3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

Each potential impact area within this section contains information related to the affected environment, environmental consequences, and mitigation. A general discussion for each of these areas follows.

3.1.1 Affected Environment

The affected environment discussions describe the existing social, economic, natural, and physical environment in the project area. This information establishes the baseline conditions for each resource category against which to evaluate potential impacts from the proposed project.

3.1.2 Environmental Consequences

The environmental consequences discussions will assess the potential impacts (positive and negative) of the Preferred Alternative. The information will include all direct, indirect and cumulative impacts along with any mitigation measures that might be warranted.

Direct Impacts. Direct impacts are caused by the proposed project and occur at the same time and place. These effects are directly linked to the project and are highly predictable.

Indirect Impacts. Indirect impacts are caused by the proposed project and occur later in time or are farther removed in distance, but they are still reasonably foreseeable. Types of indirect impacts related to transportation projects fall under the following three broad categories (NCHRP, 2002):

- Alteration of the behavior and functioning of the affected environment caused by project encroachment on the environment.
- Project-influenced development effects (land use effects).

- Effects related to project-influenced development effects (i.e., effects of the change in land use on the human and natural environment).

Cumulative Impacts. Cumulative impacts are direct and indirect impacts of the project in association with past, present, and reasonably foreseeable future actions of other parties in the surrounding area. The Council on Environmental Quality has outlined the following eight principles for cumulative impact analysis:

- Cumulative impacts are caused by the aggregate of past, present, and reasonably foreseeable future actions.

- Cumulative impacts are the total impact, including both direct and indirect impacts, on a given resource, ecosystem, and human community of all actions taken, no matter who has taken the actions.

- Cumulative impacts need to be analyzed in terms of the specific resource, ecosystem, and human community being affected.

- It is not practical to analyze the cumulative impacts of an action on the universe; the list of environmental impacts must focus on those that are truly meaningful.

- Cumulative impacts on a given resource, ecosystem, and human community are rarely aligned with political or administrative boundaries.

- Cumulative impacts may result from the accumulation of similar impacts or the synergistic interaction of different impacts.

- Cumulative impacts may last for many years beyond the life of the action that caused the impacts.

- Each affected resource, ecosystem, and human community must be analyzed in terms of its capacity to accommodate additional impacts, based on its own time and space parameters.

Reasonably foreseeable actions in this project area could include activities within Camp Robinson, residential and commercial development, and transportation projects. Actions within Camp Robinson are subject to NEPA regulations, so it is anticipated that any cumulative impacts with regards to the Camp's future actions would be outlined within the associated environmental documentation. Transportation projects are the only one of these actions that can be predicted with enough certainty to be included in cumulative impact assessments related to the North Belt Freeway project. The following are the transportation projects likely to occur within the project area that will be used for cumulative impact analysis:

Highway 107 Widening from 2 lanes to 5 lanes

Bear Paw Drive - Brockington Road (1.7 miles) (2.7 kilometers)

Jacksonville Cato Road - Bayou Meto (0.9 miles) (1.4 kilometers)

Brockington Road Widening from 2 lanes to 4 lanes

Maryland Avenue - Highway 107 (1.2 miles) (1.9 kilometers)

Jacksonville Cut-off Reconstruction

Highway 107 - Bayou Meto (1.5 miles) (2.4 kilometers)

3.1.3 Mitigation

Agencies are required to identify and include in their project all relevant and reasonable mitigation measures that could decrease or eliminate potential impacts, even if the impacts are not considered to be significant. The Council on Environmental Quality has included the following actions in the definition of mitigation:

- Avoiding the impact altogether by not taking a certain action or parts of an action.
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.

- Compensating for the impact by replacing or providing substitute resources or environments.

3.2 LAND USE AND LAND COVER

3.2.1 Affected Environment

Land use and land cover are dictated by the interplay between the physiography of the landscape and the manmade environment. These interrelationships can be evaluated only after a basic understanding has been obtained related to the project area's underlying physiography and overlying development and land cover.

3.2.1.1 Physiography

The project is primarily in the Ouachita Mountains Ecoregion of Arkansas, with just the eastern section in the Mississippi Alluvial Plain Ecoregion (Woods *et al.*, 2004).

The United States Geological Survey (USGS) and Arkansas Geological Commission (Haley *et al.*, 1993) have mapped the geology of the project area into two formations, the Jackfork Sandstone Formation and Holocene Alluvium. The majority of the project will be on the Jackfork Sandstone Formation, with the eastern terminus on alluvium of the Mississippi Alluvial Plain.

Soils are highly related to ecoregions and geology. Soils along the project corridor are mapped into four soil associations on the general soil map in the *Soil Survey of Pulaski County* (Haley *et al.*, 1975). Soils in the Mississippi River Alluvial Plain Ecoregion are mapped as the Perry-Norwood association. These are composed of poorly to well-drained, level, deep, clayey and loamy soils on bottomlands. Soils in the Ouachita Mountains Ecoregion are mapped into three soil associations. The Linker-Mountainburg association is composed of well drained, gently sloping to steep, moderately deep and shallow, loamy and stony soils on hills, mountains, and ridges. The Leadvale-Gutherie-Linker association is composed of poorly to well drained, level to gently sloping, deep and moderately deep, loamy

soils in valleys and on tops of low mountains. The Amy-Rexor association is mapped along Kellogg Creek and Fears Lake. These are poorly to well drained, level to gently undulating deep, loamy soils on floodplains of local drainages.

A variety of mineral deposits have been mined in the Ouachita Mountains. Mineral deposits reported in Pulaski County include bauxite, quartz, lead, zinc, copper, and silver. Known mineral deposits in the project area include the Kellogg Mines and the Jeffrey Quarry. The Kellogg Mines are south of Kellogg Creek and east of Kellogg Acres Road. The Jeffrey Quarry is at Crystal Hill, north of Highway 365 and south of the Preferred Alternative.

The Kellogg Mines operated intermittently from about 1847 to 1926. Mining began after Benjamin Kellogg discovered mineral lead in a tributary of what is now named Kellogg Creek. It was found that the ore was difficult to smelt due to the presence of silver, so the material was crushed, hauled to the Arkansas River and exported to England for processing. The modern city of North Little Rock was originally named Argenta, which is Latin for *silver*. The California Gold Rush of 1849 ended the first period of activities at the Kellogg Mines. The Confederate Army opened another shaft during the Civil War, which was later destroyed by the Union Army. Various leases operated the mines sporadically over the years, evidently with little economic success, until the main shaft flooded and mining was abandoned. Many of the abandoned Kellogg Mines tunnels and shafts have since collapsed. Assays of cores taken by the Arkansas Geological Commission indicate trace amounts of silver, lead, copper, and zinc (Stuart-Leslie, 2003).

The Jeffrey Quarry Construction Company began operations in the late 1950s and operated through the 1960s, primarily to quarry sandstone road-fill for the construction of Interstate 40. During and following the active years of the quarry, many mineral specimens were removed by collectors and geologists. Minerals described from the quarry include rectorite, quartz, ankerite, apatite, and cookeite (Newsom, 1978). The quarry is presently filled with water.

3.2.1.2 Existing Development

Development outside of Camp Robinson is largely residential, with the exception of an agricultural field at the eastern terminus of the proposed project. Undeveloped property in the project area includes both uplands and bottomlands.

Camp Robinson is a 32,000-acre (13,000 hectare) Army National Guard training facility. The camp provides facilities for training Arkansas Army National Guard, the Air National Guard, and Army, Navy, and Marine reserves. The original 6,000 acres (2,400 hectares) were acquired by the United States for an encampment called Camp Pike. The camp was renamed Camp Robinson in 1937. The camp expanded to 48,000 acres (19,400 hectares) during World War II and was used for basic training and to house German prisoners of war. Following the war, the camp was declared surplus. Although the largest portion was distributed to the Military Department of the State of Arkansas, smaller portions were distributed to the City of North Little Rock for an airport and a park, to Central Baptist College, and to several private ownerships. Thirty-one acres (12.5 hectares) were retained by the Department of Defense as the US Army Reserve Center Camp Pike.

Incorporated city properties in the project area include North Little Rock, Sherwood, and Jacksonville. Unincorporated communities include Crystal Hill and Gravel Ridge. See Section 3.6.1.2 for additional information on communities and Section 1.4.4 for more information about existing road networks in the project area.

3.2.1.3 Land Cover

Three natural plant communities were identified in the project area: Oak-Hickory, Mixed Oak-Pine, and Bottomland. Aside from developed property, natural plant communities have in some places been displaced with pasture grasses or agricultural crops.

OAK-HICKORY – Post oak is the dominant species in uplands of the project area. Dry ridges north and south of the Kellogg Creek valley are covered by nearly pure stands of post oak. Eastern red cedar and winged elm are spotty throughout these uplands and are more prominent in areas of natural disturbance. Blackjack oak is a co-dominant species with post oak and black hickory on dry slopes primarily south of Camp Robinson. In valleys between

ridges and on north-facing slopes, southern red oak is co-dominant with post oak, along with mockernut hickory. Smooth sumac is the most common shrub in areas where oak-hickory woodland has been harvested.

MIXED OAK-PINE – Shortleaf pine replaces oak-hickory woodland in areas that have been heavily disturbed by human activities, particularly by military activities on Camp Robinson. Shortleaf pine is usually mixed with oak-hickory forest, especially with post oak, but there are a few nearly pure stands. Loblolly pine has been planted in a few areas.

BOTTOMLAND – The most diverse plant communities in the project area are the bottomlands of Kellogg Creek and Fears Lake. Bald cypress and buttonbush are the dominant woody species in the Fears Lake portion of Kellogg Creek. Herbaceous wetlands in the Kellogg Creek valley are predominantly wool grass, cattails, and smartweed. Non-native species such as Chinese privet and Japanese honeysuckle have invaded some upper reaches of Kellogg Creek.

PASTURE – A few pastures in the project area have native grasses, especially broomsedge and bluestem, but most have been converted to modern pasture using introduced species, primarily tall fescue.

FIELD – Fields delineated inside Camp Robinson were distinguished in this analysis from pasture outside of the camp. These fields serve a number of purposes including security zones, storage areas, firing ranges, and training grounds.

CROPS – Former bottomlands at the eastern terminus of the project have been cleared for agriculture with soybeans as the primary crop.

3.2.2 Environmental Consequences

The primary direct impact to land use and land cover is the conversion to highway right of way. Land use and land cover categories were determined using aerial imagery interpretation and were digitized into a geographic information system (GIS). Land use and land cover impacts were calculated in the GIS platform using an estimated average right of way width of 300 feet (91 meters) and 40-acre (16-hectare) interchanges. Since this analysis is based on

recent aerial imagery interpretation, it does not include proposed new subdivision developments. New subdivisions may exist by the time the facility is constructed. Direct impacts on potential new development could be minimized by inclusion of this facility in future planning by developers and communities.

3.2.2.1 No-Action Alternative

Direct Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no direct impacts to land use or land cover.

Indirect Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no indirect impacts to land use or land cover.

Cumulative Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no cumulative impacts to land use or land cover related to this project. However, other transportation infrastructure improvements throughout the project area could occur at a faster rate, and these improvements could have impacts on land use and land cover.

3.2.2.2 Preferred Alternative

Direct Impacts. Table 3.2-1 lists the estimated direct impacts to existing land use for the Preferred Alternative, rounded to the nearest acre and their hectare equivalents. The *Undeveloped* category includes wooded areas and pastures outside of the military base. The *Military Base* category also includes some property owned by the military that is outside of Camp Robinson proper. The *Existing Roadway* category includes impacts to existing roads outside of the base. *Utility Right of Way* was not delineated in residential and other areas where the land has another use. The *Miscellaneous* category includes ponds and reservoirs, borrow areas, sewage ponds, levees, larger ditches, railroad property, and towers.

Table 3.2-1 Land Use Impacts Acres (Hectares)	
Undeveloped	369 (149)
Military Base	151 (61)
Existing Roadway	59 (24)
Cropland	59 (24)
Residential	33 (13)
Miscellaneous	17 (10)
Cemetery	9 (4)
Utility Right of Way	6 (2)
Commercial	2 (1)
Railroad	1 (0.4)
Total Impacts	707 (286)

The Preferred Alternative would convert approximately 707 acres (286 hectares) to highway right of way. About half of these acres are undeveloped, although much of the property is owned by development firms. The largest land use impact would be to military property on Camp Robinson. Agricultural impacts would occur at the planned interchange construction joining the existing interchange at the eastern terminus of the project. Residential properties would be impacted at Crystal Hill, Sherwood, Kellogg Acres, and Northlake Estates. The Batesville Pike road relocation would require nine acres (four hectares) of property owned by the new Arkansas State Veteran's Cemetery, but would not impact any graves. The only impacts to commercial property would be on Highway 365 at Crystal Hill.

Table 3.2-2 lists the estimated direct impacts to existing land cover for the Preferred Alternative rounded to the nearest acre and their hectare equivalents. See Land Cover, Section 3.2.1.3, for a description of the land cover categories.

Table 3.2-2 Land Cover Impacts Acres (Hectares)	
Mixed Oak-Pine	251 (102)
Oak-Hickory	203 (82)
Bottomland	28 (11)
Crops	59 (24)
Field	22 (9)
Pasture	6 (2)
Development	138 (56)
Total Impacts	707 (286)

Oak-hickory is the natural vegetation cover of uplands along the Preferred Alternative. The mixed oak-pine cover type is dominant primarily due to the history of human disturbance to the environment associated with Camp Robinson. Oak-hickory woodlands cover the steep slopes southwest of Camp Robinson, and are the predominant cover from north of the Kevin McReynolds Baseball Complex in Sherwood to Fears Lake south of Gravel Ridge. The largest area with relatively unfragmented oak-hickory woods impacted by the Preferred Alternative occurs on a ridge north of Oakdale Road and south of Kellogg Creek. The Preferred Alternative minimizes impacts to bottomlands at Fears Lake.

Indirect Impacts. Indirect impacts to existing land use and land cover can occur following construction due to increased accessibility and visibility. Property adjacent to proposed interchanges is especially likely to be developed following construction, and generally for commercial uses.

Indirect impacts to land use and land cover on the western half of the Preferred Alternative are expected to be minor. Access to Camp Robinson from the proposed facility would be restricted. Although an interchange is planned with access to Highway 365, much of the existing land use on Highway 365 is commercial, so additional commercial land use would not be a land use conversion.

The Batesville Pike road relocation and a planned interchange with the new road would provide accessibility and visibility to property south of the existing Batesville Pike road. Residential and commercial development of this property is expected to follow soon after construction of the project. The planned interchange at Highway 107 would likely encourage residential development on uplands north and south of Oakdale Road, and encourage commercial development near the interchange.

Indirect impacts to natural plant communities include the spread of invasive species along the new highway corridor, and potentially into natural areas. Transportation corridors are the principal means for the distribution of invasive plant species. Potentially invasive non-native species already noted in the project area include Japanese honeysuckle, Chinese privet, mimosa tree, Callery pear, and China-berry tree. Many roadside weeds, Johnson grass for example, generally do not invade undisturbed natural communities.

Cumulative impacts. Cumulative impacts would be related to other planned transportation projects that are reasonably foreseeable. These projects are outlined in Section 3.1.2. These projects would convert additional, largely undeveloped, property to a transportation use.

3.2.3 Mitigation Summary

Impacts to developed property will be avoided and minimized to the extent practicable. Excess right of way outside of the safety zone will be allowed to revegetate naturally. A post-construction survey for invasive plant species will be conducted in order to identify possible problem areas and species.

3.3 VISUAL ENVIRONMENT

3.3.1 Affected Environment

From Camp Robinson eastward to Kellogg Creek, a distance of eight miles (13 kilometers), the Preferred Alternative is largely on massive Purdham Hill. Purdham Hill is not actually a single hill but a series of ridges and high plateaus. The general landscape setting in the project area is rolling hills and bluffs with a relatively broad valley at Kellogg Creek. At its

western terminus, the Preferred Alternative falls among low hills near the Arkansas River Valley, the corridor is at an elevation of about 350 feet (107 meters) above mean sea level (msl). The corridor elevation rises quickly up the west side of Purdham Hill to about 550 feet (168 meters) msl, and from this perspective Pinnacle Mountain and other Arkansas River Valley hills can be seen to the south and west. North and east of Purdham Hill, the landscape drops again to about 350 feet (107 meters) msl at Fears Lake (Kellogg Creek), south of Gravel Ridge.

Natural vegetation in the project area consists mostly of forested uplands. These uplands have a moderate to high visual quality, and during some years, fall foliage is particularly attractive. At Fears Lake, bottomland vegetation inhabits the floodplain of Kellogg Creek. Much of what was formerly hardwood forest is standing dead timber so that the visual character is only moderate. Bottomland on the eastern side of the project area has been converted to agriculture.

In addition to Fears Lake at Kellogg Creek, water resources adjacent to the corridor include Engineers Lake in Camp Robinson, and Indianhead Lake. These manmade lakes are visual features of moderately high quality.

Manmade development includes Camp Robinson, the North Little Rock Municipal Airport, Sylvan Hills High School, the Kevin McReynolds Baseball Complex, and numerous residential communities. Much of the immediate area of the proposed project lies outside major urban development and the overall visual character is rural, largely forested uplands. However, residential development continues to alter much of the present rural character of the corridor.

There are no visually sensitive resources in the project area. Viewers of the road would be primarily residential and military. Viewers from the road would include local, commuter, and commercial traffic.

3.3.2 Environmental Consequences

3.3.2.1 No Action Alternative

Direct Impacts. The No-Action Alternative would not involve new construction, thus no visual impacts would occur.

Indirect Impacts. No indirect impacts to the visual environment are anticipated as a result of the No-Action Alternative.

Cumulative Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no cumulative impacts to the visual environment related to this project.

3.3.2.2 Preferred Alternative

Direct Impacts. Much of the viewshed of the Preferred Alternative would have a high to moderately high visual quality due to some rolling topography and that much of the viewshed is forested with oak-hickory (Figure 3.3-1) and mixed oak-pine forest. Westbound traffic would encounter visually interesting views of the Arkansas River Valley towards the western terminus of the project (Figure 3.3-2). Fears Lake is largely herbaceous and scrub-shrub wetlands (see Figure 3.9-1 in the Wetlands Section), but Engineers Lake on Camp Robinson (Figure 3.3-3) and Indianhead Lake (Figure 3.3-4) are moderately interesting visual features.

Residential development is encountered at Crystal Hill, Kellogg Acres, Oakdale, Indianhead Lake Estates, and Northlake Estates (Figure 3.3-5). Additional developments that would be viewed from the road include the North Little Rock Municipal Airport and two concrete water tanks at Central Arkansas Water (Figure 3.3-6). The Batesville Pike relocation would be adjacent to the State Veteran's Cemetery.

Indirect Impacts. Indirect impacts to the visual environment occur primarily from indirect impacts to land use. The Batesville Pike relocation would encourage residential development in that area. Residential development east of the relocated roadway and

Figure 3.3-1 View to the northwest of oak-hickory forest along Oakdale Road

Figure 3.3-2 View to the southwest from Trapp Road south of Camp Robinson

Figure 3.3-3 View from the north side of Engineers Lake on Camp Robinson

Figure 3.3-4 View southwest across Indianhead Lake to the Indianhead Lake Estates subdivision

Figure 3.3-5 View to the southeast of new residential development at Northlake Estates

Figure 3.3-6 View to the northeast at Batesville Pike and Maryland Avenue on the east side of Camp Robinson

north of the Kevin McReynolds Baseball Complex may expose the complex to views of the new transportation facility and residential development. Restricted access to Camp Robinson would prevent additional indirect impacts there. Nearly all of the oak-hickory forest north of Highway 107 and along Oakdale Road is slated for future residential development, and visibility of the property from a new transportation facility and an interchange on Highway 107 may encourage development.

Cumulative Impacts. Cumulative impacts in the project area would be related to other planned transportation projects that are reasonably foreseeable. These projects are outlined in Section 3.1.2. These projects would result in cumulative impacts due to additional urbanization of the visual environment.

3.3.3 Mitigation Summary

Excess right of way outside of safety zones will be allowed to revegetate naturally. AHTD's Standard Specifications include native wildflowers in the permanent seeding mix.

3.4 AIR QUALITY

3.4.1 Affected Environment

Ambient air monitoring is conducted at various locations throughout Arkansas by the State and Local Air Monitoring Stations and the National Air Monitoring Stations programs. Based on historical monitoring data, the existing air quality of the county encompassing the project area (Pulaski) is designated as being in attainment for the National Ambient Air Quality Standards for carbon monoxide, ozone (both the 1-Hour and the 8-Hour), particulate matter (fine and course), nitrogen dioxide, sulfur dioxide and lead. Attainment areas are those areas identified by the Environmental Protection Agency (EPA) as being in compliance with the National Ambient Air Quality Standards.

3.4.2 Environmental Consequences

The primary mobile sources of air pollution emissions associated with this project are the motor vehicles that would be utilizing the proposed highway facility. Consequently, an air quality assessment was performed in order to estimate the degree of air quality impacts that

would result from the associated air pollutant emissions from these motor vehicles. This assessment was conducted by following the guidelines established by the AHTD, the FHWA, and the EPA. The assessment methods and results are outlined in Appendix C.

3.4.2.1 No-Action Alternative

Direct Impacts. The No-Action Alternative is anticipated to result in both beneficial and adverse effects for some residents located within the project area. With no new highway facility nearby, residents would not be exposed to the additional air pollution associated with this new roadway, such as fine particulate matter, carbon monoxide and ozone precursors (hydrocarbons and nitrogen oxides). However, without the proposed facility, there would be an increase in traffic congestion on existing Interstate 40, Highway 365, Highway 107, Highway 67 and the local street network due to increases in traffic volumes. This increase in congestion would lead to a reduction of traffic speeds. As a consequence, residences along these existing roadways would likely be exposed to an increase in air pollution, such as fine particulate matter, carbon monoxide and ozone precursors.

Indirect Impacts. With or without the implementation of the proposed project, there would be associated additional development, which would continue to increase over time. This would result in rising levels of background air pollution, such as fine particulate matter, carbon monoxide and ozone precursors. With additional fine particulate matter and ozone precursor emissions, there would be an associated contribution to the formation of a regional haze and also a rise in ground-level ozone levels. Consequently, individuals, particularly those with sensitive respiratory systems such as asthmatics, would be inclined to limit the amount of time they spend in outdoor activities in order to compensate. Also, with additional contributions to the formation of a regional haze, the visibility of an area would decline.

Cumulative Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no cumulative air quality impacts related to this alternative. However, other transportation infrastructure improvements throughout

the project area could occur at a faster rate with the No-Action Alternative, and these improvements could have air quality impacts.

3.4.2.2 Preferred Alternative

Direct Impacts. Based on the results of the analysis, it has been determined that the Preferred Alternative would have minimal impacts on air quality as related to carbon monoxide concentrations (See Analysis Results in Appendix C). However, increases in pollutant levels are anticipated for fine particulate matter, carbon monoxide and ozone precursors.

Indirect Impacts. Indirect impacts would be similar to those outlined for the No-Action Alternative, including increases in air pollution due to additional development.

Cumulative Impacts. Cumulative impacts in the project area would be related to other planned transportation projects that are reasonably foreseeable. These projects are outlined in Section 3.1.2. Cumulative impacts on air quality would be minimal.

3.4.3 Mitigation Summary

Based on the microscale analysis results, no mitigation measures are required for the proposed facility. Furthermore, the project is located in an area, which is in attainment status for all transportation pollutants and where there are no transportation control measures. Therefore, this project is not subject to transportation conformity requirements. However, during the construction of the proposed facility, air quality impacts will be minimized by the selected contractor through a combination of fugitive dust control, equipment maintenance and compliance with state and local regulations.

3.5 NOISE QUALITY

3.5.1 Affected Environment

3.5.1.1 Noise Terminology

Noise is a form of vibration that causes pressure variations in elastic media such as air and water. The ear is sensitive to this pressure variation and perceives it as sound. The intensity

of these pressure variations causes the ear to discern different levels of loudness. These pressure differences are most commonly measured in decibels (dB), the unit of measurement for noise.

The decibel scale audible to humans spans from zero to approximately 140 dB. A level of zero decibels corresponds to the lower limit of audibility, while 140 decibels produces a sensation more akin to pain than sound. The decibel scale is a logarithmic representation of the actual sound pressure variations. Therefore, a 26% change in the energy level only changes the sound level one dB. The human ear would not detect this change except in an acoustical laboratory. A doubling of the energy level would result in a three dB increase, which would be barely perceptible in the natural environment. A tripling in energy level would result in a clearly noticeable change of five dB in the sound level. This would be perceived as a doubling of the apparent loudness.

The human ear has a non-linear sensitivity to noise. To account for this in noise measurements, electronic weighting scales are used to define the relative loudness of different frequencies. The "A" weighting scale is widely used in environmental analysis because it closely resembles the non-linearity of human hearing. The unit of A-weighted noise is dBA.

Time-varying characteristics of environmental noise are analyzed statistically to determine the duration and intensity of noise exposure. In an urban environment, noise is made up of two distinct parts. One is ambient or background noise. Wind noise and distant traffic noise make up the acoustical environment surrounding the project. These sounds are not readily recognized, but combine to produce a non-irritating ambient sound level. This background sound level varies through the day, being lowest at night and highest during the day. The other component of urban noise is intermittent, higher in pitch, and louder than the background noise. Transportation noise and local industrial noise are examples of this type of noise. Sounds of this nature can be very disturbing, while brief and intense noises can interrupt, annoy or startle. It is for these reasons that environmental noise is analyzed statistically.

The L_{eq} is the equivalent steady-state sound having the same A-weighted sound energy as that contained in the time-varying sound over a specific period of time. The time period considered for traffic noise is one hour. The abbreviation then becomes L_{eq} (h), which correlates reasonably well to the effects of noise on people. All traffic noise levels in this analysis will be expressed in dBA L_{eq} (h).

3.5.1.2 Current Noise Levels

Ambient noise levels in the study area are a function of traffic volume and daily activities of the general populace. The primary source of background noise is the traffic on Interstate 40, Highway 365, Highway 107, Highway 67, the local street network, and the local airports.

Ambient noise measurements were taken at 16 sites along the Preferred Alternative representing noise sensitive receptors that would likely be affected by the proposed project. Based upon ambient noise readings within the study area, background noise levels range from 43 to 70 dBA L_{eq} (h). Detailed information about noise analysis procedures and results are available in Appendix D.

The current aural environments of the study area vary considerably depending on location and proximity to the existing roadway system. Since existing Interstate 40, Highway 365, Highway 107 and Highway 67 are the predominant roadways within the study area and have the highest traffic volumes and truck percentages, the areas adjacent to these roadways and the associated commercial activity centers have the highest ambient noise levels.

3.5.2 Environmental Consequences

FHWA's Traffic Noise Model version 2.5 (TNM) was utilized as the highway traffic noise prediction computer program to project future design-hour traffic noise levels for the year 2030. The number of impacted noise receptors was estimated by utilizing the 66 dBA Leq (h) contour (the "approach" level for the FHWA's Noise Abatement Criteria Activity Category B) and also the 10 dBA or greater ("substantial" increase from existing) contour.

3.5.2.1 No-Action Alternative

Direct Impacts. The No-Action Alternative would result in overall beneficial noise effects for the residents in the project area. This alternative would result in increases in traffic congestion on existing Interstate 40, Highway 365, Highway 107, Highway 67 and on the local street network. This increased congestion would cause lower speeds, thereby resulting in a reduction in noise levels on these existing roadways.

Indirect Impacts. No indirect noise impacts are anticipated due to the No-Action Alignment.

Cumulative Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no cumulative noise impacts related to this project. However, other transportation infrastructure improvements throughout the project area could occur at a faster rate, and these improvements could have noise impacts.

3.5.2.2 Preferred Alternative

Direct Impacts. The construction of the Preferred Alternative is anticipated to adversely impact noise receptors at both the 66.0 dBA Leq (h) and the 10 dBA or greater noise levels. The total number of noise receptors impacted for the 66.0 dBA Leq (h) noise level is 7. The total number of impacted noise receptors for the 10 dBA or greater noise level is 12. The area between Batesville Pike and Highway 67 had the highest number of impacted noise receptors for both the 66.0 dBA Leq (h) and 10 dBA noise levels.

Indirect Impacts. Once the Preferred Alternative has been constructed, traffic volumes on the new facility would continue to increase over time, which would result in rising background noise levels. Additionally, new commercial and residential development around interchange areas could increase local traffic volumes. Consequently, the character of a neighborhood can be altered with increasing background noise levels. Individuals who reside in areas with low background noise, such as most rural locations, tend to spend more time outdoors and non-enclosed. However, with rising background noise levels, day-to-day activities, such as conversations, get louder in order to

compensate. People tend to provide themselves refuges in their own personal space such as sunrooms versus open patios.

Cumulative Impacts. Cumulative impacts in the project area would be related to other planned transportation projects that are reasonably foreseeable. These projects are outlined in Section 3.1.2. Cumulative impacts to noise receptors are expected to be minimal.

3.5.3 Mitigation Summary

Various methods of mitigation are available to minimize the potential noise impacts of the proposed facility. Among these are reduction of speed limits, restriction of truck traffic to specific times of the day and a total prohibition of trucks. Also, the alteration of horizontal and vertical alignments, property acquisition for construction of noise barriers or berms, property acquisition to create buffer zones (to prevent development that could be adversely impacted) and noise insulation of public use or nonprofit institutional structures can be considered. In addition, the utilization of berms and sound barriers can also be considered.

Restriction or prohibition of trucks would not be consistent with the project's stated purpose and need. Reduction of speed limits, although acoustically beneficial, is seldom practical due to the resulting reduction of the system's operational efficiency. Design criteria and recommended termini for the proposed project prevent substantial horizontal and vertical alignment shifts that would produce significant changes in the projected acoustical environment. Normally, the desire to purchase a limited amount of right of way prohibits the acquisition of buffer zones or the construction of earth berms. However, where opportunities occur to incorporate earth berms as part of the highway construction and placement of excavated waste materials, they will be evaluated as part of the design phase of the Selected Alternative. Therefore, the construction of noise barriers and/or earth berms is considered the only prudent noise mitigation measure for this proposed facility.

For all areas where noise impacts would be most notable, noise abatement (i.e., barriers) would have to be constructed between the road and the receiver in order to effectively abate the noise produced by traffic. These areas are located in the more dense residential

developments in the study corridor and would be reviewed to determine the reasonableness and feasibility of noise mitigation in future studies.

AHTD's Policy of Reasonableness and Feasibility will be applied to the residential areas that are identified as having the potential to be impacted by noise once an alignment has been selected. Based upon the preliminary data related to noise contour information, the Crystal Hill area and the Oakdale and Northlake Estates subdivisions warrant additional and detailed studies for noise barrier analysis if the Preferred Alternative is selected. This detailed noise mitigation analysis will be conducted as part of the design phase. The focus of this analysis will be in the areas that currently have existing and/or expanding residential development. The current residential development within the study area is increasing the number of sensitive receptors on a continuing basis. These changes will be evaluated and considered during the noise barrier feasibility evaluation.

3.6 SOCIOECONOMIC

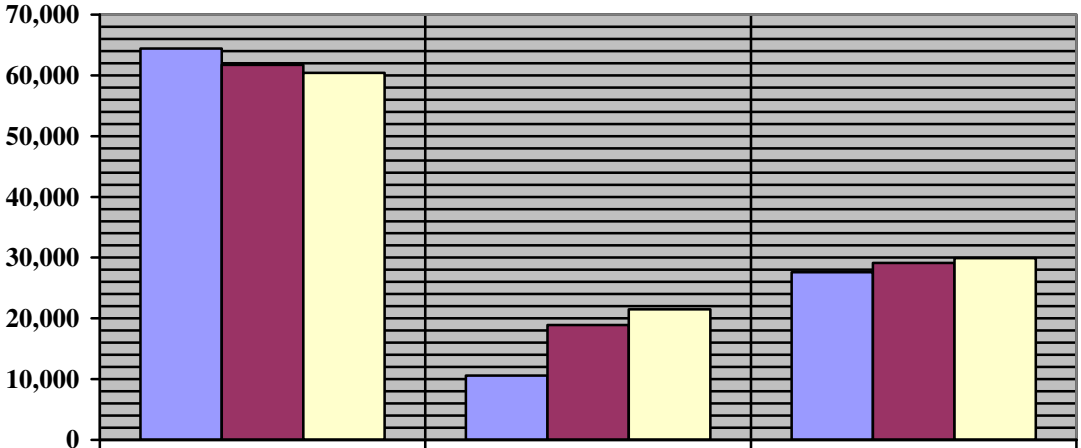
3.6.1 Affected Environment

3.6.1.1 Populations

The geographic area considered for analysis of existing social conditions and environmental consequences consists of a one-county region (Pulaski County). The project study area involves three cities – North Little Rock, Sherwood, and Jacksonville. Over the recent years, the region has experienced significant population growth outside of North Little Rock, as shown in Table 3.6-1. The majority of this growth was concentrated in the Sherwood area. Detailed census information is available in Appendix E.

Pulaski County is geographically located in the center of the State of Arkansas and is the most populated county in the state, with a population total of 361,474 in the year 2000. According to the 2000 US Census, the population within the project area totaled 115,092, making up 32% of the Pulaski County population.

Table 3.6-1 Population Totals



	North Little Rock	Sherwood	Jacksonville
1980	64,419	10,586	27,589
1990	61,741	18,893	29,101
2000	60,433	21,511	29,916

North Little Rock has the largest population of the cities in the project area, but had a 2% decrease in population between 1990 and 2000. Although North Little Rock has declined in population, the region's population grew slightly between 1990 and 2000 due to the continued growth of Sherwood and Jacksonville. Sherwood is a smaller city located between North Little Rock and Jacksonville that grew 8.8% between 1990 and 2000. Jacksonville is located along Highway 67, between Sherwood and Cabot. Jacksonville was once a fast growing suburban area of Little Rock and North Little Rock, but its population increase has now slowed to less than 3% between 1990 and 2000.

Population density reflects the degree of urbanization. Over time, urban growth and urban services within the study area have expanded and settlement patterns have increased in density. Between 1990 and 2000, a majority of the communities in the study area increased in population density per square mile.

The lowest densities are generally along the northern edges of the study area. Population densities increase closer to North Little Rock. Areas with higher densities within the study area include some of the smaller residential areas, such as Kellogg Valley and Runyan Acres.

The highest densities generally border the larger urban centers to the south. Unincorporated areas that are exceptions to this pattern are found in the Gravel Ridge community, which has areas that show both positive and negative population growth.

3.6.1.2 Communities

AHTD has identified two dimensions of community, *territorial* and *relational*. The *relational* dimension of community has to do with the nature and quality of relationships in that community, and these communities may have no defined territorial boundaries. A sense of community (relational) is the perception of similarity to others, an acknowledged reliance on mutual assistance, support, cooperation, or interaction with others; a willingness to maintain this reliance by giving to or doing for others, and the feeling that one is part of a larger dependable and stable structure. There are four elements of a relational community:

- Safety
- Membership
- Influence
- Integration and fulfillment of needs

Other communities seem to be defined primarily according to *territorial* existence, as in the case of neighborhoods, but even in such cases, proximity or shared territory cannot by itself constitute a sense of community.

The most common usage of the word *"community"* indicates a large group living in close proximity. Examples of local communities include:

- *Neighborhood Community* – A neighborhood community is a geographically localized community, often within a larger city or suburb. Neighborhood communities are normally stabile in age, culture, race, and the length of time its citizens remain.

- *Planned Neighborhood Community* (*Subdivision)* – A planned neighborhood community, commonly referred to as a subdivision, is one that was designed and built more or less following the plan. These types of neighborhoods normally differ in behavior patterns, sense of socialization, and individuality.

There are 17 areas identifiable as communities in and around the project area, as shown in Figure 3.6-1. These communities are categorized into relational communities and territorial communities. The territorial communities can be further subdivided into neighborhood communities and planned neighborhood communities.

The relational communities include Gravel Ridge, Runyan Acres, and Oak Grove. The territorial communities include the neighborhood communities of Crystal Hill and Kellogg Acres and the planned neighborhood communities (subdivisions) of Windridge, Miller's Crossing, Hidden Creek, Amber Oaks, Oakdale, Silver Springs, Kellogg Valley, Gap Creek, Indianhead Lake Estates, Northlake Estates, Tara Mount, and Pennpoint Estates. Detailed community descriptions are included in Appendix E.

3.6.1.3 Title VI and Environmental Justice

Illegal discrimination based on race, color, age, and national origin can limit the opportunity for minorities to gain equal access to services and programs. Title VI of the Civil Rights Act of 1964 is the federal law that protects individuals and groups from discrimination on the basis of their race, color, age and national origin in programs and activities that receive federal financial assistance.

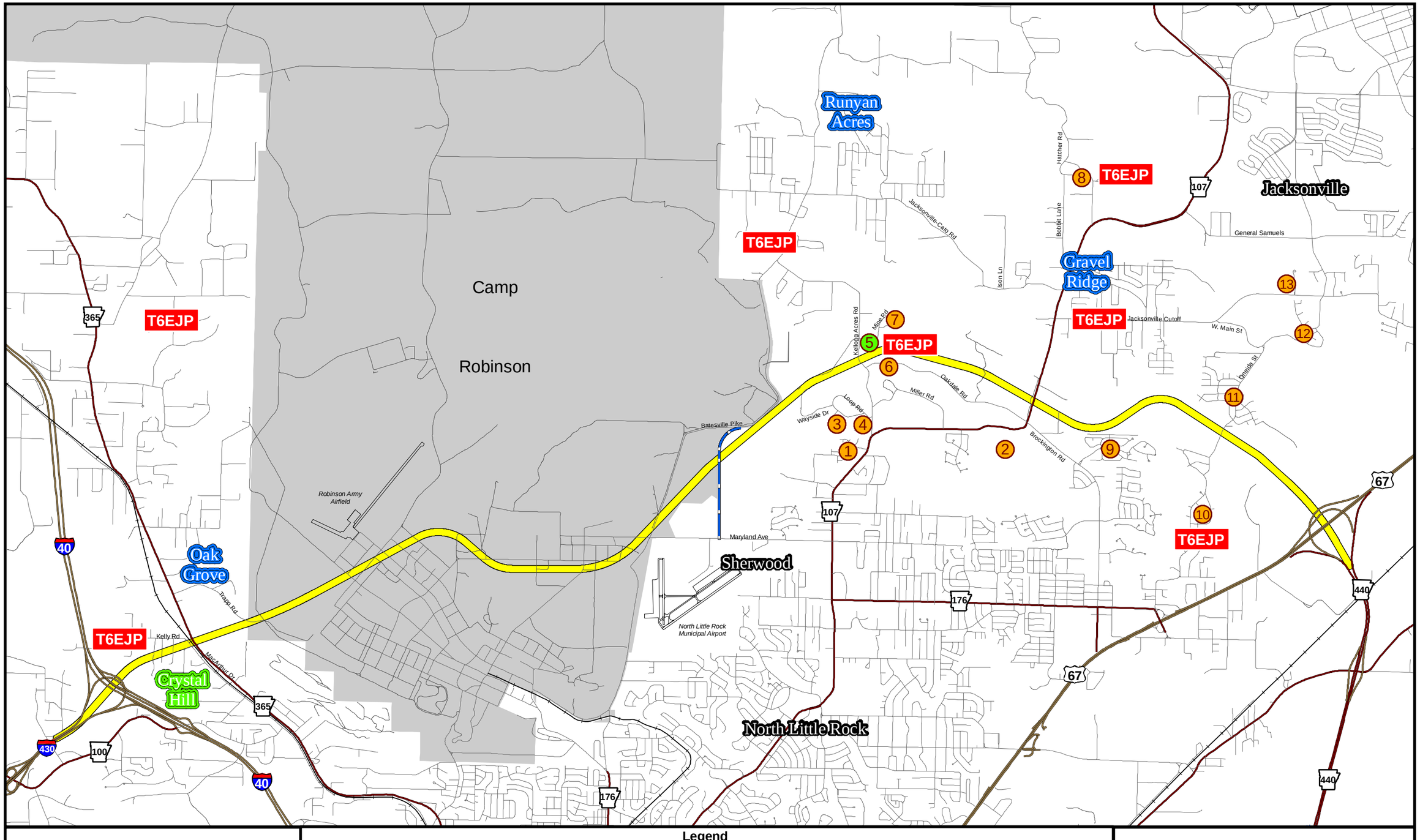
Presidential Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations, directs federal agencies to make environmental justice part of their mission by identifying and addressing the effects of all disproportionately high and adverse human health or environmental effects of their programs, policies and activities on "minority populations and low-income populations." In order to comply with this order, the FHWA in association with the AHTD, must appropriately address the concerns of those populations potentially affected by their activities. Those individuals must be

appropriately involved in the development of projects within their communities to obtain the best fit possible without sacrificing safety or mobility.

Minorities are simplified into five different categories: African-Americans, Hispanic-American/Latinos, American Native Americans/Alaska Natives, Asian Americans, and Native Hawaiian/Pacific Islanders. According to the US Census Bureau, elderly populations are considered as ages 65 and older. A low-income community or population was classified in the year 2000 as having an aggregated mean annual income level for a family of four correlating to $17,463, which compares to $18,850 in the year 2004 (adjusted for inflation). Data for these populations from the 2000 Census are presented in Table 3.6-2 for Pulaski County and the project area. Based upon field observations and U.S. Census Data, there were six areas along the Preferred Alternative that may contain Title VI and/or Environmental Justice populations. See Figure 3.6-1 for information on locations.

Table 3.6-2
Title VI and Environmental Justice Populations (2000 Census)

	Pulaski County	Project Area
Total Population	361,474	10,839
Minority Population (% of Total)	121,265 (34)	1,575 (15)
Hispanic or Latino Population (% of Total)	8,816 (2)	281 (3)
65 and Older Population (% of Total)	41,425 (11)	1,004 (9)
Low-Income Population (% of Total)	10,009 (10)	878 (7)



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Job R60101
AHTD - Environmental GIS - Reed
August 2, 2007

Miles
0 0.25 0.5 1 1.5 2
Kilometers
0 0.4 0.8 1.6 2.4 3.2

Legend

- Preferred Alternative
- Relocated Batesville Pike
- Camp Robinson
- 1 Windridge
- 2 Miller's Crossing
- 3 Hidden Creek
- 4 Amber Oaks
- 5 Kellogg Acres
- 6 Oakdale
- 7 Silver Springs
- 8 Kellogg Valley
- 9 Gap Creek
- 10 Indianhead Lake Estates
- 11 Northlake Estates
- 12 Tara Mount
- 13 Pennpoint Estates
- Relational Community
- Neighborhood Community
- Planned Community (Subdivision)
- T6EJP Title VI / Environmental Justice Populations

Figure 3.6-1
Communities and Title VI / Environmental Justice Populations

North Belt Freeway

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3.6.1.4 Economic Characteristics

Housing and Income Levels

Pulaski County has a higher median household income than the state average of $33,445. Some comparative data on age, household income and the median home value for the state, Pulaski County and the cities in the project area from the 2000 Census are listed in Table 3.6-3.

Table 3.6-3
Age, Household Income and Median House Value Information (2000 Census)

Place	Median Age	Median Household Income	Median House Value
Arkansas	37.0	$33,445	$72,800
Pulaski County	35.0	$38,120	$85,300
Jacksonville	29.5	$35,460	$73,100
North Little Rock	36.5	$35,578	$76,500
Sherwood	35.9	$44,838	$91,700

The housing market continues to be strong in the Little Rock/North Little Rock Metropolitan Statistical Area (MSA) based on the number of single family housing unit permits issued over the last ten years. During each of the last three years, the number of permits has exceeded 3,000 with many of those permits for homes in Maumelle, Sherwood and Jacksonville, which would be directly served by the North Belt Freeway. Table 3.6-4 shows the strength of the housing market of the area.

Table 3.6-4
Single Family Housing Unit Permits Issued
Little Rock/North Little Rock MSA

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Total	2,007	1,867	1,759	2,064	2,280	2,001	2,197	2,459	3,160	3,075	3,396

The lack of housing over-valuation in central Arkansas, the region's affordability advantage, and local economic vitality has enabled the construction activity to remain robust through the end of 2005. Regional housing construction has so far defied the deceleration that normally accompanies rising interest rates.

Labor Force

For the year 2005, the total labor force in Pulaski County was estimated to be 195,400 with total employment of 186,425. As shown in Table 3.6-5, the total unemployment rate of 4.6% compares favorably with the state average of 5.5% and the national average of 5.7 %.

Table 3.6-5
Employment Figures for Year 2005

Place	Labor Force	Employment	Unemployment Rate
Pulaski County	195,400	186,425	4.6%
Jacksonville	13,677	12,900	5.7%
North Little Rock	32,118	30,704	4.4%
Sherwood	12,960	12,575	3.0%

The percentage of the Pulaski County labor force in each of the major employment sectors is shown in Table 3.6-6. The employment sectors are diverse and serve as a good foundation for employment in the area.

Table 3.6-6
Industry Percent of Labor Force

Educational, health and social services	22.8
Retailing	12.1
Manufacturing	8.6
Administrative, professional, scientific	8.5
Finance and insurance	7.7
Arts, entertainment, recreation, food services	6.9
Public administration	6.9
Transportation and warehousing	6.1
Construction	5.6

Industrial Parks and Sites

Three major industrial parks, Galloway, Springhill and Rose City, are located in North Little Rock, as are a number of developed sites not situated within parks. Pulaski Industrial Park and the Little Rock Air Force Base have attracted industrial development in the Jacksonville area. All of these industrial parks and the Air Force Base would benefit from the improved access resulting from the construction of the North Belt Freeway.

Office Development

North Little Rock has experienced substantial growth in office development over the last decade and office complexes now offer a combined total of nearly one million square feet of net leaseable area. Also affected by this proposed project is the significant expansion of office development in western Little Rock that is accessed from Interstate 430. The proposed North Belt Freeway would connect directly to Interstate 430.

Retail Development

Retailing remains a major portion of the economy in central Arkansas. In 2002, retailing accounted for 35,300 jobs in the region, or about 12% of total employment. The Little Rock/North Little Rock MSA accounts for 23% of the state's population but had 29% of the value of all retail sales. For the ten-year period of 1992-2002, retail sales increased 61.3% in the USA, 60.8% in the state and 64.4% in the Little Rock/North Little Rock MSA.

North Little Rock is of special significance as it offers an impressive variety of retail facilities that draw customers from all over the state. Three of the 20 largest malls and shopping centers in the state are located in North Little Rock. The three facilities are McCain Mall, Lakewood Village, and McCain Plaza.

Conclusion

The Little Rock/North Little Rock MSA benefits from being connected by good highways to all parts of the state and serves as a hub for many economic activities with a wide array of retail, manufacturing, educational, and medical facilities. The overall economy of the project area is strong and vibrant. Growth in several economic indicators such as population,

housing, employment and retail sales has been steady over the last 15 years, and this trend is expected to continue.

3.6.2 Environmental Consequences

Transportation projects can affect communities in a variety of ways, both positively and negatively. Transportation projects may be developed without attention to the surrounding area, thereby disrupting or dividing stable and unified neighborhoods, damaging community character, promoting urban sprawl, or disrupting pedestrian mobility. Or, transportation projects can be shaped to help revitalize business districts, stimulate economic development, improve access, reinforce growth management goals, and enhance community character.

Public Involvement is one method to assure that transportation projects are developed with full consideration of their impacts on people and their communities by affirming the following goals:

Responsive Coordination: Promotes citizen involvement and response during community sensitive decision-making in the planning and development process for transportation projects; embraces community concerns such as land use issues, environmental preservation, or economic development; minimizes conflict; and works to solve community problems by promoting livable and stable communities.

Nondiscrimination: Ensures that decision-makers are alerted to environmental justice issues by recognizing impacts on all segments of society and avoiding disproportionate impacts on specific populations.

3.6.2.1 Social and Community Impacts

Social impacts are all social and cultural consequences of public or private actions that alter the ways in which people live, work, and play, relate to one another, organize to meet their needs, and generally cope as members of society.

This wide-ranging definition for describing the nature of social impacts may be outlined as changes in one or more of the following:

- Way of life – the way people live, work, play, and interact with one another on a day-to-day basis;
- Culture – shared beliefs, customs, and values;
- Community – its cohesion, stability, character, services, and facilities; and
- Quality of the environment – the quality of air and water, the level of dust and noise experienced, safety and fears about security, etc.

This, in terms of the individual or household, may become a:

- Reduction in perceived quality of life;
- Change in status or type of employment;
- Worsening of economic situation, level of income or property values;
- Disruption in everyday life (having to do things differently); and
- Changed attitude towards local community or level of satisfaction with the neighborhood.

The presence of the Preferred Alternative would result in some community changes. However, the Preferred Alternative was specifically developed and located to minimize community, residential, and business impacts while attempting to maximize public access to the new transportation facility. Social impacts may not necessarily be dictated by the precise physical location of the proposed highway, but rather by the presence of the proposed highway through the local area.

The proposed project would not split any subdivisions or urban neighborhoods. Due to the location of the Preferred Alternative between the Kellogg Acres and Oakdale communities, and between the Indianhead Lake Estates and Northlake Estates communities, the social impacts are expected to be similar for each. The Preferred Alternative would result in relocation of individuals or clusters of homes and businesses. However, due to the grade

separations connecting these particular neighborhoods, the relational aspect of the communities should remain intact. During the design phase of the project, feasible mitigation options will be presented to the local residents for comment and discussion.

Before or during the construction period of the project, temporary increases in traffic congestion, disruption of traffic patterns, and changes in access may occur. Access impacts can be caused by road closures, roadway relocations, or driveway relocations. Access changes can affect homeowners and businesses by increasing or decreasing travel times to destinations. In some cases, the initial inconvenience of new routes might be substantial. However, roadway plans will be designed to minimize these impacts.

3.6.2.2 Title VI and Environmental Justice Populations Impacts

The Preferred Alternative was evaluated to determine if there is a potential for disproportionate and adverse impacts to low-income, elderly, or minority populations. Using U.S. Census data, the Health & Human Services Poverty Guidelines, and field observations, it was determined that the Crystal Hill area has the largest amount of minority, elderly, and low-income populations that could be impacted by the Preferred Alternative. However, the alignment through this area is determined by the location of the Interstate 40/430 Interchange and the alignment placing dictated by Camp Robinson. No minority or low-income populations are anticipated to be relocated by the Preferred Alternative.

Relocation studies indicated that a substantial number of the relocatees in the Crystal Hill area could be considered elderly. Based on the analysis conducted by the AHTD, the proposed project would not exert a high and/or adverse impact upon minority or low-income populations. While some impacts may be borne by elderly, minority and low-income residents, the level of impact would not be disproportionately high. Further steps to minimize impacts will be considered during the final design phase; where avoidance is not possible, the acquisition and relocation process will be conducted in accordance with the Uniform Relocations Assistance and Real Property Policies Act of 1970. For more information about Environmental Justice requirements and procedures, see Appendix E.

3.6.2.3 Relocations

Relocation of homes and businesses affects people in many different ways. The individual's income, race, and age, among other factors, influence a person's ability to adjust to relocation and that person's attitude towards it. To some degree, most people who are relocated would experience some psychological adjustment problems. In most cases, these problems are minor, and the individuals successfully re-adjust. However, some of these psychological problems can lead to a behavior that may be disruptive to their life; therefore, every effort is made to minimize relocations in the planning and design of highway facilities.

Table 3.6-7 provides a general listing of the numbers of residences and businesses that would be relocated by the Preferred Alternative. Special attention will be given to all relocatees to ensure that replacement housing will be obtained within their monetary means. Also, special relocation advisory services and assistance services will be administered commensurate with all relocatees' needs.

Table 3.6-7
Relocation Impacts

Total Relocations	**42**
Residential Owners	29
Residential Tenants	4
Businesses	9
Non-Profit Businesses	0
Total Minorities	0
Total Elderly	10
Total Low-Income	0

In terms of age and ability to adjust to relocation, there is some evidence indicating that the elderly, low-income, and minority populations usually suffer more from relocation than do any other category of citizens. The elderly and the low-income citizens may rely heavily on long established travel patterns and access to transportation and relocation can disrupt their established patterns of travel and their working habits.

For lower income persons, relocation can become a major problem if the new housing obtained as a result of relocation costs more to maintain. Also, as a result of higher population densities in lower income neighborhoods, there may be a higher degree of interaction between neighborhoods, and therefore a greater degree of attachment to the older neighborhoods. Conversely, some people with lower income may welcome the opportunity to depart from their neighborhood and environments.

Appendix E contains a Conceptual Stage Relocation Statement and Housing Inventory that was compiled with the cooperation of local real estate companies and newspapers. The housing inventory provides an estimate of the available housing and is an indication of the state of the market for this area. This information will be further refined when the project is designed and right of way is purchased.

3.6.2.4 No-Action Alternative

Direct Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no direct impacts on Title VI/Environmental Justice populations or communities.

Indirect Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no indirect impacts on Title VI/Environmental Justice populations or communities.

Cumulative Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no cumulative social impacts related to this project. However, other transportation infrastructure improvements throughout the project area could occur at a faster rate, and these improvements could have social impacts.

3.6.2.5 Preferred Alternative

Direct Impacts. The Preferred Alternative would potentially displace 29 residential owners, four residential tenants, and nine businesses (24 employees). Twenty of the residential relocations, three tenants, and eight business relocations occur within the

Crystal Hill community. All other displacements occur within the Kellogg Acres and Gap Creek communities. Based on field observations, nine of the residential owner relocations in the Crystal Hill community and the residential tenant relocation within the Kellogg Acres community appear to be elderly families. Field observations also show that no families within these communities appear to be considered low-income.

The Preferred Alternative would go through the Crystal Hill community and between the Kellogg Acres neighborhood and the Oakdale subdivision. It will also run adjacent to the south side of the Silver Springs and Northlake Estates subdivisions and along the north side of the Gap Creek subdivision. Although this alignment would run between Kellogg Acres neighborhood and the Oakdale subdivision, a grade separation at Kellogg Acres Road would allow for a connection between the two communities to remain.

Indirect Impacts. The proposed highway could accelerate current residential and commercial development trends in the project area. The use of public services such as police, fire, and emergency medical, may be impacted during construction. The proposed highway could encourage commercial/residential development at or near this project, particularly near the proposed interchange/grade separation at Highway 365 near the Crystal Hill area and near Highway 107/Brockington Road. The outcome of a new highway interchange in an urbanized area is difficult to predict. Some interchanges, depending on the location and environmental structure, are clearly essential in turning around distressed areas and encouraging economic growth. Others do little to stimulate growth and revive a struggling economy, and some have a mix of significant positive and negative impacts.

No two situations are ever identical. There are, however, important lessons to be learned from the experiences of communities elsewhere with major highway infrastructure projects. In general, the following can occur:

- Interchanges between two highways most notably have a positive effect on an area's access to nearby business and commercial markets. Likewise, the area around a new interchange is more readily accessible from other regional markets.

Improved accessibility can generate development pressures. Natural and other land use limitations, as well as zoning regulations, can channel where and if such development occurs.

- Areas that are distressed would not necessarily experience an economic upswing as a result of an interchange. Some interchanges give developers a reason to build heavily in the area. Others have no effect on economic growth in struggling areas.

- The design of an interchange can have important implications for development potential in its vicinity. Sites adjacent to an interchange may suffer from aesthetic harm caused by a particularly large or poorly located interchange.

Cumulative Impacts. At this time, no cumulative socioeconomic impacts related to this project are anticipated. Cumulative impacts along the Preferred Alternative would be related to other planned transportation projects that are reasonably foreseeable. These projects are outlined in Section 3.1.2. Cumulative socioeconomic impacts are expected to be minimal.

3.6.2.9 Economic Impacts

The Little Rock-North Little Rock MSA has historically had a balanced economy that insulates the area from large booms and busts. The employment sectors are diverse and serve as a good foundation for employment in the area.

For the year 2005, the total labor force in Pulaski County was estimated to be 195,400 with total employment of 186,425. The total unemployment rate of 4.6% compares favorably with the state average of 5.5% and the national average of 5.7 %. Table 3.6-8 shows the number of jobs in each of the area's major communities and the jobs held by city residents as reported to the 2000 Census. Note that just slightly more than one-third (37%) of the total jobs are in cities north of the Arkansas River and nearly the same percent (36%) are held by residents of the same city. These figures indicate a great deal of commuting across northern Pulaski County as well as into the southern part of the county and into Faulkner County.

Three of the 20 largest malls and shopping centers in the state are located near each other in North Little Rock. These and other smaller centers in the Highway 67 corridor in the vicinity of McCain Boulevard attract a large number of employees and shoppers from long distances throughout central Arkansas and beyond. All employment centers would benefit from improved access provided by the construction of the North Belt Freeway. This is emphasized by the cross-county commuting indicated by the statistics in Table 3.6-8. Improved traffic operations should enhance business opportunities and no negative impacts are expected due to diverted traffic, as the remaining traffic should easily support highway-oriented businesses.

Table 3.6-8
Employment by City – Year 2000
Little Rock-North Little Rock Metropolitan Statistical Area

City	Total Jobs by Place of Work	% of Total	Total Jobs Held by City Residents	% Jobs Held by City Residents
Cabot	5,077	2	1,730	34
Conway	30,410	11	14,240	47
Jacksonville	14,946	6	6,680	45
Maumelle	4,862	2	950	20
North Little Rock	37,948	14	11,035	29
Sherwood	6,903	3	1,825	26
Totals	100,146	37	36,460	36
Benton	10,140	4	4,225	42
Bryant	3,507	1	845	24
Little Rock	153,866	57	72,090	47
Totals	167,513	63	77,160	46

Source: 2000 Census Transportation Planning Package, Part III from *Metrotrends*, Metroplan, December 2005

In addition to the benefits of enhanced traffic operations and improved accessibility, the short-term benefits include highway construction jobs and the related indirect benefit of jobs for material supplies.

Site-specific economic impacts by the proposed project are expected to be limited. Only a few commercial relocations are anticipated since the Preferred Alternative passes through largely undeveloped or residential areas.

Both of the large military installations in the area are expected to benefit from improved access. The Highway 107 Interchange would enhance access to the Little Rock Air Force Base, and it would take some pressure off the congested Vandenberg Boulevard Interchange on Highway 67. Camp Robinson would also be well served by the proposed interchanges on Batesville Pike and on Highway 365. Although the Preferred Alternative passes through Camp Robinson, care has been taken to coordinate with Camp officials to maintain the continuity of interior roads through the proposed construction of grade separations along the proposed project.

The North Little Rock Airport is another important economic engine in the project area that is expected to benefit from enhanced accessibility. The airport is home to approximately 180 corporate and private aircraft and is used extensively by the business community, with over 56,000 operations occurring per year. The airport is also home to the national Weather Service and has two fixed-base operators. The location of the Batesville Pike Interchange just to the north of the airport would enhance the airport's accessibility dramatically with no negative impacts expected.

The intersection of Highway 107 and Brockington Road in Sherwood is an area slated for commercial development by the city's long-range land use plan. The presence of a North Belt Freeway Interchange would ensure that this could occur and perhaps enhance the area's retailing significance by the improvement in accessibility.

The No-Action Alternative could be expected to have a negative economic effect due to increased congestion and less direct connections between economic centers in the region.

3.6.3 Mitigation Summary

Residents and business owners within the proposed right of way for the project would be eligible for relocation assistance in accordance with Public Law 91-646. It is the policy of the AHTD that adequate replacement housing be made available, or built if necessary, before any person is required to move from their occupied dwelling. It is required that relocation specialists conduct relocation studies and available housing inventories for all replacement housing and businesses.

Businesses are an integral part of the make-up of a neighborhood. A commercial property inventory indicated there are ten commercial properties available in the project area. At the time of displacement, another inventory of available units in the area will be obtained and an analysis of the market will be performed in order to ensure that these units are adequate to meet the needs of the relocatees. Any businesses displaced should have an opportunity to relocate. However, in the case of single proprietorship businesses, a special problem arises. Most of these are small neighborhood businesses that usually rely on neighborhood patronage. If relocation necessitates moving out of the neighborhood, a small business may fail if this property is outside of the neighboring area. In this case, in order to assist the displaced businesses in relocating within the local area, AHTD will explore all possible sources of funding or other resources that may be available to businesses. Sources that will be considered include but are not limited to: state and local entities, the Department of Housing and Urban Development, the Economic Development Administration, the Farmers Home Administration, the Small Business Administration and other federal agencies.

All displaced persons, businesses, and nonprofit organizations are eligible for reimbursement for actual moving costs. These persons may also be eligible for re-establishment cost payments or payments in lieu of moving. These payments are made according to a fixed schedule or through bids received by AHTD. The relocatees have the option of which method they would use in order to move their personal property or business.

Appropriate measures will be taken to ensure that the businesses to be displaced are fully aware of their benefits and entitlements, course of action, and any special provisions designed to encourage businesses to relocate within the same community.

At the moment, there are no other identified unusual conditions involved with this project. Further steps to minimize relocations will be considered during the final design of the project. Where avoidance is not possible, the acquisition and relocation process will be conducted in accordance with the Uniform Relocation Assistance and Real Property Policies Act of 1970. Relocation resources are made available to all residents and businesses without discrimination and are comparable to the needs of the relocatees.

It is the AHTD's policy that fair housing and replacement of businesses be offered to all affected persons regardless of race, color, age, religion, sex, or national origin. Construction of this project would not begin until decent, safe, and sanitary replacement housing is in place and offered to all affected persons.

Existing housing resources within the areas of North Little Rock, Sherwood, Gravel Ridge, and Jacksonville may be necessary for relocation of the displaced households and businesses in the project area. Current vacant housing in the area may be utilized for this purpose. The displaced residences may be relocated in housing of higher quality and value than their existing residence under the policies and guidelines of the Uniform Relocation Assistance and Real Property Acquisition Act of 1970. The displaced residential tenants will also be provided assistance through the Relocation Program, and emphasis will be given to provide relocation counseling to elderly, low-income, and businesses that are in need. The provision of suitable and acceptable replacement housing, combined with adequate relocation payments, can be expected to minimize adverse relocation impacts resulting from project implementation.

3.7 HYDROGEOLOGY AND GROUNDWATER

3.7.1 Affected Environment

The project area is located near the boundary of two physiographic regions, the Ouachita Mountains and the Mississippi Alluvial Plain. Most of the project area is located within the Ouachita Mountains region, except for a small area near the project's eastern terminus at Highway 67.

Groundwater in the Ouachita Mountains is obtained from a thick sequence of sandstone, shale, slate, chert and novaculite. The materials in the weathered zone are more porous and permeable than the original unweathered rock with water storage occurring between the individual soil particles. The maximum thickness of these sequences is 20 feet (six meters). Weathering has not affected the rock below the water table; and groundwater generally occurs only in secondary openings such as joints, fractures, and solution channels. This significantly affects the potential groundwater production capacity of the unweathered rock.

Groundwater moves in the direction of the slope of the water table. In the weathered zone, this slope generally follows the topography, however in the unweathered zone, the slope of the water table is controlled mainly by geologic structure with groundwater generally moving toward the synclinal axes and away from the anticlinal axes.

Permeabilities are relatively low in the Ouachita Mountains strata. Wells drilled into these rocks seldom yield more than 5 - 10 gallons (19 - 38 liters) per minute. Maximum water-level fluctuations normally do not exceed 10 - 20 feet (3 - 6 meters) during a given year, although the levels in certain wells may fluctuate as much as 80 feet (24 meters) in a six month period (Plebuch and Hines, 1967). The drilling of dry holes is common in this Ouachita Mountains region. When a water well is developed in this region, usually its quantity is inadequate and its quality is poor. Water production is generally between 5 - 10 gallons (19 - 38 liters) per minute with iron ranging from 0.01 to 0.74 parts per million (ppm) and total dissolved solids from 72 - 414 ppm.

The abandoned Kellogg Mines area lies within the project area in the Interior Highlands region. Some of these mine shafts are known to reach depths of 100 feet (30 meters) or more. These mines can allow for a direct connection of surface water with the groundwater resulting in limited filtration of the surface water by the soil.

A small portion of the project area is located in the Mississippi Alluvial Aquifer, which has prolific groundwater production. This area is a wedge section abutting the Ouachita Mountains and is relatively thin, reducing the relative production capacity and quality of any aquifer identified. The aquifer is an alluvial aquifer that normally has poor water quality and minimal domestic value, but important agricultural value.

The predominant characteristic of the alluvium is the change from gravel or coarse sand at the base of the aquifer to fine material at the top. The alluvium may generally be divided into two parts: a lower part consisting of gravel and sand with minor amounts of silt and clay, and an upper part consisting of silt and clay with minor amounts of sand. The portion of alluvium affected by the Preferred Alternative is relatively thin and predominately clay with sand near

the base. The groundwater available from this aquifer is of relatively poor quality with its primary value as irrigation water for agricultural purposes.

Depths to water in wells in the alluvium ranges from 10 - 40 feet (3 - 12 meters) below land surface. Annual fluctuations of water levels rarely exceed 10 feet (three meters) (Plebuch and Hines, 1967) and normally are caused by seasonal changes in irrigation pumpage rates more than from variations in the rates of recharge from precipitation. These water wells generally yield calcium bicarbonate-type water with dissolved mineral constituents and a variety of physical properties. Iron concentrations in 90 samples ranged from 0.1 - 52 ppm, dissolved solids in three samples from 242 - 327 ppm, and hardness in 76 samples from 6 - 505 ppm. (Plebuch and Hines, 1967).

3.7.2 Environmental Consequences

Road construction and maintenance can impact groundwater through flow modification and water quality impacts. Water table levels in the immediate area of a roadway can be lowered due to road excavation and drainage. Embankments and structures can cause an increase in water table levels. Groundwater quality can be affected when impaired surface water seeps underground. Surface water can become impaired by the construction and maintenance of roadways through increased sedimentation, spills of chemicals and pollutants, and salting of roadways. Chronic surface water impairment along high traffic volume roads can occur from exhaust emissions, pavement tire wear, petroleum drippage, and corrosion of metals. These impacts on groundwater quantity and quality can have effects on vegetation growth, susceptibility of soil to erosion, loss of water for drinking and agricultural use, and habitat changes for fish and wildlife.

3.7.2.1 No-Action Alternative

Direct Impacts. The No-Action Alternative would not involve new construction, thus no impacts on groundwater would occur due to construction activities.

Indirect Impacts. No indirect impacts on groundwater are anticipated as a result of the No-Action Alternative.

Cumulative Impacts. No cumulative impacts on groundwater are anticipated as a result of the No-Action Alternative. However, increased traffic volumes on the existing network would result in increasing amounts of pollutants in highway runoff, decreasing safety levels, and a greater potential for hazardous materials spills that could impact the groundwater.

3.7.2.2 Preferred Alternative

Direct Impacts. Groundwater resources in the Ouachita Mountains of Pulaski County are not considered a reliable and significant groundwater resource. Also, the availability of public water supplies in the study area minimizes the value of the Ouachita Mountains aquifers as a significant groundwater resource. Only minor portions of Mississippi Alluvial Plain alluvial aquifer are affected by the Preferred Alternative. This aquifer is considered important for agriculture irrigation purposes, but has limited value for domestic purposes due to the water quality of the aquifer and the availability of public water supplies. For the reasons outlined above, it is anticipated that only minor impacts would result to groundwater from construction and maintenance of any of the Preferred Alternative.

Indirect Impacts. No indirect impacts on groundwater are anticipated as a result of this project.

Cumulative Impacts. Cumulative impacts in the project area would be related to other planned transportation projects that are reasonably foreseeable. These projects are outlined in Section 3.1.2. No cumulative impacts to groundwater are anticipated.

3.7.3 Mitigation Summary

Special provisions and actions will be required during the design and construction phase to protect groundwater in the vicinity of the Kellogg Mines. These commitments will include ditch paving through highly vulnerable areas, including areas where conduits directly leading to the groundwater are discovered during construction. Coordination with state and federal agencies involved with groundwater quality protection will be conducted as needed when concerns are identified.

3.8 SURFACE WATER QUALITY AND QUANTITY

3.8.1 Affected Environment

3.8.1.1 Surface Water Quality

Arkansas has six major river basins: Arkansas River, Mississippi River, Ouachita River, Red River, St. Francis River, and White River. All of the waters within the proposed project area fall in the Bayou Meto and Tributaries segment of the Arkansas River Basin. The waters within this segment have been designated as suitable for the propagation of fish and wildlife, primary and secondary contact recreation, and public, industrial and agricultural water supplies (ADEQ, 2002). None of the streams in the project area have been designated as Extraordinary Resource Waters, Ecologically Sensitive Waterbodies, or Natural and Scenic Waterways (APCEC, 2004).

Bayou Meto is currently on the 303(d) list of impaired waters based on the presence of priority organics resulting from industrial pollution within the watershed. Although the source of the contamination has been eliminated, one organic pollutant, dioxin, has been detected in fish tissues collected from Bayou Meto, and a fish consumption advisory has been issued. Other threats to water quality in the watershed include irrigation for agricultural purposes (ADEQ, 2002).

The Federal Water Pollution Control Act declares the discharge of any pollutants into the waters of the United States from any point source is unlawful, except under the terms and conditions of a permit issued under the National Pollutant Discharge Elimination System (NPDES). Any construction disturbing an area of one acre (0.4 hectare) or more in Arkansas is required to obtain an NPDES permit for storm water discharge from the Arkansas Department of Environmental Quality (ADEQ). As of 2002, ten facilities within the proposed project area had been issued NPDES permits (ADEQ, 2002).

3.8.1.2 Floodplains and Floodways

The protection of floodplains and floodways is required by Executive Order 11988, *Floodplain Management*; US DOT Order 5640.2, *Floodplain Management and Protection*; and 23 Code of Federal Regulations 650. The intent of these regulations is to avoid or

minimize, where practicable, highway encroachments within the 100-year (base) floodplain and to avoid supporting land use development that is incompatible with floodplain values.

Floodplains have many natural and beneficial values. These values include, but are not limited to fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, forestry, natural moderation of floods, water quality maintenance and groundwater recharge.

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the Federal Insurance Administration as the base flood for purposes of floodplain management measures. The 500-year flood is used to indicate additional areas of flood risk in the community. Encroachment on floodplains, such as placement of fill material, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. Under the concept used by the National Flood Insurance Program (NFIP), the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of the NFIP limit such increases in flood heights to 1.0 foot (0.3 meter), provided that hazardous velocities are not produced.

3.8.2 Environmental Consequences

3.8.2.1 Water Quality

Runoff related to permanent operation of the facility can contribute an array of pollutants to surface and groundwater resources. Highway runoff may contain solids, heavy metals, nutrients, petroleum products, bacteria, and other pollutants. They accumulate on highway surfaces, roadside areas, and rights of way from sources such as highway use, maintenance, natural sources, and deposition of air pollution. Highway pollutants, such as solids, heavy metals, and organics (found in fuels and motor oils) have been found to relate directly with traffic volume. Traffic-related pollutants are better controlled using site-specific measures. Other pollutants (herbicides and nutrients) are found in highway runoff mainly as a result of

highway maintenance activities and adjacent land use contributions. Maintenance related pollutants are better controlled through the use of general measures, such as herbicide and fertilizer application management.

The impacts of highway runoff pollution on aquatic ecosystems are extremely site and runoff-event specific. Although all highway runoff contains pollutants, the pollutant loading does not always constitute a problem for receiving waters. Potential surface water quality impacts were compared for the alignment alternatives in the SDEIS with a method developed by AHTD utilizing a Water Quality Index (WQI) score.

3.8.2.2 Floodways and Floodplains

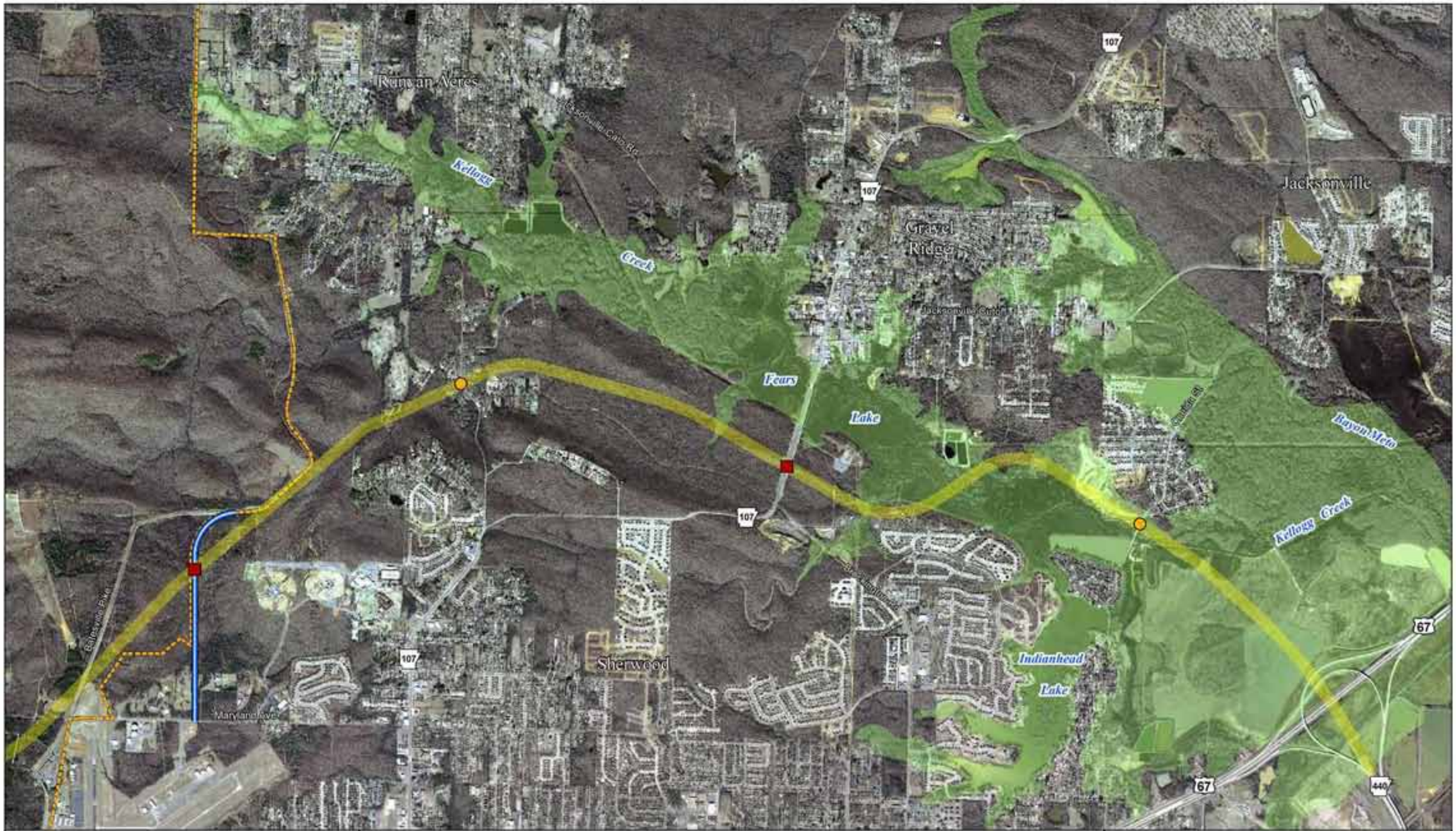
The Federal Emergency Management Agency delineates zones within the floodplain and demonstrates these on Flood Insurance Rate Maps. Pulaski County, as well as Sherwood and Jacksonville, all participate in the NFIP. Flood Insurance Rate Maps and Flood Boundary Maps were obtained for these communities. Within this study area, the largest floodplain areas occur along Bayou Meto and Kellogg Creek (Figure 3.8-1).

3.8.2.3 No-Action Alternative

Direct Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no direct impacts to water quality or quantity.

Indirect Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no indirect impacts to water quality or quantity.

Cumulative Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no cumulative impacts to water quality and quantity. However, other transportation infrastructure improvements throughout the project area could occur at a faster rate, and these improvements could have water quality and quantity impacts.



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July 27, 2007

Miles
0 0.125 0.25 0.5 0.75 1
Approximate Scale
0 0.2 0.4 0.8 1.2 1.6
Kilometers

Legend

- 100 Year Floodplain
- Preferred Alternative
- Interchange
- Grade Separation
- Camp Robinson Boundary
- Relocated Batesville Pike

Photography Date: January - March 2006

Figure 3.8-1
Floodplains
North Belt Freeway

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3.8.2.4 Preferred Alternative

Direct Impacts. Stream crossings and types of structures along the Preferred Alternative are shown on Figure 3.8-2. The Preferred Alternative crosses 25 intermittent and perennial streams. Construction of the drainage structures along the Preferred Alternative could temporarily increase stream sediment loads and impact water quality. The WQI scores used to compare impacts for the alternative alignments indicated that the Preferred Alternative has the least potential to impact surface water quality of all the new location alternatives studied. Additional information about the WQI method and WQI scores are included in Appendix G. The Preferred Alternative could potentially impact approximately 12,800 linear feet (3,900 linear meters) of floodplains (Table 3.8-1).

Table 3.8-1
Floodplain Impacts for the Preferred Alternative
Linear Feet (Linear Meters)

Stream	SFHA*	Floodway
Unnamed tributary Kellogg Creek	400 (122)	0 (0)
Kellogg Creek	6,400 (1,950)	0 (0)
Bayou Meto/Kellogg Creek	6,000 (1,829)	0 (0)

*Special Flood Hazard Areas Inundated by 100-year Flood

Indirect Impacts. Water quality impacts could migrate outside the immediate vicinity of this project. After construction is completed, stream water quality should return to normal if Best Management Practices (BMPs) are followed for sediment and erosion control.

Cumulative Impacts. Cumulative impacts in the project area would be related to other planned transportation projects that are reasonably foreseeable. These projects are outlined in Section 3.1.2. Expected cumulative impacts include increased turbidity and pollutant concentrations associated with the construction and maintenance of these projects. Overall, the cumulative impacts to water quality and quantity would be minimal.

3.8.3 Mitigation Summary

3.8.3.1 Water Quality

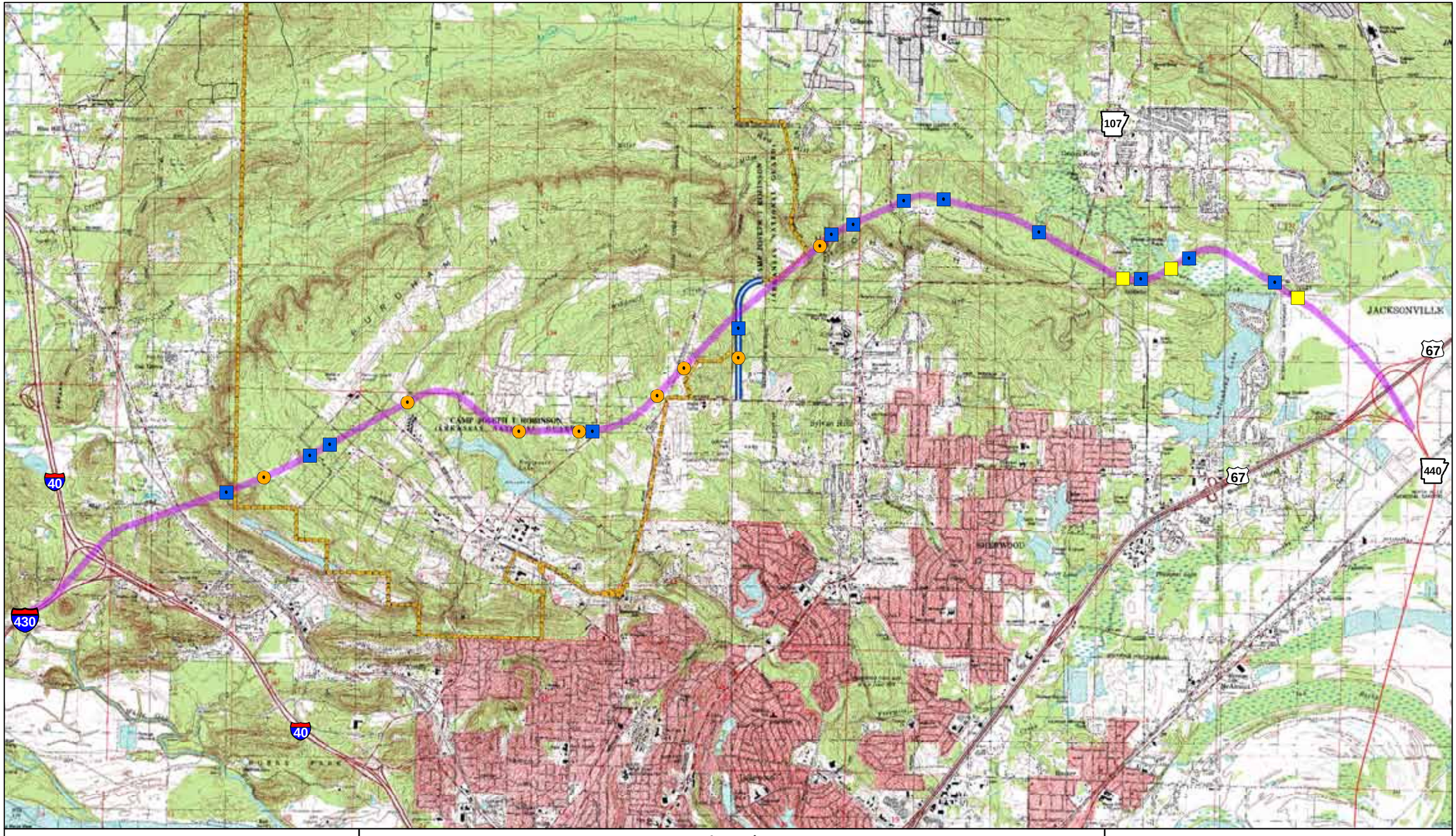
The AHTD will comply with all requirements of the Clean Water Act, as Amended, for the construction of this project. This includes Section 401; Water Quality Certification, Section 402; NPDES, and Section 404; Permits for Dredged or Fill Material. Impacts to streams within the project area will be minimized by constructing the project to the minimum width necessary to meet design safety standards. The project will be constructed on new alignment, thus minimizing temporary impacts associated with detours.

The AHTD will prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the requirements of the permit. Before construction begins, AHTD will file the requisite Notice of Intent with ADEQ. The SWPPP will include all specifications and BMPs needed for control of erosion and sedimentation. This will be prepared when the roadway design work has been completed in order to best integrate the BMPs with the project design.

General measures to be used to manage stormwater runoff include litter control, proper usage of deicing chemicals and herbicides, establishment and maintenance of vegetation, and reducing direct discharges to receiving waters when practicable.

Specific measures to be considered and used for management of potential pollution problems include grassed channels, overland flow through vegetation, wet detention basins, and wetlands.

During construction, or after the facility is operating, runoff impacts may be caused by spills of materials. If a material spill should occur during construction, clean-up procedures are followed as outlined in the Standard Specifications for Highway Construction. Measures taken to ensure accidental spill and runoff control while the facility is operating are coordinated by the Arkansas State Police, the Arkansas Highway Police, AHTD, and a contracted hazardous spill containment team. The State Emergency Operations Center's HAZMAT Hot Line is notified for official notification and response.



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August 7, 2007

Miles
0 0.25 0.5 1 1.5 2
Approximate Scale
0 0.4 0.8 1.6 2.4 3.2
Kilometers

Legend

- Preferred Alternative
- Camp Robinson Boundary
- Relocated Batesville Pike
- Bridge*
- Box Culvert
- Pipe Culvert

**Symbol represents approximate centerpoint; bridges may be longer than illustrated*

Cato, North Little Rock, and Olmstead 1988 USGS Topographic Maps
McAlmont 1986 USGS Topographic Map

Figure 3.8-2
Waters of the US Crossings
North Belt Freeway

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3.8.3.2 Floodways and Floodplains

Local ordinances typically prohibit any new construction within the boundaries of any identified regulatory floodway(s) that would cause any increase in flooding depths on upstream or adjacent properties. Similarly, the local ordinances require that the cumulative effects of all construction within any identified 100-year floodplain or Zone A Special Flood Hazard Area may not cause more than one foot (0.3 meter) increase in flooding depths anywhere within the community.

The AHTD's own internal policy is to design projects within these areas so that any permanent construction within an identified 100-year floodplain or Zone A Special Flood Hazard Area, may not cause an increase in flooding depths during passage of the 100-year flood if there are any existing insurable buildings within the boundaries of the floodplain with floor elevations below the current 100-year flood elevation. The increase in flooding depth caused by any new construction may not cause other insurable buildings to be flooded during passage of the 100-year flood.

All of the floodplain and floodway encroachments will be designed to comply with the respective communities' local flood damage prevention ordinance. During project design, hydraulic data and construction plans will be submitted to the communities for review, approval and/or permitting as specified by their ordinance.

3.9 WETLANDS AND WATERS OF THE UNITED STATES

3.9.1 Affected Environment

The western end of the project area is located in the Ouachita Mountains Ecoregion characterized by steep hillsides and streams that are rocky and fast flowing. Soils are moderately permeable, and consequently, wetlands are almost non-existent in this ecoregion.

The eastern end of the project area is located in the Mississippi Alluvial Plain Ecoregion. The land in this ecoregion is flat and the waterways are meandering and entrenched. Soils are often almost impermeable, and wetlands are much more prevalent in this region. All wetlands were delineated using the 1987 Corps of Engineers Wetlands Delineation Manual.

3.9.1.1 Fears Lake

Fears Lake wetland is located on the southwestern boundary of Jacksonville and just south of Gravel Ridge. Kellogg Creek flows through the wetland from west to east and empties into Bayou Meto approximately one-half mile (0.8 kilometer) downstream from the wetlands eastern boundary. Gap Creek flows into Fears Lake from the south, entering approximately in the center of the wetland.

Fears Lake wetland is in an early successional stage and still appears to be expanding. Presently, mature bald cypress and swamp tupelo occur along the channel while much of the remainder is dead hardwood timber and shrubby vegetation. Numerous small bald cypress and swamp tupelo are beginning to grow throughout the lake, and many types of emergent vegetation have become established. Figure 3.9-1 shows a typical view of Fears Lake.

There are some wetlands located toward the east end of Fears Lake, bounded by upland ridges and sewer treatment ponds to the north and Fears Lake to the south. The wetlands are old creek channels and low areas that are permanently to seasonally flooded. Buttonbush, bald cypress, and various rushes dominate the low areas.

It appears that as recently as 32 years ago, most of what is wetland today was a hardwood floodplain forest. Wetland vegetation was restricted primarily to a narrow strip along the creek channel. Apparently a rise in water level killed much of the hardwood timber in the floodplain, and the construction of multiple subdivisions and levees may be related directly and/or indirectly to the wetland expansion. Increased beaver and nutria activity within the lake has also contributed to the rising water level.

3.9.1.2 Palustrine Forested Wetlands

Palustrine forested wetlands occur along Kellogg Creek just downstream of Fears Lake. They are bounded on the south side by cultivated land and the north by upland hardwoods. Part of this wetland system is an oxbow formed by Kellogg Creek that is about eight acres (three hectares) in size. The remainder of the wetlands consists of old creek channels and low areas that are permanently to seasonally flooded. Vegetation in the lower areas is

dominated by bald cypress and swamp tupelo while the remainder is dominated by lowland oaks and hickories. Figure 3.9-2 shows a typical view of these wetlands.

3.9.1.3 Scrub/Shrub Wetland

This wetland is located in the northwest corner of a cultivated field, just south of the Kellogg Creek wetland. The area is grown up in wet weeds, saplings, sedges, rushes, and shrubs. The area appears to be quickly reverting to a palustrine forested wetland. Figure 3.9-3 shows a typical view of this wetland.

3.9.1.4 Cypress Brake Wetland

This wetland is located northeast of Indianhead Lake adjoining the farmed agricultural ground on the east end of the project. This wetland is dominated by bald cypress, swamp tupelo, and buttonbush. This wetland is flooded for most of the year average. Figure 3.9-4 shows a typical view of this wetland.

3.9.1.5 Waters of the United States

The stream crossings on the eastern end of the project are located in the Mississippi Alluvial Plain Ecoregion Level III and the Grand Prairie Ecoregion Level IV. These streams are primarily perennial streams that are influenced by groundwater and precipitation runoff. The streams are meandering and entrenched and are located within broad alluvial floodplains. The stream crossings on the southern and western end of the project are located in the Ouachita Mountain Ecoregion Level III and the Fourche Mountain Ecoregion Level IV. These streams are primarily intermittent headwater streams with a couple of perennial streams that are influenced by precipitation runoff. These streams are located in narrow valleys and have gravel and shale bedrock substrates.

3.9.2 Environmental Consequences

3.9.2.1 No-Action Alternative

Direct Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no direct impacts to wetlands or waters of the US.

Figure 3.9-1 Fears Lake Wetland

Figure 3.9-2 Kellogg Creek Palustrine Bottomland Hardwood Wetland

Figure 3.9-3 Scrub-Shrub Wetland

Figure 3.9-4 Cypress Brake Wetland

Indirect Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no indirect impacts to wetlands or waters of the US.

Cumulative Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no cumulative impacts to wetlands or waters of the US related to this project. However, other transportation infrastructure improvements throughout the project area could occur at a faster rate, and these improvements could impact wetlands and waters of the US.

3.9.2.2 Preferred Alternative

Direct Impacts. Impacts to wetlands and waters of the US for the Preferred Alternative are summarized in Table 3.9-1. Wetland locations are shown on Figure 3.9-5. Waters of the US crossings are shown on Figure 3.8-2.

The Preferred Alternative would impact approximately 32.4 total acres (13.1 hectares) of wetlands. It would have 25 drainage structures (three bridges and 22 pipe or box culverts) that cross waters of the US. Two bridges are for Kellogg Creek crossings and one is for a Gap Creek crossing. The eastern end of this alignment crosses the southern end of Fears Lake and Kellogg Creek, and it would impact scrub/shrub and palustrine wetlands (bottomland hardwood, bald cypress). There is a small patch of bottomland hardwood wetland that would be impacted in a creek bottom located west of Highway 107 and south of the western end of Fears Lake.

Table 3.9-1

Waters of the US and Wetland Impacts

Stream Crossings			Wetland Impacts acres (hectares)				
Intermittent	Perennial	Total	Palustrine Forested	Fears Lake	Scrub/Shrub	Cypress Brake	Total
22	3	25	12.7 (5.1)	8.1 (3.3)	5.3 (2.1)	6.3 (2.5)	32.4 (13.1)

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Miles
0 0.125 0.25 0.5 0.75 1
Approximate Scale
0 0.2 0.4 0.8 1.2 1.6
Kilometers

Legend

- Wetlands
- Preferred Alternative
- Conceptual Interchange Footprint
- Camp Robinson Boundary
- Relocated Batesville Pike

Photography Date: January - March 2006

Figure 3.9-5
Wetlands Impacted
North Belt Freeway

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Indirect Impacts. Construction of the drainage structures along the Preferred Alternative could temporarily increase stream sediment loads. These sediments could deposit in wetlands or waters of the US outside the immediate vicinity of this project. After construction is completed, stream sediment loads should return to normal levels if BMPs are followed for sediment and erosion control. The proposed interchange for the Preferred Alternative at Highway 107 could promote new commercial and residential development north of the interchange, and have impacts on Fears Lake wetlands.

Cumulative Impacts. Cumulative impacts in the project area would be related to other planned transportation projects that are reasonably foreseeable. These projects are outlined in Section 3.1.2. Overall, the cumulative impacts to wetlands and/or waters of the US would be minimal.

3.9.3 Mitigation Summary

AHTD's standard commitments to minimize impacts to wetlands and waters of the US can be found in Section 4.8. The AHTD proposes to mitigate the unavoidable wetland impacts associated with this project at the Rixey Bayou Wetland Mitigation Area. The Vicksburg District Corps of Engineers permitted the Selected Alignment in the FEIS on December 19, 1994, under Individual Permit Number CELMK-OD-FE14-PBH-G13-1. This permit expired on June 21, 2000. This permit required 50 acres (20 hectares) of mitigation from the Rixey Bayou Wetland Mitigation Area for 28 acres (11 hectares) of permanent wetland impacts. If additional wetland mitigation is required for the Preferred Alternative in this document, additional mitigation acres are available at the Rixey Bayou Wetland Mitigation Area. The Rixey Bayou Wetland Mitigation plan is located in Appendix N of the 1994 FEIS.

3.10 DRINKING WATER SUPPLIES

3.10.1 Affected Environment

All of the domestic water used in the project area comes from Central Arkansas Water, except for a small area at the eastern end of the project area that is supplied by Jacksonville Waterworks. The water sources for Central Arkansas Water are Lake Maumelle (western

Pulaski County) and Lake Winona (northern Saline County). Jacksonville Waterworks obtains its water from a series of wells east of Jacksonville.

There may be some rural residents in the project area who have chosen to stay on private sources of water for their domestic and/or agricultural purposes. These private sources of water may come from wells or surface waters. Wells are typically installed in the first water bearing rock formation encountered during drilling.

The Safe Drinking Water Act of 1986 requires identification and protection of sole source aquifers and the establishment of wellhead protection areas. No sole source aquifers or wellhead protection areas are located within the study area.

3.10.2 Environmental Consequences

The potential ways road construction and maintenance can impact public drinking water supplies depends upon the water source type. Surface water sources can be affected by the construction and maintenance of roadways through increased sedimentation, spills of chemicals and pollutants, and salting of roadways. Chronic water quality impacts along high traffic volume roads can occur from exhaust emissions, pavement tire wear, petroleum drippage, and corrosion of metals, and this could potentially impact public drinking water supplies originating from surface water sources. Groundwater sources could also be affected by these water quality impacts with migration of the surface water into the subsurface. However, the biggest threats to water wells are vibrations caused by earth moving activities during road construction. These actions, including blasting, can cause impacts ranging from short-term water quality impairments to permanent damage to the water well.

Although public water is available throughout the project area, some residents may have chosen to remain on private water supplies for their domestic and/or agricultural purposes. Because of the low potential for use of private water sources in this area and the difficulty in assessing the recharge areas for private wells, no assessment of impacts on these systems was performed.

3.10.2.1 No-Action Alternative

Direct Impacts. The proposed project area does not have a public drinking water wellhead protection area within it. As a result of the No-Action Alternative, increased traffic volumes on the existing facility could result in greater amounts of pollutants in highway runoff and a greater potential for hazardous waste spills due to decreased safety levels. Because of these reasons, the No-Action Alternative could increase the potential for direct impacts to private drinking water sources.

Indirect Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no indirect impacts to public drinking water supplies.

Cumulative Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no cumulative impacts to public drinking water supplies related to this project.

3.10.2.2 Preferred Alternative

Direct Impacts. No direct impacts to public drinking water supplies are anticipated as a result of the Preferred Alternative.

Indirect Impacts. No indirect impacts to public drinking water supplies are anticipated as a result of the Preferred Alternative.

Cumulative Impacts. No cumulative impacts to public drinking water supplies are anticipated as a result of the Preferred Alternative.

3.10. 3 Mitigation Summary

If any permanent impacts to private drinking water sources occur as a result of this project, the AHTD will mitigate these impacts by providing an alternative water source, either by drilling a new well or connecting the residents to a community water system.

3.11 TERRESTRIAL AND AQUATIC COMMUNITIES

3.11.1 Affected Environment

3.11.1.1 Terrestrial Fauna

As previously stated, dominant habitat types within the project area include oak-hickory uplands, mixed pine-oak uplands, bottomlands, croplands, pasture, and fields. Although a few species such as white-tailed deer, coyote, and raccoon can utilize a variety of habitats, the vast majority of species are adapted to very specific habitat types. State and county faunal records were compared to known habitat preferences to prepare lists of mammals, birds, reptiles, and amphibians expected to occur within the project area (GBMC & Associates and GEC, 2004, 2005a, 2005b; Sealander and Heidt, 1990; Trauth *et al*., 2004). These lists can be found in Appendix J.

Oak-hickory uplands, the most common habitat type throughout the project area, are home to a wide variety of animals. Common mammals occurring in these forests include the gray squirrel, gray fox, white-footed mouse, and red bat. Birds such as the Black-and-White Warbler, Wood Thrush, and Brown Creeper are also common. Reptiles and amphibians expected to occur with these uplands include the southern copperhead and Great Plains rat snake as well as Fowler's toad.

Mixed pine-oak uplands, which are mainly centered around areas of human disturbance, are also a common habitat type throughout the project area. Common mammals associated with this habitat type include the fox squirrel, eastern chipmunk, and nine-banded armadillo. Bird species such as Pine Warbler, Pileated Woodpecker, and Sharp-shinned Hawk are also likely to occur here. The three-toed box turtle, eastern garter snake, and northern fence lizard are common reptiles observed in these mixed forests.

Bottomlands, which include bottomland hardwood forests as well as scrub-shrub wetlands, often contain the greatest diversity of animals of any habitat type. Many mammals such as the beaver, mink, and southern bog lemming are adapted specifically to life in these moist environments. Many species of waterfowl rely on these habitats for foraging and nesting. Other species of birds are also common throughout these bottomlands including

Red-shouldered Hawk, Belted Kingfisher and American Woodcock. Bottomland habitats are also home to a vast array of reptiles and amphibians including the red-eared slider, western cottonmouth, and western slimy salamander.

Croplands typically support the least diversity of any of the habitats. The regular cycles of disturbance prohibit their use other than as foraging areas. Animals such as the white-tailed deer, deer mouse, and Mourning Dove are often observed feeding on grain from the various crops. Predators such as the Red-tailed Hawk, red fox, and coyote often follow their prey into these areas.

Pastures and fields, like bottomlands, are home to a large number of species. This results from the "edge effect" created by the open habitats of the pastures and fields and adjacent woodlands. Many species of mammals, including mice, rats, and striped skunks, prefer these habitats. Bird species such as Meadowlark, Indigo Bunting, and Eastern Bluebird are common. Reptiles such as the eastern coachwhip and ground skink are well adapted to these habitats.

3.11.1.2 Aquatic Fauna

Numerous bayous, streams, ponds, lakes, and wetlands occur throughout the proposed project area. Each of these habitats contains a variety of aquatic organisms. Lists of aquatic macroinvertebrates and fishes likely to occur within the area have been prepared and are included in Appendix J (GBMC and GEC, 2005a; Robison and Buchanan, 1988). Many species of amphibians, birds, mammals, and reptiles also utilize the waterbodies.

3.11.1.3 Threatened and Endangered Species

Pursuant to Section VII of the Endangered Species Act of 1973 as currently amended, a record check of the Arkansas Natural Heritage Commission database of sensitive species was performed to determine the presence of federally listed threatened or endangered species or state sensitive species in the project area. Their records indicate that no federally listed or state sensitive species are known to occur within the project area.

3.11.2 Environmental Consequences

3.11.2.1 No-Action Alternative

Direct Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no direct impacts to terrestrial or aquatic communities.

Indirect Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no indirect impacts to terrestrial or aquatic communities.

Cumulative Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no cumulative impacts to terrestrial or aquatic communities related to this project. However, other transportation infrastructure improvements throughout the project area could occur at a faster rate, and these improvements could impact terrestrial and aquatic communities.

3.11.2.2 Preferred Alternative

Direct Impacts. Although some mortality would occur to the less mobile species, such as amphibians and reptiles, and to young individuals or those species that utilize dens or burrows, habitat loss would be the primary impact to terrestrial communities due to the construction of the Preferred Alternative. Habitat loss can reduce the amount of available forage or nesting sites, thus increasing densities of the resident populations or forcing some individuals to leave in search of more desirable habitats. This results in increased competition for resources and decreases the total carrying capacity of the surrounding habitats.

Impacts to aquatic communities associated with the Preferred Alternative would include those in intermittent and perennial streams, small ponds, wetlands, and reservoirs. As with the terrestrial communities, direct mortality would be limited to those species with limited mobility such as aquatic macroinvertebrates and amphibians.

Habitat isolation may result at various stream crossings where culverts are used. Temporary impacts resulting from changes in water quality during construction could occur. Increases in sedimentation rates can clog gill filaments of fish and macroinvertebrates, potentially leading to disease or even death. Pollution from highway runoff could also have detrimental effects on aquatic communities.

Streams are often channelized to accommodate highway crossings. During the channelization process, stream flow increases and available habitat is reduced because natural substrates are changed, riparian vegetation is removed, and stream sinuosity is removed.

Indirect Impacts. Indirect impacts to terrestrial communities as the result of highway construction include increases in vehicle-animal collisions and the continued loss of habitat due to induced commercial and residential development. Vehicle-animal collisions are density dependent; that is, as the density of animals within a particular area increases, the rates of collisions would also increase. The construction of the proposed project would increase the collision rates in the area by reducing the amount of available habitat and increasing the traffic volume to the area.

Habitat loss as the result of residential and commercial development around the interchange areas may occur. Developers are attracted to these areas due to the increased accessibility of the area. Because the North Belt Freeway would function as a controlled access facility, the areas surrounding the proposed interchanges have the greatest potential for further development.

Additional indirect impacts are expected due to habitat fragmentation. The construction of the project has the potential to isolate small tracts, which may limit use by certain species. These areas may provide suitable habitat, but because they have been isolated from other similar habitats, they may no longer be accessible.

Indirect impacts to aquatic communities are also expected near all proposed interchanges due to commercial and residential development.

Cumulative Impacts. Cumulative impacts in the project area would be related to other planned transportation projects that are reasonably foreseeable. These projects are outlined in Section 3.1.2. Expected cumulative impacts include a conversion of habitat to highway right of way. Overall, the cumulative impacts to terrestrial and aquatic communities would be minimal.

3.11.3 Mitigation Summary

Impacts to terrestrial and aquatic communities will be minimized by limiting construction to the minimum width necessary to meet design safety standards. Additional measures can be utilized to minimize impacts, including the use of fencing to redirect animals away from the roadway. The use of culverts and bridges as safe animal crossings has also shown to be effective in areas where animals exhibit regular migration routes.

Properly timed construction of bridges and culverts can also minimize impacts to aquatic communities by disturbing those areas only during dry periods, especially for intermittent streams that do not have continuous flow. Temporary impacts will be minimized by constructing the project on a new alignment, eliminating the need for detours. The use of bridges or properly sized and placed culverts can allow construction to occur across water bodies without hindering the movements of aquatic organisms. Erosion control methods will also be used to decrease the amount of sediments and pollutants entering the stream during construction.

3.12 SECTIONS 4(f) AND 6(f) RESOURCES

No designated natural areas, existing or proposed parks/recreation areas, or Wild and Scenic Rivers would be impacted by the Preferred Alternative. This alternative avoids the Kevin McReynolds Baseball Complex at Sylvan Hills High School. A pedestrian survey and correspondence with Arkansas Department of Parks and Tourism and local municipalities failed to disclose any other existing park or recreational areas. Therefore, Section 4(f) of the USDOT Act of 1966 concerning the use of public recreation lands and Section 6(f) of the Land and Water Conservation Act do not apply. Potential impacts to Section 4(f) cultural resources are discussed in the following section.

3.13 CULTURAL RESOURCES

3.13.1 Affected Environment

The data generated for this study is based on a thorough records review regarding known archeological and historic sites from previous surveys and an architectural survey of the entire project area. Potential impacts to cultural resources were analyzed using an estimated 300-foot (91-meter) wide corridor as an area of potential effect (APE) along the alignment alternatives, with expanded right of way estimates at the interchange locations. Additionally, a quarter-mile (0.4 kilometer) wide buffer zone was considered to allow for any possible shifts in design. The APE and buffer zone, when combined, make up the cultural resources project study area. The methodology and processes used to make these determinations are discussed in detail in Appendix B.

3.13.1.1 Archeological Resources

Of the 28 archeological sites identified in the project study area during the records check, ten are within the buffer zone of the Preferred Alternative and eight sites are within the APE. In addition to these sites, there are also unrecorded archeological components associated with at least ten standing structures that are at least 50 years old within the project study area. Other unknown archeological resources may be present in unsurveyed sections of the Preferred Alternative.

3.13.1.2 Historic Resources

A review of General Land Office (GLO) plats and other historic maps revealed segments of three historic roads in the project study area (Figure 3.13-1). One of the roads was likely used during the early 1800s for Indian removal and is recognized by the National Park Service as Bell's Route of the Trail of Tears.

Seventy-seven structures thought to be 50 years old or older were identified in the project study area during project development (Figure 3.13-1). All of these have been evaluated for inclusion in the National Register of Historic Places (NRHP) by FHWA in consultation with the State Historic Preservation Officer (SHPO). Of these 77 structures, six are within the buffer zone of the Preferred Alternative, and 11 are within the APE. In addition, five

structural elements (rock walls, walkways, steps, etc.) associated with the previously recorded Camp Joseph T. Robinson Native Stone Architecture Historic District were identified within the APE.

Of the 17 evaluated structures and five structural elements identified within the APE and buffer zone of the Preferred Alternative, one structure and the five structural elements have been determined eligible for the NRHP. Within the project study area, but outside the Preferred Alternative APE and buffer zone, ten out of 60 structures were determined eligible.

3.13.2 Environmental Consequences

3.13.2.1 No-Action Alternative

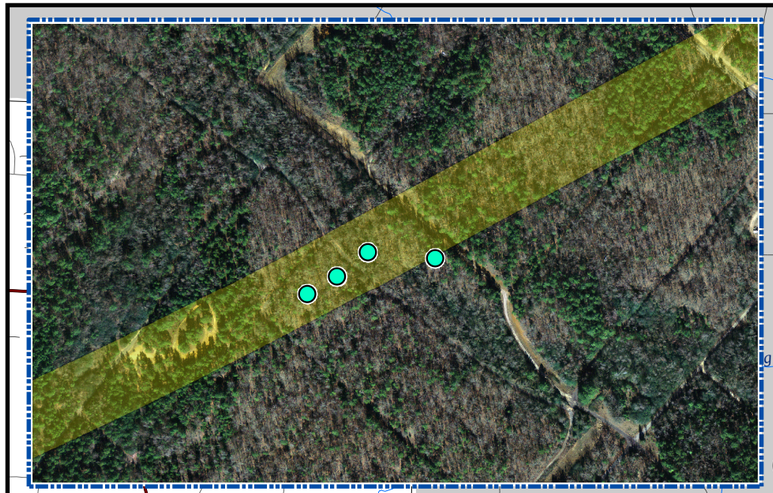
Direct Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no direct impacts to cultural resources.

Indirect Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no indirect impacts to cultural resources.

Cumulative Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no cumulative impacts to cultural resources related to this project. However, other transportation infrastructure improvements throughout the project area could occur at a faster rate, and these improvements could impact cultural resources.

3.13.2.2 Preferred Alternative

Direct Impacts. Only the cultural resources within the APE of the Preferred Alternative were considered to be impacted (see Table 3.13-1). The Preferred Alternative would result in direct impacts to eight known archeological sites (3PU349, 3PU354, 3PU548, 3PU549, 3PU572, 3PU661, 3PU685 and 3PU789), and ten unrecorded archeological components associated with NRHP ineligible standing structures. Of the eight known sites, four of the sites (3PU549, 3PU661, 3PU685 and 3PU789) and all 10 standing structure archeological component sites have not been evaluated, while the other four sites



Camp Robinson

Runyan Acres

Jacksonville

Gravel Ridge

Sherwood

Oak Grove

Crystal Hill

North Little Rock

Kellogg Creek

Miles Creek

Newton Creek

Spring Creek

Woodruff Creek

Bayou Meto

Fears Lake

Indianhead Lake

Engineers Lake

Peeler Lake

Robinson Army Airfield

North Little Rock Municipal Airport

Batesville Pike

Maryland Ave

Jacksonville-Cato Rd

Ison Ln

Bobbit Lane

Hatcher Rd

General Samuels

Jacksonville Cutoff

W. Main St

Loneida St

Kellogg Acres Rd

Milne Rd

Miller Rd

Oakdale Rd

Wayside Dr

Loop Rd

Brockington Rd

Kelly Rd

Trapp Rd

MacArthur Dr

1855 Historic Road

Lewisburg Road/
Fort Smith - Little Rock Road
Trail of Tears - Bell Route

Hogan's Road/
Old Batesville Road

365 40 430 100 107 67 176 440

N W E S

Job R60101
AHTD - Environmental GIS - Reed
August 2, 2007

Miles
0 0.25 0.5 1 1.5 2
0 0.45 0.9 1.8 2.7 3.6
Kilometers

Legend

- Eligible Structural Element
- Eligible Structure
- Structure Not Eligible
- Historic Roads
- Relocated Batesville Pike
- Camp Robinson
- Preferred Alternative

Figure 3.13-1
Historic Structures and Roads
North Belt Freeway

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Table 3.13-1
List of Cultural Resources Identified for the
Preferred Alternative APE and Buffer Zone

Recorded Archeological Sites	Historic Structures	Roads
	Structural Element A* - **I**	
	Structural Element C* - **I**	
3PU334♦	Structural Element D* - **I**	
3PU343◊	Structural Element E* - **I**	
3PU344◊	Structural Element F* - **I**	
3PU349◊ - **I**	Structure T	
3PU354◊ - **I**	Structure V	
3PU355◊	Structure X	
3PU356◊	Structure BB	
3PU381◊	Structure MMM† - **I**	Lewisburg Road/Fort Smith – Little Rock Road - **I**
3PU382◊	Structure NNN† - **I**	
3PU548◊ - **I**	Structure OOO† - **I**	
3PU549♦ - **I**	Structure PPP† - **I**	Hogan's Road/Old Batesville Road/Unnamed 1855 GLO Road - **I**
3PU572◊ - **I**	Structure QQQ† - **I**	
3PU585♦	Structure RRR† - **I**	
3PU661♦ - **I**	Structure SSS† - **I**	
3PU679♦	Structure TTT† - **I**	
3PU684◊	Structure UUU† - **I**	
3PU685♦ - **I**	Structure VVV† - **I**	
3PU789♦ - **I**	Structure WWW	
	Structure XXX* - **I**	
	Structure YYY	

I - Resource will be impacted.
* Historic Property eligible to the NRHP.
♦ Unevaluated archeological site (will be evaluated during final survey).
◊ Archeological site determined ineligible to the NRHP during previous survey (will be reassessed during final survey).
† Structures within the APE that may contain unevaluated archeological components (will be evaluated during final survey).

have been determined to be ineligible. All of the archeological sites and components identified, and any unsurveyed portions of the Preferred Alternative, will be visited and assessed and/or reassessed during the final cultural resources survey.

One structure and five structural elements determined eligible to the NRHP will be impacted by the Preferred Alternative. Structure XXX (Camp Robinson Bridge #2) and the five structural elements (Structural Elements A and C - F) were determined eligible to the NRHP as contributing elements to the previously recorded Camp Joseph T. Robinson Native Stone Architectural Historic District and qualify as Section 4(f) properties.

The Preferred Alternative crosses small segments of two early roads (Lewisburg Road/Fort Smith-Little Rock Road, Hogan's Road/Old Batesville Road/Unnamed 1855 GLO Road). The Lewisburg Road/Fort Smith-Little Rock Road served as a route during Indian removal and is recognized by the National Park Service as Bell's Route of the Trail of Tears. It is currently part of the National Trail System. A survey of the Preferred Alternative at the road crossings did not reveal any clear evidence of intact sections of old road beds or associated archeological sites and impacts to these resources will be negligible.

Indirect Impacts. Future development in the area surrounding the Preferred Alternative could result in additional impacts to the cultural resources identified in the buffer zone and undiscovered resources located outside it. The most likely area for future development is the area around the proposed interchanges. However, because it is not known where the development might occur or the nature of the development in these areas, it is not possible to determine impacts to the known or undiscovered resources at these locations.

Cumulative Impacts. Cumulative impacts in the project area would be related to other planned transportation projects that are reasonably foreseeable. These projects are outlined in Section 3.1.2. Cumulative impacts to cultural resources are expected to be minimal, and will be assessed and mitigated as required during the development of these transportation projects.

3.13.3 Section 4(f) Historic Properties

One structure and all five structural elements impacted by the Preferred Alternative qualify as Section 4(f) properties. All of these resources were determined to be contributing elements to the previously recorded Camp Joseph T. Robinson Native Stone Architectural Historic

District. This district is historically significant under Criterion A for its association with events that made a significant contribution to broad patterns of history (WWII) and is also architecturally significant under Criterion C as a discontinuous historic district. An individual Section 4(f) Evaluation has been prepared by AHTD for these resources (see Appendix L). It identified no feasible or prudent avoidance alternative.

None of the other structures identified in the study area or any of the archeological sites identified to date appear to qualify as Section 4(f) properties. Likewise, no archeological evidence of sites or intact segments of old road beds have been identified in association with the early roads, and no sites within the project area have been identified as traditional cultural properties.

3.13.4 Mitigation Summary

Measures have been taken to mitigate the anticipated adverse affect to those properties that have been determined eligible for inclusion to the NRHP and are expected to be impacted by the Preferred Alternative. These properties include Structure XXX (Camp Robinson Bridge #2) and Structural Elements A and C – F, which are contributing elements of the Camp Robinson Historic District. Mitigation measures were developed by FHWA in consultation with the SHPO and included mapping and photographic and architectural documentation of all of these properties. The documentation prepared meets the Secretary of the Interior's Standards and was submitted to the SHPO for review. The SHPO concurred that the documentation is sufficient to resolve the anticipated adverse effect that the undertaking may have on these properties. None of the other structures identified within the Preferred Alternative APE or buffer zone were determined to be eligible for nomination to the National Register and no further work is anticipated regarding standing structures in the project study area.

Because much of the land along the Preferred Alternative is privately owned, an intensive archeological survey of the Preferred Alternative has not been yet been completed. About 65% of the route has been examined during previous surveys and this accounts for the 18 previously recorded sites identified within the APE and buffer zone. Until final project

design is fully developed, project impacts to archeological resources can not be fully addressed. In order to ensure that all outstanding fieldwork, site assessment, and mitigation are carried out in compliance with pertinent state and federal laws and regulations, a Programmatic Agreement (PA) was signed by the FHWA, SHPO and the AHTD. A copy of the PA is included in Appendix M. The PA requires that:

- An intensive cultural resources survey will be conducted of the entire project area once the final project design has been developed.
- All sites identified will be evaluated to determine if Phase II testing is necessary.
- All National Register eligibility determinations will be made by FHWA in consultation with the SHPO and other appropriate interested parties.
- Any sites determined eligible for the National Register will be avoided if possible. If avoidance is not possible, site specific treatment plans to mitigate or minimize impacts will be prepared and submitted to the SHPO, the appropriate Indian tribes or other appropriate interested parties for review. Once approved, the treatment plans will be carried out at the earliest practicable time.
- Should any sites be found to qualify as Section 4(f) properties, there should be enough flexibility within the study corridor to modify final roadway designs to consider avoidance of all but the very largest sites (except where the route has been designated by Camp Robinson officials). If avoidance is not possible, an Individual Section 4(f) Evaluation will be prepared for the qualifying property as per 49 United States Code (USC) Section 303 and Title 23 USC Section 138.
- Standard documentation regarding all phases of the project will be provided to the SHPO for review and comment.
- All fieldwork, resource evaluation, treatment and reporting will conform to the Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation" (48 CFR 44716), "A State Plan for the Conservation of Archeological Resources in Arkansas" (Davis, 1984), the "2007 Integrated Cultural Resources Management Plan for Installations of the Arkansas Army National Guard" (ARNG, 2007) and all other pertinent state and federal laws and regulations.

- Consultation will continue with appropriate federally recognized Indian tribes throughout project duration.

3.14 FARMLAND

3.14.1 Affected Environment

Agriculture is important to the economy of eastern Pulaski County, as is timber management in the western part of the county. Much of the agriculture activities are restricted to the flatter grounds adjacent to Bayou Meto and Kellogg Creek on the eastern end of the proposed project. Most of the farming activity on the eastern end is agricultural crops, such as soybeans and rice. The upland areas on the remainder of the project have a mixture of hardwood and pines. Some small farms and open fields are also located in the uplands.

3.14.2 Environmental Consequences

The impacts of highway construction upon prime and unique farmland have become an important consideration in highway planning. The US Department of Agriculture Soil Conservation Service, in corporation with the Arkansas Agriculture Experimental Station, published a soil survey of Pulaski County in 1975. This survey was used to determine the number of acres of prime farmland that would be converted to highway right of way. The Farmland Conversion Impact rating is located in Appendix I. There is no unique farmland or farmland of statewide importance located in the project area. After coordinating with the District Conservationist of the Soil Conservation Service in Pulaski County, it was determined that the main impact would be the severance of farmland and disruption of farming activities. The loss of prime farmland is not expected to have a significant impact on agriculture in the area. Agriculturally, the eastern end of the proposed project is more conducive to intense agricultural activity because of level land use and the fertility of the soil. This area is where the major impact upon agriculture would occur.

3.14.2.1 No-Action Alternative

Direct Impacts. The No-Action Alternative would not involve new construction, thus no impacts on prime farmland would occur due to construction activities.

Indirect Impacts. No indirect impacts on prime farmland are anticipated as a result of the No-Action Alternative.

Cumulative Impacts. No cumulative impacts on prime farmland are anticipated as a result of the No-Action Alternative.

3.14.2.2 Preferred Alternative

Direct Impacts. The Preferred Alternative would impact approximately 89 acres (36 hectares) of prime farmland. Right of way acquisition for the proposed facility would reduce the amount of land held by some farmers, and it may become less economical for some to continue farming. Bisection of these farms would not only convert farmland to highway right of way, but also result in the disruption of some farm operations. Irrigation patterns, if existing, would be disrupted and may have to be changed.

The construction of the new facility would also result in certain positive impacts on farm operations. Access to an improved road would provide the following benefits:

(1) Farm-to-market would be made more accessible to farmers; and

(2) Farm supplies can be transported more easily.

Indirect Impacts. No indirect impacts on prime farmland are anticipated. No new local connections would be created to the proposed facility in the area where farmland now exists. Without any new local connections, it is not anticipated that induced development would occur in the farmland area as a result of this project.

Cumulative Impacts. Cumulative impacts in the project area would be related to other planned transportation projects that are reasonably foreseeable. These projects are outlined in Section 3.1.2. No cumulative impacts to prime farmland are anticipated.

3.14.3 Mitigation Summary

The location of the facility near property lines can minimize farm severance. Farm severance can be mitigated through the construction of frontage roads and overpasses, or severance

damages can be paid to affected owners if damages are established through the appraisal process. The construction of any frontage roads must be economically feasible. Frontage roads would allow farming to continue as usual but may encourage urban development.

Any severance payments, as determined by the appraisal process, will compensate farm owners for their lack of access to the severed portion of the farm. Severed farmland is expected to remain in production through lease or sale to adjacent farm owners.

3.15 HAZARDOUS MATERIALS

3.15.1 Affected Environment

Environmental Site Assessment investigational methods were utilized to identify hazardous materials in the project area. A database query and field investigations identified 18 EPA sites, 58 permitted facilities, 98 permitted sites, seven illegal dumps, three illegal landfills and two non-permitted underground storage tanks within a one-mile (1.6-kilometer) buffer along each side of the alignment alternative centerlines. Information regarding hazardous waste regulations and investigation procedures are presented in Appendix H.

3.15.2 Environmental Consequences

3.15.2.1 No-Action Alternative

Direct Impacts. No direct impacts to hazardous materials sites would occur due to the No-Action Alternative since no right of way acquisition would occur.

Indirect Impacts. No indirect impacts to hazardous materials sites would occur due to the No-Action Alternative.

Cumulative Impacts. Because no activities related to the proposed project would occur under the No-Action Alternative, there would be no cumulative impacts to hazardous materials related to this project. However, other transportation infrastructure improvements throughout the project area could occur at a faster rate and these improvements could impact hazardous materials.

3.15.2.2 Preferred Alternative

Direct Impacts. Hazardous material sites within 150 feet (46 meters) of the proposed centerline of the Preferred Alternative are considered to be potentially impacted by the project. A total of 11 sites were identified as having a potential to be impacted by the Preferred Alternative: four illegal dumps, two landfills, an abandoned underground and aboveground storage tank facility, an old military vehicle storage area, a demolition debris site, and a tire storage area. Figure 3.15-1 shows the sites identified along the Preferred Alternative. Detailed information about these hazardous materials sites is available in Appendix H.

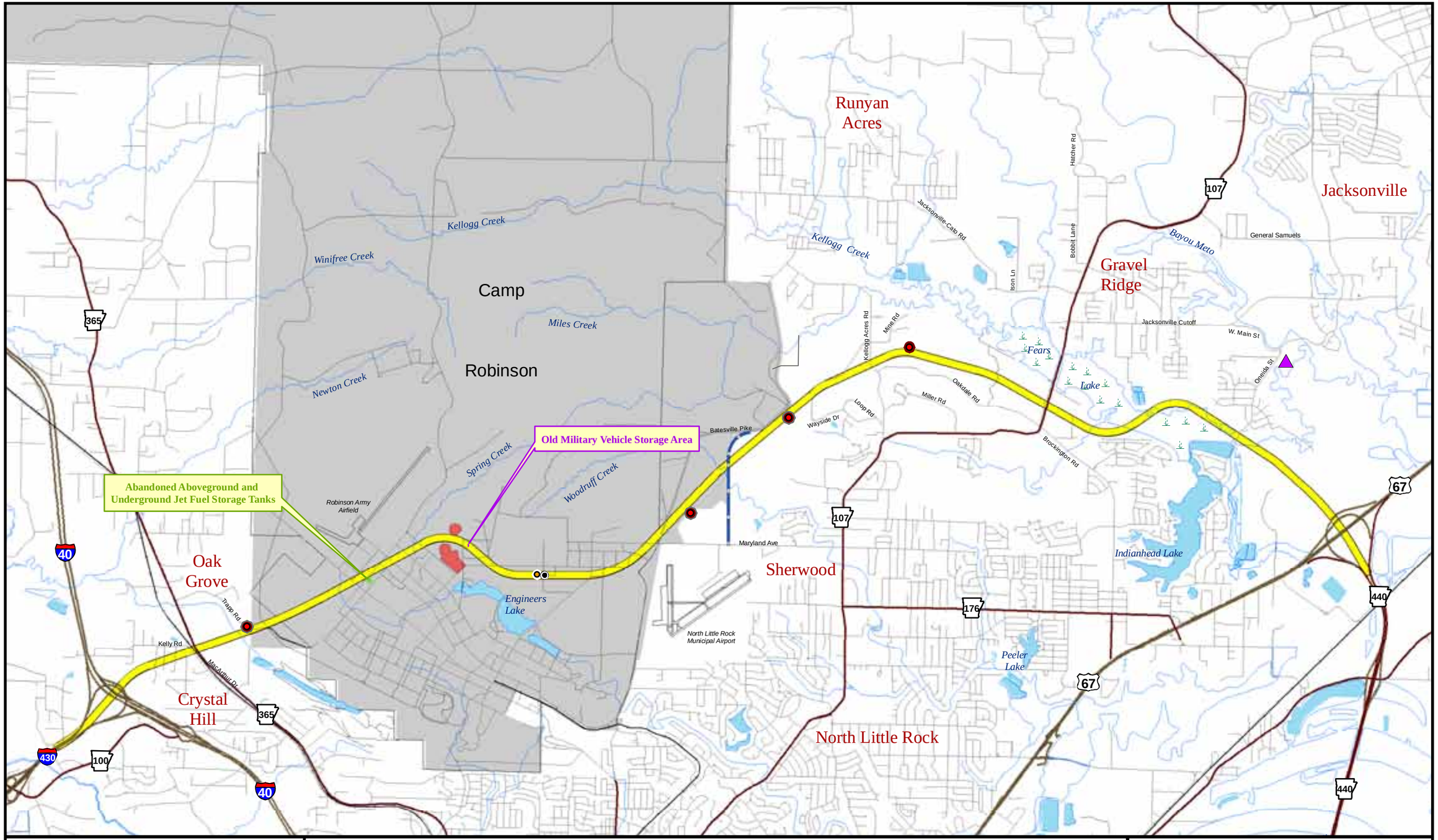
Indirect Impacts. Future residential and commercial development could occur around the interchange areas proposed for this project. These future developments could have additional impacts to hazardous material sites.

Cumulative Impacts. At this time, no cumulative impacts to hazardous materials from the Preferred Alternative are anticipated.

3.15.3 Mitigation Summary

The project would require acquisition and demolition of standing structures along the proposed Preferred Alternative. An asbestos survey will be conducted on each building prior to the development of demolition plans. If the survey detects the presence of any asbestos-containing materials, plans will be developed to accomplish the safe removal of these materials prior to demolition. All asbestos abatement work will be conducted in conformance with ADEQ, EPA and Occupational Safety and Health Administration (OSHA) asbestos abatement regulations.

The probability of impacting a known hazardous material or waste site is reduced due to the preliminary investigations conducted to avoid such sites. The two large landfills identified within Camp Robinson will not be impacted by the Preferred Alternative due to alignment adjustments to avoid them. If a hazardous waste site is identified, observed or discovered during construction within the right of way area, it will be AHTD's responsibility to determine the type and extent of the contamination. The AHTD will determine the



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Job R60101
AHTD - Environmental GIS - Reed
August 2, 2007

Miles
0 0.25 0.5 1 1.5 2
0 0.4 0.8 1.6 2.4 3.2
Kilometers

Legend

- Preferred Alternative
- Relocated Batesville Pike
- Camp Robinson
- Demolition Debris
- Illegal Dump
- Landfill Sites 2C and 2D
- Tire Storage
- Landfill

Figure 3.15-1
Hazardous Materials Sites

North Belt Freeway

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remediation and disposal methods to be employed for that particular type of contamination. Any required remediation work will be conducted in conformance with ADEQ, EPA and OSHA regulations.

The AHTD's *Standard Specifications for Highway Construction* that will be utilized during the construction of the project requires the contractor to employ best management practices to prevent pollution by spills; proper use, storage, and disposal techniques; and to limit the amount of hazardous materials stored on-site.

3.16 ENERGY

Energy consumed in the construction of the facility would be a fixed cost related to the production and placement of materials (asphalt, structures, cut, fill, etc.). This cost would be offset over the life of the project by the energy efficiencies gained with the use of an improved transportation facility. In most situations, fuel efficiencies would be improved because of higher levels of service including uniform speeds, less congestion, and free flow of traffic.

The new facility would provide better service and minimize indirections, thereby reducing energy consumption. As traffic is diverted to the new facility, old and previously congested segments of the area's street system would experience decreases in congestion. Consequently, an improvement in operating efficiency would likely occur in all segments of the system. No major arterials or streets would be severed by the facility, therefore minimal increase of indirections would occur. These minimal indirections would have insignificant impact upon energy consumption. The construction of this freeway would complete an exterior loop around the Little Rock/North Little Rock metropolitan area thereby minimizing congestion and delays especially for northbound traffic (Highway 67) and reducing the energy consumption associated with any existing traffic congestion related to the existing street/arterial system.

Decreased operating efficiency caused by congestion would increase the use of energy resources for the No-Action Alternative.

3.17 POLLUTION PREVENTION MEASURES

In keeping with Executive Order (EO) 12856 – Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements (August 1993), EO 12873 – Federal Acquisition, Recycling, and Waste Prevention (October 1993) and EO 12902 – Energy Efficiency and Water Conservation at Federal Facilities (March 1994) and other supporting Environmental Laws, the AHTD has implemented pollution prevention measures over the years that address pollution at its source.

EO 12902-Energy Efficiency and Water Conservation at Federal Facilities (March 1994) does not apply to this project, since it includes requirements for buildings and structures that are constructed, renovated or purchased for use by the federal government.

EO 12873-Federal Acquisition, Recycling, and Waste Prevention (October 1993) directs the federal government to more efficiently use natural resources by maximizing recycling and preventing waste whenever possible, and to "serve as a model in this regard for private and other public institutions."

EO 12856-Federal Compliance with Right-to-Know Law and Pollution Prevention Requirements (August 1993) includes commitments that the federal government "should become a leader in the field of pollution prevention through the management of its facilities, its acquisition practices, and in supporting the development of innovative pollution prevention programs and technologies."

The Community Right-to-Know Act of 1986 was signed into law as part of the Superfund Amendments and Reauthorization Act. This act establishes reporting and emergency notification requirements for companies that use, manufacture, or process any of approximately 1,500 chemicals. The act also requires that companies maintain a current file of Material Safety Data Sheets (MSDS) for each hazardous chemical in their facility and that companies provide information about these chemicals in reports submitted to the local fire department, the local emergency planning committee, and the state emergency response commission. The AHTD follows these regulations and keeps a copy of all MSDS sheets for all materials that would be used in the construction process.

The impacts of road construction are initially seen as a severe and detrimental force, changing the project area from a common visual element into a new and unfamiliar landscape. As time progresses, the public gradually accepts these impacts. Interstate construction requires clearing and grubbing, relocating streams, demolishing and/or removing existing structures, erosion and sediment controls, excavation and placement of fill materials, construction of bridges and box culverts, drainage improvements, storing materials and equipment, access improvements, compaction control, road bed construction, and erecting highway support structures such as signs, signals, signal poles and their accompanying traffic control facilities. It is the intention of the AHTD to lessen these environmental impacts through pollution prevention measures that have been incorporated into the AHTD's *Standard Specifications for Highway Construction, Edition of 2003*. In order for the AHTD to incorporate pollution prevention measures, the AHTD requires the contractor to comply with pollution prevention measures. Standard Construction Specifications (Appendix K) address responsibilities of the AHTD's contractors as they relate to pollution prevention; issues such as how to lessen impacts to temporary rights of way; applicable environmental permits, licenses and taxes; Section 404 permits; and ways to reduce or eliminate point and non-point sources of pollution.

Pollution prevention is comprised of reducing, reusing and recycling materials in a cost effective manner that would greatly reduce the potential for pollutants to enter the environment from the work zone. By not using certain chemicals, components or ingredients known to be of a toxic nature, the AHTD is reducing possible environmental consequences. A responsibility of the AHTD is to ensure that the contractor reduces the use of potentially hazardous materials during construction of this project.

Re-use of materials during construction is a financial incentive to the contractor. The movement of soils from one area to another is a prime example of reuse. The contractor can re-use excavated material from one area as fill material in another area.

Another aspect of pollution prevention is the use of recyclables in road building applications. The AHTD will allow the usage of recyclable materials in road construction where they yield economic, engineering and environmental benefits. If the contractor wishes to use recyclable

materials, a written statement of the type, quantity and location the material is to be used is submitted to the AHTD for approval.

The AHTD allows the addition of fly ash in cement mixes. Fly ash is a waste product of coal-fired electric generation plants. Certain classes of concrete can accept 15% by weight of fly ash added to the concrete mix. Granulated blast furnace slag (25%), a waste product of steel production, is also accepted in certain types of cement mixes. The addition of rubber to asphalt in hot-mix asphalt pavement containing crumb rubber modifiers is sometimes used.

The AHTD allows up to 15% recycled asphalt pavement and up to 30% recycled asphalt to be added to virgin asphalt. Mulch tackifiers are made from recycled newsprint or other paper products. Rubblized concrete has been used as a substitution for aggregate by the AHTD in past Interstate rehabilitation projects. The feasibility of using rubblized concrete for this project is limited since it is a new facility with minimal pavement to be rehabilitated.

Although the project area has been surveyed for the presence of hazardous materials, pollution prevention should also address discovery situations of hazardous materials that sometimes occur. As discussed previously in Section 3.15.3, immediate action is taken to assure that pollutants are contained and remediated using the Standard Specifications for Highway Construction to address the hazard (see Appendix K).

The AHTD's specifications concerning pollution prevention guide the AHTD and contractors in preventing unwanted environmental problems. By limiting the pollution generated by construction and having measures in place to address unforeseen accidents, the AHTD will be striving to preserve, protect and beautify the affected environment.

3.18 CONSTRUCTION IMPACTS

Impacts to the environment would occur during construction of the proposed facility with most being classified as temporary or short-term. The most common impacts associated with highway construction include temporary air and water quality degradation; noise; temporary disruption of traffic including safety, control, and maintenance; the storage and disposal of construction materials; and the establishment, maintenance, and use of haul roads, borrow

and waste areas. Air, noise and water quality impacts are discussed in greater detail in other portions of this Affected Environment and Environmental Consequences Section. Although the noise associated with construction activities cannot be eliminated, it can be reduced by the establishment of reasonable working hours. Sensitive noise areas, such as residential neighborhoods will be identified and work restricted to daylight hours in these areas as much as practicable. The dust associated with construction can be reasonably controlled with a watering program, and erosion from construction sites will be controlled using standard practices as described in the AHTD Erosion and Sediment Control Design and Construction Manual. Traffic disruption should be minimal due to the small number of residential and commercial units affected and because the entire route would be on new location.

The No-Action Alternative would not cause construction impacts.

3.19 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Environmental relationships are complex. Not only are natural and physical elements involved, but a wide range of social issues add to the complexity of these environmental relationships.

The highway-planning goal is to create a facility that fulfills traffic service needs, which is environmentally acceptable and compatible with present land uses, and enhances potential land use decisions. The conversion of residential, business, and agricultural land uses to transportation uses can be viewed as an exchange of one long-term productive resource for another. It is the AHTD's responsibility to balance these trade-offs.

In order to fully realize the planned and forecasted growth of the study area and to benefit the region through efficient traffic transportation, the proposed facility is needed. It is the AHTD's position that the short-term disruption due to the construction of this facility should enhance the long-term productivity of the cities in the study area, the urbanized area, and the State of Arkansas.

3.20 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Some elements, which are invested in a highway improvement, require irreversible commitments. These elements include space, land and land uses, construction materials and equipment, and future maintenance commitments.

Space offers some possibilities for multiple uses. Although 707 acres (286 hectares) would be committed to highway use, this land can serve non-highway functions. For instance, maintenance and enhancement of surface water drainage around and under the highway would be a design feature of the project. Also, wildlife habitat would be provided on the right of way as natural vegetation becomes reestablished.

The commitment of land use is practically irreversible and irretrievable. Development at interchanges and along access roads is inevitable and almost impossible to reverse.

Although petroleum products would be irretrievably committed in construction activities, the increase in efficiency of operation of motor vehicles using the new roadway would offset this commitment. Thousands of man-hours of labor would be irretrievable and irreversibly committed to the project. Construction materials would be irreversibly and irretrievably committed due to the expense and impracticality of recycling such materials.

Construction of the project commits future public expenditures for maintenance. Although millions of dollars would be expended in the construction of this project, the project is expected to improve traffic efficiency in the northern half of the metro area. The preceding discussion indicates that none of these commitments are significantly adverse and they are in the best public interest.

3.21 IMPACT SUMMARY

Impacts to the social, economic, natural, and cultural environment would result from construction of the Preferred Alternative evaluated in this document. Many of the perceived benefits that are related to the purpose and need of the project cannot be measured, and are therefore listed below.

- Provide a highway directly connecting the rapidly growing northeast and northwest parts of Pulaski County;
- Increase safety by decreasing congestion on existing streets and highways, especially on Highway 67 and Highway 107;
- Provide improved traffic service for local traffic demands, and
- Provide a highway facility consistent with the Central Arkansas Regional Transportation Study and related plans by providing a facility which:
    - Serves as a bypass for through traffic in northern Pulaski County;
    - Provides improved access to northern Pulaski County; and
    - Completes the northern link in the Little Rock/North Little Rock metro area's circumferential highway network.

Table 3.21-1 reviews the major advantages and disadvantages of the Preferred Alternative (as outlined in the SDEIS) in comparison to the other alignment alternatives considered. Eight of the most important adverse impact areas (as outlined in the SDEIS) are provided as a comparison of the alignment alternative impacts in Table 3.21-2. Table 3.21-3 summarizes these updated details for the Preferred Alternative. A summary of the measures to minimize harm is located in the Commitments Section, Section 4.

Table 3.21-1

Alignment Alternative Comparison

The Preferred Alternative is highlighted in yellow

Alignment Alternative	Advantages	Disadvantages
Common	• Approved route through Camp Robinson	• Bisects Crystal Hill neighborhood
A	• Shortest alignment alternative • Lower cost estimates • Highest traffic volume	• High number of relocatees • High number of noise receptors • Impacts several subdivisions • Higher wetland impacts • Highest prime farmland impacts
Ab	• Lowest cost estimates • Lowest wetland impacts • Highest traffic volume	• High number of relocatees • High number of noise receptors • Impacts several subdivisions
B	• Lower number of relocatees • Lower number of noise receptors • Lower prime farmland impacts	• Highest wetland impacts • Impacts one subdivision
Ba	• Lowest number of relocatees • Lowest number of noise receptors • Lowest impact on commercial/ residential land • Lowest prime farmland impacts	• Highest wetland impacts • Separates Kellogg Acres neighborhood from Oakdale community
Bb	• Lower number of relocatees	• Impacts two subdivisions
Bab	• Lowest number of relocatees • Lower number of noise receptors • Lower wetland impacts	• Separates Kellogg Acres neighborhood from Oakdale community
C	• Lowest wetland impacts	• Longest and most expensive alignment alternative • Most relocatees • Impacts one subdivision • High floodplain and stream crossing impacts resulting in greatest potential for water quality impacts • Lowest traffic volume

Table 3.21-2
Alignment Alternative Impact Summary - 2006†

The Preferred Alternative is highlighted in yellow

Alignment Alternative	Length miles (kilometers)	Acreage (hectares)	Total Cost (in million $)	Weighted Traffic Volume# (2030) vehicles per day	Existing Land Use Converted to Highway Right of Way					Cultural Resources-Direct Impacts				Noise Impacts*	Hazardous Materials Impacts		
					Commercial/ Residential acres (hectares)	Military Base acres (hectares)	Miscellaneous†† acres (hectares)	Undeveloped/ Agricultural acres (hectares)	Prime Farmland acres (hectares)	Recorded Archeological Sites	Historic Structures	Historic Bridges	Historic Roads	Estimated Receptors 2030 Traffic	Illegal Dumps	Landfills	Underground Storage Tanks
Common	6.9 (11.1)	398 (161)	135	-	21 (8)	151 (61)	49 (20)	190 (77)	0	4	10	1	3	5-6**	5	2	2
A	5.3 (8.5)	305 (123)	136	36,216	17 (7)	0	51 (21)	238 (96)	139 (56)	1	0	0	0	51	0	0	0
Ab	5.4 (8.7)	319 (129)	131	36,216	31 (13)	0	58 (23)	229 (93)	111 (45)	2	0	0	0	51	0	0	0
B	5.7 (9.2)	315 (127)	146	34,978	19 (8)	0	47 (19)	249 (101)	98 (39)	1	2	0	0	13	1	0	0
Ba	5.8 (9.3)	318 (129)	146	34,978	14 (6)	0	43 (17)	260 (105)	97 (39)	2	0	0	0	13	2	0	0
Bb	5.7 (9.2)	326 (132)	141	34,978	33 (13)	0	52 (21)	241 (98)	110 (44)	2	2	0	0	13	1	0	0
Bab	5.8 (9.3)	330 (134)	141	34,978	28 (11)	0	50 (20)	252 (101)	114 (46)	3	0	0	0	7	1	0	0
C	7.9 (12.7)	444 (180)	205	32,315	24 (10)	0	34 (14)	386 (156)	108 (43)	1	1	0	0	37	1	1	0

Continued	Relocations							Floodplain Impacts		USACE Section 404 Impacts			Surface Water Quality Impact Ratings
	Residential Owners	Residential Tenants	Businesses	Total	Minority Households	Elderly Households	Low-Income Households	Special Flood Hazard Area linear feet (linear meter)	Floodway linear feet (linear meter)	Stream Crossings		Wetlands acres (hectares)	
										Intermittent	Perennial		
Common	20	3	8	31	0	3	0	0	0	12	0	0	1.2
A	30	7	0	37	0	0	2	12,700 (3,870)	0	8	3	52 (21)	2.5
Ab	30	7	0	37	0	0	2	13,400 (5,000)	0	9	2	30 (12)	2.5
B	12	8	1	21	0	4	2	13,100 (4,000)	600 (183)	8	3	55 (22)	2.5
Ba	6	8	0	14	0	2	3	13,100 (4,000)	0	9	3	55 (22)	2.3
Bb	12	8	1	21	0	4	2	13,600 (4,150)	0	9	2	32 (13)	2.5
Bab	6	8	0	14	0	2	3	13,600 (4,150)	0	10	2	32 (13)	2.3
C	27	14	0	41	0	0	0	9,400 (2,900)	4000 (1,200)	6	11	30 (12)	2.9

† For alignments A, Ab, B, Ba, Bb, and Bab, the traffic and impacts outlined in the table are with an interchange at Oneida Street. With a grade separation at Oneida Street, the traffic and impacts would vary slightly. These differences are outlined in Sections 2 and 3 of the SDEIS.
†† Miscellaneous includes railroads, cemeteries, roadways, utility right of ways, ponds, reservoirs, borrow areas, sewage ponds, levees, ditches, and towers.
*10 dBA level receptors and receptors that approach the noise abatement criteria (66 dBA).
** A range is indicated because the receptor count changes based upon which alignment is combined with the Common Alignment.
# Traffic volumes are for the entire alignment alternative including the Common Alignment section.

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Table 3.21-3
Preferred Alternative Impact Summary - 2007

Length miles (kilometers)	**Acreage** (hectares)	**Total Cost#** (in million $)	**Weighted Traffic Volume(2030)** vehicles per day	**Noise Impacts*** Estimated Receptors
12.7 (20.4)	707 (286)	347	34,468	19

Existing Land Use Converted to Highway Right of Way				
Commercial/ Residential acres (hectares)	**Military Base** acres (hectares)	**Miscellaneous†** acres (hectares)	**Undeveloped/ Agricultural** acres (hectares)	**Prime Farmland** acres (hectares)
35 (14)	151 (61)	92 (37)	428 (173)	89 (36)

Cultural Resources-Direct Impacts			**Hazardous Materials Impacts**		
Recorded Archeological Sites	**Historic Structures**	**Historic Roads**	**Dumps and Storage Areas**	**Landfills**	**Underground Storage Tanks**
8	16	2	4	2	2

Relocations						
Residential Owners	**Residential Tenants**	**Businesses**	**Total**	**Minority Households**	**Elderly Households**	**Low-Income Households**
29	4	9	42	0	10	0

Floodplain Impacts		**USACE Section 404 Impacts**		
Special Flood Hazard Area linear feet (linear meter)	**Floodway** linear feet (linear meter)	**Stream Crossings**		**Wetlands** acres (hectares)
		Intermittent	**Perennial**	
12,800 (3,900)	0	22	3	32 (13)

Cost estimates for the Preferred Alternative were updated in 2007 and increased from $271 million to $347 million as outlined in Section 2.4.2.3 of the FEIS.
*10 dBA level receptors and receptors that approach the noise abatement criteria (66 dBA).
† Miscellaneous includes railroads, cemeteries, roadways, utility right of ways, ponds, reservoirs, borrow areas, sewage ponds, levees, ditches, and towers.

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