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ENVIRONMENTAL ASSESSMENT

MEGAPOP FIBER OPTIC INTERNET BACKBONE LOOP

Neshoba, Newton, and Lauderdale Counties
Mississippi

TENNESSEE VALLEY AUTHORITY

JULY 2005

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MISSISSIPPI

TENNESSEE VALLEY AUTHORITY

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The Proposed Decision and Need

Tennessee Valley Authority (TVA) must make two decisions: (1) whether to permit a 330-mile leg of its fiber optic network between Cordova, Tennessee (near Memphis), and Philadelphia, Mississippi, to be used to carry internet traffic and (2) whether to administer a $2 million Appalachian Regional Commission (ARC) grant to install 40 miles of fiber optic line through parts of Neshoba, Newton, and Lauderdale Counties between the cities of Philadelphia and Meridian, Mississippi.

These actions would assist a local consortium called MEGAPOP, the Mississippi Economic Growth Alliance and Point of Presence Inc. MEGAPOP has formed to develop a new broadband internet backbone loop serving the northern part of the state. The location of the loop is shown in Figure 1. The existing TVA network and the line to be installed would be parts of the loop. Additional components would include a stretch of currently operational fiber optic line between Memphis and Jackson, Mississippi (approximately 200 miles), a stretch of existing “dark” fiber optic line between Jackson and Quitman (approximately 100 miles), which would need to be activated, and a 31-mile stretch of fiber that is being installed between Quitman and Meridian by Telepak, the company which would operate the network using the backbone. A more detailed view of the part of the loop to be funded by the ARC grant is shown in Figure 2.

The purpose of the internet loop is to improve the communication infrastructure for rural North Mississippi's commercial, industrial, and residential end users to help make the area economically competitive. It has been shown that information, computing, and telecommunication industries have become critical drivers of the U.S. economy. The infrastructure necessary to deploy this technology is geographically uneven in the southeast, particularly in Mississippi. Therefore, Mississippi educators, health care providers, and businesses have not been able to leverage telecommunications advances and are not able to compete effectively in the economy. The project would help meet the ARC strategic goal of providing Appalachian residents with the physical infrastructure necessary for self-sustaining economic development and improved quality of life and the TVA mission of promoting sustainable economic development in its service area.

The total investment for the internet loop is estimated at $5,641,000. Including the ARC grant and the use of the TVA fiber optic network, which has been valued as in-kind assistance worth $1 million the total federal involvement would be about 53 percent. Without this assistance, the project could not be afforded by the area.


MEGAPOP Route
Memphis
Hernando
Ashland
Holly Springs
Senatobia
New Albany
Oxford
Batesville
Marks
Clarksdale
Pontotoc
Tupelo
Fulton
Charleston
Coffeeville
Pittsboro
Houston
Aberdeen
Grenada
Walthall
West Point
Indianola
Carrollton
Winona
Starkville
Columbus
Ackerman
Belzoni
Lexington
Kosciusko
Louisville
Macon
Rolling Fork
Mayersville
Yazoo City
Carthage
Philadelphia
Decatur
Segment to be installed in this project
Canton
Vicksburg
Forest
Raymond
Jackson
Brandon
Meridian
Raleigh
Bay Springs
Mendenhall
Hazlehurst
Quitman
Waynesboro
Prentiss
Collins
Ellisville
N
Miles
0
10
20

Figure 1

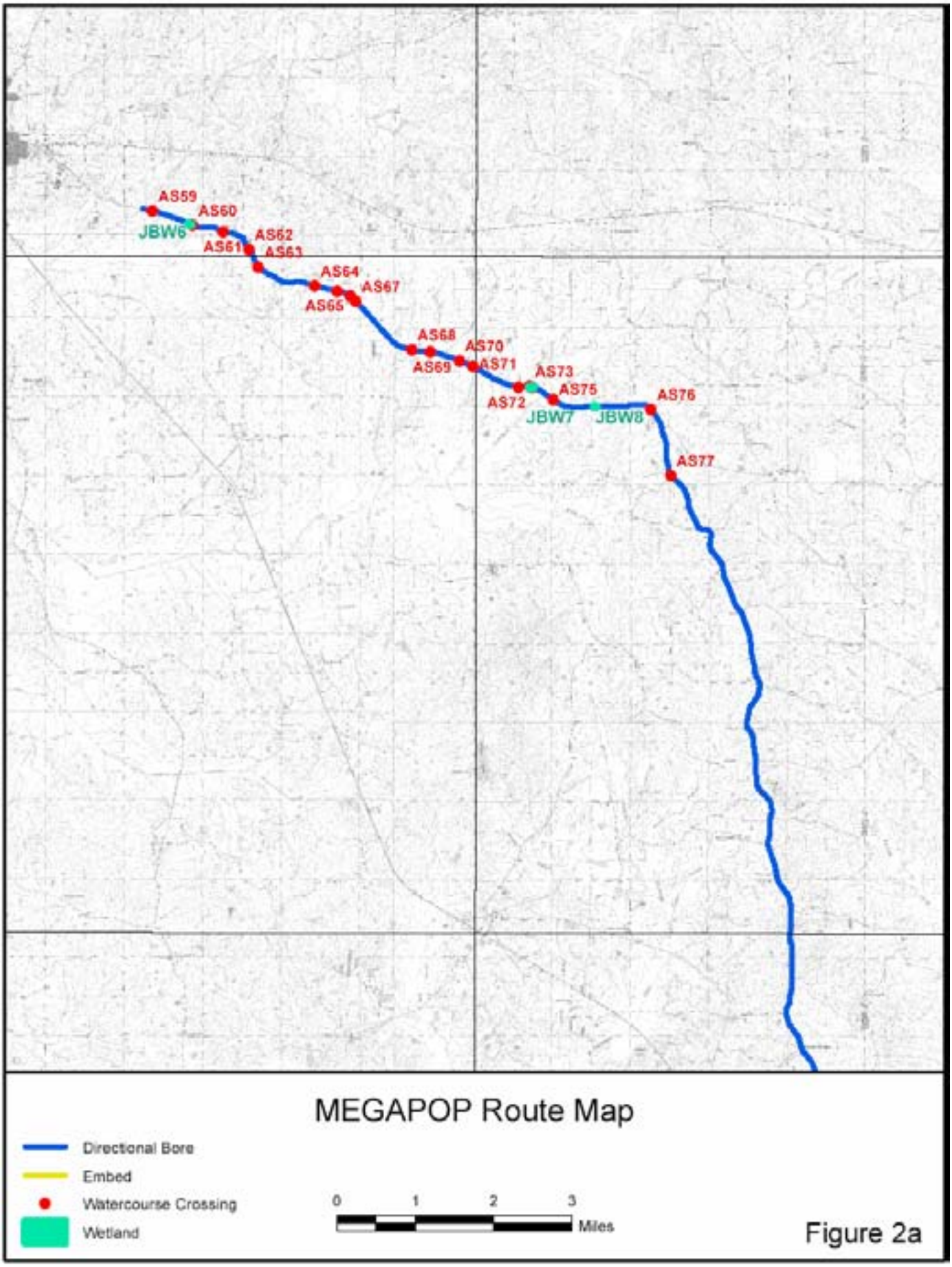
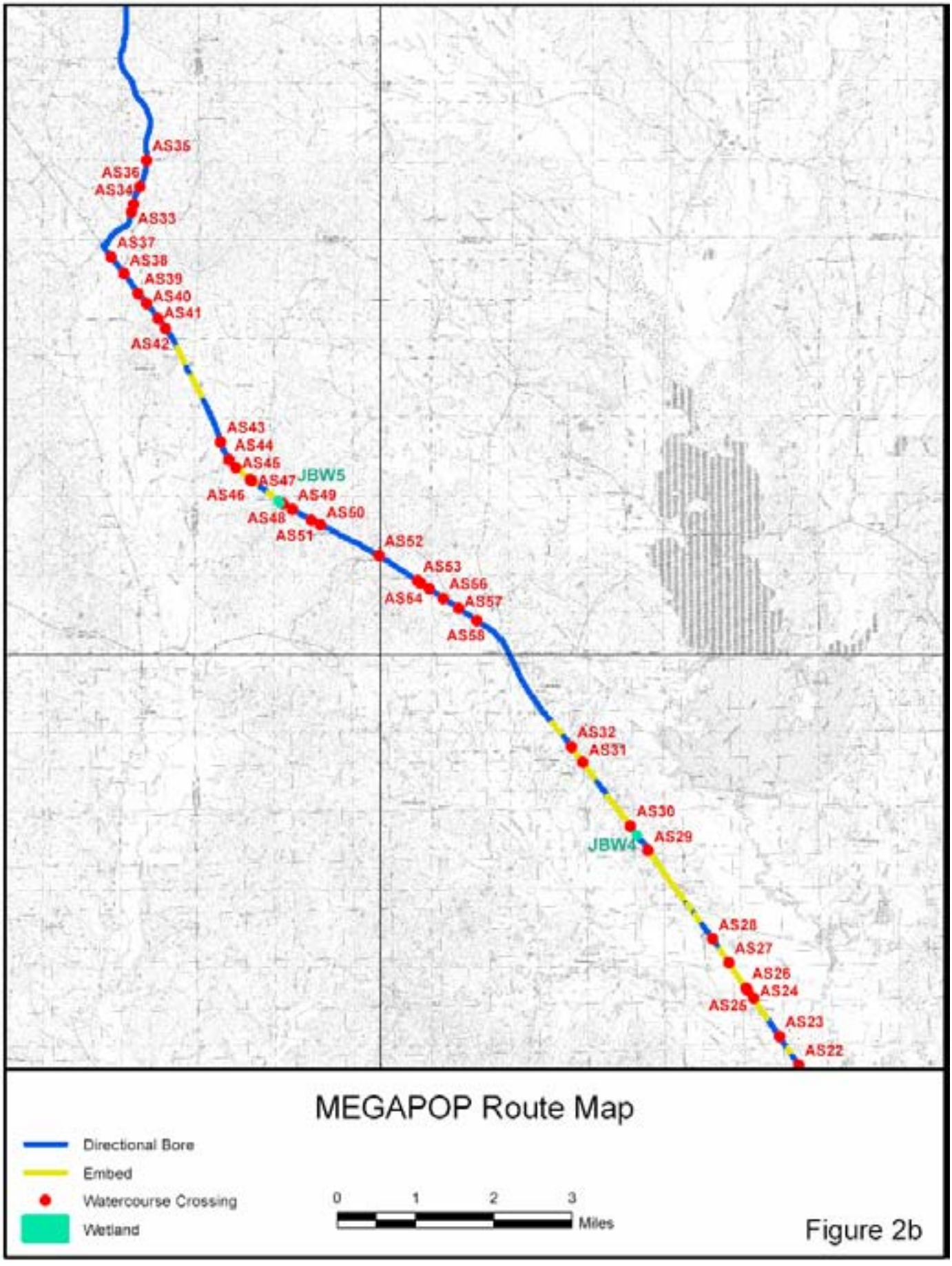

AS59
AS60
JBW6
AS61
AS62
AS63
AS64
AS67
AS65
AS68
AS70
AS69
AS71
AS73
AS75
AS72
JBW7
JBW8
AS76
AS77
MEGAPOP Route Map
Directional Bore
Embed
Watercourse Crossing
Wetland
0
1
2
3
Miles

Figure 2a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AS38
AS39
AS40
AS41
AS42
AS43
AS44
AS45
AS47
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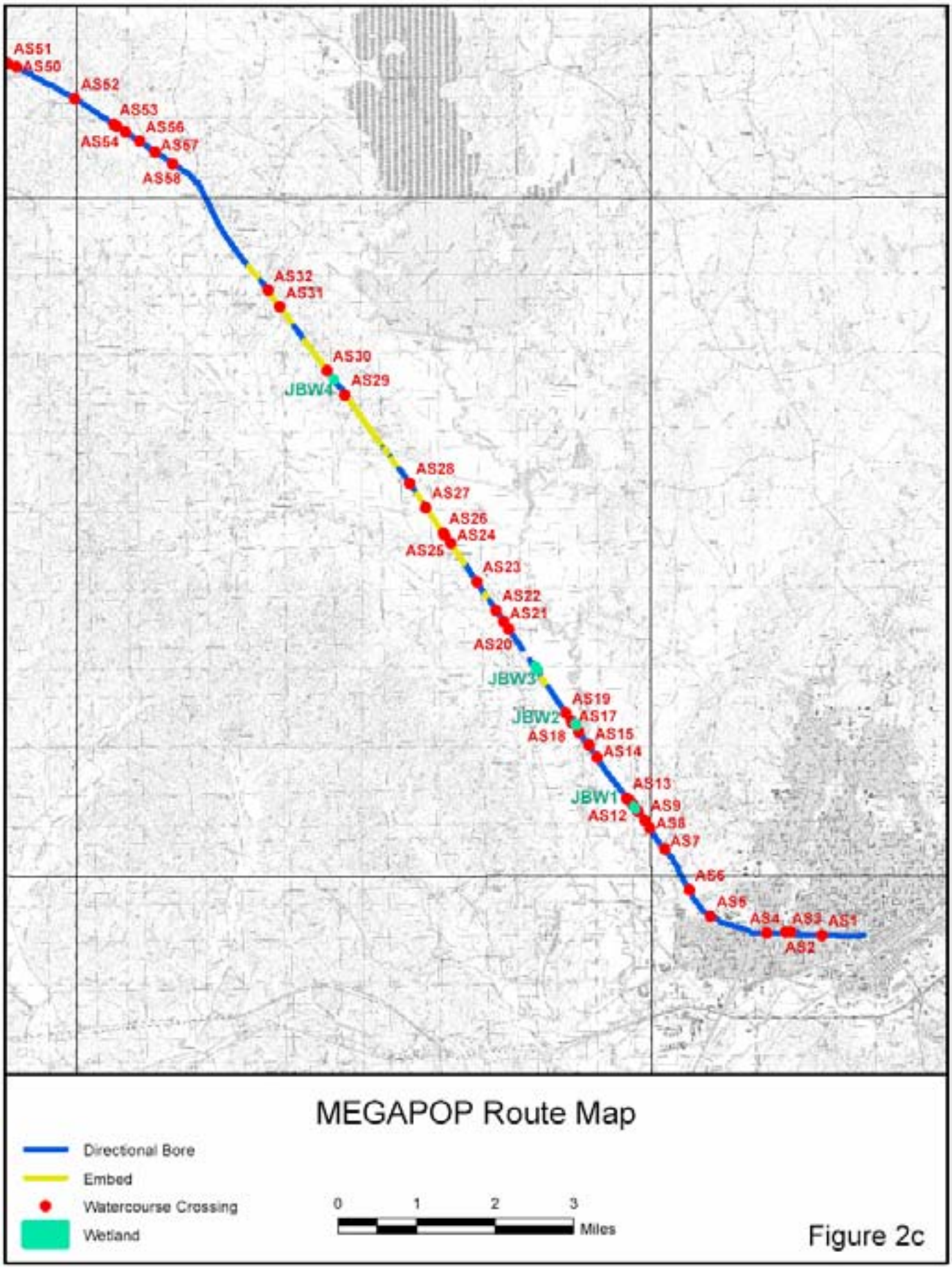
AS49
AS48
AS50
AS51
AS52
AS53
AS56
AS54
AS57
AS58
AS32
AS31
AS30
AS29
JBW4
AS28
AS27
AS26
AS24
AS25
AS23
AS22
MEGAPOP Route Map
Directional Bore
Embed
Watercourse Crossing
Wetland
0
1
2
3
Miles

Figure 2b


AS51
AS50
AS52
AS53
AS56
AS54
AS57
AS58
AS32
AS31
AS30
JBW4
AS29
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AS24
AS25
AS23
AS22
AS21
AS20
JBW3
AS19
JBW2
AS17
AS18
AS15
AS14
AS13
JBW1
AS9
AS12
AS8
AS7
AS6
AS5
AS4
AS3
AS1
AS2
MEGAPOP Route Map
Directional Bore
Embed
Watercourse Crossing
Wetland
0
1
2
3
Miles
Figure 2c

Other Environmental Reviews and Documentation

The fiber optic line to be installed with the ARC grant would lie partly along State Route (SR) 19 between its intersection with SR 491 and the city of Meridian. In recent years, SR 19 has been widened to four lanes along part of this route, and widening of the remaining two-lane stretch is planned. Two Environmental Assessments (EAs) were prepared by the Federal Highway Administration for these widenings. The EAs included cultural resource surveys (Carr et al., 1998; Hyatt, 1992).

Due to the length of time since preparation of the EAs and the differences between impacts of widening the highway and installing the fiber optic line, not all of the information in the EAs is relevant to this review. However, TVA has independently reviewed the information in the EAs and has determined that the cultural resource surveys done as part of the EAs are adequate. This TVA EA, therefore, incorporates by reference the information in those surveys.

Environmental Permits and Notifications

Telepak, as the operator for MEGAPOP, would be responsible under a clause in the contract between Telepak and TVA for obtaining all necessary permits, for making notifications to the appropriate agencies for the proposed project, and for complying with all provisions of permits. The project would require permits from the Mississippi Department of Transportation to construct utility lines along or across state highways. Permits have already been obtained for the parts of the route along SRs 486 and 491, and applications have been submitted for the parts of the route along SR 19. Under the permits, all sod disturbed by the proposed work is to be replaced by the applicant and maintained for a sufficient length of time to ensure a living and growing sod, and the applicant is responsible for properly safeguarding and directing traffic.

The manager for the contractor has stated that the project does not need a storm water permit because of the small amount of disturbance at any one time.

Any wetland impacts associated with this project would be subject to Federal Section 404 Clean Water Act permit requirements as well as state Section 401 water quality certification. Nationwide Permit (NWP) 12 for utility line work and corresponding Section 401 water quality certification would apply.

Alternatives and Comparison

This EA evaluates two alternatives, the No Action and the Proposed Action Alternatives.

Alternative A - No Action

Under the No Action Alternative, TVA would not administer the grant or provide the assistance. In this event, ARC could possibly find another federal agency to administer the grant (ARC grants must be administered by a federal agency), but if TVA did not permit use of its fiber optic network, the project as designed would probably be impractical due to the high cost of installing new fiber in place of using the TVA fiber. The western and southern stretches of fiber could still be used, though the redundancy of the loop would not be present, thus reducing the reliability of the internet service.

Alternative B (Proposed Alternative) – Use of TVA Fiber Optic Network and Administration of ARC Grant

Under the Action Alternative, the fiber optic line would connect with TVA's fiber optic system at the TVA transmission line east of Philadelphia along SR 486. TVA would splice a connection to its own fiber optic line and run the connecting line down a tower to a buried junction box at the base of the tower, where it would connect to the MEGAPOP line. In addition, TVA would allow Telepak to install equipment at TVA's Cordova Substation for connection to Telepak's network. TVA Environmental Quality Specifications for Transmission Substation or Communications Construction (Appendix A) would apply to all aspects of the project involving TVA transmission lines and substations.

The MEGAPOP line would continue from the connection at the transmission line to Meridian along SRs 486, 491, and 19. The line would normally be laid 5 feet within the back edge of the highway right-of-way. In rural areas, this would avoid the shoulder, fore slope, drainage ditch, and back slope of the highway. Within the built-up areas of Meridian the line would generally be under the sidewalk or utility strip; where necessary to avoid obstructions, it would be under the roadway.

Installation of the line would use established methods and would be done by an experienced contractor. The company would use two methods: directional boring and embedding. About 25 miles would be installed by directional boring. This would be used along SRs 486 and 491 and parts of SR 19, including under streams, road crossings, wooded areas, any other environmentally sensitive areas, and the developed part of Meridian. The boring would be done by a special machine about 16 feet long. One of the crew would walk along the route to monitor and control the bit with a special sensor. The hole would be about 4 inches in diameter to accommodate the two strands of fiber. The boring would be done in runs, which are expected to be between 600 and 1,000 feet, though if adverse soil conditions or obstructions were encountered, a run might be shorter.

The boring machine would initially be set along SR 486 where the first run of line would end, and the run would be bored back to the start where the fiber would be connected to the TVA fiber optic system. Upon completion of the first run of boring, the bit would be brought to the surface to grab an end of line and would then be drawn back, pulling the line to the machine. After that, the machine would be turned and the next run bored in the forward direction. The machine would then be loaded on a truck and taken to the next expected location where the bit would be brought out to the surface (leapfrogging the spot where the first forward run came to the surface), and the next run would be bored back to the previous end. Then the machine would again be turned to bore in the forward direction. This leapfrogging and backward/forward pattern would continue to the end of the directional boring. The part of the line installed by boring is illustrated in Figure 2.

To help advance the boring and keep the borehole open, thick slurry would be pumped into the borehole. The slurry would be made of bentonite, a nonhazardous colloidal clay commonly used in drilling for oil. This slurry would form a tough cake along the surface of the boring. It would also seal any fractures created by the boring and prevent infiltration of water. The slurry would be mixed in the boring machine's storage tank. About 300 gallons of slurry would be needed for every 1,000 feet of boring. The boring would be at least 48 inches below the ground surface and at least 60 inches below the base of any streams.

The other method of installation would be embedding. This technique would be used for about 15 miles only in open areas with no sensitive environmental resources and having

sufficient width for the machinery. A small bulldozer carrying a roll or rolls of line would pull a special knife blade along the route of the line. At the end of the run, it would pull up the blade and reverse direction, laying line back to the start of the run. Then, it would proceed again to the far end of the run, filling the furrow in and tamping down the fill. Laborers would follow, smoothing the tread marks, reseeding, and mulching. The furrow would be about 6 inches wide and at least 42 inches deep. The part of the line to be installed by embedding is illustrated in Figure 2.

For both methods of installation, at the end of one run and start of another, a hole about 3 feet by 3 feet horizontally and 3 feet deep would be dug so that the line could be buried after connecting the ends. About every 2.5 miles, the holes would be manholes or handholes, which would be accessible, covered structures constructed to hold a coil of line to provide slack. The manholes would be precast concrete structures 5 feet by 5 feet horizontally and 4 feet deep. The handholes would be plastic structures about 5 feet long, 2.5 feet wide, and typically 2.5 feet deep.

The line-laying machine would be equipped with a small backhoe for digging the holes. No manholes, handholes, or regular burial holes would be excavated in streams or streamside management zones (SMZs), and silt fences would be used around them as needed to prevent runoff. The topsoil would be stockpiled and reused, and seeding and mulching would be done as needed after completion.

When the project would enter each county, the contractor would hold a meeting with county utility staffs, and the “one-call” notification process would be used to ensure that all crossing utility lines that could be affected would be identified and avoided. Special care would be taken with any pipelines, such as water, sewer, petroleum, or natural gas, which would pose special environmental, safety, or health impacts in the event of a leak. In some cases, small excavations might be done over known utility lines to locate them exactly. The line would be placed at least 24 inches below any utility lines crossed.

Other Alternatives Not Considered in Detail

The alternative of directional boring of the entire route was considered by MEGAPOP, but the additional costs of doing this makes this unreasonable. (Boring costs approximately six times as much as embedding.) The areas where embedding would be used were identified based on a low likelihood of adverse environmental impacts, so the additional amount of directional boring would provide very little environmental benefit. Some other route for the proposed line could be identified, but the identified route appears to be the route that most economically connects the disparate segments of the loop and is the one proposed by MEGAPOP. In addition, the proposed route runs through or close to the major cities in the area and the Choctaw Indian Reservation, thus providing the most opportunity for possible subsidiary networks serving those communities. Because the proposed route uses highway right-of-way to the extent possible to minimize cost and environmental impact, no other route would be likely to have lesser environmental impact. The line could be placed along the other side of the highways, but the affected environment appears to be similar in both cases along SRs 486 and 491. Along SR 19, similar or more extensive known environmental features such as wetlands appear to be present on the other side, so changing the existing route would probably have the same or greater impact.

Comparison of Alternatives

Under the No Action Alternative, there would be no socioeconomic benefits and no effects on the natural environment if the proposed line were not constructed to complete the contemplated broadband internet loop. Under the Action Alternative, there would be beneficial socioeconomic effects. There would also be minor negative impacts on terrestrial ecology, wetlands, aquatic resources, rare species, floodplains, noise levels, visual quality, and transportation.

Scope of Environmental Review

The potential environmental impacts associated with the installation of the fiber optic line between Philadelphia and Meridian are examined in this EA. Because the Quitman-Meridian stretch of the loop is expected to be constructed whether or not the ARC-funded stretch is installed, has no federal agency involvement, and has independent utility, the impacts of the Quitman-Meridian stretch are not addressed in this EA.

The resource areas identified as needing evaluation are terrestrial ecology, wetlands, aquatic resources, endangered and threatened species, cultural resources, floodplains, and socioeconomic conditions, as well as the consideration of the potential for indirect and cumulative effects related to economic growth caused by the new internet access.

Certain potential impacts are not expected because of the way the project would be done or the environmental features of the area. Because the bentonite would seal the boring, there would be no impact on groundwater. The route would be entirely within highway right-of-way, so there would be no impacts on prime farmland, land use, recreation, or natural areas. Due to the type of project, there would be no environmental justice issues of disproportionately high or adverse human health or environmental effects on minority and low income populations.

Certain other impacts would be very minor and primarily temporary because of the limited duration and nature of the installation process. It is expected to take a total of 90 days, so the machinery would proceed on average about 0.5 mile per day. This would be rapid enough that no residents or businesses along the route would be disturbed significantly. The installation of the line would have no air quality implications because only small amounts of fugitive dust and pollutants from the diesel equipment would be generated. Short-term interruptions in traffic flow during construction would be minimized with routine traffic control measures and by keeping materials out of the travel lanes and off the shoulders. The equipment would generate noise, but only the operators would need hearing protection. Installation of the line would have insignificant temporary visual impact. The manhole/handhole covers would project slightly above the ground surface and have an insignificant long-term visual impact. Accordingly, none of these resource areas are addressed further in this EA.

It is possible that TVA will be asked to assist with the installation of subsidiary fiber optic lines connected to the regional loop. The kinds of impacts associated with the installation of subsidiary fiber optic lines would be similar to those addressed in this EA and also are expected to be insignificant, provided:

1. Installation uses the same established methods addressed in this EA, directional boring and embedding.

2. Directional boring is used when sensitive resources are present to avoid or minimize impacts to such resources.
3. Prior to any physical disturbance, appropriate surveys are conducted to document the location of any sensitive resources, including federally listed threatened and endangered species, wetlands, and cultural resources.
4. Best Management Practices (BMPs) are used to avoid or reduce potential impacts on aquatic resources and water quality.
5. All applicable environmental permits and approvals are obtained.

If these conditions are met, future subsidiary fiber optic line projects would qualify as categorical exclusions and not need preparation of separate EAs (TVA, 1983). The documentation and general conditions associated with categorical exclusions also would have to be met.

Terrestrial Ecology

Affected Environment

Ecologically, the project area is within the Southern Mixed Forest Province, which is dominated by deciduous broad-leaved hardwood forests and mixed pine/hardwood forest communities. Overall, the landscape of the project area is quite fragmented due to existing roads, utility rights-of-way, farms, rural residential areas, and urban areas.

Comparison of topographic maps and aerial photographs with current conditions noted in a driving survey indicate that considerable changes in the area's land use have occurred in recent years. These include clear-cutting, reversion of timbered areas to forest or conversion to pasture, gradual creation of old-field habitats from previously farmed areas, and residential and commercial developments.

Various habitats occur along the proposed project corridor (Table 1). Almost half of the corridor consisted of maintained right-of-way and residential/commercial areas. Approximately 28 percent of the corridor is comprised of forested habitats of various ages.

Table 1. Habitats Along Route of Proposed 31-Mile Stretch of Buried Fiber Optic Cable

Habitat	Percent Occurrence
Maintained right-of-way	24
Residential/Commercial/Urban	22
Agricultural fields	17
Pine-dominated woodlands	13
Scrub-Shrub	10
Hardwood-dominated woodlands	8
Mixed pine/hardwood woodlands	7

Exotic species of plants occur along much of the proposed project corridor. Mimosa, tree-of-heaven, Japanese honeysuckle, and kudzu occur throughout the route and are dominant in some areas.

In contrast to the generally fragmented nature of habitats along the project, one hardwood stand along the route is unique in its maturity and diversity of species. This stand displays a characteristic floodplain forest species assemblage and appears to have once been a forested wetland until major ditching was carried out to drain the area. The canopy consists of mature cherry bark oak, chestnut oak, black oak, willow oak, sweetgum, red maple, black gum, loblolly pine, mockernut hickory, and shagbark hickory, with an understory of like saplings and blue-beech. Old growth characteristics are present. For example, one chestnut oak and one cherry bark oak are at least 5 feet in diameter. Groundcover is sparse and includes round leaf catbriar, Virginia creeper, Japanese honeysuckle, and poison ivy. The proposed line would pass under this forest via directional boring for about 2,000 linear feet along SR 19 southeast of Okatibbee Creek. Figure 3 is a copy of the field sheet showing this forested area. The green triangles near Okatibbee Creek indicate the general area of large trees.

A variety of animal species is present in the project area, largely because the route crosses many habitat types in the landscape. However, due to the habitat fragmentation and habitat edges along the route, the most abundant species were those tolerant of disturbed habitats. Birds were most conspicuous, as the survey was done in peak breeding season. Sixty-three bird species were observed.

The floodplain forest described above may be of special importance as habitat for wildlife, especially to those species requiring large tracts of mature forest. Observed bird species included Neotropical migrants such as Acadian flycatcher, pine warbler, prothonotary warbler, red-eyed vireo, and summer tanager. This forest may also harbor other species that are state listed and require forested habitat.

Expected Impacts

If the MEGAPOP fiber optic line were installed, there would be minor and insignificant impacts overall to the plants and animals in the area because little area would be disturbed, and the actual project route itself consists mostly of maintained highway right-of-way.

Impacts to the floodplain forest associated with Okatibbee Creek would also be limited and insignificant. No handholes or manholes would be located in the forest. The line would run under the forest only a short distance from its edge, so any surface disturbance at ends of runs of line, to get the boring machine to the route and for line burial, would be near the edge and minimize fragmentation. At most, two points are expected where runs of line would be bored and have to be connected. These points would be located away from the especially large trees. The boring machine would be brought to the route as short a distance as possible from the roadway rather than bringing it along the line itself.

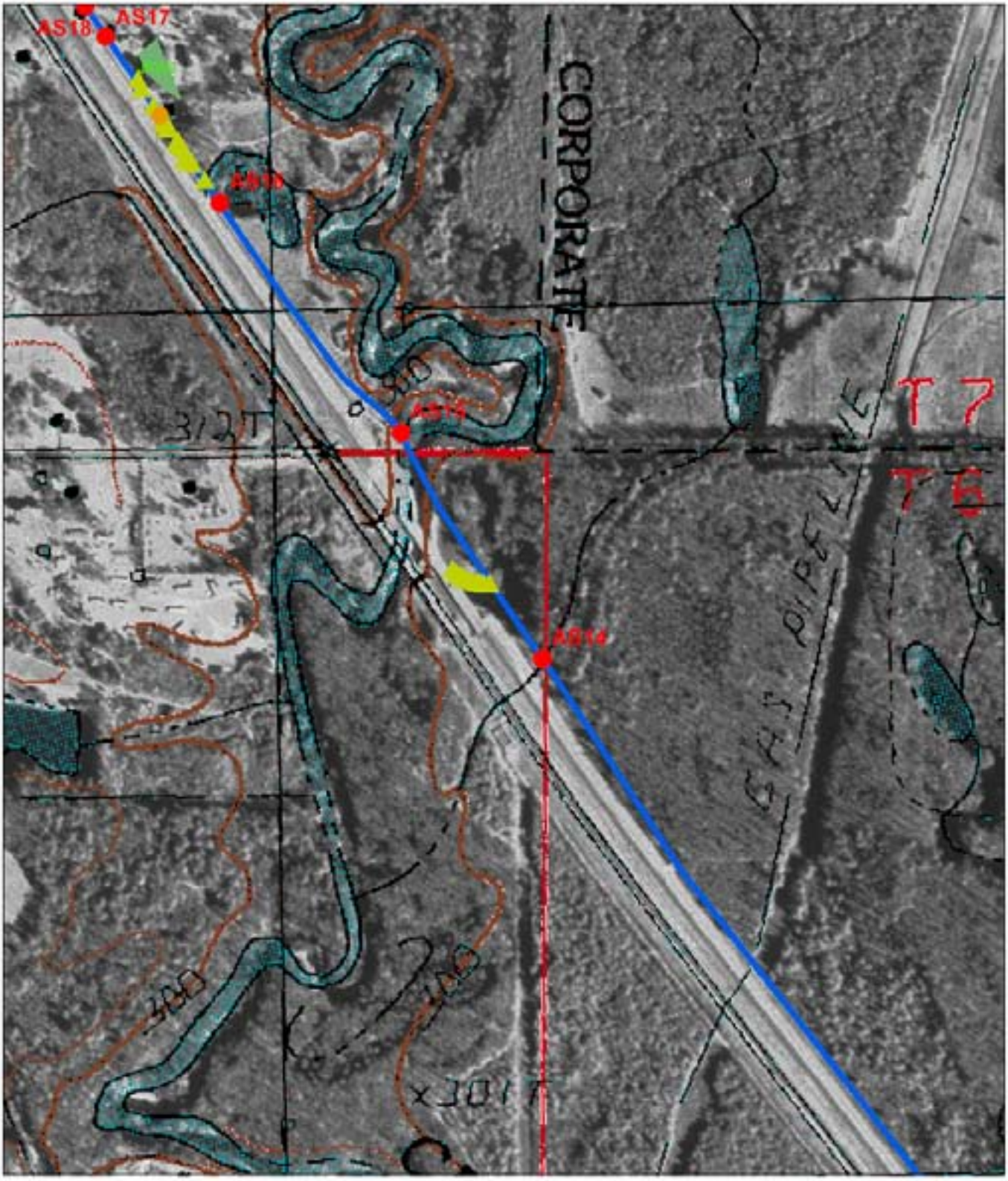
AS18
AS17
AS15
AS14
AS14
CORPORATE
T 7
T 6
3123'
300
300
x3017'
Directional Boring
Wetland
Stream Crossing
Handhole
Tree
0
500
1,000
Feet

Figure 3

Wetlands

Affected Environment

Due to the relatively low topographic relief and hydrologic characteristics of the streams in this region, wetlands are common. Wetlands are less common, however, in the immediate project area because the proposed project corridor follows highway and state road rights-of-way.

Wetlands in the project area were surveyed in May and June 2005. Wetland determinations were performed according to USACE standards (Environmental Laboratory, 1987), which require documentation of hydrophytic vegetation (Reed, 1997), hydric soil, and wetland hydrology. Wetlands are classified according to the Cowardin system for the classification of wetlands and deepwater habitats (Cowardin et al., 1979).

Eight wetlands totaling 2.14 acres were identified along the proposed 31-mile route. The types and sizes are shown in Table 2, and the locations are shown in Figure 2. Descriptive details for the wetlands are reported on Routine Wetland Determination Data Forms contained in Appendix B. Wetland boundaries were located in the field and were then flagged, recorded using global positioning system (GPS) coordinates, and sketched on field maps. The coordinates are also given in Appendix B. Wetland acreages were estimated using the GPS coordinates and MapSource mapping software. Due to the uncertainty of right-of-way widths and potential footprint location of the fiber optic line and locations of surface disturbance for points where the line would have to come to the surface, estimated areas of wetlands include wetlands located in the entire right-of-way rather than in a possible section that may be impacted.

All eight wetlands were determined to display wetland hydrology, to be dominated by hydrophytic vegetation, and to contain hydric soils.

Table 2. Wetlands Along Route of Proposed 31-Mile Stretch of Buried Fiber Optic Cable

Wetland Identification*	Type**	Size of Wetland Located in Right-of-Way (acres)
JBW1	PEM	0.24
JBW2	PEM	0.29
JBW3	PEM	0.73
JBW4	PSS	0.12
JBW5	PSS	0.25
JBW6	PSS	0.15
JBW7	PFO	0.22
JBW8	PFO	0.14
	TOTAL	**2.14**

* watercourse crossings listed in south-to-north sequence

** PEM – Palustrine emergent; PFO – Palustrine forested; PSS – Palustrine scrub-shrub

In addition to the wetlands located within the proposed project right-of-way, there are two wetlands located adjacent to the right-of-way. The locations of these wetlands were noted in the project survey for access planning purposes. One wetland is located at the northern end of the proposed line, just south of the proposed route and within the southern right-of-way of SR 486 after the line crosses SR 486. This wetland occurs within the floodplain, and just west of perennial stream crossing AS 59. (See Figure 2 for the location of AS 59 and the aquatic resources section below for more information on stream crossings). It appears that this wetland may have recently been timbered for residential development. A second wetland occurs in a floodplain pasture just north of a perennial stream at crossing AS 43. (See Figure 2 for the location of AS 43.) This wetland does not appear to be intersected by the estimated project centerline, though it may present an access issue for equipment and vehicles.

Expected Impacts

No significant impacts to wetlands are anticipated. Direct disturbance of wetlands located along the proposed right-of-way would be minimized by the use of directional drilling and boring and avoiding, to the extent possible, the entry of vehicles and heavy equipment into wetlands. Impacts to the two wetland areas located outside the proposed right-of-way area would be avoided by not locating access roads and equipment staging areas in them. Indirect impacts to wetlands would be minimized by routine BMPs, such as silt fences and hay bales around disturbed areas near wetlands, shown in Muncy (1999).

If it is determined impracticable to avoid any wetland areas, impacts are expected to be minor and insignificant due to the small size of the wetlands along the route, commonness of the wetlands in the area, and the short timeframe of the activity. Any unavoidable impacts to wetlands would require a Section 404 permit, most likely NWP 12 permit, and all permit requirements would be followed

Aquatic Resources

Existing Environment

The proposed 31-mile line falls within two watersheds, the Chunky-Okatibbee (U.S. Geological Survey [USGS] Cataloging Unit 03170001) and the north-bordering Upper Pearl (USGS Cataloging Unit 03180001). These watersheds display slow-flowing, meandering streams that are sourced from predominantly agricultural or forested landscapes.

Fieldwork to assess surface water and aquatic ecology was conducted in May and June 2005. Considering the uncertainties regarding points where runs of line would have to come to the surface and equipment/vehicle access points, all watercourses intersected by the highway and state road right-of-way along the route were surveyed.

Seventy-seven watercourses would be crossed by the proposed fiber optic line. Thirty-three of these watercourses are perennial, five are intermittent, and 39 are wet-weather conveyances (WWC). Based upon these classifications, and on the slope of the surrounding landscape, SMZs were assigned and flagged in the field based on guidance set forth in Muncy, 1999. Watercourse locations are shown in Figure 2, and Table 3 includes the type of each watercourse and the width of the SMZ on each bank of the stream. All SMZs are measured horizontally rather than along the topography due to the steepness of the banks in some cases.

Table 3. Watercourse Crossings Along Proposed Route

Crossing	Stream Type	SMZ** (feet)
AS1	Perennial	50
AS2	WWC	50
AS3	Perennial	50
AS4	WWC	50
AS5	WWC (catch basin)	50
AS6	Perennial	100
AS7	Perennial	100
AS8	WWC	50
AS9	WWC	50
AS10	Perennial	50
AS11	WWC	50
AS12	Perennial	50
AS13	WWC	50
AS14	WWC	50
AS15	Perennial	50
AS16	Perennial (ponds)	50
AS17	Intermittent	50
AS18	Perennial	50
AS19	Perennial	50
AS20	Perennial	50
AS21	Perennial	50
AS22	Perennial	50
AS23	WWC	50
AS24	WWC	50
AS25	WWC	50
AS26	WWC	50
AS27	Perennial	50
AS28	WWC	50
AS29	WWC	50
AS30	WWC	50
AS31	WWC	50

Crossing	Stream Type	SMZ** (feet)
AS32	WWC	50
AS58	Perennial	50
AS57	Intermittent	50
AS56	WWC	50
AS55	Perennial	50
AS54	Intermittent	50
AS53	Perennial	50
AS52	WWC	50
AS50	Perennial	50
AS51	WWC	50
AS49	WWC	50
AS48	WWC	50
AS47	WWC	50
AS46	WWC	50
AS45	WWC	50
AS44	WWC	50
AS43	Perennial	50
AS42	WWC	50
AS41	WWC	50
AS40	WWC	50
AS39	WWC	50
AS38	Perennial	65/50
AS37	WWC	50
AS33	WWC	50
AS34	WWC	50
AS36	WWC	50
AS35	Perennial	50
AS77	Perennial	50
AS76	Perennial	50
AS75	Perennial	50
AS74	WWC	50
AS73	WWC	50
AS72	Perennial	50
AS71	Intermittent	50

Crossing	Stream Type	SMZ** (feet)
AS70	Intermittent	50
AS69	Perennial	50
AS68	Perennial	50
AS67	WWC	50
AS66	Perennial	50
AS65	WWC	50
AS64	WWC	50
AS63	Perennial	50
AS62	Perennial	50
AS61	Perennial	50
AS60	Perennial	50
AS59	Perennial	50

**SMZ width per side of watercourse

The information on two watercourse crossings needs some elaboration. AS15 is at Okatibbee Creek along SR 19. This creek contains numerous meanders. One meander just northwest of the crossing comes back so close to the proposed route that the SMZ for this crossing includes the area between the meander and the crossing and ends 50 feet northwest of the closest point of the meander to the route. AS16, a short distance northwest of AS15, is actually not a crossing but is included because the route of the line passes within 50 feet of two ponds in the yard of a private residence to the northeast of the route. The SMZ is measured 50 feet in each direction along the route from the closest point to the ponds.

Roadside ditches are present throughout the project area. These are also watercourses, but because they extend throughout the route and the line itself would not cross them, they were not flagged as aquatic resources. In many cases, especially along the southern end of SR 19 just north of Meridian, where the right-of-way is 75 feet wide, these road ditches display undefined banks and well-developed hydrophytic vegetation. While the primary purpose or function of these drainage features is to control surface runoff from SR 19, these watercourses may also provide small areas of high arthropod productivity, thereby providing food for insectivorous reptiles, amphibians, birds, and mammals that inhabit the surrounding areas. In addition, the well-developed hydrophytic vegetation in many of these drainage ditches likely captures sediment in runoff from surrounding impervious surfaces to keep it from reaching more significant watercourses and habitats in the project area.

Expected Impacts

Impacts to aquatic ecology and water quality are expected to be minor and insignificant. Directional boring activities would be used under watercourses and SMZs to avoid impacts. The depth under streambeds would be at least 60 inches. To minimize the chance of sedimentation affecting SMZs or watercourses from ground disturbance outside SMZs, routine BMPs from Muncy (1999) or their equivalent would be adopted. BMPs could include measures such as silt fences and hay bales around excavations for handholes, manholes, and line run connection points where disturbance would occur close enough to

SMZs to affect them without the BMPs; minimizing unavoidable travel of equipment and vehicles through road ditches and SMZs to the locations of boring or embedding; immediate cover and reseeding of any ground disturbance; and the use of temporary crossing structures for any crossing of road ditches containing water or saturated soil. Any clearing of vegetation would need to minimize ground disturbance and avoid grubbing.

Endangered and Threatened Species

Existing Environment

Terrestrial Plants--According to the TVA and Mississippi Heritage Databases, Neshoba County has 3 state-listed vascular terrestrial plant species, Newton County has 15, and Lauderdale County has recorded occurrences of 17. The names, ranking, and habitats of the recorded occurrences are listed in Table 4.

Plant species listed by the state of Mississippi are not assigned an official state status, such as endangered or threatened. Instead, the Mississippi Natural Heritage Program uses the heritage-ranking system developed by The Nature Conservancy to indicate the relative rarity of species. Within this system, S1 indicates that a species has very few populations in the state; S5 indicates that the species is abundant and secure in the state; S2, S3, and S4 indicate intermediate degrees of rarity. SU indicates possible imperilment of a species, but the rank is uncertain due to lack of information. SR indicates that the species is rare, though not to the level as to be possibly impaired, and the rank is uncertain due to lack of information

None of the counties along the route are known to contain federally listed species, though Price's potato bean, federally listed as threatened, has been found in a road right-of-way in Kemper County to the east of the route.

Table 4. State-Listed Plant Species in MEGAPOP Proposed Project Area

Scientific Name	Common Name	State Rank	General Description
Neshoba County			
Nestronia umbellula	Nestronia	S1S2	Dry, sandy sites along highway
Pycanthemum muticum	Mountain mint	S2S3	Low swampy roadsides
Rhododendron arborescens	Smooth azalea	S1	Bogs, woods along streams
Newton County			
Camassia scilloides	Wild hyacinth	S2S3	Floodplain forest
Carex meadii	Mead's sedge	S3S4	Prairies, openings of dry forests, roadsides
Carex microdonta	Small-toothed sedge	S2?	Open wet areas
Cleistes divaricata	Spreading pogonia	S3	Bogs and pine barrens
Crataegus ashei	Ashe hawthorn	S1	Wooded slopes near water sources
Crataegus meridionalis	Gallion hawthorn	S1	Wooded slopes
Crataegus triflora	Three-flowered hawthorn	S1	Rich woods on limestone slopes
Echinacea purpurea	Eastern purple coneflower	S3S4	Prairies
Isoetes melanopoda	Blackfoot quillwort	S2	Scour holes of floodplain
Lobelia appendiculata	Appendaged lobelia	S2S3	Glades, open dry areas with

Scientific Name	Common Name	State Rank	General Description
			limestone
Platanthera cristata	Crested fringed orchid	S3	Open wet areas
Polytaenia nuttallii	Prairie parsley	S2	Openings or borders of oak forests
Rhamnus lanceolata	Lance-leaved buckthorn	S2	Open wooded slopes, usually in limestone
Rosa foliolosa	White prairie rose	SR	Woodland margins, roadsides, fencerows
Silene ovata	Ovate catchfly	S1S2	Dry to mesic forest
Lauderdale County			
Antennaria solitaria	Single-headed pussytoes	S3?	Open woods and woodland margins
Aster puniceus	Purple-stemmed aster	S1	Wet meadows, moist roadsides
Bidens coronata	Golden flowered beggar tick	SU	Wet meadows and swamps
Callirhoe triangulata	Clustered poppy-mallow	S1S2	Wetlands
Carex picta	Painted sedge	S2S3	Dry forests
Clematis glaucophylla	White-leaved leather flower	S1	Openings in rich woods along streams
Cypripedium pubescens	Yellow lady-slipper	S2S3	Bogs, swamps, and rich woods
Decodon verticillatus	Hairy swamp loosestrife	S2S3	Wetlands
Dentaria diphylla	Pepper-root	S1S2	Rich damp woods and meadows
Melanthium virginicum	Virginia bunchflower	S2S3	Mesic upland prairies and forests
Pachysandra procumbens	Allegheny-spurge	S3	Rich wooded slopes
Panax quinquefolius	American ginseng	S3	Rich woods
Platanthera blephariglottis	Large white fringed orchid	S2	Moist meadows and bogs
Platanthera cristata	Crested fringed orchid	S3	Moist meadows and bogs
Rhapidophyllum hystrix	Needle palm	S3	Dry open forest
Staphylea trifolia	American bladdernut	S3	Slopes near streams
Tiarella cordifolia	Heart-leaved foam-flower	S2	Woodland edges and rich woods

Note: Data as of May 13, 2005, from TVA Natural Heritage Database and Mississippi Natural Heritage Inventory, Mississippi Museum of Natural Science

From May 23, through June 2, 2005, the proposed route was surveyed for any rare plant species. Most areas were determined not to be suitable habitat for listed species because they are already heavily impacted and fragmented due to human-generated disturbances. Large forest tracts, wetlands, and wooded floodplains of perennial and intermittent streams have higher potential for federally or state-listed species. In particular, the relatively large stand of mature forest southeast of Okatibbee Creek along SR 19 (mentioned in the previous Terrestrial Ecology section) may provide habitat for single-headed pussytoes, painted sedge, white-leaved leather flower, yellow lady-slipper, pepper-root, American ginseng, and heart-leaved foamflower. However, none of these species were found in the vicinity of the proposed route.

One listed plant species was observed along the project right-of-way. Smooth azalea occurs within the eastern SMZ for stream crossing AS63. This species has an S1 state ranking of "critically imperiled in Mississippi."

Animals-- According to the TVA and Mississippi Heritage Databases, Neshoba County has recorded occurrences of 3 listed animal species, Newton County has 10, and Lauderdale County has 18. The names, status, and ranking of the recorded species are listed in Table 5.

Table 5. Federally and State-Listed Animal Species in MEGAPOP Proposed Project Area

Scientific Name	Common Name	Federal Status	State Status	State Rank
Neshoba County				
Graptemys oculifera	Ringed map turtle	LT	END	S2
Hobbseus attenuatus	Pearl rivulet crayfish	-	NOST	S2
Ursus americanus luteolus	Louisiana black bear	LT	END	S1
Newton County				
Alligator mississippiensis	American alligator	LT(S/A)	NOST	S4
Ambystoma cingulatum	Flatwoods salamander	LT	NOST	SRF
Cemophora coccinea	Scarlet snake	-	NOST	S4
Eumeces anthracinus	Coal skink	-	NOST	S3S4
Hemidactylium scutatum	Four-toed salamander	-	NOST	S1S2
Macrochelys temminckii	Alligator snapping turtle	-	NOST	S3
Procambarus barbiger	Jackson prairie crayfish	-	NOST	S2
Procambarus jaculus	Javelin crayfish	-	NOST	S4
Pseudotriton ruber	Red salamander	-	NOST	S3
Regina septemvittata	Queen snake	-	NOST	S3
Lauderdale County				
Alligator mississippiensis	American alligator	LT(S/A)	NOST	S4
Cemophora coccinea	Scarlet snake	-	NOST	S4
Deirochelys reticularia	Chicken turtle	-	NOST	S4
Gopherus polyphemus	Gopher tortoise	PS:LT	END	S2
Lanius ludovicianus	Loggerhead shrike	PS	NOST	S4

Scientific Name	Common Name	Federal Status	State Status	State Rank
Mesomphix capnodes	Dusky button	-	NOST	S?
Mesomphix pilsbryi	Striate button	-	NOST	S?
Obovaria unicolor	Alabama hickorynut	-	NOST	S3
Percina aurora	Pearl darter	C	END	S1
Percina lenticula	Freckled darter	-	NOST	S2
Peromyscus polionotus	Old field mouse	PS	NOST	S2S3
Pituophis melanoleucus lodingi	Black pine snake	C	END	S2
Praticolella lawae	Appalachian shrubsnail	-	NOST	S?
Procambarus lagniappe	Lagniappe crayfish	-	NOST	S1
Pseudotriton ruber	Red salamander	-	NOST	S3
Pupisoma macneilli	Gulf babybody	-	NOST	S?
Triodopsis vulgata	Dished three-tooth	-	NOST	S?
Vertigo oscariana	Capital vertigo	-	NOST	S?

Note: All information compiled from Mississippi Natural Heritage Inventory Database (Mississippi Museum of Natural Science, 2005)
Federal Status: C = Candidate for Listing; LE = Listed Endangered; LT = Listed Threatened; LT(S/A) = Listed Threatened due to its similarity of appearance to a federally listed species; PS = Partial Status
State Status: NOST = No Status; END = State Endangered

Surveys for rare, threatened, and endangered animals were conducted from May 23, through June 2, 2005. Neither listed terrestrial animal species nor their habitats were observed in the proposed project corridor. Because stream crossings were typically degraded due to sedimentation, little suitable habitat for listed aquatic species was observed. Okatibbee Creek may provide habitat for the listed alligator snapping turtle, though no evidence of this species was observed. There were crayfish burrows in a few channels and wetlands, so the Pearl River and Lagniappe crayfish could be present, though no living crayfish were observed. The Jackson prairie crayfish constructs burrows in well-drained prairie soils away from running water, only adopting an aquatic existence during breeding season (NatureServe, 2005). However, no suitable habitat for this species was observed during the field survey.

Expected Impacts

Because neither listed terrestrial animal species nor their habitats were observed, TVA expects no direct or indirect impacts to protected terrestrial animal species. Because directional boring would be used under streams and SMZs, and BMPs such as those noted above would be instituted in all areas, TVA has concluded that there would likely be no direct or indirect impacts on listed aquatic animal species in streams and SMZs or listed plant species in SMZs as a result of this action. Due to the very limited disturbance expected outside SMZs, and the fact that no actual habitat or individuals of listed plant species were found outside SMZs, TVA also concludes that there would be no effect on any listed plant or terrestrial animal species outside SMZs.

Cultural Resources

Existing Environment

Northeastern Mississippi has been the location of human occupation for over 12,000 years. The prehistory and history of the area is generally divided into six broad periods: Paleo-Indian (10,000-8000 B.C.); Archaic (8000-1000 B.C.); Gulf Formational Period (1100-300 B.C.); Woodland (300 B.C.-900 A.D.); Mississippian (1000-1700 A.D.); and Historic (1700 A.D.-present) (Bense, 1994; Walthall, 1980). Prehistoric land use and settlement varies during each period, but generally, short- and long-term habitation sites are located on floodplains and alluvial terraces along rivers and tributaries. Specialized campsites tend to be located on older alluvial terraces and in the uplands.

The Historic Period is represented by settlement in the region by Europeans, European Americans, and African Americans and the subsequent removal of Native American tribes. Excursions into the area by French, Spanish, and English traders and explorers occurred during the 16th through 18th centuries. The first permanent European-American settlements in the area occurred in the early 19th century following the acquisition of the land from the Chickasaw and their forced removal.

Expected Impacts

The previous cultural resource surveys (Carr et al., 1998; Hyatt, 1992), found no significant archaeological or historical sites that would be affected by the installation of the fiber optic line. Based on these results and consultation with a knowledgeable archaeologist in the area, TVA determined that no properties listed in or eligible for listing in the National Register of Historic Places would be affected. In compliance with Section 106 of the National Historic Preservation Act, TVA consulted with the Mississippi State Historic Preservation Officer (SHPO). The SHPO concurred with TVA's determination on June 6, 2005. A copy of the concurrence letter is included in Appendix C.

Floodplains

Construction of the underground fiber optic line would involve work within the 100-year floodplain of various streams. For purposes of consistency with Executive Order 11988, an underground fiber optic line is considered to be a repetitive action in the floodplain that would not result in adverse floodplain impacts because the area would be returned to preconstruction conditions after completion of the project.

Socioeconomic Conditions

Existing Environment

Most if not all of the state would be impacted to some extent by the operation of the proposed internet loop. However, the greatest direct impacts should be felt by the 36 Mississippi counties through which the line would run or which are adjacent to those counties. Collectively these counties have a population of 1,463,843, over 51 percent of the state total. Per capita personal income in the project area was $24,725 in 2003, higher than the state average of $23,466, but only 78.6 percent of the national average of $31,472. The employment distribution for these counties as a whole is very similar to that of the state, with 3.2 percent in farming, 12.3 percent in manufacturing, and 18.5 percent in government. As of March 2005, the labor force in the project area was 720,520; statewide, the labor force was 1,336,500. In the project area, 47,560 were unemployed, for an unemployment rate of 6.6 percent; statewide, 93,300 were unemployed, for an unemployment rate of 7.0 percent (Mississippi Department of Employment Security, 2005).

Both the project area and state unemployment rates were higher than the national rate of 5.4 percent.

County population in the project area ranges from 8,026 in Benton County to 250,800 in Hinds County (U.S. Census Bureau, 2000). Per capita personal income ranges from $16,219 in Choctaw County to $36,451 in Madison County. A few counties have more than 10 percent of their employment in farming, the highest being Carroll County, at 24.6 percent. Manufacturing accounts for 43.5 percent of employment in Pontotoc County, but at the other extreme, only 2.9 percent in Tunica County. Government employment accounts for only 5.3 percent in Tunica County, but 43.8 percent in Neshoba County.

Expected Impacts

Construction and installation activities related to this project would provide some relatively small, temporary increases in income and employment in these counties and other nearby counties. These jobs would be located in different areas as work progressed. However, given the size of the labor force in the project area and in surrounding counties (essentially the rest of the state plus the Memphis area), most jobs could be filled by residents of the general area where the work is located except perhaps for a few specialized tasks. Therefore, there likely would be no adverse impacts on community services, schools, housing, or other local services and facilities.

Once the project is completed, it would directly create a small number of additional jobs. In addition, the increased availability of high-speed internet access would provide opportunities for improved efficiencies in commercial and industrial operations and in government. Also, it could provide new opportunities that would not otherwise be feasible in the state. Many areas and communities are actively pursing widely available broadband access for a variety of uses, including education and medical purposes. (See, for example, City of Seattle; 2005, Bennett; 2003, and the Council of the City of New York, 2005). Such uses include remote provision of health services, connecting health facilities to specialty consultation services, and providing remote assessment and diagnostic services. It is also being planned for use in increasing the quality of education in both public and private schools at all levels, including higher education. In addition, plans include its use for things such as worker training, vocational education, career enhancement, and professional research. These increased capabilities would help the area and the state of Mississippi to achieve better quality of life and a higher level of competitiveness with the nation and with the rest of the world. In addition to improvement in quality of life, additional job openings would be created for residents of the state, along with an improved mix of jobs. These new jobs would tend to accrue over time, as part of a gradual expansion of the economy. Therefore, no significant adverse impacts to the social structure and stability of the area, to community services and schools, or to the economy would be likely.

Cumulative and Indirect Impacts

Due to the small impact of the installation of the fiber optic line and lack of potential significant impact on the environment with the adopted mitigation measures, TVA has concluded that the incremental effect of this project, when added to other past, present, and reasonably foreseeable future actions, would have insignificant cumulative impacts.

The availability of improved internet access in the region is expected to have indirect socioeconomic benefits by making the area more economically competitive. As noted above, the gradual expansion of the economy is not expected to have adverse impacts on community services, schools, housing, or other local services and facilities. New

businesses, residences, roads, and other utilities may be constructed, but it is not possible to foresee the types, amounts, or locations, so the indirect impacts of such construction on the environment cannot be estimated.

Commitments and Mitigation Measures

Planned avoidance of sensitive resources through use of directional boring, the avoidance of the identified wetlands near the project, and the use of routine BMPs such as those in Muncy, 1999, would help to ensure that any potential impacts are minor and insignificant. MEGAPOP would be required to ensure that its contractor adheres to these mitigation measures.

Preferred Alternative

TVA's preferred alternative is Alternative B: permitting a leg of its fiber optic network between Cordova, Tennessee and Philadelphia, Mississippi to be used to carry internet traffic and administering the $2 million ARC grant to install 40 miles of fiber optic line between Philadelphia and Meridian.

EA Preparers

Kelly Baxter	Endangered and Threatened species
Jason Bulluck (Arcadis)	Terrestrial and Aquatic Ecology, Wetlands, Endangered and Threatened Species
Stephanie Chance	Endangered and Threatened Species
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James Eblen	Socioeconomic Conditions
Bennett Graham	Cultural Resources
Hill Henry	Terrestrial Ecology
Marianne Jacobs	Cultural Resources
Roger Milstead	Floodplains
Denny Painter	Project Manager
Kim Pilarski	Wetlands
Ed Scott	Aquatic Ecology
Peter Scheffler	NEPA Project Management

Agencies and Others Consulted

The SHPO was consulted in compliance with Section 106 of the National Historic Preservation Act. The Mississippi Department of Transportation was contacted to obtain a

permit to construct utility lines along or across state highways. Local governments and planning and development districts were involved in the process of obtaining the ARC grant and the Mississippi Office of Budget and Fund Management, which houses the State Clearinghouse, was notified of the grant application. The Mississippi Department of Environmental Quality was consulted in obtaining heritage data.

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APPENDIX A – TENNESSEE VALLEY AUTHORITY ENVIRONMENTAL QUALITY PROTECTION SPECIFICATIONS FOR TRANSMISSION SUBSTATION OR COMMUNICATIONS CONSTRUCTION

1. General – Tennessee Valley Authority (TVA) and/or the assigned contractor and subcontractors shall plan, coordinate, and conduct his or her operations in a manner that protects the quality of the environment and complies with TVA's environmental expectations discussed in the preconstruction meeting (including clearing and grading or reclearing and removal or dismantling). This specification contains provisions that shall be considered in all TVA and contract construction, dismantling, or forensic operations. If the contractor and his or her subcontractors fail to operate within the intent of these requirements, TVA will direct changes to operating procedures. Continued violation will result in a work suspension until correction or remedial action is taken by the contractor. Penalties and contract termination will be used as appropriate. The costs of complying with the Environmental Quality Protection Specifications are incidental to the contract work, and no additional compensation will be allowed. At all site perimeters, structure, foundation, conduit, grounding, fence, drainage ways, etc., appropriate protective measures to prevent erosion or release of contaminants will be taken immediately upon the end of each step in a construction, dismantling, or forensic sequence, and those protective measures will be inspected and maintained throughout the construction and site stabilization and rehabilitation period.

2. Regulations - TVA and/or the assigned contractor and subcontractor(s) shall comply with all applicable federal, state, and local environmental and antipollution laws, regulations, and ordinances related to environmental protection and prevention, control, and abatement of all forms of pollution.

3. Use Areas - TVA and/or the assigned contractor and/or subcontractor(s) use areas include but are not limited to site office, shop, maintenance, parking, storage, staging, assembly areas, utility services, and access roads to the use areas. The construction contractor and subcontractor(s) shall submit plans and drawings for their location and development to the TVA engineer and project manager for approval. Secondary containment will be provided for fuel and petroleum product storage pursuant to 29CFR1910.106(D)(6)(iii)(OSHA).

4. Equipment - All major equipment and proposed methods of operation shall be subject to the approval of TVA. The use or operation of heavy equipment in areas outside the right-of-way, access routes, site, or structure, pole, or tower sites will not be permitted without permission of the TVA inspector or field engineer. Heavy equipment use on steep slopes (greater than 20 percent) and in wet areas will be held to the minimum necessary to construct the transmission or communication facility. Steps will be taken to limit ground disturbance caused by heavy equipment usage, and erosion and sediment controls will be instituted on disturbed areas in accordance with state requirements and Best Management Practices (BMPs).

   No subsurface ground-disturbing equipment or stump-removal equipment will be used by construction forces except on access roads or at the actual site, structure, pole, or tower sites, where only footing locations and controlled runoff diversions shall be created that disturb the soil. All other areas of ground cover or in-place stumps and roots shall remain in place. (Note: Tracked vehicles disturb surface layer of the ground

due to size and function.) Some disking of the right-of-way, access, and site(s) may occur for proper seedbed preparation.

Unless ponding previously occurred (i.e., existing low-lying areas), water should not be allowed to pond on the site or around structures except around foundation holes; the water must be directed away from the site in as dispersed a manner as possible. At tower or structure sites, some means of upslope interruption of potential overland flow and diversion around the footings should be provided as the first step in construction-site preparation. If leveling is necessary, it must be implemented by means that provide for continuous gentle, controlled, overland flow or percolation. A good grass cover, straw, gravel, or other protection of the surface must be maintained. Steps taken to prevent increases in the moisture content of the in-situ soils will be beneficial both during construction and over the service life of any anchor, foundation, or its structure.

5. Sanitation - A designated TVA or contractor and/or subcontractor(s) representative shall contract a sanitary contractor who will provide sanitary chemical toilets convenient to all principal points of operation for every working party. The facilities shall comply with applicable federal, state, or local health laws and regulations. They shall not be located closer than 100 feet to any stream or tributary or to any wetland. The facilities shall be required to have proper servicing and maintenance, and the waste disposal contractor shall verify in writing that the waste disposal will be in state-approved facilities. Employees shall be notified of sanitation regulations and shall be required to use the toilet facilities.

6. Refuse Disposal - Designated TVA and/or contractor and subcontractor(s) personnel shall be responsible for daily inspection, cleanup, and proper labeling, storage, and disposal of all refuse and debris produced by his or her operations and by his or her employees. Suitable refuse collecting facilities will be required. Only state-approved disposal areas shall be used. Disposal containers such as dumpsters or roll-off containers shall be obtained from a proper waste disposal contractor. Solid, special, construction/demolition, and hazardous wastes as well as scrap are part of the potential refuse generated and must be properly managed with emphasis on reuse, recycle, or possible give away, as appropriate, before they are handled as wastes. Records of the amounts generated shall be provided to the site's or project's designated environmental specialist. Contractor(s) and subcontractor(s) must meet similar provisions on any project contracted by TVA. Final debris, refuse, product, and material removal is the responsibility of the contractor unless special written agreement is made with the ultimate TVA owner of the site.

7. Landscape Preservation - TVA and its contractor(s) and subcontractor(s) shall exercise care to preserve the natural landscape in the entire construction, dismantling, or forensic area as well as use areas, in or outside the right-of-way, and on or adjacent to access roads. Construction operations shall be conducted to prevent any unnecessary destruction, scarring, or defacing of the natural vegetation and surroundings in the vicinity of the work.

8. Sensitive Areas Preservation - Certain areas on site and along the access and/or right-of-way may be designated by the specifications or the TVA engineer as environmentally sensitive. These areas include but are not limited to areas classified as erodible, geologically sensitive, scenic, historical and archaeological, fish and wildlife refuges, endangered species' habitat, water supply watersheds, and public recreational areas such as parks and monuments. Contractors, their subcontractor(s), and TVA

construction crews shall take all necessary actions to avoid adverse impacts to these sensitive areas and their adjacent buffer zones. These actions may include suspension of work or change of operations during periods of rain or heavy public use; hours may be restricted or concentrations of noisy equipment may have to be dispersed. If prehistoric or historic artifacts or features are encountered during clearing, grading, borrow, fill, construction, dismantling, or forensic operations, the operations shall immediately cease for at least 100 feet in each direction, and TVA's construction superintendent, project manager, or area environmental program administrator and TVA Cultural Resources Program shall be notified. The site shall be left as found until a significance determination is made. Work may continue elsewhere beyond the 100-foot perimeter.

9. Water Quality Control - TVA and contractor construction, dismantling, or forensic activities shall be performed by methods that will prevent entrance or accidental spillage of solid matter, contaminants, debris, and other objectionable pollutants and wastes into flowing caves, sinkholes, streams, dry watercourses, lakes, ponds, and underground water sources.

   The clearing contractor erected erosion and/or sedimentation control shall be maintained and (when TVA or contract construction personnel are unable) the construction crew(s) shall maintain BMPs such as silt fences on steep slopes and adjacent to any stream, wetland, or other water body. Additional BMPs may be required for areas of disturbance created by construction activities and at sequential steps of construction at the same location on site. BMPs will be inspected by the TVA field engineer or other designated TVA or contractor and/or subcontractor(s)personnel routinely and during periods of high runoff, and any necessary repairs will be made as soon as practicable. BMP inspections and any required sampling will be conducted in accordance with permit requirements. Records of all inspections and sampling results will be maintained on site, and copies of inspection forms and sampling results will be forwarded to the TVA project manager or supporting environmental specialist.

   Acceptable measures for disposal of waste oil from vehicles and equipment shall be followed. No waste oil shall be disposed of within the site, access, or right-of-way, on a related construction site or its access roads.

10. Turbidity and Blocking of Streams - Construction, dismantling, or forensic activities in or near Streamside Management Zones or other bodies of water shall be controlled to prevent the water turbidity from exceeding state or local water quality standards for that stream. **All conditions** of a general storm water permit, aquatic resource alteration permit or a site-specific permit **shall be met** including monitoring of turbidity in receiving streams and/or storm water discharges and implementation of appropriate erosion and sediment control measures.

    Appropriate drainage facilities for temporary construction, dismantling, or forensic activities interrupting natural site drainage shall be provided to avoid erosion. Watercourses shall not be blocked or diverted unless required by the specifications or the TVA engineer. Diversions shall be made in accordance with TVA's "A Guide for Environmental Protection and Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities."

    On rights-of-way, mechanized equipment shall not be operated in flowing or standing water bodies except when approved and, then, only to construct crossings or to perform

required construction under direct guidance of TVA. Construction of stream fords or other crossings will only be permitted at approved locations and to current TVA construction access road standards. Material shall not be deposited in watercourses, their adjacent wetlands or within stream bank areas where it could be washed away by high stream flows. Appropriate U.S. Army Corps of Engineers' and state permits shall be obtained.

Mechanized equipment shall not be operated in flowing or standing water on substation, switching station, or telecommunication sites.

Wastewater from construction, dismantling, or dewatering operations shall be controlled to prevent excessive erosion or turbidity in a stream, wetland, lake, pond or conveyed to a sinkhole. Any work or placing of equipment within a flowing or dry watercourse requires the prior approval of TVA.

11. Floodplain Evaluation - During the planning and design phase of the substation or communications facility, floodplain information should be obtained to avoid locating flood-damageable facilities in the 100-year floodplain. If the preferred site is located within a floodplain area, alternative sites must be evaluated and documentation prepared to support a determination of "no practicable alternative" to siting in the floodplain. In addition, steps taken to minimize adverse floodplain impacts should also be documented.

12. Clearing - No construction, dismantling, or forensic activities may clear additional site or right-of-way vegetation or disturb remaining retained vegetation, stumps, or regrowth at locations other than the structure, substation, or communication site or access thereto. TVA and the construction, dismantling, or forensic contractor(s) must provide appropriate erosion or sediment controls for areas they have disturbed after each disturbance that have previously been restabilized after clearing operations. Control measures shall be implemented as soon as practicable after disturbance in accordance with applicable federal, state, and/or local storm water regulations.

13. Restoration of Site - All construction, dismantling, or forensic-related disturbed areas with the exception of farmland under cultivation and any other areas as may be designated by TVA's specifications shall be stabilized in the following manner unless the property owner and TVA's engineer specify a different method:

    A. The subsoil shall be loosened to a minimum depth of 6 inches if possible and worked to remove unnatural ridges and depressions.

    B. If needed, appropriate soil amendments will be added.

    C. All disturbed areas will initially be seeded with a temporary ground cover such as winter wheat, rye, or millet, depending on the season. Perennials may also be planted during initial seeding if proper growing conditions exist. Final restoration and final seeding will be performed as line construction is completed. Final seeding will consist of permanent perennial grasses such as those outlined in TVA's "A Guide for Environmental Protection and Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities." Exceptions would include those areas designated as native grass planting areas. Initial and final restoration will be performed by the clearing contractor.

D. Rehabilitation species shall use species designated by federal guidance that are low–maintenance, native species appropriate for the site conditions that prevail at that location.

E. TVA holds the option, depending upon the time of year and weather condition, to delay or withdraw the requirement of seeding until more favorable planting conditions are certain. In the meantime, other stabilization techniques must be applied.

F. The site must be protected from species designated by the Federal Invasive Species Council and must not be the source of species that can be transported to other locations via equipment contaminated with viable materials; thus, the equipment must be inspected and any such species' material found must be removed and destroyed prior to transport to another location.

14. Air Quality Control - Construction, dismantling, and/or forensic crews shall take appropriate actions to minimize the amount of air pollution created by their operations. All operations must be conducted in a manner that avoids creating a nuisance and prevents damage to lands, crops, dwellings, or persons.

15. Burning - Before conducting any open burning operations, the contractor and subcontractor(s) shall obtain permits or provide notifications as required to state forestry offices and/or local fire departments. Burning operations must comply with the requirements of state and local air pollution control and fire authorities and will only be allowed in approved locations and during appropriate hours and weather conditions. If weather conditions such as wind direction or speed change rapidly, the contractor's burning operations may be temporarily stopped by the TVA field engineer. The debris for burning shall be piled and shall be kept as clean and as dry as possible, then burned in such a manner as to reduce smoke. No materials other than dry wood shall be open burned. The ash and debris shall be buried away from streams or other water sources and shall be in areas coordinated with the property owner on rights-of-way or project manager for TVA sites.

16. RENOVATION OR DEMOLITION DEBRIS MAY NOT BE BURNED.

17. Dust and Mud Control - Construction, dismantling, or forensic activities shall be conducted to minimize the creation of dust. This may require limitations as to types of equipment, allowable speeds, and routes utilized. Water, straw, wood chips, dust palliative, gravel, combinations of these, or similar control measures may be used subject to TVA's approval. On new construction sites and easements, the last 100 feet before an access road approaches a county road or highway shall be graveled to prevent transfer of mud onto the public road.

18. Vehicle Exhaust Emissions - TVA and/or the contractor(s) and subcontractor(s) shall maintain and operate equipment to limit vehicle exhaust emissions. Equipment and vehicles that show excessive emissions of exhaust gasses and particulates due to poor engine adjustments or other inefficient operating conditions shall not be operated until corrective repairs or adjustments are made.

19. Vehicle Servicing - Routine maintenance of personal vehicles will not be performed on the right-of-way or access route to the site. However, if emergency or "have to" situations arise, minimal/temporary maintenance to personal vehicles will occur in order

to mobilize the vehicle to an off-site maintenance shop. Heavy equipment will be serviced on the site except adjacent to or in designated sensitive areas. The Heavy Equipment Department within TVA or the construction, dismantling, or forensic contractor will properly maintain these vehicles with approved spill protection controls and countermeasures. If emergency maintenance in a sensitive or questionable area arises, the area environmental coordinator or construction environmental engineer will be consulted. All wastes and used oils will be properly recovered, handled, and disposed/recycled. Records of amounts generated shall be provided to TVA. Equipment shall not be temporarily stored in stream floodplains whether overnight or on weekends or holidays.

20. Smoke and Odors - TVA and/or the contractor(s) and subcontractor(s) shall properly store and handle combustible material that could create objectionable smoke, odors, or fumes. The contractor and subcontractor(s) shall not burn refuse such as trash, rags, tires, plastics, or other debris.

21. Noise Control - TVA and/or the contractor and subcontractor(s) shall take measures to avoid the creation of noise levels that are considered nuisances, safety, or health hazards. Critical areas including but not limited to residential areas, parks, public use areas, and some ranching operations will require special considerations. TVA's criteria for determining corrective measures shall be determined by comparing the noise level of the construction, dismantling, or forensic operation to the background noise levels. In addition, especially noisy equipment such as helicopters, pile drivers, air hammers, chippers, chain saws, or areas for machine shops, staging, assembly, or blasting may require corrective actions when required by TVA.

22. Noise Suppression - All internal combustion engines shall be properly equipped with mufflers as required by the Department of Labor's "Safety and Health Regulations for Construction." TVA may require spark arresters in addition to mufflers on some engines. Air compressors and other noisy equipment may require sound-reducing enclosures in some circumstances.

23. Damages - The movement of construction, dismantling, or forensic crews and equipment shall be conducted in a manner that causes as little intrusion and damage as possible to crops, orchards, woods, wetlands, and other property features and vegetation. The contractor and subcontractor(s) will be responsible for erosion damage caused by his or her actions and employees and, especially, for creating conditions that would threaten the stability of the right-of-way or site soil, the structures, or access to either. When property owners prefer the correction of ground cover condition or soil and subsoil problems themselves, the section of the project to be handled shall be documented with an implementation schedule and a property owner signature obtained.

24. Final Site Cleanup and Inspection - The contractor’s designated person shall ensure that all construction, dismantling, or forensic-related debris, products, materials, and wastes are properly handled, labeled as required, and removed from the site. Upon completion of those activities, that person and a TVA-designated person shall walk down the site and complete an approval inspection.

Revision July 2003

APPENDIX B – WETLAND DATA FORMS AND WETLAND BOUNDARIES

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TVA Natural Heritage Project Routine Wetland Determination Form

Project: Mega Pop	Investigator: Jason Bulluck	Normal Circumstances:	y	Sample ID:	JBW1
County: Lauderdale		Atypical Situation:		Station or Structure Number(s):	N/A
State: Mississippi	Date: May 24, 2005	Problem Area:		Cowardin Code:	PEM1

Vegetation

	Plant Species	Stratum	Indicator		Plant Species	Stratum	Indicator
1.	*Juncus effusus*	H	FACW+	9.			
2.	*Carex lurida*	H	OBL	10.			
3.	*Lonicera japonica*	V	FAC-	11.			
4.	*Carex vulpinoidea*	H	OBL	12.			
5.	*Cyperus virens*	H	FACW	13.			
6.	*Solidago spp.*	H	FAC	14.			
7.				15.			
8.				16.			

Percent of Dominant Species That are OBL, FACW, or FAC: 100%

Hydrology

Field Observations:

Depth of Surface Water:	0	(in.)
Depth to Free Water in Pit:	12	(in.)
Depth to Saturated Soil:	4	(in.)

Wetland Hydrology Indicators:

	Primary Indicators			Secondary Indicators
n	Inundated		Drift Lines	Y Oxidized Root Channels
y	Saturated in Upper 12 in.	Y	Water Marks	y Water Stained Leaves
	Sediment Deposits	y	Drainage Patterns	

Remarks:

Soils

Soil Unit:		Drainage class:		Listed hydric soil?	Yes		No	

Profile Description:

Depth (Inches)	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance	Texture
0-8”	10YR6/1	5YR3/4	many	Silty clay
		7.5YR5/8	Common	
8-12”	10YR5/1+	5YR4/6	common	Clay

Hydric Soil Indicators:

y	Gleyed or Low Chroma Colors		Histic Epipedon		Aquic Moisture Regime
	Sulfidic Odor		High Organic Cont. Surf. Layer Sandy Soils	y	Reducing Conditions
y	Concretions		Organic Streaking in Sandy Soils		Other (Explain in Remarks)

Remarks: F3 Hydric Soil Indicator met

Wetland Determination

Hydrophytic Vegetation Present?	Yes	Y	No		Is this Sampling Point Within a USACE Wetland?	Yes	Y	No	
Wetland Hydrology Present?	Yes	Y	No		Does area only meet USFWS wetland definition?	Yes	Y	No	
Hydric Soils Present?	Yes	y	No		Is wetland mapped on NWI?	Yes		No	n

Estimated size: 0.24 acres

Wetland Descriptors

Sample ID: JBW1	**Photo ID(s): "JBW1"**

Flagging Description:
C1: N32 23.251 W088 45.201 C2: N32 23.245 W088 45.202 C3: N32 23.257 W088 45.221
C4: N32 23.278 W088 45.234 C5: N32 23.286 W088 45.236

Drawing

Please Include: North Arrow, Project Centerline, Survey Corridor Boundaries, Length of Wetland Feature, Distances from Centerline, Photo Locations

See field form

Obvious Connections to Waters of the US/State?		Yes	n	No	Waterbody/Watershed: Chunky-Okatibbee (03170001)									
Primary Water Source (If other, note in comments)		Cap. Fringe		Overbanking		Sheet Flow	y	Groundwater	y	Precipitation		Other		
TVARAM SCORE:	N/A	**TVARAM CATEGORY:**	N/A											

Description of Wetland and Other Comments: (i.e. forest age class; habitat features; hydrologic regime; description of the wetland outside of or adjacent to ROW; erosion potential, existing disturbances, adjacent land use, wildlife observations, station numbers, lat-long, etc)

- fed by 2 culverts from under HWY 19, draining into AS 10. All wet area within an existing transmission line ROW. Some puddles present, but obviously frequently inundated.

TVA Natural Heritage Project Routine Wetland Determination Form

Project: Mega Pop	Investigator: Jason Bulluck	Normal Circumstances:	y	Sample ID:	JBW2
County: Lauderdale		Atypical Situation:		Station or Structure Number(s):	N/A
State: Mississippi	Date: May 24, 2005	Problem Area:		Cowardin Code:	PEM1

Vegetation

	Plant Species	Stratum	Indicator		Plant Species	Stratum	Indicator
1.	*Juncus effusus*	H	FACW+	9.	*Sapium sebifurum*	W	FAC
2.	*Andropogon virginica*	H	FAC-	10.	*Quercus nigra*	W	FAC
3.	*Carex reniformis*	H	FACW	11.			
4.	*Carex complanata*	H	FAC+	12.			
5.	*Quercus phellos*	S	FACW-	13.			
6.	*Salix nigra*	S	OBL	14.			
7.	*Acer rubrum*	S	FAC	15.			
8.	*Liquidambar syriciflua*	S	FAC+	16.			

Percent of Dominant Species That are OBL, FACW, or FAC: 90%

Hydrology

Field Observations:

Depth of Surface Water:	---	(in.)
Depth to Free Water in Pit:	>12	(in.)
Depth to Saturated Soil:	4	(in.)

Wetland Hydrology Indicators:

Primary Indicators				Secondary Indicators	
	Inundated		Drift Lines	Y	Oxidized Root Channels
y	Saturated in Upper 12 in.	Y	Water Marks	y	Water Stained Leaves
	Sediment Deposits	y	Drainage Patterns		

Remarks:

Soils

Soil Unit:		Drainage class:		Listed hydric soil?	Yes		No	

Profile Description:

Depth (Inches)	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance	Texture
0-4”	7.5YR5/2	5YR4/6	Common	Sandy clay loam
4-12”	10YR6/1	5YR5/8	many	Sandy clay loam

Hydric Soil Indicators:

y	Gleyed or Low Chroma Colors		Histic Epipedon		Aquic Moisture Regime
	Sulfidic Odor		High Organic Cont. Surf. Layer Sandy Soils	y	Reducing Conditions
	Concretions		Organic Streaking in Sandy Soils		Other (Explain in Remarks)

Remarks: F3 Hydric Soil Indicator met

Wetland Determination

Hydrophytic Vegetation Present?	Yes	Y	No		Is this Sampling Point Within a USACE Wetland?	Yes	Y	No	
Wetland Hydrology Present?	Yes	Y	No		Does area only meet USFWS wetland definition?	Yes	Y	No	
Hydric Soils Present?	Yes	y	No		Is wetland mapped on NWI?	Yes	y	No	

Estimated size: 0.29 acres

Wetland Descriptors

Sample ID: JBW2	**Photo ID(s): "JBW2"**

Flagging Description:
C1: N32 24.228 W088 46.030 C2: N32 24.235 W088 46.042 C3: N32 24.243 W088 46.052
C4: N32 24.256 W088 46.061 C5: N32 24.265 W088 46.048

Drawing

Please Include: North Arrow, Project Centerline, Survey Corridor Boundaries, Length of Wetland Feature, Distances from Centerline, Photo Locations

See field form

Obvious Connections to Waters of the US/State?		Yes	n	No	Waterbody/Watershed: Chunky-Okatibbee (03170001)								
Primary Water Source (If other, note in comments)		Cap. Fringe		Overbanking		Sheet Flow		Groundwater	y	Precipitation		Other	

TVARAM SCORE:	N/A	**TVARAM CATEGORY:**	N/A

Description of Wetland and Other Comments: (i.e. forest age class; habitat features; hydrologic regime; description of the wetland outside of or adjacent to ROW; erosion potential, existing disturbances, adjacent land use, wildlife observations, station numbers, lat-long, etc)

-early successional wetland mainly outside (east of) ROW but may slightly overlap the centerline

-whole open area may have once been wetland before AS17 was trenched

-this open area containing this wetland and AS 17 is approximately 0.1 mile long

TVA Natural Heritage Project Routine Wetland Determination Form

Project: Mega Pop	Investigator: Jason Bulluck	Normal Circumstances:	y	Sample ID:	JBW3
County: Lauderdale		Atypical Situation:		Station or Structure Number(s):	N/A
State: Mississippi	Date: May 25, 2005	Problem Area:		Cowardin Code:	PEM1

Vegetation

	Plant Species	Stratum	Indicator		Plant Species	Stratum	Indicator
1.	*Juncus effusus*	H	FACW+	9.	*Alnus serrulata*	S	FACW+
2.	*Carxe bullata*	H	OBL	10.	*Salix nigra*	S	OBL
3.	*Carex complanata*	H	FAC+	11.			
4.	*Juncus scirpoides*	H	FACW+	12.			
5.	*Juncus gymnocarpus*	H	OBL	13.			
6.	*Cladium mariscoides*	H	OBL	14.			
7.	*Lonicera japonica*	S	FAC-	15.			
8.	*Rosa multiflora*	S	UPL	16.			

Percent of Dominant Species That are OBL, FACW, or FAC: 80%

Hydrology

Field Observations:

Depth of Surface Water:	---	(in.)
Depth to Free Water in Pit:	---	(in.)
Depth to Saturated Soil:	0	(in.)

Wetland Hydrology Indicators:

	Primary Indicators			Secondary Indicators
	Inundated		Drift Lines	Y Oxidized Root Channels
y	Saturated in Upper 12 in.	Y	Water Marks	Water Stained Leaves
y	Sediment Deposits	y	Drainage Patterns	

Remarks:

Soils

Soil Unit:		Drainage class:		Listed hydric soil?	Yes		No	

Profile Description:

Depth (Inches)	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance	Texture
0-5”	10YR5/1	2.5YR4/8	Few	Sand
5-8”	10YR4/1	2.5YR4/8	Few	Clayey sand
8-12”	10YR6/1	5YR5/8	few	Sandy clay

Hydric Soil Indicators:

y	Gleyed or Low Chroma Colors		Histic Epipedon		Aquic Moisture Regime
	Sulfidic Odor		High Organic Cont. Surf. Layer Sandy Soils	y	Reducing Conditions
	Concretions		Organic Streaking in Sandy Soils		Other (Explain in Remarks)

Remarks: F3 Hydric Soil Indicator met

Wetland Determination

Hydrophytic Vegetation Present?	Yes	Y	No		Is this Sampling Point Within a USACE Wetland?	Yes	Y	No	
Wetland Hydrology Present?	Yes	Y	No		Does area only meet USFWS wetland definition?	Yes	Y	No	
Hydric Soils Present?	Yes	y	No		Is wetland mapped on NWI?	Yes	y	No	

Estimated size: 0.73 acres

Wetland Descriptors

Sample ID: JBW3	**Photo ID(s): "JBW3"**

Flagging Description:
C1: N32 24.949 W088 46.605 C2: N32 24.949 W088 46.614 C3: N32 24.944 W088 46.622
C4: N32 24.971 W088 46.646 C5: N32 24.971 W088 46.658 C6: N32 24.993 W088 46.652 C7: N32 24.999 W088 46.646

Drawing

Please Include: North Arrow, Project Centerline, Survey Corridor Boundaries, Length of Wetland Feature, Distances from Centerline, Photo Locations

See field form

Obvious Connections to Waters of the US/State?		Yes	n	No	Waterbody/Watershed: Chunky-Okatibbee (03170001)							
Primary Water Source (If other, note in comments)		Cap. Fringe		Overbanking	y	Sheet Flow		Groundwater	y	Precipitation		Other
TVARAM SCORE:	N/A	**TVARAM CATEGORY:**	N/A									

Description of Wetland and Other Comments: (i.e. forest age class; habitat features; hydrologic regime; description of the wetland outside of or adjacent to ROW; erosion potential, existing disturbances, adjacent land use, wildlife observations, station numbers, lat-long, etc)

-There has been some disturbance due to construction outside HWY 19 ROW, with some sedimentation impacts on the wetland within this project corridor. Also some drainage coming off parking lot to north and cleared area to south.

TVA Natural Heritage Project Routine Wetland Determination Form

Project: Mega Pop	Investigator: Jason Bulluck	Normal Circumstances:	y	Sample ID:	JBW4
County: Lauderdale		Atypical Situation:		Station or Structure Number(s):	N/A
State: Mississippi	Date: May 25, 2005	Problem Area:		Cowardin Code:	PSS1

Vegetation

	Plant Species	Stratum	Indicator		Plant Species	Stratum	Indicator
1.	*Juncus effusus*	H	FACW+	9.			
2.	*Cladium mariscoides*	H	OBL	10.			
3.	*Juncus gymnocarpus*	H	OBL	11.			
4.	*Typha latifolia*	H	OBL	12.			
5.	*Salix nigra*	H/S/W	OBL	13.			
6.	*Acer rubrum*	S	FAC	14.			
7.				15.			
8.				16.			

Percent of Dominant Species That are OBL, FACW, or FAC: 100%

Hydrology

Field Observations:

Depth of Surface Water:	---	(in.)
Depth to Free Water in Pit:	---	(in.)
Depth to Saturated Soil:	0	(in.)

Wetland Hydrology Indicators:

Primary Indicators				Secondary Indicators	
	Inundated		Drift Lines	Y	Oxidized Root Channels
y	Saturated in Upper 12 in.	Y	Water Marks	y	Water Stained Leaves
y	Sediment Deposits	y	Drainage Patterns		

Remarks:

Soils

Soil Unit:		Drainage class:		Listed hydric soil?	Yes		No	

Profile Description:

Depth (Inches)	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance	Texture
0-3”	7.5YR3/4	5YR4/6	few	Silty loam
3-8”	10YR4/4	2.5YR5/8	Few	Sandy clay
8-12”	10YR4/1	5YR5/8	few	Clayey sand

Hydric Soil Indicators:

y	Gleyed or Low Chroma Colors		Histic Epipedon		Aquic Moisture Regime
	Sulfidic Odor		High Organic Cont. Surf. Layer Sandy Soils	y	Reducing Conditions
	Concretions		Organic Streaking in Sandy Soils		Other (Explain in Remarks)

Remarks: F3 Hydric Soil Indicator met

Wetland Determination

Hydrophytic Vegetation Present?	Yes	Y	No		Is this Sampling Point Within a USACE Wetland?	Yes	Y	No	
Wetland Hydrology Present?	Yes	Y	No		Does area only meet USFWS wetland definition?	Yes	Y	No	
Hydric Soils Present?	Yes	y	No		Is wetland mapped on NWI?	Yes		No	N

Estimated size: 0.12 acres

Wetland Descriptors

Sample ID: JBW4	**Photo ID(s): "JBW4"**

Flagging Description:
C1: N32 28.003 W088 49.124 C2: N32 28.001 W088 49.131 C3: N32 27.999 W088 49.137
C4: N32 28.009 W088 49.149 C5: N32 28.013 W088 49.146 C6: N32 28.013 W088 49.138 C7: N32 28.005 W088 49.131

Drawing

Please Include: North Arrow, Project Centerline, Survey Corridor Boundaries, Length of Wetland Feature, Distances from Centerline, Photo Locations

See field form

Obvious Connections to Waters of the US/State?		Yes	n	No	Waterbody/Watershed: Chunky-Okatibbee (03170001)								
Primary Water Source (If other, note in comments)		Cap. Fringe		Overbanking	y	Sheet Flow		Groundwater	y	Precipitation		Other	
TVARAM SCORE:	N/A	**TVARAM CATEGORY:**	N/A										

Description of Wetland and Other Comments: (i.e. forest age class; habitat features; hydrologic regime; description of the wetland outside of or adjacent to ROW; erosion potential, existing disturbances, adjacent land use, wildlife observations, station numbers, lat-long, etc)

COMMENT MADE IN FIELD-0-8" soil is probably deposited from surrounding mowed upland road bank areas via surface flow and filling during road construction. This probably not wetland due to failure to meet hydric soil criteria, but delineated just in case.

POST FIELD COMMENT-When considering that the upper soil has resulted from fill and erosion related with HWY 19, the lower soil strata do display that F3 indicators for hydric soils may be met. Such situations may indicate an "atypical situation" and may be thought to warrant further soil and hydrological investigations. However, considering the small size of this wetland, it is quite realistic to just avoid impacts altogether. This may well be a remnant of a wetland that was intact and larger before the expansion of HWY 19 and the construction of the flanking embankment.

TVA Natural Heritage Project Routine Wetland Determination Form

Project: Mega Pop	Investigator: Jason Bulluck	Normal Circumstances:	y	Sample ID:	JBW5
County: Lauderdale		Atypical Situation:		Station or Structure Number(s):	N/A
State: Mississippi	Date: May 25, 2005	Problem Area:		Cowardin Code:	PSS1

Vegetation

	Plant Species	Stratum	Indicator		Plant Species	Stratum	Indicator
1.	*Juncus gymnocarpus*	H	OBL	9.	*Acer rubrum*	S	FAC
2.	*Mimulus ringens var. ringens*	H	OBL	10.	*Diaspora virginiana*	S	FAC
3.	*Juncus scirpoidea*	H	FACW+	11.			
4.	*Carex franki*	H	OBL	12.			
5.	*Juncus effuses*	H	FACW+	13.			
6.	*Baccharis halimifolia*	S	FAC	14.			
7.	*Liquidambar styriciflua*	S	FAC+	15.			
8.	*Cephalanthus occidentalis*	S	OBL	16.			

Percent of Dominant Species That are OBL, FACW, or FAC: 100%

Hydrology

Field Observations:

Depth of Surface Water:	0	(in.)
Depth to Free Water in Pit:	9	(in.)
Depth to Saturated Soil:	0	(in.)

Wetland Hydrology Indicators:

	Primary Indicators			Secondary Indicators
y	Inundated		Drift Lines	Y Oxidized Root Channels
y	Saturated in Upper 12 in.		Water Marks	y Water Stained Leaves
y	Sediment Deposits	y	Drainage Patterns	

Remarks:

Soils

Soil Unit:		Drainage class:		Listed hydric soil?	Yes		No	

Profile Description:

Depth (Inches)	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance	Texture
0-4”	10YR4/2	2.5YR4/8	Common	Silty clay
4-6”	10YR5/1	5YR5/8	Common	Silty clay loam
6-9”	10YR6/6	5YR4/6	Common	Sandy clay
9-12”	N4/5PB	2.5YR4/8 5YR5/8	Few few	Sandy clay

Hydric Soil Indicators:

y	Gleyed or Low Chroma Colors		Histic Epipedon		Aquic Moisture Regime
	Sulfidic Odor		High Organic Cont. Surf. Layer Sandy Soils	y	Reducing Conditions
	Concretions		Organic Streaking in Sandy Soils		Other (Explain in Remarks)

Remarks: F3 Hydric Soil Indicator met; F8 indicator met also

Wetland Determination

Hydrophytic Vegetation Present?	Yes	Y	No		Is this Sampling Point Within a USACE Wetland?	Yes	Y	No	
Wetland Hydrology Present?	Yes	Y	No		Does area only meet USFWS wetland definition?	Yes	Y	No	
Hydric Soils Present?	Yes	y	No		Is wetland mapped on NWI?	Yes		No	N

Estimated size: 0.25 acres

Wetland Descriptors

Sample ID: JBW5	**Photo ID(s): "JBW5"**

Flagging Description:
C1: N32 31.697 W088 53.815 C2: N32 31.698 W088 53.810 C3: N32 31.706 W088 53.805
C4: N32 31.726 W088 53.842 C5: N32 31.738 W088 53.836 C6: N32 31.715 W088 53.832 C7: N32 31.708 W088 53.829

Drawing

Please Include: North Arrow, Project Centerline, Survey Corridor Boundaries, Length of Wetland Feature, Distances from Centerline, Photo Locations

See field form

Obvious Connections to Waters of the US/State?		Yes	n	No	Waterbody/Watershed: Chunky-Okatibbee (03170001)									
Primary Water Source (If other, note in comments)	y	Cap. Fringe		Overbanking		Sheet Flow		Groundwater	y	Precipitation		Other		
TVARAM SCORE:	N/A	**TVARAM CATEGORY:**	N/A											

Description of Wetland and Other Comments: (i.e. forest age class; habitat features; hydrologic regime; description of the wetland outside of or adjacent to ROW; erosion potential, existing disturbances, adjacent land use, wildlife observations, station numbers, lat-long, etc)

-impacted from filling activities and mowing associated with HWY 19 ROW and underground cable box

-rained previous night, though this area still not as inundated as last week. This suggests that this area may well stay inundated nearly 100% of the time.

TVA Natural Heritage Project Routine Wetland Determination Form

Project: Mega Pop	Investigator: Jason Bulluck	Normal Circumstances:	y	Sample ID:	JBW6
County: Neshoba		Atypical Situation:		Station or Structure Number(s):	
State: Mississippi	Date: 06/01/05	Problem Area:		Cowardin Code:	PSS1

Vegetation

	Plant Species	Stratum	Indicator		Plant Species	Stratum	Indicator
1.	*Juncus effusus*	H	FACW+	9.			
2.	*Rubus sp.*	S		10.			
3.	*Lonicera japonica*	S	FAC-	11.			
4.	*Solidago sp.*	H		12.			
5.	*Carex complanata*	H	FAC+	13.			
6.	*Eleocharis microcarpa*	H	OBL	14.			
7.	*Juncus acuminatus*	H	OBL	15.			
8.	*L. styriciflua*	S	FAC+	16.			

Percent of Dominant Species That are OBL, FACW, or FAC: >/=63.5%

Hydrology

Field Observations:

Depth of Surface Water:	0	(in.)
Depth to Free Water in Pit:	0	(in.)
Depth to Saturated Soil:	0	(in.)

Wetland Hydrology Indicators:

Primary Indicators				Secondary Indicators	
Y	Inundated		Drift Lines	Y	Oxidized Root Channels
Y	Saturated in Upper 12 in.	Y	Water Marks	Y	Water Stained Leaves
Y	Sediment Deposits	Y	Drainage Patterns		

Remarks:

Soils

Soil Unit:		Drainage class:		Listed hydric soil?	Yes		No	

Profile Description:

Depth (Inches)	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance	Texture
0-3	2.5Y 5/4			Silty Clay Loam
3-6	7.5YR 5/4	5YR 5/8	Few	Clay
6-12	5YR 6/1	5YR 5/8	Many	Silty Clay

Hydric Soil Indicators:

Y	Gleyed or Low Chroma Colors		Histic Epipedon		Aquic Moisture Regime
	Sulfidic Odor		High Organic Cont. Surf. Layer Sandy Soils	Y	Reducing Conditions
	Concretions		Organic Streaking in Sandy Soils		Other (Explain in Remarks)

Remarks: F3 Hydric Soil Indicator met.

Wetland Determination

Hydrophytic Vegetation Present?	Yes	Y	No		Is this Sampling Point Within a USACE Wetland?	Yes	Y	No	
Wetland Hydrology Present?	Yes	Y	No		Does area only meet USFWS wetland definition?	Yes	Y	No	
Hydric Soils Present?	Yes	Y	No		Is wetland mapped on NWI?	Yes		No	N

Estimated size: 0.15 Acres.

Wetland Descriptors

Sample ID: JBW6	**Photo ID(s):** photo "JBW6"
Flagging Description: W6C1→ W6C5	

Drawing

Please Include: North Arrow, Project Centerline, Survey Corridor Boundaries, Length of Wetland Feature, Distances from Centerline, Photo Locations

See field form

Obvious Connections to Waters of the US/State?		Yes	N	No	Waterbody/Watershed: Chunky-Okatibbee (03170001)														
Primary Water Source (If other, note in comments)		Cap. Fringe		Overbanking		Sheet Flow	Y	Groundwater	Y	Precipitation		Other							
TVARAM SCORE: N/A		**TVARAM CATEGORY:**	N/A																

Description of Wetland and Other Comments: (i.e. forest age class; habitat features; hydrologic regime; description of the wetland outside of or adjacent to ROW; erosion potential, existing disturbances, adjacent land use, wildlife observations, station numbers, lat-long, etc)

--Within cow pasture just west of AS60 stream crossing.

--Crayfish burrows and cricket frogs.

C1: N32 45.365 W089 03.785
C2: N32 45.372 W089 03.784
C3: N32 45.366 W089 03.767
C4: N32 45.357 W089 03.746
C5: N32 45.355 W089 03.751

TVA Natural Heritage Project Routine Wetland Determination Form

Project: Mega Pop	Investigator: Jason Bulluck	Normal Circumstances:	Y	Sample ID:	JBW7
County: Neshoba		Atypical Situation:		Station or Structure Number(s):	
State: MS	Date: 06/02/05	Problem Area:		Cowardin Code:	PF01

Vegetation

	Plant Species	Stratum	Indicator		Plant Species	Stratum	Indicator
1.	*Quercus phellos*	S/T	FACW-	9.	*Nyssa sylvatica*	T	FAC
2.	*Acer rubrum*	S/T	FAC	10.	*Athyrium asplenioides*	H	FAC
3.	*Toxicodendron radicasi*	SV	FAC	11.	*Woodwardia areolata*	H	OBL
4.	*Smilax rotundifolia*	S	FAC	12.			
5.	*Quercus nigra*	T	FAC	13.			
6.	*Lonicera japonica*	S	FAC-	14.			
7.	*Carpinus cavoliniana*	S/T	FAC	15.			
8.	*Cornus foemina*	T	FACW-	16.			

Percent of Dominant Species That are OBL, FACW, or FAC: 91 %

Hydrology

Field Observations:

Depth of Surface Water:	0	(in.)
Depth to Free Water in Pit:	1	(in.)
Depth to Saturated Soil:	0	(in.)

Wetland Hydrology Indicators:

Primary Indicators				Secondary Indicators	
Y	Inundated	Y	Drift Lines	Y	Oxidized Root Channels
Y	Saturated in Upper 12 in.	Y	Water Marks	Y	Water Stained Leaves
Y	Sediment Deposits	Y	Drainage Patterns		

Remarks:

Soils

Soil Unit:		Drainage class:		Listed hydric soil?	Yes		No	

Profile Description:

Depth (Inches)	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance	Texture
0 – 3”	10YR 5/2			Sitly Clay
3 – 5”	7.5YR 5/2	10YR 5/8	Common	Silty Clay
5 – 10”	10YR 6/1	10YR 5/8	Many	Silty Clay
10 – 14”	10YR4/2	2.5YR 3/6	Common	Silty Clay

Hydric Soil Indicators: F3 Hydric Soil Indicator met

Y	Gleyed or Low Chroma Colors		Histic Epipedon		Aquic Moisture Regime
	Sulfidic Odor		High Organic Cont. Surf. Layer Sandy Soils	Y	Reducing Conditions
Y	Concretions		Organic Streaking in Sandy Soils		Other (Explain in Remarks)

Remarks:

Wetland Determination

Hydrophytic Vegetation Present?	Yes	Y	No		Is this Sampling Point Within a USACE Wetland?	Yes	Y	No	
Wetland Hydrology Present?	Yes	Y	No		Does area only meet USFWS wetland definition?	Yes	Y	No	
Hydric Soils Present?	Yes	Y	No		Is wetland mapped on NWI?	Yes		No	Y

Estimated size: 0.22

Wetland Descriptors

Sample ID: JBW7	**Photo ID(s):** photo "JBW7"

Flagging Description: C1: N32 43.560 W088 59.308 C2: N32 43.568 W088.59.297 C3: N32 43.563 W088 59.249 C4: N32 43.551 W088 59.263

Drawing

Please Include: North Arrow, Project Centerline, Survey Corridor Boundaries, Length of Wetland Feature, Distances from Centerline, Photo Locations

See field form

Obvious Connections to Waters of the US/State?		Yes	N	No	Waterbody/Watershed: Upper Pearl (0318000)									
Primary Water Source (If other, note in comments)		Cap. Fringe		Overbanking		Sheet Flow	Y	Groundwater	Y	Precipitation		Other		
TVARAM SCORE:	Not conducted	**TVARAM CATEGORY:**	TVA RAM Not conducted.											

Description of Wetland and Other Comments: (i.e. forest age class; habitat features; hydrologic regime; description of the wetland outside of or adjacent to ROW; erosion potential, existing disturbances, adjacent land use, wildlife observations, station numbers, lat-long, etc)

-Fed by 2 WWC that drain from under SR 486
-Open understory (Few herbs); wetland occurs at bases of two slopes placed in loblolly, where a low area is persistently flooded by WWC and precipitation, and where groundwater appears to be very near, if not at, the surface
-the wetland is hardwood dominated though completely surrounded by loblollies

TVA Natural Heritage Project Routine Wetland Determination Form

Project: Mega Pop	Investigator: Jason Bullluck	Normal Circumstances:	Y	Sample ID:	JBW8
County: Neshoba		Atypical Situation:		Station or Structure Number(s):	
State: MS	Date: 06/02/05	Problem Area:		Cowardin Code:	PF01

Vegetation

	Plant Species	Stratum	Indicator		Plant Species	Stratum	Indicator
1.	*Nyssa sylvatica*	S/T	FAC	9.	*Carpinus caroliniana*	S/T	FACW-
2.	*Acer rubrum*	S/T	FAC	10.			
3.	*Liquidambar styriciflua*	S/T	FAC+	11.			
4.	*Smilax rotundifolia*	S	FAC	12.			
5.	*Ligustrum sinense*	S	FAC	13.			
6.	*Woodwardia aerolata*	H	OBL	14.			
7.	*Microstegium vimineum*	H	FAC+	15.			
8.	*Liriodendron tulipifera*	T	FAC	16.			

Percent of Dominant Species That are OBL, FACW, or FAC: 100%

Hydrology

Field Observations:

Depth of Surface Water: 0 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators				Secondary Indicators	
Y	Inundated	Y	Drift Lines	Y	Oxidized Root Channels
Y	Saturated in Upper 12 in.	Y	Water Marks	Y	Water Stained Leaves
Y	Sediment Deposits	Y	Drainage Patterns		

Remarks:

Soils

Soil Unit:		Drainage class:		Listed hydric soil?	Yes		No	

Profile Description:

Depth (Inches)	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance	Texture
0 – 4”	10YR 4/2	5YR 5/8	Few	Silty Clay
4 – 12”	7.5YR 6/2	5YR5/8	Many	Silty Clay

Hydric Soil Indicators:

y	Gleyed or Low Chroma Colors		Histic Epipedon		Aquic Moisture Regime
y	Sulfidic Odor		High Organic Cont. Surf. Layer Sandy Soils	y	Reducing Conditions
	Concretions		Organic Streaking in Sandy Soils		Other (Explain in Remarks)

Remarks: F3 Hydric Soil Indicator met; A4 Indicator met as well.

Wetland Determination

Hydrophytic Vegetation Present?	Yes	Y	No		Is this Sampling Point Within a USACE Wetland?	Yes	Y	No	
Wetland Hydrology Present?	Yes	Y	No		Does area only meet USFWS wetland definition?	Yes	Y	No	
Hydric Soils Present?	Yes	Y	No		Is wetland mapped on NWI?	Yes		No	N

Estimated size: O.14

Wetland Descriptors

Sample ID: JBW8	**Photo ID(s):** Photo "JBW8"

Flagging Description: C1: N32 43.340 W088 58.451 C2: N32 43.348 W088 58.456 C3: N32 43.348 W088 58.435 C4: N32 43.347 W088 58.422

Drawing

Please Include: North Arrow, Project Centerline, Survey Corridor Boundaries, Length of Wetland Feature, Distances from Centerline, Photo Locations

See field form

Obvious Connections to Waters of the US/State?		Yes	N	No	Waterbody/Watershed: Upper Pearl (03180001)							
Primary Water Source (If other, note in comments)		Cap. Fringe		Overbanking		Sheet Flow		Groundwater		Precipitation		Other
TVARAM SCORE:	Not conducted	**TVARAM CATEGORY:**	Not conducted.									

Description of Wetland and Other Comments: (i.e. forest age class; habitat features; hydrologic regime; description of the wetland outside of or adjacent to ROW; erosion potential, existing disturbances, adjacent land use, wildlife observations, station numbers, lat-long, etc)

--Wetland fed by road and residential pond drainage from opposite side of SR 486 that is converted under SR 486.

--Inundated from recent rains to high level.

Appendix B. Wetlands Boundaries Along Proposed Route

Wetland #	Type	Estimated Acreage	ROW	Boundary Description Flag	Coordinates	Field Sheet
JBW1	PEM1	0.24	HWY 19	C1	N32 23.251 W88 45.201	H11
				C2	N32 23.245 W88 45.202	
				C3	N32 23.257 W88 45.221	
				C4	N32 23.278 W88 45.234	
				C5	N32 23.286 W88 45.236	
JBW2	PEM1	0.29	HWY 19	C1	N32 24.228 W88 46.030	H11
				C2	N32 24.235 W88 46.042	
				C3	N32 24.243 W88 46.052	
				C4	N32 24.256 W88 46.061	
				C5	N32 24.265 W88 46.048	
JBW3	PEM1	0.73	HWY 19	C1	N32 24.949 W88 46.605	H11
				C2	N32 24.949 W88 46.614	
				C3	N32 24.944 W88 46.622	
				C4	N32 24.971 W88 46.646	
				C5	N32 24.987 W88 46.658	
				C6	N32 24.993 W88 46.652	
				C7	N32 24.999 W88 46.646	
JBW4	PSS1	0.12	HWY 19	C1	N32 28.003 W88 49.124	F10
				C2	N32 28.001 W88 49.131	
				C3	N32 27.999 W88 49.137	
				C4	N32 28.009 W88 49.149	
				C5	N32 28.013 W88 49.146	
				C6	N32 28.013 W88 49.138	
				C7	N32 28.005 W88 49.131	
JBW5	PSS1	0.25	HWY 19	C1	N32 31.697 W88 53.815	E08
				C2	N32 31.698 W88 53.810	
				C3	N32 31.706 W88 53.805	
				C4	N32 31.726 W88 53.842	
				C5	N32 31.738 W88 53.836	
				C6	N32 31.715 W88 53.832	
				C7	N32 31.708 W88 53.829	
JBW6	PSS1	0.15	SR 486	C1	N32 45.365 W89 03.785	A05
				C2	N32 45.372 W89 03.784	
				C3	N32 45.366 W89 03.767	
				C4	N32 45.357 W89 03.746	
				C5	N32 45.355 W89 03.751	
JBW7	PFO1	0.22	SR 486	C1	N32 43.560 W88 59.304	A06
				C2	N32 43.568 W88 59.297	
				C3	N32 43.563 W88 59.249	
				C4	N32 43.551 W88 59.263	
JBW8	PFO1	0.14	SR 486	C1	N32 43.340 W88 58.451	A06
				C2	N32 43.348 W88 58.456	
				C3	N32 43.348 W88 58.435	
				C4	N32 43.347 W88 58.422	

ROW = Right-of-Way

Note: GPS points are believed internally consistent for each wetland as used to calculate acreage but may inaccurately locate wetland with respect to fiber optic line. In GIS database used to generate Figure 2 and Figure 3 some wetlands have been hand placed to fit more closely the location marked on the field sheets.

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APPENDIX C – SHPO CONCURRENCE LETTER

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June 6, 2005

Mr. J. Bennett Graham
Tennessee Valley Authority
400 West Summit Hill Drive
Knoxville, Tennessee 37902-1401

Dear Mr. Graham:

RE: Proposed installation of about 40 miles of fiber optic cable for an internet backbone from Philadephia to Meridian, Lowndes, Neshoba and Newton Counties

We have reviewed your June 1, 2005, cultural resources assessment request for the above referenced project proposal in accordance with our responsibilities outlined in 36 CFR 800.4 and 800.5 regarding the identification of historic properties and assessment of any potential adverse effects. It is our determination that no properties listed in or eligible for listing in the National Register of Historic Places will be affected. Therefore, we have no reservations with the proposal.

In addition, we are not aware of any potential of this undertaking to affect Indian cultural or religious sites. However, if you require confirmation of this, the tribal entities will have to be contacted directly.

Should there be additional work in connection with the project, or any changes in the scope of work, please let us know in order that we may provide you with appropriate comments in compliance with the above referenced regulations. There remains a very remote possibility that unrecorded cultural resources may be encountered during construction. Should this occur, we would appreciate your contacting us immediately so that we may take appropriate steps under 36 CFR 800, part 13, regarding our response within forty-eight hours. If we can be of further assistance, please do not hesitate to contact this office.

Sincerely,

H. T. Holmes
State Historic Preservation Officer
Thomas H. Waggener
By: Thomas H. Waggener
Review and Compliance Officer

cc: Clearinghouse for Federal Programs