March 13, 2012

Regulatory Division

Action ID No. 2008-00252

Mr. Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

Reference the Department of the Army individual permit (IP) issued to you on July 21, 2008, for the U.S. Highway 70 Goldsboro Bypass project (R-2554), from Aulander Road (SR 1381) west of Goldsboro, in Wayne County and ending east of Promise Land Road (SR 1323) southwest of LaGrange, in Lenoir County. This office received a permit modification request dated January 10, 2012, addressing the proposed construction of Section A, from west of NC581 to NCSR 1300 (Salem Church Rd.) in Wayne County.

An unintentional omission in the original 2008 IP application revealed the section break between the A Section and the BA Section being moved to the east. Due to changes in the contour and elevation file since 2008, there have been increases in impacts to some of the sites.
Permit Site VII (on the wetland/stream drawings) has been updated (now in the A Section), as well as some of the other sites.

The proposed modification will result in 3.99 acres of permanent wetland impacts (3.59 acres riparian & 0.40 non-riparian). These impacts represent an increase in jurisdictional impacts presented in the original IP by the following amounts: 1.7 acres of riparian wetland impacts and 0.02 acre of non-riparian impacts. The project will temporarily impact 0.31 acre of wetlands. There will also be 0.31 acre of hand clearing in wetlands and 165 linear feet of temporary stream impacts. The proposed modification will also result in 2,202 linear feet of permanent stream impacts, an increase of 1253 linear feet from the original permit.

There will be no jurisdictional impacts due to utility relocations on this project. The power lines, telephone lines and cable TV will be relocated jointly to the left side of US 70 on proposed poles and existing poles in wetlands. Most of the existing water lines will be relocated along the length of the project with installation in wetland areas being performed by trenchless methods.

This modification request was discussed and coordinated with the appropriate State and Federal

agencies at previous Merger 01 concurrence meetings and the coordination revealed no objections to this modification request. Therefore, the permit is hereby modified in accordance with the specific work activities described above and in the enclosed plans.

It is understood that all conditions of the original permit and applicable modifications remain valid. In addition, the permittee will comply with the additional special permit conditions as follows:

a.) All work authorized by this permit modification must be performed in strict compliance with the submitted work plans, which are part of this permit. Any modification to the permit plans must be approved by US Army Corps of Engineers (Corps) prior to implementation.

b.) The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit, and any authorized modifications. A copy of this permit, and any authorized modifications, including all conditions, shall be available at the project site during construction and maintenance of this project.

c.) Under the previous permit, compensatory mitigation was provided for the following impacts on the entire R-2554 project: 16.32 acres of riparian wetlands, 11.3 acres of non-riparian wetlands, and 13,153 feet of stream. Increased stream and wetland impacts will be mitigated through the use of assets in the NCDOT Debit Ledger, and onsite mitigation via natural stream design (NSD). The permittee shall comply with the on-site wetland and stream mitigation plans submitted with the original application dated march 28, 2008 and this modification request on January 10, 2012. The following tables represent the mitigation proposed by NCDOT:

Table 1. Wetland Mitigation (ac.)

Section	Restoration	Preservation (5:1)	Total Credits Proposed
R-2554BA Tommy's Rd. (site 8)	0.11	2.37	0.58
R-2554C Bear Creek (site 12)*	26.84		26.84
Jeffrey's Warehouse	0.21	8.61	1.9
Totals	27.16	10.98	29.36

*Bear Creek is the Mill Branch Mitigation Bank

Table 2. Stream Mitigation (l.ft.)

Section	Restoration	Preservation (5:1)	Total Credits Proposed
R-2554A Claridge Nursery	10,397		10,397
R-2554A NSD Site VII	544		544
R-2554BA NSD Site 4	1,083		1,083
R-2554BA NSD Site 5	561		561

R-2554BA Tommys Rd. (site 8)	61	691	199.2
R-2554BB NSD Site 9	1,236		1,236
R-2554C UT West Bear Creek	1,243		1,243
Totals	15,125	691	15,263.2

d.) Prior to commencing construction within jurisdictional waters of the United States for any portion of the proposed project, the permittee shall forward the latest version of project construction drawings to the Corps of Engineers, Washington Regulatory Field Office NCDOT Regulatory Project Manager. Half-size drawings will be acceptable.

e.) Compliance with Condition O of the original 404 Individual Permit for R-2554, Goldsboro Bypass (AID: SAW-2008-00252) specified that NCDOT provide the Corps with the following information prior to applying for permit modification to any section of the R-2554 project:

- Project Correspondence from 2006 with associated figures discussing the unavoidable impacts to 5.88 acres of the Bear Creek Mitigation Bank (Bank).
- A change order for the Mitigation Agreement between NCDOT and Restoration Systems removing 5.88 acres and associated credits of available mitigation provided by the Bank.
- Condemnation proceeding records detailing NCDOT right of way acquisition.

The Corps is in receipt of the requested documentation and NCDOT is currently in compliance with permit Special Condition "O" of the original 404 Individual Permit.

Questions regarding this correspondence may be directed to Tom Steffens, NCDOT Coordinator/Regulatory Project Manager at the Washington Regulatory Field Office, telephone (910) 251-4615.

Sincerely,
FILENAME:R-2554-A IP Mod Final 1
CESAW-RG-W/Steffens/slb/s

Mail/ JB 3-13-12
File/

Tom Steffens
Project Manager
Washington Regulatory Field Office

Copies furnished w/o attachments:

Mr. Travis Wilson
Eastern Region Highway Project Coordinator
Habitat Conservation Program
1142 I-85 Service Road
Creedmoor, North Carolina 27522

Mr. Gary Jordan
U.S. Fish and Wildlife Service
Fish and Wildlife Enhancement
Post Office Box 33726
Raleigh, North Carolina 27636-3726

Mr. Chris Militscher
C/O FHWA
U.S. Environmental Protection Agency
Raleigh Office
310 New Bern Avenue, Room 206
Raleigh, North Carolina 27601

NCDENR
North Carolina Department of Environment and Natural Resources
Division of Water Quality
Charles Wakild, P.E
Director

Beverly Eaves Perdue
Governor

Dee Freeman
Secretary

March 19, 2012

Dr. Greg Thorpe, PhD., Manager
Project Development and Environmental Analysis
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina, 27699-1548

Subject: CORRECTION to Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act and NEUSE BUFFER RULES with ADDITIONAL CONDITIONS for Construction of US 70 Goldsboro Bypass in Wayne County, Federal Aid Project No. F-56-2(28), State Project No. 8.T330801,
TIP No. R-2554A, DWQ Project No. 20080570 ver. 3.

Dear Dr. Thorpe:

Attached hereto is a modification of Certification No. 3740 issued to The North Carolina Department of Transportation (NCDOT) dated May 16, 2008.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,

Robert Ridlehoover for Charles Wakild
Director

Attachments

cc: Tom Steffens, US Army Corps of Engineers, Washington Field Office
Chris Manley, NCDOT NEU
Chad Coggins, Division 4 Environmental Officer
Travis Wilson, NC Wildlife Resources Commission
Beth Harmon, Ecosystem Enhancement Program
Jason Elliott, NCDOT, Roadside Environmental Unit
File Copy

Transportation and Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1617
Location: 512 N. Salisbury St. Raleigh, North Carolina 27604
Phone: 919-807-6300 \ FAX: 919-807-6492
Internet: www.ncwaterquality.org

Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act and NEUSE BUFFER RULES, with ADDITIONAL CONDITIONS

THIS CERTIFICATION MODIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality (DWQ) Regulations in 15 NCAC 2H .0500 and 15A NCAC 2B.0233. This certification modification for R-2554 Section A authorizes the NCDOT to impact acres of jurisdictional wetlands, linear feet of jurisdictional streams and square feet of protected riparian buffers in Wayne County. The project shall be constructed pursuant to the application dated received January 10, 2012 and additional information received February 13, 2012. **This correction replaces the modification issued March 8, 2012.** The modified authorized impacts are as described below, and **replace** the Section A approved impacts in the original authorization:

Revised Section A Stream Impacts in the Neuse River Basin

Site	Permanent Fill in Perennial Stream (linear ft)	Bank Stabilization to Intermittent Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
I	255	24	59	338	279
III	157	0	0	157	157
IV	210	28	20	258	238
WB 1	0	0	33	33	0
VII	1414	16	33	1463	1430
VIII	114	0	20	134	0
Total	**2150**	**68**	**165**	**2383**	**2104**

Total Revised Stream Impact for R-2554 Section A: 2,383 linear feet

Revised Section A Wetland Impacts in the Neuse River Basin

Site	Permanent Fill (ac)	Temporary Fill (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Total Wetland Impact (ac)	Wetland Impacts Requiring Mitigation (ac)
I	0.92	0	0.03	0.15	0	1.10	1.10
II	0.14	0	0	0.04	0	0.18	0.18
III	0.14	0	0	0.02	0	0.16	0.16
IV	0.65	0	0	0.03	0	0.68	0.68
V	0.19	0	0	0.03	0	0.22	0.22
VI	0	0.08	0	0	0.31	0.39	0
VII	1.34	0	0.14	0.07	0	1.55	1.55
VIII	0.04	0.23	0	0.06	0	0.33	0.10
Total	**3.42**	**0.31**	**0.17**	**0.40**	**0.31**	**4.61**	**3.99**

Total Revised Wetland Impact for R-2554 Section A: 4.61 acres.

Revised Section A Neuse Riparian Buffer Impacts

Site	Zone 1 Impact (sq ft)	*minus* Wetlands in Zone 1 (sq ft)	= Zone 1 Buffers (not wetlands) (sq ft)	Zone 1 Buffer Impacts Requiring Mitigation (sq ft)		Zone 2 Impact (sq ft)	*minus* Wetlands in Zone 2 (sq ft)	= Zone 2 Buffers (not wetlands) (sq ft)	Zone 2 Buffer Impacts Requiring Mitgation (sq ft)
I	18805	11733	7072	7072		12443	6200	6243	6243
II	10839	5608	5231	5231		8794	1302	7492	7492
III	13455	6824	6631	6631		8859	4456	4403	4403
IV	9246	0	9246	0		6297	0	6297	0
V	8202	0	8202	0		3154	0	3154	0
VI	75089	28524	46565	46565		48868	6017	42851	42851
VII	6006	3660	2346	0		3057	2013	1044	0
Totals	**141642**	**56349**	**85293**	**65499**		**91472**	**19988**	**71484**	**60989**

Total Revised R-2554 Section A Buffer Impacts: 233,114 square feet.

Note: Wetland, Stream and Riparian Buffer Impacts for R-2554 Sections BA, BB, and C are unchanged from the previous versions of this application. This modification addresses impact changes for Section A only.

The application provides adequate assurance that the discharge of fill material into the waters of the Neuse River Basin in conjunction with the proposed development will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North Carolina certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of PL 92-500 and PL 95-217 if conducted in accordance with the application and conditions hereinafter set forth.

This approval is only valid for the purpose and design that you submitted in your modified application dated received January 10, 2012 and addition information received Feburary 13, 2012. All the authorized activities and conditions of certification associated with the original Water Quality Certification dated May 16, 2008 and modification dated August 24, 2009 still apply except where superceded by this certification. **This correction replaces the modification issued March 8, 2012.** Should your project change, you are required to notify NCDWQ and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). Additional buffer impacts may require compensatory mitigation as described in 15A NCAC 2B.0242(9). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

Conditions of Certification:

1. When final design plans are completed for R-2554 Sections BB and C, a modification to the 401 Water Quality Certification and the Neuse River Riparian Buffer Authorization shall be submitted with applicable fees to the NC Division of Water Quality. Final designs shall reflect all appropriate avoidance, minimization, and mitigation for impacts to wetlands, streams, surface waters, and buffers. No construction activities that impact any wetlands, streams, surface waters, or buffers located in R-2554 Sections BB and C shall begin until after the permittee applies for, and receives a written modification of the 401 Water Quality Certification and the Neuse River Riparian Buffer Authorization from the NC Division of Water Quality.

2. Compensatory mitigation for impacts to 14,193 linear feet of streams is required for R-2554. As stated in your application, compensatory mitigation for impacts to jurisdictional streams shall be provided by linear feet of onsite stream restorations plus feet of onsite stream preservation. The stream mitigations will occur as follows:

Section	Site	Restoration (1:1) (linear feet)	Preservation (5:1) (linear feet)	Total Credits Proposed (linear ft)
A	Claridge Nursery	10397	0	10397
A	NSD Site VII	544	0	544
BA	NSD Site 4	1083	0	1083
BA	NSD Site 5	561	0	561
BA	Tommy's Road Site 8	61	691	199.2
BB	NSD Site 9	1236	0	1236
C	UT West Bear Creek	1243	0	1243
Totals	-	**15,125**	**691**	**15263.2**

The onsite stream relocations shall be constructed in accordance with the design submitted in your March 28, 2008 application and January 10, 2012 modification application. Please be reminded that as-builts for the completed streams shall be submitted to the North Carolina Division of Water Quality 401 Wetlands Unit with the as-builts for the rest of the project. If the parameters of this condition are not met, then the permittee shall supply additional stream mitigation for these impacts. All channel relocations will be constructed in a dry work area, will be completed and stabilized, and must be approved on site by DWQ staff, prior to diverting water into the new channel. Whenever possible, channel relocations shall be allowed to stabilize for an entire growing season. All stream relocations and restorations shall have a 50-foot wide native wooded buffer planted on both sides of the stream unless otherwise authorized by this Certification. A transitional phase incorporating rolled erosion control product (RECP) and appropriate temporary ground cover is allowable.

authorized by this Certification. A transitional phase incorporating rolled erosion control product (RECP) and appropriate temporary ground cover is allowable.

3. The stream mitigation sites shall be monitored annually for five years or until success criteria are satisfied. Monitoring protocols shall follow the Monitoring Level I outlined in the Stream Mitigation Guidelines, April 2003. Success of the mitigation site shall be determined by NCDWQ during an on-site visit at or near the end of the monitoring period.

4. Compensatory mitigation for impacts to 29.35 acres of wetlands for R-2554 is required. As stated in your application, compensatory mitigation for these wetlands shall occur as follows:

Section	Site	Restoration (1:1) (acres)	Preservation (5:1) (acres)	Total Credits Proposed (acres)
BA	Tommy's Road Site 8	0.11	2.37	0.584
C	Bear Creek (Site 12)	26.84	0	26.840
Jeffrey's Warehouse	Jeffrey's Warehouse Mitigation Bank	0.21	8.61	1.932
Totals	-	**27.16**	**10.98**	**29.356**

The permittee shall comply with the on-site wetland mitigation plan submitted with the application on March 28, 2008 and modification application on January 10, 2012.

5. For the onsite wetland mitigation sites, the permittee shall plant 680 stems/acre. Vegetation success shall be measured by survivability over a 5-year monitoring period. Survivability will be based on 320 stems/acre after three (3) years and 260 stems after five (5) years. A survey of vegetation during the growing season shall be conducted annually over the five-year monitoring period and submitted to the NC Division of Water Quality. If the surviving vegetation densities are below the required thresholds after the five-year monitoring period, the site may still be declared successful at the discretion of and with written approval from the NC Division of Water Quality.

6. For the onsite wetland mitigation sites, hydrologic success of the sites will be attained by restoration of a hydrologic regime that results in inundation or saturation of the soils within 12 inches of the ground surface for at least 12.5 percent of the growing season. The hydrologic monitoring shall persist for a total of five (5) years. After the five-year monitoring period, if the monitoring requirements are not met, the site may still be declared successful at the discretion of and with written approval from the NC Division of Water Quality.

7. Compensatory mitigation for impacts to 821,019 square feet of protected riparian buffers in Zone 1 and 547,463 square feet of protected riparian buffers in Zone 2 shall be required for R-2554. As stated in your applications compensatory mitigation for these riparian buffers shall be provided partially by onsite buffer restorations as follows:

Section	Site	Zone 1 Restoration (sq ft)	Zone 2 Restoration (sq ft)	Total (sq ft)
A	NSD Site VI	34380	22733	57113
A	Claridge Nursery	617605	377052	994657
BA	NSD Site 4	59609	35530	95169
BA	NSD Site 5	34199	21760	55959
BA	Tommy's Road Site 8	4459	3333	7792
BB	NSD Site 9	74108	46713	120821
C	UT West Bear Creek	73181	48787	121968
Totals	-	**897541**	**555908**	**1453479**

8. In accordance with 15A NCAC 02B.0242(9) riparian vegetation reestablishment for buffer mitigation sites shall include a minimum of at least 2 native hardwood tree species planted at a density sufficient to provide 320 trees per acre at maturity. The mitigation area shall be placed under a perpetual conservation easement that will provide for protection of the property's nutrient removal efficiencies.

9. For the buffer mitigation sites, the permittee shall monitor the sites. An annual report shall be submitted to the DWQ for a period of 5 years showing monitoring results, survival rate/ success of tree and vegetation establishment, and that diffuse flow through the riparian buffer has been maintained. The first annual report shall be submitted within one year of final planting. Failure to achieve a buffer density of 320 trees per acre after 5 years will require the annual

10. All on-site mitigation sites shall be protected in perpetuity by a conservation easement or through NCDOT fee simple acquisition and recorded in the NCDOT Natural Environment Unit mitigation geodatabase.

11. A copy of the final construction drawings shall be furnished to NCDWQ Central Office prior to the pre-construction meeting. The permittee shall provide written verification that the final construction drawings comply with the permit drawings contained in the application dated received January 10, 2012 and additional information received February 13, 2012. Any deviations from the approved drawings are not authorized unless approved by the NC Division of Water Quality.

12. The post-construction removal of any temporary bridge structures must return the project site to its preconstruction contours and elevations. The impacted areas shall be revegetated with appropriate native species.

13. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Please refer to the most current version of *Stormwater Best Management Practices.*

14. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams, shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by NCDWQ. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact NCDWQ for guidance on how to proceed and to determine whether or not a permit modification will be required.

15. If multiple pipes or barrels are required, they shall be designed to mimic natural stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel should be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.

16. Riprap shall not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed.

17. For all streams being impacted due to site dewatering activities, the site shall be graded to its preconstruction contours and revegetated with appropriate native species.

18. The stream channel shall be excavated no deeper than the natural bed material of the stream, to the maximum extent practicable. Efforts must be made to minimize impacts to the stream banks, as well as to vegetation responsible for maintaining the stream bank stability. Any applicable riparian buffer impact for access to stream channel shall be temporary and be revegetated with native riparian species.

19. All riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated. Maintained buffers shall be permanently revegetated with non-woody species by the end of the growing season following completion of construction. For the purpose of this condition, maintained buffer areas are defined as areas within the transportation corridor that will be subject to regular NCDOT maintenance activities including mowing. The area with non-maintained buffers shall be permanently revegetated with native woody species before the next growing season following completion of construction.

20. All stormwater runoff shall be directed as sheetflow through stream buffers at nonerosive velocities, unless otherwise approved by this certification.

21. Pursuant to NCAC15A 2B.0233(6), sediment and erosion control devices shall not be placed in Zone 1 of any Neuse Buffer without prior approval by the NCDWQ. At this time, the NCDWQ has approved no sediment and erosion control devices in Zone 1, outside of the approved project impacts, anywhere on this project. Moreover, sediment and erosion control devices shall be allowed in Zone 2 of the buffers provided that Zone 1 is not compromised and that discharge is released as diffuse flow.

22. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills.

23. During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S., or protected riparian buffers.

24. The dimension, pattern and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions.

25. The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage.

26. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval.

27. All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water.

28. Heavy equipment shall be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the introduction of other pollutants into the stream.

29. All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials.

30. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification.

31. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited.

32. The permittee and its authorized agents shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State and Federal law. If NCDWQ determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, NCDWQ may reevaluate and modify this certification.

33. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification..

34. A copy of this Water Quality Certification shall be maintained on the construction site at all times. In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager.

35. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization shall be clearly marked by highly visible fencing prior to any land disturbing activities. Impacts to areas within the fencing are prohibited unless otherwise authorized by this certification.

36. The Permittee shall report any violations of this certification to the Division of Water Quality within 24 hours of discovery.

37. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.

38. Upon completion of the project (including any impacts at associated borrow or waste sites), the NCDOT Division Engineer shall complete and return the enclosed "Certification of Completion Form" to notify NCDWQ when all work included in the 401 Certification has been completed.

39. Native riparian vegetation (i.e. trees and shrubs native to your geographic region) must be reestablished in the riparian areas within the construction limits of the project by the end of the growing season following completion of construction.

40. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities.

41. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards:

a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual.*
b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual.* The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual.*
d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.

42. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification.

Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties. This Certification shall become null and void unless the above conditions are made conditions of the Federal 404 and/or Coastal Area Management Act Permit. This Certification shall expire upon the expiration of the 404 or CAMA permit.

If you wish to contest any statement in the attached Certification you must file a petition for an administrative hearing. You may obtain the petition form from the office of Administrative hearings. You must file the petition with the office of Administrative Hearings within sixty (60) days of receipt of this notice. A petition is considered filed when it is received in the office of Administrative Hearings during normal office hours. The Office of Administrative Hearings accepts filings Monday through Friday between the hours of 8:00am and 5:00pm, except for official state holidays. The original and one (1) copy of the petition must be filed with the Office of Administrative Hearings.

The petition may be faxed-provided the original and one copy of the document is received by the Office of Administrative Hearings within five (5) business days following the faxed transmission.
The mailing address for the Office of Administrative Hearings is:

Office of Administrative Hearings
6714 Mail Service Center
Raleigh, NC 27699-6714
Telephone: (919)-733-2698, Facsimile: (919)-733-3478

A copy of the petition must also be served on DENR as follows:

Ms. Mary Penny Thompson, General Counsel
Department of Environment and Natural Resources
1601 Mail Service Center
Raleigh, NC 27699-1601

This the 19th day of March 2012

DIVISION OF WATER QUALITY

Charles Wakild
Director

WQC No. 3740

NCDWQ Project No.: _____ **County:** _____

Applicant: _____

Project Name: _____

Date of Issuance of 401 Water Quality Certification: _____

Certificate of Completion

Upon completion of all work approved within the 401 Water Quality Certification or applicable Buffer Rules, and any subsequent modifications, the applicant is required to return this certificate to the 401 Transportation Permitting Unit, North Carolina Division of Water Quality, 1650 Mail Service Center, Raleigh, NC, 27699-1650. This form may be returned to NCDWQ by the applicant, the applicant's authorized agent, **or** the project engineer. It is not necessary to send certificates from all of these.

Applicant's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: _____ Date: _____

Agent's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: _____ Date:_____

Engineer's Certification

_____ Partial _____ Final

I, _____, as a duly registered Professional Engineer in the State of North Carolina, having been authorized to observe (periodically, weekly, full time) the construction of the project,for the Permittee hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature _____ Registration No. _____

Date _____

Jeffrey's Warehouse Debit Ledger

The Jeffrey's Warehouse Mitigation Site is located in HUC 030210201 and was originally constructed as on-site mitigation for R-1030 US 117 from south of NC 581 in Goldsboro to the US 264 Bypass in Wilson. There are two parcels associated with this mitigation site. The west parcel (approximately 50.2 acres) is bounded on the northwest by the Little River and on the southeast by the US 117 right-of-way. The east parcel (approximately 37.5 acres) is bounded on the northwest by the US 117 right-of-way, on the northeast by a Wayne County Board of Education school bus maintenance shop, and on the east and southeast by private property. The site was constructed in 2006 and has undergone five years of hydrologic and vegetative monitoring.

To offset unavoidable wetland impacts associated with TIP R-2554A, the Jeffrey's Warehouse Mitigation site will be debited 8.61 acres of riverine wetland preservation, 0.19 acres of riverine restoration, and 0.02 acres of non-riverine restoration.

Mitigation Type	Amount Available (acres)	Debit	TIP	Amount Remaining
Riverine Preservation	12.36	3.75	R-2814 A&B	8.61
Riverine Preservation	8.61	8.61	R-2554A	0

Mitigation Type	Amount Available (acres)	Debit	TIP	Amount Remaining
Riverine Restoration	3.66	2.62	R-2814 A&B	1.04
Riverine Restoration	1.04	0.19	R-2554A	0.85

Mitigation Type	Amount Available	Debit	TIP	Amount Remaining
Non-riverine Restoration	23.02	2.76	R-2719A	20.26
Non-riverine Restoration	20.26	0.92	B-4304	19.34
Non-riverine Restoration	19.34	1.77	R-2814 A&B	17.57
Non-riverine Restoration	17.57	0.02	R-2554A	17.55

North Carolina Department of Transportation
Project Development and Environmental Analysis Branch
Natural Environment Unit
Raleigh, North Carolina

Claridge State Nursery
On-site Stream Mitigation Plan for
US Highway 70 Goldsboro Bypass Construction
Wayne County, North Carolina

T.I.P. Number R-2554
WBS No. 34461.1.3

October 21, 2011

1.0 BASELINE INFORMATION

The project is located within USGS Hydrologic Cataloging Unit 03020201, and NC Division of Water Quality (NCDWQ) sub-basin 03-04-06 of the Neuse River Basin, and is part of the of the South Atlantic-Gulf region. The project is located immediately west of Claridge Nursery Road in Wayne County near Goldsboro, on land that is entirely owned by the North Carolina Division of Forest Resources. The project boundary is within the Inner Coastal Plain physiographic province; specifically the Southeastern Floodplains and Low Terraces Ecoregion. Land use within the watershed is primarily agriculture and forestry. Existing stream lengths, drainage areas, and jurisdictional status are summarized in Table 1.

Table 1. Summary of Existing Stream Lengths and Drainage Areas.

Stream Reach	Existing Length (LF)	Drainage Area (sq mi)	Intermittent/Perennial Status
M1	6,400	1.80	NCDWQ Form Score = > 30 Stream reach already considered perennial by agencies during impact assessments. Status = Perennial
UT1	740	0.13	NCDWQ Form Score = 19.75 Stream is shown as intermittent on USGS map. Stream is not shown on County soils, but hydric soils indicate the presence of a channel. Status = Intermittent
UT2	2,530	0.25	NCDWQ Form Score = 24.75 Stream is shown as intermittent on USGS map. Stream is shown on County soils. Status = Intermittent

The project includes three jurisdictional streams; an unnamed tributary main stem (Reach M1) to the Little River, and two smaller tributaries (Reaches UT1 and UT2) that drain into M1. The lower section of the site (The Canal) flows to a portion of the Little River has been assigned

Stream Index Number 27-57-21.4 (NCDWQ 2010) and is designated a warm water stream (USACE et al. 2003) with a classification of B; NSW.

Most of the native plant communities have been removed from the site to facilitate silviculture land use. The vegetation currently found within the project area contains a mixture of pine canopy, fescue grasses, and disturbed/maintained land for crop rotation. Approximately 70% (23 acres) of the project boundary is composed of open fields and disturbed/maintained land that also contains an interior road, while the remaining 30% (9 acres) is made up of a mix of maintained vegetation harvested for nursery practices.

The North Carolina Department of Transportation (NCDOT) will perform on-site mitigation for jurisdictional stream impacts associated with Transportation Improvement Program (TIP) R-2554 and the construction of the US Highway 70 Goldsboro Bypass alignment. The project will serve as on-site mitigation through the restoration of 10,587 linear feet of streams and 31.8 acres of riparian buffer.

2.0 SITE SELECTION

TIP R-2554 will involve roadway construction for the US Highway 70 bypass and installing a bridge over the restored stream alignment. Permanent stream impacts associated with the project are 13,038 linear feet of jurisdictional stream channels.

The mitigation site includes areas which are within a Conservation Easement held by NCDOT. These areas occur both north and south of approximate roadway station 66+36 to station 67+27. Within these areas NCDOT will restore 10,587 linear feet of streams via floodplain excavation, site grading and planting.

Site Considerations

Several existing culverted road crossings will be incorporated into the restoration designs for the three stream reaches. In some locations, existing culverts will be replaced to provide increased capacity, promote connection with the restored floodplain, and set culvert inverts to appropriate elevations. An existing irrigation line crosses the proposed design for M1 at approximate stations 14+00 and station 22+00; these crossings will not be placed in an easement if future maintenance is required for the irrigation lines. The existing irrigation line that crosses M1 near station 21+00 will be abandoned prior to construction activities.

3.0 SITE PROTECTION INSTRUMENT

The mitigation areas are located within a NCDOT Conservation Easement for the project. They are outside of future US Highway 70 ROW and maintenance areas. They will be managed to prohibit all use inconsistent with its use as mitigation property, including any activity that would materially alter the biological integrity or functional and educational value of the site, consistent with the mitigation plan.

The site will be placed on the NEU mitigation geo-database. It will be monitored for five years with annual reports provided to the agencies. After closeout, the site will placed in the NCDOT Stewardship Program for long term management and protection.

4.0 OBJECTIVES

The goal of the project is to restore 10,587 linear feet of stream and 31.8 acres of riparian buffer to mitigate for all impacts associated with TIP R-2554. The functional restoration of the site will be accomplished using natural channel design approaches for single-thread (Reach M1) and riparian headwater valleys (Reaches UT1 & UT2). The proposed restoration and mitigation amounts are summarized in Table 2 below:

Table 2. Restoration Approaches and Proposed Mitigation Amounts.

Mitigation Area	Size	Potential Credits	Restoration Approach
Stream Reach M1	8,059 LF*	8,059 (1:1 ratio)	Restoration will consist of a Rosgen Priority Level II approach. A new floodplain will be excavated at a lower elevation, and a stable meandering channel restored through the new floodplain. (E streamtype)
Stream Reach UT1	754 LF*	754 (1:1 ratio)	Restoration will consist of grading a floodplain and promoting diffuse surface flows toward M1. The system will be allowed to form on its own as a braided channel headwater stream. (DA streamtype)
Stream Reach UT2	1,774 LF*	1,774 (1:1 ratio)	Restoration will consist of grading a floodplain and promoting diffuse surface flows toward M1. The system will be allowed to form on its own as a braided channel headwater stream. (DA streamtype)
Riparian Buffer Restoration	31.8 acres	31.8 (1:1 ratio)	Restoration will include the planting of 50 foot riparian buffers on both sides of the restored stream segments.
Totals	**10,587 LF 31.8 acres**	**10,587 (stream) 31.8 (buffer)**	

* Stream lengths exclude the sections of channel which will flow through culverted crossings or lie outside of the Conservation Easement held by NCDOT.

5.0 MITIGATION WORK PLAN

The mitigation areas will be constructed at the end of the construction of TIP R-2554. Construction activities involve floodplain excavation, stream channel and headwater valley grading, structure installation, and native vegetation planting. Once these have been established, the new stream channels will be stabilized and prepared for normal flow conditions.

Main Stem M1

Reference reach data and past project experience support the design of a single-thread channel for M1 due to its watershed size, slope, and sediment transport competency (stream power). The design involves a Rosgen Priority Level II approach in which a new, meandering single-thread channel (E/C streamtype) will be constructed through a floodplain excavated at a lower

elevation. In-stream structures will consist of logs and wooden structures to provide stability. The streambanks and adjacent floodplain areas will be planted with native vegetation that are moderately to highly tolerant of flooded conditions.

UT1 and UT2

UT1 and UT2 have been channelized in the past to improve drainage of the site for agriculture. A riparian headwater valley restoration approach is proposed for UT1 and UT2 due to their small drainage areas and low slope. Restoration of these reaches will seek to restore historic flow and flooding processes. This approach is described in the US Army Corps of Engineers and NC Division of Water Quality guidance document *"Information Regarding Stream Restoration with Emphasis on the Coastal Plain (April 2007)."* It is likely that in undisturbed conditions, the systems existed as headwater wetland/stream complexes, exhibiting diffuse flows and wetland plant communities within a narrow valley of hydric soils. This assessment is supported by on-site soils, topography, and reference site data.

Based on valley slopes and drainage areas, these systems most likely functioned prior to disturbance as headwater swamps, or small braided stream systems. Restoration will focus on grading a new floodplain at a lower elevation (to match the elevation of the restored M1 channel) and restoring diffuse flow patterns along the restored headwater valley. The valley bottom will be roughened to restore the natural microtopographic variability that is common within braided headwater systems. The systems will primarily be allowed to form braided channels and flow patterns on their own over time.

The Natural Environment Unit shall be contacted to provide construction assistance to ensure that the mitigation areas are constructed appropriately.

Riparian Buffer Planting

Following the successful completion of site grading and stabilization, a vegetation plan for the site will include the planting of bare-root trees in riparian buffer areas adjacent to all three restored streams. A minimum buffer width of 50 feet will be maintained on all restored streams with wider buffers in most areas. Tree species commonly found in Coastal Plain Bottomland Hardwood forests will be planted across the site that include a mixture of no less than six native species adapted to site conditions, such as River birch (*Betula nigra*), Green ash (*Fraxinus pennsylvanica*), Swamp tupelo (*Nyssa sylvatica var.biflora*), Sycamore (*Platanus occidentalis*), Overcup oak (*Quercus lyrata*), Swamp chestnut oak (*Quercus michauxii*), and Bald cypress (*Taxodium distichum*).

Native grass seeding and mulching will be applied on all disturbed areas within the stream restoration area for stabilization purposes according to guidance and standard procedures of NCDOT's Roadside Environmental Unit. An as-built report will be submitted within 60 days of completion of the project.

6.0 PERFORMANCE STANDARDS

The NCDOT shall monitor stream channel stability and buffer vegetation survival on the site. Post-restoration monitoring will be conducted for a minimum of five years or until the success criteria are met following the completion of construction to document project success. Different monitoring approaches are proposed for the restored stream reaches, based on the restoration approaches to be used. For reaches UT1 and UT2, which involve the restoration of the historic flow pattern as a multi-thread headwater stream system to be constructed as a broad or diffuse swale with shallow flow paths, monitoring will focus primarily on visual assessments and documentation. For reach M1, which involves a more traditional restoration of a single-thread channel, monitoring approaches follow those recommended by the Stream Mitigation Guidelines (USACE and NCDWQ 2003). These approaches are described below in Section 7.0.

7.0 MONITORING REQUIREMENTS

The stream mitigation site will be monitored for five years or until success criteria is satisfied. Monitoring protocols shall follow the Monitoring Level 1outlined in the Stream Mitigation Guidelines, April 2003. NCDOT will evaluate the success of the stream restoration project based on guidance provided by the Stream Mitigation Guidelines disseminated by the United States Army Corps of Engineers-Wilmington District. The survey of the channel dimension will consist of permanent cross sections placed at equal number of pools and riffles. Annual photographs showing both banks and upstream and downstream views will be taken from permanent, mapped photo points. The survey of the longitudinal profile will represent distinct areas of the stream and cover a cumulative total of 3,000 linear feet of channel. The entire restored length of stream will be investigated for channel stability and in-stream structure functionality. Any evidence of channel instability will be identified, mapped and photographed.

8.0 OTHER INFORMATION

The restoration approach for reaches UT1 and UT2 are based on data and conclusions developed through a study of functional riparian headwater stream systems in the Coastal Plain. This study evaluated the conditions that determine channel formation in small headwater systems, and developed relationships between drainage area and valley slope that correlate to channel form. The data indicate that the designs for reaches UT1 and UT2 should seek to restore moderately defined headwater stream systems (braided flow patterns), and that it is unlikely that well-defined single-thread stream segments would be supported.

9.0 DETERMINATION OF CREDITS

Per the NCDOT plans and 401/404 permit application for R-2554; NCDOT proposes to restore 10,587 linear feet of stream and 31.8 acres of riparian buffer via floodplain excavation and channel grading and subsequent native buffer reforestation to mitigate for permanent impacts associated with the TIP at a 1:1 ratio. An as-built report will be submitted within 60 days of completion of the project to verify actual linear feet constructed and buffer acreage planted. The success of the mitigation area and determination of total credits will be based upon successful completion and closeout of the monitoring period.

9.1 CREDIT RELEASE SCHEDULE

NCDOT proposes immediate, full release of the proposed 10,587 linear feet of restored streams and 31.8 acres of restored riparian buffer as on-site mitigation for the associated stream impacts of 13,038 linear feet for R-2554 at a 1:1 ratio.

10.0 GEOGRAPHIC SERVICE AREA

The proposed Geographic Service Area (GSA) for the mitigation area is composed of the 8-digit Hydrologic Cataloging Unit (HUC) 03020201. It is anticipated that the entire 10,587 linear feet will be used on-site at a 1:1 ratio to offset stream impacts associated with R-2554. Any remaining linear footage will be available for use within HUC 03020201 as well as adjacent HUC's 03020202 and 03020203 within the Neuse River Basin.

11.0 MAINTENANCE PLAN

The site will be held by NCDOT and placed on the NEU mitigation geodatabase. Once monitoring is completed and the site is closed out, it will be placed in the NCDOT Stewardship Program for long term maintenance and protection.

If an appropriate third party recipient is identified in the future, then the transfer of the property will include a conservation easement or other measure to protect the natural features and mitigation value of the site in perpetuity.

12.0 LONG TERM ADAPTIVE MANAGEMENT PLAN

The site will be managed by the NCDOT according to the mitigation plan. In the event that unforeseen issues arise that affect the management of the site, any remediation will be addressed by NCDOT in coordination with the Interagency Review Team.

13.0 FINANCIAL ASSURANCES

The site will be managed by NCDOT with its own distinct cost center number within the NCDOT budgeting and financial tracking system. Therefore, all accounting for revenues, contract encumbrances, fund transfers, and expenses will be performed and reported independent from other capital budget or operating budget accounting.

TABLE 15
Mitigation Credit
Bear Creek-Mill Branch Mitigation Site

Mitigation Design Unit	Area (acres)	Mitigation Credit Ratio[1]	Replacement Credit (acre credits)
On-Site Riverine Wetland Restoration	88	1.8:1[2]	49
On-Site Riverine Wetland Enhancement	34	4:1	9
On-Site Upland Buffer Restoration	23	-----[2]	-----
Off-Site Riverine Wetland Preservation	300	10:1	30
TOTAL	445	5.06:1	88
Riparian Buffer Establishment	4	1770 linear feet both sides of channel (3rd order stream or less). If used, buffer credit will be allotted by reducing the wetland replacement credits by 1 credit per 885 feet of buffer (2 wetland credits total)[3].	
	4	1620 linear feet both sides of channel (fifth order river or less). If used, buffer credit will be allotted by reducing the wetland replacement credits by 1 credit per 1620 linear feet. (1 wetland credit total)[3].	
Neuse River Nitrogen Removal	-----	Projected 100,000 pounds/year (45,359 kilograms/year) (Table 3)	

1: Mitigation credit ratios denote mitigation acres : impact acres

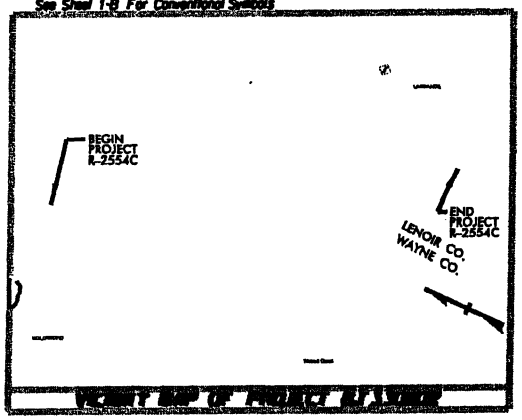
2: Restoration of upland ecotones and wetland buffers generates reduced credit ratios for wetland restoration in the complex. Because, upland discharge buffers may provide up to a 20% increase in wetland functions (NCDOT 1994), mitigation ratios in restored wetland areas are reduced to 1.8:1 to reflect derived wetland functional benefits.

3: Buffers for third order streams or less reside within wetland restoration areas. Therefore, the buffer acreage is deducted at a ratio of 2 acres of buffer : 1 wetland replacement acre-credit.
Buffers for fifth order rivers or less reside within upland buffer restoration areas. Therefore, the riparian buffer acreage is deducted at a ratio of 5 acres of buffer : 1 wetland replacement credit.

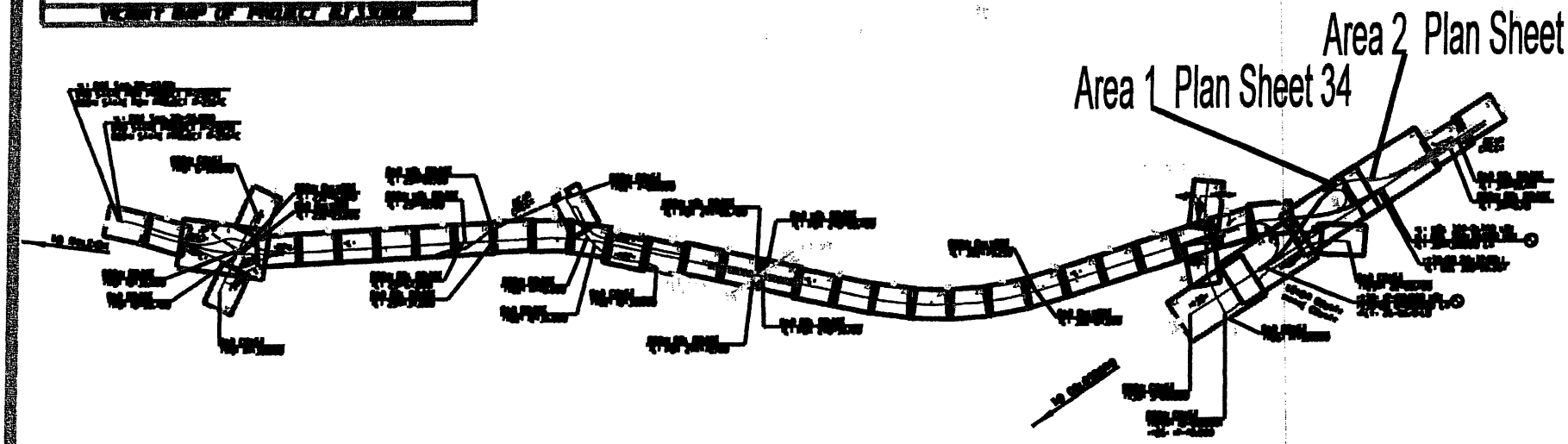
See Sheet 1-A For Table of Sheets
See Sheet 1-B For Conventional Symbols

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

METRIC



VICINITY MAP OF PROJECT LOCATION



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III
THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS LIMITED TO INTERCHANGES.

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

PROJECT:

GRAPHIC SCALES

5 0 10

5 0 10

0 3

DESIGN DATA

PROJECT LENGTH

PLANS PREPARED BY:
FLORENCE & HUTCHESON, INC.
CONSULTING ENGINEERS
RALEIGH, NC 27606

USING STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:

PROJECT ENGINEER

PROJECT DESIGN ENGINEER

NCDOT CONTACT:
DESIGN SERVICES - PROJECT ENGINEER

HYDRAULICS ENGINEER

SIGNATURE P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER P.E.

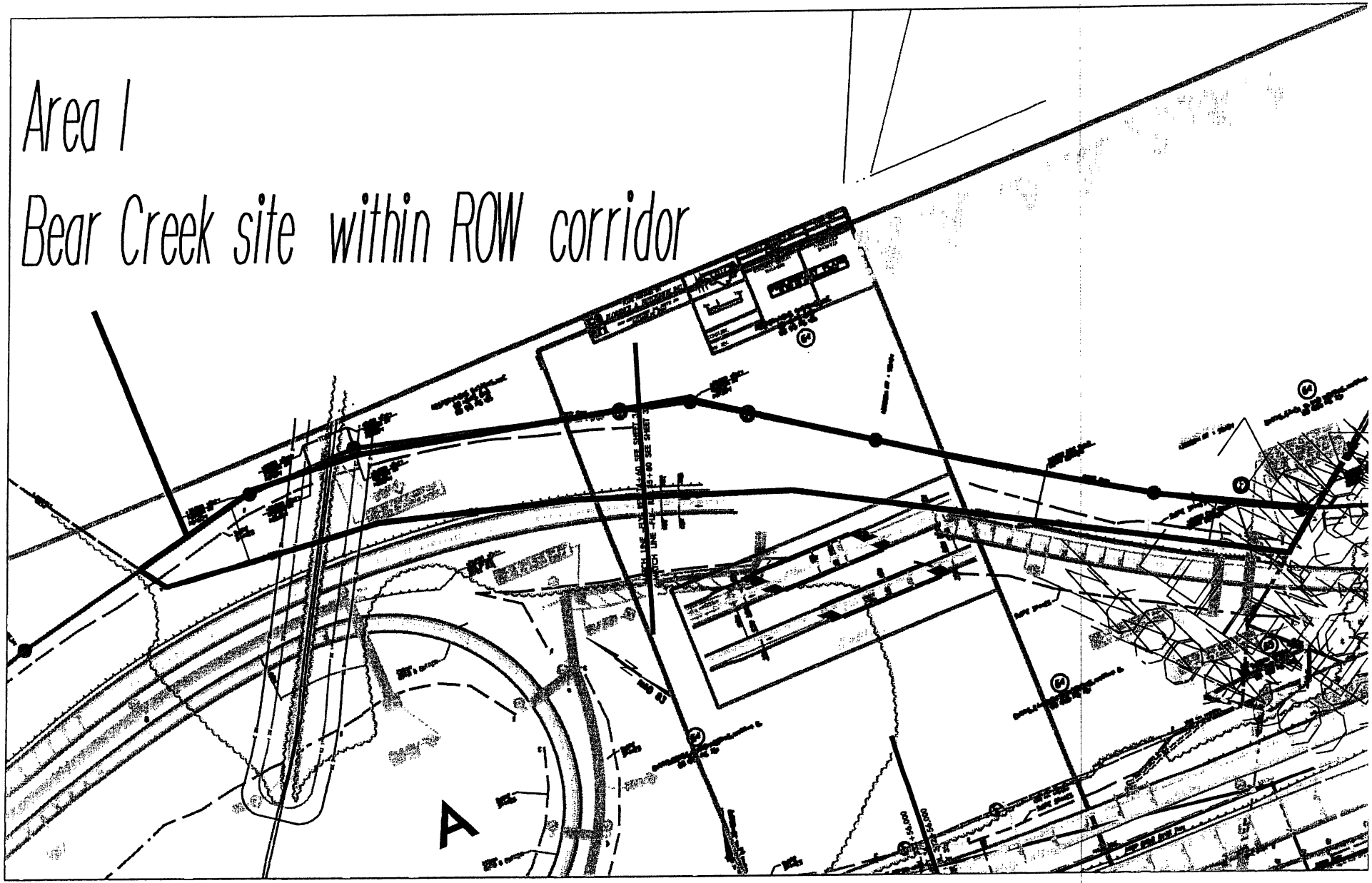
DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

R2554C.TSH 08/02/2006 09:45:14 AM

Area 1

Bear Creek site within ROW corridor



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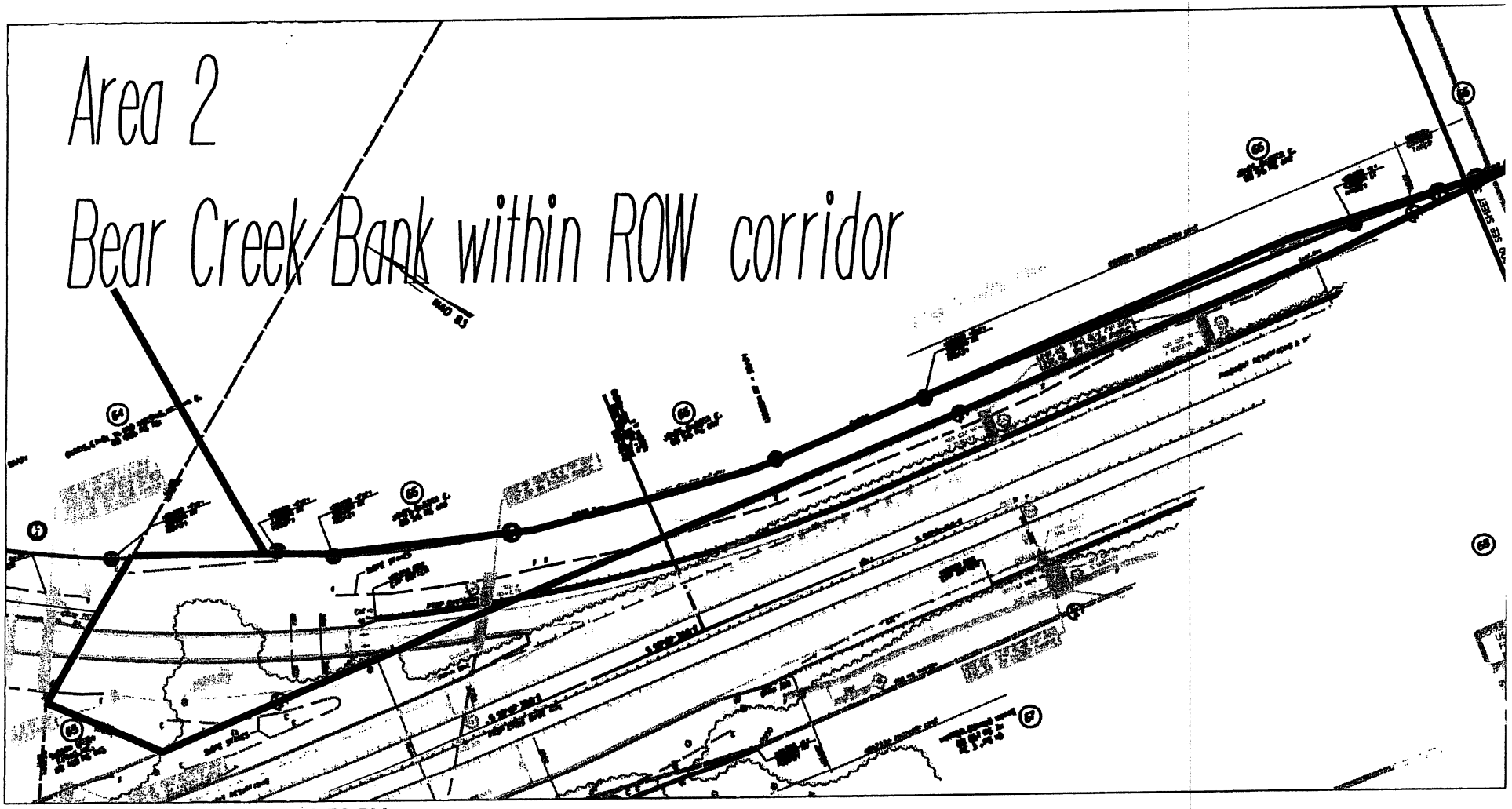

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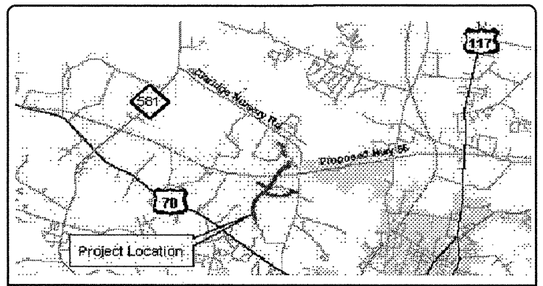
9/09/99

TIP PROJECT: R-2554A



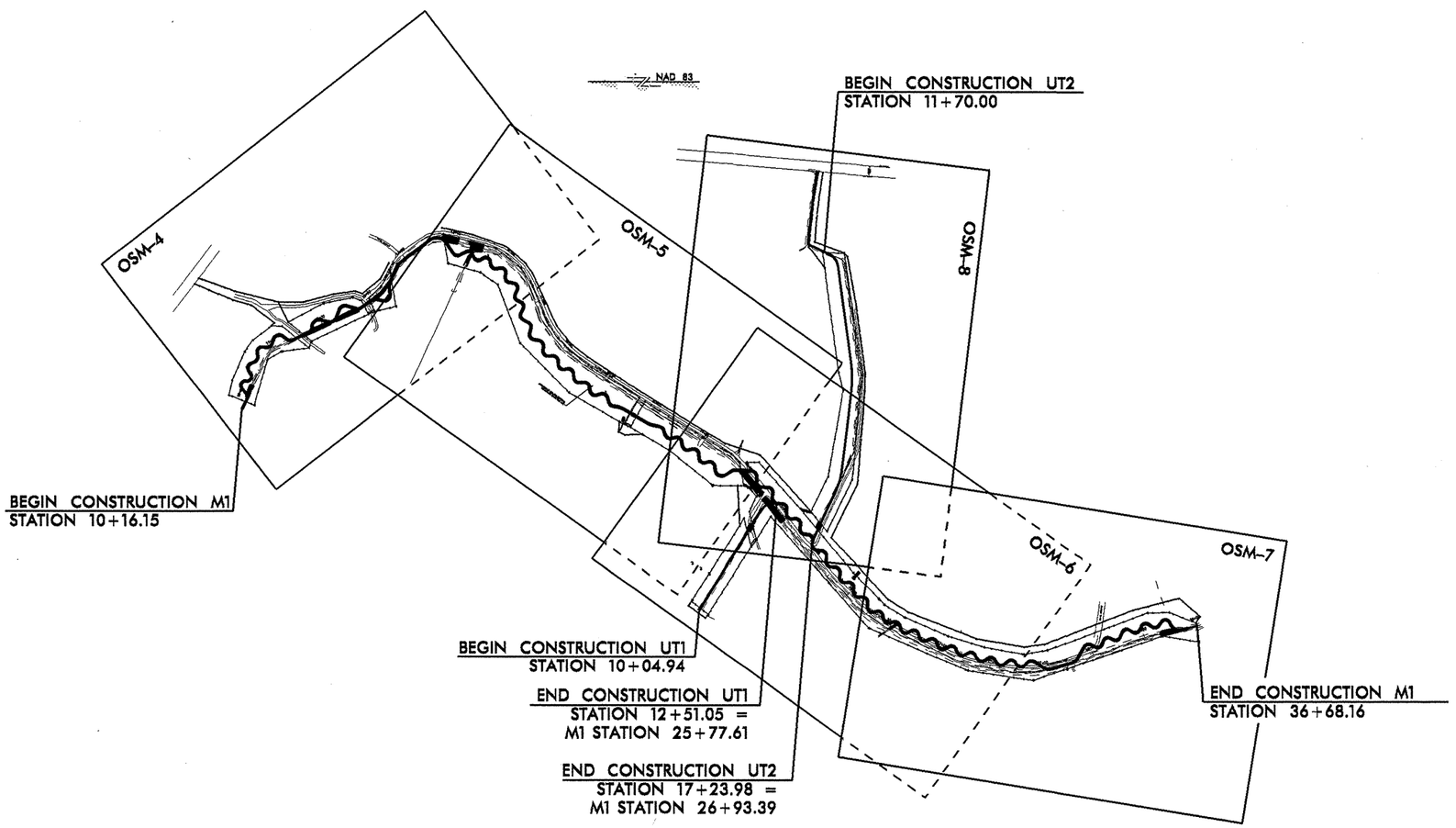
VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAYNE COUNTY

LOCATION: *2 MILES SOUTHEAST OF NC HWY 581 OFF OF CLARIDGE NURSERY ROAD (SR 1326)*

TYPE OF WORK: ON-SITE MITIGATION



METRIC	STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
	N.C.	R-2554A	OSM-1	16

	STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
	34461.1.3	NHF-70(30)	P.E.
	34461.2.4		R/W, UTIL
CONST. REV.	34461.3.4		CONST.
R/W REV.			

PROGRESS DRAWING
FOR REVIEW PURPOSES ONLY
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

10 0 25
PLANS

2.5 0 5
PROFILE (HORIZONTAL)

0.5 0 1
PROFILE (VERTICAL)

PROJECT LENGTH

REACH:	M1	UT1	UT2
EXISTING STREAM LENGTH	= 2206m	236m	763m
PROPOSED DESIGN STREAM LENGTH (EXCLUDES CROSSINGS)	= 2399m	230m	540m

Prepared in the Office of:

Baker

Michael Baker Engineering Inc.
8000 Regency Parkway
Suite 200
Cary, NORTH CAROLINA 27518
Phone: 919.463.5488
Fax: 919.463.5490

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:

PROJECT ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER *P.E.*

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR *DATE*

REVISIONS

GENERAL NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR JOB SITE SAFETY.
2. SUBSURFACE PLANS ARE NOT AVAILABLE; THEREFORE, THE CONTRACTOR WILL BE REQUIRED TO LOCATE UTILITIES, INCLUDING EXISTING IRRIGATION LINES AND PROTECT FROM DAMAGE.
3. GRADING SHOULD INCLUDE SMOOTH TRANSITIONS.
4. CONTRACTOR WILL BE REQUIRED TO PUMP BASE STREAM FLOW AROUND AREA WHERE CONSTRUCTION WILL OCCUR IN THE ACTIVE STREAM CHANNEL.

MORPHOLOGICAL MEASUREMENTS TABLE

		M1	UT1 **	UT2 **
1.	reach name			
2.	stream type	E/C5	DA5	DA5
3.	drainage area (sq. mi)	1.80	0.13	0.25
4.	bankfull width (ft)	mean: 13.4 range: --- - ---	mean: NA range: --- - ---	mean: NA range: --- - ---
5.	bankfull mean depth (ft)	mean: 1.1 range: --- - ---	mean: NA range: --- - ---	mean: NA range: --- - ---
6.	width/depth ratio	mean: 12 range: --- - ---	mean: NA range: --- - ---	mean: NA range: --- - ---
7.	bankfull cross-sectional area (sq. ft)	mean: 15 range: --- - ---	mean: NA range: --- - ---	mean: NA range: --- - ---
8.	bankfull mean velocity (ft/sec)	mean: 0.9 range: --- - ---	mean: 1.9 range: --- - ---	mean: 0.4 range: --- - ---
9.	bankfull discharge (cfs)	mean: 11.1 range: --- - ---	mean: 8.1 range: --- - ---	mean: 2.4 range: --- - ---
10.	bankfull max depth (ft)	mean: 1.6 range: --- - ---	mean: NA range: --- - ---	mean: NA range: --- - ---
11.	width of floodprone area (ft)	mean: 62 range: --- - ---	mean: NA range: --- - ---	mean: NA range: --- - ---
12.	entrenchment ratio	mean: 4.6 range: -	mean: NA range: -	mean: NA range: --- - ---
13.	meander length (ft)	mean: 134 range: 107 - 161	mean: NA range: --- - ---	mean: NA range: --- - ---
14.	ratio of meander length to bankfull width	mean: 10 range: 8 - 12	mean: NA range: --- - ---	mean: NA range: --- - ---
15.	radius of curvature (ft)	mean: 38 range: 27 - 38	mean: NA range: --- - ---	mean: NA range: --- - ---
16.	radius of curvature to bankfull width *	mean: 2.8 range: 2.5 - 4.3	mean: NA range: --- - ---	mean: NA range: --- - ---
17.	belt width (ft)	mean: 54 range: 40 - 67	mean: NA range: --- - ---	mean: NA range: --- - ---
18.	meander width ratio	mean: 4 range: 3 - 5	mean: NA range: --- - ---	mean: NA range: --- - ---
19.	sinuosity (stream length/valley length)	mean: 1.25 range: --- - ---	mean: NA range: --- - ---	mean: NA range: --- - ---
20.	valley slope (ft/ft)	mean: 0.0008 range: --- - ---	mean: 0.003 range: --- - ---	mean: 0.003 range: --- - ---
21.	average slope (ft/ft)	mean: 0.0006 range: --- - ---	mean: 0.003 range: --- - ---	mean: 0.003 range: --- - ---
22.	Pool slope (ft/ft)	mean: 0 range: --- - ---	mean: NA range: --- - ---	mean: NA range: --- - ---
23.	Ratio of pool slope to average slope	mean: 0 range: --- - ---	mean: NA range: --- - ---	mean: NA range: --- - ---
24.	maximum pool depth (ft)	mean: 2.5 range: --- - ---	mean: NA range: --- - ---	mean: NA range: --- - ---
25.	ratio of pool depth to average bankfull depth	mean: 2.2 range: -	mean: NA range: --- - ---	mean: NA range: --- - ---
26.	pool width (ft)	mean: 17.4 range: --- - ---	mean: NA range: --- - ---	mean: NA range: --- - ---
27.	ratio of pool width to bankfull width	mean: 1.3 range: -	mean: NA range: --- - ---	mean: NA range: --- - ---
28.	pool to pool spacing (ft)	mean: 67 range: 54 - 80	mean: NA range: --- - ---	mean: NA range: --- - ---
29.	ratio of pool to pool spacing to bankfull width	mean: 5 range: 4 - 6	mean: NA range: --- - ---	mean: NA range: --- - ---
30.	ratio of lowest bank height to bankfull height (or max bankfull depth)	mean: 1.00 range: 1.00 - 1.20	mean: NA range: --- - ---	mean: NA range: --- - ---

NA = not applicable

* RADIUS OF CURVATURE RATIO BASED ON OUTSIDE RADIUS OF MEANDER BENDS.

** DESIGNS FOR UT1 AND UT2 WILL USE THE 2007 USACE AND NCDWQ GUIDANCE FOR COASTAL PLAIN HEADWATER STREAMS.

INDEX OF SHEETS

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	OSM-1A

PROJECT ENGINEER

CONST.REV.

R /W REV.

PROJECT ENGINEER

Baker

Michael Baker Engineering Inc.
8000 Regency Parkway
Suite 200
Cary, NORTH CAROLINA 27518
Phone: 919.463.5488
Fax: 919.463.5490

PROGRESS DRAWING
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STREAM CONVENTIONAL SYMBOLS

SUPERCEDES SHEET 1B

LOG VANE

LOG WEIR

ROOT WAD

LOG CROSS VANE

J-HOOK

ROCK VANE

TEMPORARY SILT CHECK

FOOT BRIDGE

TEMPORARY STREAM CROSSING

PERMANENT STREAM CROSSING

ROCK CROSS VANE

BOULDER CLUSTER

SILT FENCE

SAFETY FENCE

TRANSPLANTED VEGETATION

ROCK STEP POOL

SINGLE WING DEFLECTOR

DOUBLE WING DEFLECTOR

SMB — STREAM MITIGATION BUFFER

FLOODPLAIN INTERCEPTOR

NOTE: ALL ITEMS ABOVE MAY NOT BE USED ON THIS PROJECT

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	OSM-1B

Note: Not to Scale

**S.U.E. = Subsurface Utility Engineering*

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 23
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing High Quality Wetland Boundary — HQ WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- River Basin Buffer — RBB
- Flow Arrow
- Disappearing Stream
- Spring
- Swamp Marsh
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Guage — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line
- Proposed Right of Way Line with Iron Pin and Cap Marker
- Proposed Right of Way Line with Concrete or Granite Marker
- Existing Control of Access
- Proposed Control of Access
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Curb Cut for Future Wheel Chair Ramp — CCFR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equaility Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — TV
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?U/TL
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	OSM-2

PROJECT ENGINEER

PROJECT ENGINEER

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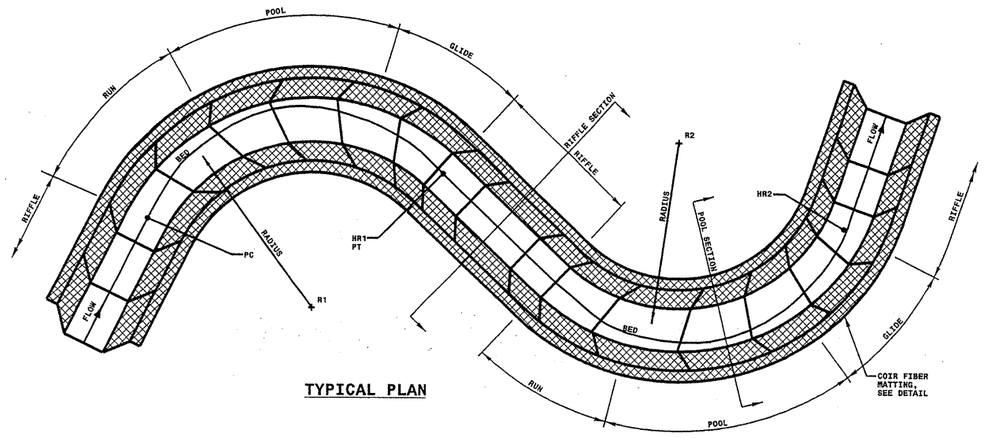
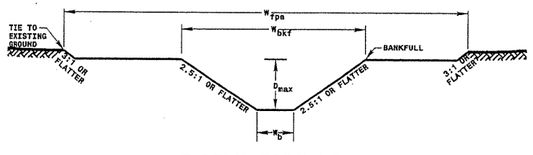
PROGRESS DRAWING
FOR REVIEW PURPOSES ONLY
DO NOT USE FOR CONSTRUCTION

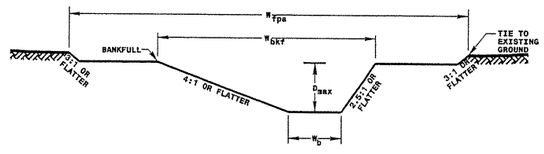
CHANNEL TYPICAL DETAIL
NOT TO SCALE



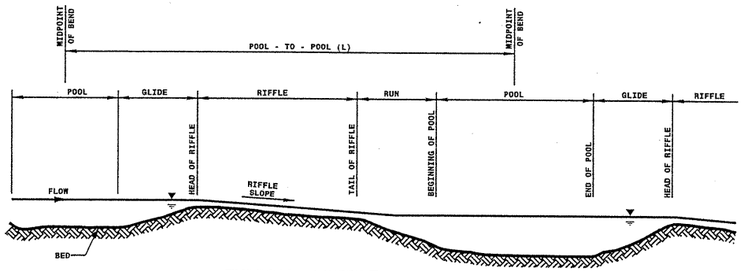
TYPICAL PLAN



TYPICAL RIFFLE WITH BANKFULL BENCH
(REACH M1)



TYPICAL POOL WITH BANKFULL BENCH



TYPICAL PROFILE

W_{bkf} = BANKFULL WIDTH
D_{max} = MAXIMUM DEPTH
W_b = BOTTOM WIDTH
W_{fpa} = FLOOD PRONE AREA WIDTH

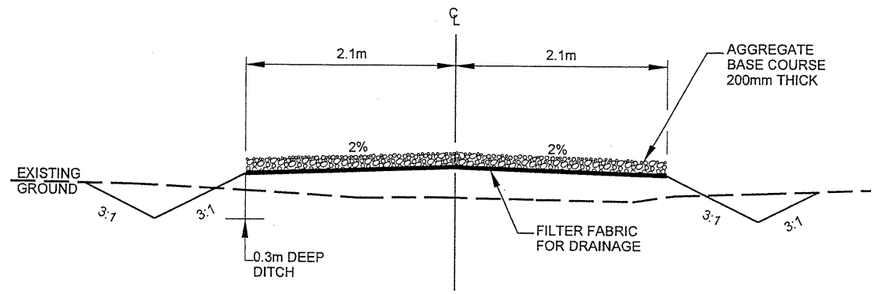
NOTES:
1. THE COORDINATES FOR EACH CENTER OF RADIUS (EX. "R1","R2") ARE INDICATED ON THE PLAN SHEETS.

CROSS-SECTION DIMENSIONS (m)

REACH	RIFFLE				POOL				Width/Depth Ratio
	W_{bkf}	D_{max}	W_b	W_{fpa}	W_{bkf}	D_{max}	W_b	W_{fpa}	
M1, Sta. 10+16-36+85.93	4.08	0.49	1.68	18.90	5.30	0.76	0.73	18.90	12
UT1, Sta. 10+00-12+47.19	*								
UT2, Sta. 10+00-17+42.64	*								

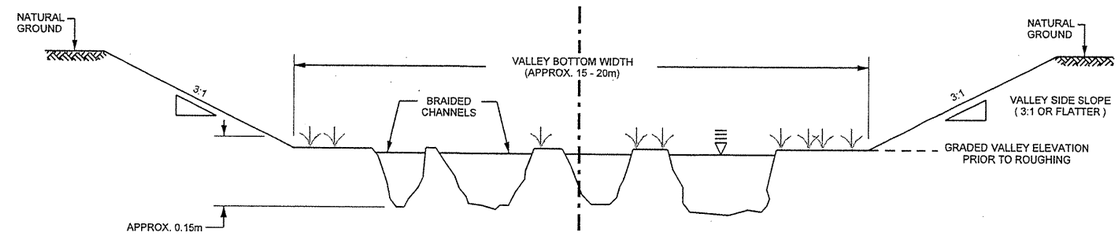
* DESIGNS FOR UT1 AND UT2 DO NOT FOLLOW A TYPICAL TRAPEZOIDAL CHANNEL DESIGN. SEE DETAIL FOR BRAIDED CHANNEL.

RELOCATED FARM PATH



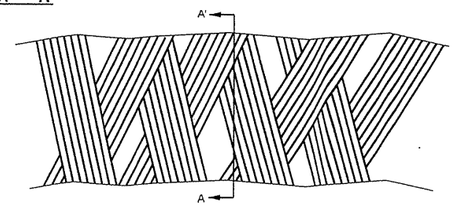
TYPICAL SECTION

BRAIDED CHANNEL DETAIL
NOT TO SCALE
(APPLIES TO UT1 & UT2)

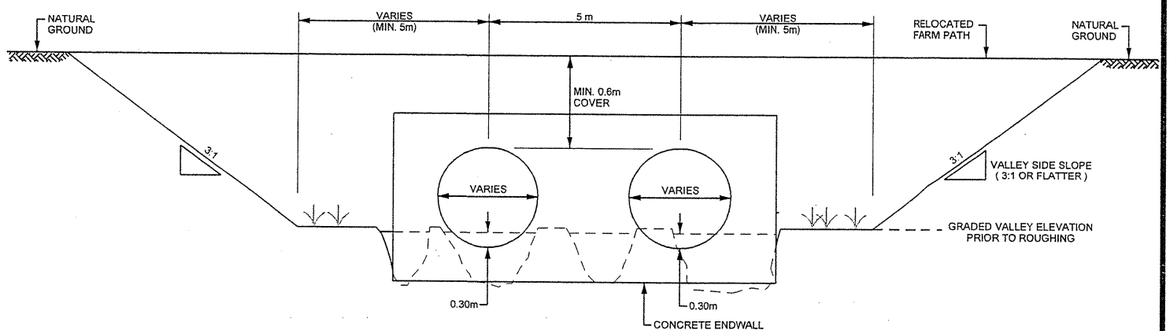


SECTION A - A'

NOTES:
1. REACHES UT1 AND UT2 WILL BE CONSTRUCTED BY FIRST RESTORING VALLEY TOPOGRAPHY AS SHOWN ON THE TYPICAL DIMENSIONS.
2. THE RESTORED VALLEY BOTTOM WILL THEN BE ROUGHENED.
3. BRAIDED CHANNELS WILL BE SHAPED TO FORM SMOOTH TRANSITIONS INTO THE SINGLE THREAD CHANNEL AT THE TIE IN OF M1.
4. UPON COMPLETION OF BRAIDED CHANNEL FEATURES, APPLY MULCH TEMPORARY SEED, AND PERMANENT SEED TO THE CONSTRUCTED VALLEY ACCORDING TO SEDIMENT AND EROSION CONTROL SPECIFICATIONS.



PLAN VIEW OF MICROTOPOGRAPHIC PATTERN

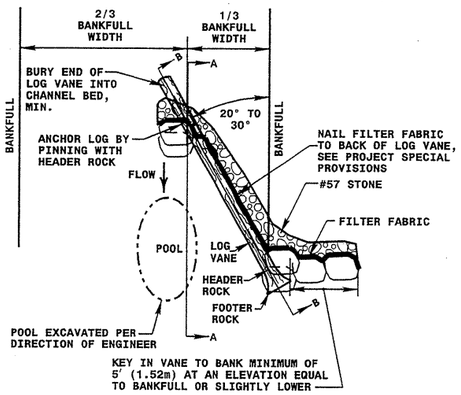


NOTES:
1. TYPICAL SECTION APPLIES TO UT1 AND UT2.
2. CULVERTS ARE TO BE EVENLY SPACED AND PLACED 0.30 METERS BELOW THE BED ELEVATION.
3. MINIMUM OF 0.6 METERS COVER FOR ALL PIPES.

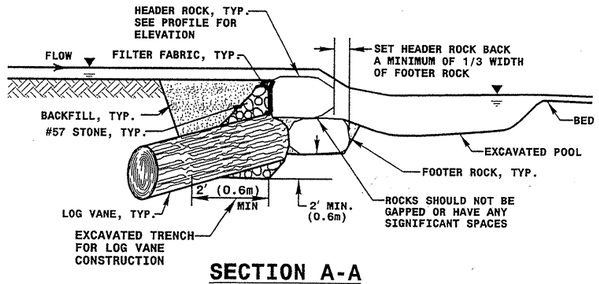
10/26/2011
R:\114046\Design\Plans\R2554_Rdy_dtl_psh_OSM2.dgn

LOG VANE DETAIL

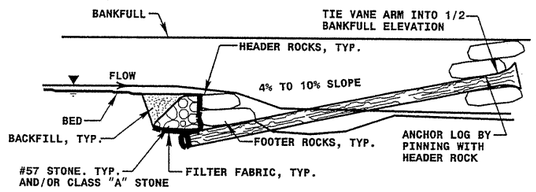
NOT TO SCALE



PLAN VIEW



SECTION A-A



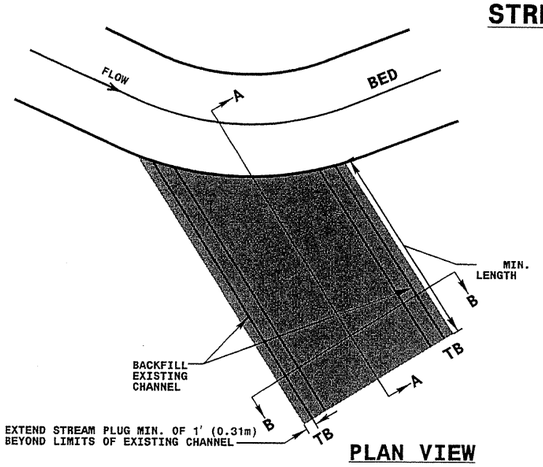
SECTION B-B

BOULDER DIMENSIONS (FT)(M)		
HEIGHT	LENGTH	WIDTH
2' (0.6m)	2' (0.6m)	2' (0.6m)

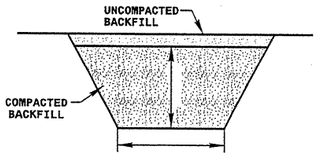
NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

STREAM PLUG

NOT TO SCALE

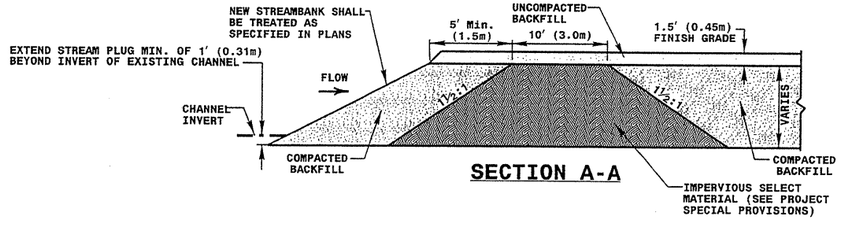


PLAN VIEW

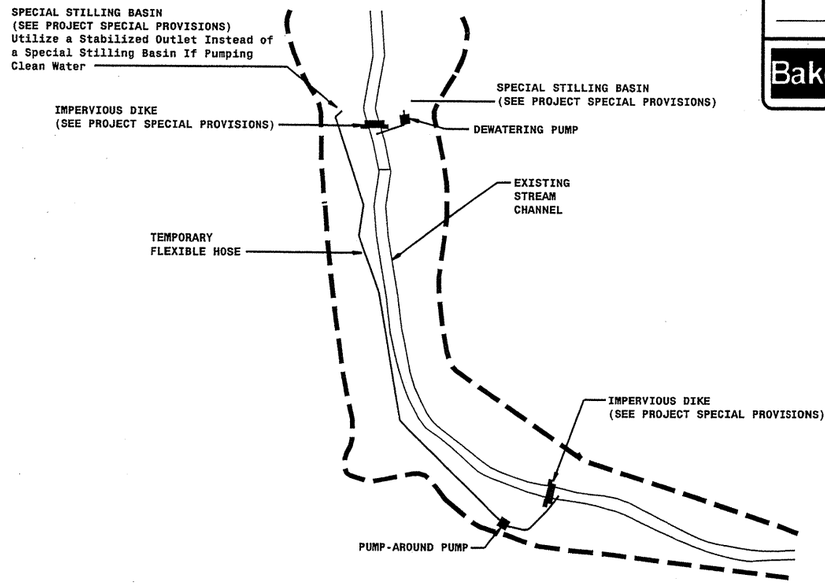


SECTION B-B

NOTES:
1. STREAM PLUG SHALL BE INSTALLED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
2. PLUG SHOULD BE INSTALLED AT THE INTERFACE BETWEEN EXISTING CHANNEL AND PROPOSED CHANNEL.
3. BOTTOM OF PLUG SHOULD BE A MINIMUM OF 1' (0.31m) BELOW THE INVERT OF THE EXISTING CHANNEL.
4. PLUG SHOULD EXTEND A MINIMUM OF 1' (0.31m) BEYOND THE LIMITS OF THE EXISTING STREAM CHANNEL.
5. INSTALL EROSION CONTROL MATTING AND SEED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS IMMEDIATELY AFTER GRADING.
6. COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.



SECTION A-A



NOTES:
1) All excavation shall be performed in only dry or isolated sections of channel.
2) Impervious dikes are to be used to isolate work from stream flow when necessary.
3) All graded areas shall be stabilized within 24 hours.
4) Maintenance of stream flow operations shall be incidental to the work. This includes polyethylene sheeting, diversion pipes, pumps and hoses.
5) Pumps and hoses shall be of sufficicient size to dewater the work area.

SEQUENCE OF CONSTRUCTION FOR TYPICAL WORK AREA

1. INSTALL SPECIAL STILLING BASIN(S)..
2. INSTALL UPSTREAM PUMP AND TEMPORARY FLEXIBLE HOSE.
3. PLACE UPSTREAM IMPERVIOUS DIKE AND BEGIN PUMPING OPERATIONS FOR STREAM DIVERSION.
4. PLACE DOWNSTREAM IMPERVIOUS DIKE AND PUMPING APPARATUS. DEWATER ENTRAPPED AREA. AREA TO BE DEWATERED SHALL BE EQUAL TO ONE DAY'S WORK.
5. PERFORM STREAM RESTORATION WORK IN ACCORDANCE WITH THE PLANS.
6. EXCAVATE ANY ACCUMULATED SILT AND DEWATER BEFORE REMOVAL OF IMPERVIOUS DIKES. REMOVE IMPERVIOUS DIKES, PUMPS, AND TEMPORARY FLEXIBLE HOSE. (DOWNSTREAM IMPERVIOUS DIKES FIRST).
7. ALL GRADING AND STABILIZATION MUST BE COMPLETED IN ONE DAY WITHIN THE PUMP AROUND AREAS BETWEEN THE IMPERVIOUS DIKES. THE IMPERVIOUS DIKE LOCATIONS AS SHOWN ON THIS SHEET ONLY SHOW THE UPPER AND LOWER EXTENT OF WORK FOR EACH STREAM SEGMENT. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LOCATION OF THE IMPERVIOUS DIKE(S) FOR EACH DAY'S WORK.
8. REMOVE SPECIAL STILLING BASIN(S) AND BACKFILL. STABILIZE DISTURBED AREA WITH SEED AND MULCH.

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PROJECT ENGINEER

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PROGRESS DRAWING
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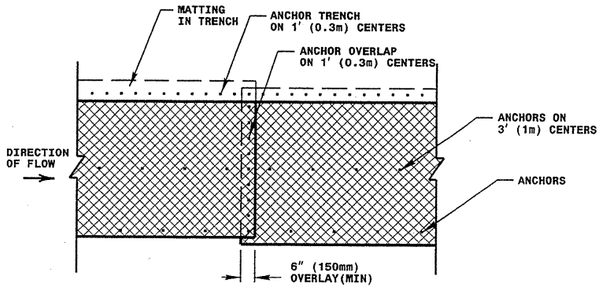
REVISIONS

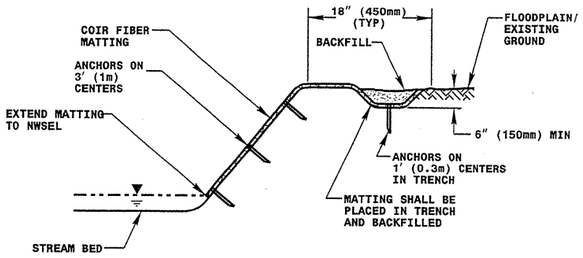
REVISIONS

COIR FIBER MATTING DETAIL

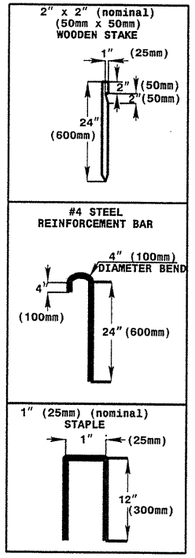
NOT TO SCALE



PLAN VIEW



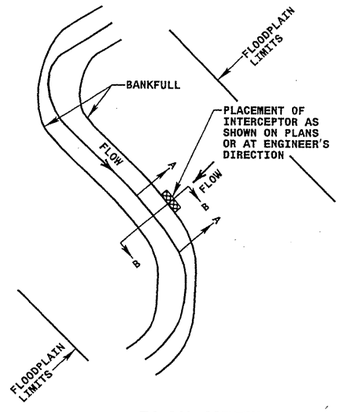
TYPICAL CROSS SECTION



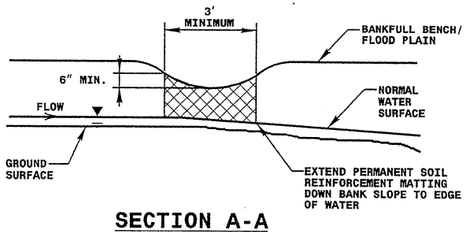
ANCHOR OPTIONS

FLOODPLAIN INTERCEPTOR DETAIL

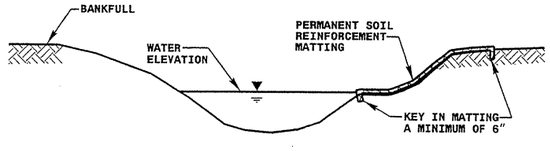
NOT TO SCALE



PLAN VIEW



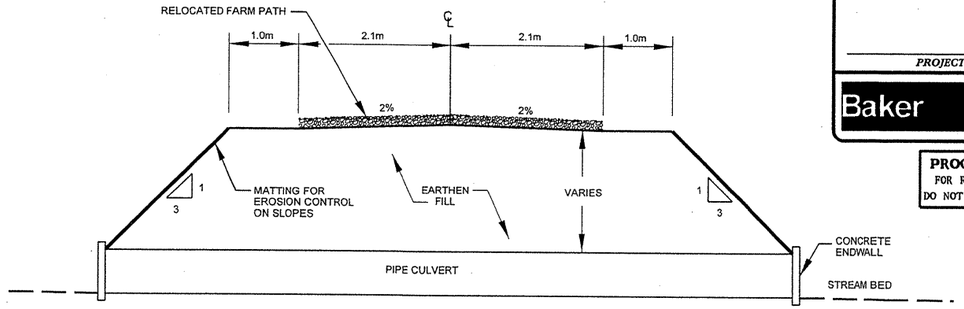
SECTION A-A



SECTION B-B

PERMANENT ROAD CULVERT CROSSING

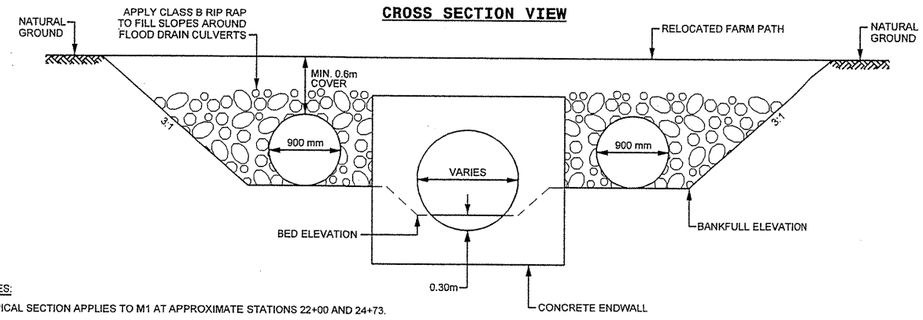
NOT TO SCALE



NOTES:

1. INSTALL PIPE CULVERT IN ACCORDANCE WITH SECTIONS 300 AND 1032.
2. INSTALL MATTING FOR EROSION CONTROL ALONG FILL SLOPES.
3. INSTALL CONCRETE ENDWALLS IN ACCORDANCE WITH SECTION 838.

CROSS SECTION VIEW



NOTES:

1. TYPICAL SECTION APPLIES TO M1 AT APPROXIMATE STATIONS 22+00 AND 24+73.
2. CULVERTS ARE TO BE EVENLY SPACED AND PLACED 0.30 METERS BELOW THE BED ELEVATION.
3. MINIMUM OF 0.6 METERS COVER FOR ALL PIPES.

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PROGRESS DRAWING
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REACH M1 CURVE DATA

M1-1
PI STA = 10+25.77 N = 186,661.9581 E = 698,291.9977
DELTA = 65° 12' 22" (LT)
DEGREE = 498° 13' 27"
TANGENT = 7.36
LENGTH = 13.09
RADIUS = 11.50
PC STA = 10+18.41 N = 186,665.2470 E = 698,285.4185
PT STA = 10+31.50 N = 186,666.5515 E = 698,297.7424

M1-2
PI STA = 10+60.69 N = 186,684.7836 E = 698,320.5443
DELTA = 129° 20' 24" (RT)
DEGREE = 698° 43' 44"
TANGENT = 17.32
LENGTH = 18.51
RADIUS = 8.20
PC STA = 10+43.37 N = 186,673.9649 E = 698,307.0140
PT STA = 10+61.88 N = 186,667.4611 E = 698,320.3343

M1-3
PI STA = 10+80.68 N = 186,648.6609 E = 698,320.1063
DELTA = 123° 27' 17" (LT)
DEGREE = 698° 43' 44"
TANGENT = 15.25
LENGTH = 17.67
RADIUS = 8.20
PC STA = 10+65.44 N = 186,663.9063 E = 698,320.2911
PT STA = 10+83.10 N = 186,656.9112 E = 698,332.9278

M1-4
PI STA = 11+01.79 N = 186,667.0204 E = 698,348.6383
DELTA = 100° 15' 24" (RT)
DEGREE = 698° 43' 44"
TANGENT = 9.82
LENGTH = 14.35
RADIUS = 8.20
PC STA = 10+91.97 N = 186,661.7083 E = 698,340.3828
PT STA = 11+06.32 N = 186,657.9510 E = 698,352.3956

M1-5
PI STA = 11+21.47 N = 186,643.9498 E = 698,358.1961
DELTA = 74° 35' 12" (LT)
DEGREE = 698° 43' 44"
TANGENT = 6.25
LENGTH = 10.67
RADIUS = 8.20
PC STA = 11+15.23 N = 186,649.7195 E = 698,355.8058
PT STA = 11+25.90 N = 186,644.7207 E = 698,364.3935

M1-6
PI STA = 11+44.35 N = 186,646.9972 E = 698,382.6962
DELTA = 99° 03' 28" (RT)
DEGREE = 698° 43' 44"
TANGENT = 9.61
LENGTH = 14.18
RADIUS = 8.20
PC STA = 11+34.73 N = 186,645.8109 E = 698,373.1590
PT STA = 11+48.91 N = 186,637.3921 E = 698,382.3662

M1-7
PI STA = 11+66.45 N = 186,619.8645 E = 698,381.7641
DELTA = 76° 59' 12" (LT)
DEGREE = 572° 57' 28"
TANGENT = 7.95
LENGTH = 13.44
RADIUS = 10.00
PC STA = 11+58.50 N = 186,627.8122 E = 698,382.0371
PT STA = 11+71.93 N = 186,617.8087 E = 698,389.4462
CC N = 186,627.4689 E = 698,392.0312

M1-8
PI STA = 11+96.02 N = 186,611.5834 E = 698,412.7102
DELTA = 113° 09' 50" (RT)
DEGREE = 520° 52' 15"
TANGENT = 16.67
LENGTH = 21.73
RADIUS = 11.00
PC STA = 11+79.35 N = 186,615.8929 E = 698,396.6059
PT STA = 12+01.07 N = 186,598.4725 E = 698,402.4133

M1-9
PI STA = 12+16.74 N = 186,586.1536 E = 698,392.7383
DELTA = 64° 04' 21" (LT)
DEGREE = 572° 57' 28"
TANGENT = 6.26
LENGTH = 11.18
RADIUS = 10.00
PC STA = 12+10.48 N = 186,591.0748 E = 698,396.6033
PT STA = 12+21.66 N = 186,580.5259 E = 698,395.4743

M1-10
PI STA = 12+60.64 N = 186,545.4693 E = 698,412.5177
DELTA = 57° 19' 21" (LT)
DEGREE = 716° 11' 50"
TANGENT = 4.37
LENGTH = 8.00
RADIUS = 8.00
PC STA = 12+56.27 N = 186,549.4020 E = 698,410.6057
PT STA = 12+64.27 N = 186,544.9553 E = 698,416.8602

M1-11
PI STA = 12+83.45 N = 186,542.7009 E = 698,435.9075
DELTA = 96° 40' 35" (RT)
DEGREE = 477° 27' 53"
TANGENT = 13.49
LENGTH = 20.25
RADIUS = 12.00
PC STA = 12+69.97 N = 186,544.2861 E = 698,422.5144
PT STA = 12+90.21 N = 186,529.5829 E = 698,432.7760

M1-12
PI STA = 13+17.08 N = 186,503.4504 E = 698,426.5377
DELTA = 84° 31' 14" (LT)
DEGREE = 477° 27' 53"
TANGENT = 10.90
LENGTH = 17.70
RADIUS = 12.00
PC STA = 13+06.18 N = 186,514.0564 E = 698,429.0695
PT STA = 13+23.88 N = 186,499.9174 E = 698,436.8534

M1-13
PI STA = 13+50.24 N = 186,491.3757 E = 698,461.7936
DELTA = 87° 47' 30" (RT)
DEGREE = 477° 27' 53"
TANGENT = 11.55
LENGTH = 18.39
RADIUS = 12.00
PC STA = 13+38.69 N = 186,495.1168 E = 698,450.8703
PT STA = 13+57.08 N = 186,480.3164 E = 698,458.4762
CC N = 186,483.7641 E = 698,446.9821

M1-14
PI STA = 13+79.16 N = 186,459.1661 E = 698,452.1319
DELTA = 50° 03' 45" (LT)
DEGREE = 716° 11' 50"
TANGENT = 3.74
LENGTH = 6.99
RADIUS = 8.00
PC STA = 13+75.43 N = 186,462.7444 E = 698,453.2053
PT STA = 13+82.42 N = 186,456.0461 E = 698,454.1865

M1-15
PI STA = 14+14.46 N = 186,429.2857 E = 698,471.8085
DELTA = 48° 06' 54" (RT)
DEGREE = 716° 11' 50"
TANGENT = 3.57
LENGTH = 6.72
RADIUS = 8.00
PC STA = 14+10.89 N = 186,432.2685 E = 698,469.8443
PT STA = 14+17.60 N = 186,425.8319 E = 698,470.8992

M1-16
PI STA = 14+44.70 N = 186,399.6255 E = 698,463.9999
DELTA = 111° 03' 29" (LT)
DEGREE = 520° 52' 15"
TANGENT = 16.02
LENGTH = 21.32
RADIUS = 11.00
PC STA = 14+28.68 N = 186,415.1201 E = 698,468.0791
PT STA = 14+50.00 N = 186,401.3861 E = 698,479.9253

M1-17
PI STA = 14+68.95 N = 186,403.4675 E = 698,498.7524
DELTA = 31° 42' 57" (RT)
DEGREE = 381° 58' 19"
TANGENT = 4.26
LENGTH = 8.30
RADIUS = 15.00
PC STA = 14+64.68 N = 186,402.9993 E = 698,494.5172
PT STA = 14+72.99 N = 186,401.6393 E = 698,502.6012

M1-18
PI STA = 15+08.01 N = 186,386.6147 E = 698,534.2326
DELTA = 27° 02' 48" (RT)
DEGREE = 520° 52' 15"
TANGENT = 2.65
LENGTH = 5.19
RADIUS = 11.00
PC STA = 15+05.36 N = 186,387.7498 E = 698,531.8428
PT STA = 15+10.55 N = 186,384.5171 E = 698,535.8448

M1-19
PI STA = 16+02.55 N = 186,311.5729 E = 698,591.9101
DELTA = 92° 46' 30" (RT)
DEGREE = 286° 28' 44"
TANGENT = 20.99
LENGTH = 32.38
RADIUS = 20.00
PC STA = 15+81.56 N = 186,328.2174 E = 698,579.1171
PT STA = 16+13.95 N = 186,299.6007 E = 698,574.6658

M1-20
PI STA = 16+47.59 N = 186,280.4121 E = 698,547.0273
DELTA = 84° 52' 47" (LT)
DEGREE = 698° 43' 44"
TANGENT = 7.50
LENGTH = 12.15
RADIUS = 8.20
PC STA = 16+40.09 N = 186,284.6883 E = 698,553.1855
PT STA = 16+52.24 N = 186,273.8958 E = 698,550.7367

M1-21
PI STA = 16+73.17 N = 186,255.7102 E = 698,561.0890
DELTA = 92° 28' 57" (RT)
DEGREE = 698° 43' 44"
TANGENT = 8.56
LENGTH = 13.24
RADIUS = 8.20
PC STA = 16+64.60 N = 186,263.1521 E = 698,556.8527
PT STA = 16+77.84 N = 186,251.8002 E = 698,553.4706

M1-22
PI STA = 16+95.84 N = 186,243.5820 E = 698,537.4581
DELTA = 96° 19' 19" (LT)
DEGREE = 698° 43' 44"
TANGENT = 9.16
LENGTH = 13.79
RADIUS = 8.20
PC STA = 16+86.68 N = 186,247.7639 E = 698,545.6062
PT STA = 17+00.46 N = 186,235.9439 E = 698,542.5118

M1-23
PI STA = 17+18.11 N = 186,221.2293 E = 698,552.2476
DELTA = 112° 36' 12" (RT)
DEGREE = 698° 43' 44"
TANGENT = 12.30
LENGTH = 16.12
RADIUS = 8.20
PC STA = 17+05.81 N = 186,231.4841 E = 698,545.4626
PT STA = 17+21.93 N = 186,218.9069 E = 698,540.1727

M1-24
PI STA = 17+38.46 N = 186,215.7844 E = 698,523.9376
DELTA = 93° 39' 50" (LT)
DEGREE = 636° 37' 11"
TANGENT = 9.59
LENGTH = 14.71
RADIUS = 9.00
PC STA = 17+28.87 N = 186,217.5965 E = 698,533.3597
PT STA = 17+43.58 N = 186,206.4974 E = 698,526.3482

M1-25
PI STA = 17+61.74 N = 186,188.9175 E = 698,530.9113
DELTA = 110° 25' 33" (RT)
DEGREE = 707° 21' 19"
TANGENT = 11.66
LENGTH = 15.61
RADIUS = 8.10
PC STA = 17+50.08 N = 186,200.2035 E = 698,527.9819
PT STA = 17+65.69 N = 186,190.1110 E = 698,519.3126

M1-26
PI STA = 17+81.82 N = 186,191.7616 E = 698,503.2721
DELTA = 67° 00' 47" (LT)
DEGREE = 707° 21' 19"
TANGENT = 7.69
LENGTH = 12.30
RADIUS = 8.10
PC STA = 17+74.13 N = 186,190.9746 E = 698,510.9201
PT STA = 17+86.43 N = 186,184.1650 E = 698,502.0877

M1-27
PI STA = 18+06.21 N = 186,164.6249 E = 698,499.0411
DELTA = 106° 00' 05" (RT)
DEGREE = 707° 21' 19"
TANGENT = 10.75
LENGTH = 14.99
RADIUS = 8.10
PC STA = 17+95.46 N = 186,175.2459 E = 698,500.6971
PT STA = 18+10.44 N = 186,169.1445 E = 698,489.2881

M1-28
PI STA = 18+27.82 N = 186,176.4491 E = 698,473.5252
DELTA = 88° 13' 47" (LT)
DEGREE = 707° 21' 19"
TANGENT = 7.85
LENGTH = 12.47
RADIUS = 8.10
PC STA = 18+19.96 N = 186,173.1470 E = 698,480.6508
PT STA = 18+32.44 N = 186,169.4289 E = 698,470.0046

M1-29
PI STA = 18+49.11 N = 186,154.5198 E = 698,462.5278
DELTA = 87° 41' 01" (RT)
DEGREE = 707° 21' 19"
TANGENT = 7.78
LENGTH = 12.40
RADIUS = 8.10
PC STA = 18+41.33 N = 186,161.4733 E = 698,466.0150
PT STA = 18+53.73 N = 186,157.7230 E = 698,455.4390

M1-30
PI STA = 18+73.26 N = 186,165.7647 E = 698,437.6429
DELTA = 86° 32' 18" (LT)
DEGREE = 698° 43' 44"
TANGENT = 7.72
LENGTH = 12.39
RADIUS = 8.20
PC STA = 18+65.54 N = 186,162.5861 E = 698,444.6771
PT STA = 18+77.93 N = 186,158.9353 E = 698,434.0454

M1-31
PI STA = 18+96.82 N = 186,142.2168 E = 698,425.2387
DELTA = 75° 39' 39" (RT)
DEGREE = 698° 43' 44"
TANGENT = 6.37
LENGTH = 10.83
RADIUS = 8.20
PC STA = 18+90.45 N = 186,147.8505 E = 698,428.2064
PT STA = 19+01.28 N = 186,143.6967 E = 698,419.0456

M1-32
PI STA = 19+22.05 N = 186,148.5224 E = 698,398.8511
DELTA = 93° 05' 13" (LT)
DEGREE = 698° 43' 44"
TANGENT = 8.65
LENGTH = 13.32
RADIUS = 8.20
PC STA = 19+13.39 N = 186,146.5110 E = 698,407.2683
PT STA = 19+26.71 N = 186,140.0092 E = 698,397.2959

M1-33
PI STA = 19+46.40 N = 186,120.6430 E = 698,393.7582
DELTA = 83° 01' 20" (RT)
DEGREE = 636° 37' 11"
TANGENT = 7.97
LENGTH = 13.04
RADIUS = 9.00
PC STA = 19+38.43 N = 186,128.4790 E = 698,395.1896
PT STA = 19+51.48 N = 186,121.1119 E = 698,385.8064

M1-34
PI STA = 19+71.03 N = 186,122.2630 E = 698,366.2845
DELTA = 97° 01' 43" (LT)
DEGREE = 636° 37' 11"
TANGENT = 10.18
LENGTH = 15.24
RADIUS = 9.00
PC STA = 19+60.85 N = 186,121.6640 E = 698,376.4446
PT STA = 19+76.10 N = 186,112.1060 E = 698,366.9331

M1-35
PI STA = 19+93.78 N = 186,094.4580 E = 698,368.0602
DELTA = 90° 25' 43" (RT)
DEGREE = 636° 37' 11"
TANGENT = 9.07
LENGTH = 14.20
RADIUS = 9.00
PC STA = 19+84.71 N = 186,103.5071 E = 698,367.4823
PT STA = 19+98.92 N = 186,093.9478 E = 698,359.0070

M1-36
PI STA = 20+16.84 N = 186,092.9393 E = 698,341.1119
DELTA = 94° 16' 16" (LT)
DEGREE = 636° 37' 11"
TANGENT = 9.70
LENGTH = 14.81
RADIUS = 9.00
PC STA = 20+07.14 N = 186,093.4849 E = 698,350.7938
PT STA = 20+21.95 N = 186,083.3249 E = 698,342.3772

M1-37
PI STA = 20+38.93 N = 186,066.4931 E = 698,344.5921
DELTA = 91° 12' 57" (RT)
DEGREE = 636° 37' 11"
TANGENT = 9.19
LENGTH = 14.33
RADIUS = 9.00
PC STA = 20+29.73 N = 186,075.6076 E = 698,343.3927
PT STA = 20+44.06 N = 186,065.4874 E = 698,335.4543

M1-38
PI STA = 20+62.29 N = 186,063.4926 E = 698,317.3313
DELTA = 87° 19' 26" (LT)
DEGREE = 636° 37' 11"
TANGENT = 8.59
LENGTH = 13.72
RADIUS = 9.00
PC STA = 20+53.71 N = 186,064.4323 E = 698,325.8689
PT STA = 20+67.42 N = 186,054.9204 E = 698,317.8713

M1-39
PI STA = 20+84.86 N = 186,037.5198 E = 698,318.9677
DELTA = 84° 00' 18" (RT)
DEGREE = 636° 37' 11"
TANGENT = 8.10
LENGTH = 13.20
RADIUS = 9.00
PC STA = 20+76.75 N = 186,045.6081 E = 698,318.4581
PT STA = 20+89.95 N = 186,036.1682 E = 698,310.9768

M1-40
PI STA = 21+09.28 N = 186,032.9449 E = 698,291.9195
DELTA = 95° 15' 11" (LT)
DEGREE = 636° 37' 11"
TANGENT = 9.87
LENGTH = 14.96
RADIUS = 9.00
PC STA = 20+99.41 N = 186,034.5901 E = 698,301.6467
PT STA = 21+14.37 N = 186,023.4091 E = 698,294.4484

M1-41
PI STA = 21+32.83 N = 186,005.5687 E = 698,299.1797
DELTA = 88° 26' 33" (RT)
DEGREE = 636° 37' 11"
TANGENT = 8.76
LENGTH = 13.89
RADIUS = 9.00
PC STA = 21+24.07 N = 186,014.0347 E = 698,296.9345
PT STA = 21+37.96 N = 186,003.0942 E = 698,290.7779

M1-42
PI STA = 21+53.70 N = 185,998.6489 E = 698,275.6844
DELTA = 66° 14' 41" (LT)
DEGREE = 636° 37' 11"
TANGENT = 5.87
LENGTH = 10.41
RADIUS = 9.00
PC STA = 21+47.83 N = 186,000.3079 E = 698,281.3172
PT STA = 21+58.23 N = 185,992.8251 E = 698,274.9337

M1-43
PI STA = 21+72.10 N = 185,979.0677 E = 698,273.1605
DELTA = 22° 57' 57" (RT)
DEGREE = 190° 59' 09"
TANGENT = 6.09
LENGTH = 12.02
RADIUS = 30.00
PC STA = 21+66.01 N = 185,985.1120 E = 698,273.9395
PT STA = 21+78.03 N = 185,973.8065 E = 698,270.0848

M1-44
PI STA = 22+35.09 N = 185,924.5548 E = 698,241.2922
DELTA = 20° 05' 06" (LT)
DEGREE = 143° 14' 22"
TANGENT = 7.08
LENGTH = 14.02
RADIUS = 40.00
PC STA = 22+28.00 N = 185,930.6702 E = 698,244.8672
PT STA = 22+42.02 N = 185,917.5837 E = 698,240.0346

M1-45
PI STA = 22+58.08 N = 185,901.7787 E = 698,237.1835
DELTA = 61° 51' 46" (RT)
DEGREE = 636° 37' 11"
TANGENT = 5.39
LENGTH = 9.72
RADIUS = 9.00
PC STA = 22+52.69 N = 185,907.0861 E = 698,238.1409
PT STA = 22+62.41 N = 185,900.1200 E = 698,232.0518

M1-46
PI STA = 22+80.60 N = 185,894.5250 E = 698,214.7410
DELTA = 86° 26' 46" (LT)
DEGREE = 636° 37' 11"
TANGENT = 8.46
LENGTH = 13.58
RADIUS = 9.00
PC STA = 22+72.14 N = 185,897.1263 E = 698,222.7894
PT STA = 22+85.72 N = 185,886.3308 E = 698,216.8384

M1-47
PI STA = 23+02.91 N = 185,869.6622 E = 698,221.0999
DELTA = 92° 53' 00" (RT)
DEGREE = 636° 37' 11"
TANGENT = 9.46
LENGTH = 14.59
RADIUS = 9.00
PC STA = 22+93.44 N = 185,878.8513 E = 698,218.7529
PT STA = 23+08.03 N = 185,867.7994 E = 698,211.8243

M1-48
PI STA = 23+27.40 N = 185,863.9474 E = 698,192.8472
DELTA = 92° 18' 42" (LT)
DEGREE = 636° 37' 11"
TANGENT = 9.37
LENGTH = 14.50
RADIUS = 9.00
PC STA = 23+18.03 N = 185,865.8115 E = 698,202.0305
PT STA = 23+32.53 N = 185,854.8468 E = 698,195.0801

M1-49
PI STA = 23+51.39 N = 185,836.5290 E = 698,199.5745
DELTA = 101° 21' 56" (RT)
DEGREE = 636° 37' 11"
TANGENT = 10.99
LENGTH = 15.92
RADIUS = 9.00
PC STA = 23+40.40 N = 185,847.2016 E = 698,196.9559
PT STA = 23+56.32 N = 185,836.0650 E = 698,188.5952

M1-50
PI STA = 23+74.84 N = 185,835.2830 E = 698,170.0926
DELTA = 97° 11' 38" (LT)
DEGREE = 636° 37' 11"
TANGENT = 10.21
LENGTH = 15.27
RADIUS = 9.00
PC STA = 23+64.63 N = 185,835.7140 E = 698,180.2909
PT STA = 23+79.90 N = 185,825.2190 E = 698,171.7973

M1-51
PI STA = 23+97.67 N = 185,807.6997 E = 698,174.7648
DELTA = 93° 36' 00" (RT)
DEGREE = 636° 37' 11"
TANGENT = 9.58
LENGTH = 14.70
RADIUS = 9.00
PC STA =-23+88.08 N = 185,817.1491 E = 698,173.1642
PT STA = 24+02.79 N = 185,806.6956 E = 698,165.2336

M1-52
PI STA = 24+29.65 N = 185,803.8815 E = 698,138.5224
DELTA = 116° 41' 47" (LT)
DEGREE = 477° 27' 53"
TANGENT = 19.47
LENGTH = 24.44
RADIUS = 12.00
PC STA = 24+10.18 N = 185,805.9210 E = 698,157.8816
PT STA = 24+34.62 N = 185,787.5024 E = 698,149.0419

M1-53
PI STA = 24+52.88 N = 185,772.1364 E = 698,158.9106
DELTA = 37° 06' 12" (RT)
DEGREE = 477° 27' 53"
TANGENT = 4.03
LENGTH = 7.77
RADIUS = 12.00
PC STA = 24+48.85 N = 185,775.5249 E = 698,156.7344
PT STA = 24+56.63 N = 185,768.1210 E = 698,158.6022

M1-54
PI STA = 24+95.44 N = 185,729.4254 E = 698,155.6295
DELTA = 85° 36' 26" (RT)
DEGREE = 572° 57' 28"
TANGENT = 9.26
LENGTH = 14.94
RADIUS = 10.00
PC STA = 24+86.17 N = 185,738.6595 E = 698,156.3389
PT STA = 25+01.12 N = 185,729.4254 E = 698,146.3683

M1-55
PI STA = 25+20.56 N = 185,729.4254 E = 698,126.9251
DELTA = 87° 17' 33" (LT)
DEGREE = 636° 37' 11"
TANGENT = 8.56
LENGTH = 13.71
RADIUS = 9.00
PC STA = 25+11.97 N = 185,729.4254 E = 698,135.5095
PT STA = 25+25.69 N = 185,720.8506 E = 698,126.5196

REVISIONS

10/26/2011
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PROJECT REFERENCE NO.	SHEET NO.
R-2554A	OSM-2C

PROJECT ENGINEER

PROJECT ENGINEER

Baker
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PROGRESS DRAWING
FOR REVIEW PURPOSES ONLY
DO NOT USE FOR CONSTRUCTION

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REVISIONS

REACH M1 CURVE DATA

M1-56
PI STA = 25+47.95 N = 185,698.6157 E = 698,125.4681
DELTA = 93° 02' 19" (RT)
DEGREE = 636° 37' 11"
TANGENT = 9.49
LENGTH = 14.61
RADIUS = 9.00
PC STA = 25+38.45 N = 185,708.0956 E = 698,125.9164
PT STA = 25+53.07 N = 185,699.5659 E = 698,116.0253

M1-57
PI STA = 25+72.48 N = 185,701.5096 E = 698,096.7102
DELTA = 93° 07' 29" (LT)
DEGREE = 636° 37' 11"
TANGENT = 9.50
LENGTH = 14.63
RADIUS = 9.00
PC STA = 25+62.98 N = 185,700.5579 E = 698,106.1672
PT STA = 25+77.61 N = 185,692.0148 E = 698,096.2755

M1-58
PI STA = 25+96.47 N = 185,673.1737 E = 698,095.4128
DELTA = 92° 38' 28" (RT)
DEGREE = 636° 37' 11"
TANGENT = 9.42
LENGTH = 14.55
RADIUS = 9.00
PC STA = 25+87.04 N = 185,682.5886 E = 698,095.8439
PT STA = 26+01.59 N = 185,674.0382 E = 698,086.0278

M1-59
PI STA = 26+20.40 N = 185,675.7632 E = 698,067.2998
DELTA = 97° 27' 06" (LT)
DEGREE = 636° 37' 11"
TANGENT = 10.25
LENGTH = 15.31
RADIUS = 9.00
PC STA = 26+10.15 N = 185,674.8227 E = 698,077.5104
PT STA = 26+25.45 N = 185,665.5169 E = 698,067.6915

M1-60
PI STA = 26+43.05 N = 185,647.9357 E = 698,068.3635
DELTA = 98° 21' 27" (RT)
DEGREE = 636° 37' 11"
TANGENT = 10.42
LENGTH = 15.45
RADIUS = 9.00
PC STA = 26+32.63 N = 185,658.3468 E = 698,067.9655
PT STA = 26+48.08 N = 185,649.0552 E = 698,058.0050

M1-61
PI STA = 26+65.58 N = 185,650.9354 E = 698,040.6084
DELTA = 89° 02' 02" (LT)
DEGREE = 636° 37' 11"
TANGENT = 8.85
LENGTH = 13.99
RADIUS = 9.00
PC STA = 26+56.73 N = 185,649.9845 E = 698,049.4067
PT STA = 26+70.71 N = 185,642.1544 E = 698,039.5093

M1-62
PI STA = 26+88.26 N = 185,624.7425 E = 698,037.3299
DELTA = 92° 41' 30" (RT)
DEGREE = 636° 37' 11"
TANGENT = 9.43
LENGTH = 14.56
RADIUS = 9.00
PC STA = 26+78.83 N = 185,634.1025 E = 698,038.5015
PT STA = 26+93.39 N = 185,626.3524 E = 698,028.0352

M1-63
PI STA = 27+10.05 N = 185,629.1954 E = 698,011.6205
DELTA = 91° 56' 24" (LT)
DEGREE = 636° 37' 11"
TANGENT = 9.31
LENGTH = 14.44
RADIUS = 9.00
PC STA = 27+00.74 N = 185,627.6066 E = 698,020.7939
PT STA = 27+15.18 N = 185,619.9735 E = 698,010.3431

M1-64
PI STA = 27+34.91 N = 185,600.4318 E = 698,007.6363
DELTA = 87° 08' 00" (RT)
DEGREE = 636° 37' 11"
TANGENT = 8.56
LENGTH = 13.69
RADIUS = 9.00
PC STA = 27+26.35 N = 185,608.9115 E = 698,008.8108
PT STA = 27+40.03 N = 185,601.1809 E = 697,999.1085

M1-65
PI STA = 27+59.74 N = 185,602.9050 E = 697,979.4788
DELTA = 91° 41' 05" (LT)
DEGREE = 636° 37' 11"
TANGENT = 9.27
LENGTH = 14.40
RADIUS = 9.00
PC STA = 27+50.47 N = 185,602.0941 E = 697,988.7118
PT STA = 27+64.87 N = 185,593.6522 E = 697,978.9396

M1-66
PI STA = 27+83.15 N = 185,575.4081 E = 697,977.8764
DELTA = 92° 39' 57" (RT)
DEGREE = 636° 37' 11"
TANGENT = 9.43
LENGTH = 14.56
RADIUS = 9.00
PC STA = 27+73.72 N = 185,584.8210 E = 697,978.4249
PT STA = 27+88.27 N = 185,576.3939 E = 697,968.4993

M1-67
PI STA = 28+06.61 N = 185,578.3108 E = 697,950.2638
DELTA = 99° 20' 47" (LT)
DEGREE = 636° 37' 11"
TANGENT = 10.60
LENGTH = 15.61
RADIUS = 9.00
PC STA = 27+96.01 N = 185,577.2024 E = 697,960.8081
PT STA = 28+11.61 N = 185,567.7265 E = 697,950.8825

M1-68
PI STA = 28+29.03 N = 185,550.3421 E = 697,951.8986
DELTA = 99° 02' 16" (RT)
DEGREE = 636° 37' 11"
TANGENT = 10.54
LENGTH = 15.56
RADIUS = 9.00
PC STA = 28+18.48 N = 185,560.8688 E = 697,951.2833
PT STA = 28+34.04 N = 185,551.3880 E = 697,941.4059

M1-69
PI STA = 28+52.03 N = 185,553.1721 E = 697,923.5082
DELTA = 96° 29' 50" (LT)
DEGREE = 636° 37' 11"
TANGENT = 10.08
LENGTH = 15.16
RADIUS = 9.00
PC STA = 28+41.94 N = 185,552.1720 E = 697,933.5416
PT STA = 28+57.10 N = 185,543.0900 E = 697,923.6498

M1-70
PI STA = 28+74.56 N = 185,525.6326 E = 697,923.8950
DELTA = 92° 38' 12" (RT)
DEGREE = 636° 37' 11"
TANGENT = 9.42
LENGTH = 14.55
RADIUS = 9.00
PC STA = 28+65.14 N = 185,535.0557 E = 697,923.7626
PT STA = 28+79.69 N = 185,525.9339 E = 697,914.4758

M1-71
PI STA = 28+99.22 N = 185,526.5582 E = 697,894.9568
DELTA = 100° 36' 27" (LT)
DEGREE = 636° 37' 11"
TANGENT = 10.84
LENGTH = 15.80
RADIUS = 9.00
PC STA = 28+88.37 N = 185,526.2116 E = 697,905.7933
PT STA = 29+04.18 N = 185,515.8431 E = 697,896.6109

M1-72
PI STA = 29+20.77 N = 185,499.4452 E = 697,899.1423
DELTA = 88° 34' 26" (RT)
DEGREE = 636° 37' 11"
TANGENT = 8.78
LENGTH = 13.91
RADIUS = 9.00
PC STA = 29+11.99 N = 185,508.1212 E = 697,897.8029
PT STA = 29+25.90 N = 185,497.8904 E = 697,890.5023

M1-73
PI STA = 29+43.20 N = 185,494.8267 E = 697,873.4776
DELTA = 95° 39' 42" (LT)
DEGREE = 636° 37' 11"
TANGENT = 9.94
LENGTH = 15.03
RADIUS = 9.00
PC STA = 29+33.27 N = 185,496.5866 E = 697,883.2569
PT STA = 29+48.29 N = 185,485.2688 E = 697,876.1936

M1-74
PI STA = 29+65.20 N = 185,469.0066 E = 697,880.8147
DELTA = 90° 54' 09" (RT)
DEGREE = 636° 37' 11"
TANGENT = 9.14
LENGTH = 14.28
RADIUS = 9.00
PC STA = 29+56.06 N = 185,477.8013 E = 697,878.3156
PT STA = 29+70.33 N = 185,466.6463 E = 697,871.9817

M1-75
PI STA = 29+90.09 N = 185,461.5473 E = 697,852.8994
DELTA = 104° 04' 29" (LT)
DEGREE = 636° 37' 11"
TANGENT = 11.53
LENGTH = 16.35
RADIUS = 9.00
PC STA = 29+78.55 N = 185,464.5251 E = 697,864.0434
PT STA = 29+94.90 N = 185,451.4620 E = 697,858.4979

M1-76
PI STA = 30+12.58 N = 185,436.0053 E = 697,867.0782
DELTA = 102° 29' 29" (RT)
DEGREE = 636° 37' 11"
TANGENT = 11.21
LENGTH = 16.10
RADIUS = 9.00
PC STA = 30+01.37 N = 185,445.8082 E = 697,861.6365
PT STA = 30+17.46 N = 185,432.8126 E = 697,856.3304

M1-77
PI STA = 30+35.03 N = 185,427.8122 E = 697,839.4968
DELTA = 97° 16' 00" (LT)
DEGREE = 636° 37' 11"
TANGENT = 10.22
LENGTH = 15.28
RADIUS = 9.00
PC STA = 30+24.81 N = 185,430.7225 E = 697,849.2941
PT STA = 30+40.08 N = 185,418.4617 E = 697,843.6229

M1-78
PI STA = 30+57.93 N = 185,402.1361 E = 697,850.8270
DELTA = 97° 24' 24" (RT)
DEGREE = 636° 37' 11"
TANGENT = 10.25
LENGTH = 15.30
RADIUS = 9.00
PC STA = 30+47.68 N = 185,411.5097 E = 697,846.6906
PT STA = 30+62.98 N = 185,399.2426 E = 697,840.9983

M1-79
PI STA = 30+81.79 N = 185,393.9305 E = 697,822.9537
DELTA = 104° 41' 16" (LT)
DEGREE = 636° 37' 11"
TANGENT = 11.66
LENGTH = 16.44
RADIUS = 9.00
PC STA = 30+70.13 N = 185,397.2242 E = 697,834.1420
PT STA = 30+86.57 N = 185,383.9429 E = 697,828.9766

M1-80
PI STA = 31+04.61 N = 185,368.4942 E = 697,838.2927
DELTA = 96° 41' 45" (RT)
DEGREE = 636° 37' 11"
TANGENT = 10.12
LENGTH = 15.19
RADIUS = 9.00
PC STA = 30+94.50 N = 185,377.1590 E = 697,833.0675
PT STA = 31+09.69 N = 185,364.3149 E = 697,829.0778

M1-81
PI STA = 31+27.77 N = 185,356.8472 E = 697,812.6121
DELTA = 96° 14' 07" (LT)
DEGREE = 636° 37' 11"
TANGENT = 10.04
LENGTH = 15.12
RADIUS = 9.00
PC STA = 31+17.73 N = 185,360.9928 E = 697,821.7528
PT STA = 31+32.85 N = 185,348.2108 E = 697,817.7260

M1-82
PI STA = 31+49.82 N = 185,333.6087 E = 697,826.3723
DELTA = 92° 25' 45" (RT)
DEGREE = 636° 37' 11"
TANGENT = 9.39
LENGTH = 14.52
RADIUS = 9.00
PC STA = 31+40.43 N = 185,341.6884 E = 697,821.5881
PT STA = 31+54.94 N = 185,329.1712 E = 697,818.0972

M1-83
PI STA = 31+74.54 N = 185,319.9124 E = 697,800.8310
DELTA = 98° 54' 16" (LT)
DEGREE = 636° 37' 11"
TANGENT = 10.52
LENGTH = 15.54
RADIUS = 9.00
PC STA = 31+64.02 N = 185,324.8839 E = 697,810.1021
PT STA = 31+79.55 N = 185,311.5226 E = 697,807.1776

M1-84
PI STA = 31+97.59 N = 185,297.1351 E = 697,818.0614
DELTA = 100° 14' 10" (RT)
DEGREE = 636° 37' 11"
TANGENT = 10.77
LENGTH = 15.75
RADIUS = 9.00
PC STA = 31+86.82 N = 185,305.7250 E = 697,811.5634
PT STA = 32+02.57 N = 185,292.2670 E = 697,808.4535

M1-85
PI STA = 32+21.83 N = 185,283.5594 E = 697,791.2676
DELTA = 109° 14' 17" (LT)
DEGREE = 636° 37' 11"
TANGENT = 12.67
LENGTH = 17.16
RADIUS = 9.00
PC STA = 32+09.16 N = 185,289.2873 E = 697,802.5725
PT STA = 32+26.32 N = 185,274.7731 E = 697,800.4005

M1-86
PI STA = 32+45.17 N = 185,261.7011 E = 697,813.9883
DELTA = 103° 31' 41" (RT)
DEGREE = 636° 37' 11"
TANGENT = 11.42
LENGTH = 16.26
RADIUS = 9.00
PC STA = 32+33.75 N = 185,269.6201 E = 697,805.7569
PT STA = 32+50.01 N = 185,255.5505 E = 697,804.3635

M1-87
PI STA = 32+67.72 N = 185,246.0160 E = 697,789.4435
DELTA = 104° 34' 20" (LT)
DEGREE = 636° 37' 11"
TANGENT = 11.64
LENGTH = 16.43
RADIUS = 9.00
PC STA = 32+56.08 N = 185,252.2833 E = 697,799.2508
PT STA = 32+72.51 N = 185,238.1010 E = 697,797.9767

M1-88
PI STA = 32+88.94 N = 185,226.9238 E = 697,810.0270
DELTA = 81° 37' 54" (RT)
DEGREE = 572° 57' 28"
TANGENT = 8.64
LENGTH = 14.25
RADIUS = 10.00
PC STA = 32+80.31 N = 185,232.7971 E = 697,803.6949
PT STA = 32+94.55 N = 185,219.8044 E = 697,805.1377

M1-89
PI STA = 33+22.38 N = 185,196.8675 E = 697,789.3859
DELTA = 52° 03' 18" (LT)
DEGREE = 381° 58' 19"
TANGENT = 7.32
LENGTH = 13.63
RADIUS = 15.00
PC STA = 33+15.05 N = 185,202.9057 E = 697,793.5326
PT STA = 33+28.68 N = 185,189.8845 E = 697,791.5978

M1-90
PI STA = 33+76.53 N = 185,144.2722 E = 697,806.0457
DELTA = 42° 58' 03" (LT)
DEGREE = 358° 05' 55"
TANGENT = 6.30
LENGTH = 12.00
RADIUS = 16.00
PC STA = 33+70.23 N = 185,150.2755 E = 697,804.1442
PT STA = 33+82.23 N = 185,141.1754 E = 697,811.5290

M1-91
PI STA = 34+17.14 N = 185,124.0089 E = 697,841.9243
DELTA = 90° 38' 12" (RT)
DEGREE = 572° 57' 28"
TANGENT = 10.11
LENGTH = 15.82
RADIUS = 10.00
PC STA = 34+07.03 N = 185,128.9815 E = 697,833.1197
PT STA = 34+22.84 N = 185,115.2601 E = 697,836.8542

M1-92
PI STA = 34+40.94 N = 185,099.6005 E = 697,827.7791
DELTA = 100° 57' 56" (LT)
DEGREE = 636° 37' 11"
TANGENT = 10.91
LENGTH = 15.86
RADIUS = 9.00
PC STA = 34+30.03 N = 185,109.0410 E = 697,833.2501
PT STA = 34+45.89 N = 185,096.0252 E = 697,838.0879

M1-93
PI STA = 34+62.43 N = 185,090.6045 E = 697,853.7173
DELTA = 96° 10' 21" (RT)
DEGREE = 636° 37' 11"
TANGENT = 10.03
LENGTH = 15.11
RADIUS = 9.00
PC STA = 34+52.41 N = 185,093.8897 E = 697,844.2450
PT STA = 34+67.52 N = 185,081.5404 E = 697,849.4327

M1-94
PI STA = 34+84.85 N = 185,065.8666 E = 697,842.0236
DELTA = 94° 57' 45" (LT)
DEGREE = 636° 37' 11"
TANGENT = 9.82
LENGTH = 14.92
RADIUS = 9.00
PC STA = 34+75.04 N = 185,074.7405 E = 697,846.2183
PT STA = 34+89.95 N = 185,062.4553 E = 697,851.2271

M1-95
PI STA = 35+09.95 N = 185,055.5066 E = 697,869.9737
DELTA = 99° 53' 56" (RT)
DEGREE = 636° 37' 11"
TANGENT = 10.71
LENGTH = 15.69
RADIUS = 9.00
PC STA = 34+99.24 N = 185,059.2277 E = 697,859.9346
PT STA = 35+14.93 N = 185,046.2566 E = 697,864.5822

M1-96
PI STA = 35+32.93 N = 185,030.7077 E = 697,855.5192
DELTA = 95° 52' 40" (LT)
DEGREE = 636° 37' 11"
TANGENT = 9.97
LENGTH = 15.06
RADIUS = 9.00
PC STA = 35+22.96 N = 185,039.3248 E = 697,860.5418
PT STA = 35+38.02 N = 185,026.5939 E = 697,864.6054

M1-97
PI STA = 35+56.64 N = 185,018.9117 E = 697,881.5731
DELTA = 103° 10' 31" (RT)
DEGREE = 636° 37' 11"
TANGENT = 11.35
LENGTH = 16.21
RADIUS = 9.00
PC STA = 35+45.29 N = 185,023.5930 E = 697,871.2334
PT STA = 35+61.50 N = 185,009.9111 E = 697,874.6583

M1-98
PI STA = 35+78.20 N = 184,996.6654 E = 697,864.4820
DELTA = 95° 31' 12" (LT)
DEGREE = 636° 37' 11"
TANGENT = 9.91
LENGTH = 15.00
RADIUS = 9.00
PC STA = 35+68.29 N = 185,004.5253 E = 697,870.5205
PT STA = 35+83.29 N = 184,991.4109 E = 697,872.8863

M1-99
PI STA = 36+06.90 N = 184,978.8964 E = 697,892.9030
DELTA = 121° 33' 25" (RT)
DEGREE = 636° 37' 11"
TANGENT = 16.09
LENGTH = 19.09
RADIUS = 9.00
PC STA = 35+90.81 N = 184,987.4258 E = 697,879.2604
PT STA = 36+09.91 N = 184,971.7351 E = 697,878.4951

M1-100
PI STA = 36+28.71 N = 184,963.3675 E = 697,861.6601
DELTA = 77° 09' 00" (LT)
DEGREE = 381° 58' 19"
TANGENT = 11.96
LENGTH = 20.20
RADIUS = 15.00
PC STA = 36+16.74 N = 184,968.6924 E = 697,872.3734
PT STA = 36+36.94 N = 184,951.7382 E = 697,864.4690

REACH UT1 CURVE DATA

UT1-1
PI STA = 12+32.24 N = 185,713.0530 E = 698,097.2388
DELTA = 60° 51' 35" (RT)
DEGREE = 286° 28' 44"
TANGENT = 11.75
LENGTH = 21.24
RADIUS = 20.00
PC STA = 12+20.49 N = 185,719.2370 E = 698,087.2502
PT STA = 12+41.73 N = 185,701.3173 E = 698,096.7014

REACH UT2 CURVE DATA

UT2-1
PI STA = 11+94.60 N = 185,582.0972 E = 698,546.4462
DELTA = 58° 03' 53" (RT)
DEGREE = 190° 59' 09"
TANGENT = 16.65
LENGTH = 30.40
RADIUS = 30.00
PC STA = 11+77.95 N = 185,597.2745 E = 698,553.2961
PT STA = 12+08.35 N = 185,579.8823 E = 698,529.9427

UT2-2
PI STA = 14+12.23 N = 185,552.7617 E = 698,327.8718
DELTA = 14° 40' 21" (RT)
DEGREE = 38° 11' 50"
TANGENT = 19.31
LENGTH = 38.41
RADIUS = 150.00
PC STA = 13+92.92 N = 185,555.3306 E = 698,347.0120
PT STA = 14+31.33 N = 185,555.1247 E = 698,308.7051

UT2-3
PI STA = 16+03.14 N = 185,576.1464 E = 698,138.1922
DELTA = 17° 11' 45" (RT)
DEGREE = 57° 17' 45"
TANGENT = 15.12
LENGTH = 30.01
RADIUS = 100.00
PC STA = 15+88.02 N = 185,574.2964 E = 698,153.1986
PT STA = 16+18.03 N = 185,582.3503 E = 698,124.4037

UT2-4
PI STA = 15+85.61 N = 185,568.5781 E = 698,155.0135
DELTA = 19° 11' 16" (RT)
DEGREE = 57° 17' 45"
TANGENT = 16.90
LENGTH = 33.49
RADIUS = 100.00
PC STA = 15+68.71 N = 185,567.0942 E = 698,171.8511
PT STA = 16+02.20 N = 185,575.5135 E = 698,139.5990

REVISIONS

CONSTRUCTION SEQUENCE

The Contractor is responsible for following the sequence of construction in accordance with the plans and provisions, as directed by the Engineer. Construction shall proceed in the following manner unless otherwise directed by the Engineer.

The length of stream that is isolated as a daily work area is left to Contractor's discretion in accordance with the following provisions:

1. All project operations will comply with the provided Sediment and Erosion Control Plan.
2. The project consists of three stream reaches (Reaches M1, UT1, and UT2). Once work begins on a stream reach, the Contractor must complete that site before moving work crews and equipment to a different stream reach.
3. Before water is turned into the new channel, each reach of stream must be a completed work product, i.e. all bank and channel modifications, including excavation, grading, fill, seeding and mulching and matting, as directed by the engineer.

The following general provisions will apply to each stream reach:

1. Layout location of the new stream channel, construction easement limits, and set grade stakes. The Engineer must inspect and approve all layout work before construction may begin.
2. Mobilize equipment and materials to the site.
3. Set up staging areas, construction entrances, and safety fences.
4. Open construction area shall be minimized - the Contractor shall not begin more work than can be completed in a day.
5. The Contractor shall work in the dry. Pump-around operations will be required.
6. Apply mulch, temporary, and permanent seeding as work areas are completed and approved by the Engineer.
7. Repair construction entrances and demobilize equipment from the site.

The following provisions are provided for each stream site:

Reach M1

1. Contractor shall begin by excavating bench limits as indicated on the plans.
2. Install pump-around operations as required to construct new channel and in-stream structures in the dry.
3. Beginning at the upstream end of the reach, begin installing structures and stabilizing banks as indicated on the plans.
4. Contractor shall install the culvert crossings as specified on the plans at approximate stations 22+00 and 24+73.
5. Remove pump-around operations and ensure compliance with the sediment and erosion control plan prior to leaving the site.

Reach UT1

1. Contractor shall begin by excavating grading limits as indicated on the plans.
2. Reconstruct valley topography as indicated on the plans.
3. Contractor shall install the culvert crossing as specified on the plans at approximate station 11+76.
4. Remove equipment and ensure compliance with the sediment and erosion control plan prior to leaving the site.

Reach UT2

1. Contractor shall begin by excavating grading limits as indicated on the plans.
2. Reconstruct valley topography as indicated on the plans.
3. Contractor shall install the culvert crossings as specified on the plans at approximate station 16+95.
4. Remove equipment and ensure compliance with the sediment and erosion control plan prior to leaving the site.

PROJECT REFERENCE NO.	SHEET NO.
R-2554	OSM-3

PROJECT ENGINEER

PROJECT ENGINEER

Baker
Michael Baker Engineering Inc.
8000 Regency Parkway
Suite 200
Cary, NORTH CAROLINA 27518
Phone: 919.463.5488
Fax: 919.463.5490

PROGRESS DRAWING
FOR REVIEW PURPOSES ONLY
DO NOT USE FOR CONSTRUCTION

SUMMARY OF QUANTITIES

DESC	SECT	QUANTITY	UNIT	ITEM DESCRIPTION
0420000000-M	310	20	M	1650 mm RC Pipe Culvert - Class III
0396000000-M	310	30	M	1050 mm RC Pipe Culvert - Class III
0390000000-M	310	100	M	900 mm RC Pipe Culvert - Class III
1121000000-M	520	1550	MTON	Aggregate Base Course
0000100000-N	800	1	LS	Mobillization/Demobilization
2209000000-M	838	13	M3	Endwalls -1650mm Single RCP
2209000000-M	838	5.0	M3	Endwalls - 1050mm Double RCP
2209000000-M	838	3.5	M3	Endwalls - 900mm Double RCP
3656000000-M	876	6000	M2	Filter Fabric for Drainage
3642000000-M	876	10	MTON	Plain Rip Rap, Class A
3649000000-M	876	20	MTON	Plain Rip Rap, Class B
6133000000-N	SP	1	LS	Construction Surveying for Mitigation
6133000000-N	SP	1	LS	Grading for Mitigation
1077000000-M	SP	14	MTON	No. 57 Stone
6133000000-N	SP	1	LS	Diversion Pumping for Mitigation
3651000000-M	SP	90	MTON	Boulders
6133000000-N	SP	29	EACH	Log Vane
6133000000-N	SP	11500	M2	Coir Fiber Matting
0995000000-M	340	80	M	Pipe Removal
6036000000-M	1631		M2	Matting for Erosioin Control
6038000000-M	SP		M2	Permanent Soil Reinforcement Matting
0314000000-M	SP		MTON	Impervious Select Material

EARTHWORK SUMMARY FOR MITIGATION

IN CUBIC METERS

LINE	STATION TO STATION		MITIGATION EXCAVATION		MITIGATION EMBANK + %	MITIGATION BORROW	MITIGATION TOTAL WASTE
			TOTAL UNCLASS.	UNDERCUT			
REACH M1	10+16.15	36+68.16	117,229		93,731	0	23,498
REACH UT1	10+04.94	12+51.05	4,156		10	0	4,146
REACH UT2	11+70.00	17+23.98	10,502		1,704	0	8,798
	TOTAL		131,887		95,445	0	36,442
	Waste in lieu of borrow						
	GRAND TOTAL		131,887		95,445	0	36,442
	SAY		132,000		95,450	0	36,450

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R2554-10" (PID:AI6451) WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 185822.83(m) EASTING: 698741.63(m)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99987872
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R2554-10" TO -L- STATION (supplied by roadway) IS

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

GRAPHIC SCALE
25 12.5 0 25 50
PLANS

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	OSM-4

PROJECT ENGINEER

PROJECT ENGINEER

Baker
Michael Baker Engineering Inc.
8000 Regency Parkway
Suite 200
Cary, NORTH CAROLINA 27518
Phone: 919.463.5488
Fax: 919.463.5490

PROGRESS DRAWING
FOR REVIEW PURPOSES ONLY
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REVISIONS

NAD 83

SR 1326 CLARIDGE NURSERY ROAD

EXISTING FARM PATH

PROPOSED SLOPE STAKE LINE

EXISTING BRIDGE CROSSING TO REMAIN

EXISTING 375mm CONCRETE PIPE (DO NOT DISTURB)

WEATHER STATION

AVOID DISTURBANCE OF EXISTING WEATHER STATION

BEGIN CONSTRUCTION M1
STATION 10+16.15

EXISTING 1800mm CMP TO REMAIN (DO NOT DISTURB)

EXISTING IRRIGATION LINE (DO NOT DISTURB)

NOT SURVEYED

INV. 23.51

INV. 22.33

WATER LINE

GRAVEL DRIVEWAY

FUTURE HWY 70 BYPASS

750mm x 1500mm CLASS "B" RIP RAP APRON

STORM INLET CULVERT (DO NOT DISTURB)

TIE EXISTING DITCH INTO PROPOSED CHANNEL

FLOODPLAIN INTERCEPTOR

PROPOSED SLOPE STAKE LINE

MATCHLINE M1

SHEET OSM-5 STATION 17+50

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00

—CE— CONSERVATION EASEMENT BOUNDARY
△ CONSERVATION EASEMENT CAP
—E— TEMPORARY CONSTRUCTION EASEMENT
⊙ WHITE TOP WD. STAKE SET
FILL EXISTING CHANNEL
STREAM PLUG

NOTES:
1. LOG VANE LOCATIONS MAY BE ALTERED BY ENGINEER
2. CHANNEL PLUG LOCATIONS ARE APPROXIMATE AND MAY BE ALTERED BY ENGINEER.

10/25/2011
R:\14046\Design\Plans\R2554_Rdy_psh_OSM4.dgn

GRAPHIC SCALE

25 12.5 0 25 50

PLANS

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	OSM-5

PROJECT ENGINEER

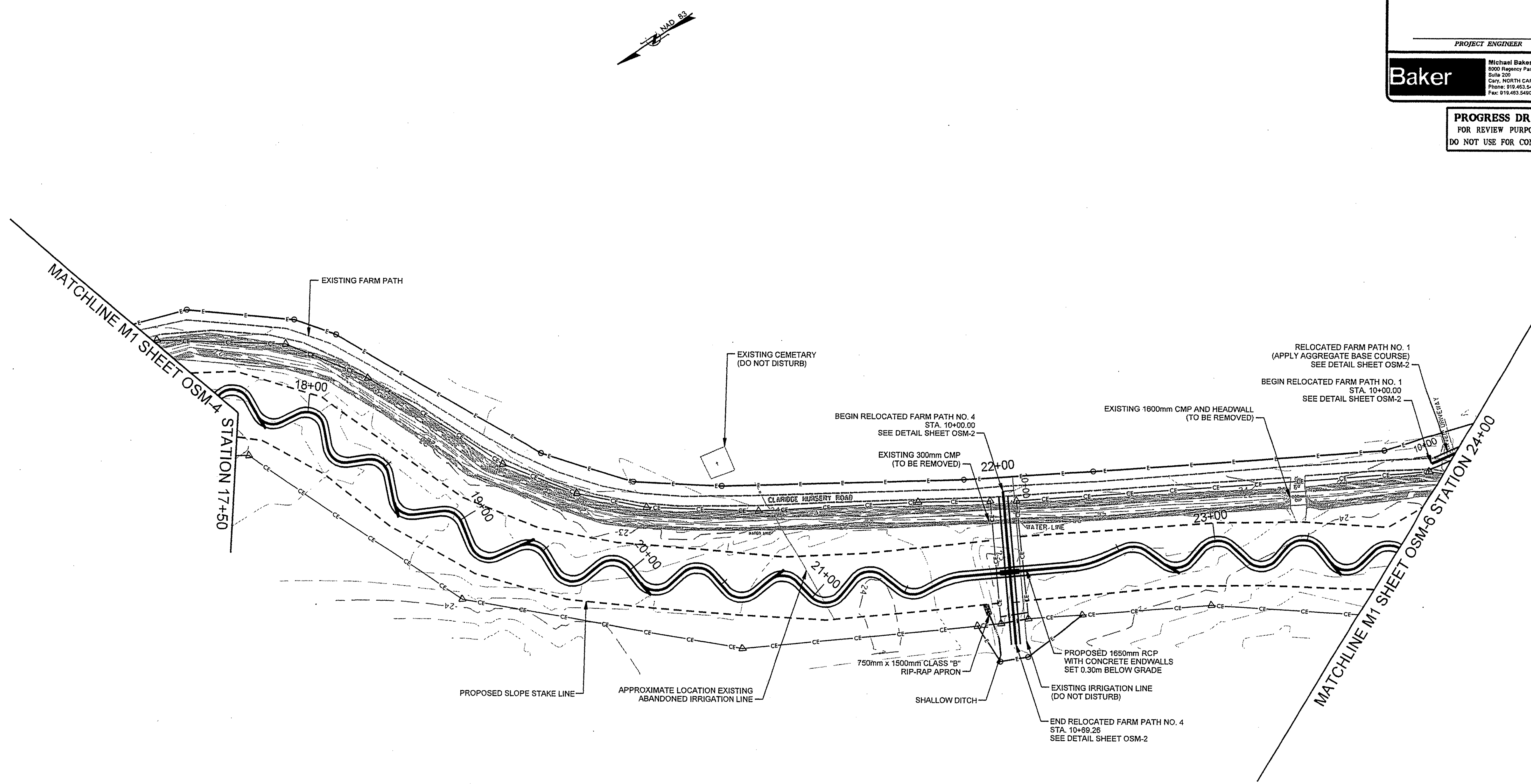
PROJECT ENGINEER

Baker

Michael Baker Engineering Inc.
8000 Regency Parkway
Suite 200
Cary, NORTH CAROLINA 27518
Phone: 919.463.5488
Fax: 919.463.5490

PROGRESS DRAWING
FOR REVIEW PURPOSES ONLY
DO NOT USE FOR CONSTRUCTION

REVISIONS



—CE— CONSERVATION EASEMENT BOUNDARY

△ CONSERVATION EASEMENT CAP

—E— TEMPORARY CONSTRUCTION EASEMENT

⊙ WHITE TOP WD. STAKE SET

FILL EXISTING CHANNEL

STREAM PLUG

10/26/2011
R:\114096\Design\Plans\R2554_Rdy_psh_OSM5.dgn

GRAPHIC SCALE
25 12.5 0 25 50
PLANS

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	OSM-6

PROJECT ENGINEER

PROJECT ENGINEER

Baker
Michael Baker Engineering Inc.
8000 Regency Parkway
Suite 200
Cary, NORTH CAROLINA 27518
Phone: 919.463.5488
Fax: 919.463.5490

PROGRESS DRAWING
FOR REVIEW PURPOSES ONLY
DO NOT USE FOR CONSTRUCTION

REVISIONS

NAD 83

MATCHLINE UT2 SHEET OSM-8 STATION 15+50

APPROXIMATE LOCATION EXISTING WATER LINE (DO NOT DISTURB)

REMOVE EXISTING FARM PATH

RELOCATED FARM PATH NO. 2 SEE DETAIL SHEET OSM-2

BEGIN RELOCATED FARM PATH NO. 3 STA. 10+00.00 = RELOCATED FARM PATH NO. 1 STA. 10+17.45 SEE DETAIL SHEET OSM-2

EXISTING 300mm CMP (REMOVE)

RELOCATED FARM PATH NO. 1 (APPLY AGGREGATE BASE COURSE) SEE DETAIL SHEET OSM-2

PROPOSED (2) 1050mm RCP WITH CONCRETE ENDWALLS SET 0.30m BELOW GRADE

END CONSTRUCTION UT2
STATION 17+23.98 =
M1 STATION 26+93.39

750mm BLACK PLASTIC PIPE (REMOVE)

END RELOCATED FARM PATH NO. 2 STA. 11+83.94 = RELOCATED FARM PATH NO. 1 STA. 12+54.62 SEE DETAIL SHEET OSM-2

PROPOSED 300mm RCP w/ 600mm x 1200mm CLASS "B" RIP RAP APRON

MATCHLINE M1 SHEET OSM-5 STATION 24+00

PROPOSED 1650mm RCP WITH CONCRETE ENDWALLS SET 0.30m BELOW GRADE

RELOCATED FARM PATH NO. 3 (APPLY AGGREGATE BASE COURSE) SEE DETAIL SHEET OSM-2

EXISTING 375mm CMP (REMOVE)

EXISTING 1800mm CMP (REMOVE)

END CONSTRUCTION UT1
STATION 12+51.05 =
M1 STATION 25+77.61

END RELOCATED FARM PATH NO. 3 STA. 11+64.15 SEE DETAIL SHEET OSM-2

EXISTING PILONS (REMOVE)

REMOVE EXISTING 600mm TERRACOTTA PIPE AND INSTALL (2) 900mm RCP WITH CONCRETE ENDWALLS SET 0.30m BELOW GRADE

APPROXIMATE LOCATION EXISTING IRRIGATION LINE (DO NOT DISTURB)

PROPOSED SLOPE STAKE LINE

BEGIN CONSTRUCTION UT1
STATION 10+04.94

PROPOSED SLOPE STAKE LINE

300mm CMP (REMOVE)

REMOVE EXISTING FARM PATH AND RELOCATE

FLOODPLAIN INTERCEPTOR

MATCHLINE M1 SHEET OSM-7 STATION 31+00

CE CONSERVATION EASEMENT BOUNDARY

CONSERVATION EASEMENT CAP

E TEMPORARY CONSTRUCTION EASEMENT

WHITE TOP WD. STAKE SET

FILL EXISTING CHANNEL

STREAM PLUG

10/16/2011
R-2554A\Design\Plans\R2554_Rdy_psh_OSM6.dgn

GRAPHIC SCALE
25 12.5 0 25 50
PLANS

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	OSM-7

PROJECT ENGINEER

PROJECT ENGINEER

Baker
Michael Baker Engineering Inc.
8000 Regency Parkway
Suite 200
Cary, NORTH CAROLINA 27518
Phone: 919.463.5488
Fax: 919.463.5490

PROGRESS DRAWING
FOR REVIEW PURPOSES ONLY
DO NOT USE FOR CONSTRUCTION

REVISIONS

NAD 83

MATCHLINE M1 SHEET OSM-6 STATION 31+00

END RELOCATED FARM PATH NO. 1
STA. 20+27.20
SEE DETAIL SHEET OSM-2

EXISTING POWER POLES
(DO NOT DISTURB)

END CONSTRUCTION M1
STATION 36+68.16

RELOCATED FARM PATH NO. 1
SEE DETAIL SHEET OSM-2

EXISTING POWER POLES
(DO NOT DISTURB)

GRAVEL DRIVEWAY

PROPOSED SLOPE STAKE LINE

REMOVE EXISTING FARM
PATH AND RELOCATE

—CE— CONSERVATION EASEMENT BOUNDARY
△ CONSERVATION EASEMENT CAP
—E— TEMPORARY CONSTRUCTION EASEMENT
⊙ WHITE TOP WD. STAKE SET
FILL EXISTING CHANNEL
STREAM PLUG

10/26/2011
R:\11496\Design\Plans\R2554_Rdy_psh_OSM7.dgn

GRAPHIC SCALE
25 12.5 0 25 50
PLANS

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	OSM-8

PROJECT ENGINEER

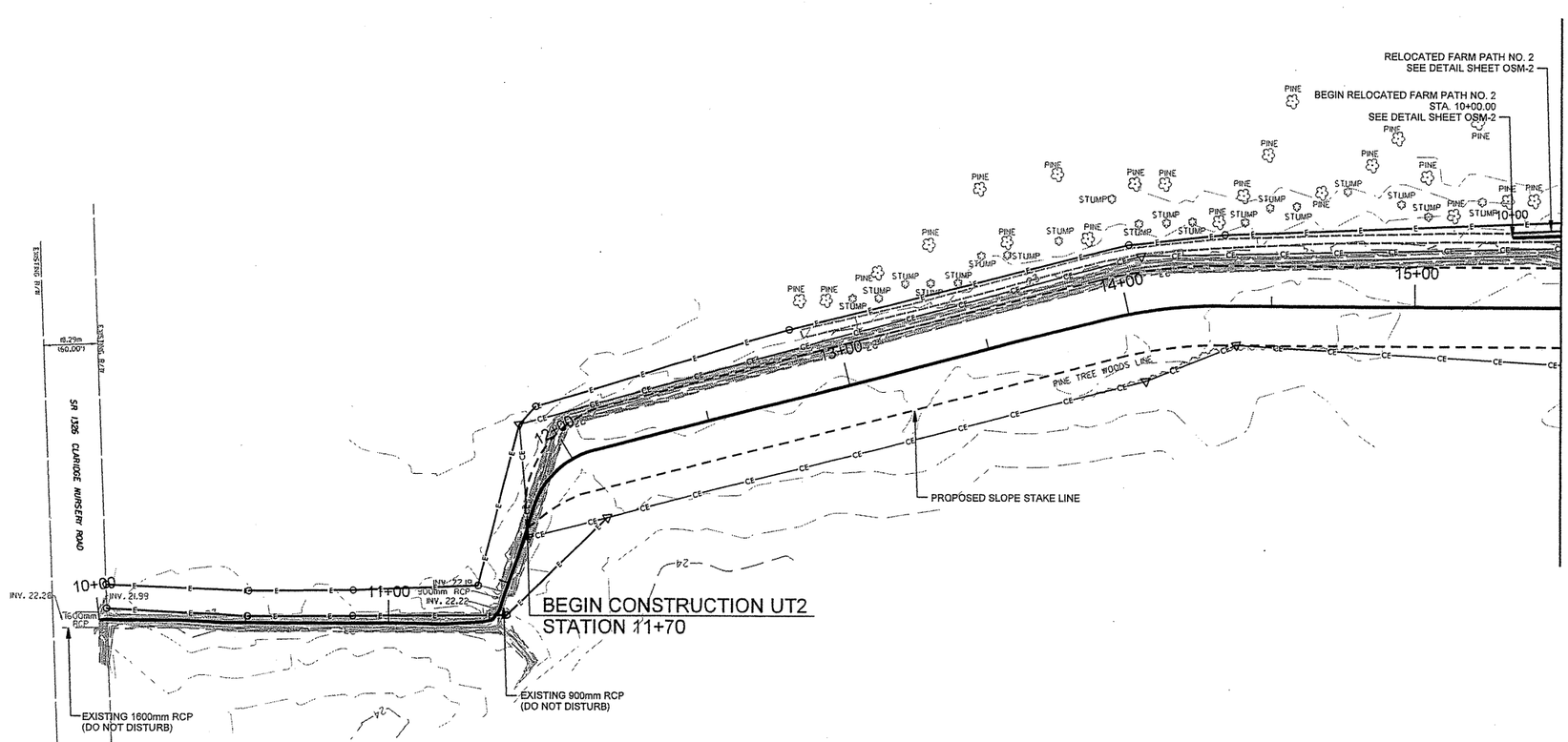
PROJECT ENGINEER

Baker
Michael Baker Engineering Inc.
8000 Regency Parkway
Suite 200
Cary, NORTH CAROLINA 27518
Phone: 919.463.5488
Fax: 919.463.5490

PROGRESS DRAWING
FOR REVIEW PURPOSES ONLY
DO NOT USE FOR CONSTRUCTION

REVISIONS

NAD 83



CE CONSERVATION EASEMENT BOUNDARY
△ CONSERVATION EASEMENT CAP
E TEMPORARY CONSTRUCTION EASEMENT
○ WHITE TOP WD. STAKE SET
FILL EXISTING CHANNEL
STREAM PLUG

10/16/2011
R:\2554A\Design\Plans\R2554_Rdy_psh_OSM8.dgn

-M1-

PROGRESS DRAWING
FOR REVIEW PURPOSES ONLY
DO NOT USE FOR CONSTRUCTION

METRIC

25 0 50

CONST.REV.

R /W REV.

PROJECT REFERENCE NO	SHEET NO
R-2554	OSM-9

PROJECT ENGINEER

PROJECT ENGINEER

Baker
Michael Baker Engineering Inc.
8000 Regency Parkway
Suite 200
Cary, NORTH CAROLINA 27518
Phone: 919.463.5488
Fax: 919.463.5490

35
25
15

DESIGN BANKFULL

DESIGN THALWEG

EXISTING GROUND

BEGIN CONSTRUCTION M1
STATION 10+16.17
ELEV. = 22.22

MATCHLINE M1 STATION 23+50

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00

MATCHLINE M1 STATION 23+50

EXISTING GROUND

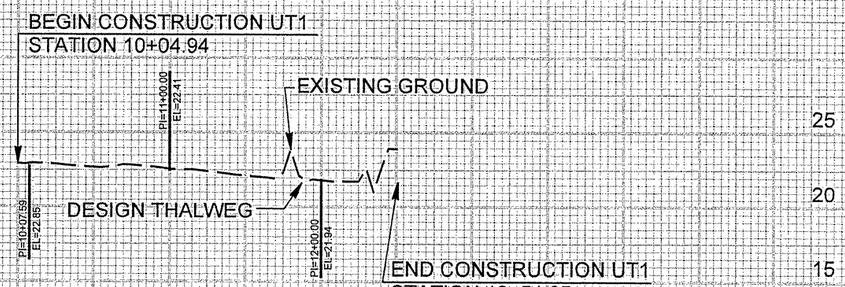
DESIGN BANKFULL

DESIGN THALWEG

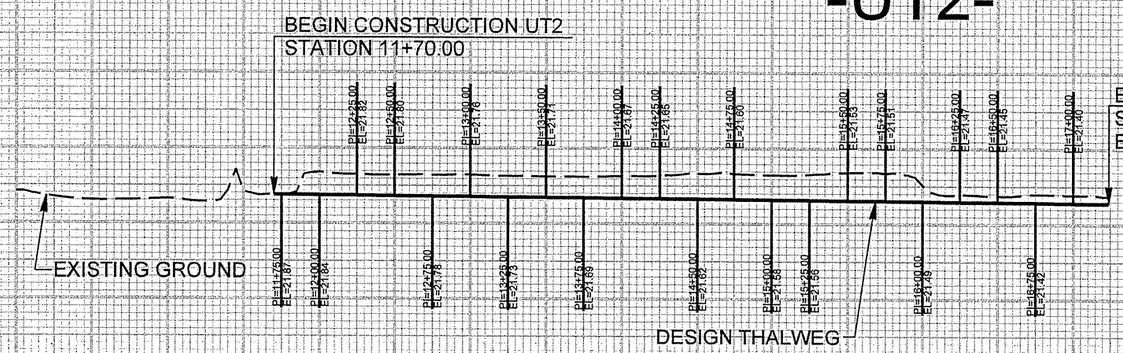
END CONSTRUCTION M1
STATION 36+68.16
ELEV. = 20.36

25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00 35+00 36+00

-UT1-



-UT2-



METRIC

25 0 50

CONST.REV.

R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2554	OSM-10

PROJECT ENGINEER

PROJECT ENGINEER

Baker

Michael Baker Engineering Inc.
8000 Regency Parkway
Suite 200
Cary, NORTH CAROLINA 27518
Phone: 919.463.5488
Fax: 919.463.5490

PROGRESS DRAWING
FOR REVIEW PURPOSES ONLY
DO NOT USE FOR CONSTRUCTION

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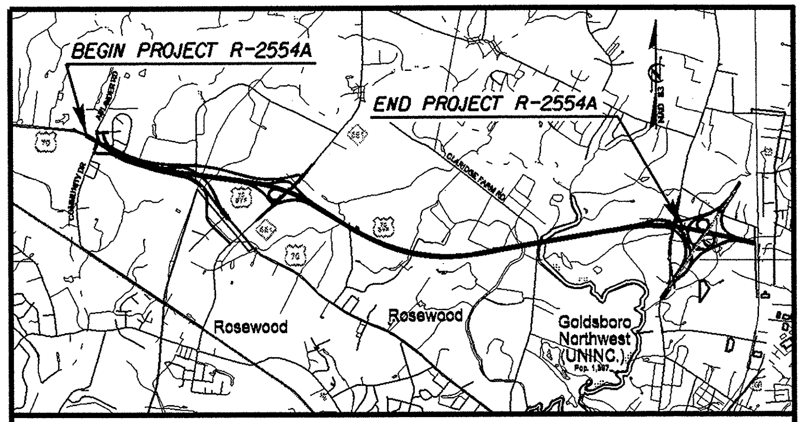
TIP PROJECT: R-2554A

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2554A	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34461.1.3	NHF-70(30)	P.E.	
34461.2.4		R/W, UTIL	

METRIC

ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND/OR MILLIMETERS UNLESS OTHERWISE SHOWN

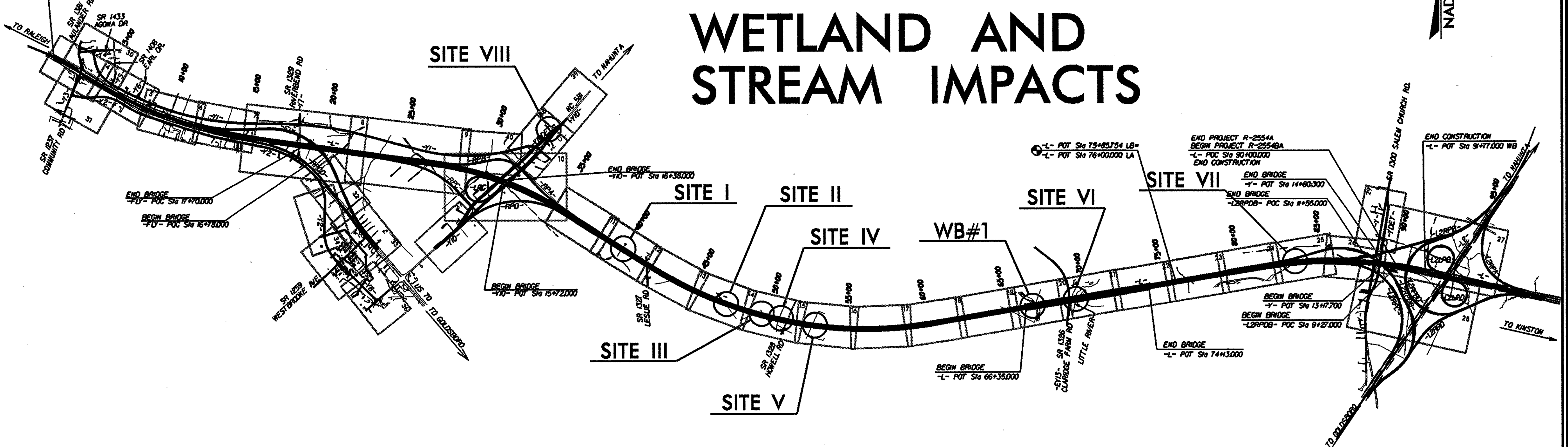
Permit Drawing
Sheet 1 of 45

WAYNE COUNTY

LOCATION: US 70 (GOLDSBORO BYPASS) FROM WEST OF NC 581 TO SR 1300 (SALEM CHURCH ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, CULVERTS AND SIGNING

WETLAND AND STREAM IMPACTS



THIS PROJECT IS NOT WITHIN THE MUNICIPAL BOUNDARY OF GOLDSBORO
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III EXCEPT BY PERMIT
THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS LIMITED TO INTERCHANGES.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

PLANS (5 0 10)

PROFILE (HORIZONTAL) (5 0 10)

PROFILE (VERTICAL) (1 0 2)

DESIGN DATA

ADT 2010 = 19,800
ADT 2030 = 36,400
DHV = 11 %
D = 60 %
T = 26 % *
V = 110 km/h
* TTST 16 % + DUAL 10 %
FUNC. CLASS.: FREEWAY

PROJECT LENGTH

LENGTH ROADWAY T.I.P. PROJECT R-2554A	8.028 KM.
LENGTH STRUCTURES T.I.P. PROJECT R-2554A	0.778 KM.
TOTAL LENGTH OF STATE T.I.P. PROJECT R-2554A	8.806 KM.

NOTE: EB LANE USED TO DETERMINE PROJECT LENGTH

PLANS PREPARED BY:
Florence & Hutcheson
CONSULTING ENGINEERS
5121 KINGDOM WAY, SUITE 100
RALEIGH, N.C. 27607
License No: F-0258

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JANUARY 20, 2006 — DENNIS J. MORY, PE, PROJECT ENGINEER

LETTING DATE: SEPTEMBER 18 2012 — HENRY BARE, PROJECT DESIGN ENGINEER

NCDOT CONTACT: CATHY S. HOUSER, PE, ROADWAY DESIGN - PROJECT ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

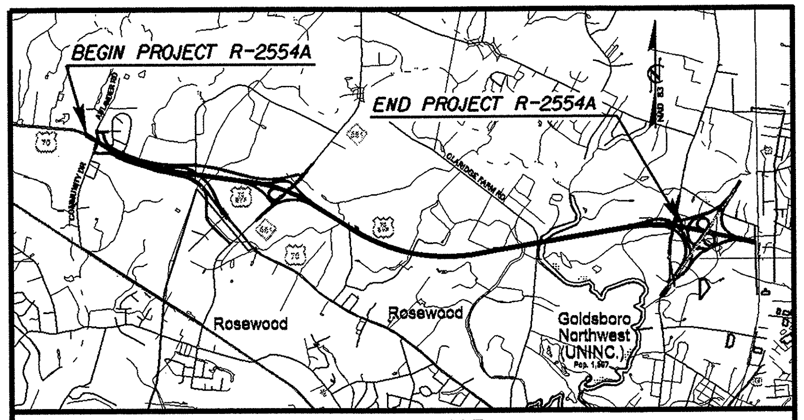
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY DESIGN ENGINEER P.E.

CONTRACT No.:

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



VICINITY MAP

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2554A	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34461.1.3	NHF-70(30)	P.E.	
34461.2.4		R/W, UTIL	

Permit Drawing Sheet 2 of 45

METRIC

ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND/OR MILLIMETERS UNLESS OTHERWISE SHOWN

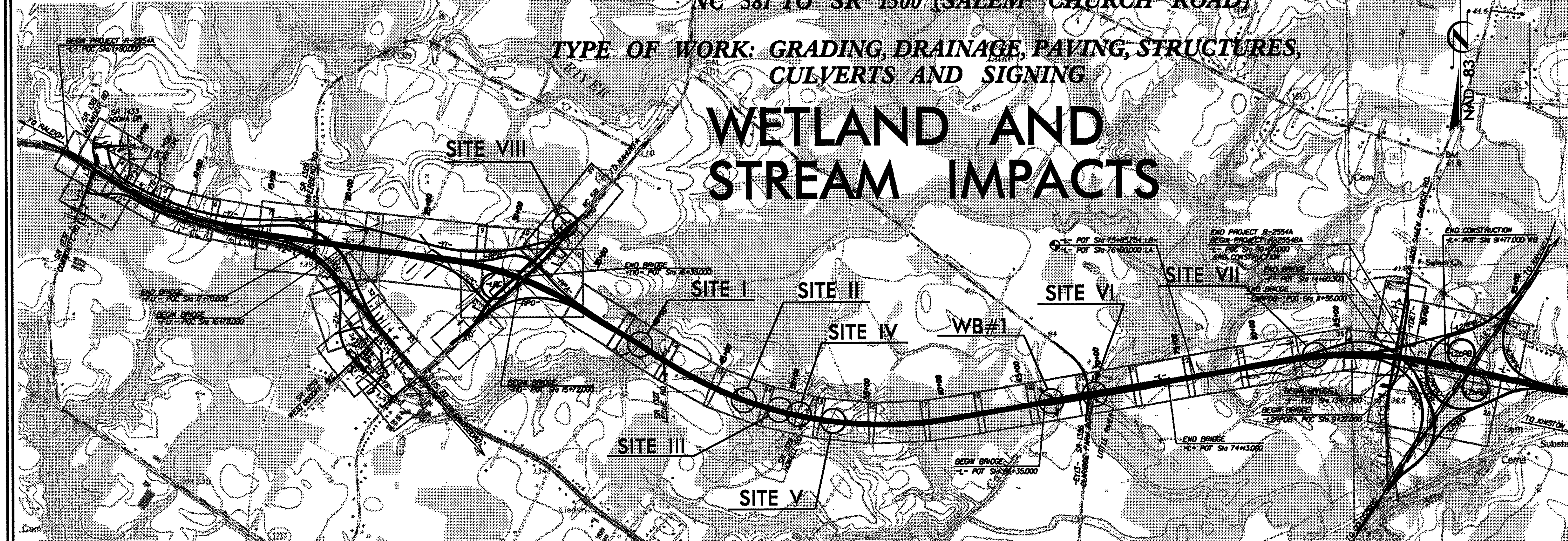
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAYNE COUNTY

LOCATION: US 70 (GOLDSBORO BYPASS) FROM WEST OF NC 581 TO SR 1300 (SALEM CHURCH ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, CULVERTS AND SIGNING

WETLAND AND STREAM IMPACTS



THIS PROJECT IS NOT WITHIN THE MUNICIPAL BOUNDARY OF GOLDSBORO.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III EXCEPT BY PERMIT.
THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS LIMITED TO INTERCHANGES.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

TIP PROJECT: R-2554A

CONTRACT No.:

GRAPHIC SCALES

PLANS (5 0 10)

PROFILE (HORIZONTAL) (5 0 10)

PROFILE (VERTICAL) (1 0 2)

DESIGN DATA

ADT 2010	= 19,800
ADT 2030	= 36,400
DHV	= 11 %
D	= 60 %
T	= 26 % *
V	= 110 km/h

* TTST 16 % + DUAL 10 %
FUNC. CLASS.: FREEWAY

PROJECT LENGTH

LENGTH ROADWAY T.I.P. PROJECT R-2554A	8.028 KM.
LENGTH STRUCTURES T.I.P. PROJECT R-2554A	0.778 KM.
TOTAL LENGTH OF STATE T.I.P. PROJECT R-2554A	8.806 KM.

NOTE: EB LANE USED TO DETERMINE PROJECT LENGTH

PLANS PREPARED BY:
Florence & Hutcheson
CONSULTING ENGINEERS
5121 KINGDOM WAY, SUITE 100
RALEIGH, N.C. 27607
License No: F-0258

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JANUARY 20, 2006

LETTING DATE: SEPTEMBER 18 2012

DENNIS J. MORY, PE
PROJECT ENGINEER

HENRY BARE
PROJECT DESIGN ENGINEER

NCDOT CONTACT: CATHY S. HOUSER, PE
ROADWAY DESIGN - PROJECT ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

P.E.
STATE HIGHWAY DESIGN ENGINEER

R/W REV. - 01/10/08
COMBINED PARCEL 30 WITH PARCEL 29
R/W REV. - 11/28/06
CORRECTED PROPERTY OWNER INFORMATION
REMOVED LEVEL SPREADERS

REVISIONS

NAD 83

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0288

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	12
R/W SHEET NO. 12	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

5m 0 10m

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.
R/W REV.

Permit Drawing
Sheet 3 of 45

GEORGE H. BECTON, HEIRS (29)
DANNY P. SASSER (31)
CATHERINE S. SMITH (32)

RIP RAP ON BANKS ONLY

EST. 1.8 MTN CL-B RIP RAP
EST. 5.9 SM FILTER FABRIC

-L- TS Sta 41+71.877

CLASS 'IV' RIP RAP
EST. 11 MTN

CLASS 'I' RIP RAP
EST. 25 MTN

0.91m SPECIAL CUT BASE DITCH SEE DETAIL 9

HEADWALL

0.61m SPECIAL BASE DITCH SEE DETAIL 6

ROCK CHECK DAMS SEE DETAIL 20

GRAU 350

CAT-I

3GI TYPE 'A'

2GI

GOLDSBORO BYPASS

2@ 2.13 x 2.13 RCBC

0.91m SPECIAL CUT BASE DITCH SEE DETAIL 9

0.61m SPECIAL BASE DITCH SEE DETAIL 6

ROCK CHECK DAMS SEE DETAIL 20

30.000m (TYP.)

CLASS 'I' RIP RAP
EST. 12" MTN

EST. 4.5 MTN CL-B RIP RAP
EST. 11.7 SM FILTER FABRIC

GEORGE H. BECTON, HEIRS (29)

GEORGE H. BECTON, HEIRS (29)

DANNY P. SASSER (31)

CATHERINE S. SMITH (32)

SOIL

EXISTING R/W

MATCH LINE -L- 38+40.000 SEE SHEET 11

MATCH LINE -L- 41+80.000 SEE SHEET 13

SITE 1

E E DENOTES EXCAVATION IN WETLAND

DENOTES MECHANIZED CLEARING

F F DENOTES FILL IN WETLAND

S S DENOTES FILL IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

SEE SHEET 46 FOR -L- PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS

FILE: R:\Hydraulics\Wetland permit\Drawings\FINAL\2554a_hyd_perm_wet_pshl2.dgn
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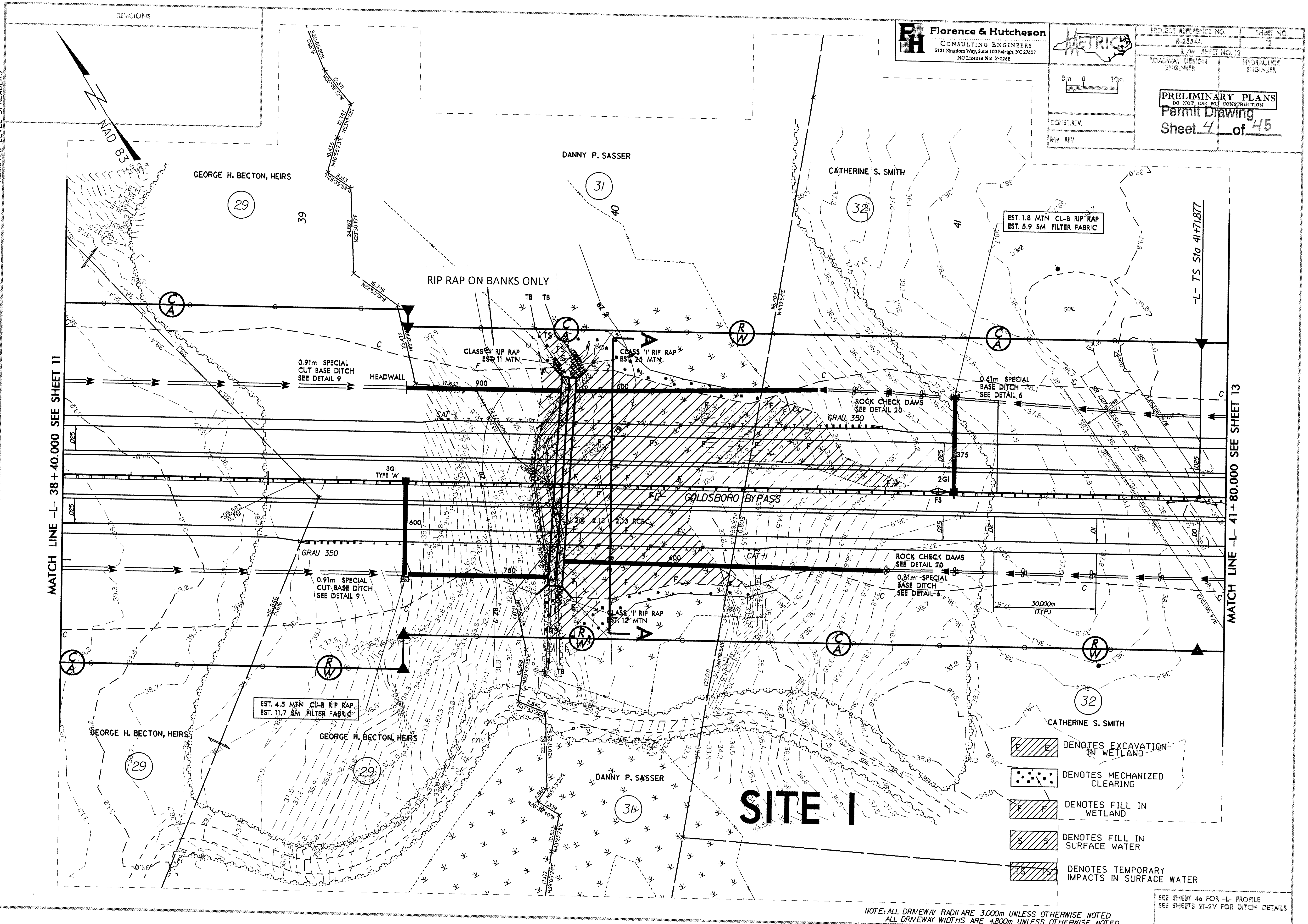
PLOT DRIVER: $PLTDRVR$
PEN TABLE: $PENTBL$
USER$

R/W REV. - 01/10/08
COMBINED PARCEL 30 WITH PARCEL 29
R/W REV. - 11/28/06
CORRECTED PROPERTY OWNER INFORMATION
REMOVED LEVEL SPREADERS



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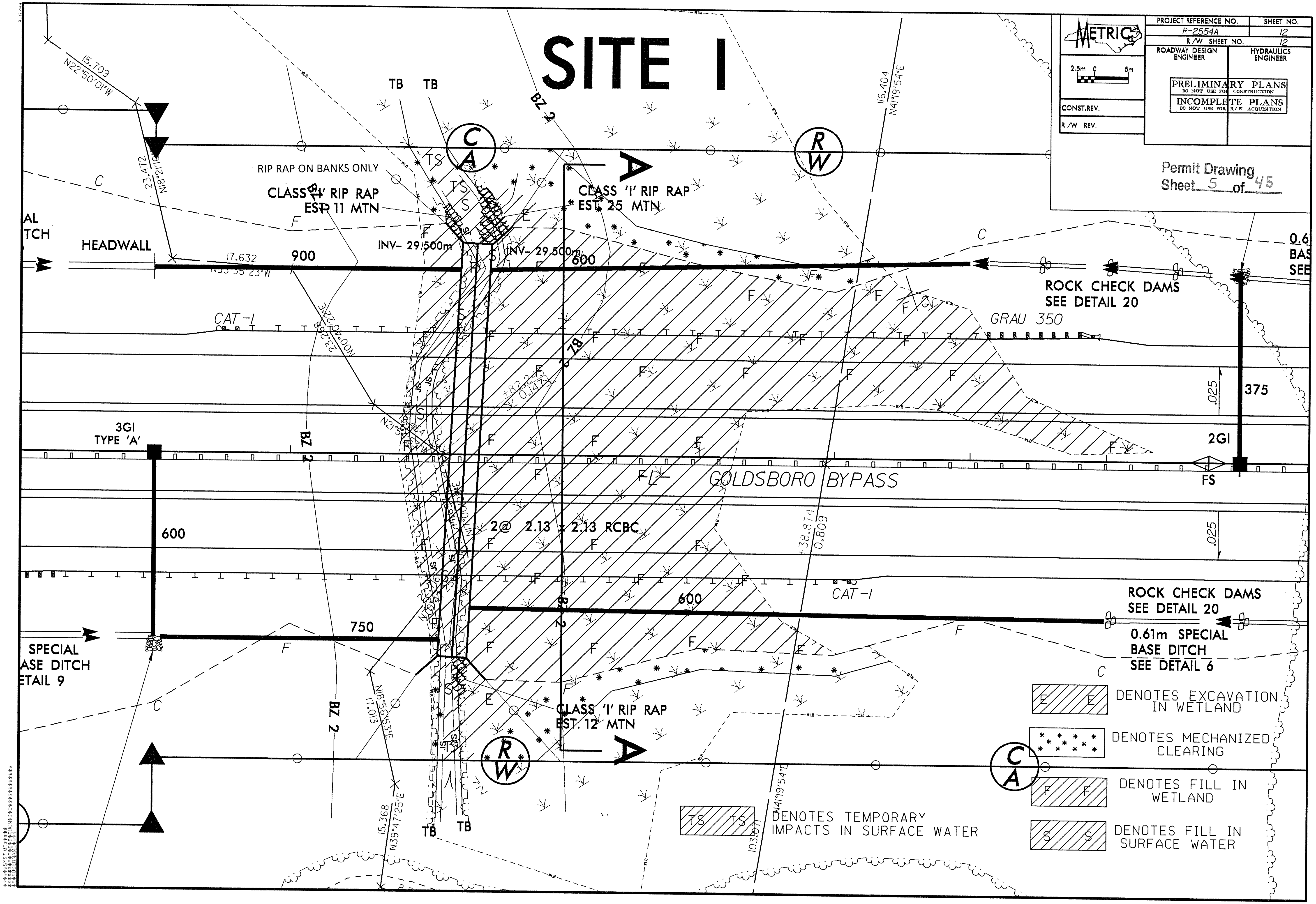
PEN TABLE: $PENTBL$



SITE I
METRIC
PROJECT REFERENCE NO. R-2554A
SHEET NO. 12
R/W SHEET NO. 12
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION
CONST.REV.
R/W REV.
Permit Drawing Sheet 5 of 45
RIP RAP ON BANKS ONLY
CLASS 'I' RIP RAP EST. 11 MTN
CLASS 'I' RIP RAP EST. 25 MTN
CLASS 'I' RIP RAP EST. 12 MTN
HEADWALL
INV- 29.500m
INV- 29.500m
ROCK CHECK DAMS SEE DETAIL 20
0.61m SPECIAL BASE DITCH SEE DETAIL 6
SPECIAL BASE DITCH DETAIL 9
3GI TYPE 'A'
2GI
FS
-L- GOLDSBORO BYPASS
2@ 2.13 x 2.13 RCBC
GRAU 350
CAT-I
BZ 2
TB
TS
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
DENOTES FILL IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

METRIC	PROJ. REFERENCE NO.	SHEET NO.
	R-2554A	
	GOLDSBORO BYPASS	
	2m 0 2m SCALE	

Permit Drawing
Sheet 6 of 45

CLEARING LIMITS

CLEARING LIMITS

0.025

16.420

6:1

35.481

6:1

16.420

0.025

3:1

3:1

L
40+20.000
EX. EL. 32.174

CLEARING LIMITS

CLEARING LIMITS

0.025

36.156

6:1

35.197

6:1

36.156

0.025

3:1

3:1

L
40+00.000
EX. EL. 30.567

SECTION A-A

TEMPORARY STREAM IMPACTS

CLEARING LIMITS

0.025

6:1

34.925

6:1

0.025

3:1

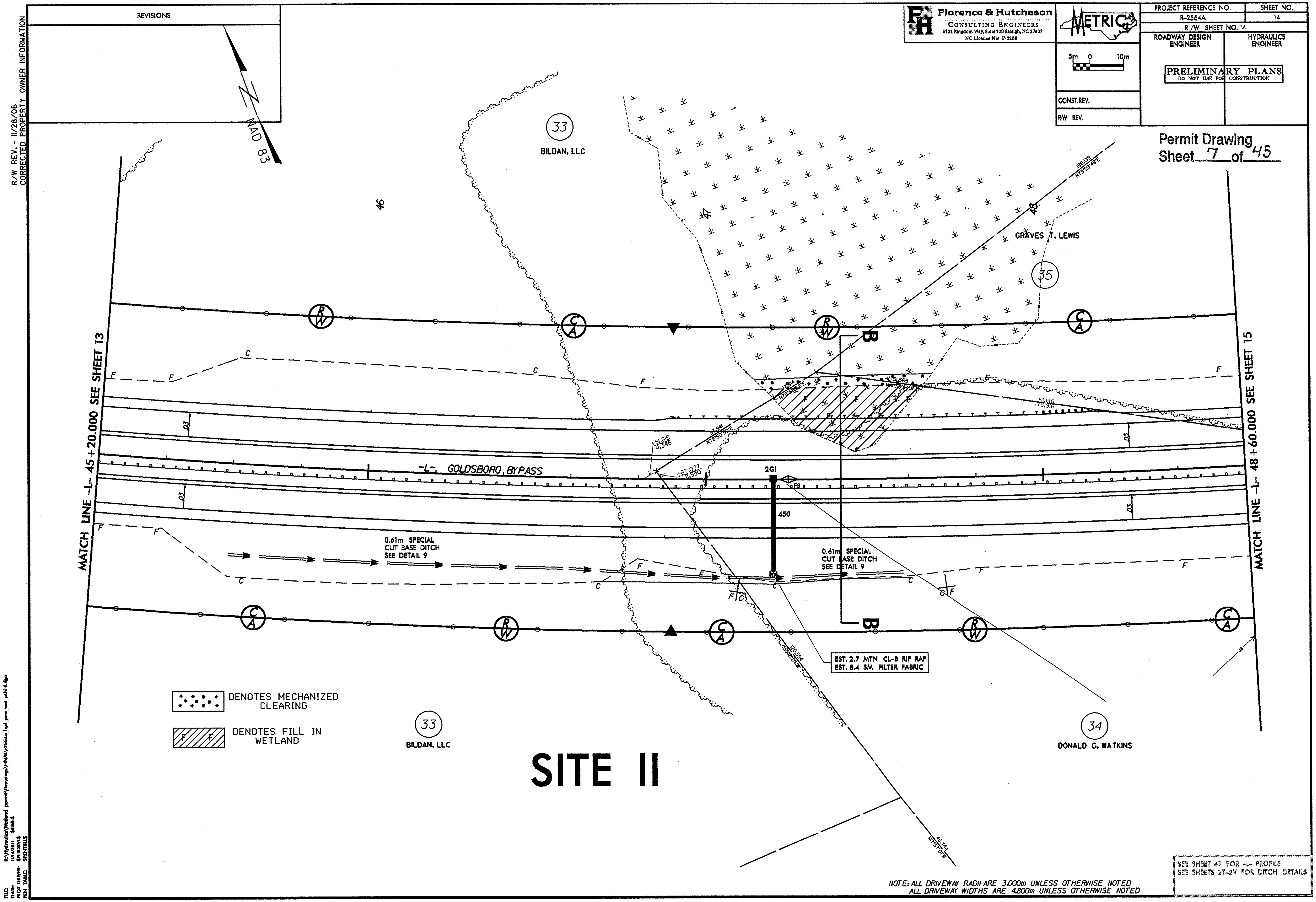
3:1

L
39+80.000
EX. EL. 29.465

42 40 38 36 34 32 30 28 26 24

40 30 20 10 0 10 20 30 40

PENTABLE: SPENTBLS
PLOTDWG: SPLTDWGS
FILE NAME: SPEED



REVISIONS
R/W REV. - 11/28/06
CORRECTED PROPERTY OWNER INFORMATION
NAD 83
Florence & Hutcheson
CONSULTING ENGINEERS
NC License No: F-0288
METRIC
PROJECT REFERENCE NO.
R-2554A
SHEET NO.
14
R/W SHEET NO. 14
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
Permit Drawing
Sheet 7 of 45
33
BILDAN, LLC
GRAVES T. LEWIS
35
MATCH LINE -L- 45+20.000 SEE SHEET 13
MATCH LINE -L- 48+60.000 SEE SHEET 15
-L- GOLDSBORO BYPASS
2GI
450
0.61m SPECIAL
CUT BASE DITCH
SEE DETAIL 9
0.61m SPECIAL
CUT BASE DITCH
SEE DETAIL 9
EST. 2.7 MTN CL-B RIP RAP
EST. 8.4 SM FILTER FABRIC
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
33
BILDAN, LLC
34
DONALD G. WATKINS
SITE II
SEE SHEET 47 FOR -L- PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS
NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

R/W REV.- 11/28/06
CORRECTED PROPERTY OWNER INFORMATION

REVISIONS

NAD 83

Florence & Hutcheson
CONSULTING ENGINEERS
3121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: P-0288

METRIC
5m 0 10m

CONST.REV.
R/W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	14
R /W SHEET NO. 14	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 8 of 45

MATCH LINE -L- 45+20.000 SEE SHEET 13

MATCH LINE -L- 48+60.000 SEE SHEET 15

-L- GOLDSBORO BYPASS

BILDAN, LLC

GRAVES T. LEWIS

0.61m SPECIAL CUT BASE DITCH SEE DETAIL 9

0.61m SPECIAL CUT BASE DITCH SEE DETAIL 9

EST. 2.7 MTN CL B RIP RAP
EST. 8.4 SM FILTER FABRIC

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

33 BILDAN, LLC

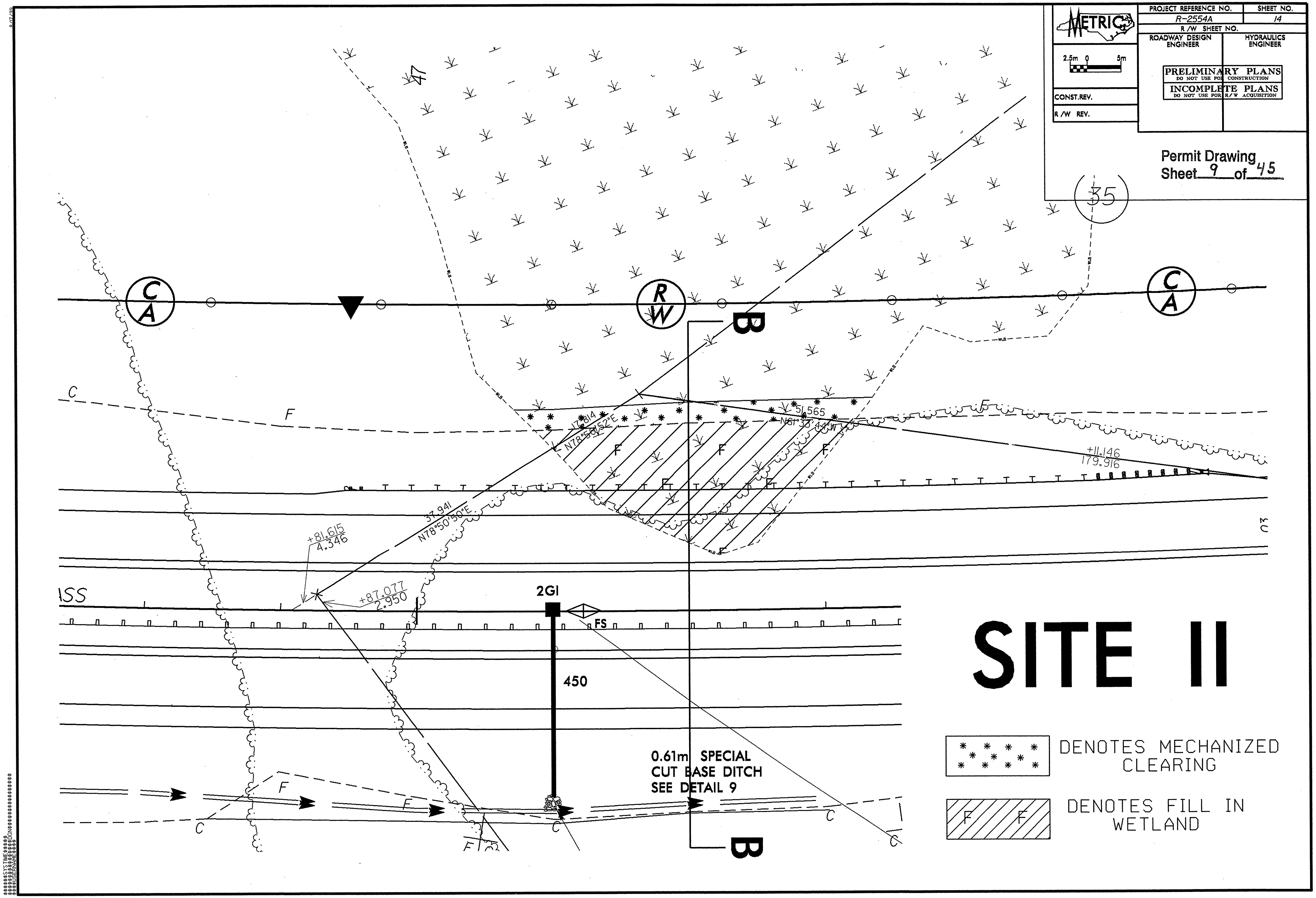
34 DONALD G. WATKINS

SITE II

NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

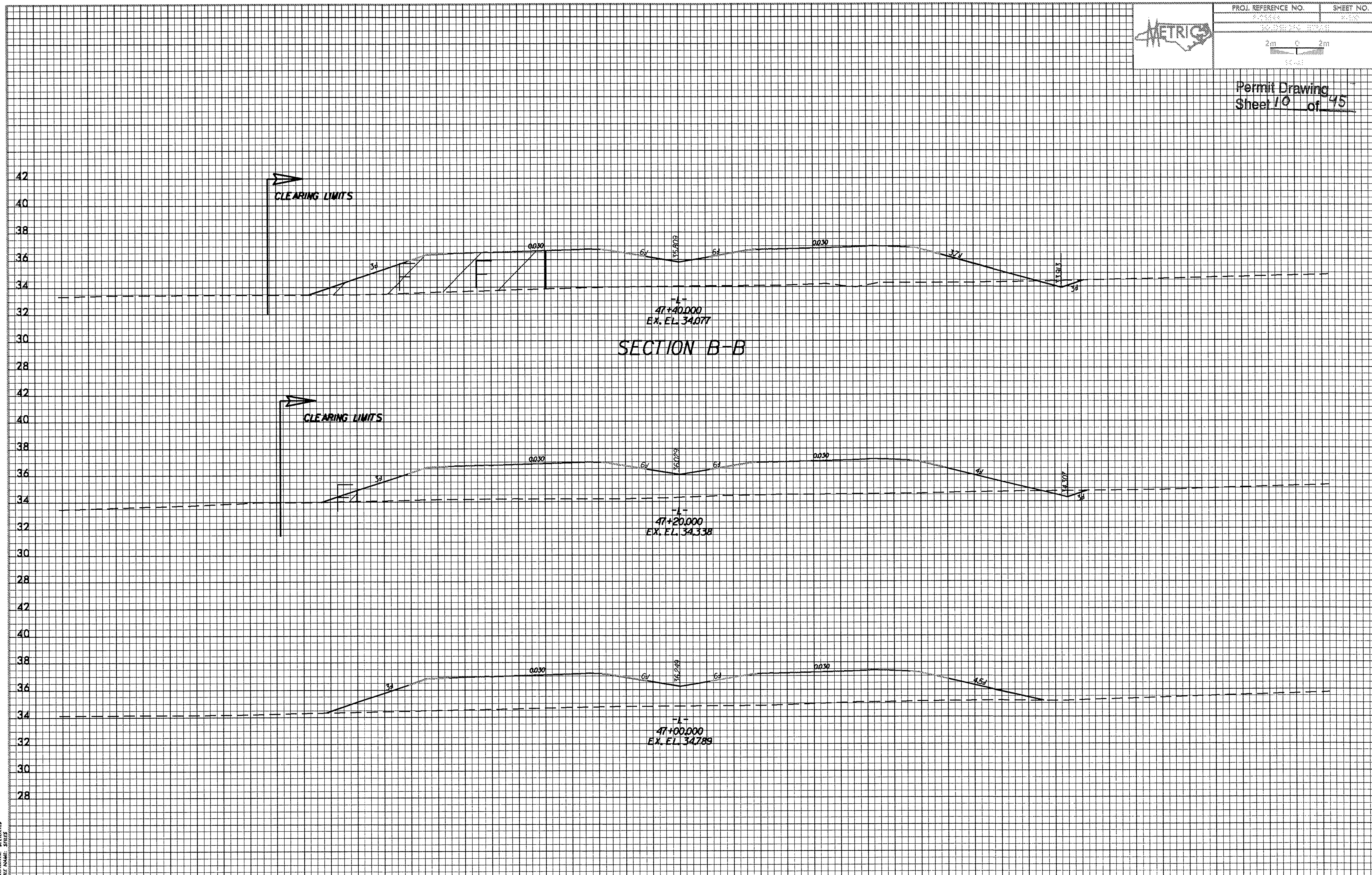
SEE SHEET 47 FOR -L- PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS

FILE: R:\Hydraulics\Wetland permit\Drawings\FINAL\r2554a_hyd_prm_wet_pshl14.dgn
DATE: 11/4/2011
PLOT DRIVER: $PLTDRV$
PEN TABLE: $PENTBL$



METRIC
PROJECT REFERENCE NO.
R-2554A
SHEET NO.
14
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
CONST.REV.
R/W REV.
Permit Drawing
Sheet 9 of 45
SITE II
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
0.61m SPECIAL
CUT BASE DITCH
SEE DETAIL 9
2GI
FS
450
+81.615
4.346
+87.077
2.950
37.941
N78°50'50"E
17.814
N78°50'52"E
51.565
N61°33'44"W
+11.146
179.916

Permit Drawing
Sheet 10 of 45



R/W REV. - 11/30/10
PARCEL 35 ADDED PROPOSED 3.6 DRIVE, SHIFTED GUARDRAIL TO 0.6 OFF ROW TO ACCOUNT FOR POST & OFFSET BLOCKS

R/W REV. - 11/28/06
CORRECTED PROPERTY OWNER INFORMATION
REMOVED TURN AROUND ON PARCEL 35
ADDED R/W MONUMENT ALONG EXIST. R/W
REMOVED R/W MONUMENT ALONG EXIST. R/W ON PARCEL 34

REVISIONS

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NC License No: F-0266

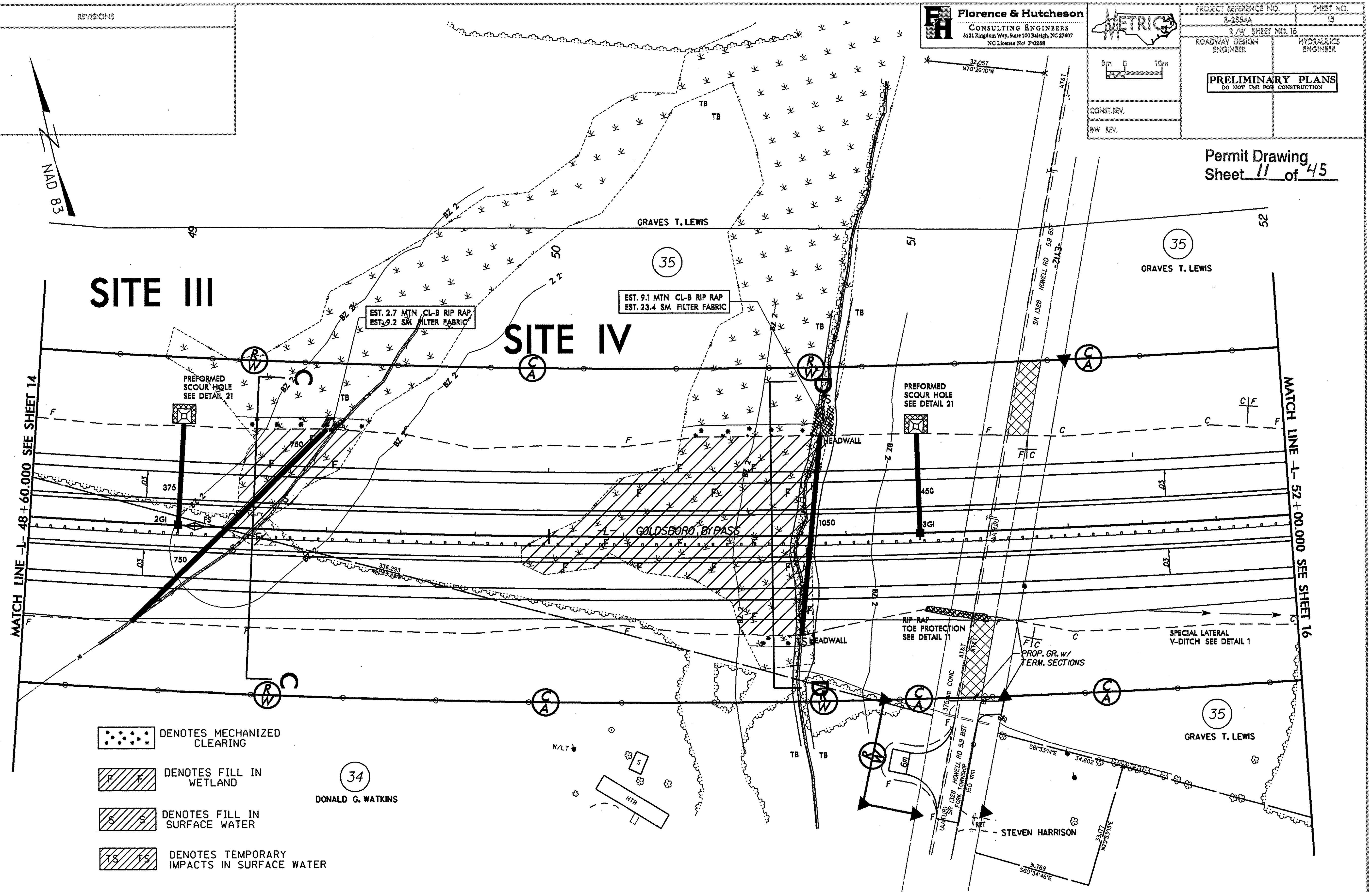
METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	15
R/W SHEET NO. 15	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.
R/W REV.

Permit Drawing
Sheet 11 of 45



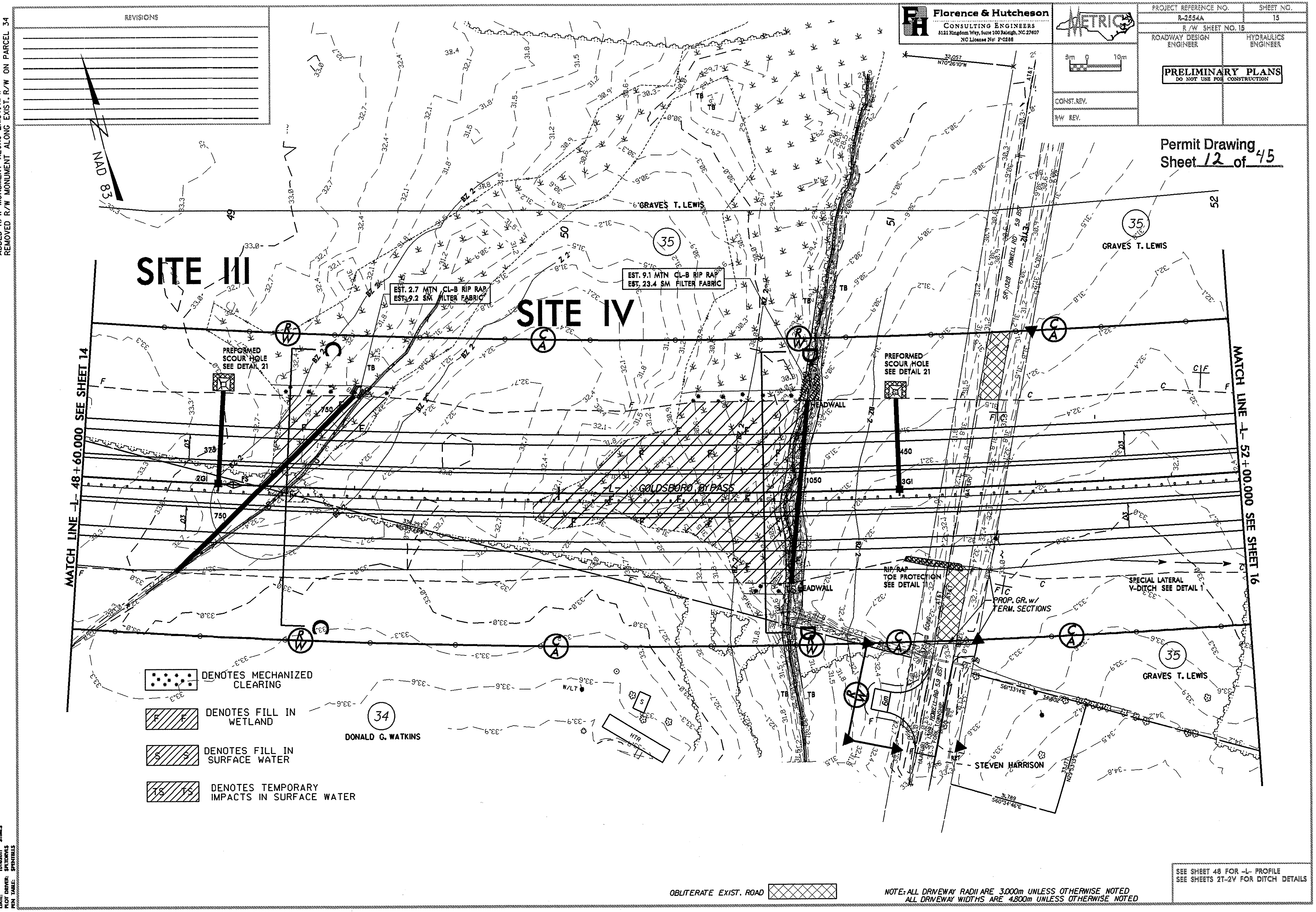
OBLITERATE EXIST. ROAD

NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

SEE SHEET 48 FOR -L- PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS

R/W REV. - 11/30/10
PARCEL 35 ADDED PROPOSED 3.6 DRIVE, SHIFTED
GUARDRAIL TO 0.6 OFF ROW TO ACCOUNT FOR
POST & OFFSET BLOCKS

R/W REV. - 11/28/06
CORRECTED PROPERTY OWNER INFORMATION
REMOVED TURN AROUND ON PARCEL 35
ADDED R/W MONUMENT ALONG EXIST. R/W
REMOVED R/W MONUMENT ALONG EXIST. R/W ON PARCEL 34



METRIC	PROJECT REFERENCE NO.	SHEET NO.
2.5m 0 5m	R-2554A	15
	R /W SHEET NO.	15
CONST.REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
R /W REV.	PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
	INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	

Permit Drawing
Sheet 13 of 45

REVISIONS

SITE III

NAD 83

EST. 2.7 MTN CL-B RIP RAP
EST. 9.2 SM FILTER FABRIC

PREFORMED SCOUR HOLE SEE DETAIL 21

BZ 2

TB

750

375

2GI

FS

.03

336.293
N61°33'43"W

DENOTES MECHANIZED CLEARING

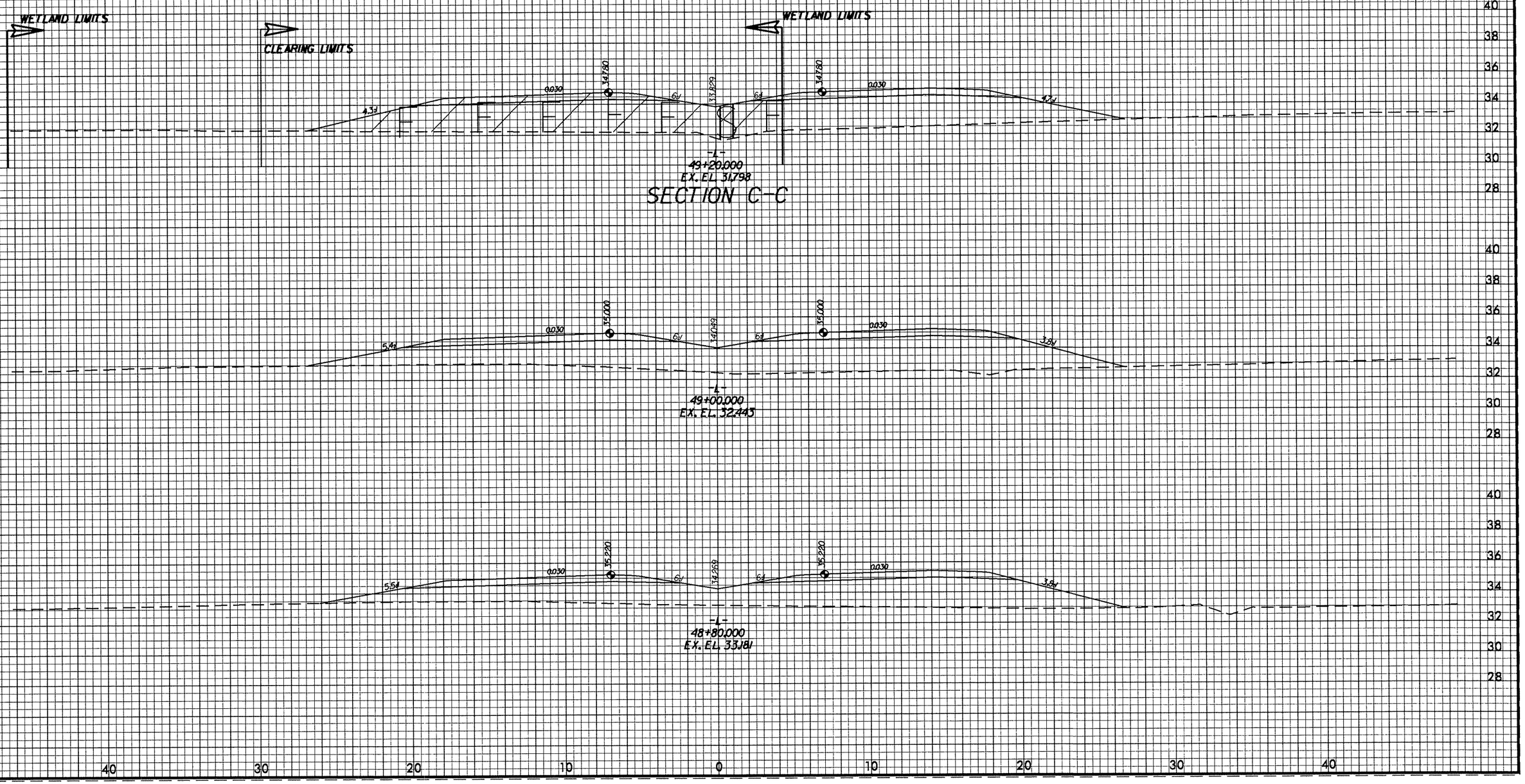
DENOTES FILL IN WETLAND

DENOTES FILL IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJ. REFERENCE NO.	SHEET NO.
R-2554A	X-103
GOLDSBORO BYPASS	
2m 0 2m	
SCALE	

Permit Drawing
Sheet 17 of 45



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PLOTDATE: $PLTDATE15
FILENAME: $FILE15

METRIC	PROJECT REFERENCE NO.	SHEET NO.
2.5m 0 5m	R-2554A	15
	R/W SHEET NO.	15
CONST.REV.	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
R/W REV.	PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
	INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	

Permit Drawing
Sheet 15 of 45

SITE IV

EST. 9.1 MTN CL-B RIP RAP
EST. 23.4 SM FILTER FABRIC

RIP RAP ON BANKS ONLY

TB

TB

BZ 2

HEADWALL

PREFORMED
SCOUR HOLE
SEE DETAIL 21

450

3GI

1050

-L- GOLDSBORO BYPASS

BZ 2

RIP RAP
TOE PROTECTION
SEE DETAIL 11

HEADWALL

PROP. GR. w/
TERM. SECTIONS

375mm CONC

NAD 83

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

DENOTES FILL IN SURFACE WATER

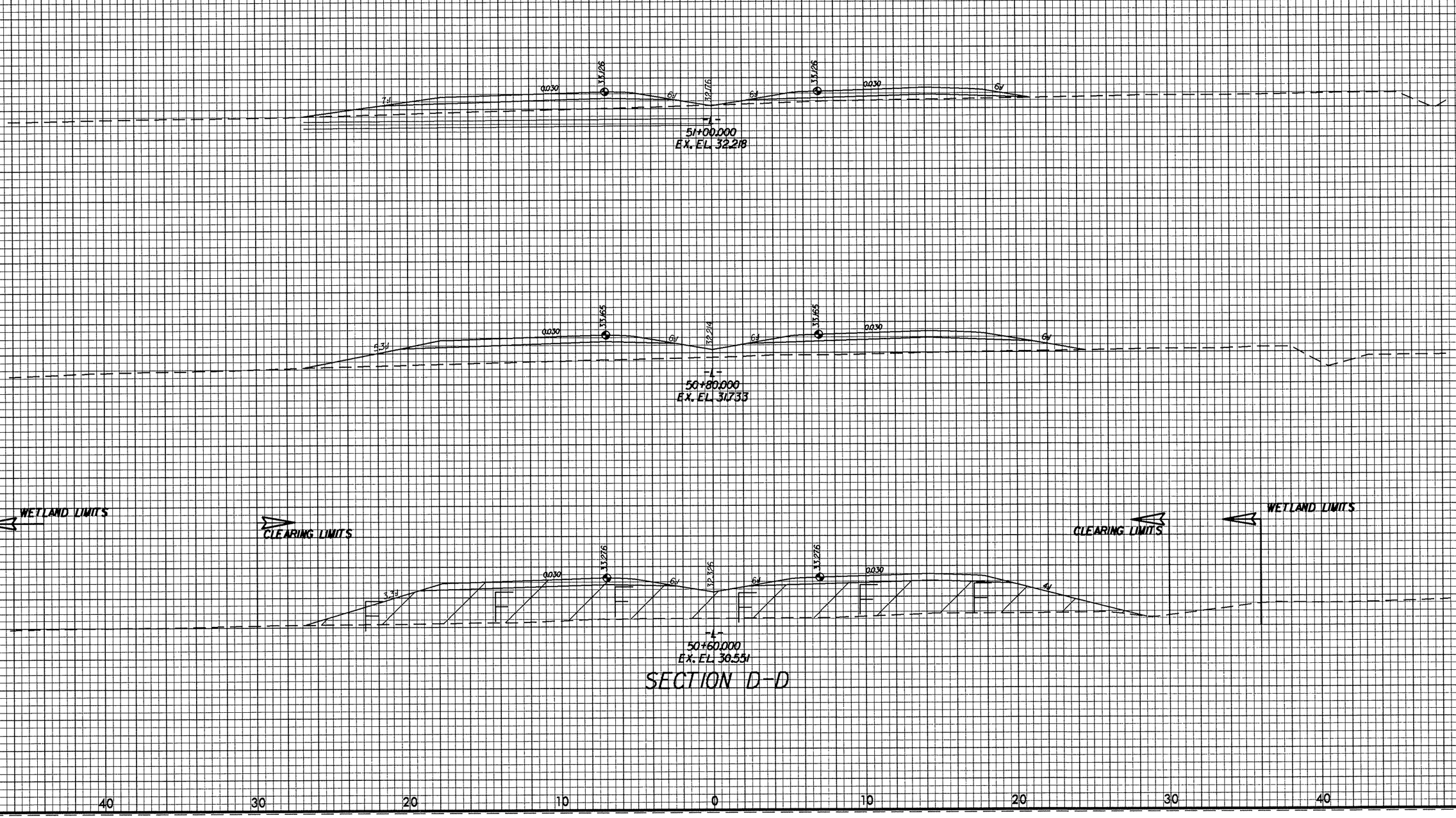
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

PROJ. REFERENCE NO.	SHEET NO.
R-2554A	X-106
GOLDSBORO BYPASS	

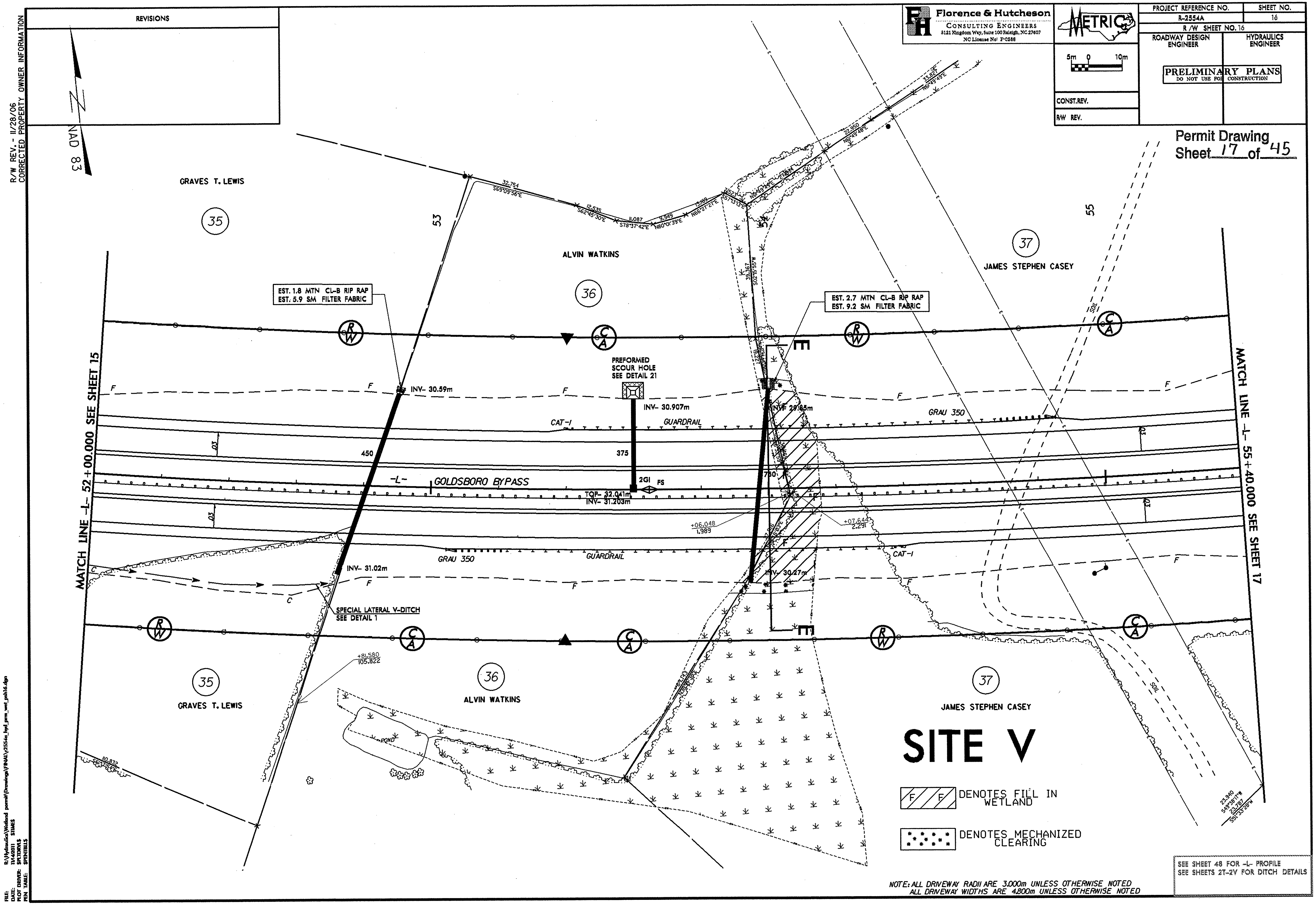
2m 0 2m
SCALE

Permit Drawing
Sheet 16 of 45



SECTION D-D

PENTABLE: SPENTBL15
PLOTDRVR: SPLTDRV15
FILE NAME: SP1015



REVISIONS
R/W REV. - 11/28/06 CORRECTED PROPERTY OWNER INFORMATION
NAD 83
Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0286
METRIC
PROJECT REFERENCE NO.
SHEET NO.
R-2554A
16
R/W SHEET NO. 16
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
5m 0 10m
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
Permit Drawing
Sheet 17 of 45
GRAVES T. LEWIS
35
ALVIN WATKINS
36
JAMES STEPHEN CASEY
37
53
55
EST. 1.8 MTN CL-B RIP RAP
EST. 5.9 SM FILTER FABRIC
EST. 2.7 MTN CL-B RIP RAP
EST. 9.2 SM FILTER FABRIC
PREFORMED SCOUR HOLE SEE DETAIL 21
INV- 30.59m
INV- 30.907m
INV- 29.85m
INV- 31.02m
INV- 30.27m
TOP- 32.041m
INV- 31.203m
CAT-I
GUARDRAIL
GRAU 350
450
375
750
2GI
FS
-L-
GOLDSBORO BYPASS
+06.048
1.989
+07.644
2.291
SPECIAL LATERAL V-DITCH
SEE DETAIL 1
+81.580
105.822
POND
SOIL
MATCH LINE -L- 52+00.000 SEE SHEET 15
MATCH LINE -L- 55+40.000 SEE SHEET 17
SITE V
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
SEE SHEET 48 FOR -L- PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS
NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

REVISIONS

R/W REV. - 11/28/06
CORRECTED PROPERTY OWNER INFORMATION

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METRIC

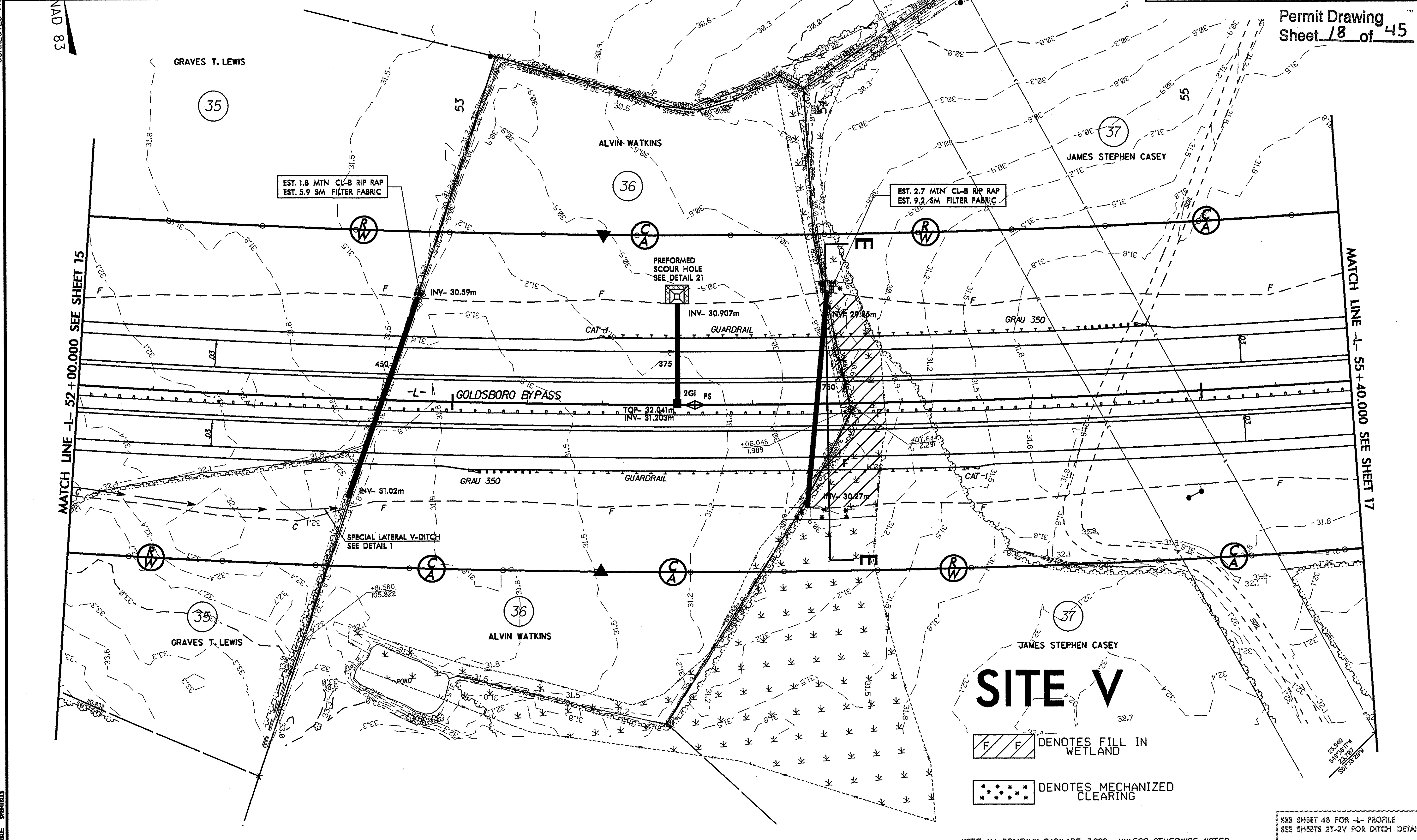
PROJECT REFERENCE NO.	SHEET NO.
R-2554A	16
R/W SHEET NO. 16	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

Permit Drawing
Sheet 18 of 45



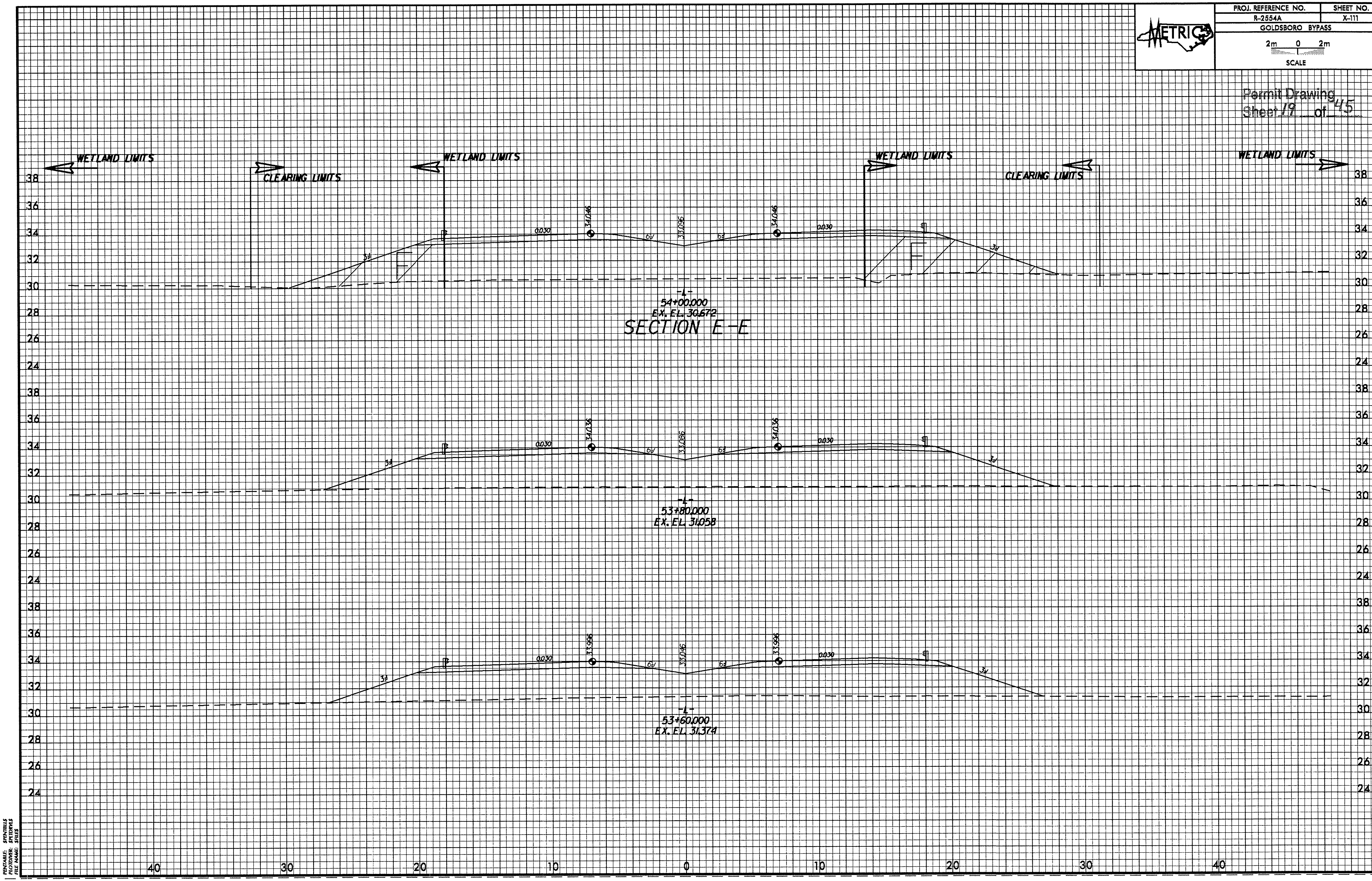
SITE V

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

SEE SHEET 48 FOR -L- PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS

NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED


PROJ. REFERENCE NO.
R-2554A
SHEET NO.
X-111
GOLDSBORO BYPASS
METRIC
2m 0 2m
SCALE
Permit Drawing
Sheet 19 of 45
WETLAND LIMITS
CLEARING LIMITS
WETLAND LIMITS
WETLAND LIMITS
CLEARING LIMITS
WETLAND LIMITS
34.046
33.096
34.046
0.030
0.030
-L-
54+00.000
EX. EL. 30.672
SECTION E-E
34.036
33.086
34.036
-L-
53+80.000
EX. EL. 31.058
33.996
33.046
33.996
-L-
53+60.000
EX. EL. 31.374
40
30
20
10
0
10
20
30
40

REVISIONS

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METRIC

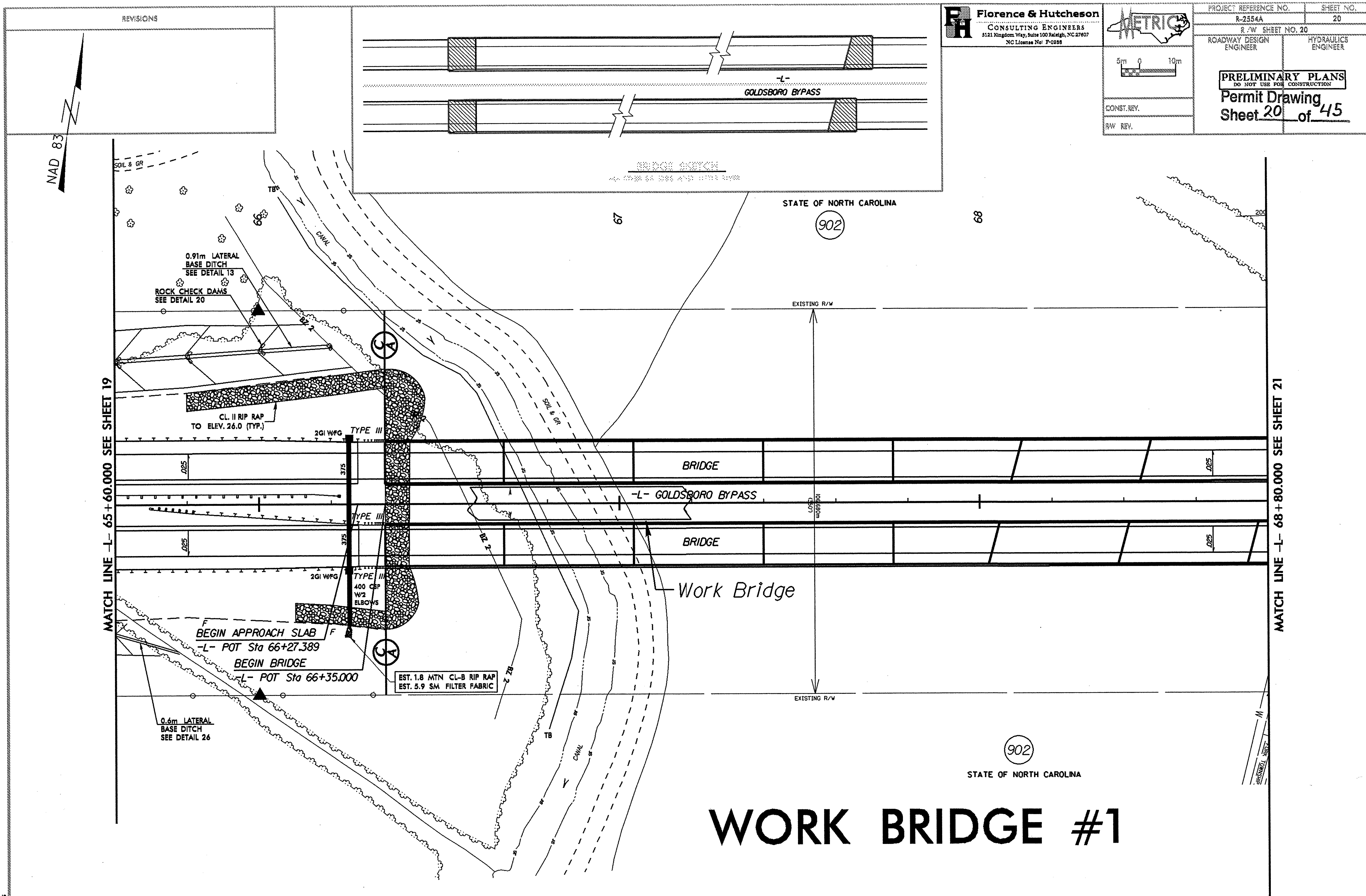
PROJECT REFERENCE NO.	SHEET NO.
R-2554A	20
R/W SHEET NO. 20	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CONST. REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 20 of 45



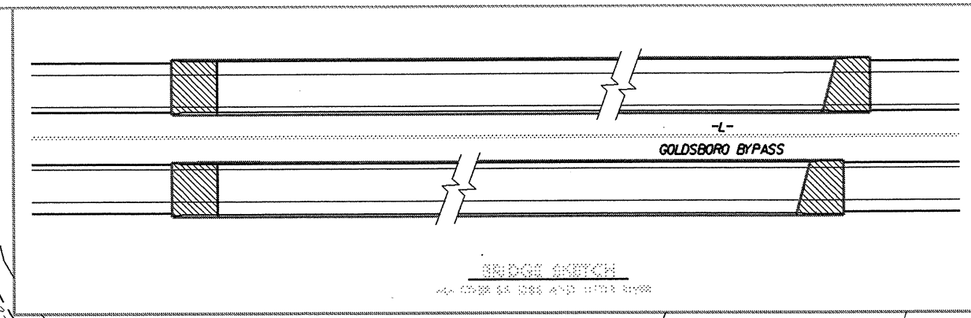
WORK BRIDGE #1

SEE SHEET 50 FOR -L- PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS

NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

REVISIONS

NAD 83



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NC License No: P-0258

METRIC
5m 0 10m

CONST. REV.
R/W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	20
R/W SHEET NO. 20	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 21 of 45

MATCH LINE -L- 65+60.000 SEE SHEET 19

MATCH LINE -L- 68+80.000 SEE SHEET 21

STATE OF NORTH CAROLINA (902)

EXISTING R/W

0.91m LATERAL BASE DITCH SEE DETAIL 13

ROCK CHECK DAMS SEE DETAIL 20

CL. II RIP RAP TO ELEV. 26.0 (TYP.)

2GI W/FG TYPE III

BRIDGE

-L- GOLDSBORO BYPASS

Work Bridge

2GI W/FG TYPE III 400 CSP W/2 ELBOWS

BEGIN APPROACH SLAB -L- POT Sta 66+27.389

BEGIN BRIDGE -L- POT Sta 66+35.000

EST. 1.8 MTN CL-B RIP RAP
EST. 5.9 SM FILTER FABRIC

0.6m LATERAL BASE DITCH SEE DETAIL 26

CANAL

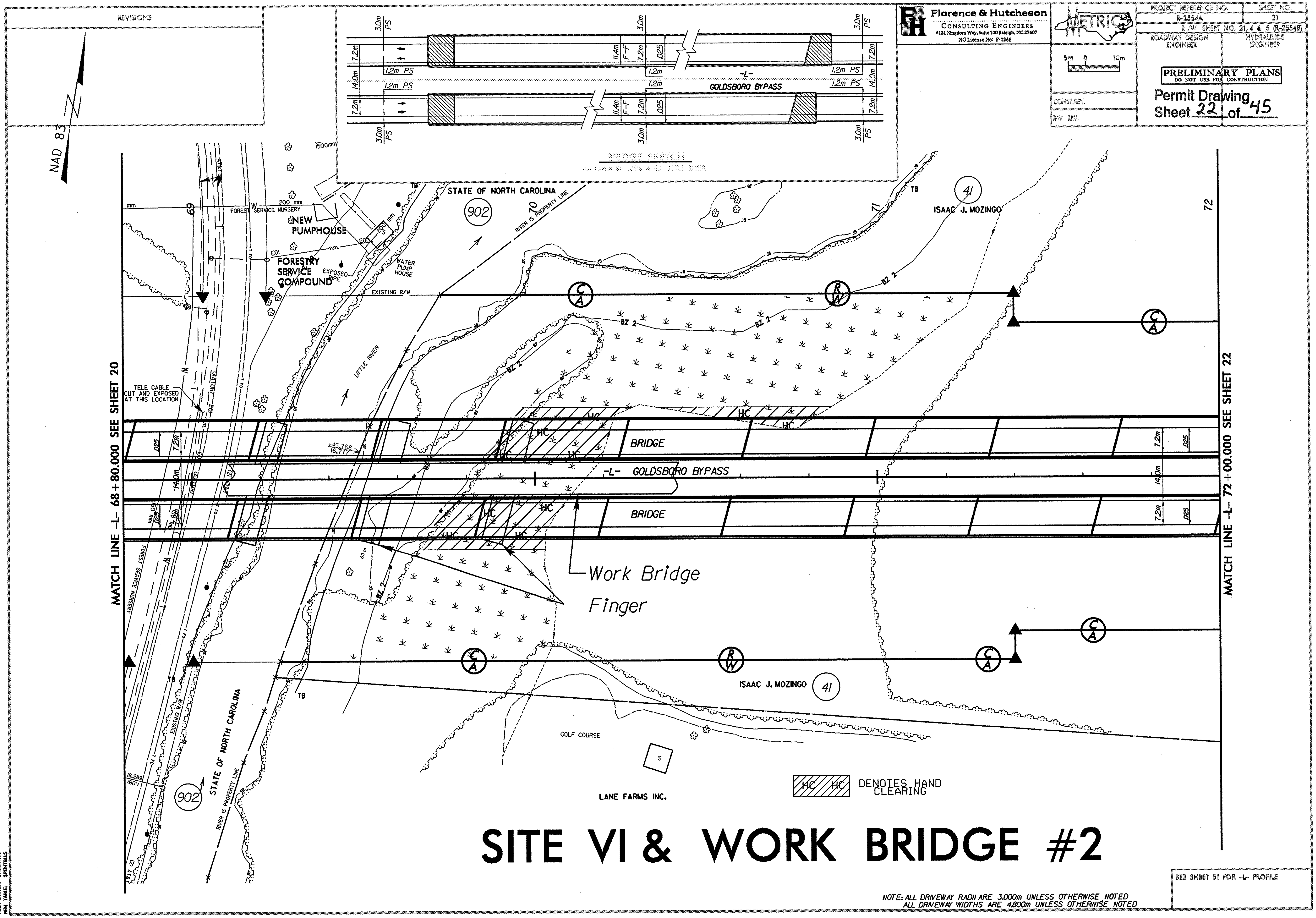
SOIL & SR

WORK BRIDGE #1

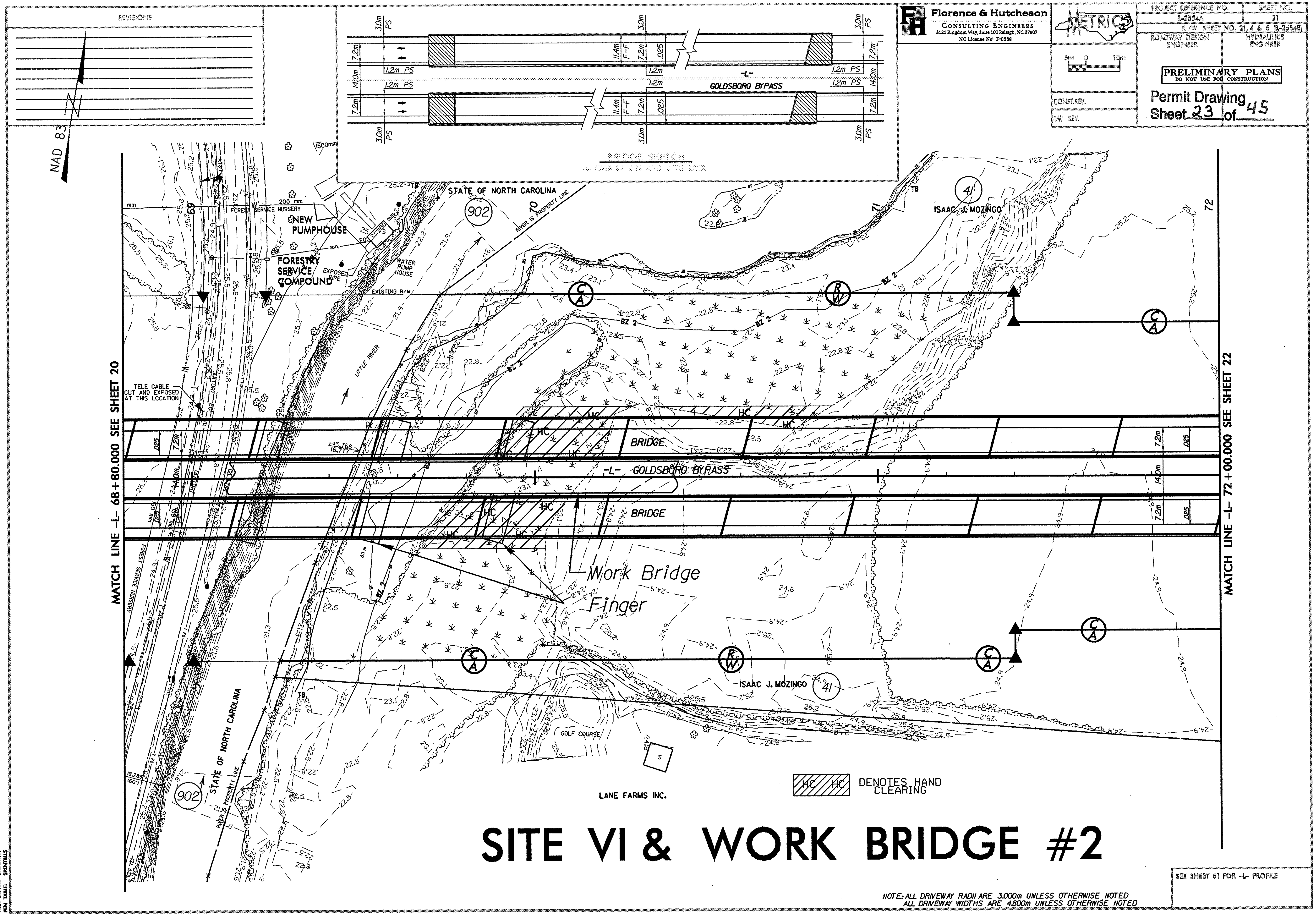
NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

SEE SHEET 50 FOR -L- PROFILE
SEE SHEETS 27-29 FOR DITCH DETAILS

FILE: R:\Hydraulics\Watford permit\Drawings\FINAL\25514a_hyd_prm_wtd_pshl20.dgn
DATE: 11/4/2011
PLOTTED BY: SIMMONS
PEN TABLE: SPENTABLE



REVISIONS
NAD 83
Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0266
METRIC
PROJECT REFERENCE NO.
R-2554A
SHEET NO.
21
R/W SHEET NO. 21, 4 & 5 (R-2554B)
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Permit Drawing
Sheet 22 of 45
CONST. REV.
R/W REV.
BRIDGE SKETCH
GOLDSBORO BYPASS
STATE OF NORTH CAROLINA
RIVER IS PROPERTY LINE
902
FOREST SERVICE NURSERY
NEW PUMPHOUSE
FORESTRY SERVICE COMPOUND
EXPOSED PIPE
WATER PUMP HOUSE
EXISTING R/W
LITTLE RIVER
ISAAC J. MOZINGO
41
TELE CABLE CUT AND EXPOSED AT THIS LOCATION
MATCH LINE -L- 68+80.000 SEE SHEET 20
MATCH LINE -L- 72+00.000 SEE SHEET 22
BRIDGE
-L- GOLDSBORO BYPASS
Work Bridge Finger
GOLF COURSE
LANE FARMS INC.
DENOTES HAND CLEARING
SITE VI & WORK BRIDGE #2
SEE SHEET 51 FOR -L- PROFILE
NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED



SITE VI & WORK BRIDGE #2

R/W REV. - 11/28/06
CORRECTED PROPERTY OWNER INFORMATION
REVISED R/W MONUMENT ON PARCEL 42

REVISIONS

NAD 83

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5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0288

METRIC

5m 0 10m

CONST.REV.
R/W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	24
R/W SHEET NO. 7 & 8 (R-2554B)	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 24 of 45

SITE VII

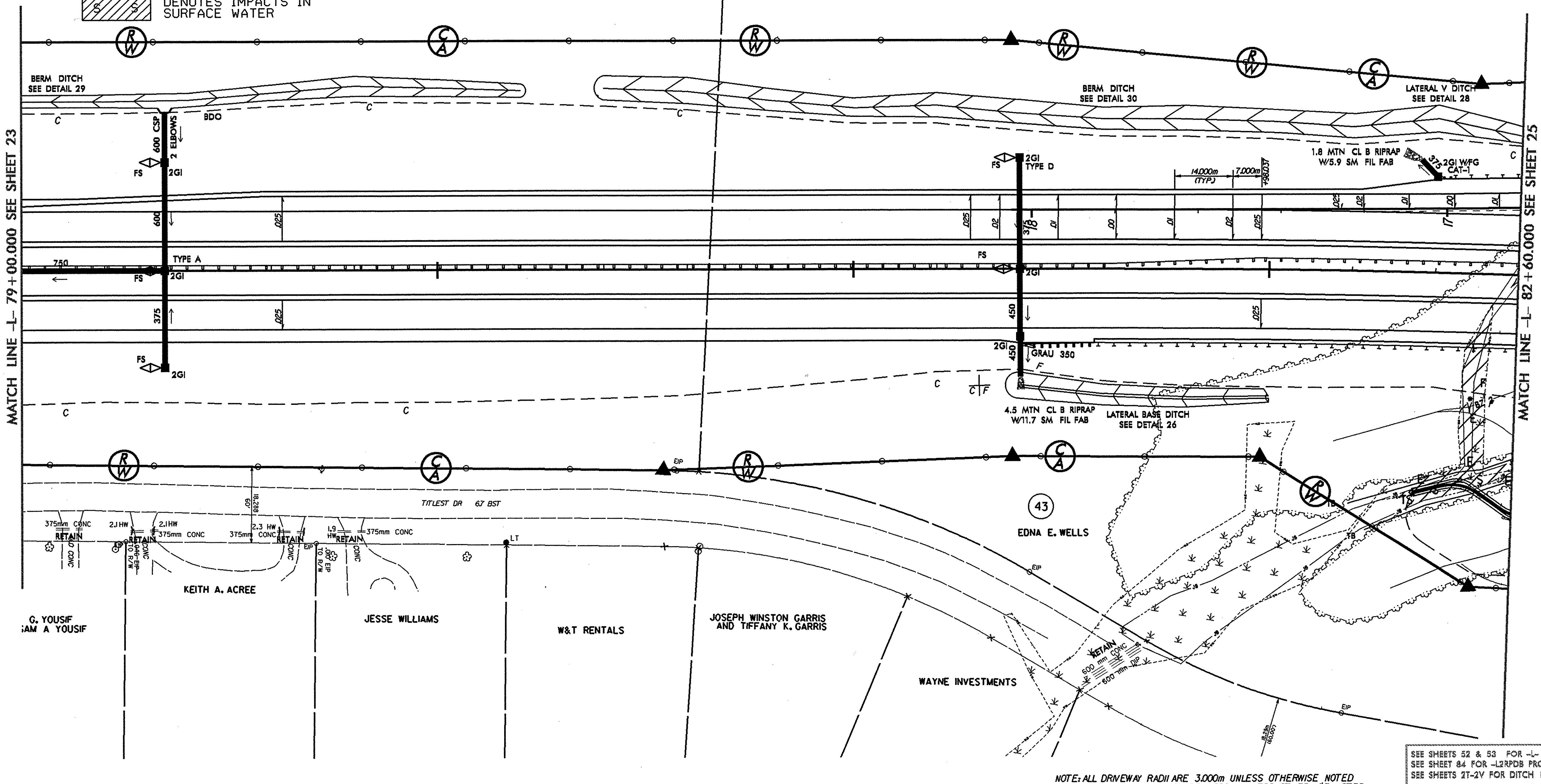
DENOTES EXCAVATION IN WETLAND

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

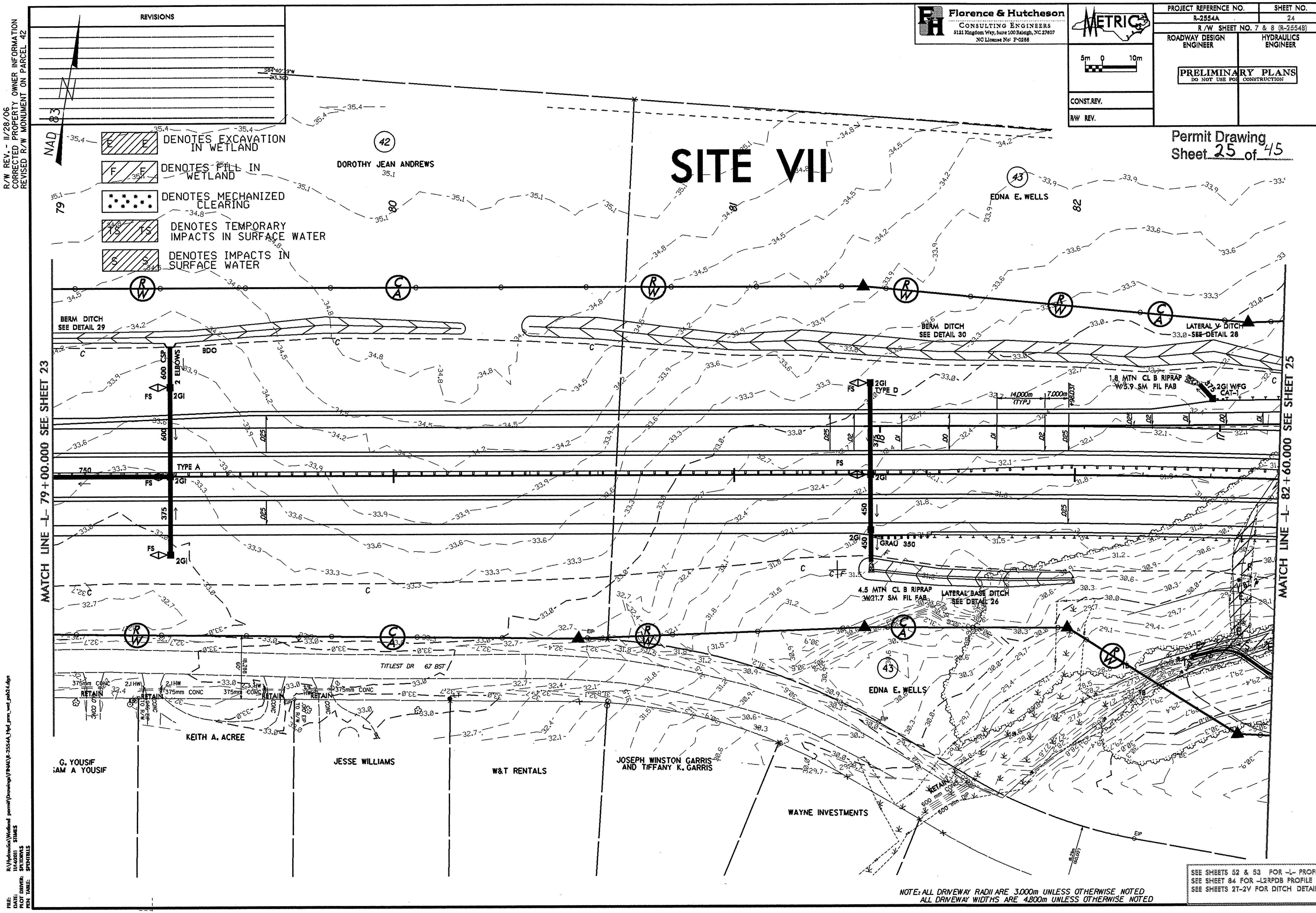
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER



NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

SEE SHEETS 52 & 53 FOR -L- PROFILE
SEE SHEET 84 FOR -L2RPDB PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS



R/W REV. - 11/28/06
CORRECTED PROPERTY OWNER INFORMATION
REVISED R/W MONUMENT ON PARCEL 42
REVISIONS
NAD 83
Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0266
METRIC
5m 0 10m
PROJECT REFERENCE NO.
R-2554A
SHEET NO.
24
R/W SHEET NO. 7 & 8 (R-2554B)
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
Permit Drawing
Sheet 25 of 45
SITE VII
DENOTES EXCAVATION IN WETLAND
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DOROTHY JEAN ANDREWS
EDNA E. WELLS
BERM DITCH SEE DETAIL 29
BERM DITCH SEE DETAIL 30
LATERAL V DITCH SEE DETAIL 28
1.8 MTN CL B RIPRAP W/5.9 SM FIL FAB
4.5 MTN CL B RIPRAP W/21.7 SM FIL FAB
LATERAL BASE DITCH SEE DETAIL 26
600 CSP
2 ELBOWS
2GI
TYPE A
TYPE D
GRAU 350
TITLEST DR 67 BST
KEITH A. ACREE
G. YOUSIF
SAM A YOUSIF
JESSE WILLIAMS
W&T RENTALS
JOSEPH WINSTON GARRIS AND TIFFANY K. GARRIS
WAYNE INVESTMENTS
MATCH LINE -L- 79+00.000 SEE SHEET 23
MATCH LINE -L- 82+60.000 SEE SHEET 25
SEE SHEETS 52 & 53 FOR -L- PROFILE
SEE SHEET 84 FOR -L2RPDB PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS
NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

R/W REV. - 07/23/10 PARCEL 43A NAME REVISION
R/W REV. - 11/28/06 ADDED PARCEL 43A

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METRIC

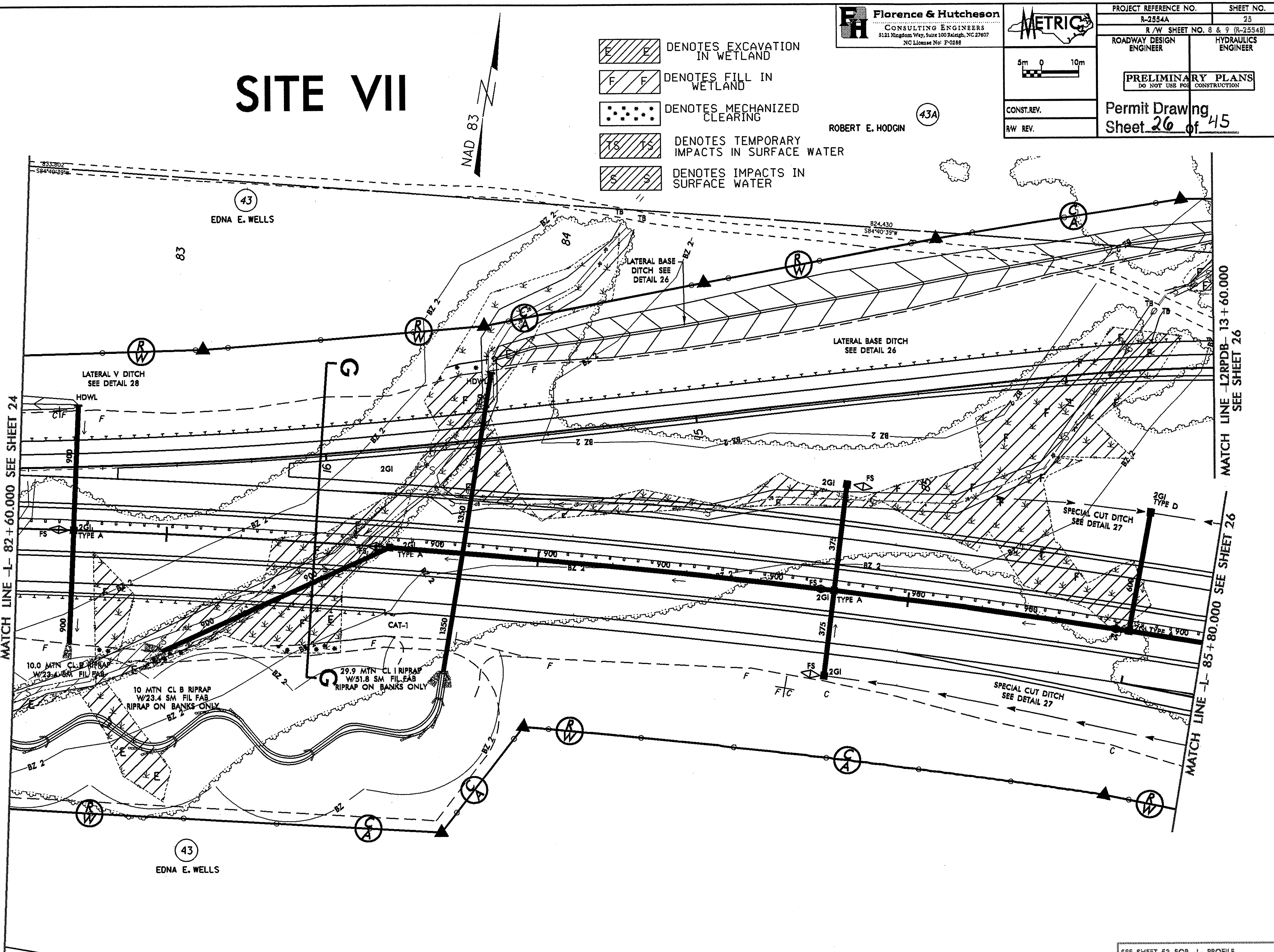
PROJECT REFERENCE NO.	SHEET NO.
R-2554A	23
R/W SHEET NO. 8 & 9 (R-2554B)	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.
R/W REV.

Permit Drawing
Sheet 26 of 45

SITE VII



NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

SEE SHEET 53 FOR -L- PROFILE
SEE SHEET 82 FOR -L2RPC- PROFILE
SEE SHEETS 83 & 84 FOR -L2RPDB- PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS

R/W REV. - 07/23/10
PARCEL 43A NAME REVISION
R/W REV. - 11/28/06
ADDED PARCEL 43A

SITE VII

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CONSULTING ENGINEERS
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NC License No: F-0286

METRIC

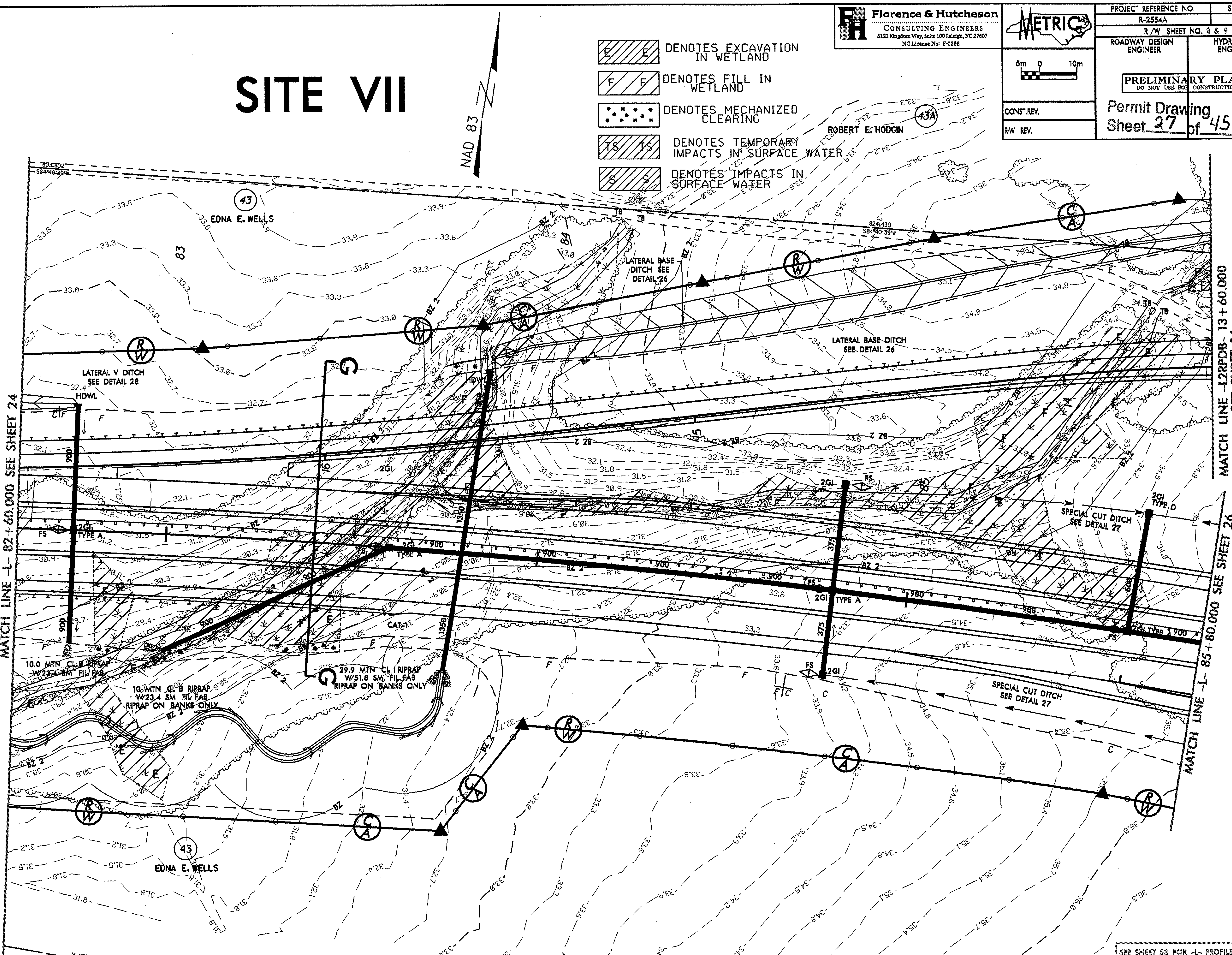
PROJECT REFERENCE NO.	SHEET NO.
R-2554A	25
R/W SHEET NO. 8 & 9 (R-2554B)	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.
R/W REV.

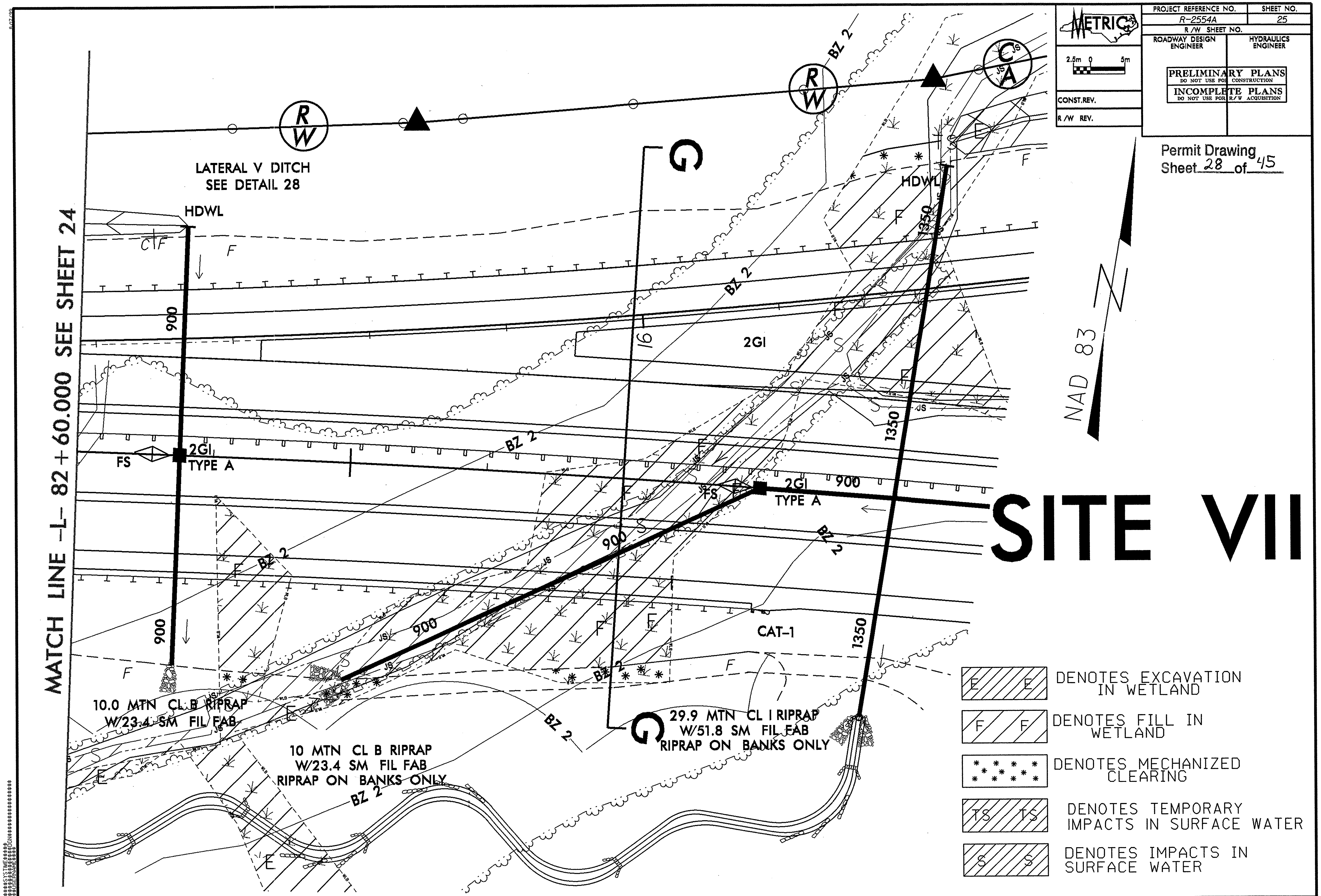
Permit Drawing
Sheet 27 of 45

- E / E — DENOTES EXCAVATION IN WETLAND
- F / F — DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- S / S — DENOTES IMPACTS IN SURFACE WATER



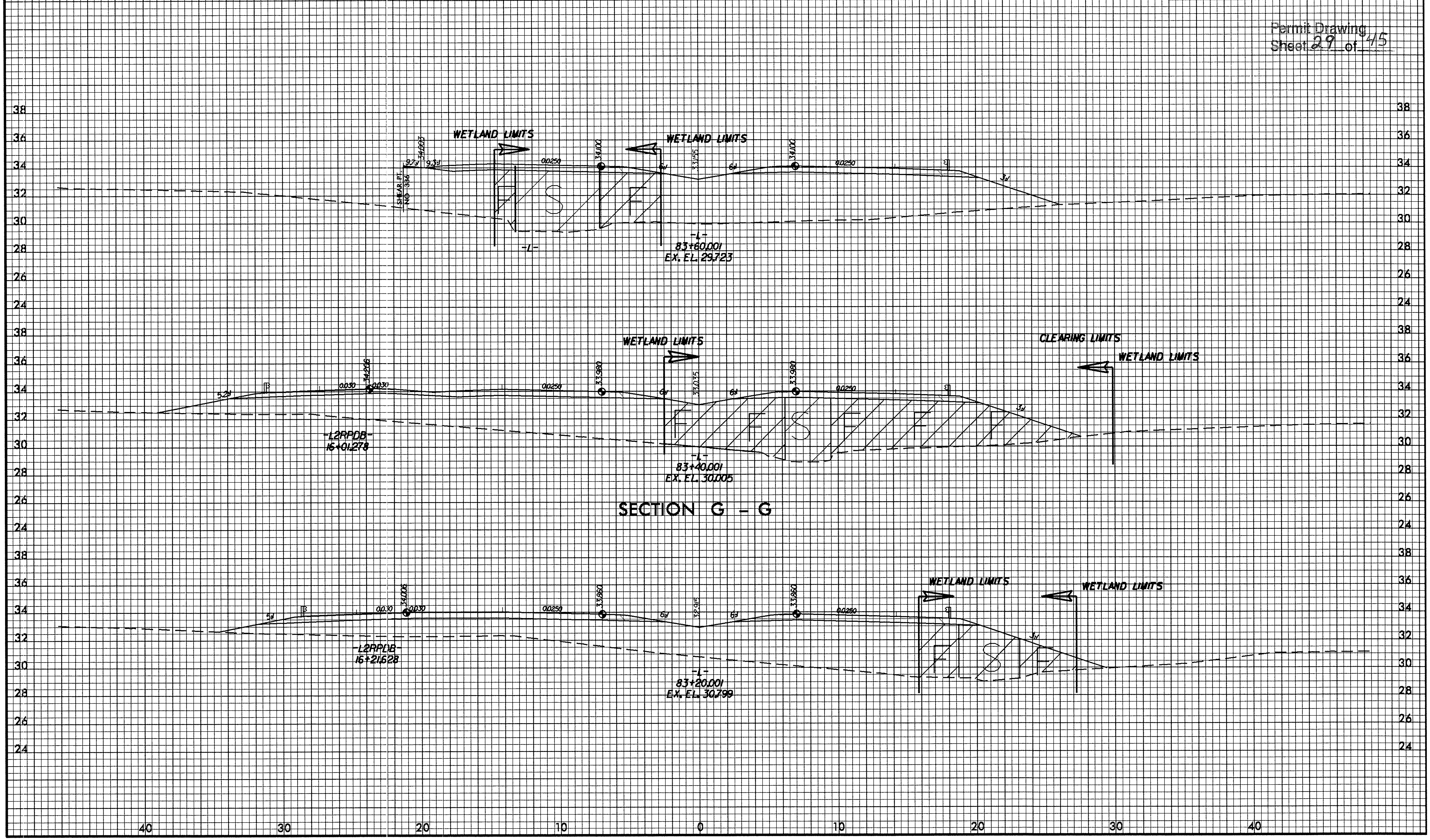
SEE SHEET 53 FOR -L- PROFILE
SEE SHEET 82 FOR -L2RPC- PROFILE
SEE SHEETS 83 & 84 FOR -L2RPDB- PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS

NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED


METRIC
PROJECT REFERENCE NO. R-2554A
SHEET NO. 25
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION
2.5m 0 5m
CONST.REV.
R/W REV.
Permit Drawing
Sheet 28 of 45
NAD 83
SITE VII
MATCH LINE -L- 82+60.000 SEE SHEET 24
LATERAL V DITCH
SEE DETAIL 28
HDWL
2GI
TYPE A
FS
2GI
900
TYPE A
CAT-1
1350
10.0 MTN CL B RIPRAP
W/23.4 SM FIL FAB
10 MTN CL B RIPRAP
W/23.4 SM FIL FAB
RIPRAP ON BANKS ONLY
29.9 MTN CL I RIPRAP
W/51.8 SM FIL FAB
RIPRAP ON BANKS ONLY
BZ 2
DENOTES EXCAVATION IN WETLAND
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER

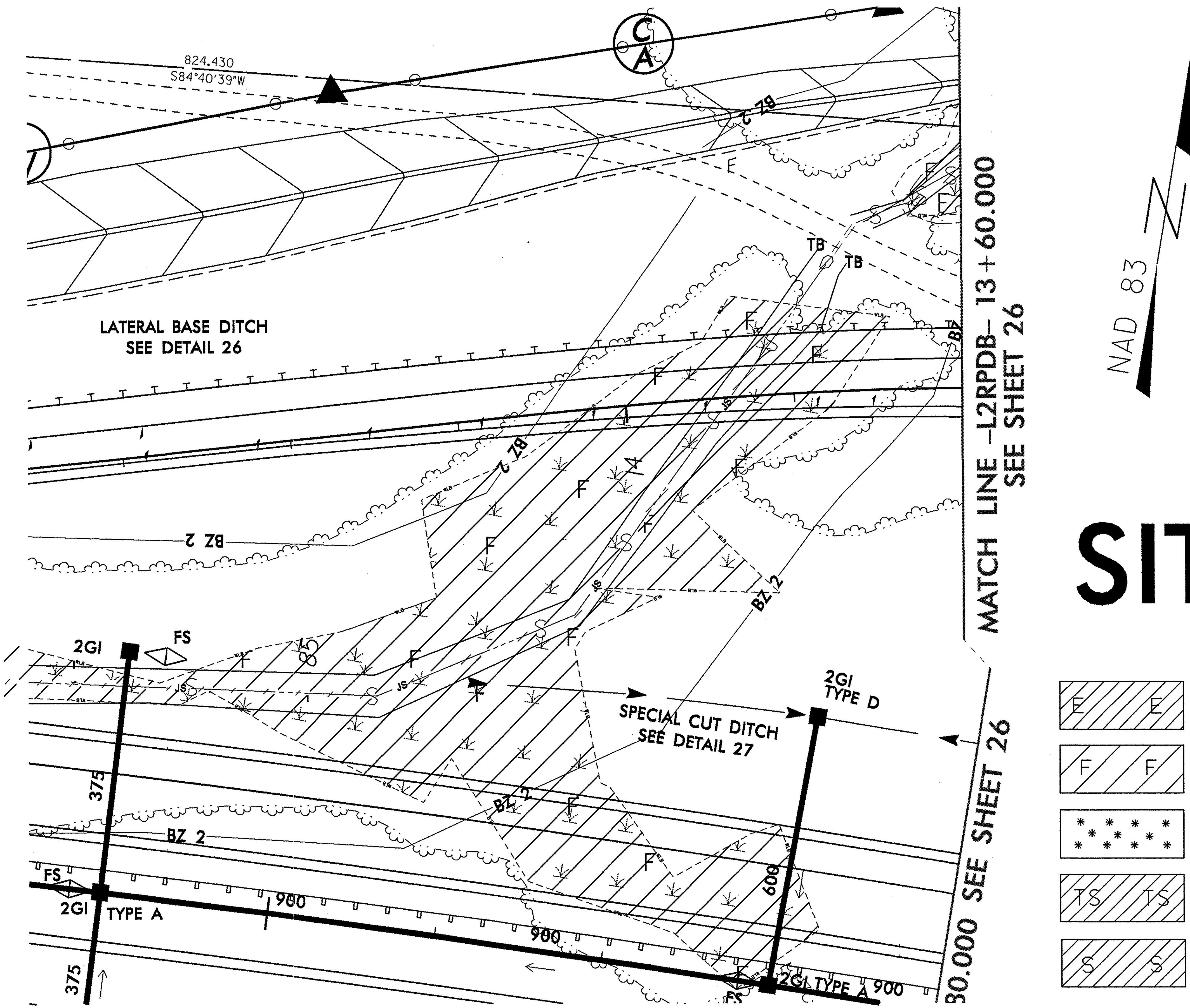
PROJ. REFERENCE NO.	SHEET NO.
R-2554A	
GOLDSBORO BYPASS	
2m 0 2m SCALE	

Permit Drawing
Sheet 29 of 45



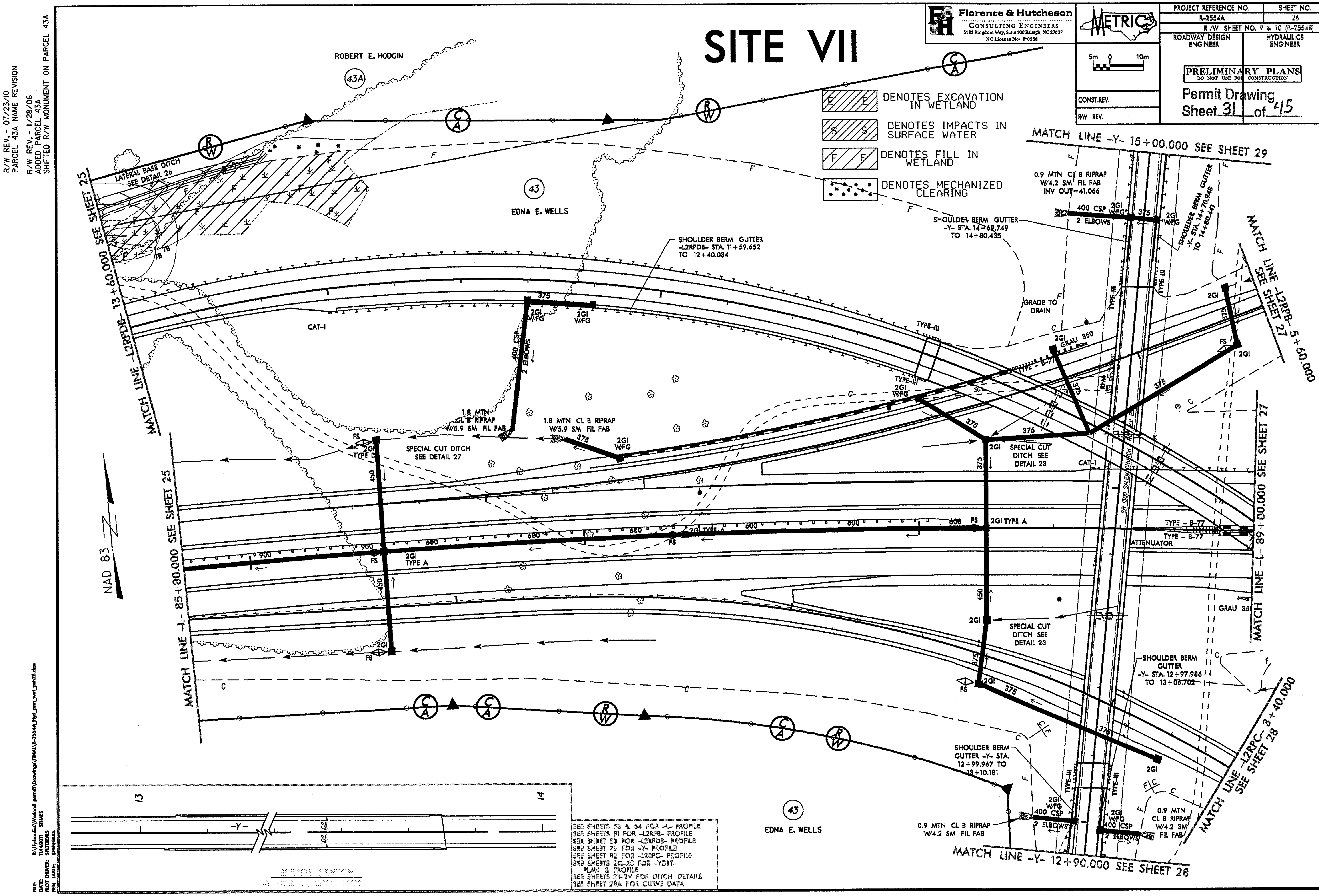
METRIC	PROJECT REFERENCE NO.	SHEET NO.
	R-2554A	25
	R/W SHEET NO.	
2.5m 0 5m	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
R/W REV.	INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	

Permit Drawing
Sheet 30 of 45



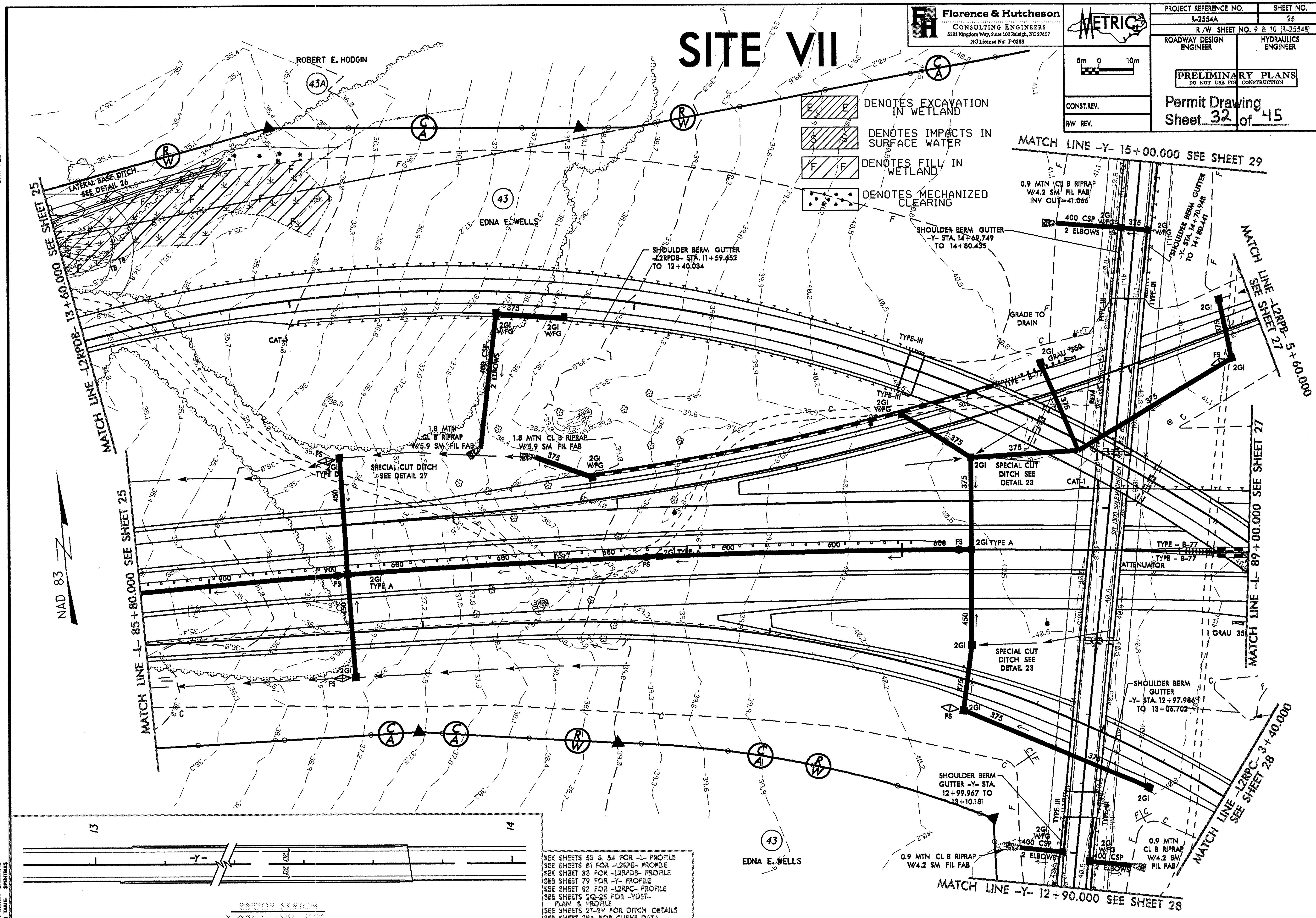
SITE VII

E E	DENOTES EXCAVATION IN WETLAND
F F	DENOTES FILL IN WETLAND
* * *	DENOTES MECHANIZED CLEARING
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S S	DENOTES IMPACTS IN SURFACE WATER



SITE VII
Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0266
METRIC
PROJECT REFERENCE NO.
SHEET NO.
R-2554A
26
R/W SHEET NO. 9 & 10 (R-2554B)
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
Permit Drawing
Sheet 31 of 45
DENOTES EXCAVATION IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
R/W REV.- 07/23/10
PARCEL 43A NAME REVISION
R/W REV. - 11/28/06
ADDED PARCEL 43A
SHIFTED R/W MONUMENT ON PARCEL 43A
ROBERT E. HODGIN
43A
43
EDNA E. WELLS
LATERAL BASE DITCH SEE DETAIL 26
MATCH LINE -L2RPDB- 13+60.000 SEE SHEET 25
MATCH LINE -Y- 15+00.000 SEE SHEET 29
MATCH LINE -L2RPB- 5+60.000 SEE SHEET 27
MATCH LINE -L- 89+00.000 SEE SHEET 27
MATCH LINE -L- 85+80.000 SEE SHEET 25
MATCH LINE -L2RPC- 3+40.000 SEE SHEET 28
MATCH LINE -Y- 12+90.000 SEE SHEET 28
SHOULDER BERM GUTTER -L2RPDB- STA. 11+59.652 TO 12+40.034
0.9 MTN CL B RIPRAP W/4.2 SM FIL FAB INV OUT=41.066
SHOULDER BERM GUTTER -Y- STA. 14+69.749 TO 14+80.435
SHOULDER BERM GUTTER -Y- STA. 14+70.948 TO 14+80.441
GRADE TO DRAIN
CAT-1
1.8 MTN CL B RIPRAP W/5.9 SM FIL FAB
SPECIAL CUT DITCH SEE DETAIL 27
SPECIAL CUT DITCH SEE DETAIL 23
SR 1300 SALEM CHURCH
ATTENUATOR
TYPE - B-77
GRAU 350
SHOULDER BERM GUTTER -Y- STA. 12+97.986 TO 13+06.702
SHOULDER BERM GUTTER -Y- STA. 12+99.967 TO 13+10.181
0.9 MTN CL B RIPRAP W/4.2 SM FIL FAB
NAD 83
SEE SHEETS 53 & 54 FOR -L- PROFILE
SEE SHEETS 81 FOR -L2RPB- PROFILE
SEE SHEET 83 FOR -L2RPDB- PROFILE
SEE SHEET 79 FOR -Y- PROFILE
SEE SHEET 82 FOR -L2RPC- PROFILE
SEE SHEETS 2Q-2S FOR -YDET- PLAN & PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS
SEE SHEET 28A FOR CURVE DATA

R/W REV. - 07/23/10
PARCEL 43A NAME REVISION
R/W REV. - 11/28/06
ADDED PARCEL 43A
SHIFTED R/W MONUMENT ON PARCEL 43A



PROJECT REFERENCE NO.	SHEET NO.
R-2554A	26
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

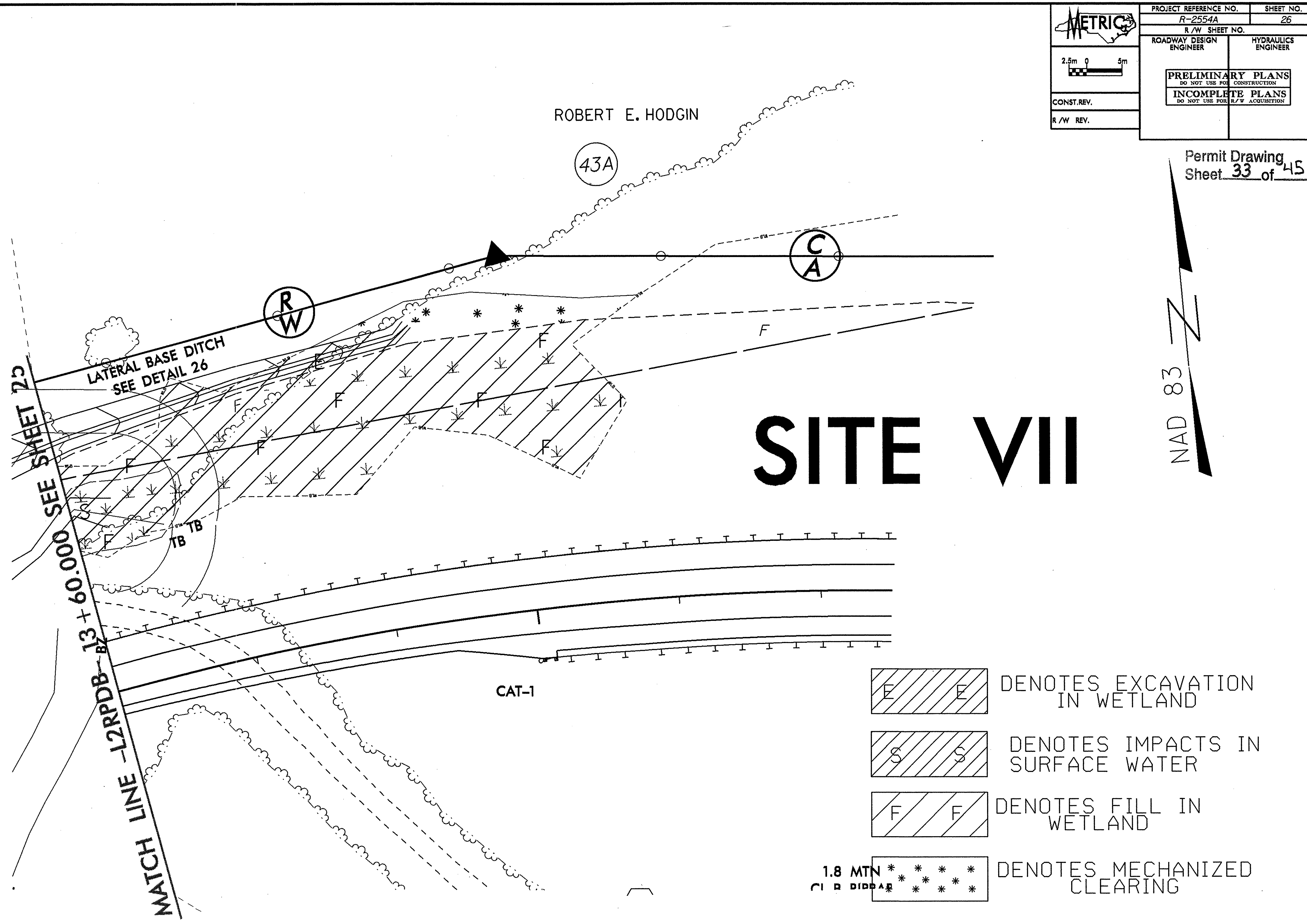
CONST.REV.

R/W REV.

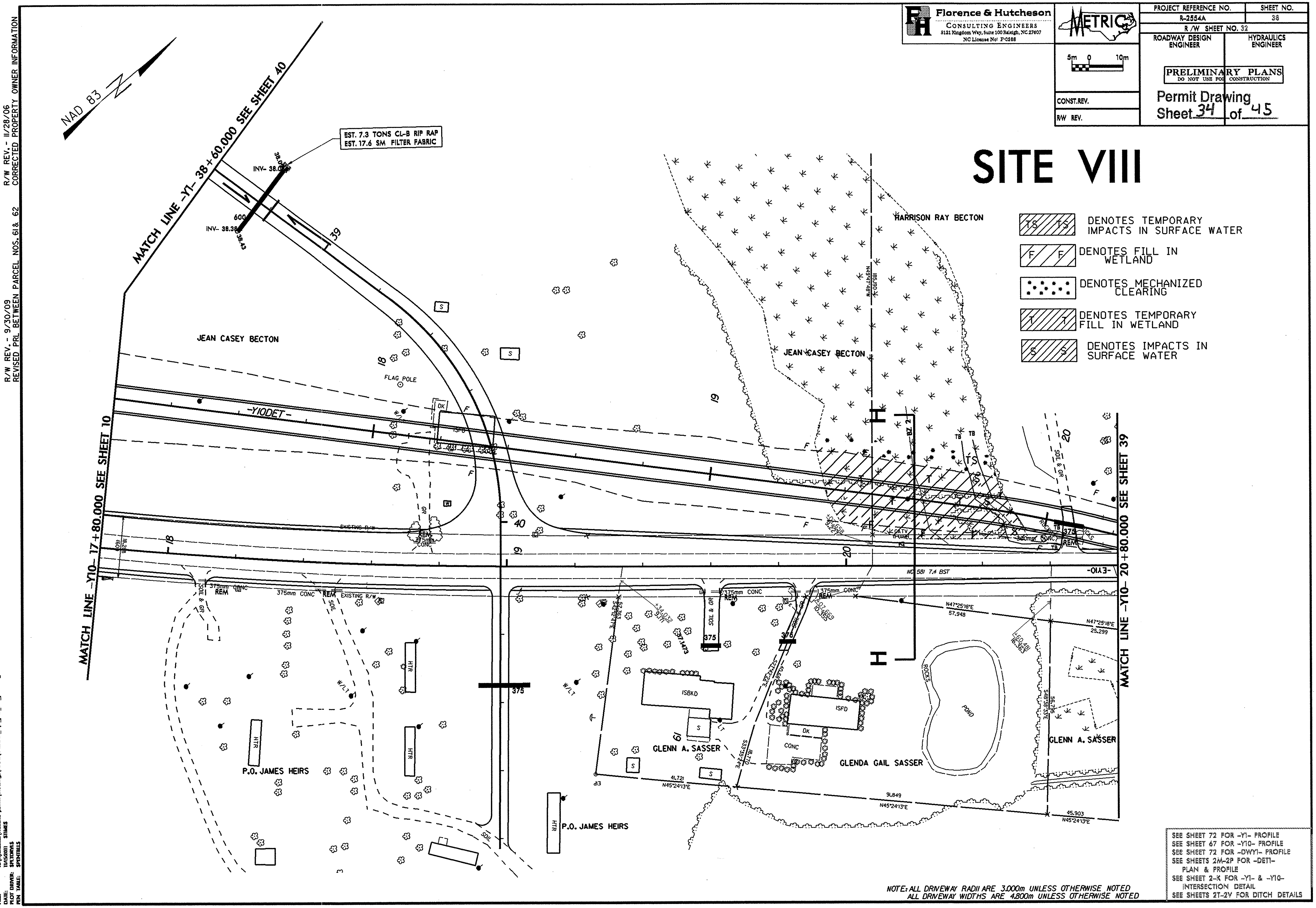
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

Permit Drawing
Sheet 33 of 45



R/W REV. - 7/08/09
REVISED PUE ON PARCEL NO. 60
R/W REV. - 6/11/09
REDUCED PAINTED ISLAND TO 19+80 -Y10-
R/W REV. - 4/15/09
ADDED PUE TO PARCEL NOS. 60, 61 & 62
R/W REV. - 11/28/06
CORRECTED PROPERTY OWNER INFORMATION
R/W REV. - 9/30/09
REVISED PRL BETWEEN PARCEL NOS. 61 & 62



Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0268
METRIC
PROJECT REFERENCE NO. R-2554A
SHEET NO. 38
R/W SHEET NO. 32
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
Permit Drawing
Sheet 34 of 45
SITE VIII
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
NAD 83
EST. 7.3 TONS CL-B RIP RAP
EST. 17.6 SM FILTER FABRIC
MATCH LINE -Y1- 38+60.000 SEE SHEET 40
MATCH LINE -Y10- 17+80.000 SEE SHEET 10
MATCH LINE -Y10- 20+80.000 SEE SHEET 39
JEAN CASEY BECTON
HARRISON RAY BECTON
-Y10DET-
FLAG POLE
EXISTING R/W
NC 581 7.4 BST
-EY10-
375mm CONC
GLENN A. SASSER
GLENDA GAIL SASSER
P.O. JAMES HEIRS
POND
ROCKS
N47°25'18"E
57.948
N45°24'13"E
91.849
45.903
41.721
SEE SHEET 72 FOR -Y1- PROFILE
SEE SHEET 67 FOR -Y10- PROFILE
SEE SHEET 72 FOR -DWY1- PROFILE
SEE SHEETS 2M-2P FOR -DET1- PLAN & PROFILE
SEE SHEET 2-K FOR -Y1- & -Y10- INTERSECTION DETAIL
SEE SHEETS 2T-2V FOR DITCH DETAILS
NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

R/W REV. - 7/08/09 REVISED PUE ON PARCEL NO. 60
R/W REV. - 6/11/09 REDUCED PAINTED ISLAND TO 19+80 -Y10-
R/W REV. - 4/15/09 ADDED PUE TO PARCEL NOS. 60, 61 & 62
R/W REV. - 11/28/06 CORRECTED PROPERTY OWNER INFORMATION
R/W REV. - 9/30/09 REVISED PRL BETWEEN PARCEL NOS. 61 & 62

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0266

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	38
R/W SHEET NO. 32	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

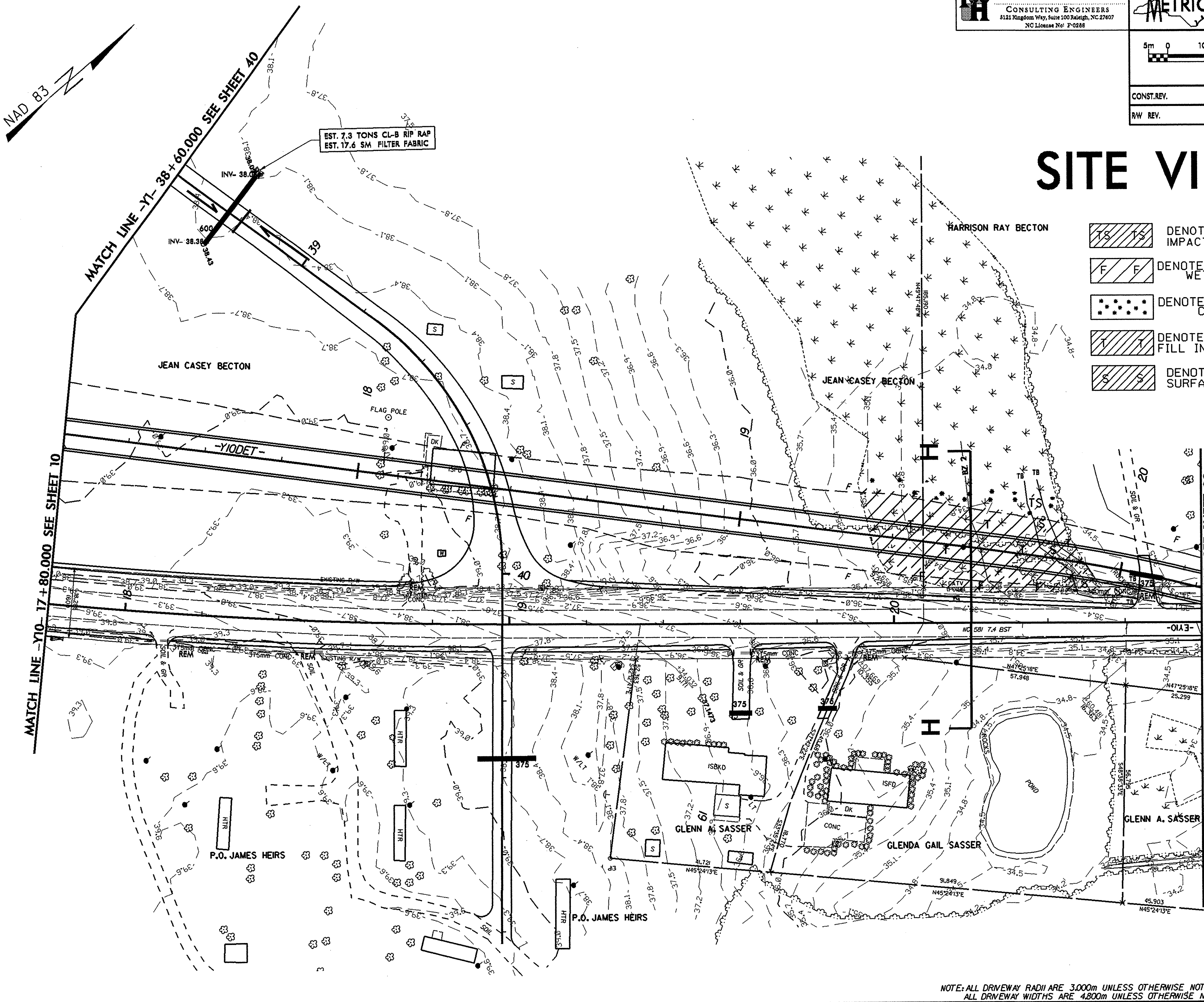
CONST. REV.
R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 35 of 45

SITE VIII

Symbol	Description
TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F	DENOTES FILL IN WETLAND
*	DENOTES MECHANIZED CLEARING
T	DENOTES TEMPORARY FILL IN WETLAND
S	DENOTES IMPACTS IN SURFACE WATER



NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

SEE SHEET 72 FOR -Y1- PROFILE
SEE SHEET 67 FOR -Y10- PROFILE
SEE SHEET 72 FOR -DWY1- PROFILE
SEE SHEETS 2M-2P FOR -DET1- PLAN & PROFILE
SEE SHEET 2-K FOR -Y1- & -Y10- INTERSECTION DETAIL
SEE SHEETS 2T-2V FOR DITCH DETAILS

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	38
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

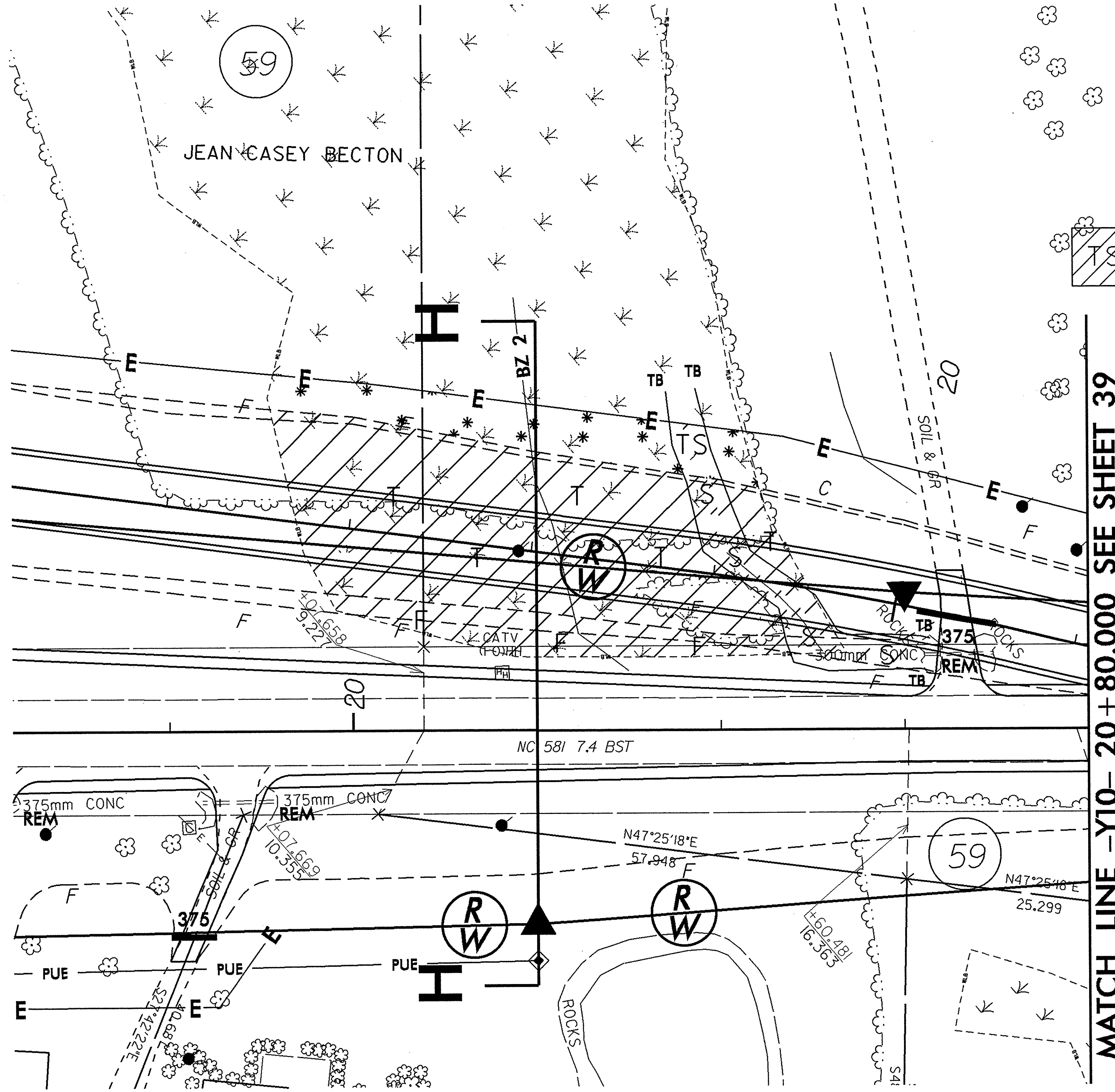
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

CONST. REV.

R/W REV.

Permit Drawing
Sheet 36 of 45



DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

DENOTES TEMPORARY FILL IN WETLAND

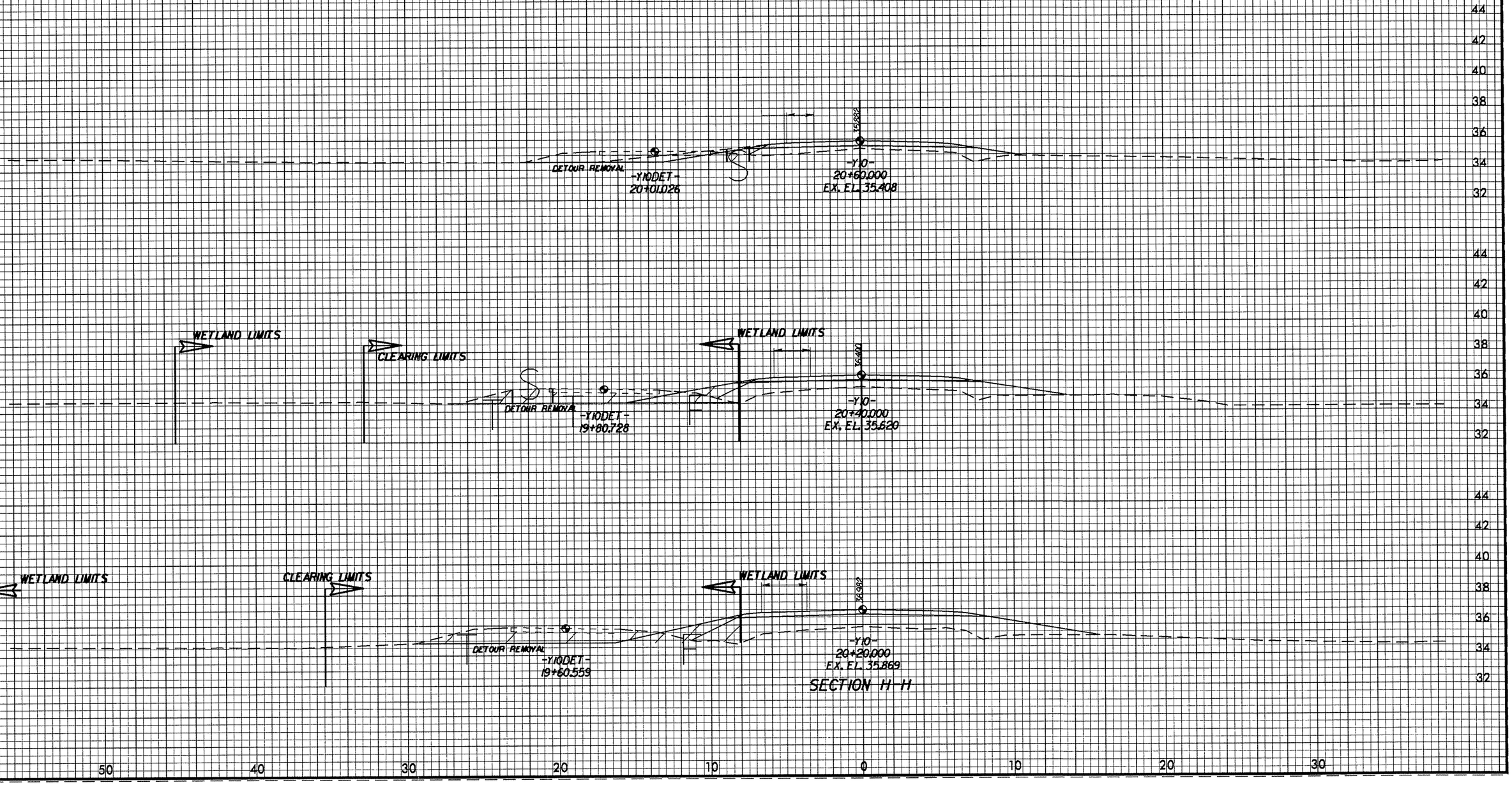
DENOTES IMPACTS IN SURFACE WATER

SITE VIII

PROJ. REFERENCE NO.	SHEET NO.
R-2554A	X-284
GOLDSBORO BYPASS	

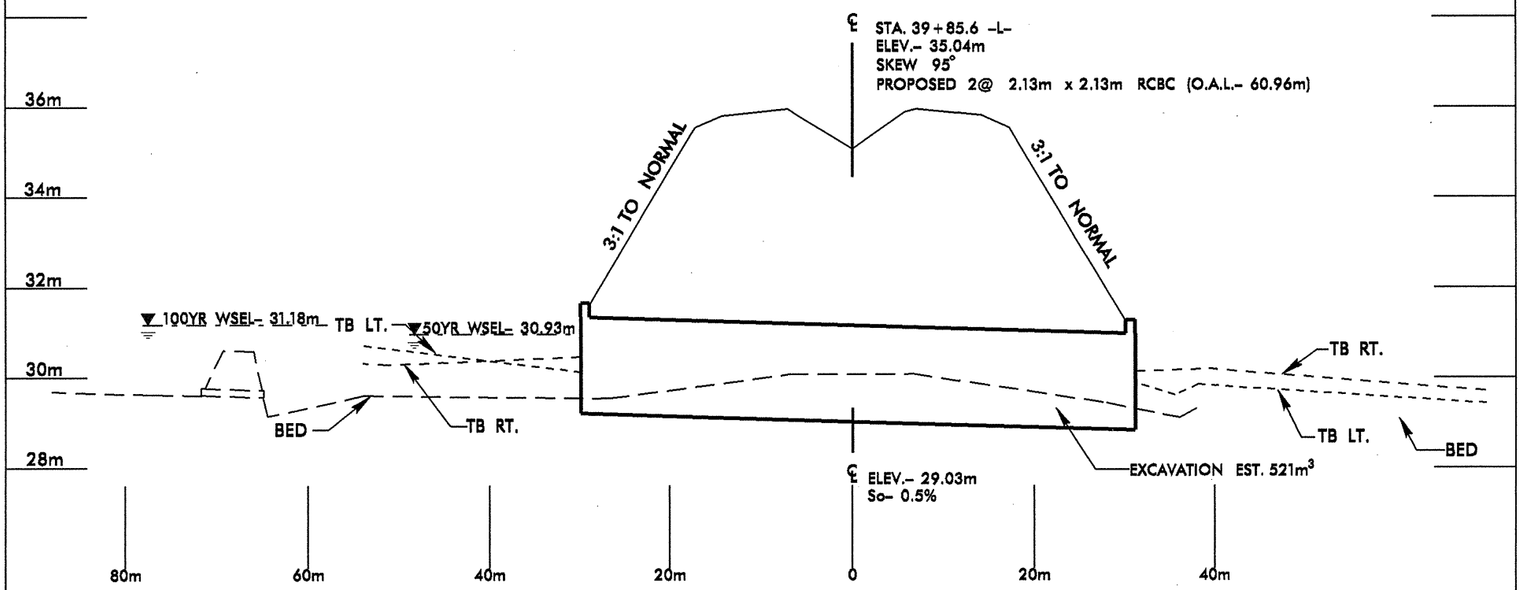
2m 0 2m
SCALE

Permit Drawing
Sheet 37 of 45



SECTION H-H

PENTABLE: SPENTBLLS
PLOTDATE: $PLTDATE$
FILE NAME: $FILE$



10m 0m 10m
VERT.

5m 0m 20m
HOR.

PROFILE

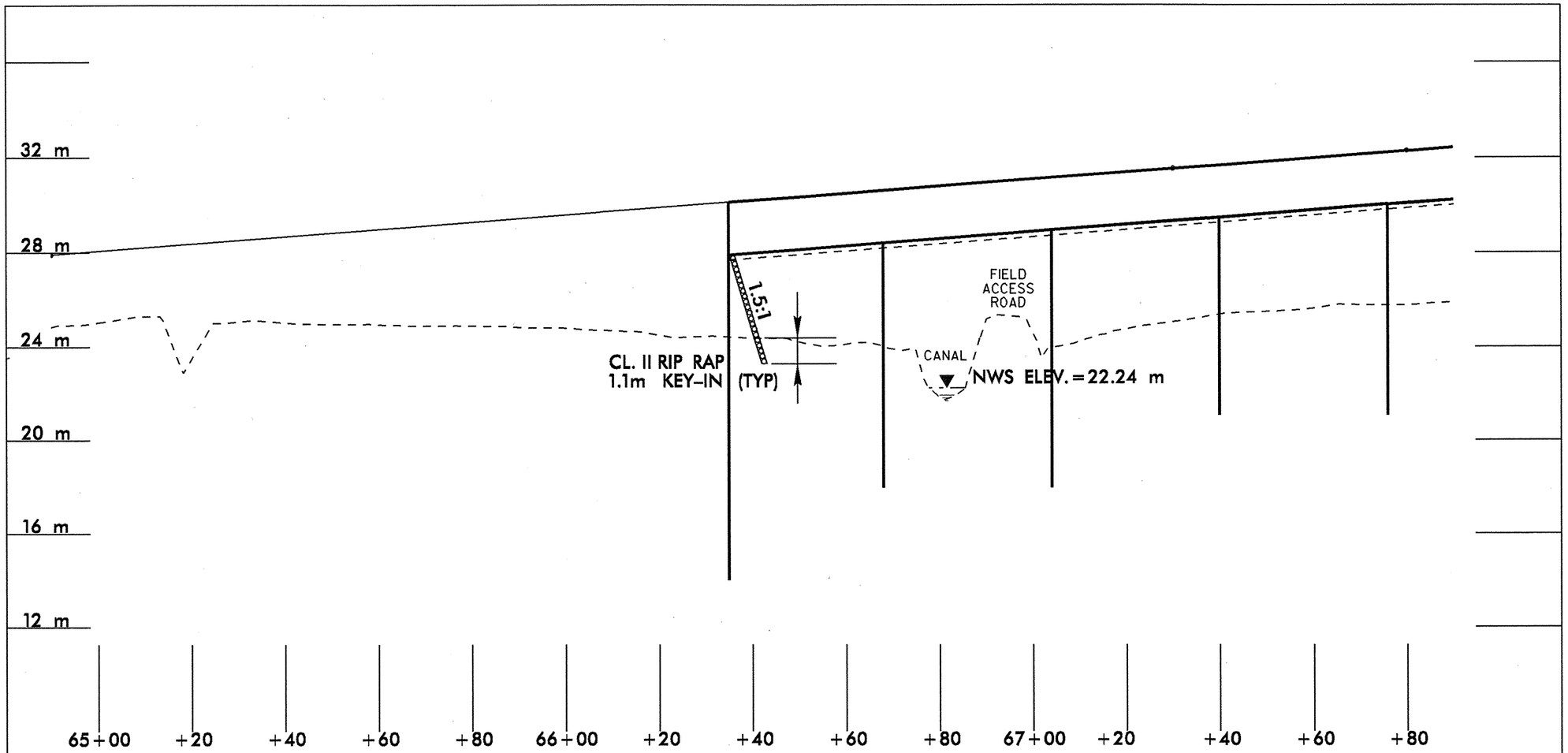
SITE 1

NCDOT
DIVISION OF HIGHWAYS
WAYNE COUNTY
PROJECT: 34461.1.3 (R-2554A)

GOLDSBORO BYPASS FROM US 70 WEST OF NC 581 TO SR 1300

SHEET **OF** **11/15/11**

Permit Drawing
Sheet 38 of 45



4m 0m 4m
VERT.

10m 0m 40m
HOR.

PROFILE

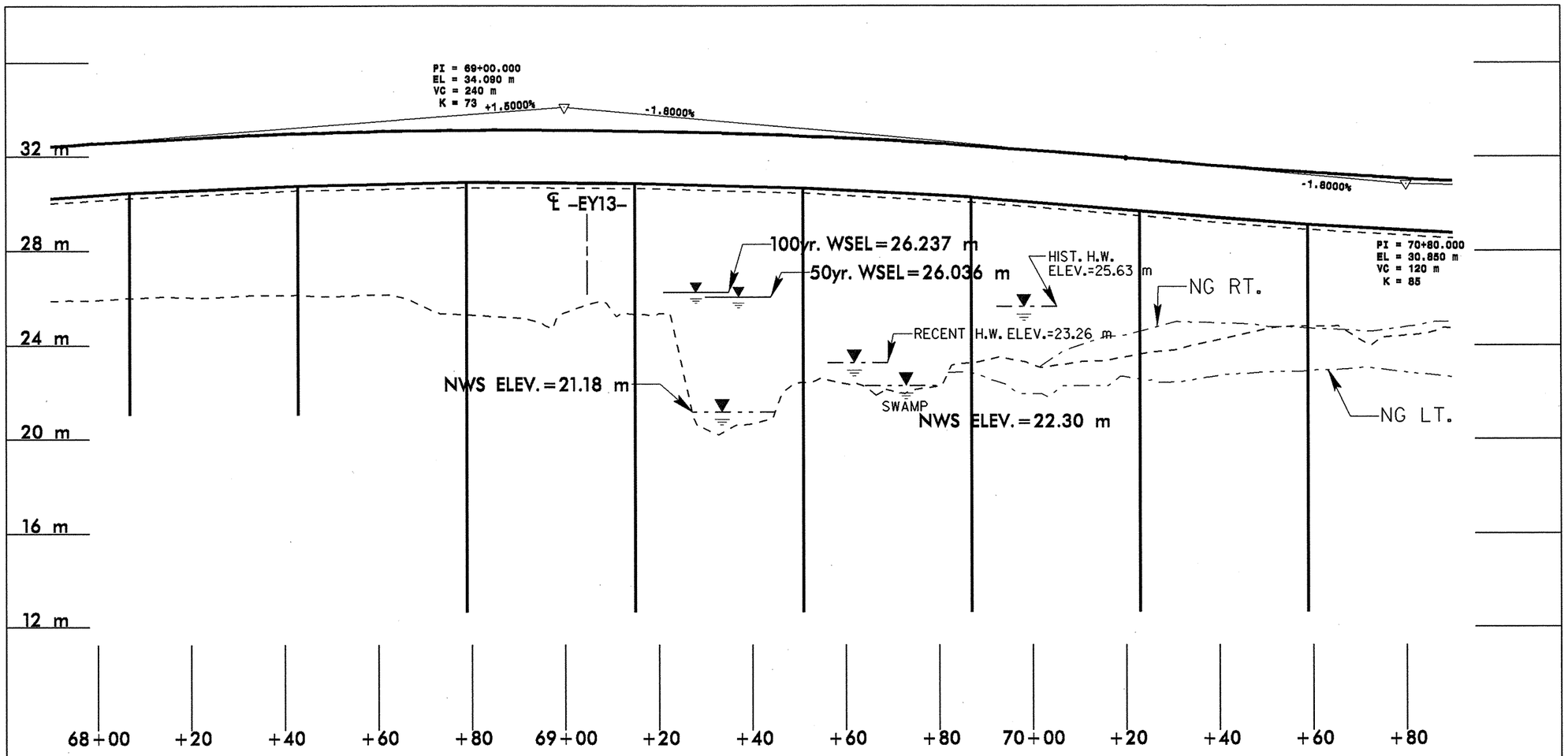
SITE VI

NCDOT

DIVISION OF HIGHWAYS
WAYNE COUNTY
PROJECT: 34461.1.3 (R-2554A)

GOLDSBORO BYPASS FROM US 70
WEST OF NC 581 TO SR 1300

SHEET 1 OF 4 8/22/11



4m 0m 4m
VERT.

10m 0m 40m
HOR.

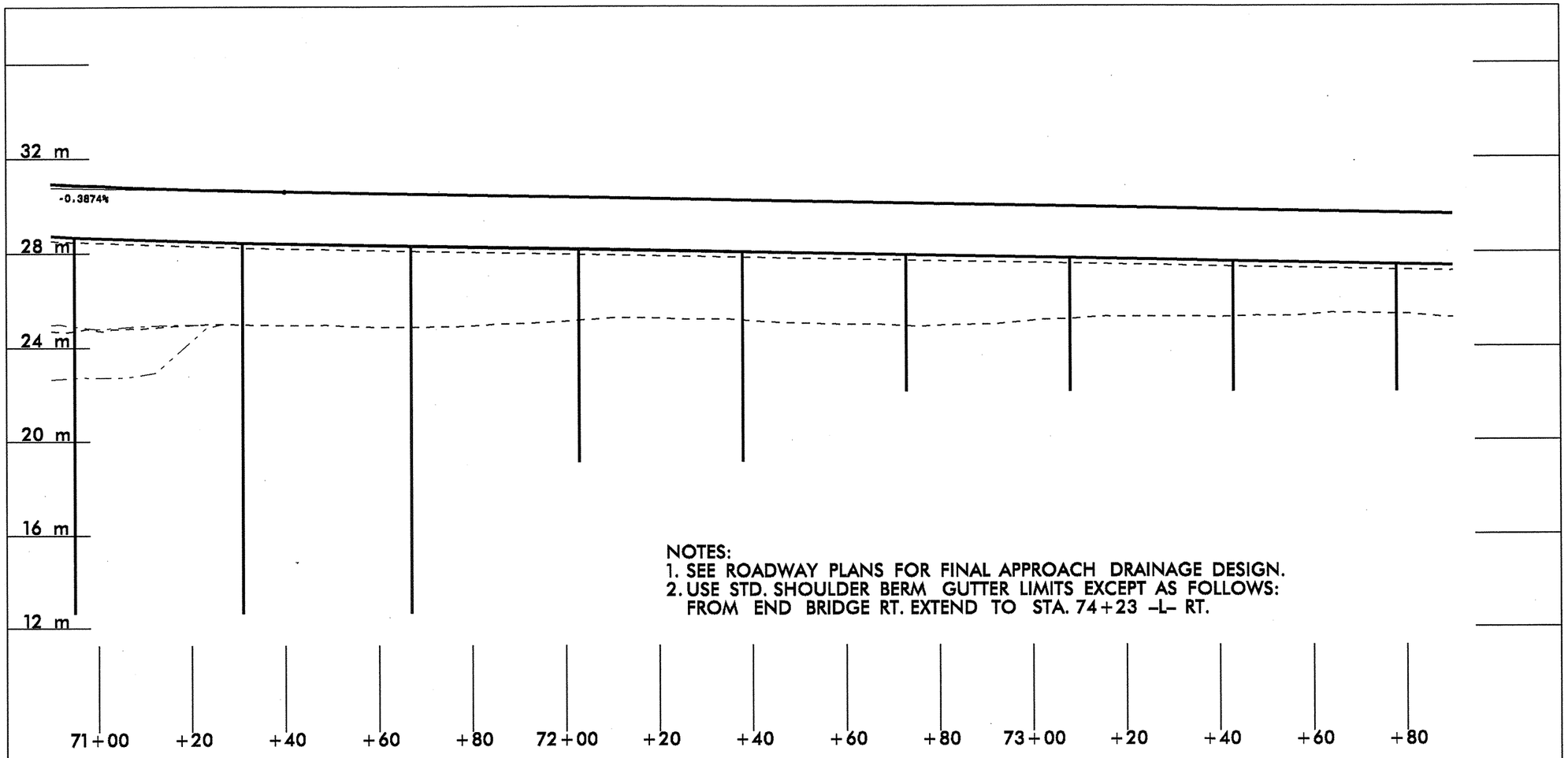
PROFILE

SITE VI

NCDOT
DIVISION OF HIGHWAYS
WAYNE COUNTY
PROJECT: 34461.1.3 (R-2554A)

GOLDSBORO BYPASS FROM US 70
WEST OF NC 581 TO SR 1300

SHEET 2 OF 4 **8/22/11**



NOTES:
1. SEE ROADWAY PLANS FOR FINAL APPROACH DRAINAGE DESIGN.
2. USE STD. SHOULDER BERM GUTTER LIMITS EXCEPT AS FOLLOWS:
   FROM END BRIDGE RT. EXTEND TO STA. 74+23 –L– RT.

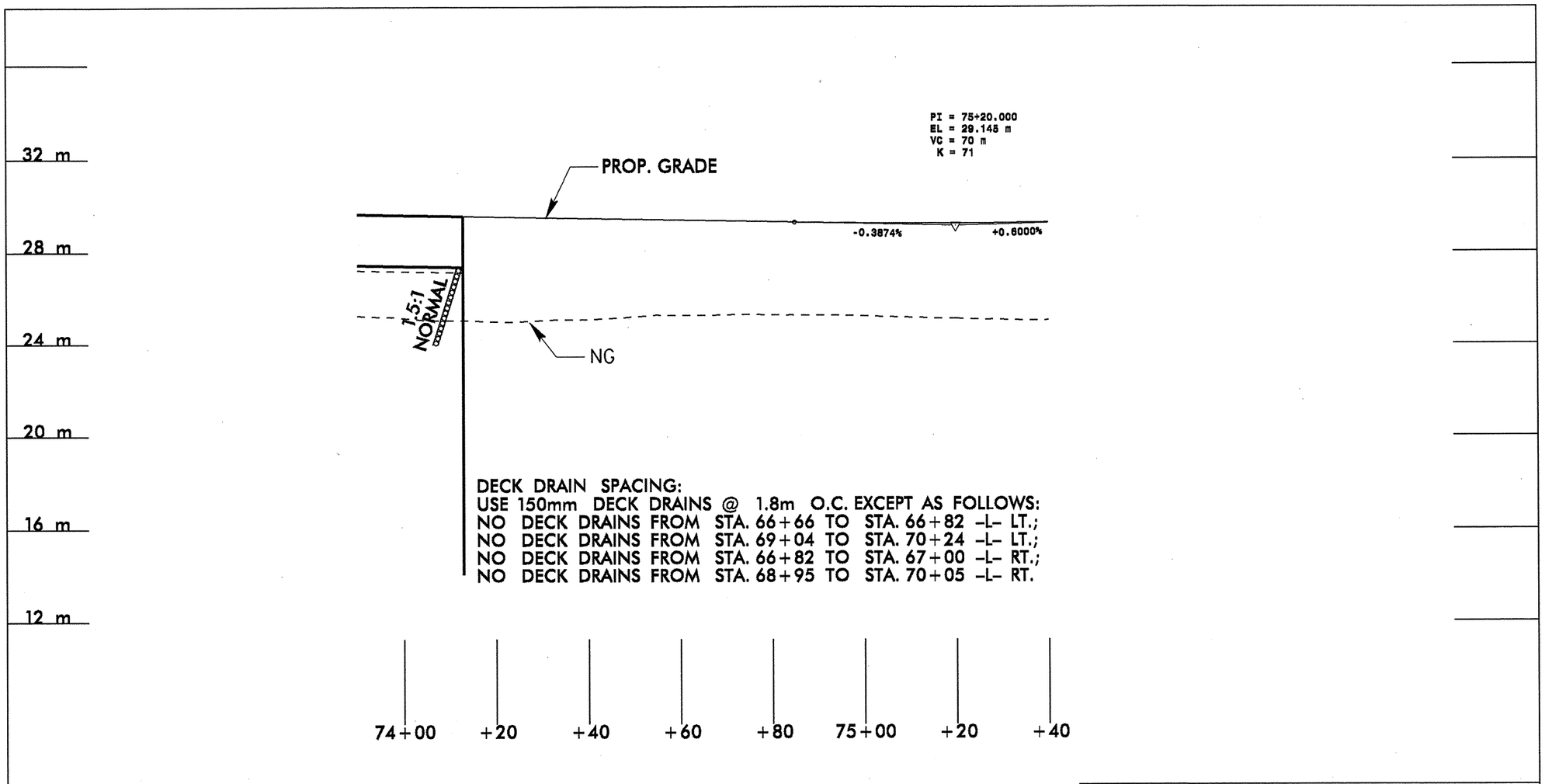
PROFILE

SITE VI

NCDOT
DIVISION OF HIGHWAYS
WAYNE COUNTY
PROJECT: 34461.1.3 (R-2554A)

GOLDSBORO BYPASS FROM US 70
WEST OF NC 581 TO SR 1300

SHEET 3 OF 4 8/22/11



DECK DRAIN SPACING:
USE 150mm DECK DRAINS @ 1.8m O.C. EXCEPT AS FOLLOWS:
NO DECK DRAINS FROM STA. 66+66 TO STA. 66+82 -L- LT.;
NO DECK DRAINS FROM STA. 69+04 TO STA. 70+24 -L- LT.;
NO DECK DRAINS FROM STA. 66+82 TO STA. 67+00 -L- RT.;
NO DECK DRAINS FROM STA. 68+95 TO STA. 70+05 -L- RT.

4m 0m 4m
VERT.

10m 0m 40m
HOR.

PROFILE

SITE VI

NCDOT
DIVISION OF HIGHWAYS
WAYNE COUNTY
PROJECT: 34461.1.3 (R-2554A)

GOLDSBORO BYPASS FROM US 70
WEST OF NC 581 TO SR 1300

SHEET 4 OF 4 8/22/11

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
29	GEORGE H. BECTON, HEIRS	N NC 581 HWY GOLDSBORO, N.C. 27530
31	DANNY P. SASSER	203 SADDLEWOOD DR. GOLDSBORO, N.C. 27534
32	CATHERINE S. SMITH	405 PARK AVE. GOLDSBORO, N.C. 27530
33	BILDAN, LLC	P.O. BOX 867 NEW BERN, N.C. 28562
34	DONALD G. WATKINS	644 NOBLES MILL RD. DEEP RUN, N.C. 28525
35	GRAVES T. LEWIS	P.O. BOX 429 LAKE WACCAMAW, N.C. 28450
36	ALVIN WATKINS	2199 US 70 WEST GOLDSBORO, N.C. 27530
37	JAMES S. CASEY	156 BLUEBERRY RD. GOLDSBORO, N.C. 27530
41	ISAAC J. MOZINGO	2716 SALEM CHURCH ROAD GOLDSBORO, N.C. 27530
43	EDNA E. WELLS	673 WELLS TOWN ROAD TEACHEY, N.C. 28464
43A	ROBERT E. HODGIN	
59	JEAN C. BECTON	343 NC HWY 581 N. GOLDSBORO, N.C. 27530
64	HARRISON R. BECTON	385 NC HWY 581 N. GOLDSBORO, N.C. 27530
902	N.C. DEPARTMENT OF TRANSPORTATION	P.O. BOX 3165 WILSON, N.C. 27895

NCDOT

DIVISION OF HIGHWAYS

WAYNE COUNTY

PROJECT: 34461.1.3 (R-2554A)

GOLDSBORO BYPASS FROM US 70 WEST OF NC 581 TO SR 1300

Permit Drawing

SHEET OF Sheet 43 of 45

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	WETLAND IMPACTS: Temp. Fill In Wetlands (ac)	WETLAND IMPACTS: Excavation in Wetlands (ac)	WETLAND IMPACTS: Mechanized Clearing in Wetlands (ac)	WETLAND IMPACTS: Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	SURFACE WATER IMPACTS: Temp. SW impacts (ac)	SURFACE WATER IMPACTS: Existing Channel Impacts Permanent (ft)	SURFACE WATER IMPACTS: Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
I	40+00 -L-	2@2.13m X 2.13m RCBC	0.92		0.03	0.15		0.04	0.01	255	59	
		Bank Stabilization								24		
II	47+40 -L-		0.14			0.04						
III	49+20 -L-	750mm RCP	0.14			0.02		0.01		157		
IV	50+60 -L-	1050mm RCP	0.65			0.03		0.01	<.01	210	20	
		Bank Stabilization								28		
V	54+00 -L-	750mm RCP	0.19			0.03						
WB#1	66+80 -L-								0.02		33	
VI & WB#2	70+00 -L-			0.08			0.31					
VII	84+00 -L-	900mm &1350mm RCP	1.34		0.14	0.07		0.19	0.01	1414	33	544
		Bank Stabilization								16		
VIII	20+20 -Y10DET-		0.04	0.23		0.06		0.01	<.01	114	20	
TOTALS:			3.42	0.31	0.17	0.40	0.31	0.26	0.04	2202	165	544

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAYNE COUNTY
WBS - 34461.1.3 (R-2554A)

SHEET #########

ATN Revised 3/31/05

Permit Drawing
Sheet 44 of 45

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation in Wetlands (ha)	Mechanized Clearing in Wetlands (ha)	Hand Clearing in Wetlands (ha)	SURFACE WATER IMPACTS: Permanent SW impacts (ha)	Temp. SW impacts (ha)	Existing Channel Impacts Permanent (m)	Existing Channel Impacts Temp. (m)	Natural Stream Design (m)
I	40+00 -L-	2@2.13m X 2.13m RCBC	0.371		0.012	0.061		0.016	0.004	78	18	
		Bank Stabilization								7		
II	47+40 -L-		0.055			0.015						
III	49+20 -L-	750mm RCP	0.057			0.010		0.003		48		
IV	50+60 -L-	1050mm RCP	0.264			0.012		0.004	<.001	64	6	
		Bank Stabilization								8		
V	54+00 -L-	750mm RCP	0.079			0.011						
WB#1	66+80 -L-								0.007		10	
VI & WB#2	70+00 -L-			0.032			0.124					
VII	84+00 -L-	900mm &1350mm RCP	0.541		0.058	0.030		0.079	0.002	431	10	166
		Bank Stabilization								5		
VIII	20+20 -Y10DET-		0.017	0.095		0.024		0.004	0.001	35	6	
TOTALS:			1.385	0.127	0.071	0.163	0.124	0.106	0.014	671	50	166

NOTE: THE WETLAND SOUTH OF THE FILL SLOPE ON SITE IV IS ACCOUNTED FOR ON THE WETLAND IMPACT SUMMARY AS A TOTAL TAKE.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAYNE COUNTY
WBS - 34461.1.3 (R-2554A)

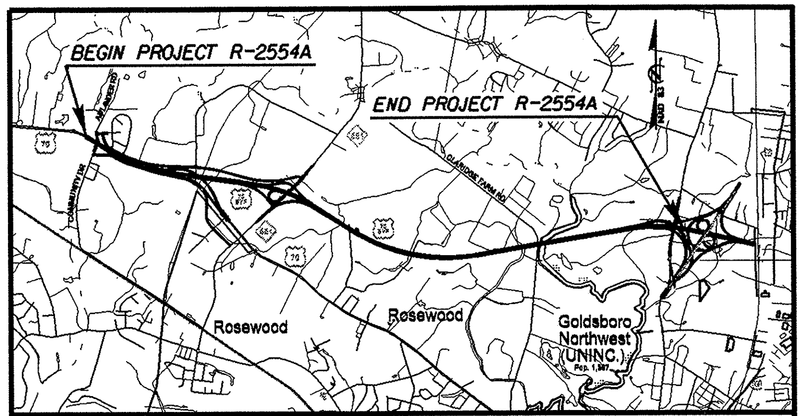
SHEET ##########

WHE Revised 5/21/2008

Permit Drawing
Sheet 45 of 45

TIP PROJECT: R-2554A

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

METRIC ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND/OR MILLIMETERS UNLESS OTHERWISE SHOWN	STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
	N.C.	R-2554A	1	
	STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
	34461.1.3	NHF-70(30)	P.E.	
	34461.2.4		R/W, UTIL	

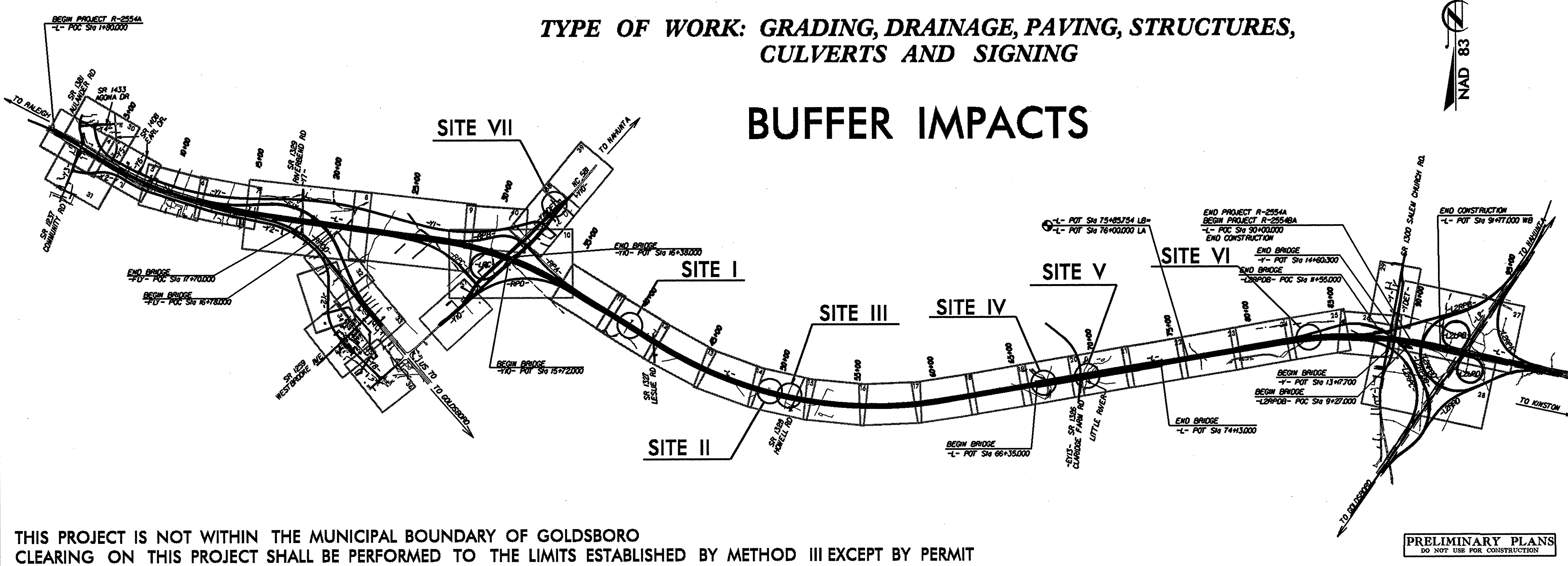
Buffer Drawing
Sheet 1 of 22

WAYNE COUNTY

LOCATION: US 70 (GOLDSBORO BYPASS) FROM WEST OF NC 581 TO SR 1300 (SALEM CHURCH ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, CULVERTS AND SIGNING

BUFFER IMPACTS



THIS PROJECT IS NOT WITHIN THE MUNICIPAL BOUNDARY OF GOLDSBORO
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III EXCEPT BY PERMIT
THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS LIMITED TO INTERCHANGES.

GRAPHIC SCALES

PLANS (5 0 10)

PROFILE (HORIZONTAL) (5 0 10)

PROFILE (VERTICAL) (1 0 2)

DESIGN DATA

ADT 2010 = 19,800
ADT 2030 = 36,400
DHV = 11 %
D = 60 %
T = 26 % *
V = 110 km/h
* TTST 16 % + DUAL 10 %
FUNC. CLASS.: FREEWAY

PROJECT LENGTH

LENGTH ROADWAY T.I.P. PROJECT R-2554A	8.028 KM.
LENGTH STRUCTURES T.I.P. PROJECT R-2554A	0.778 KM.
TOTAL LENGTH OF STATE T.I.P. PROJECT R-2554A	8.806 KM.

NOTE: EB LANE USED TO DETERMINE PROJECT LENGTH

PLANS PREPARED BY:
Florence & Hutcheson
CONSULTING ENGINEERS
5121 KINGDOM WAY, SUITE 100
RALEIGH, N.C. 27607
License No: F-0258

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JANUARY 20, 2006

LETTING DATE: SEPTEMBER 18 2012

DENNIS J. MORY, PE — PROJECT ENGINEER

HENRY BARE — PROJECT DESIGN ENGINEER

NCDOT CONTACT: CATHY S. HOUSER, PE — ROADWAY DESIGN - PROJECT ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY DESIGN ENGINEER P.E.

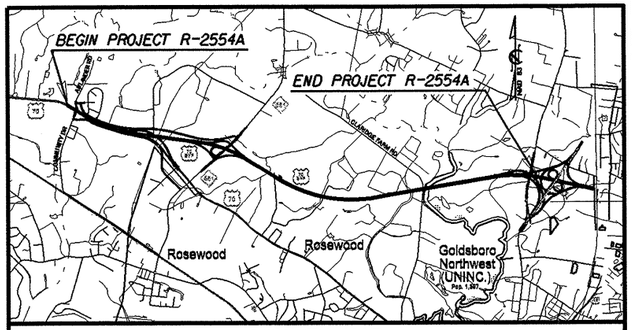
CONTRACT No.:

TIP PROJECT: R-2554A

CONTRACT No.:

FILE: R:\Hydraulics\Buffer Permit\WONS\2554A_Hyd_prm_wet_Sitesheet_NSD.dgn
DATE: 10/2/2011
PLOT DRIVER: $PLOTDRV$
PEN TABLE: $PENTBL$

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



VICINITY MAP

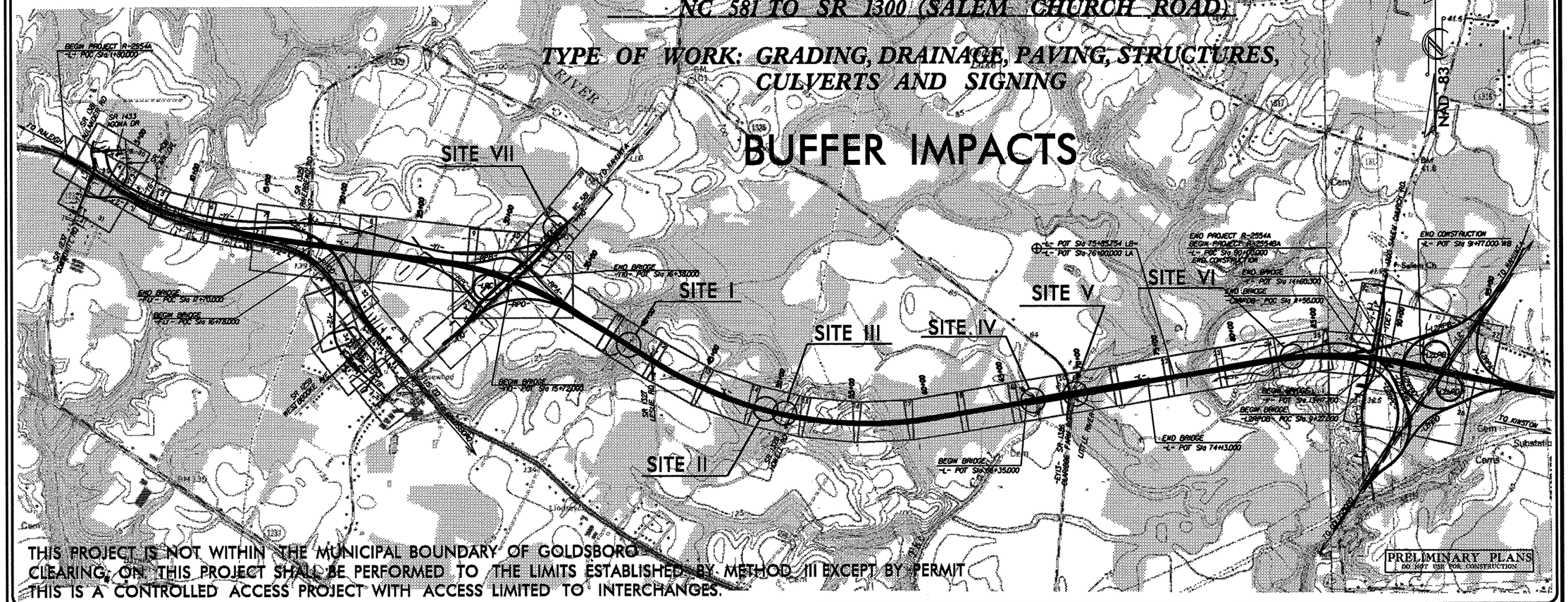
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAYNE COUNTY

LOCATION: US 70 (GOLDSBORO BYPASS) FROM WEST OF NC 581 TO SR 1300 (SALEM CHURCH ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, CULVERTS AND SIGNING

BUFFER IMPACTS



THIS PROJECT IS NOT WITHIN THE MUNICIPAL BOUNDARY OF GOLDSBORO.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III EXCEPT BY PERMIT.
THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS LIMITED TO INTERCHANGES.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND/OR MILLIMETERS UNLESS OTHERWISE SHOWN

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2554A	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34461.1.3	NHF-70(30)	P.E.
34461.2.4		R/W, UTIL

Buffer Drawing
Sheet 2 of 22

GRAPHIC SCALES
PLANS 5 0 10
PROFILE (HORIZONTAL) 5 0 10
PROFILE (VERTICAL) 1 0 2

DESIGN DATA
ADT 2010 = 19,800
ADT 2030 = 36,400
DHV = 11 %
D = 60 %
T = 26 % *
V = 110 km/h
* TTST 16 % + DUAL 10 %
FUNC. CLASS.: FREEWAY

PROJECT LENGTH

LENGTH ROADWAY T.I.P. PROJECT R-2554A	8.028 KM.
LENGTH STRUCTURES T.I.P. PROJECT R-2554A	0.778 KM.
TOTAL LENGTH OF STATE T.I.P. PROJECT R-2554A	8.806 KM.

NOTE: EB LANE USED TO DETERMINE PROJECT LENGTH

PLANS PREPARED BY:
Florence & Hutcheson
CONSULTING ENGINEERS
5121 KINGDOM WAY, SUITE 100
RALEIGH, N.C. 27607
License No: F-0258

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JANUARY 20, 2006

LETTING DATE: SEPTEMBER 18 2012

DENNIS J. MORY, PE
PROJECT ENGINEER

HENRY BARE
PROJECT DESIGN ENGINEER

NCDOT CONTACT: CATHY S. HOUSER, PE
ROADWAY DESIGN - PROJECT ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

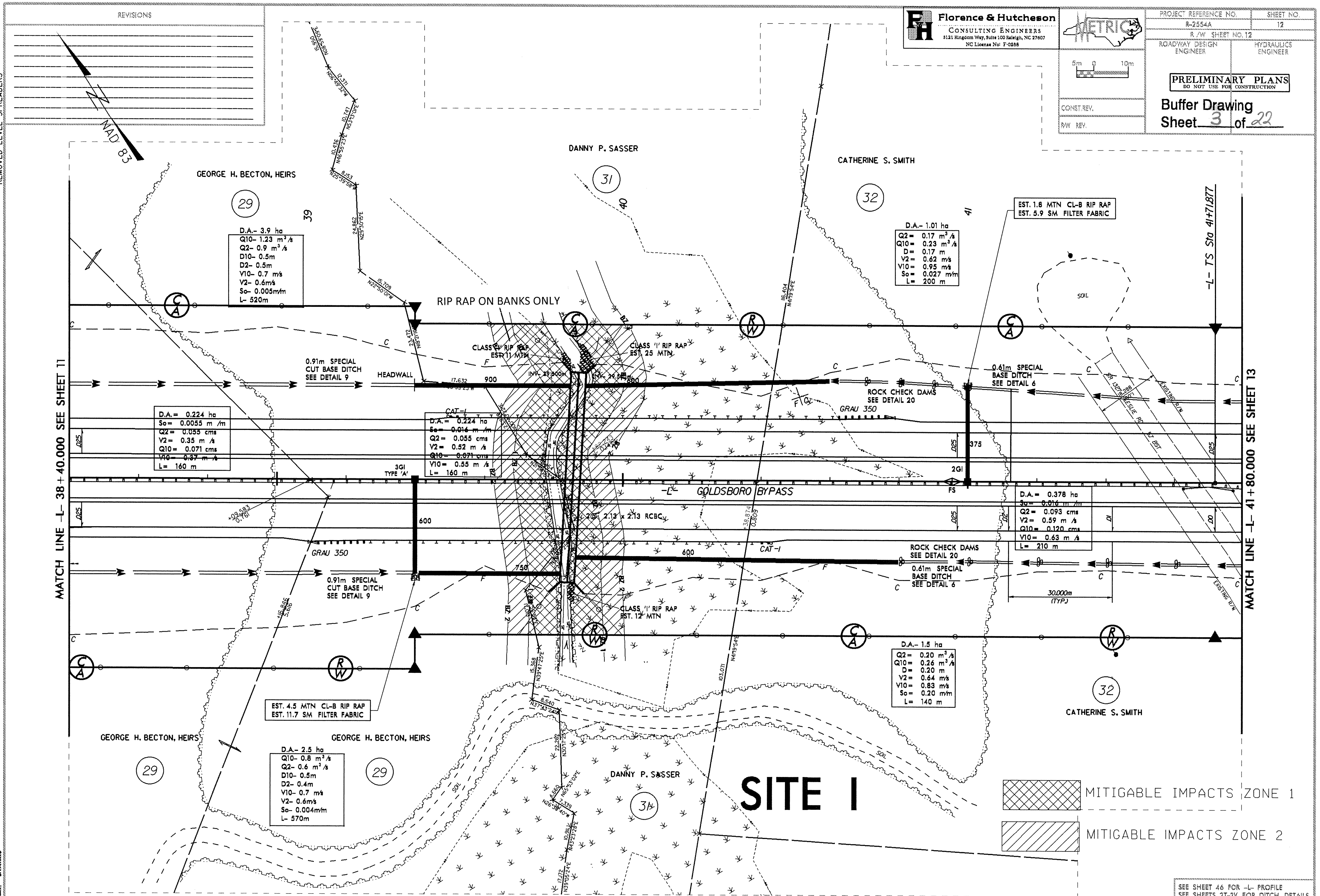
ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

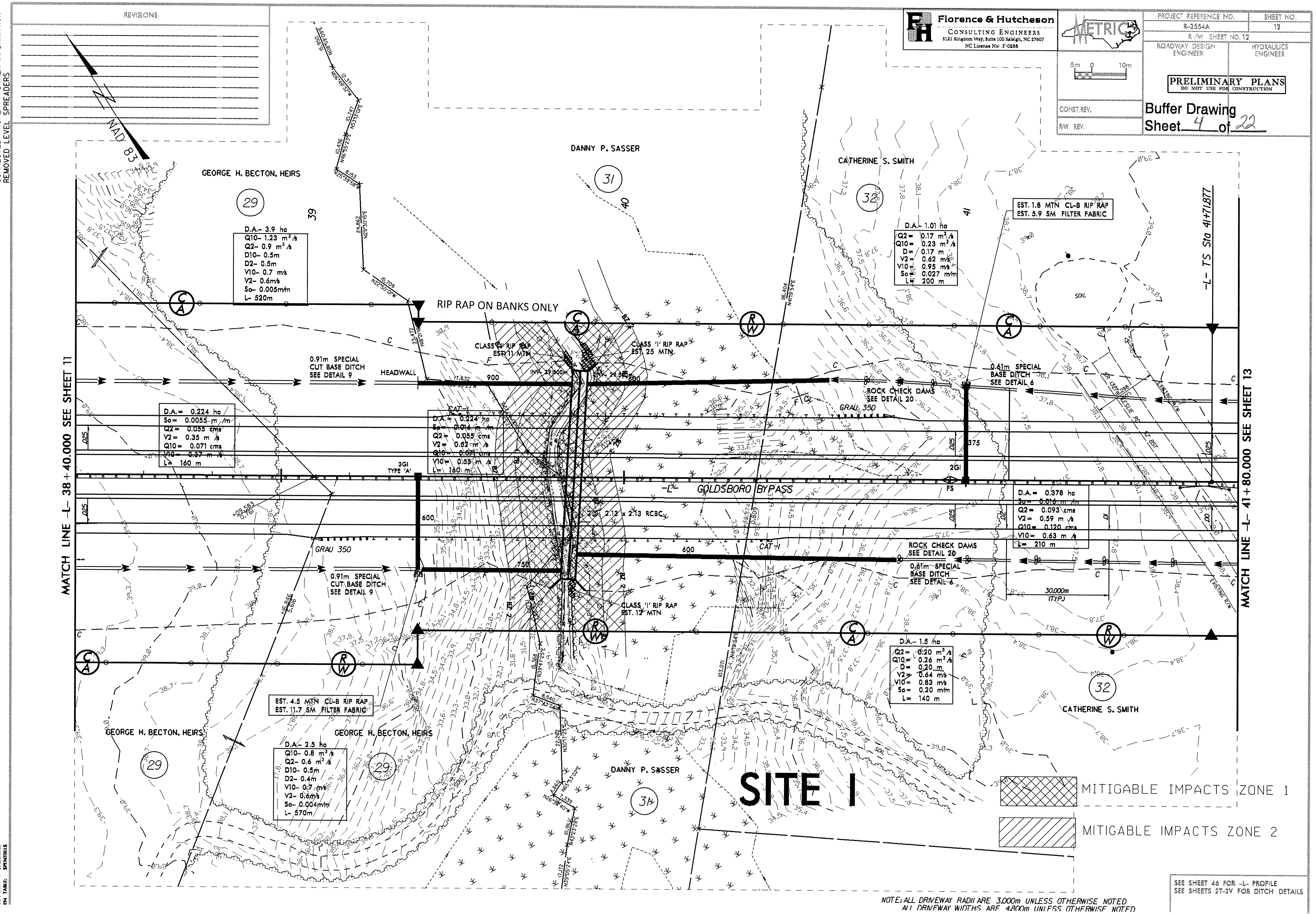
P.E.
STATE HIGHWAY DESIGN ENGINEER

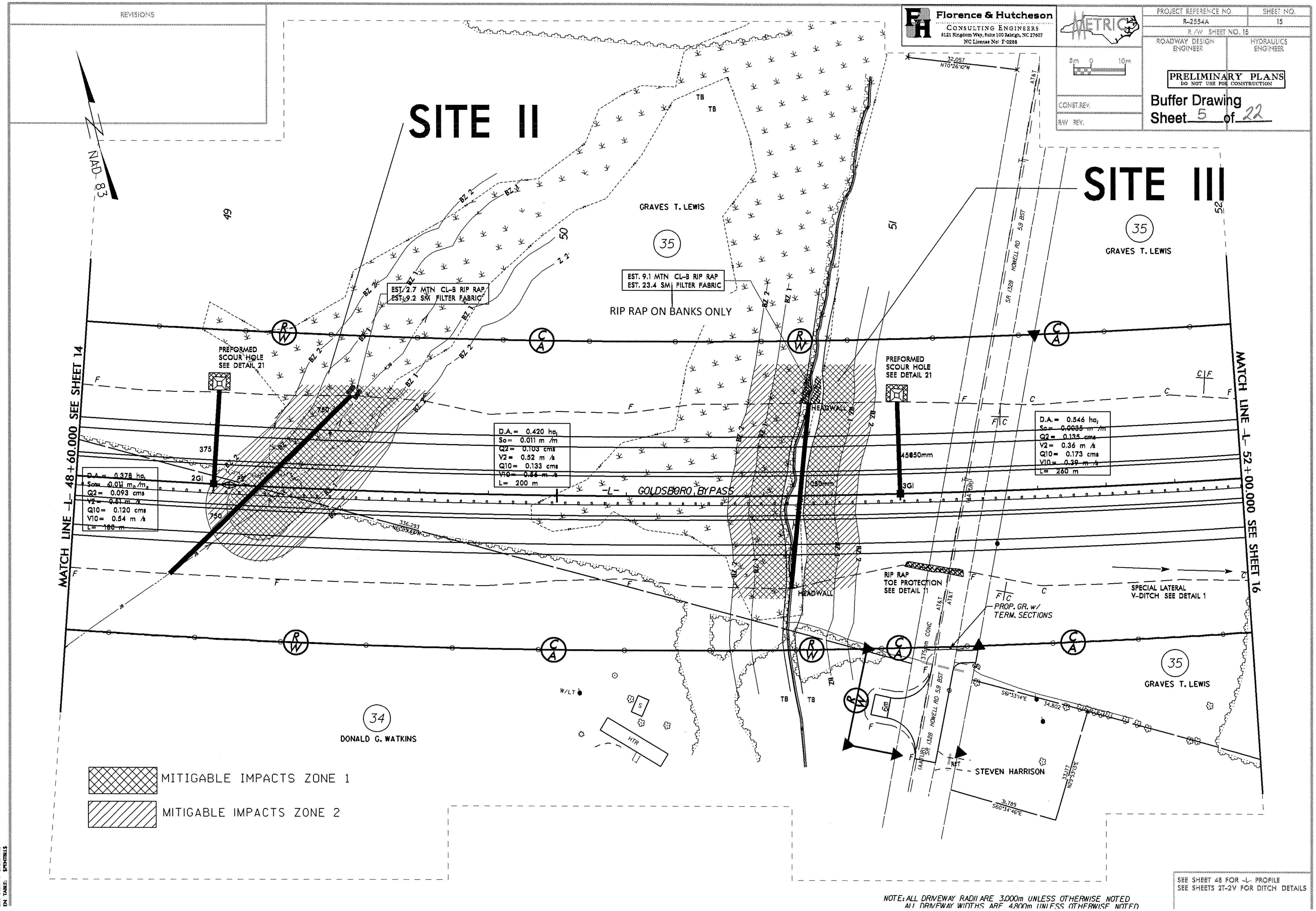
R/W REV. - 01/10/08
COMBINED PARCEL 30 WITH PARCEL 29
R/W REV. - 11/28/06
CORRECTED PROPERTY OWNER INFORMATION
REMOVED LEVEL SPREADERS


REVISIONS
NAD 83
Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingston Way, Suite 100 Raleigh, NC 27607
NC License No: F-0258
METRIC
PROJECT REFERENCE NO.
SHEET NO.
R-2554A
12
R/W SHEET NO. 12
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
Buffer Drawing
Sheet 3 of 22
DANNY P. SASSER
CATHERINE S. SMITH
GEORGE H. BECTON, HEIRS
29
31
32
D.A.- 3.9 ha
Q10- 1.23 m³/s
Q2- 0.9 m³/s
D10- 0.5m
D2- 0.5m
V10- 0.7 m/s
V2- 0.6m/s
So- 0.005m/m
L- 520m
RIP RAP ON BANKS ONLY
EST. 1.8 MTN CL-B RIP RAP
EST. 5.9 SM FILTER FABRIC
D.A.- 1.01 ha
Q2= 0.17 m³/s
Q10= 0.23 m³/s
D= 0.17 m
V2= 0.62 m/s
V10= 0.95 m/s
So= 0.027 m/m
L= 200 m
-L- TS Sta 41+71.877
CLASS 'I' RIP RAP EST. 11 MTN
CLASS 'I' RIP RAP EST. 25 MTN
0.91m SPECIAL CUT BASE DITCH SEE DETAIL 9
HEADWALL
0.61m SPECIAL BASE DITCH SEE DETAIL 6
ROCK CHECK DAMS SEE DETAIL 20
GRAU 350
D.A.= 0.224 ha
So= 0.0055 m/m
Q2= 0.055 cms
V2= 0.35 m/s
Q10= 0.071 cms
V10= 0.37 m/s
L= 160 m
CAT-I
D.A.= 0.224 ha
So= 0.016 m/m
Q2= 0.055 cms
V2= 0.52 m/s
Q10= 0.071 cms
V10= 0.55 m/s
L= 160 m
3GI TYPE 'A'
2GI
FS
MATCH LINE -L- 38+40.000 SEE SHEET 11
MATCH LINE -L- 41+80.000 SEE SHEET 13
-L- GOLDSBORO BYPASS
2 @ 2.13 x 2.13 RCBC
D.A.= 0.378 ha
So= 0.016 m/m
Q2= 0.093 cms
V2= 0.59 m/s
Q10= 0.120 cms
V10= 0.63 m/s
L= 210 m
600
GRAU 350
CAT-I
ROCK CHECK DAMS SEE DETAIL 20
0.61m SPECIAL BASE DITCH SEE DETAIL 6
0.91m SPECIAL CUT BASE DITCH SEE DETAIL 9
30.000m (TYP.)
CLASS 'I' RIP RAP EST. 12 MTN
D.A.- 1.5 ha
Q2= 0.20 m³/s
Q10= 0.26 m³/s
D= 0.20 m
V2= 0.64 m/s
V10= 0.83 m/s
So= 0.20 m/m
L= 140 m
EST. 4.5 MTN CL-B RIP RAP
EST. 11.7 SM FILTER FABRIC
D.A.- 2.5 ha
Q10- 0.8 m³/s
Q2- 0.6 m³/s
D10- 0.5m
D2- 0.4m
V10- 0.7 m/s
V2- 0.6m/s
So- 0.004m/m
L- 570m
SITE I
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2
SEE SHEET 46 FOR -L- PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS

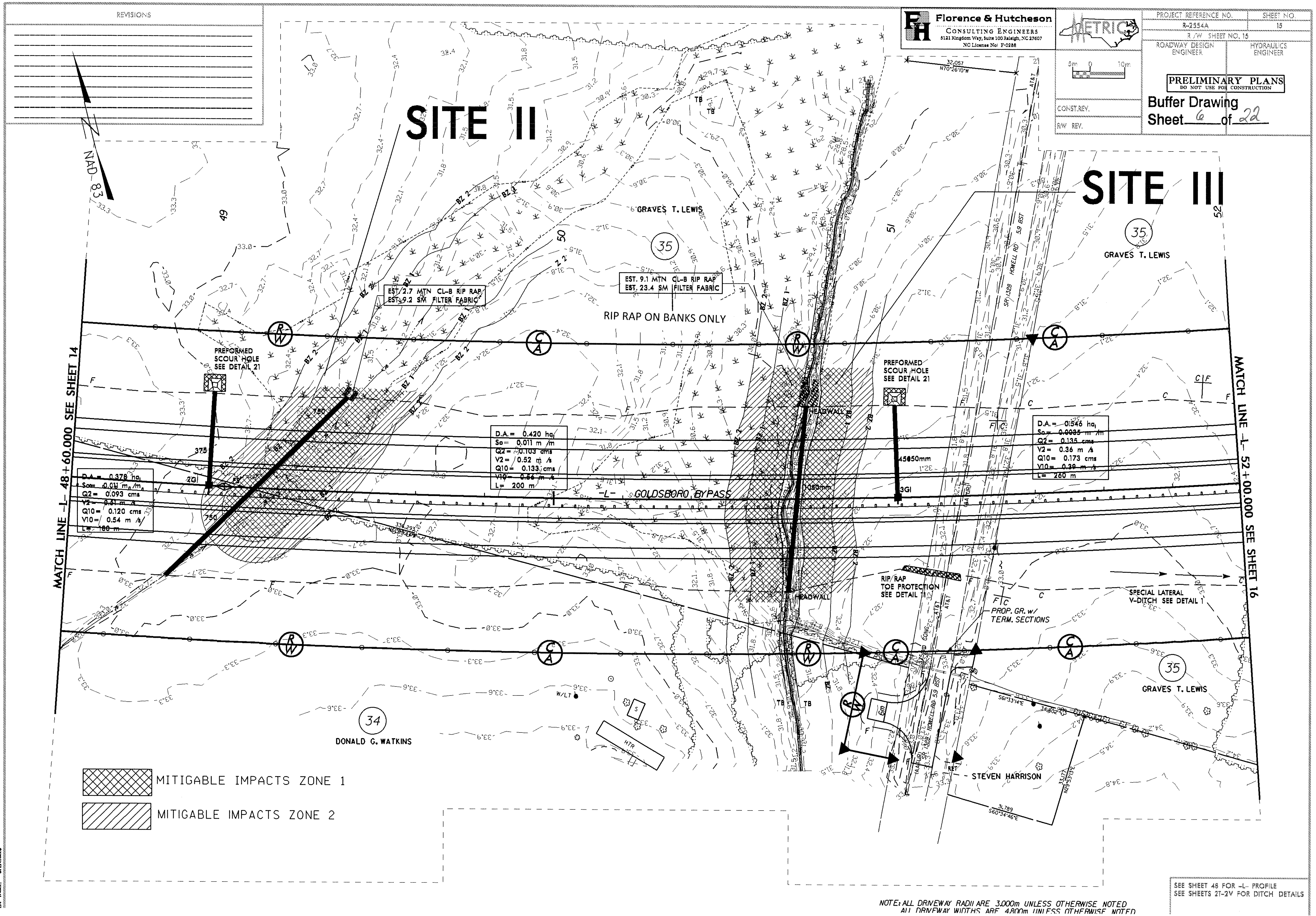
NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

R/W REV. - 01/10/08
COMBINED PARCEL 30 WITH PARCEL 29
R/W REV. - 11/28/06
CORRECTED PROPERTY OWNER INFORMATION
REMOVED LEVEL SPREADERS





REVISIONS
Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0266
METRIC
PROJECT REFERENCE NO.
R-2554A
SHEET NO.
15
R/W SHEET NO. 15
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Buffer Drawing
Sheet 5 of 22
CONST. REV.
R/W REV.
NAD 83
SITE II
SITE III
GRAVES T. LEWIS
35
EST. 2.7 MTN CL-B RIP RAP
EST. 9.2 SM FILTER FABRIC
EST. 9.1 MTN CL-B RIP RAP
EST. 23.4 SM FILTER FABRIC
RIP RAP ON BANKS ONLY
PREFORMED SCOUR HOLE SEE DETAIL 21
MATCH LINE -L- 48+60.000 SEE SHEET 14
MATCH LINE -L- 52+00.000 SEE SHEET 16
D.A.= 0.378 ha
So= 0.011 m/m
Q2= 0.093 cms
V2= 0.51 m/s
Q10= 0.120 cms
V10= 0.54 m/s
L= 188 m
D.A.= 0.420 ha
So= 0.011 m/m
Q2= 0.103 cms
V2= 0.52 m/s
Q10= 0.133 cms
V10= 0.56 m/s
L= 200 m
D.A.= 0.546 ha
So= 0.0035 m/m
Q2= 0.135 cms
V2= 0.36 m/s
Q10= 0.173 cms
V10= 0.39 m/s
L= 260 m
-L- GOLDSBORO BYPASS
HEADWALL
1050mm
450mm
RIP RAP TOE PROTECTION SEE DETAIL 11
SPECIAL LATERAL V-DITCH SEE DETAIL 1
PROP. GR. w/ TERM. SECTIONS
SR 1328 HOWELL RD 5.9 BST
34
DONALD G. WATKINS
STEVEN HARRISON
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2
SEE SHEET 48 FOR -L- PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS
NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED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CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No. F-0288
METRIC
PROJECT REFERENCE NO.
SHEET NO.
R-2554A
15
R/W SHEET NO. 15
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Buffer Drawing
Sheet 6 of 22
CONST. REV.
R/W REV.
NAD 83
SITE II
SITE III
GRAVES T. LEWIS
DONALD G. WATKINS
STEVEN HARRISON
EST. 2.7 MTN CL-B RIP RAP
EST. 9.2 SM FILTER FABRIC
EST. 9.1 MTN CL-B RIP RAP
EST. 23.4 SM FILTER FABRIC
RIP RAP ON BANKS ONLY
PREFORMED SCOUR HOLE SEE DETAIL 21
D.A.= 0.378 ha
So= 0.011 m/m
Q2= 0.093 cms
V2= 0.51 m/s
Q10= 0.120 cms
V10= 0.54 m/s
L= 180 m
D.A.= 0.420 ha
So= 0.011 m/m
Q2= 0.103 cms
V2= 0.52 m/s
Q10= 0.133 cms
V10= 0.56 m/s
L= 200 m
D.A.= 0.546 ha
So= 0.0035 m/m
Q2= 0.135 cms
V2= 0.36 m/s
Q10= 0.173 cms
V10= 0.39 m/s
L= 260 m
-L- GOLDSBORO BYPASS
HEADWALL
1050mm
450mm
HOWELL RD
MATCH LINE -L- 48+60.000 SEE SHEET 14
MATCH LINE -L- 52+00.000 SEE SHEET 16
RIP RAP TOE PROTECTION SEE DETAIL 11
SPECIAL LATERAL V-DITCH SEE DETAIL 1
PROP. GR. w/ TERM. SECTIONS
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2
SEE SHEET 48 FOR -L- PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS
NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

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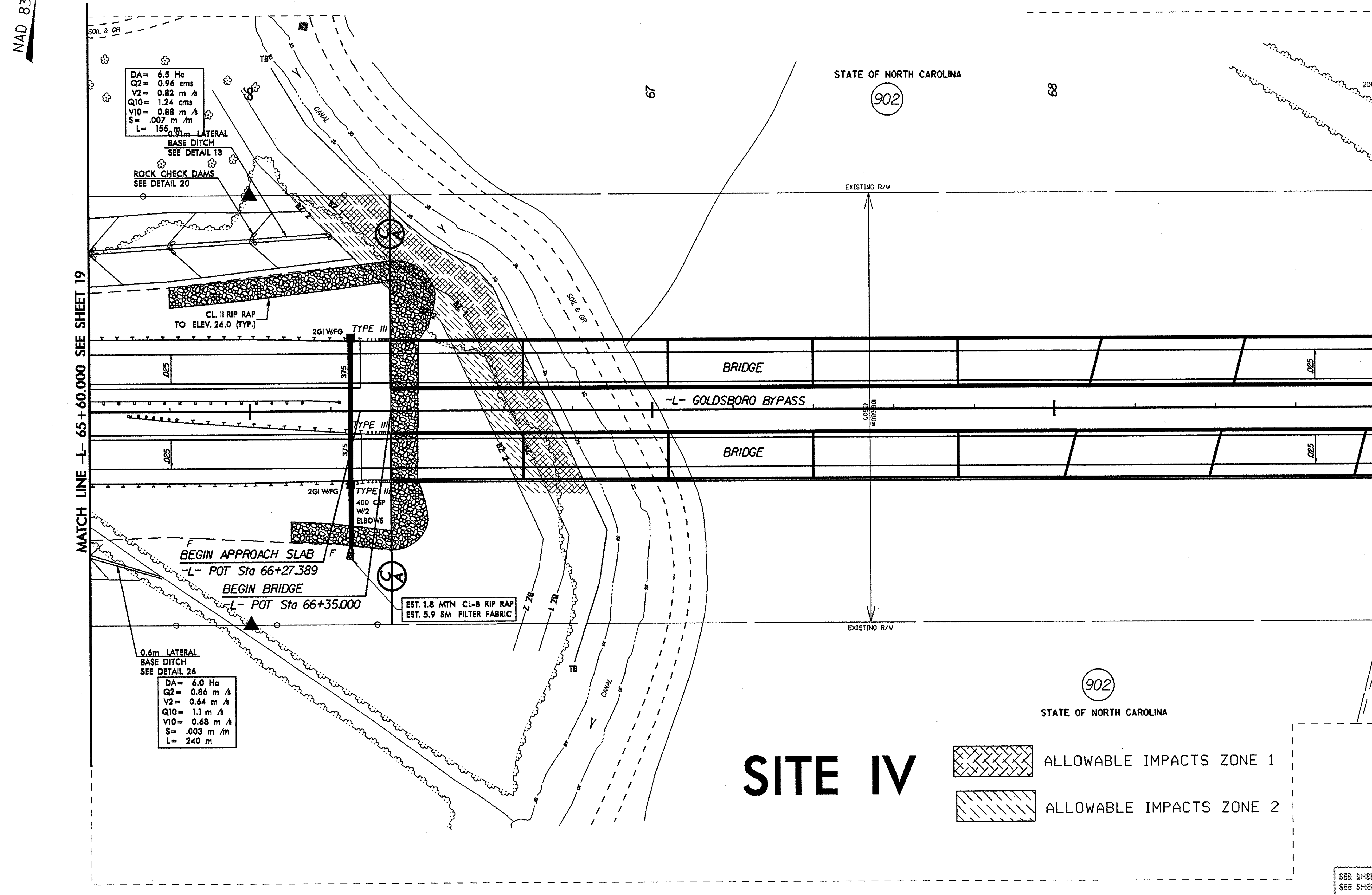
METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	20
R/W SHEET NO. 20	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Buffer Drawing
Sheet 7 of 22

CONST. REV.
R/W REV.



SEE SHEET 50 FOR -L- PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS

NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

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METRIC

5m 0 10m

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	20
R/W SHEET NO. 20	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

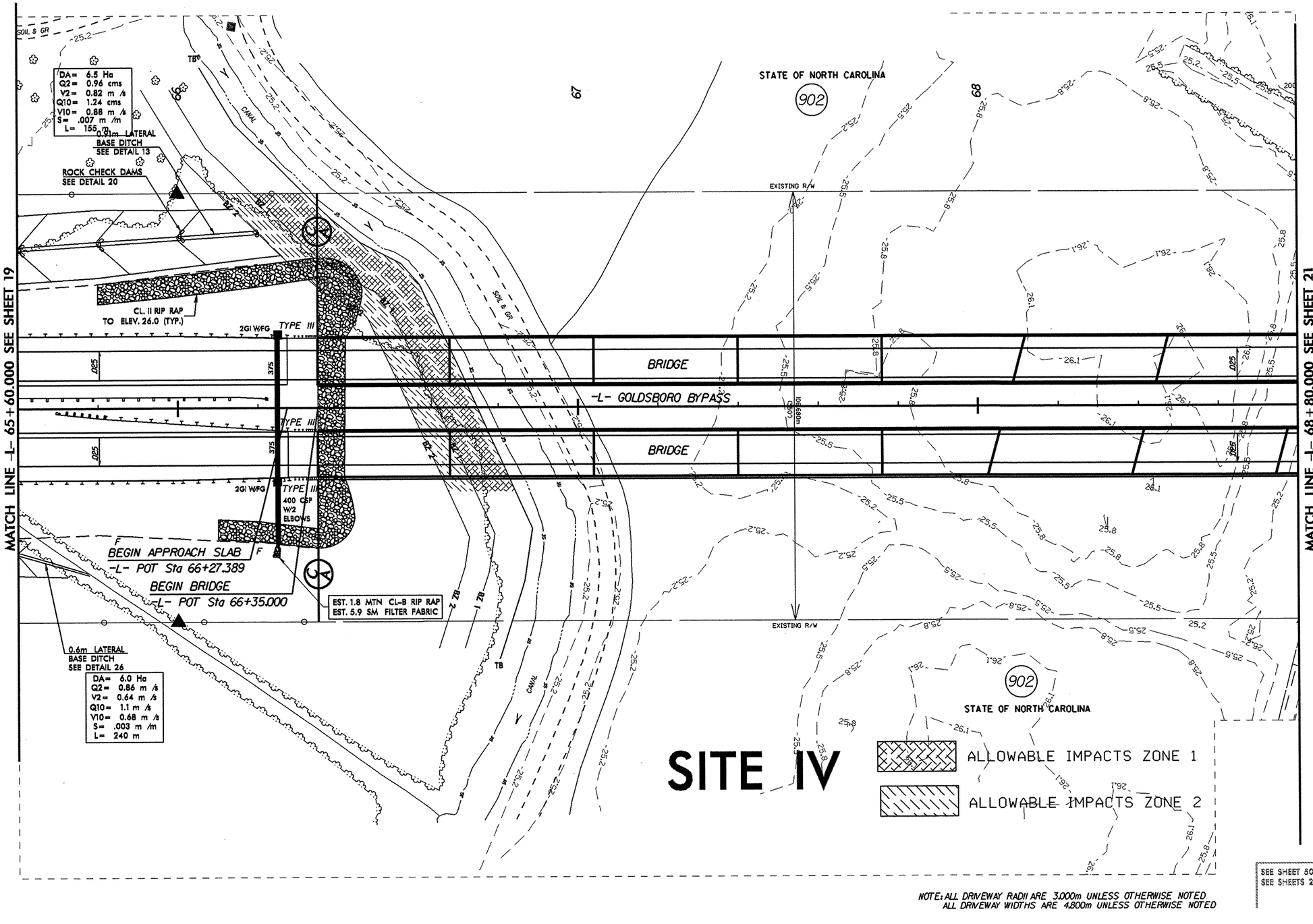
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

Buffer Drawing
Sheet 8 of 22

NAD 83



SEE SHEET 50 FOR -L- PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS

NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

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DATE: 11/9/2011
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PEN TABLE: $PENTBL$
USER: $USERNAME$

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	21
R/W SHEET NO. 21, 4 & 5 (R-2554B)	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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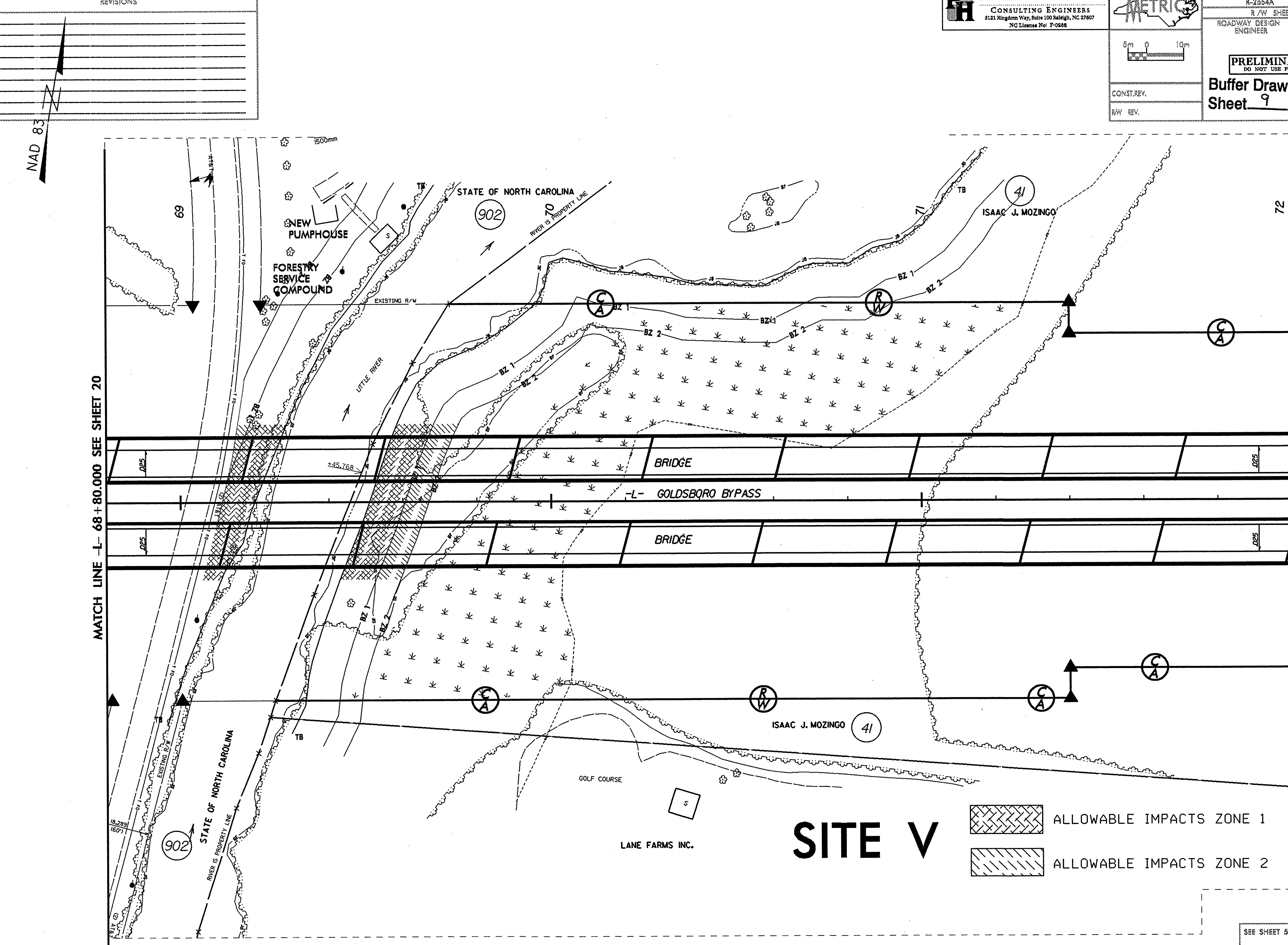
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0986

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Buffer Drawing
Sheet 9 of 22

REVISIONS



SITE V

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

SEE SHEET 51 FOR -L- PROFILE

NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

REVISIONS

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0266

METRIC

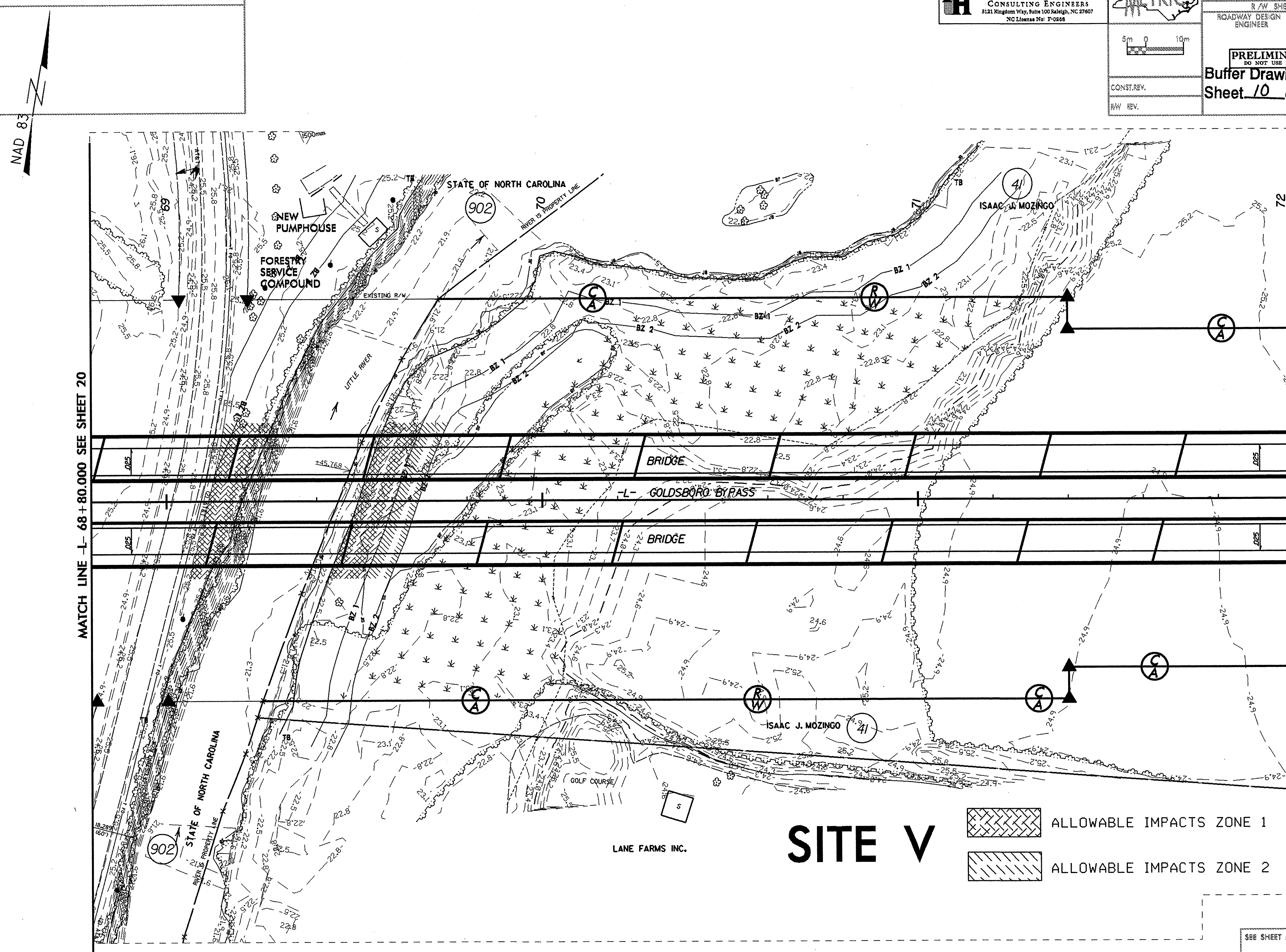
PROJECT REFERENCE NO.	SHEET NO.
R-2554A	21
R/W SHEET NO. 21, 4 & 5 (R-2554B)	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CONST.REV.

R/W REV.

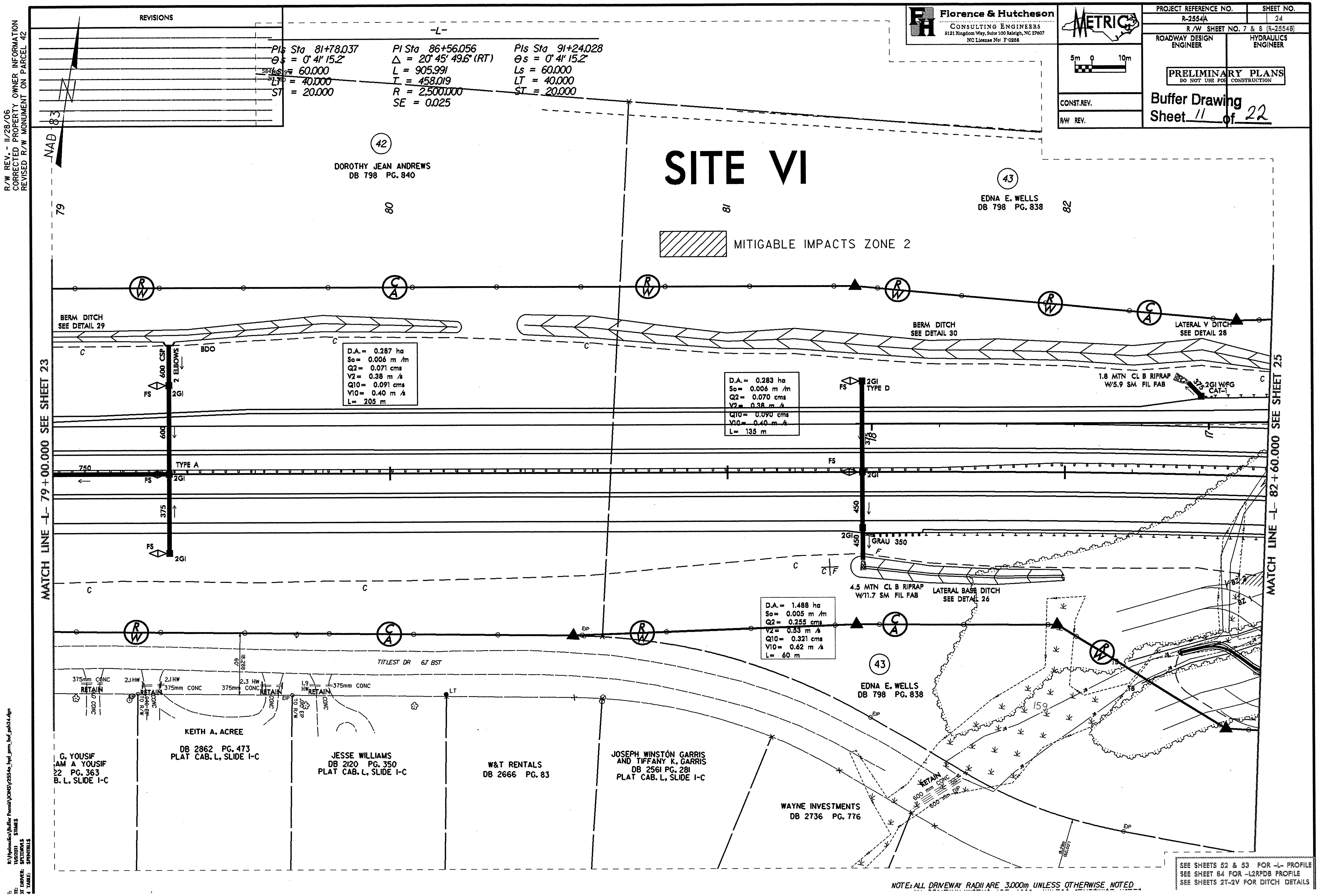
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Buffer Drawing
Sheet 10 of 22



SEE SHEET 51 FOR -L- PROFILE

NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED



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CONSULTING ENGINEERS
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METRIC
PROJECT REFERENCE NO. R-2554A
SHEET NO. 24
R/W SHEET NO. 7 & 8 (R-2554B)
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Buffer Drawing
Sheet 11 of 22
CONST.REV.
R/W REV.
REVISIONS
R/W REV. - 11/28/06
CORRECTED PROPERTY OWNER INFORMATION
REVISED R/W MONUMENT ON PARCEL 42
NAD 83
-L-
PIs Sta 81+78.037
θs = 0° 41' 15.2"
Ls = 60.000
LT = 40.000
ST = 20.000
PI Sta 86+56.056
Δ = 20° 45' 49.6" (RT)
L = 905.991
T = 458.019
R = 2,500.000
SE = 0.025
PIs Sta 91+24.028
θs = 0° 41' 15.2"
Ls = 60.000
LT = 40.000
ST = 20.000
SITE VI
MITIGABLE IMPACTS ZONE 2
42
DOROTHY JEAN ANDREWS
DB 798 PG. 840
43
EDNA E. WELLS
DB 798 PG. 838
BERM DITCH
SEE DETAIL 29
BERM DITCH
SEE DETAIL 30
LATERAL V DITCH
SEE DETAIL 28
D.A.= 0.287 ha
So= 0.006 m/m
Q2= 0.071 cms
V2= 0.38 m/s
Q10= 0.091 cms
V10= 0.40 m/s
L= 205 m
D.A.= 0.283 ha
So= 0.006 m/m
Q2= 0.070 cms
V2= 0.38 m/s
Q10= 0.090 cms
V10= 0.40 m/s
L= 135 m
D.A.= 1.488 ha
So= 0.005 m/m
Q2= 0.255 cms
V2= 0.53 m/s
Q10= 0.321 cms
V10= 0.62 m/s
L= 60 m
1.8 MTN CL B RIPRAP
W/5.9 SM FIL FAB
2GI W/FG CAT-1
2GI TYPE D
TYPE A
GRAU 350
4.5 MTN CL B RIPRAP
W/11.7 SM FIL FAB
LATERAL BASE DITCH
SEE DETAIL 26
MATCH LINE -L- 79+00.000 SEE SHEET 23
MATCH LINE -L- 82+60.000 SEE SHEET 25
TITLEST DR 6.7 BST
KEITH A. ACREE
DB 2862 PG. 473
PLAT CAB. L, SLIDE I-C
G. YOUSIF
AM A YOUSIF
22 PG. 363
B. L, SLIDE I-C
JESSE WILLIAMS
DB 2120 PG. 350
PLAT CAB. L, SLIDE I-C
W&T RENTALS
DB 2666 PG. 83
JOSEPH WINSTON GARRIS
AND TIFFANY K. GARRIS
DB 2561 PG. 281
PLAT CAB. L, SLIDE I-C
WAYNE INVESTMENTS
DB 2736 PG. 776
EDNA E. WELLS
DB 798 PG. 838
NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
SEE SHEETS 52 & 53 FOR -L- PROFILE
SEE SHEET 84 FOR -L2RPDB PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS

R/W REV. - 11/28/06
CORRECTED PROPERTY OWNER INFORMATION
REVISED R/W MONUMENT ON PARCEL 42

REVISIONS

Florence & Hutcheson
CONSULTING ENGINEERS
5121 Kingdom Way, Suite 100 Raleigh, NC 27607
NC License No: F-0266

METRIC

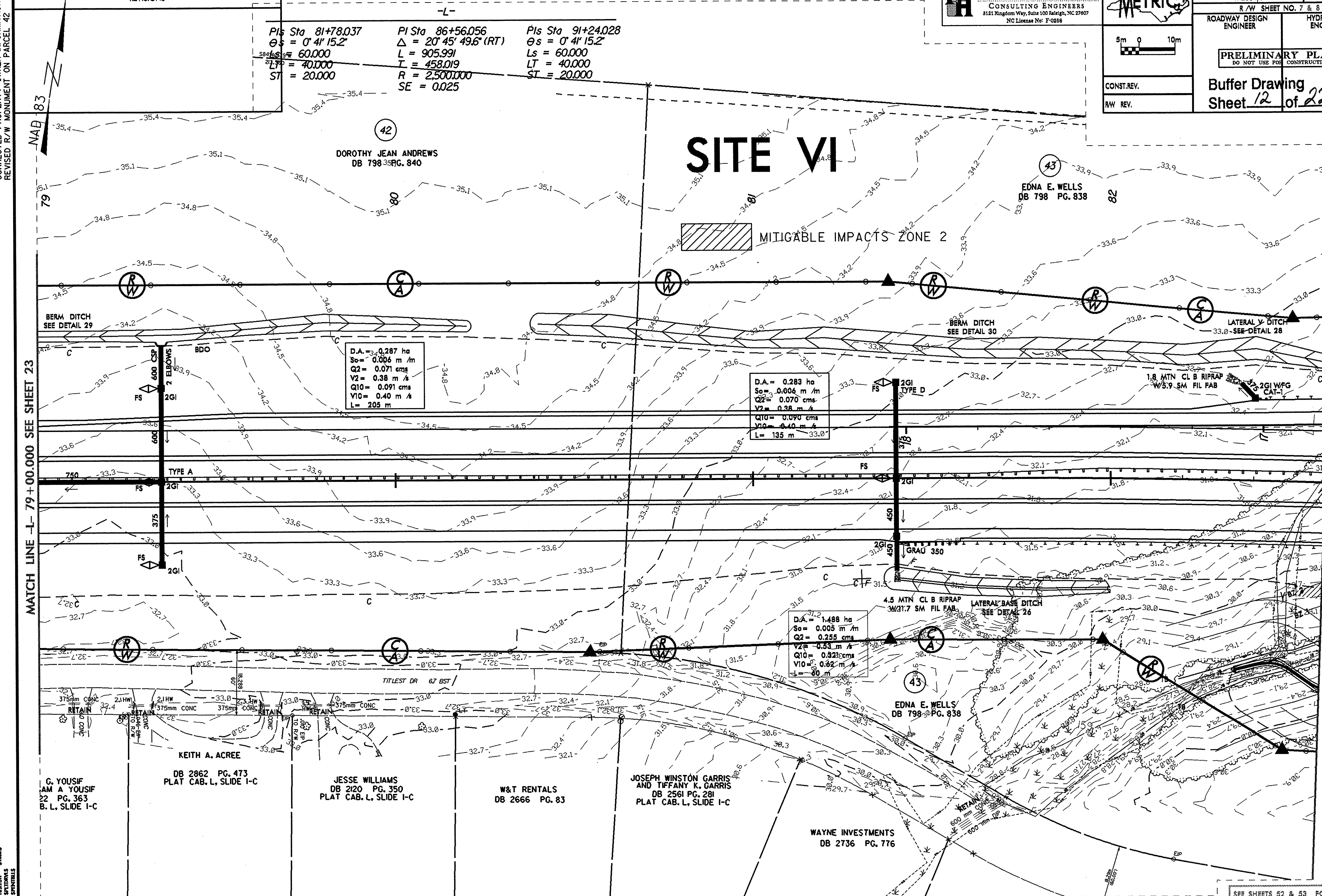
PROJECT REFERENCE NO.	SHEET NO.
R-2554A	24
R/W SHEET NO. 7 & 8 (R-2554B)	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.
R/W REV.

Buffer Drawing
Sheet 12 of 22

SITE VI



SEE SHEETS 52 & 53 FOR -L- PROFILE
SEE SHEET 84 FOR -L2RPDB PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS

NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED

R/W REV. - 07/23/10
PARCEL 43A NAME REVISION

R/W REV. - 11/28/06
ADDED PARCEL 43A

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NC License No: F-0288

METRIC

5m 0 10m

CONST.REV.

R/W REV.

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	25
R /W SHEET NO. 8 & 9 (R-2554B)	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Buffer Drawing
Sheet 13 of 22

NAD 83

ROBERT E. HODGIN (43A)

EDNA E. WELLS (43)

EDNA E. WELLS (43)

MATCH LINE -L- 82+60.000 SEE SHEET 24

MATCH LINE -L2RPDB- 13+60.000 SEE SHEET 26

MATCH LINE -L- 85+80.000 SEE SHEET 26

LATERAL BASE DITCH SEE DETAIL 26

LATERAL V DITCH SEE DETAIL 28

LATERAL BASE DITCH SEE DETAIL 26

SPECIAL CUT DITCH SEE DETAIL 27

SPECIAL CUT DITCH SEE DETAIL 27

CHORD WW 1-S-BW

R/W 1.2m WW 1-S-BW

1.2m WW 1-S-BW

R/W 1.2m WW 1-S-BW

-STRM01-

CAT-1

10.0 MTN CL B RIPRAP W/23.4 SM FIL FAB

10 MTN CL B RIPRAP W/23.8 SM FIL FAB RIPRAP ON BANKS ONLY

29.9 MTN CL I RIPRAP W/51.8 SM FIL FAB RIPRAP ON BANKS ONLY

D.A.= 0.179 ha
So= 0.006 m /m
Q2= 0.044 cms
V2= 0.34 m /s
Q10= 0.057 cms
V10= 0.36 m /s
L= 85 m

D.A.= 0.252 ha
So= 0.006 m /m
Q2= 0.062 cms
V2= 0.37 m /s
Q10= 0.080 cms
V10= 0.39 m /s
L= 120 m

D.A.= 0.148 ha
So= 0.006 m /m
Q2= 0.041 cms
V2= 0.33 m /s
Q10= 0.053 cms
V10= 0.35 m /s
L= 80 m

D.A.= 0.148 ha
So= 0.006 m /m
Q2= 0.041 cms
V2= 0.33 m /s
Q10= 0.053 cms
V10= 0.35 m /s
L= 80 m

SITE VI

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED

SEE SHEET 33 FOR -L- PROFILE
SEE SHEET 82 FOR -L2RPC- PROFILE
SEE SHEETS 83 & 84 FOR -L2RPDB- PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS

R:\Hydraulics\Buffer Permit\DONS\r2554a_hyd_prm_buf_pal25.dgn
11/9/2011 STIMES
USER: SPEIGHTS
FILE: SPEIGHTS

R/W REV. - 07/23/10
PARCEL 43A NAME REVISION
R/W REV. - 11/28/06
ADDED PARCEL 43A

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CONSULTING ENGINEERS
5121 Kingston Way, Suite 100 Raleigh, NC 27607
NC License No. F-0268

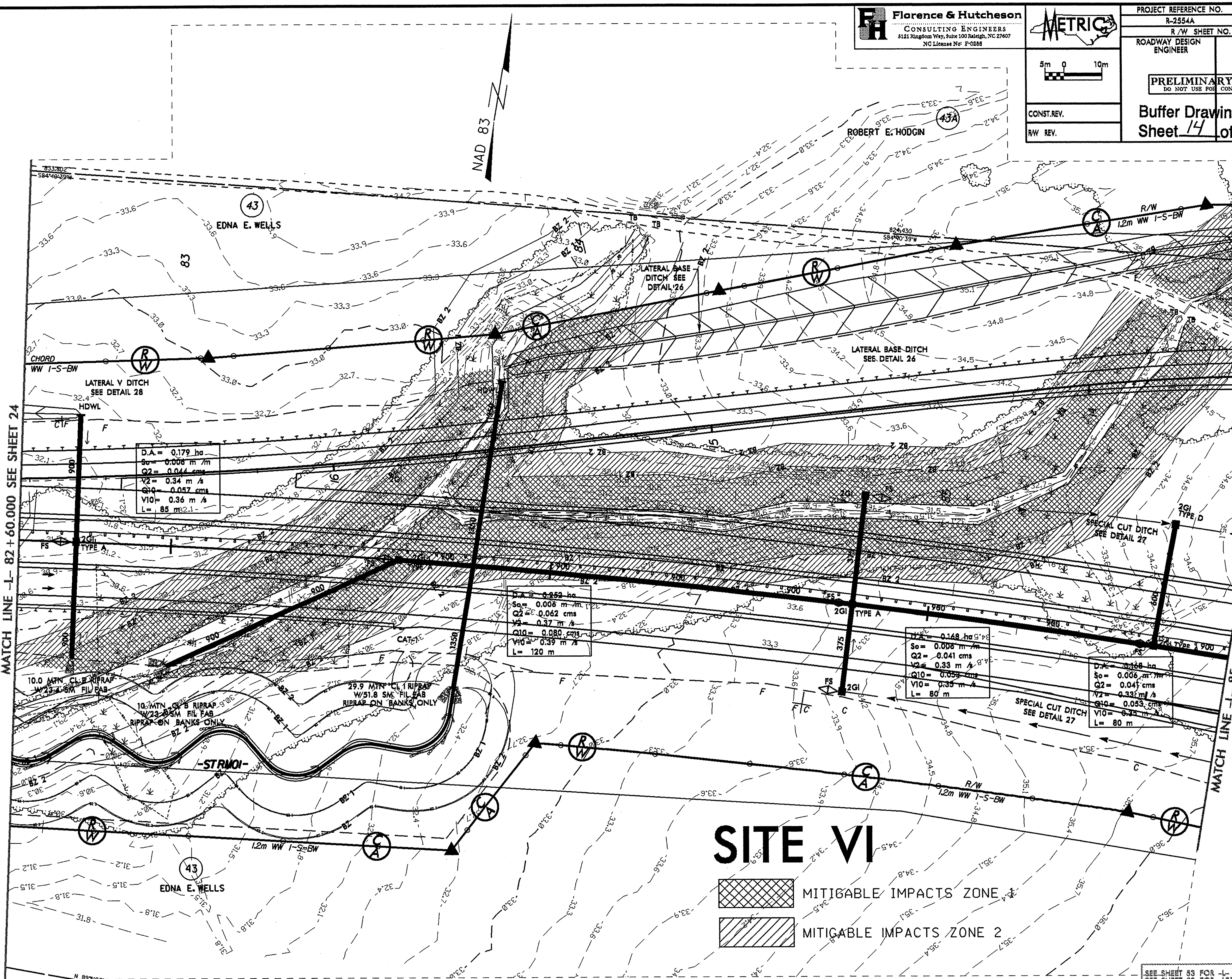
METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	25
R/W SHEET NO. 8 & 9 (R-2554B)	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.
R/W REV.

Buffer Drawing
Sheet 14 of 22



SITE VI

MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2

SEE SHEET 53 FOR -L- PROFILE
SEE SHEET 82 FOR -L2RPC- PROFILE
SEE SHEETS 83 & 84 FOR -L2RPDB- PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS

NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	26
R/W SHEET NO. 9 & 10 (R-2554B)	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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CONSULTING ENGINEERS
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METRIC

PRELIMINARY PLANS
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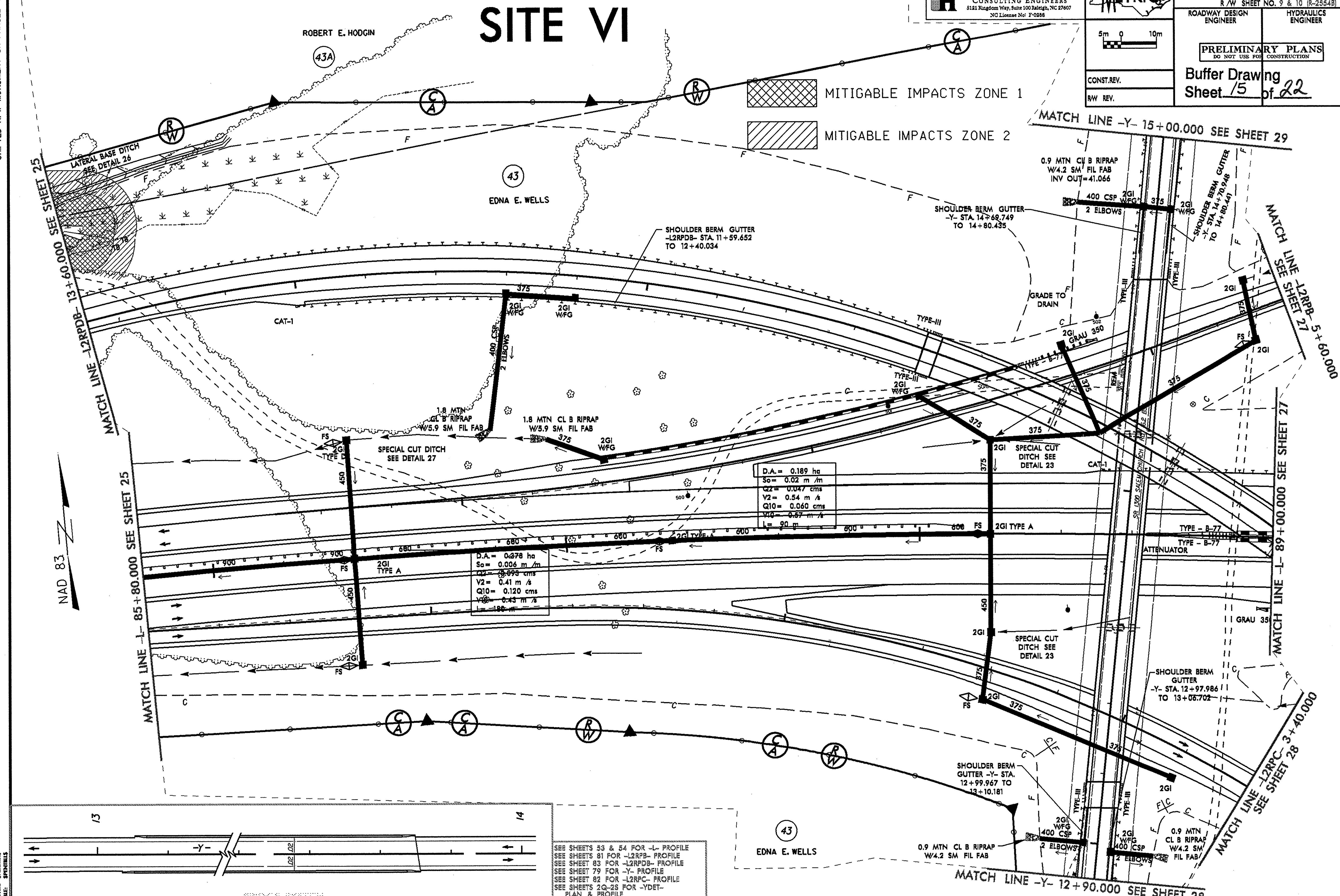
CONST.REV.
R/W REV.

R/W REV. - 07/23/10
PARCEL 43A NAME REVISION
R/W REV. - 11/28/06
ADDED PARCEL 43A
SHIFTED R/W MONUMENT ON PARCEL 43A

SITE VI

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

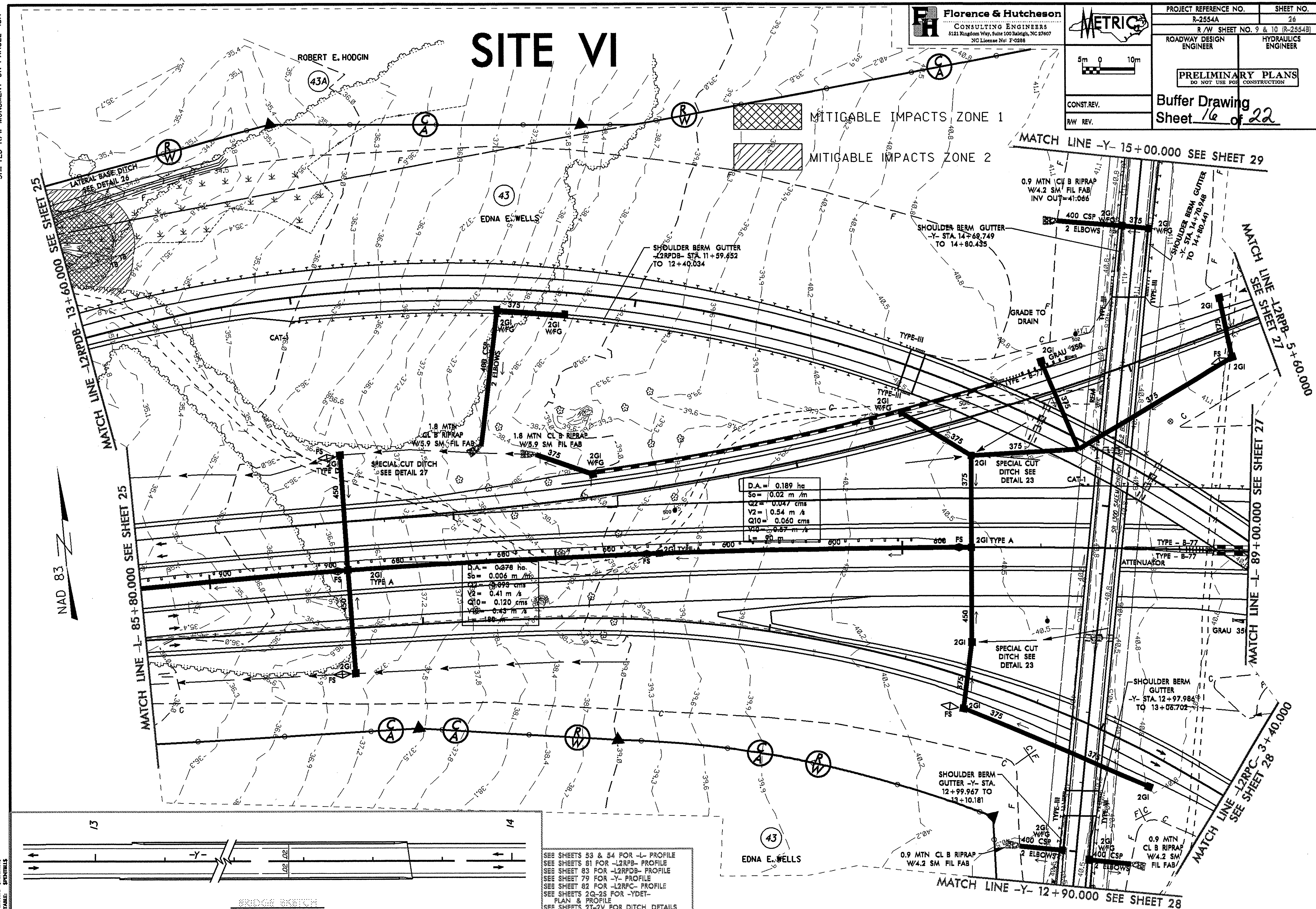


13 14 -Y-

BRIDGE SKETCH

SEE SHEETS 53 & 54 FOR -L- PROFILE
SEE SHEET 81 FOR -L2RPB- PROFILE
SEE SHEET 83 FOR -L2RPDB- PROFILE
SEE SHEET 79 FOR -Y- PROFILE
SEE SHEET 82 FOR -L2RPC- PROFILE
SEE SHEETS 2Q-2S FOR -YDET- PLAN & PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS
SEE SHEET 2BA FOR CURVE DATA

SITE VI



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METRIC
PROJECT REFERENCE NO. R-2554A
SHEET NO. 26
R/W SHEET NO. 9 & 10 (R-2554B)
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
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CONST.REV.
R/W REV.
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2
ROBERT E. HODGIN
EDNA E. WELLS
LATERAL BASE DITCH SEE DETAIL 26
MATCH LINE -Y- 15+00.000 SEE SHEET 29
MATCH LINE -L2RPB- 5+60.000 SEE SHEET 27
MATCH LINE -L- 89+00.000 SEE SHEET 27
MATCH LINE -L2RPC- 3+40.000 SEE SHEET 28
MATCH LINE -Y- 12+90.000 SEE SHEET 28
MATCH LINE -L- 85+80.000 SEE SHEET 25
MATCH LINE -L2RPDB- 13+60.000 SEE SHEET 25
NAD 83
0.9 MTN CL B RIPRAP W/4.2 SM FIL FAB INV OUT=41.066
SHOULDER BERM GUTTER -Y- STA. 14+69.749 TO 14+80.435
SHOULDER BERM GUTTER -Y- STA. 14+70.948 TO 14+80.441
SHOULDER BERM GUTTER -L2RPDB- STA. 11+59.652 TO 12+40.034
GRADE TO DRAIN
1.8 MTN CL B RIPRAP W/5.9 SM FIL FAB
SPECIAL CUT DITCH SEE DETAIL 27
SPECIAL CUT DITCH SEE DETAIL 23
D.A.= 0.189 ha
So= 0.02 m /m
Q2= 0.047 cms
V2= 0.54 m /s
Q10= 0.060 cms
V10= 0.57 m /s
L= 90 m
D.A.= 0.276 ha
So= 0.006 m /m
Q2= 0.093 cms
V2= 0.41 m /s
Q10= 0.120 cms
V10= 0.43 m /s
L= 185 m
SHOULDER BERM GUTTER -Y- STA. 12+97.986 TO 13+06.702
SHOULDER BERM GUTTER -Y- STA. 12+99.967 TO 13+10.181
0.9 MTN CL B RIPRAP W/4.2 SM FIL FAB
ATTENUATOR
TYPE - B-77
SR 1300 SALEM CHURCH RD
R/W REV. - 07/23/10 PARCEL 43A NAME REVISION
R/W REV. - 11/28/06 ADDED PARCEL 43A SHIFTED R/W MONUMENT ON PARCEL 43A
BRIDGE SKETCH

SEE SHEETS 53 & 54 FOR -L- PROFILE
SEE SHEETS 81 FOR -L2RPB- PROFILE
SEE SHEET 83 FOR -L2RPDB- PROFILE
SEE SHEET 79 FOR -Y- PROFILE
SEE SHEET 82 FOR -L2RPC- PROFILE
SEE SHEETS 2Q-2S FOR -YDET- PLAN & PROFILE
SEE SHEETS 2T-2V FOR DITCH DETAILS
SEE SHEET 2&A FOR CURVE DATA

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METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	38
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

5m 0 10m

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.
R/W REV.

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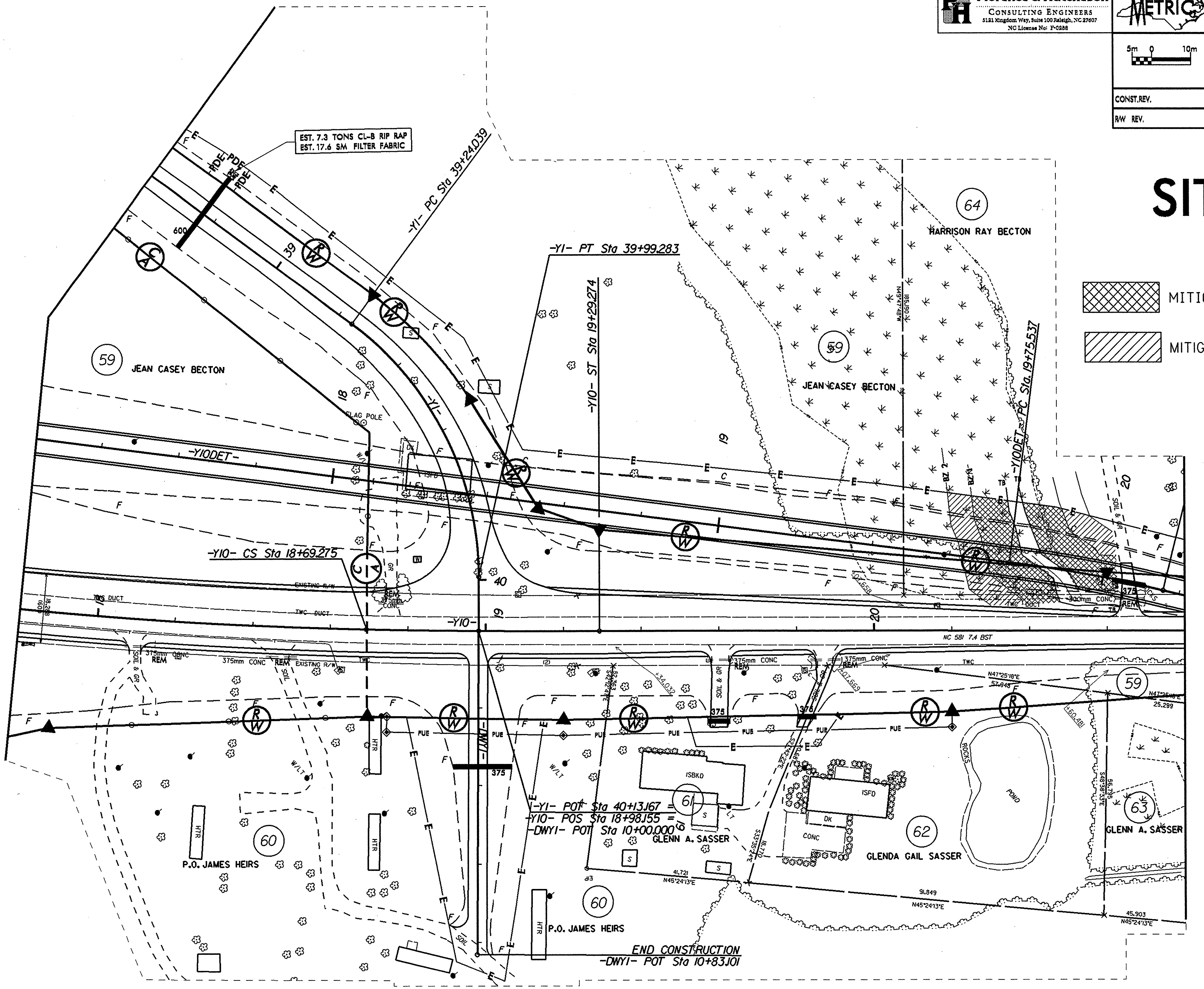
SITE VII

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2



NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

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METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2554A	38
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

5m 0 10m

CONST.REV.
R/W REV.

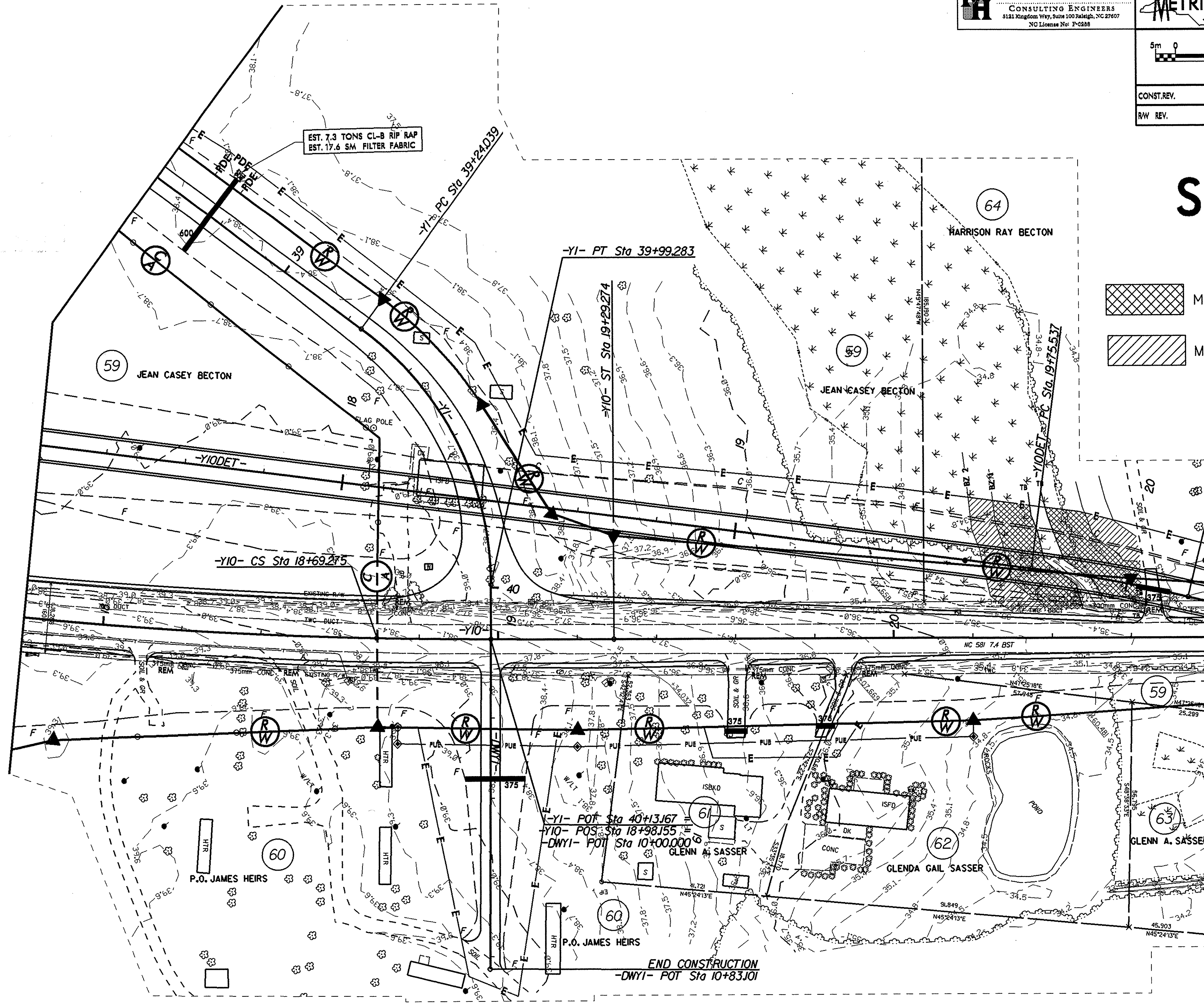
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Buffer Drawing
Sheet 18 of 22

SITE VII

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2



NOTE: ALL DRIVEWAY RADII ARE 3.000m UNLESS OTHERWISE NOTED
ALL DRIVEWAY WIDTHS ARE 4.800m UNLESS OTHERWISE NOTED

BUFFER IMPACTS SUMMARY

			IMPACT									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
I	2 @ 2.13 m x 2.13 m RCBC	39+60 to 40+00 -L-	X						18805	12443	31248		
II	750 mm RCP	49+00 to 49+60 -L-	X						10839	8794	19633		
III	1050 mm RCP	50+50 to 50+90 -L-	X						13455	8859	22324		
IV	BRIDGE	66+10 to 66+80 -L-				9246	6297	15532					
V	BRIDGE	69+10 to 70+70 -L-				8202	3154	11356					
VI	900 mm RCP & 1350 mm RCP	82+50 to 86+00 -L-	X						75089	48868	123968	34380	22733
VII		19+60 to 20+05 -Y10DET-	X						6006	3057	9063		
TOTAL:						17448	9451	26888	124194	82021	206236	34380	22733

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAYNE COUNTY
PROJECT: 34461.1.3 (R-2554A)

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WETLANDS IN BUFFER IMPACTS SUMMARY

SITE NO.	STATION (FROM/TO)		WETLANDS IN BUFFERS ZONE 1 (ft^2)	WETLANDS IN BUFFERS ZONE 2 (ft^2)
I	39+75 to 40+10 -L-		11733	6200
II	49+15 to 49+50 -L-		5608	1302
III	50+50 to 50+65 -L-		6824	4456
VI	82+50 to 85+40 -L-		28524	6017
	13+40 to 14+00 -L2RPDB-			
VII	19+60 to 19+90 -Y10DET-		3660	2013
TOTAL:			56349	19988

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAYNE
PROJECT: 34461.1.3 (R-2554A)

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BUFFER IMPACTS SUMMARY

SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	IMPACT TYPE: ROAD CROSSING	IMPACT TYPE: BRIDGE	IMPACT TYPE: PARALLEL IMPACT	ALLOWABLE: ZONE 1 (m^2)	ALLOWABLE: ZONE 2 (m^2)	ALLOWABLE: TOTAL (m^2)	MITIGABLE: ZONE 1 (m^2)	MITIGABLE: ZONE 2 (m^2)	MITIGABLE: TOTAL (m^2)	BUFFER REPLACEMENT: ZONE 1 (m^2)	BUFFER REPLACEMENT: ZONE 2 (m^2)
I	[illegible] @ 2.13 m x 2.13 m RCB	39+60 to 40+00 -L-	X						1747	1156	2903		
II	750 mm RCP	49+00 to 49+60 -L-	X						1007	817	1824		
III	1050 mm RCP	50+50 to 50+90 -L-	X						1250	823	2074		
IV	BRIDGE	66+10 to 66+80 -L-		X		859	585	1443					
V	BRIDGE	69+10 to 70+70 -L-		X		762	293	1055					
VI	900 mm RCP & 1350 mm RCP	82+50 to 86+00 -L-	X						6976	4540	11517	3194	2112
VII		19+60 to 20+05 -Y10DET-	X						558	284	842		
TOTAL:						1621	878	2498	11538	7620	19160	3194	2112

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAYNE COUNTY
PROJECT: 34461.1.3 (R-2554A)

11/9/2011

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WETLANDS IN BUFFER IMPACTS SUMMARY

SITE NO.	STATION (FROM/TO)		WETLANDS IN BUFFERS ZONE 1 (m^2)	WETLANDS IN BUFFERS ZONE 2 (m^2)
I	39+75 to 40+10 -L-		1090	576
II	49+15 to 49+50 -L-		521	121
III	50+50 to 50+65 -L-		634	414
VI	82+50 to 85+40 -L-		2650	559
	13+40 to 14+00 -L2RPDB-			
VII	19+60 to 19+90 -Y10DET-		340	187
TOTAL:			5235	1857

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

WAYNE
PROJECT: 34461.1.3 (R-2554A)

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