# *Roquist Wetland Restoration Site Phase I Mitigation Report*

Roquist Wetland Restoration Site Phase I

Bertie County, North Carolina

Cataloging Unit: 03010107

SCO# 04-0627901A

NC DENR# D050315


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## EXECUTIVE SUMMARY

The Roquist Wetland Restoration Site (hereafter referred to as "the Site") is located within Bertie County, North Carolina within Hydrologic Unit 03010107 of the Roanoke River Basin. The Roquist wetland forms the headwater basin of Roquist Creek and Indian Creek.

The Site encompasses 3,926 acres (ac) and is almost entirely (99%) comprised of an extensive wetland system. The drainage area is approximately 13,700 ac. The land surrounding the wetland is comprised mostly of agricultural crops and pine plantations. The Site itself had been timbered for nearly a century. Timbering in the Roquist wetland required elevated logging roads to be constructed throughout the Site. These roads included ditches adjacent and perpendicular to the logging roads. 12 miles (mi) of logging roads existed on the Site pre-construction.

Originally, Phase I of the Roquist project consisted of restoration of 52 ac of previously ditched and filled nonriverine wetlands, preservation of 3,776 ac of nonriverine wetlands, preservation of 45 ac of uplands, and preservation of 3,660 ft of stream on Jack's Branch. However, due to fiscal constraints, the restoration design for Phase I was scaled back to include 45.2 ac. The restoration efforts included filling roadside ditches, grading logging roads to existing wetland elevations, and planting of native vegetation. Construction took place between April 30, 2007 and January 16, 2008. Final acceptance was given on February 6, 2008. Restoration efforts will improve water storage, pollutant removal, aquatic/wildlife habitat, and recreation. The post-construction site conditions are further detailed within this report.

Monitoring of the wetland restoration efforts will be performed for 5 successful years. Monitoring for two wetland components, hydrology and vegetation, will take place. Groundwater hydrology will be monitored with automated groundwater gauges. These gauges will record water level data daily. Hydrologic success criterion consists solely of the restored area meeting the requirements to be classified as a wetland. These requirements are detailed within this report.

Vegetation plots were set within the restored area. These plots will be inventoried during each growing season within the 5 year monitoring period. All but two plots were set to coincide with the groundwater gauge locations. Wetland vegetation survivability deals with the number of live plantings and is further detailed within this report.

Figures 4 and 5 within this report summarize the mitigation areas, vegetation plot and groundwater gauge locations, and the planting zones.

Future visitors of the Site should be aware of the presence of wild hogs, which is evidenced by footprints found throughout the Site, when completing monitoring tasks. The wild hogs may also contribute to the destruction of plantings installed.

In the event that vegetation and/or hydrology success criteria are not fulfilled, appropriate contingency measures will be implemented in coordination with the Resource agencies.

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# 1.0 Introduction

The North Carolina Ecosystem Enhancement Program (EEP) developed a regional wetlands mitigation site in eastern North Carolina. The Roquist Wetland Restoration Site is located in western Bertie County south of Lewiston-Woodville, North Carolina within Hydrologic Unit 03010107 of the Roanoke River Basin (Figure 1).

The Roquist Wetland Restoration Site is a unique ecosystem hosting prime examples of nonriverine wetland communities in large, nearly intact tracts. The Site encompasses 3,926 ac positioned on the interstream divide of the Roanoke and Cashie Rivers. Historically, the Site was known as a pocosin primarily for its geologic setting rather than its vegetative composition. The Site is almost entirely comprised of Nonriverine Swamp Forest and Wet Hardwood Forest Communities with relatively smaller portions of Mesic Mixed Hardwood Forest Communities (Schafale and Weakly 1990) positioned along the margins of the vast flat. Historic activities in the Site include intensive logging and some conversion of wetland hardwood forests into pine plantation. These efforts required constructing elevated roads for access into the area in addition to ditching in order to drain the site for ease of timber removal. Although the Roquist Wetland Restoration Site has been heavily timbered for nearly a century, there remains approximately 390 ac of high quality old growth forest harboring specimens of a rare 95+ years of age. The old growth forest forms a contiguous Nonriverine Swamp and Wet Hardwood (Schafale and Weakly 1990) stand that is uncommon to be of this age and size.

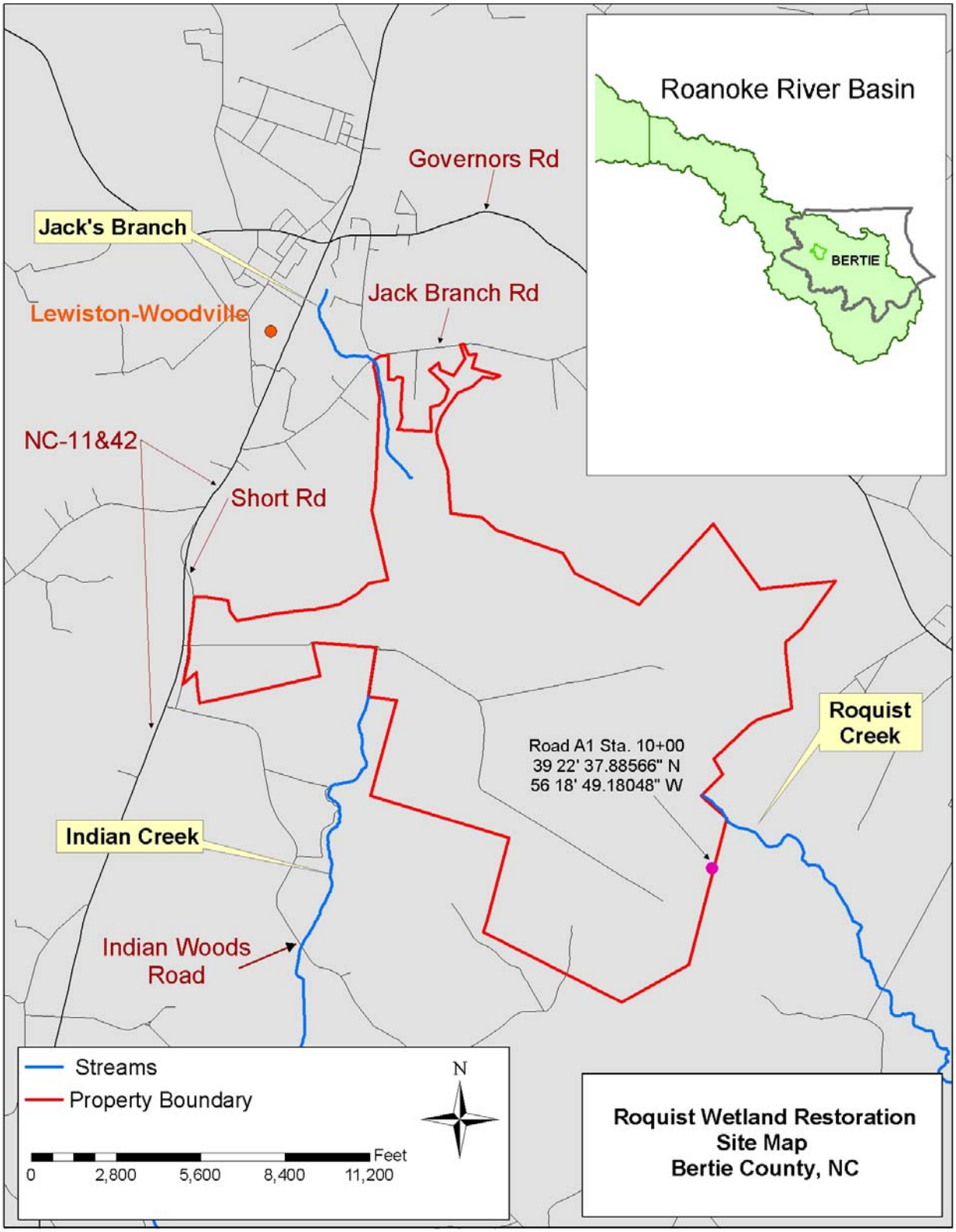
# 2.0 Project Summary

Due to the magnitude of the restoration effort for the Roquist Wetland Restoration Site, the project was divided into two major phase's (hereafter referred to as Phase I and Phase II). The restoration components for Phase I of the Roquist Wetland Restoration Site consisted of restoring ditched and filled wetlands and preserving existing Nonriverine Swamp Forest, Nonriverine Wet Hardwood Forest, and Mesic Mixed Hardwood Forest Communities. The Roquist Wetland Restoration plan (August 2005) proposed restoration of 52 ac of wetlands. However, due to fiscal constraints, Phase I was scaled back to include only 45.2 ac of restored wetlands. Specifically, Phase I consisted of the following components:

- restoration of 45.2 ac of previously ditched and filled nonriverine wetlands
- preservation of 3,776 ac of nonriverine wetlands
- preservation of 45 ac of uplands
- preservation of 3,660 ft of stream

The project activities, timeline, and contacts are summarized in Appendices A and B.

**Figure 1. Site Map**



## 2.1 Pre-Construction Site Conditions

### 2.1.1 Land Use

The Site encompasses 3,926 ac positioned on the interstream divide of the Roanoke and Cashie Rivers, drainage area of approximately 13,700 ac. The Roquist wetland forms the headwater basin of Roquist Creek and Indian Creek. Land use surrounding the wetland is mostly comprised of agriculture crops and pine plantations. The Site itself lies almost entirely within the limits of the wetland system with peripheral portions of the Site extending into uplands. Ninety percent of the Site is 42 feet (ft) above mean sea level (msl) with a gradual rise to 54 ft above msl forming the rim. The highest elevation reaches 78 ft above msl and is located within the small stream basins (Jack's Branch) located in the northern portion of the Site.

Timber records from International Paper indicate the Roquist Wetland Restoration Site has been timbered for nearly a century with the oldest stands being established in 1905 and 1910. However, the majority of the existing forest within the Site ranges from twelve to sixty years of age. The most recent timbering activities occurred in 2003 with a final 927 ac harvested from April to October. In addition, logging records reveal a pine plantation was established within timbered wetlands near the western entrance of the Site. Timbering in the Roquist wetland required elevated logging roads to be constructed throughout the Site to aid in removal of timber. Aerial photographs of the Site indicate that five miles of logging roads were present as early as 1964. These roads include ditches located adjacent and perpendicular to the logging roads ranging in width from 2 to 25 ft. Prior to construction, 12 mi of logging roads traversed the Site including a small segment in the north. Figure 2 is an example of the logging roads and adjacent ditches that were in place prior to construction.

**Figure 2. Logging Roads**

### 2.1.2 Water Resources

There are three jurisdictional streams located within the Site. These streams include Jack's Branch, Roquist Creek, and Indian Creek (Figure 1). On the USGS topographic map Jack's Branch appears to have a continuous channel through the Roquist wetland and connecting with Indian Creek. Historically, this may have been accurate but field investigations (2003) of Jack's Branch revealed no continuous channel through the Roquist wetland, but Jack's Branch does have 4,000 ft of clearly defined channel in the northern section of the Site. Non-jurisdictional surface waters observed within the Site include drainage ditches located adjacent to and perpendicular to the existing logging roads.

The Roquist Wetland Restoration Site is almost entirely comprised of an extensive wetland system. Specifically, the wetland accounts for 99%, or 3,881 ac of the Site. Based on field observations, the wettest hydrology is localized within the center of the Site where the lowest recorded elevations (41.5-42 ft above msl) occur. These areas experience more frequent and deeper inundation when compared with the adjacent wetland areas. Presumably this is due to the influx of water from the surrounding uplands. Relatively drier wetlands are located along the margins of the Roquist wetland where elevations are slightly higher (43-45 ft above msl) than elevations within the central flat. Environmental scientists of HSMM of North Carolina, Inc. (HSMM) delineated the wetland/upland boundary along the proposed mitigation areas from October 20 to 28, 2003 using the methods described in the *1987 U.S. Army Corps of Engineers (USACE) Manual, Field Guide for Wetland Delineation*. The jurisdictional determination was received from the USACE on February 11, 2004 (Appendix A).

### 2.1.3 Habitat

*The Classification of Natural Communities of North Carolina, Third Approximation* (Schafale and Weakley 1990) was used to categorize the Site's natural plant communities. Consequently, the following natural communities were identified within the 3,926-ac Site: Nonriverine Swamp Forest, Nonriverine Wet Hardwood Forest, and Mesic Mixed Hardwood Forest (Coastal Plain Subtype). These communities are listed in the North Carolina Natural Heritage Program's (NCNHP) database for Natural Communities within the Roquist wetland. Floristic communities that could not be classified according to Schafale and Weakley (1990) included pine plantation, old-field community, and clear-cut areas (early succession) (Figure 4, Table 1).

Old-field communities within the Site include early stages of Nonriverine Swamp and Wet Hardwood Forests and accounted for approximately 25% of the Site's plant community. These communities were classified as those that have been intensively logged within 1 to 10 years of the investigation (October 2003). Clear-cut communities were classified as areas that had been intensively logged within one year of the Site investigation. Clear-cut communities included approximately 32% of the Site's plant community.

**Table 1. Roquist Wetland Restoration Site Pre-Construction Plant Communities**

| Plant Community | Acres | Percent of Total Area |
|---|---|---|
| Nonriverine Swamp Forest | 769 | 20 |
| Nonriverine Wet Hardwood Forest | 751 | 19 |
| Mesic Mixed Hardwood Forest | 23 | 1 |
| Pine Plantation | 46 | 1 |
| Old-Field | 981 | 25 |
| Clear-Cut (Early Succession) | 1,251 | 32 |
| Logging Roads and Ditches* | 105* | 2* |
| **Total** | **3,926** | **100** |

* Non-plant community accounting for the remaining area.

**Figure 3. Old-fields community (left) and clear-cut community (right)**

There are two species listed as Endangered (E) and six species listed as Federal Species of Concern (FSC) for Bertie County (Table 2) by the U.S. Fish & Wildlife Service. The Roquist Wetland Restoration Site includes suitable habitat for four of the six FSC as outlined in Table 2 below.

# 3.0 Mitigation Types

The Site consists of 2 types of mitigation: restoration and preservation (Figure 4).

**Table 2. Federal Species of Concern for Bertie County, NC**

| Common Name | Scientific Name | NC Status | Habitat Present |
|---|---|---|---|
| American eel | *Anguilla rostrata* | FSC | No |
| Cerulean warbler | *Dendroica cerulea* | FSC | Yes |
| Chowanoke crayfish | *Orconectes virginianus* | FSC | Yes |
| Eastern Henslow's sparrow | *Ammodramus henslowii* | FSC | Yes |
| Rafinesque's big-eared bat | *Corynorhinus rafinesquii* | FSC | No |
| Red-cockaded woodpecker | Picoides borealis | E | No |
| Shortnose Sturgeon | Acipenser brevirostrum | E | No |
| Southeastern myotis | Myotis austroriparius | FSC | Yes |

(E) A taxon in danger of extinction throughout all or a significant portion of its range.
(FSC) A species under consideration for listing, for which there is insufficient information to support listing at this time. These species may or may not be listed in the future.

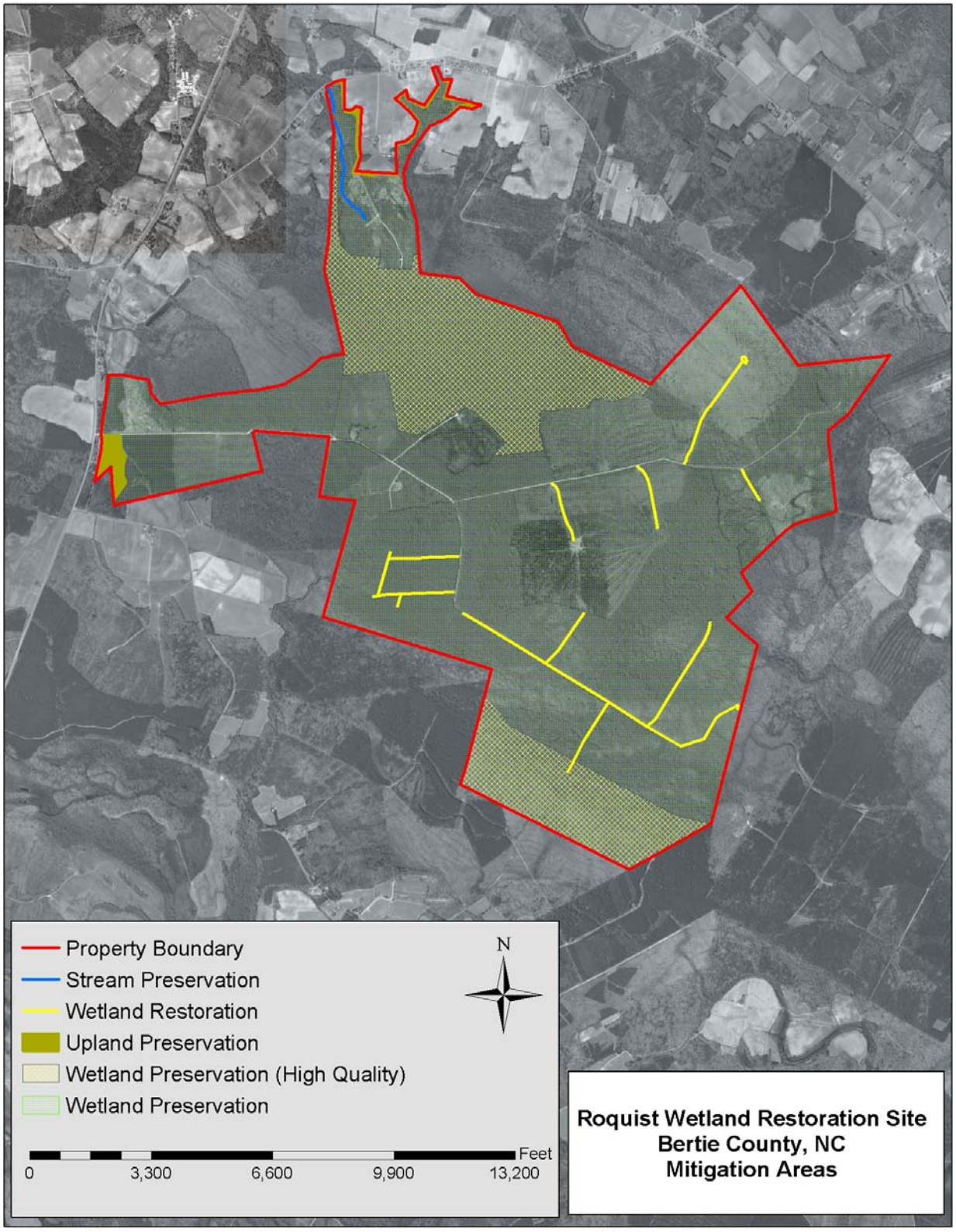
## 3.1 Wetland Restoration

Wetland restoration efforts for Phase I of the Roquist Wetland Restoration Site included 45 ac of nonriverine wetlands (see Appendix H for Record Drawing produced at completion of construction). The restoration efforts consisted of grading the existing logging roads and spoil areas to their original wetland elevations, filling the existing roadside ditches to their original wetland elevations, and soil preparation (ripping/disking) of the restoration areas.

Additionally, impervious dikes were placed in select locations within the restored ditch areas to restrict ground water movement through backfilled ditches. Prior to construction cross sections were surveyed approximately every 1,000 ft in the restoration areas in order to compare existing natural elevations to road, ditch, and spoil area elevations. Natural wetland elevations determined by these cross sections were used as the design elevations in the restoration areas. After completion of construction, as-built surveys were conducted in order to ensure grading conformed to the design elevation (Appendix H).

All soils utilized for construction within the restoration area consisted of in situ soils and organic debris generated onsite during clearing and grading operations. Rock material, most likely rip rap imported during original road construction, was discovered during excavation of Road A1. This material was excavated to an elevation 2 feet below the design elevation and backfilled with in situ soils generated from excavation on other roads.

**Figure 4. Mitigation Areas**

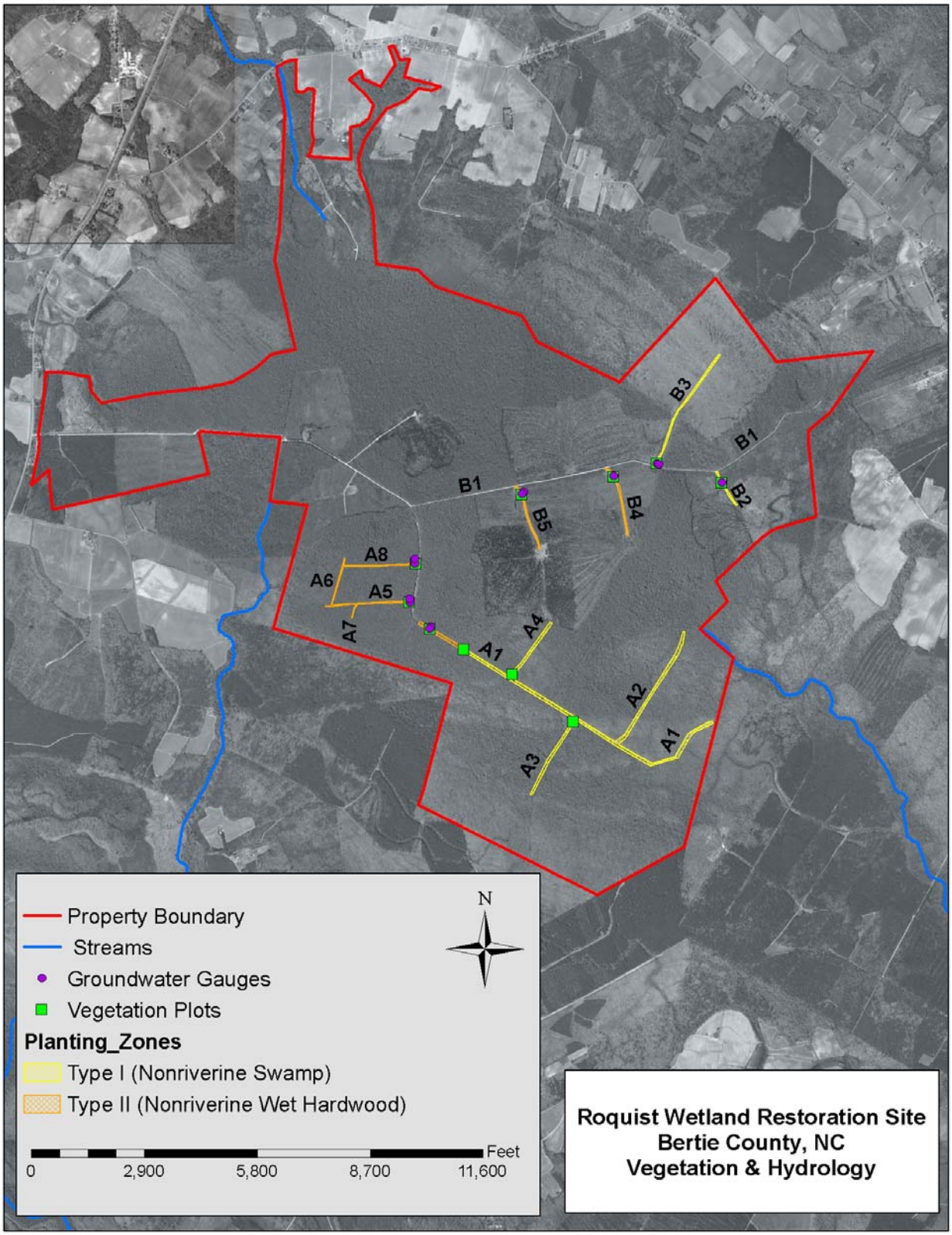


The wetland restoration area was planted with trees in the form of bare-root stock. Planting was performed between December 11, 2007 and January 16, 2008 using a minimum stem count of 331.5 stems per acre. The restoration areas were planted with either a Nonriverine Swamp Community or Nonriverine Wet Hardwood Community, according to the Plant Plan on Sheet 2B in the Record Drawing (Appendix H, Figure 5). The plant community planted in the restoration areas was originally to be determined by the existing plant community surrounding that location. In the restoration areas where the surrounding plant community was a clear cut or old field community, the plant community planted was to be determined by the plant community that existed prior to timbering. The approved Issued for Construction plans mistakenly had the planting zones labeled backwards and therefore, was planted as such. Due to the fact that many of the species are shared between the two planting types and that that the two types share similar abiotic variables these plantings are likely to survive. There were a total of 33.1 ac of Type I planting (Nonriverine Swamp Community) and 12.1 ac of Type II planting (Nonriverine Wet Hardwood Community). Species planted for each of the communities are shown in Table 3, Vegetation Planting.

**Table 3. Vegetation Planting**

| Plant Species (common) | Plant Species (scientific) | Plant Stratum | Planting Type | Qty |
|---|---|---|---|---|
| Green Ash | Fraxinus pennsylvania | tree | I | 1,500 |
| Black Gum | Nyssa sylvatica var. biflora | tree | I, II | 1,500 |
| Laurel oak | Quercus laurifolia | tree | I, II | 1,500 |
| Swamp Chestnut Oak | Quercus michauxii | tree | I, II | 2,000 |
| Willow Oak | Quercus phellos | tree | I | 1,500 |
| Shumard Oak | Quercus shumardii | tree | I | 1,100 |
| Bald Cypress | Taxodium distichum | tree | I, II | 2,000 |
| Iron Wood | Carpinus caroliniana | shrub | I | 680 |
| Sweet Pepperbush | Clethra alnifolia | shrub | I, II | 862 |
| Highbush Blueberry | Vaccinium corymbosum | shrub | I | 680 |
| Water Tupelo | Nyssa aquatic | tree | II | 500 |
| Cherry Bark Oak | Quercus pagoda | tree | II | 400 |
| American Elm | Ulmus Americana | tree | II | 400 |
| Virginia Willow | Itea virginica | shrub | II | 182 |
| Coastal Dog-Hobbie | Leucothoe axillaris | shrub | II | 182 |

**Figure 5. Vegetation & Gauges**



## 3.2 Wetland Preservation

The wetland preservation component for the Roquist Wetland Restoration Site consists of preserving 3,776 ac. Of this, 390 ac are high quality wetland preservation. The total preservation acreage included areas that contained stands established before 1993 (1,520 ac), areas that have been logged since 1993 (2,210 ac), and a ten year old pine plantation (established in 1993) (46 ac). Of the stand established, before 1993, 390 ac make up an area of high quality wetland preservation due to the presence of a rare, old growth forest harboring specimens of 95+ years of age. Although the logged areas were absent of mature vegetation at the time of initial observation (2003), they are considered an essential part of the existing high quality forests. By the time of construction, these areas were already 4+ years into succession and demonstrated good natural ability. These areas will ultimately contribute to the formation of an extensive wilderness area through the discontinuation of timber practices and the process of natural regeneration within the Site.

## 3.3 Upland Preservation

The upland preservation component for the Site consisted of preserving 45 ac of existing Mesic Mixed Hardwood Forests and clear-cut uplands. These areas were located along the western and northern boundaries of the Site.

## 3.4 Stream Preservation

The stream preservation component consists of 3,660 linear feet of channel on Jack's Branch in the northern portion of the Site. This stream is on a site that contains habitat for 4 Federal Species of Concern and the area upland of the stream is a High Quality Wetland Preservation area which makes this a viable stream preservation reach. The portion of the stream within the project boundary is protected by the conservation easement surrounding it. There is a small portion of Jack's Branch that does not have a 50 ft buffer on both sides of the stream within the easement as can be seen by the gap in the stream preservation area in Figure 4.

# 4.0 Monitoring Plan

Monitoring of wetland restoration efforts will be performed for five successful years following the conclusion of construction and planting (February 2008). Monitoring is for two wetland components, hydrology and vegetation.

## 4.1 Hydrology

Initially, 11 groundwater gauges were installed in 5 locations on the Site and data has been collected since May 11, 2005. Currently, there are 12 gauges in 7 locations throughout the Site (Sheet 4 and 6-7 of Record Drawing, Appendix H). Ten of the current twelve gauges are set in pairs with one being located in a reference wetland adjacent to the restoration area and the other inside of the restoration area. These gauges record data once daily and will be in operation throughout the year. Data will be retrieved monthly throughout the growing season to provide effective monitoring and assessment of success criteria for wetland hydrology during the five-year monitoring period.

Remote Data Systems, Inc. model Ecotone™ WM Series automated groundwater monitoring gauges were installed within the reference wetlands and in the restoration areas on May 10, 2005 in accordance with specifications in the Corps of Engineers' *Installing Monitoring Wells/Piezometers in Wetlands* (WRP Technical Note HY-IA-3.1, August, 1993). These gauges will continuously record water level data along a 40-inch gradient once daily.
Gauge data collected thus far has been plotted against precipitation data obtained from the NC Climate Office (Appendix D). The precipitation data is from two stations: the Peanut Belt Research station (ID:LEWS) and the Lewiston station (ID:314692). In these plots it can be seen that the reference wetlands have a higher water depth than the restoration areas the majority of the time. There are a few instances where the opposite occurs in the period after construction was complete. Large drops in water depth may be a result of a record drought experienced during 2007. Over time it can be seen that the water depth in the restoration areas are becoming greater and approaching the reference wetland depth. It should be noted that gauges in restored areas had to be removed and then reinstalled after grading.

### 4.1.1 Hydrologic Success Criteria

Wetland hydrology success criterion will be satisfied in the restoration areas during average climatic conditions when saturated soil conditions occur within 12 in of the ground's surface for a minimum of 12.5% of the growing season, or if the hydro period in the restoration areas is within 20% of the reference wetland's hydro period during drought conditions.

## 4.2 Vegetation

HSMM established ten quantitative sampling plots (10 meter (m) x 10 m) for vegetation on April 15, 2008 in the wetland restoration areas. The plots were set in accordance with specifications in *CVS-EEP Protocol for Recording Vegetation, All Levels of Plot Sampling* (Version 4.0, 2006) and at the direction of EEP. Seven of the ten plots were placed so that a groundwater gauge was just inside of the plot edge (Appendix H). Photos were taken on April 15, 2008 at each sampling plot at to provide a visual record of vegetation development over time (Appendix E). Vegetation plots will be inventoried during each growing season and will be in accordance with CVS Level II protocol. Baseline monitoring was completed October 29, 2008. The collected data can be found in Appendix F along with the established photo stations in Appendix G.

### 4.2.1 Vegetation Success Criteria

Wetland vegetation success criterion is defined by a minimum mean density of 320 trees per acre of approved target species surviving for the first three years (USACE 1995). The required success criteria will decrease by 10% per year after the third year to 290 stems per acre for year four and 260 stems per acre for year five. Vegetation success criteria apply to the Nonriverine Swamp Community and the Nonriverine Wet Hardwood Community that has been planted within the Roquist Wetland Restoration Site.

As can be seen from the collected baseline data in Appendix F, there are vegetative plots where no or only a few planted woody stems were found. This already does not meet the year 1 success criteria discussed in the following section and a contingency plan will need to be enforced. This data also shows that almost every plot has strong, healthy bare root planting species present that are not a shared species between the two planting types. This supports the statement made in section 3.1 about either planting type having a high chance of survivability in any of the restoration areas.
It should be noted that wild hogs are present on this Site and could contribute to the destruction of planted vegetation.

# 5.0 Contingency Plan

In the event that vegetation and/or hydrology success criteria are not fulfilled, appropriate contingency measures will be implemented in coordination with the Resource Agencies. Examples of such actions include replanting and extension of the monitoring period if community mitigation types do not fulfill minimum number of planted stems per acre requirements. If exotic invasive plant species are of concern, appropriate measures will be used to control for them. Hydrologic contingency will require consultation with hydrologists and the Resource agencies in the event that predicted hydrology is not achieved during the monitoring period. Recommendations for altering hydrology to establish wetland hydrology will be implemented and monitored until the hydrology success criteria are achieved.

# 6.0 Mitigation Values

The objective of the Roquist Wetland Restoration Site is to enhance, restore, and preserve 3,823 ac of the Roanoke and Cashie Rivers' headwater ecosystems. The mitigation components should be viewed from the perspective of their cumulative contribution to the overall value of the ecosystem rather than their individual values. The nonriverine ecosystem to be protected in perpetuity not only provides valuable habitat to a diverse assemblage of flora and fauna but also serves as a contiguous wildlife corridor. Wetland values that will be increased by the mitigation efforts for the Site include water storage, pollutant removal, aquatic/wildlife habitat, and recreation. The types of natural communities available for mitigation within the Site are listed in Table 3, Mitigation Credits.

The Roquist Wetland Restoration Site will be managed by EEP. All mitigation credits and the credit release schedule for the Roquist Wetland Restoration Site will be consistent with the July 22, 2003 MOA between the NCDENR, NCDOT, and USACE.

**Table 4. Mitigation Credits**

| Mitigation Type | Area (ac)/ Length (ft) | Mitigation Ratio | Recommended Mitigation Credits |
|---|---|---|---|
| **Wetlands** | | | |
| *Restoration* | 45.2 | 1:1 | 45.2 |
| *Preservation* | 3,386 | 5:1 | 677.2 |
| *High Quality Preservation* | 390 | 5:1 | 78.0 |
| ***Streams*** | | | |
| *Preservation* | 3,660 | 5:1 | 732.0 |
| **Total** | | | **1,532.4** |

# 7.0 References

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# APPENDIX A

# PROJECT ACTIVITY AND REPORTING HISTORY

| Project Activity and Reporting History | | |
|---|---|---|
| **Activity** | **Data Collection Completion** | **Completion or Delivery Date** |
| Restoration Plan | NA | August 2005 |
| Final Design – Construction Plans | NA | July 2006 |
| Construction | NA | January 16, 2008 |
| Permanent Seeding | NA | June 2007 |
| Bare-Root Planting | NA | January 2008 |
| Mitigation Plan / Record Drawings (Year 0 Monitoring – baseline) | October 2008 | November 2008 |
| Year 1 Monitoring | | |
| Year 2 Monitoring | | |
| Year 3 Monitoring | | |
| Year 4 Monitoring | | |
| Year 5 Monitoring | | |

# APPENDIX B

# PROJECT CONTACTS

| Project Contacts | |
|---|---|
| **Designer**<br>HSMM of North Carolina, Inc. | 3333 Regency Parkway, Suite 120<br>Cary, NC 27518<br>Rick Prosser, 919-460-6895 |
| **Construction Contractor**<br>Sawyer's Land Developing, Inc. | 275 Higginsport Road<br>Belhaven, NC 27810<br>Len Hunt, 252-943-2154 |
| Aggregate Supplier | Hanson, Rocky Mount Quarry #017<br>10471 NC-97<br>West Rocky Mount, NC 27801<br>252-977-1611 |
| **Seeding Contractor**<br>Holland Landscaping, Inc. | 953 Blackrock Road<br>Merry Hill, NC 27957<br>Randy Holland, 252-856-4163 |
| **Planting Contractor**<br>Emerald Forest, Inc. | 4651 Black Woods Road<br>Chesapeake, VA 23322<br>Peter McClintock, 757-421-0929 |
| Bare-root plant supplier | International Paper SC Super Tree Nursery<br>5594 Highway 38 S<br>Blenheim, SC 29516<br>843-528-3203 |
| Bare-root plant supplier | Emerald Forest, Inc. (see info above) |
| **Surveying Contractor**<br>H.C. Harris, Jr., Engineering & Surveying, P.A. | 216 Main Street<br>Winterville, NC 28590<br>Cliff Harris, Jr., 252-321-5607 |

# APPENDIX C

# ROQUIST WETLAND RESTORATION SITE
# JURISDICTIONAL DETERMINATION

36.0885458 N
77.1631285 W

# U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action ID 200411232 County Bertie

## NOTIFICATION OF JURISDICTIONAL DETERMINATION

Property Owner/Agent: NCDOT, Gregory J. Thorpe, Ph.D.
Address: Environmental Management Director, PDEA
1548 Mail Service Center
Raleigh, North Carolina 27699-1548
Telephone No.: (919) 733-3141
Size and location of property (waterbody, highway name/number, town, etc.) The project area is approximately 3,926 acres located on the east side of NC Highway 11 just north of NCSR 1108 and south of Woodville/Lewiston adjacent to Roquist Pocosin, Roquist Creek, Jack's Branch, and Indian Creek.

**Indicate Which of the Following Apply:**

_ There are waters of the U.S. and or wetlands, on the above described property which we strongly suggest should be delineated and surveyed. The surveyed wetland lines must be verified by our staff before the Corps will make a final jurisdictional determination on your property.

_ Because of the size of your property and our present workload, our identification and delineation of your wetlands cannot be accomplished in a timely manner. You may wish to obtain a consultant to obtain a more timely delineation of the wetlands. Once the consultant has flagged a wetland line on the property, Corps staff will review it, and, if it is accurate, we strongly recommend that you have the line surveyed for final approval by the Corps. The Corps will not make a final jurisdictional determination on your property without an approved survey.

X The waters of the U.S. and/or wetlands, within the construction corridor limits, have been delineated by your consultant, the delineation has been reviewed in the field by the Corps on February 11, 2004, and the delineation as shown in the submission by your consultant, dated February 18 and 23, 2004, has been determined by the Corps to be accurate, based on the information at this time. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ There are no waters of the U.S., to include wetlands, present on the above described property which are subject to the permit requirements of Section 404 of the Clean Water Act (33 USC 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

X The property is located in one of the 20 Coastal Counties subject to regulation under the Coastal Area Management Act (CAMA). You should contact the Division of Coastal Management in Elizabeth City, NC, at (252) 264-3901 to determine their requirements.

Placement of dredged or fill material in Waters of the US and/or wetlands on this property without a Department of the Army permit may constitute a violation of Section 301 of the Clean Water Act (33 USC 1311). A permit is not required for work restricted entirely to existing non-wetland area. If you have any questions regarding this determination and/or the Corps of Engineers regulatory program, please contact Bill Biddlecome at (252) 975-1616 ext. 31.

Basis For Determination: The wetlands are a broad continuum to Roquist Pocosin, Roquist Creek, Indian Creek, and Jack's Branch which are tributaries to the Roanoke River.

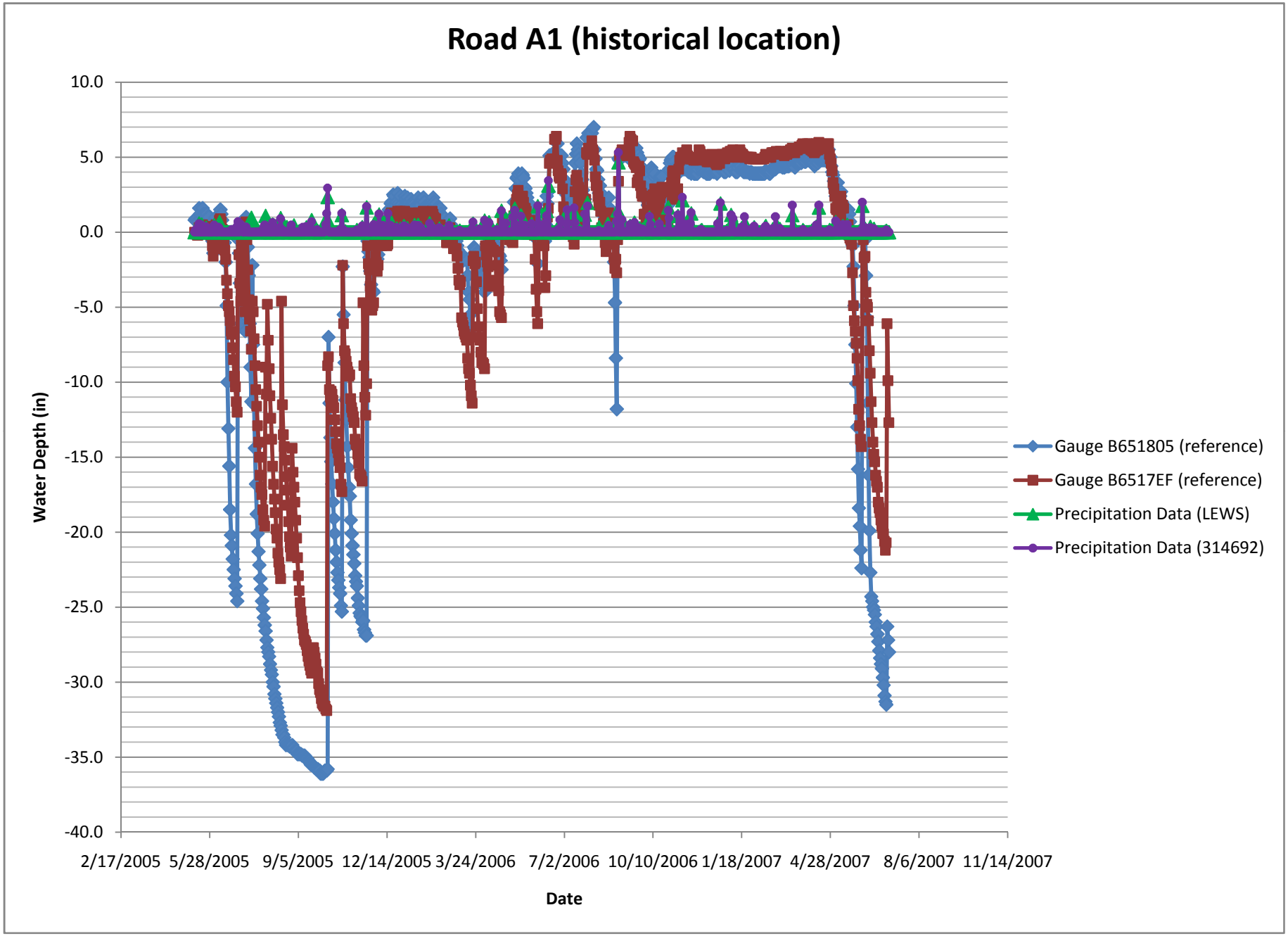
Owner/Authorized Agent Signature _____

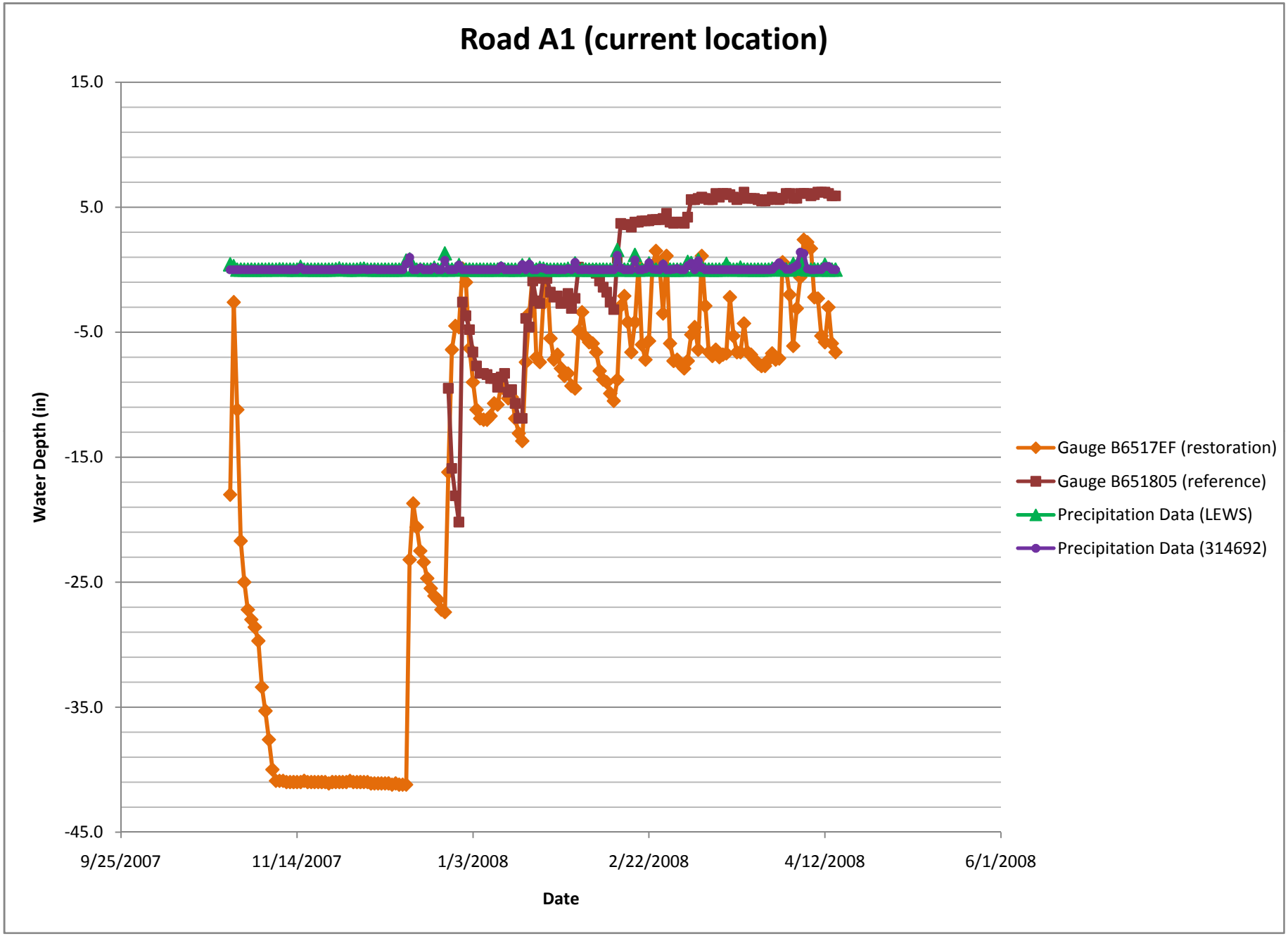
Corps Regulatory Official William J. Biddlecome
Date 2/5/2004 Expiration Date 2/5/2009

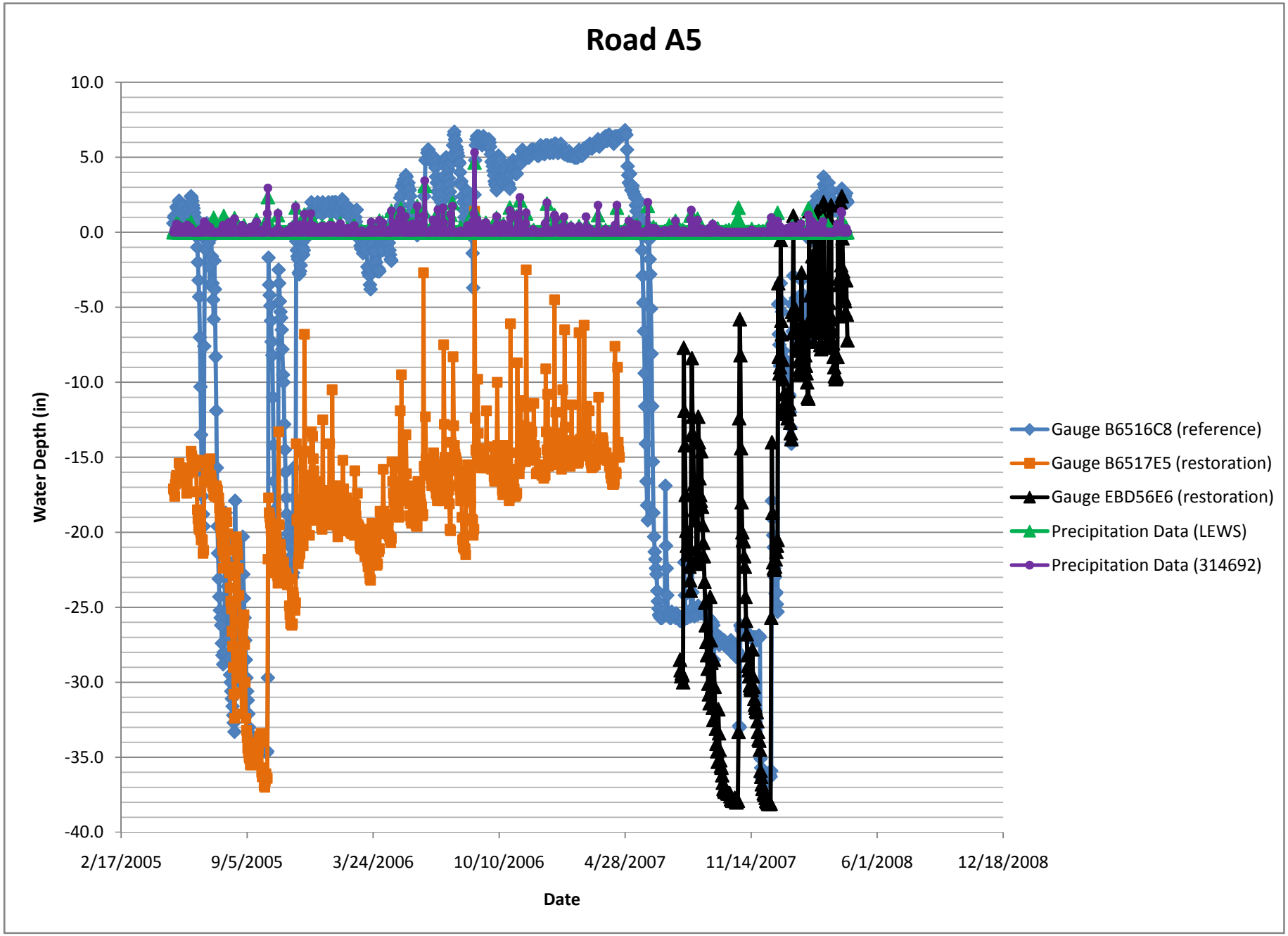
SURVEY PLAT OR FIELD SKETCH OF THE DESCRIBED PROPERTY AND THE WETLAND DELINEATION FORM MUST BE ATTACHED TO THE FILE COPY OF THIS FORM

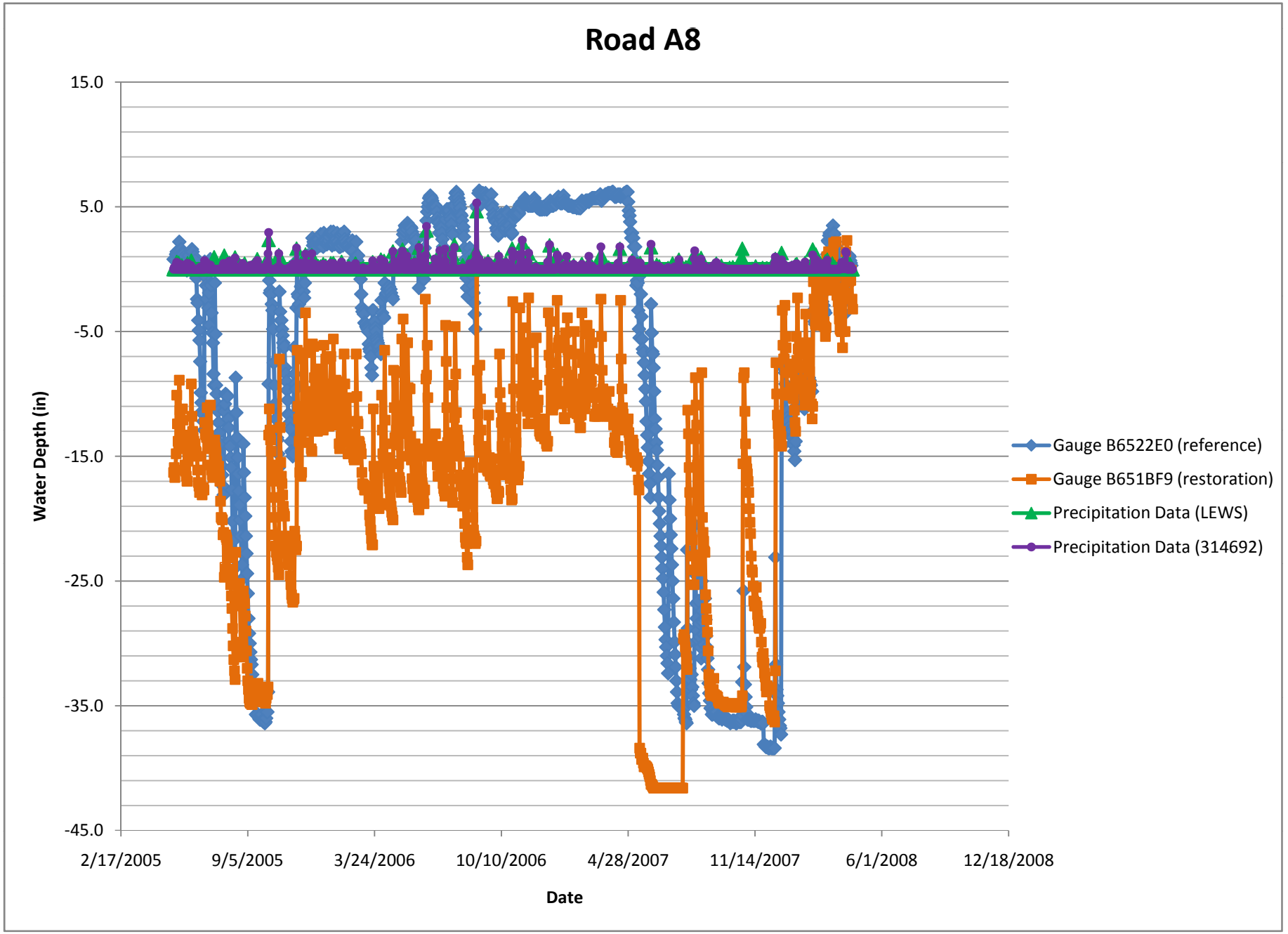
# APPENDIX D

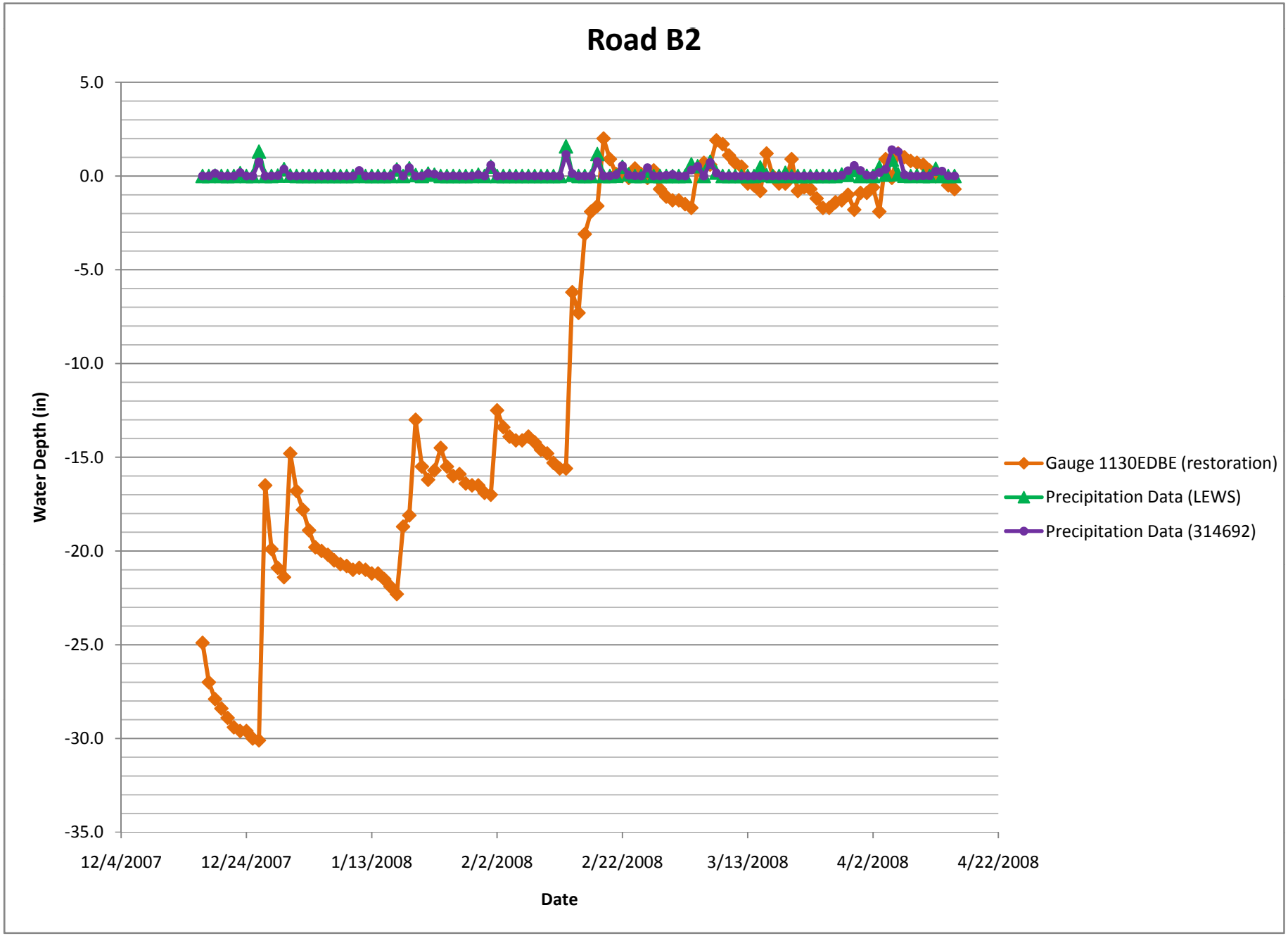
# GAUGE DATA

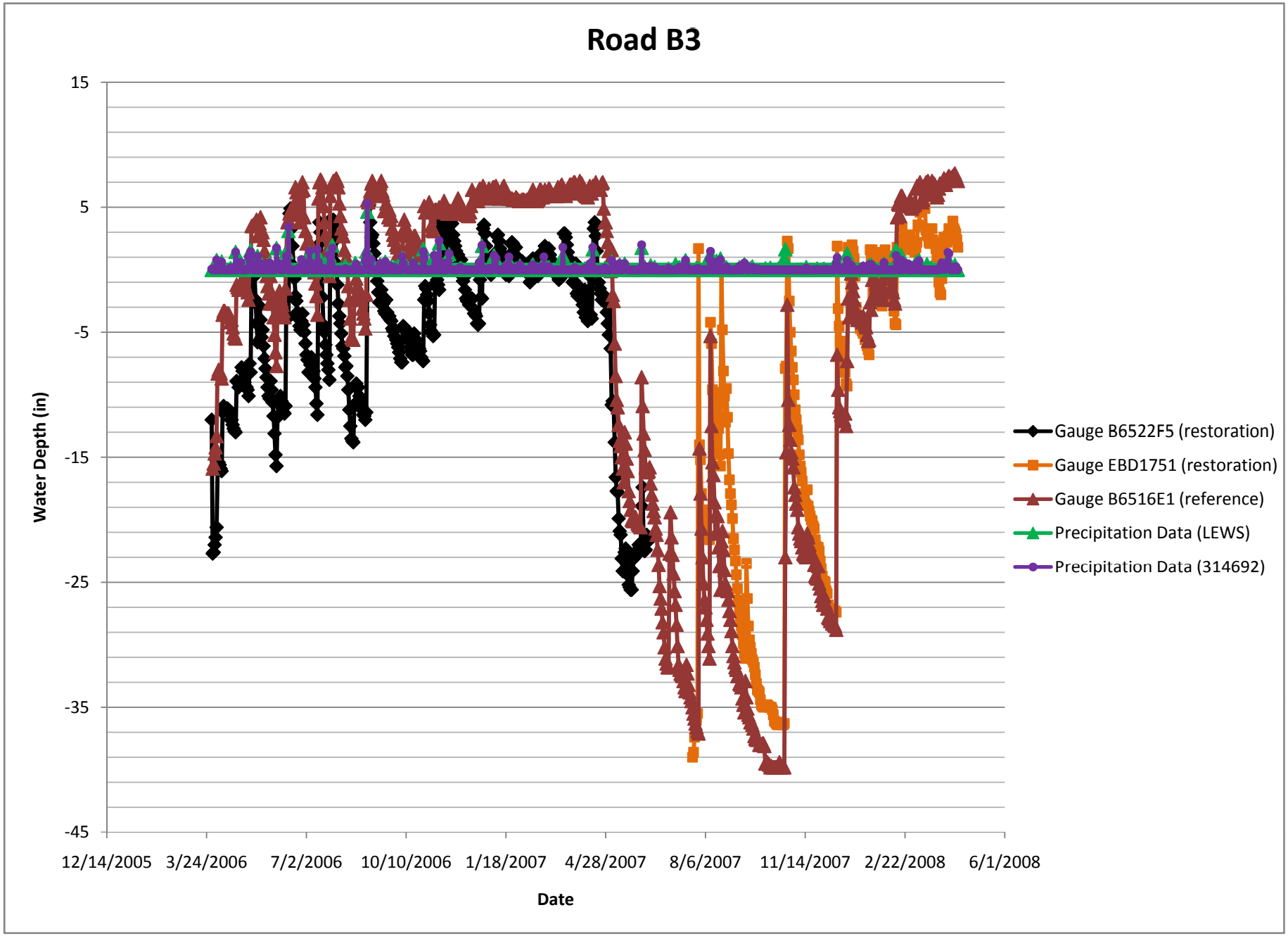

Road A1 (historical location)
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
Water Depth (in)
2/17/2005
5/28/2005
9/5/2005
12/14/2005
3/24/2006
7/2/2006
10/10/2006
1/18/2007
4/28/2007
8/6/2007
11/14/2007
Date
Gauge B651805 (reference)
Gauge B6517EF (reference)
Precipitation Data (LEWS)
Precipitation Data (314692)

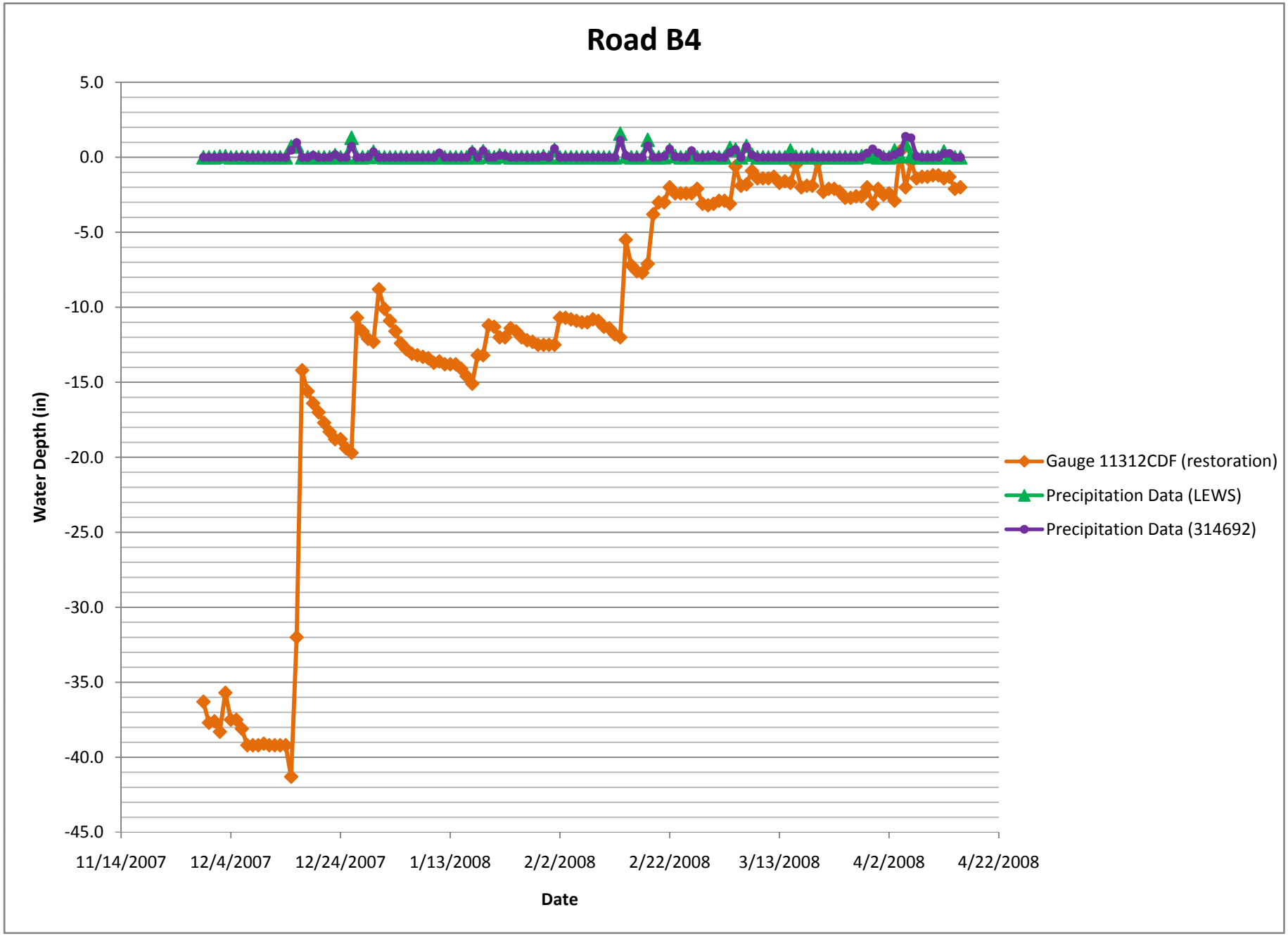

Road A1 (current location)
15.0
5.0
-5.0
-15.0
-25.0
-35.0
-45.0
Water Depth (in)
9/25/2007
11/14/2007
1/3/2008
2/22/2008
4/12/2008
6/1/2008
Date
Gauge B6517EF (restoration)
Gauge B651805 (reference)
Precipitation Data (LEWS)
Precipitation Data (314692)

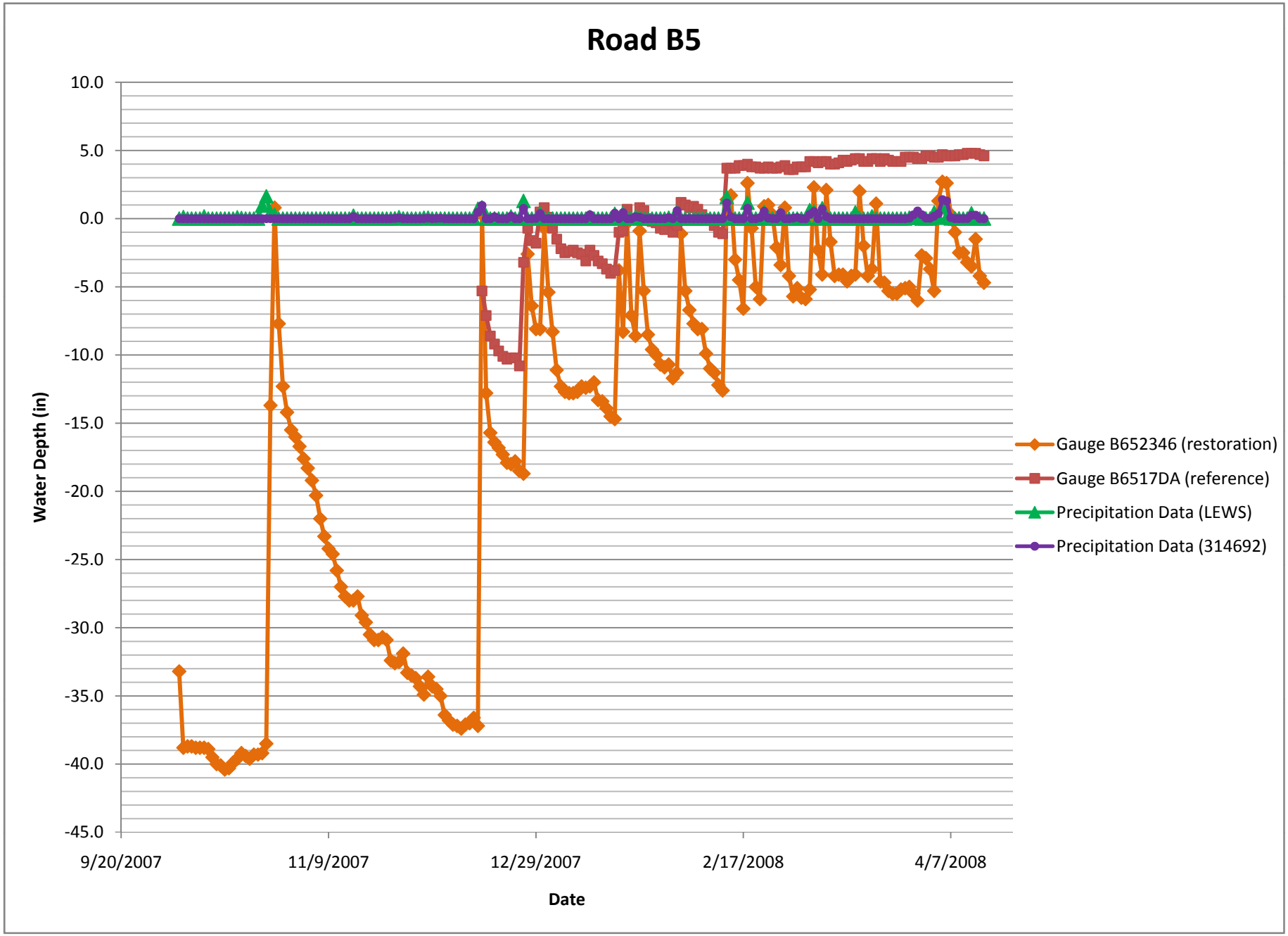

Road A5
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
Water Depth (in)
2/17/2005
9/5/2005
3/24/2006
10/10/2006
4/28/2007
11/14/2007
6/1/2008
12/18/2008
Date
Gauge B6516C8 (reference)
Gauge B6517E5 (restoration)
Gauge EBD56E6 (restoration)
Precipitation Data (LEWS)
Precipitation Data (314692)


Road A8
15.0
5.0
-5.0
-15.0
-25.0
-35.0
-45.0
Water Depth (in)
2/17/2005
9/5/2005
3/24/2006
10/10/2006
4/28/2007
11/14/2007
6/1/2008
12/18/2008
Date
Gauge B6522E0 (reference)
Gauge B651BF9 (restoration)
Precipitation Data (LEWS)
Precipitation Data (314692)


Road B2
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
Water Depth (in)
12/4/2007
12/24/2007
1/13/2008
2/2/2008
2/22/2008
3/13/2008
4/2/2008
4/22/2008
Date
Gauge 1130EDBE (restoration)
Precipitation Data (LEWS)
Precipitation Data (314692)


Road B3
15
5
-5
-15
-25
-35
-45
Water Depth (in)
12/14/2005
3/24/2006
7/2/2006
10/10/2006
1/18/2007
4/28/2007
8/6/2007
11/14/2007
2/22/2008
6/1/2008
Date
Gauge B6522F5 (restoration)
Gauge EBD1751 (restoration)
Gauge B6516E1 (reference)
Precipitation Data (LEWS)
Precipitation Data (314692)


Road B4
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
-45.0
Water Depth (in)
11/14/2007
12/4/2007
12/24/2007
1/13/2008
2/2/2008
2/22/2008
3/13/2008
4/2/2008
4/22/2008
Date
Gauge 11312CDF (restoration)
Precipitation Data (LEWS)
Precipitation Data (314692)


Road B5
10.0
5.0
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
-30.0
-35.0
-40.0
-45.0
Water Depth (in)
9/20/2007
11/9/2007
12/29/2007
2/17/2008
4/7/2008
Date
Gauge B652346 (restoration)
Gauge B6517DA (reference)
Precipitation Data (LEWS)
Precipitation Data (314692)

# APPENDIX E

# VEG PLOT PHOTOS

**Plot 1**

**Plot 2**

**Plot 3**

**Plot 4**

**Plot 5**

**Plot 6**

## Plot 7

## Plot 8

## Plot 9

## Plot 10

# APPENDIX F

# BASELINE VEGETATION DATA

## Planted Woody Stem Data: CVS Level 1

| Leader: E. Ancaya | Project: Roquist | Team: | | Plot: VP 01 | Date: 10/27/08 | Page: | |
|---|---|---|---|---|---|---|---|
| **Species Name** | **Source** | **Coordinates** X (m) | Y (m) | ddh (mm) | **Height** (cm) | DBH (cm) | **Vigor** | **Damage** |
| *Fraxinus pennsylvanica* | CR | 6.3 | 1.9 | 5 | 54 | | 4 | |
| *Nyssa sylatica* var. *biflora* | CR | 9.7 | 2.7 | 3 | 57 | | 4 | |
| *Fraxinus pennsylvanica* | CR | 9.9 | 4.1 | 7 | 69 | | 4 | |
| *Vaccinium corymbosum* | CR | 9.7 | 7.6 | 4 | 60 | | 4 | |
| | | | | | | | | |

## Planted Woody Stem Data: CVS Level 1

| Leader: E. Ancaya | Project: Roquist | Team: | | Plot: VP 02 | Date: 10/27/08 | Page: | |
|---|---|---|---|---|---|---|---|
| **Species Name** | **Source** | **Coordinates** X (m) | Y (m) | ddh (mm) | **Height** (cm) | DBH (cm) | **Vigor** | **Damage** |
| *Vaccinium corymbosum* | CR | 1.8 | 5.8 | 4 | 60 | | 3 | |
| *Quercu michauxii* | CR | 4.9 | 2.0 | 5 | 65 | | 3 | |
| *Quercus phellos* | CR | 6.3 | 5.7 | 5 | 45 | | 3 | |
| *Fraxinus pennsylvanica* | CR | 5.9 | 9.2 | 5 | 60 | | 3 | |
| *Nyssa sylatica* var. *biflora* | CR | 8.2 | 8.2 | 4 | 36 | | 3 | |
| *Nyssa sylatica* var. *biflora* | CR | 8.2 | 6.2 | 4 | 61 | | 3 | |
| *Nyssa sylatica* var. *biflora* | CR | 8.9 | 5.1 | 8 | 99 | | 4 | |
| *Nyssa sylatica* var. *biflora* | CR | 9 | 4.9 | 4 | 66 | | 4 | |
| *Nyssa sylatica* var. *biflora* | CR | 8.4 | 3.6 | 4 | 42 | | 4 | |
| *Nyssa sylatica* var. *biflora* | CR | 8.8 | 3.9 | 8 | 93 | | 4 | |
| | | | | | | | | |

## Planted Woody Stem Data: CVS Level 1

| Leader: E. Ancaya | Project: Roquist | Team: | | Plot: VP 03 | Date: 10/27/08 | Page: | |
|---|---|---|---|---|---|---|---|
| **Species Name** | **Source** | **Coordinates** X (m) | Y (m) | ddh (mm) | **Height** (cm) | DBH (cm) | **Vigor** | **Damage** |
| *Clethra alnifolia* | CR | 4.8 | 1.0 | 3 | 33 | | 3 | |
| | | | | | | | | |

## Planted Woody Stem Data: CVS Level 1

| Leader: E. Ancaya | Project: Roquist | Team: | | | Plot: VP 04 | Date: 10/27/08 | Page: |
|---|---|---|---|---|---|---|---|
| **Species Name** | **Source** | **Coordinates** X (m) | Y (m) | ddh (mm) | **Height** (cm) | DBH (cm) | **Vigor** | **Damage** |
| *Leucothoe axillaris* | CR | 8.8 | 5.0 | 5 | 54 | | 3 | |
| | | | | | | | | |

## Planted Woody Stem Data: CVS Level 1

| Leader: E. Ancaya | Project: Roquist | Team: | | | Plot: VP 05 | Date: 10/27/08 | Page: |
|---|---|---|---|---|---|---|---|
| **Species Name** | **Source** | **Coordinates** X (m) | Y (m) | ddh (mm) | **Height** (cm) | DBH (cm) | **Vigor** | **Damage** |
| | | | | | | | | |
| | | | | | | | | |

## Planted Woody Stem Data: CVS Level 1

| Leader: E. Ancaya | Project: Roquist | Team: | | | Plot: VP 06 | Date: 10/27/08 | Page: |
|---|---|---|---|---|---|---|---|
| **Species Name** | **Source** | **Coordinates** X (m) | Y (m) | ddh (mm) | **Height** (cm) | DBH (cm) | **Vigor** | **Damage** |
| *Itea virginica* | CR | 3 | 8.1 | 3 | 29 | | 2 | possible uprooting |
| | | | | | | | | |

## Planted Woody Stem Data: CVS Level 1

| Leader: E. Ancaya | Project: Roquist | Team: | | | Plot: VP 07 | Date: 10/27/08 | Page: |
|---|---|---|---|---|---|---|---|
| **Species Name** | **Source** | **Coordinates** X (m) | Y (m) | ddh (mm) | **Height** (cm) | DBH (cm) | **Vigor** | **Damage** |
| *Ulmus americana* | CR | 1.5 | 1.0 | 3 | 27 | | 2 | |
| *Ulmus americana* | CR | 0.9 | 2.6 | 3 | 50 | | 4 | |
| *Ulmus americana* | CR | 2.7 | 8.4 | 5 | 52 | | 3 | |
| *Nyssa sylatica* var. *biflora* | CR | 3.2 | 4.8 | 6 | 44 | | 3 | |
| *Nyssa sylatica* var. *biflora* | CR | 3.8 | 1.5 | 5 | 54 | | 3 | |
| *Quercus phellos* | CR | 6 | 8.9 | 3 | 20 | | 3 | |
| *Quercu michauxii* | CR | 9.9 | 2.2 | 6 | 38 | | 3 | |
| *Ulmus americana* | CR | 9.2 | 8.1 | 8 | 53 | | 3 | |
| | | | | | | | | |

## Planted Woody Stem Data: CVS Level 1

| Leader: E. Ancaya | Project: Roquist | Team: | | Plot: VP 08 | Date: 10/27/08 | Page: | |
|---|---|---|---|---|---|---|---|
| **Species Name** | **Source** | **Coordinates** X (m) | Y (m) | ddh (mm) | **Height** (cm) | DBH (cm) | **Vigor** | **Damage** |
| *Quercu michauxii* | CR | 6.3 | 6.9 | 5 | 53 | | 4 | |
| *Quercus shumardii* | CR | 9 | 6.9 | 3 | 50 | | 3 | |
| | | | | | | | | |

## Planted Woody Stem Data: CVS Level 1

| Leader: E. Ancaya | Project: Roquist | Team: | | Plot: VP 09 | Date: 10/28/08 | Page: | |
|---|---|---|---|---|---|---|---|
| **Species Name** | **Source** | **Coordinates** X (m) | Y (m) | ddh (mm) | **Height** (cm) | DBH (cm) | **Vigor** | **Damage** |
| *Vaccinium corymbosum* | CR | 0.5 | 9.2 | 6 | 81 | | 3 | |
| *Quercus phellos* | CR | 3.3 | 5.8 | 4 | 49 | | 3 | |
| *Quercus shumardii* | CR | 7.7 | 7.2 | 4 | 46 | | 3 | |
| *Quercus laurifolia* | CR | 9.9 | 6.6 | 8 | 58 | | 4 | |
| *Quercus laurifolia* | CR | 7.3 | 3.8 | 4 | 38 | | 4 | |
| *Taxodium distichum* | CR | 8.7 | 0.1 | 7 | 68 | | 3 | |
| | | | | | | | | |

## Planted Woody Stem Data: CVS Level 1

| Leader: E. Ancaya | Project: Roquist | Team: | | Plot: VP 10 | Date: 10/28/08 | Page: | |
|---|---|---|---|---|---|---|---|
| **Species Name** | **Source** | **Coordinates** X (m) | Y (m) | ddh (mm) | **Height** (cm) | DBH (cm) | **Vigor** | **Damage** |
| *Nyssa sylatica* var. *biflora* | CR | 1.8 | 6.7 | 3 | 35 | | 3 | |
| *Nyssa sylatica* var. *biflora* | CR | 3.5 | 6.5 | 8 | 60 | | 3 | |
| *Nyssa sylatica* var. *biflora* | CR | 6.8 | 5.4 | 7 | 58 | | 3 | |
| *Quercus laurifolia* | CR | 6.9 | 7.9 | 3 | 32 | | 3 | |
| *Quercus shumardii* | CR | 9.4 | 0.1 | 7 | 57 | | 4 | |
| *Quercu michauxii* | CR | 9.8 | 3.4 | 8 | 61 | | 4 | |
| | | | | | | | | |

# Natural Woody Stem Data: CVS Level 2

| Leader: E. Ancaya | Project: Roquist | Team: | Plot: VP 02 | Date: 10/27/08 | Page: |
|---|---|---|---|---|---|

**Height Cut-Off for Stems** (all stems shorter than this height are ignored and not tallied): X 10cm 50cm 100cm 137cm

| Species Name | Seedlings - Height Classes | | | Saplings - DBH | | Trees DBH | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 10 - 50cm | 50 - 100cm | 100 - 137cm | 0 - 1cm | 1 - 2.5cm | | | | |
| *Liquidambar styraciflua* | 8 | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# Natural Woody Stem Data: CVS Level 2

| Leader: E. Ancaya | Project: Roquist | Team: | Plot: VP 03 | Date: 10/27/08 | Page: |
|---|---|---|---|---|---|

**Height Cut-Off for Stems** (all stems shorter than this height are ignored and not tallied): X 10cm 50cm 100cm 137cm

| Species Name | Seedlings - Height Classes | | | Saplings - DBH | | Trees DBH | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 10 - 50cm | 50 - 100cm | 100 - 137cm | 0 - 1cm | 1 - 2.5cm | | | | |
| *Acer rubrum* | 1 | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# Natural Woody Stem Data: CVS Level 2

| Leader: E. Ancaya | Project: Roquist | Team: | Plot: VP 04 | Date: 10/27/08 | Page: |
|---|---|---|---|---|---|

**Height Cut-Off for Stems** (all stems shorter than this height are ignored and not tallied): X 10cm 50cm 100cm 137cm

| Species Name | Seedlings - Height Classes | | | Saplings - DBH | | Trees DBH | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 10 - 50cm | 50 - 100cm | 100 - 137cm | 0 - 1cm | 1 - 2.5cm | | | | |
| *Liquidambar styraciflua* | 3 | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# Natural Woody Stem Data: CVS Level 2

| Leader: E. Ancaya | Project: Roquist | Team: | Plot: VP 05 | Date: 10/27/08 | Page: |
|---|---|---|---|---|---|

**Height Cut-Off for Stems** (all stems shorter than this height are ignored and not tallied): X 10cm 50cm 100cm 137cm

| Species Name | Seedlings - Height Classes | | | Saplings - DBH | | Trees DBH | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 10 - 50cm | 50 - 100cm | 100 - 137cm | 0 - 1cm | 1 - 2.5cm | | | | |
| *Rhus copallina* | | 1 | 2 | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# Natural Woody Stem Data: CVS Level 2

| Leader: E. Ancaya | Project: Roquist | Team: | Plot: VP 06 | Date: 10/27/08 | Page: |
|---|---|---|---|---|---|

**Height Cut-Off for Stems** (all stems shorter than this height are ignored and not tallied): X 10cm 50cm 100cm 137cm

| Species Name | Seedlings - Height Classes | | | Saplings - DBH | | Trees DBH | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 10 - 50cm | 50 - 100cm | 100 - 137cm | 0 - 1cm | 1 - 2.5cm | | | | |
| *Rhus copallina* | 2 | | | | | | | | |
| *Salix nigra* | | | 1 | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# Natural Woody Stem Data: CVS Level 2

| Leader: E. Ancaya | Project: Roquist | Team: | Plot: VP 07 | Date: 10/27/08 | Page: |
|---|---|---|---|---|---|

**Height Cut-Off for Stems** (all stems shorter than this height are ignored and not tallied): X 10cm 50cm 100cm 137cm

| Species Name | Seedlings - Height Classes | | | Saplings - DBH | | Trees DBH | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 10 - 50cm | 50 - 100cm | 100 - 137cm | 0 - 1cm | 1 - 2.5cm | | | | |
| *Diospyros virginiana* | 6 | | | | | | | | |
| *Diospyros virginiana* | | 11 | | | | | | | |
| *Diospyros virginiana* | | | 23 | | | | | | |
| *Acer rubrum* | 4 | | | | | | | | |
| | | | | | | | | | |

# Natural Woody Stem Data: CVS Level 2

| Leader: E. Ancaya | Project: Roquist | Team: | Plot: VP 08 | Date: 10/27/08 | Page: |
|---|---|---|---|---|---|

**Height Cut-Off for Stems** (all stems shorter than this height are ignored and not tallied): X 10cm 50cm 100cm 137cm

| Species Name | Seedlings - Height Classes | | | Saplings - DBH | | Trees DBH | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 10 - 50cm | 50 - 100cm | 100 - 137cm | 0 - 1cm | 1 - 2.5cm | | | | |
| *Acer rubrum* | 13 | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

# Natural Woody Stem Data: CVS Level 2

| Leader: E. Ancaya | Project: Roquist | Team: | Plot: VP 09 | Date: 10/28/08 | Page: |
|---|---|---|---|---|---|

**Height Cut-Off for Stems** (all stems shorter than this height are ignored and not tallied): X 10cm 50cm 100cm 137cm

| Species Name | Seedlings - Height Classes | | | Saplings - DBH | | Trees DBH | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 10 - 50cm | 50 - 100cm | 100 - 137cm | 0 - 1cm | 1 - 2.5cm | | | | |
| *Acer rubrum* | 1 | | | | | | | | |
| *Quercus rubra* | 114 | | | | | | | | |
| *Diospyros virginiana* | | 3 | | | | | | | |
| *Liquidambar styraciflua* | 1 | | | | | | | | |
| | | | | | | | | | |

# Natural Woody Stem Data: CVS Level 2

| Leader: E. Ancaya | Project: Roquist | Team: | Plot: VP 10 | Date: 10/28/08 | Page: |
|---|---|---|---|---|---|

**Height Cut-Off for Stems** (all stems shorter than this height are ignored and not tallied): X 10cm 50cm 100cm 137cm

| Species Name | Seedlings - Height Classes | | | Saplings - DBH | | Trees DBH | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 10 - 50cm | 50 - 100cm | 100 - 137cm | 0 - 1cm | 1 - 2.5cm | | | | |
| *Quercus rubra* | 1 | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

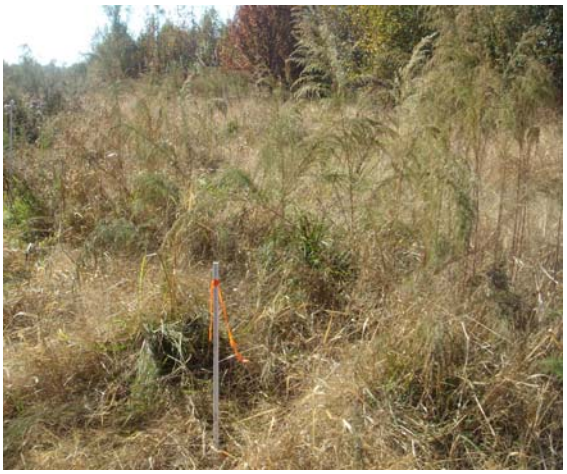
# APPENDIX G

# PERMANENT PHOTO STATIONS

**Plot 1**

**Plot 2**

**Plot 3**



**Plot 4**

**Plot 5**

**Plot 6**

## Plot 7

## Plot 8

## Plot 9

## Plot 10

# APPENDIX H

# RECORD DRAWINGS

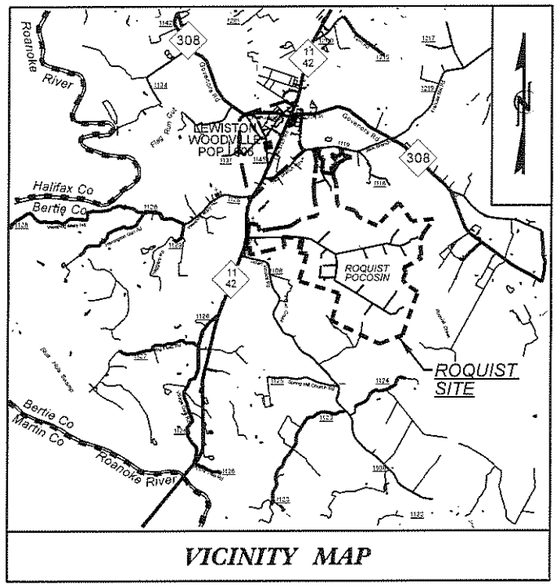
| SCO PROJECT NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|
| 04-062790IA | 1 | 20 |

# STATE OF NORTH CAROLINA
# ECOSYSTEM ENHANCEMENT PROGRAM

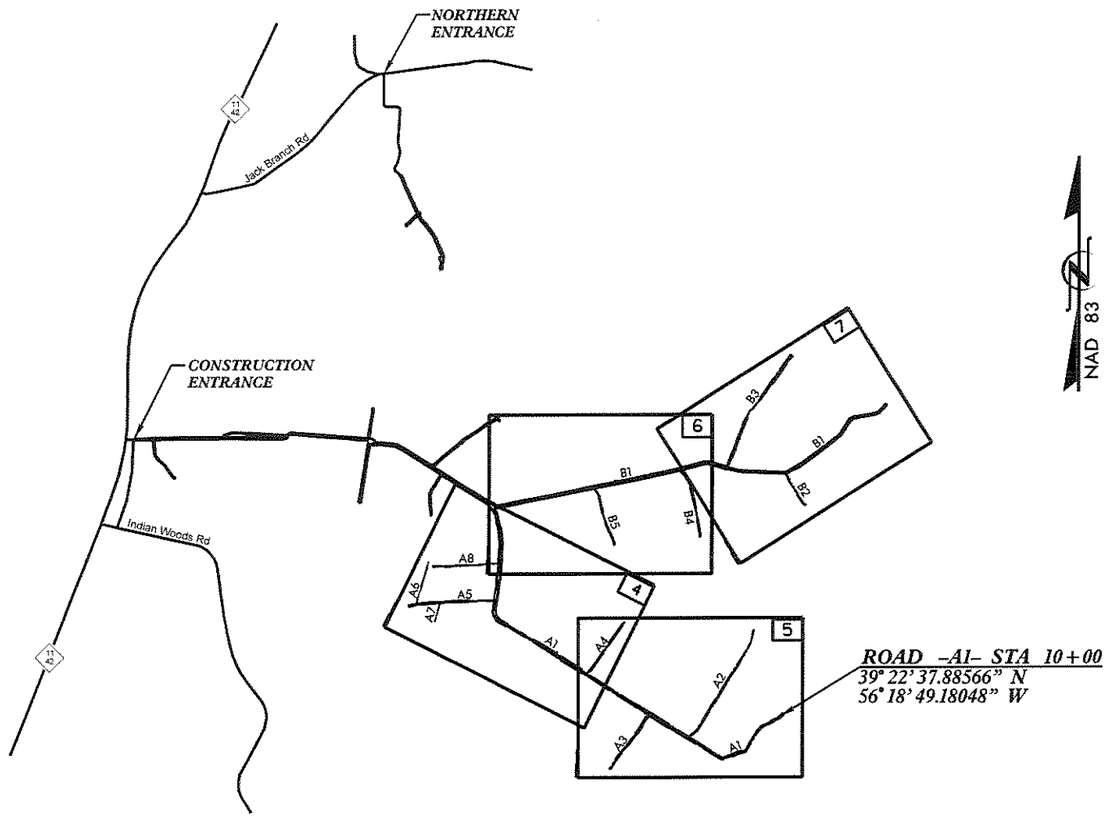
# ROQUIST WETLAND RESTORATION SITE
## PHASE 1

*LOCATION: NC 11/42 LEWISTON-WOODVILLE*
*BERTIE COUNTY*

*TYPE OF WORK: WETLAND RESTORATION, GRADING, AND DRAINAGE*




*VICINITY MAP*




*ROAD -A1- STA 10+00*
*39° 22' 37.88566" N*
*56° 18' 49.18048" W*

## NOTES

1. RECORD DRAWINGS ARE BASED UPON "ISSUED FOR CONSTRUCTION" DRAWINGS ISSUED BY HSMM AND SEALED BY S.GRANT GINN (PE #021767) ON APRIL 23, 2007, AND AS-BUILT DRAWINGS ISSUED BY H.C. HARRIS, JR. ENGINEERING & SURVEYING, P.A. AND SEALED BY H.C. HARRIS, JR. (PLS #L-3419) ON JUNE 16, 2008.

**NCDENR # D050315**

*GRAPHIC SCALES*

200 50 0 200 400
PLANS SHEETS

1000 500 0 1000 2000
SITE PLAN

*PROJECT LENGTH*

WETLAND RESTORATION AREA: 45.2 ACRES

LENGTH OF LOGGING ROADS REMOVED: 5.6 MILES

AREA OF DISTURBANCE: 45.2 ACRES


PREPARED IN THE OFFICE OF:
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ON BEHALF OF:
*HSMM of North Carolina, Inc.*
*3333 Regency Parkway, Suite 120 – Cary, NC 27518*
*tel: 919.460.6895*

RICK PROSSER, P.E.
*HSMM PROJECT MANAGER*

TRACY MORRIS
*EEP PROJECT MANAGER*

TAMMIE TUCKER, E.I.
*HSMM PROJECT CONTACT*

LIN XU
*EEP REVIEW COORDINATOR*


*HYDRAULICS ENGINEER*

NORTH CAROLINA PROFESSIONAL SEAL 28441 ENGINEER AMY J. WAZENEGGER
12/12/08

**RECORD DOCUMENT**

DO NOT USE FOR CONSTRUCTION

ROQUIST WETLAND RESTORATION SITE

## NOTES

1. RECORD DRAWINGS ARE BASED UPON "ISSUED FOR CONSTRUCTION" DRAWINGS ISSUED BY HSMM AND SEALED BY S.GRANT GINN (PE #021767) ON APRIL 23,2007. AND AS-BUILT DRAWINGS ISSUED BY H.C.HARRIS,JR. ENGINEERING & SURVEYING,P.A. AND SEALED BY H.C.HARRIS,JR.(PLS #L-3419) ON JUNE 16,2008.
2. GENERAL NOTES REMAIN UNCHANGED FROM THE "ISSUED FOR CONSTRUCTION" DRAWINGS.

INDEX OF SHEETS



* SHEETS OMITTED FROM THIS RECORD DRAWING SET BECAUSE THEY REMAIN UNCHANGED FROM THE IFC DRAWINGS

# GENERAL NOTES

1. THE ROADWAY STANDARDS THAT ARE REFERENCED HEREIN SHALL BE CONSIDERED A PART OF THESE PLANS AS THEY APPEAR IN "ROADWAY STANDARD DRAWINGS" – HIGHWAY DESIGN BRANCH – NORTH CAROLINA DEPARTMENT OF TRANSPORTATION – RALEIGH, NC, DATED JANUARY 2002 AND THE LATEST REVISION THERETO.
2. ALL CONSERVATION EASEMENT CORNER MARKERS HAVE BEEN PLACED BY OTHERS.
3. THE CONTRACTOR SHALL VERIFY THE LOCATION AND EXISTENCE OF ALL UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION.
4. THE CONTRACTOR IS RESPONSIBLE FOR AVOIDING ANY DISTURBANCE OR DAMAGE TO UTILITIES AND SHALL BE RESPONSIBLE FOR IMMEDIATELY REPARING ANY DAMAGE AT A COST INCIDENT TO THIS CONTRACT.
5. THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS WHICH AFFECT NEW WORK PRIOR TO ANY CONSTRUCTION ACTIVITIES.
6. THE CONTRACTOR IS SOLEY RESPONSIBLE FOR ALL SAFETY ACCORDING TO CURRENT OSHA REGULATIONS.
7. THE CONTRACTOR SHALL INSTALL EROSION CONTROL MEASURES PRIOR TO ANY CONSTRUCTION ACTIVITIES ACCORDING TO THE APPROVED SEDIMENT AND EROSION CONTROL PLAN.
8. THE COORDINATE SYSTEM IS THE NAD 83 STATE PLANE GRID. THE VERTICAL DATUM IS BASED ON NVD 1929.
9. CLEARING AND GRUBBING SHALL BE LIMITED TO THAT WHICH IS NECESSARY FOR REMOVAL OF ANY SPOIL AREAS ADJACENT TO EXISTING DITCHES AND SHALL BE APPROVED BY THE ENGINEER. DEBRIS REMOVAL SHALL BE AS DIRECTED BY ENGINEER.

CONSTRUCTION SEQUENCE:

1. MOBILIZE EQUIPMENT TO ROQUIST WETLAND RESTORATION SITE.
2. ESTABLISH STAGING AREAS AND MARK CONSTRUCTION EQUIPMENT ACCESS LOCATIONS WITH VISIBLE MARKERS. CONSTRUCTION EQUIPMENT SHALL BE MAINTAINED AND SERVICED WITHIN THE LIMITS OF THE ESTABLISHED STAGING AREAS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL STAGING AREAS IN AN ENVIRONMENTALLY SENSITIVE MANNER.
3. INSTALL IMPROVEMENTS TO SITE ACCESS ROADS IF REQUIRED AND INSTALL TEMPORARY EROSION CONTROL MEASURES (I.E., CONSTRUCTION ENTRANCE, SILT FENCE, ROCK SEDIMENT DAMS, ETC.).
4. PERFORM ANY CLEARING AND GRUBBING NECESSARY FOR CONSTRUCTION ACTIVITIES.
5. BEGIN WORK AT MOST REMOTE POINT AND WORK BACK. REMOVE ROAD AND SPOIL AREAS AND FILL DITCHES AS SHOWN ON THE PLANS. CONSTRUCT DITCH BLOCKS AT LOCATIONS SHOWN ON THE PLANS.
6. CONSTRUCTION CAN OCCUR SIMULTANEOUSLY IN SECTIONS –A– AND –B–.
7. AT THE END OF EACH DAY OF CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE TEMPORARY SEED AND MULCH AS NEEDED, TO ALL DISTURBED AREAS. IN ADDITION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY EROSION CONTROL MEASURES ON A DAILY BASIS THROUGHOUT THE CONSTRUCTION PERIOD.

SCO PROJECT NO. 07-RP-CWA SHEET NO. 1A
04-08-2014

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 28441 ENGINEER AMY J. WAZENEGGER 11/12/08


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ON BEHALF OF:
HSMM of North Carolina, Inc.
3333 Regency Parkway, Suite 120 – Cary, NC 27518
tel: 919.460.6895
FOR:
NCEEP


RECORD DOCUMENT
DO NOT USE FOR CONSTRUCTION

NOTES

1. RECORD DRAWINGS ARE BASED UPON "ISSUED FOR CONSTRUCTION" DRAWINGS ISSUED BY HSMM AND SEALED BY S.GRANT GINN (PE #021767) ON APRIL 23, 2007, AND AS-BUILT DRAWINGS ISSUED BY H.C. HARRIS, JR. ENGINEERING & SURVEYING, P.A. AND SEALED BY H.C. HARRIS, JR. (PLS #L-3419) ON JUNE 16, 2008.

STATE OF NORTH CAROLINA

# CONVENTIONAL SYMBOLS

SCO PROJECT NO. 04-[illegible]  SHEET NO. 1B

NC GRAPHICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 28441 ENGINEER AMY J. NEGGERS 11/2/08

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ON BEHALF OF:
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tel: 919.460.6895

FOR:
*NCEEP*

## ROADS & RELATED ITEMS

- Edge of Pavement
- Curb
- Prop. Slope Stakes Cut (C)
- Prop. Slope Stakes Fill (F)
- Prop. Woven Wire Fence
- Prop. Chain Link Fence
- Prop. Barbed Wire Fence
- Prop. Wheelchair Ramp (WCR)
- Exist. Guardrail
- Prop. Guardrail
- Equality Symbol
- Roadway Removal

## RIGHT OF WAY

- Baseline Control Point
- Existing Right of Way Marker
- Exist. Right of Way Line w/Marker
- Prop. Right of Way Line with Proposed R/W Marker (Iron Pin & Cap)
- Prop. Right of Way Line with Proposed (Concrete or Granite) R/W Marker
- Exist. Control of Access Line
- Prop. Control of Access Line
- Exist. Easement Line (E)
- Prop. Temp. Construction Easement Line (TCE)
- Prop. Temp. Drainage Easement Line (TDE)
- Prop. Perm. Drainage Easement Line (PDE)

## HYDROLOGY

- Stream or Body of Water
- Flow Arrow
- Disappearing Stream
- Spring
- Existing Wetland Area
- Shoreline
- Falls, Rapids
- Prop. Ditches and Prop. Creek (FLOW)
- Existing Channel, Existing Relic
- Backfill Exist Pond or Channel
- Spoil Removal Area
- Root Wad Bank Protection
- Groundwater Water Gauge
- Impermeable Clay Plug

## STRUCTURES

MAJOR
- Bridge, Tunnel, or Box Culvert (CONC)
- Bridge Wing Wall, Head Wall and End Wall (CONC WW)

MINOR
- PROPOSED CONSTRUCTION ENTRANCE
- Head & End Wall (CONC HW)
- Pipe Culvert
- Footbridge
- Drainage Boxes (CB)
- Paved Ditch Gutter
- Rock Cross Vane
- Log Vane

## UTILITIES

- Exist. Pole
- Exist. Power Pole
- Prop. Power Pole
- Exist. Telephone Pole
- Prop. Telephone Pole
- Exist. Joint Use Pole
- Prop. Joint Use Pole
- Telephone Pedestal (T)
- Cable TV Pedestal (C)
- Hydrant
- Satellite Dish
- Exist. Water Valve
- Sewer Clean Out
- Power Manhole (P)
- Telephone Booth
- Water Manhole (W)
- Light Pole
- H-Frame Pole
- Power Line Tower
- Pole with Base
- Gas Valve
- Gas Meter
- Telephone Manhole (T)
- Power Transformer
- Sanitary Sewer Manhole
- Storm Sewer Manhole (S)
- Tank; Water, Gas, Oil
- Water Tank With Legs
- Traffic Signal Junction Box (S)
- Fiber Optic Splice Box (F)
- Television or Radio Tower

- Utility Power Line Connects to Traffic Signal Lines Cut Into the Pavement (TS)
- Water Line (W)
- Sanitary Sewer (SS)
- Sanitary Sewer Force Main (FSS)
- Gas Line (G)
- Storm Sewer (S)
- Power Line (P)
- Telephone Cable (T)
- U/G Telephone Conduit (TC)
- Unknown Utility (?UTL)
- Television Cable (TV)
- Fiber Optics Cable (FO)
- Exist. Water Meter (0)
- Drawn According to U/G Records (DATUM)
- Abandoned According to U/G Records (ABAND)
- End Of Information (E.O.I.)

## BOUNDARIES & PROPERTIES

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Property Line Symbol (PL)
- Exist. Iron Pin (IP)
- Property Corner
- Property Monument (MON)
- Property Number (123)
- Parcel Number (6)
- Fence Line (SW & ISW)
- Existing Wetland Boundaries (WLB)
- Proposed Wetland Boundaries (WLB)
- Existing Endangered Animal Boundaries (EAB)
- Existing Endangered Plant Boundaries (EPB)
- Proposed Temporary Silt Fence
- Proposed Temporary Rock Sediment Dam Type "A"

## BUILDINGS & OTHER CULTURE

- Buildings
- Foundations
- Area Outline
- Gate
- Sign
- Well
- Small Mine
- Swimming Pool

## TOPOGRAPHY

- Loose Surface
- Hard Surface
- Change in Road Surface
- Curb
- Right of Way Symbol (R/W)
- Guard Post (GP)
- Paved Walk
- Bridge
- Box Culvert or Tunnel
- Ferry
- Culvert
- Footbridge
- Trail, Footpath
- Light House

## VEGETATION

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Veg. Plot
- Transplant

## RAILROADS

- Standard Gauge (CSX TRANSPORTATION)
- RR Signal Milepost (MILEPOST 35)
- Switch (SWITCH)

RECORD DOCUMENT
DO NOT USE FOR CONSTRUCTION

# NOTES

1. RECORD DRAWINGS ARE BASED UPON "ISSUED FOR CONSTRUCTION" DRAWINGS ISSUED BY HSMM AND SEALED BY S.GRANT GINN (PE #021767) ON APRIL 23,2007. AND AS-BUILT DRAWINGS ISSUED BY H.C.HARRIS,JR. ENGINEERING & SURVEYING,P.A. AND SEALED BY H.C.HARRIS,JR.(PLS #L-3419) ON JUNE 16,2008.

## SITE PLAN

1000' 0' 1000' 2000' 3000'

SCO PROJECT NO. SHEET NO.
04-062/2016 2

NORTH CAROLINA PROFESSIONAL SEAL 28447 ENGINEER AMY LYNN LEGGETT 7/2/08

PREPARED BY AND FOR THE DEPT. OF:
WAZ Engineering, PC
112 N. Main Street - Holly Springs, NC 27540
tel: 919.567.0495
ON BEHALF OF:
*HSMM of North Carolina, Inc.*
*3333 Regency Parkway, Suite 120 - Cary, NC 27518*
*tel: 919.460.6895*
FOR:
*NCEEP*

JACKS BRANCH
CROP FIELD
CROP FIELD
CROP FIELD
REMAINING ROAD
PINE PLANTATION
Jack Branch Rd
LEWISTON-WOODVILLE
11 42
APPROX. PROPERTY BOUNDARY, TYP.
RESTORATION AREA
-B3-
-B1-
-B2-
-B4-
-B5-
APPROX. PROPERTY BOUNDARY
REMAINING ROAD
EXIST. WOOD LINE, TYP.
GRAVEL CONSTRUCTION ENTRANCE
PINE PLANTATION
APPROX. LOCATION OF EXCAVATED RIP-RAP MATERIAL STOCKPILE
REMAINING ROAD
-A8-
-A6-
-A5-
-A7-
RESTORATION AREA
-A4-
-A2-
-A1-
-A1-
-A3-
Indian Woods Rd
PINE PLANTATION
INDIAN CREEK
RESTORATION AREA
PINE PLANTATION
11 42

***ROAD -A1- STA 10+00***
*39 22' 37.88566" N*
*56 18' 49.18048" W*

ROQUIST CREEK

ROAD REMOVED

**RECORD DOCUMENT**
DO NOT USE FOR CONSTRUCTION

## NOTES

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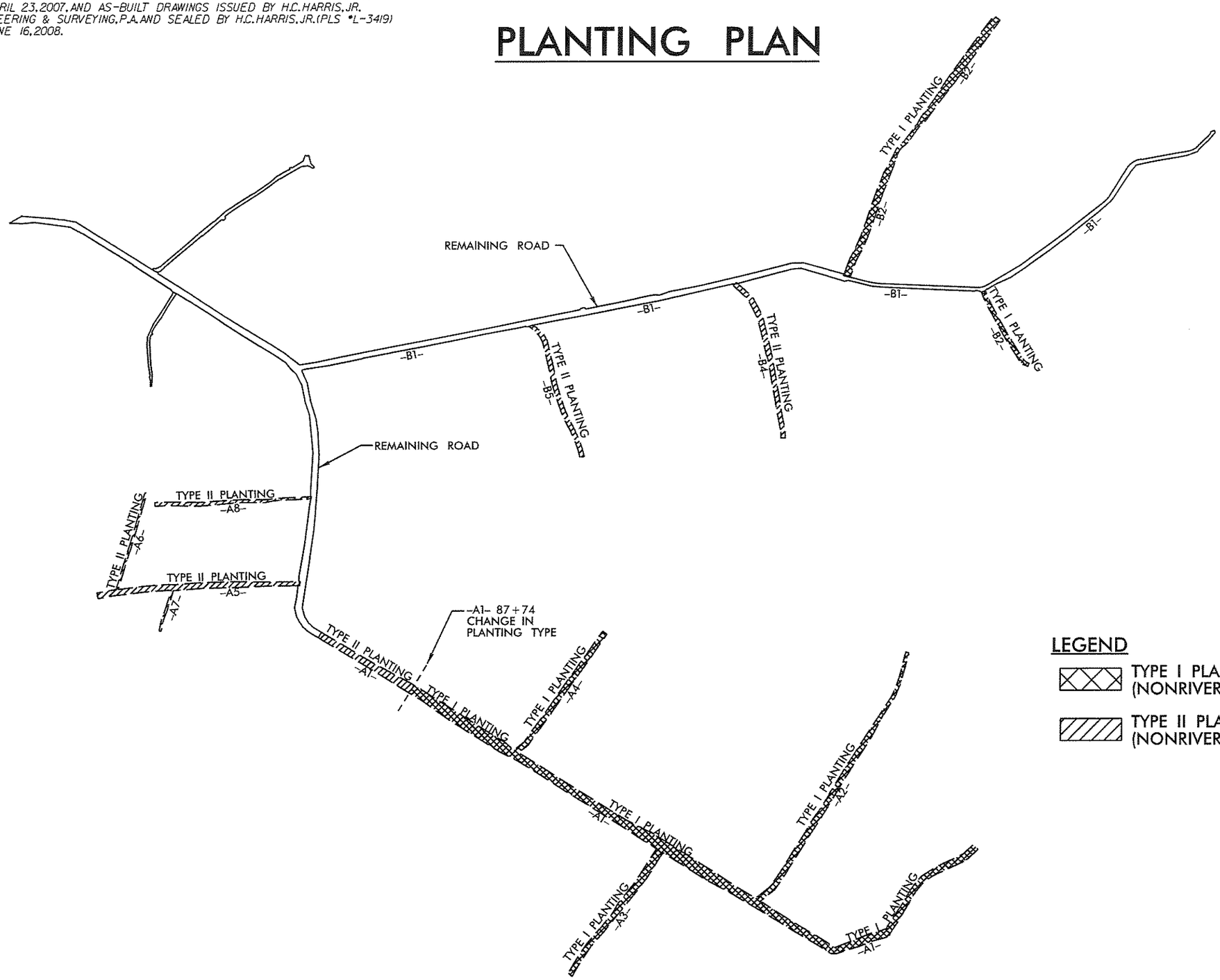
# PLANTING PLAN

600' 0' 600' 1200' 1800'




SCO PROJECT NO. 04-66290A SHEET NO. 1 OF 28

NORTH CAROLINA PROFESSIONAL SEAL 28491 ENGINEER AMY J. WAZENEGGER 11/12/08

PREPARED BY, THE OFFICE OF:
WAZ Engineering, PC
112 N. Main Street - Holly Springs, NC 27540
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*HSMM of North Carolina, Inc.*
*3333 Regency Parkway, Suite 120 – Cary, NC 27518*
*tel: 919.460.6895*
FOR:
*NCEEP*

LEGEND

- TYPE I PLANTING (NONRIVERINE SWAMP)
- TYPE II PLANTING (NONRIVERINE WET HARDWOOD)

**RECORD DOCUMENT**
DO NOT USE FOR CONSTRUCTION

# NOTES

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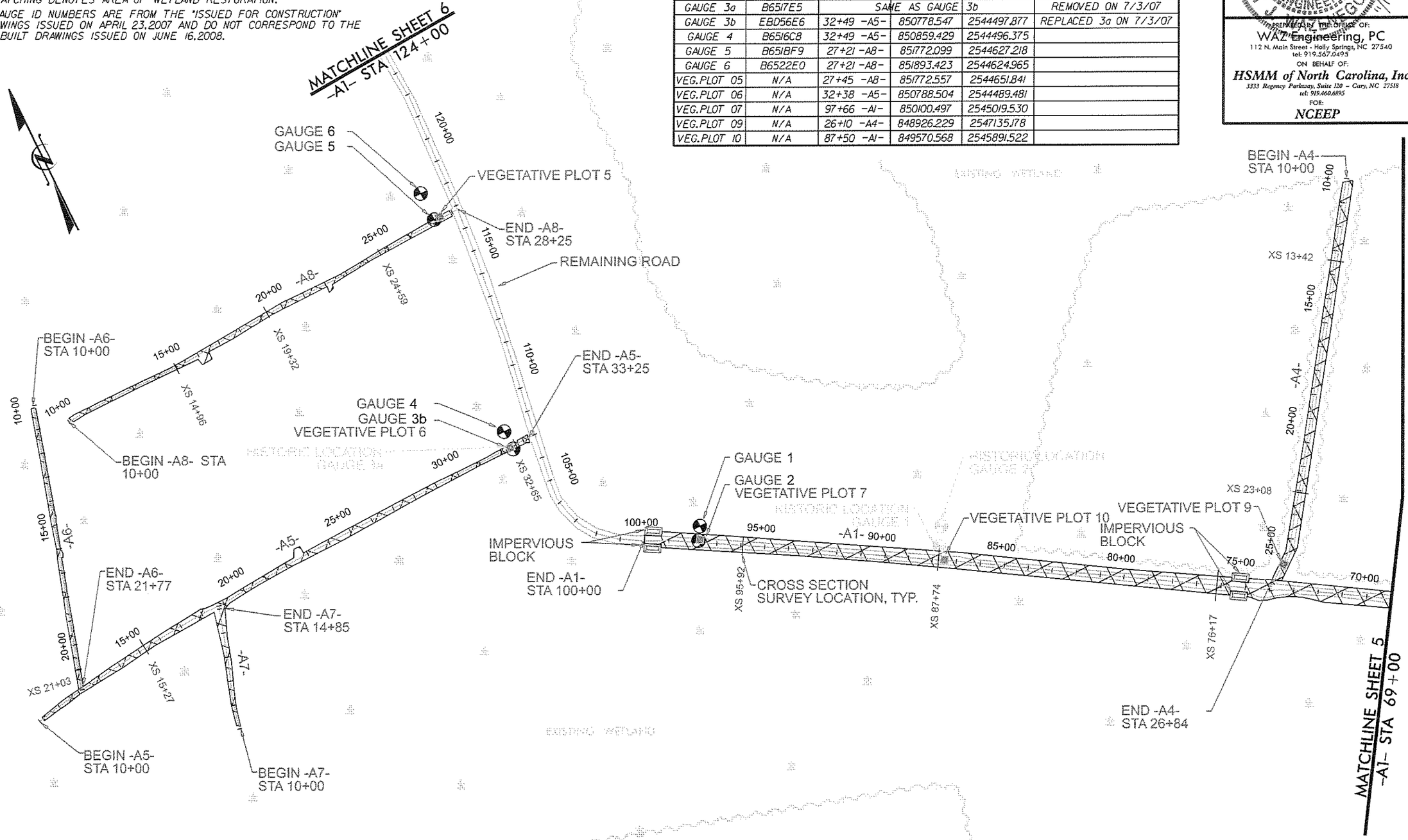
2. VEG.PLOTS ARE 10m BY 10m.
3. HATCHING DENOTES AREA OF WETLAND RESTORATION.
4. GAUGE ID NUMBERS ARE FROM THE "ISSUED FOR CONSTRUCTION" DRAWINGS ISSUED ON APRIL 23,2007 AND DO NOT CORRESPOND TO THE AS-BUILT DRAWINGS ISSUED ON JUNE 16,2008.

200' 0' 200' 400' 600'

| FEATURE | SERIAL NO. | LOCATION | NORTHING | EASTING | NOTES |
|---|---|---|---|---|---|
| GAUGE 1 | B651805 | 97+79 -A1- | 850151.506 | 2545043.214 | MOVED ON 10/4/07 HISTORIC LOCATION 87+74 -A1- |
| GAUGE 2 | B6517EF | 97+79 -A1- | 850100.345 | 2545011.322 | MOVED ON 10/4/07 HISTORIC LOCATION 87+74 -A1- |
| GAUGE 3a | B6517E5 | SAME AS GAUGE | 3b | | REMOVED ON 7/3/07 |
| GAUGE 3b | EBD56E6 | 32+49 -A5- | 850778.547 | 2544497.877 | REPLACED 3a ON 7/3/07 |
| GAUGE 4 | B6516C8 | 32+49 -A5- | 850859.429 | 2544496.375 | |
| GAUGE 5 | B651BF9 | 27+21 -A8- | 851772.099 | 2544627.218 | |
| GAUGE 6 | B6522E0 | 27+21 -A8- | 851893.423 | 2544624.965 | |
| VEG.PLOT 05 | N/A | 27+45 -A8- | 851772.557 | 2544651.841 | |
| VEG.PLOT 06 | N/A | 32+38 -A5- | 850788.504 | 2544489.481 | |
| VEG.PLOT 07 | N/A | 97+66 -A1- | 850100.497 | 2545019.530 | |
| VEG.PLOT 09 | N/A | 26+10 -A4- | 848926.229 | 2547135.178 | |
| VEG.PLOT 10 | N/A | 87+50 -A1- | 849570.568 | 2545891.522 | |




SCO PROJECT NO. 07-080790A | SHEET NO. 4

NORTH CAROLINA PROFESSIONAL SEAL 28449 ENGINEER AMY J. EGGELL 11/2/08

PREPARED IN THE OFFICE OF:
WAZ Engineering, PC
112 N. Main Street - Holly Springs, NC 27540
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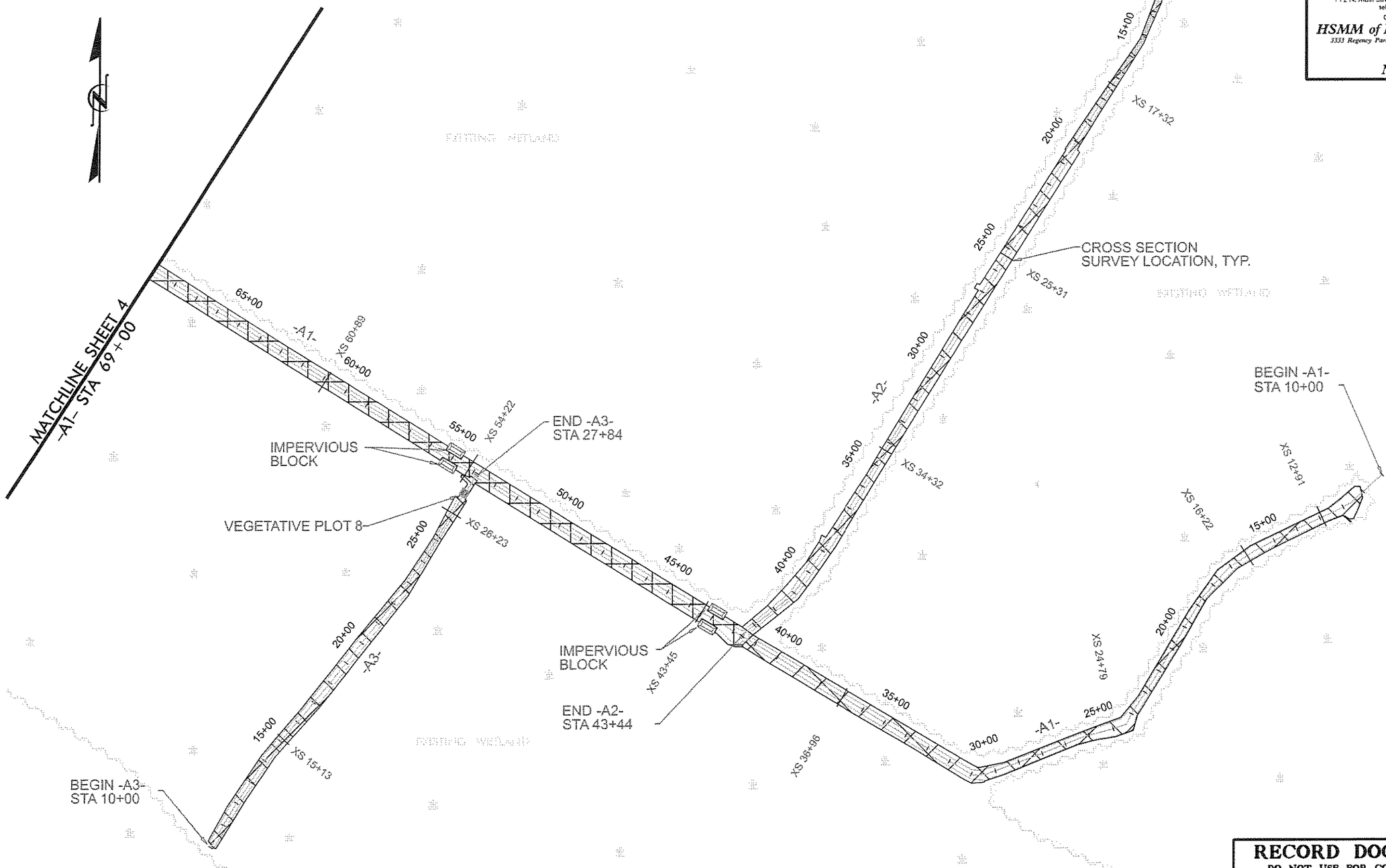
ON BEHALF OF:
*HSMM of North Carolina, Inc.*
3333 Regency Parkway, Suite 120 - Cary, NC 27518
tel: 919.460.6895
FOR:
*NCEEP*

**RECORD DOCUMENT**
DO NOT USE FOR CONSTRUCTION

# NOTES

1. RECORD DRAWINGS ARE BASED UPON "ISSUED FOR CONSTRUCTION" DRAWINGS ISSUED BY HSMM AND SEALED BY S.GRANT GINN (PE #021767) ON APRIL 23,2007, AND AS-BUILT DRAWINGS ISSUED BY H.C.HARRIS,JR. ENGINEERING & SURVEYING,P.A. AND SEALED BY H.C.HARRIS,JR.(PLS #L-3419) ON JUNE 16,2008.
2. VEG.PLOTS ARE 10m BY 10m.
3. HATCHING DENOTES AREA OF WETLAND RESTORATION.
4. GAUGE ID NUMBERS ARE FROM THE "ISSUED FOR CONSTRUCTION" DRAWINGS ISSUED ON APRIL 23,2007 AND DO NOT CORRESPOND TO THE AS-BUILT DRAWINGS ISSUED ON JUNE 16,2008.

| FEATURE | SERIAL NO. | LOCATION | NORTHING | EASTING |
|---|---|---|---|---|
| VEG.PLOT 08 | N/A | 27+20 -A3- | 847721.603 | 2548701.399 |




SCO PROJECT NO. 04-082907A | SHEET NO. 10 OF 15

NORTH CAROLINA PROFESSIONAL SEAL 28441 ENGINEER AMY J. WATENEGGER 11/2/08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112 N. Main Street - Holly Springs, NC 27540
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tel: 919.460.6895
FOR:
*NCEEP*


**RECORD DOCUMENT**
**DO NOT USE FOR CONSTRUCTION**

# NOTES

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| FEATURE | SERIAL NO. | LOCATION | NORTHING | EASTING | NOTES |
|---|---|---|---|---|---|
| GAUGE 7 | B652144 | N/A | N/A | N/A | REMOVED ON 10/4/07 HISTORIC LOCATION 117+50 -B1- |
| GAUGE 8 | B6517A3 | N/A | N/A | N/A | REMOVED ON 10/4/07 HISTORIC LOCATION 117+50 -B1- |
| GAUGE 9 | B652346 | 24+25 -B5- | 853572.823 | 2547368.693 | MOVED ON 10/4/07 |
| GAUGE 13 | B6517DA | 24+25 -B5- | 853614.337 | 2547425.387 | NEW GAUGE, INSTALLED ON 11/28/07 |
| GAUGE 14 | 11312CDF | 26+20 -B4- | 854021.596 | 2549732.920 | NEW GAUGE, INSTALLED ON 11/28/07 |
| VEG.PLOT 03 | N/A | 26+12 -B4- | 854011.486 | 2549733.109 | |
| VEG.PLOT 04 | N/A | 21+00 -B1- | 853552.756 | 2547377.277 | |

200' 0' 200' 400' 600'

SCO PROJECT NO. 04-07-307A SHEET NO. 6

NORTH CAROLINA PROFESSIONAL SEAL 28441 ENGINEER JAMES WESLEY EGGER 11/26/08

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ON BEHALF OF:
*HSMM of North Carolina, Inc.*
3333 Regency Parkway, Suite 120 – Cary, NC 27518
tel. 919.460.6895
FOR:
*NCEEP*

END -B4-
STA 28+92

70+00 75+00 80+00 85+00 90+00 95+00 100+00 105+00 110+00 115+00 120+00 125+00 130+00

-B1-

END -B5-
STA 26+42

MATCHLINE SHEET 7
-B1- STA 65+00

REMAINING ROAD

GAUGE 14
VEGETATIVE PLOT 3

XS 22+68

25+00

GAUGE 13

XS 22+79

GAUGE 9
VEGETATIVE PLOT 4

20+00 -B4- 15+00

XS 12+58

10+00

BEGIN -B4-
STA 10+00

20+00 -B5- 15+00

CROSS SECTION
SURVEY LOCATION, TYP.

XS 11+84

10+00

BEGIN -B5-
STA 10+00

REMAINING ROAD

HISTORIC LOCATION GAUGE 8

HISTORIC LOCATION GAUGE 7

HISTORIC LOCATION GAUGE 7

-A1-

MATCHLINE SHEET 4
-A1- STA 124+00

EXISTING WETLAND

EXISTING WETLAND

EXISTING WETLAND

**RECORD DOCUMENT**
DO NOT USE FOR CONSTRUCTION

# NOTES

1. RECORD DRAWINGS ARE BASED UPON "ISSUED FOR CONSTRUCTION" DRAWINGS ISSUED BY HSMM AND SEALED BY S.GRANT GINN (PE #021767) ON APRIL 23,2007, AND AS-BUILT DRAWINGS ISSUED BY H.C.HARRIS,JR. ENGINEERING & SURVEYING,P.A. AND SEALED BY H.C.HARRIS,JR.(PLS #L-3419) ON JUNE 16,2008.
2. VEG.PLOTS ARE 10m BY 10m.
3. HATCHING DENOTES AREA OF WETLAND RESTORATION.
4. GAUGE ID NUMBERS ARE FROM THE "ISSUED FOR CONSTRUCTION" DRAWINGS ISSUED ON APRIL 23,2007 AND DO NOT CORRESPOND TO THE AS-BUILT DRAWINGS ISSUED ON JUNE 16,2008.

200' 0' 200' 400' 600'

| FEATURE | SERIAL NO. | LOCATION | NORTHING | EASTING | NOTES |
|---|---|---|---|---|---|
| GAUGE 11a | B6522F5 | SAME AS GAUGE 11b | | | INSTALLED ON 3/29/06 REMOVED ON 7/3/07 |
| GAUGE 11b | EBD1751 | 44+00 -B3- | 854345.692 | 2550835.144 | REPLACED 11a ON 7/3/07 |
| GAUGE 12 | B6516E1 | 44+00 -B3- | 854326.396 | 2550884.764 | INSTALLED ON 3/29/06 |
| GAUGE 15 | 1130EDBE | 17+20 -B2- | 853861.404 | 2552510.824 | NEW GAUGE, INSTALLED ON 11/28/07 |
| VEG.PLOT 01 | N/A | 17+10 -B2- | 853851.371 | 2552515.118 | |
| VEG.PLOT 02 | N/A | 43+90 -B3- | 854355.803 | 2550834.954 | |



SCO PROJECT NO. 04-0827/01A SHEET NO. 7

NORTH CAROLINA PROFESSIONAL SEAL 28441 ENGINEER AMY E. LEGGETT 12/08

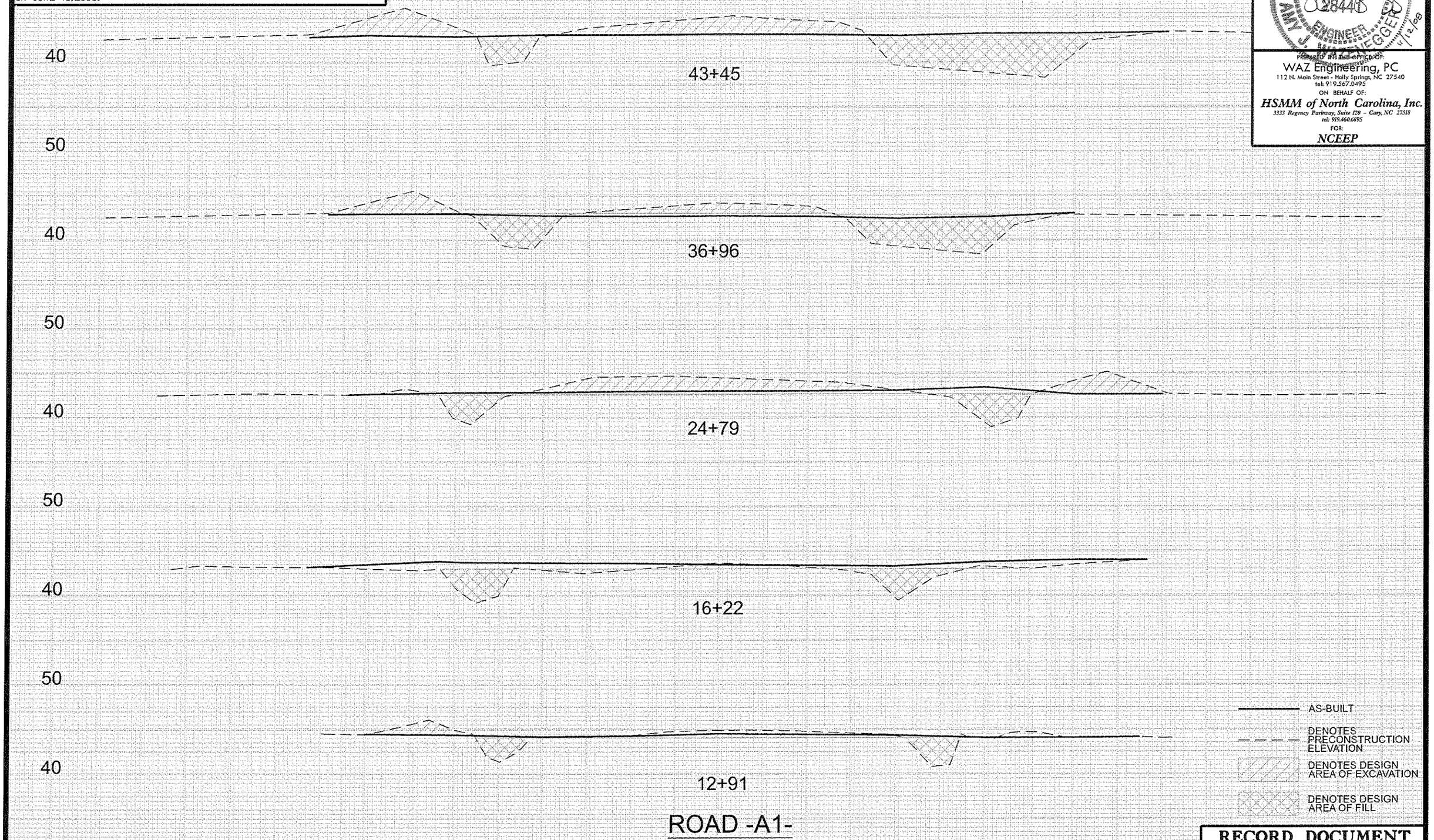
PREPARED IN THE OFFICE OF:
WAZ Engineering, PC
112 N. Main Street - Holly Springs, NC 27540
tel: 919.567.0495
ON BEHALF OF:
*HSMM of North Carolina, Inc.*
3333 Regency Parkway, Suite 120 - Cary, NC 27518
tel: 919.460.6895
FOR:
*NCEEP*

**RECORD DOCUMENT**
DO NOT USE FOR CONSTRUCTION

## NOTES

1. RECORD DRAWINGS ARE BASED UPON "ISSUED FOR CONSTRUCTION" DRAWINGS ISSUED BY HSMM AND SEALED BY S.GRANT GINN (PE #021767) ON APRIL 23, 2007, AND AS-BUILT DRAWINGS ISSUED BY H.C. HARRIS, JR. ENGINEERING & SURVEYING, P.A. AND SEALED BY H.C. HARRIS, JR. (PLS #L-3419) ON JUNE 16, 2008.

# ROQUIST WETLAND RESTORATION SITE




SCO PROJECT NO. 04-0620-01A | SHEET NO. X-1

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 28440 ENGINEER AMY J. WAGGONER 7/2/08


PREPARED IN THE OFFICE OF:
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ON BEHALF OF:
*HSMM of North Carolina, Inc.*
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*tel: 919.460.6895*
FOR:
*NCEEP*


**RECORD DOCUMENT**
DO NOT USE FOR CONSTRUCTION

## NOTES

1. RECORD DRAWINGS ARE BASED UPON "ISSUED FOR CONSTRUCTION" DRAWINGS ISSUED BY HSMM AND SEALED BY S.GRANT GINN (PE #021767) ON APRIL 23,2007, AND AS-BUILT DRAWINGS ISSUED BY H.C.HARRIS,JR. ENGINEERING & SURVEYING,P.A. AND SEALED BY H.C.HARRIS,JR.(PLS #L-3419) ON JUNE 16,2008.

# ROQUIST WETLAND RESTORATION SITE

SCO PROJECT NO. 04-0621-01A | SHEET NO. X-2

NORTH CAROLINA PROFESSIONAL SEAL 28441 ENGINEER AMY S. WATENEGGER 4/12/08

PREPARED IN THE OFFICE OF:
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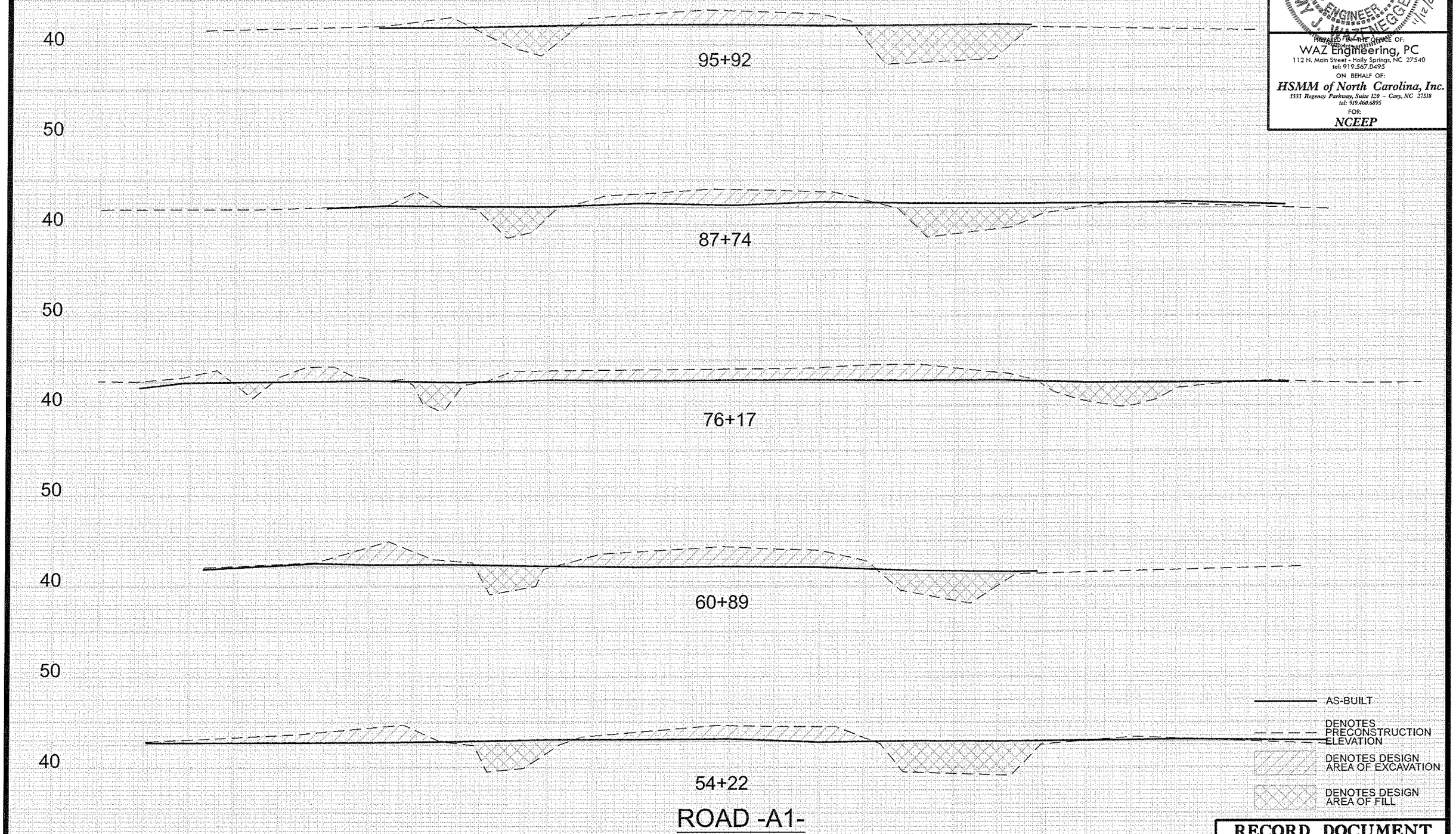
ON BEHALF OF:
*HSMM of North Carolina, Inc.*
*3333 Regency Parkway, Suite 120 - Cary, NC 27518*
*tel: 919.460.6895*
FOR:
*NCEEP*




**RECORD DOCUMENT**
DO NOT USE FOR CONSTRUCTION

## NOTES

1. RECORD DRAWINGS ARE BASED UPON "ISSUED FOR CONSTRUCTION" DRAWINGS ISSUED BY HSMM AND SEALED BY S.GRANT GINN (PE #021767) ON APRIL 23,2007. AND AS-BUILT DRAWINGS ISSUED BY H.C.HARRIS,JR. ENGINEERING & SURVEYING,P.A. AND SEALED BY H.C.HARRIS,JR.(PLS #L-3419) ON JUNE 16,2008.

# ROQUIST WETLAND RESTORATION SITE

SCO PROJECT NO. 04-062/96A | SHEET NO. X-3

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 28440 ENGINEER AMY J. WATENEGGER 11/2/08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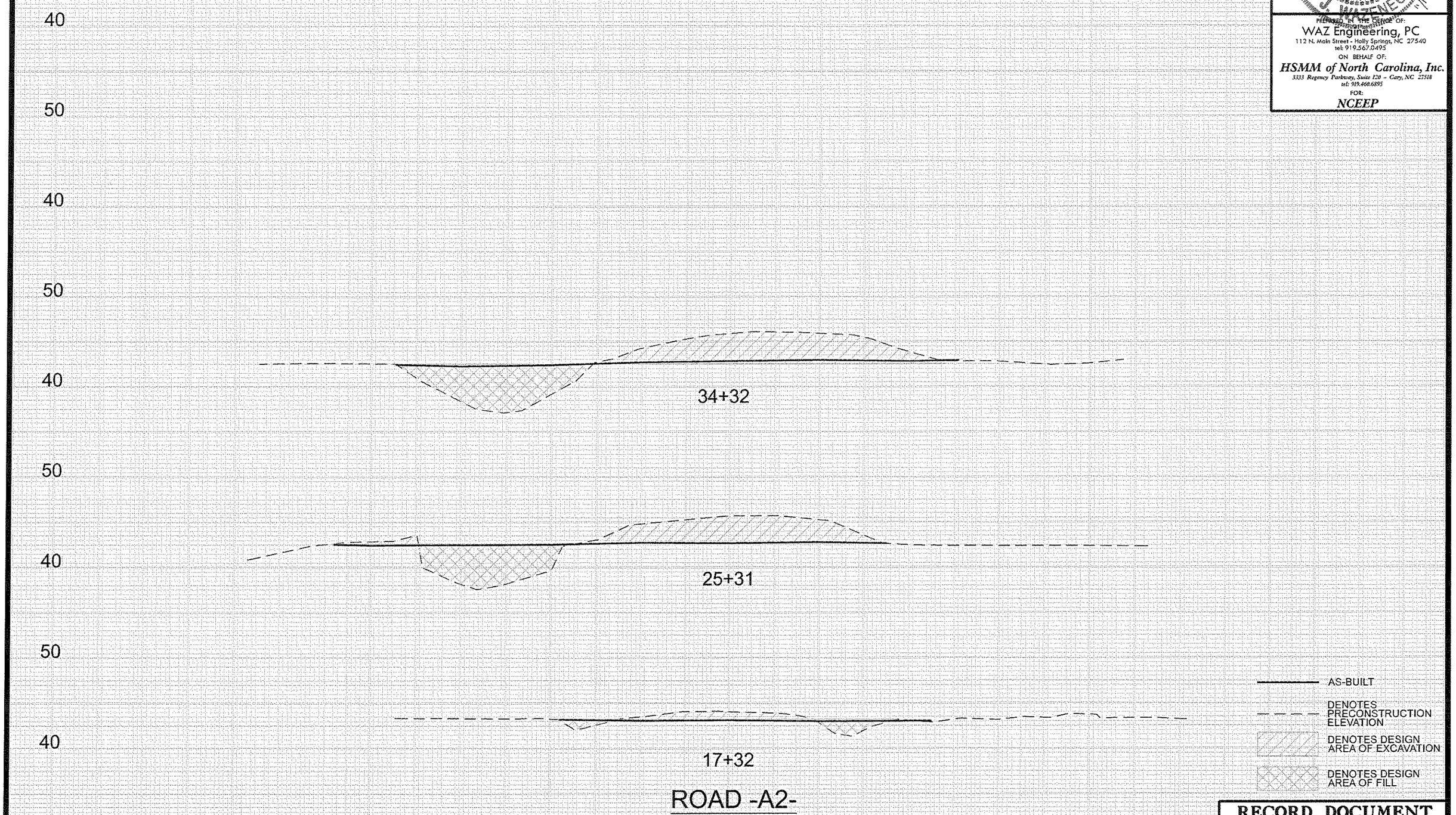
FOR:
*NCEEP*


AS-BUILT

DENOTES PRECONSTRUCTION ELEVATION

DENOTES DESIGN AREA OF EXCAVATION

DENOTES DESIGN AREA OF FILL

**RECORD DOCUMENT**
DO NOT USE FOR CONSTRUCTION

## NOTES

1. RECORD DRAWINGS ARE BASED UPON "ISSUED FOR CONSTRUCTION" DRAWINGS ISSUED BY HSMM AND SEALED BY S.GRANT GINN (PE "021767) ON APRIL 23, 2007. AND AS-BUILT DRAWINGS ISSUED BY H.C. HARRIS, JR. ENGINEERING & SURVEYING, P.A. AND SEALED BY H.C. HARRIS, JR. (PLS "L-3419) ON JUNE 16, 2008.

# ROQUIST WETLAND RESTORATION SITE

SCO PROJECT NO. 5 C 0 [illegible] SHEET NO. X-4

NORTH CAROLINA PROFESSIONAL SEAL 28441 ENGINEER AMY J. WAZENEGGER 11/12/08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ON BEHALF OF:
*HSMM of North Carolina, Inc.*
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*tel: 919.460.6895*
FOR:
*NCEEP*


40
50
40
50
40
50
40

26+23

15+13

ROAD -A3-

70 60 50 40 30 20 10 0 10 20 30 40 50

AS-BUILT

DENOTES PRECONSTRUCTION ELEVATION

DENOTES DESIGN AREA OF EXCAVATION

DENOTES DESIGN AREA OF FILL

**RECORD DOCUMENT**
DO NOT USE FOR CONSTRUCTION

## NOTES

1. RECORD DRAWINGS ARE BASED UPON "ISSUED FOR CONSTRUCTION" DRAWINGS ISSUED BY HSMM AND SEALED BY S.GRANT GINN (PE #021767) ON APRIL 23,2007. AND AS-BUILT DRAWINGS ISSUED BY H.C.HARRIS,JR. ENGINEERING & SURVEYING,P.A. AND SEALED BY H.C.HARRIS,JR.(PLS #L-3419) ON JUNE 16,2008.

# ROQUIST WETLAND RESTORATION SITE

SCO PROJECT NO. 04-052-0014 A

SHEET NO. X-5

STORM DUCK ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 28441 ENGINEER GREGORY A. WAZ 9/12/08


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112 N. Main Street - Holly Springs, NC 27540
tel: 919.567.0495

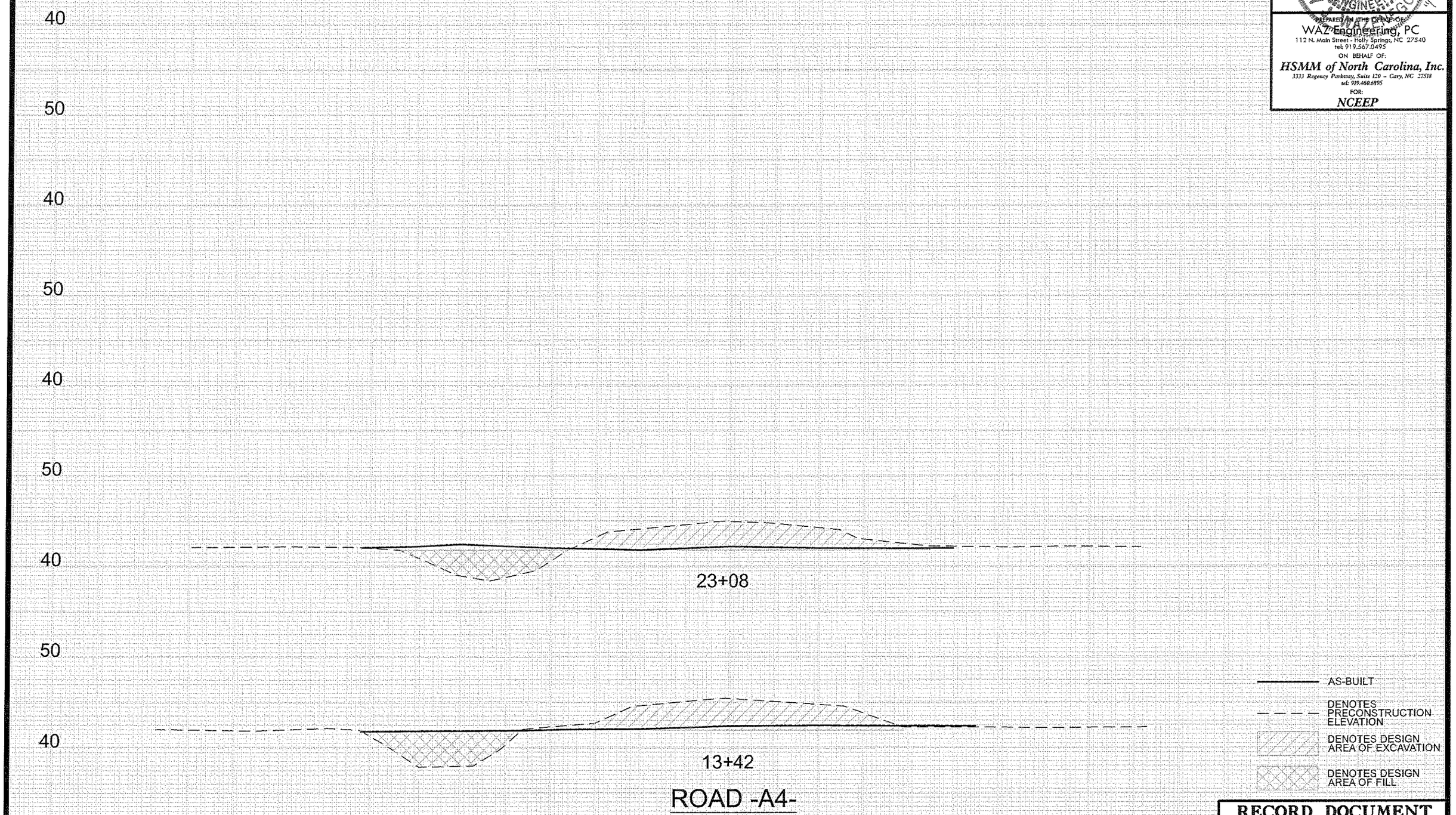

ON BEHALF OF:

*HSMM of North Carolina, Inc.*

*3333 Regency Parkway, Suite 120 – Cary, NC 27518*
*tel: 919.460.6895*

FOR:

*NCEEP*




**RECORD DOCUMENT**
DO NOT USE FOR CONSTRUCTION

## NOTES

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# ROQUIST WETLAND RESTORATION SITE

SCO PROJECT NO. 04-082/001A | SHEET NO. X-6

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 28441 ENGINEER AMY E. EGGETT 11/2/08


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ON BEHALF OF:
*HSMM of North Carolina, Inc.*
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*tel: 919.460.6895*
FOR:
*NCEEP*


40

50

40

50

40

50

40

32+65

15+27

ROAD -A5-

70 60 50 40 30 20 10 0 10 20 30 40 50

AS-BUILT

DENOTES PRECONSTRUCTION ELEVATION

DENOTES DESIGN AREA OF EXCAVATION

DENOTES DESIGN AREA OF FILL

**RECORD DOCUMENT**
DO NOT USE FOR CONSTRUCTION

## NOTES

1. RECORD DRAWINGS ARE BASED UPON "ISSUED FOR CONSTRUCTION" DRAWINGS ISSUED BY HSMM AND SEALED BY S.GRANT GINN (PE #021767) ON APRIL 23,2007, AND AS-BUILT DRAWINGS ISSUED BY H.C.HARRIS,JR. ENGINEERING & SURVEYING,P.A. AND SEALED BY H.C.HARRIS,JR.(PLS #L-3419) ON JUNE 16,2008.

# ROQUIST WETLAND RESTORATION SITE

| SCO PROJECT NO. | SHEET NO. |
|---|---|
| 04-062790 | X-7 |

NORTH CAROLINA PROFESSIONAL SEAL 28447 ENGINEER ANDREW L. GEE 7/12/08


PREPARED IN THE OFFICE OF:
WAZ Engineering, PC
112 N. Main Street, Holly Springs, NC 27540
tel: 919.367.0495


ON BEHALF OF:

*HSMM of North Carolina, Inc.*
*3333 Regency Parkway, Suite 120 - Cary, NC 27518*
*tel: 919.460.6895*

FOR:

*NCEEP*

40

50

40

50

40

50

40

21+03

ROAD -A6-

70 60 50 40 30 20 10 0 10 20 30 40 50

AS-BUILT

DENOTES PRECONSTRUCTION ELEVATION

DENOTES DESIGN AREA OF EXCAVATION

DENOTES DESIGN AREA OF FILL

**RECORD DOCUMENT**
DO NOT USE FOR CONSTRUCTION

## NOTES

1. RECORD DRAWINGS ARE BASED UPON "ISSUED FOR CONSTRUCTION" DRAWINGS ISSUED BY HSMM AND SEALED BY S.GRANT GINN (PE #021767) ON APRIL 23, 2007, AND AS-BUILT DRAWINGS ISSUED BY H.C.HARRIS, JR. ENGINEERING & SURVEYING, P.A. AND SEALED BY H.C.HARRIS, JR. (PLS #L-3419) ON JUNE 16, 2008.

# ROQUIST WETLAND RESTORATION SITE

SCO PROJECT NO. 04-062190A | SHEET NO. X-8

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 28441 ENGINEER AMY E. EGGER 7/2/08


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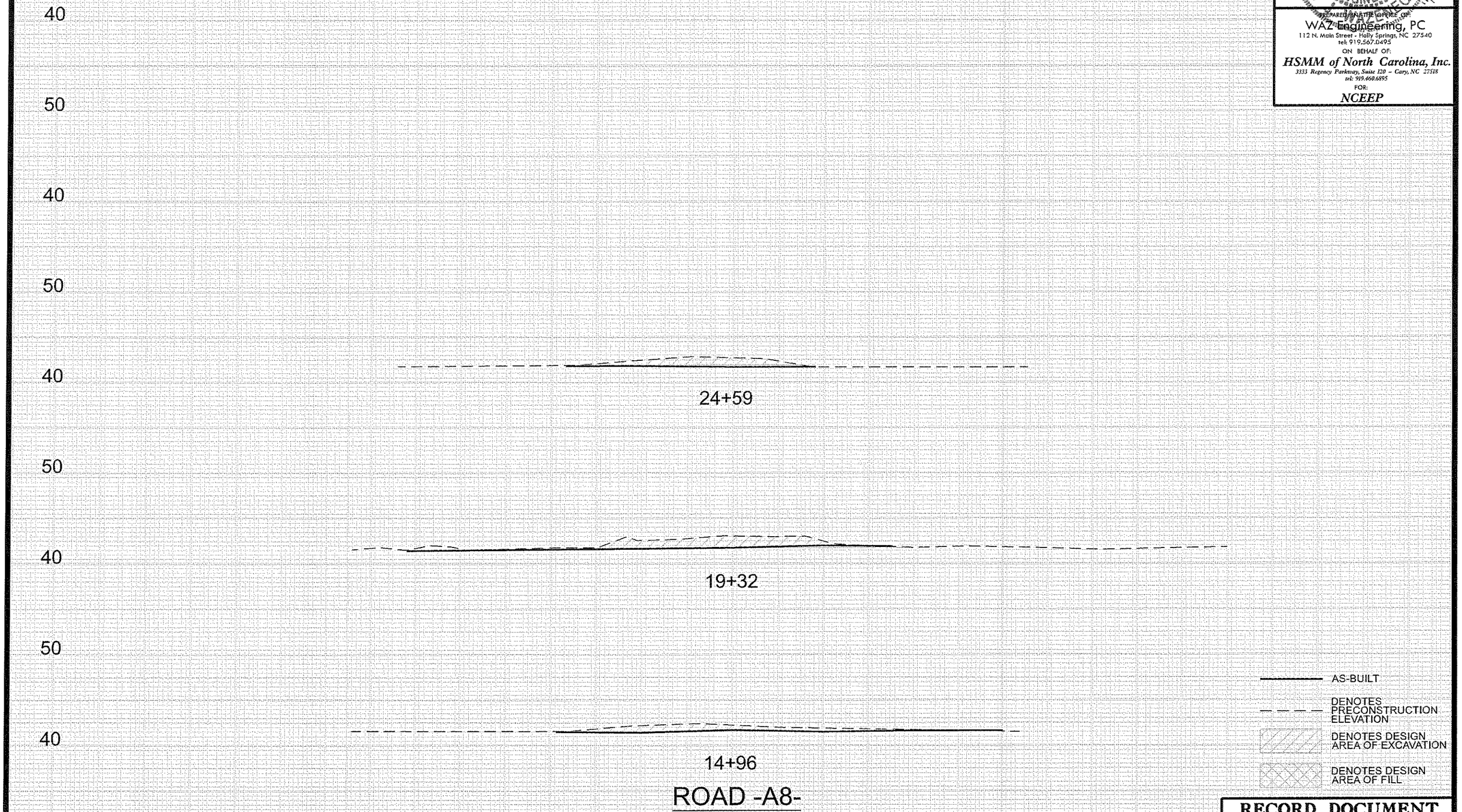
ON BEHALF OF:
*HSMM of North Carolina, Inc.*
*3333 Regency Parkway, Suite 120 – Cary, NC 27518*
*tel: 919.460.6895*
FOR:
*NCEEP*


**RECORD DOCUMENT**
DO NOT USE FOR CONSTRUCTION

## NOTES

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# ROQUIST WETLAND RESTORATION SITE

SCO PROJECT NO. 04-[illegible]/A16 | SHEET NO. X-9

NORTH CAROLINA PROFESSIONAL SEAL 28441 ENGINEER JAMES M. WALLEGGER 7/2/08


PREPARED BY THE OFFICE OF:
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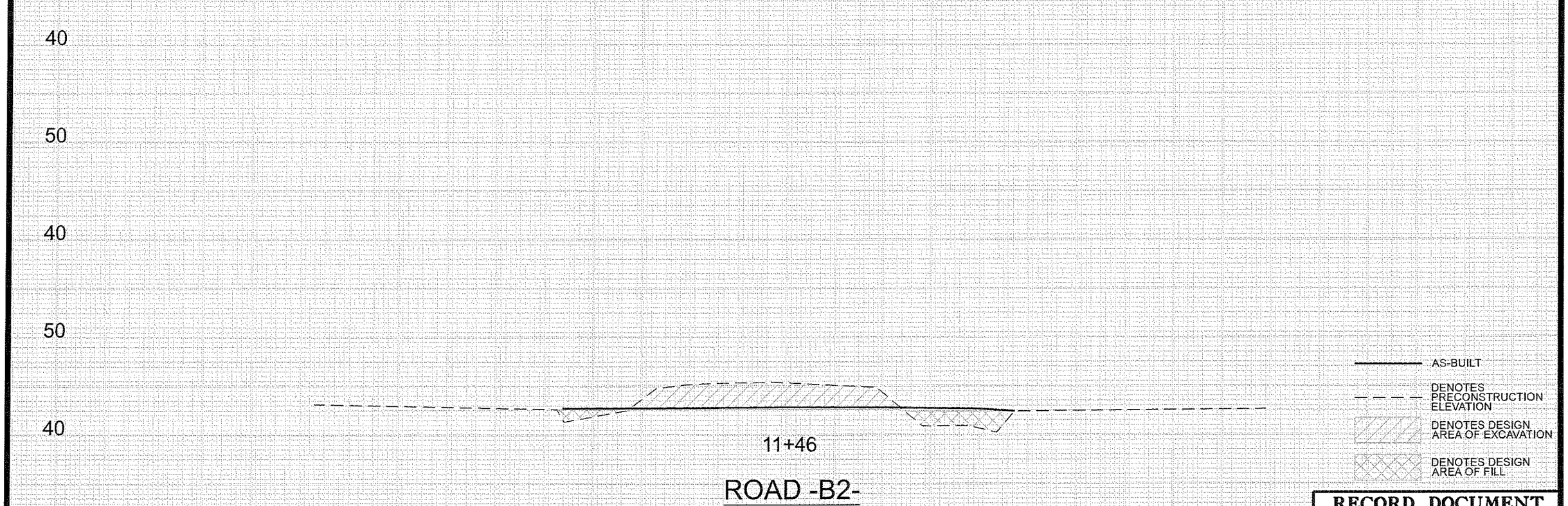
112 N. Main Street - Holly Springs, NC 27540
tel: 919.567.0495
ON BEHALF OF:
*HSMM of North Carolina, Inc.*
*3333 Regency Parkway, Suite 120 - Cary, NC 27518*
*tel: 919.460.6895*
FOR:
*NCEEP*


**RECORD DOCUMENT**
DO NOT USE FOR CONSTRUCTION

## NOTES

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# ROQUIST WETLAND RESTORATION SITE

SCO PROJECT NO. 04-062-01A | SHEET NO. X-10

NORTH CAROLINA PROFESSIONAL SEAL 22844 ENGINEER AMY J. WAZENEGGER 11/12/08


PREPARED IN THE OFFICE OF:
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tel: 919.567.0495
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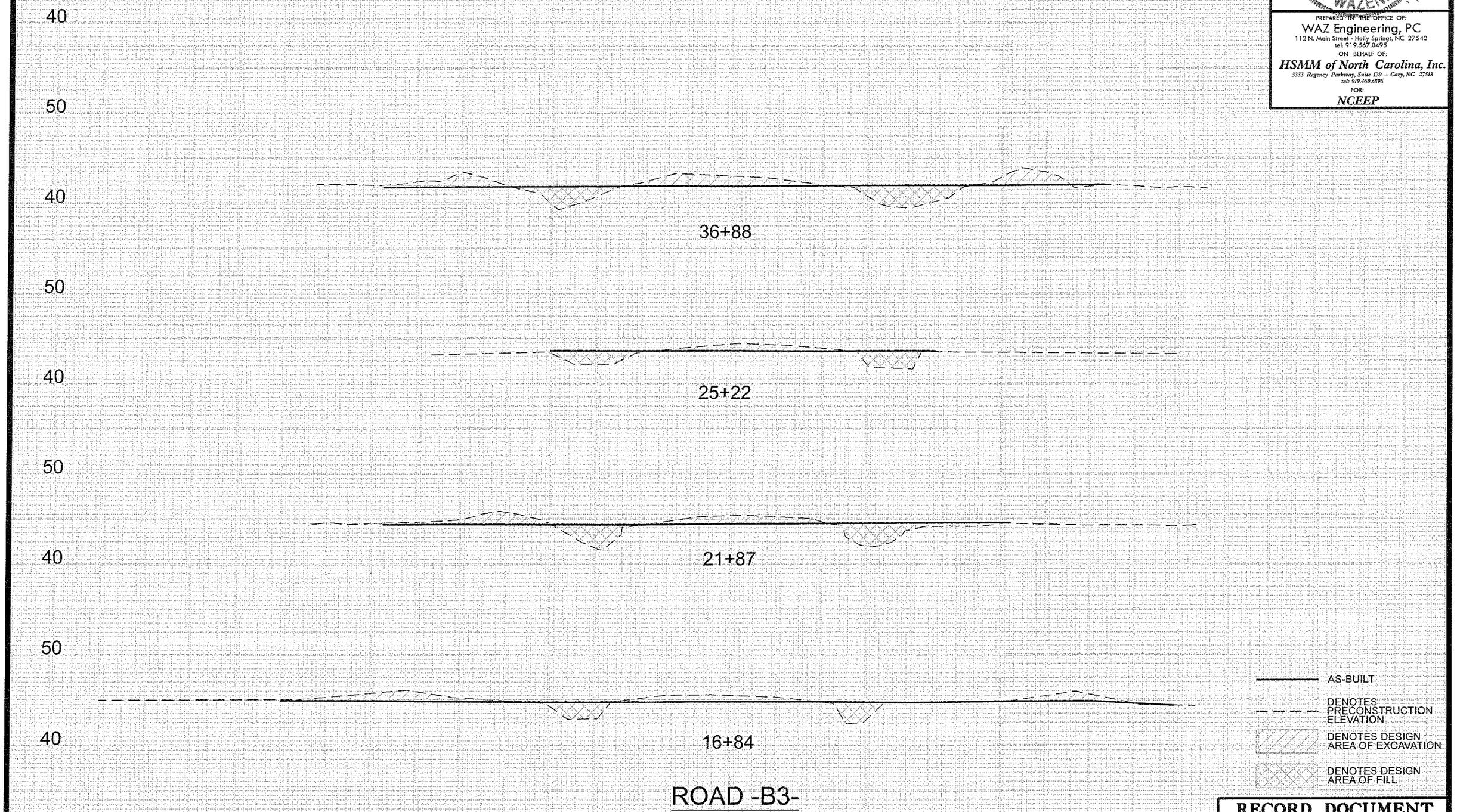
*HSMM of North Carolina, Inc.*
*3333 Regency Parkway, Suite 120 – Cary, NC 27518*
*tel: 919.460.6895*
FOR:
*NCEEP*


AS-BUILT

DENOTES PRECONSTRUCTION ELEVATION

DENOTES DESIGN AREA OF EXCAVATION

DENOTES DESIGN AREA OF FILL

**RECORD DOCUMENT**
DO NOT USE FOR CONSTRUCTION

# ROQUIST WETLAND RESTORATION SITE

## NOTES

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SCO PROJECT NO. 04-062307A | SHEET NO. X-11

NORTH CAROLINA PROFESSIONAL SEAL 28441 ENGINEER AMY E. LEGGER 7/12/08

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ON BEHALF OF:
*HSMM of North Carolina, Inc.*
*3333 Regency Parkway, Suite 120 - Cary, NC 27518*
*tel: 919.460.6895*
FOR:
*NCEEP*

40
50
40
50
40
50
40

22+68

12+58

ROAD -B4-

70 60 50 40 30 20 10 0 10 20 30 40 50

AS-BUILT

DENOTES PRECONSTRUCTION ELEVATION

DENOTES DESIGN AREA OF EXCAVATION

DENOTES DESIGN AREA OF FILL

**RECORD DOCUMENT**
DO NOT USE FOR CONSTRUCTION

## NOTES

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# ROQUIST WETLAND RESTORATION SITE

SCO PROJECT NO. 04-062/SWA

SHEET NO. X-12



PREPARED IN THE OFFICE OF:
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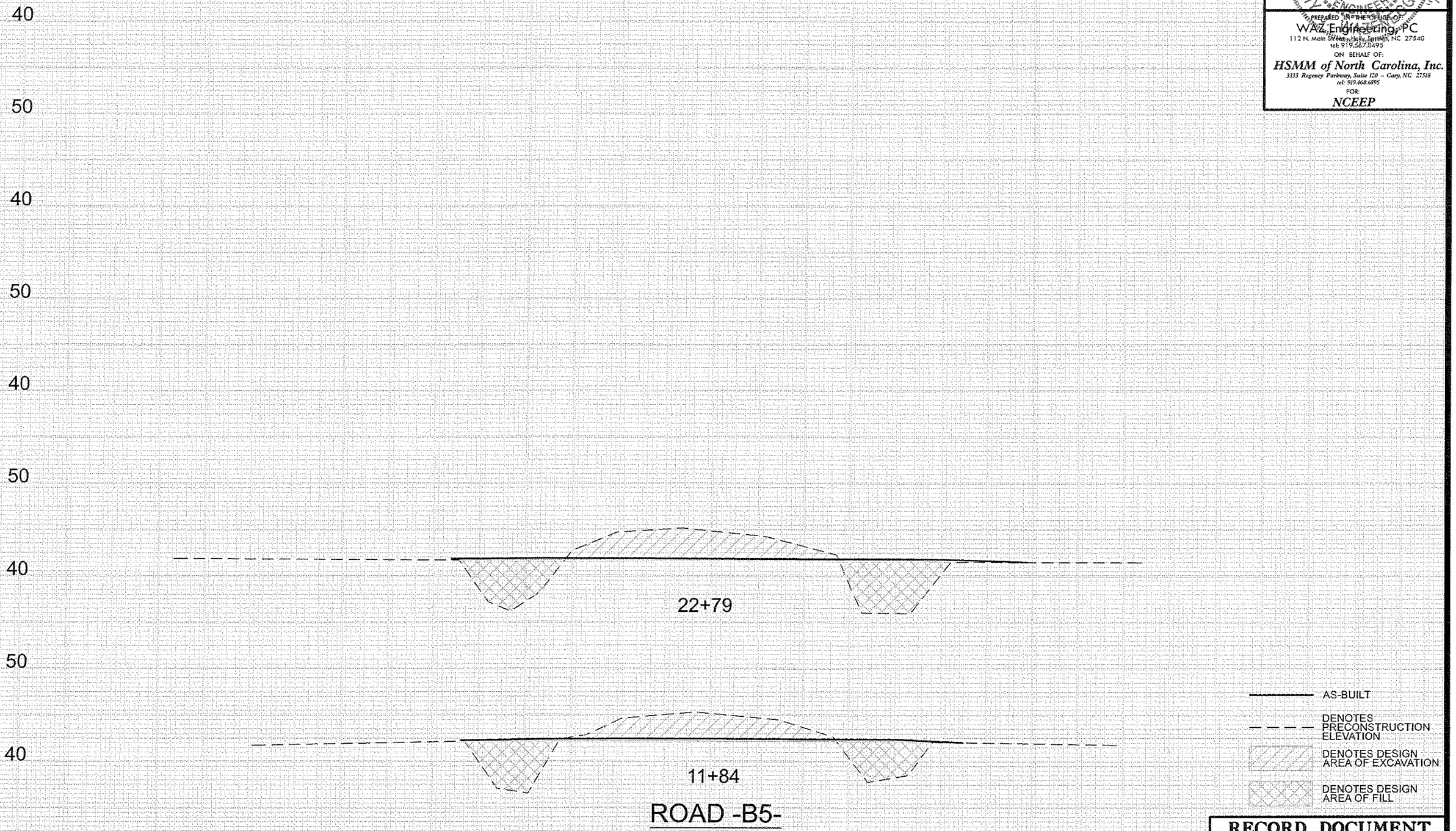
ON BEHALF OF:
*HSMM of North Carolina, Inc.*
*3333 Regency Parkway, Suite 120 – Cary, NC 27518*
*tel: 919.460.6895*
FOR:
*NCEEP*


**RECORD DOCUMENT**
DO NOT USE FOR CONSTRUCTION