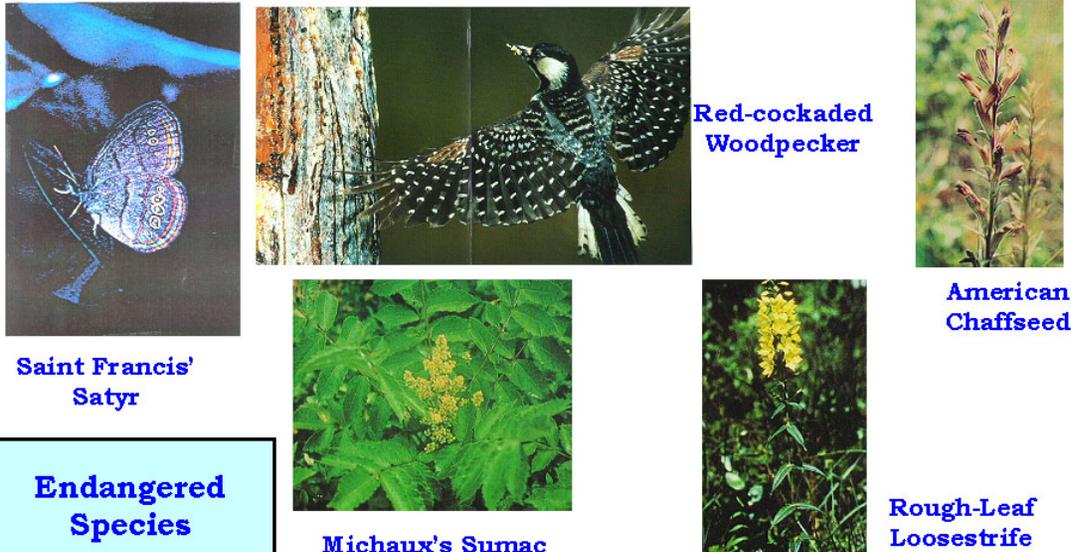


**Figure 3.6: Historical Urban Development Surrounding Fort Bragg / Pope Air Force Base**

## E. DESTRUCTION OF THE NATURAL ENVIRONMENT

For well over a decade now, efforts have been made by State and Local Governments, non-profit organizations and the Federal Government to raise the public's awareness of endangered plant and animal species, which are being threatened by urban development pressures located within the Sandhills region of North Carolina. The initial protection efforts in response to the Endangered Species Act focused on a specific species -- the Red Cockaded Woodpecker. However, over time a more comprehensive approach has begun to emerge which seeks to identify and protect North Carolina's endangered "Longleaf Pine Ecosystem" -- rather than one species.

**Encroachment Is More Than Just Noise  
and Accident Potential Issues:**



**Saint Francis' Satyr**

**Red-cockaded Woodpecker**

**American Chaffseed**

**Michaux's Sumac**

**Rough-Leaf Loosestrife**

**Endangered Species**

**Figure 3.7:**  
**Endangered Species within the Long-Leaf Pine Ecosystem**



**Figure 3.8:**  
**Long-Leaf Pine Ecosystem on Fort Bragg**

Due to a number of federal mandates, Fort Bragg and Pope Air Force Base initially had to bear the greatest responsibility for preserving the Ecosystem. Today, the responsibility for management and protection of the Ecosystem is shared with other stakeholders in the North Carolina Sandhills Conservation Partnership (NCSCP), which has been successful in developing a coordinated approach to the issue.

The NCSCP's mission is to *“coordinate the development and implementation of conservation strategies for the red-cockaded woodpecker, other native biota, longleaf pine and other ecosystems in the Sandhills of North Carolina compatible with the land use objectives of the partners.”* The mission and the goals of the Conservation Partnership are very compatible with those of the Fort Bragg / Pope Air Force Base Regional Land Use Advisory Commission.

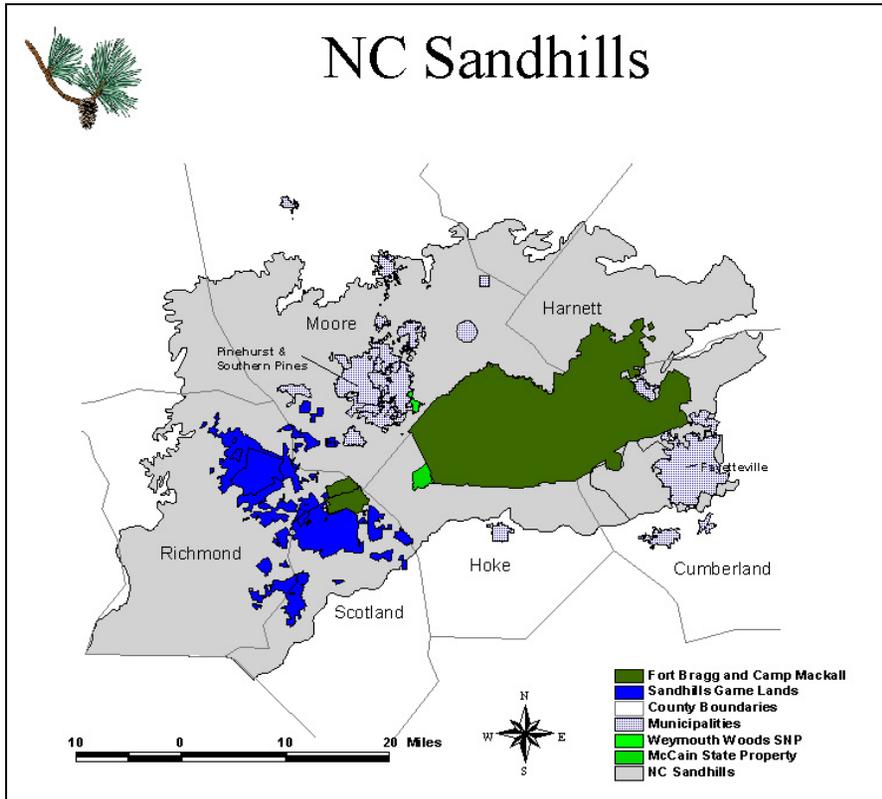
Since its formal establishment in 1999, the NCSPC has managed to include state agencies (North Carolina Natural Heritage Program, North Carolina Department of Commerce - Division of Community Assistance, North Carolina Department of Environment and Natural Resources - Divisions of Parks and Recreation and Forest Resources, and the North Carolina Department of Transportation), private landowners, realtors, county and municipal governments, Pine Needle Harvesters Association, private consulting foresters, the Nature Conservancy, Fort Bragg and other environmental groups among its stakeholders.

Working with its partners, the NCSCP has been successful in acquiring approximately 4,800 acres of key land for conservation purposes in the region surrounding the Fort Bragg / Pope Air Force Base military complex.

**Table 3. 4  
NCSCP CONSERVATION LAND PURCHASE**

Tract Name	Acreage	Purchase Price
Horse Creek	549	\$ 1,875,000.
QueWhiffle Creek	243	\$ 436,608.
Parsons	333	\$ 750,000.
Carvers Creek (Clark)	1,172	\$ 5,276,430.
Calloway	2,400	\$ 5,300,000.
Breeden	100	\$ 2 97,500.
<b>TOTALS</b>	<b>4,797</b>	<b>\$13,935,538.</b>

Source: U.S. Fish and Wildlife Service.



**Figure 3.9: Overall Map of the NC Sandhills Region**

In addition, the Conservation Center of the Sandhills, which consists of NCSCP partners, was established in downtown Southern Pines. The Conservation Center of the Sandhills now houses offices of the U.S. Fish and Wildlife Service, the U.S. Army Environmental Center, the Sandhills Area Land Trust, and the Nature Conservancy -- all under one roof.

A current and ongoing initiative of the North Carolina Sandhills Conservation Partnership is the development of a detailed inventory of the potential habitat areas of endangered plant and animal species indigenous to the "Longleaf Pine Ecosystem." It is also seeking the opportunity to establish an innovative "Longleaf Pine Ecosystem" National Wildlife Refuge on individual parcels of property assembled near the Fort Bragg boundary -- especially in Harnett, Hoke, Moore, Richmond, and Scotland Counties.

A negative side effect of properly managing the "Longleaf Pine Ecosystem" is the use of fire and the generation of smoke. Regularly scheduled controlled burns are required to maintain the flora and fauna of the Ecosystem. Naturally, such burns are not widely appreciated by the human population residing near the managed lands -- whether on or near the Fort Bragg property.

## F. TRANSPORTATION PATTERNS / GATE CLOSURES

Security has been an issue of concern for both Fort Bragg and Pope Air Force Base for many years. Pope AFB successfully dealt with the issue in the early 1980's, when it erected guard posts and chain link fencing around its entire perimeter boundary.

Due to its vast size and the number of North Carolina State highways that traverse it, Fort Bragg has found it difficult to duplicate Pope's isolation. Beginning a decade ago, during the Gulf War, Fort Bragg embarked on the task of erecting closable gates at each of the off-post entrances to the training lands. The roadways were rarely blocked until the September 11, 2001

terrorist attacks on New York City and Washington, DC. From that event until the present, several of the gates were closed and have remained barred. Not only is the Army now planning to keep those gates permanently closed, it is also in the process of developing a transportation plan with the affected local governments, businesses and NCDOT to eliminate the through traffic on Bragg Boulevard (by redirecting it onto an upgraded Murchison Road) and enclosing the entire cantonment area with chain link fences. Quite unexpectedly, commuting and transportation patterns have been permanently modified in the region around the military installations.

In addition, long-range transportation plans include the construction of a major limited-access highway system called the Outer Loop/US Highway 13 extension. The proposal calls for the new beltway to run from the I-95 / U.S. Highway 13 interchange (north of Fayetteville), along the eastern edge of Fort Bragg, and back to I-95 at a location south of the Town of Hope Mills. Construction of the first phase of the U.S. Highway 13 Bypass, which will connect I-95 with U.S. Highway 401 (Ramsey Street) north of the city, is nearing completion and should be open for use within a year. It is anticipated that this new highway segment will have an immediate impact on the development potential for the rural lands east of the Cape Fear River. Virtually overnight, the focus of new residential development could switch from eastern Hoke County (west of Fayetteville) to the closer and soon to be more accessible areas of northeastern Cumberland County.

Although commuting patterns were not studied for this report, it is likely that the permanent gate closures may have an impact on traffic congestion, increased commuting times, and the development potential of private lands along Fort Bragg's western boundary. It is also likely that the new U.S. Highway 13 extension will have a significant impact on the region's development and transportation patterns by making rural areas located further away from Fort Bragg attractive for residential development.



**Figure 3.10: King Road Gate – Permanently Closed**

## **G. U.S. AIR FORCE AIRCRAFT LOW-LEVEL APPROACH CORRIDORS**

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An important feature of Air Force training at Pope Air Force Base involves flying C-130 cargo planes approximately 300 to 500 feet above the ground while approaching and after leaving the Fort Bragg drop zones -- a tactic known as "nap-of-the-earth" flights. The significance of this training is that pilots need to practice their radar evading skills.

During the preparation of the 1991 Fort Bragg/Pope Air Force Base Joint Land Use Study, an effort was made to identify and map the approximate location of these approach corridors. It was assumed that, within a decade, residential development planned for these same over-flight areas would result in land use incompatibility problems. As a result, a series of recommendations were proposed which included the placement of warning signs along the state highways, deed disclosure statements, restrictive zoning districts, and possible property purchases by the military. To date the military, local governments, or private property owners have implemented none of these recommendations.

As described in Section two, a series of public information meetings were held in each of the participating counties at the beginning of this Joint Land Use Study process. One such well-publicized meeting was held at Ben Haven Elementary School, which is located in the heart of the over-flight area. Invitations to the meeting were mailed to local realtors and sent home by way of the school's approximately 500 students. Of the fewer than twenty people who attended the meeting, no one expressed concern about the noise or hazards associated with the low flying aircraft.

Air Force officials, interviewed for this study, believe that this issue has already been addressed in their current flight protocols. For example, flight patterns are being shifted on a continual basis throughout the year to avoid over concentration of flights in the same location. Even as the areas along the approach corridors continue to develop, Air Force personnel believe that their efforts are sufficient to protect its mission and to prevent civilian complaints.

## **H. URBAN LIGHT POLLUTION**

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Throughout history, warfare has traditionally been conducted during daylight hours with massed troop movements. As recently as the American Civil War (1860 through 1865) military operations would normally draw to a close once darkness set in -- commencing in daylight the next morning. Through the technical advances, which have occurred with transportation systems, weapons, and night vision equipment, it is now possible -- even preferred -- to conduct stealth military operations under the cover of darkness.

In order for military training exercises to simulate realistic battle conditions in the Twenty-first Century, it is necessary for soldiers and pilots to train in darkness. The growing urban population centers, surrounding the Fort Bragg / Pope Air Force

Base military complex, are making the evening sky ever brighter -- as more and more light pollution illuminates the atmosphere. The increasing light levels may compromise the effectiveness of night vision equipment and diminishes the realism of the training exercises.

It is beyond the scope of this study to examine the issue of urban night-light encroachment. However, a successful method/model of regulating and reducing the perceived growing threat of night-light pollution (generated by street/area lighting, businesses, industries, and homes in the region) should be developed to determine which training areas will be impacted by higher levels of light at night.

## **I. CELLULAR TOWER CONSTRUCTION**

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In addition to the aircraft low-level flight concerns which were addressed in the 1991 JLUS report, recent developments in the telecommunications industry have spurred increased demand for the construction of numerous cellular telephone towers within the Fort Bragg / Pope Air Force Base region. These towers often reach heights ranging from 300 to over 1,000 feet (comparable to a thirty to 100 story building). Such obstacles pose an even greater threat to safety of military pilots, the integrity of the flight corridors, and migratory birds (which get caught in the guy wires) than the construction of residential homes in the area.

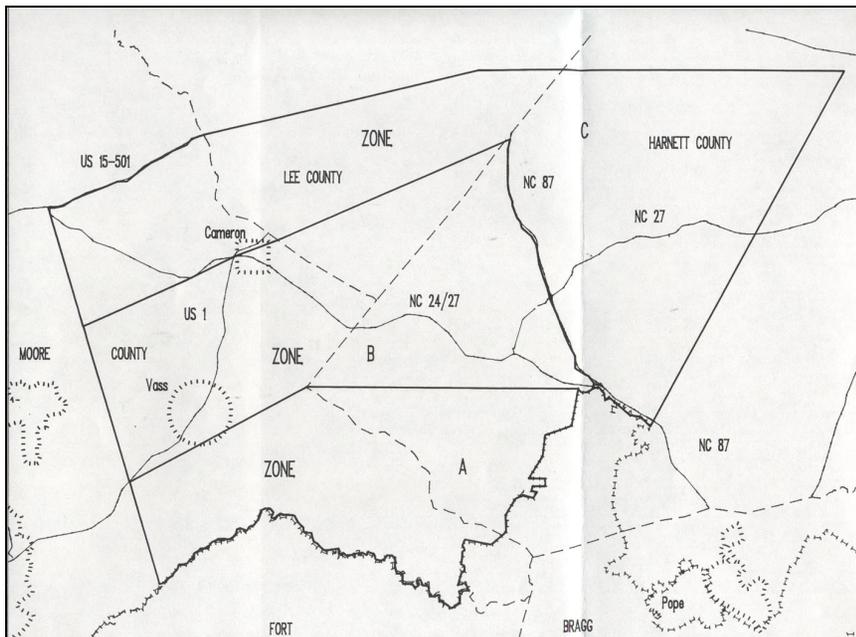
It is beyond the scope of this study to consider the full impact of this issue on the low-level flight corridors and the migratory bird flight patterns. However, cell tower encroachment and other towers may cause a reduction of realistic low-level flight training opportunities in the region and continue to result in the destruction of migratory birds.

# REGIONAL GROWTH AND LAND USE COMPATIBILITY

## A. INTRODUCTION

The analytical tools and computer technology used in land use planning has advanced tremendously since the 1991 Joint Land Use Study. At that time, Geographic Information Systems (GIS) were not widely utilized. Today, nearly all of the local governments in the surrounding counties have some form of GIS software capabilities. In fact, six of the seven counties have countywide digital parcel mapping that is maintained.

In the 1991 JLUS, detailed land use recommendations were made for the areas adjacent to the military reservation. However, the mapping was not of sufficient detail for the local planning agencies to implement the proposals. As seen below, a map depicting Zone A, Zone B and Zone C in Moore and Harnett Counties makes it nearly impossible to make a determination concerning boundary line designations on local zoning maps.



**Figure 4.1: Military Overflight Zones (1991 JLUS)**

The current GIS capabilities allow local planners to delineate the exact geographic location of any proposed zoning boundaries and conduct land use analysis. Some of the capabilities can be noted in the GIS analysis performed for this study.

## **B. JOINT LAND USE STUDY 2002 GIS PROJECT**

With funding from the Department of Defense, Office of Economic Adjustment and monetary, as well as in-kind contributions from local governments, the North Carolina Division of Community Assistance contracted with the Center for Geographic Information and Analysis (CGIA) to develop a regional GIS database project for the entire seven county study area. The CGIA project manager and his project staff worked with local governments to obtain digital parcel, orthophotography, zoning, infrastructure and other existing data to begin assembling the database. The CGIA staff had to “seam together” the various data layers using coordinate systems from each of the counties to unify the database. Each county projects its database in different geographic units and organizes its attribute data differently. Therefore, the data from each county had to be reprojected in order for it to match up at the county boundary lines.

The project work took nearly one year to complete. The result is a seamless GIS database for the entire region on nine compact discs. In addition to the local government data layers, CGIA assembled many statewide data layers as a part of the database. The entire GIS project includes parcels, orthophotos, transportation, infrastructure, and environmental data layers. The 130 layers of information are available from the Division of Community Assistance.

This enormous regional database has been analyzed to form the recommendations for this plan. The resulting analysis is detailed in the paragraphs and pages that follow.



**Figure 4.2: Joint Land Use Study 2002 – GIS Project**

## **C. REGIONAL POPULATION GROWTH AND CHANGE**

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As noted in Section three, the region has experienced significant growth from the military's role in the community. An increase in the surrounding population has had a direct impact on the landscape immediately surrounding the military reservation -- transforming what was once a very rural agricultural area prior to the 1980s into a much more urbanized landscape in some areas by the year 2000 as will be seen on the pages that follow.

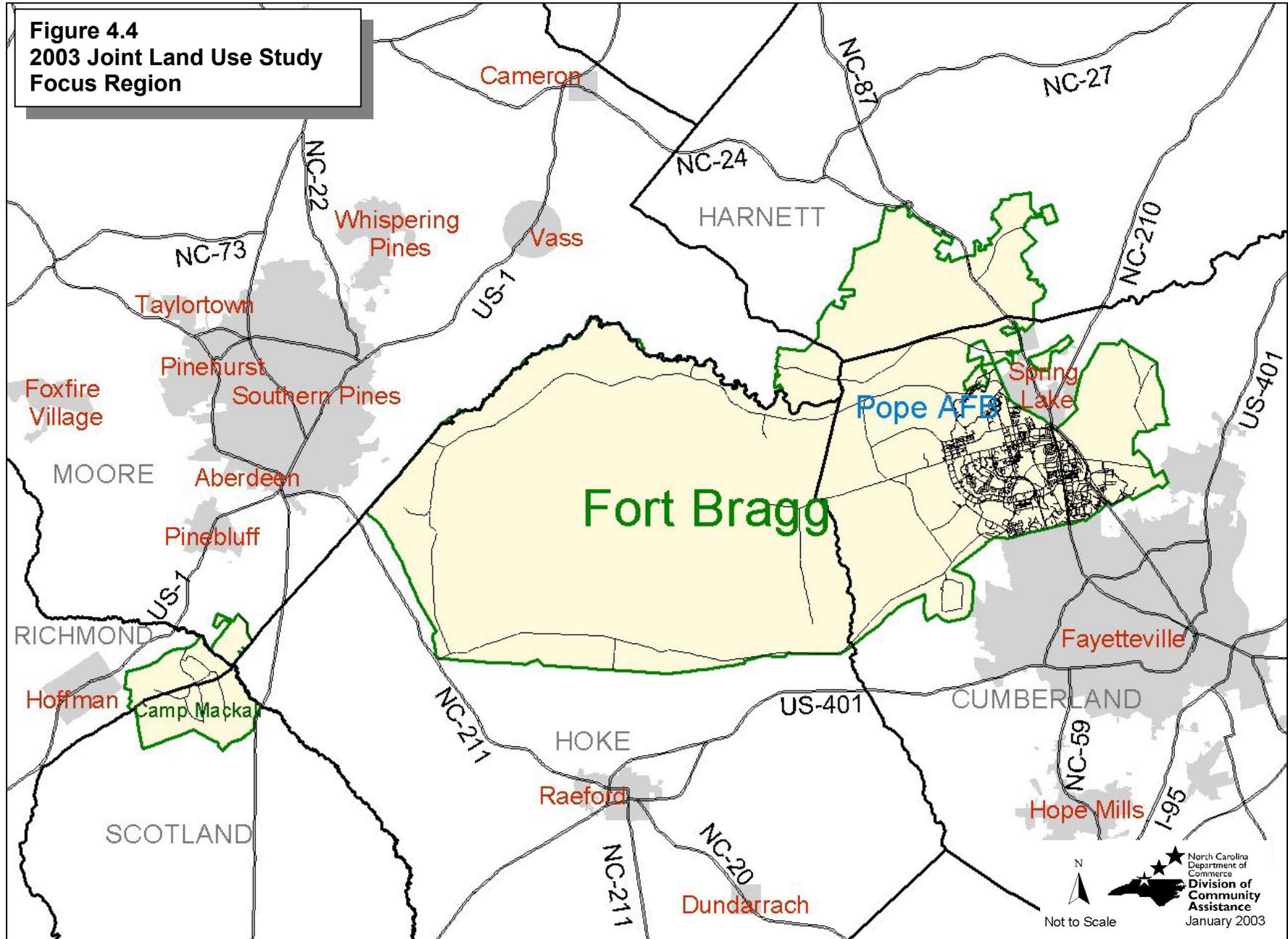
To begin understanding this change in population growth, the JLUS GIS database was utilized to display population density and growth changes. The US Census was used to determine the density figures. In addition to the Census data, aerial photography and orthophotos were examined to determine the population concentration and change as well.

For the detailed analysis, the focus region included Cumberland, Harnett, Hoke, Moore, Scotland and Richmond Counties, all of which have land within a one-mile area adjacent to the Military Reservation. Sampson County was not included in the focus region because Sampson County is neither adjacent to the military reservation nor susceptible to potential military training impacts. The one-mile region, which is analyzed later, contains the lands that are potentially incompatible with military training activities and have potential environmental protection issues related to development.

Maps displaying the region and the focus area for the Joint Land Use Study Region follow.



**Figure 4.4**  
**2003 Joint Land Use Study**  
**Focus Region**



## D. POPULATION DENSITY ANALYSIS

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Working with the 2000 and 1990 Census figures, the following categories were established to measure population density in relation to the type of development within the region. The general characteristics including the lot size and dwelling units per acre were also estimated.

The **Rural Classification** applies to areas which have a population of between 0 and 166.4 persons per square mile, 0 to 64 dwelling units per square mile, and lots that are ten acres or greater in size.

The **Transition Classification** applies to areas which have a population ranging from >166.4 to 554 persons per square mile, 64 to 213 dwelling units per square mile, and lots which range in size from 3 and 9.99 acres.

The **Urban Classification** applies to areas, which have a population of more than 554 persons per square mile, more than 213 dwelling units per square mile, and lots, which are less than 3 acres in size.

### ***METHODOLOGY FOR THE CLASSIFICATIONS***

**Determining Lot Sizes** - The lot size categories for Rural (10 acres or greater), Transition (3 to 9.99 acres), and Urban (less than 3 acres) areas were established by utilizing accepted “smart growth” principals and North Carolina standards for development. North Carolina Subdivision law specifically exempts lots ten acres or greater in size from local government subdivision regulation since they are considered to be rural in nature (NCGS 160A-376 (2) and 153A-335 (2)). Within the planning profession, it is generally accepted that areas, which are fully developed with lots of three acres or smaller in size are urban. The transition category was proposed to fill the gap between the areas identified as urban and those recognized as rural.

Using the 10-acre or greater category, the density assumption was made that at least one dwelling unit for each ten acres of land was in the rural area. The one dwelling unit per ten acres yields a maximum of sixty-four dwelling units per 640 acres, which is the same as sixty-four dwelling units per square mile.

**Example:**

1 dwelling unit per 10 acres

640 acres (square mile) ÷ 10 acres = 64 dwelling units per square mile

Determining Persons Per Square Mile - The persons per square mile figure was determined in order to establish the population density within each of the three designated categories. To begin this analysis the average persons per household figure for the region was determined.

The persons per household for the entire Fort Bragg / Pope Air Force Base Region (2.6) was determined by adding the "Average Persons Per Household" column in Table 5 and then dividing the sum by the number of counties adjacent to the military reservation boundary (6). Once again, Sampson County was not included in the focus area analysis.

**TABLE 4.1  
AVERAGE PERSONS PER HOUSEHOLD BY COUNTY**

County	Average Persons Per Household
Cumberland	2.65
Harnett	2.61
Hoke	2.86
Moore	2.38
Richmond	2.51
Scotland	2.61
<b>Six County Average</b>	<b>2.60</b>

\*Source: 2000 U.S. Census

With the establishment of the persons per household figure, the persons per square mile number could be calculated for each of the three density categories.

For example, the rural class contains a maximum of sixty-four dwelling units per square mile. The study region as a whole has an average household size of 2.6 persons. The sixty-four dwelling units, when multiplied by the 2.6 persons per household, equal 166.4 persons per square mile. This same process was followed to determine the persons per square mile for the transitional and urban classes.

**Rural Class (Yellow) – 0 to 166.4 persons per square mile**

1 dwelling unit per 10 acres

640 acres (square mile) ÷ 10 acres = 64 dwelling units per square mile

64 dwelling units × 2.6 persons per household = 166.4 persons per square mile

**Transition Class (Orange): >166.4 to 554 persons per square mile**

Minimum 1 dwelling unit per 3 acres (Maximum 1 DU per 9.99 acres)

640 acres (square mile) ÷ 3 acres = 213 dwelling units per square mile

213 dwelling units × 2.6 persons per household = 554 persons per square mile

**Urban Class (Red): >554 persons per square mile**

This class includes all development on lots where the density is greater than 1 dwelling unit per 3 acres.

**\*NOTE:**

All parcels and dwelling unit counts may not match perfectly with the designated categories. Some deviation does exist. The parcel and dwelling unit figures are generalizations that appear to be accurate when compared with the existing parcel size throughout the region. The rural and developed land use analysis in "E. Existing Level of Protection from Development of Rural Lands," utilizes existing county tax parcel data instead of the census data used in this analysis.

***REGIONAL POPULATION DENSITY PATTERNS***

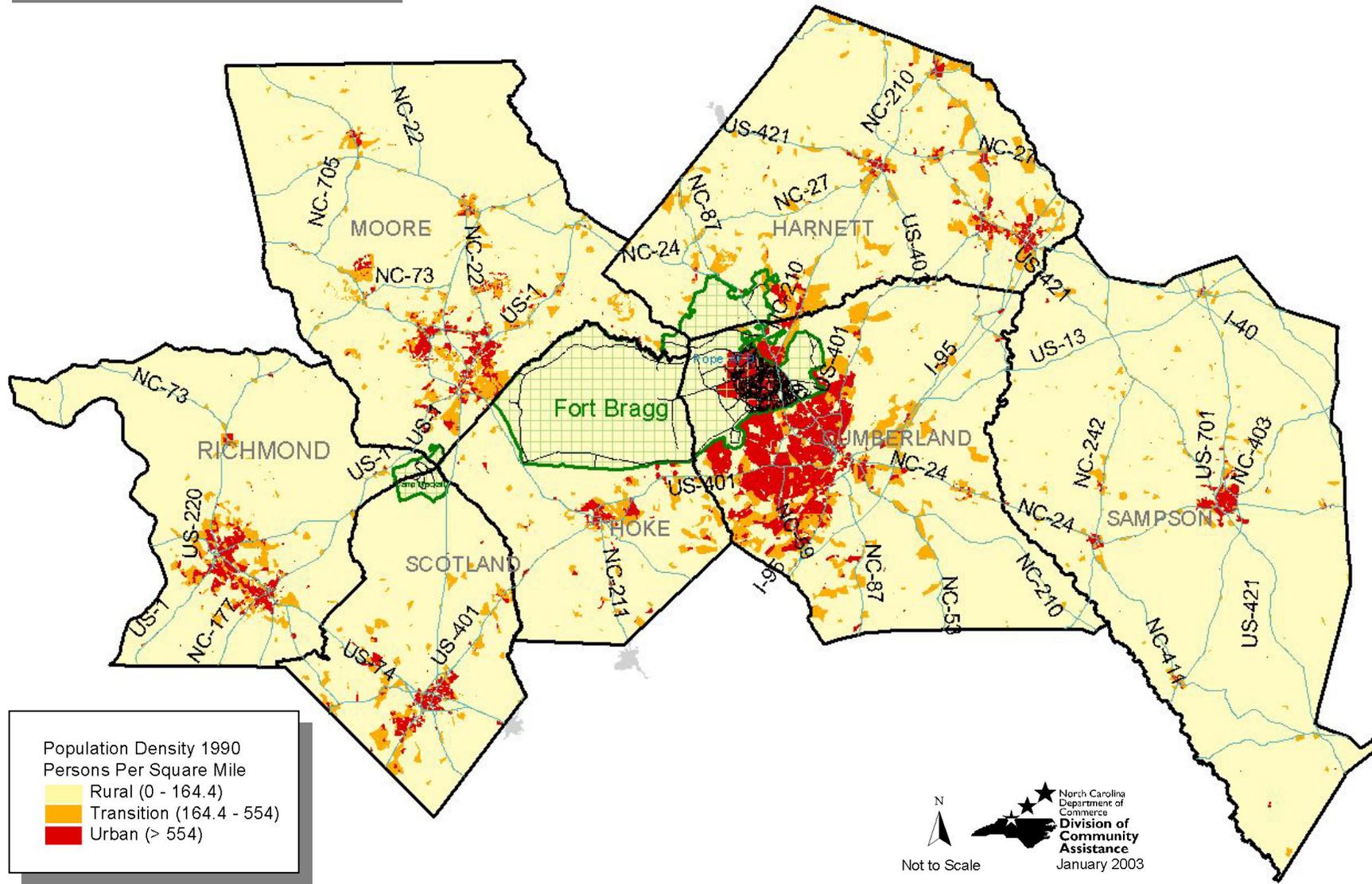
In 1990, the dominant urban centers are immediately noticeable, including the Cumberland County Urban Area, Rockingham/Hamlet, Laurinburg, Aberdeen/Pinehurst/Southern Pines, Raeford, Clinton and the intense urban area on post in the eastern portion of the military reservation. It appears that the urban density on the military reservation is adjacent to the high concentration of urban density off post in 1990. One area where incompatible population densities are most obvious is along the southern boundary of Fort Bragg near the Hoke and Cumberland County boundaries.

In 2000, the urban population densities have increased between the Raeford and Fayetteville urban areas. Much of the land has changed from the rural designation to the urban or transition categories. The population is being expanded at high-density levels along the southern boundary of Fort Bragg westward from Cumberland County into Hoke County.

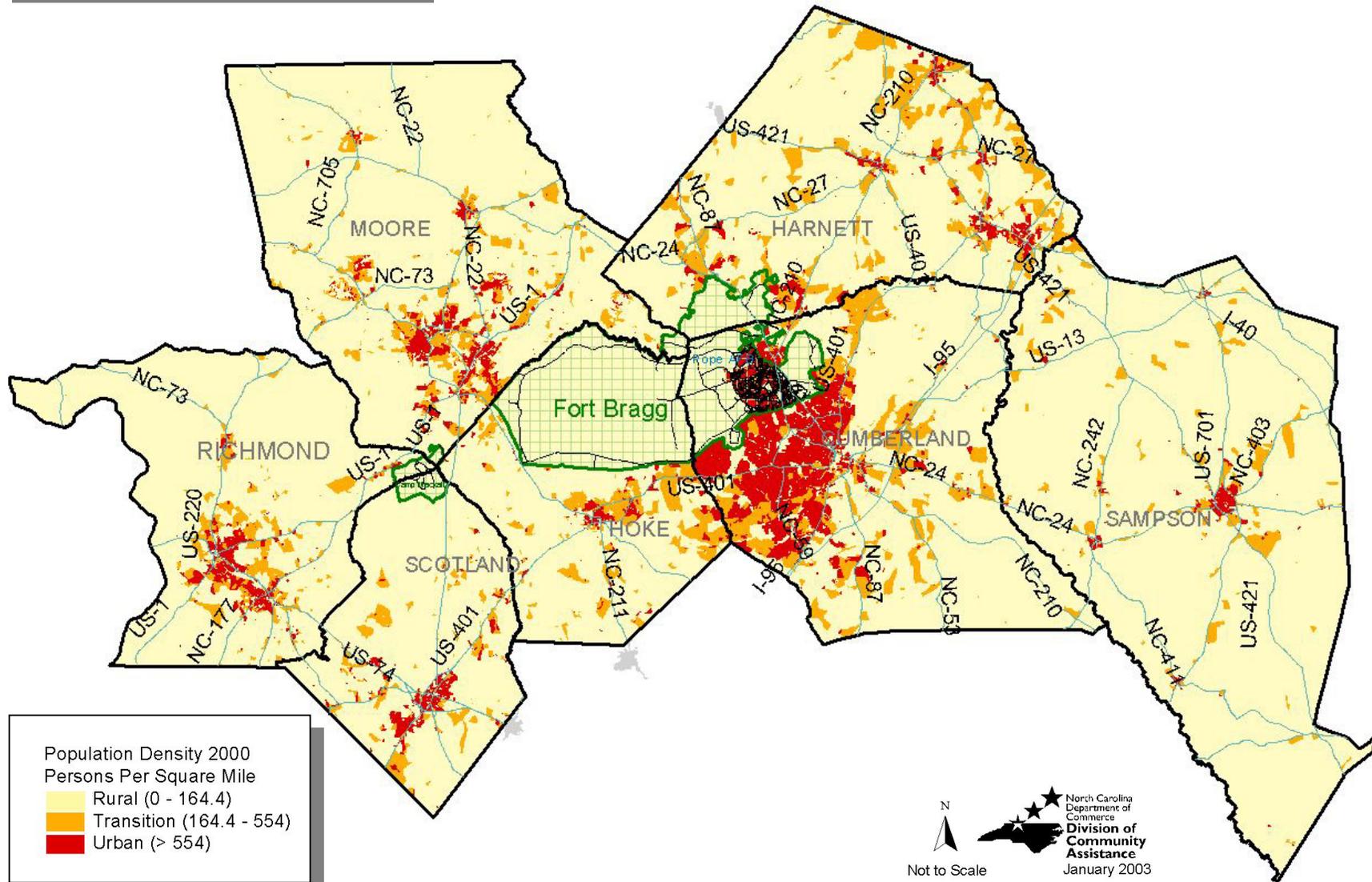
To the north of the military reservation (in western Harnett County), it is noted that an increase in urban and transition density is occurring along and adjacent to NC Highway 87.

At various locations near the military reservation are pockets of transition development that need to be monitored closely to prevent encroachment and incompatible land uses. Several examples are the areas near the Town of Hoffman adjacent to Camp Mackall and the areas between Camp Makall and Fort Bragg in Moore and Hoke Counties.

**Figure 4.5**  
**1990 Population Density**  
**Overall Seven County Region**



**Figure 4.6**  
**2000 Population Density**  
**Overall Seven County Region**



The table below displays the Census figures for the region's population in both 1990 and 2000. As noted on the population density maps the major concentration of population is in Cumberland County, with over fifty percent of the region's total population located therein. Harnett County accounts for fifteen percent and Moore nearly thirteen percent.

**TABLE 4.2  
POPULATION BY COUNTY - 1990 AND 2000**

County	1990	% of Region	2000	% of Region	% Change from 1990 - 2000
Cumberland	274,713	54.7%	302,963	51.8%	10.3%
Harnett	67,833	13.5%	91,025	15.6%	34.2%
Hoke	22,856	4.5%	33,646	5.8%	47.2%
Moore	59,000	11.7%	74,769	12.8%	26.7%
Richmond	44,511	8.9%	46,564	8.0%	4.6%
Scotland	33,763	6.7%	35,998	6.2%	6.6%
	502,676	100.0%	584,965	100.0%	16.4%

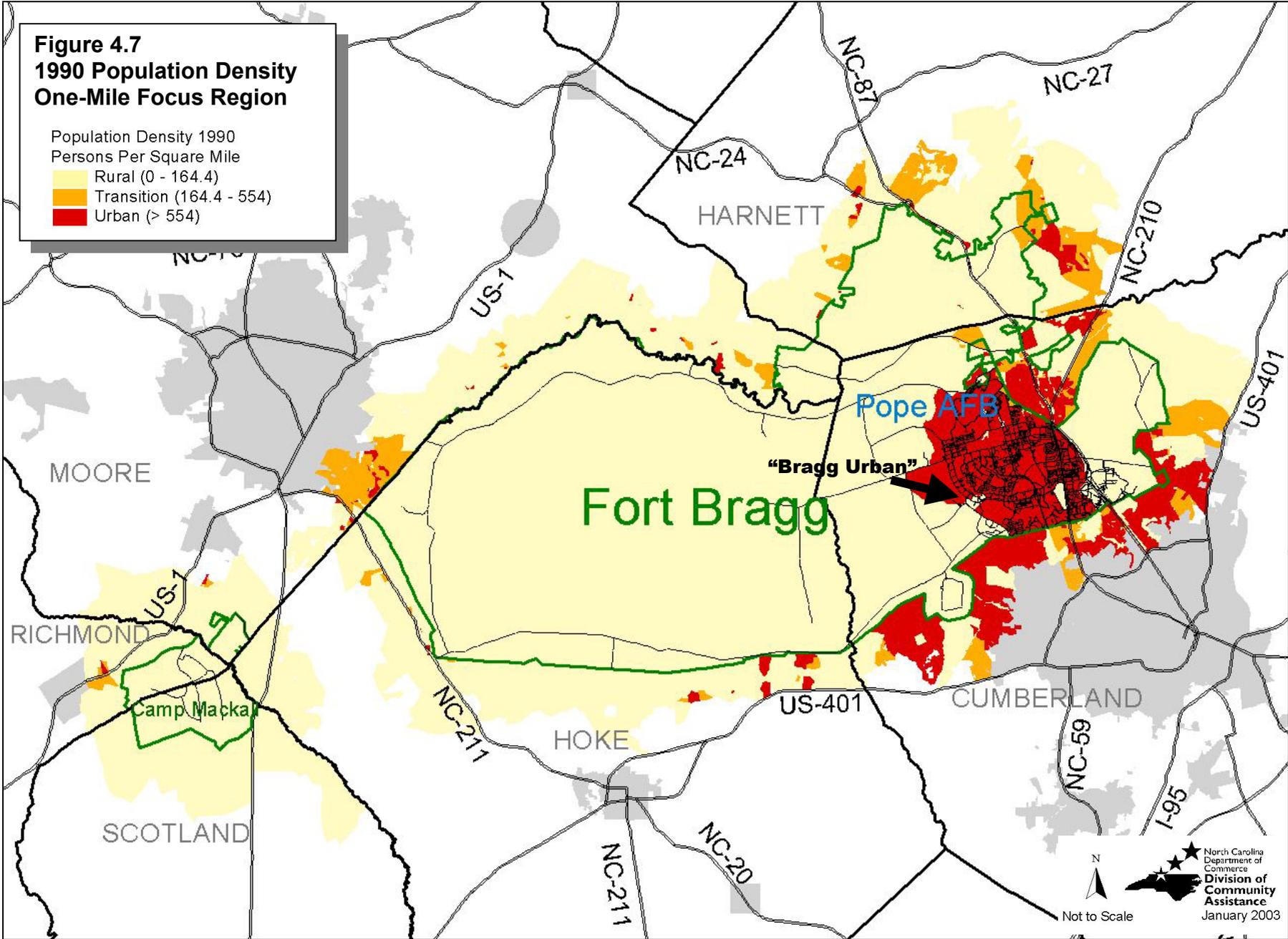
\*Sampson not included in this analysis.

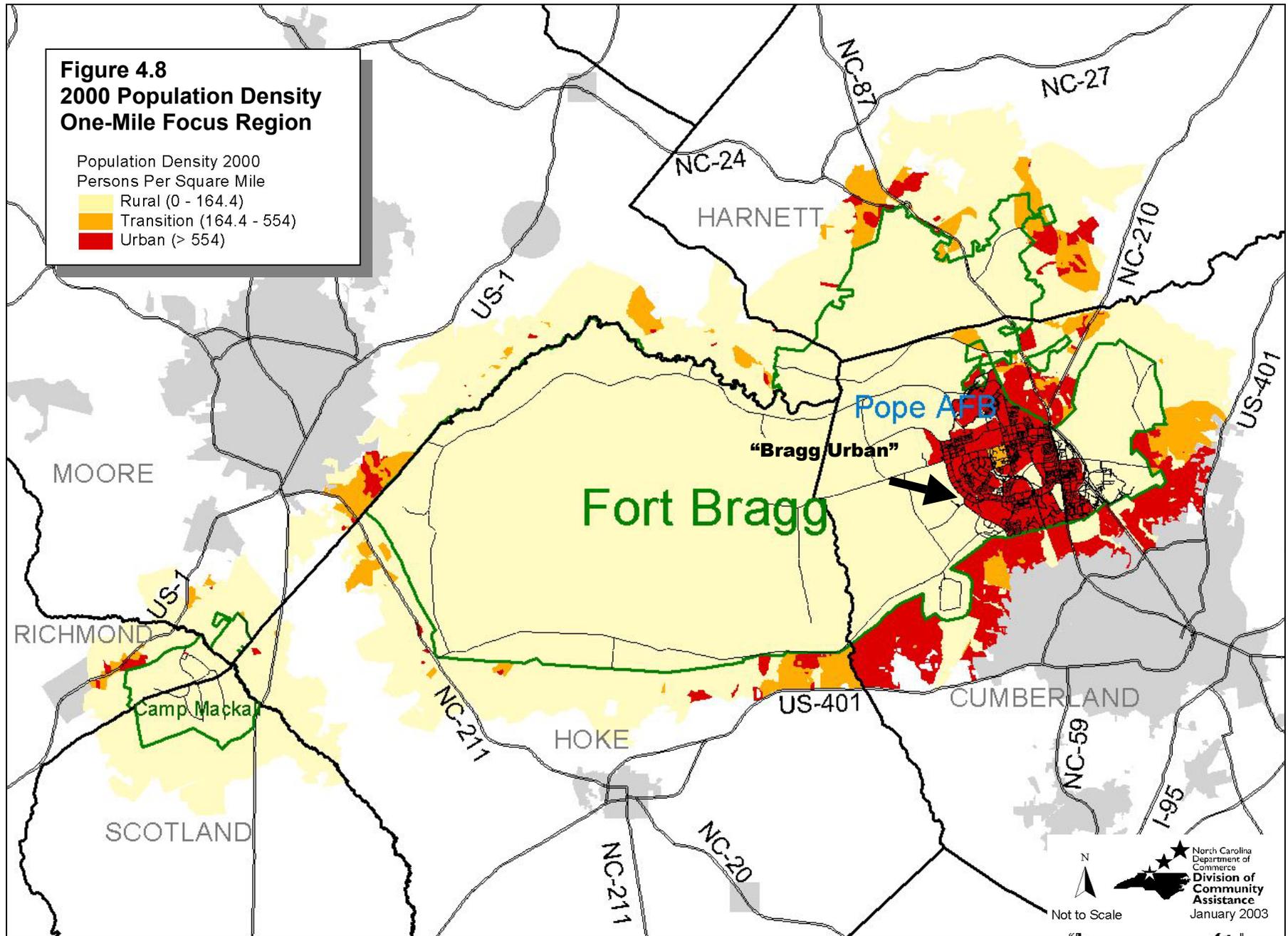
***ONE-MILE AREA ADJACENT TO THE MILITARY RESERVATION BOUNDARY***

Taking a closer look at the land in close proximity to the Fort Bragg/Pope Air Force Base/Camp Mackall boundaries, clear patterns of increased urbanization and encroachment can be identified -- especially within the one-mile area. The one-mile area is used in the detailed land use analysis recorded towards the end of this section.

As observed, the military's cantonment (or urban) area is adjacent to the major concentrations of urban development in the surrounding counties. The only exceptions are the large assemblage of transition land near the Aberdeen/ Pinehurst/ Southern Pines urban area and scattered pockets of higher population densities to the northeast of the military reservation and along its southern boundary.

By 2000, it is clear that urban population densities are expanding westward along the southern boundary of the base with increased density to the northeast.





The tables below depict the total population by county within the one-mile area surrounding the military reservation. The figures do not include the population on the military reservation.

**TABLE 4.3.  
POPULATION WITHIN ONE-MILE AREA SURROUNDING MILITARY BASES**

County	1990 Total Population - One-Mile Area	% of One-Mile Area	2000 Total Population One- Mile Area	% of One- Mile Area	% Change in One- Mile Area from 1990 to 2000
Cumberland	54,938	79.6%	61,106	73.8%	11.2%
Harnett	6,739	9.8%	11,125	13.4%	65.1%
Hoke	3,289	4.8%	6,180	7.5%	87.9%
Moore	3,391	4.9%	3,590	4.3%	5.9%
Richmond	421	0.6%	835	1.0%	98.3%
Scotland	204	0.3%	12	0.0%	-94.1%
Total	68,982		82,848		20.1%

**TABLE 4.4  
ONE-MILE STUDY AREA POPULATION PERCENTAGE OF TOTAL COUNTY POPULATION**

County	1990 Total Population One-Mile Area	% of County Population	2000 Total Population One-Mile Area	% of County Population
Cumberland	54,938	20.0%	61,106	20.2%
Harnett	6,739	9.9%	11,125	12.2%
Hoke	3,289	14.4%	6,180	18.4%
Moore	3,391	5.7%	3,590	4.8%
Richmond	421	0.9%	835	1.8%
Scotland	204	0.6%	12	0.0%
Total	<b>68,982</b>		<b>82,848</b>	

Cumberland County represents over seventy percent of the population within the one-mile study area with 61,106 persons, while Harnett County has thirteen percent of the total study area population with 11,125. In addition, twenty percent of Cumberland County's total population is within one-mile of the reservation. Nearly nineteen percent of Hoke County's total population is within one-mile of the boundary.

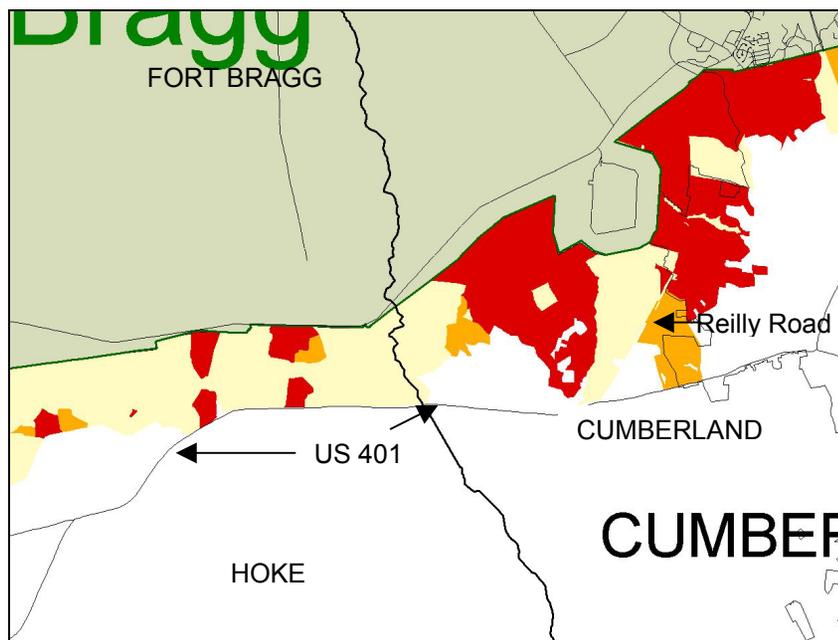
The percent population change from 1990 to 2000 for the entire one-mile study area was an increase of over twenty percent. As depicted in the density analysis, Harnett and Hoke Counties experienced a very high percentage of growth in the one-mile area from 1990 to 2000. Harnett's change was sixty five percent and Hoke's growth was eighty-eight percent. Two unexpected changes occurred in Scotland and Richmond Counties. They are such an anomaly that they are probably due to changes in the Census boundaries.

Taking a closer look at the focus growth areas can help in predicting future growth patterns and encroachment areas between the military and the civilian communities. It was already becoming clear by 1990 that compatibility issues were beginning to emerge, which raised concerns regarding the long-term sustainability of the military training mission.

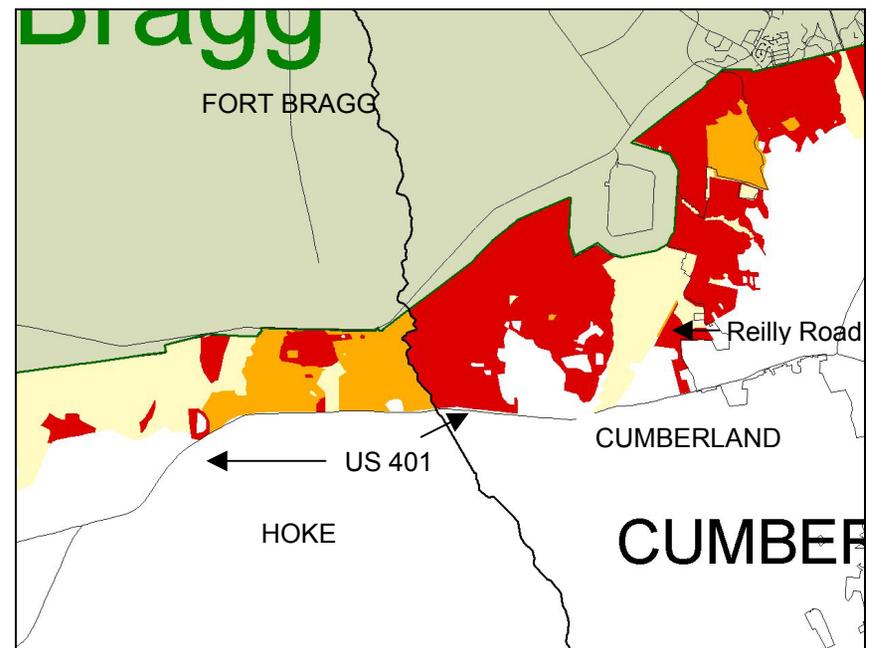
**CUMBERLAND COUNTY AND HOKE COUNTY CASE STUDIES**

The maps and images below depict the population and development changes which occurred along the southern boundary of the military reservation along US Highway 401 in Cumberland and Hoke Counties from the 1980's through the year 2000.

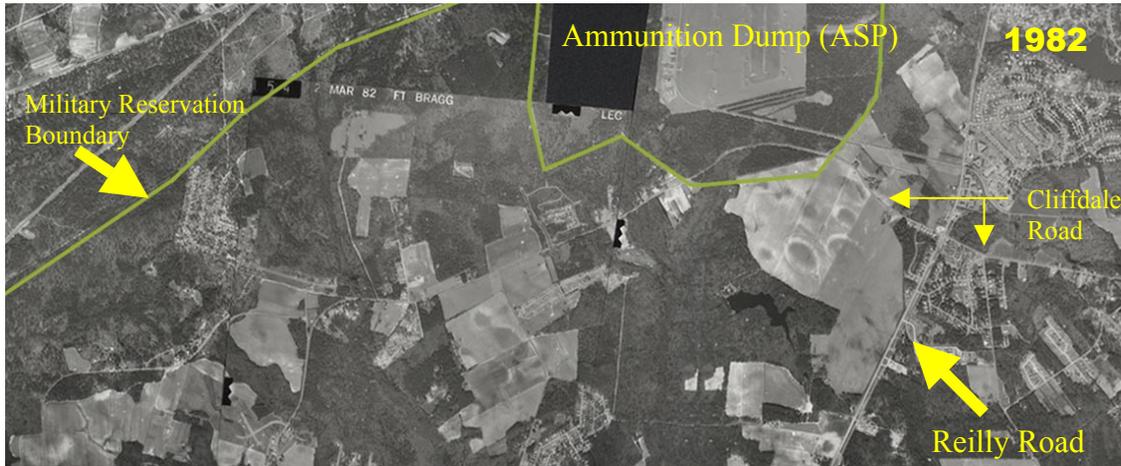
The maps, which follow, depict the high-density urban areas in Cumberland County, Hoke County and Harnett County in closer detail.



**Figure 4.9: 1990 Population Density  
Cumberland-Hoke Case Study**

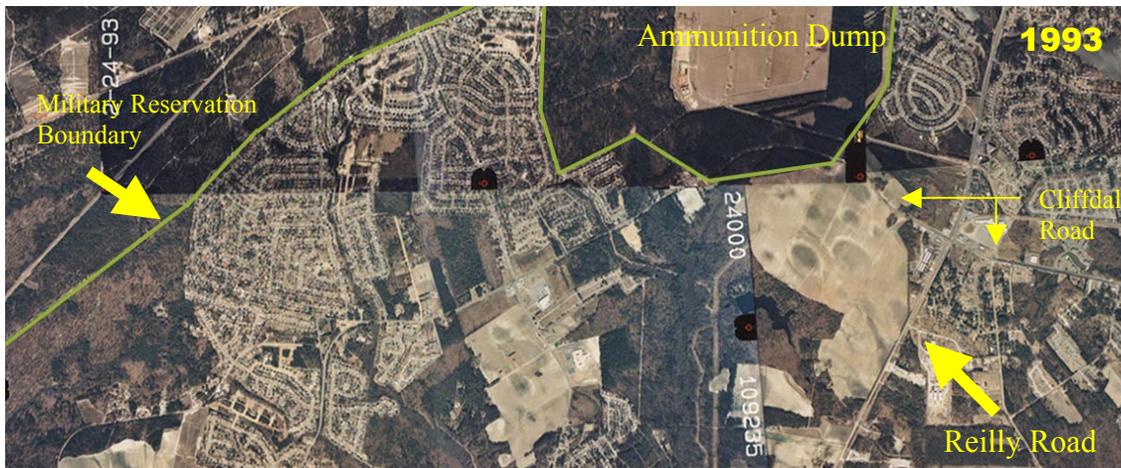


**Figure 4.10: 2000 Population Density  
Cumberland-Hoke Case Study**



**Figure 4.11: 1982 Aerial Image of Cumberland County - Cliffdale Road**

The 1982 aerial image displays the rural landscape of northwestern Cumberland County in 1982. The area is located along the southern boundary of Fort Bragg. A clear line of separation between urban and rural had been established at Reilly Road. The land on post includes the Army's ammunition long-term storage facility. Also noted, is the beginning of a subdivision to the far west of the existing urban growth. The small development was only the beginning of the increased urban growth that was to come.



**Figure 4.12: 1993 Aerial Image of Cumberland County - Cliffdale Road**

By 1993, development nearly surrounded the Army's ammunition disposal area and was pushing towards the Fort until it was contiguous with the military boundary line. Only a few larger parcels remained undeveloped.



**Figure 4.13 Development in the Cliffdale Road Area**

Figure 4.14 displays the continued increase in urban development, which had occurred adjacent to the Fort Bragg boundary by 2000. Several larger parcels remain undeveloped, however, close proximity to water and sewer make these parcels desirable for continued expansion. In the far western portion of the image, a new elementary school has been built and several new residential subdivisions have been constructed. Water and sewer lines have now been extended into these areas -- a situation, which will encourage increased urban development. Computer-enhanced images are displayed on the next page demonstrating how the area might look in the near future. Recent rezoning actions in this area will promote continued urban development. In addition, the urban services and schools will encourage further development in this area.



**New Residential Development and Elementary School**

**Figure 4.14: 2000 Aerial Image of Cumberland County - Cliffdale Road**



**Figure 4.15: Hoke Loop Road Before Development – Agricultural land recently rezoned to R10 density**  
 (Approx. 5 dwelling units per acre -- Cumberland County near Hoke County Boundary Line)



**Figure 4.16: Hoke Loop Road Potential Development** (Water and Sewer are now available).  
 (R10 = Up to  $\pm$  5 dwelling units per acre in Cumberland County)



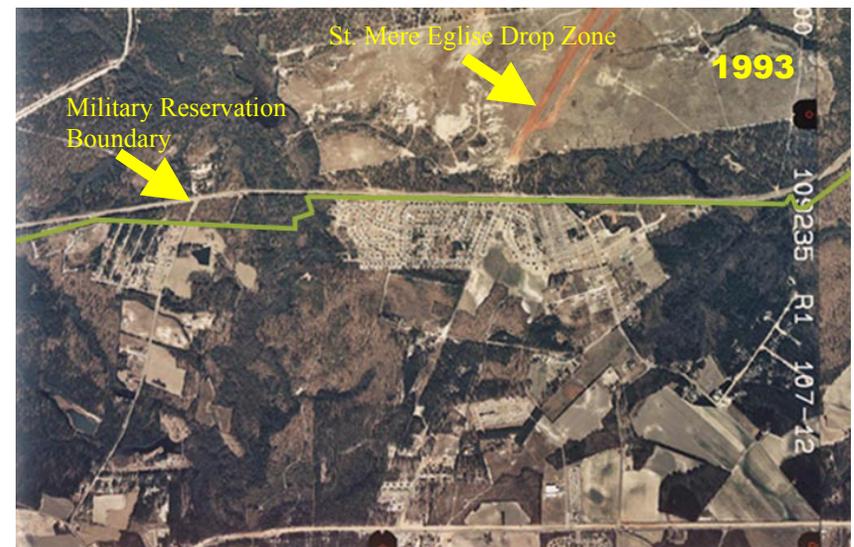
**Figure 4.17: Hoke Loop Road Potential Development**  
 (If opposite side of road is rezoned to R10.)

The 1982 aerial image below displays land located in Hoke County, which is adjacent to the southern boundary of Fort Bragg and is neighboring land shown in the previous aerial images. It is also located next to the St. Mere Eglise Drop Zone. In the left portion of the photograph one can see the beginning of a manufactured home park. This was the only urban density development in the area. The remaining land was agricultural and low-density rural development.

By 1993, significant urban density development had occurred in the area. Because of this incompatible growth, Ste. Mere Eglise Drop Zone had to be closed to all heavy equipment drops -- limiting its use to only small numbers of paratroopers. With the extension of water lines to serve this area, it has grown into an urbanized place.



**Figure 4.18: 1982 Aerial in Hoke County Ste. Mere Eglise Drop Zone**



**Figure 4.19: 1993 Aerial in Hoke County Ste. Mere Eglise Drop Zone**

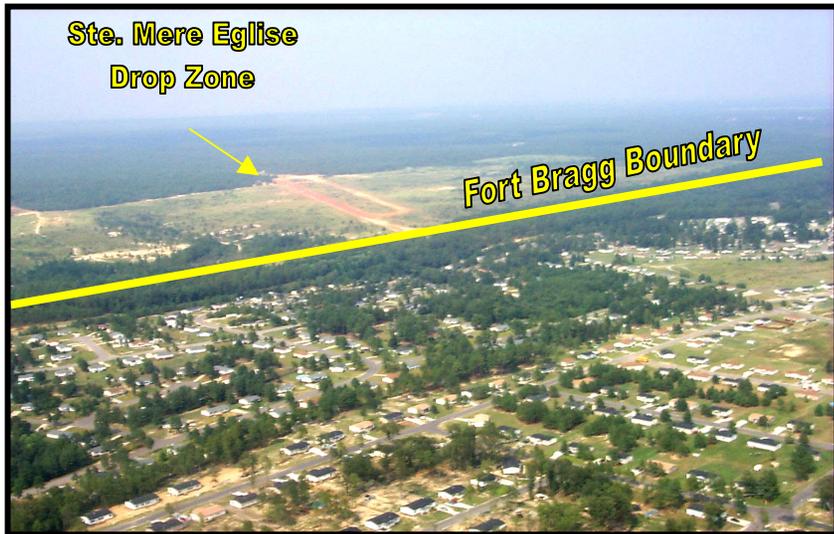
Sewer lines have now been extended into this area -- which should continue to place a demand for more urban density development. Dirt travel ways have been upgraded to paved roads, which now serve new rapidly expanding housing developments.



**Figure 4.20: 2000 Aerial in Hoke County Ste. Mere Eglise Drop Zone**



**Figure 4.21: Development in Hoke County - Wayside Road**



**Figure 4.22: Aerial View of Development Adjacent to Ste. Mere Eglise Drop Zone**



**Figure 4.23: Development in Hoke County - Wayside Road**



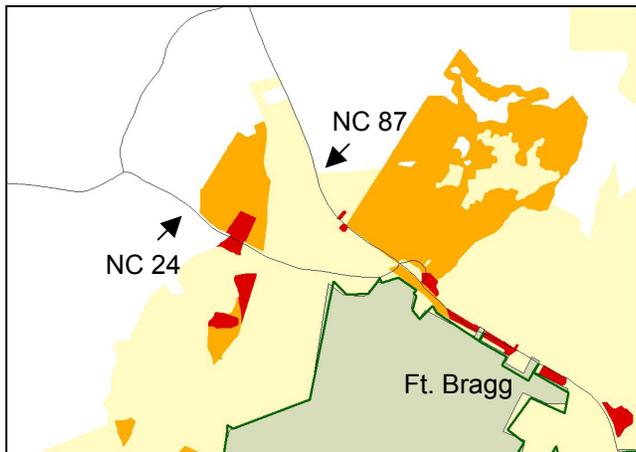
**Figure 4.24: Development in Hoke County  
Hobson Road**



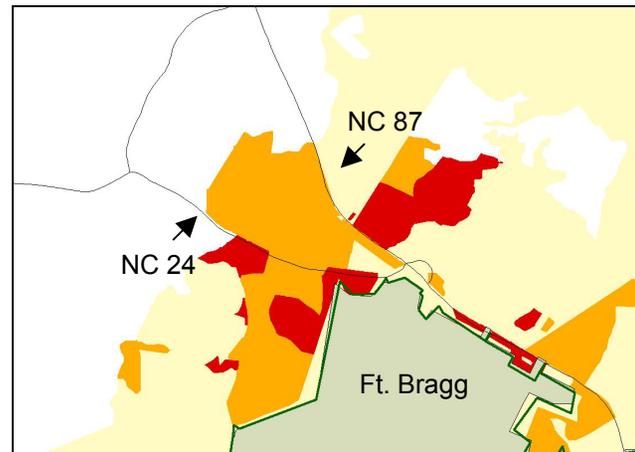
**Figure 4.25: Development in Hoke County  
Hobson Road**

***HARNETT COUNTY ALONG NC HIGHWAY 87 CASE STUDY***

Growth along the Northeastern portion of the Fort Bragg Military Reservation is also very dramatic. From 1990 to 2000 the population grew by sixty-five percent within the one-mile area in Harnett County. The images below display the population density and aerial photos of the growth since 1990.



**Figure 4.26: 1990 Population Density – Harnett County**

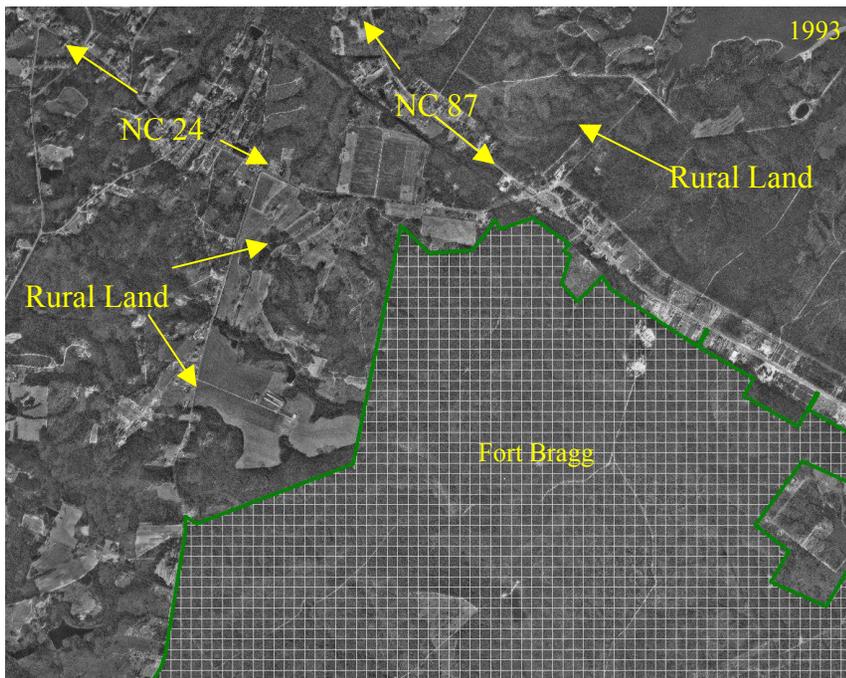


**Figure 4.27: 2000 Population Density – Harnett County**

In 1990, some development was identifiable immediately adjacent to the military boundary. Although there was very little urban density development, a significant amount of transition density development was present.

The 2000 population density shows the transition from a more rural area to an increasingly developed one. Much of the transition density area was transformed into urban density development and a significant amount of the rural land was transformed into transition and urban density usage.

The aerial photos that follow confirm the population density figures and other Census population growth figures. Much of the rural land that was present in the 1993 aerial photograph was converted to dense residential development by the year 2000.



**Figure 4.28: 1993 Aerial Image – Harnett County**



**Figure 4.29: 2000 Aerial Image – Harnett County**

The areas depicted above are examples of good land use compatibility. As noted in Figure 4.24, Fort Bragg is planning housing for the areas adjacent to civilian urban development that includes residential and commercial uses.

## **E. EXISTING LEVEL OF PROTECTION FROM DEVELOPMENT OF RURAL LANDS**

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One of the main issues of concern for this study was whether or not there was an adequate level of protection (or impediments to development) for the undeveloped or rural lands within the one-mile study area. It was assumed, but not documented, that certain environmental and governmentally imposed regulations already served as some level of protection for the rural lands.

The first step in this analysis was to identify the rural lands utilizing the definitions and classifications established in an earlier section. Parcels greater than ten acres in size were coded as rural. The parcels were then overlaid with the year 2000 aerial photography to determine if the classification was appropriate. It was discovered that in some cases the ten-acre or larger parcels contained significant urban density development, which included manufactured home parks, commercial uses, and industrial developments. The parcels which were ten acres or greater in size, and contained significant development, were reclassified as urban. The parcel data contained within the "Joint Land Use Study 2002 - GIS Project" was used to make this classification.

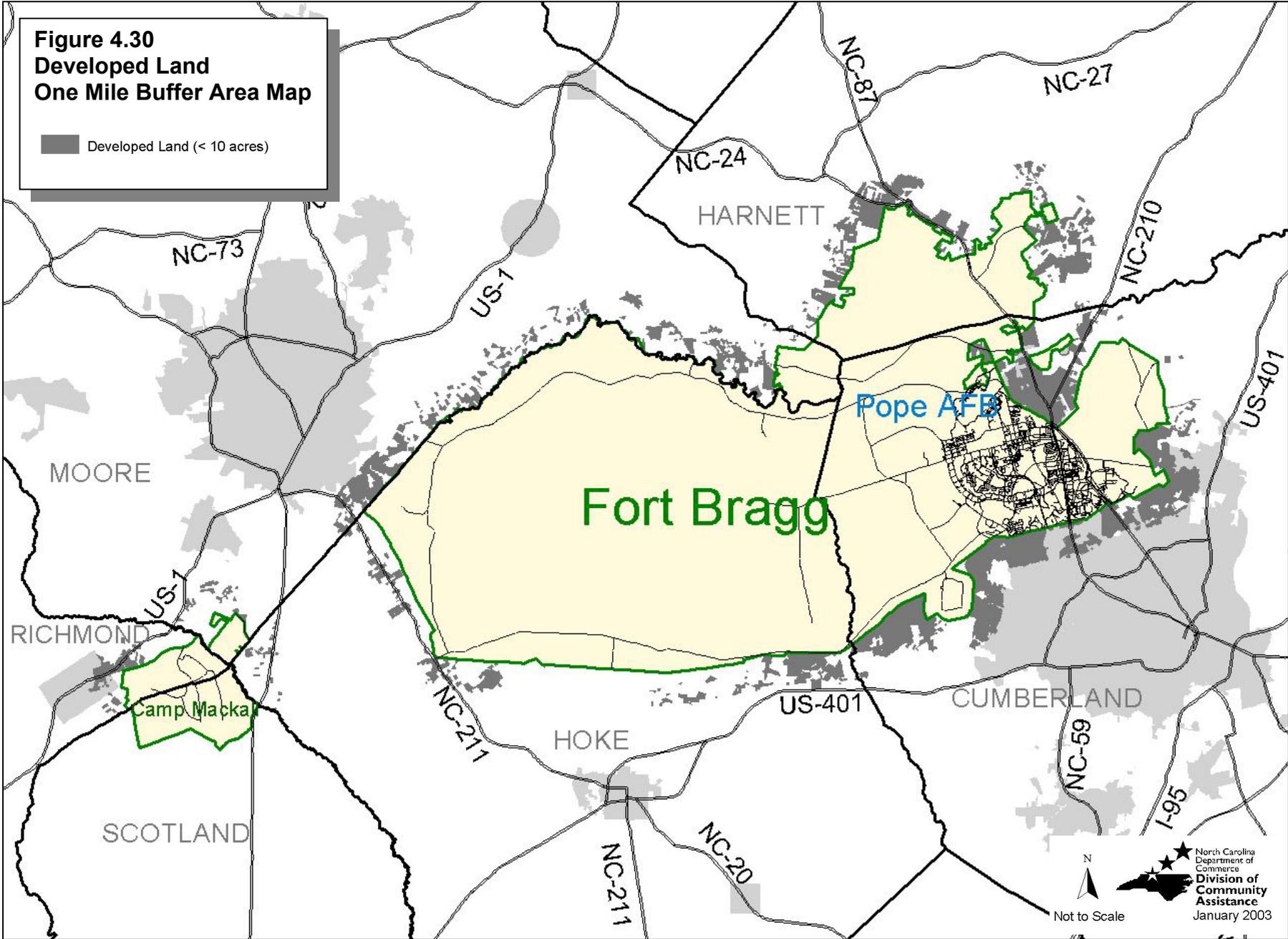
The following map images display the parcel data for the entire one-mile study region. The first map shows developed (or urban) lands. Nineteen percent of the total land area within one mile of the reservation is classed as

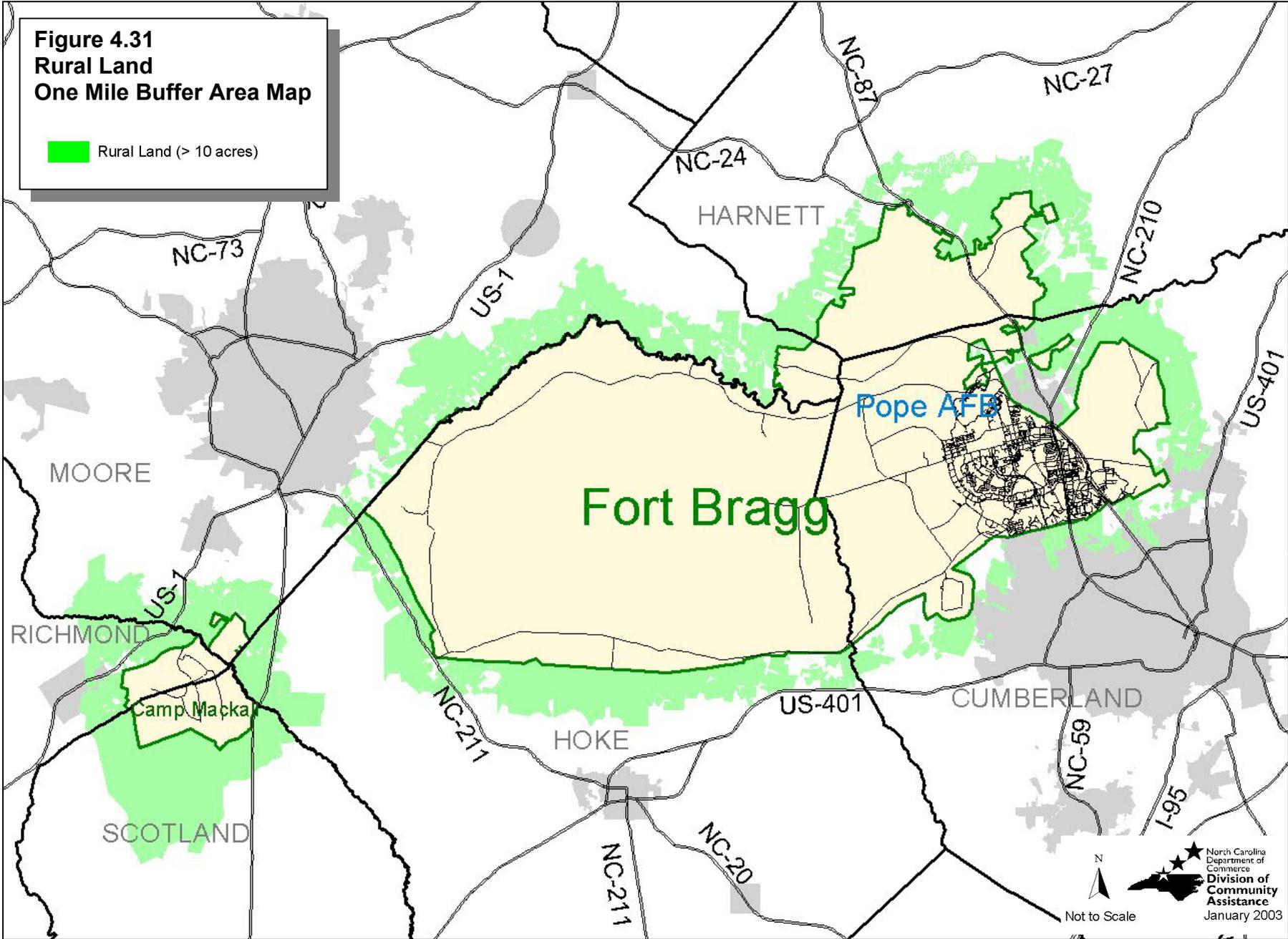
Urban development. Please note that the tax parcel data was used for the basis of determining the land classifications in this land protection analysis.

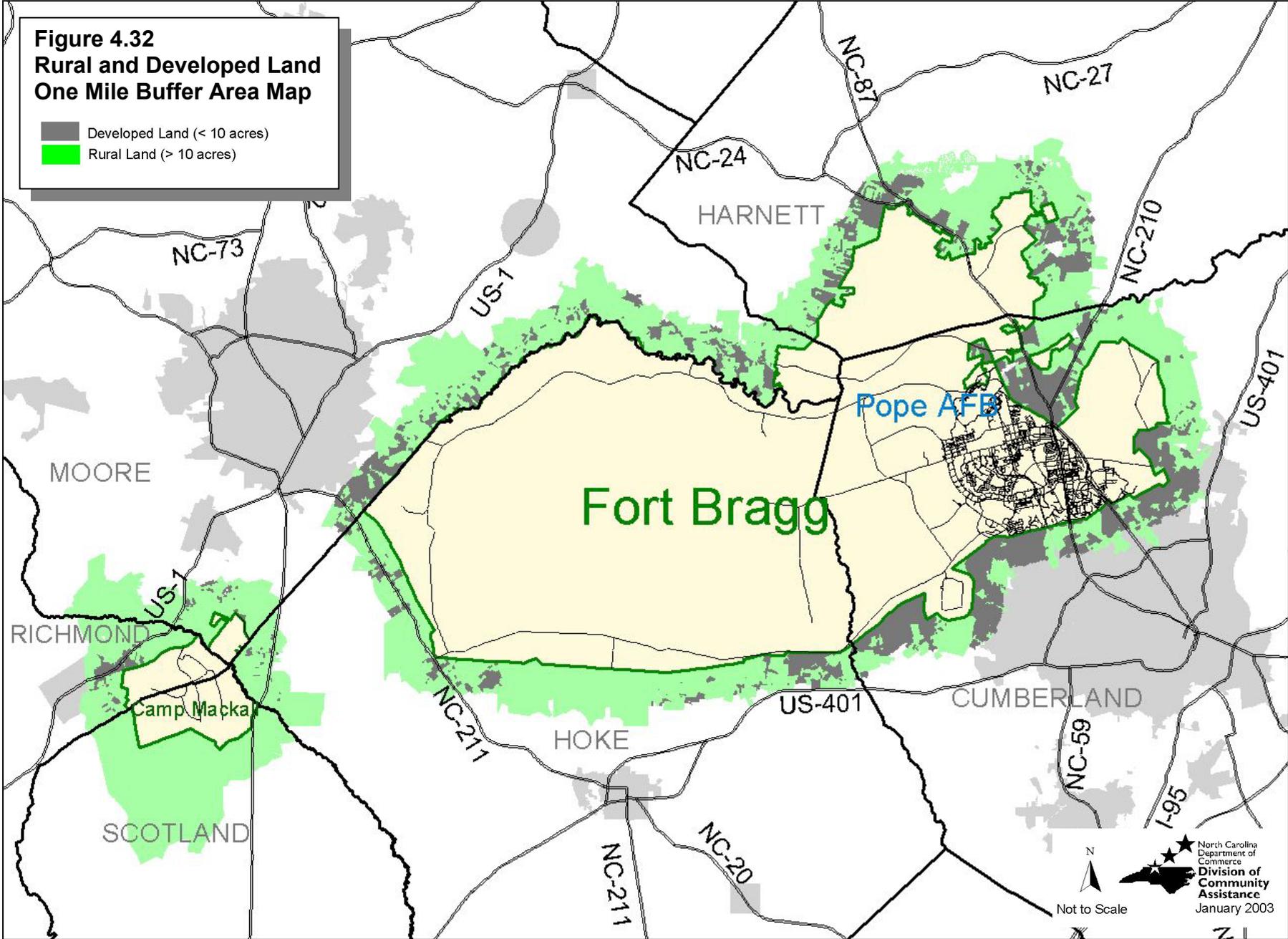
The next map displays the rural land -- areas containing undeveloped parcels of land greater than ten acres in size. Approximately eighty-one percent of the land within one-mile of the reservation is classed as rural.

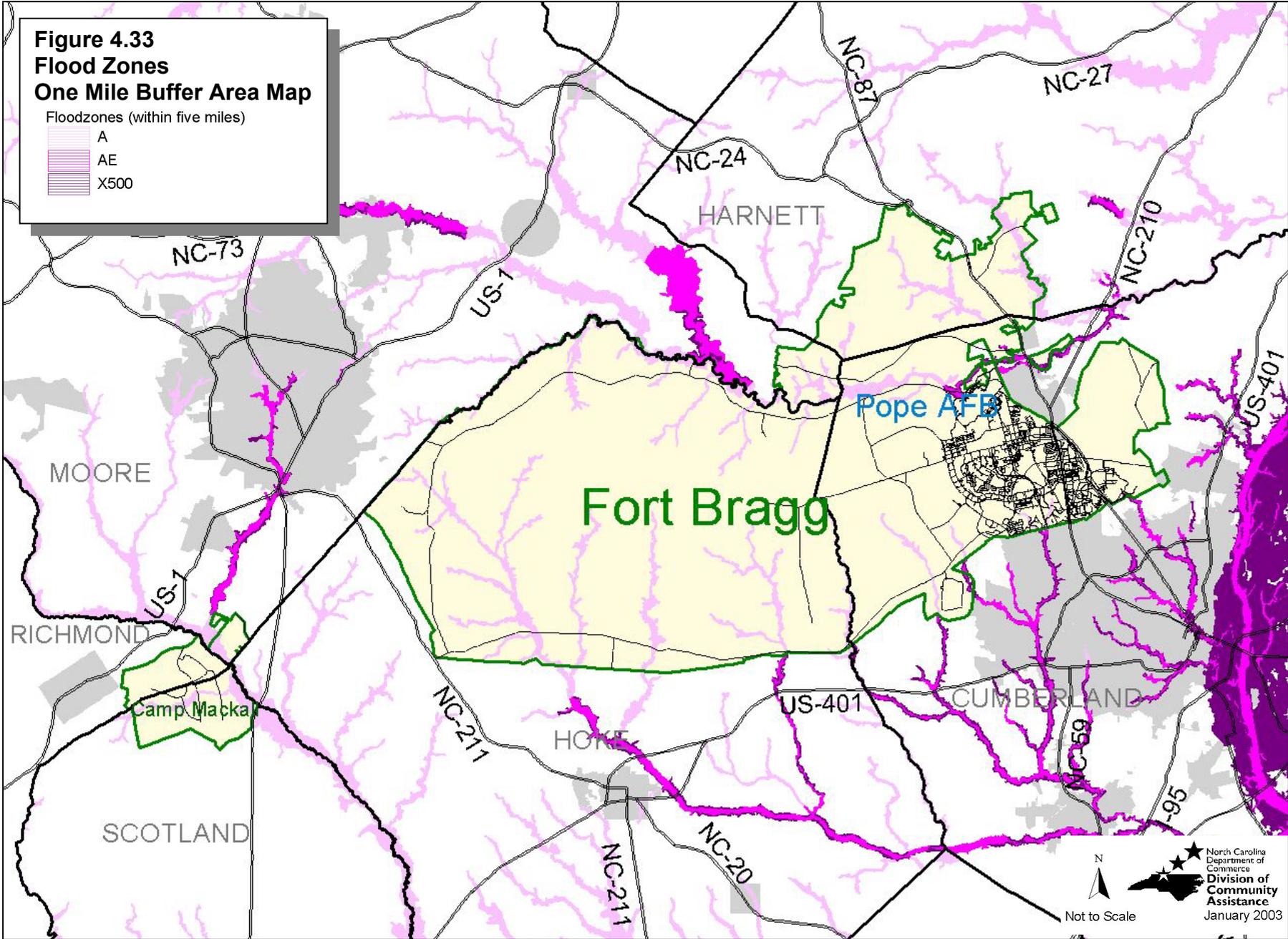
Once the rural and developed parcels were identified, the focus of the analysis shifted to the rural lands. With the rural lands identified, GIS data layers were overlaid to determine the existing level of protection for rural lands within one mile of the Military Boundary. The GIS data layers that were utilized to determine the existing levels of protection included, flood plains, wetlands, watershed/water supply areas, and managed lands. The managed lands included federal, state, local and other conservation non-profit owned lands. The "level of protection" classification could also be interpreted to mean impediments to future development.

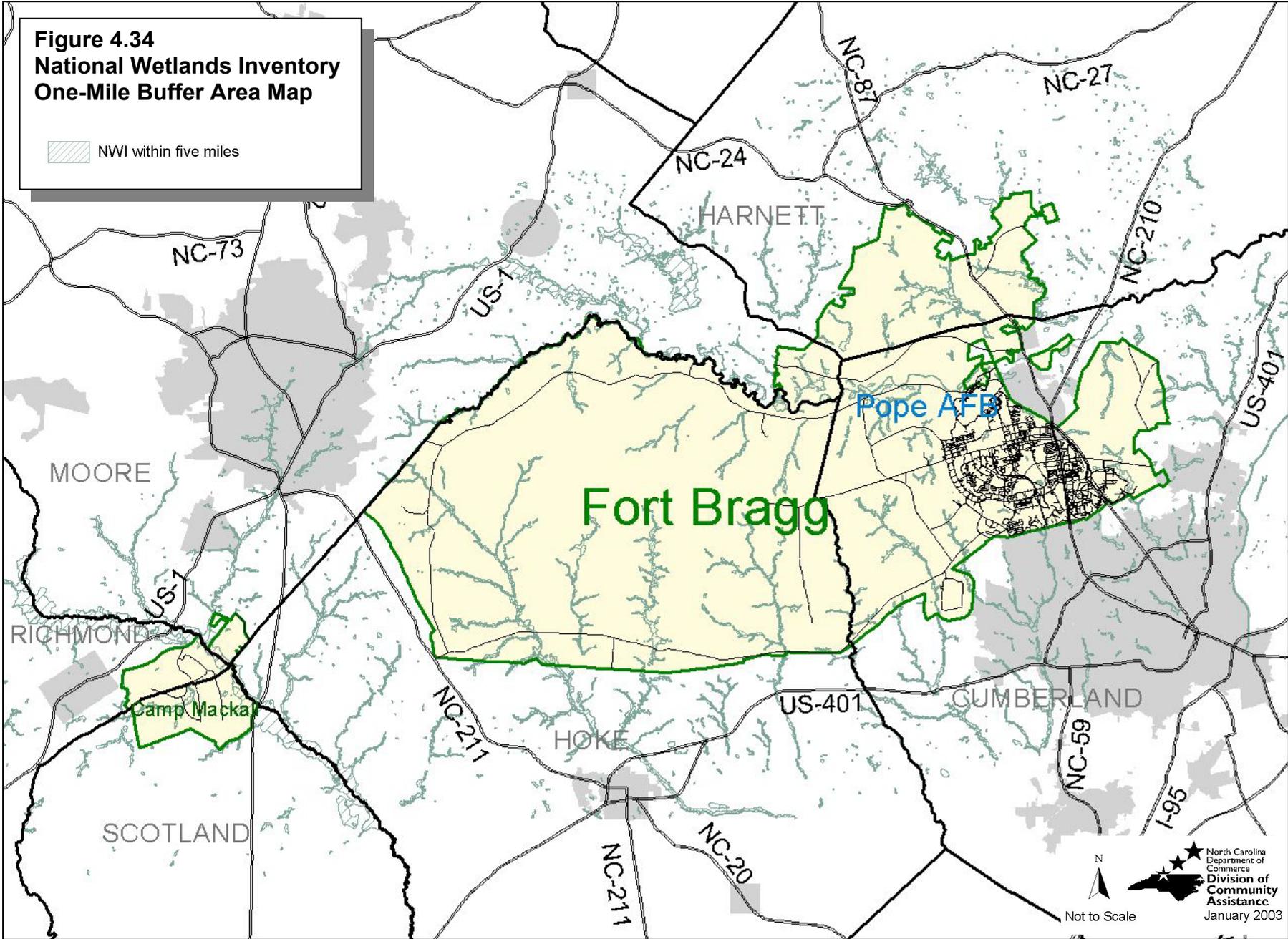
The following maps display the various data layers used to determine the level of land protection. A significant amount of natural limitations and development regulations exist to impede urban density development near the military reservation.

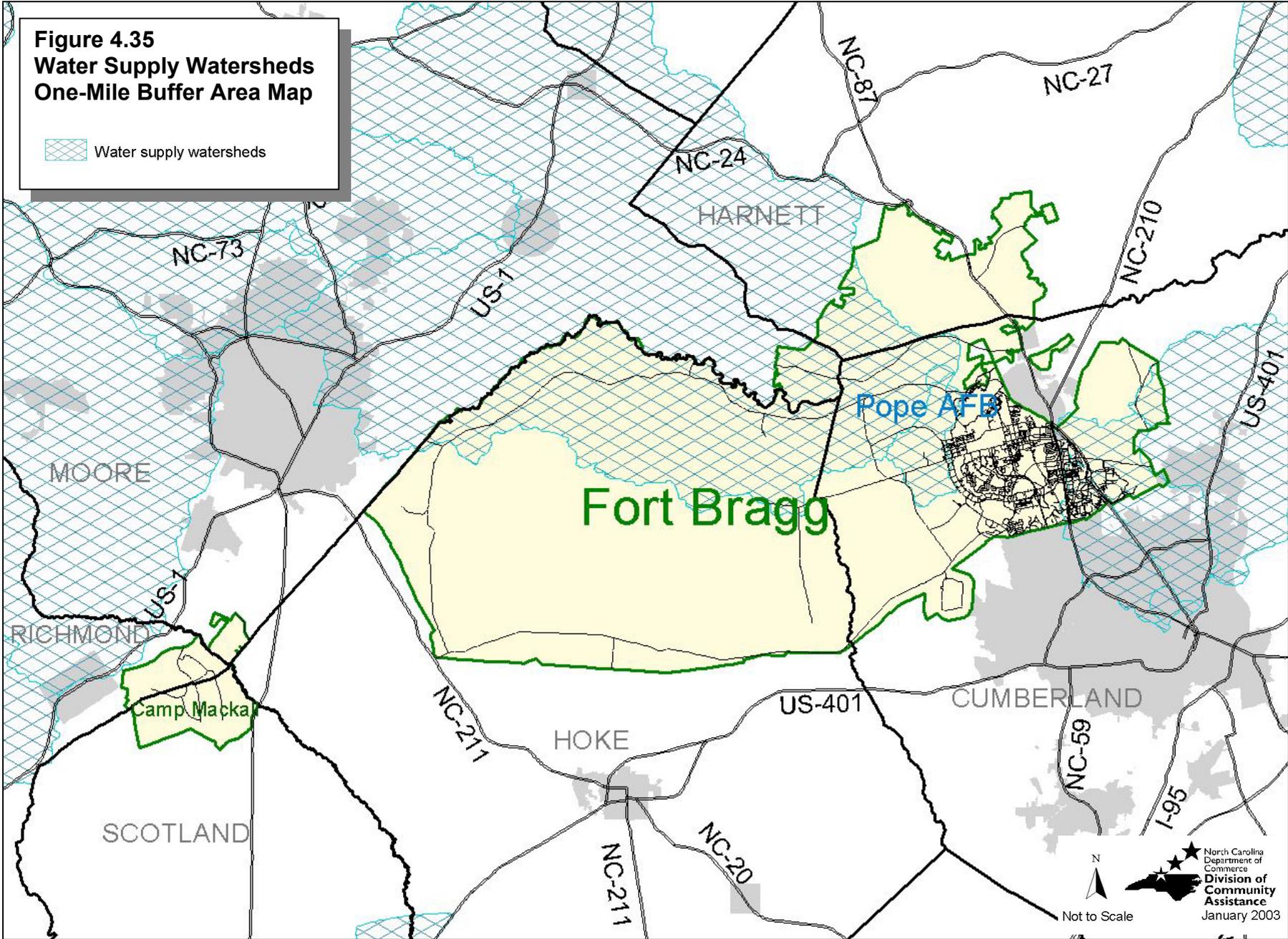


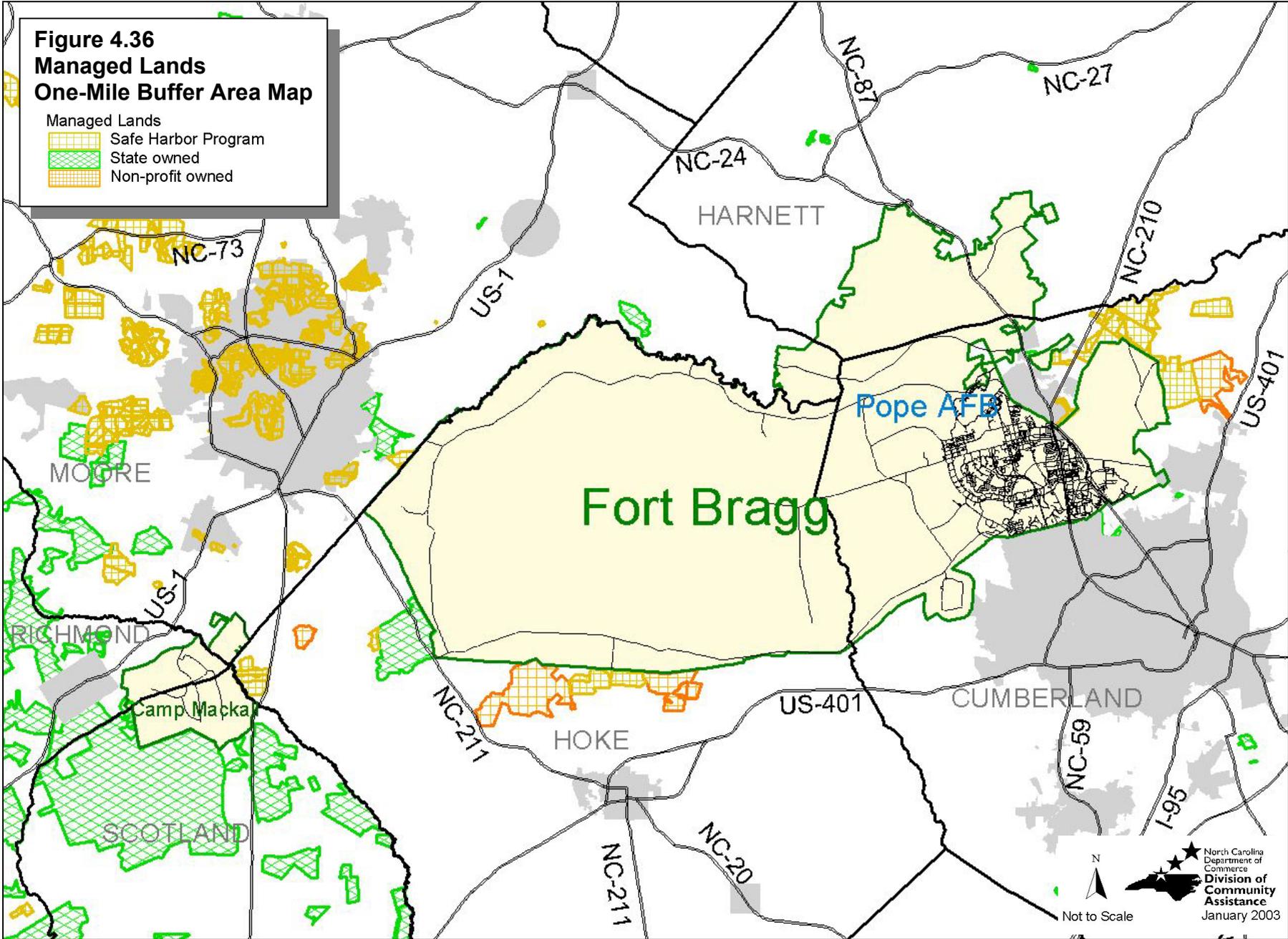


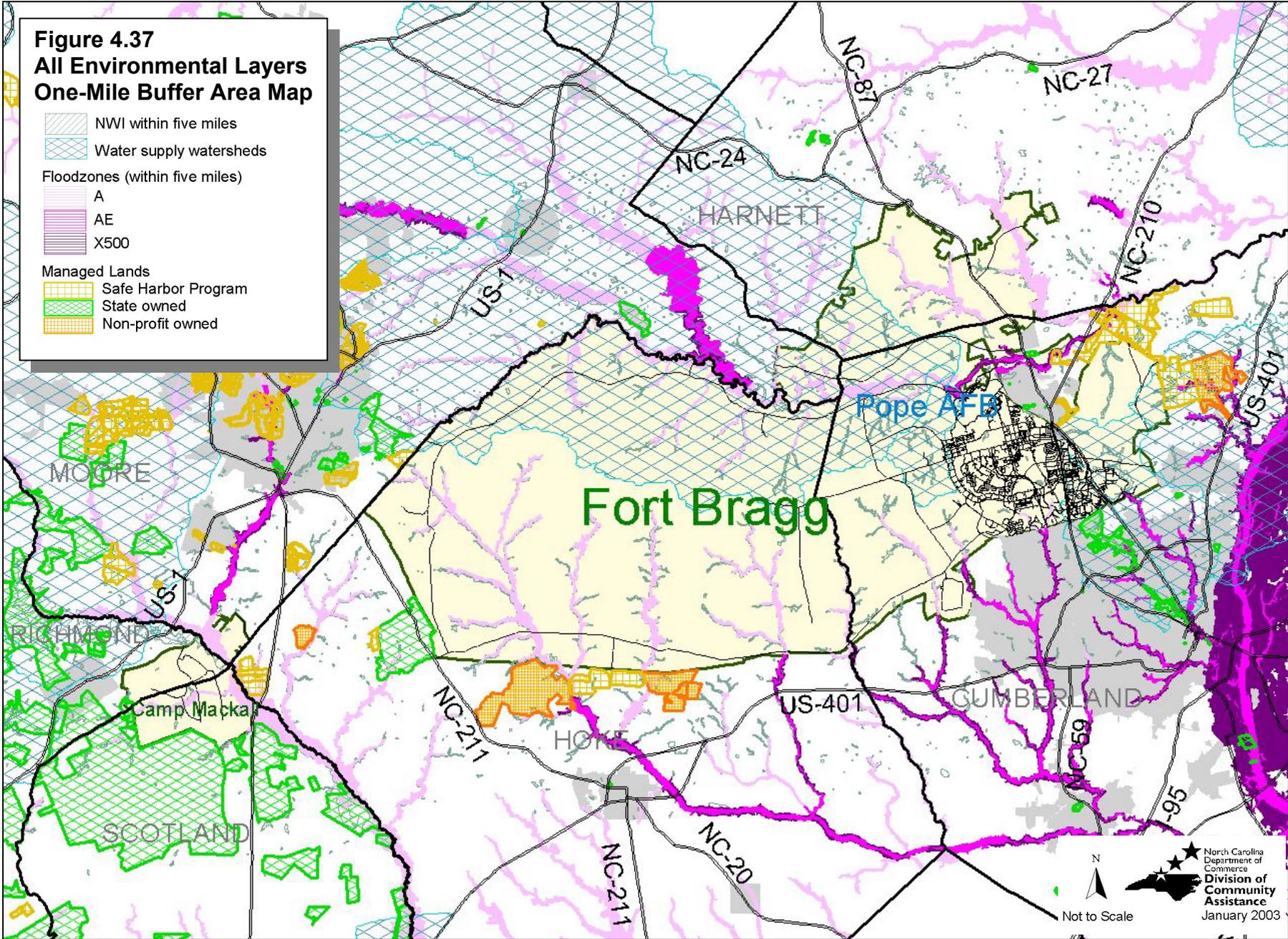








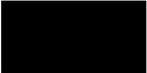


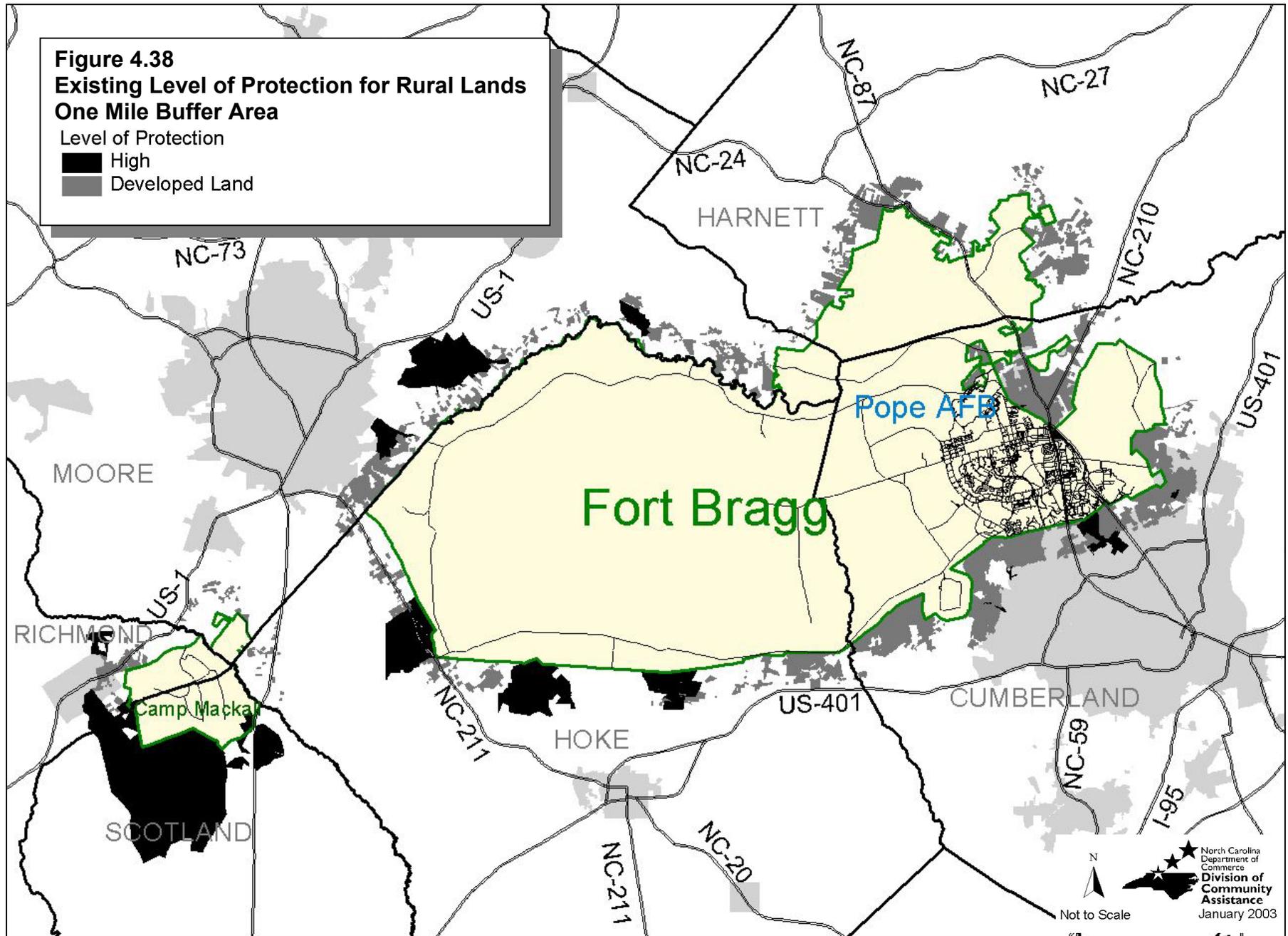


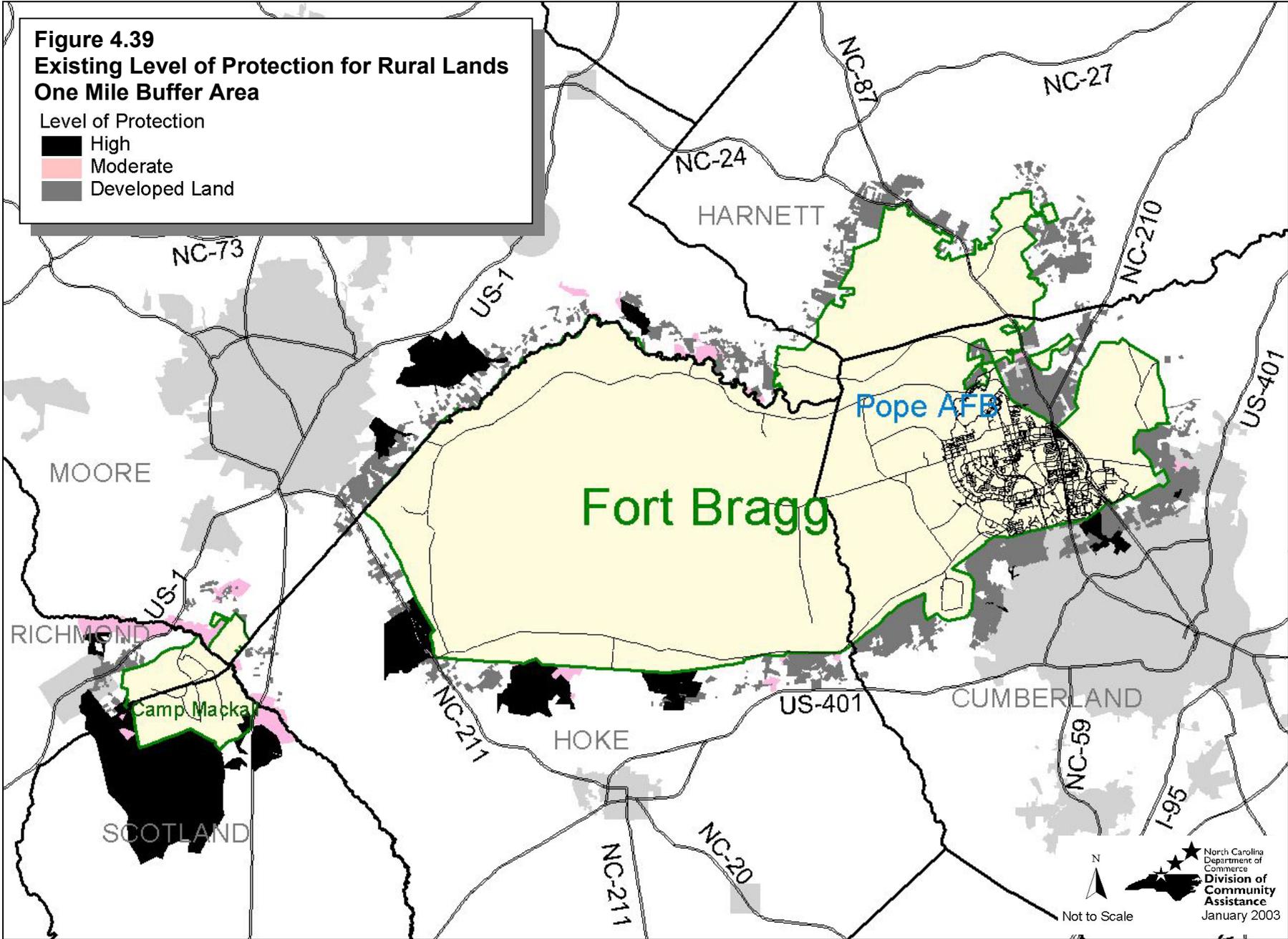
**CLASSIFICATION OF EXISTING LEVEL OF PROTECTION FOR RURAL LANDS**

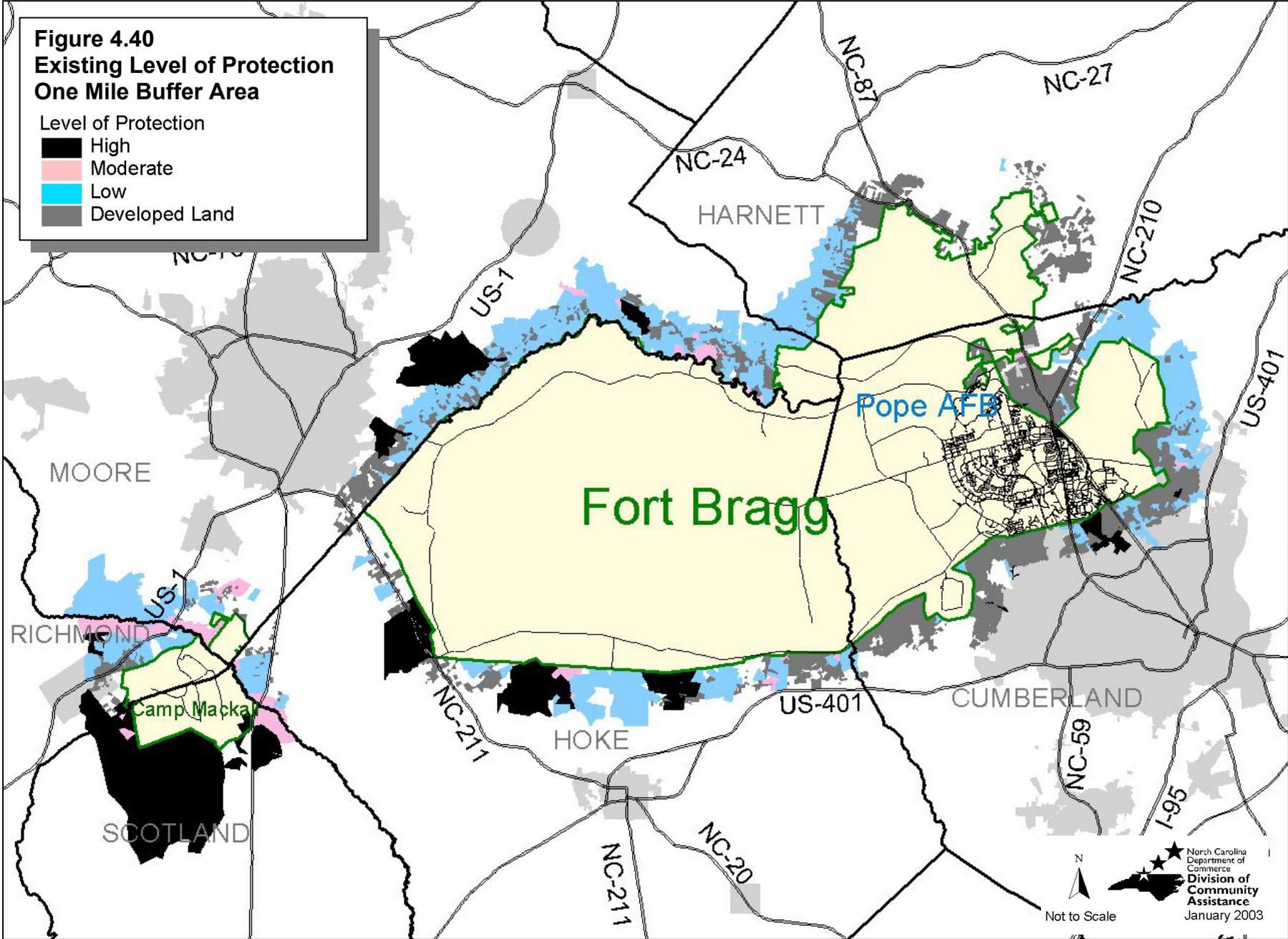
After identifying the numerous data layers described in the above analysis, they were overlaid the existing property parcels for all land within the one-mile area. The goal was to determine the existing level of protection for all of the rural land within the one-mile buffer area. The rural parcels (81%), which excluded the developed parcels (19%) within the one-mile area, were classified by level of protection using the categories displayed in Table 4.5 displayed below.

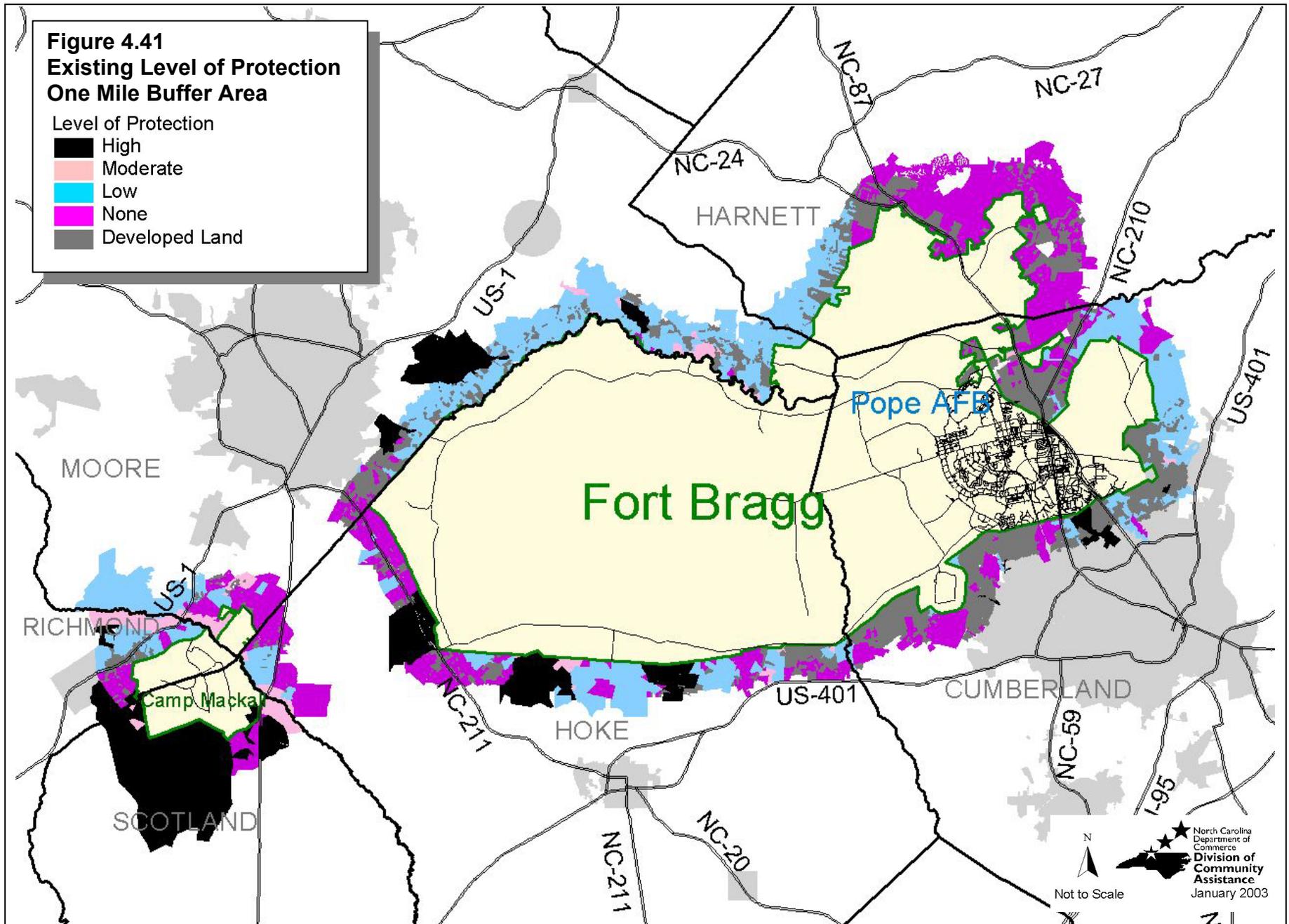
**TABLE 4.5  
EXISTING LEVEL OF PROTECTION FOR RURAL LANDS CLASSIFICATIONS AND CRITERIA**

Existing Level of Protection	Map Symbol	Criteria for Associated Classification
<b>High</b>		<ul style="list-style-type: none"> <li>Owned by a public or non-profit entity for conservation purposes (ie: The State game lands in Scotland County are considered as having an existing high level of protection)</li> </ul>
<b>Moderate</b>		<ul style="list-style-type: none"> <li>Contains Significant wetlands and flood plain (Parcels are located entirely or primarily within wetlands and/or flood plain)</li> </ul>
<b>Low</b>		<ul style="list-style-type: none"> <li>Contains portions of wetlands and/or flood plain (Parcels have limited flood plain and/or wetland occurrences)</li> <li>Located within the Lumber or Cape Fear River’s watershed/water supply protection areas (WS-III – Minimum 20,000 Sq. Ft. lot size)</li> </ul>
<b>None</b>		<ul style="list-style-type: none"> <li>Parcels in this classification have no existing level of protection based on the above criteria</li> </ul>









The following tables display the parcels of land, which are both developed and rural, with the noted levels of protection. Thirty-four percent of the rural lands have no level of protection or impediments to development. Thirty-six percent of the rural lands within one-mile of the reservation have a low level of protection. Five percent has a moderate level of protection and almost twenty-five percent have a high level of protection.

**TABLE 4.6  
DEVELOPED AND RURAL ACREAGE BY COUNTY IN THE ONE-MILE BUFFER AREA**

Category	Cumberland		Harnett		Hoke		Moore		Richmond		Scotland		Total Region	
Rural Acres	12,026	56%	12,922	78%	19,233	89%	20,394	86%	4,065	88%	11,249	100%	<b>79,889</b>	<b>81%</b>
Developed Acres	9,264	44%	3,660	22%	2,305	12%	3,358	14%	542	13%	-	0%	<b>19,128</b>	<b>19%</b>
Total Acres	21,290	100%	16,582	100%	21,538	101%	23,753	100%	4,606	101%	11,249	100%	<b>99,017</b>	<b>100%</b>

\*Percentage is greater than 100% due to rounding.

**TABLE 4.7  
LEVEL OF PROTECTION / IMPEDIMENT TO DEVELOPMENT (ONE-MILE STUDY AREA) FOR RURAL LANDS BY COUNTY (ACRES)**

Category	Cumberland		Harnett		Hoke		Moore		Richmond		Scotland		Total Region	
None	5,301	44%	10,086	78%	7,908	41%	2,399	12%	793	20%	661	6%	<b>27,148</b>	<b>34%</b>
Low	5,908	49%	2,837	22%	5,166	27%	13,290	65%	1,399	34%		0%	<b>28,600</b>	<b>36%</b>
Moderate	113	1%		0%	713	4%	1,289	6%	991	24%	655	6%	<b>3,761</b>	<b>5%</b>
High	704	6%		0%	5,447	28%	3,417	17%	881	22%	9,933	88%	<b>20,381</b>	<b>26%</b>
	12,026	100%	12,922	100%	19,233	100%	20,395	100%	4,065	100%	11,249	100%	<b>79,890</b>	<b>100%</b>

## **F. LEVEL OF PROTECTION NEEDED FOR RURAL LANDS**

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The next step in the process was to identify the appropriate levels of protection needed for the rural lands. The data layers reviewed for this analysis included prime farmlands (soils), primary and potential significant Natural Heritage areas, and the military noise and accident potential zones and contours.

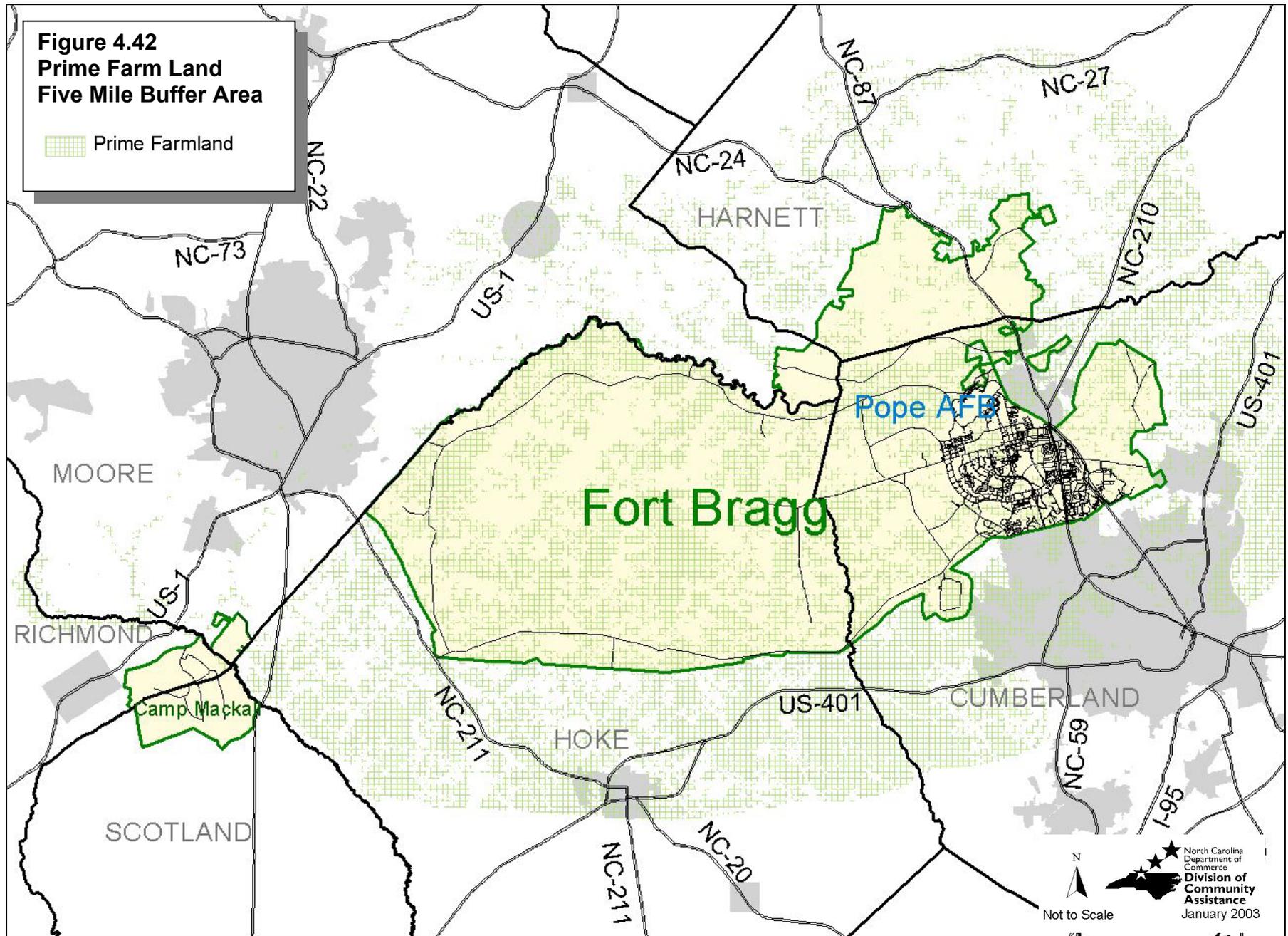
The selected data layers were overlaid to determine which parcels of land were in need of protection. Parcels of rural land that were impacted both by the noise and accident potential, as well as the primary Natural Heritage areas, were considered to be in critical need of protection.

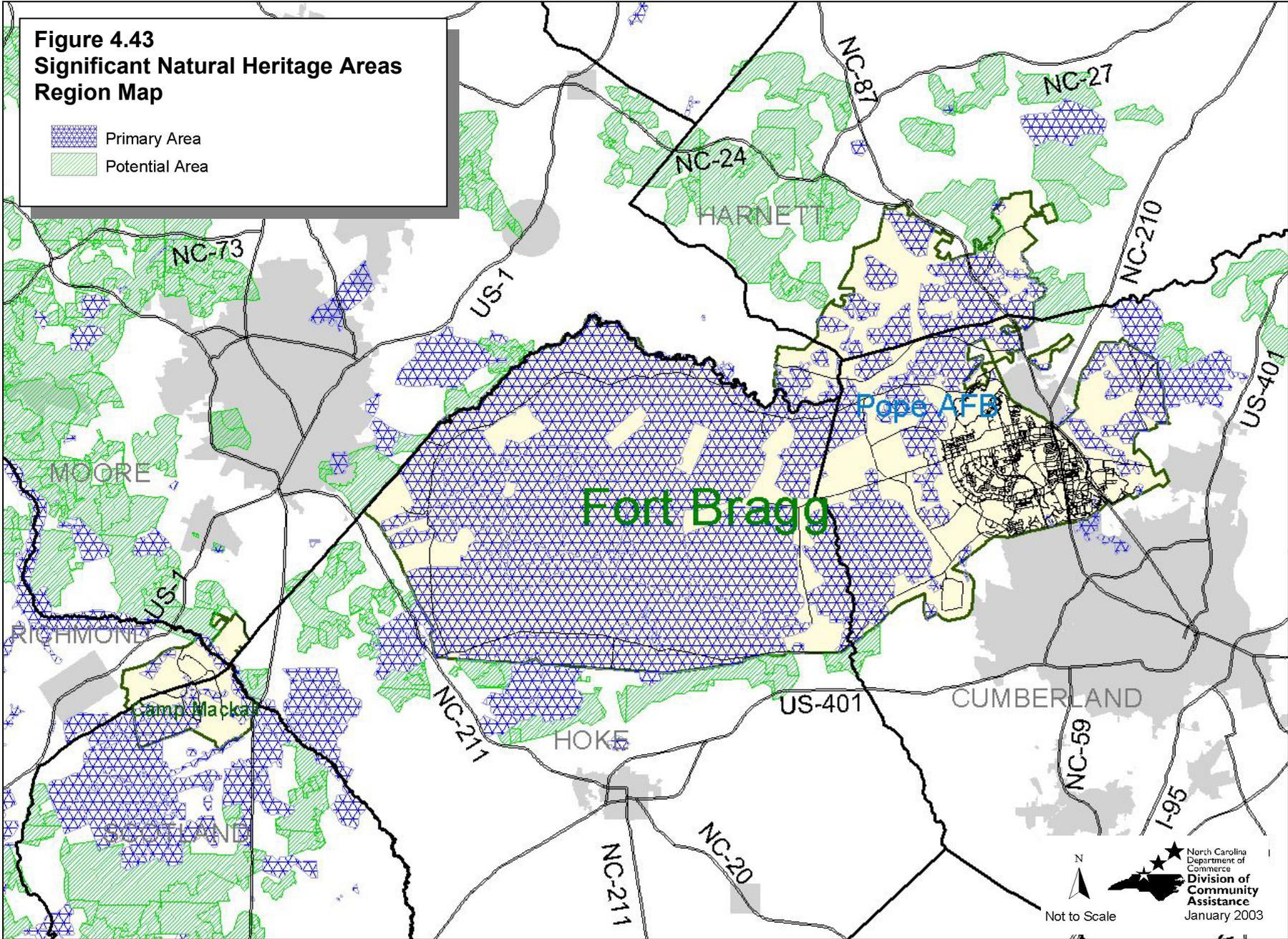
For the most part, serious noise levels associated with military aircraft flights, artillery fire, and small arms training are contained within the Fort Bragg / Pope Air Force Base boundaries. There are only three areas where noise levels of sixty-two decibels or greater extend off the military boundaries -- at the end of the Pope Air Force Base runway in Spring Lake, in western Hoke County near the Sandhills Correctional Facility, and in eastern Hoke County near the fort's Ste. Mere Eglise drop zone. These areas fall within the category of being in critical need of protection.

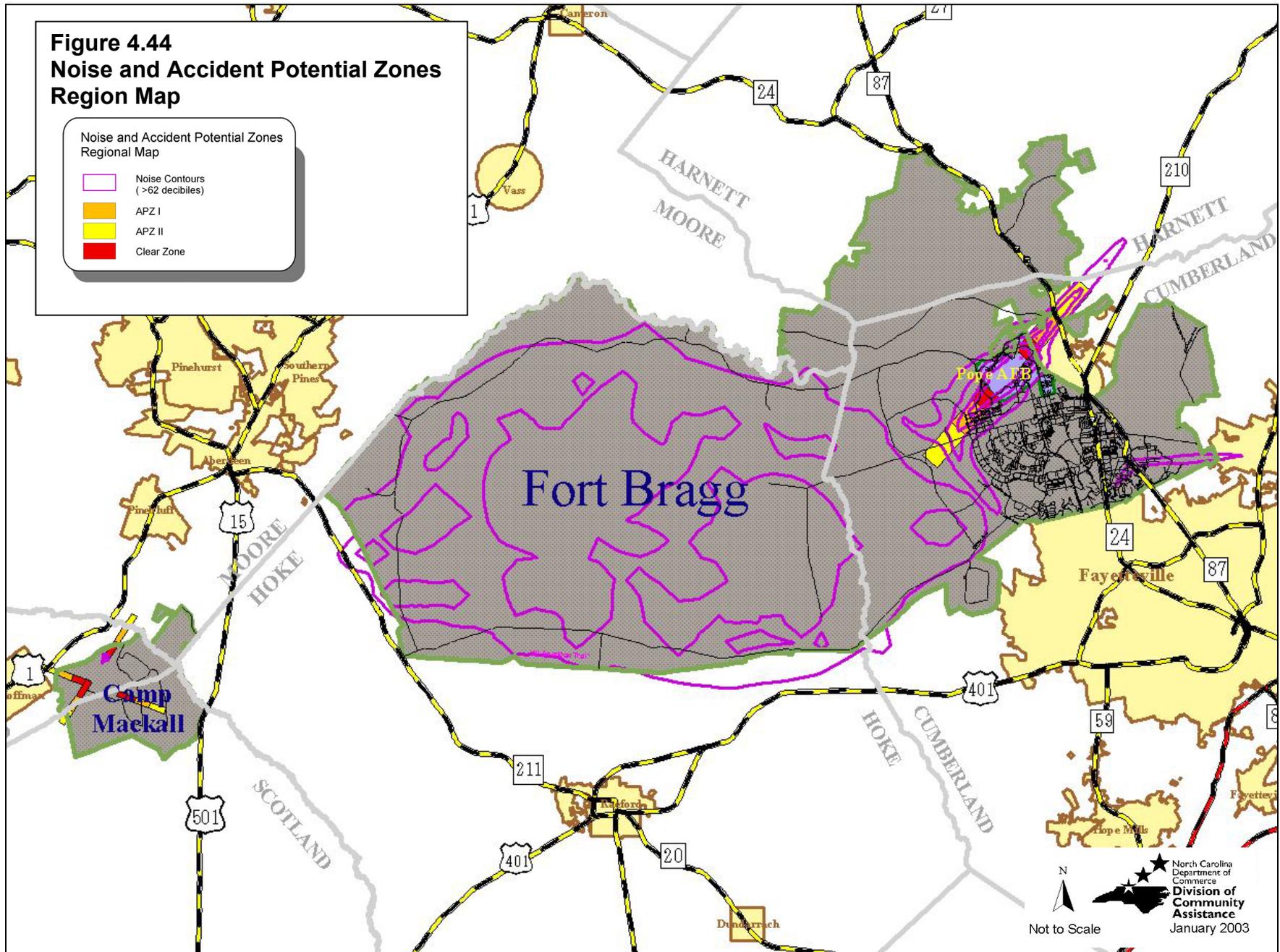
Throughout much of the region are areas designated by the Natural Heritage Program as Primary Significant Natural Heritage Areas. These parcels (which include portions of the Sandhills Game Lands) are located both on and off the military reservation. They are among some of the best examples in the nation, state, region, or county for elements of certain rare species or natural communities. The primary heritage areas identified in this study also include land that has not yet undergone extensive investigation by the Natural Heritage Program biologists. It is likely that with further investigation much of the Sandhills Game Lands will be listed with the Natural Heritage Program.

The prime farmland data layer was added to identify agricultural property, which has an important need for protection. Farmland in the Fort Bragg region is becoming an increasingly scarce commodity, as the much of the area has become urbanized. Much of the soils suitable for prime farmland have become residential within the region because of the adaptability of the land for development. The prime farmland data layer was developed from the United States Department of Agricultural Soil Surveys.

The rural parcels, which were not affected by the above mentioned data layers were not considered as needing immediate protection from development.







The “Level of Protection Needed for Rural Lands” map on the following page displays all rural land within one mile of the military reservation that is need of protection. The table below displays the categories depicted on the map and the criteria for each selected classification.

**TABLE 4.8  
LEVEL OF PROTECTION NEEDED FOR RURAL LANDS CLASSIFICATIONS AND CRITERIA**

Level of Protection Needed for Rural Lands	Map Symbol	Criteria for Associated Classification
<b>Critical Need</b>		<ul style="list-style-type: none"> <li>• Within Noise Contours greater than 62 dBs <i>and/or</i></li> <li>• Contains Primary Significant Natural Heritage Areas</li> </ul>
<b>Important Need</b>		<ul style="list-style-type: none"> <li>• Contains Potential Significant Natural Heritage Areas <i>and/or</i></li> <li>• Contains Prime Farmland</li> </ul>
<b>None</b>		<ul style="list-style-type: none"> <li>• Contains existing Residential and Agricultural Low Density Development (Immediate Protection not needed)</li> </ul>

Twenty-five percent of the rural land is already protected, twenty-four percent of the land is in critical need of protection, thirty-four percent of the land is identified as having an important need for protection, and seventeen percent has no immediate need of protection.

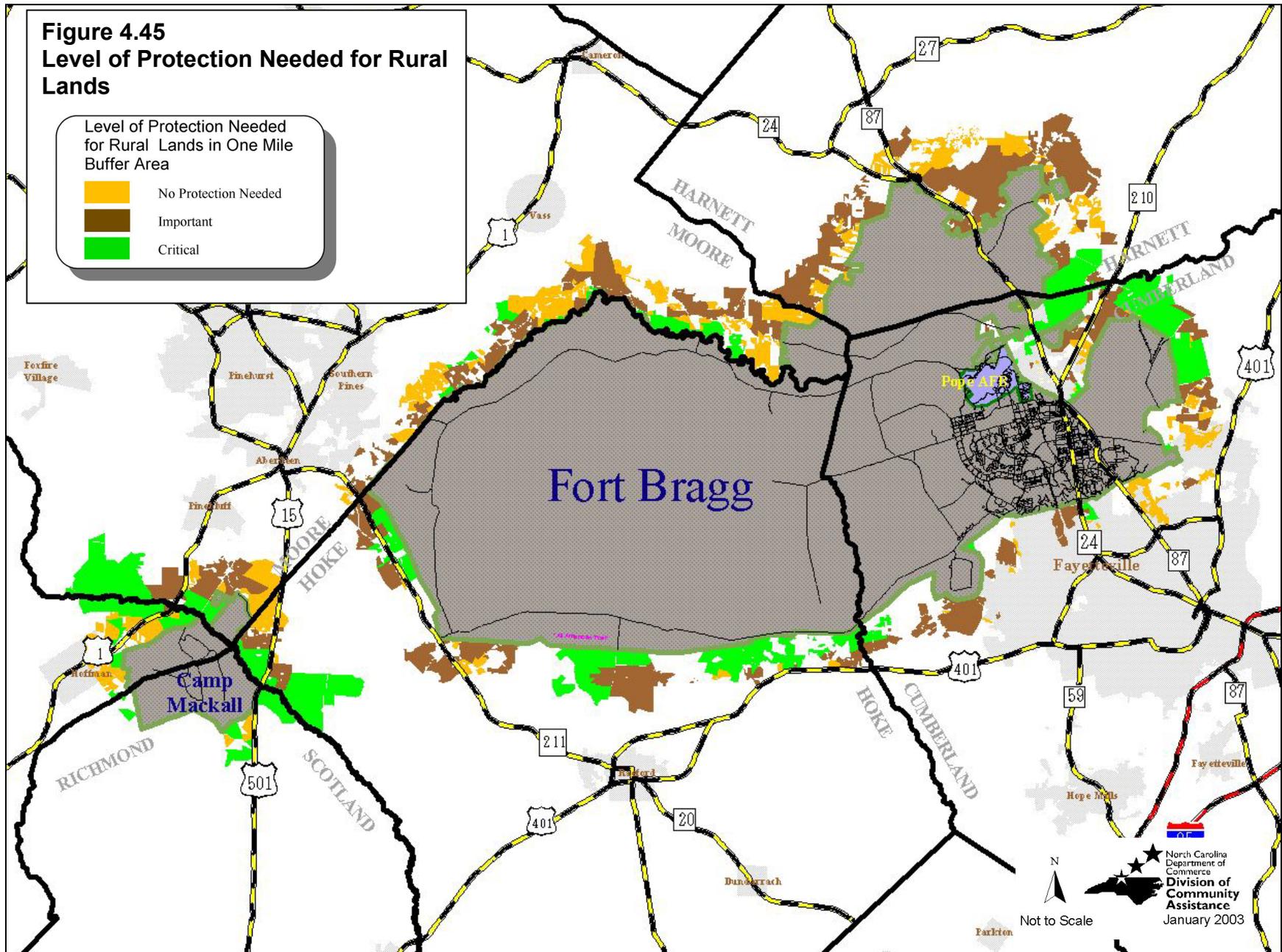
**TABLE 4.9  
LEVEL OF PROTECTION NEEDED FOR RURAL LANDS**

	Cumberland		Harnett		Hoke		Moore		Richmond		Scotland		Total Region	
Critical	4842	40%	1030	8%	7358	38%	4308	21%	1581	39%	1086	10%	20206	25%
Important	4704	39%	8580	66%	5370	28%	6718	33%	60	1%	230	2%	25662	32%
None	1777	15%	3312	26%	1059	6%	5952	29%	1542	38%		0%	13642	17%
	11323	94%	12922	100%	13787	72%	16978	83%	3183	78%	1316	12%	59510	74%
Protected	704	6%	0	0%	5447	28%	3417	17%	881	22%	9933	88%	20381	26%
Total Rural	12026	100%	12912	100%	19234	100%	20395	100%	4065	100%	11249	100%	79880	100%

**Figure 4.45**  
**Level of Protection Needed for Rural Lands**

Level of Protection Needed  
 for Rural Lands in One Mile  
 Buffer Area

- No Protection Needed
- Important
- Critical



## G. POPULATION GROWTH PROJECTIONS WITHIN THE ONE-MILE STUDY AREA

Once the rural parcels needing protection and parcels suitable for development were identified, the number of acres required to accommodate future population growth was determined. Using a shift share analysis, the 2030 population projection was determined, by county, for the entire one-mile study area.

The North Carolina Office of State Planning maintains up-to-date population projections for all counties within the state. The existing population residing within the one-mile area was compared to its respective Census figures on the county level to determine each county's share of the population for the years 1990 and 2000. (Please refer to the information earlier in Table 4.2) The one-mile area county population ratio was used to multiply the Office of State Planning 2030 county projections and to determine the expected population growth within the one-mile area.

**TABLE 4.10**  
**TOTAL COUNTY POPULATION PROJECTIONS 2010 - 2030**

County	2000 Total Population One- Mile Area	2000 Population	2010 Projected	2020 Projected	2030 Projected
Cumberland	61,106	302,963	334,040	366,204	396,665
Harnett	11,125	91,025	116,559	144,266	173,339
Hoke	6,180	33,646	46,193	59,949	75,179
Moore	3,590	74,769	89,533	104,051	118,468
Richmond	835	46,564	47,816	48,889	49,735
Scotland	12	35,998	37,991	39,671	40,949
	82,848	584,965	672,132	763,030	854,335

Source of Projections: North Carolina Office of Sate Planning

***Example Calculation:***

Projected Cumberland County 2030 Population Figure for the one-mile area

Cumberland 1-Mile Pop 2000 X Cumberland Total Pop 2030 = Cumberland 1-Mile Population in 2030  
Cumberland Total Pop 2000

$$\frac{61,106}{302,963} \times 396,665 = \mathbf{80,005} \text{ (Cumberland 1-Mile Population in 2030)}$$

Once the total population by county was projected for the one-mile area, it was necessary to estimate the total number of dwelling units, which would need to be constructed. The Census established an average occupancy rate of 2.6 persons per household for the region. This figure was divided by each projected county population projection for the one-mile area to determine the total number of dwelling units needed by 2030 in the one-mile area adjacent to the military reservation. To determine the actual number of new units needed, the existing dwelling units were subtracted from the projected units. Based on the dwelling units needed in 2030, the total number of acres required for the dwelling units was determined. The total number of units was divided by the number of units per acre, based on the development potential for a particular zoning designation listed below.

The table below displays the acreage required, by county, for the projected development at R10, R15, RR, and one dwelling unit per acre densities.

**TABLE 4.11  
PROJECTED ACREAGE NEEDED FOR NEW DEVELOPMENT IN 2030 - ONE-MILE AREA**

County	Total 1- Mile Population 2030	Total Dwelling Units 2030	Existing Dwelling Units 2000	Dwelling Units Needed 2030	Acres Needed @ R10 Density	Acres Needed @ R15 Density	Acres Needed @ RR Density	Acres Needed One Dwelling unit/ Per Acre
Cumberland	80,005	30,771	25,243	5,528	1,256	1,906	2,513	5,528
Harnett	21,185	8,148	5,370	2,778	631	958	1,263	2,778
Hoke	13,809	5,311	1,969	3,342	760	1,152	1,519	3,342
Moore	5,688	2,188	1,516	672	153	232	305	672
Richmond	892	343	307	36	8	12	16	36
Scotland	14	5	6	-1	0	0	0	-1
	121,593	46,766	34,411	12,355	2,808	4,261	5,616	12,355

R10 = Zoning District - minimum of 10,000 square foot lots (4.4 dwelling units per acre – maximum)

R15 = Zoning District - minimum of 15,000 square foot lots (2.9 dwelling units per acre – maximum)

RR = Zoning District - minimum of 20,000 square foot lots (2.2 dwelling units per acre – maximum)

## H. PROPOSED FUTURE LAND USE

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With the level of protection required for rural lands determined and the growth for the one-mile area projected through 2030, a future land development plan was prepared. The land protection analysis, the existing and proposed water and sewer facilities, and the transportation network provided the basis for determining the future land use classifications.

All land that was less than ten acres in size -- or greater than ten acres and developed -- was classed as urban. Land that already had existing urban services, highway extensions planned or was located adjacent to the military urban land use was also classed as urban. Therefore, some of the land initially identified by the land protection model as "important" or "critical" was changed to urban on the land use plan map to reflect the investment in urban services that have already been constructed in the areas. Any use suggested as appropriate for the "urban" areas is deemed compatible with both the military demands and environmental concerns. However, the urban lands adjacent the western boundary of Fort Bragg in Hoke County will be more compatible with the military uses if developed for commercial or industrial purposes.

The lands that were classified as "critical" in the land protection model were listed as "Critical Preservation Lands" (CPL) on the land use plan. These lands include rural areas that are exposed to noise and accident potential from military training and/or lands which are considered significant "primary natural heritage areas". The CPL class suggests the preservation of areas due to the incompatibility of development with the military and environmental concerns. Dwellings in this area should be equipped with

storm/multi-pane windows and doors and be developed at a density of no more than one dwelling unit per ten acres in order to preserve significant natural heritage elements and to protect the military reservation from further urban encroachment.

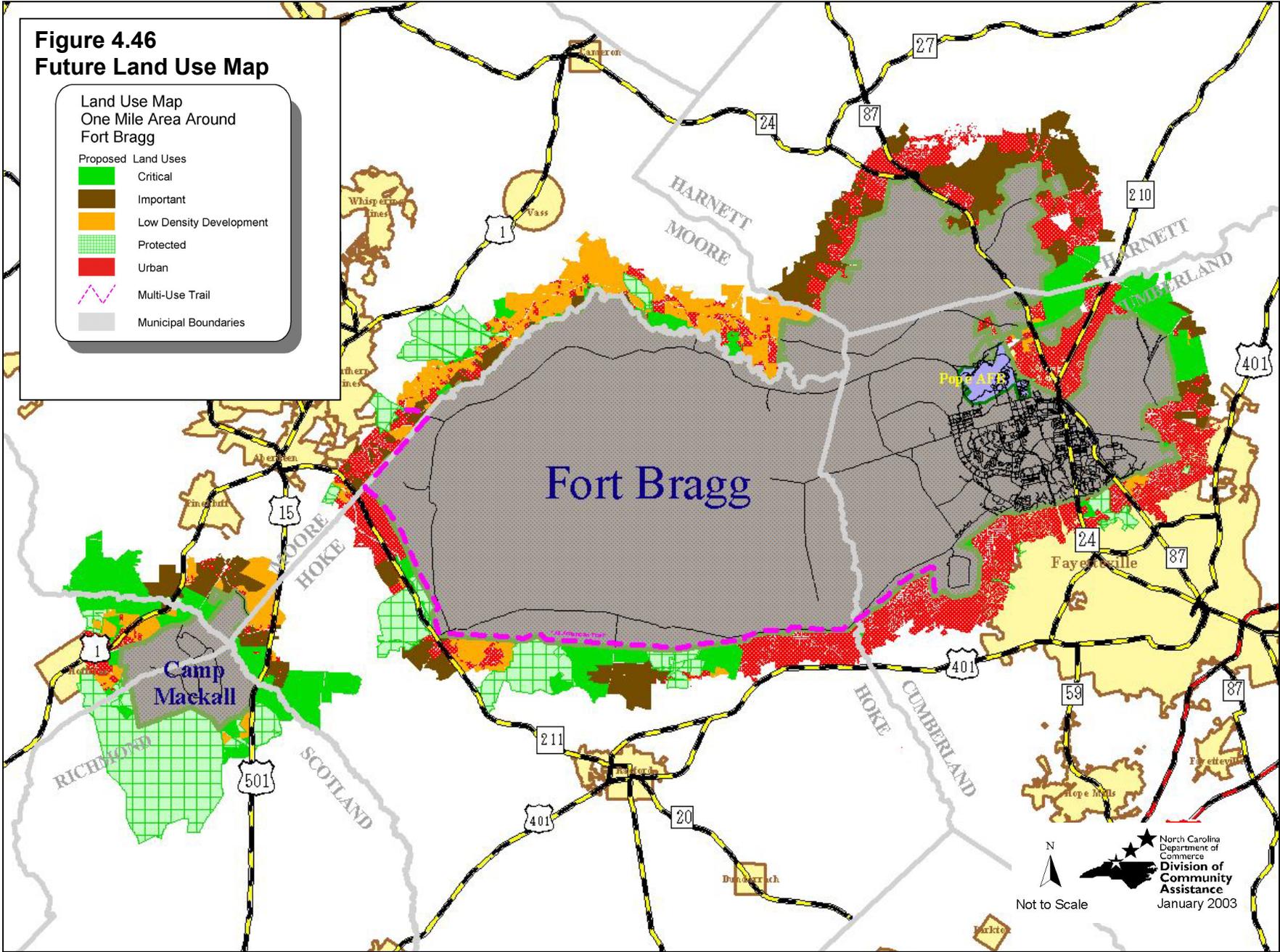
The "Important Preservation Lands" (IPL) includes parcels, which are identified as prime farmland and/or potential natural heritage lands. Land development within the IPL should take place at the same density as recommended for the critical preservation lands (CPL).

In addition to the CPL and IPL parcels, the parcels identified as "no immediate need for protection" and did not have existing urban services were classified as "Low Density Development" lands (LDD). The LDD areas are primarily rural and agricultural lands with houses on three acres or greater. The LDD lands are concentrated in the existing agricultural and equestrian lands in southern Moore County along the northwestern boundary of Fort Bragg and are located in smaller areas within the one-mile buffer area. Moore County should continue the low-density development policies already in effect in this area. Moore County's policy here includes minor subdivisions only by property owners once every two years with a maximum of four new lots each time. This area is also located within the Cape Fear watershed (WS-III) area (20,000 sq. ft. minimum lot size).

The table that follows contains the classifications, criteria and proposed recommendations for the future land use of the one-mile buffer area. Figure 4.42 is a map that exhibits the proposed future land use patterns for the one-mile area surrounding the military reservation.

**TABLE 4.12  
FUTURE LAND USE CLASSIFICATIONS AND RECOMMENDATIONS**

Land Use Classification	Symbol	Classification Reasons	Proposed Recommendations / Restrictions (Described further in the Recommendations Section)
<b>Critical Preservation Lands (CPL)</b>		<ul style="list-style-type: none"> <li>• Within Noise Contours greater than 62 dBs <i>and/or</i></li> <li>• Contains Primary Significant Natural Heritage Areas</li> <li>• Imminent Threat to Military Training Missions and Long-Leaf Pine Ecosystem</li> </ul>	<ul style="list-style-type: none"> <li>• Required Real Estate Disclosure Statement</li> <li>• Prohibit New Water &amp; Sewer Lines</li> <li>• One Dwelling Per Ten Acres</li> <li>• Residential and Agricultural land uses permitted</li> <li>• Land Purchase or Acquisition of Development Rights from <b>willing sellers</b></li> <li>• Tax credits or deductions for <b>willing sellers</b></li> <li>• Local Government compensation trust fund</li> </ul>
<b>Important Preservation Lands (IPL)</b>		<ul style="list-style-type: none"> <li>• Contains Potential Significant Natural Heritage Areas</li> <li>• Contains Prime Farmland</li> <li>• Potential Threat to Military Training Missions and Long-Leaf Pine Ecosystem</li> </ul>	<ul style="list-style-type: none"> <li>• Required Real Estate Disclosure Statement</li> <li>• Prohibit New Water &amp; Sewer Lines</li> <li>• One Dwelling Per Ten Acres</li> <li>• Residential and Agricultural land uses permitted</li> <li>• Land Purchase or Acquisition of Development Rights from <b>willing sellers</b></li> <li>• Tax credits or deductions for <b>willing sellers</b></li> <li>• Local Government compensation trust fund</li> </ul>
<b>Low Density Development (LDD)</b>		<ul style="list-style-type: none"> <li>• Contains existing Residential and Agricultural Low Density Development</li> <li>• Compatible with Military Land Uses</li> </ul>	<ul style="list-style-type: none"> <li>• Required Real Estate Disclosure Statement</li> <li>• Minimum One Dwelling Per Three Acres</li> <li>• Residential and Agricultural land uses permitted</li> </ul>
<b>Urban Density Development (UDD)</b>		<ul style="list-style-type: none"> <li>• Contains existing developed lands</li> <li>• Appropriate for future urban development</li> <li>• Compatible with Military Land Uses</li> </ul>	<ul style="list-style-type: none"> <li>• Required Real Estate Disclosure Statement</li> <li>• Urban land uses permitted</li> </ul>



**TABLE 4.13  
FUTURE LAND USE CLASSIFICATIONS IN ACRES BY COUNTY**

Class	Cumberland		Harnett		Hoke		Moore		Richmond		Scotland		Total Region	
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%
Critical	4,384	21%	1,030	6%	5,423	25%	4,098	17%	1,581	34%	1,086	10%	<b>17,602</b>	<b>17.8%</b>
Important	1,141	5%	8,580	52%	3,381	16%	3,269	14%	60	1%	0	0%	<b>16,431</b>	<b>16.6%</b>
LDD	427	2%	0	0%	1,738	8%	9,610	40%	1,087	24%	0	0%	<b>12,862</b>	<b>13.0%</b>
UDD	14,635	69%	6,972	42%	5,492	25%	3,358	14%	997	22%	230	2%	<b>31,684</b>	<b>32.0%</b>
Protected	704	3%	0	0%	5,504	26%	3,417	14%	881	19%	9,933	88%	<b>20,438</b>	<b>20.6%</b>
	21,290	100%	16,582	100%	21,538	100%	23,753	100%	4,606	100%	11,249	100%	<b>99,017</b>	<b>100.0%</b>

Adoption and implementation of this land use plan by Fort Bragg, Pope Air Force Base, and the local governments with jurisdiction in the one-mile study area will generate a pattern of sustainable development over the next thirty years. This plan accommodates the projected urban growth, protects the threatened natural environment, provides for the inclusion of recreational facilities, and protects the military training mission.

Failure to implement this plan will ultimately lead to the destruction of both the natural environment and the viability of Fort Bragg, Pope Air Force Base, and Camp Mackall as a military training facility.

The following section offers a series of recommendations and action steps to assist with the successful implementation of this suggested future land use development through 2030.

**General Recommendation A: Real Estate Disclosure Statements**

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Quite often potential homebuyers and renters are unaware of special circumstances and conditions that may exist in the home's environment, which could detrimentally affect both the area's quality of life and the home's resale value. This could be a particular problem for potential buyers of existing or newly built homes located within the one-mile area around the military reservations. Much of that area is affected by aircraft and artillery noise and dense pine smoke, which result from "best land management practices". It is important to guarantee that potential homebuyers and renters are provided with the information, which they need to make well-informed decisions about whether or not to locate in an area.

**Recommendation**

It is recommended that the North Carolina General Assembly adopt a bill requiring real estate disclosure statements for all parcels of property located within one mile of the military installations. (Please refer to Appendix B for a sample resolution.) As appropriate, the real estate disclosure statements should include warnings about potential noise and startle affects from low flying aircraft, blast noise from artillery/small arms fire, and intensive smoke resulting from controlled burns of the managed pine forest areas.

**Actions**

- Immediately following adoption of this Joint Land Use Study, an official representative of the RLUAC should meet with the North Carolina League of Municipalities, the North Carolina Association of County Commissioners, and representatives from each of the other North Carolina military installations, who are either currently involved in preparing or have recently completed a Joint Land Use Study process, to seek their support for this recommendation.
- Representatives from the RLUAC (and the other military installations) should meet with the *North Carolina Advisory Commission on Military Affairs* to seek their support for legislation which would require real estate disclosure statements for all land located within one mile of North Carolina's military installations.
- The RLUAC and the *North Carolina Advisory Commission on Military Affairs* should submit a bill to the 2003 session of the North Carolina General Assembly, which requires real estate disclosure statements for all land, located within one mile of military installations.

## **General Recommendation B: Urban Encroachment**

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During the next thirty years, the North Carolina Office of State Planning projects that population in the six counties surrounding Fort Bragg will grow by an additional 269,000 people -- much of it within one mile of the military boundaries. Throughout the past decade alone, population in the Fort Bragg / Pope Air Force Base one-mile study area expanded by 13,866 people -- a twenty percent increase. Land along the military boundaries is being converted from rural to urban densities at an increasing rate -- especially along the fringes of the Fayetteville metro region.

Even with strong municipal and county land use management tools currently in place (land use plans and zoning ordinances), inappropriate and incompatible development continues to occur. Such urban expansion, left unchecked, will pose a major threat to the integrity of the military complex, the natural environment, and the quality of life of people residing there in less than twenty years. Clearly the planning, protection, and land management efforts currently being utilized by local governments in the region have failed to stem the growing tide of incompatible urban development. New and stronger actions are recommended to preserve the military installations, the environment, and the public safety.

### **Recommendations**

1. It is recommended that the North Carolina General Assembly adopt legislation that requires local governments in the Fort Bragg / Pope Air Force Base region to permit only low density development (ten acre minimum lot size and no more than one dwelling unit per ten acres) on all land which is identified as “critical preservation” and “important preservation” in this study.
2. It is recommended that the North Carolina General Assembly establish a special trust fund to assist the U.S. Department of Defense, the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, the Nature Conservancy, and other allied groups with their efforts to make fee simple purchase or the acquisition of development rights for lands identified as “critical preservation” and “important preservation” in this study.
3. It is recommended that the General Assembly adopt a package of personal tax credits or deductions to serve as an incentive to encourage owners of property identified as “critical preservation” and “important preservation” to voluntarily sell their property or development rights.
4. Recognizing that the permanent preservation of “critical” and “important” land around the military reservations could result in the potential loss of an increased tax base for local governments, it is recommended that the North Carolina General Assembly create a special trust fund to compensate the effected local governments. The trust fund should

provide grants for only certain designated purposes, such as (but not limited to) the improvement / development of educational, recreational facilities and/or economic development initiatives.

5. It is recommended that the RLUAC develop criteria to prioritize and phase the purchases of the “critical preservation” and “important preservation” land as it becomes available.

## **Actions**

- Immediately following adoption of this Joint Land Use Study, an official representative of the RLUAC should meet with the North Carolina League of Municipalities, the North Carolina Association of County Commissioners, and representatives from each of the other North Carolina military installations, who are either currently involved in preparing or have recently completed a Joint Land Use Study process, to seek their support for the recommendations listed above.
- Representatives from the RLUAC (and the other military installations) should meet with the *North Carolina Advisory Commission on Military Affairs* to seek their support for the legislative proposals listed above.
- The RLUAC and the *North Carolina Advisory Commission on Military Affairs* should submit a comprehensive bill to the 2003 session of the North Carolina General Assembly, which addresses the proposals listed above. (Refer to Appendix C for a complete listing of proposed Legislative actions.)
- In the second half of 2003, the RLUAC and the Sandhills Area Conservation Partnership should jointly sponsor a committee that seeks to establish criteria to phase the purchase of land or development rights for those areas identified as “critical preservation” and “important preservation” in this study.

## **General Recommendation C: Water and Sewer Extension Policies**

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Although development can occur in areas, which lack public utilities (generally at a low density), urban density development is virtually assured in areas where public water and sewer systems are extended. Both the 1991 Joint Land Use Study (JLUS) and the current effort have concluded that medium and high-density residential development is not compatible with military training areas. It is widely recognized that the concentration of urban populations in areas adjacent to the military boundaries can pose a major threat to the safety of the civilian residents and to the integrity of the bases as viable training facilities. Any serious effort to protect the bases from urban encroachment should include a plan to prohibit the extension of water and sewer lines to areas which are identified as “critical preservation land” and “important preservation land” in this study.

### **Recommendation**

It is recommended that the North Carolina General Assembly adopt legislation that prohibits the extension of public water and sewer lines to land, which is identified as “critical preservation” and “important preservation” in this study.

### **Actions**

- Immediately following adoption of this Joint Land Use Study, an official representative of the RLUAC should meet with representatives from the North Carolina League of Municipalities, the North Carolina Association of County Commissioners, and each of the other North Carolina military installations, who are either currently involved in preparing or have recently completed a Joint Land Use Study process, to seek their support for this recommendation.
- Representatives from the RLUAC (and the other military installations) should meet with the *North Carolina Advisory Commission on Military Affairs* to seek their support for legislation, which would prohibit the extension of public water and sewer lines to land, which is identified as “critical preservation” and “important preservation” in this study.
- The RLUAC and the *North Carolina Advisory Commission on Military Affairs* should submit a bill to the 2003 session of the North Carolina General Assembly, which would prohibit the extension of public water, and sewer lines to land, which is identified as “critical preservation” and “important preservation” in this study. (Refer to Appendix C for a complete listing of proposed Legislative actions.)

## **General Recommendation D: Military Actions**

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Just as urban encroachment in surrounding areas can become a sustainability issue for Fort Bragg and Pope Air Force Base, change of military mission, equipment, and land use activities at the installations can have a negative impact on the sustainability and livability of the urban communities encircling them. Although, local governments have a recognized responsibility for protecting the integrity of the military complex, the military community also bears a responsibility for being a good neighbor. For neighboring urban communities to make responsible land use planning and growth decisions, it is necessary for the military officials to provide detailed information regarding proposed development plans and future mission changes. Local governments cannot be expected to make well-informed planning decisions without advance knowledge of new military training requirements.

Similarly, local governments surrounding the military complex need assurances that the Army and Air Force will continue to accept their share of the responsibility for identifying, preserving, and protecting the natural environment and endangered species on their side of the boundary.

### **Recommendations**

1. It is recommended that the military continue to submit new land use and development plans to both the RLUAC and local governments in the region for their review and comment prior to implementation.
2. It is recommended that Fort Bragg continue to preserve and protect its forested “green belt” area from urban growth and development.
3. It is recommended that Fort Bragg continue to preserve and protect its natural habitat areas along the perimeter boundaries from destructive military training activities.

### **Actions**

- Immediately following the adoption of this study, Fort Bragg and Pope Air Force Base should begin to develop and implement a local government notification process for any changes in military equipment and or land use activities, which could have significant off-base impacts.
- Fort Bragg should periodically review its environmental programs to guarantee the continued preservation of its natural areas and endangered species.

## **General Recommendation E: Aircraft Low-Level Routes and Low Altitude Tactical Navigation Area**

Pope Air Force Base's 43D Airlift Wing Airspace Management Office completed a comprehensive review of its aircraft Low-Level Routes and the Low Altitude Tactical Navigation Area (LATN) in the fall of 2002. The Air Combat Command Airspace and Ranges Directorate and the Air Mobility Command Airspace and Procedures Office directed this review.

The review covered all low-level visual and instrument training routes and the low altitude tactical navigation areas -- to include the approach corridor routes into the drop zones within the Fort Bragg restricted area and Camp Mackall complex. The corridors for the drop zones are generally flown between 800 feet and 1,000 feet Above Ground Level (AGL). These corridor routes also fall within the LATN area, which has been environmentally assessed and approved for 300 feet AGL for the C130 aircraft and 500 feet AGL for C-5, C-17 and C-141 aircrafts.

### **Recommendation**

It is recommended that the Fort Bragg / Pope Air Force Base Regional Land Use Advisory Commission adopt a resolution recognizing and supporting Pope Air Force Base's assigned and attached units right to continue to fly low-level terrain masking and navigation missions within the six county area that surrounds the Fort Bragg/ Pope AFB military complex.

### **Actions**

- Immediately following adoption of this Joint Land Use Study, the Fort Bragg / Pope Air Force Base Regional Land Use Advisory Commission should prepare and adopt the resolution of support described in the above recommendation.

## **General Recommendation F: Transportation Policies**

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The permanent closure of several Fort Bragg gateways, the planned rerouting of State Route 87 traffic to Cumberland County's Murchison Road, the scheduled limiting of public access to Fort Bragg's Bragg Boulevard, and the construction of the Fayetteville Outer Loop/NC Highway 13 extension, have the potential to seriously alter traffic and commuting patterns within the region. It could also have a direct impact (both positive and negative) on property values and development potential for land located within the one-mile area surrounding the military reservation. Although the effect of these actions could be quite complex and far reaching, a detailed analysis of the potential impacts is beyond the scope and design of this study.

### **Recommendation**

It is recommended that the Fort Bragg / Pope Air Force Base Regional Land Use Advisory Commission (RLUAC) initiate a detailed regional transportation study, which measures the impacts of the permanent gate closures, the limiting of public access to Fort Bragg's Bragg Boulevard, and the construction of the Fayetteville Outer Loop.

### **Actions**

- Following the adoption of this study, the RLUAC should work with the Fayetteville Metropolitan Planning Organization and the Mid Carolina, Lumber River, and Triangle Rural Planning Organizations to develop a proposed outline for a detailed regional transportation study.
- Once a proposed transportation study design is approved, the RLUAC should identify both a consultant to lead the study process and the necessary funding to support the process.

## **General Recommendation G: Urban Light Pollution**

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Light levels in the night sky, resulting from the growing urban areas which surround the Fort Bragg / Pope Air Force Base military complex, have begun to adversely affect the ability of pilots and ground troops to conduct realistic night training missions. Although the issue is beyond the scope of this Joint Land Use Study, it should be addressed by the region in some future study.

### **Recommendation**

It is recommended that the RLUAC develop a proposed study design to investigate the effect of light pollution on night training missions. The proposed study should also examine practical ways of reducing the levels of night-light in the Fort Bragg region.

### **Action Plans**

- Following the adoption of this study, the RLUAC should appoint a committee to develop a light pollution study design. It should also seek to identify potential funding sources for the proposed study.

## **General Recommendation H: Building Code Revisions**

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Outside to inside noise reduction (sound attenuation) for dwelling units was an issue of major importance in the earlier Joint Land Use Study. Of particular concern, was the potential negative impact of artillery and aircraft noise on the quality of life for people living near Fort Bragg and Pope Air Force Base. A recommendation was offered to pursue a revision of the North Carolina State Building Code to require additional insulation for homes constructed in noise sensitive areas. However, further study of the issue revealed that such action was unnecessary. With the addition of storm windows / doors (or double paned windows) and fireplace dampers, current insulation requirements are sufficient to reduce the outside to inside noise to acceptable levels.

### **Recommendations**

1. It is recommended that the Fort Bragg / Pope Air Force Base Regional Land Use Advisory Commission adopt a resolution that supports the required installation of storm windows and doors (or double paned windows) on all new homes constructed within the 62+ decibel noise areas surrounding Fort Bragg, Pope Air Force Base, and Camp Mackall.
2. It is recommended that local governments, having jurisdiction in the 62+ decibel noise level areas, adopt ordinances requiring the installation of double paned windows and/or storm windows and doors on all new homes constructed within the noise sensitive areas.

### **Actions**

- During the first half of 2003, the RLUAC should appoint a committee to draft an ordinance, which requires the installation of double paned windows, and/or storm windows and doors on new homes, which are to be, constructed in areas with 62+ decibel noise levels.
- Following the preparation of the above-mentioned ordinance, an official RLUAC representative should begin the process of meeting with each of the local governments in Cumberland, Harnett, Hoke, Moore, Richmond, and Scotland Counties to explain the home improvement recommendation.
- Local governments in the above named counties should adopt and enforce the proposed exterior to interior noise reduction ordinance by the Fall of 2003.

## **General Recommendation I: Broadcasting, Telecom, and Other Towers**

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Throughout the Fort Bragg and Pope Air Force Base region numerous broadcasting, telecommunication, and other towers (especially for cell phones) are being constructed. These towers often range in height from 300 feet to over 1000 feet -- the equivalent of a thirty to 100 story office building. The proliferation of these towers creates a potential threat to the safety of aircraft navigation in general, but pose a major hazard for the numerous military training flights, which occur on a daily basis throughout the region. Routine military training exercises require pilots to practice low-level radar evasion tactics at heights ranging from 100 to 500 feet. Clearly the low-level flights are within the height ceilings of many of the towers. The erection of too many towers -- in the wrong locations -- may result in the loss of the meaningful training opportunities for military helicopter and fixed wing aircraft pilots.

### **Recommendation**

To minimize the potential for future air space hazards, it is recommended that local governments in the Fort Bragg / Pope Air Force Base region revise their zoning regulations to limit the construction of additional broadcasting, telecommunication, and other towers to locations that are consistent with military operational patterns.

### **Actions**

- Following acceptance of the recently completed model height and locational guidelines for towers, the RLUAC should formally endorse them by resolution.
- Following the endorsement of the above mentioned model tower guidelines, an official RLUAC representative should begin the process of meeting with each of the local governments within Cumberland, Harnett, Hoke, Moore, Richmond, Sampson and Scotland Counties to encourage their inclusion in local zoning ordinances.

## **General Recommendation J: Recreational Multi-Use Trail**

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As parcels of undeveloped property around Fort Bragg and Pope Air Force Base, identified as “critical” in this study, become protected, an impressive buffer of managed natural areas will begin to emerge. Such public lands represent both a significant conservation and recreational opportunity in a rapidly growing urban region that currently lacks both. A truly unique opportunity, which should be studied for its feasibility, is the construction of a major multi-use (horse back riding, bicycling, and hiking) trail. The trail could potentially link parcels of property along Fort Bragg’s southern boundary -- extending from the Fayetteville metro area on the east, through the Sandhills Game Lands, to the Aberdeen/Southern Pines/Pinehurst area on the west. With the addition of interpretive signage (which identifies natural features) and one or two State managed picnic areas and campgrounds, the proposed trail could become a very unique and popular recreational facility for the enjoyment of both the military and civilian populations.

### **Recommendation**

It is recommended that the Fort Bragg / Pope Air Force Base Regional Land Use Advisory Commission examine the feasibility developing a major multi-use recreational trail, which could run through Hoke and Scotland Counties -- extending from Fayetteville, through the Sandhills Game Lands, to Southern Pines.

### **Actions**

- By the middle of 2004, the RLUAC should create a special committee to examine the feasibility of developing a multi-use recreational trail.
- If deemed feasible, the committee should develop a “master plan” for the proposed trail.
- Following completion of a “master plan”, the RLUAC should formally adopt the proposal and recommend its findings to the appropriate State, local government, and military entities.

## APPENDICIES

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### APPENDIX A. PUBLIC INFORMATION MEETINGS - Questions and Answers

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#### 1. Questions Raised at the Hoke County Public Information Meeting January 17, 2002

(A) **Question:** How has Fort Bragg's closing of Chicken, Plank, and Manchester Roads affected the region?

*Answer: No one has yet researched that issue.*

(B) **Question:** What recreational uses are or can be planned for the Overhills and McLean–Thompson Property?

*Answer: The Overhills estate is presently used by the public for fishing and hunting. The McLean–Thompson property was purchased solely to protect Simmons Army Airfield.*

(C) **Question:** Could Fort Bragg work with Hoke County on the construction of a water transmission line to the McDougald Downs / Puppy Creek area? Only one water line currently serves the community.

*Answer: A proposal would have to be submitted and evaluated, but it could be a possibility.*

(D) **Question:** What development can occur in the noise zones?

*Answer: The noise areas are not good for housing development. Warehousing, manufacturing, and outdoor recreational uses are appropriate land uses.*

(E) **Question:** Can this study get into the economic development concerns of Hoke County?

*Answer: This study will not be able to address an economic impact analysis. It is designed to focus on how the local governments and military installations can better interface and work together through good land use planning.*

(F) **Comment:** If Fort Bragg must shut down the roads on post, then Highway 211 needs to be widened. Perhaps Fort Bragg could help with the repair costs of the roads off post.

- (G) Comment:** It was suggested that Fort Bragg pave the portion of Raeford and Vass Roads on Fort Bragg north of Plank Road. By Court Order (Federal Court Case in 1977), these should be open. The Vass Road Gate is presently open.
- (H) Comment:** The western part of Hoke County (Ashley Heights) is in a high noise zone. Housing development should be avoided in this area.
- (I) Question:** What is the relationship between the Fort Bragg / Pope Air Force Base Regional Land Use Advisory Commission (RLUAC) and the Wildlife Refuge group?

*Answer: The goal of the Sandhills Group is to create a unique wildlife refuge. Parcels of land will be purchased as they become available from willing sellers. Most of the land will not come in as large contiguous parcels.*

## 2. Questions Raised at the Scotland County Public Information Meeting January 24, 2002

(A) **Comment:** How could there be any type of deference from incoming enemies when there is no training?

(B) **Comment:** There is noise during military training and anyone who does not like it can leave.

(C) **Question:** Is the current study going to cover the Solutions/Recommendations that were implemented?

*Answer: Yes.*

(D) **Comment:** Concern was expressed about whether or not the researchers are familiar with the Cumberland County 2001 Plan.

(E) **Comment:** The same issues that impact Fort Bragg also impact Scotland County. A great tool is “Conservation Rights”.

(F) **Question:** Will the GIS mapping be available to local governments?

*Answer: Yes.*

(G) **Question:** Will any of the GIS Mapping be infrared?

*Answer: No.*

(H) **Comment:** An attendee commented that he leased property near game land. It bothers him that the military comes onto his property without permission. They have damaged his gate and have not replaced it. He has called Fort Bragg several times and has not received an answer. He feels that the military is not respectful to landowners. He does not want them on his property during hunting season.

(I) **Question:** Will the study recommend rezoning the buffers around the military?

*Answer: Too early to make that determination.*

(J) **Comment:** Concern was expressed that a lot of money has already been spent to develop the western part of Cumberland County. The attendee is afraid that the JLUS may recommend a totally different and costly land use pattern.

(K) **Question:** Is the study going to recommend expanding the military airspace into the Sandhills area?

*Answer: A recent magazine article mentioned that there are no plans at this time to extend Fort Bragg's training ground. In order for that to take place, a major environmental impact statement/report would have to be prepared.*

**(L) Question:** When will the Joint Land Use Study be completed and when/how will the results be shared with the community?

*Answer: The study is scheduled to be completed by the end of 2002. A second round of public information meetings will be held to share the results/recommendations.*

**(M) Question:** Will expanding Fort Bragg means more noise in the area?

*Answer: There are no plans to expand Fort Bragg at this time. However, even if it does expand sometime in the future that does not mean there will be more noise in the area.*

**(N) Question:** Will military training affect the Sandhills Game Land? "Are you thinking of "spilling over into the Game Land"?"

*Answer: There are no plans at this time to expand training on the Game Lands beyond the current levels.*

**(O) Question:** Did the earlier Joint Land Use Study recommend controlling artillery noise. If so, was the recommendation implemented?

*Answer: The earlier Joint Land Use Study identified "Noise and Accident Potential Zones" (NAPZ's) where small arms, artillery, and aircraft noise levels were too intense to be compatible with residential development. Most of the local governments in area surrounding the military installations reflected this information in their adopted land use plans and zoning ordinances.*

**(P) Question:** Will the study recommend limiting hunting and fishing on Fort Bragg?

*Answer: No.*

**(Q) Comment:** It was suggested that the military should alter its flight plan in the Deer Croft Community. Helicopters are currently flying at tree top levels in the area.

**(R) Comment:** It was suggested that Fort Bragg should notify the residents in the Camp Mackall area when weapons load testing is about to occur.

### 3. Questions Raised at the Moore County Public Information Meeting January 31, 2002

(A) **Question:** Is the Calaway Track of land in Hoke County an area that is going to be conserved?

*Answer:* Yes. The North Carolina Department of Transportation purchased the property to mitigate natural habitat areas, which will be destroyed as highway improvements are made in the surrounding region.

(B) **Question:** The presentation did not show the location of the artillery firing points. Where are they located?

*Answer:* The firing points are located all around the fort. The largest concentrations are located in Hoke County.

(C) **Question:** Is Camp Mackall addressed by this study?

*Answer:* No. It was not addressed.

(D) **Question:** What types of plans are there for the corridor area between Fort Bragg and Camp Mackall? Are there plans for improved roads? Transportation Corridor?

*Answer:* There is no military jurisdiction between Fort Bragg and Camp Mackall. It is difficult for the military to make plans for the area since they do not own it.

(E) **Question:** The current JLUS takes into account the same areas as the 1990-1991 study. Since Fort Bragg may be changing in the near future, ie., as a bombing range for the Navy, shouldn't someone at Fort Bragg be talking to someone in the White House regarding this situation?

*Answer:* Fort Bragg is not involved in or aware of any decisions to use its bombing ranges by the Navy. Nothing formal has been decided between the Navy and Fort Bragg at this time.

#### 4. Questions Raised at the Cumberland County Public Information Meeting February 28<sup>th</sup>, 2002

No questions were asked or comments made during the Cumberland County Public Information Meeting.

#### 5. Questions Raised at the Harnett County Public Information Meeting March 14, 2002

**(A) Question:** Do you give out any type of information via mail to which the public can respond?

*Answer: Questionnaires could be developed and sent.*

**(B) Comment:** Fort Bragg purchased the land (Overhills Estate) after development was already established in the area. Therefore, Fort Bragg encroached upon the residents.

**(C) Comment:** Fort Bragg needs to tell us how they plan to develop over the next five years. There is not much room left for growth. The last major purchase was the Rockefeller property.

**(D) Question:** Why is no one building on Fort Bragg?

*Answer: Funding is an issue. A proposal is being considered for a private developer to handle development and repairs for lower enlisted personnel housing quarters.*

**(E) Comment:** This program (new housing lease agreement on Fort Bragg) will not benefit small contractors who cannot afford the lease.

**(F) Comment:** It is a concern that the government is separating military housing from the civilians. This is not what the soldiers want.

**(G) Questions:** Is Brandywood Subdivision under consideration as an opening to Fort Bragg? Is Fort Bragg going to become a closed post? Will that action accelerate the upgrading of US-13 to accommodate the increased traffic? Is there a residential retirement community planned for Ft. Bragg?

*Answer: Brandywood Subdivision is only one of the locations under consideration as an opening to Fort Bragg. Fort Bragg is not going to close, but thru traffic will be limited in the future. Currently there are no plans for a retirement community at Fort Bragg.*

**(H) Question:** What is the timeframe for new housing development at Fort Bragg? Is there any information available regarding taxes between the county and the development?

*Answer: The exact timeframe is unknown, but the issue of taxes should be addressed in the six-month timeframe. One possible scenario is that a developer could be chosen in the June / July timeframe. A plan could be developed within a year.*

## **6. Questions Raised at the Richmond County Public Information Meeting April 18, 2002**

**(A) Question:** Is Fort Bragg still working on a ten-year plan? Do they still have the seven-year and the ten-year plan?

*Answer: Fort Bragg plans for projects from 2005 – 2009. They develop a Form 1391, which goes to Congress for approval. At the present time, they are doing design work for the 2003 and 2004 projects.*

**(B) Question:** Should protective “buffers” be developed around the military installations?

*Answer: Yes. It would be a good idea. It would also be a good idea to encourage local governments to identify residential areas around the military bases and preserve them as rural or low-density areas. The Sandhills Game Lands currently work as buffers.*

**(C) Comment:** If you notice growth of the military, please consider us.

**(D) Question:** Does Fort Bragg have plans to extend its Camp MacKall training area into the Hoffman area?

*Answer: Although Fort Bragg is building better facilities for the troops at Camp MacKall, it has no plans to purchase any additional land in the Hoffman area at this time.*

**(E) Question:** What about the military noise in the Hoffman area?

*Answer: Fort Bragg just got new noise contours. There are no serious noise levels at Hoffman for the moment, but they are coming.*

**(F) Question:** In reference to September 11, are we really lucky to be this close to Fort Bragg? Are you expecting to see more growth within the military?

*Answer: Proposed growth at Fort Bragg is pretty much “flat line”. For the most part, it has been pretty stable. With what is going on overseas, a few organizations based at Fort Bragg have had some mild growth, but not so much at the Fort for the years 2000 – 2007 timeframe.*

**(G) Question:** If needed, is there room to grow? Do you intend to grow into the surrounding residential areas and local governments?

*Answer: There is room to grow at Fort Bragg. It is more relevant to determine “how” it grows. Fort Bragg has been communicating with various committees concerning how to regulate and plan for its future growth. That is a good reason to establish buffers and buffer zones.*

**(H) Question:** When you say “buffer zones”, do you mean for the air or for the ground? Tower heights are being restricted now.

*Answer: Both, but the greatest concern is buffering areas on the ground.*

**(I) Question:** Do all the counties abutting Fort Bragg and Pope Air Force Base have countywide zoning?

*Answer: No. Only Richmond County is without countywide zoning.*

**(J) Question:** Are there any permanent-based people at Camp MacKall?

*Answer: Very few. It is basically a training camp -- hosting students on a temporary basis. Control tower personnel are the only permanent staff.*

**(K) Question:** Is it correct to assume that the military would like to see very limited development around Camp MacKall?

*Answer: That is correct. However, much of the area is already protected by the Sandhills Game Lands. The Game Land is owned and managed by the State of North Carolina. The federal government has no desire to take it over.*

**(L) Question:** There is talk of making U.S. 1 Highway a four-lane road. Is the Department of Transportation going to do that?

*Answer: It is something that needs to be addressed to and discussed with the North Carolina Department of Transportation officials.*

**(M) Question:** Is it correct that Camp MacKall does not have restricted air space?

*Answer: At this time, Camp MacKall does not have restricted air space.*

**APPENDIX B. SAMPLE REAL ESTATE DISCLOSURE FORM**

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**AREA OF MILITARY IMPACT**  
**NORTH CAROLINA REALESTATE DISCLOSURE FORM**

Property at the following location is situated within one mile of both a military installation and a protected long-leaf pine forest area. The subject property may therefore be exposed to periodic low-level military aircraft over-flights, artillery / small arms noise, other such military training activities, and smoke from controlled burns of managed pine forest areas.

**Parcel #:** \_\_\_\_\_ **Deed Book #** \_\_\_\_\_ **Page #** \_\_\_\_\_

**Address:** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

I, \_\_\_\_\_, (owner of the subject property) herby certify that I have informed \_\_\_\_\_ (prospective purchaser/lessee/renter) that the subject property is located within one mile of both a military installation and a protected long-leaf pine forest area and may therefore be exposed to periodic low-level military aircraft over-flights, artillery / small arms noise, other such military training activities, and smoke from controlled burns of managed pine forest areas.

\_\_\_\_\_  
*Owner*                      *Date*

I, \_\_\_\_\_, (prospective purchaser/lessee/renter of the subject property) herby certify that I have been informed by \_\_\_\_\_ (owner) that the subject property is located within one mile of both a military installation and a protected long-leaf pine forest area and may therefore be exposed to periodic low-level military aircraft over-flights, artillery / small arms noise, other such military training activities, and smoke from controlled burns of managed pine forest areas.

\_\_\_\_\_  
*Purchaser/Lessee/Renter*                      *Date*

Signed before me on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, in the County of \_\_\_\_\_, North Carolina.  
\_\_\_\_\_, Notary Public, State of North Carolina.

My Commission Expires on \_\_\_\_\_. (SEAL)

## **C. PROPOSED LEGISLATIVE INITIATIVES**

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### **Requirement for Real Estate Disclosure Statements**

1. It is recommended that the North Carolina General Assembly adopt a bill requiring real estate disclosure statements for all parcels of property located within one mile of the military installations. As appropriate, the real estate disclosure statements should include warnings about potential low-level aircraft flights, artillery/small arms noise, and intensive smoke resulting from controlled burns in the surrounding pine forests.

### **Actions to Halt Urban Encroachment**

1. It is recommended that the North Carolina General Assembly adopt legislation that requires local governments in the Fort Bragg / Pope Air Force Base region to permit only low density development (ten acre minimum lot size and no more than one dwelling unit per ten acres) on all land which is identified as “critical preservation” and “important preservation” in this study.

2. It is recommended that the North Carolina General Assembly adopt legislation that prohibits the extension of public water and sewer lines to land, which is identified as “critical preservation” and “important preservation” in this study.

3. It is recommended that the North Carolina General Assembly establish a special trust fund to assist the U.S. Department of Defense, the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, the Nature Conservancy, and other allied groups with their efforts to make fee simple purchase or the acquisition of development rights for lands identified as “critical preservation” and “important preservation” in this study.

4. It is recommended that the General Assembly adopt a package of personal tax credits or deductions to serve as an incentive to encourage owners of property identified as “critical preservation” and “important preservation” to voluntarily sell their property or development rights.

5. Recognizing that the permanent preservation of “critical” and “important” land around the military reservations could result in the potential loss of an increased tax base for local governments, it is recommended that the North Carolina General Assembly create a special trust fund to compensate the effected local governments. The trust fund should provide grants for only certain designated purposes, such as the improvement / development of educational and/or recreational facilities.

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