USACE Project Number: SAS-2010-5678
HA Project Number: HWYCONST.2010

Higginbotham and Associates, Inc.

January 1, 2011

US Army Corps of Engineers
Savannah District, Piedmont Branch
1590 Adamson Parkway, Suite 200
Morrow, Georgia 30260-1777

Attention: Mr. Edward B. Johnson, Chief
Piedmont Branch

Subject: **Request for Regional General Permit No. 001 (Roads and Bridges)**
Construction of the State Route 1 Bypass, in Taylor County, Georgia

To Whom It May Concern:

On behalf of our client, Taylor County, Higginbotham and Associates, Inc., has enclosed a complete Pre-Construction Notification Form, requesting Department of the Army authorization to impact a total of 942 linear feet of perennial streams, 12 linear feet of intermittent streams, 258 linear feet of ephemeral streams, and 1.3-acre of wetland areas for the construction of the proposed 4-mile State Route 1 Bypass. This project would be located west of the City of Butler, Taylor County, Georgia.

If you need have any questions regarding this request or need any additional information to complete your review of this proposed project, please contact our office at your earliest convenience.

Sincerely,

Michael C. Higginbotham

Michael C. Higginbotham, President
Higginbotham & Associates, Inc.
(404) 555-1234 (telephone)
(404) 555-1235 (fax)
admin@HigginbothamAssociates.com

cc: Mr. John Smith – Taylor County Roads

Enclosures:
1) Pre-Construction Notification Form
2) Supporting Information
3) Mitigation SOP Worksheets
4) Threatened and Endangered Aquatic Species Survey
5) Cultural Resources Report
6) Jurisdictional Determination Request

Figures:
Figure 1: Project Location Map
Figure 2(a-f): NRCS County Soils Surveys
Figure 3(a-d): FEMA Flood Maps
Figure 4: USGS 7.5' Topographic Map
Figure 5: National Wetland Inventory Map
Figure 6 (a-c): Waters of the US Maps
Figures 7-16: Plan-View Survey of Project Corridor

Culverts:
Figures 1-7: Arch-Span Culvert Design
Figure 8: Stream Culvert Detail

US ARMY CORPS OF ENGINEERS, SAVANNAH DISTRICT
REGIONAL PERMIT 1
PRE-CONSTRUCTION NOTIFICATION (PCN) FORM

APPLICANT/OWNER Taylor County DOT, Attn: Mr. John Smith **Date** January 1, 2011

Phone(hm/bus) (404) 456-7890 **FAX** (404) 586-7891 **E-Mail** admin@taylor.com

Address 1000 Main St. **City** Butler **State** GA **Zip Code** 31555

AGENT/CONSULTANT Higginbotham & Assoc., Inc., Attn: Michael C. Higginbotham

Phone(hm/bus) (478) 555-1234 **FAX** (478) 555-1235 **E-Mail** admin@higginbothamassociates.com

Address 555 MLK Blvd., Suite 1000 **City** Macon **State** GA **Zip Code** 31204

PROJECT LOCATION/ADDRESS Begins on Hilltop Road and continues north to the intersection of Manor Road.

City Butler **County** Taylor **Subdivision** N/A **Lot** N/A

Latitude 33.461111° N **Longitude** -84.508889° W **Hydrologic Map Cataloging Unit** 03130005

Nearest Named Stream, River or Other Waterbody Beaver Creek

PROJECT DESCRIPTION The project would require impacts to (a total of) 942 linear feet of perennial stream channels, 12 linear feet of intermittent stream channels, 258 linear feet of ephemeral stream channels, and 1.3 acres of jurisdictional wetland areas for the construction of a 4-mile, two-lane roadway. The project's environmental setting is primarily rural and agricultural landscapes. The proposed typical section of roadway would consist of a two-lane undivided highway, extending outward 750 feet from major intersections. The typical total right-of-way width for the roadway would be 100 feet. The road corridor would utilize portions of existing roadways as well as portions of new road alignment.

PROJECT AREA AND IMPACT INFORMATION

	PROJECT AREA		IMPACTS TO US WATERS	
	ACRES	LINEAR FEET	ACRES	LINEAR FEET
TOTAL PROJECT AREA	55.31	N/A	N/A	N/A
UPLAND	53.52	N/A	N/A	N/A
WETLAND	1.296	N/A	1.296	N/A
OPEN WATER	0	N/A	0	N/A
PERENNIAL STREAM	0.344	1,343	0.144	942
INTERMITTENT STREAM	0.0008	12	0.0008	12
EPHEMERAL STREAM	0.015	258	0.015	258
MAN-MADE DITCHES	0	0	0	0

WETLAND/STREAM IMPACT AVOIDANCE/MINIMIZATION (RC B.3)
Due to their nature, linear impacts often intersect and cross wetlands and streams. Every effort was made to avoid streams and wetlands. Multiple alignments were studied and the one with the least environmentally damaging impacts to waters of the US was chosen. Once the alignment with the lowest overall impacts was selected, further minimization efforts were made through the design phase, including the use of existing culverts, bottomless culverts, and clear span bridges.

WATER QUALITY MANAGEMENT PLAN STATEMENT (RC B.6) **The proposed erosion and runoff control measures are in compliance with the Taylor County Sediment Control and Flood Protection Regulations.**

FLOODPLAIN MANAGEMENT STATEMENT (RC B.7) **The proposed erosion and runoff control measures are in compliance with the Taylor County Sediment Control and Flood Protection Regulations.**

MAPS, DRAWINGS AND OTHER SUPPLEMENTAL INFORMATION. For questions 1 thru 13, YES answers must include information with this PCN necessary to adequately comply with the referenced Regional Condition (RC), or to explain/address the question. For questions 14 and 15, no information is required.

1. Is a Georgia Revocable License required for the project? (RC A.5 and B.8) Yes _____ No __X__
(NOTE: If the project is located in State of Georgia regulated tidal waters: (1) a copy of the Georgia Revocable License Request must be attached to this PCN; and (2) a copy of the complete PCN must be submitted to the Georgia Department of Natural Resources, Coastal Resources Division.)

2. Is a Georgia Stream Buffer Variance required for the project? (RC B.9) Yes _____ No __X__

3. Are federally protected species present on the project area? (RC B.4) Yes _____ No __X__

4. Are cultural resources located on or near the project area? (RC B.5) Yes __X__ No _____

5. Is compensatory mitigation required? (RC D) Yes __X__ No _____

6. Is the project area located in a 303(D) listed stream? (RC B.8) Yes _____ No __X__

7. Is the project area located in a trout stream? (RC B.9) Yes _____ No __X__

8. Are culverts proposed in streams and/or wetlands? (RC B.13) Yes __X__ No _____

9. Any in-stream/wetland storm water management? (RC B.13, C.1 and E) Yes _____ No __X__

10. Will the project be phased (additional wetland/stream impacts in the future)? Yes _____ No __X__

11. Have authorized wetland/stream impacts occurred in the project area? Yes _____ No __X__

12. Have unauthorized wetland/stream impacts occurred in the project area? Yes _____ No __X__

13. Is a request for waiver of the 300-foot stream impact limit included? Yes _____ No __X__

14. Is the project area located within 5 miles of an airport? Yes __X__ No _____

15. Is the project area in a USEPA Priority Watershed? Yes _____ No __X__
(www.epa.gov/region4/water/watersheds/priority.htm#FL)

IMPORTANT NOTES:
1. Refer to Savannah District 2007 Nationwide Permit Regional Conditions (RCs) for assistance with completing this form. Section "B" provides a complete list of all information that must be submitted as an attachment to this PCN. This document can be viewed at http://www.sas.usace.army.mil/regulatory/permits.html.
2. All maps and drawings that are attached to this PCN must be submitted on 8 ½ X 11-inch paper. Supplemental maps and drawings larger than 8 ½ X 11 may also be submitted for clarity.

State Route 1 (Road Construction) - Supporting Information:

Background

The 4-mile construction of the State Route 1 Bypass would begin on Hilltop Road and continue north to the intersection/junction of Manor Road. The project's environmental setting is comprised of primarily rural and agricultural landscapes. The proposed typical section would consist of a two-lane undivided highway, extending outward 750 feet from major intersections. The typical total right-of-way width for the roadway would be 100 feet. A 200-foot study area (100 feet on either side of the proposed centerline) was surveyed throughout the project for natural resources. The road corridor would utilize portions of existing roadways as well as portions of new road alignment. The start and end coordinates for this road corridor are the following:

Start coordinates: latitude 33.461111° north; longitude -84.508889° west
End coordinates: latitude 33.523611° north; longitude -84.503056° west

The site is mapped by the US Department of Agriculture, Natural Resources Conservation Service as containing well drained Cecil sandy loam soils, moderate-to-excessively drained Ashlar sandy loam complex soils, and well drained Pacolet sandy loam soils. The subject site is located within the Flint River Watershed (Hydrologic Unit Code No. 03130005). The United States Fish and Wildlife Service (USFWS) Athens, Georgia Ecological Field Office website, the Georgia Department of Natural Resources (Georgia DNR) Natural Heritage Program species occurrence website, the Natural Resources Conservation Service (NRCS) County soil survey, and the US Geologic Survey (USGS) 7.5' topographic quadrangles were reviewed for baseline information. Using this supporting data, information on vegetation cover/land use, the location of jurisdictional waters of the United States, protected species and other ecological issues that may be of concern was collected by Higginbotham and Associates (HA) personnel and prepared for this report. An on-site field assessment of waters of the United States was conducted during November 2010.

The preferred project site is located approximately 0.3-mile from the Tarmac Municipal Airport. However, due to the proposed project reducing acreages of waters of the US, there is no expectation that the project would increase wildlife strikes or any sort of a wildlife attractant hazard. The applicant will coordinate with the Federal Aviation Administration and provide the USACE with a copy of their final correspondence.

Sparrow National Wildlife Refuge is the closest refuge and is located approximately 5.5 miles southeast of the proposed project. Due to the distance from proposed project to the nearest wildlife refuge, no effect is expected to any refuges. Also, no federal projects are located on or near the proposed project.

This notification requests authorization to construct a 4-mile, two lane roadway and supporting infrastructure through the use of Regional Permit No. 01 (RP 01). The project would require impacts to perennial, intermittent and ephemeral stream channels, and jurisdictional wetland areas for the construction of this roadway. The following sections document project compliance with the US Army Corps of Engineers (USACE) RP General Conditions, as well as the Special Conditions for this RP 01.

General Conditions:

1. That all activities identified and authorized herein shall be consistent with the terms and conditions of this permit; and that any activities not specifically identified and authorized herein shall constitute a violation of the terms and conditions of this permit which may result in the modification, suspension, or revocation of this permit, in whole or in part, as set forth more specifically in General Conditions "6" or "7" hereto, and in the institution of such legal proceedings as the United States Government may consider appropriate, whether or not this permit has been previously modified, suspended, or revoked in whole or in part. **The road corridor would be constructed within the terms and conditions of this RP 01.**

2. Endangered Species.

(a.) No activity is authorized under this RP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. Non-federal permittees shall notify the Savannah District Engineer (DE) if any listed species or designated critical habitat might be affected or is in the vicinity of the project, Or is located in the designated critical habitat, and shall not begin work on the activity until notified by the DE that the requirements of the Endangered Species Act have been satisfied and that the activity is authorized. For activities that may affect Federally-listed endangered or threatened species or designated critical habitat, the notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. As a result of formal or informal consultation with the USFWS or National Marine Fisheries Service (NMFS), the DE may add species-specific regional endangered species conditions to this RP. **Refer to the following statement.**

(b.) Authorization of an activity by this RP does not authorize the "take" of a threatened or endangered species as defined under the Federal ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the USFWS or the NMFS, both lethal and non-lethal "takes" of protected species are in violation of the Endangered Species Act. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the USFWS and NMFS on their web pages at http://www.fws.gov/athens/endangered/counties_endangered.html and http://sero.nmfs.noaa.gov/pr/pr.htm, respectively. **An aquatic species survey has been performed by the Blue Heron Group, a local firm which specializes in the review of aquatic and terrestrial species habitat. This survey has been performed to determine if any state or federally listed (protected) fish or mussel species occur within the vicinity of the streams being crossed by the proposed corridor. The USFWS *Endangered Species in Georgia* database (http://www.fws.gov/athens/endangered/counties_endangered.html) and the Georgia Natural Heritage Program's (GNHP) *Element Occurrence Records* (http://www.georgiawildlife.org/node/1379) were reviewed for protected species habitat that may exist within the project corridor. Additional information on protected species was also compiled from several publications and resources, including *Protected Species Inventory and Identification in the Alabama-Coosa-Tallapoosa and Apalachicola-Chattahoochee-Flint River Basins. Volume 1: Summery Report, Appendices A-C* (Ziewitz et al., 1997), *Unionid Mollusks of the Apalachicola Basin in Alabama, Florida and Georgia* (Brim Box and Williams, 2000), and *A Field Guide to Freshwater Fishes of North America: North of Mexico* (Page and Burr, 1991). As a result of this survey, the Blue Heron Group reports that no federally protected fish or mussel species were observed during the aquatic species survey and suitable habitat for federally protected species generally was absent from the proposed project corridor. A copy of this survey documenting the findings of this investigation has been provided with this submittal.**

3. Use of this RP is prohibited in tidal waters. **The proposed project would not occur within the coastal 11 counties in the State of Georgia; therefore, the project would not result in any fill activities within tidal waters.**

4. That the permittee agrees to make every reasonable effort to execute the construction or operation of the work authorized herein in a manner to minimize any adverse impact on fish, wildlife, and natural environmental values. **The County has avoided larger volumes of wetland areas and wider stream channels based on their final plan design of this road corridor. Minimization efforts occurred through the planned development of this roadway along the narrowest portion of stream channels found along the project site. In addition, portions of existing roadways with culverted crossings would be utilized for the construction of this roadway and bridging efforts through the use of arch-span culverts would be installed to further minimize impacts to waters of the US.**

5. That the permittee agrees to execute the work authorized herein in a manner to minimize any degradation of water quality. **The Georgia DNR, Environmental Protection Division has previously certified compliance of RP 01 with Section 401 of the Clean Water Act. Therefore, the proposed project would not require individual Section 401 Water Quality Certification.**

6. That the permittee shall allow the DE or his authorized representative(s) or designee(s) to make periodic inspections at any time deemed necessary in order to assure that the activity being performed under authority of this RP is in accordance with the terms and conditions prescribed herein. **The applicant willingly authorizes the USACE to perform any inspection(s) of the site, whenever necessary. Taylor County Department of Transportation respectfully requests that they are contacted when the USACE shall perform an inspection of the proposed State Route 1 corridor.**

7. That this RP may be summarily suspended, in whole or in part, upon a finding by the DE that immediate suspension of the activity authorized herein would be in the general public interest. Such suspension shall be effective upon receipt by a permittee of a written notice thereof which shall indicate (1) the extent of the suspension, (2) the reasons for this action, and (3) any corrective or preventative measures to be taken by a permittee which are deemed necessary by the DE to abate imminent hazards to the general public interest. A permittee shall take immediate action to comply with the provisions of this notice. Within 10 days following receipt of this notice of suspension the permittee may request a hearing in order to present information relevant to a decision as to whether his permit should be reinstated, modified, or revoked. If a hearing is requested, it shall be conducted pursuant to procedures prescribed by the Chief of Engineers. After completion of the hearing, or within a reasonable time after issuance of the suspension notice to the permittee, if no hearing is requested, the permit will either be reinstated, modified or revoked. **Our client has stated that they would take immediate action to resolve any issues and/or comply with the provisions of any notices received from the USACE.**

8. That this permit may be either modified, suspended, or revoked in whole or in part if the Secretary of the Army or his authorized representative determines that there has been a violation of any of the terms or conditions of this permit or that such action would otherwise be in the public interest. Any such modification, suspension, or revocation shall become effective 30 days after receipt of written notice of such action which shall specify the facts or conduct warranting same unless: (1) within the 30-day period a permittee is able to satisfactorily demonstrate that: (a) the alleged violation of the terms and conditions of this permit did not, in fact, occur; or (b) the alleged violation was accidental and the permittee has been operating in compliance with the terms and conditions of the permit and is able to provide satisfactory assurance that future operations shall be in full compliance with the terms and conditions of this permit; or (2) within the aforesaid 30-day period, a permittee requests that a public hearing be held to present oral and written evidence concerning the proposed modification, suspension, or

revocation. The conduct of this hearing and the procedures for making a final decision either to modify, suspend, or revoke this permit in whole or in part, shall be pursuant to procedures prescribed by the Chief of Engineers. **Taylor County Department of Transportation has stated that they would take immediate action to resolve any issues and/or comply with the provisions of any notices received from the USACE.**

9. That if and when the permittee desires to abandon the activity authorized herein, unless such abandonment is part of a transfer procedure by which the permittee is transferring his interests herein to a third party, he must restore the area to a condition satisfactory to the DE. **In the instance that the property would be abandoned, Taylor County would coordinate with the USACE to perform satisfactory restoration of all areas impacted throughout the project corridor. Upon our acquisition of the land for proposed development of this roadway, the likelihood of a land transfer to new ownership is extremely minimal.**

10. That there shall be no unreasonable interference with navigation by the existence or use of the activity authorized herein. **The project corridor does not contain navigable waters, as defined in 33 CFR 329.4; therefore, the proposed corridor would not result in any effects on navigation.**

11. No activity which may affect historic properties listed, or eligible for listing, in the National Register of Historic Places (NRHP) is authorized, until the DE has complied with the provisions of 33 CFR Part 325, Appendix C. The prospective permittee must notify the DE if the authorized activity may affect any historic properties listed, determined to be eligible, or which the prospective permittee has reason to believe may be eligible for listing on the NRHP, and shall not begin the activity until notified by the DE that the requirements of the National Historic Preservation Act have been satisfied and that the activity is authorized. Information on the location and existence of historic resources can be obtained from the State Historic Preservation Office and the NRHP (see 33 CFR 330.4(g)). For activities that may affect historic properties listed in, or eligible for listing in, the NRHP, the notification must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. **A Phase I and Phase II Cultural Resources Survey has been prepared by Dig and Find, Incorporated, an archaeological firm which specializes in the preparation of reports pertaining to cultural resources and archaeological site findings on or near the project corridor, and the review of any potential effects to cultural resources and/or archaeological sites which are listed in or eligible for listing in the NRHP. Five (5) one-sided, binded copies of these reports discussing their findings have been included as part of this submittal.**

12. That the permittee, upon receipt of a notice of revocation of the RP or upon the RP's expiration before completion of the authorized structure or work, shall without expense to the United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the waterway to its former condition. If the permittee fails to comply with the direction of the Secretary of the Army or his authorized representative, the Secretary or his designee may restore the waterway to its former condition, by contract or otherwise, and recover the cost thereof from the permittee. **Taylor County states that they shall willingly comply with this condition of the permit.**

13. Any structure or fill authorized shall be properly maintained, including maintenance to ensure public safety. **The proposed road crossings have been designed to provide safe shoulders and an adequate road width of travel lanes along the proposed roadway. In accordance with best management practices, silt fencing would be installed along the areas being filled to prevent the escape of any sediment material into neighboring waterways. Once the proposed fill activities have been completed, the areas would be immediately mulched and/or seeded to stabilize these areas from any future erosion. The proposed stream culverts would be properly maintained by Taylor County to ensure public safety.**

14. No activity may occur in a State designated primary or secondary trout stream. **There are no State designated trout streams within the project corridor; therefore, the project would not result in any fill activities within these subject waterways.**

15. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights. **The project would not result in any effects to properties which contain proprietary tribal rights, water rights, or treaty fishing and hunting rights.**

Special Conditions:

1. That the RP can only be used to fill a maximum of 1-acre of wetlands and/or 300 feet of ephemeral, intermittent, or perennial stream for each crossing between the project's logical natural high ground termini (All wetland and stream crossings must extend between previously existing natural high ground locations). **Each proposed stream/wetland crossing would be beneath the required thresholds for this permit. The approximate acreage/linear feet of impacts per each crossing have been annotated on the enclosed plan-view surveys (Figures 7-16).**

2. A pre-construction notification (PCN) is required for use of this RP (form enclosed). Impacts to wetlands must be calculated and reported in acres. Impacts to ephemeral, intermittent, and perennial streams (streams) must be calculated separately from wetland impacts, and reported in linear feet of stream channel (Ordinary High Water Mark) and in acres. The PCN will include a statement regarding whether the activity may occur in or directly adjacent to waters designated on the Georgia 2000 303(d) list. The EPA maintains a list of these waters on their "Surf Your Watershed" website (www.epa.gov/surf/). **Please refer to the enclosed PCN Form.**

3. That no work will be performed until the DE notifies the permittee, in writing, that the work is within the scope of this RP. **Taylor County understands and complies with this condition; they stated that no work will commence within waters of the US until Department of the Army authorization is received from the USACE.**

4. No activity may consist of unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.) and material used for construction or discharge must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act). **Clean earthen material acquired from a non-contaminated source would be used for the construction of this roadway.**

5. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., excavate, fill, or smother downstream by substantial turbidity) of an important spawning area are not authorized. **The project site does not contain important spawning areas; however, best management practices would be implemented through the installation of sediment barrier structures (i.e., silt fencing and hay bales) above areas of State-regulated stream buffer for erosion control, to minimize adverse effects to water quality, and to prevent downstream smothering of aquatic habitat by turbidity.**

6. Adverse effects on the aquatic system caused by the accelerated passage of water and/or the restriction of its flow shall be minimized to the maximum extent practicable. **The construction of the proposed culvert crossings would be designed to maintain low-flow conditions, thereby allowing for the life-cycle movements of aquatic species indigenous to the stream. In addition, the proposed culverts would be embedded to 20% of the culvert diameter to allow natural substrate colonization in the bottom of the structure.**

7. Activities in breeding areas for migratory waterfowl must be avoided to the maximum extent practicable. **Open water areas located near the project corridor have been avoided through the analysis of multiple alternative road alignments.**

8. Any temporary fills must be removed in their entirety and the affected areas returned to their pre-existing condition. **No temporary fill activities would occur within any waters of the US as a result of this project. All proposed wetland/stream crossings would be permanently constructed as part of the proposed road corridor.**

9. Ditches and medians associated with road crossings must be designed and constructed to prevent drainage of wetlands, and finished road elevations cannot be lower than surrounding wetlands. **Each proposed road crossing would be constructed above-grade to extend the road across waters of the US to other high-ground locations and to ensure that the road is constructed at a safe elevation. All medians would be constructed within the right-of-way's shoulder widths and any man-made ditches would be constructed within upland areas, outside of any waters of the US.**

10. That no dredged or fill material will be discharged into waterways designated by the Georgia Department of Natural Resources as "Drinking Water Supplies," "Wild River," or "Scenic River," or which are actively being studied for possible inclusion in the Wild and Scenic Rivers system. **The subject waterways being impacted as a result of this project are not components of the National Wild and Scenic River System nor are any rivers officially designated as a "study river" for possible inclusion. Also, the project site is not located within a National Oceanic and Atmospheric Administration designated marine sanctuary, National Estuarine Research Reserve, state natural heritage site, or national resource waterway.**

11. That the discharge will be carried out in conformity with the goals and objectives of the Environmental Protection Agency (EPA) guidelines established pursuant to Section 404(b) of the Clean Water Act and as published in 40 CFR 230. **Taylor County has made every effort to avoid streams and wetlands located throughout the project corridor. Multiple alignments were studied and the one with the least environmentally damaging impacts to waters of the US was chosen.**

Although Alignments 1 and 2 would follow different corridors, both would impact six (8) perennial streams, three (3) intermittent streams, six (6) ephemeral streams, and ten (10) wetland areas.

Alignment 3 would utilize a portion of Alignment 1 and would travel in a north/south direction, resulting in impacts to five (5) perennial streams, two (2) intermittent streams, three (3) ephemeral streams, nine (9) wetland areas and one (1) open water area.

Alignment 4 (preferred alternative) would utilize a portion of Alignment 1 and would slightly travel east and back into the center of the project corridor, avoiding impacts to an intermittent stream channel and an open water area. This alignment would result in impacts to five (5) perennial streams, one (1) intermittent streams, three (3) ephemeral streams and eight (8) wetland areas.

Once the alignment with the lowest overall impacts was selected, further minimization efforts were made through the design phase, including the use of existing culverts, bottomless culverts, and clear span bridges.

12. All wetland and stream crossings must extend between previously existing natural high ground locations. **As previously mentioned in Special Condition 9 above, each proposed road crossing would be constructed above-grade to extend the road across waters of the US to other high-ground locations and to ensure that the road is constructed at a safe elevation.**

13. Adequately spaced and sized culverts must be placed at all wetland and adjacent flood plain crossings. Culverts shall be adequate to accommodate flooding and sheet flow in a manner that does not cause flooding of associated uplands or disruption of hydrologic characteristics that support aquatic sites on either side of the crossing. Culverts shall be positioned below bed level of the water body crossed to allow free movement of the natural streambed substrate, and to allow the free movement of fish and other organisms. Bridges should be considered and utilized for crossings whenever possible.

Measures will be included in culvert construction that will promote the safe passage of fish and other aquatic organisms. The dimension, pattern and profile of the stream above and below a pipe or culvert should not be permanently modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity.

For any crossing of a perennial stream where use of a culvert is proposed, an alternatives analysis must be prepared and submitted with the PCN. The analysis must document why the use of an arch-span bottomless culvert or bridging would not be a practicable alternative. If use of a multi-barrel pipe culvert is proposed, the analysis must also provide an explanation as to why a box culvert cannot be used. At a minimum, the analysis must compare construction and compensatory mitigation costs for the above discussed alternatives.

Bank-full flows shall be accommodated through maintenance of the existing bank-full channel cross sectional area. Additional culverts at such crossings shall be allowed only to receive flows exceeding bank-full.

Unless clearly demonstrated that it would not be practicable, the upstream and downstream invert of culverts (except bottomless culverts) installed in perennial streams will be buried/embedded to a depth of 20 percent of the culvert diameter (20 percent of the height of elliptical culverts), to allow natural substrate to colonize the structure's bottom, encourage fish movement and maintain the existing channel slope. Culvert slope should not exceed 4 percent.

Culverts shall be of adequate size to accommodate flooding and sheet flow in a manner that does not cause flooding of associated uplands or disruption of hydrologic characteristics that support aquatic sites on either side of the culvert.

Where adjacent floodplain is available, flows exceeding bank-full should be accommodated by installing equalizer culverts at the floodplain elevation.

Unless specifically described in the PCN for the purpose of storm water management, use of undersized culverts to attain storm water management or waste treatment is not authorized.

A waiver from the above culvert specifications may be requested in writing. The waiver will only be issued if it can be demonstrated that the impacts of complying with these specifications would result in more adverse impacts to the aquatic environment. C**ulverts installed in perennial and intermittent stream channels would be embedded at 20% of the culvert diameter to allow for natural colonization of substrate material. Several arch-span culverts would be**

installed to minimize impacts to waters of the US along the project corridor. A blanket drain (aggregate-size stone with filter fabric material) would be installed at one stream crossing location to further reduce stream impacts. No waiver is being requested by Taylor County, and the installation of culverts will be performed in accordance with these conditions.

14. The constructed activity will not relocate a stream or river channel. **This road construction would not involve any proposed increases to existing widths of stream channels nor involve the relocation of any streams as a result of fill activities within waters of the US.**

15. That the proposed work shall conform to existing land use plans and/or zoning. **After acquisition of land within the project corridor, the County rezoned this land specifically for the purpose of road construction.**

16. That if the permittee during the execution of the work authorized herein encounters a threatened/endangered species, he shall immediately stop work and notify the DE and the USFWS and/or the NMFS depending on species encountered. **Work within the project corridor would immediately cease upon the discovery of any threatened/endangered species within the project corridor. The USACE, USFWS, NMFS and all other respective State and Federal agencies will be notified and the preparation of information regarding our findings will be provided shortly afterwards.**

17. That the Savannah DE may determine that an Individual Permit application is required on a case-by-case basis if he feels it is in the public interest. **We strongly believe that the proposed project would not require issuance of a standard individual permit based on the proposed impacts at each crossing. However, if the USACE determines that an individual permit would be necessary, we will provide your office with the remaining required information to begin the review process accordingly.**

18. If fill material is to be placed within the 100-year flood plain, the permittee shall provide written confirmation from the Federal Emergency Management Agency (FEMA) that the proposed work will be performed in compliance with all applicable regulations/requirements of FEMA pertaining to construction activities in designated flood plains or flood ways. **Taylor County has been delegated by FEMA as a local-level liaison for floodplain management, and therefore, the County has ensured that the construction efforts occurring within the 100-year flood plain would comply with all of FEMA's flood plain regulations and information on flood prone hazard areas.**

19. That the discharge will not be located in the proximity of a public water supply intake. **The County's nearest public water supply project is over 2 miles away from the project corridor. This project would not result in any effects to this facility.**

20. Compensatory mitigation is required for a project that would result in an adverse impact to and/or the loss of 0.1 acre or more of wetlands and/or 100 linear feet or more of non-tidal stream. Adverse impacts to waters of the US include activities that result in a temporary loss in function and do not result in permanent conversion of one aquatic resource type to another (e.g., placement of rip-rap on a stream bank; or construction of a buried utility line in all types of wetland, where the wetland is restored to it's preconstruction contours). A loss of waters of the US includes all filled areas and areas permanently adversely affected by flooding, excavation or drainage (e.g., installation ofa culvert/pipe in a stream). The US Army Corps of Engineers has discretion to determine if work would result in an impact to or a loss of waters of the US. For a project that involves an impact to andlor loss of wetlands and streams, if either the 0.1-acre or 100 linear foot threshold is met, compensatory mitigation is required for all impacts and losses.

Compensatory mitigation plans must be in accordance with the most recent approved version of the SOP. For site-specific mitigation plans, sufficient information must be included to document that the proposed mitigation would adequately compensate for all wetland/stream impacts. Plans that propose use of an approved commercial mitigation bank or use of in-lieu-fee banking must also document that the mitigation (i.e., credit) would compensate for all wetland/stream impacts.

The use of in-lieu fee banking is not appropriate if commercial mitigation bank credits are available for a project site. For projects where no commercial bank credits are available, and the mitigation plan includes the proposed use of in-lieu fee mitigation, the plan must include either: (1) a statement that no bank services the project site; or (2) the name(s) of the mitigation bank(s) contacted, the date of contact, and a statement that the banker(s) confirmed that no credits were available. The following conversion factors will be used to convert SOP credit requirements to in-lieu-fee mitigation acre requirements: (a) SOP wetland credits x 0.875 = in-lieu-fee wetland acres; and (b) SOP stream credits x 0.0046 = in-lieu-fee stream acres.

All impacts to wetlands and open waters must be calculated and reported in acres. Stream impacts must be calculated separately and reported in both linear feet and acres.

For projects that have both an acre limit loss of waters of the US and a linear foot stream loss limit, the acreage of stream loss (i.e., the length of the stream bed filled or excavated times the average width of the stream, from the ordinary high water mark to ordinary high water mark, applies towards that acre limit loss of waters of the US). For example, if a proposed project activity involves filling 0.1 acre of wetlands and 100 linear feet of a stream bed with an average width of 10 feet, the acreage loss of waters of the US for that activity would be calculated as follows: 0.1 + [(100 x 10) / 43,560] = 0.123 acre. **The total required mitigation credits for this project have been calculated at 4,834 stream mitigation credits and 10.3 wetland mitigation credits. While attempting to utilize the 10% reduction in mitigation credits through the use of a 12-digit HUC as the service area for this project,**

Taylor County proposes to purchase 4,351 stream mitigation credits and 9.3 wetland mitigation credits as compensatory mitigation to adequately offset the proposed impacts to waters of the US within the project corridor. These credits would be purchased from a USACE-approved commercial wetland and stream mitigation bank that services the project area.

21. This RP cannot be used to authorize projects that would impact compensatory mitigation sites or an approved compensatory mitigation bank, unless that project's purpose is to enhance the mitigation site or bank. An individual permit application would be required for these projects. **Upon our investigation of property tax records, no mitigation areas protected by restrictive covenants or conservation easements lie within the project corridor.**

22. That authorizations for construction under this RP are valid for a period of 5 years from the date of approval of the specific project. **Our expected target date for completion of this project is June 2011. This project can be completed within the 5-year timeframe.**

23. Projects authorized under this RP, but not commenced before the expiration date, must be re-coordinated. **Taylor County will comply with this condition of the permit; however, the County expects to complete construction by June 2011.**

24. Projects that need additional time to complete the authorized activity, a request for a permit extension at least one month prior to the expiration date must be submitted to the USACE for review and approval. **If additional time is deemed as necessary and the proposed work has already commenced, Taylor County will contact the USACE for a time extension on this permit.**

25. Use of this RP is prohibited in waters of the United States that presently support anadromous fish, or in those waters that previously supported such fish and where restoration of fish migrations and populations is possible. A list of the Georgia rivers supporting anadromous fish habitat is presented in Enclosure 2. **The project corridor contains no listed stream channels supporting anadromous fish populations. Therefore, this condition would not be applicable towards this project.**

26. Use of this RP is prohibited in waters of the United States where Federally listed species are present. An individual permit would be required if Federally listed species could be adversely impacted by a project. **Habitat descriptions on the USFWS Athens, Georgia Ecological Field Office website, and the Georgia DNR Natural Heritage Program species occurrence website were reviewed to determine if any areas exist within the project corridor. An aquatic species survey has also been performed to determine if any aquatic and terrestrial species and/or their habitats exist. Based on the findings of this review, no Federally listed threatened or endangered species occur within this project corridor.**

27. That roadways constructed under this regional permit shall be located, outlined, designed, constructed and operated in accordance with the minimal requirements as contained in the Georgia Erosion and Sedimentation Control Act of 1975, as amended. Utilization of plans and specifications as contained in "Manual for Erosion and Sediment Control of Georgia, Fifth Edition," dated April 28, 2000, published by the Georgia Soil and Water Conservation Commission or their equivalent will aid in achieving compliance with the aforementioned minimal requirements. **Refer to the next statement.**

28. That highways constructed under the authority of the RP shall be located, outlined, designed, constructed and operated according to standards that will minimize erosion and sediment damage to the highways and adjacent properties and prevent pollution of surface and ground water resources. Measures to minimize erosion include the following: mulching, grassing, slope drains, check dams with silt control gates, and limiting areas of exposed soil. **Appropriate soil erosion and sediment control BMPs would be installed and maintained in accordance within *The Manual for Erosion and Sediment Control in Georgia* during project construction. Additionally, all work below the ordinary high water mark of all stream channels proposed for impact would be permanently stabilized at the earliest practicable date.**

Conclusion:

The proposed 4.3-mile construction of State Route 1 would result in impacts to a total of 942 linear feet of perennial streams, 12 linear feet of intermittent streams, 258 linear feet of ephemeral streams, 1,296 acre of wetland areas throughout the project corridor. Avoidance and minimization efforts to jurisdictional waters of the US have been implemented to the maximum extent practicable in project design. Further impact avoidance is not feasible due to larger volumes of wetland areas and wider stream channels being located along both sides of the project corridor. Based on the submittal of this PCN Form and all enclosed information, Higginbotham and Associates, on behalf of the Taylor County Department of Transportation, respectfully requests that the proposed wetland and stream impacts are authorized by USACE personnel pursuant to RP 01. If you have any questions concerning this request or the enclosed information, please contact our office at your earliest convenience.

WORKSHEET 1: ADVERSE IMPACT FACTORS FOR RIVERINE SYSTEMS WORKSHEET

Stream Type Impacted	Intermittent 0.1			Perennial Stream > 15' in width 0.4			Perennial Stream ≤ 15' in width 0.8		
Priority Area	Tertiary 0.5			Secondary 0.8			Primary 1.5		
Existing Condition	Fully Impaired 0.25			Somewhat Impaired 0.5			Fully Functional 1.0		
Duration	Temporary 0.05			Recurrent 0.1			Permanent 0.2		
Dominant Impact	Shade/ Clear 0.05	Utility X-ing 0.4	Bank Armor 0.7	Deten-tion 1.5	Stream Crossing (≤ 100') 1.7	Impound 2.7	Morpho-logic Change 2.7	Pipe >100' 3.0	Fill 3.0
Scaling Factor (Based on # linear feet impacted)	< 100' impact 0	100-200' impact 0.05	201-500' impact 0.1	501-1000' impact 0.2	> 1000' impact 0.4 for each 1000' feet of impact (round impacts to the nearest 1000') (example: 2,200' of impact – scaling factor = 0.8; 2,800' of impact – scaling factor – 1.2)				

Reaches to Be Impacted	**Stream 15**	**Stream 18**	**Stream 19**	**Stream 20**
	Complete the Following for Each Reach to Be Impacted			
Simon Channel Evolution Stage	Stage IV	Stage IV	Stage IV	Stage IV
Rosgen Stream Type/D50				
Criteria for Selecting Existing Condition for Each Reach	Entrenchment, Bank Stability, Channel Shape	Entrenchment, Bank Stability, Channel Shape	Entrenchment, Bank Stability, Channel Shape	Entrenchment, Bank Stability, Channel Shape
Bankfull Width and Depth	Width: 12' Depth: 2'	Width: 8' Depth: 6-12"	Width: 6' Depth: 2"	Width: 8' Depth: 6-12"
Bankfull Indicators (attach photograph showing bankfull for each reach)	Scour marks, Wrested vegetation	Scour marks, Wrested vegetation	Scour marks, Wrested vegetation	Scour marks, Wrested vegetation
Factors	**Stream 15**	**Stream 18**	**Stream 19**	**Stream 20**
Stream Type Impacted	0.8	0.8	0.8	0.8
Priority Area	0.5	0.5	0.5	0.5
Existing Condition	0.5	0.5	0.5	0.5
Duration	0.2	0.2	0.2	0.2
Dominant Impact	3.0	3.0	3.0	3.0
Scaling Factor	0.05	0.05	0.1	0.05
Sum of Factors M =	5.05	5.05	5.1	5.05
Feet Stream in Reach Impacted LF =	133	155	210	165
M X LF =	672	783	1071	833

Total Mitigation Credits Required = (M X LF) = 3359

WORKSHEET 1: ADVERSE IMPACT FACTORS FOR RIVERINE SYSTEMS WORKSHEET

Stream Type Impacted	Intermittent 0.1			Perennial Stream > 15' in width 0.4			Perennial Stream ≤ 15' in width 0.8		
Priority Area	Tertiary 0.5			Secondary 0.8			Primary 1.5		
Existing Condition	Fully Impaired 0.25			Somewhat Impaired 0.5			Fully Functional 1.0		
Duration	Temporary 0.05			Recurrent 0.1			Permanent 0.2		
Dominant Impact	Shade/ Clear 0.05	Utility X-ing 0.4	Bank Armor 0.7	Deten-tion 1.5	Stream Crossing (≤ 100') 1.7	Impound 2.7	Morpho-logic Change 2.7	Pipe >100' 3.0	Fill 3.0
Scaling Factor (Based on # linear feet impacted)	< 100' impact 0	100-200' impact 0.05	201-500' impact 0.1	501-1000' impact 0.2	> 1000' impact 0.4 for each 1000' feet of impact (round impacts to the nearest 1000') (example: 2,200' of impact – scaling factor = 0.8; 2,800' of impact – scaling factor – 1.2)				

Reaches to Be Impacted	**Stream 21**	**Stream 24**		
	Complete the Following for Each Reach to Be Impacted			
Simon Channel Evolution Stage	Stage III	Stage IV		
Rosgen Stream Type/D50				
Criteria for Selecting Existing Condition for Each Reach	Entrenchment, Bank Stability, Channel Shape	Entrenchment, Bank Stability, Channel Shape		
Bankfull Width and Depth	Width: 3' Depth: 1-2"	Width: 3' Depth: 2-4"		
Bankfull Indicators (attach photograph showing bankfull for each reach)	Scour marks, Wrested vegetation	Scour marks, Wrested vegetation		
Factors	**Stream 21**	**Stream 24**		
Stream Type Impacted	0.1	0.8		
Priority Area	0.5	0.5		
Existing Condition	0.5	0.5		
Duration	0.2	0.2		
Dominant Impact	3.0	3.0		
Scaling Factor	0.0	0.1		
Sum of Factors M =	4.3	5.1		
Feet Stream in Reach Impacted LF =	12	279		
M X LF =	52	1423		

Total Mitigation Credits Required = (M X LF) = 1475+PAGE 1 = 4834

WETLANDS AND OPEN WATERS MITIGATION WORKSHEETS

ADVERSE IMPACT FACTORS

Factor	Options						
Dominant Effect	Fill 2.0	Dredge 1.8	Impound 1.6	Drain 1.4	Flood 1.2	Clear 1.0	Shade 0.5
Duration of Effects	7+ years 2.0	5-7 years 1.5	3-5 years 1.0	1-3 years 0.5	< 1 year 0.1		
Existing Condition	Class 1 2.0	Class 2 1.5	Class 3 1.0	Class 4 0.5	Class 5 0.1		
Lost Kind	Kind A 2.0	Kind B 1.5	Kind C 1.0	Kind D 0.5	Kind E 0.1		
Preventability	High 2.0	Moderate 1.0	Low 0.5	None 0			
Rarity Ranking	Rare 2.0	Uncommon 0.5	Common 0.1				

† These factors are determined on a case-by-case basis.

REQUIRED MITIGATION CREDITS WORKSHEET

Factor	Wetland 2	Wetland 6	Wetland 6	Wetland 8	Wetland 9	Wetland 11
Dominant Effect	2.0	2.0	0.5	2.0	0.5	0.5
Duration of Effect	2.0	2.0	2.0	2.0	2.0	2.0
Existing Condition	1.0	0.5	0.5	1.5	1.5	1.0
Lost Kind	1.0	2.0	2.0	2.0	2.0	2.0
Preventability	0.5	0.5	0.5	1.0	0.5	0.5
Rarity Ranking	0.1	0.1	0.1	0.1	0.1	0.1
Sum of r Factors	R_1 =6.6	R_2 =7.1	R_2 =5.6	R_3 =8.6	R_4 =6.6	R_5 =6.1
Impacted Area	AA_1 =0.047	AA_2 = 0.173	AA_2 = 0.018	AA_3 = 0.25	AA_4 = 0.017	AA_5 = 0.003
R × AA =	0.310	1.23	0.10	2.15	0.112	0.018

Total Required Credits = Σ (R × AA) = 3.92

Factor	Wetland 11	Ephemeral Stream 12	Wetland 14	Ephemeral Stream 17	Ephemeral Stream 22	
Dominant Effect	2.0	2.0	2.0	2.0	2.0	
Duration of Effect	2.0	2.0	2.0	2.0	2.0	
Existing Condition	1.0	1.5	1.5	1.5	1.5	
Lost Kind	2.0	2.0	2.0	2.0	2.0	
Preventability	0.5	1.0	0.5	0.5	0.5	
Rarity Ranking	0.1	0.1	0.1	0.1	0.1	
Sum of r Factors	R_6 =7.6	R_1 =8.6	R_2 =8.1	R_3 =8.1	R_4 =8.1	
Impacted Area	AA_6 = 0.014	AA_1 = 0.004	AA_2 = 0.771	AA_3 = 0.003	AA_4 = 0.008	
R × AA =	0.106	0.034	6.25	0.024	0.006	

Total Required Credits = $\sum$ (R × AA) + Page 1 = **6.42+ 3.92 = 10.34**

Enclosure 4:

Threatened and Endangered Aquatic Species Survey

Enclosure 5:

Cultural Resources Report

Enclosure 6:

JD Verification
Examples of JD requirements can be found in the EPJD or AJD
example at:
http://www.sas.usace.army.mil/Regulatory/Checklist_Examples.html

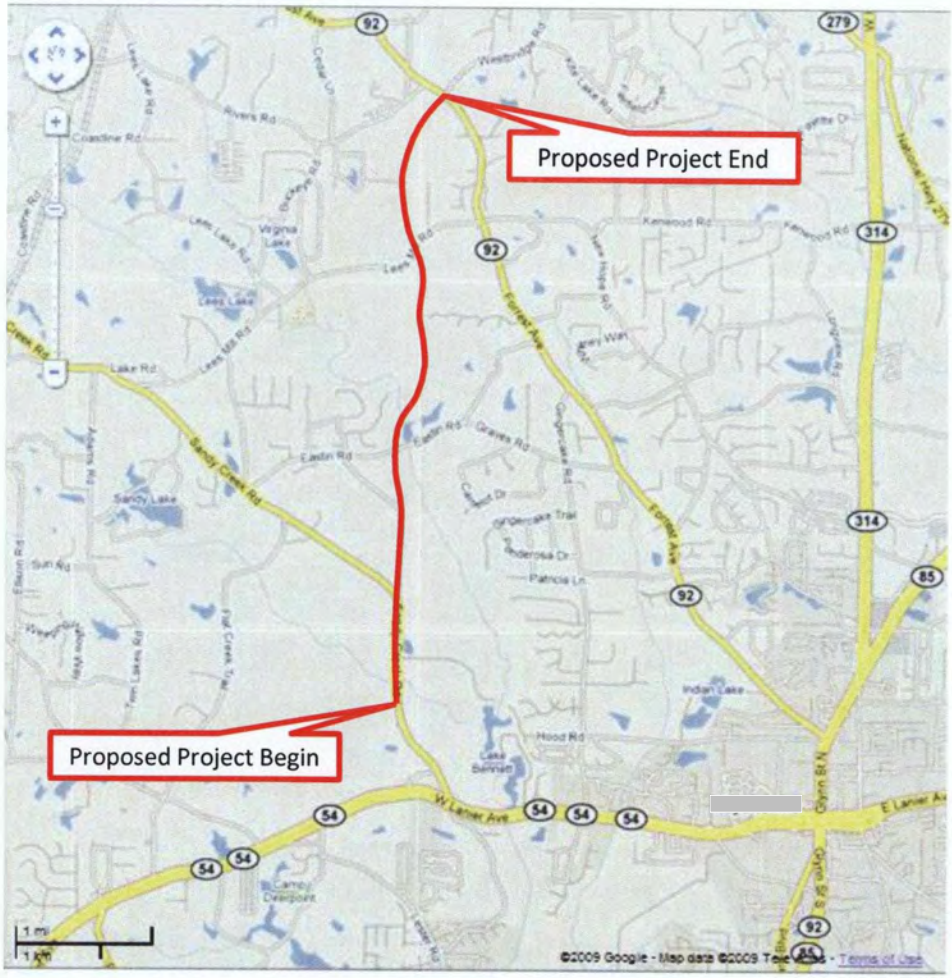
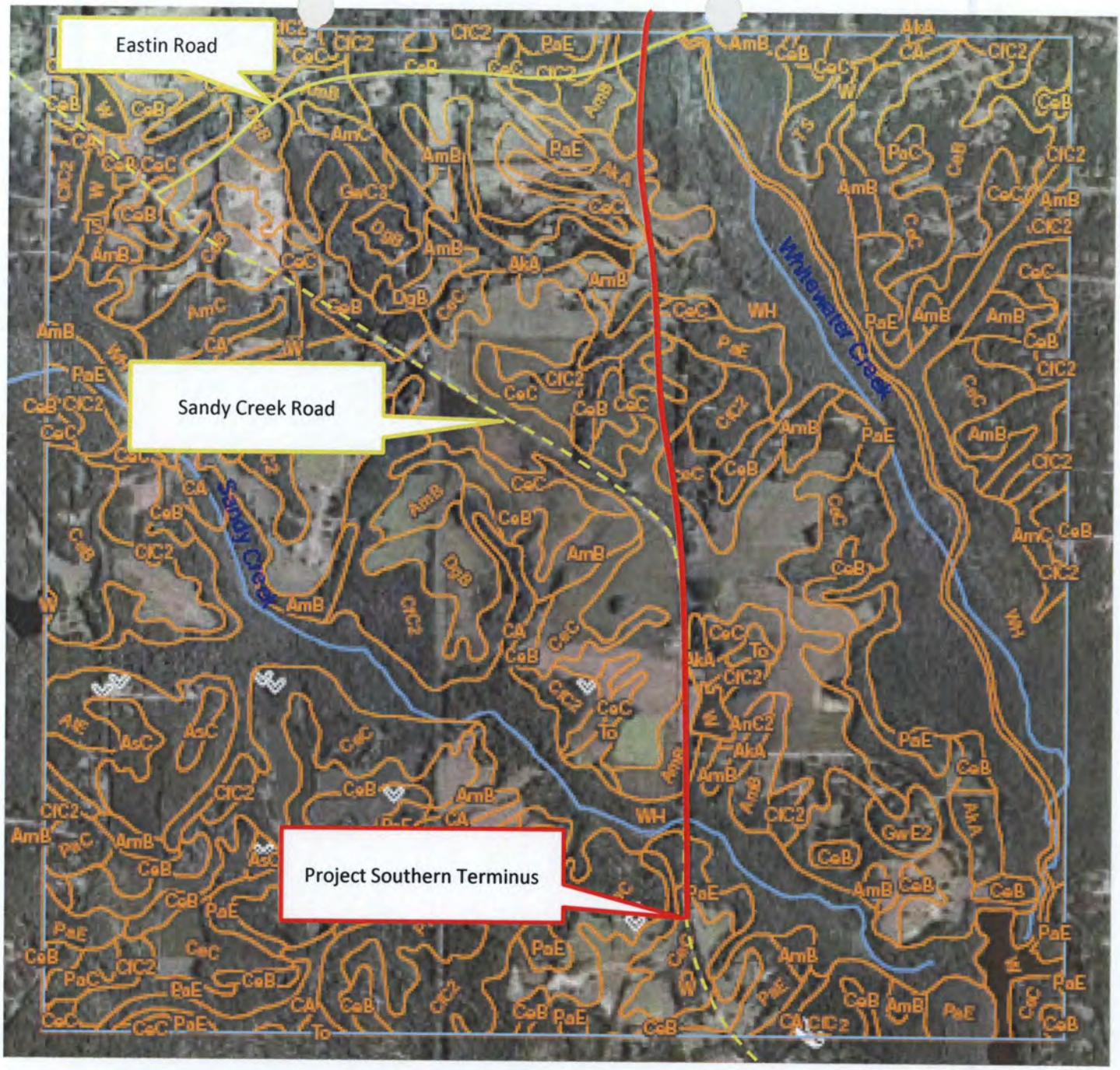


Figure 1: Project Location Map

Source: Google Maps

N



Map Scale: 1:30,000 if printed on A size (8.5" x 11") sheet.

Meters
0 400 800 1,600 2,400

Feet
0 1,500 3,000 6,000 9,000

USDA Natural Resources Conservation Service

Web Soil Survey 2.2
National Cooperative Soil Survey

Figure 2a: NRCS Soils Map (see Figure 2b for Soils Legend)

Source: NRCS Web Soil Survey

Map Unit Legend

Clayton, Fayette, and Henry Counties, Georgia (GA625)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AkA	Altavista sandy loam, 0 to 3 percent slopes	44.7	1.8%
AmB	Appling sandy loam, 2 to 6 percent slopes	281.7	11.2%
AmC	Appling sandy loam, 6 to 10 percent slopes	127.7	5.1%
AnC2	Appling sandy clay loam, 6 to 10 percent slopes, eroded	14.2	0.6%
AsC	Ashlar sandy loam, 2 to 10 percent slopes	272.8	10.9%
AtE	Ashlar sandy loam, very rocky, 10 to 25 percent slopes	44.8	1.8%
CA	Cartecay soils	119.2	4.8%
CeB	Cecil sandy loam, 2 to 6 percent slopes	665.4	26.5%
CeC	Cecil sandy loam, 6 to 10 percent slopes	458.3	18.3%
CfC2	Cecil sandy clay loam, 6 to 10 percent slopes, eroded	138.3	5.5%
PaE	Pacolet sandy loam, 10 to 25 percent slopes	227.6	9.1%
To	Toccoa sandy loam	10.3	0.4%
W	Water	43.9	1.8%
WH	Wehadkee soils	34.9	1.4%
Subtotals for Soil Survey Area		**2,483.7**	**99.0%**
Totals for Area of Interest		**2,508.7**	**100.0%**

Fulton County, Georgia (GA121)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AgB	Appling-Hard Labor complex, 2 to 6 percent slopes	16.6	0.7%
AgC	Appling-Hard Labor complex, 6 to 10 percent slopes	7.9	0.3%
ReD	Rion sandy loam, 10 to 15 percent slopes	0.5	0.0%
Subtotals for Soil Survey Area		**25.0**	**1.0%**
Totals for Area of Interest		**2,508.7**	**100.0%**

USDA Natural Resources Conservation Service

Web Soil Survey 2.2
National Cooperative Soil Survey

Figure 2b: Soils Legend for Figure 2a

Source: NRCS Web Soil Survey

Map Scale: 1:27,800 if printed on A size (8.5" x 11") sheet.

Meters
0 350 700 1,400 2,100

Feet
0 1,500 3,000 6,000 9,000

USDA Natural Resources Conservation Service

Web Soil Survey 2.2
National Cooperative Soil Survey

Figure 2c: NRCS Soils Map (see Figure 2d for Soils Legend)

Source: NRCS Web Soil Survey

Map Unit Legend

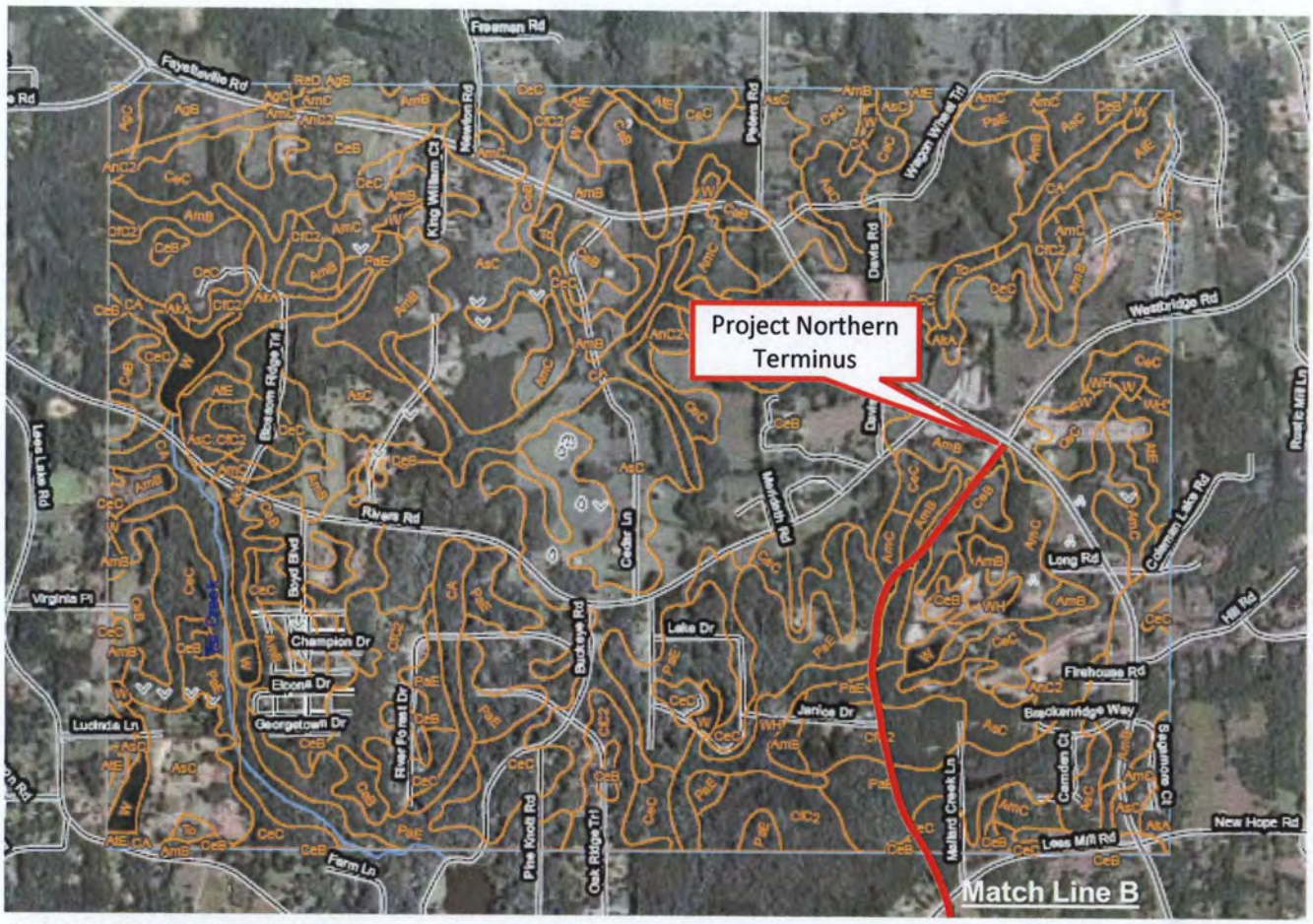
Clayton, Fayette, and Henry Counties, Georgia (GA625)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AkA	Altavista sandy loam, 0 to 3 percent slopes	47.2	1.7%
AmB	Appling sandy loam, 2 to 6 percent slopes	121.1	4.4%
AmC	Appling sandy loam, 6 to 10 percent slopes	50.7	1.8%
AnC2	Appling sandy clay loam, 6 to 10 percent slopes, eroded	3.4	0.1%
AsC	Ashlar sandy loam, 2 to 10 percent slopes	29.2	1.1%
AtE	Ashlar sandy loam, very rocky, 10 to 25 percent slopes	107.4	3.9%
CA	Cartecay soils	46.2	1.7%
CeB	Cecil sandy loam, 2 to 6 percent slopes	491.2	17.8%
CeC	Cecil sandy loam, 6 to 10 percent slopes	594.8	21.5%
CfC2	Cecil sandy clay loam, 6 to 10 percent slopes, eroded	486.8	17.7%
GeB	Gwinnett sandy loam, 2 to 6 percent slopes	16.4	0.6%
GwC3	Gwinnett sandy clay loam, 6 to 10 percent slopes, severely eroded	15.6	0.6%
PaC	Pacolet sandy loam, 6 to 10 percent slopes	43.6	1.6%
PaE	Pacolet sandy loam, 10 to 25 percent slopes	365.0	13.2%
To	Toccoa sandy loam	3.5	0.1%
TS	Toccoa soils	2.6	0.1%
W	Water	83.4	3.0%
WH	Wehadkee soils	255.6	9.2%
Totals for Area of Interest		**2,765.7**	**100.0%**

USDA Natural Resources Conservation Service

Web Soil Survey 2.2
National Cooperative Soil Survey

Figure 2d: Soils Legend for Figure 2c

Source: NRCS Web Soil Survey



Map Scale: 1:23,400 if printed on A size (8.5" x 11") sheet.

Meters: 0 — 300 — 600 — 1,200 — 1,800

Feet: 0 — 1,000 — 2,000 — 4,000 — 6,000

USDA Natural Resources Conservation Service

Web Soil Survey 2.2
National Cooperative Soil Survey

Figure 2e: NRCS Soils Map (see Figure 2f for Soils Legend)

Source: NRCS Web Soil Survey

Map Unit Legend

Clayton, Fayette, and Henry Counties, Georgia (GA625)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AkA	Altavista sandy loam, 0 to 3 percent slopes	58.8	2.0%
AmB	Appling sandy loam, 2 to 6 percent slopes	174.2	5.8%
AmC	Appling sandy loam, 6 to 10 percent slopes	45.0	1.5%
AnC2	Appling sandy clay loam, 6 to 10 percent slopes, eroded	2.9	0.1%
AsC	Ashlar sandy loam, 2 to 10 percent slopes	32.5	1.1%
AtE	Ashlar sandy loam, very rocky, 10 to 25 percent slopes	47.7	1.6%
CA	Cartecay soils	56.3	1.9%
CeB	Cecil sandy loam, 2 to 6 percent slopes	698.5	23.3%
CeC	Cecil sandy loam, 6 to 10 percent slopes	565.3	18.8%
CfC2	Cecil sandy clay loam, 6 to 10 percent slopes, eroded	314.8	10.5%
DgB	Davidson loam, 2 to 6 percent slopes	50.2	1.7%
GeB	Gwinnett sandy loam, 2 to 6 percent slopes	24.1	0.8%
GwC3	Gwinnett sandy clay loam, 6 to 10 percent slopes, severely eroded	31.5	1.1%
GwE2	Gwinnett sandy clay loam, 10 to 25 percent slopes, eroded	9.5	0.3%
PaC	Pacolet sandy loam, 6 to 10 percent slopes	19.1	0.6%
PaE	Pacolet sandy loam, 10 to 25 percent slopes	209.7	7.0%
Tc	Toccoa sandy loam	19.3	0.6%
TS	Toccoa soils	15.5	0.5%
W	Water	53.9	1.8%
WH	Wehadkee soils	571.9	19.1%
Totals for Area of Interest		2,999.6	100.0%

USDA Natural Resources Conservation Service

Web Soil Survey 2.2
National Cooperative Soil Survey

Figure 2f: Soils Legend for Figure 2e

Source: NRCS Web Soil Survey

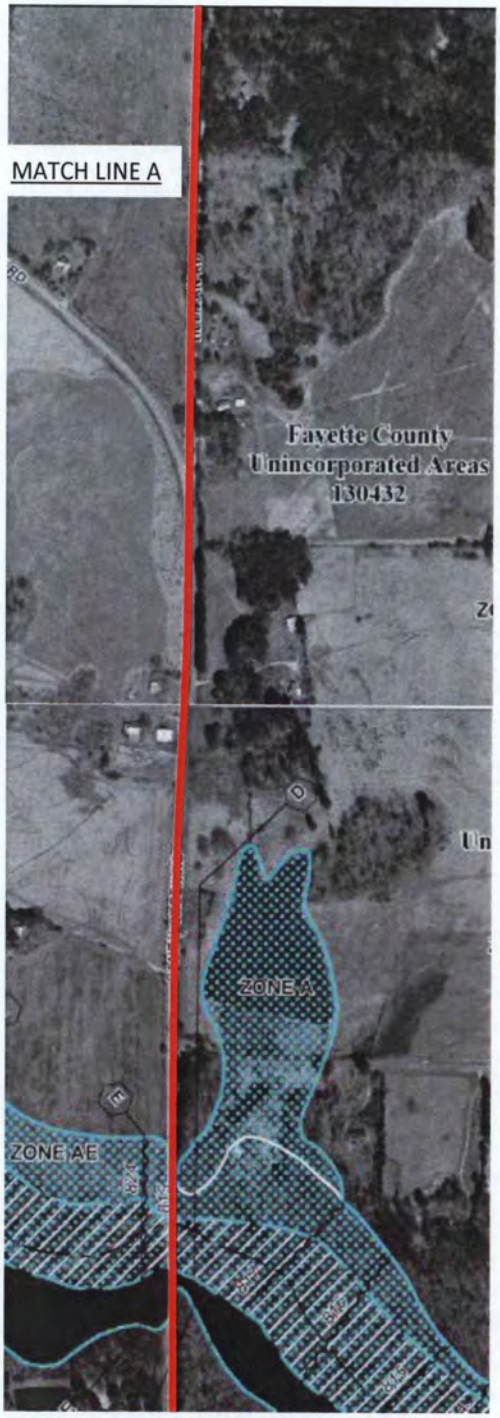
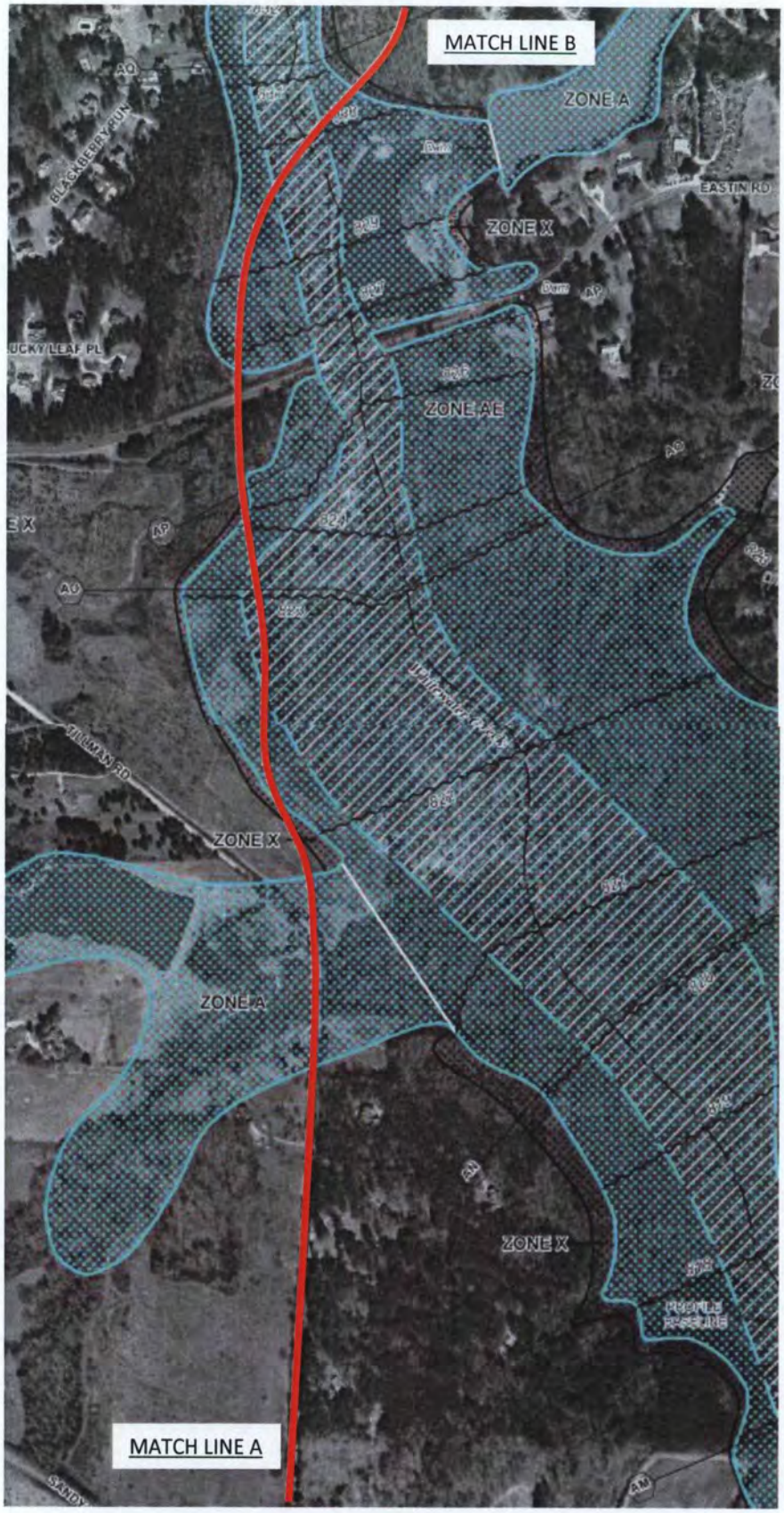


Figure 3a: FEMA Flood Map



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood, also known as the base flood) is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

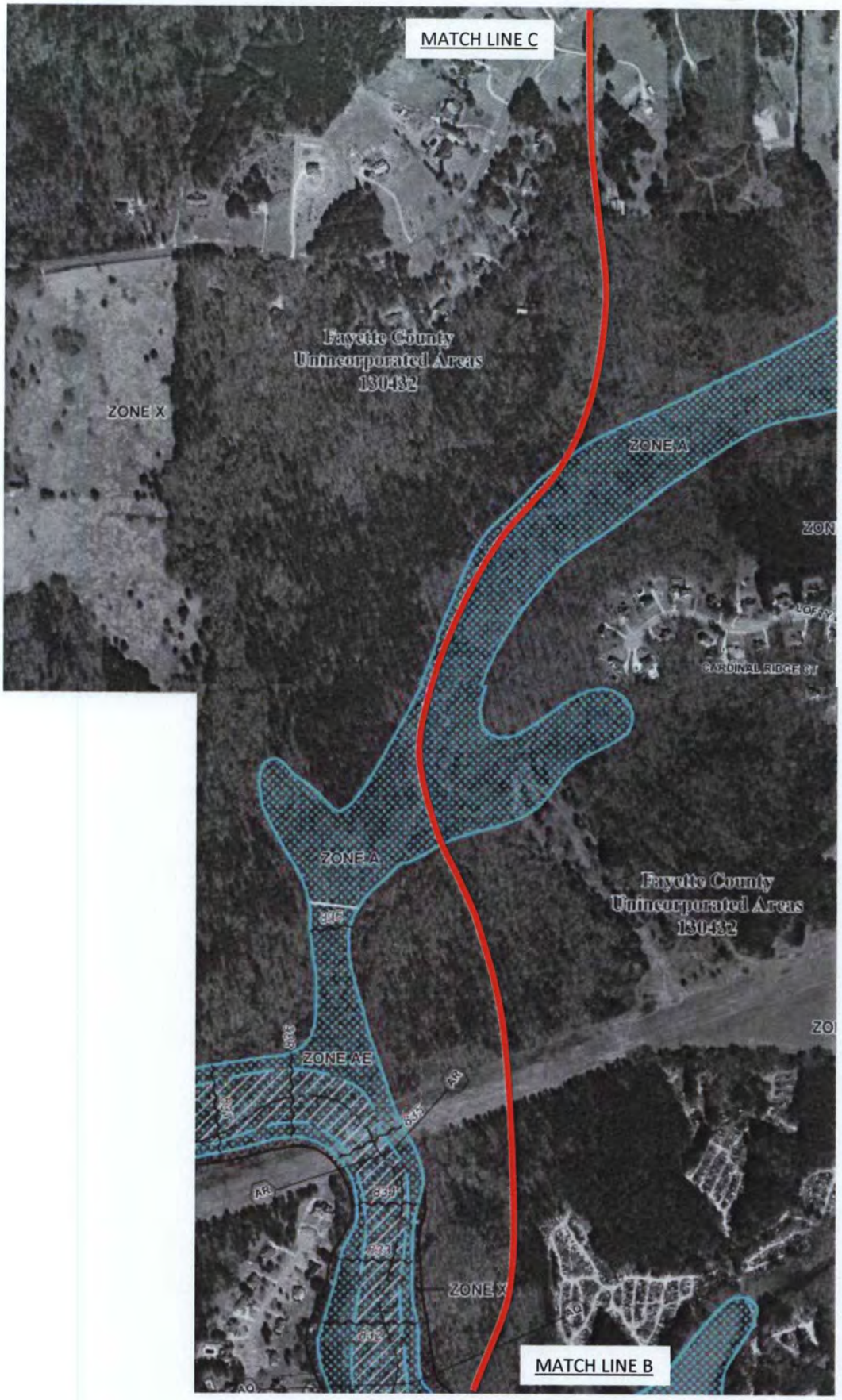
CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 97° 32' 08", 33° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4089000 FT — 5000-foot grid ticks: Georgia State Plane coordinate system

Figure 3b: FEMA Flood Map



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A — No Base Flood Elevations determined.
- ZONE AE — Base Flood Elevations determined.
- ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR — Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are generally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- 97° 07' 30", 32° 22' 30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4989000 FT — 5000-foot grid ticks: Georgia State Plane coordinate system

Figure 3c: FEMA Flood Map

Figure 3d: FEMA Flood Map

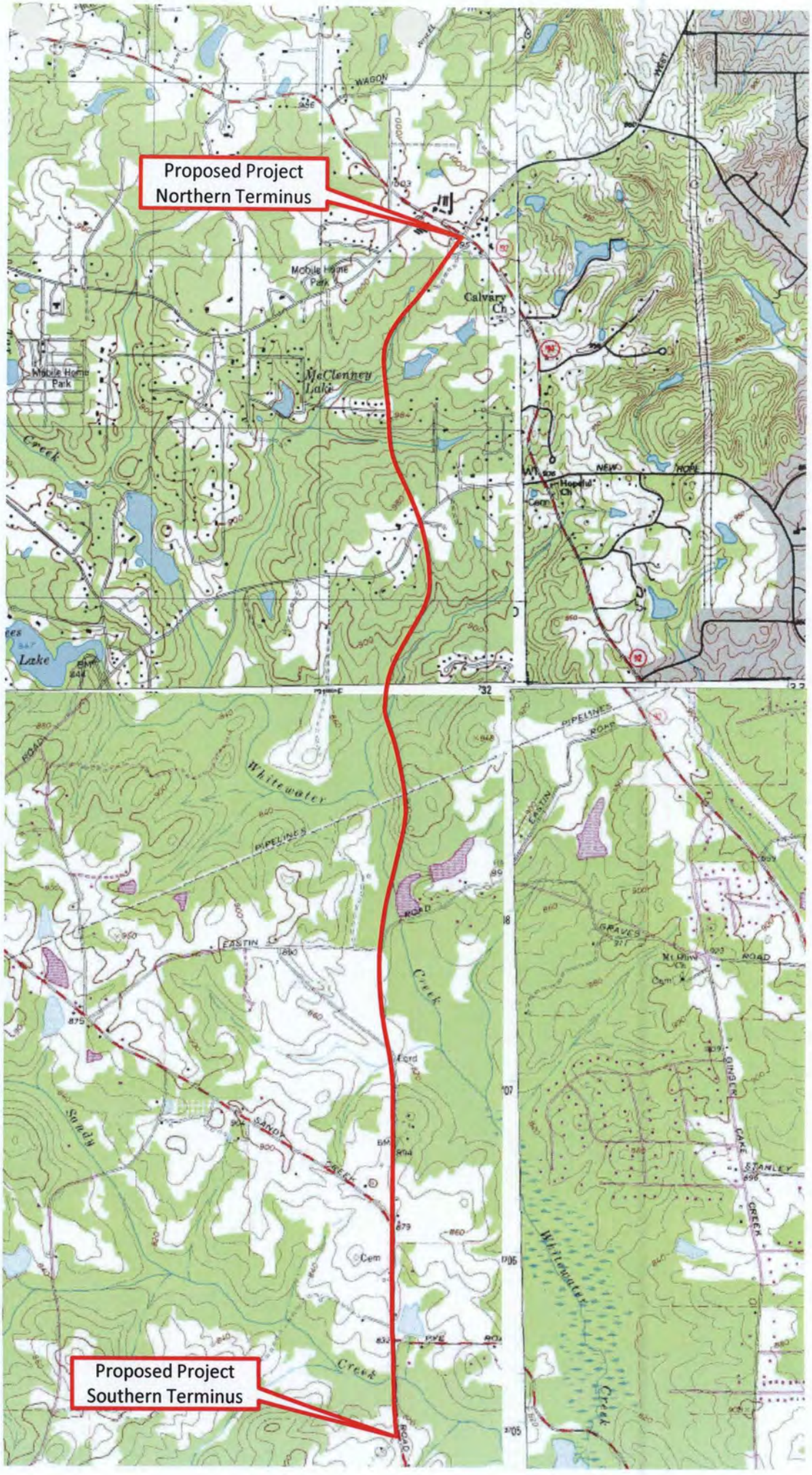
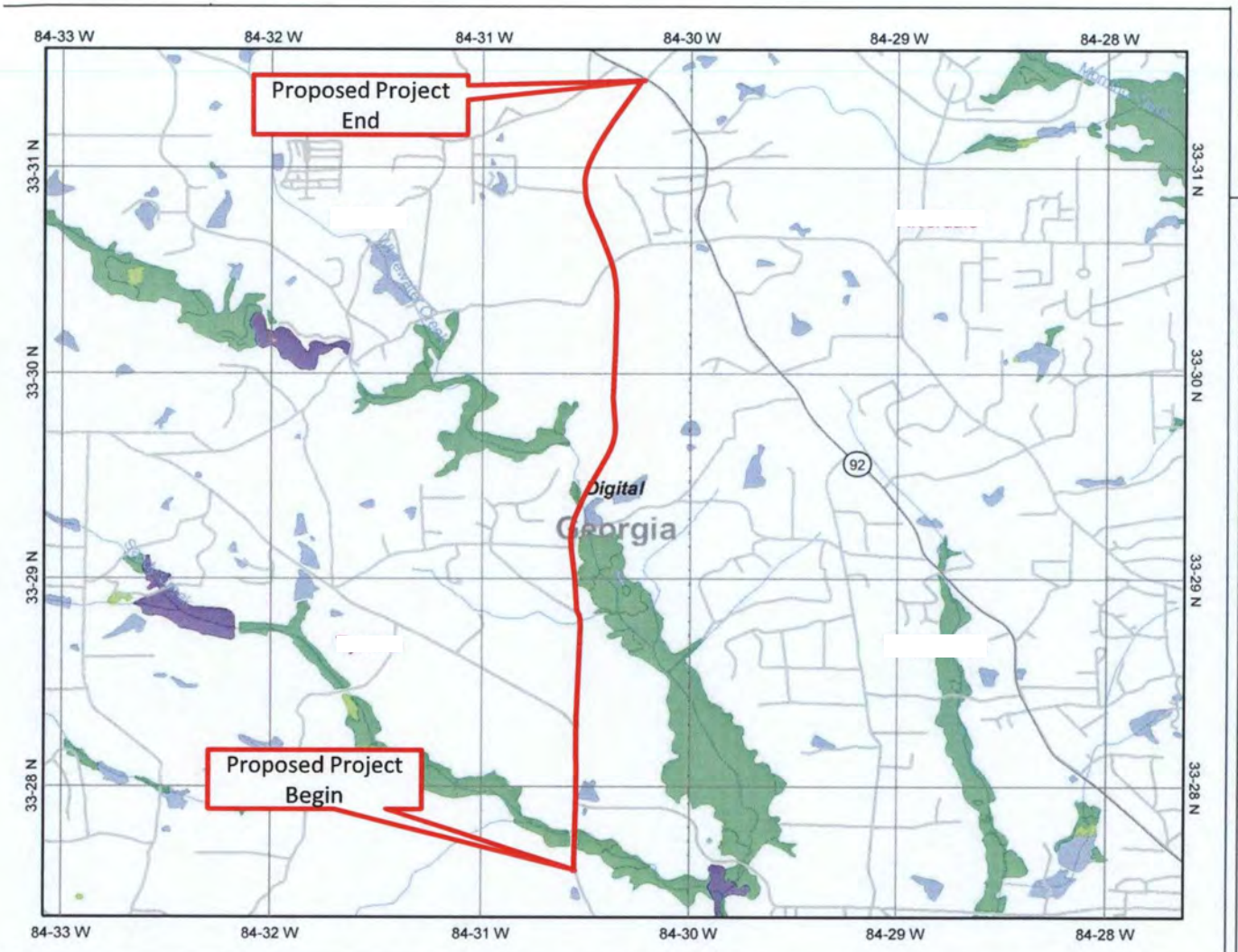


Figure 4: USGS Topographic Map (Drainage Map)



Legend

- Interstate
- Major Roads
- Other Road
- Interstate
- State highway
- US highway
- Roads
- Cities
- USGS Quad Index 24K
- Lower 48 Wetland Polygons
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- Lower 48 Available Wetland Dat
- Non-Digital
- Digital
- No Data
- Scan
- NHD Streams
- Counties 100K
- States 100K
- South America
- North America

Scale: 1:54,519

Figure 5: National Wetland Inventory Map

Source: U.S. Fish and Wildlife Service: Wetlands Online Mapper

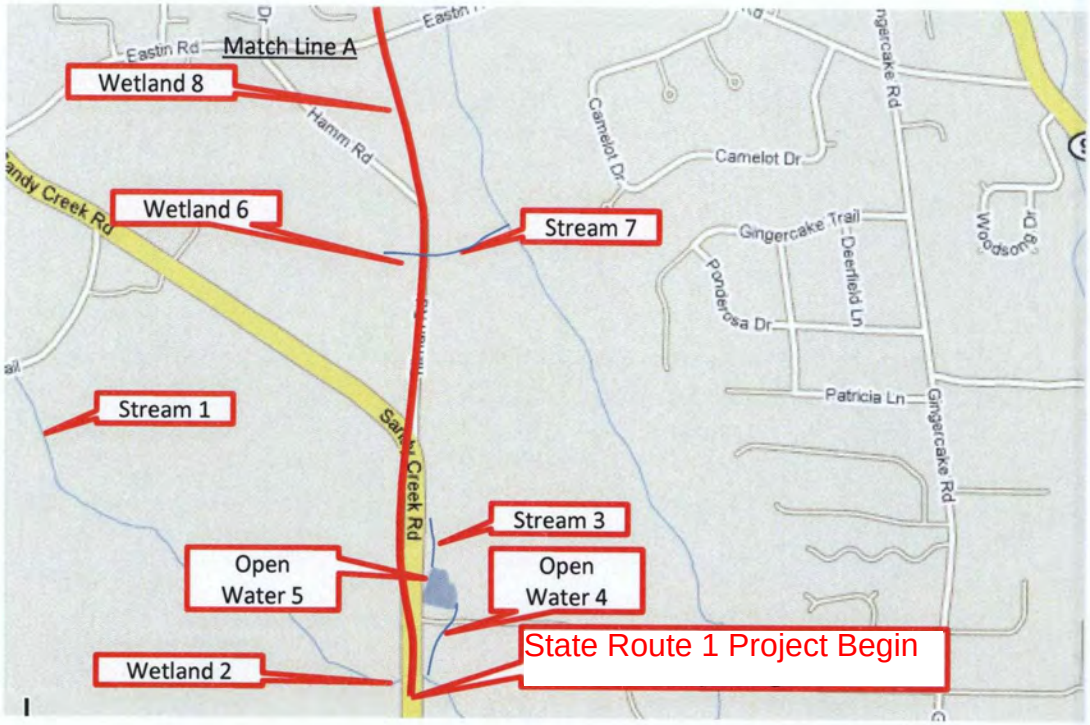


Figure 6a: Waters of the U.S. Map

0 2000 ft. 4000 ft.

N

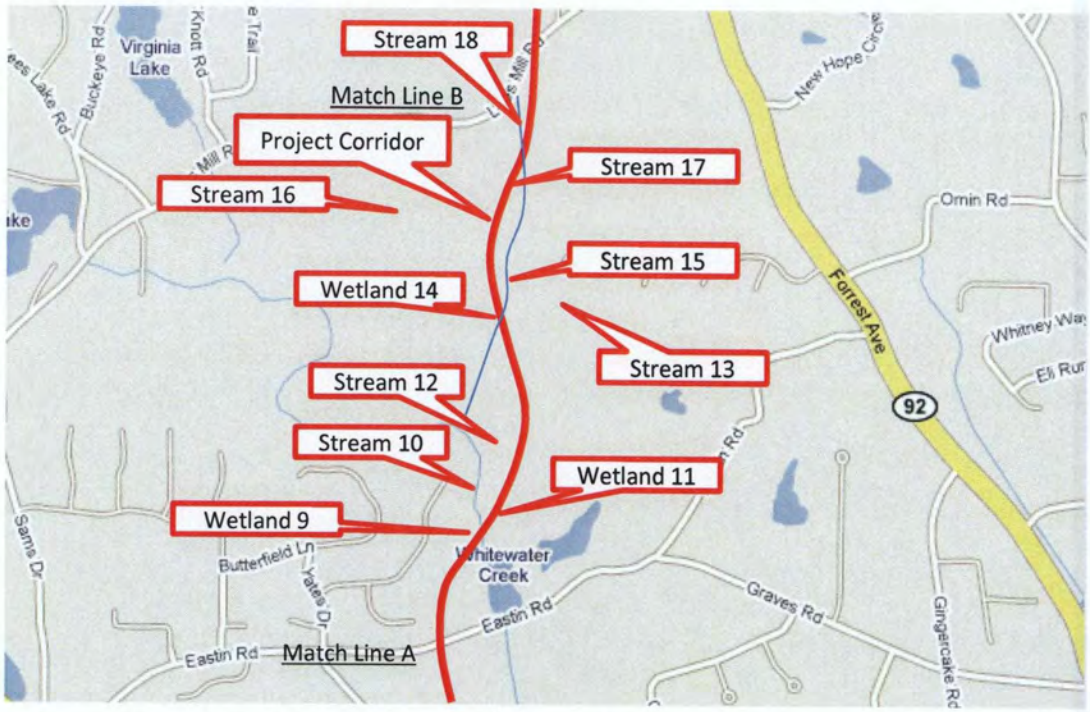


Figure 6b: Waters of the U.S. Map

0 2000 ft. 4000 ft.

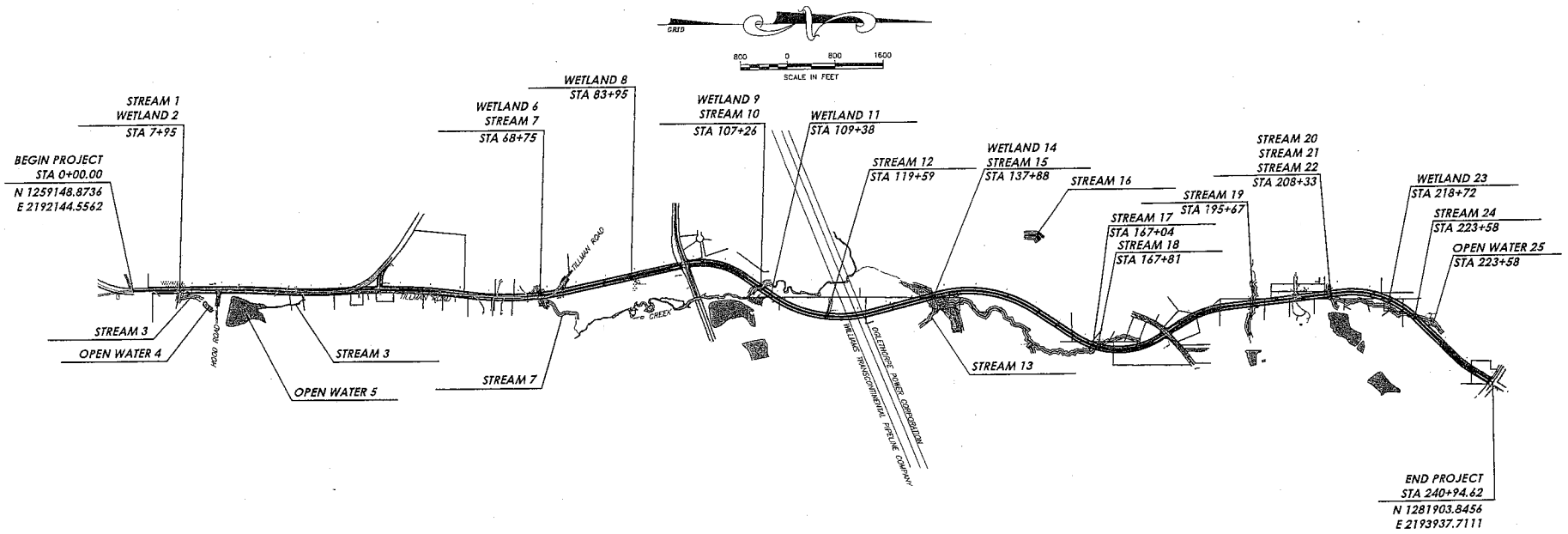
N

Figure 6c: Waters of the U.S. Map

0 2000 ft. 4000 ft.

N

PROPOSED STATE ROUTE 2, OVERALL VIEW OF IMPACT AREAS TO WATERS OF THE US

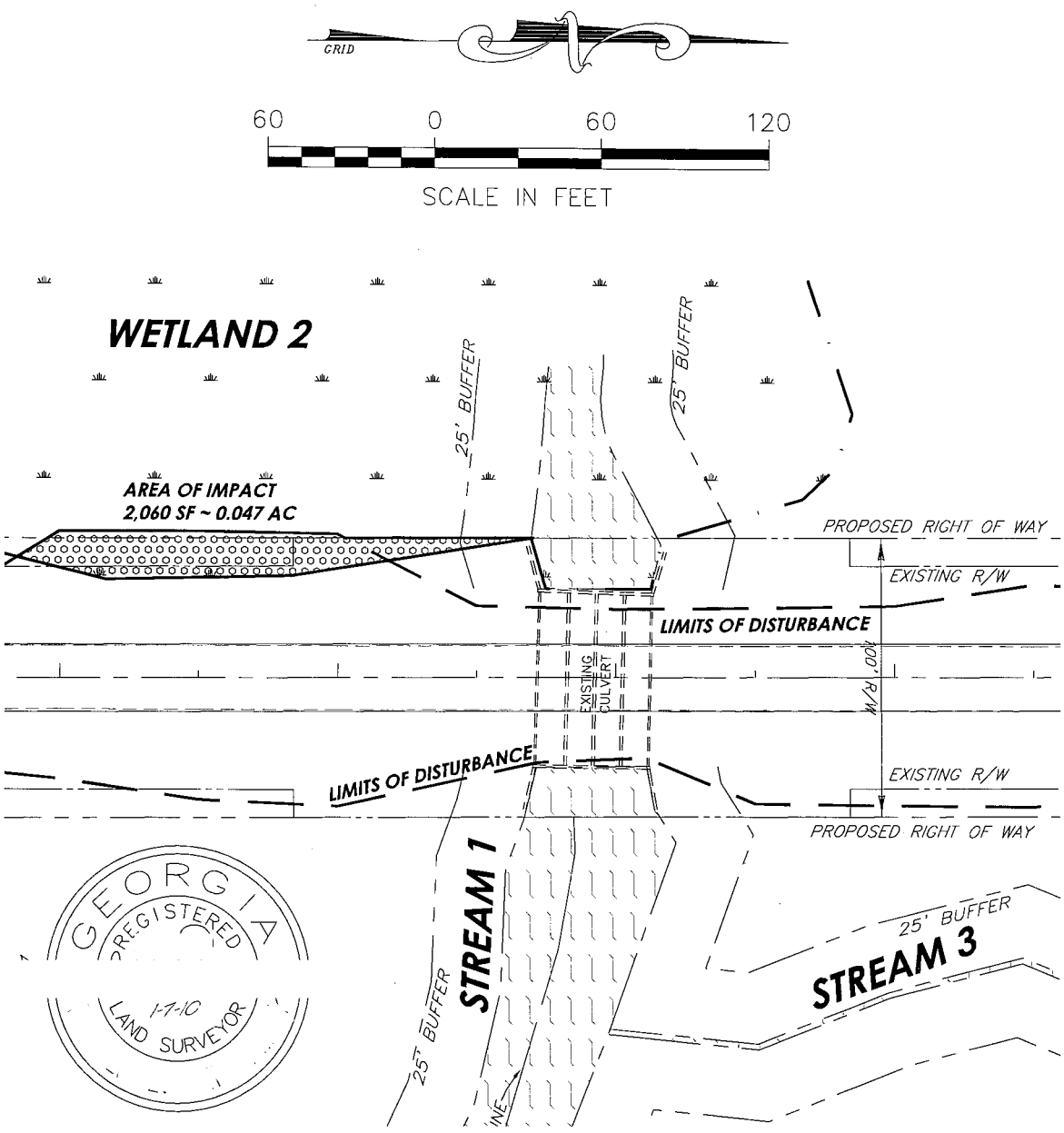


REV. No.	DATE	DESCRIPTION	BY	APP'D
1	1-5-10	RENAME STREAM "H" TO "K"	RD	
2	1-7-10	RENUMBER STREAM & WETLANDS	RD	

FIGURE 6 OF 16 OVERALL VIEW

LAND LOT –
DISTRICT – 5th, 7th
SECTION –
CITY –
COUNTY –
STATE – GEORGIA

DESIGN MO	SCALE 1" = 800'
DRAWN RD, SG, JB	DATE 12/23/09
CHECK DWJ	FILE NO. 05170-RS
APPROVED DWJ	SHEET NO. 1



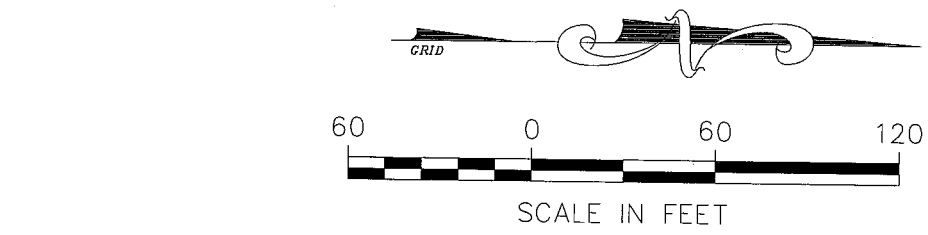
IMPACTED AREA

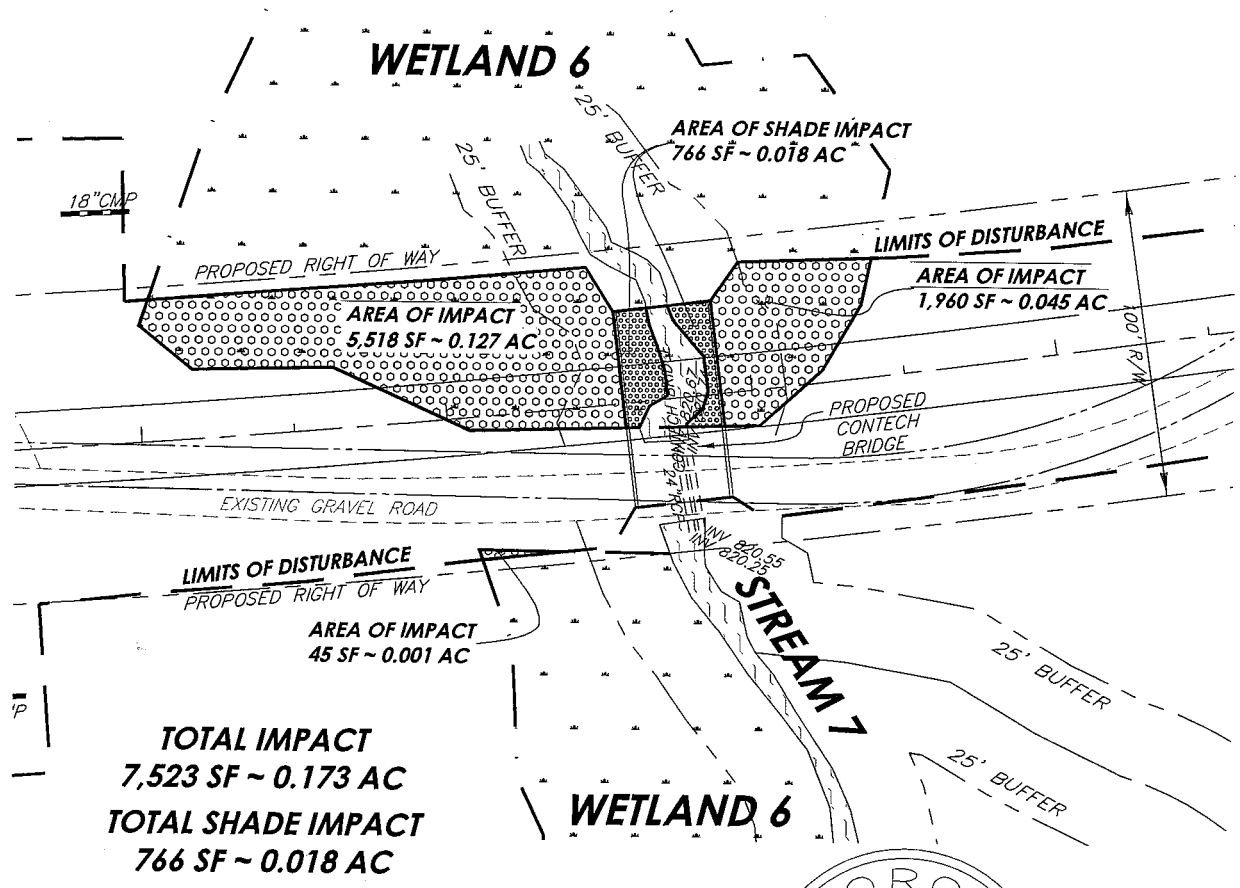
WETLAND AREA

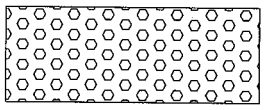
STREAMS & LAKES

US ARMY CORPS OF ENGINEERS
STREAM & WETLAND IMPACTS
FIGURE 7 OF 16

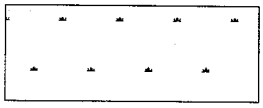
LAND LOT	DESIGN MCI	SCALE 1"=60'
DISTRICT 5th, 7th	DRAWN RD	DATE 1-7-10
SECTION	CHECK DWJ	FILE NO. 4267
COUNTY	APPROVED DWJ	SHEET NO. 2
STATE GEORGIA		



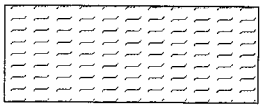




IMPACTED AREA



WETLAND AREA

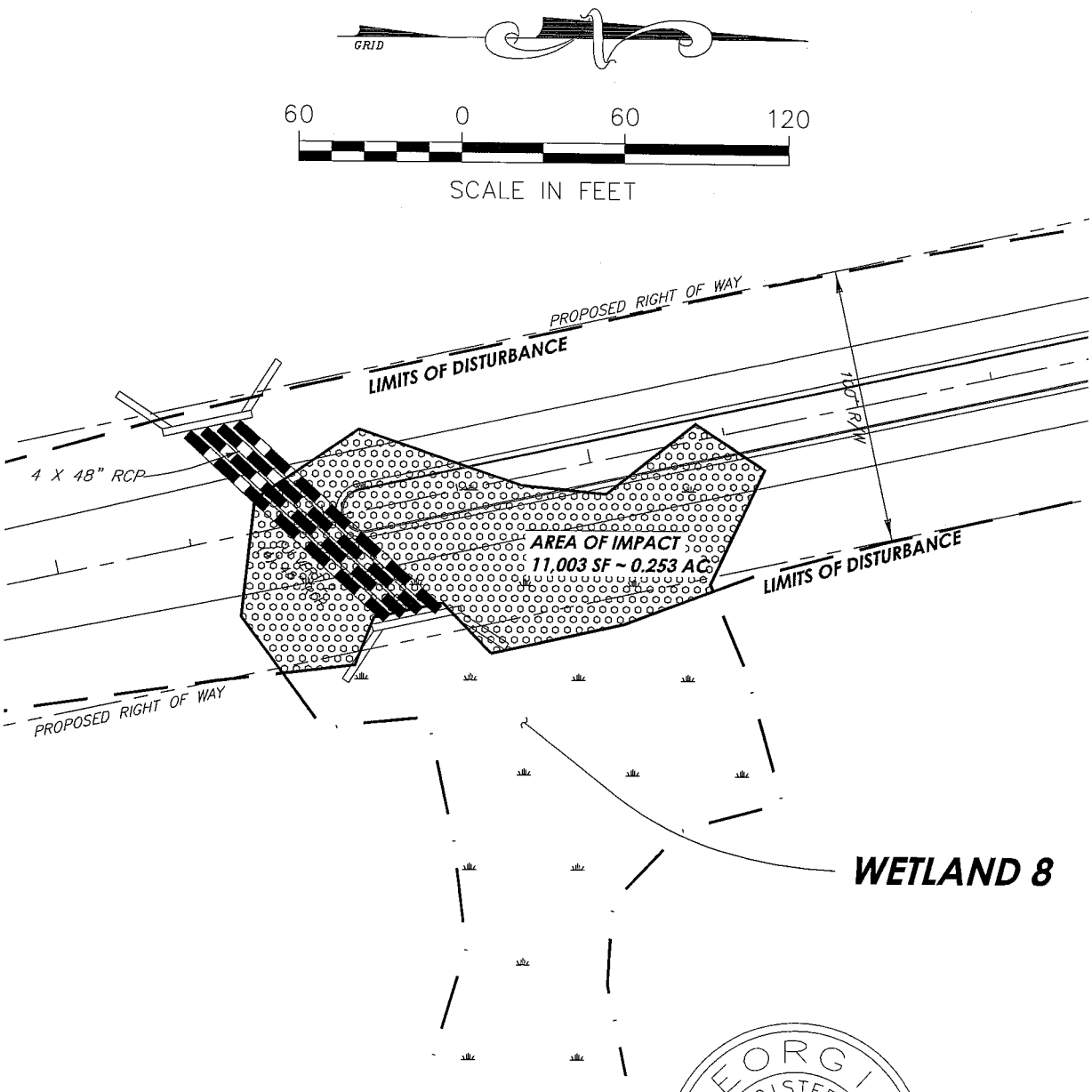


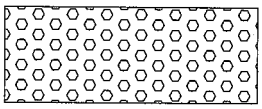
STREAMS & LAKES

US ARMY CORPS OF ENGINEERS
STREAM & WETLAND IMPACTS

FIGURE 8 OF 16

LAND LOT	DESIGN MCI	SCALE 1"=60'
DISTRICT 5th, 7th	DRAWN RD	DATE 1-7-10
SECTION	CHECK DWJ	FILE NO. 4267
COUNTY	APPROVED DWJ	SHEET NO. 3
STATE GEORGIA		





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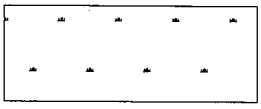
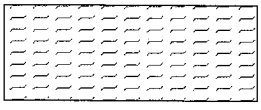


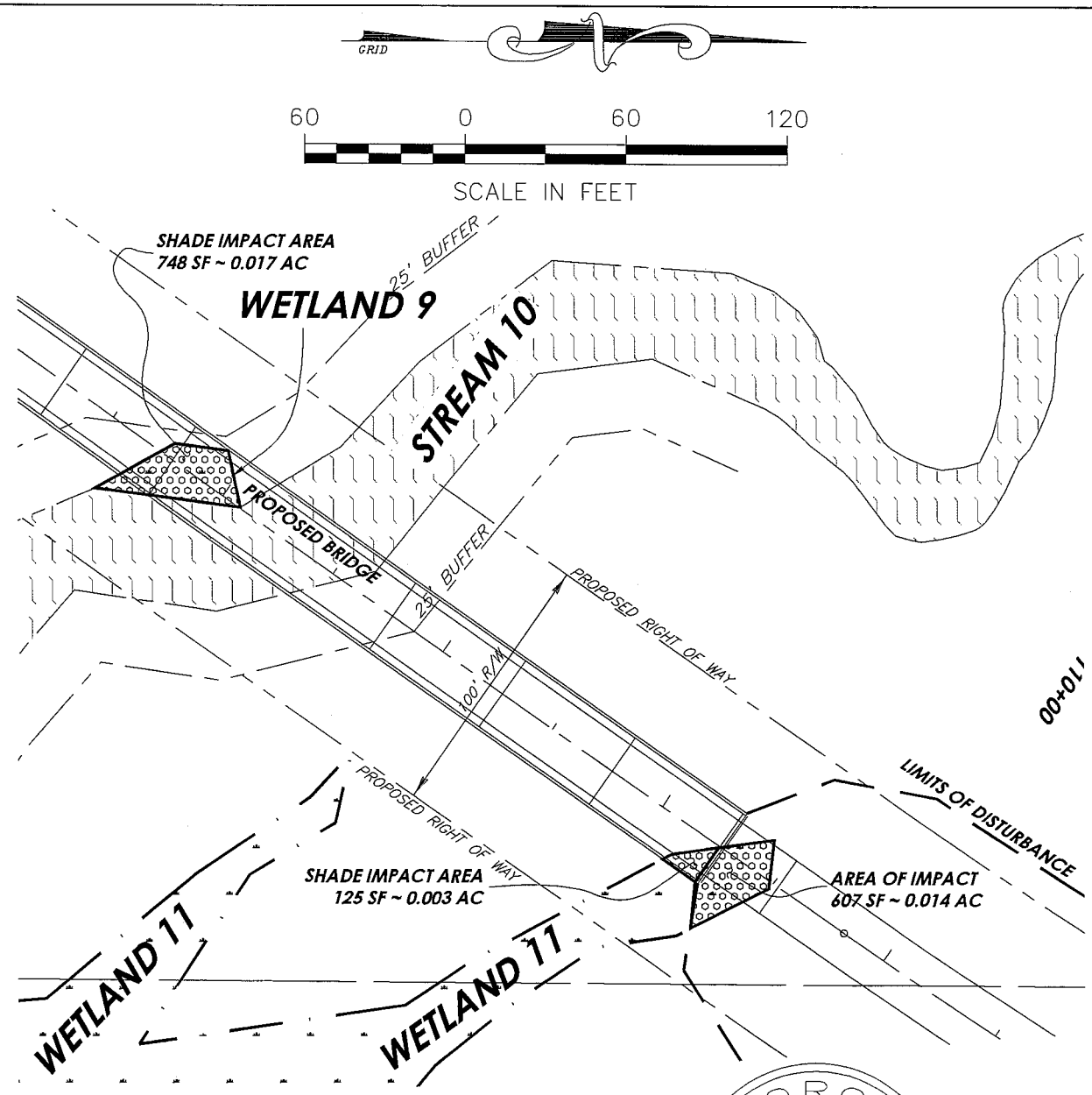
WETLAND AREA

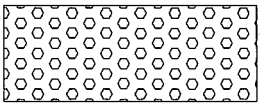


STREAMS & LAKES

US ARMY CORPS OF ENGINEERS
STREAM & WETLAND IMPACTS
FIGURE 9 OF 16

LAND LOT	DESIGN MCI	SCALE 1"=60'
DISTRICT 5th, 7th	DRAWN RD	DATE 1-7-10
SECTION	CHECK DWJ	FILE NO. 4267
COUNTY	APPROVED DWJ	SHEET NO. 4
STATE GEORGIA		





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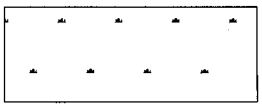
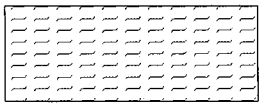


WETLAND AREA

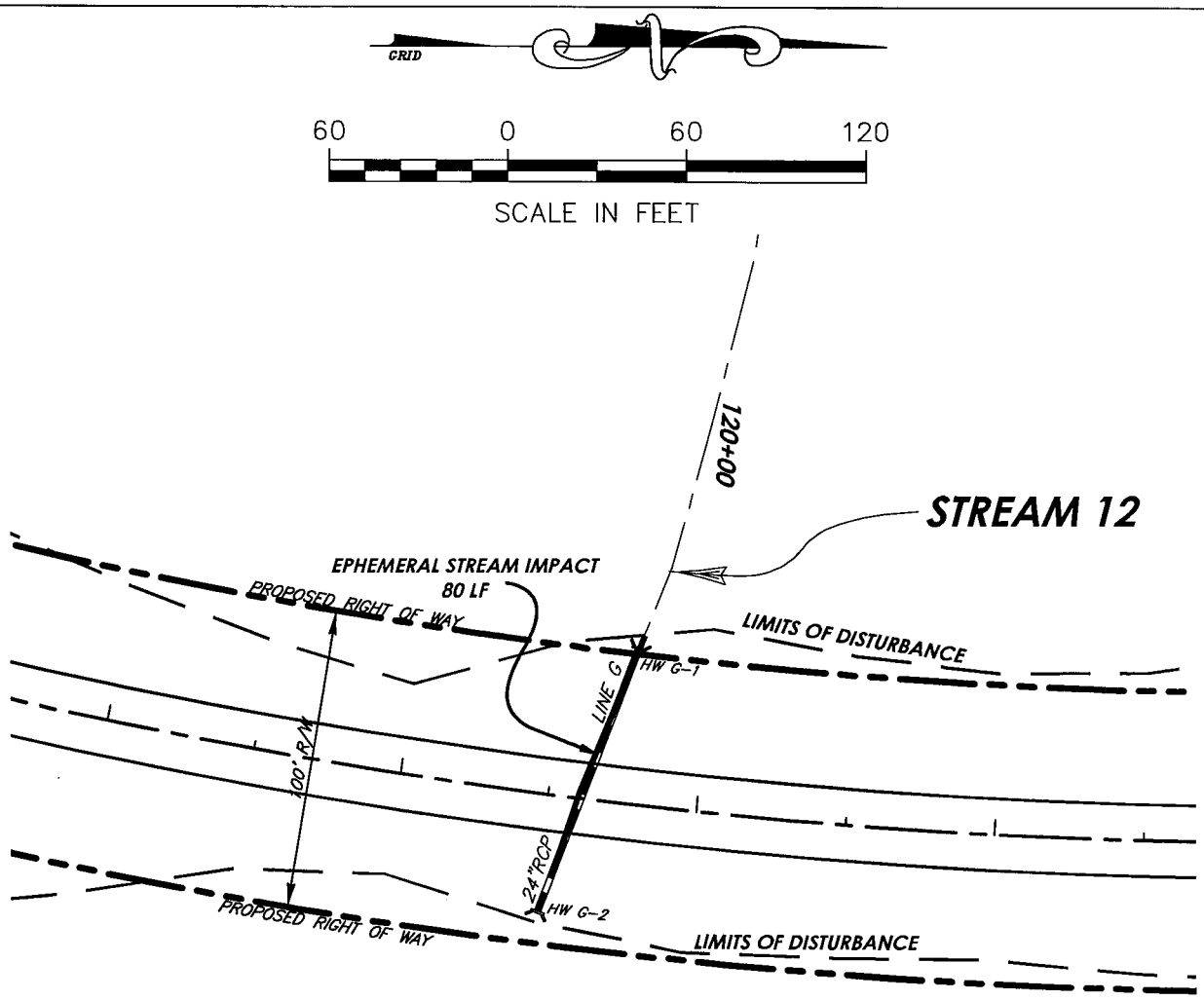


STREAMS & LAKES

US ARMY CORPS OF ENGINEERS
STREAM & WETLAND IMPACTS

FIGURE 10 OF 16

LAND LOT	DESIGN MCI	SCALE 1"=60'
DISTRICT 5th, 7th	DRAWN RO	DATE 1-7-10
SECTION	CHECK DWJ	FILE NO. 4267
COUNTY	APPROVED DWJ	SHEET NO. 5
STATE GEORGIA		



IMPACTED AREA

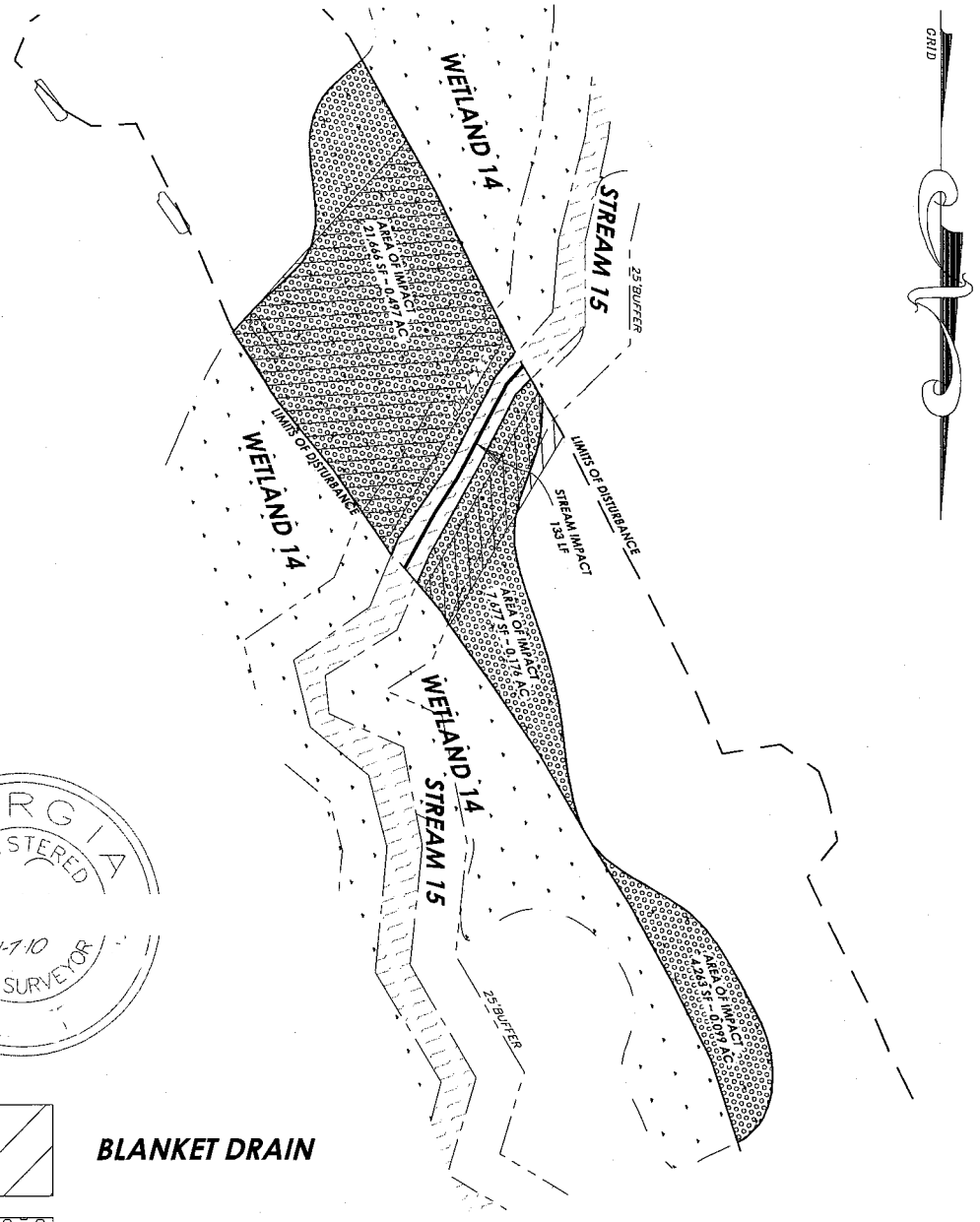
WETLAND AREA

STREAMS & LAKES

GEORGIA REGISTERED 1-7-10 LAND SURVEYOR

US ARMY CORPS OF ENGINEERS
STREAM & WETLAND IMPACTS
FIGURE 11 OF 16

LAND LOT		DESIGN MCI	SCALE 1"=60'
DISTRICT 5th, 7th		DRAWN RD	DATE 1-7-10
SECTION		CHECK DWJ	FILE NO. 4267
COUNTY		APPROVED DWJ	SHEET NO. 6
STATE GEORGIA			



GEORGIA
REGISTERED
1710
LAND SURVEYOR

BLANKET DRAIN

IMPACTED AREA

WETLAND AREA

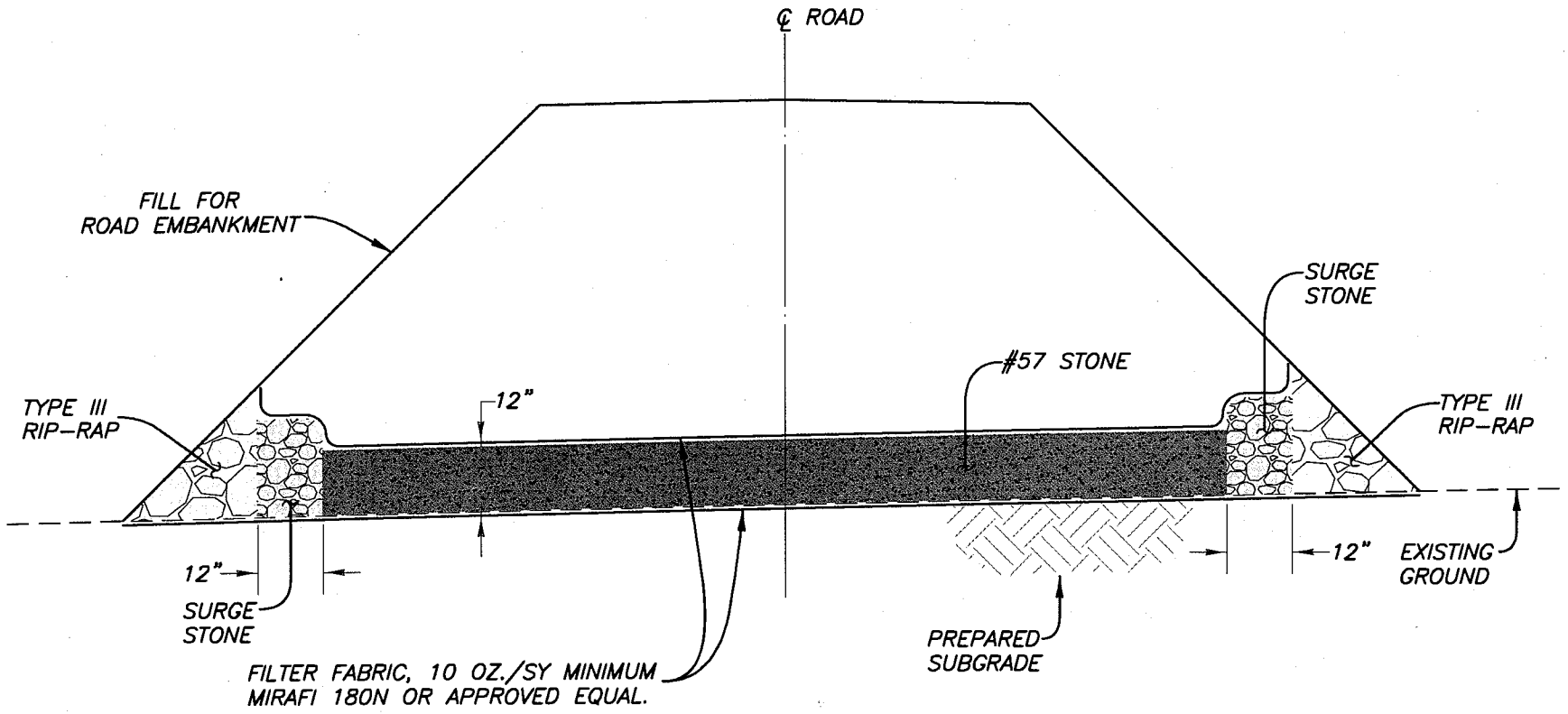
STREAMS & LAKES

100 0 100 200

SCALE IN FEET

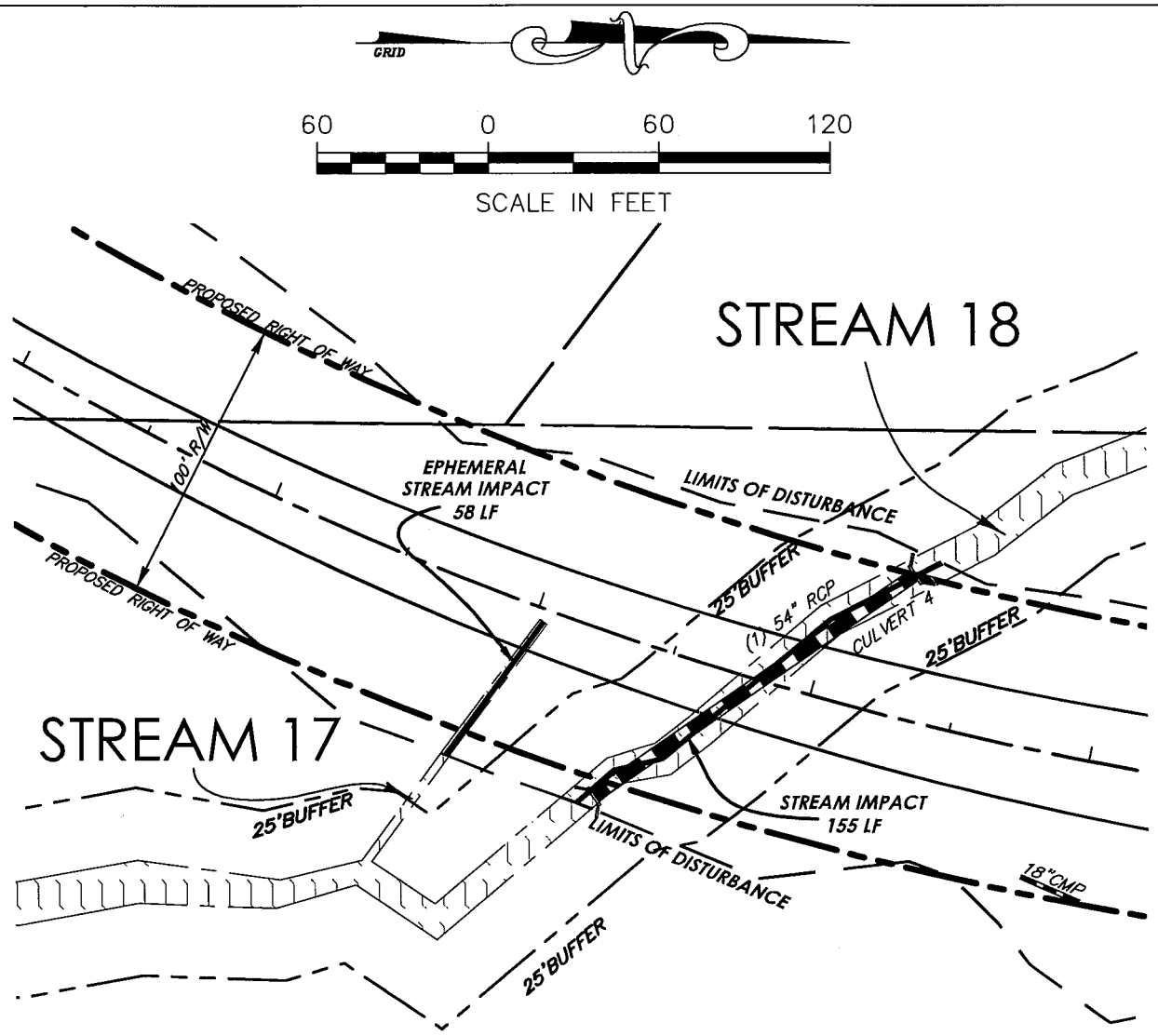
US ARMY CORPS OF ENGINEERS
STREAM & WETLAND IMPACTS

LAND LOT	DESIGN MCI	SCALE 1"=100'
DISTRICT 5th, 7th	DRAWN RD	DATE 1-7-10
SECTION	CHECK DWJ	FILE NO. 4267
COUNTY	APPROVED DWJ	SHEET NO. 7
STATE GEORGIA		



DETAIL – BLANKET DRAIN at WETLAND 14

N.T.S.



GEORGIA REGISTERED 1-7-10 LAND SURVEYOR

IMPACTED AREA

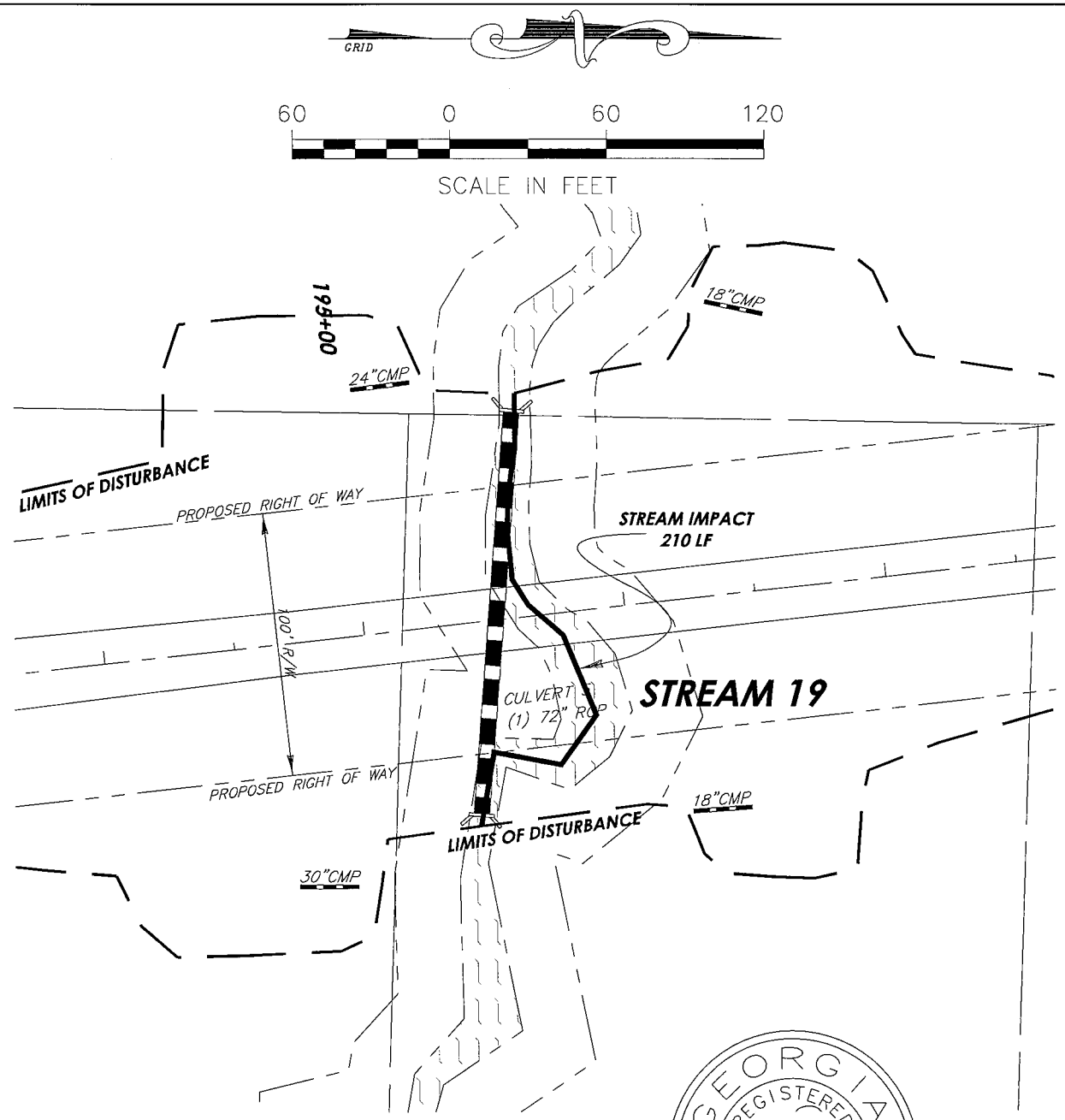
WETLAND AREA

STREAMS & LAKES

US ARMY CORPS OF ENGINEERS
STREAM & WETLAND IMPACTS

FIGURE 13 OF 16

LAND LOT	DESIGN MCI	SCALE 1"=60'
DISTRICT 5th, 7th	DRAWN RD	DATE 1-7-10
SECTION	CHECK DWJ	FILE NO. 4267
COUNTY	APPROVED DWJ	SHEET NO. 8
STATE GEORGIA		



IMPACTED AREA

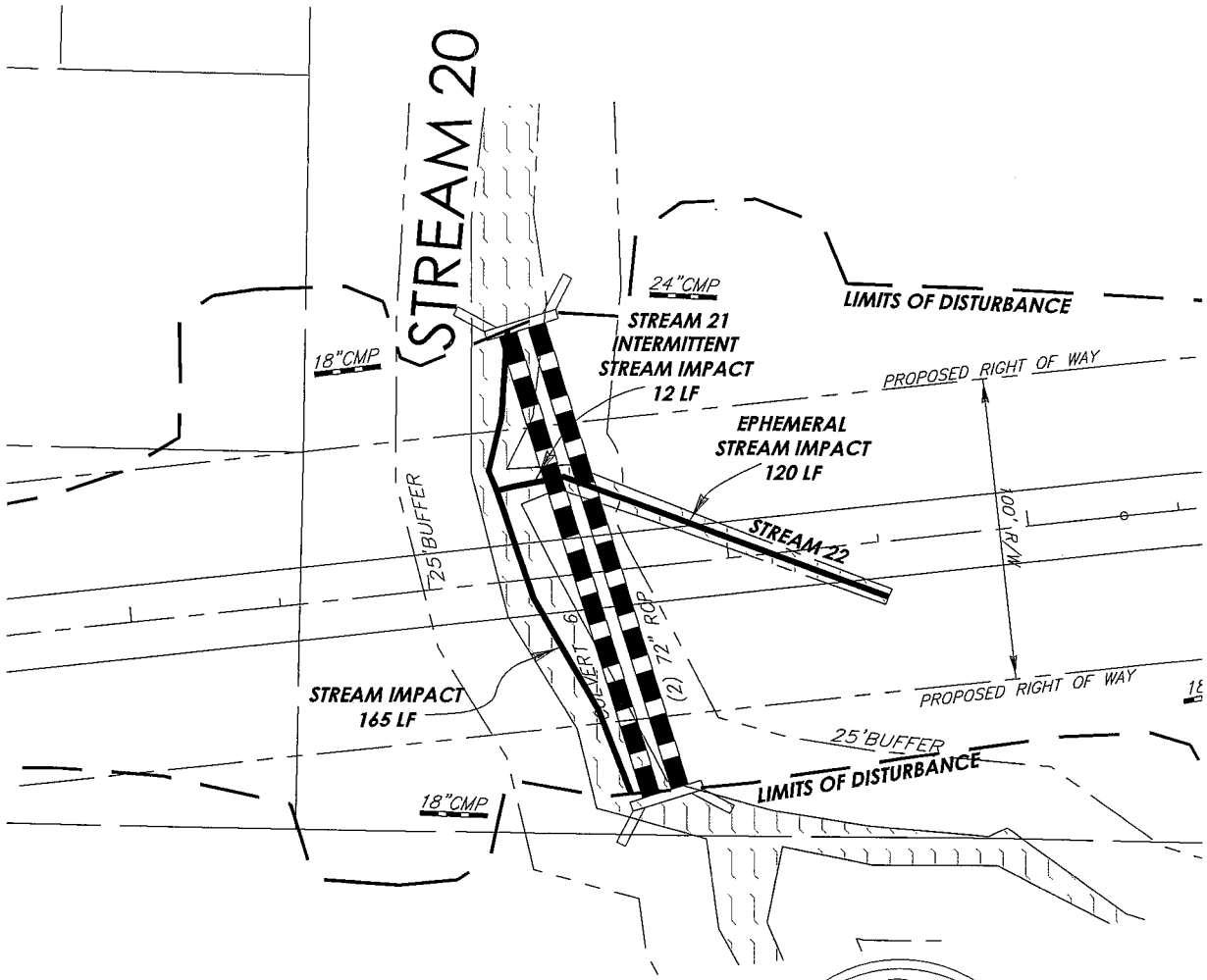
WETLAND AREA

STREAMS & LAKES

US ARMY CORPS OF ENGINEERS
STREAM & WETLAND IMPACTS

FIGURE 14 OF 16

LAND LOT	DESIGN MCI	SCALE 1"=60'
DISTRICT 5th, 7th	DRAWN RD	DATE 1-7-10
SECTION	CHECK DWJ	FILE NO. 4267
COUNTY	APPROVED DWJ	SHEET NO. 9
STATE GEORGIA		



GEORGIA REGISTERED 1-7-10 LAND SURVEYOR

IMPACTED AREA

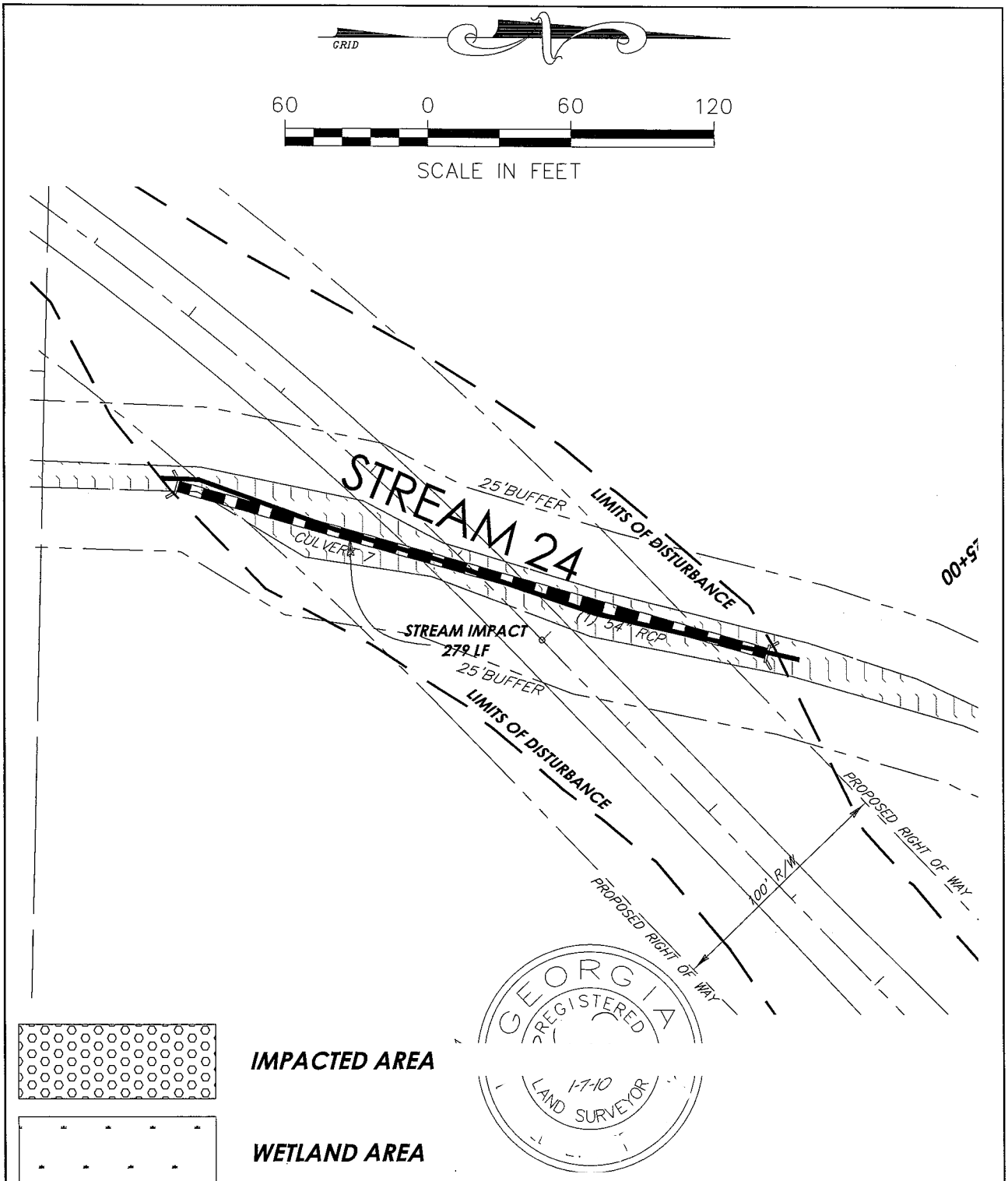
WETLAND AREA

STREAMS & LAKES

US ARMY CORPS OF ENGINEERS
STREAM & WETLAND IMPACTS

FIGURE 15 OF 16

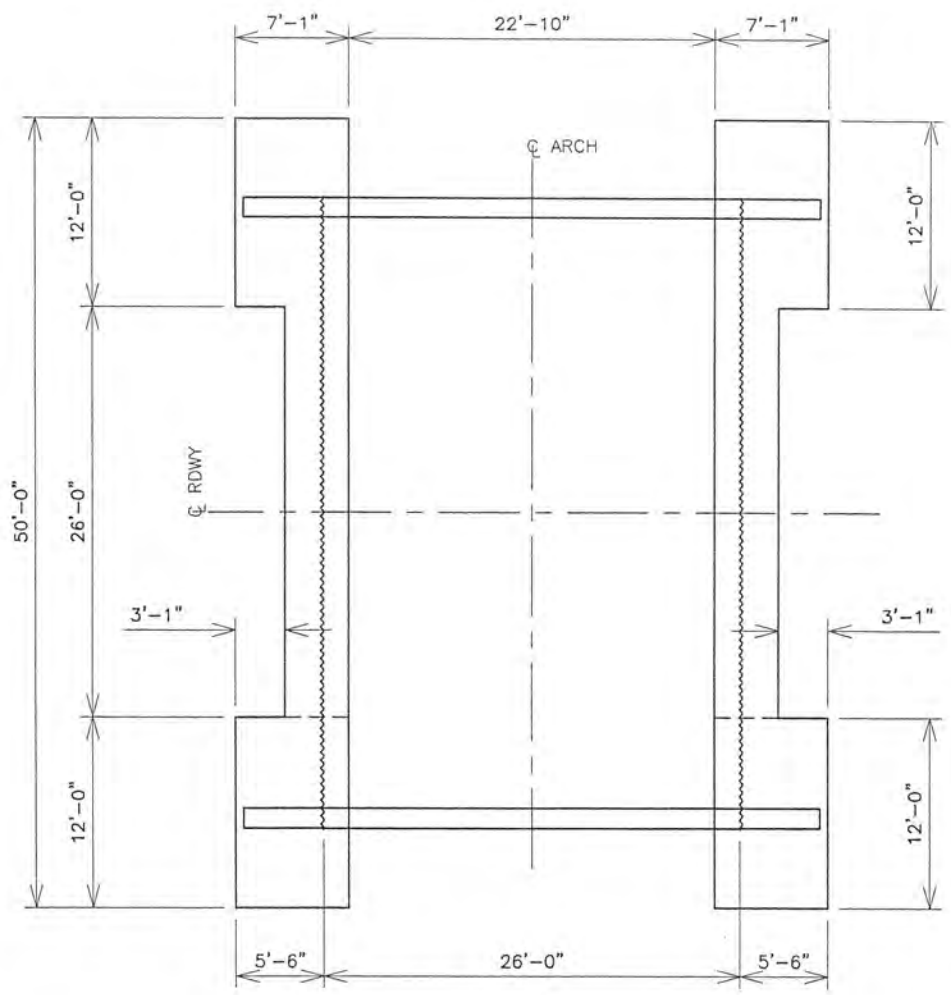
LAND LOT	DESIGN MCI	SCALE 1"=60'
DISTRICT 5th, 7th	DRAWN RD	DATE 1-7-10
SECTION	CHECK DWJ	FILE NO. 4267
COUNTY	APPROVED DWJ	SHEET NO. 10
STATE GEORGIA		



US ARMY CORPS OF ENGINEERS
STREAM & WETLAND IMPACTS

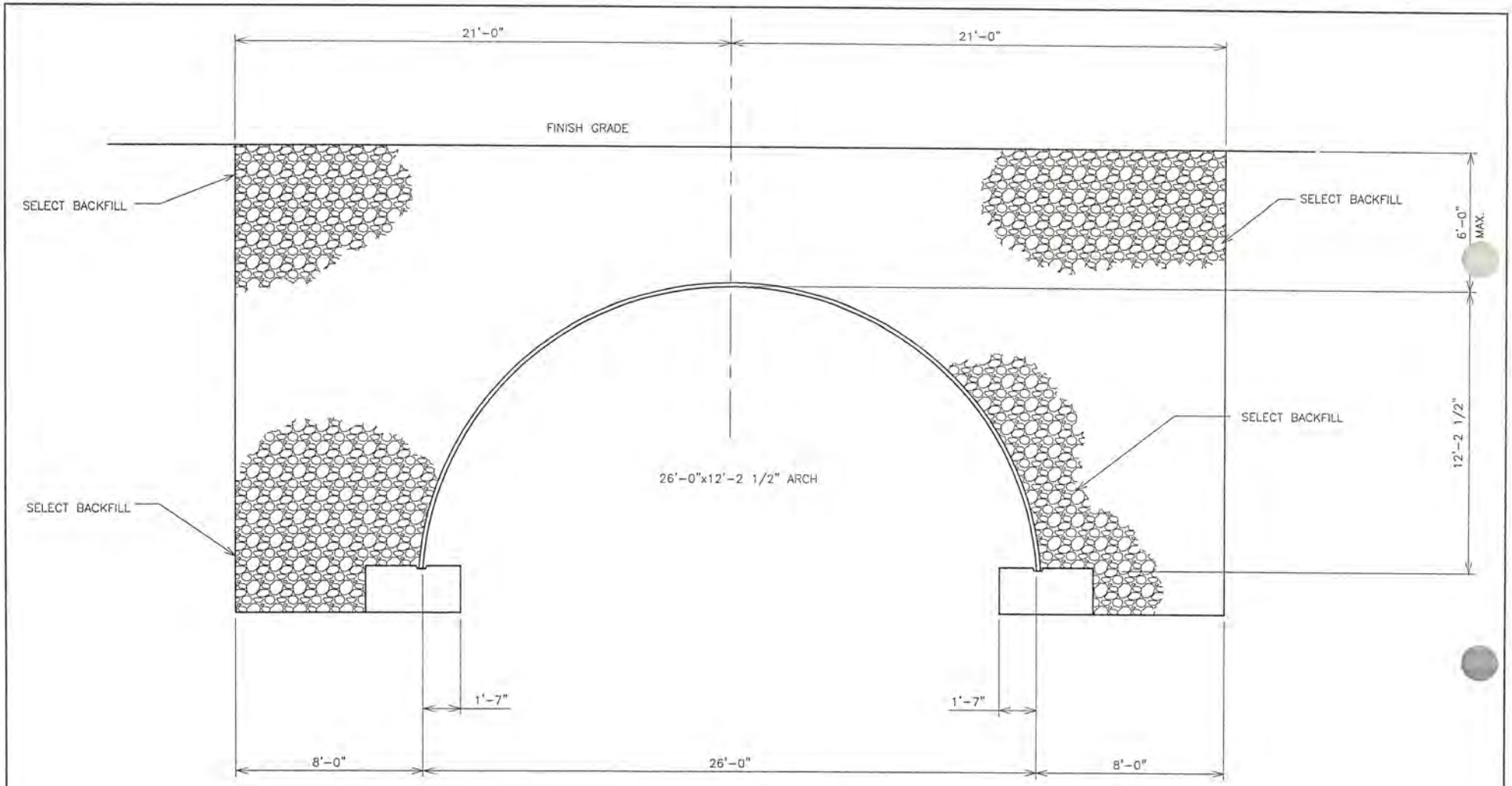
FIGURE 16 OF 16

LAND LOT	DESIGN MCI	SCALE 1"=60'
DISTRICT 5th, 7th	DRAWN RD	DATE 1-7-10
SECTION	CHECK DWJ	FILE NO. 4267
COUNTY	APPROVED DWJ	SHEET NO. 11
STATE GEORGIA		



FOUNDATION PLAN

LONG SPAN BRIDGE & CULVERT	STRUCTURE NO.		CORRUGATED METAL ARCH	1/7
	DATE: 7/29/10	DRAWN BY: JWS	26'-0" X 12'-2 1/2"	



TYPICAL CROSS SECTION

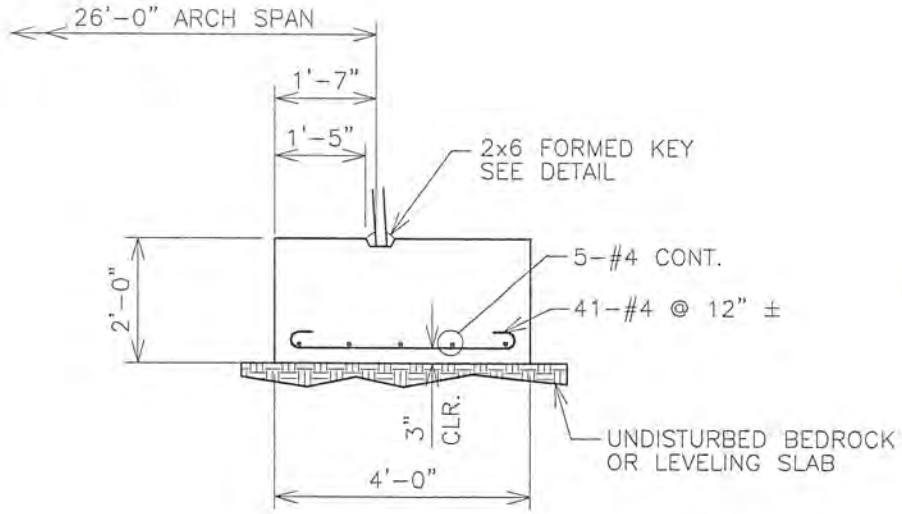
LONG SPAN BRIDGE & CULVERT	STRUCTURE NO.		CORRUGATED METAL ARCH
	DATE: 7/29/10	DRAWN BY: JWS	26'-0" X 12'-2 1/2"

CONCRETE & REINFORCEMENT GENERAL NOTES:

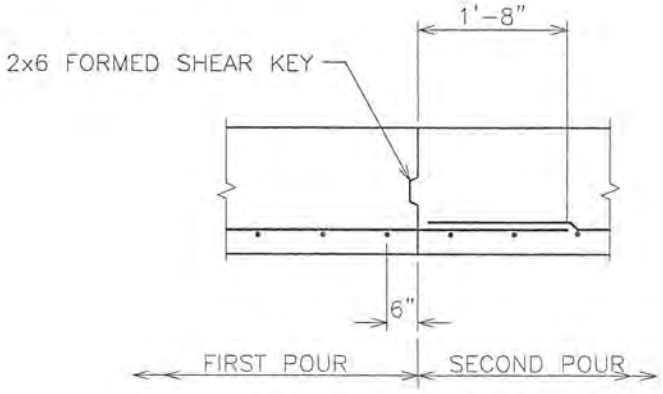
1. DESIGN, MATERIAL AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE FOLLOWING STANDARDS:
   ACI 318 BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE
   ACI SP66 ACI DETAILING MANUAL
   ACI 301 SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS
   CRSI RECOMMENDED PRACTICE FOR PLACING REINFORCING STEEL
   AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES
   GADOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
2. CONCRETE SHALL DEVELOP 3000 PSI MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS.
3. NOT USED
4. CONCRETE FOR FOUNDATIONS AND WALLS SHALL BE GADOT CLASS A WITH MAXIMUM WATER/CEMENT RATIO = 0.49, AIR CONTENT RANGE (%) = 5-8, MAXIMUM SLUMP = 3"±1".
5. REINFORCING STEEL SHALL BE DEFORMED BARS CONFORMING TO AASHTO M 31 or M 322, GRADE 60.
6. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185, FLAT SHEET ONLY.
7. UNLESS NOTED, CONCRETE COVER OVER REINFORCING SHALL BE:

	MINIMUM COVER (inches)
CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH	3
CONCRETE EXPOSED TO EARTH OR WEATHER:	
PRIMARY REINFORCMENT	2
STIRRUPS, TIES AND SPIRALS	1 1/2
CONCRETE DECK SLABS	
TOP REINFORCEMENT	2 1/2
BOTTOM REINFORCEMENT	1
CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND:	
PRIMARY REINFORCEMENT	1 1/2
STIRRUPS, TIES AND SPIRALS	1
CONCRETE PILES CAST AGAINST AND/OR PERMANENTLY EXPOSED TO EARTH	2

8. UNLESS OTHERWISE SHOWN, THE MINIMUM LAP FOR BAR SPLICES SHALL BE:
   (SPLICE LENGTHS ARE FOR AASHTO CLASS "B" SPLICES, IF LONGER SPLICES ARE REQUIRED, THEY SHALL BE SHOWN ON THE DRAWINGS.)
   * BARS MAY BE SPLICED WITH SWAGED TYPE MECHANICAL SPLICES WHICH WILL DEVELOP 125% OF THE BAR YIELD STRENGTH. INSTALLATION SHALL BE IN THE PRESENCE OF A MANUFACTURER'S REPRESENTATIVE OR QUALIFIED INSPECTOR.
9. ALL REINFORCING HOOKS SHALL BE STANDARD HOOKS AS DEFINED BY ACI, UNLESS OTHERWISE NOTED.
10. ALL EXPOSED EDGES OF CONCRETE SHALL HAVE A 3/4-INCH, 45 DEGREE CHAMFER.
11. A 1/2-INCH BITUMASTIC PREFORMED EXPANSION JOINT SHALL BE PLACED AT ALL LOCATIONS NOTED ON THE DRAWINGS AND ALSO AROUND ALL PENETRATIONS OF CONCRETE.
12. PRIOR TO PLACING CONCRETE, REFER TO WATER, SEWER, TELEPHONE, CABLE AND ELECTRICAL DRAWINGS FOR UNDERGROUND AND EMBEDDED ITEMS NOT SHOWN ON THE BRIDGE DRAWINGS.
13. EXPANSION BOLTS SPECIFIED ON THE DRAWINGS ARE SPECIFIED BY DIAMETER AND EMBEDMENT LENGTH REQUIRED. EXPANSION BOLTS SHALL BE HILTI-KWIK BOLT II OR ENGINEER APPROVED EQUAL. ALL BOLTS SHALL BE TORQUED TO MANUFACTURER'S STANDARD TORQUE VALUES.
14. ALL EXPOSED SURFACES SHALL RECEIVE A GADOT CLASS 1 FINISH TO ONE FOOT BELOW THE GROUND LINE.
15. WELDING OF CONCRETE REINFORCEMENT IS NOT ALLOWED.

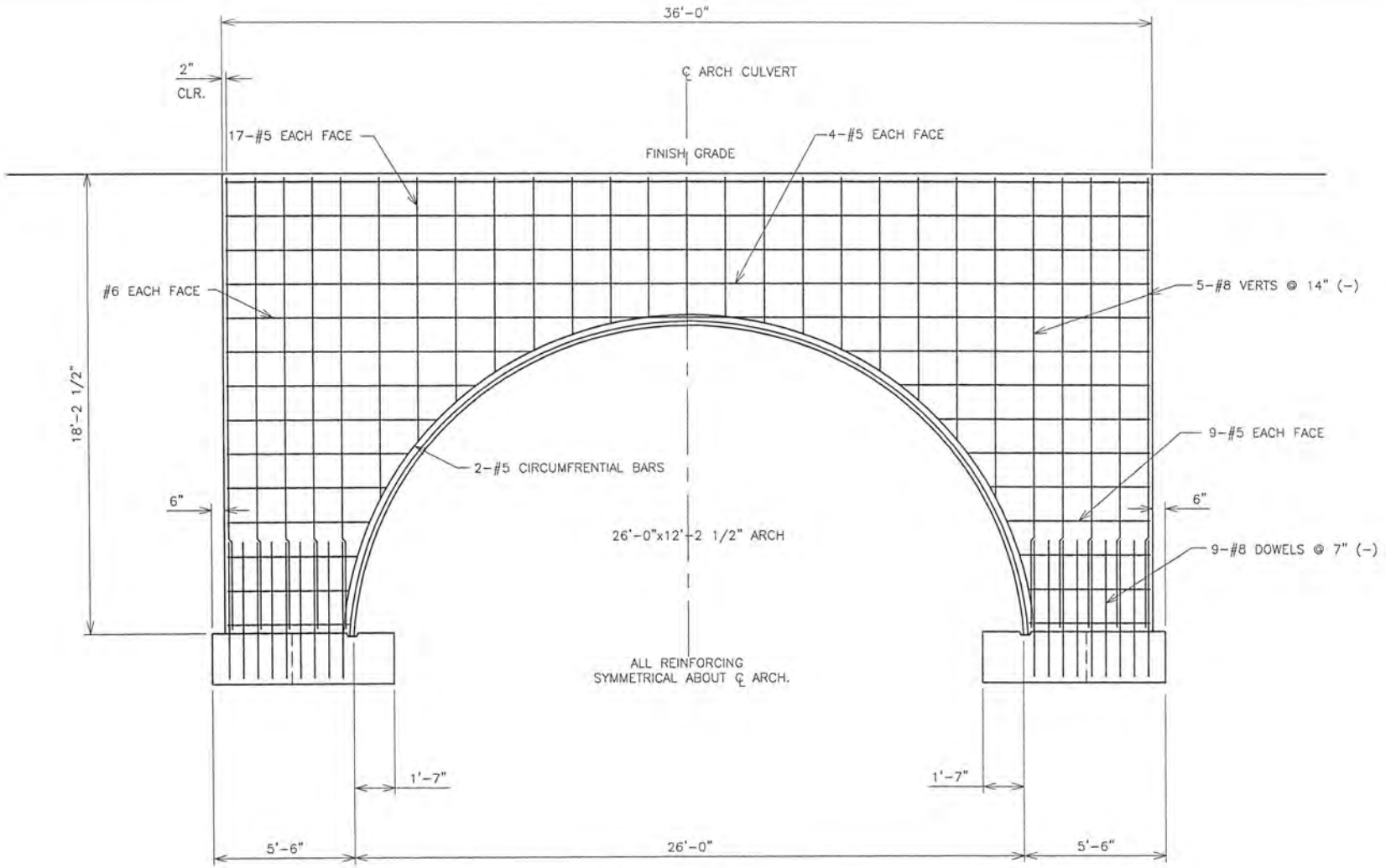


ARCH FOOTING SECTION



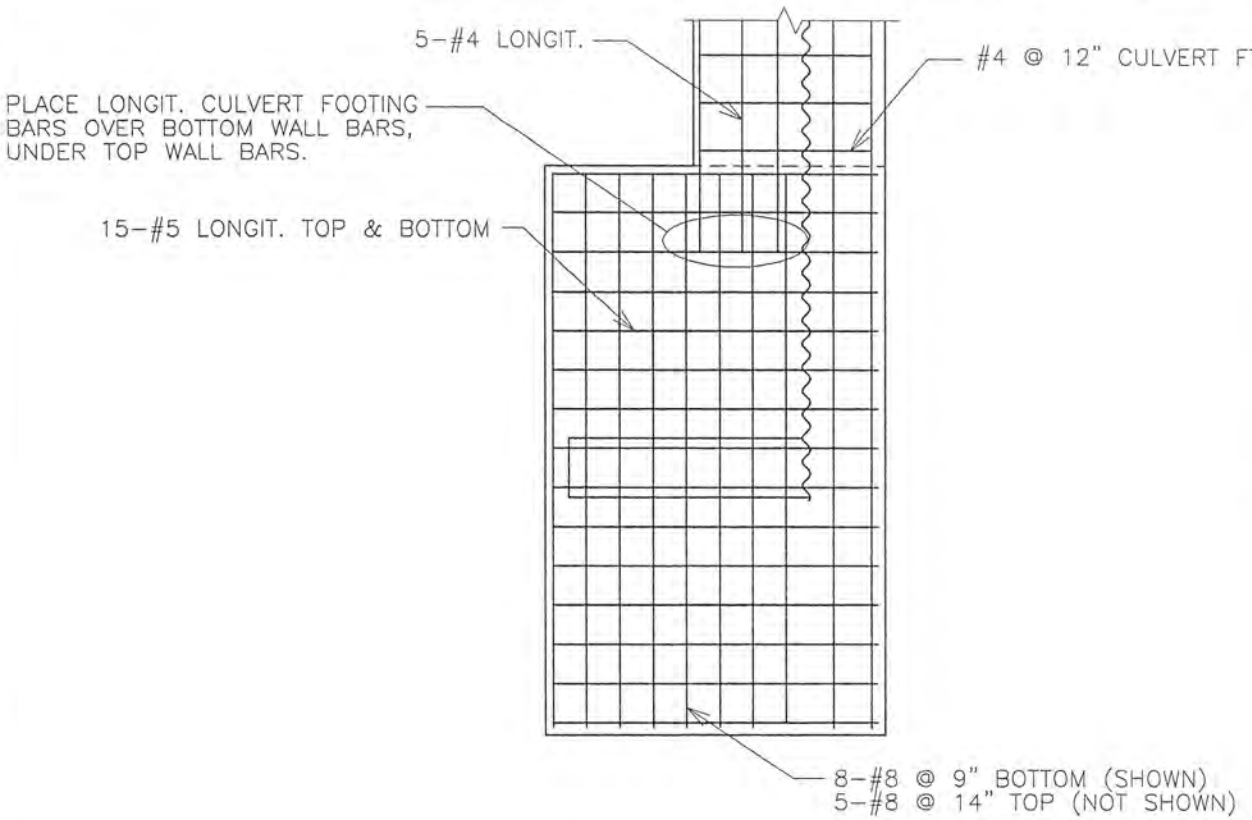
FOOTING CONSTRUCTION JOINT

LONG SPAN BRIDGE & CULVERT	STRUCTURE NO.		CORRUGATED METAL ARCH
	DATE: 7/29/10	DRAWN BY: JWS	26'-0" X 12'-2 1/2"



HEADWALL ELEVATION

LONG SPAN BRIDGE & CULVERT	STRUCTURE NO.		CORRUGATED METAL ARCH
	DATE: 7/29/10	DRAWN BY: JWS	26'-0" X 12'-2 1/2"



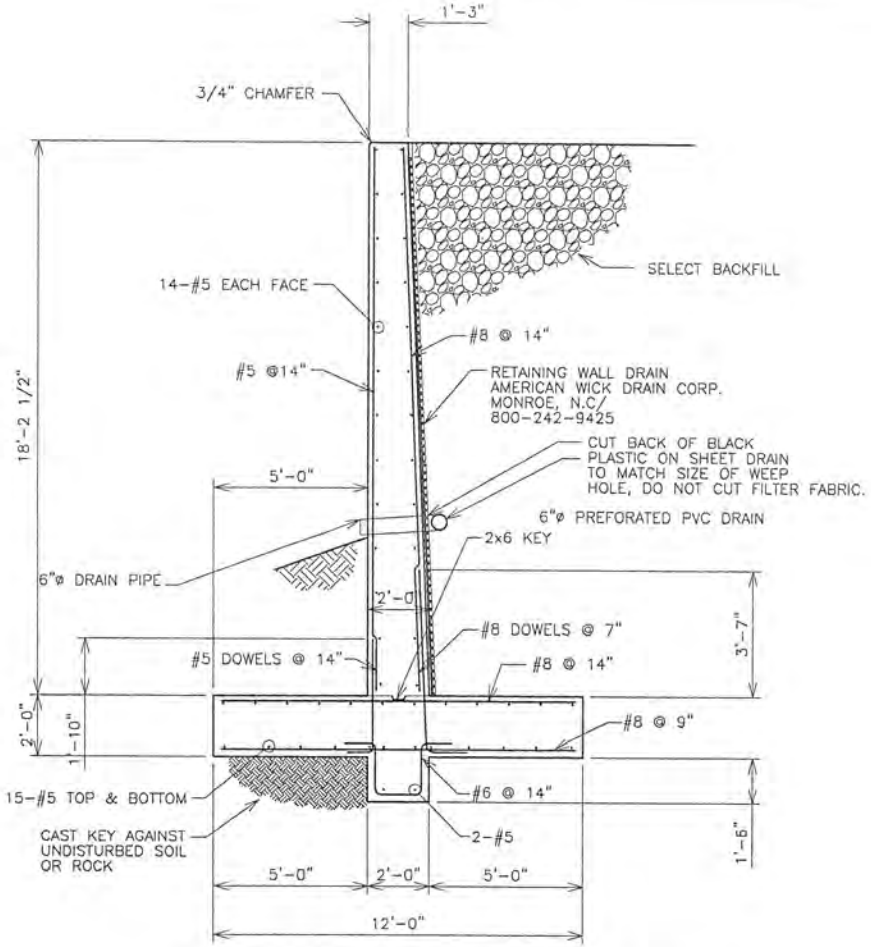
CORNER REINFORCING DETAIL

AASHTO M-145 -TABLE 1 (MODIFIED)*				
GROUP CLASSIFICFATION	A-1		A-2 (Modified)	
Sieve analysis, percent passing	A-1-a	A-1-b	A-2-4	A-2-5
No. 10 (2.00 mm)	50 max.			
No. 40 (0.425 mm)	30 max.	50 max.		
No. 100 (0.150 mm)			50 max.	50 max.
No. 200 (0.075 mm)	15 max.	20 max.	20 max.	20 max.
Characteristics of fraction passing No. 40 (0.425 mm)				
Liquid Limit			40 max.	41 max.
Plasticity Limit	6 max.	6 Max.	10 max.	10 max.
Usual Types of Significant Constituent Materials	Stone Fragments Gravel and Sand		Silty or Clayey Gravel and Sand	

*Modified to be more select than M-145

SELECT BACKFILL GRADATION

LONG SPAN BRIDGE & CULVERT	STRUCTURE NO.		CORRUGATED METAL ARCH
	DATE: 7/29/10	DRAWN BY: JWS	26'-0" X 12'-2 1/2"



TYPICAL HEADWALL AND WINGWALL SECTION

LONG SPAN BRIDGE & CULVERT	STRUCTURE NO.		CORRUGATED METAL ARCH	6/7
	DATE: 7/29/10	DRAWN BY: JWS	26'-0" X 12'-2 1/2"	

REQUIRED SUBMITTALS
The contractor shall submit the following items to the Design Engineer for approval in writing at least two weeks prior to use:

*Manufacturer Certification for yield strength of reinforcing steel.
*Manufacturer Certification for concrete mix designs.
*Soil classification test results of AASHTO M145 A-1-a as central backfill around the culvert and the site soil backfill material. See Table 1.

DEFINITIONS

MATERIAL SUPPLIER – CUSTOM – Corrugated Steel Arch – Long Span Bridge & Culvert.

CONCRETE
1.0 CODES AND STANDARDS
Concrete shall conform to AASHTO Standard specifications for Highway Bridges, Division II construction, Section 8 concrete structures.
2.0 STANDARD FOR MATERIALS
Portland Cement
Conforming to ASTM Specification C-150, Type I or II.
Water
The water shall be potable, drinkable, clean, free from injurious amounts of oils, acids, alkalis, organic materials or deleterious substances.
Aggregates
Fine and coarse aggregates shall conform to ASTM specification C-33 "Specification for Concrete Aggregates".
Steel Reinforcing
Reinforcing bars shall be grade 60 steel per ASTM A6155.
3.0 PROPORTIONING OF CONCRETE
The concrete shall be homogeneous, readily placeable and uniformly workable and shall be proportioned in accordance with ACI-211.1
4.0 QUALITIES REQUIRED FOR CUT OFF WALL AND SLOPE COLLAR
Type of cement: I or II; The concrete shall have a 28-day compressive strength of 3,500 psi slump=3 inches; and air content: 6.5%±1.5%.
4.1 Maximum Size of Coarse Aggregates
Maximum size of coarse aggregates shall not be larger than 1/5 of the narrowest dimension between forms and not larger than 1/4 of the thickness of slabs.
4.2 Rate of Hardening of Concrete
Concrete mix shall be adjusted to produce the required rate of hardening for varied climatic conditions:
a) Under 40°F Ambient Temperature – NonChloride Accelerator (Approval in Writing from the Engineer). Concrete shall be placed in accordance with "ACI 306 Cold Weather Concreting".
b) Over 70°F Ambient Temperature – Retard (Type D Admixture).
c) Between 40°F and 70°F – Normal rate of hardening (Type A Admixture).
5.0 MIXING AND PLACING
The work includes furnishing all labor, materials, transportation, supervision, tools, and construction machinery that may be necessary.
Equipment
Ready Mix Concrete shall be used and shall conform to the "Specifications for Ready-Mixed Concrete," ASTM C-94.
Approval is required prior to using job mixed concrete. Work shall be in accordance with ACI Recommended Practice for Winter or Hot Weather Concrete, whichever is appropriate.
Preparation
All work shall be in accordance with ACI-304R, "Recommended Practice for Measuring, Mixing and Placing Concrete". All construction debris and extraneous matter shall be removed from within the forms. Struts, stays, bracing and blocks, serving temporarily to hold the forms in correct shape and alignment, shall be removed. All concrete shall be placed on clean, damp surfaces, free from water, or upon properly consolidated fills. Concrete shall be deposited in approximately horizontal layers, not to exceed 18 inches. Concrete that has to be dropped four feet or more shall be placed through a tremie.
Vibration
Concrete shall be consolidated by means of mechanical vibration. Vibrators shall be inserted and removed vertically at regular intervals not to exceed every 18 inches to ensure uniform consolidation. In no case shall vibrators be used to transport concrete inside the forms.
6.0 FORM WORK
The work includes furnishing all labor, materials, transportation, supervision, tools, and construction machinery that may be necessary.
Installation
Form work shall follow ACI 347, "Recommended Practice for Concrete Form Work". Forms shall conform to the working drawing to shape, line and dimensions of members and shall be substantially free from surface defects and sufficiently tight to prevent leakage. They shall be properly braced and tied to maintain position and shape.
Removal
Remove forms in a manner and at such time as to ensure complete safety of the structure. In no case shall supporting forms or shoring be removed until sufficient strength has been obtained to support weight and load.

7.0 CURING
Fresh concrete shall be protected from rains, flowing water and mechanical injury, sun, drying winds, and freezing for a period of 7 days. The temperature of the concrete must be kept above 50°F for at least 7 days.
8.0 TESTING
The frequency of the tests will be at the discretion of the Design Engineer.
9.0 CONCRETE FOR LONGITUDINAL STIFFENERS
The concrete placed for the longitudinal stiffeners shall have a minimum of 28-day compressive strength of 1,500 psi.
Backfill operation can be continued after the concrete has been hardened for 12 to 24 hours.

EARTHWORK SPECIFICATIONS

GENERAL
The Contractor shall furnish all labor, material and equipment, and perform all work and services except those set out and furnished by [redacted] necessary to complete in a satisfactory manner the site preparation, excavation, filling, compaction, and grading as shown on the plans and as described therein.

This work shall consist of all clearing and grading, preparation of the land to be filled, filling of the land, spreading and compaction of the fill, and all subsidiary work necessary to complete the grading of the cut and fill areas to conform with the project lines, grades, slopes and specifications.

This work is to be accomplished under the observation of the Engineer's designated representative. Placement of backfill material will not be permitted unless the Engineer's designated representative (QA/QC field technician) is onsite.

Prior to bidding the work, the Contractor shall investigate the construction site as to the nature and location of the work, and the general and local conditions including, without limitation, the character of surface or subsurface conditions and obstacles to be encountered. The Contractor shall also make any additional investigation as they deem necessary for the planning and proper execution of the work.

GEOTECHNICAL DATA

The geotechnical engineer shall verify the allowable bearing capacity of the subgrade soil at the bottom of the footings based on theexploration pits, the excavation should extend to the competent natural soil and filled with crushed stone or CADOT concrete having a 28-day compressive strength of 3,0000 psi. Concrete shall be placed at a 3"±1" slump, water-cement ratio shall be 0.49 and an intrained air content of 6.5% ± 1.5%.
If conditions other than those indicated by the confirmatory subsurface boring program are discovered by the Contractor, [redacted] LLC should be notified immediately. The material, which the Contractor believes to be a changed condition, should not be disturbed so that the [redacted] designated representative can investigate the condition.

CLEARING AND GRUBBING

The work includes furnishing all labor, materials, transportation, supervision, tools and construction machinery which may be necessary to accomplish the clearing and grubbing for this project area.

When the construction/operation sequence requires, all trees, bush, etc., shall be removed from the limits of the areas to receive fill or other engineered structures. The areas may be extended outside the actual lines of construction only to the distance required to provide the contractor with sufficient space to perform the work.

All stumps, vegetation, brush, or debris shall be removed from the limits of the fill or other engineered structures.

STRIPPING
The work includes furnishing all labor, materials, transportation, supervision, tools, and construction machinery that may be necessary.

When the construction/operation sequence requires the area of fill or other engineered structures shall be properly stripped. This stripping shall include topsoil and other deleterious materials. Topsoil shall be removed to its full depth and stockpiled for use in the final cover. Any rubbish, organic and other objectionable soils, and other deleterious material, shall be properly disposed of at a site approved by LSBC.

EXCAVATION
The work includes furnishing all labor, materials, transportation, supervision, tools, and construction machinery that may be necessary to accomplish the excavation in the grading limits as determined by the site Civil Engineer.

The lines and grades shall be established by using control benchmarks.

The Contractor shall remove all materials encountered within that portion of the site to the proper depth as indicated on the drawings prepared by the project Civil Engineer.

Suitable material removed from the excavation may be used, in so far as practical, in the formation of embankments as shown on the Drawings

BACKFILL REQUIREMENTS

Material Qualifications
The select backfill material around the long span arch culvert shall be AASHTO M145 A-1-a well-graded granular material as detailed in Table 1. Recycled concrete material shall not be used.

The select backfill material and site soil backfill for the adjoining embankment material shall be tested in the laboratory for grain size distribution (AASHTO T-27 for granular material; AASHTO T 88 for soil material) and the maximum dry unit weight and the optimum moisture content by Modified Proctor Method (AASHTO T-180) at a frequency no less than 1 for each type of materials. The testing described above is for purposes of verification of site soil backfill parameters and is in addition to the general project specifications for the embankment backfill, but does not supersede project specifications that may be more stringent.
Placement
Place backfill material evenly on both sides of the pipe with each lift to be extended the entire length of the pipe prior to placement of the next sequential lift. Fill placement shall begin in the middle of the pipe length and extend equally on both sides in the upstream and downstream directions. When directed, shovel slicing and/or spud bars shall be used in conjunction with all of the compaction operations, to completely backfill the corrugations along the haunch of the pipe (below the Springline).

The selected granular backfill shall be placed in horizontal layers not to exceed 8-inch loose depth. The lift thickness may be reduced by the Design Engineer or his designated representative to obtain the required compaction, fill all the voids, achieve the proper seating of the backfill material and achieve the stability of the backfill material and the pipe. The granular backfill shall be compacted to 90 percent of the maximum dry unit weight as determined by the Modified Proctor test (AASHTO T-180). Field nuclear density tests shall be performed at a minimum frequency of two tests per every other lift on each side of the structure. Greater emphasis shall be given to a uniform degree of compaction throughout each lift than to achieving a degree of compaction greater than the minimum specified criteria.

All granular material shall be compacted using mechanical devices, hand devices, vibrating plates or other equipment approved by the Engineer. Compaction equipment weighing more than 24,000 pounds shall not be used within 2.5 feet of the corrugated metal structure.

The soil backfill within 10 feet of the granular backfill shall be placed in layers not to exceed 8-inch loose depth. The lift thickness may be reduced by the Design Engineer to obtain the required compaction. The soil backfill shall be compacted to a minimum of 90 percent of the maximum dry unit weight as determined by the Modified Proctor test (AASHTO T-180) with a moisture content within 2% of the optimum moisture content. Field nuclear density tests shall be performed at a minimum frequency of four tests per every other lift or to the project requirements, whichever is more stringent on the soil backfill on each side of the structure. The testing described above is in addition to the general project specifications for the embankment backfill and does not supersede project specification that are more stringent than these requirements. The contractor shall submit to the owner samples of proposed soil backfill material for testing to verify the maximum dry unit weight and the optimum moisture content by Modified Proctor Method (AASHTO T-180) and grain size relationship (AASHTO T-27).
If at any time longitudinal cracks develop in the backfill surrounding the pipe, to a distance of 30 feet from the springline of the pipe, these features should be brought to the immediate attention of the field QA/QC personnel and the Design Engineer.
While compacting granular backfill material with a vibratory compactor adjacent to the pipe, the opposite side of the pipe should be observed to note if vibrations are loosening the granular materials on that side. This may be more prevalent at higher elevations of the backfill with respect to the pipe. If this condition occurs the field QA/QC technician and Design Engineer should be notified prior to placement of a sequential lift on either side.
The structure should not be crossed with equipment heavier than a D-4 type dozer. No other equipment or highway (HS20) loading shall be allowed to cross the structure until the roadway pavement is placed. Top filling should begin at the middle of the structure (length wise) with backfill being pushed up and over the structure with a D-4 or preferably smaller type dozer. The fill should be pushed over the structure in a directional manner 45 to 90 degrees to the axis of the structure. Special care should be maintained by the contractor to operate construction equipment parallel to the axis of the pipe during backfill placement.

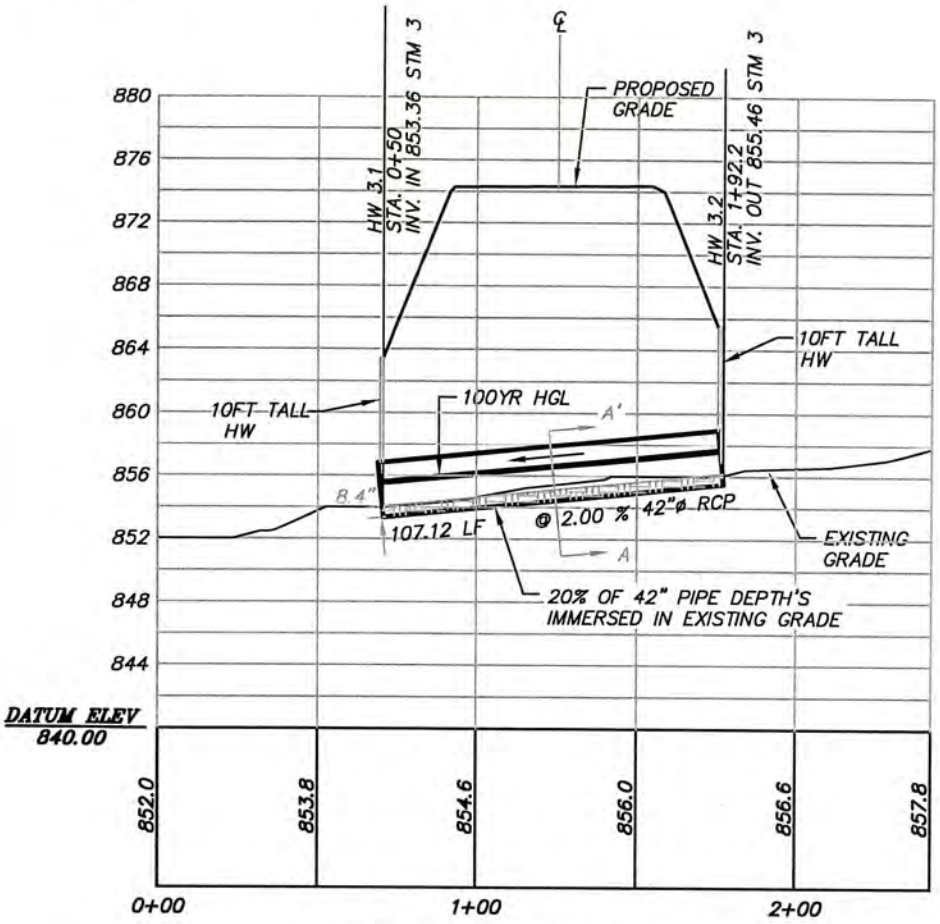
ADDITIONAL REQUIREMENTS

1. Materials must be dense graded. No open or gap graded material is allowed.
2. Fine beach sands, windblown sands, stream deposits exhibiting fine, rounded particles and typically specific by AASHTO as A-3 materials are not allowed.
3. On-site mixing or blending to achieve specified gradation is not allowed.
4. Maximum particle size must not exceed 3 inches. For A-2 materials, moisture content must be between -3% to +2% of optimum as defined by AASHTO T-180. All soil classifications are limited in height of cover and structure shape applications as follows:
   (a) A-1-a material is suitable for all structural shapes, sizes, and fill heights.
   (b) A-1-b material is suitable only for use with high profile arch and pear shaped structures to a 12 feet maximum fill height and for use with elliptical and low profile arch structures to a 20 feet maximum fill heights.

CAUTION:

The backfill specifications and requirements detailed in these engineering plans are critical to the stability of the structure. Deviation from the materials and procedures detailed in these plans may result in excessive deflection of the structure and could result in failure.

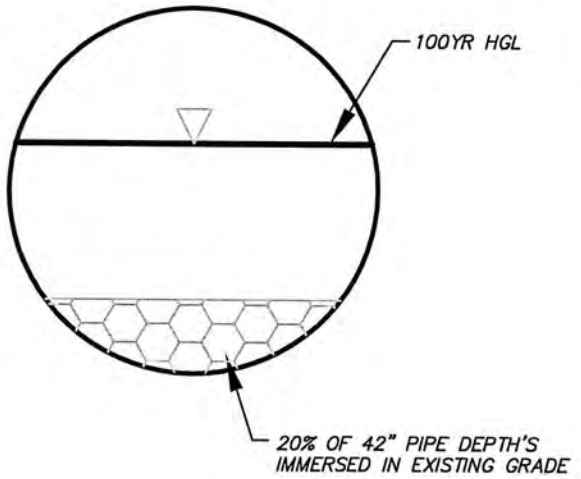
LONG SPAN BRIDGE & CULVERT	STRUCTURE NO.		CORRUGATED METAL ARCH	7/7
	DATE: 7/29/10	DRAWN BY: JWS	26'-0" X 12'-2 1/2"	



STORM PROFILE 3

HORIZONTAL SCALE: 1" = 50
VERTICAL SCALE: 1" = 10'

CROSS SECTION A–A'. 42" PIPE



	DATE: 11-30-2007 PROJECT: 02085.05		
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