Prepared for:

North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program

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Final As-Built and Monitoring Baseline Report

Bishop Road Wetland Restoration
EEP IMS # 38
Hyde County, North Carolina

Data Collected February 2009
Report Submitted October 2009

Final Mitigation and As-Built Baseline Report

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EEP IMS # 38
Hyde County, North Carolina

Prepared for:
North Carolina Ecosystem Enhancement Program

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Executive Summary

The Bishop Road site was first identified for potential wetland mitigation by North Carolina Department of Transportation (NCDOT) circa 2001. Work on the project with North Carolina Ecosystem Enhancement Program (NCEEP) began in 2005 after the formation of NCEEP. The project was first bid for construction in May 2007 and all bids exceeded the estimated project costs. The project was scaled back and a few construction requirements were eliminated. The project was rebid in July 2007. Construction began in March 2008 and was completed in February 2009. The site is owned by NCDOT but will be managed by NCEEP through the monitoring period.

The overall goals of the restoration project are to:

- Restore hydrology.
- Restore natural diverse wetland communities.
- Protect site from vehicle access, logging or development

These goals will be achieved through the following objectives:

- Remove earthen roads and fill roadside drainage ditches.
- Remove bedding rows in select areas and replant areas to establish natural plant communities, non-riverine pine flatwoods, coastal marshes and riverine forested wetlands
- Purchase property fee simple, put under conservation in perpetuity, and install vehicle access barriers

Mitigation components resulting from the project are coastal marsh restoration and preservations, riverine forested wetland restoration and preservation and non-riverine pine flatwood restoration and preservation. The restoration types and amounts were modified during the construction due mainly to plant community nomenclature and inaccuracy of the topographic survey. These modifications deviate significantly from names and amounts presented in the July 2006 Restoration Plan. Approximately 36 acres of non-riverine pine flatwood restoration was removed to reduce construction costs. The tidal freshwater marsh community is now referred to coastal marsh at the request of NCEEP and the Department of Coastal Management. A 2.2-acre section of tidal freshwater marsh/coastal marsh located west of Old Bishop Road was changed to non-riverine pine flatwood due to inaccurate survey elevations. ARCADIS developed the design based on topographic survey information provided by a third party. Based on the survey elevations and its proximity to open water this area was slated for marsh restoration. After the area was cleared during construction, it was obvious that the area was significantly higher than the survey depicted. DWQ Buffer Rule Clarification #2007-009 (issued after the Bishop Road Restoration Plan was developed) allows for riparian buffer

restoration mitigation credit to be generated adjacent to coastal wetlands. Due to this clarification, areas adjacent to the two coastal marsh restoration areas at the project site became available for riparian buffer restoration. At the request of EEP, ARCADIS relabeled these areas from 0.171 acres of non-riverine pine flatwood restoration to 0.171 acres of riparian buffer restoration.

Restoration on the site was accomplished by removing existing earthen roadways, using this material to fill existing roadside ditches, clearing vegetation from non-jurisdictional areas and replanted the areas with appropriate native vegetation. The roadside ditches drain hydric soils on site and prevent hydrologic connectivity across the site. All restoration areas, except coastal marsh, were ripped prior to planting.

The restoration plan includes 0.343 acre of coastal marsh restoration, 0.171 acre of riparian buffer restoration, 184.0 acres of coastal marsh preservation, 56.3 acres non-riverine pine flatwood restoration, 332.5 acres of non-riverine pine flatwood preservation, 1.0 acre of riverine forested wetland restoration and 61.7 acres of riverine forested wetland preservation. Non-jurisdictional areas which are not being claimed for mitigation comprise 51.0 acres. Site performance will be documented for a minimum of five years or until success criteria is met; whichever is longer, with data collected from groundwater monitoring gauges and vegetation monitoring plots. Each monitoring year's data will be compared to the previous year's data to document site progression.

Baseline woody vegetation density ranged from 324 (Plot 25) to 1781 (Plot 18) stems per acre. These tabulations included planted and volunteer species. Plot 25 is located in coastal marsh. The planting density for woody stems in this community was 258 stems per acre. Additional herbaceous vegetation was planted but not tallied because it was dormant and could not be located.

- Several items occurred after the installation of the monitoring devices and the baseline monitoring that may affect the data collection or future data comparison.
- Gauge 25 (located in coastal marsh at the end of Silverthorne Road) was inundated. It is expected to be replaced in the winter of 2009 by the NCEEP monitoring firm.
- Gauge 23 (located on the old Weyerhauser Service Road) was destroyed by a black bear. It is expected to be replaced in the winter of 2009 by the NCEEP monitoring firm.
- Vegetation Plot 21 (located in non-riverine pine flatwoods) did not meet the initial planting density (486 verses 538). This is only 2 stems below the specified density. Given that all other sites were planted well above the specified density and this plot is meeting the year 3 vegetation success criteria of 320 stems per acre, this is not considered an issue.

1. Project Goals, Background, and Attributes

1.1 Location and Setting

The Bishop Road site (site) is situated along Bishop Road (SR 1156), between US 264 and the Pungo River, in Hyde County (Figure 1). It is approximately 1 mile (1.6 kilometers) north of Scranton, 5 miles (8.05 kilometers) southeast of Leechville, and 10 miles (16.09 kilometers) east of Belhaven. The 691.7-acre site (279.9-hectare) is owned by the North Carolina Department of Transportation (NCDOT) and will be managed by the North Carolina Ecosystem Enhancement Program (NCEEP) over the monitoring period.

Directions:

From Raleigh, take US 64 east towards Wendell. Merge onto US 264 East. Continue on US 264 approximately 135 miles. Turn right onto Silverthorne Road. The site abuts the intersection of US 264 and Bishop Road and extends to the west and north. Silverthorne Road is approximately 4 miles east of the Intercoastal Waterway/US 264 crossing. For a Project Vicinity Map refer to Figure 1.

The Bishop Road site lies approximately 1 mile (1.6 kilometers) north of Scranton along US 264. The site is bordered to the northwest by Tarklin Creek, the south by Scranton Creek, and the west by the Pungo River. The remainder of the site is bordered by roads, managed timber areas, agricultural fields, and wooded or undeveloped lands (Figure 2). Bishop Road is an improved gravel road. Silverthorne Road and Weyerhaeuser Service Road are unimproved gravel and soil roads. The Bishop Road site is within the lower Tar-Pamlico River basin, United States Geological Survey (USGS) Hydrologic Unit 03020104, and North Carolina Division of Water Quality (NCDWQ) subbasin 03-03-07 (NCDWQ, 2004).

The primary land-use classification within the project vicinity is forested woodland, which includes the pine plantation and riverine forested wetland communities present onsite. Agricultural land, forested woodland, and two residences occur along Bishop and Silverthorne Roads and adjacent to the Bishop Road site.

The project reference communities are located on site. Groundwater monitoring gauges were installed in the reference communities. Refer to as-built sheets for gauge locations.

1.2 Project Goals and Objectives

The NCEEP retained ARCADIS G&M of North Carolina, Inc. (ARCADIS) to conduct restoration activities at the Bishop Road site in Hyde County, North Carolina. This restoration effort was initiated

to satisfy mitigation requirements for NCDOT impacts to wetlands that occurred within the Tar-Pamlico River Basin. The goals, objectives and system of measurement of this restoration effort are listed below:

1.2.1 Goals

- Restore site hydrology.
- Restore natural diverse wetland communities.
- Protect site from vehicle access, logging or development

1.2.2 Objectives

- Remove earthen roads and fill roadside drainage ditches.
- Remove bedding rows in selected areas and replant areas to establish natural plant communities, non-riverine pine flatwoods, coastal marshes and riverine forested wetlands
- Purchase property fee simple, put under conservation in perpetuity and install vehicle access barriers

1.2.3 System of Measurement

- Document hydrology with groundwater monitoring gauges
- Document vegetation development with permanent 10 m x 10 m plots
- Document vehicle access through visual observation

1.3 Project Structure, Restoration Type, and Approach

1.3.1 Project Structure

Mitigation components resulting from the project are coastal marsh restoration and preservations, riverine forested wetland restoration and preservation and non-riverine pine flatwood restoration and preservation and coastal marsh riparian buffer restoration. Figure 2 shows the location of the project components and Table 1 presents acreage of each component.

The restoration types and amounts were modified during the construction due mainly to plant community nomenclature and inaccuracy of the topographic survey. These modifications deviate significantly from names and amounts presented in the July 2006 Restoration Plan. Approximately

36.0 acres of non-riverine pine flatwood restoration were removed to reduce construction costs. The tidal freshwater marsh community is now referred to coastal marsh at the request of NCEEP and the Department of Coastal Management. A 2.2-acre section of tidal freshwater marsh/coastal marsh located west of Old Bishop Road was changed to non-riverine pine flatwood due to inaccurate survey elevations. ARCADIS developed the design based on topographic survey information provided by a third part. Based on the survey elevations and its proximity to open water, this area was slated for marsh restoration. After the area was cleared during construction, it was obvious that the area was significantly higher than the survey depicted. A small section of non-riverine pine flatwood restoration (0.171 acre) was changed to riparian buffer restoration. This change resulted from the need of riparian buffer credits in the area.

Vehicle access barriers comprised of concrete Jersey barriers, an earthen berm and a metal gate were installed on site. The locations of these structures are shown on the as built drawings (Appendix B). The Jersey barriers were installed in three locations; two adjacent to US 264 (Sheets 2 and 4) and one at the northern end of Bishop Road (Sheet 7). A metal gate was installed at the end of Silverthorne Road on private property (Sheet 3). It was installed at this location at the request of and in coordination with the property owner. The earthen berm was installed at the intersection of Bishop Road and Silverthorne Road (Sheet 2).

1.3.2 Restoration Type and Approach

1.3.2.1 Coastal Marsh Wetlands

The restoration plan includes 0.343 acres of coastal marsh restoration at two locations. The first and larger area (0.246 acre) is located at the northern end of Bishop Road (Sheet 5) on the main branch of Tarklin Creek. The area consisted of an earthen road bed approximately 32 feet wide and approximately 2.5 feet higher than the adjacent marsh. Restoration was accomplished by removing the earthen fill to an elevation within ±0.2 feet of the adjacent marsh. The fill material was used to raise the elevation of the adjacent to the same elevation as the marsh and regarded road. The restored area was planted with vegetation representative of the adjacent marsh, included black needle rush (*Juncus roemerianus*), Sawgrass *(Cladium jamaicense),* smooth cordgrass *(Spartina alternifloria)* and pickerelweed *(Pontederia cordata).* Soils in the marsh consist of Longshoal mucky peat, a hydric A soil.

The second and smaller area (0.097 acre) is located near the end of Silverthorne Road (Sheet 3). Silverthorne Road crosses a small tidal slough of Scranton Creek at this location. There was no culvert under Silverthorne Road at this location. This disconnected the small slough upstream of Silverthorne Road from tidal flow. Sawgrass *(Cladium jamaicense)* is the dominate vegetation on the downstream (the tidal side) of the road. The upstream side was dominated by bare ground. This

significant difference in vegetation is a result of the disconnection from tidal flow. The roadway was removed and graded to an elevation within 0.2 foot of the adjacent slough elevations and replanted with the same suite of coastal marsh herbaceous vegetation as the above location. Soils in the area consist of Bolling loamy fine sand, a hydric B soil.

DCM representative Steve Trowell inspected both coastal marsh restoration areas during construction. Final construction elevations of the coastal marsh areas were provided to DCM. They accepted the final grades. A copy of their acceptance letter is shown in Appendix E.

1.3.2.2 Non-Riverine Pine Flatwood Wetlands

The non-riverine pine flatwood restoration areas include 56.3 acres of non-jurisdictional areas within the existing planted pine, and roadbed areas throughout the site. Non-riverine pine flatwood restoration was accomplished by clearing and grubbing non-jurisdictional 10-15 year old loblolly pine plantation then replanting with the appropriate wetland vegetation. The bedding rows were graded to a more natural contour. Existing roadways were also removed and adjacent ditches filled with the roadbed material to the elevation of the adjacent non-riverine pine flatwood community. The depth of cut on the roadways average around 1.5 feet. The depth of the adjacent ditches averaged around 2.5 feet. These areas were also replanted. Soils within the non-riverine pine flatwood restoration consist of Aeredale silt loam, Argent loam, Chapanoke silt loam and Yeopin silt loam, all of which are hydric.

The site was cleared by first removing the pine trees. Trees were cut at the base, leaving the roots in the ground, and then chipped. The chips were hauled off site. Branches and bark were burned on site. The tree roots were grubbed using a “rake” attached to a track excavator. This also removed the bedding rows. Root material was burned on site.

1.3.2.3 Riverine Forested Wetland

The restoration plan provided restoration of 1.0 acre of riverine forested wetland. Riverine forested wetlands restoration was accomplished by removing an earthen road bed. The road material was used to fill drainage ditches adjacent to the roadbed. Target restoration elevations were designed to be within ± 0.2 foot of the adjacent target community elevations. An initial survey revealed that the desired elevations had not been met. The contractor was required to re-grade the area to design specifications. A post construction topographic survey verified that final elevations were within the target range. Soils within the adjacent riverine wetlands consist of Belhaven muck, a hydric A soil. Trees removed to accomplish the riverine wetland restoration were a few 10-15 year old loblolly pines located on the ditch banks. After clearing, grubbing and grading, the area was replanted with riverine wetland species, including bald cypress (*Taxodium distichum*), water tupelo (*Nyssa aquitica*), tag alder (*Alnus serrulata*) and various oak (*Quercus*) species.

1.4 Project History, Contacts, and Attribute Data

The Bishop Road site was first identified for potential wetland mitigation by NCDOT circa 2001. NCDOT intended to develop the site as a wetland mitigation bank. NCDOT's local division received a notice of violation (NOV) in 2000 from the North Carolina Division of Coastal management (DCM) which required the restoration of 0.016 acre of coastal marsh at the Bishop Road site. Appendix A contains the NOV letter. However, during the design period, the NCEEP formed. The majority of NCDOT's mitigation projects were transferred to NCEEP. Work on the project with NCEEP began in 2005. The project was first bid for construction in May 2007 and all bids exceeded the estimated project costs. The project was scaled back and a few construction requirements were eliminated. The project was rebid in July 2007 and Kris-Gray Construction out of Jamesville, North Carolina, was the lowest bidder. Construction began in March 2008 and was completed in December 2008, including site planting. Tables 2, 3, and 4 summarize the site characteristics.

2. Success Criteria

In order to determine if the restoration site is performing as designed, performance criteria to monitor the development of the site are required. Monitoring provides quantitative data and documentation of changes occurring at the site. The criteria include monitoring vegetation development and changes in groundwater elevations. All post-construction monitoring data will be compared to the pre-construction data and reference data. This comparison will show whether the site is progressing towards the desired outcome. It is expected that as the monitoring period progresses the site will begin to develop a more "natural" appearance.

2.1 Vegetation

Vegetation success within the restored non-riverine pine flatwood and riverine forested areas will be measured on survivability over the 5-year monitoring period or until success criteria are met, whichever is longer. Success in restored non-riverine and riverine wetland areas will be based on criteria established by the US Army Corps of Engineers (USACE); 320 stems per acre surviving after 3 years, 288 stems after 4 years, and 260 stems after 5 years (USACE 2003). Success in Riparian Buffer Restoration areas will be based on criteria established by the NC Division of Water Quality; 320 stems surviving year 5 (Tar-Pam River basin Buffer Rules). Vegetation monitoring will follow protocol outlined in the NCEEP-CVS Level 2 and 3 guidelines. CVS Level 2 data collection allows for native naturalized plants to be counted towards success criteria. A survey of vegetation during the 230-day growing season (March 27 to November 12) (Gagnon 1999) will be conducted annually over the monitoring period in order to determine survival rate of the installed plantings. This survey will track the survivability on an annual basis and be used to calculate survivability at the end of the monitoring period. Survival of fewer than 320 stems per acre at the end of 3 years and fewer than 260 stems per

acre at the end of 5 years will require the identification and implementation of appropriate contingency measures by the NCEEP. If the contingency measures involve re-planting an area, stock of the same size/age as growing planted stems on site that were part of the original planting will be used.

Coastal marsh monitoring will follow NCEEP-CVS Level 3 guidelines in which herbaceous percent cover is calculated. The restored areas will be compared to the reference area percent cover. A significant variation between the two will indicate a possible concern and may require further investigation into the cause of the difference. Restored areas that sustain a plant species commonly found in salt/brackish marshes in the region that are tolerant to flooding or irregular flooding and high salt concentrations will be considered successful. Specifically species would be one or more of the following: smooth cordgrass, black needlerush, glasswort, salt grass, sea lavender, salt marsh bulrush, saw grass, cattail, salt meadow cordgrass, and big cordgrass. In addition, NC DCM's jurisdictional claim of a restored coastal marsh area at the Bishop Road project site will constitute restoration success.

2.2 Hydrology

The regulatory wetland hydrology criteria require saturation (free water) within 1 foot of the soil surface for 5 percent of the growing season under normal climatic conditions or the time period established by the reference gauges (USACE 1987). This equates to 12 consecutive days for the 230-days long growing season in Hyde County (March 27 to November 12) (Gagnon 1999). Thirteen shallow groundwater gauges located within the reference and restored wetland areas will monitor site hydrology throughout the monitoring period. Gauges will measure the water table over a 40-inch vertical column on a daily basis. Gauges will be downloaded at the beginning, middle and end of the growing season each year.

Pre-construction ground water data was collected during 2006, one of the driest years on record in North Carolina. The data are presented in Appendix C. The original intent of collecting these data was to use it to develop success criteria and comparison to post-construction data. However, because of the abbreviated time period of the data collection and it being collected during an atypical year, it will not be used for these purposes. This does not mean that it may not be used in the future. It just will not be currently used to develop success criteria.

Success criteria will be based on the aforementioned USACE criteria. In the event that the restoration sites do not meet those criteria, the restoration area hydroperiods will be compared to the onsite reference hydroperiods. A deviation beyond 25 percent of the hydroperiod of the reference gauges will be considered not to meet the success criteria.

Restoration areas will be monitored annually for 5 years following construction or until success criteria are met, whichever is longer.

2.2.1 Proposed Changes to the Success Criteria

Proposed changes to the Success Criteria

EEP proposes that the success criteria for restored wetland areas at the Bishop Road site be tied to an increase in pine flats and coastal marsh wetland functions post-construction and on-site reference conditions throughout the monitoring period rather than the typical regulatory success criteria of soil saturation for 5% of the given county's growing season. Proposed success criteria for non-riparian and riparian wetland areas are as follows:

Hydrologic success criteria at the restored site will be met if the site demonstrates saturation for a maximum deviation of 30% from the duration of saturation at the reference site during the growing season. Saturation is defined here as groundwater being present within 12" of the soil surface. The growing season for Hyde County is 230 days (March 27 to November 12) as defined by Gagnon, 1999. Five percent of the growing season in Hyde County equates to 12 consecutive days. However, anything less than 5% saturation for the growing season will not be considered "successful" (USACE 1987).

Hydrological Monitoring Approach

Thirteen shallow groundwater gauges located within the reference and restored wetland areas will monitor site hydrology throughout the monitoring period. Gauges will measure the water table over a 40-inch vertical column on a daily basis. Gauges will be downloaded at the beginning, middle and end of the growing season each year.

Pre-construction ground water data was collected during 2006, one of the driest years on record in North Carolina. The data is presented in Appendix C. The original intent of collecting this data was to use it to develop success criteria and comparison to post-construction data. However, because of the abbreviated time period of the data collection and it being collected during an atypical year, it will not be used for these purposes. Success criteria will be based on the aforementioned yearly criteria and in the event that the yearly criteria is not met, the standard USACE criteria will be used.

Restoration areas will be monitored annually for five years following construction or until success criteria are met, whichever is longer.

3. Monitoring Plan Guidelines

Monitoring locations were selected by NCEEP. The following language was provided by NCEEP and presents their methodology for selecting the locations. Gauge locations are shown on Figure 3 and the as-built drawing.

Locations of monitoring gauges and vegetation plots were selected using a stratified random method. The site was stratified by treatment (preservation or restoration), vegetation class and soil type.

Previously-established reference gauges in preservation areas were used for the marsh and riverine forest areas (gauges #7 and #14, respectively; see "Bishop Road Wetland Restoration Project, Final Restoration Plan," August 2006). The previous reference gauge for the non-riverine forest (gauge #10) was replaced because it is not in an area determined to be a jurisdictional wetland. Two new reference gauges (#15 and #16) were located at randomly-selected points in two predominant soil types (Argent and Hydeland) in the non-riverine forest preservation area that was determined to be a jurisdictional wetland.

For monitoring the restored portion of the site, at least one gauge and an adjacent vegetation plot were placed at randomly-selected points in each vegetation class. Because of the size and variability of the restored non-riverine forest area, five locations (#17- #21) were chosen, one in each of the five predominant soil types (Acredale, Argent, Chapanoke, Hydeland and Yeopim) with a sixth location (#22) in the southeast corner of the site (due to its distance from the other locations). One location (#23) was chosen in the restored riverine forest area. One location was chosen in each of the two restored coastal marsh areas (#24 and #25) because of expected differences in vegetation composition (*Juncus*-dominant vs *Cladium*-dominant) and lack of proximity.

3.1 Hydrology

Ground water hydrology will be monitored using 13 Remote Data Systems (RDS) water level gauges. Eight gauges were installed in the non-riverine pine flatwoods (including two reference gauges), three gauges in the coastal marsh (including one reference), and two in the riverine forested wetlands (including one reference). The number and location of the gauges were selected by NCEEP (see above). The gauges were installed on February 10-11, 2009, and were programmed to collect a reading once daily at 8:00 am. Two of the reference gauges (#7 and #14) were installed in March 2006 prior to construction activities and are collecting data points daily at 8:00 AM. Gauges will be downloaded at the beginning, middle and end of the growing season. The location and gauge number are shown on the as built drawing in Appendix B and preconstruction gauges data are presented in Appendix C.

3.2 Vegetation

3.2.1 Number of Plots Installed

Monitoring will follow NCEEP-CVS protocol. CVS Level 2 protocol will be used in wetland restoration areas and Level 3 protocol will be used in the coastal marsh restoration areas. Nine permanent vegetation monitoring plots, each measuring approximately 1,076 square feet (100 square meters), were installed on February 10-11, 2009: five within the non-riverine pine flatwoods, two within the coastal marsh, and one within the riverine forested wetland. The number and location of the plots were selected by NCEEP and are shown on the as-built drawing in Appendix B. Planted and volunteer individuals were documented. Each specimen was flagged after the appropriate data were collected. This ensured that individuals were not recounted and may make individuals easier to locate in subsequent monitoring events.

Monitoring locations are numbered 17-25. This numbering avoids confusing post-construction monitoring locations with pre-construction monitoring locations. Pre-construction locations were numbered 1-14. Two locations, 7 and 14, used for pre-construction monitoring will also be used as post-construction reference sites.

3.2.2 Vegetation Plot Records (Levels)

Level 2 methodology was applied to all plots. This documents all planted and volunteer woody species. The coastal marsh plots had herbaceous vegetation plugs planted in them. However, due to the time of year, the vegetation plugs were dormant and could not be tallied. The planted and volunteer woody stems were recorded in these plots using Level 2.

3.2.3 Photograph Stations

Photographs were taken on February 10-11, 2009, from the origin of each vegetation plot facing the opposite corner. Photographs will be taken from the same perspective in subsequent years monitoring. Vegetation monitoring data sheets are included in Appendix C.

4. Maintenance and Contingency Plans

In the event that the above identified success criteria are not met and it appears that there is a downward trend of the site's performance, remedial actions will be discussed with the NCEEP project manager. Actions could include the installation of additional plants or the reinstallation of a monitoring gauge to ensure correct installation practices were followed.

Visual assessments will also be made to determine site success. Concrete barriers were installed to prevent vehicle access to the site. If evidence of vehicle traffic is observed during site monitoring visits, NCEEP will be contacted to identify remedial actions.

5. As-Built/Baseline Conditions

Following construction, a baseline survey of the site was performed. The baseline survey documents the final constructed aspects of the site. Subsequent yearly monitoring will be compared with the baseline data in order to observe performance of the restoration activities. The baseline survey consisted of a topographic survey (conducted by the contractor) of the site to ensure the site was constructed within the designed specifications and tallying vegetation numbers within each vegetation plot. The coastal marsh as-built information was sent to The Division of Coastal management (DCM) for acceptance. Steve Trowell, DCM's field representative, accepted the as-built information via email on May 28, 2009 (Appendix E).

5.1 Vegetation

Baseline vegetation data was collected on February 10 and 11, 2009, concurrently with the installation of the monitoring gauges. The CVS data forms are presented in Appendix D. Baseline woody vegetation density ranged from 324 (Plot 25) to 1781 (Plot 18) stems per acre. These tabulations included planted and volunteer woody species. If necessary, determinations of woody growth habit will be based on characteristics as identified in the USDA PLANTS database. Plot 25 is located in coastal marsh. The planting density for woody stems in this community was 258 stems per acre. Additional herbaceous vegetation was planted but not tallied because it was dormant and could not be located.

5.2 Photo Documentation

Appendix F contains baseline photos of each vegetation plot. Photos were taken on February 10-11, 2009, shortly after planting was completed.

6. References

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TABLES

Table 1. Project Components Bishop Road Wetland Restoration, Hyde County, SCO # 050653801							
Project Component or Reach ID	Existing Acreage	Restoration Level	Approach	Acreage	Stationing	Buffer Acres	Comments
Non-Riverine Pine Flatwoods		R	R	56.3	N/A	N/A	Loblolly pine and road beds removed and replanted with suite of native species
Non-Riverine Pine Flatwoods	332.5	N/A	P	332.5	N/A	N/A	
Coastal Marsh							
Bishop Road		R	R	0.246	N/A	N/A	Road beds removed and replanted with suite of native species
Silverthorne		R	R	0.097	N/A	N/A	Road beds removed and replanted with suite of native species
Coastal Marsh	184.0	N/A	P	184.0	N/A	N/A	
Coastal Marsh Riparian Buffer		R	R	0.171	N/A	N/A	Road beds removed and replanted with suite of native species
Riverine Forested		R	R	1.0	N/A	N/A	Road beds removed and replanted with suite of native species
Riverine Forested	61.7	N/A	P	61.7	N/A	N/A	

Component Summations							
Restoration Level	Stream (lf)	Riparian Wetland (Ac)		Non-Riparian Wetland (Ac)	Upland (Ac)	Buffer (Ac)	Coastal Marsh
		Riverine	Non-Riverine				
Restoration	N/A	1.0	56.3	0	N/A	0.171	0.343
Enhancement	N/A	0	0	0	N/A	N/A	N/A
Enhancement I	N/A	0	0	0	N/A	N/A	N/A
Enhancement II	N/A	0	0	0	N/A	N/A	N/A
Creation	N/A	0	0	0	N/A	N/A	N/A
Preservation	N/A	61.7	332.5	0	N/A	N/A	184.0
HQ Preservation	N/A	0	0	0	N/A	N/A	N/A
Total	N/A	62.7	388.8	0	N/A	0.171	184.343

Table 2. Project Activity and Reporting History Bishop Road Wetland Restoration Site Hyde County, SCO # 050653801		
Activity or Report	**Data Collection Complete**	**Actual Completion or Delivery**
Restoration Plan	December 2006	August 2006
Construction	N/A	December 2008
Planting Activities	N/A	January 2009
Mitigation Plan / As-Built (Year 0 Monitoring – Baseline)	February 2009	July 2009

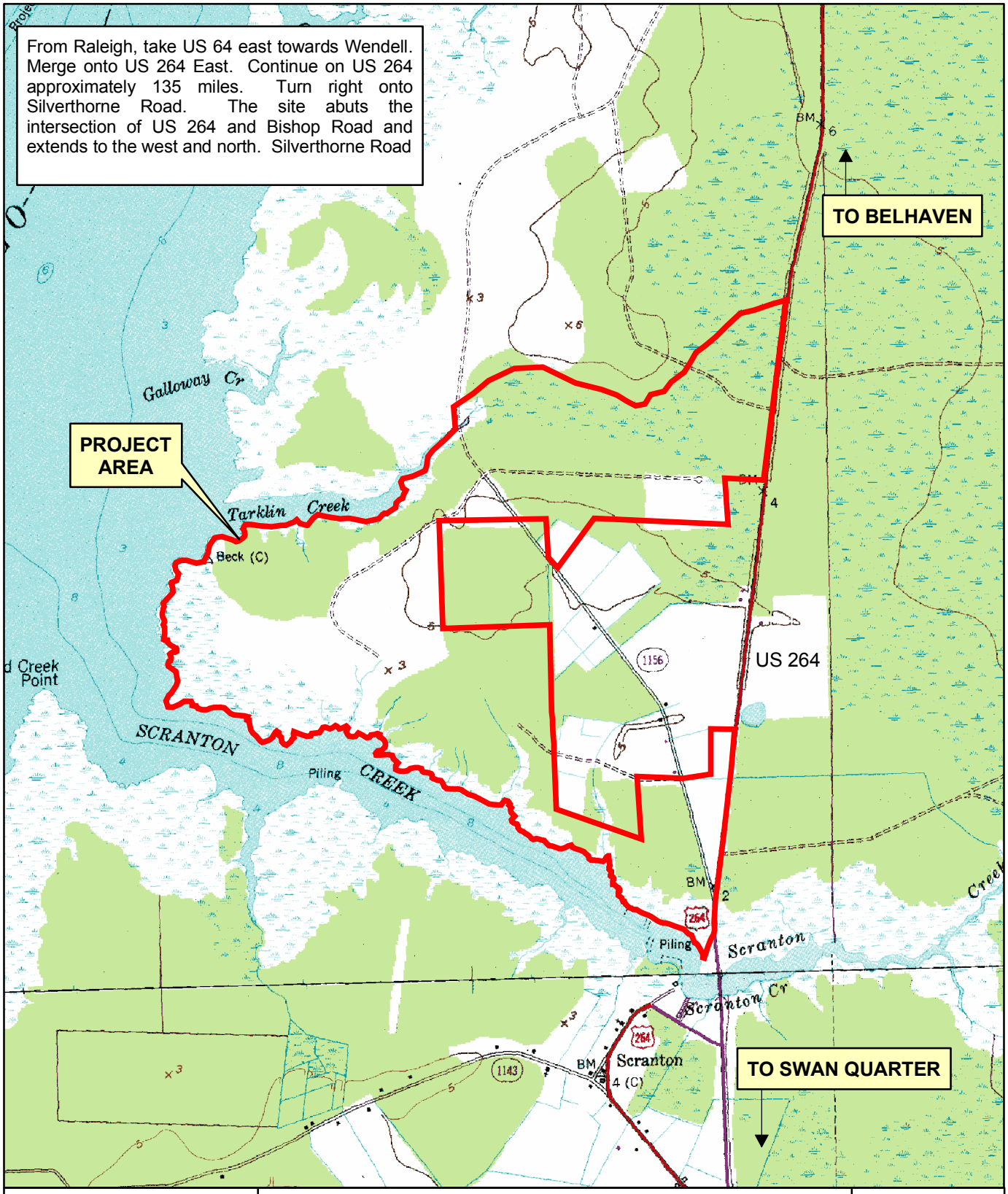
Table 3. Project Contacts Table Bishop Road Wetland Restoration Site Hyde County, SCO # 050653801	
Designer ARCADIS G&M of North Carolina, Inc.	801 Corporate Center Drive, Suite 300 Raleigh, NC 27607 Robert Lepsic (919) 854-1282 x.195 (office)
Construction Contractor Kris-Grey Construction, Inc.	P.O. Box 499 Jamesville, NC 27846 Mitch Dotson (252) 799-6607 (mobile)
Planting Contractor Habitat Assessment and Restoration Program, Inc.	9305-D Monroe Road Charlotte, NC 28270 Alan Peoples (704) 841-2841 (office) (704) 975-0881 (mobile)
Seed Mix Supplier	**Permanent Seed – ERNST Seeds** Meadville PA 16335 800-873-3321 **Temporary Seed – Indian Creek Farms** Midway, AL 888-307-8773 **Evergreen Seed, LLC** Rice, VA 23966
Nursery Stock Supplier	**Mellow Marsh Farms** Siler City, NC 919-742-1200 **Coastal Plain Conservation Nursery** Edenton, NC 252-482-5707

	South Carolina Super Tree Nursery Blenheim, SC 843-528-3943 **Weyerhaeuser NR Company** Atlanta, GA 800-221-4898
Monitoring Performers	Not yet selected

Table 4. Project Attributes Bishop Road Wetland Restoration, Hyde County, SCO # 050653801	
Project County	Hyde
Physiographic Region	Coastal
Ecoregion	Chesapeake-Pamlico Lowlands and Tidal Marshes
Project River basin	Tar-Pamilco
USGS HUC for Project (14 digit)	030401020100
NCDWQ Sub-basin for Project	03-03-07
Identify Planning Area (LWP, RBRP, other)	Not in RBRP or LWP
WRC Classification (Warm, Cool, Cold)	N/A
% of project easement fenced or demarcated	0%
Beaver activity observed during design phase?	No
Restoration Components Attributes	
Drainage Area	N/A
Stream Order	N/A
Enhancement level I Length (ft)	N/A
Perennial or Intermittent	N/A
Watershed Type (Rural, Urban(izing), etc.)	Rural
Watershed LULC Distribution	
Residential	0%
Agricultural- Row Crop	0%
Agricultural, Livestock, Forested	0%
	100%
Watershed Impervious cover %	<1%
NCDWQ AU/Index Number	N/A
NCDWQ Classification	N/A
303d listed?	No
Upstream of 303d listed Segment?	No
Reason for 303d listing or stressor	N/A
Total acreage of easement	683.0

Total vegetated acreage within the easement	683.0		
Total planted acreage as part of the restoration	57.8		
Rosgen classification of pre-existing	N/A		
Rosgen classification of As-built	N/A		
Valley type	N/A		
Valley slope %	N/A		
Valley side slope range %	N/A		
Valley toe slope range %	N/A		
Trout waters designation	None		
Species of concern, endangered, etc (Y/N)	Yes		
Dominant soil series and characteristics			
Series	Acredale	Argent	Hydeland
Depth Class	Very deep	Very deep	Very deep
Clay %	5-34	10-60	5-35
K	0.37	0.24	0.17
T	3	5	5

FIGURES



Prepared For:

Ecosystem Enhancement Program

2,000 1,000 0 2,000 4,000 Feet

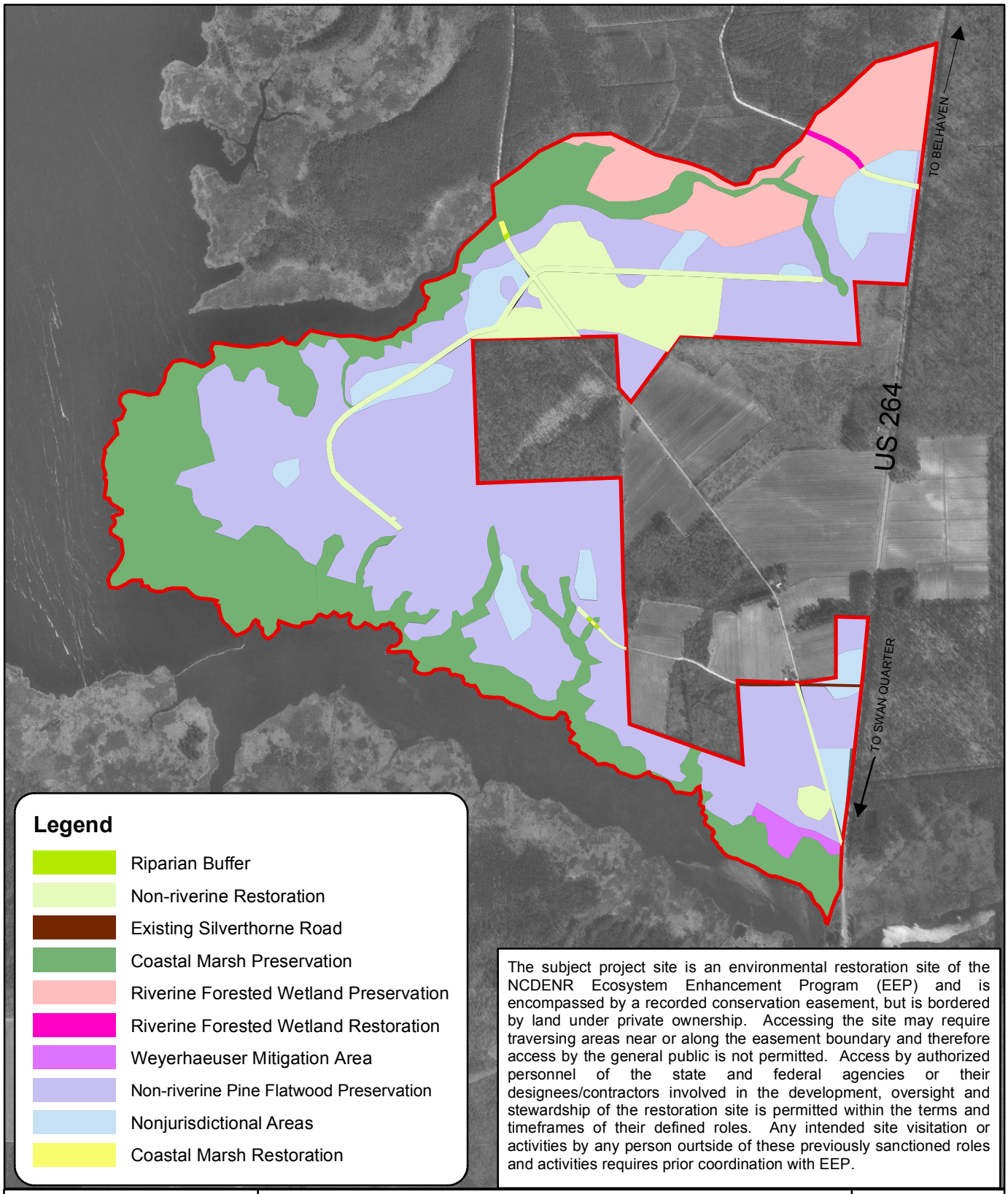
0 0.25 0.5 1 Miles

SCALE: 1:24,000

N W E S

PROJECT SITE VICINITY MAP
Bishop Road Wetland Mitigation Site
HYDE COUNTY, NORTH CAROLINA

Figure No.
1



The subject project site is an environmental restoration site of the NCDENR Ecosystem Enhancement Program (EEP) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easement boundary and therefore access by the general public is not permitted. Access by authorized personnel of the state and federal agencies or their designees/contractors involved in the development, oversight and stewardship of the restoration site is permitted within the terms and timeframes of their defined roles. Any intended site visitation or activities by any person ourtside of these previously sanctioned roles and activities requires prior coordination with EEP.

Prepared For:

Ecosystem Enhancement Program

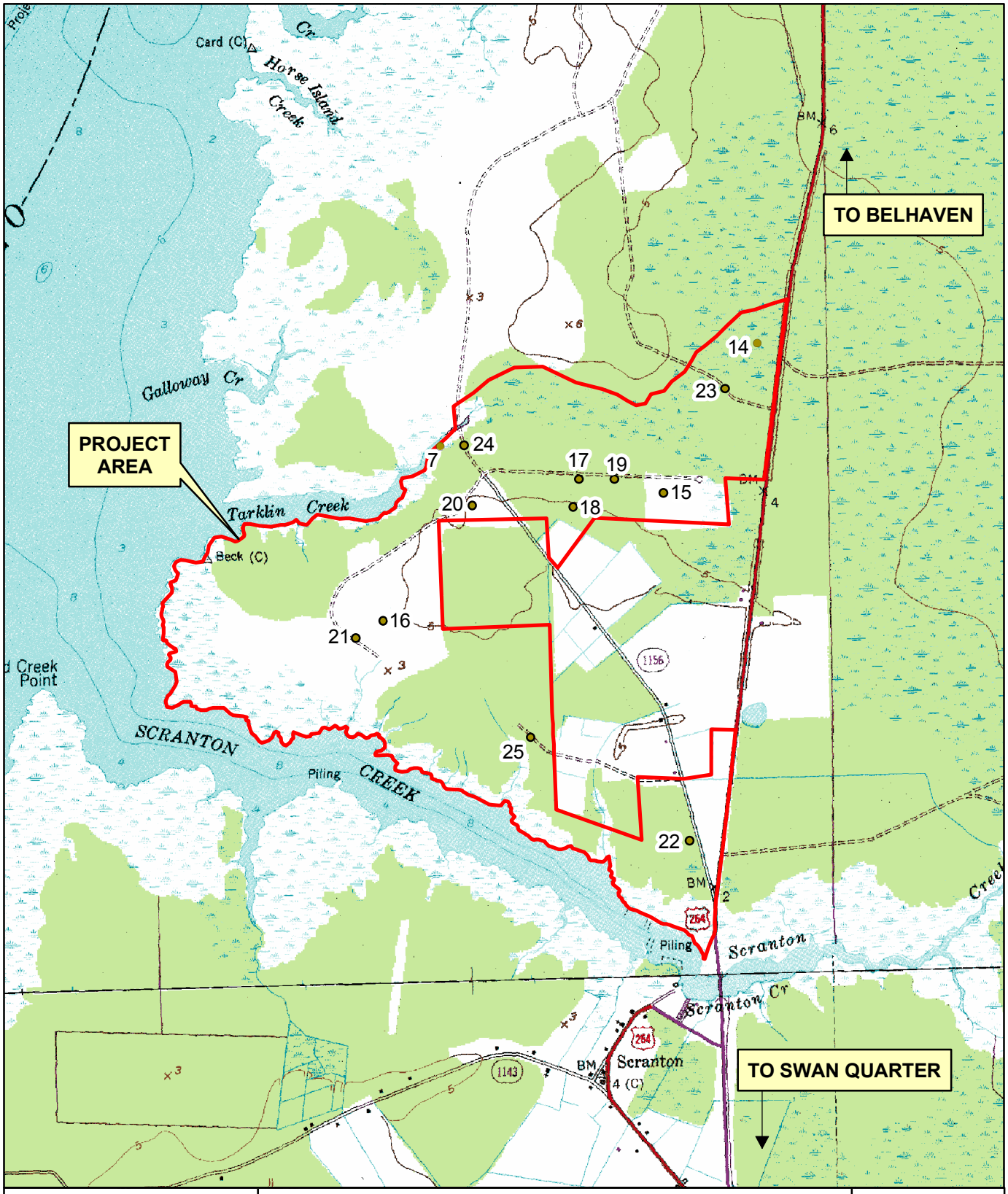
0 1,000 2,000 4,000 Feet

SCALE: 1:18,000

N W E S

PROJECT ATTRIBUTES
Bishop Road Wetland Mitigation Site
HYDE COUNTY, NORTH CAROLINA
Image: 1993 USGS DOQQ

Figure No.
2



Prepared For:

Ecosystem Enhancement Program

2,000 1,000 0 2,000 4,000 Feet

SCALE: 1:24,000

N W E S

MONITORING DEVICE LOCATIONS
Bishop Road Wetland Mitigation Site
HYDE COUNTY, NORTH CAROLINA

Figure No.
3

Appendix A

DCM Notice of Violation issued to the North Carolina Department of Transportation

NCDENR
North Carolina Department of Environment and Natural Resources
Division of Coastal Management
Michael F. Easley, Governor Charles S. Jones, Director William G. Ross Jr., Secretary

October 6, 2005

Clay Willis
N.C. Department of Transportation
113 Airport Drive
Suite 100
Edenton, NC 27932

SUBJECT: **CD05-048** - Consistency Concurrence for Proposed Impact to 0.09 Acres of Wetlands to complete widening of SR 1149/1150 (Montgomery Road) near SR 1143 (Sladesville Road), Hyde County (DCM#20050076)

Dear Mr. Willis:

The Division of Coastal Management (DCM) received on August 31, 2005 the consistency certification by the N.C. Department of Transportation (NCDOT) that the above referenced project would be consistent with the enforceable policies of North Carolina's coastal management program. NCDOT proposes to impact 0.09 acres of wetland when it widens 0.49 miles of SR 1149/1150 (Montgomery Road) near SR 1143 (Sladesville Road) in Hyde County. This project is part of a larger 4-mile long road-widening project that began in January 1999. The project was initiated without benefit of a CAMA permit and the NCDOT was issued a violation notice by DCM on September 18, 2000, for unauthorized impacts to 0.016 acres of coastal wetlands. To correct this situation, NCDOT, as part of this project, proposes to mitigate the impacts to the 0.016 acres of coastal wetlands at a 2:1 restoration ratio.

North Carolina's coastal management program consists of, but is not limited to, the Coastal Area Management Act, the State's Dredge and Fill Law, and the land use plan of the County and/or local municipality in which the proposed project is located. It is the objective of DCM to manage the State's coastal resources to ensure that proposed activities are compatible with safeguarding and perpetuating the biological, social, economic and aesthetic values of the State's coastal resources.

To solicit public comments, DCM published a public notice in the "*Washington Daily News*" on September 8, 2005 and circulated a description of the proposed project to State agencies that would have a regulatory interest in the proposed development. No comments were received asserting that the proposed project would be inconsistent with North Carolina's coastal management program.

DCM has reviewed the consistency submission pursuant to the enforceable policies of North Carolina's coastal management program, including the management objectives of Section 15A NCAC 07M of North Carolina's Administrative Code. DCM concurs, as conditioned below, that the proposed project is consistent with the enforceable policies of North Carolina's coastal management program.

400 Commerce Avenue, Morehead City, North Carolina 28557-3421
Phone: 252-808-2808 \ FAX: 252-247-3330 \ Internet: www.nccoastalmanagement.net

- In order to be found consistent with North Carolina's coastal management program, a 401 Water Quality Certification shall be obtained and a copy provided to DCM prior to initiation of construction. The N.C. Division of Water Quality (DWQ) is currently reviewing the proposed project (DWQ Project No. 00-0895) under General Water Quality Certification No. 3536.
- In order to be found consistent with North Carolina's coastal management program, DCM requires that NCDOT contact the NC Division of Water Quality (DWQ) Stormwater Management Unit prior to initiating any construction to determine whether a stormwater management permit would be required. Should a stormwater management permit be required from DWQ then it must be obtained and a copy provided to DCM prior to initiation of construction.
- In order to be found consistent with North Carolina's coastal management program, DCM requires that compensatory mitigation for the wetland impacts incurred by the widening of the full 4 miles of SR 1149/1150 (2.35 acres of non-riverine wetland impacts and 0.03 acres of coastal marsh wetland impacts) be provided through wetland restoration at a 2:1 ratio at the Bishop Road mitigation site in Hyde County. In accordance with the consistency certification submitted by NCDOT, mitigation for the project will be mitigated for at the Bishop Road Mitigation Site. In accordance with the letter from the Ecosystem Enhancement Program (EEP) to the U.S. Army Corps of Engineers, dated 5/31/05, the EEP has committed to provide the mitigation for the 2.35 acres of non-riverine wetland and 0.03 acres of coastal marsh wetland impact associated with this project.
- In order to be found consistent with North Carolina's coastal management program, DCM requires that the wetland restoration for the 2.35 acres of non-riverine wetland and 0.03 acres of coastal marsh wetland impact associated with this project be implemented as soon as possible. DCM remains very concerned that wetland impacts incurred in 1999 have not yet been mitigated. Failure to quickly initiate this mitigation could lead to the issuance of a notice of continuing violation to NCDOT.

Should the project be modified, a revised consistency certification could be necessary. This might take the form of either a supplemental consistency certification pursuant to 15 CFR 930.66, or a new consistency certification pursuant to 15 CFR 930.57. Likewise, if further project assessments reveal environmental impacts not previously considered by the proposed development, a supplemental consistency certification might be required. If you have any questions, please contact Cathy Brittingham at (919) 733-2293 x238 or via e-mail at Cathy.Brittingham@ncmail.net. Thank you for your consideration of the North Carolina coastal management program.

Sincerely,

Douglas V Huggett

Doug Huggett
Manager, Major Permits and Consistency Unit

cc: Bill Biddlecome, U.S. Army Corps of Engineers
Bill Gilmore, Ecosystem Enhancement Program
Terry Moore, Division of Coastal Management
Stephen Rynas, Division of Coastal Management
Wanda Gooden, Division of Coastal Management
Garcy Ward, NC Division of Water Quality
Bill Moore, NC Division of Water Quality

Appendix B

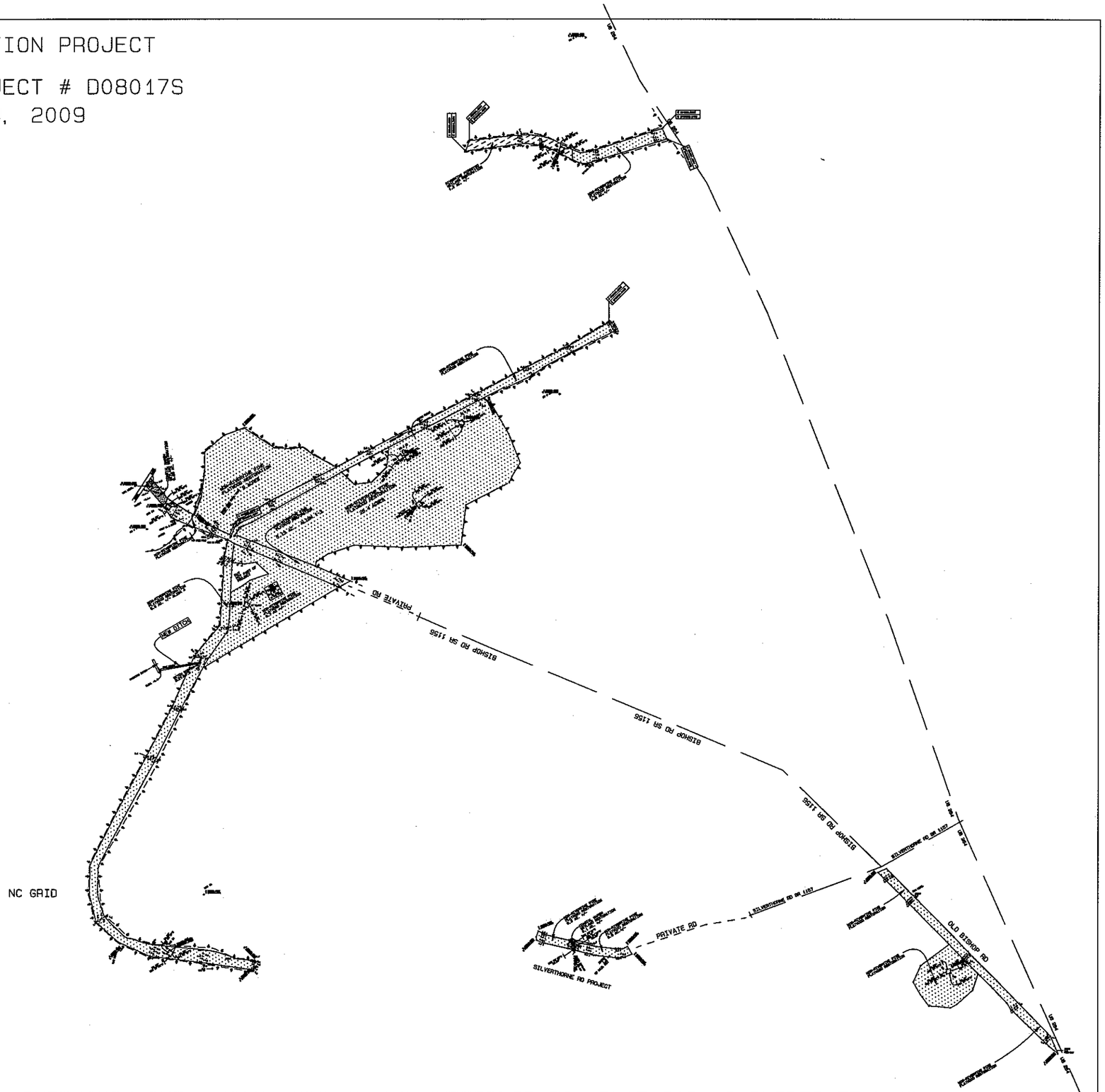
As-Built Plan Sheets

BISHOP ROAD WETLAND RESTORATION PROJECT
HYDE COUNTY, NORTH CAROLINA
SCO # 050653801 NCDERN PROJECT # D08017S
SHEET 1 OF 12 SHEETS MAY 4, 2009

AS BUILT OVERLAY LAYER
PROJECT COVER SHEET

LEGEND

- TREE LINE
- NON-RIVERINE RESTORATION AREA
- COASTAL MARSH RESTORATION AREA
- MARSH LINE
- MW or ⚠ — MONITORING WELL
- EIP OR EIR — EXISTING IRON PIPE OR ROD
- WS — WOOD STAKE
- ⊡ or NPS — NO POINT SET
- PLOTTED OR COMPUTED LINES



DISTANCES HORIZONTAL
COORIDINATES ARE NCDOT LOCAL SYSTEM
BASED ON USGS MONU N-244

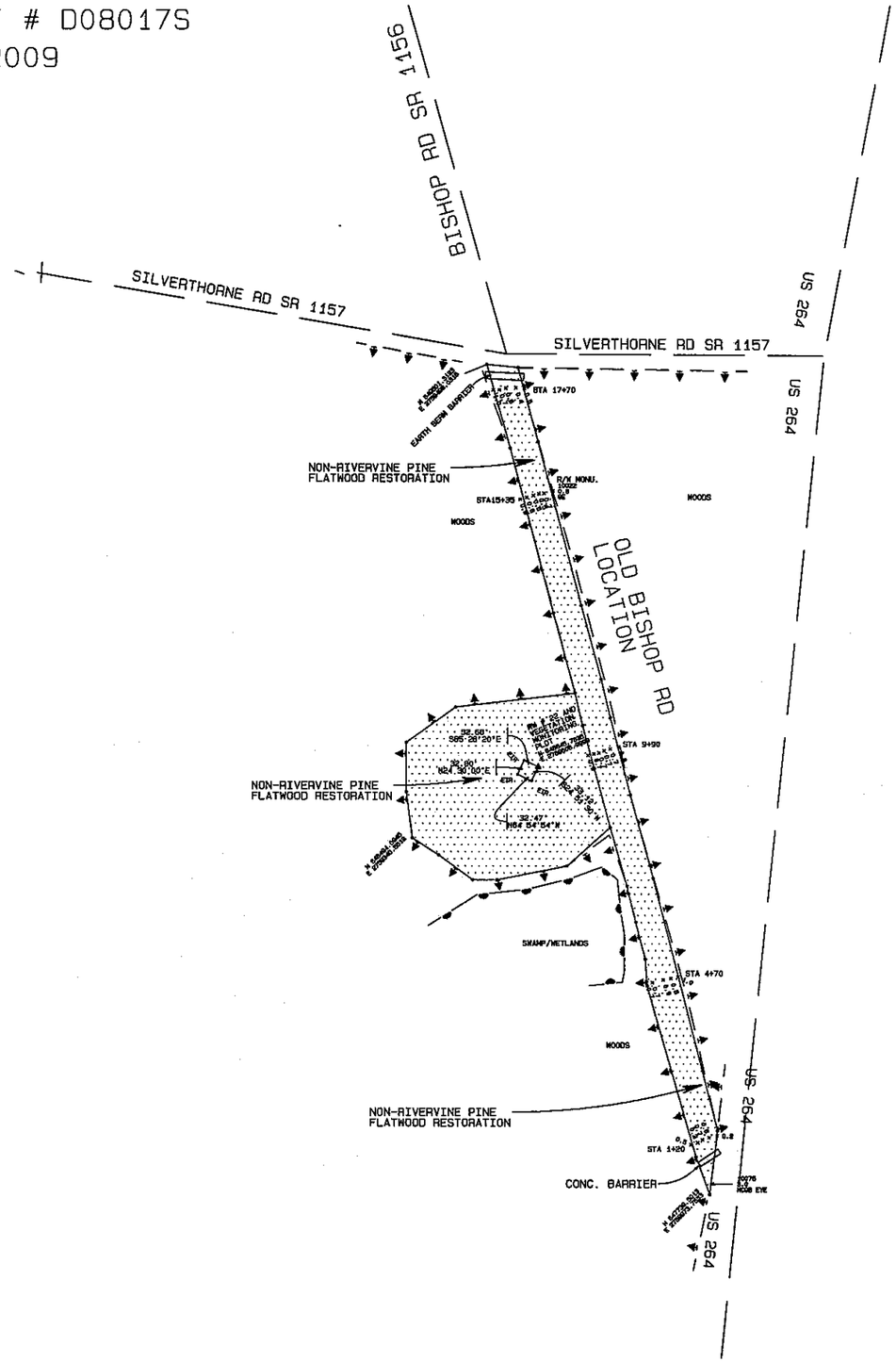
SCALE 1"=500'
0 500 1000

BISHOP ROAD WETLAND RESTORATION, CURRITUCK TWP., HYDE COUNTY, NC REFERENCE TO PLAT CAB. C SLIDES 77-K THRU 78-F AND PLANS PREPARED BY ARCADIS G & M OF NORTH CAROLINA, 801 CORPORATE CENTER DRIVE, SUITE 300, RALEIGH, NC 27607

BISHOP ROAD WETLAND RESTORATION PROJECT
HYDE COUNTY, NORTH CAROLINA
SCO # 050653801 NCDERN PROJECT # D08017S
SHEET 2 OF 12 SHEETS MAY 4, 2009

LEGEND

- TREE LINE
- NON-RIVERINE RESTORATION AREA
- COASTAL MARSH RESTORATION AREA
- MARSH LINE
- MW or MONITORING WELL
- EIP OR EIR EXISTING IRON PIPE OR ROD
- WS WOOD STAKE
- ⊡ or NPS NO POINT SET
- PLOTTED OR COMPUTED LINES



NC GRID

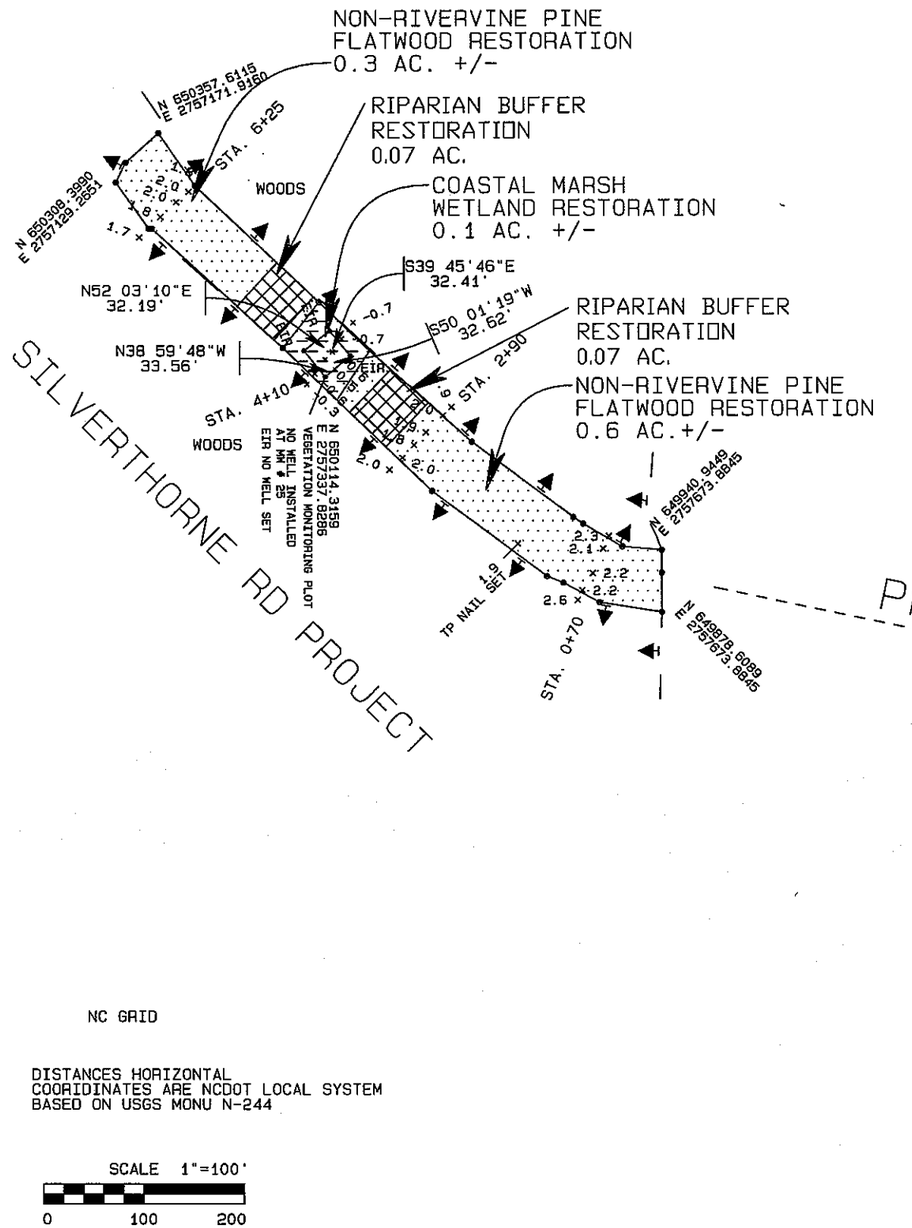
DISTANCES HORIZONTAL
COORIDINATES ARE NCDOT LOCAL SYSTEM
BASED ON USGS MONU N-244

SCALE 1"=200'

0 200 400

AS BUILT OVERLAY LAYER
BISHOP ROAD

BISHOP ROAD WETLAND RESTORATION PROJECT
HYDE COUNTY, NORTH CAROLINA
SCO # 050653801 NCDERN PROJECT # D08017S
SHEET 3 OF 12 SHEETS MAY 4, 2009
REVISED 5-13-2009 REMOVED CONC. BARRIER



LEGEND

- TREE LINE
- NON-RIVERINE RESTORATION AREA
- COASTAL MARSH RESTORATION AREA
- MARSH LINE
- MW or ⚠ — MONITORING WELL
- EIP OR EIR — EXISTING IRON PIPE OR ROD
- WS — WOOD STAKE
- □ or NPS — NO POINT SET
- PLOTTED OR COMPUTED LINES
- RIPARION BUFFER RESTORATION AREA

NC GRID

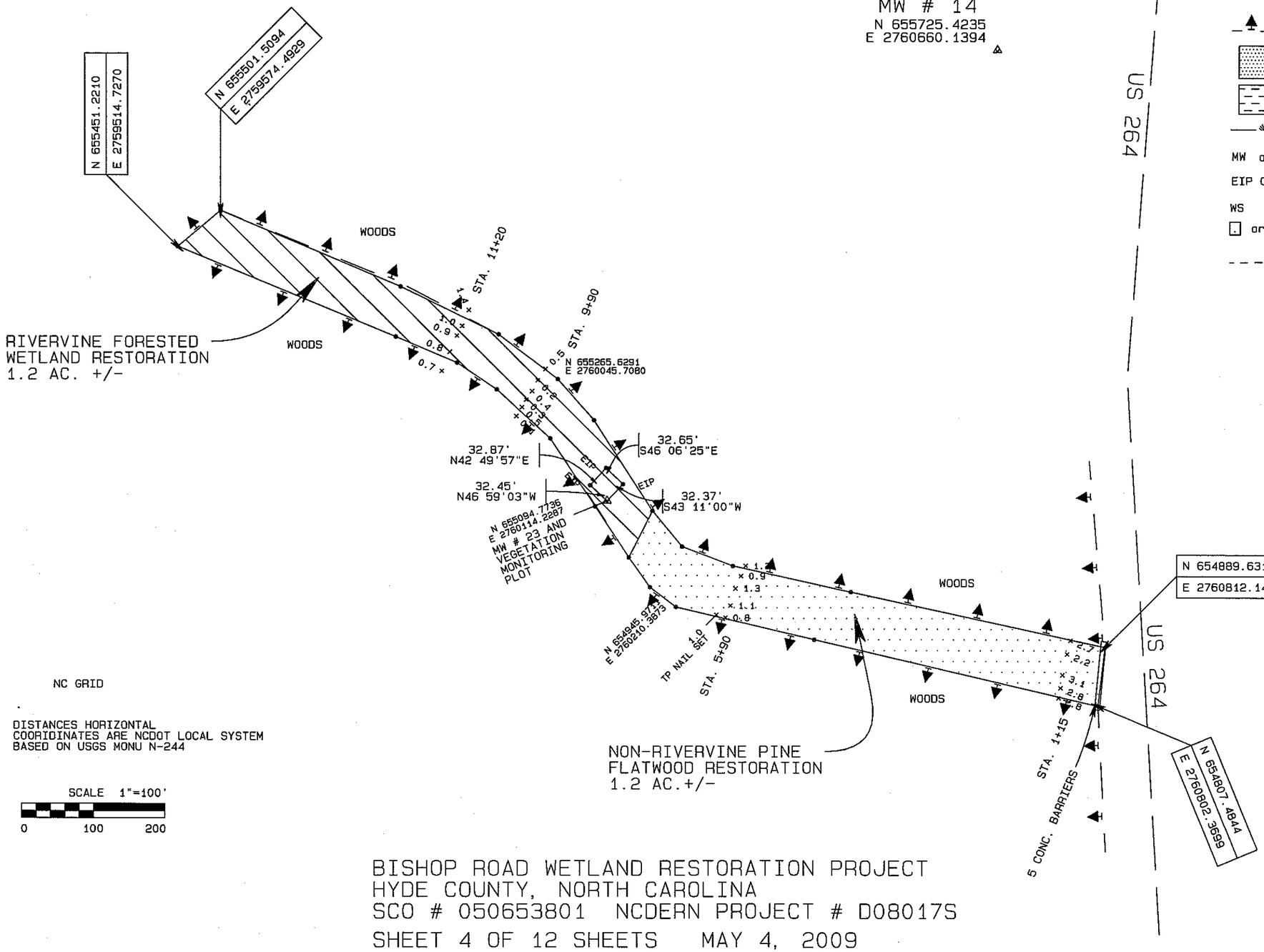
DISTANCES HORIZONTAL
COORIDINATES ARE NCDOT LOCAL SYSTEM
BASED ON USGS MONU N-244

SCALE 1"=100'

0 100 200

AS BUILT OVERLAY LAYER
BISHOP ROAD

BISHOP ROAD WETLAND RESTORATION, CURRITUCK TWP., HYDE COUNTY, NC REFERENCE TO PLAT CAB. C SLIDES 77-K THRU 78-F AND PLANS PREPARED BY ARCADIS G & M OF NORTH CAROLINA, 801 CORPORATE CENTER DRIVE, SUITE 300, RALEIGH, NC 27607



NC GRID

DISTANCES HORIZONTAL
COORIDINATES ARE NCDOT LOCAL SYSTEM
BASED ON USGS MONU N-244

SCALE 1"=100'

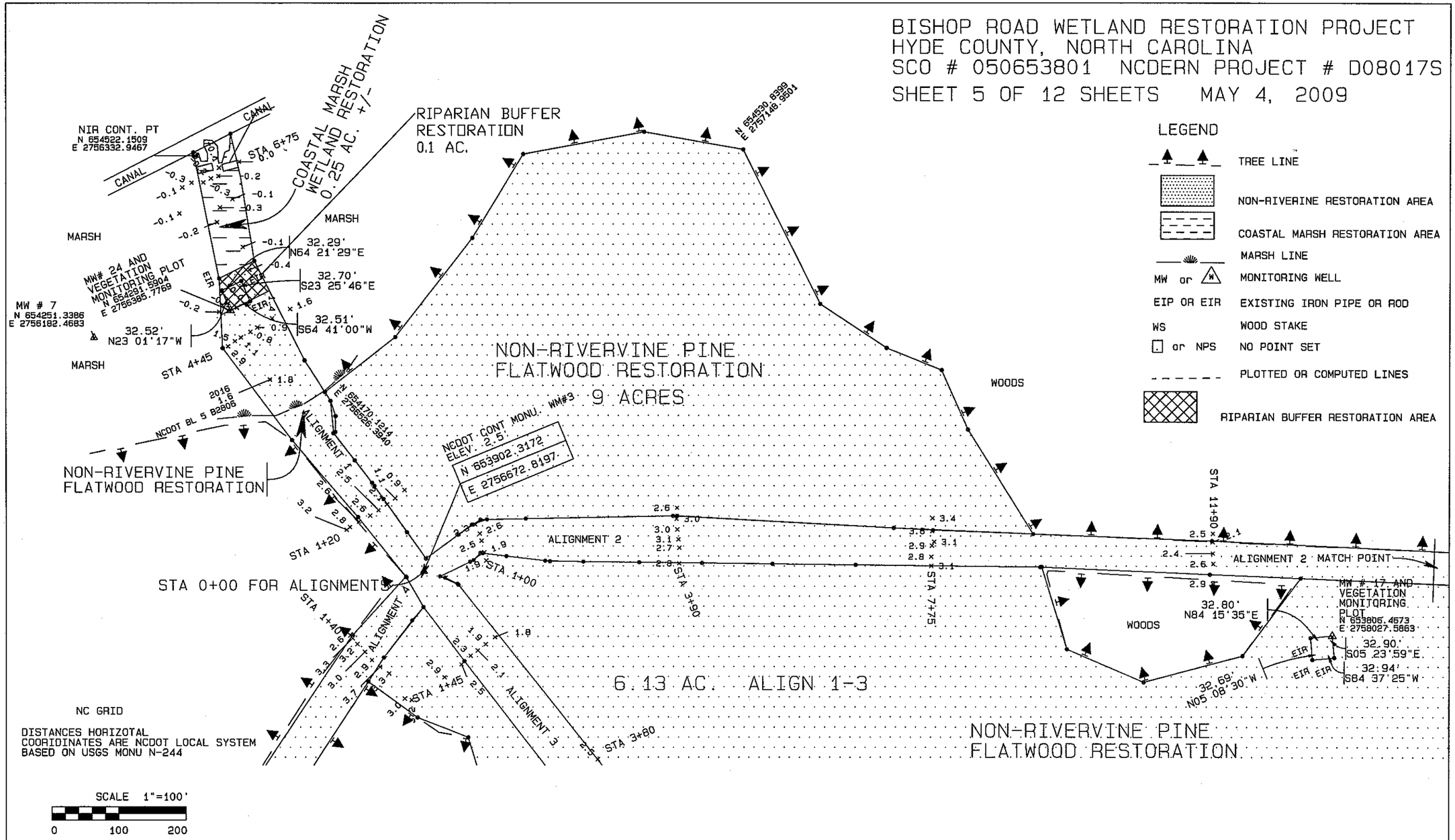
0 100 200

BISHOP ROAD WETLAND RESTORATION PROJECT
HYDE COUNTY, NORTH CAROLINA
SCO # 050653801 NCDERN PROJECT # D08017S
SHEET 4 OF 12 SHEETS MAY 4, 2009

AS BUILT OVERLAY LAYER
WEYERHAUSER SERVICE ROAD

BISHOP ROAD WETLAND RESTORATION, CURRITUCK TWP., HYDE COUNTY, NC REFERENCE TO PLAT CAB. C SLIDES 77-K THRU 78-F AND PLANS PREPARED BY ARCADIS G & M OF NORTH CAROLINA, 801 CORPORATE CENTER DRIVE, SUITE 300, RALEIGH, NC 27607

BISHOP ROAD WETLAND RESTORATION PROJECT
HYDE COUNTY, NORTH CAROLINA
SCO # 050653801 NCDERN PROJECT # D08017S
SHEET 5 OF 12 SHEETS MAY 4, 2009

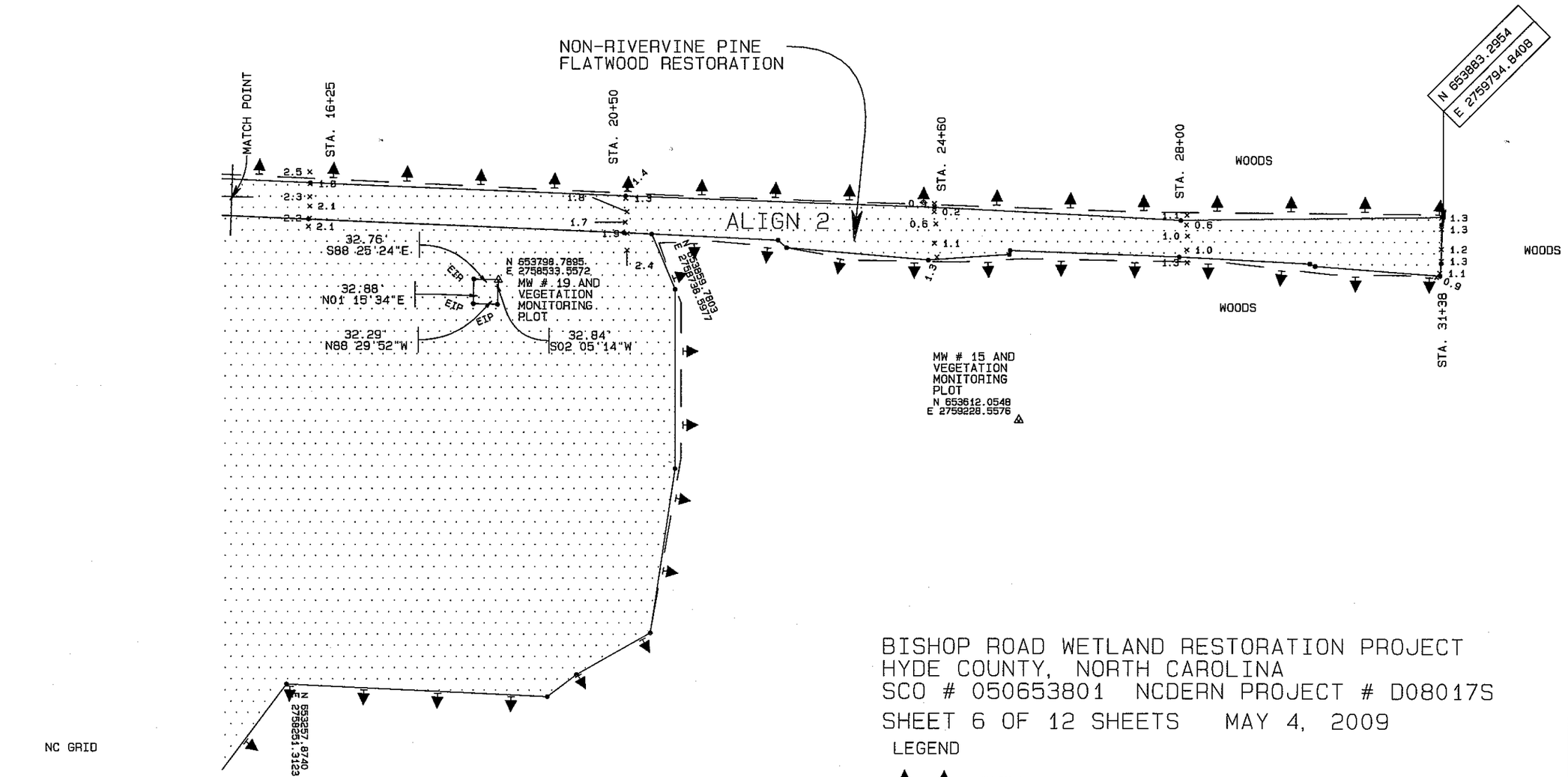


LEGEND

- TREE LINE
- NON-RIVERINE RESTORATION AREA
- COASTAL MARSH RESTORATION AREA
- MARSH LINE
- MW or (W) — MONITORING WELL
- EIP OR EIR — EXISTING IRON PIPE OR ROD
- WS — WOOD STAKE
- ⊡ or NPS — NO POINT SET
- PLOTTED OR COMPUTED LINES
- RIPARIAN BUFFER RESTORATION AREA

AS BUILT OVERLAY LAYER
ALIGN 1
PART OF ALIGN 2

BISHOP ROAD WETLAND RESTORATION, CURRITUCK TWP., HYDE COUNTY, NC REFERENCE TO PLAT CAB. C SLIDES 77-K THRU 78-F AND PLANS PREPARED BY ARCADIS G & M OF NORTH CAROLINA, 801 CORPORATE CENTER DRIVE, SUITE 300, RALEIGH, NC 27607



DISTANCES HORIZONTAL
COORDINATES ARE NCDOT LOCAL SYSTEM
BASED ON USGS MONU N-244

SCALE 1"=100'

0 100 200

BISHOP ROAD WETLAND RESTORATION PROJECT
HYDE COUNTY, NORTH CAROLINA
SCO # 050653801 NCDERN PROJECT # D08017S

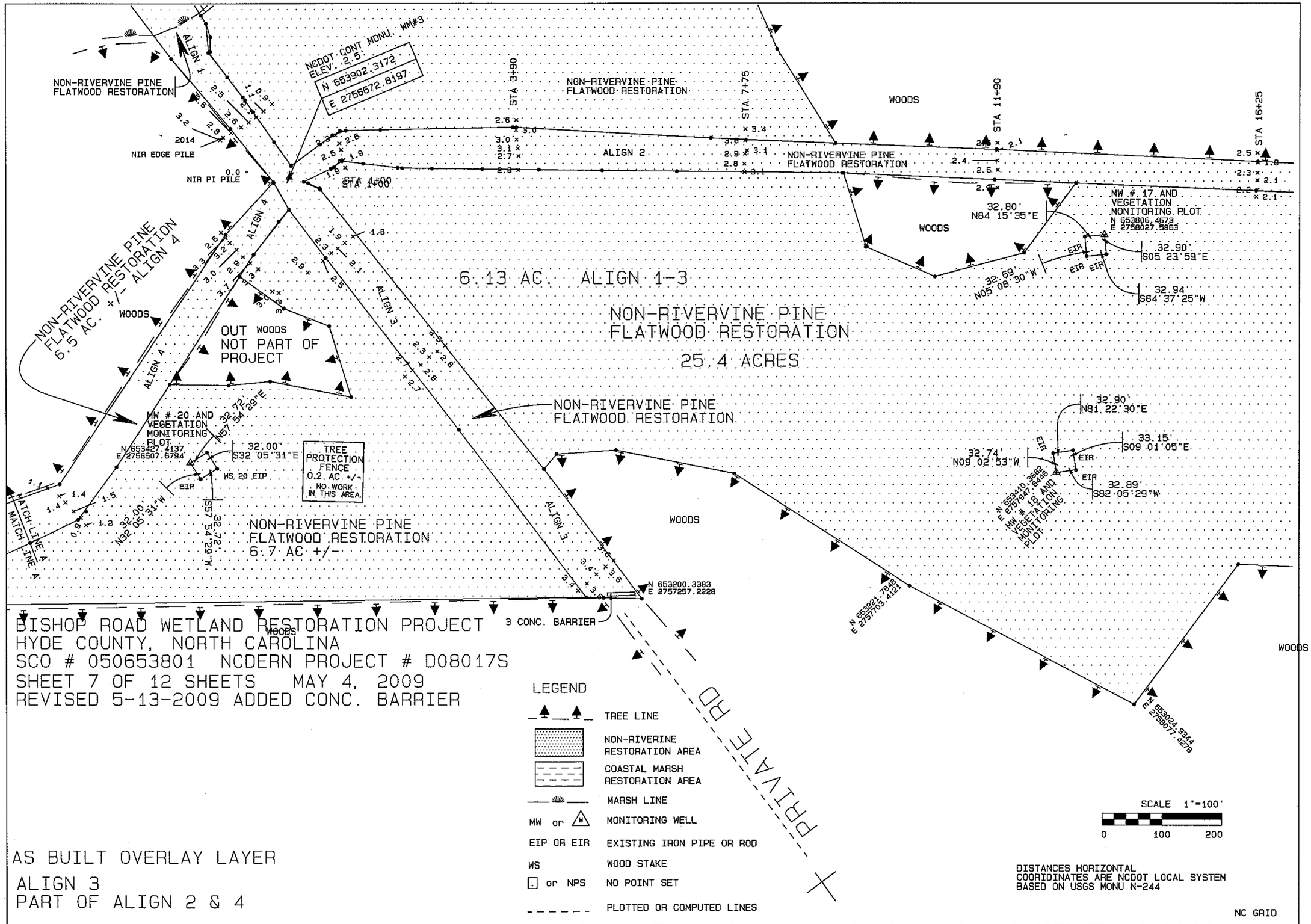
SHEET 6 OF 12 SHEETS MAY 4, 2009

LEGEND

	TREE LINE
	NON-RIVERINE^JRESTORATION AREA
	COASTAL MARSH^JRESTORATION AREA
	MARSH LINE
MW or	MONITORING WELL
EIP OR EIR	EXISTING IRON PIPE OR ROD
WS	WOOD STAKE
or NPS	NO POINT SET
	PLOTTED OR COMPUTED LINES

AS BUILT OVERLAY LAYER
PART OF ALIGN 2

BISHOP ROAD WETLAND RESTORATION, CURRITUCK TWP., HYDE COUNTY, NC REFERENCE TO PLAT CAB. C SLIDES 77-K THRU 78-F AND PLANS PREPARED BY ARCADIS G & M OF NORTH CAROLINA, 801 CORPORATE CENTER DRIVE, SUITE 300, RALEIGH, NC 27607



BISHOP ROAD WETLAND RESTORATION PROJECT
HYDE COUNTY, NORTH CAROLINA
SCO # 050653801 NCDERN PROJECT # D08017S
SHEET 7 OF 12 SHEETS MAY 4, 2009
REVISED 5-13-2009 ADDED CONC. BARRIER

LEGEND

- TREE LINE
- NON-RIVERINE RESTORATION AREA
- COASTAL MARSH RESTORATION AREA
- MARSH LINE
- MW or MONITORING WELL
- EIP OR EIR EXISTING IRON PIPE OR ROD
- WS WOOD STAKE
- or NPS NO POINT SET
- PLOTTED OR COMPUTED LINES

DISTANCES HORIZONTAL
COORIDINATES ARE NCDOT LOCAL SYSTEM
BASED ON USGS MONU N-244

NC GRID

AS BUILT OVERLAY LAYER

ALIGN 3
PART OF ALIGN 2 & 4

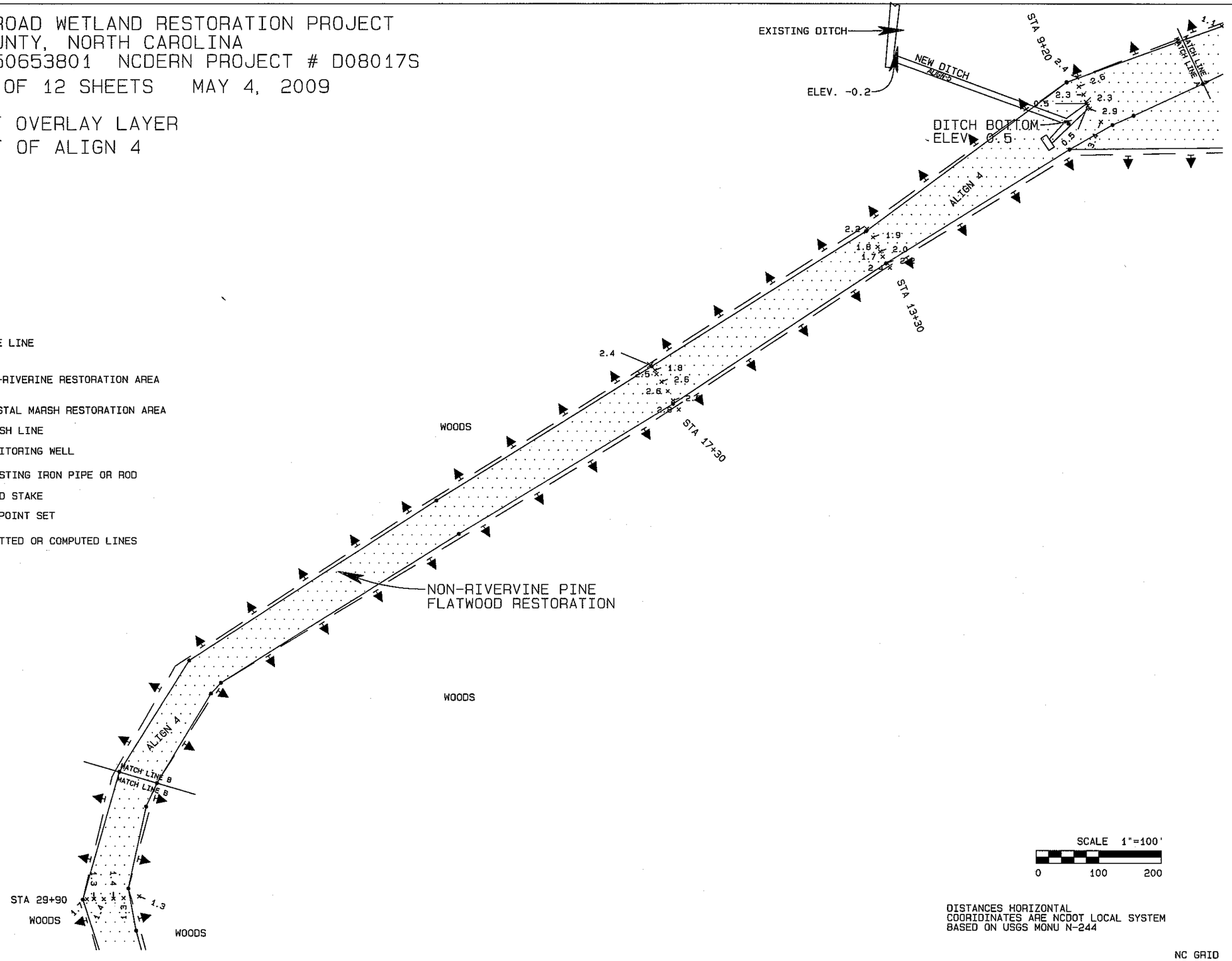
BISHOP ROAD WETLAND RESTORATION, CURRITUCK TWP., HYDE COUNTY, NC REFERENCE TO PLAT CAB. C SLIDES 77-K THRU 78-F AND PLANS PREPARED BY ARCADIS G & M OF NORTH CAROLINA, 801 CORPORATE CENTER DRIVE, SUITE 300, RALEIGH, NC 27607

BISHOP ROAD WETLAND RESTORATION PROJECT
HYDE COUNTY, NORTH CAROLINA
SCO # 050653801 NCDERN PROJECT # D08017S
SHEET 8 OF 12 SHEETS MAY 4, 2009

AS BUILT OVERLAY LAYER
MID PART OF ALIGN 4

LEGEND

- TREE LINE
- NON-RIVERINE RESTORATION AREA
- COASTAL MARSH RESTORATION AREA
- MARSH LINE
- MW or M — MONITORING WELL
- EIP OR EIR — EXISTING IRON PIPE OR ROD
- WS — WOOD STAKE
- ⊡ or NPS — NO POINT SET
- PLOTTED OR COMPUTED LINES



SCALE 1"=100'
0 100 200

DISTANCES HORIZONTAL
COORDINATES ARE NCDOT LOCAL SYSTEM
BASED ON USGS MONU N-244

NC GRID

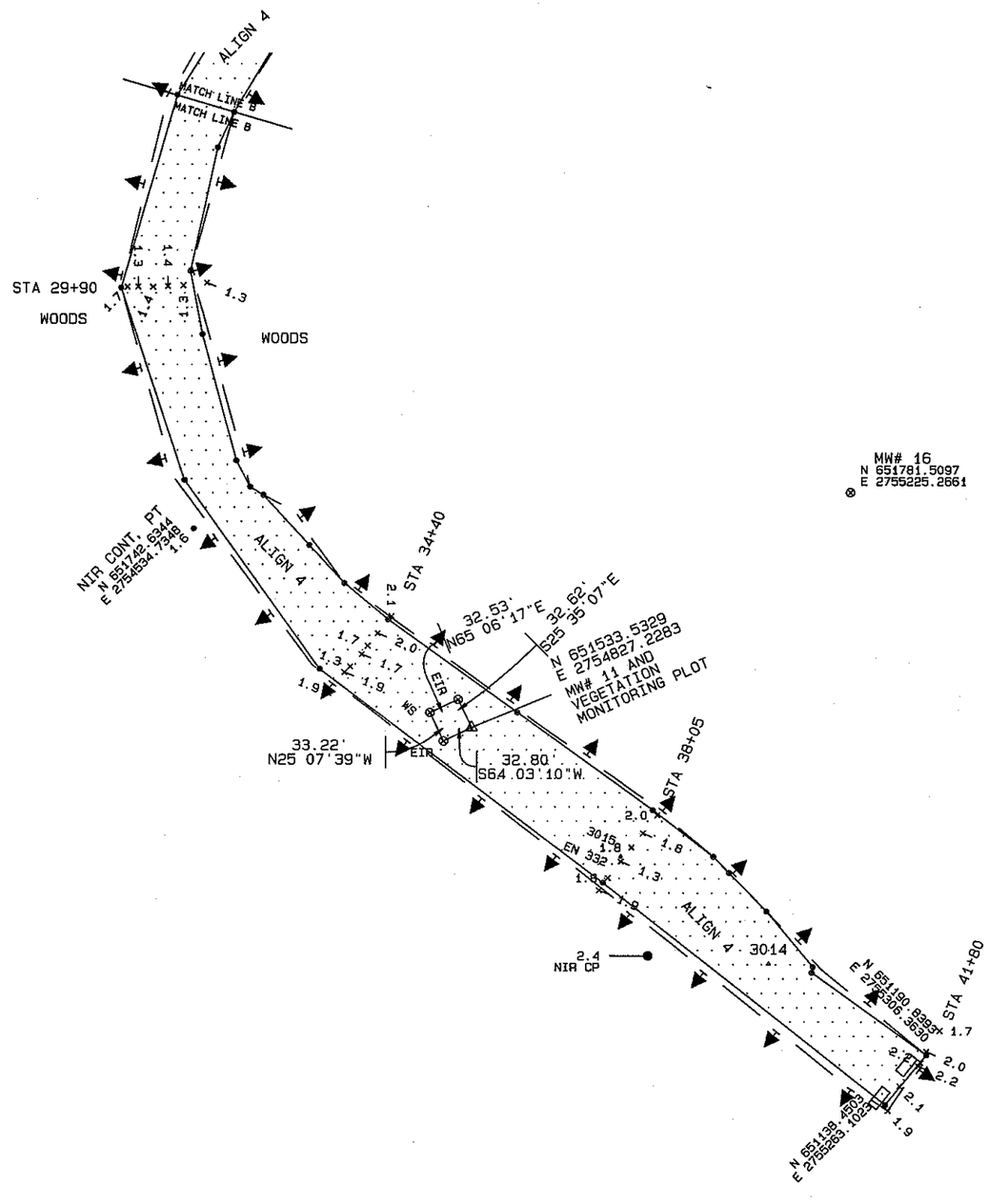
BISHOP ROAD WETLAND RESTORATION, CURRITUCK TWP., HYDE COUNTY, NC REFERENCE TO PLAT CAB. C SLIDES 77-K THRU 78-F AND PLANS PREPARED BY ARCADIS G & M OF NORTH CAROLINA, 801 CORPORATE CENTER DRIVE, SUITE 300, RALEIGH, NC 27607

BISHOP ROAD WETLAND RESTORATION PROJECT
HYDE COUNTY, NORTH CAROLINA
SCO # 050653801 NCDERN PROJECT # D08017S
SHEET 9 OF 12 SHEETS MAY 4, 2009

AS BUILT OVERLAY LAYER
LOWER (SOUTHERN) PART OF ALIGN 4

LEGEND

- TREE LINE
- NON-RIVERINE RESTORATION AREA
- COASTAL MARSH RESTORATION AREA
- MARSH LINE
- MW or ⚠ MONITORING WELL
- EIP OR EIR EXISTING IRON PIPE OR ROD
- WS WOOD STAKE
- . or NPS NO POINT SET
- PLOTTED OR COMPUTED LINES



SCALE 1"=100'

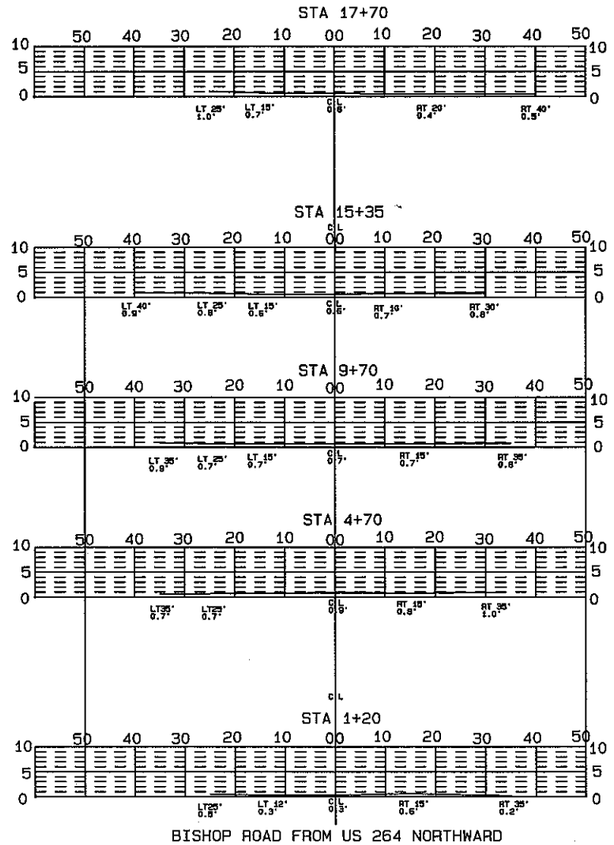
0 100 200

DISTANCES HORIZONTAL
COORDINATES ARE NCDOT LOCAL SYSTEM
BASED ON USGS MONU N-244

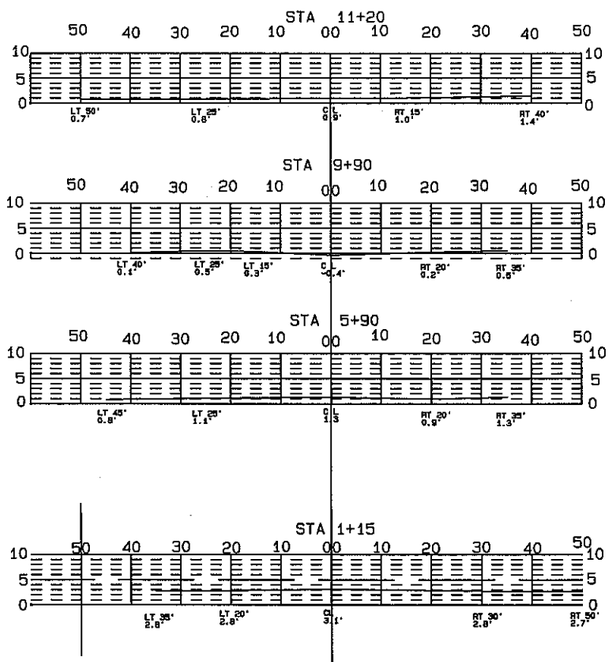
NC GRID

BISHOP ROAD WETLAND RESTORATION, CURRITUCK TWP., HYDE COUNTY, NC REFERENCE TO PLAT CAB. C SLIDES 77-K THRU 78-F AND PLANS PREPARED BY ARCADIS G & M OF NORTH CAROLINA, 801 CORPORATE CENTER DRIVE, SUITE 300, RALEIGH, NC 27607

BISHOP ROAD WETLAND RESTORATION PROJECT
HYDE COUNTY, NORTH CAROLINA
SCO # 050653801 NCDERN PROJECT # D08017S
SHEET 10 OF 12 SHEETS MAY 4, 2009

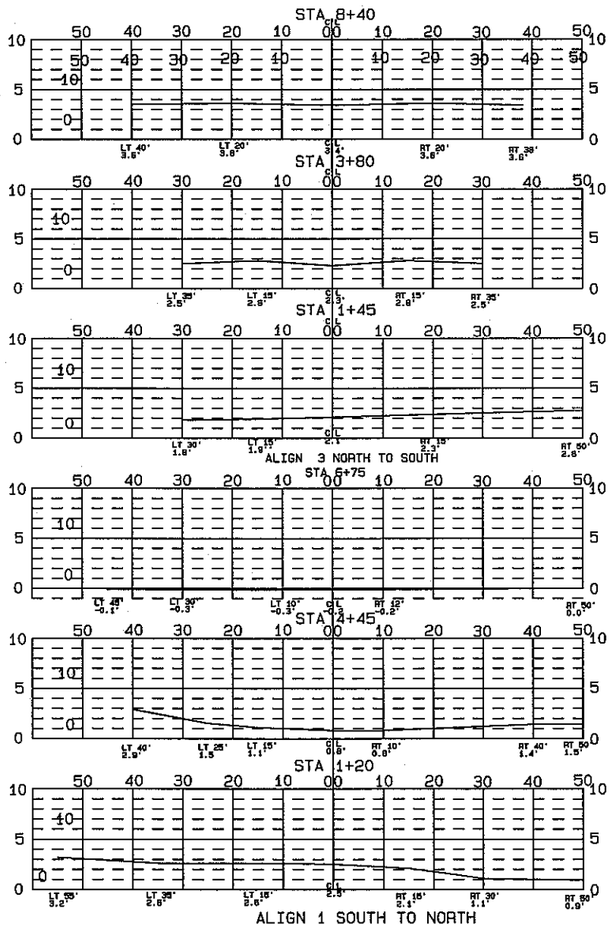


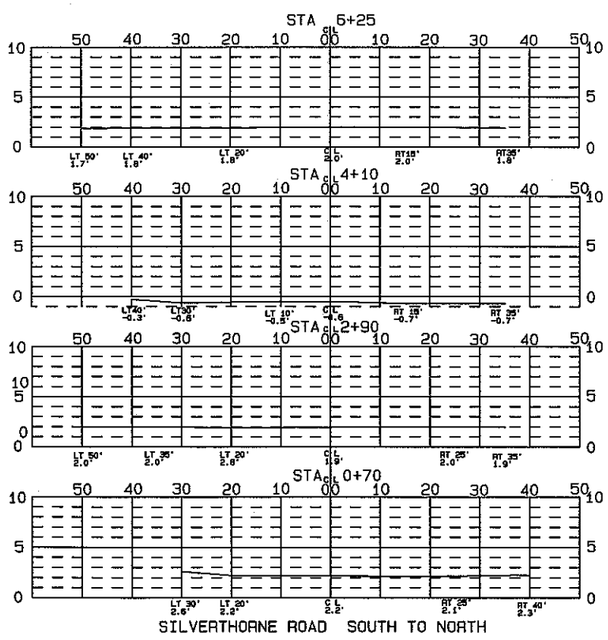
BISHOP ROAD FROM US 264 NORTHWARD



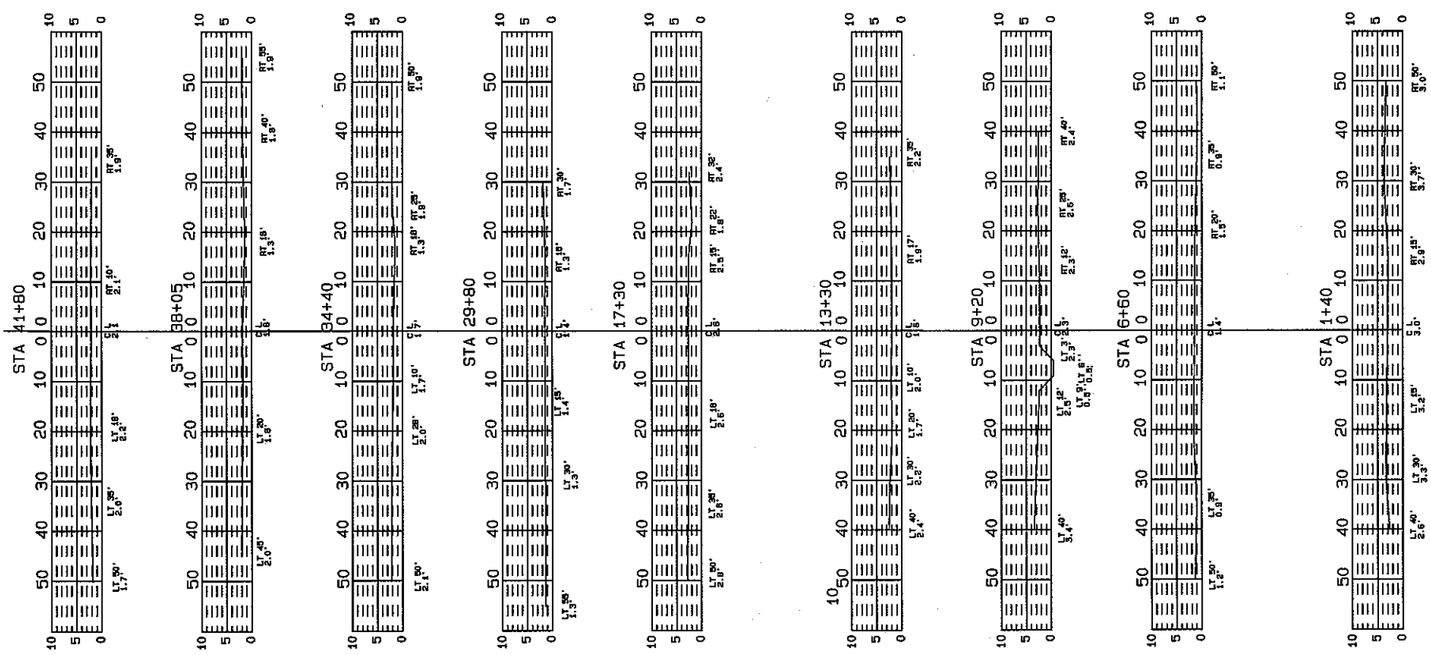
WEYERHAUSER SERVICE ROAD
FROM WEST TO EAST

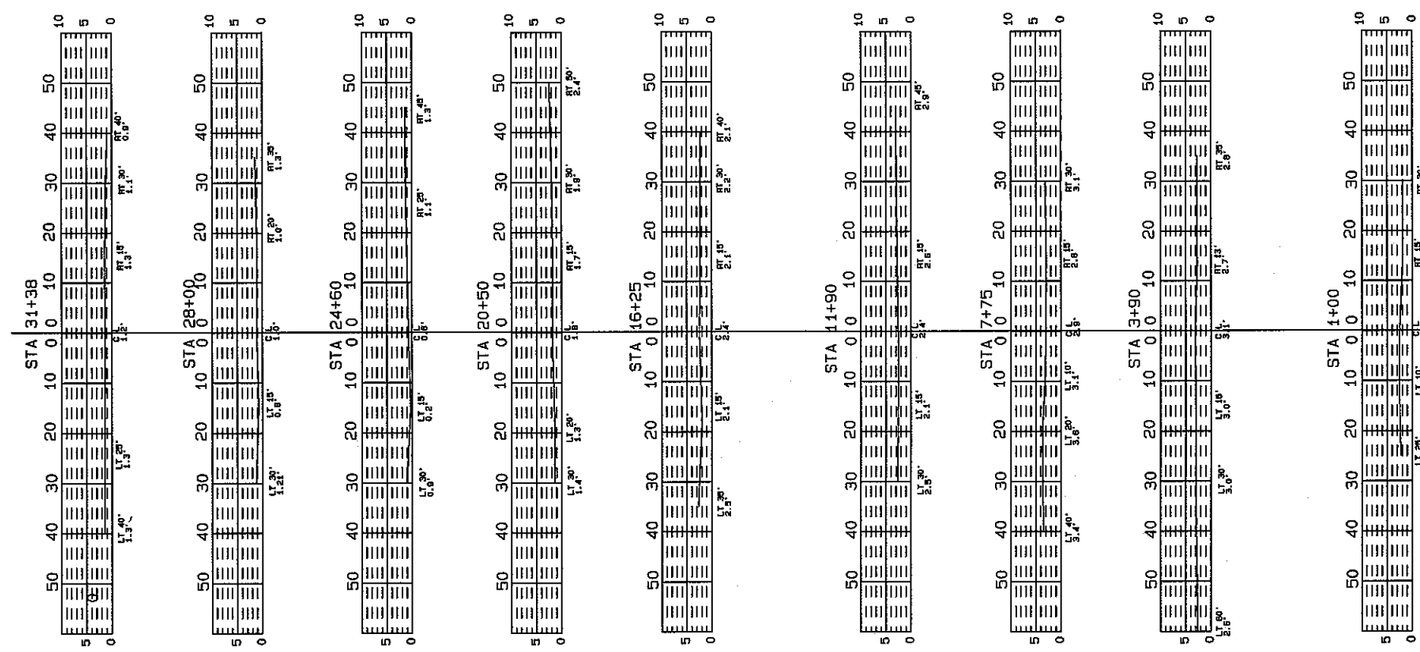
BISHOP ROAD WETLAND RESTORATION PROJECT
HYDE COUNTY, NORTH CAROLINA
SCO # 050653801 NCDERN PROJECT # D08017S
SHEET 11 OF 12 SHEETS MAY 4, 2009





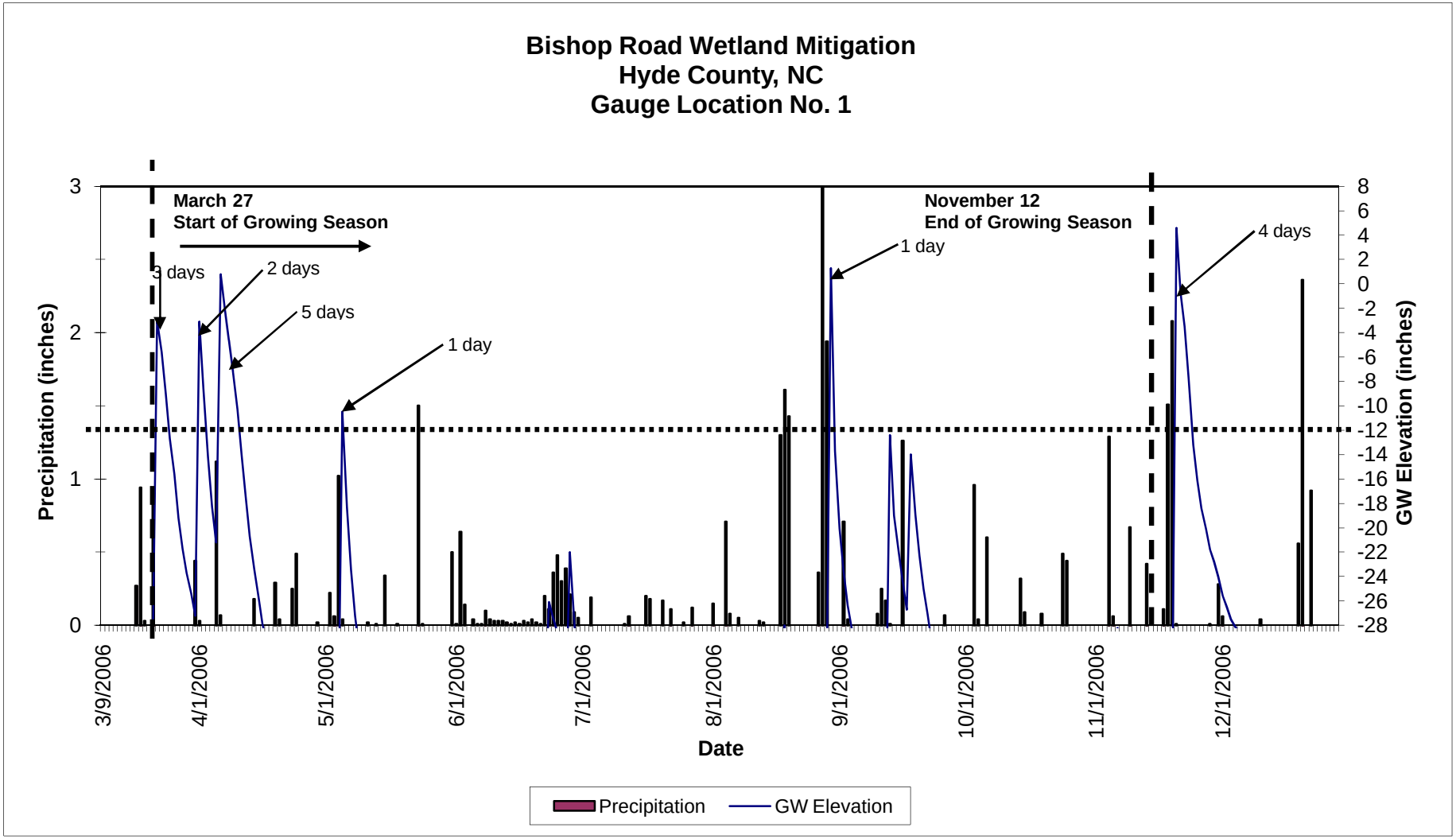
BISHOP ROAD WETLAND RESTORATION PROJECT
HYDE COUNTY, NORTH CAROLINA
SCO # 050653801 NCDERN PROJECT # D08017S
SHEET 12 OF 12 SHEETS MAY 4, 2009

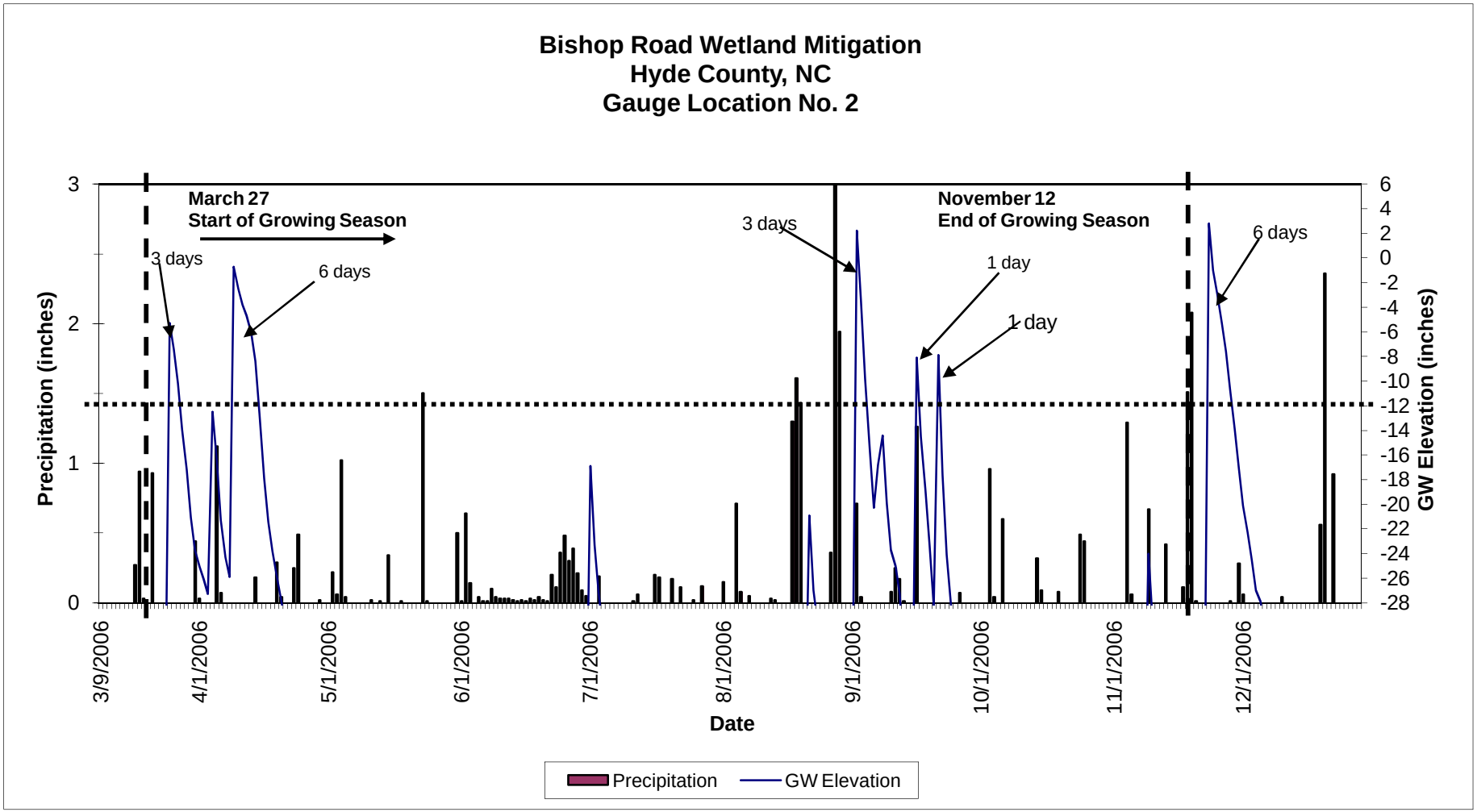


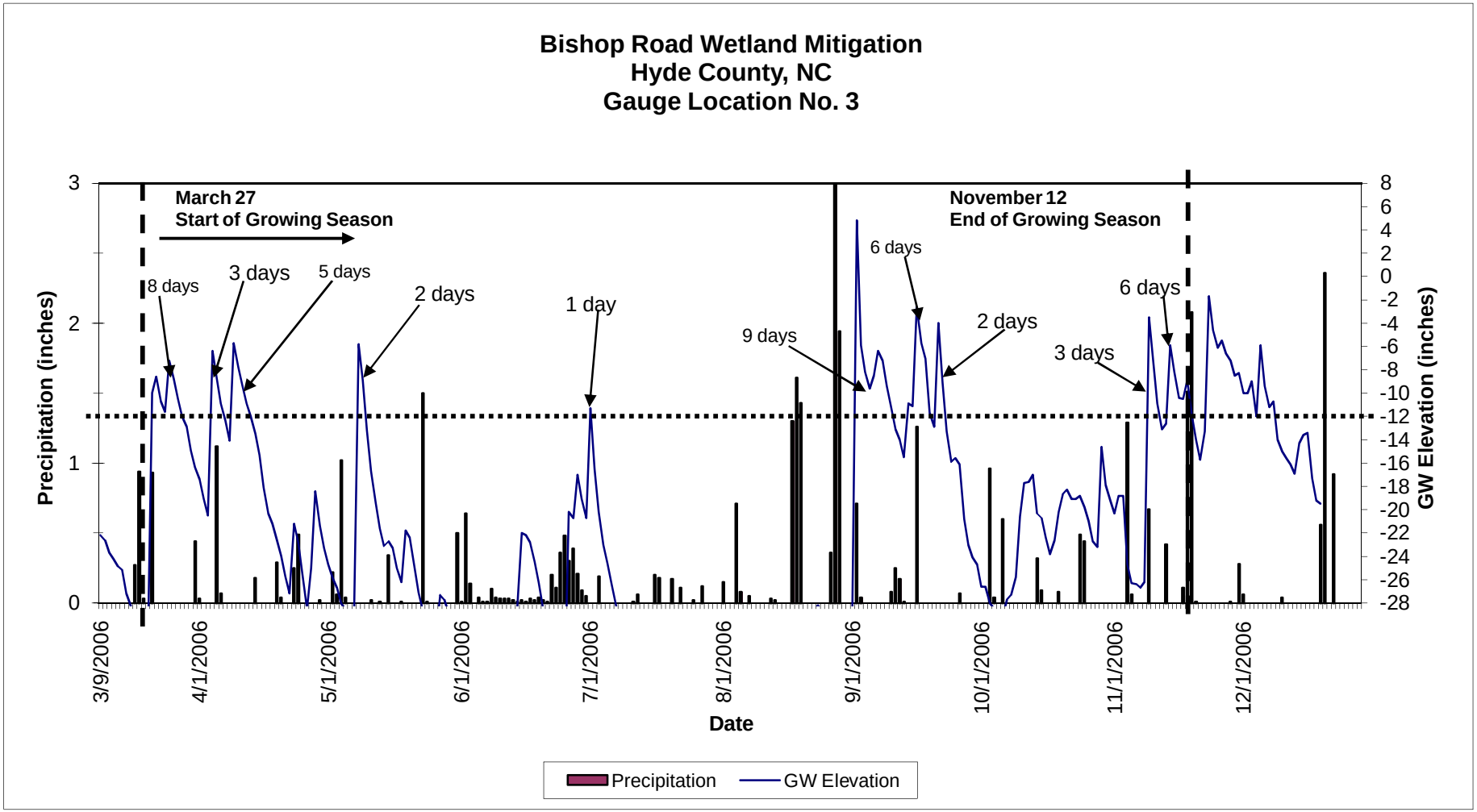


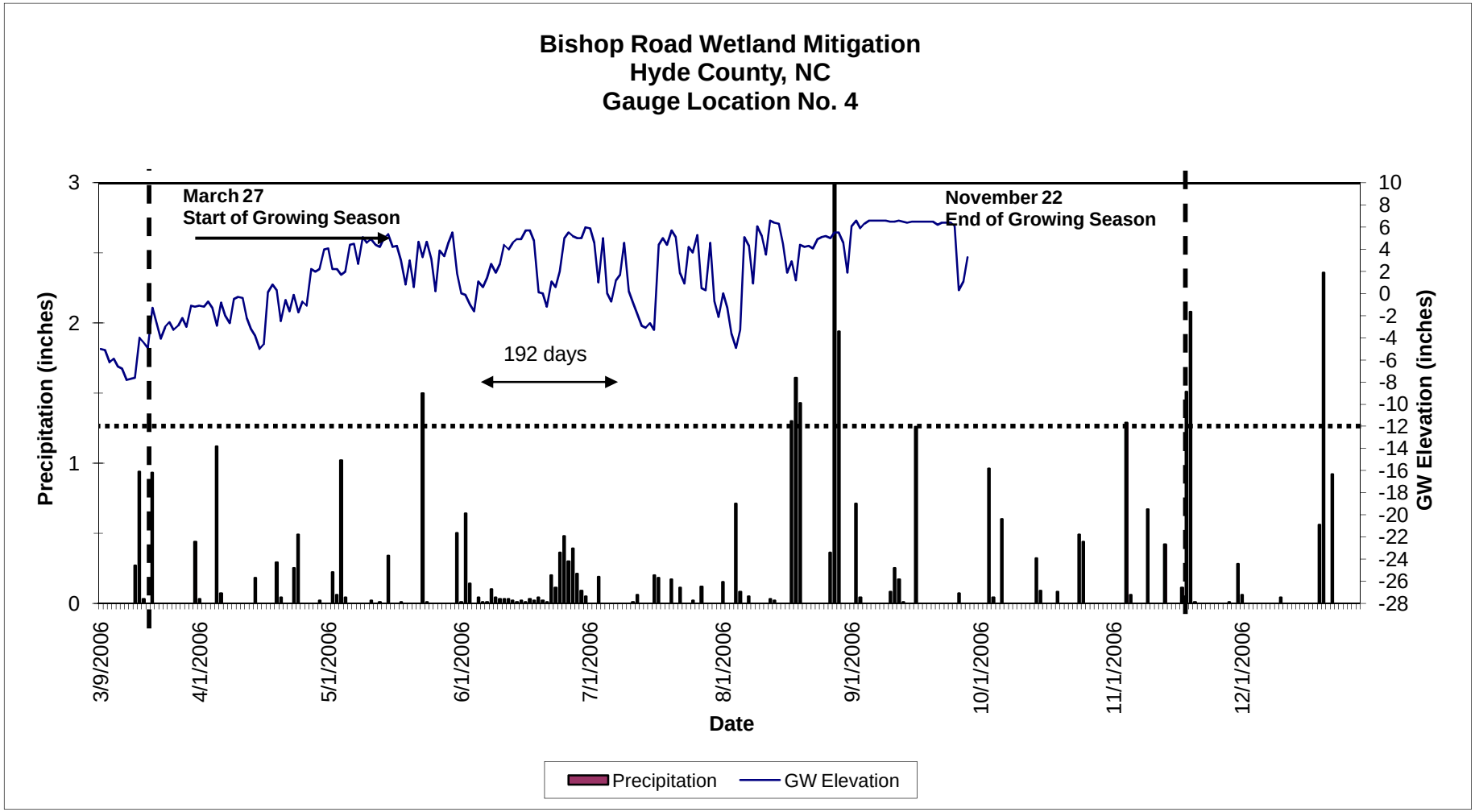
Appendix C

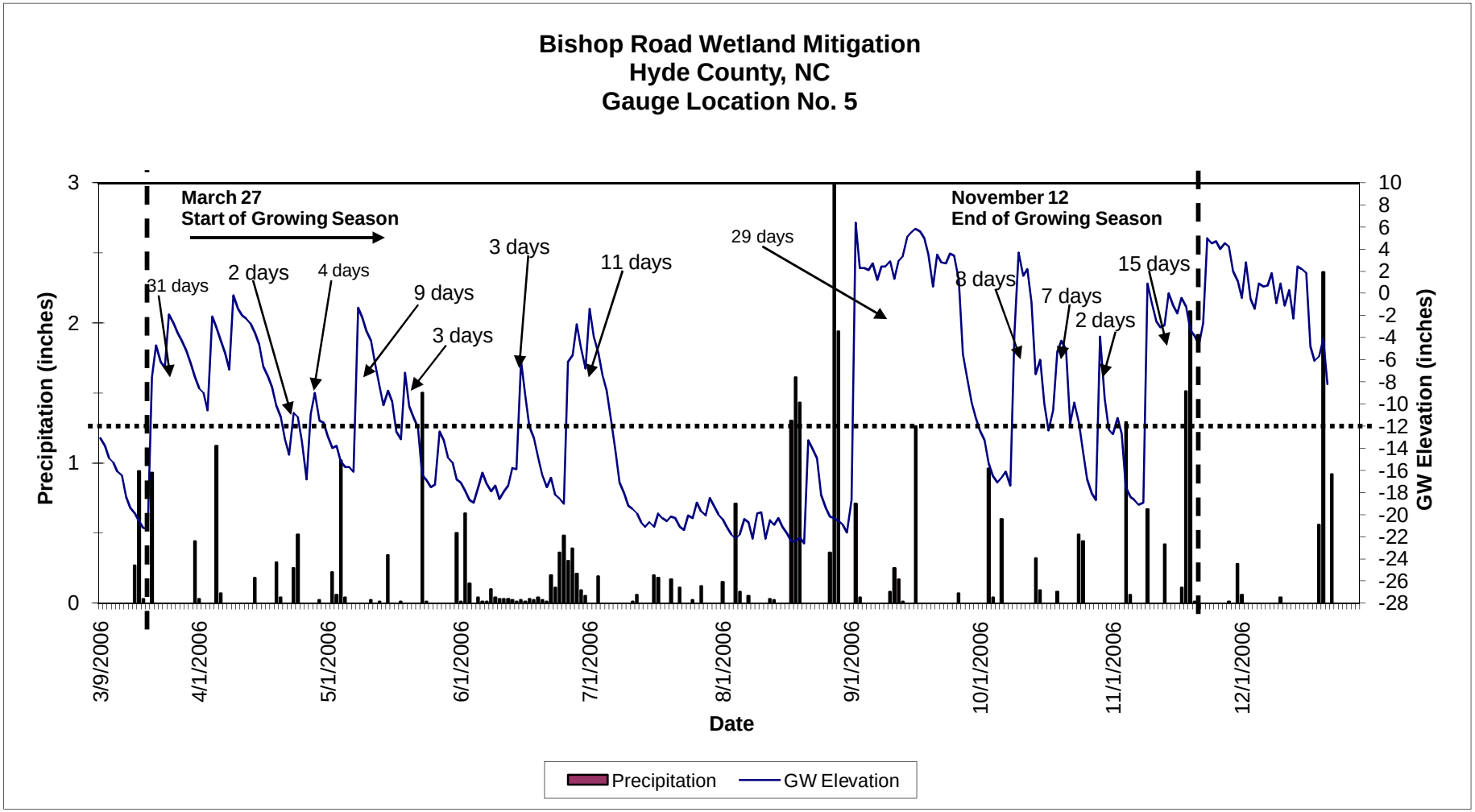
Groundwater Monitoring Gauge Data

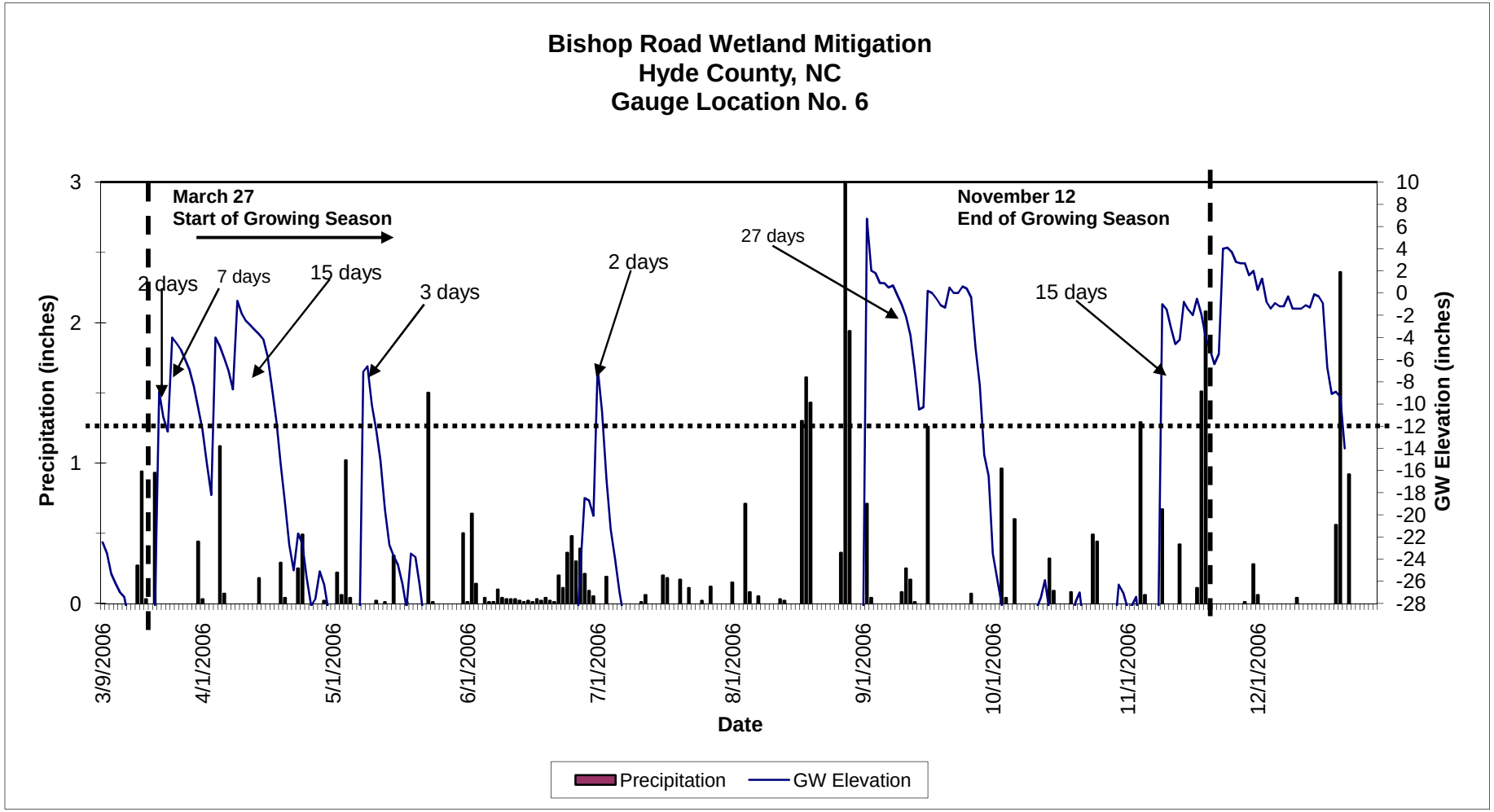

Bishop Road Wetland Mitigation
Hyde County, NC
Gauge Location No. 1
March 27
Start of Growing Season
November 12
End of Growing Season
3 days
2 days
5 days
1 day
1 day
4 days
Precipitation (inches)
GW Elevation (inches)
Date
3/9/2006
4/1/2006
5/1/2006
6/1/2006
7/1/2006
8/1/2006
9/1/2006
10/1/2006
11/1/2006
12/1/2006
Precipitation
GW Elevation

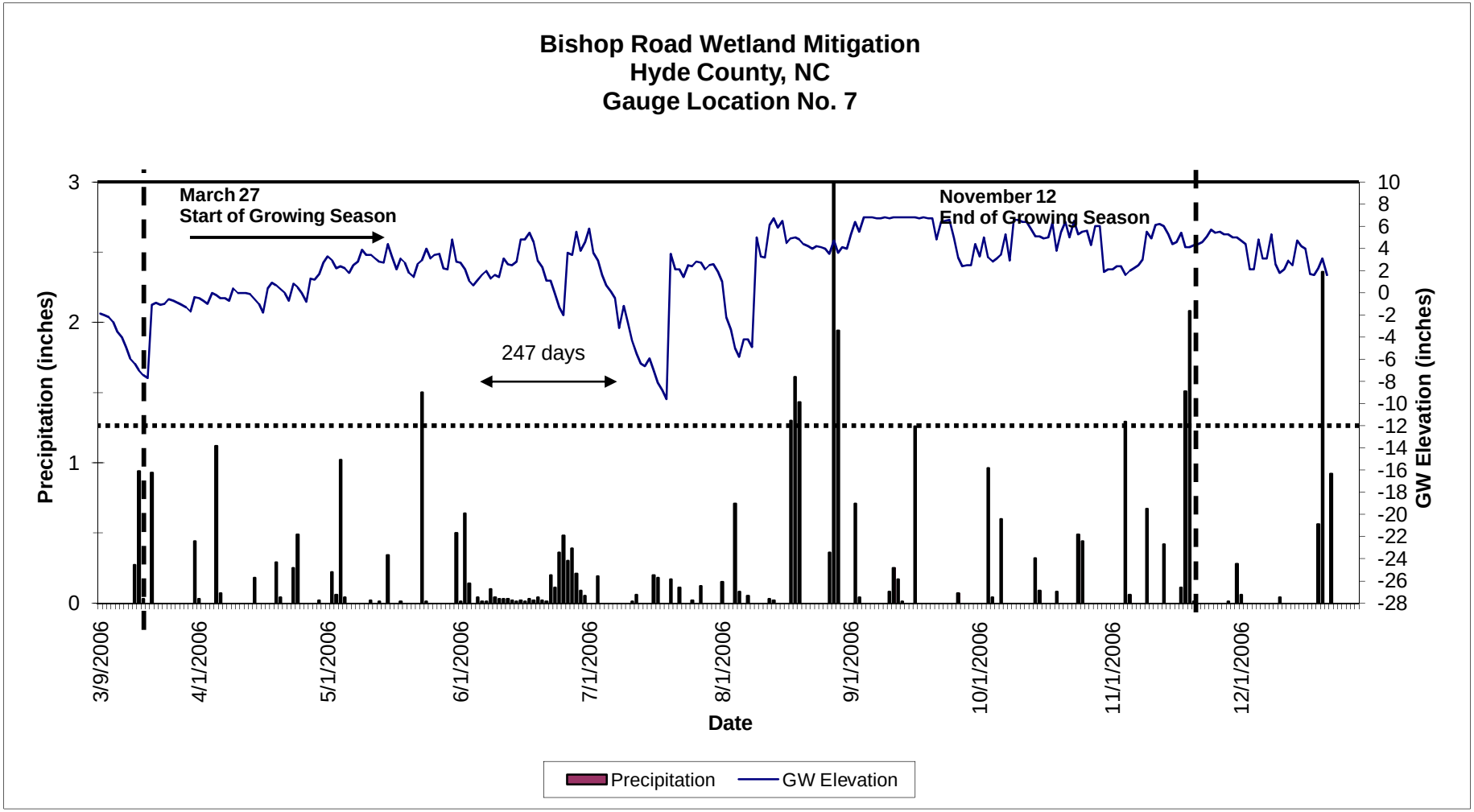

Bishop Road Wetland Mitigation
Hyde County, NC
Gauge Location No. 2
March 27
Start of Growing Season
November 12
End of Growing Season
3 days
6 days
3 days
1 day
1 day
6 days
Precipitation (inches)
GW Elevation (inches)
Date
3/9/2006
4/1/2006
5/1/2006
6/1/2006
7/1/2006
8/1/2006
9/1/2006
10/1/2006
11/1/2006
12/1/2006
Precipitation
GW Elevation

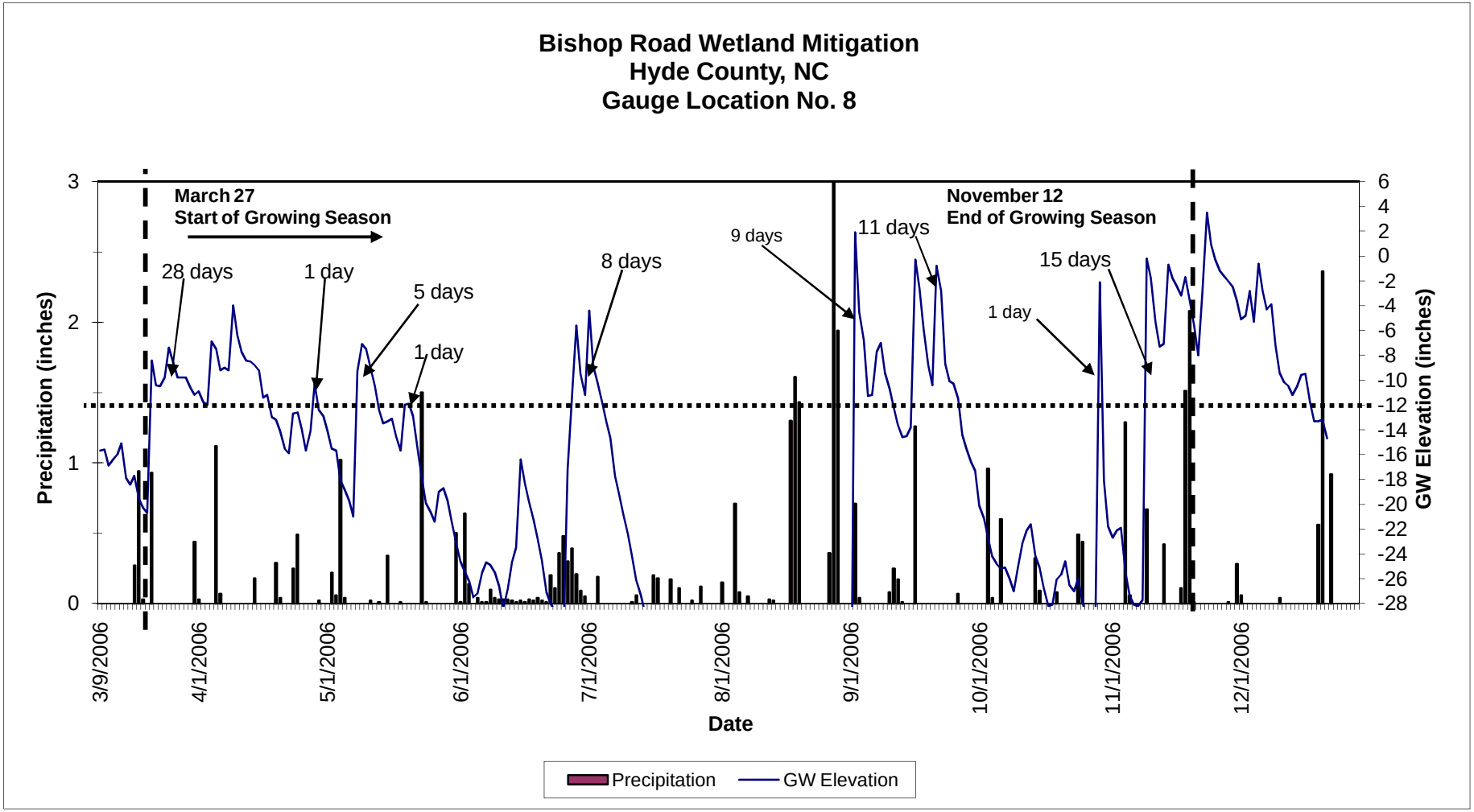

Bishop Road Wetland Mitigation
Hyde County, NC
Gauge Location No. 3
March 27
Start of Growing Season
November 12
End of Growing Season
8 days
3 days
5 days
2 days
1 day
9 days
6 days
2 days
3 days
6 days
Precipitation (inches)
GW Elevation (inches)
Date
3/9/2006
4/1/2006
5/1/2006
6/1/2006
7/1/2006
8/1/2006
9/1/2006
10/1/2006
11/1/2006
12/1/2006
Precipitation
GW Elevation

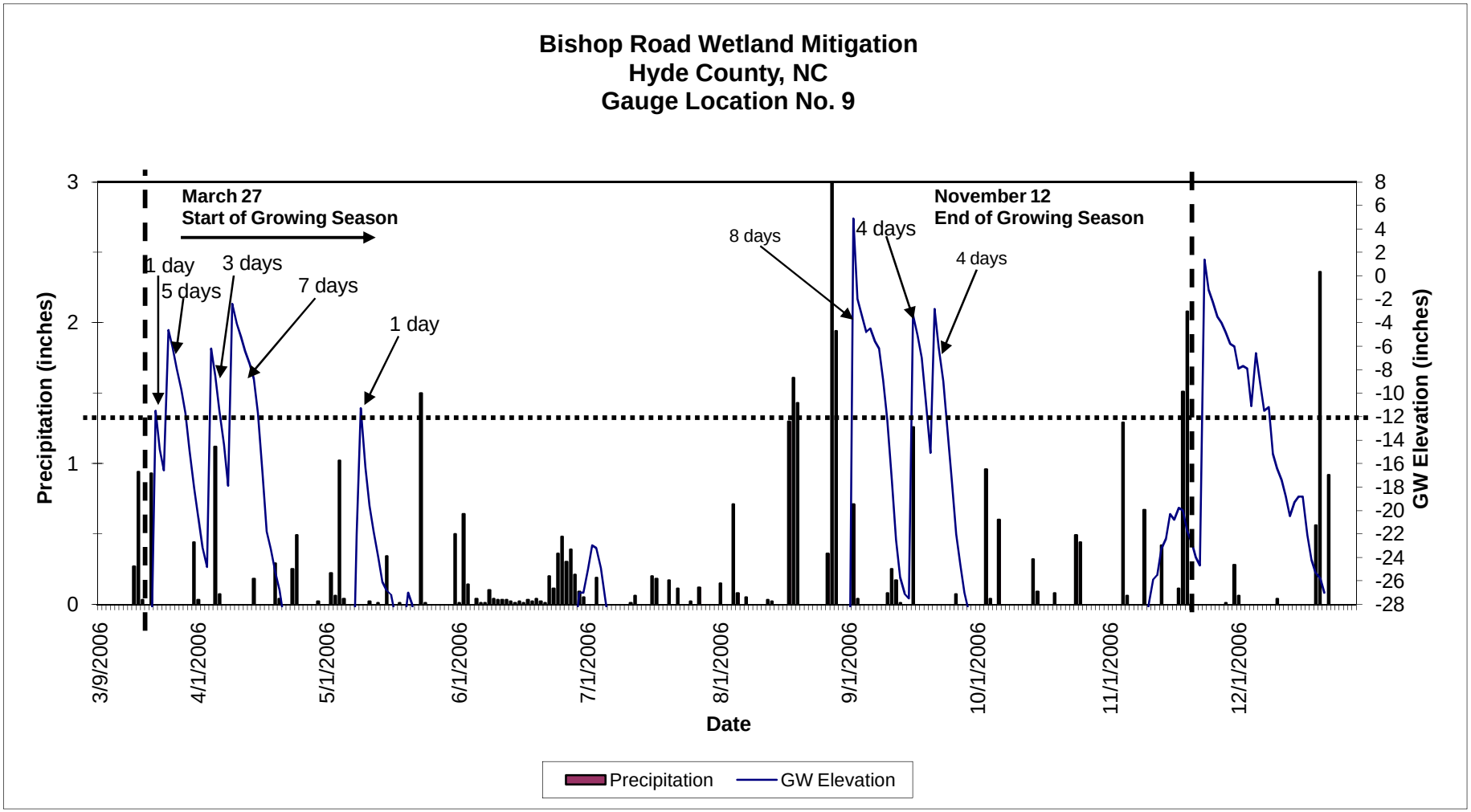

Bishop Road Wetland Mitigation
Hyde County, NC
Gauge Location No. 4
March 27
Start of Growing Season
November 22
End of Growing Season
192 days
Precipitation (inches)
GW Elevation (inches)
Date
3/9/2006
4/1/2006
5/1/2006
6/1/2006
7/1/2006
8/1/2006
9/1/2006
10/1/2006
11/1/2006
12/1/2006
Precipitation
GW Elevation

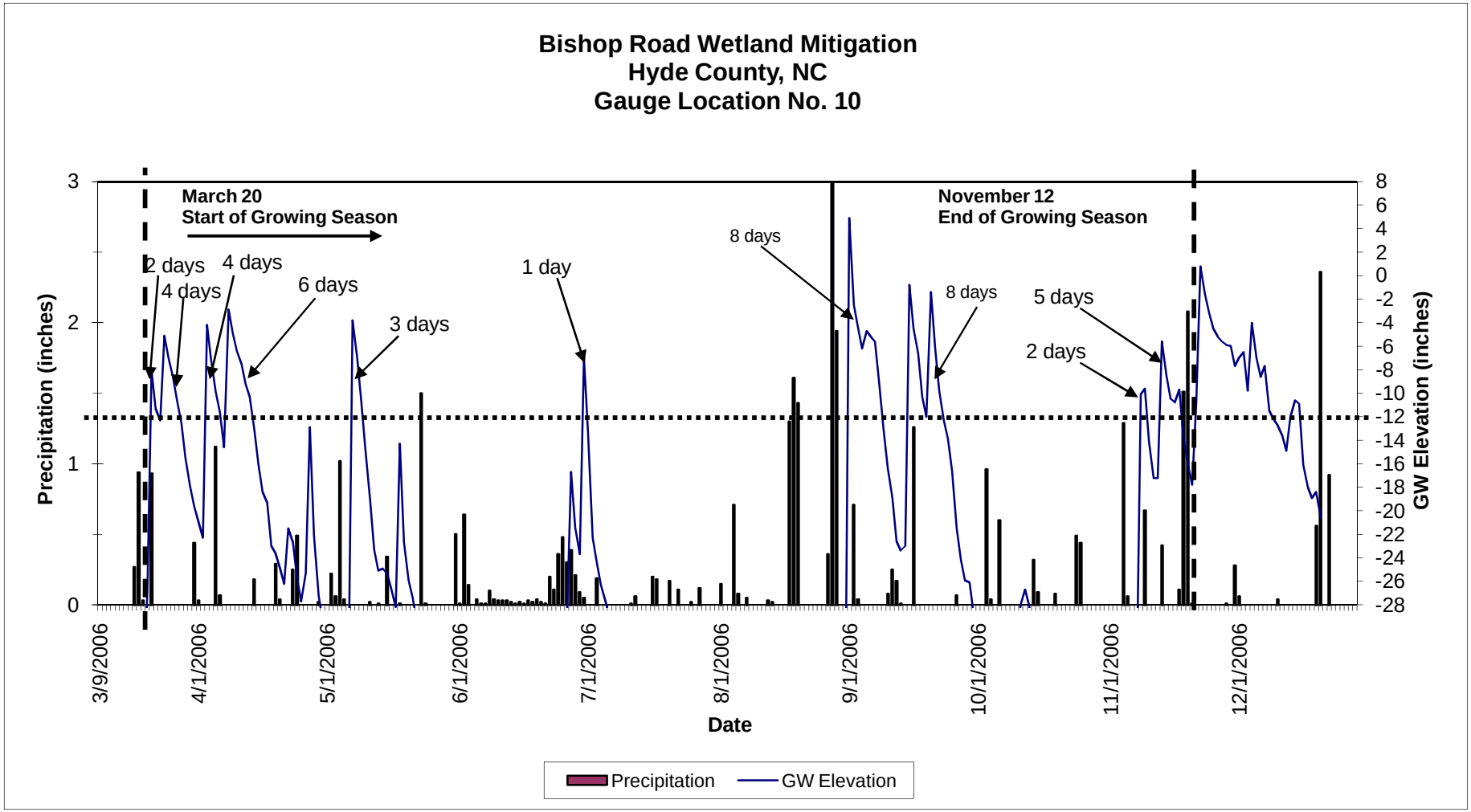

Bishop Road Wetland Mitigation
Hyde County, NC
Gauge Location No. 5
March 27
Start of Growing Season
November 12
End of Growing Season
31 days
2 days
4 days
9 days
3 days
3 days
11 days
29 days
8 days
7 days
2 days
15 days
Precipitation (inches)
GW Elevation (inches)
Date
3/9/2006
4/1/2006
5/1/2006
6/1/2006
7/1/2006
8/1/2006
9/1/2006
10/1/2006
11/1/2006
12/1/2006
Precipitation
GW Elevation

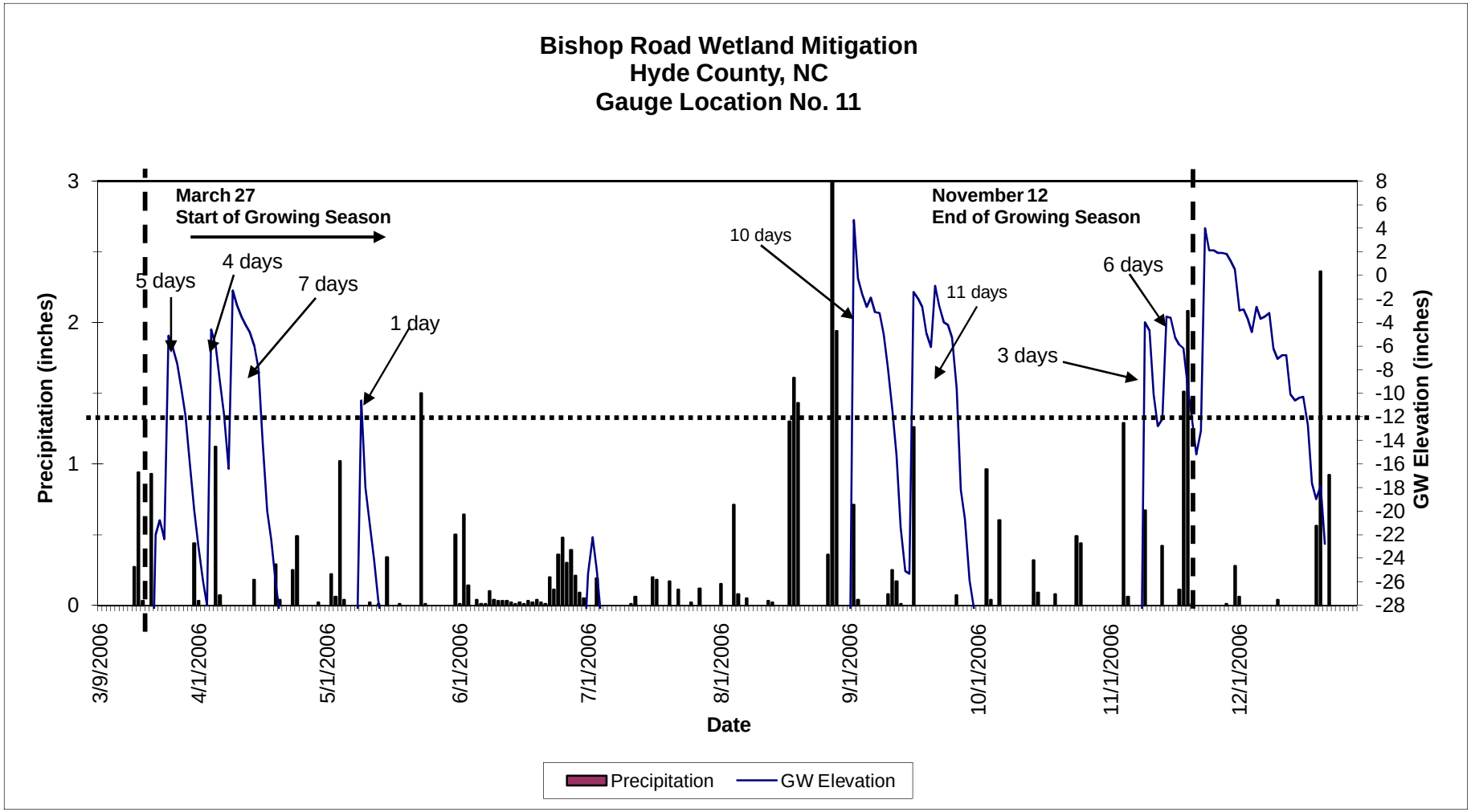

Bishop Road Wetland Mitigation
Hyde County, NC
Gauge Location No. 6
March 27
Start of Growing Season
November 12
End of Growing Season
2 days
7 days
15 days
3 days
2 days
27 days
15 days
Precipitation (inches)
GW Elevation (inches)
Date
3/9/2006
4/1/2006
5/1/2006
6/1/2006
7/1/2006
8/1/2006
9/1/2006
10/1/2006
11/1/2006
12/1/2006
Precipitation
GW Elevation

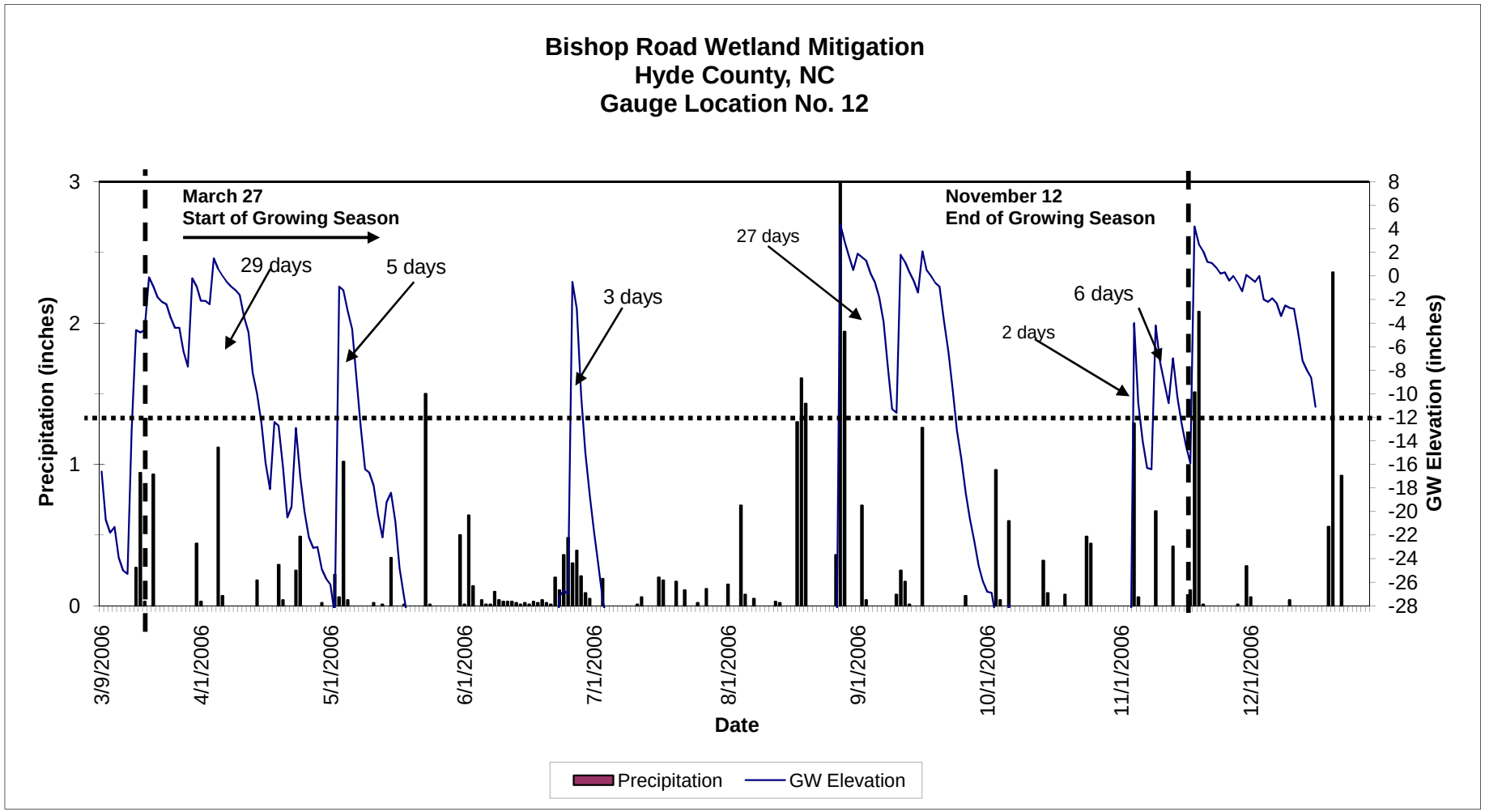

Bishop Road Wetland Mitigation
Hyde County, NC
Gauge Location No. 7
March 27
Start of Growing Season
November 12
End of Growing Season
247 days
Precipitation (inches)
GW Elevation (inches)
Date
3/9/2006
4/1/2006
5/1/2006
6/1/2006
7/1/2006
8/1/2006
9/1/2006
10/1/2006
11/1/2006
12/1/2006
Precipitation
GW Elevation

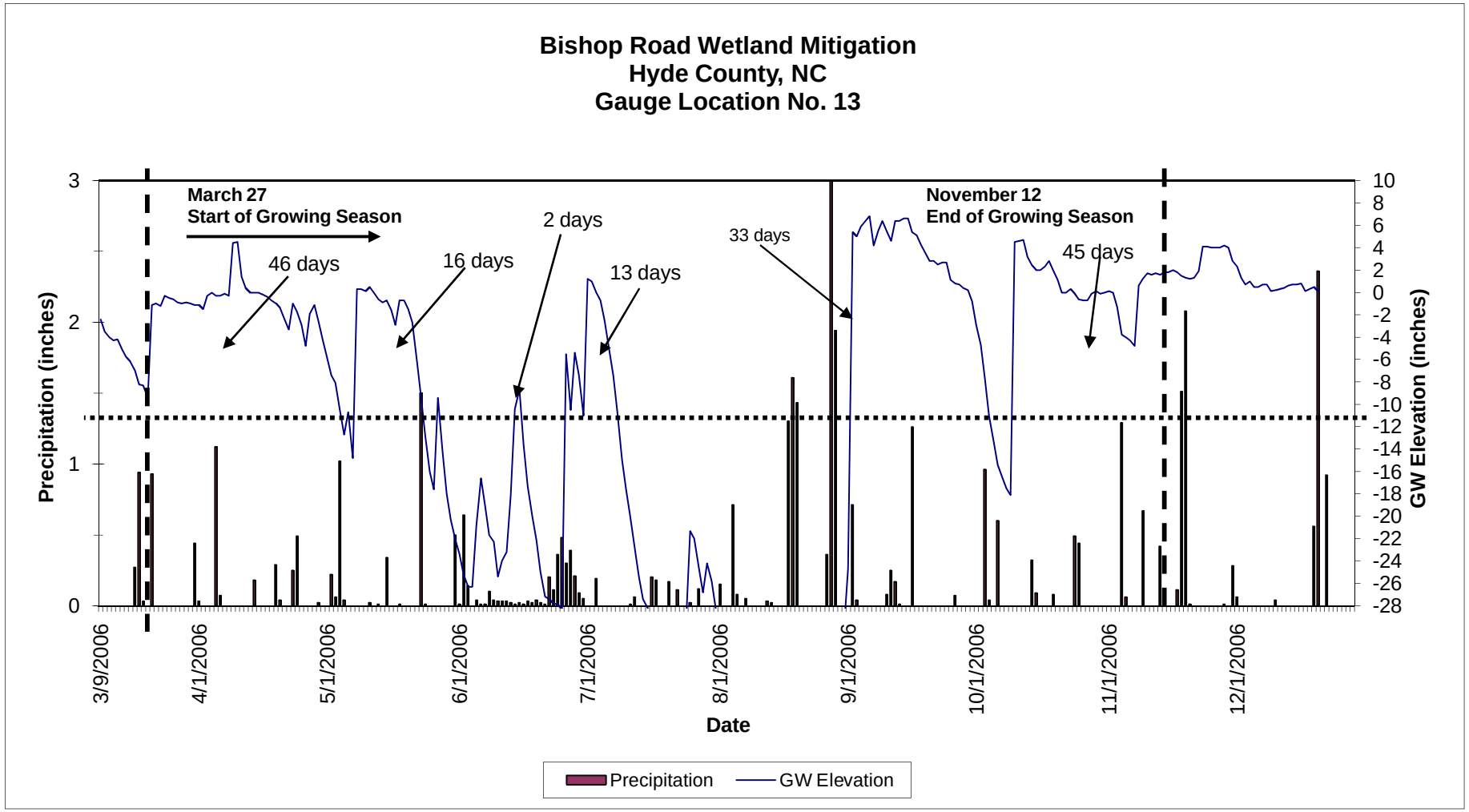

Bishop Road Wetland Mitigation
Hyde County, NC
Gauge Location No. 8
March 27
Start of Growing Season
November 12
End of Growing Season
28 days
1 day
5 days
1 day
8 days
9 days
11 days
1 day
15 days
Precipitation (inches)
GW Elevation (inches)
Date
3/9/2006
4/1/2006
5/1/2006
6/1/2006
7/1/2006
8/1/2006
9/1/2006
10/1/2006
11/1/2006
12/1/2006
Precipitation
GW Elevation

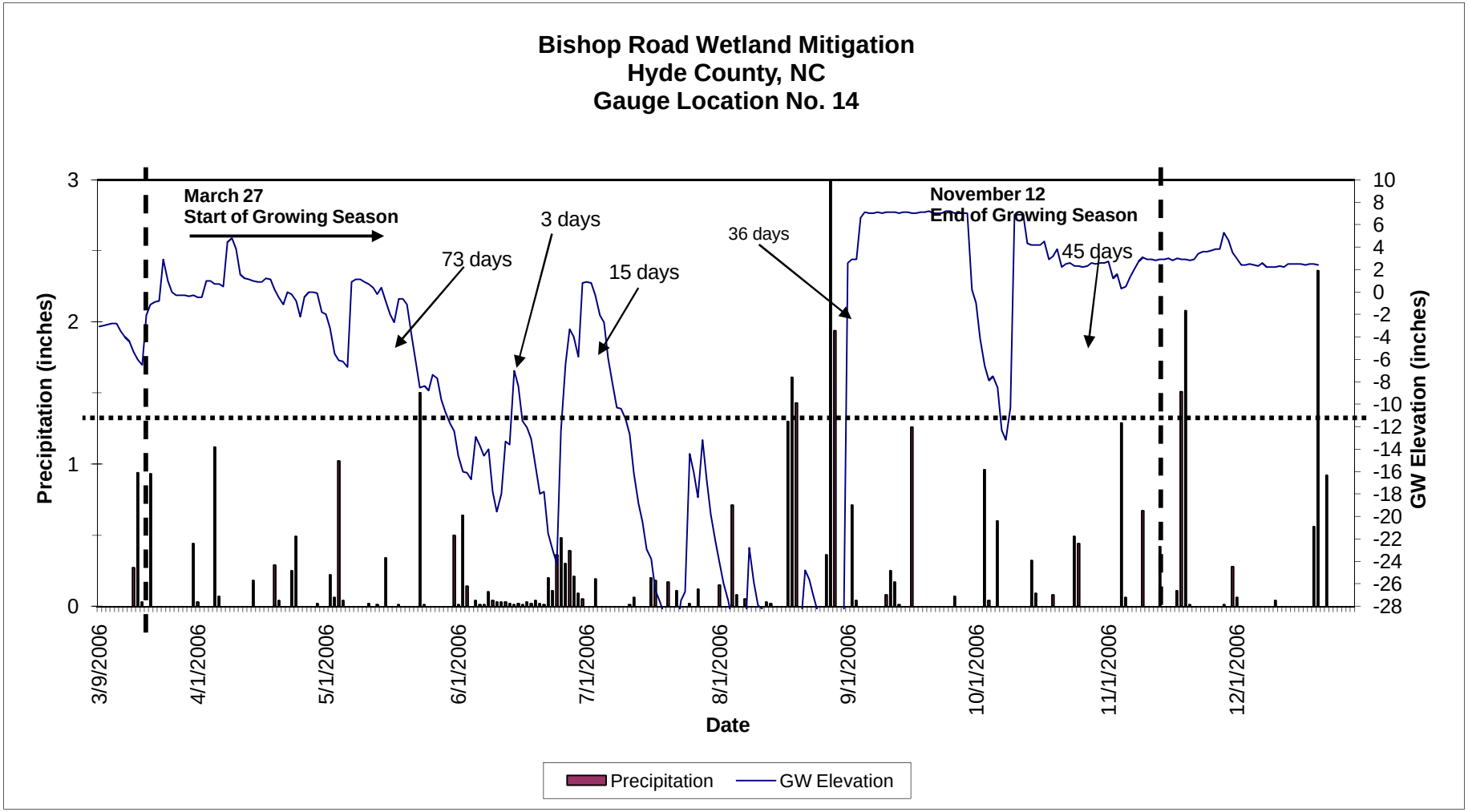

Bishop Road Wetland Mitigation
Hyde County, NC
Gauge Location No. 9
March 27
Start of Growing Season
November 12
End of Growing Season
1 day
5 days
3 days
7 days
1 day
8 days
4 days
4 days
Precipitation (inches)
GW Elevation (inches)
Date
3/9/2006
4/1/2006
5/1/2006
6/1/2006
7/1/2006
8/1/2006
9/1/2006
10/1/2006
11/1/2006
12/1/2006
Precipitation
GW Elevation


Bishop Road Wetland Mitigation
Hyde County, NC
Gauge Location No. 10
March 20
Start of Growing Season
November 12
End of Growing Season
2 days
4 days
4 days
6 days
3 days
1 day
8 days
8 days
5 days
2 days
Precipitation (inches)
GW Elevation (inches)
Date
3/9/2006
4/1/2006
5/1/2006
6/1/2006
7/1/2006
8/1/2006
9/1/2006
10/1/2006
11/1/2006
12/1/2006
Precipitation
GW Elevation


Bishop Road Wetland Mitigation
Hyde County, NC
Gauge Location No. 11
March 27
Start of Growing Season
November 12
End of Growing Season
5 days
4 days
7 days
1 day
10 days
11 days
6 days
3 days
Precipitation (inches)
GW Elevation (inches)
Date
3/9/2006
4/1/2006
5/1/2006
6/1/2006
7/1/2006
8/1/2006
9/1/2006
10/1/2006
11/1/2006
12/1/2006
Precipitation
GW Elevation


Bishop Road Wetland Mitigation
Hyde County, NC
Gauge Location No. 12
March 27
Start of Growing Season
November 12
End of Growing Season
29 days
5 days
3 days
27 days
6 days
2 days
Precipitation (inches)
GW Elevation (inches)
Date
3/9/2006
4/1/2006
5/1/2006
6/1/2006
7/1/2006
8/1/2006
9/1/2006
10/1/2006
11/1/2006
12/1/2006
Precipitation
GW Elevation


Bishop Road Wetland Mitigation
Hyde County, NC
Gauge Location No. 13
March 27
Start of Growing Season
November 12
End of Growing Season
46 days
16 days
2 days
13 days
33 days
45 days
Precipitation (inches)
GW Elevation (inches)
Date
3/9/2006
4/1/2006
5/1/2006
6/1/2006
7/1/2006
8/1/2006
9/1/2006
10/1/2006
11/1/2006
12/1/2006
Precipitation
GW Elevation


Bishop Road Wetland Mitigation
Hyde County, NC
Gauge Location No. 14
March 27
Start of Growing Season
November 12
End of Growing Season
73 days
3 days
15 days
36 days
45 days
Precipitation (inches)
GW Elevation (inches)
Date
3/9/2006
4/1/2006
5/1/2006
6/1/2006
7/1/2006
8/1/2006
9/1/2006
10/1/2006
11/1/2006
12/1/2006
Precipitation
GW Elevation

Appendix D

Vegetation Data Sheets

BISHOP ROAD WETLAND RESTORATION
2009 BASELINE VEGETATION MONITORING DATA AND RESULTS

Note: Each plot totals 0.0247 acre in size.

Species*	Plot 17	Plot 18	Plot 19	Plot 20	Plot 21	Plot 22	Plot 23	Plot 24	Plot 25	Total Stems for Plots 17-25	Total Stems/Acre
Planted											
Aronia arbutifolis			1	2						3	121
Baccharis halimifolia						9				9	364
Hibiscus moscheutos								1		1	40
Ilex opaca	1	3								4	162
Myrica cenifera	5	4	2	3	1		7			22	891
Nyssa aquatica							2			2	81
Pinus serotina	1									1	40
Quercus sp.	4	3	9	3	6	2	5			32	1296
Quercus phellos				2			1			3	121
Rosa palustris				4	1		1	9	8	23	931
Sambucus canadensis					3					3	121
Volunteer											
Acer rubrum	4	2	5	1		15				27	1093
Baccharis halimifolia				2		9				11	445
Clethra alnifolia	2	4	1							7	283
Liquidambae styraciflua	3	10	9	1	1					24	972
Myrica cenifera	4	4		2						10	405
Rhus copallina	14	12	3	9		3				41	1660
Quercus sp.		2								2	81
TOTAL STEMS/PLOT	**38**	**44**	**30**	**29**	**12**	**38**	**16**	**10**	**8**	**225**	**9109**
TOTAL STEMS/ACRE	**1538**	**1781**	**1215**	**1174**	**486**	**1538**	**648**	**405**	**324**		

Plot Data: C\ Levels 1 & 2

General Information

Project Label:

Project Name: Bishop Rd

Team: RSL KAD

Plot: Gauge 17

☐ Level 1 (planted stems only)
☒ Level 2 (planted and natural stems)

Start Date: 11 / FEB / 2005
dd/mmm/yyyy e.g. 15 / JAN / 2007

End Date (if different): / /

Party	Role**
RSL	Plot Leader
KAD	Co-leader

**Roles: Co-leader, Assistant, Guide, Land owner, Taxonomist, Other

Soil Drainage*

☐ Excessively drained
☐ Somewhat excessively drained
☐ Well drained
☐ Moderately well drained
☐ Somewhat poorly drained
☐ Poorly drained
☐ Very poorly drained

Water

Percent of Plot Submerged: 20 %

Mean Water Depth: 2 cm

Location

General: Bishop Rd

State: NC County: Hyde

Quadrangle: Ponzer NC

Place Names: 1) Scranton Creek
2) Turkle Creek 3) Scranton

EEP Reach: Bishop Rd

Land Owner: NC DOT

⊗ **GPS Receiver Location** (m):
x= 0 y= 0

Coordinate System: ☐ Lat/Long ☐ UTM ☒ State Plane ☐ Other (*specify*):

Coord. Units: ☐ deg. ☐ deg. min. ☐ deg. min. sec. ☐ m ☒ ft ☐

Datum: ☒ NAD83/WGS84 ☐ NAD27

Zone: (if applicable)

Lat: 653806.4673 (or Northing)

Long: 2758027.5863 (or Easting)

Coordinate Accuracy (m radius):
e.g. 30 <1

GPS File Name:

Site Characteristics

Elevation: 5 ± 2 ☐m ☒ft

Slope (degrees): 0

Aspect (degrees):

Compass Type: ☒ magnetic ☐ true

Plot Placement (check 1 or more)

☒ Representative
☒ Random
☒ Stratified
☐ Transect component
☐ Systematic (grid)
☒ Capture specific feature

Further details of placement can be recorded in Plot Rationale.

Taxonomic Standard Used for Plant Identification

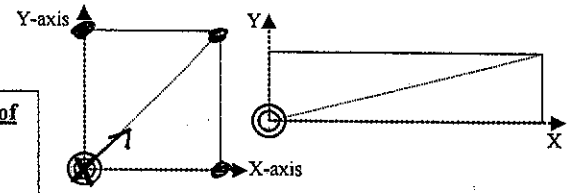
Authority: Radford et al, **Publ. Date:** 1987

Plot Diagram

Fill in *ONE* of the templates below, using the key to draw GPS location, photos and posts. Edit shape if plot doesn't match one of the templates. Draw any landmarks, such as streams, banks, fences, etc.

Standard 10m x 10m (14.142m diagonal):

Non-standard 5m x 20m (20.616m diagonal):



Bearing of Plot X-Axis: 264°

Posts (x,y) (meters)
(0,0)
(0,10)
(10,0)
(10,10)
(,)
(,)

Key
- ◎ Plot origin (0,0) point
- ⊗ GPS location point
- ○→ photo taken, with direction
- ● posts

Plot Size (ares, default=1): 1
(An "are" is 100 m²)

○→ Photo Identifier(s): Across diagonal from origin

Notes

If more space is needed, check the box and use back of datasheets.

Layout: (anything unusual about plot layout and shape)
Gauge 17 is at origin
☐ more...

Plot Location: (directions to plot, landscape content)
East of small stand of pines
☐ more...

Plot Rationale: (why location was chosen for the plot)
Represents pine flatwood restoration
Selected by NCEEP
☐ more...

Other Notes: (invasive species, erosion, disturbances, etc.)
Recently cleared and planted for restoration
Standing water on eastern portion of plot
☐ more...

Woody Stem Data: CVS Level 2

Planted Woody Stems - individual stems measured

Leader: RSL Project: Bishop Team: RSL KAD Plot: 1? Date: 2 1/10/05

Species Name	Source	Coordinates X (0.1 m)	Coordinates Y (0.1 m)	ddh (1 mm)	Height (1* cm)	DBH (1 cm)	Vigor	Damage
Quercus sp	R	1.4	1.2	5.8	58	—	4	—
Myrica cerifera	R	6.0	2.2	4.8	25	—	4	—
Quercus sp	R	9.0	5.0	4.1	55	—	4	—
M. cerifera	R	9.4	8.1	4.0	44	—	4	—
Pinus serotina	R	7.2	9.8	4.6	18	—	4	—
M. cerifera	R	5.6	9.1	4.3	28	—	4	—
Ilex opaca	R	5.5	5.8	6.0	24	—	4	—
M. cerifera	R	0.5	4.4	2.1	18	—	4	—
Quercus sp	R	3.4	4.6	5.9	57	—	4	—
M cerifera	R	3.4	6.4	6.4	47	—	4	—
Quercus	R	2.2	8.5	6.4	64	—	4	—
Magnolia virginiana	R	2.5	9.3	6.4	35	—	4	—

Source: Transplant, Live stake, Ball and burlap, Pot, Tubling, Bare Root, Mechanically planted, Unknown

Vigor: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=Dead, Missing. ↓

*Height precision drops to 10cm if >2.5m and 50cm if >4m.

Damage: Removal, Cut, Mowing, Beaver, Deer, Rodents, Insects, Game, Livestock, Other/Unknown Animal, Human Trampled, Site Too Wet, Site Too Dry, Flood, Drought, Storm, Hurricane, Diseased, Vine Strangulation, Unknown, specify other.

Natural Woody Stems - tallied by species

Explanation of cut-off & subsampling**:

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): ☐ 10cm ☐ 50cm ☐ 100cm ☐ 137cm

Species Name	☑ c	Seedlings — Height Classes: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Saplings — DBH: Sub-Sapl	0-1 cm	1-2.5	Trees — DBH: 2.5-	5-	≥10 (write DBH)
Acer rubrum		—		••	••	—					
Liquidambar styraciflua		—	•	••		—					
M. cerifera		—	•••	•		—					
Clethra alnifolia		—		••	[illegible]	—					
Rhus copallina		—	[illegible]	[illegible]	[illegible]	—					
		—				—					
		—				—					

**Required if cut-off >10cm or subsample ≠100%.

EntryTool2.2.6

Form WS2, ver 8.3

Plot Data: C\ Levels 1 & 2

General Information

Project Label:

Project Name: Bishop Rd

Team: RSL KAD

Plot: Gauge 18

☐ Level 1 (planted stems only)
☒ Level 2 (planted and natural stems)

Start Date: 11 / Feb / 2009
dd/mmm/yyyy e.g. 15 / JAN / 2007

End Date (if different): / /

Party	Role**
RSL	Plot Leader
KAD	Co-Leader

**Roles: Co-leader, Assistant, Guide, Land owner, Taxonomist, Other

Soil Drainage*

- ☐ Excessively drained
- ☐ Somewhat excessively drained
- ☐ Well drained
- ☐ Moderately well drained
- ☒ Somewhat poorly drained
- ☐ Poorly drained
- ☐ Very poorly drained

Water

Percent of Plot Submerged: <5 %

Mean Water Depth: 5 cm

Location

General: SE of Muriel / Bishop Rd

State: NC County: Hyde

Quadrangle: Ponzer

Place Names: 1) Scranton Cr

2) Terklin Cr 3) Scranton

EEP Reach:

Land Owner: NC DOT

⊗ **GPS Receiver Location** (m):
x= 0 y= 0

Coordinate System: ☐ Lat/Long ☐ UTM ☒ State Plane ☐ Other (*specify*):

Coord. Units: ☐ deg. ☐ deg. min. ☐ deg. min. sec. ☐ m ☒ ft ☐ ____

Datum: ☒ NAD83/WGS84 ☐ NAD27

Zone: (if applicable)

Lat: ~~655798.7895~~ 653410.3682 (or Northing)

Long: ~~2758533.557~~ 2757947.6446 (or Easting)

Coordinate Accuracy (m radius): e.g. 30 <1

GPS File Name:

Site Characteristics

Elevation: 5 ± ☐m ☒ft.

Slope (degrees): 0

Aspect (degrees):

Compass Type: ☒ magnetic ☐ true

Plot Placement (check 1 or more)

- ☒ Representative
- ☐ Random
- ☐ Stratified
- ☐ Transect component
- ☐ Systematic (grid)
- ☒ Capture specific feature

Further details of placement can be recorded in Plot Rationale.

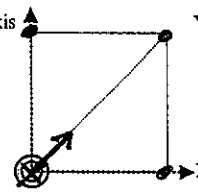
Taxonomic Standard Used for Plant Identification

Authority: Radford et al, **Publ. Date:** 1968

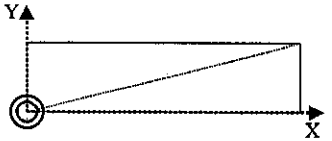
Plot Diagram

Fill in *ONE* of the templates below, using the key to draw GPS location, photos and posts. Edit shape if plot doesn't match one of the templates. Draw any landmarks, such as streams, banks, fences, etc.

Standard 10m x 10m (14.142m diagonal):



Non-standard 5m x 20m (20.616m diagonal):



●Posts (x,y) (meters)
(0,0)
(0,10)
(10,0)
(10,10)
(,)
(,)

Key

- ◎ Plot origin (0,0) point
- ⊗ GPS location point
- ○→ photo taken, with direction
- ● posts

Bearing of Plot X-Axis: 95°

Plot Size (ares, default=1): (An "are" is 100 m²) 1

○→ Photo Identifier(s): Across diagonal from origin

Notes

If more space is needed, check the box and use back of datasheets.

Layout: (anything unusual about plot layout and shape)
Standard layout
☐ more...

Plot Location: (directions to plot, landscape content)
East of barricades on Bishop Rd
☐ more...

Plot Rationale: (why location was chosen for the plot)
Selected by NCEEP
Representative of Pine Flatwoods
☐ more...

Other Notes: (invasive species, erosion, disturbances, etc.)
Recently cleared and planted for restoration.
☐ more...

Woody Stem Data: CVS Level 2

Planted Woody Stems - individual stems measured

Leader: RSL Project: Bishop Rd Team: RSL LEAD Plot: Grid 18 Date: 11 / Feb / 2005

Species Name	Source	Coordinates X (0.1 m)	Coordinates Y (0.1 m)	ddh (1 mm)	Height (1* cm)	DBH (1 cm)	Vigor	Damage
Myrica cerifera	R	2.6	3.0	7.2	—			
Quercus sp	R	0.5	4.2	4.0	—			
Myrica cerifera	R	0.2	8.0	3.5	—			
Quercus sp	R	3.5	3.3	4.9	—			
Ilex opaca	R	5.4	1.7	2.2	—			
Ilex opaca	R	6.5	1.7	3.4	—			
Quercus sp	R	3.7	7.1	5.6	—			
Ilex opaca	R	3.9	8.5	2.4	—			
Myrica cerifera	R	6.2	5.2	4.9	—			
Ilex opaca	R	9.0	7.2	2.8	—			
Myrica cerifera	R	9.2	3.3	3.9	—			

Source: Transplant, Live stake, Ball and burlap, Pot, Tubling, Bare Root, Mechanically planted, Unknown

Vigor: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=Dead, Missing.

*Height precision drops to 10cm if >2.5m and 50cm if >4m.

Damage: Removal, Cut, Mowing, Beaver, Deer, Rodents, Insects, Game, Livestock, Other/Unknown Animal, Human Trampled, Site Too Wet, Site Too Dry, Flood, Drought, Storm, Hurricane, Diseased, Vine Strangulation, Unknown, specify other.

Natural Woody Stems - tallied by species

Explanation of cut-off & subsampling**:

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): ☐ 10cm ☐ 50cm ☐ 100cm ☐ 137cm

Species Name	☑ c	Seedlings — Height Classes: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Saplings — DBH: Sub-Sapl	0-1 cm	1-2.5	Trees — DBH: 2.5-	5-	≥10 (write DBH)
Clethra alnifolia		—	••	••		—					
L. styraciflua		—	~ ••	~ ••		—					
Myrica cerifera		—	•••			—					
Rhus copalling		—	~ ••	⊓		—					
Quercus sp		—	••			—					
Acer rubrum		—		••		—					
		—				—					

**Required if cut-off >10cm or subsample ≠100%.

Plot Data: C\ Levels 1 & 2

General Information

Project Label:

Project Name: Bishop Rd

Team: RSL KAD

Plot: Gauge 15

☐ Level 1 (planted stems only)
☒ Level 2 (planted and natural stems)

Start Date: 11 / FEB 2005
dd/mmm/yyyy e.g. 15 / JAN / 2007

End Date (if different): / /

Party	Role**
RSL	Plot Leader
KAD	Co-leader

**Roles: Co-leader, Assistant, Guide, Land owner, Taxonomist, Other

Soil Drainage*

☐ Excessively drained
☐ Somewhat excessively drained
☐ Well drained
☐ Moderately well drained
☐ Somewhat poorly drained
☐ Poorly drained
☐ Very poorly drained

Water

Percent of Plot Submerged: <5 %

Mean Water Depth: 5 cm

Location

General: Bishop Rd

State: NC **County:** Hyde

Quadrangle: Ponzer

Place Names: 1) Scranton Creek
2) Jarklin Cr 3) Scranton

EEP Reach: Bishop Rd

Land Owner: NCDOT

⊗ **GPS Receiver Location** (m):
x= 0 y= 0

Coordinate System: ☐ Lat/Long ☐ UTM ☒ State Plane ☐ Other (*specify*):

Coord. Units: ☐ deg. ☐ deg. min. ☐ deg. min. sec. ☐ m ☒ ft ☐

Datum: ☒ NAD83/WGS84 ☐ NAD27

Zone: (if applicable)

Lat: 653798.7895 (or Northing)

Long: 2758533.5572 (or Easting)

Coordinate Accuracy (m radius):
e.g. 30 <1

GPS File Name:

Site Characteristics

Elevation: 5 ± 2 ☐m ☐ft.

Slope (degrees): 0

Aspect (degrees):

Compass Type: ☒ magnetic ☐ true

Plot Placement (check 1 or more)

☒ Representative
☐ Random
☐ Stratified
☐ Transect component
☐ Systematic (grid)
☒ Capture specific feature

Further details of placement can be recorded in Plot Rationale.

Taxonomic Standard Used for Plant Identification

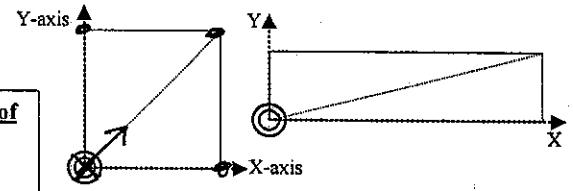
Authority: Radford etal , **Publ. Date:** 1983

Plot Diagram

Fill in *ONE* of the templates below, using the key to draw GPS location, photos and posts. Edit shape if plot doesn't match one of the templates. Draw any landmarks, such as streams, banks, fences, etc.

Standard 10m x 10m (14.142m diagonal):

Non-standard 5m x 20m (20.616m diagonal):



Bearing of Plot X-Axis: 225°

Posts (x,y) (meters)
(0,0)
(0,10)
(10,0)
(10,10)
(,)
(,)

Key
- Plot origin (0,0) point
- GPS location point
- photo taken, with direction
- posts

Plot Size (ares, default=1): 1
(An "are" is 100 m²)

Photo Identifier(s): Across diagonal from origin

Notes

If more space is needed, check the box and use back of datasheets.

Layout: (anything unusual about plot layout and shape)

Gauge 15 at origin

☐ more...

Plot Location: (directions to plot, landscape content)

South of old Mowing Road

☐ more...

Plot Rationale: (why location was chosen for the plot)

Selected by NCEEP

Represents Pine flatwood

☐ more...

Other Notes: (invasive species, erosion, disturbances, etc.)

Recently cleared and planted for restoration

☐ more...

Woody Stem Data: CVS Level 2

Planted Woody Stems - individual stems measured

Leader: RSC Project: Bishop Team: RSC KAD Plot: 19 Date: 11 1FEB 2005

Species Name	Source	Coordinates X (0.1 m)	Coordinates Y (0.1 m)	ddh (1 mm)	Height (1* cm)	DBH (1 cm)	Vigor	Damage
Quercus sp	R	7.5	1.5	7.9	5.4	—	4	—
"	R	9.0	4.2	5.3	56	—	4	—
"	R	6.7	4.0	4.1	43	—	4	—
"	R	5.0	3.3	8.8	35	—	4	—
"	R	4.0	3.8	4.4	54	—	4	—
"	R	0.8	4.4	3.3	40	—	4	—
"	R	3.0	6.8	5.0	56	—	4	—
Myrica cerifera	R	7.0	7.1	4.0	47	—	4	—
Aronia arbutifolia	R	7.2	8.0	2.5	35	—	4	—
Quercus sp	R	2.1	9.6	6.5	63	—	4	—
M. cerifera	R	5.5	9.9	3.8	38	—	4	—
Quercus sp	R	9.7	8.9	5.3	55	—	4	—

Source: Transplant, Live stake, Ball and burlap, Pot, Tubling, Bare Root, Mechanically planted, Unknown

Vigor: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=Dead, Missing.

*Height precision drops to 10cm if >2.5m and 50cm if >4m.

Damage: Removal, Cut, Mowing, Beaver, Deer, Rodents, Insects, Game, Livestock, Other/Unknown Animal, Human Trampled, Site Too Wet, Site Too Dry, Flood, Drought, Storm, Hurricane, Diseased, Vine Strangulation, Unknown, specify other.

Natural Woody Stems - tallied by species

Explanation of cut-off & subsampling**:

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): ☐ 10cm ☐ 50cm ☐ 100cm ☐ 137cm

Species Name	☑ c	Seedlings — Height Classes: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Saplings — DBH: Sub-Sapl	0-1 cm	1-2.5	Trees — DBH: 2.5-	5-	≥10 (write DBH)
Acer rubrum		—	• •	• •		—					
L. styraciflua		—	⊠			—					
Rhus copslings		—	• •	•		—					
Clethra alnifolia		—	•			—					
		—				—					
		—				—					
		—				—					

**Required if cut-off >10cm or subsample ≠100%.

Plot Data: CV Levels 1 & 2

General Information

Project Label:

Project Name: Bishop Rd

Team: RSL KAD

Plot: Gauge #20

☐ Level 1 (planted stems only)
☒ Level 2 (planted and natural stems)

Start Date: 10 / Feb / 2009
dd/mmm/yyyy e.g. 15 / JAN / 2007

End Date (if different): / /

Party	Role**
RSL	Plot Leader
KAD	Asst

**Roles: Co-leader, Assistant, Guide, Land owner, Taxonomist, Other

Soil Drainage*

- ☐ Excessively drained
- ☐ Somewhat excessively drained
- ☐ Well drained
- ☐ Moderately well drained
- ☒ Somewhat poorly drained
- ☐ Poorly drained
- ☐ Very poorly drained

Water

Percent of Plot Submerged: <5 %

Mean Water Depth: 15 cm

Location

General: Bishop Rd

State: NC **County:** County

Quadrangle: Ponzer NC

Place Names: 1) Scranton Creek

2) Tarklin Creek, 3) Scranton

EEP Reach: Bishop Rd

Land Owner: NCDOT

GPS Receiver Location (m): x= 0 y= 0

Coordinate System: ☐ Lat/Long ☐ UTM ☒ State Plane ☐ Other (*specify*): _____

Coord. Units: ☐ deg. ☐ deg. min. ☐ deg. min. sec. ☐ m ☒ ft ☐ _____

Datum: ☒ NAD83/WGS84 ☐ NAD27

Zone: (if applicable)

Lat: 653427.4137 (or Northing)

Long: 2756507.6794 (or Easting)

Coordinate Accuracy (m radius): e.g. 30 <1

GPS File Name:

Site Characteristics

Elevation: 6 ± 2 ☐m ☒ft.

Slope (degrees): 0

Aspect (degrees):

Compass Type: ☒ magnetic ☐ true

Plot Placement (check 1 or more)

- ☒ Representative
- ☒ Random
- ☒ Stratified
- ☐ Transect component
- ☐ Systematic (grid)
- ☒ Capture specific feature

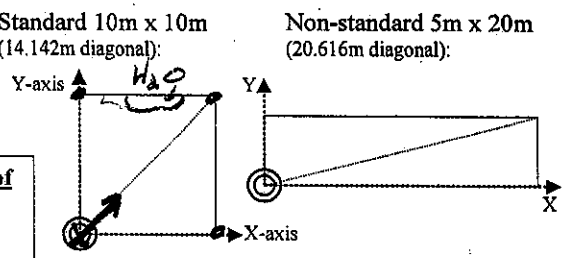
Further details of placement can be recorded in Plot Rationale.

Taxonomic Standard Used for Plant Identification

Authority: Radford et al, **Publ. Date:** 1987

Plot Diagram

Fill in *ONE* of the templates below, using the key to draw GPS location, photos and posts. Edit shape if plot doesn't match one of the templates. Draw any landmarks, such as streams, banks, fences, etc.



●Posts (x,y) (meters)
(0,0)
(0,10)
(10,0)
(10,10)
(,)
(,)

Key
- ◎ Plot origin (0,0) point
- ⊗ GPS location point
- ○→ photo taken, with direction
- ● posts

Bearing of Plot X-Axis: 154 °

Plot Size (ares, default=1): 1 (An "are" is 100 m²)

○→ Photo Identifier(s): Taken across diagonal from origin

Notes

If more space is needed, check the box and use back of datasheets.

Layout: (anything unusual about plot layout and shape)

Water from (4,10) to (10,10)

☐ more...

Plot Location: (directions to plot, landscape content)

Approximately 70m northwest of old cemetery

☐ more...

Plot Rationale: (why location was chosen for the plot)

Selected by NCEEP.
Representative of non riverine pine flatwoods

☐ more...

Other Notes: (invasive species, erosion, disturbances, etc.)

Recently cleared and planted for restoration

☐ more...

Woody Stem Data: CVS Level 2

Planted Woody Stems - individual stems measured

ader: RSL Project: Bishop Road Team: RSL LAD Plot: Guajolo Date: Feb 10 2005

Species Name	Source	Coordinates X (0.1 m)	Coordinates Y (0.1 m)	ddh (1 mm)	Height (1* cm)	DBH (1 cm)	Vigor	Damage
Myrica cerifera	R	8.1	0.0	3.6	25	—	4	—
Quercus sp	R	7.0	2.3	3.9	34	—	4	—
Aronia arbutifolia	R	2.5	2.9	5.5	54	—	4	—
Rosa palustris	R	6.1	4.2	3.1	54	—	4	—
Myrica cerifera	R	10.0	3.0	3.0	21	—	4	—
Rosa palustris	R	9.5	5.0	3.2	47	—	4	—
Quercus sp.	R	5.7	8.5	2.9	33	—	4	—
Quercus sp.	R	8.3	4.9	3.2	33	—	4	—
Rosa palustris	R	5.0	6.3	4.1	48	—	4	—
Myrica cerifera	R	4.4	5.5	3.9	38	—	4	—
Aronia arbutifolia	R	3.9	6.6	4.8	38	—	4	—
Quercus phellos	R	0.7	4.6	4.8	54	—	4	—
Quercus phellos	R	0.9	9.4	3.5	35	—	4	—
Rosa palustris	R	3.5	9.4	3.3	62	—	4	—

Source: Transplant, Live stake, Ball and burlap, Pot, Tubling, Bare Root, Mechanically planted, Unknown

Vigor: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=Dead, Missing.

*Height precision drops to 10cm if >2.5m and 50cm if >4m.

Damage: Removal, Cut, Mowing, Beaver, Deer, Rodents, Insects, Game, Livestock, Other/Unknown Animal, Human Trampled, Site Too Wet, Site Too Dry, Flood, Drought, Storm, Hurricane, Diseased, Vine Strangulation, Unknown, specify other.

Natural Woody Stems - tallied by species

Explanation of cut-off & subsampling**:

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): ☐ 10cm ☐ 50cm ☐ 100cm ☐ 137cm

Species Name	☑ c	SEEDLINGS — HEIGHT CLASSES: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	SAPLINGS — DBH: Sub-Sapl	0-1 cm	1-2.5	TREES — DBH: 2.5-	5-	≥10 (write DBH)
Rhus copelline		—	•••	••		—					
Myrica cerifera		—		•		—					
Acer rubrum		—		•		—					
Baccharis		—	•			—					
Liquidamber styraciflua		—		•		—					
		—				—					
		—				—					

**Required if cut-off >10cm or subsample ≠100%.

Plot Data: C\ Levels 1 & 2

General Information

Project Label:

Project Name: Bishop Rd

Team: RSL KAD

Plot: ~~1~~ 21

☐ Level 1 (planted stems only)
☑ Level 2 (planted and natural stems)

Start Date: 11 / FEB / 2005
dd/mmm/yyyy e.g. 15 / JAN / 2007

End Date (if different): / /

Party	Role**
RSL	Plot Leader
KAD	Co-leader

**Roles: Co-leader, Assistant, Guide, Land owner, Taxonomist, Other

Soil Drainage*

- ☐ Excessively drained
- ☐ Somewhat excessively drained
- ☐ Well drained
- ☐ Moderately well drained
- ☐ Somewhat poorly drained
- ☐ Poorly drained
- ☐ Very poorly drained

Water

Percent of Plot Submerged: 10 %

Mean Water Depth: 5 cm

Location

General: Bishop Rd

State: NC County: Hyde

Quadrangle: Ponzer

Place Names: 1) Scranton Creek

2) Turkle Creek 3) Scranton

EEP Reach: Bishop Rd

Land Owner: NCDOT

⊗ **GPS Receiver Location** (m): x= 0 y= 0

Coordinate System: ☐ Lat/Long ☐ UTM ☒ State Plane ☐ Other (*specify*):

Coord. Units: ☐ deg. ☐ deg. min. ☐ deg. min. sec. ☐ m ☒ ft ☐ ____

Datum: ☒ NAD83/WGS84 ☐ NAD27

Zone: (if applicable)

Lat: 651533.5329 (or Northing)

Long: 2754822.2283 (or Easting)

Coordinate Accuracy (m radius): e.g. 30 <1

GPS File Name:

Site Characteristics

Elevation: 5 ± 2 ☐m ☒ft.

Slope (degrees): 0

Aspect (degrees):

Compass Type: ☒ magnetic ☐ true

Plot Placement (check 1 or more)

- ☒ Representative
- ☒ Random
- ☒ Stratified
- ☐ Transect component
- ☐ Systematic (grid)
- ☒ Capture specific feature

Further details of placement can be recorded in Plot Rationale.

Taxonomic Standard Used for Plant Identification

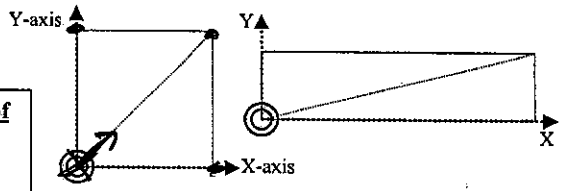
Authority: Radford et al., **Publ. Date:** 1968

Plot Diagram

Fill in *ONE* of the templates below, using the key to draw GPS location, photos and posts. Edit shape if plot doesn't match one of the templates. Draw any landmarks, such as streams, banks, fences, etc.

Standard 10m x 10m (14.142m diagonal):

Non-standard 5m x 20m (20.616m diagonal):



Bearing of Plot X-Axis: 334°

●Posts (x,y) (meters)
(0,0)
(0,10)
(10,0)
(10,10)
(,)
(,)

Key

- ◎ Plot origin (0,0) point
- ⊗ GPS location point
- ○→ photo taken, with direction
- ● posts

Plot Size (ares, default=1): (An "are" is 100 m²) 1

○→ Photo Identifier(s): Across diagonal from origin

Notes

If more space is needed, check the box and use back of datasheets.

Layout: (anything unusual about plot layout and shape)

Gauge #21 at origin

☐ more...

Plot Location: (directions to plot, landscape content)

West end of old Morgal Road

☐ more...

Plot Rationale: (why location was chosen for the plot)

Selected by NCBEP
Represents pine flatwood

☐ more...

Other Notes: (invasive species, erosion, disturbances, etc.)

Recently cleared and planted for restoration
Stake at (10,10) is wooden stake

☐ more...

Woody Stem Data: CVS Level 2

Planted Woody Stems - individual stems measured

Leader: RSL Project: Bishop Team: RSL KAD Plot: 21 Date: 2/11/09

Species Name	Source	Coordinates X (0.1 m)	Coordinates Y (0.1 m)	ddh (1 mm)	Height (1* cm)	DBH (1 cm)	Vigor	Damage
Quercus sp	R	2.0	1.8	6.5	52	—	4	—
Rosa palustris	R	4.5	2.9	2.0	43	—	4	—
Quercus sp	R	5.7	1.9	2.1	25	—	4	—
"	R	8.4	2.6	3.6	37	—	4	—
"	R	8.1	4.7	4.5	60	—	4	—
"	R	7.4	9.2	4.6	58	—	4	—
"	R	4.3	7.8	4.7	48	—	4	—
Sambucus canadensis	R	5.7	5.9	4.9	34	—	4	—
"	R	2.7	8.1	4.1	17	—	4	—
Myrica cerifera	R	1.2	5.5	3.8	38	—	4	—
Sambucus canadensis	R	0.6	3.4	4.7	43	—	4	—

Source: Transplant, Live stake, Ball and burlap, Pot, Tubling, Bare Root, Mechanically planted, Unknown

Vigor: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=Dead, Missing.

*Height precision drops to 10cm if >2.5m and 50cm if >4m.

Damage: Removal, Cut, Mowing, Beaver, Deer, Rodents, Insects, Game, Livestock, Other/Unknown Animal, Human Trampled, Site Too Wet, Site Too Dry, Flood, Drought, Storm, Hurricane, Diseased, Vine Strangulation, Unknown, specify other.

Natural Woody Stems - tallied by species

Explanation of cut-off & subsampling**:

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): ☐ 10cm ☐ 50cm ☐ 100cm ☐ 137cm

Species Name	☑ c	Seedlings — Height Classes: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Saplings — DBH: Sub-Sapl	0-1 cm	1-2.5	Trees — DBH: 2.5-	5-	≥10 (write DBH)
L. styraciflua		—				—					
		—				—					
		—				—					
		—				—					
		—				—					
		—				—					
		—				—					

**Required if cut-off >10cm or subsample ≠100%.

Plot Data: C\ Levels 1 & 2

General Information

Project Label:

Project Name: Bishop Rd

Team: KAD, ISD

Plot: 22

☐ Level 1 (planted stems only)
☒ Level 2 (planted and natural stems)

Start Date: 12 / Feb / 2005
dd/mmm/yyyy e.g. 15 / JAN / 2007

End Date (if different): / /

Party	Role**
KAD	Plot Leader
ISD	Asst

**Roles: Co-leader, Assistant, Guide, Land owner, Taxonomist, Other

Soil Drainage*

☐ Excessively drained
☐ Somewhat excessively drained
☐ Well drained
☐ Moderately well drained
☐ Somewhat poorly drained
☐ Poorly drained
☐ Very poorly drained

Water

Percent of Plot Submerged: 0 %

Mean Water Depth: — cm

Location

General: Bishop Rd

State: NC **County:** Hyde

Quadrangle: Ponzer

Place Names: 1) Scranton Cr

2) Terkle Cr 3) Scranton

EEP Reach: Bishop

Land Owner: NCDOT

⊗ **GPS Receiver Location** (m): x= 0 y= 0

Coordinate System: ☐ Lat/Long ☐ UTM ☒ State Plane ☐ Other (*specify*):

Coord. Units: ☐ deg. ☐ deg. min. ☐ deg. min. sec. ☐ m ☒ ft ☐

Datum: ☒ NAD83/WGS84 ☐ NAD27

Zone: (if applicable)

Lat: 646645.7835 (or Northing)

Long: 2759606.9999 (or Easting)

Coordinate Accuracy (m radius): e.g. 30 <1

GPS File Name:

Site Characteristics

Elevation: 3 ± ☐m ☐ft.

Slope (degrees): 0

Aspect (degrees):

Compass Type: ☒ magnetic ☐ true

Plot Placement (check 1 or more)

☒ Representative
☒ Random
☒ Stratified
☐ Transect component
☐ Systematic (grid)
☒ Capture specific feature

Further details of placement can be recorded in Plot Rationale.

Taxonomic Standard Used for Plant Identification

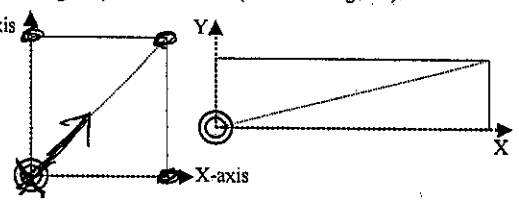
Authority: Kartesz et al, **Publ. Date:** (98)

Plot Diagram

Fill in *ONE* of the templates below, using the key to draw GPS location, photos and posts. Edit shape if plot doesn't match one of the templates. Draw any landmarks, such as streams, banks, fences, etc.

Standard 10m x 10m (14.142m diagonal):

Non-standard 5m x 20m (20.616m diagonal):



Bearing of Plot X-Axis: 303°

●Posts (x,y) (meters)
(0,0)
(0,10)
(10,0)
(10,10)
(,)
(,)

Key
- ◎ Plot origin (0,0) point
- ⊗ GPS location point
- ○→ photo taken, with direction
- ● posts

Plot Size (ares, default=1): (An "are" is 100 m²)

○→ Photo Identifier(s):

Notes

If more space is needed, check the box and use back of datasheets.

Layout: (anything unusual about plot layout and shape)

Gauge dd at origin

☐ more...

Plot Location: (directions to plot, landscape content)

West of southern portion of old Bishop Rd

☐ more...

Plot Rationale: (why location was chosen for the plot)

Selected by NCEEP
Represents Pine flatwoods

☐ more...

Other Notes: (invasive species, erosion, disturbances, etc.)

Recently cleared and planted for restoration

☐ more...

Woody Stem Data: CVS Level 2

Planted Woody Stems - individual stems measured

Leader: KAD Project: Bishop Team: KAD ISD Plot: 22 Date: 2/12/05

Species Name	Source	Coordinates X (0.1 m)	Coordinates Y (0.1 m)	ddh (1 mm)	Height (1* cm)	DBH (1 cm)	Vigor	Damage
Baccharis halimifolia	R	2.1	7.3	4.7	52	—	2	unknown
"	R	2.7	7.5	2.4	27	—	4	—
"	R	4.4	8.4	9.0	64	—	4	—
Quercus sp	R	5.4	8.4	4.1	46	—	4	—
B. halimifolia	R	9.0	7.4	7.6	74	—	4	—
"	R	5.8	5.6	8.9	54	—	4	—
"	R	2.3	1.2	8.4	72	—	4	—
"	R	2.6	0.7	7.0	43	—	4	—
Quercus sp	R	2.9	0.6	6.4	50	—	4	—
B. halimifolia	R	8.1	2.1	4.9	34	—	4	—
"	R	9.9	0.7	7.7	50	—	4	—

Source: Transplant, Live stake, Ball and burlap, Pot, Tubling, Bare Root, Mechanically planted, Unknown

Vigor: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=Dead, Missing.

*Height precision drops to 10cm if >2.5m and 50cm if >4m.

Damage: Removal, Cut, Mowing, Beaver, Deer, Rodents, Insects, Game, Livestock, Other/Unknown Animal, Human Trampled, Site Too Wet, Site Too Dry, Flood, Drought, Storm, Hurricane, Diseased, Vine Strangulation, Unknown, specify other.

Natural Woody Stems - tallied by species

Explanation of cut-off & subsampling**:

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): ☐ 10cm ☐ 50cm ☐ 100cm ☐ 137cm

Species Name	☑ c	Seedlings — Height Classes: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Saplings — DBH: Sub-Sapl	0-1 cm	1-2.5	Trees — DBH: 2.5-	5-	≥10 (write DBH)
B. halimifolia		—	☒			—					
Rhus copalling		—	•			—					
Acer rubrum		—	☒ •			—					
		—				—					
		—				—					
		—				—					

**Required if cut-off >10cm or subsample ≠100%.

Plot Data: C\ Levels 1 & 2

General Information

Project Label:

Project Name: Bishop Rd

Team: RSL KAD

Plot: Gauge #23

☐ Level 1 (planted stems only)
☒ Level 2 (planted and natural stems)

Start Date: 11 / Feb / 2009
dd/mmm/yyyy e.g. 15 / JAN / 2007

End Date (if different): / /

Party	Role**
RSL	Plot Leader
KAD	Co-leader

**Roles: Co-leader, Assistant, Guide, Land owner, Taxonomist, Other

Soil Drainage*

- ☐ Excessively drained
- ☐ Somewhat excessively drained
- ☐ Well drained
- ☐ Moderately well drained
- ☒ Somewhat poorly drained
- ☐ Poorly drained
- ☐ Very poorly drained

Water

Percent of Plot Submerged: <5 %

Mean Water Depth: >10 cm

Location

General: Bishop Rd

State: NC County: Hyde

Quadrangle: Ponzer

Place Names: 1) Swanton Cr

2) Tarklin Cr 3) Swanton

EEP Reach:

Land Owner: NCDOT

⊗ **GPS Receiver Location** (m):
x= 0 y= 0

Coordinate System: ☐ Lat/Long ☐ UTM ☒ State Plane ☐ Other (*specify*):

Coord. Units: ☐ deg. ☐ deg. min. ☐ deg. min. sec. ☐ m ☒ ft ☐

Datum: ☒ NAD83/WGS84 ☐ NAD27

Zone: (if applicable)

Lat: 655094.7736 (or Northing)

Long: 2760114.2297 (or Easting)

Coordinate Accuracy (m radius):
e.g. 30 <1

GPS File Name:

Site Characteristics

Elevation: 5 ± ☐m ☒ft.

Slope (degrees): 0

Aspect (degrees):

Compass Type: ☒ magnetic ☐ true

Plot Placement (check 1 or more)

- ☒ Representative
- ☐ Random
- ☐ Stratified
- ☐ Transect component
- ☐ Systematic (grid)
- ☒ Capture specific feature

Further details of placement can be recorded in Plot Rationale.

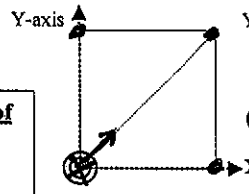
Taxonomic Standard Used for Plant Identification

Authority: Redford et al , **Publ. Date:** 1582

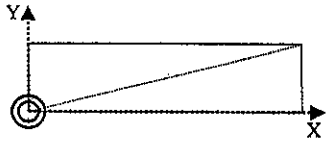
Plot Diagram

Fill in *ONE* of the templates below, using the key to draw GPS location, photos and posts. Edit shape if plot doesn't match one of the templates. Draw any landmarks, such as streams, banks, fences, etc.

Standard 10m x 10m (14.142m diagonal):



Non-standard 5m x 20m (20.616m diagonal):



Bearing of Plot X-Axis: 47°

●Posts (x,y) (meters)
(0, 0)
(0, 10)
(10, 0)
(10, 10)
(,)
(,)

Key

- ◎ Plot origin (0,0) point
- ⊗ GPS location point
- ○→ photo taken, with direction
- ● posts

Plot Size (ares, default=1): 1
(An "are" is 100 m²)

○→ Photo Identifier(s): Across diagonal from origin

Notes

If more space is needed, check the box and use back of datasheets.

Layout: (anything unusual about plot layout and shape)

Roughly center of old service road

☐ more...

Plot Location: (directions to plot, landscape content)

old service road off of 264

☐ more...

Plot Rationale: (why location was chosen for the plot)

Selected by NCEEP

Representative of Riverine Forested wetland

☐ more...

Other Notes: (invasive species, erosion, disturbances, etc.)

Recently cleared and planted for restoration

☐ more...

Woody Stem Data: CVS Level 2

Planted Woody Stems - individual stems measured

Leader: RSL Project: Bishop Rd Team: RSL KAD Plot: Grid 23 Date: 11/Feb/2005

Species Name	Source	Coordinates X (0.1 m)	Coordinates Y (0.1 m)	ddh (1 mm)	Height (1* cm)	DBH (1 cm)	Vigor	Damage
Quercus sp	R	1.0	0.8	7.0	47	—	4	
Myrica cerifera	R	1.3	2.1	4.0	35	—	4	
Nyssa aquatica	R	2.1	5.4	6.8	37	—	4	
Myrica cerifera	R	0.0	8.8	4.9	48	—	4	
Rosa palustris	R	2.9	9.4	5.2	69	—	4	
Rosa palustris	R	5.3	9.5	4.4	22	—	2	unkn - broken off
Quercus sp	R	4.9	8.2	4.8	53	—	4	
Myrica cerifera	R	5.1	6.9	2.8	31	—	4	
Quercus sp	R	6.3	7.0	5.6	52	—	4	
Myrica cerifera	R	7.4	7.6	9.2	51	—	4	
Quercus sp	R	9.1	9.9	6.2	55	—	4	
Nyssa aquatica	R	9.8	8.9	6.1	45	—	4	
Myrica cerifera	R	8.1	4.5	3.0	30	—	4	
Unknown	R	8.8	3.0	2.5	29	—	4	
Myrica cerifera	R	6.4	1.8	3.5	32	—	4	
Myrica cerifera	R	4.3	3.2	5.5	45	—	4	
Alnus serrulata	R	4.2	0.8	3.8	27	—	4	
Quercus sp	R	3.1	2.4	6.9	59	—	4	
Quercus phellos	R	2.0	4.3	6.2	51	—	4	

Source: Transplant, Live stake, Ball and burlap, Pot, Tubling, Bare Root, Mechanically planted, Unknown

Vigor: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=Dead, Missing.

*Height precision drops to 10cm if >2.5m and 50cm if >4m.

Damage: Removal, Cut, Mowing, Beaver, Deer, Rodents, Insects, Game, Livestock, Other/Unknown Animal, Human Trampled, Site Too Wet, Site Too Dry, Flood, Drought, Storm, Hurricane, Diseased, Vine Strangulation, Unknown, specify other.

Natural Woody Stems - tallied by species

Explanation of cut-off & subsampling**:

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): ☐ 10cm ☐ 50cm ☐ 100cm ☐ 137cm

Species Name	☑ c	Seedlings — Height Classes: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Saplings — DBH: Sub-Sapl	0-1 cm	1-2.5	Trees — DBH: 2.5-	5-	≥10 (write DBH)

**Required if cut-off >10cm or subsample ≠100%.

Plot Data: C\ Levels 1 & 2

General Information

Project Label:

Project Name: Bishop Rd

Team: RSL KAD

Plot: 24

☐ Level 1 (planted stems only)
☒ Level 2 (planted and natural stems)

Start Date: 11 / FEB / 2005
dd/mmm/yyyy e.g. 15 / JAN / 2007

End Date (if different): / /

Party	Role**
RSL	Plot Leader
KAD	Co-leader

**Roles: Co-leader, Assistant, Guide, Land owner, Taxonomist, Other

Soil Drainage*

- ☐ Excessively drained
- ☐ Somewhat excessively drained
- ☐ Well drained
- ☐ Moderately well drained
- ☐ Somewhat poorly drained
- ☐ Poorly drained
- ☐ Very poorly drained

Water

Percent of Plot Submerged: 30 %

Mean Water Depth: 10 cm

Location

General: Bishop Rd

State: NC **County:** Hyde

Quadrangle: Ponzer

Place Names: 1) Scranton Creek
2) Terklin Cr 3) Scranton

EEP Reach: Bishop Rd

Land Owner: NCDOT

⊗ **GPS Receiver Location** (m):
x= 0 y= 0

Coordinate System: ☐ Lat/Long ☐ UTM ☒ State Plane ☐ Other (*specify*):

Coord. Units: ☐ deg. ☐ deg. min. ☐ deg. min. sec. ☐ m ☒ ft ☐

Datum: ☒ NAD83/WGS84 ☐ NAD27

Zone: (if applicable)

Lat: 654291.5904 (or Northing)

Long: 2756385.7769 (or Easting)

Coordinate Accuracy (m radius):
e.g. 30 < 1

GPS File Name:

Site Characteristics

Elevation: 5 ± 1 ☐m ☒ft.

Slope (degrees): 0

Aspect (degrees):

Compass Type: ☒ magnetic ☐ true

Plot Placement (check 1 or more)

- ☒ Representative
- ☒ Random
- ☒ Stratified
- ☐ Transect component
- ☐ Systematic (grid)
- ☒ Capture specific feature

Further details of placement can be recorded in Plot Rationale.

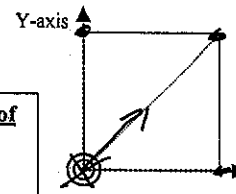
Taxonomic Standard Used for Plant Identification

Authority: Radford et al, **Publ. Date:** 1987

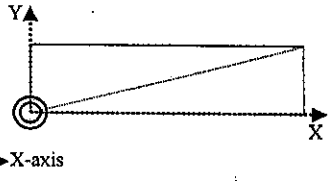
Plot Diagram

Fill in *ONE* of the templates below, using the key to draw GPS location, photos and posts. Edit shape if plot doesn't match one of the templates. Draw any landmarks, such as streams, banks, fences, etc.

Standard 10m x 10m (14.142m diagonal):



Non-standard 5m x 20m (20.616m diagonal):



Bearing of Plot X-Axis: 64°

●Posts (x,y) (meters)
(0, 0)
(0, 10)
(10, 0)
(10, 10)
(,)
(,)

Key
- ◎ Plot origin (0,0) point
- ⊗ GPS location point
- ○→ photo taken, with direction
- ● posts

Plot Size (ares, default=1): 1
(An "are" is 100 m²)

○→ Photo Identifier(s): Across diagonal from origin

Notes

If more space is needed, check the box and use back of datasheets.

Layout: (anything unusual about plot layout and shape)

gauge rod located at origin

☐ more...

Plot Location: (directions to plot, landscape content)

Northern end of Bishop Road at edge of Marsh

☐ more...

Plot Rationale: (why location was chosen for the plot)

Selected by NCEEP
Represents coastal marsh

☐ more...

Other Notes: (invasive species, erosion, disturbances, etc.)

recently cleared and planted for restoration

☐ more...

Woody Stem Data: CVS Level 2

Planted Woody Stems - individual stems measured

Leader: RSL Project: Bishop Team: RSL KAD Plot: 24 Date: 2/11/09

Species Name	Source	Coordinates X (0.1 m)	Coordinates Y (0.1 m)	ddh (1 mm)	Height (1* cm)	DBH (1 cm)	Vigor	Damage
Rosa palustris	R	2.0	7.0	3.8	69	—	4	—
"	R	2.0	2.0	4.6	105	—	4	—
"	R	6.3	7.0	5.2	106	—	4	—
"	R	8.0	5.3	2.8	66	—	4	—
"	R	10.0	6.5	3.3	62	—	4	—
"	R	8.0	9.2	2.6	46	—	4	—
"	R	6.3	4.0	3.7	63	—	4	—
"	R	10.0	3.5	2.4	60	—	4	—
"	R	6.3	1.9	2.7	66	—	4	—
Hibiscus moscheutos	R	1.2	5.2	2.3	32	—	4	—

Source: Transplant, Live stake, Ball and burlap, Pot, Tubling, Bare Root, Mechanically planted, Unknown

Vigor: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=Dead, Missing.

*Height precision drops to 10cm if >2.5m and 50cm if >4m.

Damage: Removal, Cut, Mowing, Beaver, Deer, Rodents, Insects, Game, Livestock, Other/Unknown Animal, Human Trampled, Site Too Wet, Site Too Dry, Flood, Drought, Storm, Hurricane, Diseased, Vine Strangulation, Unknown, specify other.

Natural Woody Stems - tallied by species

Explanation of cut-off & subsampling**:

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.): ☐ 10cm ☐ 50cm ☐ 100cm ☐ 137cm

Species Name	☑ c	Seedlings — Height Classes: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Saplings — DBH: Sub-Sapl	0-1 cm	1-2.5	Trees — DBH: 2.5-	5-	≥10 (write DBH)

**Required if cut-off >10cm or subsample ≠100%.

Plot Data: C\ Levels 1 & 2

General Information

Project Label:

Project Name: Bishop Rd

Team: RSL KAD

Plot: d5

☐ Level 1 (planted stems only)
☒ Level 2 (planted and natural stems)

Start Date: 12 / Feb / 2009
dd/mmm/yyyy e.g. 15 / JAN / 2007

End Date (if different): / /

Party	Role**
KAD	Plot Leader
ISO	Asst

**Roles: Co-leader, Assistant, Guide, Land owner, Taxonomist, Other

Soil Drainage*

- ☐ Excessively drained
- ☐ Somewhat excessively drained
- ☐ Well drained
- ☐ Moderately well drained
- ☐ Somewhat poorly drained
- ☐ Poorly drained
- ☐ Very poorly drained

Water

Percent of Plot Submerged: 100 %

Mean Water Depth: 20 cm

Location

General: Bishop Road

State: NC County: Hyde

Quadrangle: Ponzer

Place Names: 1) Scranton Creek

2) Tarklin Cr. 3) Scranton

EEP Reach: Bishop

Land Owner: NCDOT

⊗ **GPS Receiver Location** (m):
x= 0 y= 0

Coordinate System: ☐ Lat/Long ☐ UTM ☒ State Plane ☐ Other (*specify*):

Coord. Units: ☐ deg. ☐ deg. min. ☐ deg. min. sec. ☐ m ☒ ft ☐

Datum: ☒ NAD83/WGS84 ☐ NAD27

Zone: (if applicable)

Lat: 650114.3159 (or Northing)

Long: 2757337.8286 (or Easting)

Coordinate Accuracy (m radius):
e.g. 30 < 1

GPS File Name:

Site Characteristics

Elevation: 2 ± ☐m ☒ft.

Slope (degrees): 0

Aspect (degrees):

Compass Type: ☒ magnetic ☐ true

Plot Placement (check 1 or more)

- ☒ Representative
- ☒ Random
- ☒ Stratified
- ☐ Transect component
- ☐ Systematic (grid)
- ☒ Capture specific feature

Further details of placement can be recorded in Plot Rationale.

Taxonomic Standard Used for Plant Identification

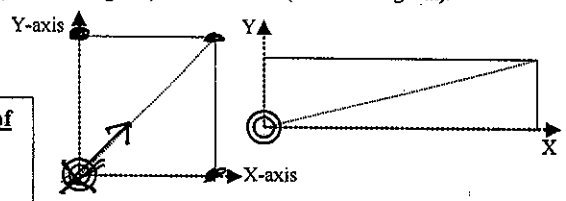
Authority: Radford et al., **Publ. Date:** 1968

Plot Diagram

Fill in *ONE* of the templates below, using the key to draw GPS location, photos and posts. Edit shape if plot doesn't match one of the templates. Draw any landmarks, such as streams, banks, fences, etc.

Standard 10m x 10m (14.142m diagonal):

Non-standard 5m x 20m (20.616m diagonal):



Bearing of Plot X-Axis: 55°

●Posts (x,y) (meters)
(0,0)
(0,10)
(10,0)
(10,10)
(,)
(,)

Key
- ◎ Plot origin (0,0) point
- ⊗ GPS location point
- ○→ photo taken, with direction
- ● posts

Plot Size (ares, default=1): 1
(An "are" is 100 m²)

○→ Photo Identifier(s): across diagonal from origin

Notes

If more space is needed, check the box and use back of datasheets.

Layout: (anything unusual about plot layout and shape)

Gage d5 located at origin

☐ more...

Plot Location: (directions to plot, landscape content)

West end of Silverthorne Rd

☐ more...

Plot Rationale: (why location was chosen for the plot)

Selected by NCEEP

Represents coastal marsh

☐ more...

Other Notes: (invasive species, erosion, disturbances, etc.)

Recently cleared and planted for restoration.

☐ more...

Planted Woody Stem Data: CVS Level 1

Leader: KAD Project: Bishop Team: KAD RSD Plot: d5 Date: 2/12/05 Page __ of __

Species Name	Source	Coordinates X (0.1 m)	Coordinates Y (0.1 m)	ddh (1 mm)	Height (1* cm)	DBH (1 cm)	Vigor	Damage
Rosa rubiginosa	R	0.6	5.7	1.4	53	—	4	—
"	R	1.0	7.5	3.1	58	—	4	—
"	R	4.3	8.1	2.9	75	—	4	—
"	R	4.7	6.4	4.9	93	—	4	—
"	R	3.3	3.9	2.2	67	—	4	—
"	R	4.0	1.8	2.1	51	—	4	—
"	R	8.0	2.8	2.4	69	—	4	—
Rosa rubiginosa	R	7.4	6.2	3.1	77	—	4	—

Source: Transplant, Live stake, Ball and burlap, Pot, Tubling, Bare Root, Mechanically planted, Unknown

Vigor: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=Dead, Missing.

Damage: Removal, Cut, Mowing, Beaver, Deer, Rodents, Insects, Game, Livestock, Other/Unknown Animal, Human Trampled, Site Too Wet, Site Too Dry, Flood, Drought, Storm, Hurricane, Diseased, Vine Strangulation, Unknown, specify other.

*Height precision drops to 10cm if >2.5m and 50cm if >4m.

Appendix E

DCM Acceptance

From: Trowell, Steve
Sent: Tuesday, May 26, 2009 9:49 AM
To: Kemp, Jessica; Steve Trowell
Cc: Schaffer, Jeff
Subject: RE: Bishop Road: As-Built elevations

Jessica:

It appears from the survey data that the restored elevations are within acceptable ranges that should promote the reestablishment of the marsh. My onsite observations of the elevation at Silverthorne, the smaller of the two sites, was to low and appeared to be ponding water but too low is better than too high.

Steve Trowell
Division of Coastal Management
Coastal Management Representative
943 Washington Sq Mall
Washington, NC 27889
252-948-3854 - Office
252-948-0478 - Fax

From: Kemp, Jessica [mailto:jessica.kemp@ncdenr.gov]
Sent: Wednesday, May 20, 2009 3:28 PM
To: Steve Trowell
Cc: Schaffer, Jeff
Subject: FW: Bishop Road: As-Built elevations

Hi Steve,
Just wondering if you've had time to look these final elevations over. The contractor has completed their work on the As-Builts and I expect their final invoice to be submitted for review next week.

I will be out of the office May 25th-June4th. If you have any questions, please call Jeff Schaffer at 919-715-1952.

Thanks,
Jessica

Jessica Kemp
Eastern Project Manager
DENR, Ecosystem Enhancement Program (www.nceep.net)
Mailing: 1652 Mail Service Center, Raleigh, NC 27699-1652
Physical: 2728 Capital Blvd., Suite 1H 103, Raleigh, NC 27604
Office: (919) 715-5838 Cell: (919) 215-7300 Fax: (919) 715-2001

PLEASE NOTE MY NEW EMAIL ADDRESS: Jessica.Kemp@ncdenr.gov

E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.

From: Kemp, Jessica
Sent: Friday, May 08, 2009 3:05 PM
To: 'Steve Trowell'
Cc: Schaffer, Jeff
Subject: Bishop Road: As-Built elevations

Hi Steve,
I got the revised As-builts in today for Bishop Road. I've attached a few excerpts that show the Silverthorne marsh restoration areas for your review. Let me know if you need anything else.

Thanks,
Jessica

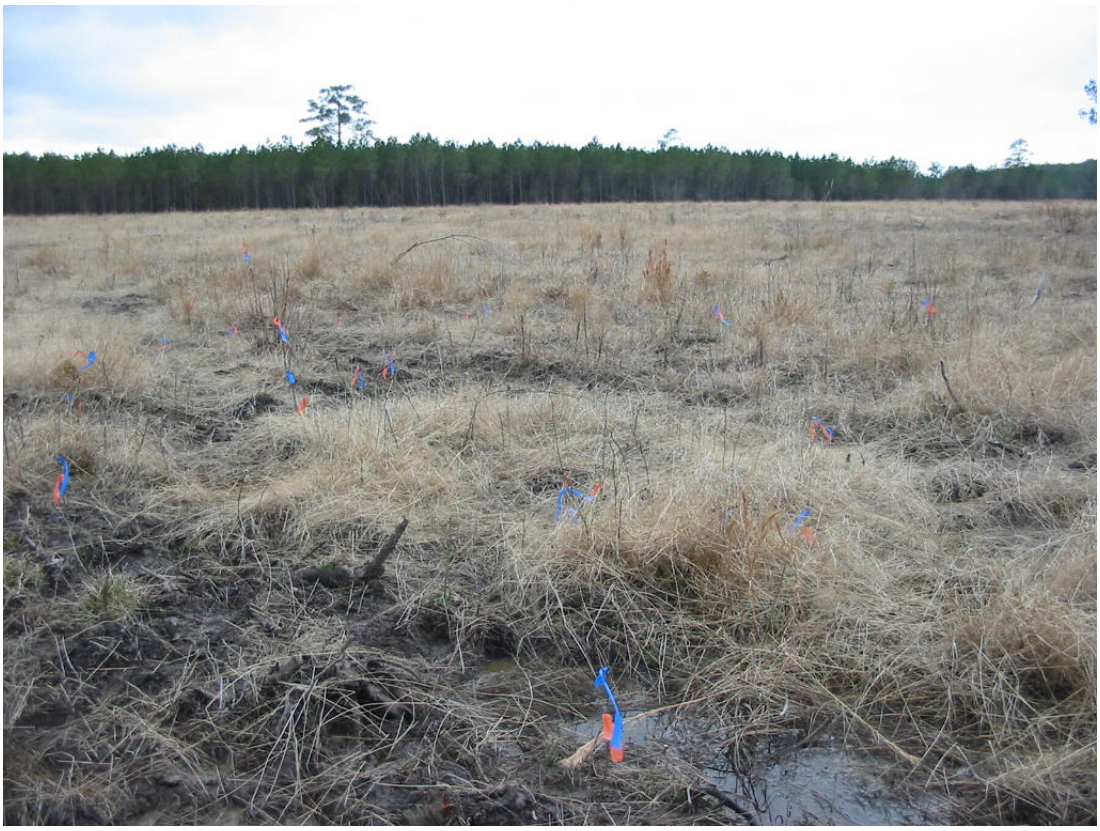
Jessica Kemp
Eastern Project Manager
DENR, Ecosystem Enhancement Program (www.nceep.net)
Mailing: 1652 Mail Service Center, Raleigh, NC 27699-1652
Physical: 2728 Capital Blvd., Suite 1H 103, Raleigh, NC 27604
Office: (919) 715-5838 Cell: (919) 215-7300 Fax: (919) 715-2001

PLEASE NOTE MY NEW EMAIL ADDRESS: Jessica.Kemp@ncdenr.gov

E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.

Appendix F

Vegetation Plot Photographs



Plot # 17 looking southwest 11 February 2009 Baseline

Plot # 18 looking northwest 11 February 2009 Baseline

Plot # 19 looking southwest 11 February 2009 Baseline

Plot # 20 looking east 10 February 2009 Baseline

Plot # 21 looking west 11 February 2009 Baseline

Plot # 22 looking west 12 February 2009 Baseline

Plot # 23 looking north 11 February 2009 Baseline

Plot # 24 looking north 11 February 2009 Baseline

Plot # 25 looking north 12 February 2009 Baseline