



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

May 3, 2017

U.S. Army Corps of Engineers
151 Patton Avenue, Room 208
Asheville, NC 28801-5006

ATTN: Ms. Loretta Beckwith
NCDOT Coordinator

Subject: **Application for Section 404 Nationwide Permits 23 and 33** for the
Proposed Replacement of Bridge Nos. 160 and 162 on I-40 over SR 1758
(Berea Church Road) in Burke County, Division 13, TIP No. B-4447,
Federal Aid Project No. BRNHS-40-1(159)115.
Debit \$240 from WBS# 38371.1.1.

Dear Ms. Beckwith:

The North Carolina Department of Transportation (NCDOT) proposes to replace bridge numbers 160 (eastbound) and 162 (westbound) on I-40 over SR 1758 (Berea Church Road) in Burke County. A temporary two-lane onsite detour alignment to the south side will be utilized. There will be 130 linear feet of permanent stream impacts (31 linear feet of which are from bank stabilization) to two UTs to Downing Creek.

Please see enclosed copies of the Pre-Construction Notification (PCN), USFWS Concurrence Request Letter, DMS Acceptance Letter, Stormwater Management Plan, Permit Drawings, and Roadway Plan Sheets. A Programmatic Categorical Exclusion (PCE) was completed in May 2016 and distributed shortly thereafter. Additional copies are available upon request.

This project calls for a letting date of June 20, 2017 and the review date was May 2, 2017. Due to the let date, we request permit issuance as soon as possible

A copy of this permit application and its distribution list will be posted on the NCDOT Website at: <http://connect.ncdot.gov/resources/Environmental>. If you have any questions or need additional information, please call Bill Barrett at (919) 707-6103.

Sincerely,


for Philip S. Harris III, P.E., C.P.M.
Natural Environment Section Head

Cc:

NCDOT Permit Application Standard Distribution List



Office Use Only:
Corps action ID no. _____
DWQ project no. _____
Form Version 1.4 January 2009

Pre-Construction Notification (PCN) Form

A. Applicant Information

1. Processing

1a. Type(s) of approval sought from the Corps:	☒ Section 404 Permit	☐ Section 10 Permit
1b. Specify Nationwide Permit (NWP) number: 23 33 or General Permit (GP) number:		
1c. Has the NWP or GP number been verified by the Corps?	☐ Yes	☒ No
1d. Type(s) of approval sought from the DWQ (check all that apply): ☒ 401 Water Quality Certification – Regular ☐ Non-404 Jurisdictional General Permit ☐ 401 Water Quality Certification – Express ☐ Riparian Buffer Authorization		
1e. Is this notification solely for the record because written approval is not required?	For the record only for DWQ 401 Certification: ☐ Yes ☒ No	For the record only for Corps Permit: ☐ Yes ☒ No
1f. Is payment into a mitigation bank or in-lieu fee program proposed for mitigation of impacts? If so, attach the acceptance letter from mitigation bank or in-lieu fee program.	☒ Yes	☐ No
1g. Is the project located in any of NC's twenty coastal counties. If yes, answer 1h below.	☐ Yes	☒ No
1h. Is the project located within a NC DCM Area of Environmental Concern (AEC)?	☐ Yes	☒ No

2. Project Information

2a. Name of project:	Replacement of Bridge Nos. 160 and 162 on I-40 over SR 1758 (Berea Church Road)
2b. County:	Burke
2c. Nearest municipality / town:	Connelly Springs
2d. Subdivision name:	<i>not applicable</i>
2e. NCDOT only, T.I.P. or state project no:	B-4447

3. Owner Information

3a. Name(s) on Recorded Deed:	North Carolina Department of Transportation
3b. Deed Book and Page No.	<i>not applicable</i>
3c. Responsible Party (for LLC if applicable):	<i>not applicable</i>
3d. Street address:	1598 Mail Service Center
3e. City, state, zip:	Raleigh, NC 27699-1598
3f. Telephone no.:	(919) 707-6103
3g. Fax no.:	(919) 212-5785
3h. Email address:	wabarrett@ncdot.gov

4. Applicant Information (if different from owner)	
4a. Applicant is:	☐ Agent ☐ Other, specify:
4b. Name:	<i>not applicable</i>
4c. Business name (if applicable):	
4d. Street address:	
4e. City, state, zip:	
4f. Telephone no.:	
4g. Fax no.:	
4h. Email address:	
5. Agent/Consultant Information (if applicable)	
5a. Name:	<i>not applicable</i>
5b. Business name (if applicable):	
5c. Street address:	
5d. City, state, zip:	
5e. Telephone no.:	
5f. Fax no.:	
5g. Email address:	

B. Project Information and Prior Project History	
1. Property Identification	
1a. Property identification no. (tax PIN or parcel ID):	<i>not applicable</i>
1b. Site coordinates (in decimal degrees):	Latitude: 35.727707 (DD.DDDDDD) Longitude: - 81.493358 (-DD.DDDDDD)
1c. Property size:	5.8 acres
2. Surface Waters	
2a. Name of nearest body of water (stream, river, etc.) to proposed project:	Downing Creek
2b. Water Quality Classification of nearest receiving water:	WS-IV
2c. River basin:	Catawba
3. Project Description	
3a. Describe the existing conditions on the site and the general land use in the vicinity of the project at the time of this application: Development in the area is rural residential and agricultural in nature.	
3b. List the total estimated acreage of all existing wetlands on the property: 0.03	
3c. List the total estimated linear feet of all existing streams (intermittent and perennial) on the property: 1,657	
3d. Explain the purpose of the proposed project: To replace Bridge No. 160 and Bridge No. 162. Bridge No. 160 is considered functionally obsolete (deck geometry appraisal of 2 out of 9). Components of both the concrete superstructure and substructure of Bridge No. 160 have experienced an increasing degree of deterioration that can no longer be addressed by maintenance activities. Bridge No. 162 is not currently classified as functionally obsolete or structurally deficient; however, NCDOT Structures Management Unit compared future anticipated maintenance costs over a 30-year period for both rehabilitation and replacement of the bridge. The total maintenance cost for rehabilitation exceed those of replacement by more than \$100,000. Additionally, replacing the bridge could eliminate or reduce the quantity of joints, which would further reduce future maintenance costs. The use of one temporary detour bridge for both bridge replacements is also cost-effective for the proposed project.	
3e. Describe the overall project in detail, including the type of equipment to be used: The project involves replacing two bridges on I-40 over Berea Church Road. A 6' X 6' RCBC for a UT to Downing Creek will be extended on the upstream end to accommodate the proposed on-site detour. Also to accommodate the on-site detour, an existing 36" CMP will be replaced with a 42-inch steel pipe that will be bored and jacked into a new location approximately 10 feet to the west of the existing CMP to minimize impacts to a DFHL population. Standard road building equipment, such as trucks, dozers, and cranes will be used.	
4. Jurisdictional Determinations	
4a. Have jurisdictional wetland or stream determinations by the Corps or State been requested or obtained for this property / project (including all prior phases) in the past? Comments: JD Package, dated January 14, 2016 was submitted to USACE and NCDWR on January 14, 2016, by Calyx Engineers on behalf of the NCDOT. Final information was provided on April 5, 2016, in an email to Lori Beckwith.	☒ Yes ☐ No ☐ Unknown
4b. If the Corps made the jurisdictional determination, what type of determination was made?	☐ Preliminary ☐ Final
4c. If yes, who delineated the jurisdictional areas? Name (if known): Brian Dustin	Agency/Consultant Company: Calyx Engineers Other:
4d. If yes, list the dates of the Corps jurisdictional determinations or State determinations and attach documentation. not yet received by NCDOT.	

5. Project History		
5a. Have permits or certifications been requested or obtained for this project (including all prior phases) in the past?	☐ Yes	☒ No ☐ Unknown
5b. If yes, explain in detail according to "help file" instructions.		
6. Future Project Plans		
6a. Is this a phased project?	☐ Yes	☒ No
6b. If yes, explain.		

C. Proposed Impacts Inventory						
1. Impacts Summary						
1a. Which sections were completed below for your project (check all that apply):						
☐ Wetlands		☒ Streams - tributaries		☐ Buffers		
☐ Open Waters		☐ Pond Construction				
2. Wetland Impacts						
If there are wetland impacts proposed on the site, then complete this question for each wetland area impacted.						
2a. Wetland impact number – Permanent (P) or Temporary (T)	2b. Type of impact	2c. Type of wetland (if known)	2d. Forested	2e. Type of jurisdiction	2f. Area of impact (acres)	
Site 1 ☐ P ☐ T		Choose One	☐ Yes ☐ No	☐ Corps ☐ DWQ		
Site 2 ☐ P ☐ T		Choose One	☐ Yes ☐ No	☐ Corps ☐ DWQ		
Site 3 ☐ P ☐ T		Choose One	☐ Yes ☐ No	☐ Corps ☐ DWQ		
Site 4 ☐ P ☐ T		Choose One	☐ Yes ☐ No	☐ Corps ☐ DWQ		
2g. Total wetland impacts					X Permanent X Temporary	
2h. Comments:						
3. Stream Impacts						
If there are perennial or intermittent stream impacts (including temporary impacts) proposed on the site, then complete this question for all stream sites impacted.						
3a. Stream impact number - Permanent (P) or Temporary (T)	3b. Type of impact	3c. Stream name	3d. Perennial (PER) or intermittent (INT)?	3e. Type of jurisdiction (Corps - 404, 10 DWQ – non-404, other)	3f. Average stream width (feet)	3g. Impact length (linear feet)
Site 1 ☒ P ☐ T	Pipe Replacement	UT to Drowning Creek	☒ PER ☐ INT	☒ Corps ☐ DWQ	3	74
Site 2 ☒ P ☐ T	RCBC Extension	UT to Drowning Creek	☒ PER ☐ INT	☒ Corps ☐ DWQ	5	25
Site 2 ☒ P ☐ T	Bank Stabilization	UT to Drowning Creek	☒ PER ☐ INT	☒ Corps ☐ DWQ	5	31
Site 2 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
Site 2 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
Site 2 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
Site 2 ☐ P ☐ T			☐ PER ☐ INT	☐ Corps ☐ DWQ		
3h. Total stream and tributary impacts						130 Perm
3i. Comments:						

4. Open Water Impacts

If there are proposed impacts to lakes, ponds, estuaries, tributaries, sounds, the Atlantic Ocean, or any other open water of the U.S. then individually list all open water impacts below.

4a. Open water impact number – Permanent (P) or Temporary (T)	4b. Name of waterbody (if applicable)	4c. Type of impact	4d. Waterbody type	4e. Area of impact (acres)
O1 ☐ P ☐ T				
O2 ☐ P ☐ T				
O3 ☐ P ☐ T				
O4 ☐ P ☐ T				
4f. Total open water impacts				X Permanent X Temporary

4g. Comments:

5. Pond or Lake Construction

If pond or lake construction proposed, then complete the chart below.

5a. Pond ID number	5b. Proposed use or purpose of pond	5c. Wetland Impacts (acres)			5d. Stream Impacts (feet)			5e. Upland (acres)
		Flooded	Filled	Excavated	Flooded	Filled	Excavated	Flooded
P1								
P2								
5f. Total								

5g. Comments:

5h. Is a dam high hazard permit required?	☐ Yes ☐ No If yes, permit ID no:
5i. Expected pond surface area (acres):	
5j. Size of pond watershed (acres):	
5k. Method of construction:	

6. Buffer Impacts (for DWQ)

If project will impact a protected riparian buffer, then complete the chart below. If yes, then individually list all buffer impacts below. If any impacts require mitigation, then you **MUST** fill out Section D of this form.

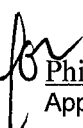
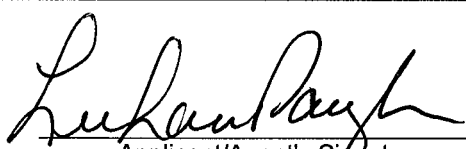
6a. Project is in which protected basin?			☐ Neuse ☐ Catawba			☐ Tar-Pamlico ☐ Randleman	☐ Other:
6b. Buffer impact number – Permanent (P) or Temporary (T)	6c. Reason for impact	6d. Stream name	6e. Buffer mitigation required?	6f. Zone 1 impact (square feet)	6g. Zone 2 impact (square feet)		
B1 ☐ P ☐ T			☐ Yes ☐ No				
B2 ☐ P ☐ T			☐ Yes ☐ No				
B3 ☐ P ☐ T			☐ Yes ☐ No				
6h. Total buffer impacts							
6i. Comments:							

D. Impact Justification and Mitigation		
1. Avoidance and Minimization		
1a. Specifically describe measures taken to avoid or minimize the proposed impacts in designing project. Avoidance and minimization measures incorporated into the Design include the following: Site 1: Rather than extending the existing pipe, a new 42-inch steel pipe will be bored and jacked into a new location approximately 10 feet to the west of the existing CMP to minimize impacts to a DFHL population. Site 2: use of a temporary retaining wall and 2:1 detour side slopes to shorten the 6' X 6' RCBC on the upstream (right) side of I-40, and the use of 1.5:1 fill slopes on the downstream (left) side of I-40 to eliminate the need to extend the downstream (right) end of the box culvert.		
1b. Specifically describe measures taken to avoid or minimize the proposed impacts through construction techniques. NCDOT Best Management Practices for Construction and Maintenance Activities will be implemented during the project.		
2. Compensatory Mitigation for Impacts to Waters of the U.S. or Waters of the State		
2a. Does the project require Compensatory Mitigation for impacts to Waters of the U.S. or Waters of the State?	☒ Yes ☐ No If no, explain:	
2b. If yes, mitigation is required by (check all that apply):	☐ DWQ ☒ Corps	
2c. If yes, which mitigation option will be used for this project?	☐ Mitigation bank ☒ Payment to in-lieu fee program ☐ Permittee Responsible Mitigation	
3. Complete if Using a Mitigation Bank		
3a. Name of Mitigation Bank: not applicable		
3b. Credits Purchased (attach receipt and letter)	Type	Quantity
3c. Comments:		
4. Complete if Making a Payment to In-lieu Fee Program		
4a. Approval letter from in-lieu fee program is attached.	☒ Yes	
4b. Stream mitigation requested:	99 linear feet	
4c. If using stream mitigation, stream temperature:	☐ warm ☒ cool ☐ cold	
4d. Buffer mitigation requested (DWQ only):	square feet	
4e. Riparian wetland mitigation requested:	acres	
4f. Non-riparian wetland mitigation requested:	acres	
4g. Coastal (tidal) wetland mitigation requested:	acres	
4h. Comments:		
5. Complete if Using a Permittee Responsible Mitigation Plan		
5a. If using a permittee responsible mitigation plan, provide a description of the proposed mitigation plan.		

6. Buffer Mitigation (State Regulated Riparian Buffer Rules) – required by DWQ				
6a. Will the project result in an impact within a protected riparian buffer that requires buffer mitigation?				☐ Yes ☐ No
6b. If yes, then identify the square feet of impact to each zone of the riparian buffer that requires mitigation. Calculate the amount of mitigation required.				
Zone	6c. Reason for impact	6d. Total impact (square feet)	Multiplier	6e. Required mitigation (square feet)
Zone 1			3 (2 for Catawba)	
Zone 2			1.5	
	6f. Total buffer mitigation required:			
6g. If buffer mitigation is required, discuss what type of mitigation is proposed (e.g., payment to private mitigation bank, permittee responsible riparian buffer restoration, payment into an approved in-lieu fee fund).				
6h. Comments:				

E. Stormwater Management and Diffuse Flow Plan (required by DWQ)	
1. Diffuse Flow Plan	
1a. Does the project include or is it adjacent to protected riparian buffers identified within one of the NC Riparian Buffer Protection Rules?	☐ Yes ☒ No
1b. If yes, then is a diffuse flow plan included? If not, explain why. Comments: If required from 1a, see attached buffer permit drawings.	☐ Yes ☐ No
2. Stormwater Management Plan	
2a. What is the overall percent imperviousness of this project?	N/A
2b. Does this project require a Stormwater Management Plan?	☒ Yes ☐ No
2c. If this project DOES NOT require a Stormwater Management Plan, explain why:	
2d. If this project DOES require a Stormwater Management Plan, then provide a brief, narrative description of the plan: See attached permit drawings.	
2e. Who will be responsible for the review of the Stormwater Management Plan?	☐ Certified Local Government ☐ DWQ Stormwater Program ☒ DWQ 401 Unit
3. Certified Local Government Stormwater Review	
3a. In which local government's jurisdiction is this project?	not applicable
3b. Which of the following locally-implemented stormwater management programs apply (check all that apply):	☐ Phase II ☐ NSW ☐ USMP ☐ Water Supply Watershed ☐ Other:
3c. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☐ No
4. DWQ Stormwater Program Review	
4a. Which of the following state-implemented stormwater management programs apply (check all that apply):	☐ Coastal counties ☐ HW ☐ ORW ☐ Session Law 2006-246 ☐ Other:
4b. Has the approved Stormwater Management Plan with proof of approval been attached?	☐ Yes ☐ No N/A
5. DWQ 401 Unit Stormwater Review	
5a. Does the Stormwater Management Plan meet the appropriate requirements?	☐ Yes ☐ No N/A
5b. Have all of the 401 Unit submittal requirements been met?	☐ Yes ☐ No N/A

F. Supplementary Information	
1. Environmental Documentation (DWQ Requirement)	
1a. Does the project involve an expenditure of public (federal/state/local) funds or the use of public (federal/state) land?	☒ Yes ☐ No
1b. If you answered "yes" to the above, does the project require preparation of an environmental document pursuant to the requirements of the National or State (North Carolina) Environmental Policy Act (NEPA/SEPA)?	☒ Yes ☐ No
1c. If you answered "yes" to the above, has the document review been finalized by the State Clearing House? (If so, attach a copy of the NEPA or SEPA final approval letter.) Comments:	☒ Yes ☐ No
2. Violations (DWQ Requirement)	
2a. Is the site in violation of DWQ Wetland Rules (15A NCAC 2H .0500), Isolated Wetland Rules (15A NCAC 2H .1300), DWQ Surface Water or Wetland Standards, or Riparian Buffer Rules (15A NCAC 2B .0200)?	☐ Yes ☒ No
2b. Is this an after-the-fact permit application?	☐ Yes ☒ No
2c. If you answered "yes" to one or both of the above questions, provide an explanation of the violation(s):	
3. Cumulative Impacts (DWQ Requirement)	
3a. Will this project (based on past and reasonably anticipated future impacts) result in additional development, which could impact nearby downstream water quality?	☐ Yes ☒ No
3b. If you answered "yes" to the above, submit a qualitative or quantitative cumulative impact analysis in accordance with the most recent DWQ policy. If you answered "no," provide a short narrative description. Due to the minimal transportation impact resulting from this bridge replacement, this project will neither influence nearby land uses nor stimulate growth. Therefore, a detailed indirect or cumulative effects study will not be necessary.	
4. Sewage Disposal (DWQ Requirement)	
4a. Clearly detail the ultimate treatment methods and disposition (non-discharge or discharge) of wastewater generated from the proposed project, or available capacity of the subject facility. not applicable	

5. Endangered Species and Designated Critical Habitat (Corps Requirement)		
5a. Will this project occur in or near an area with federally protected species or habitat?	☒ Yes	☐ No
5b. Have you checked with the USFWS concerning Endangered Species Act impacts?	☒ Yes	☐ No
5c. If yes, indicate the USFWS Field Office you have contacted.	☐ Raleigh ☒ Asheville	
5d. What data sources did you use to determine whether your site would impact Endangered Species or Designated Critical Habitat? NCDOT has submitted a Concurrence Request letter to the USFWS to address impacts to a DFHL population, dated April 26, 2017 (attached). Lori Beckwith with the USACE was copied on the April 26, 2017 submittal email. All other species listed for Burke County have a No Effect Biological Conclusion.		
6. Essential Fish Habitat (Corps Requirement)		
6a. Will this project occur in or near an area designated as essential fish habitat?	☐ Yes	☒ No
6b. What data sources did you use to determine whether your site would impact Essential Fish Habitat? NMFS County Index		
7. Historic or Prehistoric Cultural Resources (Corps Requirement)		
7a. Will this project occur in or near an area that the state, federal or tribal governments have designated as having historic or cultural preservation status (e.g., National Historic Trust designation or properties significant in North Carolina history and archaeology)?	☐ Yes	☒ No
7b. What data sources did you use to determine whether your site would impact historic or archeological resources? NEPA Documentation		
8. Flood Zone Designation (Corps Requirement)		
8a. Will this project occur in a FEMA-designated 100-year floodplain?	☐ Yes	☒ No
8b. If yes, explain how project meets FEMA requirements: NCDOT Hydraulics Unit coordination with FEMA		
8c. What source(s) did you use to make the floodplain determination? FEMA Maps		
 Philip S. Harris, P.E., C.P.M. Applicant/Agent's Printed Name	 Applicant/Agent's Signature (Agent's signature is valid only if an authorization letter from the applicant is provided.)	5/3/17 Date



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

April 26, 2017

Ms. Janet A. Mizzi
Field Supervisor
US Fish and Wildlife Service
160 Zillicoa Street
Asheville, NC 28801

SUBJECT: **Section 7 Concurrence Request** for the proposed replacement of Bridge No's. 160 and 161 on I-40 Burke County; Federal Project No. BRNHS-40-1(159)115; WBS Element 38371.1.1, Division 13; TIP. No. B-4447.

REFERENCE: Plansheets 4 and 5 with Hexastylis sp. survey results
Streamline Section 7 Memo for NLEB, dated June 15, 2016

Dear Ms. Mizzi,

The purpose of this letter is to request concurrence from the U.S. Fish and Wildlife Service (USFWS) pursuant to Section 7 of the Endangered Species Act, as amended (16 U.S.C. 1531 et seq.) (ESA).

As of January 18, 2017, the USFWS lists nine federally protected species for Burke County (Table 1).

Table 1. Federally protected species listed for Burke County.

Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion
Glyptemys muhlenbergii	Bog turtle	T(S/A)	No	Not Required
Myotis septentrionalis	Northern long-eared bat	T	Yes	*
Hexastylis naniflora	Dwarf-flowered heartleaf	T	Yes	MANLAA
Liatris helleri	Heller's blazing star	T	No	No Effect
Hudsonia montana	Mountain golden heather	T	No	No Effect
Gymnoderma lineare	Rock gnome lichen	E	No	No Effect
Isotria medeoloides	Small whorled pogonia	T	Yes	No Effect
Geum radiatum*	Spreading avens	E	No	No Effect
Sisyrinchium dichotomum	White irisette	E	No	No Effect

T (S/A) - threatened due to similarity of appearance, E - Endangered, T - Threatened
MANLAA - May Affect, Not Likely to Adversely Affect, * consistent with 4(d) rule

Small whorled pogonia - suitable habitat for small whorled pogonia exists within the study area in the form of open, dry deciduous woods. Canopy gaps are present in limited locations, mainly within the northwest quadrant of the study area. However, other habitats preferred by this species are not found within the study area. No individuals were found during a field survey on July 11, 2016. A review of NCNHP records, updated June 2016, indicates no known small whorled pogonia occurrences within 1.0 mile of the study area. Based on this review of the NHP database and the field survey, a Biological conclusion of No Effect has been reached.

Dwarf-flowered heartleaf – surveys conducted on August 11, 2015, April 13, 2017, and April 20, 2017, have resulted in the identification of five *Hexastylis* sp. populations within the project study area. These populations (shown on Plansheets 4 and 5) contain a total of 356 plants. 50 individual plants have been identified within the area defined by the proposed slopestake limits plus 5 feet.

Project plans also show a permanent drainage easement associated with the extension of an existing 36" diameter metal pipe at approximately Station 17 + 50 (Plansheet 4). The plant population closest to the invert of this pipe contains 47 individual plants that have been identified inside the slopestake plus 5 feet limit and/or within the proposed drainage easement. This pipe is now going to be replaced with a 42" steel pipe, approximately 10 feet west of the current pipe location. The resulting fill slope will be constructed to avoid the *Hexastylis* sp. plant population.

Since a very small percentage of the total plants have the potential to be affected, and that all these affected plants may not be the naniflora species, a Biological Conclusion of May Affect Not Likely to Adversely Affect has been reached.

Proposed Project Commitments

NCDOT commits to placing high visibility fencing around the *Hexastylis* sp. populations within right of way to protect them from construction activities. Further the existing 36" drainage pipe described above will be replaced during construction and the resulting fillslope moved to the west to the maximum extent practicable to avoid impacting any *Hexastylis* sp. plants.

Northern long-eared bat – According to the North Carolina Natural Heritage Program (NHP) Biotics Database, most recently updated January 2016, the nearest NLEB hibernacula record is 29 miles west (EO ID 34299) and no known NLEB roost trees occur within 150 feet of the project area. NCDOT has also reviewed the USFWS Asheville office website for consistency with NHP records. This project is located entirely outside of the red highlighted areas (12-digit HUC) that the USFWS Asheville Field Office has determined to be representative of an area that may require consultation. Based on the attached Memorandum, this project is consistent with the 4(d) rule for the Northern long-eared bat.

NCDOT believes that the requirements of Section 7(a)(2) of the ESA have been satisfied and hereby request your concurrence. If you have any questions, please contact Bill Barrett at wabarrett@ncdot.gov or (919) 707-6103.

Sincerely,



for

Philip S. Harris III, P.E., CPM, Manager
Natural Environment Section



ROY COOPER
Governor

April 26, 2017

Mr. Philip S. Harris, III, P.E., CPM
Project Development and Environmental Analysis Unit
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Harris:

Subject: Mitigation Acceptance Letter:

B-4447, Rehabilitation of Bridge 160 on I-40 over SR 1758, Burke County

The purpose of this letter is to notify you that the Division of Mitigation Services (DMS) will provide the compensatory stream mitigation for the subject project. Based on the information supplied by you on April 21, 2017, the impacts are located in CU 03050101 of the Catawba River basin in the Northern Mountains (NM) Eco-Region, and are as follows:

Catawba 03050101 NM	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1	Zone 2
Impacts (feet/acres)	0	99.0	0	0	0	0	0	0

*Some of the stream and/or wetland impacts may be proposed to be mitigated at a 1:1 mitigation ratio. See permit application for details.

This mitigation acceptance letter replacement the mitigation acceptance letter issued on April 21, 2017. This impact and associated mitigation need were under projected by the NCDOT in the 2017 impact data. Currently NCDEQ-DMS does not have cool stream mitigation credits available in this CU. NCDEQ-DMS will commit to implement sufficient compensatory cold stream mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies using the delivery timeline listed in Section F.3.c.iii of the In-Lieu Fee Instrument dated July 28, 2010. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from NCDEQ-DMS.

If you have any questions or need additional information, please contact Beth Harmon at 919-707-8420.

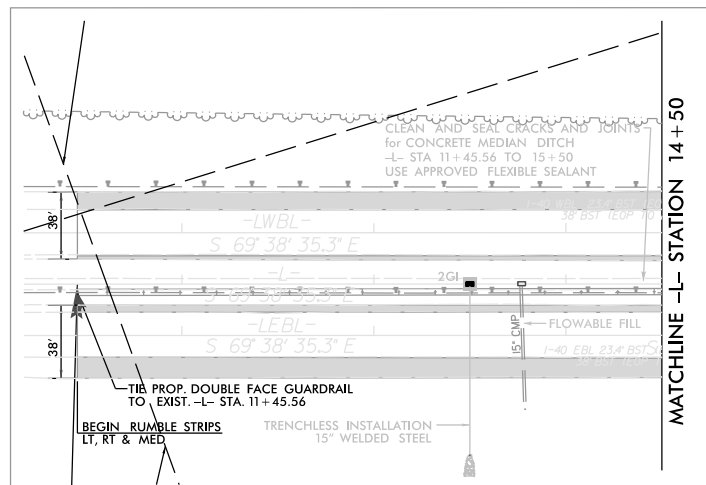
Sincerely,

James B. Stanfill
Credit Management Supervisor

cc: Ms. Lori Beckwith, USACE – Asheville Regulatory Field Office
Ms. Amy Chapman, NCDWR
File: B-4447 Revised



INSET A



BEGIN TIP PROJECT B-4447
-L- POT STA. 11+45.56

-LWBL-		-LEBL-	
PI Sta 18+77.14	PI Sta 21+99.56	PI Sta 18+77.14	PI Sta 21+99.56
$\Delta = 1' 27' 58.1''$ (LT)	$\Delta = 1' 27' 58.1''$ (RT)	$\Delta = 1' 27' 58.1''$ (LT)	$\Delta = 1' 27' 58.1''$ (RT)
D = 0' 32' 07.7"	D = 0' 23' 42.5"	D = 0' 32' 07.7"	D = 0' 23' 42.5"
L = 273.80'	L = 371.04'	L = 273.80'	L = 371.04'
T = 136.91'	T = 185.53'	T = 136.91'	T = 185.53'
R = 10,700.00'	R = 14,500.00'	R = 10,700.00'	R = 14,500.00'
SE = .02	SE = NC	SE = .02	SE = NC
RO = 60'	RO = 60'	RO = 60'	RO = 60'

-Y-	
PI Sta 12+01.64	PI Sta 13+72.25
$\Delta = 14' 41' 50.3''$ (RT)	$\Delta = 19' 53' 11.4''$ (RT)
D = 9' 47' 38.9"	D = 11' 41' 34.9"
L = 150.06'	L = 187.18'
T = 75.45'	T = 94.74'
R = 585.00'	R = 490.00'

PI Sta 18+51.39	PI Sta 17+56.40	PI Sta 16+59.75
$\Delta = 10' 47' 13.0''$ (LT)	$\Delta = 19' 54' 20.5''$ (LT)	$\Delta = 10' 07' 50.0''$ (LT)
D = 17' 57' 39.8"	D = 23' 06' 11.3"	D = 13' 28' 52.9"
L = 60.06'	L = 86.16'	L = 75.14'
T = 30.12'	T = 43.52'	T = 37.67'
R = 319.00'	R = 248.00'	R = 425.00'

274 plants total
67 plants in ROW
1 plant inside SS+5'

14 plants, all inside ROW
2 plants inside SS+5'

5 plants
3 inside ROW

48 plants total
42 plants inside ROW
47 plants inside SS+5' and/or PDE

Existing 36" CMP to be replaced
with 42" Steel pipe approx. 10'
west. Fillslope will be
constructed to avoid plants

PAVEMENT/BRIDGE RELATIONSHIP SKETCH (NTS)

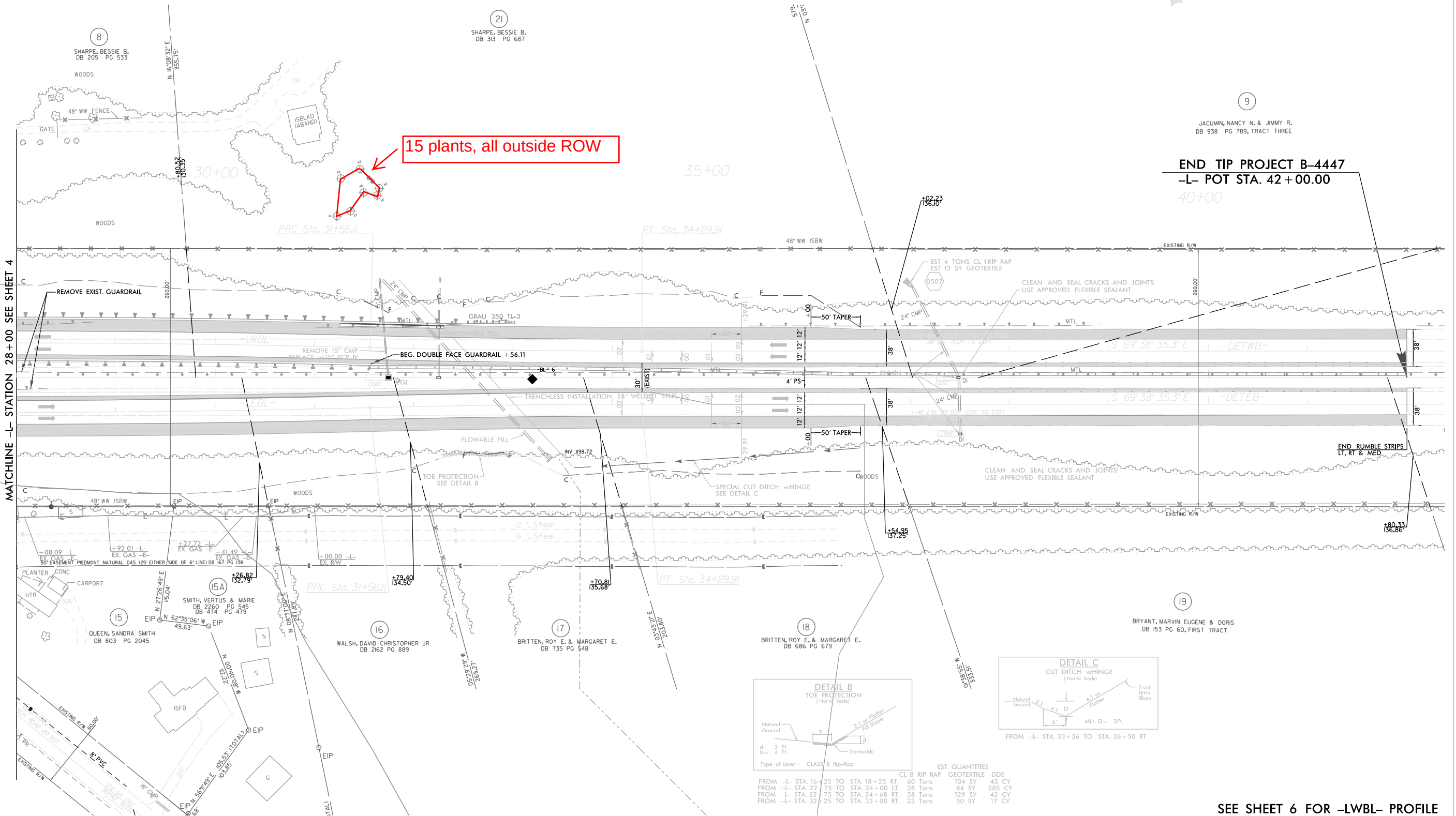
FROM	TO	CL B RIP RAP	GEOTEXTILE	DDE
FROM -L- STA. 16+25	TO STA. 18+25 RT.	60 Tons	134 SY	45 CY
FROM -L- STA. 22+75	TO STA. 24+00 LT.	38 Tons	84 SY	28 CY
FROM -L- STA. 22+75	TO STA. 24+68 RT.	58 Tons	129 SY	43 CY
FROM -L- STA. 32+25	TO STA. 33+00 RT.	23 Tons	50 SY	17 CY

SEE SHEET 6 FOR -LWBL- PROFILE
SEE SHEET 7 FOR -LEBL- PROFILE
SEE SHEET 9 FOR EXIST. -Y- PROFILE
SEE SHEETS S01-1 THRU S01-28 FOR -LWBL- STRUCTURE PLANS
SEE SHEETS S02-1 THRU S02-28 FOR -LEBL- STRUCTURE PLANS
SEE SHEETS C-1 THRU C-6 FOR CULVERT PLANS

8/17/99

-LWBL-		-LEBL-	
PI Sta 29+70.60	PI Sta 32+93.02	PI Sta 29+70.60	PI Sta 32+93.02
$\Delta = 1' 27' 58''$ (RT)	$\Delta = 1' 27' 58''$ (LT)	$\Delta = 1' 27' 58''$ (LT)	$\Delta = 1' 27' 58''$ (RT)
$D = 0' 23' 42.5''$	$D = 0' 32' 07.7''$	$D = 0' 23' 42.5''$	$D = 0' 32' 07.7''$
$L = 371.04'$	$L = 273.80'$	$L = 371.04'$	$L = 273.80'$
$T = 185.53'$	$T = 136.91'$	$T = 185.53'$	$T = 136.91'$
$R = 14,500.00'$	$R = 10,700.00'$	$R = 14,500.00'$	$R = 10,700.00'$
$SE = NC$	$SE = .02$	$SE = NC$	$SE = .02$
	$RO = 60'$		$RO = 60'$

PROJECT REFERENCE NO. B-4447	SHEET NO. 5
ROADWAY DESIGN NORTH CAROLINA PROFESSIONAL SEAL 034407 ENGINEER ANDREW P. JONES	HYDRAULICS NORTH CAROLINA PROFESSIONAL SEAL 019775 ENGINEER JAY D. LOVINGGOOD
Firm License No. 041001 421 Fayetteville St. Suite 400 Fayetteville, NC 27401 T 919-386-3190 www.stewartinc.com	
STEWART	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



SEE SHEET 6 FOR -LWBL- PROFILE
SEE SHEET 7 FOR -LEBL- PROFILE



PAT McCRORY
Governor

NICHOLAS J. TENNYSON
Secretary

June 15, 2016

TO: Bill Barrett, Environmental Senior Specialist
Environmental Coordination & Permitting Group Western, NES - PDEA

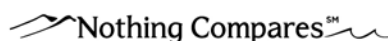
CC: Elmo Vance, Project Development Engineer
Project Development Group - Western Region, PDEA

FROM: Cheryl Gregory, Environmental Program Consultant 
Biological Surveys Group, NES - PDEA

SUBJECT: *Streamline Section 7 Consultation for the Northern Long-Eared Bat* associated with the replacement of Bridges Nos. 160 and 162 over SR 1758 on I-40 in Burke County, **TIP No. B-4447**.

The North Carolina Department of Transportation (NCDOT, Division 13) proposes to replace Bridge Nos. 160 and 162 over SR 1758 on I-40 in Burke County, TIP No. B-4447. The existing bridges are three span structures with a concrete superstructure, steel I-beams, concrete abutments and bents. The guardrail is constructed of metal. The overall length of each structure is 135 feet. The replacement structures will consist of two bridges approximately 110 feet in length. The bridges will be of sufficient width to provide two 12 foot lanes with 12-foot offsets on the outside and 6-foot offsets on the inside and will be spaced far enough apart to accommodate possible future I-40 widening. The roadway grade of the new structures will be raised approximately two feet. Improvements to the approach roadway will be required for a distance of approximately 1,340 feet to the west and 1,530 feet to the east of the new structures. The replacement structures will be replaced on the existing alignment. Traffic will be maintained on a temporary two-lane detour alignment to the south side.

The project to replace Bridge Nos. 160 and 162 has been reviewed for effects on the northern long-eared bat (NLEB). As of May 4, 2015, NLEB is listed by the U.S. Fish and Wildlife Service (USFWS) as "Threatened" under the Endangered Species Act of 1973. As of June 1, 2016, NLEB is listed by USFWS as "current" in Burke County (http://www.fws.gov/raleigh/species/cntylist/nc_counties.html). USFWS also established a final rule under the authority of section 4(d) of the Endangered Species Act that provides measures for the conservation of NLEB. The USFWS has tailored the final 4(d) rule to prohibit the take of NLEB from certain activities within areas where they are in decline. This incidental take protection applies only to known NLEB occupied maternity roost trees and known NLEB hibernacula. Effective February 16, 2016, incidental take resulting from tree removal is prohibited if it 1) occurs within a ¼ mile radius of known NLEB hibernacula; or 2) cuts or destroys known occupied maternity roost trees, or any other trees within a 150-foot radius from the known maternity tree during the pup season (June 1-July 31).



According to the North Carolina Natural Heritage Program (NHP) Biotics Database, most recently updated January 2016, **the nearest NLEB hibernacula record is 29 miles west (EO ID 34299) and no known NLEB roost trees occur within 150 feet of the project area.** EO 34299 represents three cave sites (Wind, Psuedosalt peter, Limkiln) with multiple observations from 2001 to 2009.

NCDOT has also reviewed the USFWS Asheville Field office website (http://www.fws.gov/asheville/htmls/project_review/NLEB_in_WNC.html) for consistency with NHP records. This project is located entirely outside of the red highlighted areas (12-digit HUC) that the USFWS Asheville Field Office has determined to be representative of an area that may require consultation.

For the proposed action, NCDOT has committed to the conservation measures listed below:

- 1) No alterations of a known hibernaculum's entrance or interior environment if it impairs an essential behavioral pattern, including sheltering northern long-eared bats (January 1 through December 31);
- 2) No tree removal within a 0.25 mile radius of a known hibernacula (January 1 through December 31); and
- 3) No cutting or destroying a known, occupied maternity roost tree, or any other trees within a 150-foot radius from the known, occupied maternity tree during the period from June 1 through and including July 31.

NCDOT has determined that the proposed action does not require separate consultation on the grounds that the proposed action is consistent with the final Section 4(d) rule, codified at 50 C.F.R. § 17.40(o) and effective February 16, 2016. NCDOT may presume its determination is informed by best available information and consider Section 7 responsibilities fulfilled for NLEB.

If you need any additional information, please contact Cheryl Gregory at 919-707-6142.

		North Carolina Department of Transportation Highway Stormwater Program STORMWATER MANAGEMENT PLAN FOR NCDOT PROJECTS					
(Version 2.07; Released October 2016)							
WBS Element: 38371.1.1		TIP No.: B-4447		County(ies): Burke		Page 1 of 2	
General Project Information							
WBS Element:		38371.1.1		TIP Number: B-4447		Project Type: Bridge Replacement	
NCDOT Contact:		Stephen R. Morgan, PE		Contractor / Designer:		Ray Lovinggood, PE	
Address:		1020 Birch Ridge Dr. Raleigh, NC 27610		Address:		1020 Birch Ridge Dr. Raleigh, NC 27610	
Phone:		919.707.6739		Phone:		919.707.6736	
Email:		smorgan@ncdot.gov		Email:		rlovinggood@ncdot.gov	
City/Town:		Connelly Springs		County(ies):		Burke	
River Basin(s):		Catawba		CAMA County?		No	
Wetlands within Project Limits?		No					
Project Description							
Project Length (lin. miles or feet):		0.578 mi.		Surrounding Land Use:		Rural	
		Proposed Project		Existing Site			
Project Built-Up Area (ac.):		5.8 ac.		5.2 ac.			
Typical Cross Section Description:		Four 12' Travel lanes, 4' to 12' paved shoulders with 2' grassed shoulders, 34' to 38' grassed median and 1.5:1 to 6:1 grassed side slopes		Four 11.5'+/- Travel lanes, 4' to 12' paved shoulders, variable 6' grassed shoulders, variable 22' grassed median and 1.5:1 to 6:1 grassed side slopes.			
Annual Avg Daily Traffic (veh/hr/day):		Design/Future: 57,600 Year: 2040		Existing: 47,075		Year: 2017	
General Project Narrative: (Description of Minimization of Water Quality Impacts)		B-4447 is a Transportation Improvement Project to replace Bridges #0160 on I-40 EBL and #0162 on I-40 WBL in Burke County crossing SR 1758. (Grade Separation) A 6'x6' RCBC located at Sta. 24+88-L- on I-40 over Unnamed Trib. to Drowning Creek was extended 24' on the upstream end to accommodate the proposed on-site detour. An existing 36" CMP at Sta. 17+18-L- will be replaced by a 42" steel pipe bored and jacked into a new location about ten feet away from the existing pipe. Minimization and avoidance measures incorporated into the design include the use of a temporary retaining wall and 2:1 detour side slopes to shorten the 6'x6' RCBC on the upstream side. Use of 1.5:1 fill slopes on the left side of -L- eliminated the need to extend the downstream end of the box culvert.					
Waterbody Information							
Surface Water Body (1):		Drowning Creek		NCDWR Stream Index No.:		11-52-(1)	
NCDWR Surface Water Classification for Water Body		Primary Classification:		Water Supply IV (WS-IV)			
		Supplemental Classification:		None			
Other Stream Classification:		None					
Impairments:		None					
Aquatic T&E Species?		Comments:					
NRTR Stream ID:		11-52-1		Buffer Rules in Effect:		N/A	
Project Includes Bridge Spanning Water Body?		NO		Deck Drains Discharge Over Buffer?		N/A	
Deck Drains Discharge Over Water Body?		N/A		(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)							
WBS Element: 38371.1.1		TIP No.: B-4447		County(ies): Burke		Page 2 of 2	
Additional Waterbody Information							
Surface Water Body (2):		Downing Creek		NCDWR Stream Index No.:		11-52-(1)	
NCDWR Surface Water Classification for Water Body		Primary Classification:		Water Supply IV (WS-IV)			
		Supplemental Classification:		None			
Other Stream Classification:		None					
Impairments:		None					
Aquatic T&E Species?		Comments:					
NRTR Stream ID:		11-52-1		Buffer Rules in Effect:		N/A	
Project Includes Bridge Spanning Water Body?		No		Deck Drains Discharge Over Buffer?		N/A	
Deck Drains Discharge Over Water Body?		N/A		(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)							

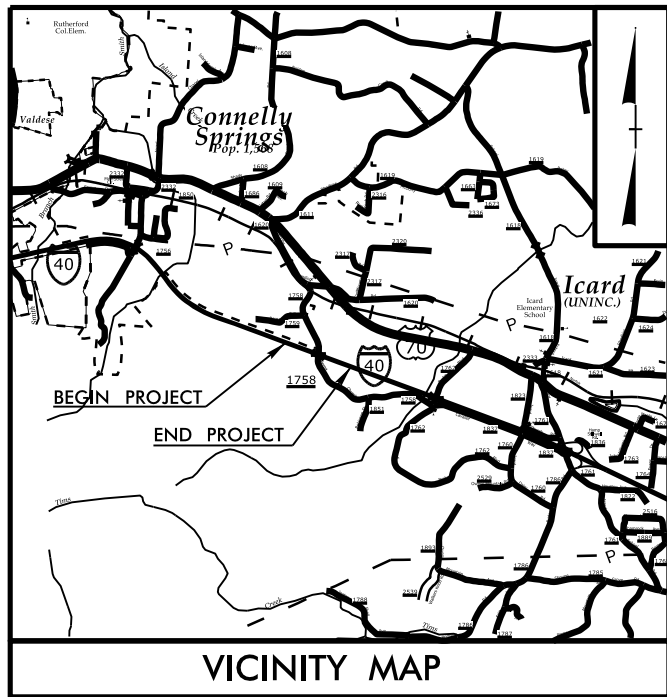
2/12/2017
mickelly
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\$\$\$\$\$DGN\$\$\$\$\$
\$\$\$\$\$USERNAME\$\$\$\$\$

09/05/99

TIP PROJECT: B-4447

CONTRACT:

See Sheet 1-A For Index of Sheets



VICINITY MAP

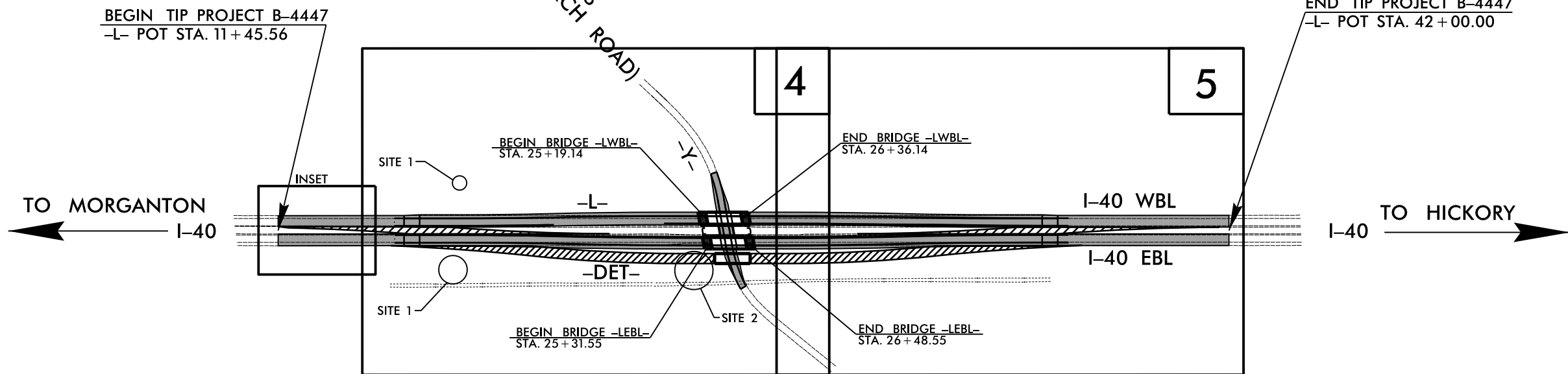
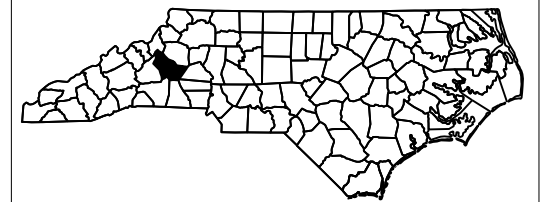
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BURKE COUNTY

LOCATION: BRIDGES 160 & 162 ON I-40 OVER SR 1758
(BEREA CHURCH ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4447	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
38371.1.1	BRNHS-40-1(159)115	PE	
38371.2.1		R/W	
38371.2.2		UTILITIES	



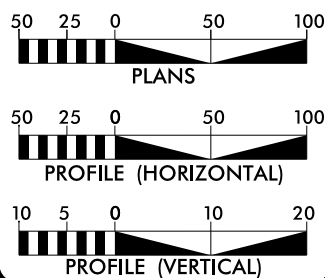
WETLAND AND SURFACE WATER IMPACTS PERMIT

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
THIS IS A FULL CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

PERMIT DRAWING
SHEET 1 OF 6

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2017 = 47,075
ADT 2040 = 57,600
K = 55 %
D = 9 %
T = 15 % *
V = 70 MPH
* 10% TTST = 5% DUAL
FUNC CLASS =
INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-4447 = 0.556 MILE
LENGTH OF STRUCTURE TIP PROJECT B-4447 = 0.022 MILE
TOTAL LENGTH OF TIP PROJECT B-4447 = 0.578 MILE

Prepared in the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
DECEMBER 22, 2016

LETTING DATE:
JUNE 20, 2017

KEVIN E. MOORE, PE
PROJECT ENGINEER

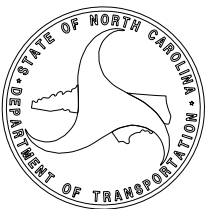
NATHAN N. ADIMA, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN
ENGINEER

SIGNATURE: _____ P.E.



INSET A

DENOTES IMPACTS IN SURFACE WATER

BEGIN TIP PROJECT B-4447
-L- POT STA. 11+45.56

SITE 1 (LEFT SIDE OF L-)
PERMANENT STREAM
IMPACTS

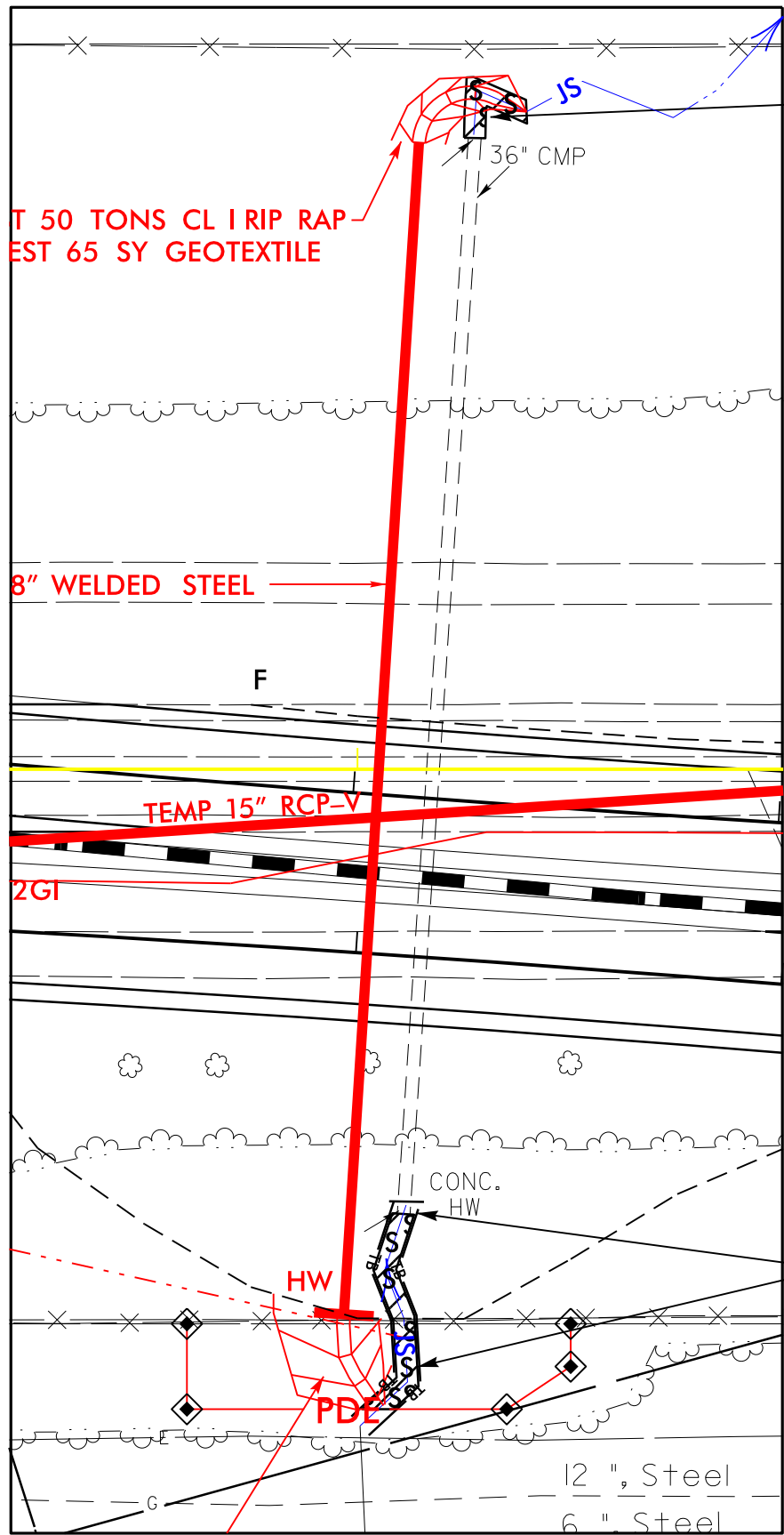
**SITE 1 (RIGHT SIDE OF -L-)
PERMANENT STREAM
IMPACTS**

NO. 2 - SITE 2 PERMANENT STREAM IMPACTS & BANK STABILIZATION

**PERMIT DRAWING
SHEET 3 OF 6**

SEE SHEET 6 FOR -LWBL- PROFILE
SEE SHEET 7 FOR -LEBL- PROFILE
SEE SHEET 9 FOR EXIST. -Y- PROFILE
SEE SHEETS S01-1 THRU S01-28 FOR -LWBL- STRUCTURE PLANS
SEE SHEETS S02-1 THRU S02-28 FOR -LEBL- STRUCTURE PLANS
SEE SHEETS C-1 THRU C-6 FOR CULVERT PLANS

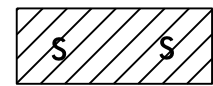
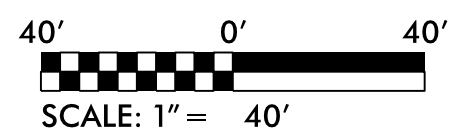
PAVEMENT/BRIDGE RELATIONSHIP SKETCH (NTS)



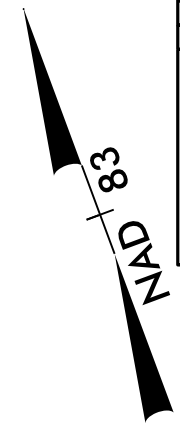
SITE 1

PERM IMPACTS
(CLASS I RIP RAP
IN NEW CHANNEL
NOT SHOWN
FOR CLARITY)

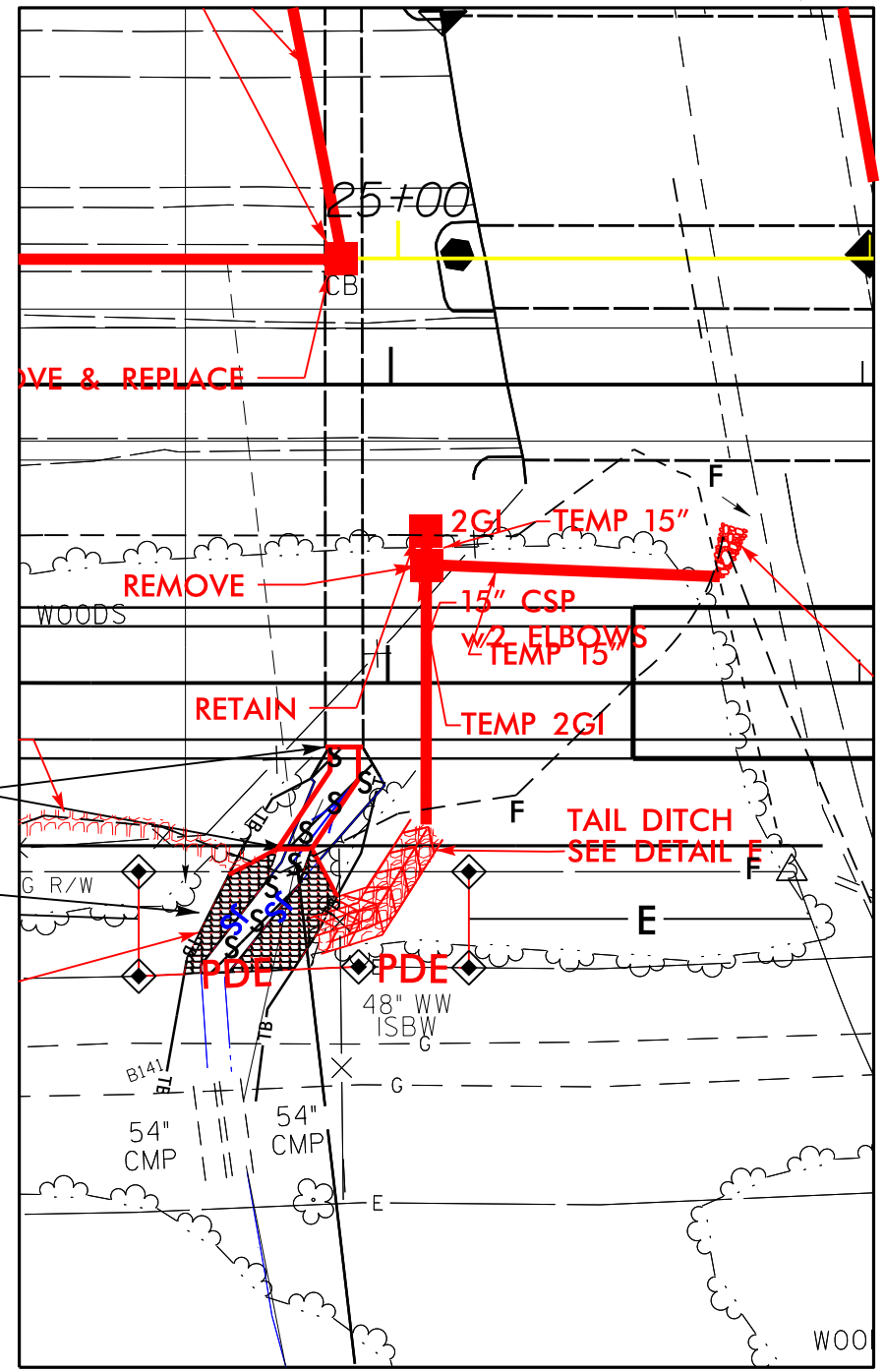
PERM IMPACTS
(CLASS I RIP RAP
IN NEW CHANNEL
NOT SHOWN
FOR CLARITY)



DENOTES IMPACTS IN
SURFACE WATER

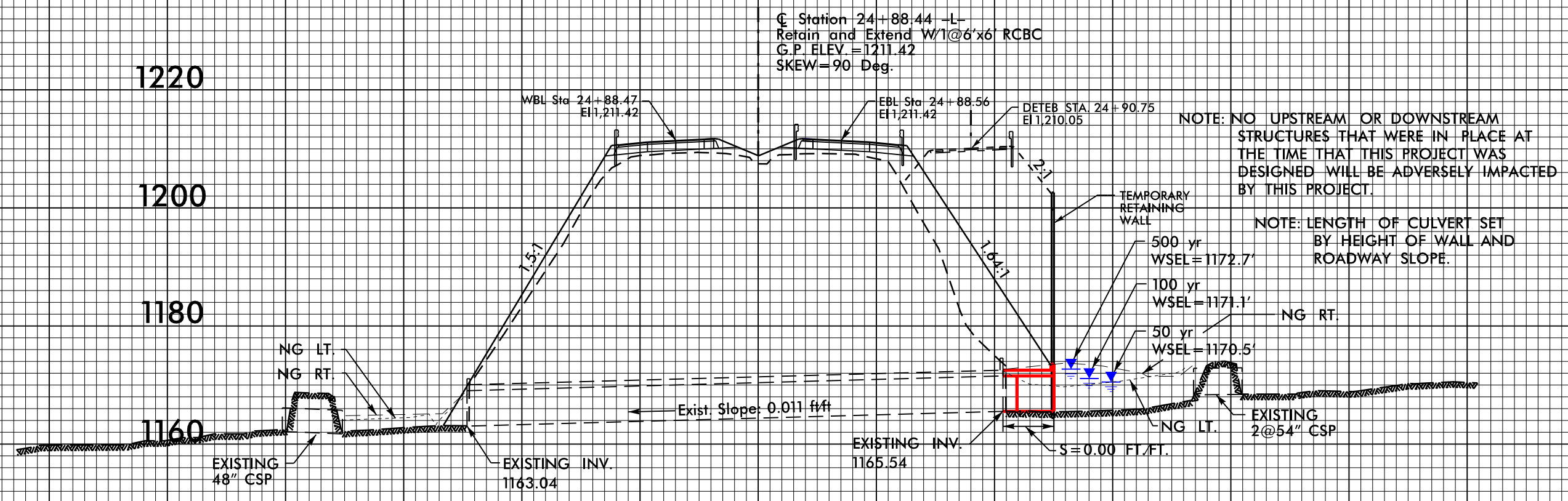


PROJECT REFERENCE NO.		SHEET NO.	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION			

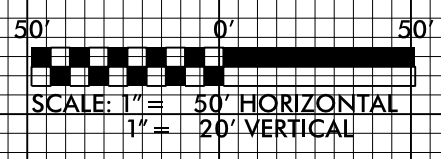


SITE 2

250' 200' 150' 100' 50' C 50' 100' 150' 200' 250'



PROFILE

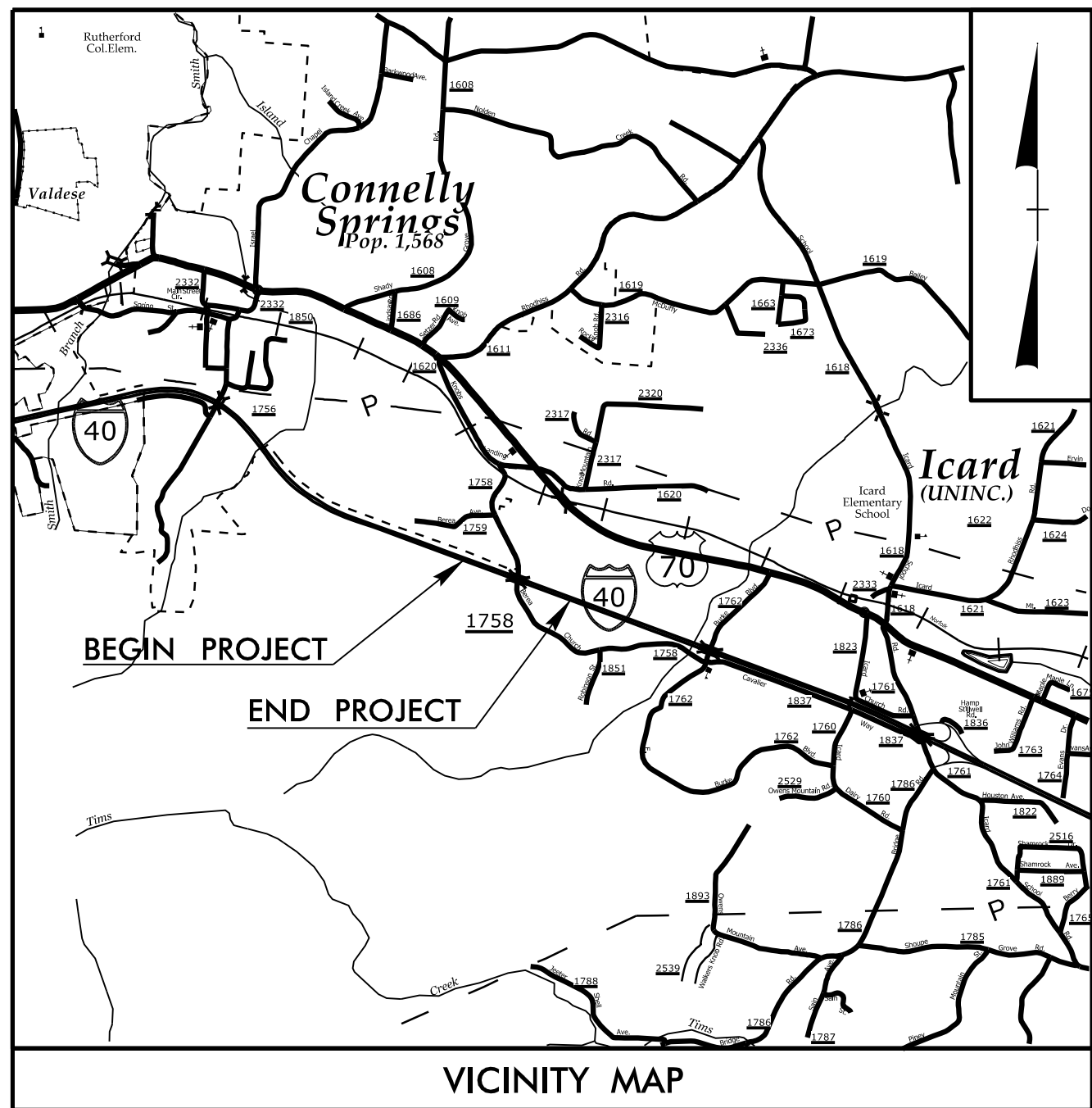


PERMIT DRAWING
SHEET 5 OF 6

09/08/99

T.I.P PROJECT: B-4447

CONTRACT: C203935



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

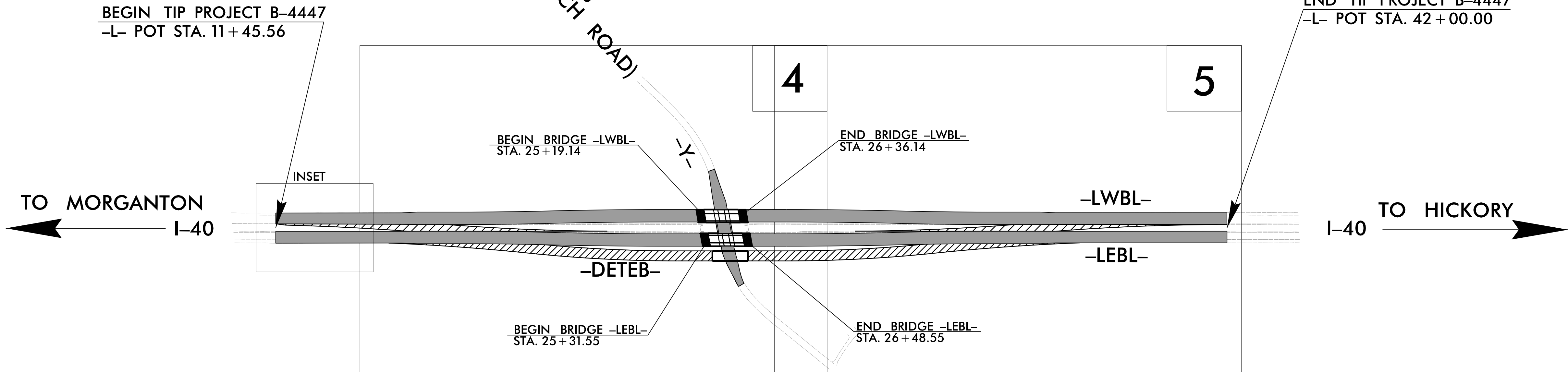
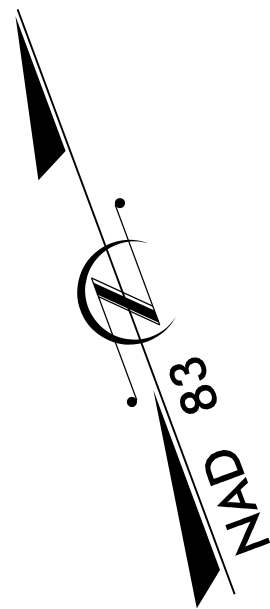
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BURKE COUNTY

LOCATION: BRIDGE NOS.160 & 162 ON I-40 OVER SR 1758
(BEREA CHURCH ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, CULVERT,
TEMPORARY RETAINING WALLS AND STRUCTURES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4447	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
38371.1.1	BRNHS-40-1(159)115	PE	
38371.2.1		ROW	
38371.2.2		UTILITY	
38371.3.1		CONSTRUCTION	



THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



PLANS



PROFILE (HORIZONTAL)



PROFILE (VERTICAL)

DESIGN DATA

2017 ADT = 47,075
2037 ADT = 56,230
K = 55%
D = 9%
T = 15% *
V = 70 MPH
*(TTST 10% + DUAL 5%)

FUNC. CLASS. = INTERSTATE

STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT B-4447 = 0.556 mi.
LENGTH STRUCTURES TIP PROJECT B-4447 = 0.022 mi.
TOTAL LENGTH TIP PROJECT B-4447 = 0.578 mi.

STRUCTURE LENGTH BASED ON -LEBL- BRIDGE

Prepared in the Offices of:



STEWART
421 FAYETTEVILLE ST., STE 400
RALEIGH, NC 27601
T 919.380.8730
Firm License #: C-1051
www.stewartinc.com
PROJECT # H15013.00

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
DECEMBER 22, 2016

LETTING DATE:
JUNE 20, 2017

ANDY YOUNG, PE
PROJECT ENGINEER

MICHAEL BURNS, EI
PROJECT DESIGN ENGINEER

GARY R. LOVERING, PE
NCDOT CONTACT

HYDRAULICS ENGINEER

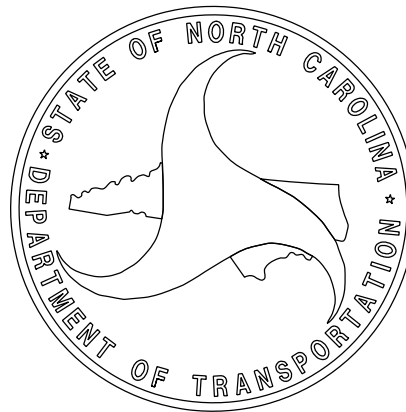


SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER



SIGNATURE: _____ P.E.



5/3/2017
\\Roadway\Proj\B4447_Rdy_tsh.dgn
USER:fkay

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

INDEX OF SHEETS, GENERAL NOTES, AND LIST OF
STANDARD DRAWINGS

PROJECT REFERENCE NO.
B-4447

SHEET NO.
1A

ROADWAY DESIGN
ENGINEER




STEWART

Perm License No. C-1051
421 Fayetteville St.
Raleigh, NC 27603
919-380-8722
www.stewartinc.com

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EFF. 01-17-2012
REV. 02-29-2016

INDEX OF SHEETS		2012 ROADWAY ENGLISH STANDARD DRAWINGS
SHEET NUMBER	SHEET	
1	TITLE SHEET	The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2012 are applicable to this project and by reference hereby are considered a part of these plans:
1A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS	STD.NO. TITLE
1B	CONVENTIONAL SYMBOLS	DIVISION 2 - EARTHWORK 200.02 Method of Clearing - Method II 225.01 Guide for Grading Subgrade - Interstate and Freeway 225.02 Guide for Grading Subgrade - Secondary and Local 225.04 Method of Obtaining Superelevation - Two Lane Pavement 225.05 Method of Obtaining Superelevation - Divided Highways
1C-1 THRU 1C-2	SURVEY CONTROL DATA SHEETS	DIVISION 3 - PIPE CULVERTS 300.01 Method of Pipe Installation
2A-1 THRU 2A-4	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS	DIVISION 4 - MAJOR STRUCTURES 422.10 Reinforced Bridge Approach Fills
2B-1 THRU 2B-4	DETOUR PLAN SHEETS	DIVISION 5 - SUBGRADE, BASES AND SHOULDERS 560.01 Method of Shoulder Construction - High Side of Superelevated Curve - Method I 560.02 Method of Shoulder Construction - High Side of Superelevated Curve - Method II
2C-1	GUARDRAIL EXTRA LENGTH POST DETAIL	DIVISION 6 - ASPHALT BASES AND PAVEMENTS 654.01 Pavement Repairs 665.01 Asphalt Shoulders - Milled Rumble Strips
2C-2	TEMPORARY B-77 DETAIL	DIVISION 8 - INCIDENTALS 815.02 Subsurface Drain 838.01 Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew 838.11 Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew 840.00 Concrete Base Pad for Drainage Structures 840.04 Concrete Open Throat Catch Basin - 12" thru 48" Pipe 840.05 Brick Open Throat Catch Basin - 12" thru 48" Pipe 840.18 Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe 840.20 Frames and Wide Slot Flat Grates 840.22 Frames and Wide Slot Sag Grates 840.25 Anchorage for Frames - Brick or Concrete or Precast 840.27 Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe 840.29 Frames and Narrow Slot Flat Grates 840.31 Concrete Junction Box - 12" thru 66" Pipe 840.32 Brick Junction Box - 12" thru 66" Pipe 840.45 Precast Drainage Structure 840.54 Manhole Frame and Cover 840.66 Drainage Structure Steps 840.72 Pipe Collar 846.01 Concrete Curb, Gutter and Curb & Gutter 846.04 Drop Inlet Installation in Shoulder Berm Gutter 862.01 Guardrail Placement 862.02 Guardrail Installation 862.03 Structure Anchor Units 862.04 Anchoring End of Guardrail - B-77 and B-83 Anchor Units 866.02 Woven Wire Fence - with Wood Post 876.01 Rip Rap in Channels 876.02 Guide for Rip Rap at Pipe Outlets
2C-3	NG 25 DETAIL	
2C-4	SLOTTED DRAIN DETAIL	
2C-5	TEMPORARY STEEL COVER DETAIL	
2C-6	GUIDE FOR PAVING SHOULDERS UNDER BRIDGES DETAIL	
2G-1 THRU 2G-4	TEMPORARY SHORING DETAILS	
3B-1	ROADWAY SUMMARIES	
3D-1 THRU 3D-2	DRAINAGE SUMMARY	
3G-1	GEOTECHNICAL SUMMARY	
3P-1	PARCEL INDEX SHEET	
4 THRU 5	PLAN SHEETS	
6 THRU 9	PROFILE SHEETS	
TMP-1 THRU TMP-14A	TRAFFIC MANAGEMENT PLANS	
PMP-1 THRU PMP-3	PAVEMENT MARKING PLANS	
EC-1 THRU EC-12	EROSION CONTROL PLANS	
RF-1	REFORESTATION PLAN	
SIGN-1 THRU SIGN-5	SIGNING PLANS	
UO-1 THRU UO-2	UTILITY BY OTHERS PLANS	
X-1A	CROSS-SECTION SUMMARY SHEET	
X-1 THRU X-36	CROSS-SECTIONS	
S01-1 THRU S01-28	STRUCTURE PLANS (-LWBL-)	
S02-1 THRU S02-28	STRUCTURE PLANS (-LEBL-)	
C-1 THRU C-6	CULVERT PLANS	

GENERAL NOTES: 2012 SPECIFICATIONS
EFFECTIVE: 01-17-2012
REVISED: 10-31-2014

GRADE LINE:
GRADING AND SURFACING:

THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

SUPERELEVATION:

ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 & STD. NO. 225.05 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:

ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01 & STD. NO. 560.02.

SUBSURFACE DRAINS:

SUBSURFACE DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.02 AT LOCATIONS DIRECTED BY THE ENGINEER.

GUARDRAIL:

THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

TEMPORARY SHORING:

SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

END BENTS:

THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:

UTILITY OWNERS ON THIS PROJECT ARE

Duke Energy
Icard Township Water

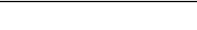
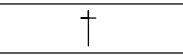
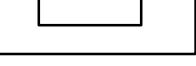
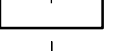
ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

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	
Computed Property Corner	
Property Monument	
Parcel/Sequence Number	
Existing Fence Line	
Proposed Woven Wire Fence	
Proposed Chain Link Fence	
Proposed Barbed Wire Fence	
Existing Wetland Boundary	
Proposed Wetland Boundary	
Existing Endangered Animal Boundary	
Existing Endangered Plant Boundary	
Existing Historic Property Boundary	
Known Contamination Area: Soil	
Potential Contamination Area: Soil	
Known Contamination Area: Water	
Potential Contamination Area: Water	
Contaminated Site: Known or Potential	

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

Stream or Body of Water	
Hydro, Pool or Reservoir	
Jurisdictional Stream	
Buffer Zone 1	
Buffer Zone 2	
Flow Arrow	
Disappearing Stream	
Spring	
Wetland	
Proposed Lateral, Tail, Head Ditch	
False Sump	

RAILROADS:

Standard Gauge	
RR Signal Milepost	
Switch	
RR Abandoned	
RR Dismantled	

RIGHT OF WAY & PROJECT CONTROL:

Secondary Horiz and Vert Control Point	
Primary Horiz Control Point	
Primary Horiz and Vert Control Point	
Exist Permanent Easment Pin and Cap	
New Permanent Easement Pin and Cap	
Vertical Benchmark	
Existing Right of Way Marker	
Existing Right of Way Line	
New Right of Way Line	
New Right of Way Line with Pin and Cap	
New Right of Way Line with Concrete or Granite RW Marker	
New Control of Access Line with Concrete C/A Marker	
Existing Control of Access	
New Control of Access	
Existing Easement Line	
New Temporary Construction Easement	
New Temporary Drainage Easement	
New Permanent Drainage Easement	
New Permanent Drainage /Utility Easement	
New Permanent Utility Easement	
New Temporary Utility Easement	
New Aerial Utility Easement	

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	
Existing Curb	
Proposed Slope Stakes Cut	
Proposed Slope Stakes Fill	
Proposed Curb Ramp	
Existing Metal Guardrail	
Proposed Guardrail	
Existing Cable Guiderail	
Proposed Cable Guiderail	
Equality Symbol	
Pavement Removal	

VEGETATION:

Single Tree	
Single Shrub	

Note: Not to Scale

*S.U.E. = Subsurface Utility Engineering

Hedge	
Woods Line	
Orchard	
Vineyard	

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	
Bridge Wing Wall, Head Wall and End Wall	
MINOR:	
Head and End Wall	
Pipe Culvert	
Footbridge	
Drainage Box: Catch Basin, DI or JB	
Paved Ditch Gutter	
Storm Sewer Manhole	
Storm Sewer	

UTILITIES:

POWER:	
Existing Power Pole	
Proposed Power Pole	
Existing Joint Use Pole	
Proposed Joint Use Pole	
Power Manhole	
Power Line Tower	
Power Transformer	
U/G Power Cable Hand Hole	
H-Frame Pole	
U/G Power Line LOS B (S.U.E.*)	
U/G Power Line LOS C (S.U.E.*)	
U/G Power Line LOS D (S.U.E.*)	

TELEPHONE:

Existing Telephone Pole	
Proposed Telephone Pole	
Telephone Manhole	
Telephone Pedestal	
Telephone Cell Tower	
U/G Telephone Cable Hand Hole	
U/G Telephone Cable LOS B (S.U.E.*)	
U/G Telephone Cable LOS C (S.U.E.*)	
U/G Telephone Cable LOS D (S.U.E.*)	
U/G Telephone Conduit LOS B (S.U.E.*)	
U/G Telephone Conduit LOS C (S.U.E.*)	
U/G Telephone Conduit LOS D (S.U.E.*)	
U/G Fiber Optics Cable LOS B (S.U.E.*)	
U/G Fiber Optics Cable LOS C (S.U.E.*)	
U/G Fiber Optics Cable LOS D (S.U.E.*)	

WATER:

Water Manhole	
Water Meter	
Water Valve	
Water Hydrant	
U/G Water Line LOS B (S.U.E.*)	
U/G Water Line LOS C (S.U.E.*)	
U/G Water Line LOS D (S.U.E.*)	
Above Ground Water Line	

TV:

TV Pedestal	
TV Tower	
U/G TV Cable Hand Hole	
U/G TV Cable LOS B (S.U.E.*)	
U/G TV Cable LOS C (S.U.E.*)	
U/G TV Cable LOS D (S.U.E.*)	
U/G Fiber Optic Cable LOS B (S.U.E.*)	
U/G Fiber Optic Cable LOS C (S.U.E.*)	
U/G Fiber Optic Cable LOS D (S.U.E.*)	

GAS:

Gas Valve	
Gas Meter	
U/G Gas Line LOS B (S.U.E.*)	
U/G Gas Line LOS C (S.U.E.*)	
U/G Gas Line LOS D (S.U.E.*)	
Above Ground Gas Line	

SANITARY SEWER:

Sanitary Sewer Manhole	
Sanitary Sewer Cleanout	
U/G Sanitary Sewer Line	
Above Ground Sanitary Sewer	
SS Forced Main Line LOS B (S.U.E.*)	
SS Forced Main Line LOS C (S.U.E.*)	
SS Forced Main Line LOS D (S.U.E.*)	

MISCELLANEOUS:

Utility Pole	
Utility Pole with Base	
Utility Located Object	
Utility Traffic Signal Box	
Utility Unknown U/G Line LOS B (S.U.E.*)	
U/G Tank; Water, Gas, Oil	
Underground Storage Tank, Approx. Loc.	
A/G Tank; Water, Gas, Oil	
Geoenvironmental Boring	
U/G Test Hole LOS A (S.U.E.*)	
Abandoned According to Utility Records	
End of Information	

SURVEY CONTROL SHEET B-4447
FINAL

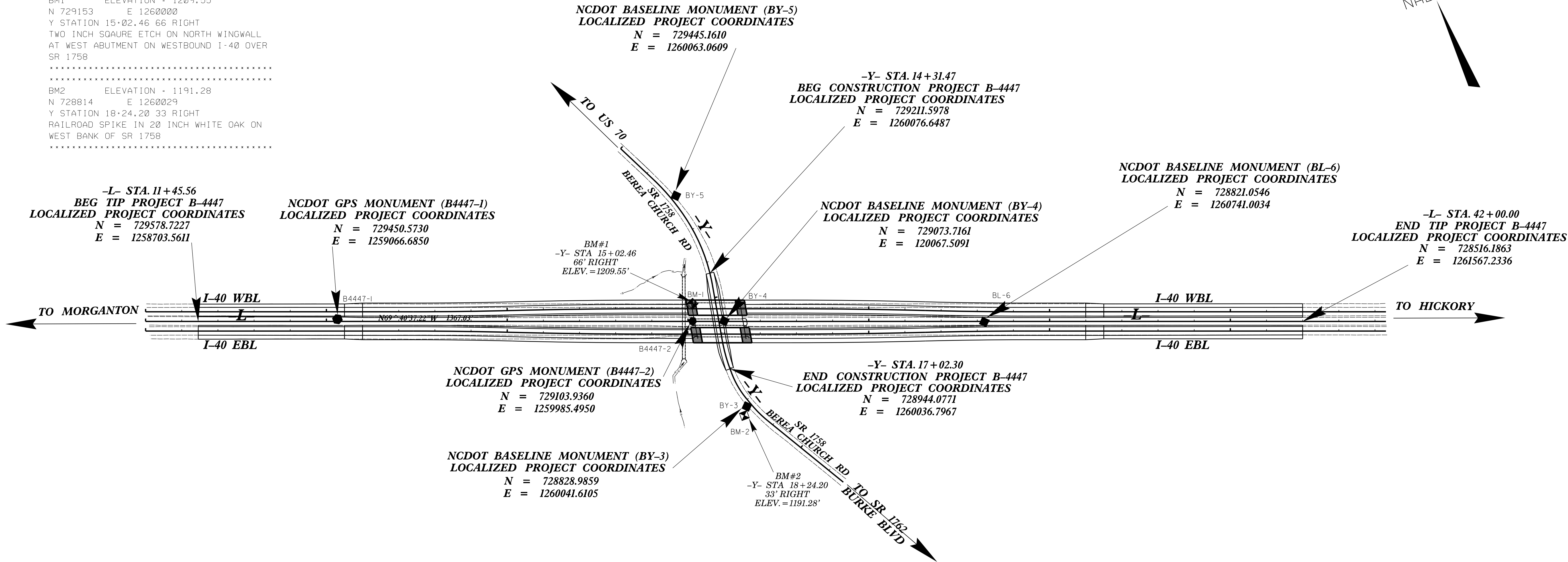
PROJECT REFERENCE NO.	SHEET NO.
B-4447	1C-1
Location and Surveys	

BL	POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1		B4447-1	729450.5730	1259066.6850	1232.71	15+30.58	6.17 LT
2		B4447-2	729103.9360	1259985.4950	1209.43	25+12.59	0.81 LT
6		BL-6	728821.0546	1260741.0034	1203.81	33+19.32	1.59 RT

BY	POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
5		BY-5	729445.1610	1260063.0609	1168.48	11+99.14	14.80 LT
4		BY-4	729073.7161	1260067.5091	1183.74	15+68.79	14.55 LT
3		BY-3	728828.9859	1260041.6105	1193.32	18+14.61	15.91 RT

BM1 ELEVATION = 1209.55
N 729153 E 1260000
Y STATION 15+02.46 66 RIGHT
TWO INCH SQAURE ETCH ON NORTH WINGWALL
AT WEST ABUTMENT ON WESTBOUND I-40 OVER
SR 1758

BM2 ELEVATION = 1191.28
N 728814 E 1260029
Y STATION 18+24.20 33 RIGHT
RAILROAD SPIKE IN 20 INCH WHITE OAK ON
WEST BANK OF SR 1758



NOTES:

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
[HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/](http://www.doh.dot.state.nc.us/preconstruct/highway/location/project/)

THE FILES TO BE FOUND ARE AS FOLLOWS:
B4447_LS_CONTROL.TXT

SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

- INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING SERVICE (OPUS)

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "B4447-2" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 729103.9360(±) EASTING: 1259985.4950(±) ELEVATION: 1209.43(±) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999856593 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "B4447-2" TO -L- STATION 11+45.56 IS N69°40'37.22"W 1367.03' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

(DESIGN ALIGNMENTS)

LWBL			
TYPE	STATION	NORTH	EAST
POT	10+00.00	729654.4374	1258576.3976
PC	17+40.23	729396.9374	1259270.3934
PRC	20+14.03	729304.9854	1259528.2858
PT	23+85.07	729180.3775	1259877.7662
PC	27+85.07	729041.2310	1260252.7839
PRC	31+56.11	728907.7220	1260598.9617
PT	34+29.91	728809.2016	1260854.4170
POT	44+30.35	728461.1834	1261792.3711

Y			
TYPE	STATION	NORTH	EAST
POT	10.00.00	729620.7057	1259965.0706
PC	11.26.19	729507.5542	1260020.9434
PT	12.76.26	729365.9978	1260069.4945
PC	12.77.50	729364.7764	1260069.7448
PT	14.64.68	729178.7481	1260071.8197
PC	16.22.08	729023.8845	1260043.6645
PT	16.97.23	728949.1509	1260036.8120
PC	17.12.88	728933.4946	1260036.7646
PT	17.99.04	728849.0128	1260051.3256
PC	18.21.27	728828.0861	1260058.8316
PT	18.81.33	728773.7916	1260084.2946
POT	21.51.39	728541.1474	1260221.4365

PERMANENT EASEMENTS IRON PIN AND CAP				
ALIGN	STATION	OFFSET	NORTH	EAST
L	16+60.00	130.00	729277.8857	1259140.6488
L	16+60.00	150.00	729259.1348	1259133.6915
L	17+35.00	150.00	729233.0448	1259204.0073
L	17+50.00	130.00	729246.5777	1259225.0278
L	17+50.00	140.00	729237.2023	1259221.5491
L	24+45.00	130.00	729004.8107	1259876.6210
L	24+45.00	152.13	728984.0628	1259868.9227
L	24+91.61	150.15	728969.7063	1259913.3150
L	25+15.00	130.00	728980.4601	1259942.2491
L	25+15.00	150.36	728961.3741	1259935.1674

NOTE: DRAWING NOT TO SCALE

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT
IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY
NCDOT FOR MONUMENT "B4447-2"
WITH NAD 83 STATE PLANE GRID COORDINATES OF
NORTHING: 729103.9360(±) EASTING: 1259985.4950(±)
ELEVATION: 1209.43(±)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT
(GROUND TO GRID) IS: 0.999856593
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"B4447-2" TO -L- STATION 11+45.56 IS
N69°40'37.22"W 1367.03'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88



B-4447

2A-1

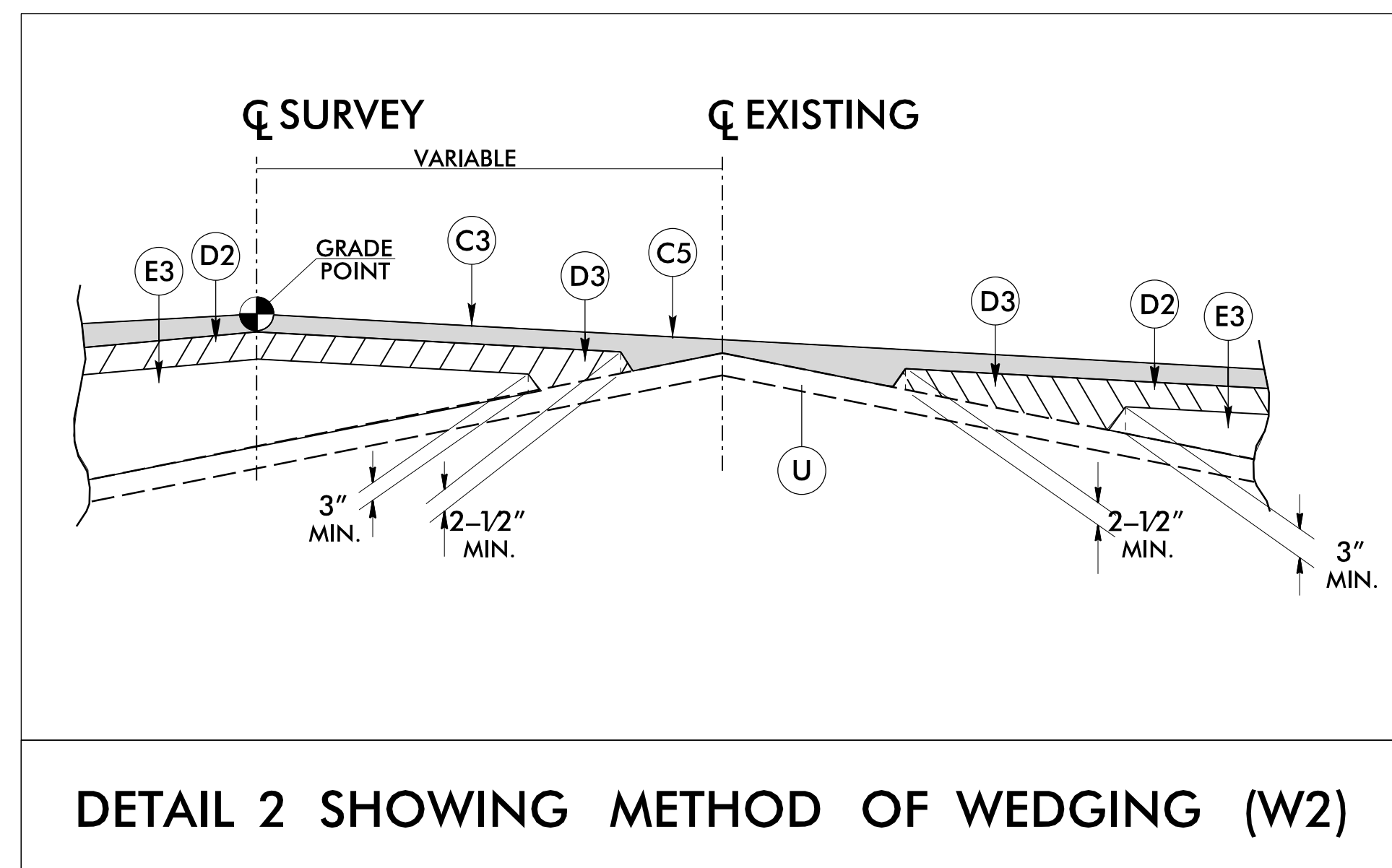
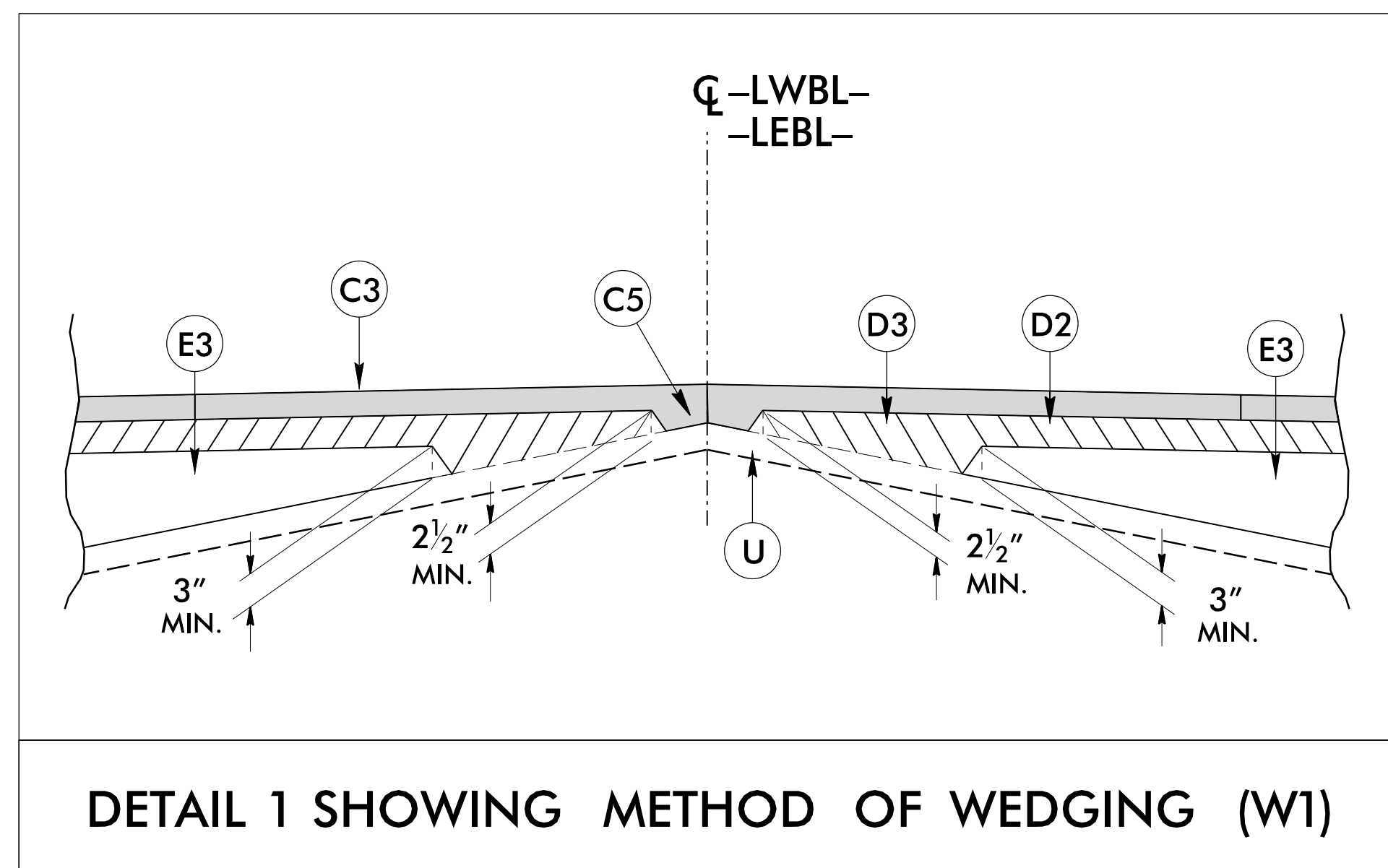
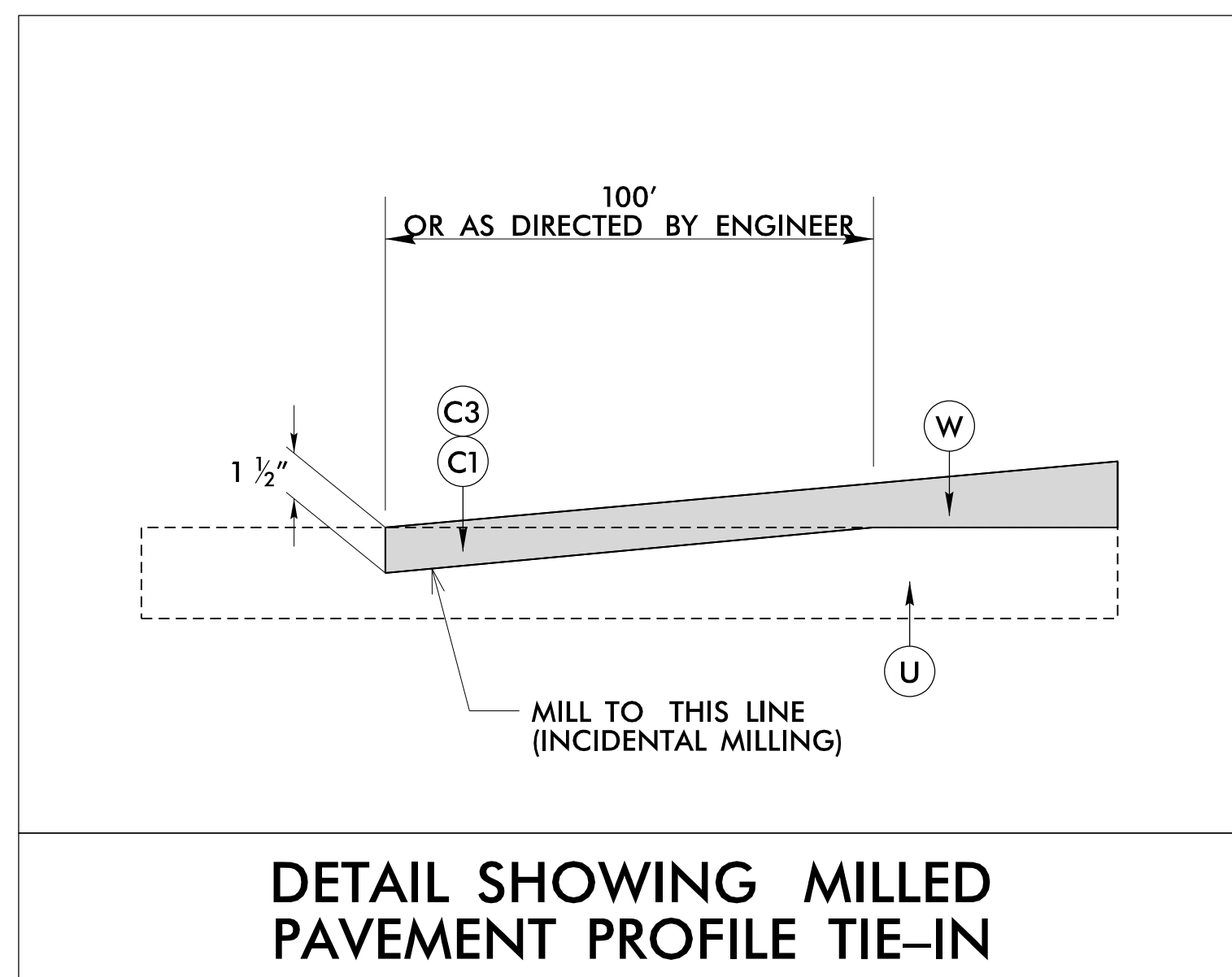
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**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

PAVEMENT SCHEDULE
(FINAL)

PAVEMENT SCHEDULE (FINAL)			
C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.	E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
C2	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	E4	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
C3	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	J	PROP. 8" AGGREGATE BASE COURSE.
C4	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	M	MILLED RUMBLE STRIPS (SEE STANDARD 665.01 AND PLANS FOR LOCATIONS)
C5	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5D, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.	R1	SHOULDER BERM GUTTER
D1	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.	T	EARTH MATERIAL.
D2	PROP. APPROX. 3½" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0D, AT AN AVERAGE RATE OF 399 LBS. PER SQ. YD.	U	EXISTING PAVEMENT.
D3	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0D, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.	V	MILLING BITUMINOUS PAVEMENT. 1.5" DEPTH.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.	W1	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL 1)
E2	PROP. APPROX. 15" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD. IN EACH OF THREE LAYERS.	W2	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL 2)

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



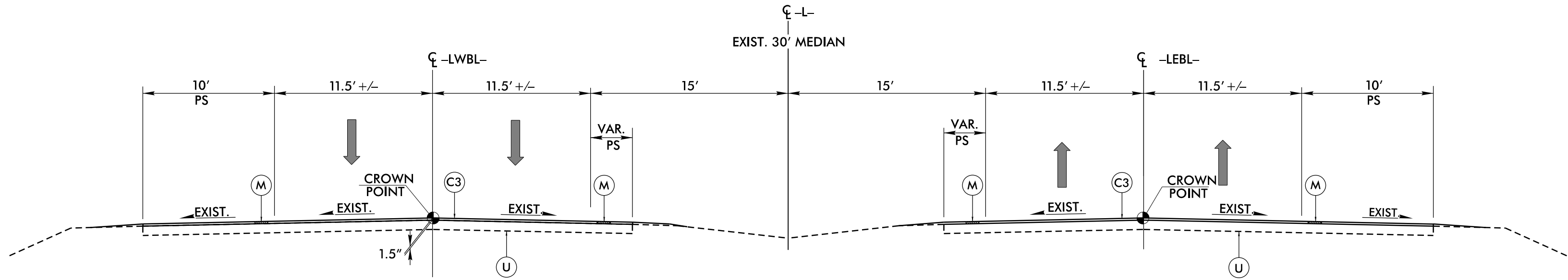
6/2/99

PAVEMENT SCHEDULE	
(FINAL PAVEMENT DESIGN)	
C3	1 1/2" S9.5D
C4	3" S9.5D
D2	3 1/2" I19.0D
E2	15" B25.0C
M	MILLED RUMBLE STRIPS
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W1	WEDGING(DETAIL 1)

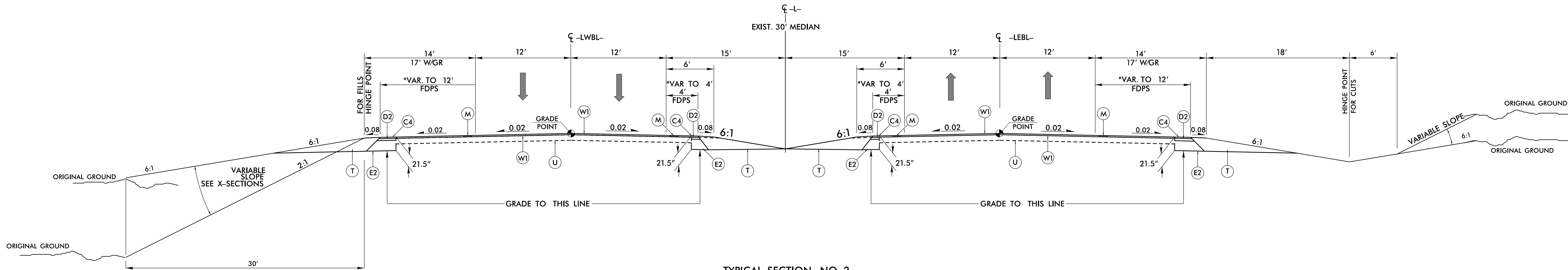
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



PROJECT REFERENCE NO.		SHEET NO.	
B-4447		2A-2	
ROADWAY DESIGN ENGINEER 		PAVEMENT DESIGN ENGINEER 	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			



TYPICAL SECTION NO. 1
-LWBL- & -LEBL- STA. 11+45.56 TO 15+50.00
-LWBL- & -LEBL- STA. 36+50.00 TO 42+00.00



TYPICAL SECTION NO. 2
-LWBL- & -LEBL- STA. 15+50.00 TO 17+40.23
-LWBL- & -LEBL- STA. 34+29.91 TO 36+50.00

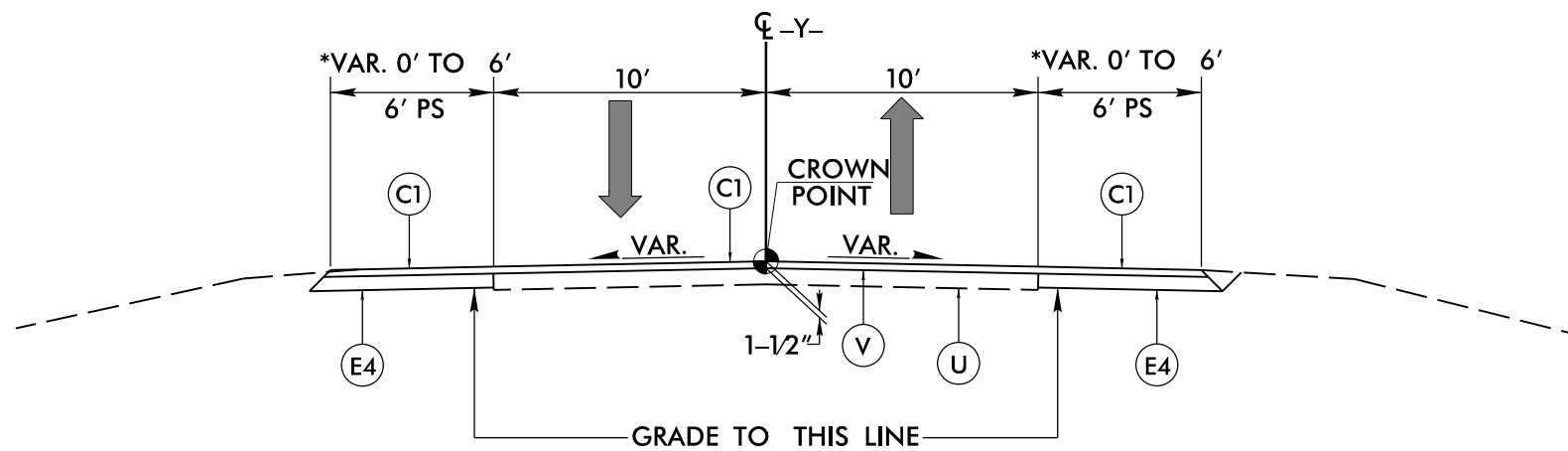
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6/2/99

5/3/2017 11:56:00 AM C:\Users\prou\OneDrive\Documents\B4447_Rdy_tup.dgn

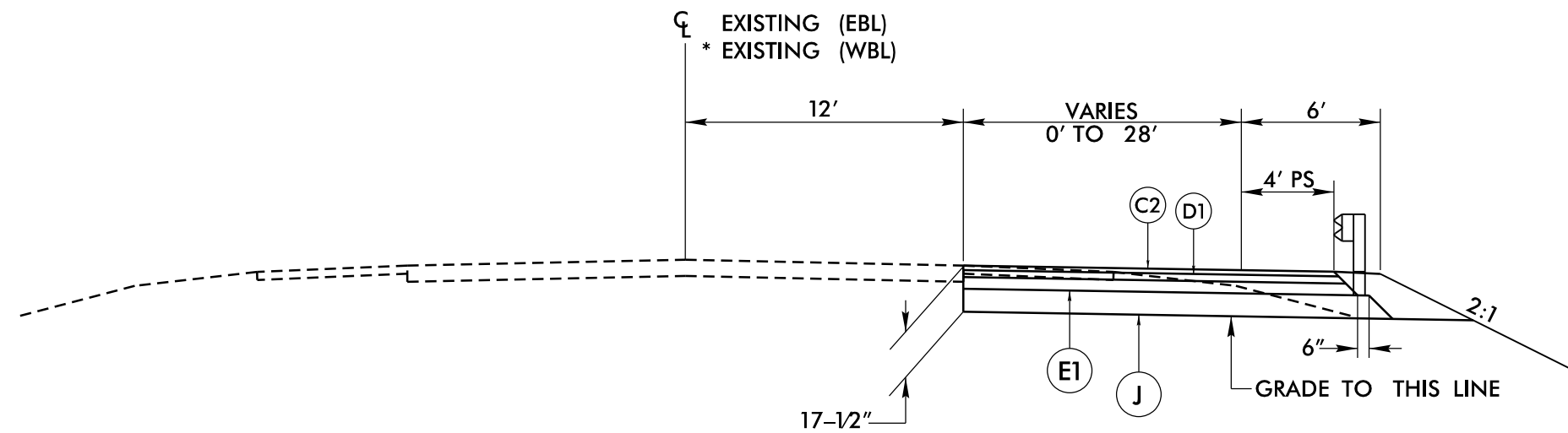
PAVEMENT SCHEDULE (FINAL PAVEMENT DESIGN)	
C1	1½" SF9.5A
C2	1½" S9.5C
D1	3" I19.0C
E1	5" B25.0C
E4	4" B25.0C
J	8" ABC
M	RUMBLE STRIPS
T	EARTH MATERIAL
U	EXIST. PAVEMENT
V	1½" MILLING

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



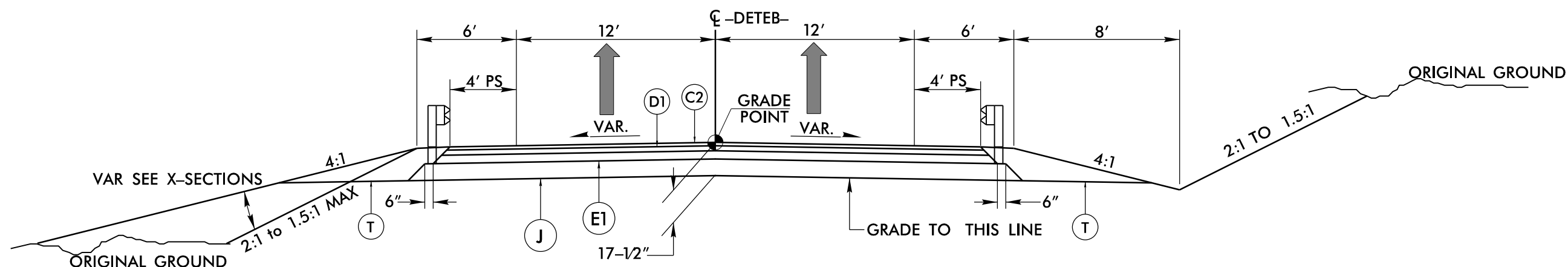
TYPICAL SECTION NO. 5

*-Y- STA. 14+31.47 TO -Y- STA. 14+79.47
-Y- STA. 14+79.47 TO -Y- STA. 16+54.30
*-Y- STA. 16+54.30 TO -Y- STA. 17+02.30



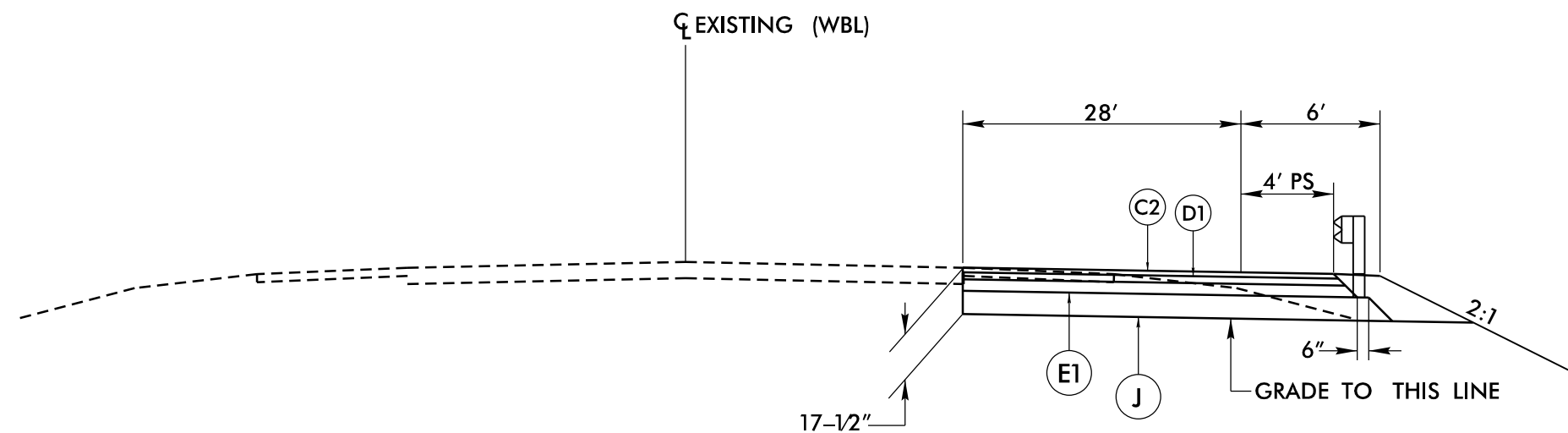
TYPICAL SECTION NO. 6

-DETEB- STA. 12+18.44 TO -DETEB- STA. 17+99.67
-DETEB- STA. 34+33.89 TO -DETEB- STA. 40+85.80
*-DETEWB- STA. 11+45.80 TO -DETEWB- STA. 15+35.27
*-DETEWB- STA. 36+51.00 TO -DETEWB- STA. 42+00.00



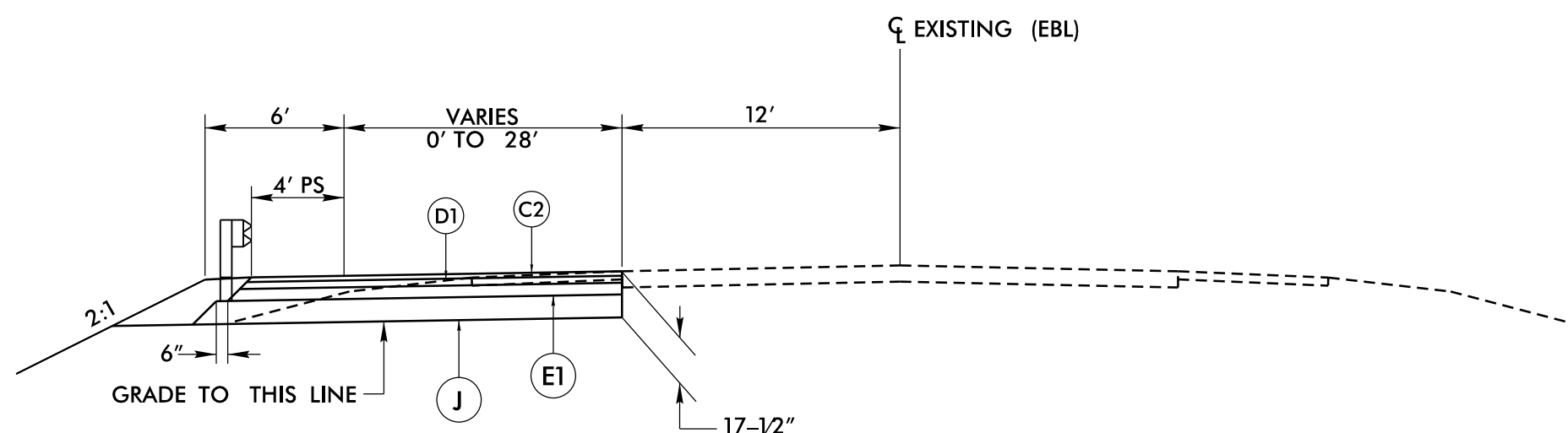
TYPICAL SECTION NO. 7

-DETEB- STA. 17+99.67 TO -DETEB- STA. 25+52 +/- (BEGIN BRIDGE)
-DETEB- STA. 26+57 +/- (END BRIDGE) TO -DETEB- STA. 34+33.89



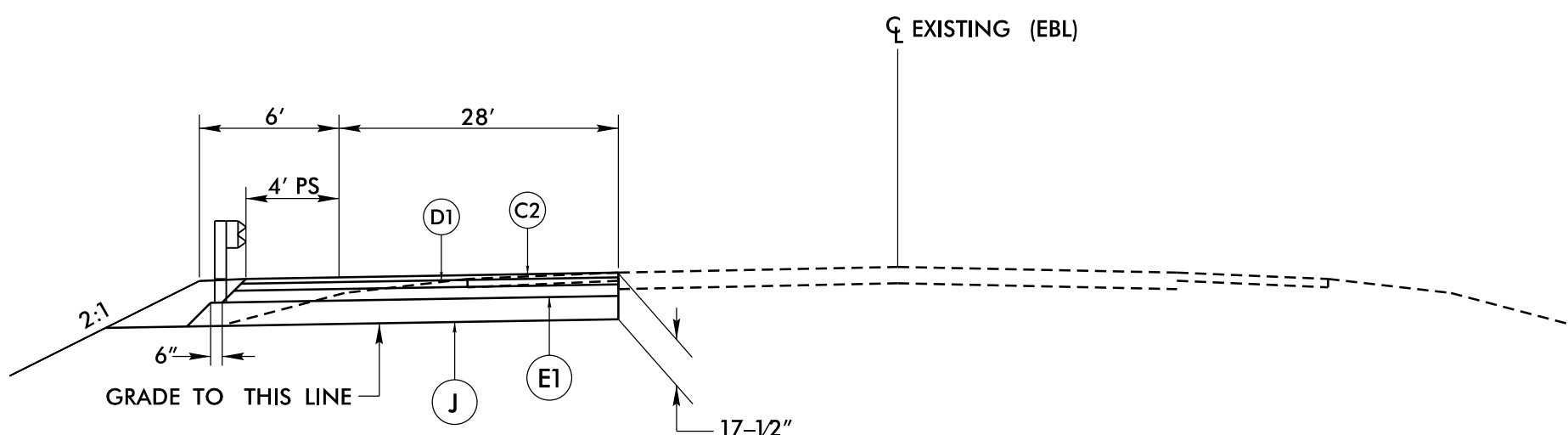
TYPICAL SECTION NO. 8

-DETEWB STA. 15+35.27 TO -DETEWB STA. 16+41.19



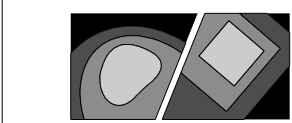
TYPICAL SECTION NO. 9

-DETEWB STA. 16+41.19 TO -DETEWB STA. 22+01.45
-DETEWB- STA. 30+07.34 TO -DETEWB- STA. 35+78.15



TYPICAL SECTION NO. 10

-DETEWB- STA. 35+78.15 TO -DETEWB- STA. 36+51.00



STEWART

Firm License No. C-1051
421 Fayetteville St.
Suite 400
Raleigh, NC 27601
T 919.380.8750
www.stewartinc.com

PROJECT REFERENCE NO.

B-4447

SHEET NO.

2A-4

ROADWAY DESIGN

ENGINEER

SEAL

034407

ANDREW P. YOUNG

ENGINEER

PAVEMENT DESIGN

ENGINEER

SEAL

22896

CLARK S. MORTIMER

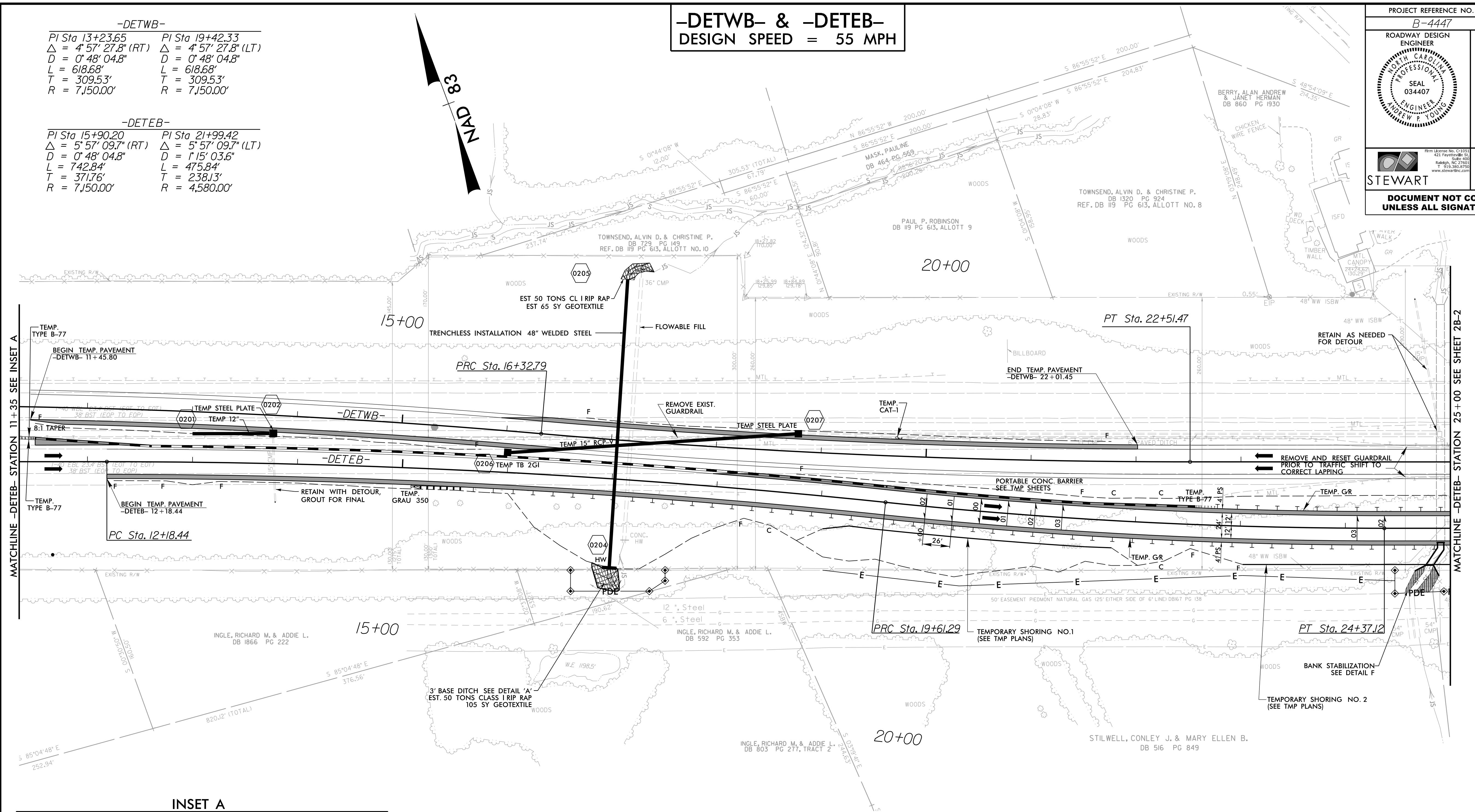
ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

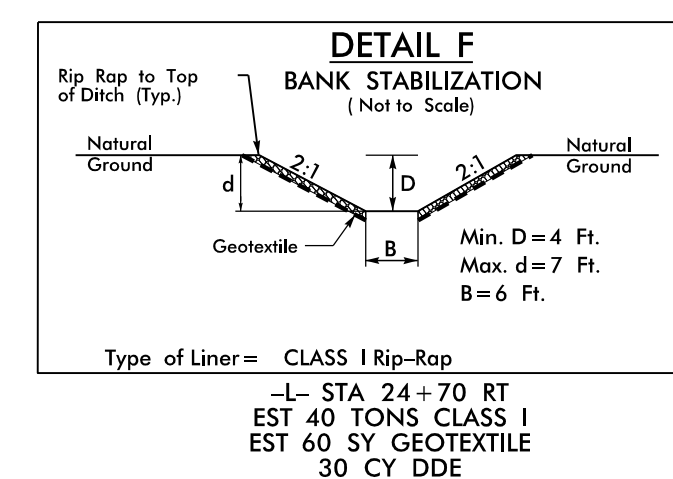
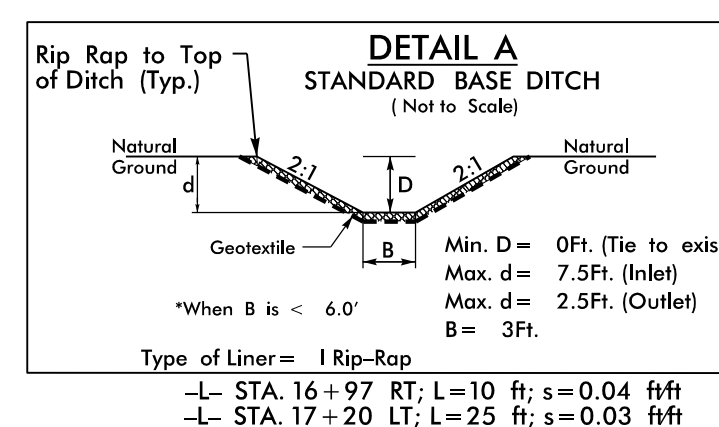
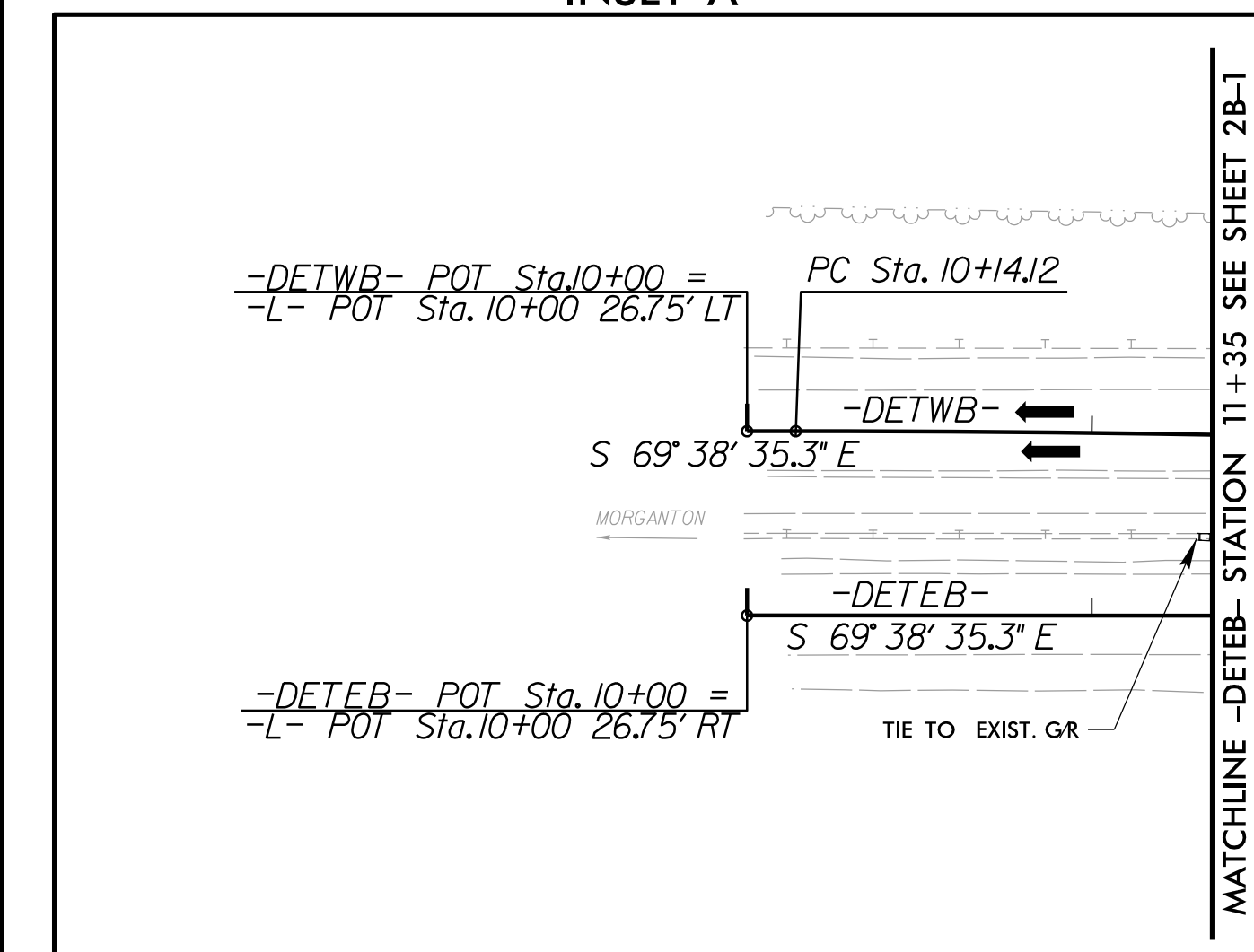
–DETWB– & –DETEB–
DESIGN SPEED = 55 MPH

<i>-DETWB-</i>	
<i>PI Sta 13+23.65</i>	<i>PI Sta 19+42.33</i>
$\Delta = 4^{\circ} 57' 27.8" (RT)$	$\Delta = 4^{\circ} 57' 27.8" (LT)$
$D = 0^{\circ} 48' 04.8"$	$D = 0^{\circ} 48' 04.8"$
$L = 618.68'$	$L = 618.68'$
$T = 309.53'$	$T = 309.53'$
$R = 7,150.00'$	$R = 7,150.00'$

<i>-DETEB-</i>	
<i>PI Sta 15+90.20</i>	<i>PI Sta 21+99.42</i>
<i>Δ = 5° 57' 09.7" (RT)</i>	<i>Δ = 5° 57' 09.7" (LT)</i>
<i>D = 0° 48' 04.8"</i>	<i>D = 1° 15' 03.6"</i>
<i>L = 742.84'</i>	<i>L = 475.84'</i>
<i>T = 371.76'</i>	<i>T = 238.13'</i>
<i>R = 7,150.00'</i>	<i>R = 4,580.00'</i>



INSET A



SEE SHEET 8 FOR -DETEB- PROFILE
SEE SHEET C-1 THRU C-6 FOR CULVERT PLANS

8/17/99

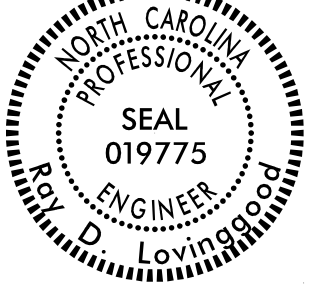
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USER:RKS

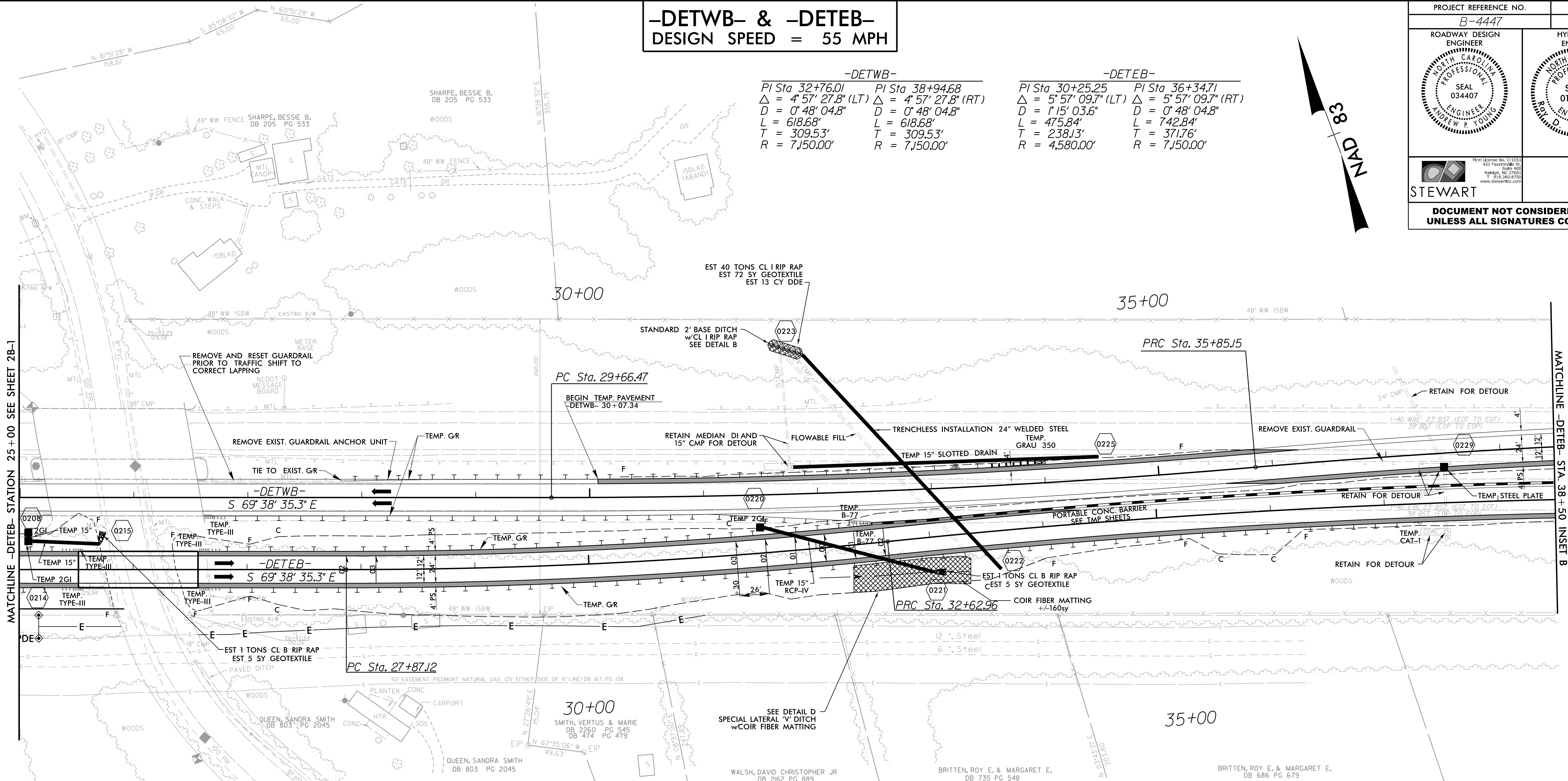
REVISIONS

-DETWB- & -DETEB-
DESIGN SPEED = 55 MPH

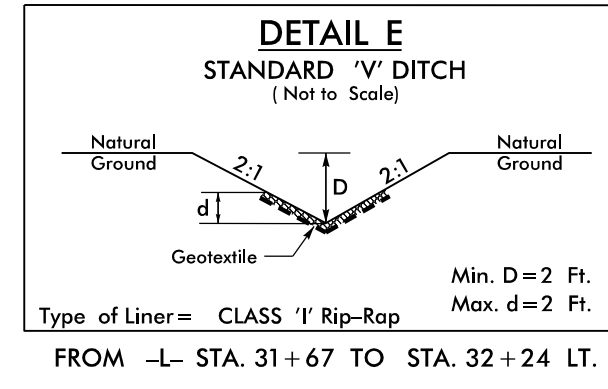
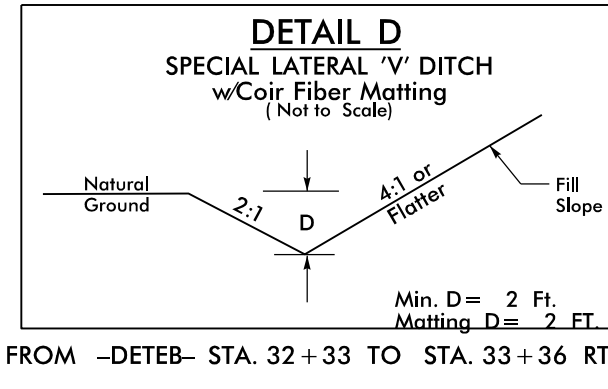
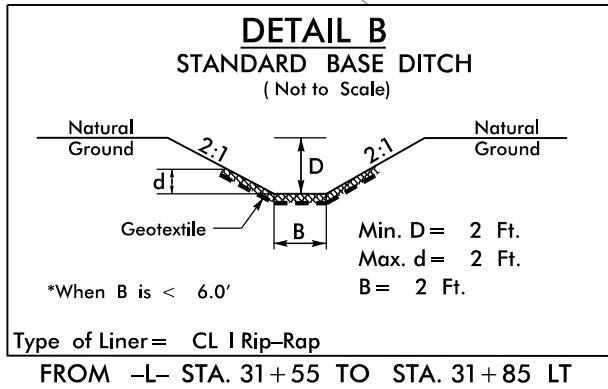
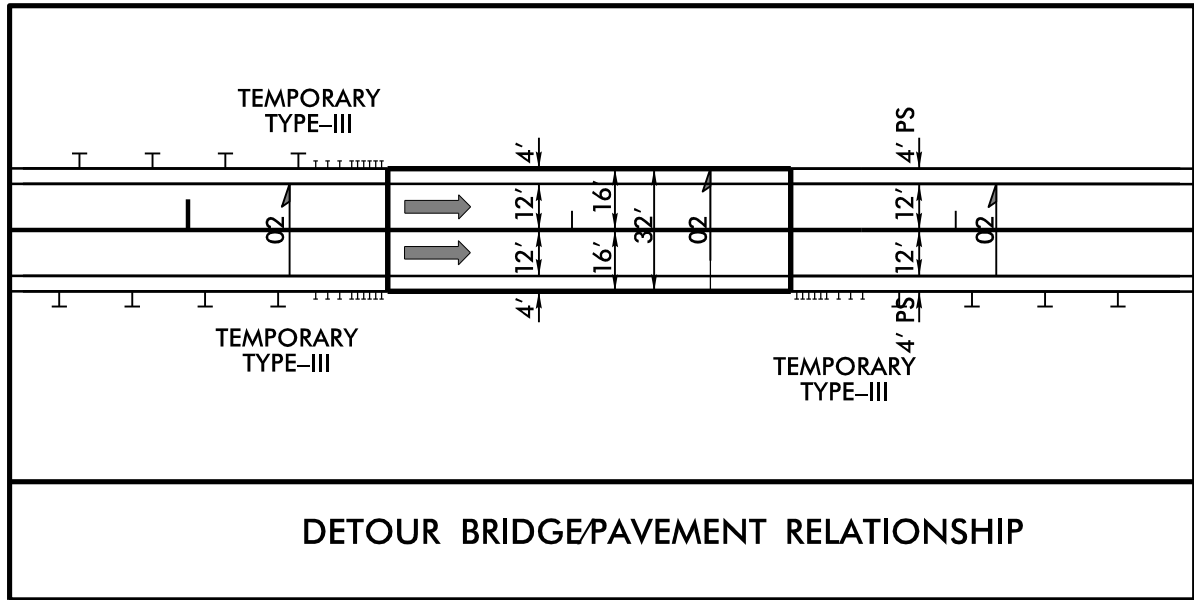
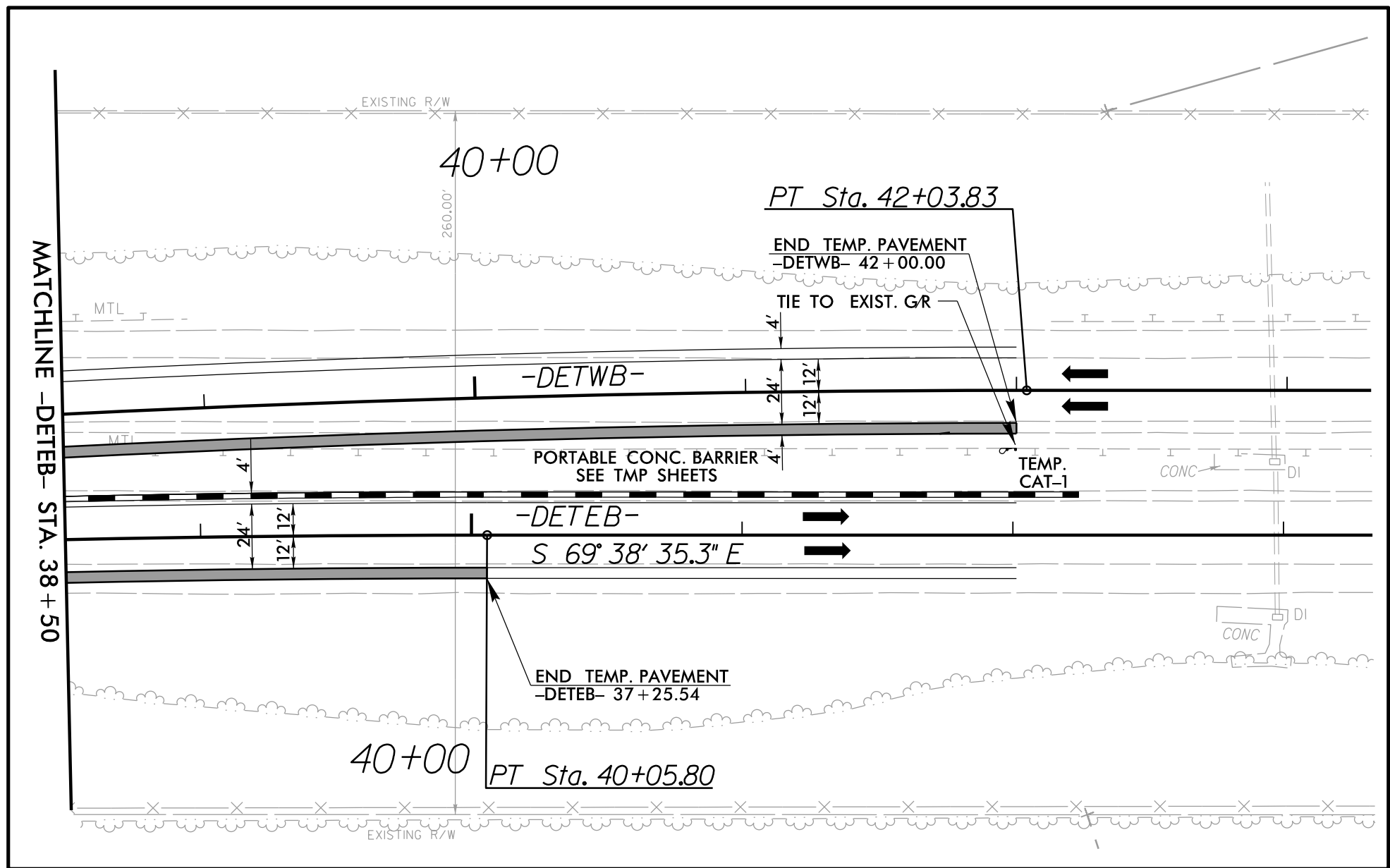
-DETWB-		-DETEB-	
PI Sta 32+76.01	PI Sta 38+94.68	PI Sta 30+25.25	PI Sta 36+34.71
$\Delta = 4' 57" 27.8" (LT)$	$\Delta = 4' 57" 27.8" (RT)$	$\Delta = 5' 57" 09.7" (LT)$	$\Delta = 5' 57" 09.7" (RT)$
$D = 0' 48" 04.8"$	$D = 0' 48" 04.8"$	$D = 1' 15" 03.6"$	$D = 0' 48" 04.8"$
$L = 618.68'$	$L = 618.68'$	$L = 475.84'$	$L = 742.84'$
$T = 309.53'$	$T = 309.53'$	$T = 238.13'$	$T = 371.76'$
$R = 7,150.00'$	$R = 7,150.00'$	$R = 4,580.00'$	$R = 7,150.00'$

83
NAD 83

PROJECT REFERENCE NO. B-4447		SHEET NO. 2B-2
ROADWAY DESIGN ENGINEER 	HYDRAULICS ENGINEER 	
Firm License No. C-1351 421 Fayetteville St. Suite 400 Fayetteville, NC 27501 P: 919.386.9590 www.stewartinc.com		
STEWART		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



INSET B



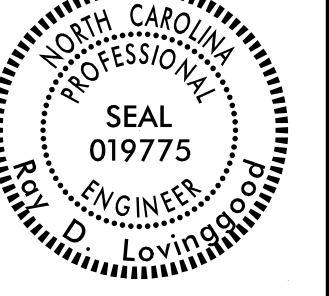
SEE SHEET 8 FOR -DETEB- PROFILE

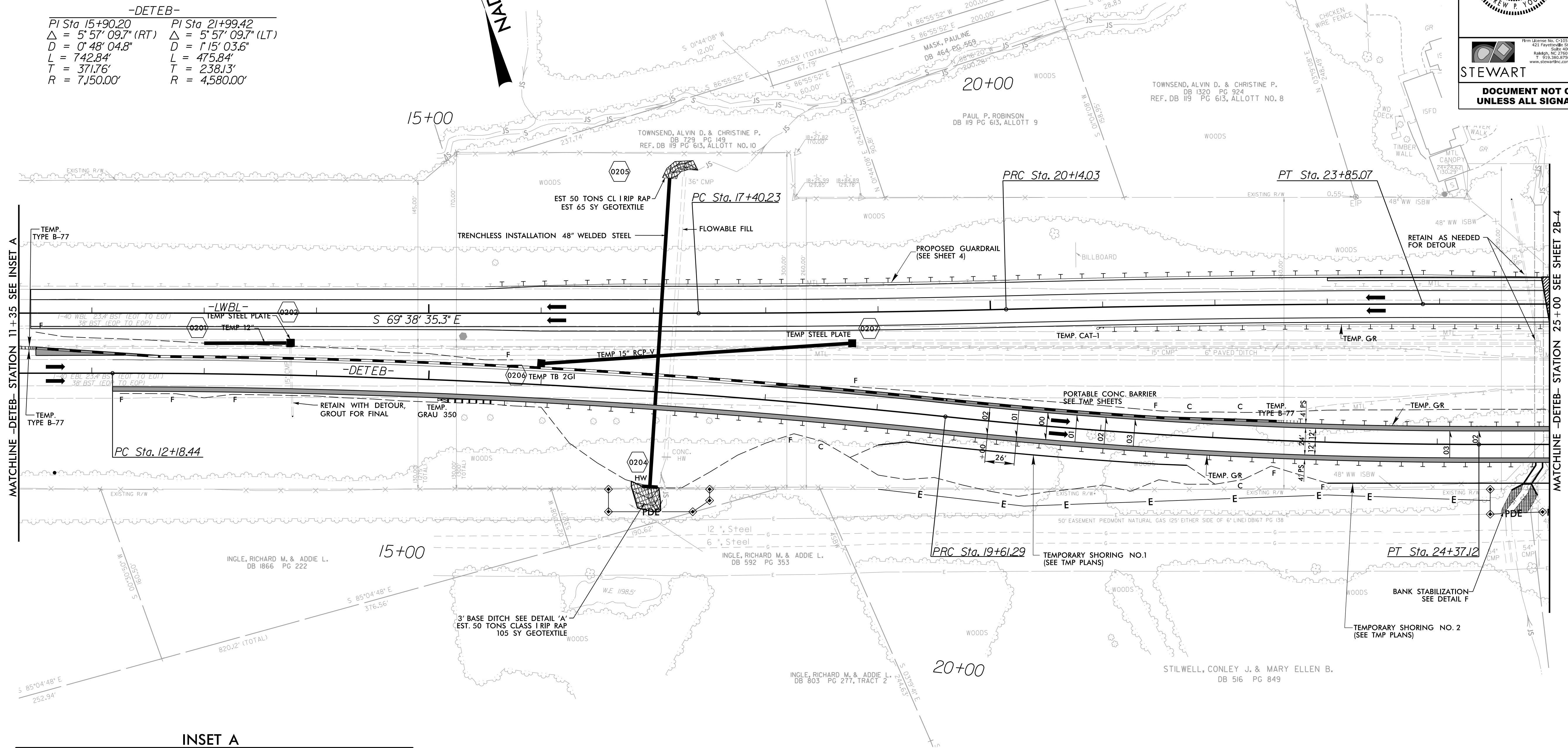
8/17/99

5/3/2017 184447_Rdy_det-2B-3.dgn
USER:RJK

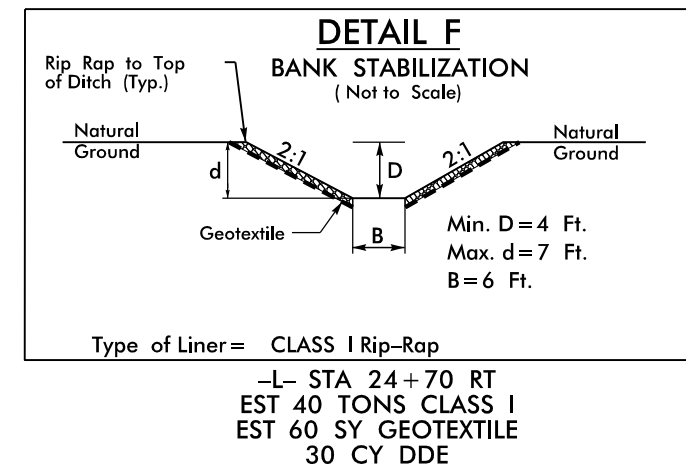
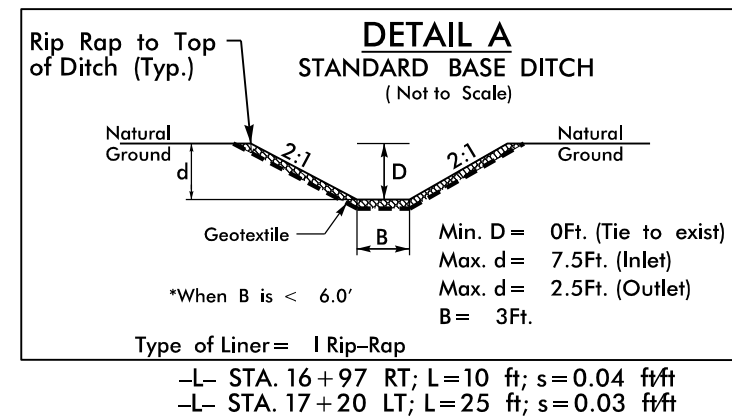
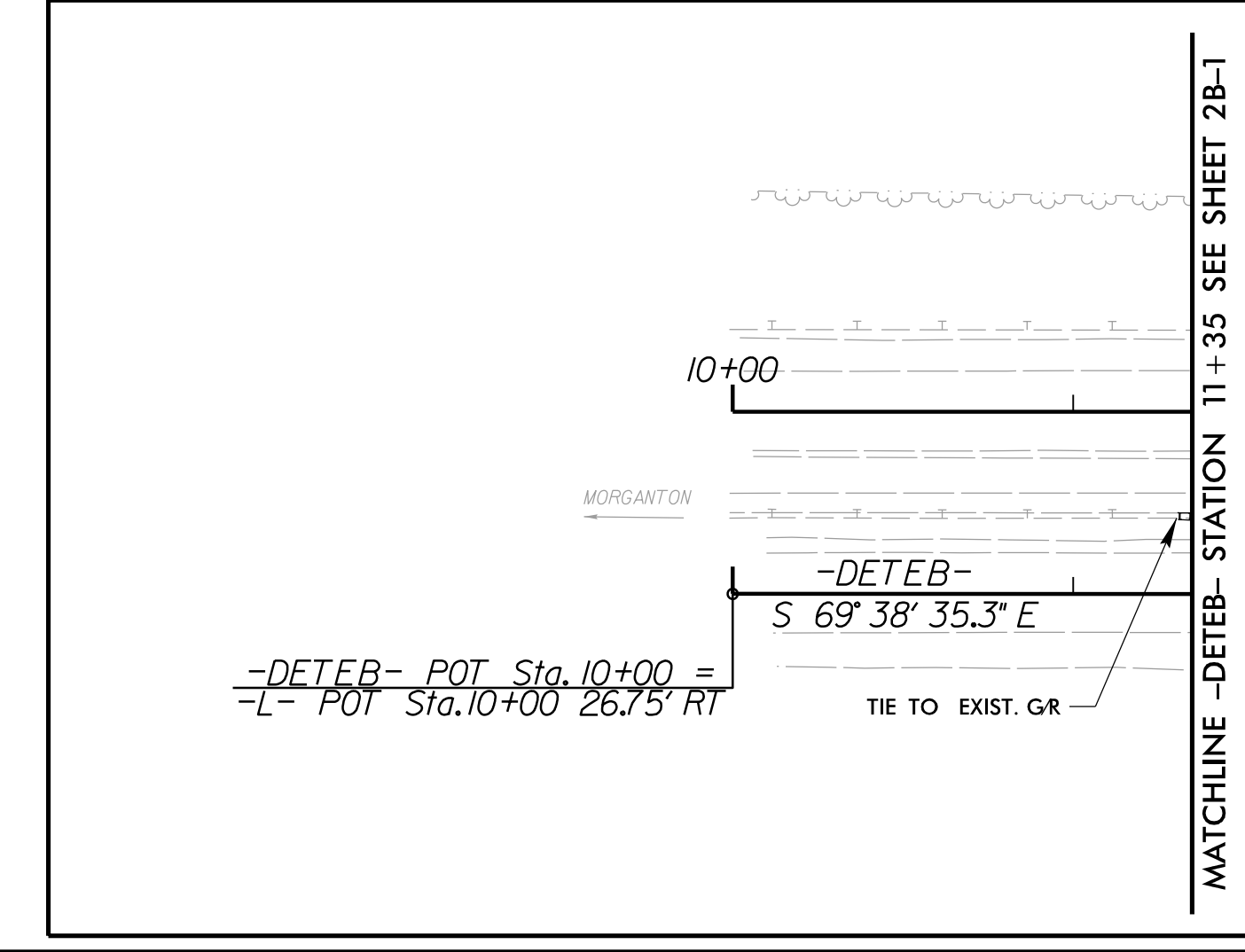
REVISIONS

-DETEB-
DESIGN SPEED = 55 MPH

PROJECT REFERENCE NO. B-4447		SHEET NO. 2B-3	
ROADWAY DESIGN ENGINEER  SEAL 034407 STEWART		HYDRAULICS ENGINEER  SEAL 019775 STEWART	
Firm License No. C-1151 421 Fayetteville St. Suite 400 Raleigh, NC 27601 P: 919.336.9599 www.stewartinc.com			
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			



INSET A



SEE SHEET 4 FOR -LWBL- PLAN VIEW
SEE SHEET 6 FOR -LWBL- PROFILE
SEE SHEET 8 FOR -DETEB- PROFILE
SEE SHEET C-1 THRU C-6 FOR CULVERT PLANS

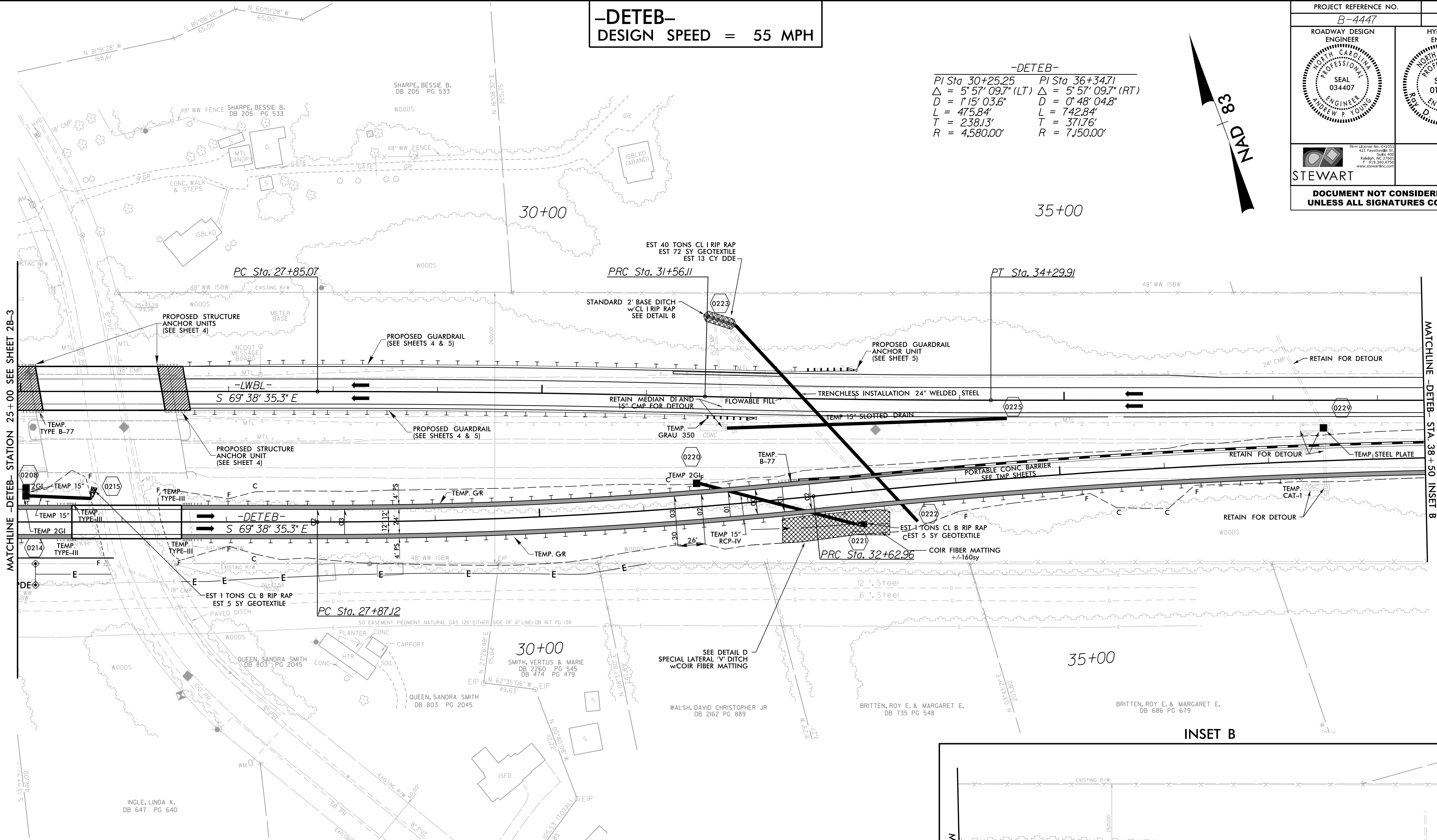
8/17/99

-DETEB-
DESIGN SPEED = 55 MPH

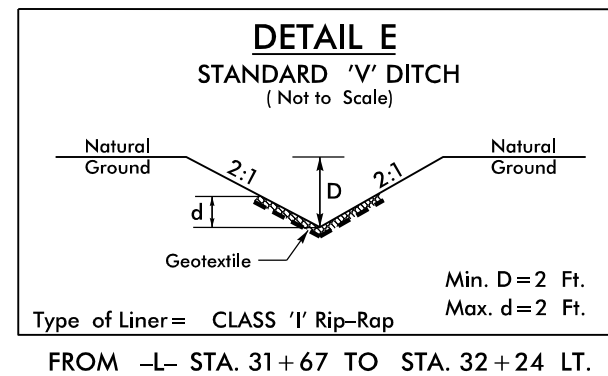
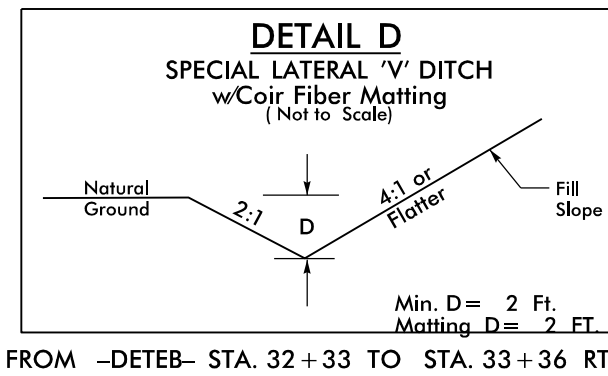
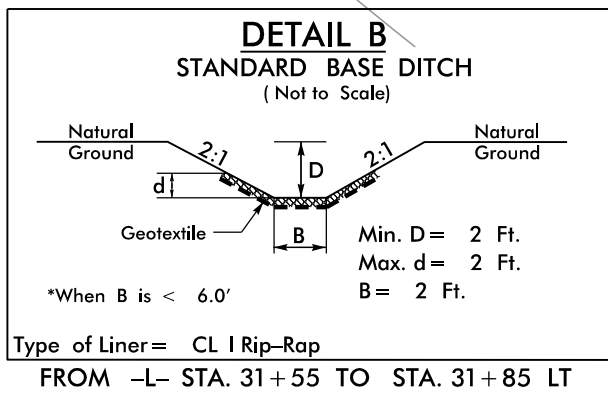
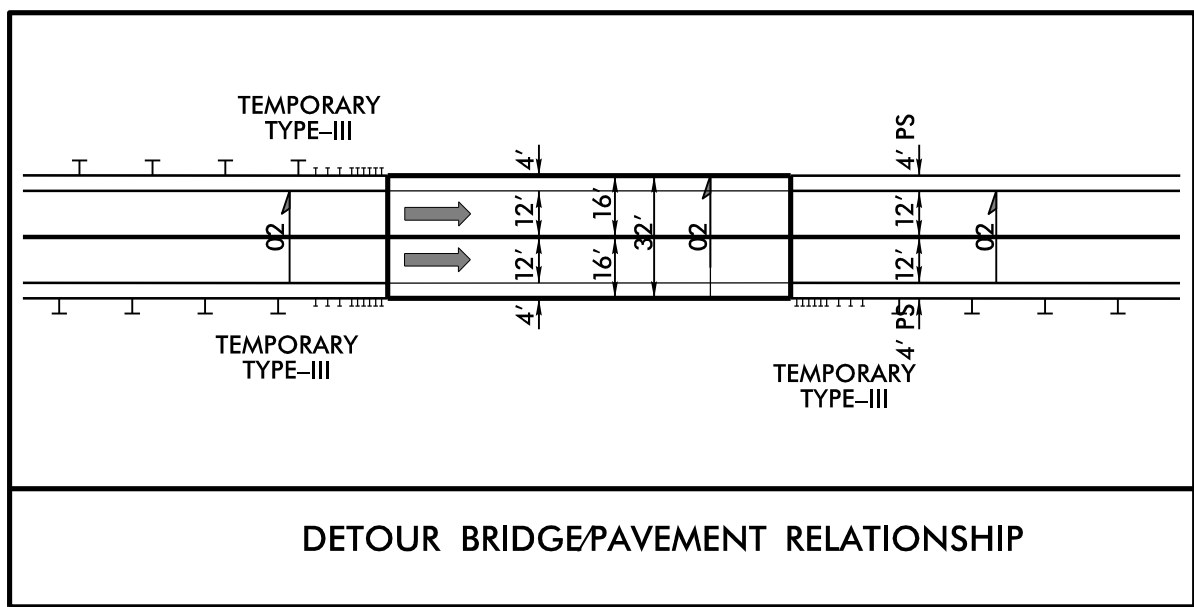
-DETEB-
PI Sta. 30+25.25 PI Sta. 36+34.71
 $\Delta = 5^\circ 57' 09.7" (LT)$ $\Delta = 5^\circ 57' 09.7" (RT)$
 $D = 1'15" 03.6"$ $D = 0' 48' 04.8"$
 $L = 475.84'$ $L = 742.84'$
 $T = 238.13'$ $T = 371.76'$
 $R = 4,580.00'$ $R = 7,150.00'$

83
NAD 83

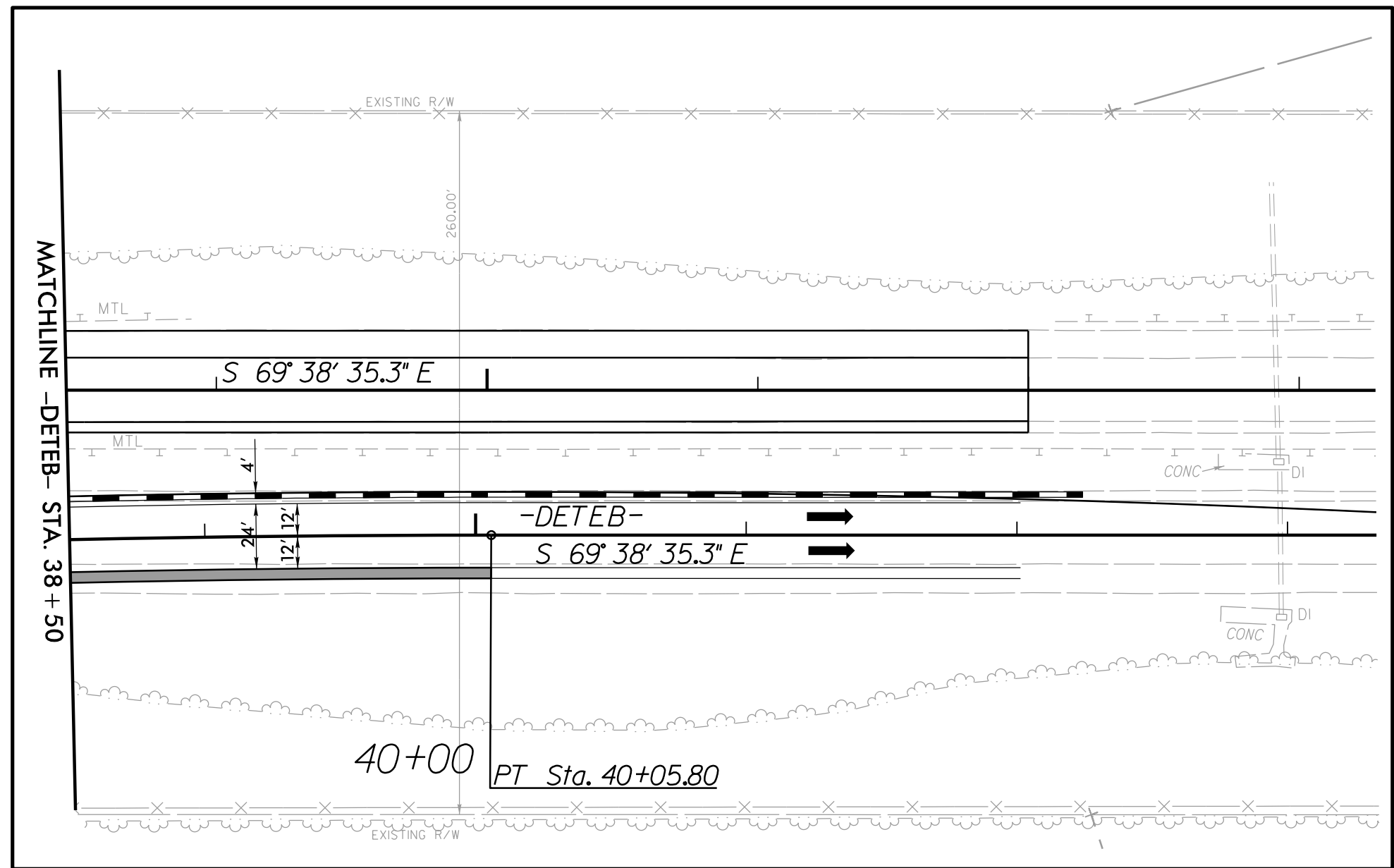
PROJECT REFERENCE NO.		SHEET NO.
B-4447		2B-4
ROADWAY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 034407 ANDREW P. YOUNG	HYDRAULICS ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 019775 RAY D. LOVINGGOOD	
STEWART		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



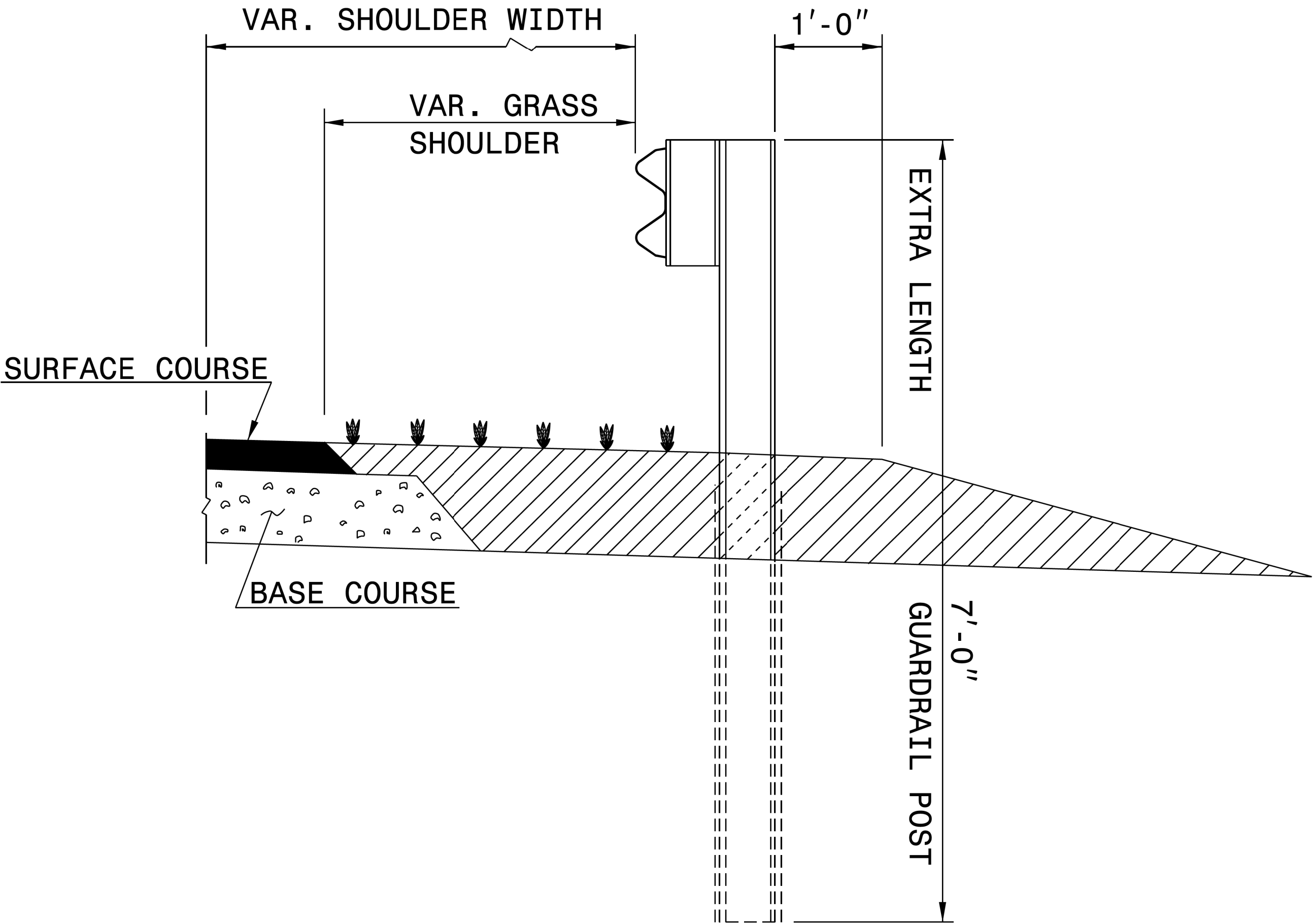
INSET B



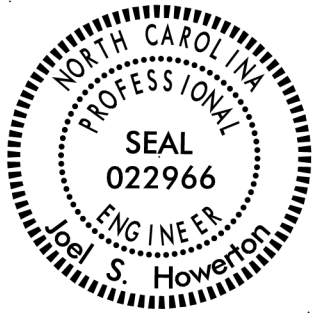
SEE SHEET 5 FOR -LWBL- PLAN VIEW
SEE SHEET 6 FOR -LWBL- PROFILE
SEE SHEET 8 FOR -DETEB- PROFILE
SEE SHEET S01-1 THRU S01-28 FOR -LWBL- STRUCTURE PLANS



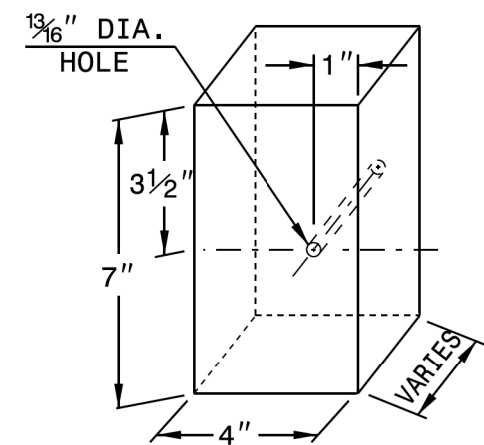
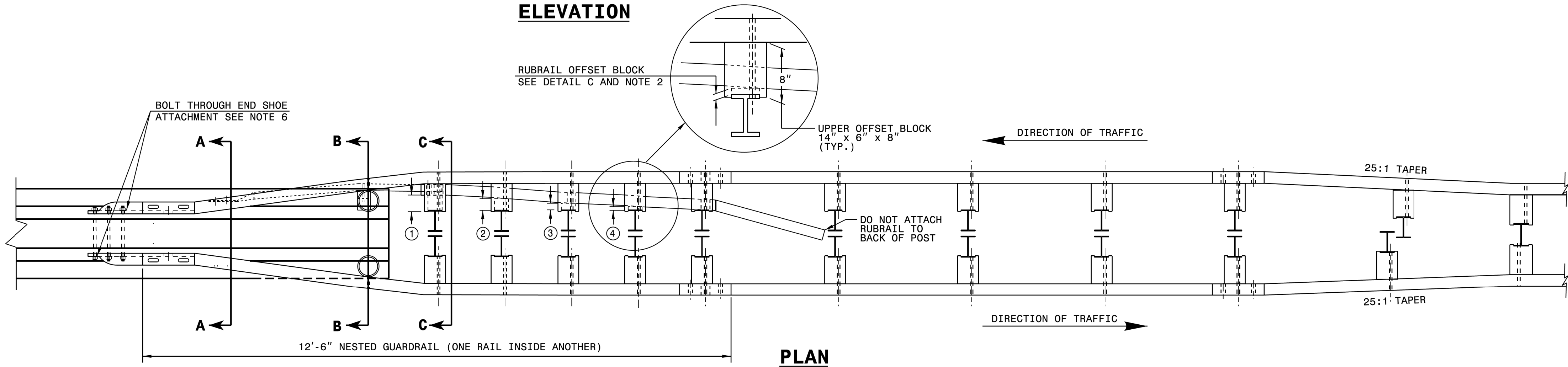
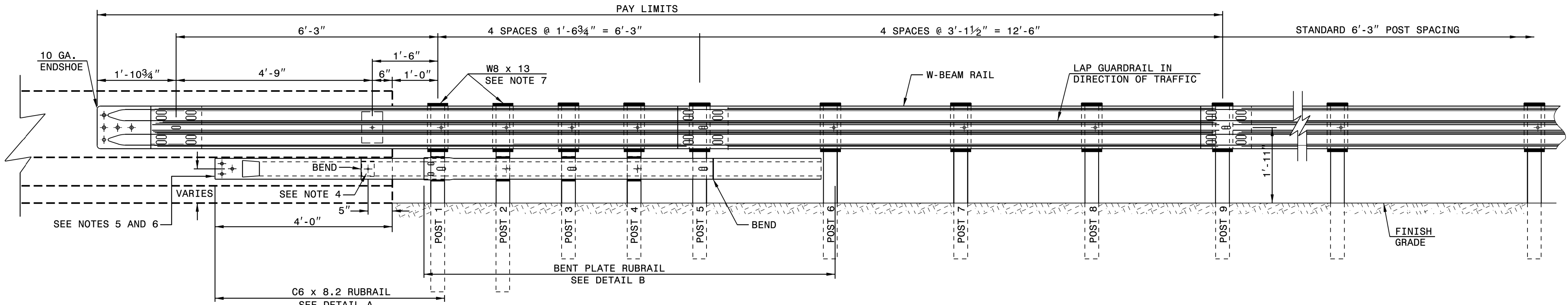
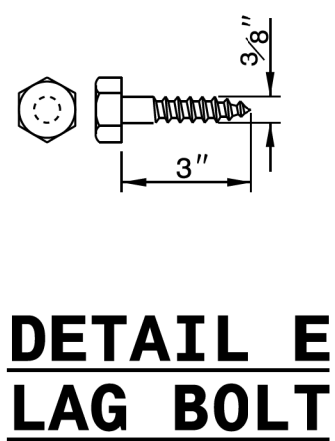
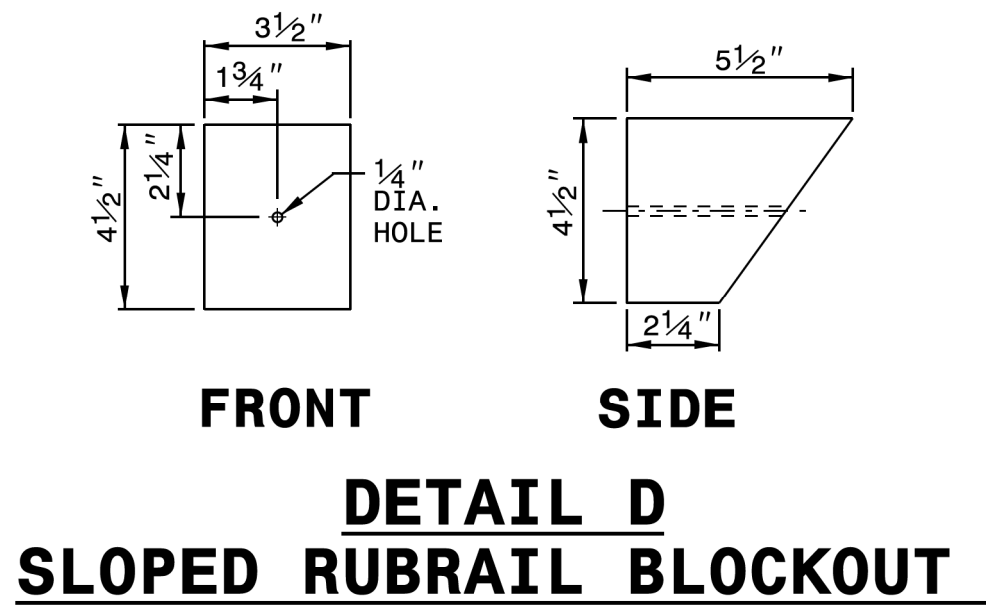
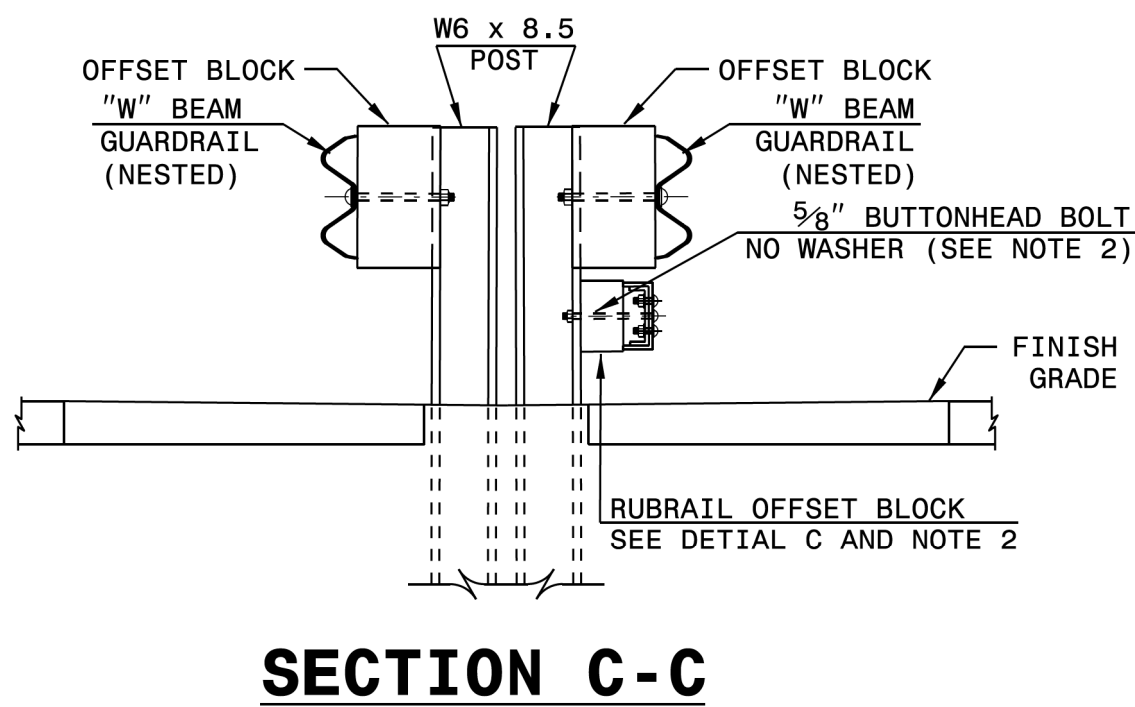
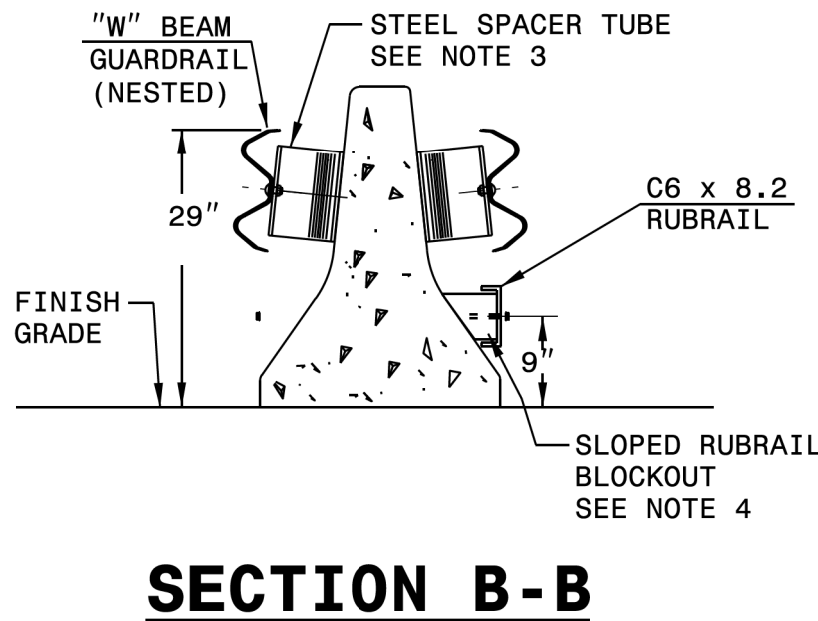
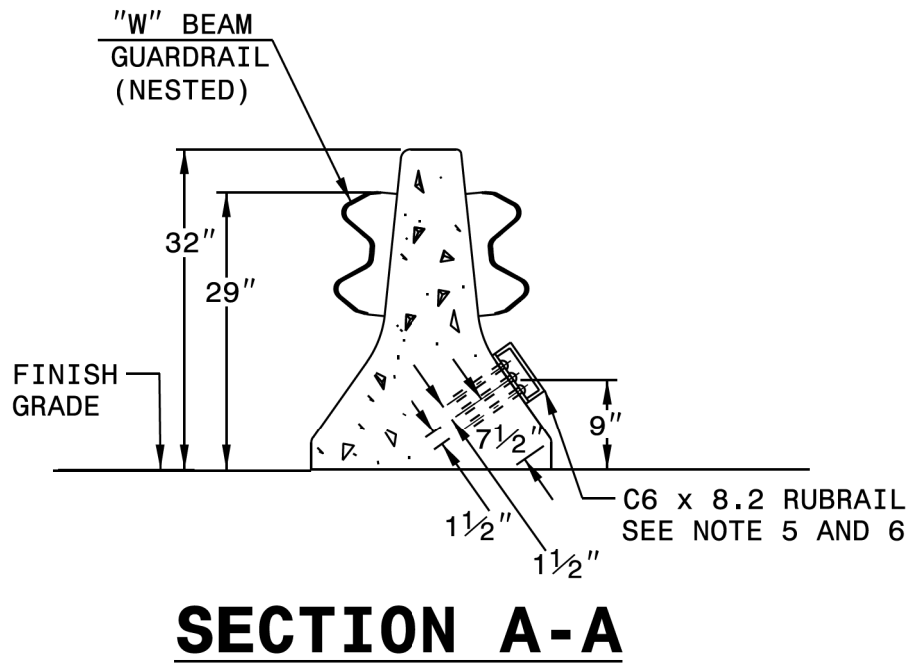
5/3/2017 10:44:47 PM det-2B-4.dgn
USER: jk



REFER TO NCDOT STANDARDS 862.01 AND 862.02 FOR PLACEMENT AND INSTALLATION.



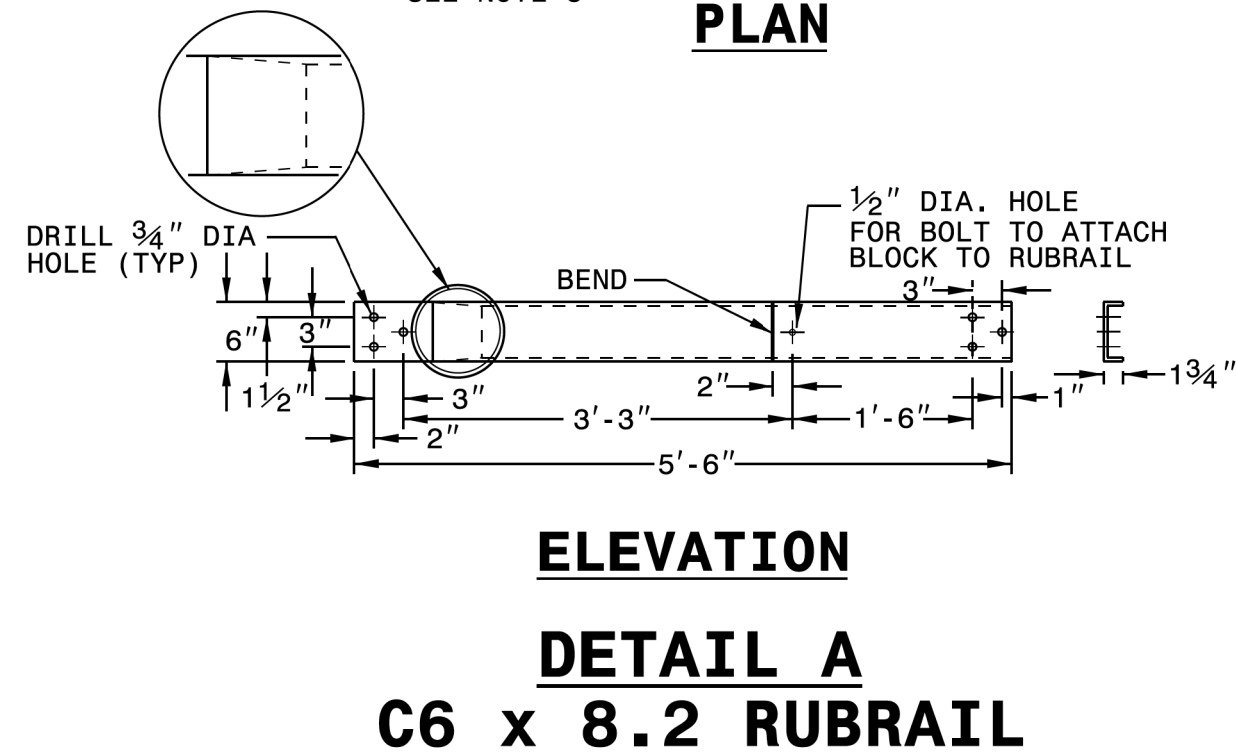
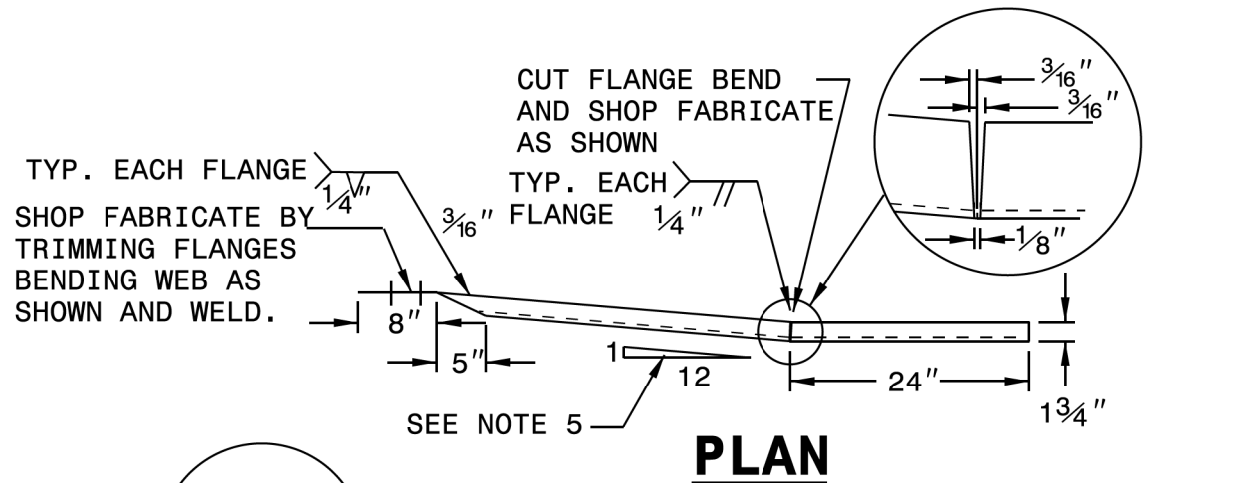
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
CONTRACT STANDARDS AND DEVELOPMENT UNIT Office 919-707-6950 FAX 919-250-4119	
7' GUARDRAIL POST	
ORIGINAL BY: <u>L. Robinson</u>	DATE: <u>1995</u>
MODIFIED BY: <u>L. Robinson</u>	DATE: <u>Feb, 1996</u>
CHECKED BY: _____	DATE: _____
FILE SPEC.: s:7'postguardrail.dgn	



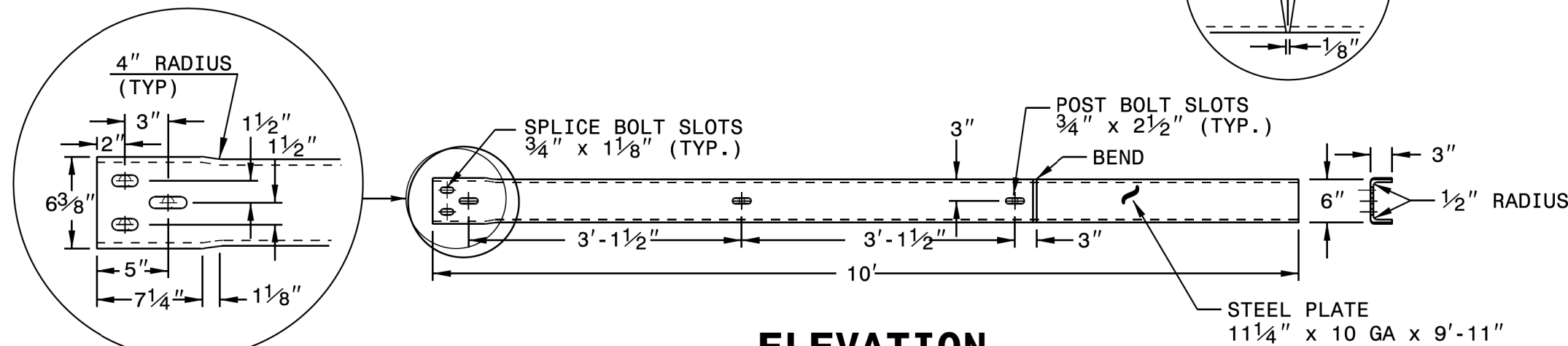
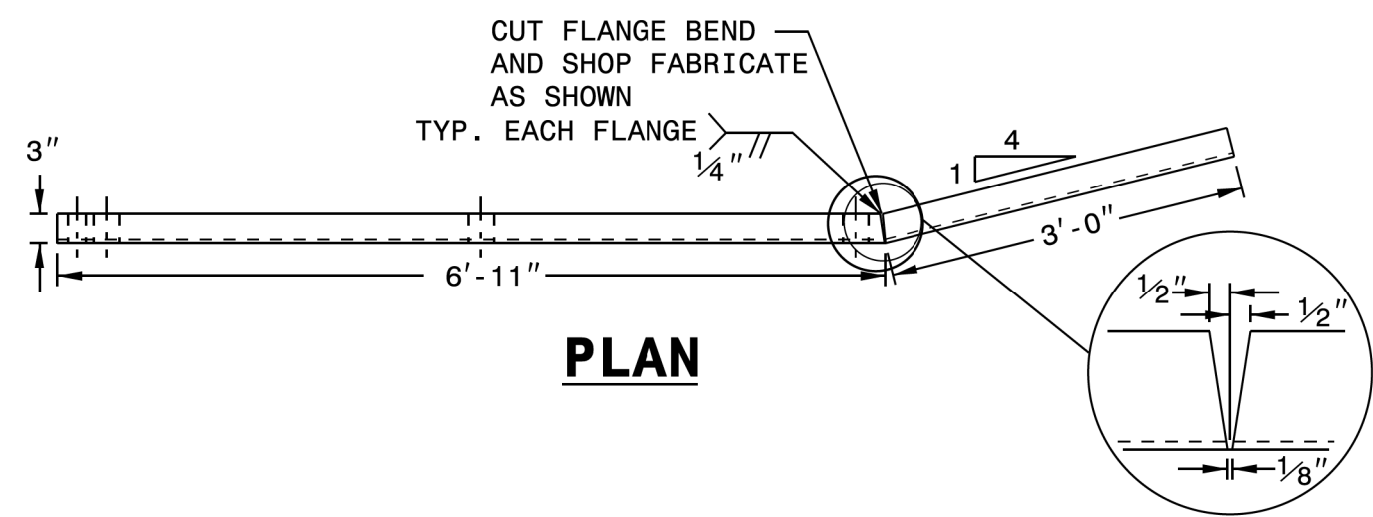
RUBRAIL BLOCKS 7" HIGH x 4" WIDE		
POST	THICKNESS	BOLT LENGTH
①	4 1/4"	9"
②	3 1/4"	5" *
③	2"	6"
④	1"	3" *

* BOLTS FOR POSTS 2 AND 4 ARE USED TO ATTACH BLOCK TO POST. RUBRAIL NOT ATTACHED TO BLOCK.

- GENERAL NOTES:
- 1) APPROACH END OF ANCHOR UNIT HAS RUBRAIL. POSTS 1 THROUGH 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKOUTS AND/OR RUBRAIL.
 - 2) RUBRAIL BLOCKOUTS LOCATED ON POSTS 1 THROUGH 4 ARE OFFSET DRILLED AND SECURED WITH 5/8" BUTTONHEAD BOLTS (SEE CHART FOR BOLT LENGTHS). SECURE BLOCKS ONLY TO POSTS 2 AND 4. SECURE RUBRAIL AND BLOCKOUTS TO POSTS 1 AND 3. RUBRAIL IS SECURED TO POST 5 WITH A 5/8" x 4 1/2" BUTTONHEAD BOLT. RUBRAIL IS FLARED TO BACK OF POST 6 AND NOT SECURED.
 - 3) STEEL SPACER TUBE IS A SCHEDULE 40 GALVANIZED PIPE 6" INSIDE DIAMETER x 9" LONG. ATTACH TUBE TO GUARDRAIL ONLY WITH 5/8" x 1 1/4" LONG BUTTONHEAD BOLT AND RECTANGULAR PLATE WASHER.
 - 4) SEE DETAIL D FOR SLOPED RUBRAIL BLOCKOUT. BLOCKOUT IS ATTACHED TO RAIL ELEMENT ONLY. USE 3/8" x 3" LAG BOLT WITH FLAT WASHER.
 - 5) SHOP FABRICATE THE C6x8.2 RUBRAIL END TO BE CONSISTENT WITH THE SLOPE OF THE JERSEY SHAPE AND ATTACH FLUSH WITH THE SLOPED TOE OF THE BARRIER.
 - 6) ANCHORAGE:
 - (a) AT NEW OR EXISTING BARRIERS, RUBRAIL SHALL BE ANCHORED USING THREE 5/8" x 6" CHEMICALLY ANCHORED BOLTS WITH WASHERS. MAXIMUM PROJECTION FOR BOLTS SHALL BE 1/2".
 - (b) AT NEW OR EXISTING BARRIERS, THE W-BEAM END SHOE SHALL BE ANCHORED USING FIVE 7/8" CHEMICALLY ANCHORED THREADED RODS WITH NUTS AND WASHERS. MAXIMUM PROJECTION FOR THREADED RODS SHALL BE 1/2". THE W-BEAM END SHOE SHALL BE INSTALLED BEHIND THE NESTED W-BEAM ELEMENTS.
 - 7) POSTS 1 AND 2 ARE 7'-6" LONG. ALL OTHER POSTS IN THE ANCHOR UNIT ARE 6'-0".



DETAIL A
C6 x 8.2 RUBRAIL

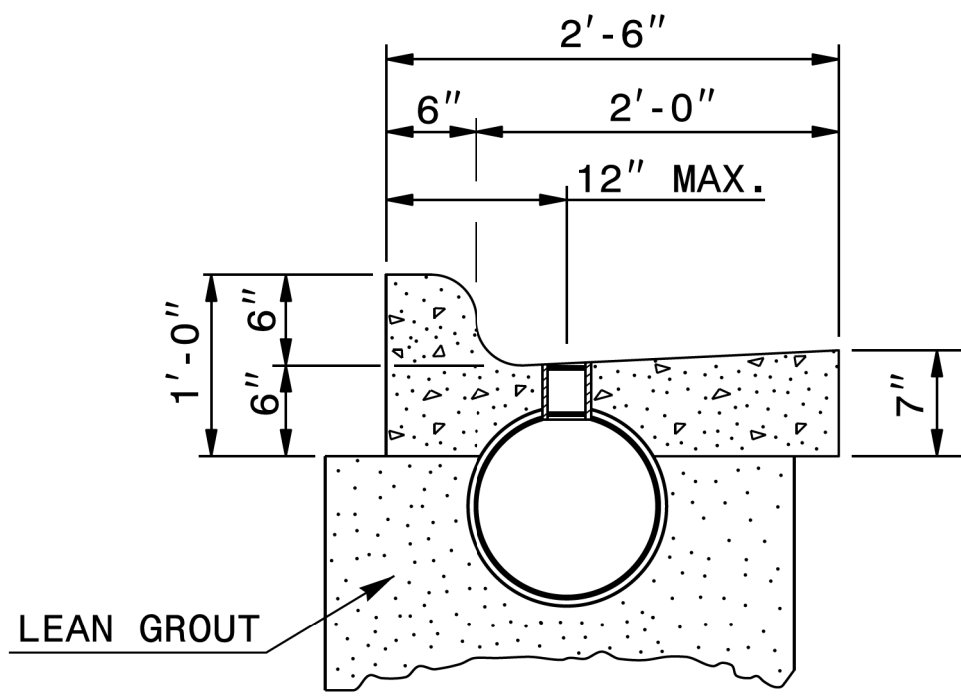


DETAIL B
BENT PLATE RUBRAIL

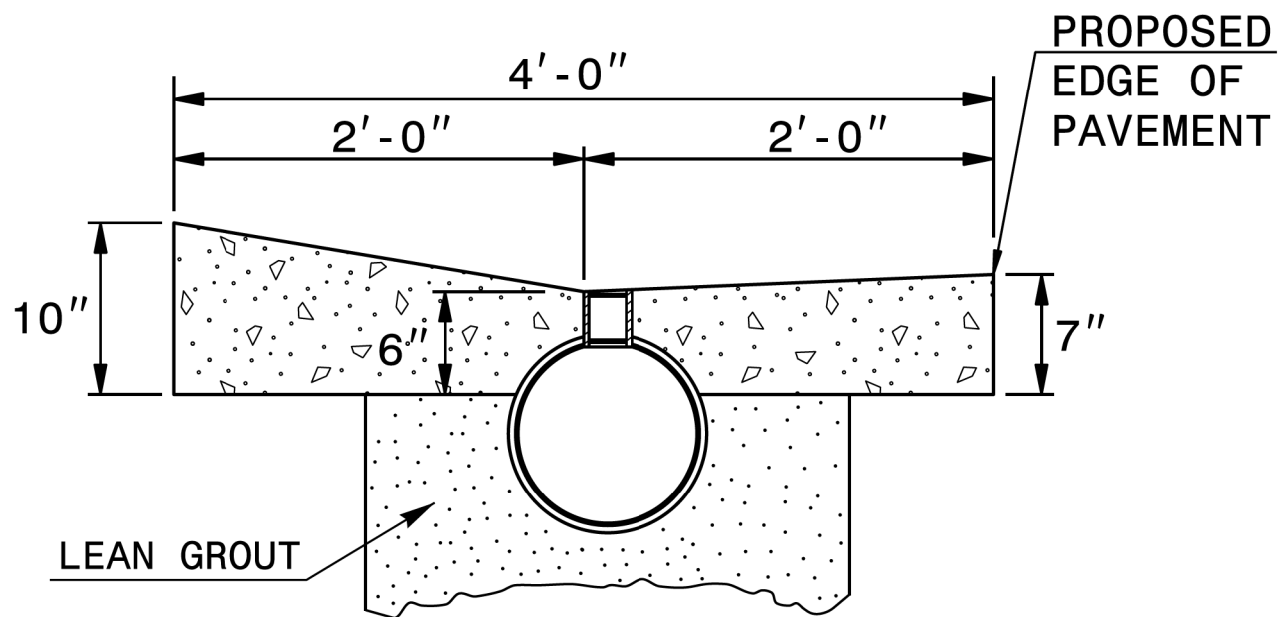
**CONTRACT STANDARDS
AND DEVELOPMENT UNIT**
Office 919-707-6950 FAX 919-250-4119

**GUARDRAIL ANCHOR UNIT
MODIFIED B-77 TYING TO
PORTABLE CONCRETE BARRIER**

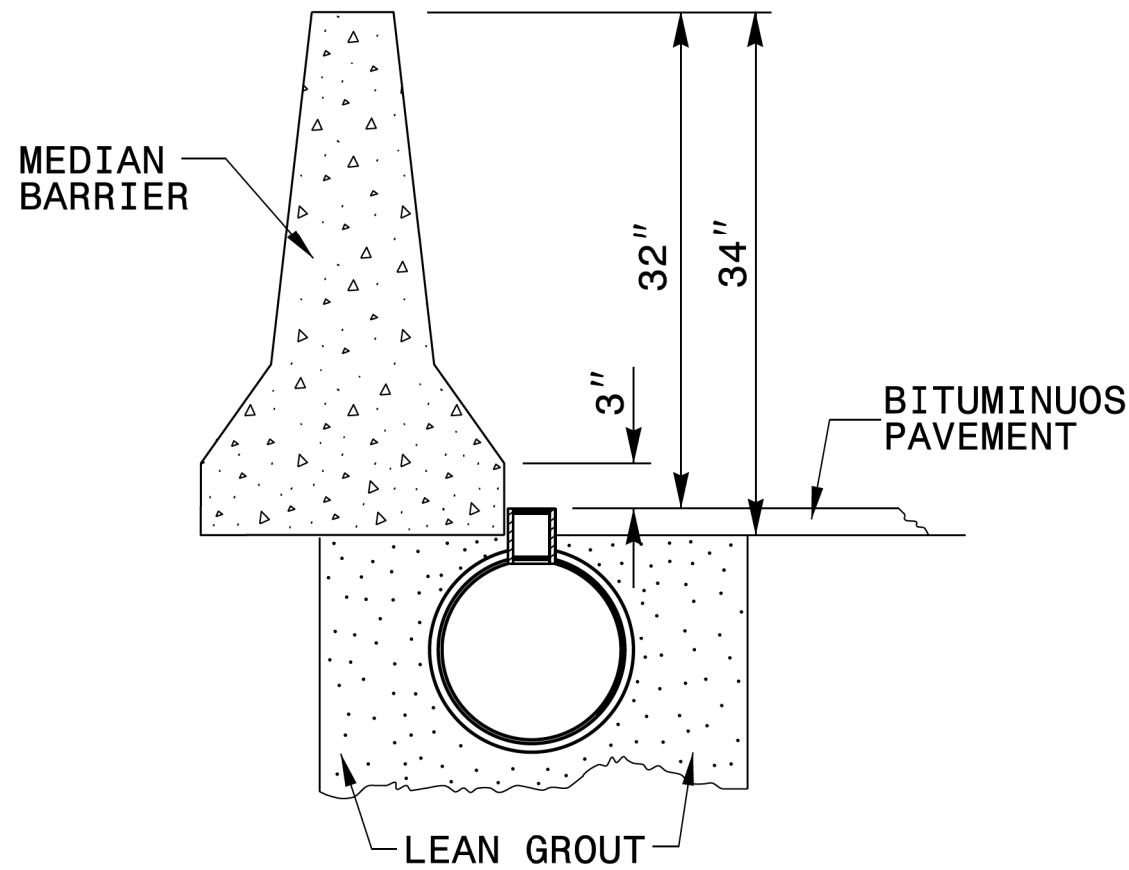
ORIGINAL BY: E.E. WARD DATE: 5-5-03
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: usr\details\stand\862stds\modified B77.dgn



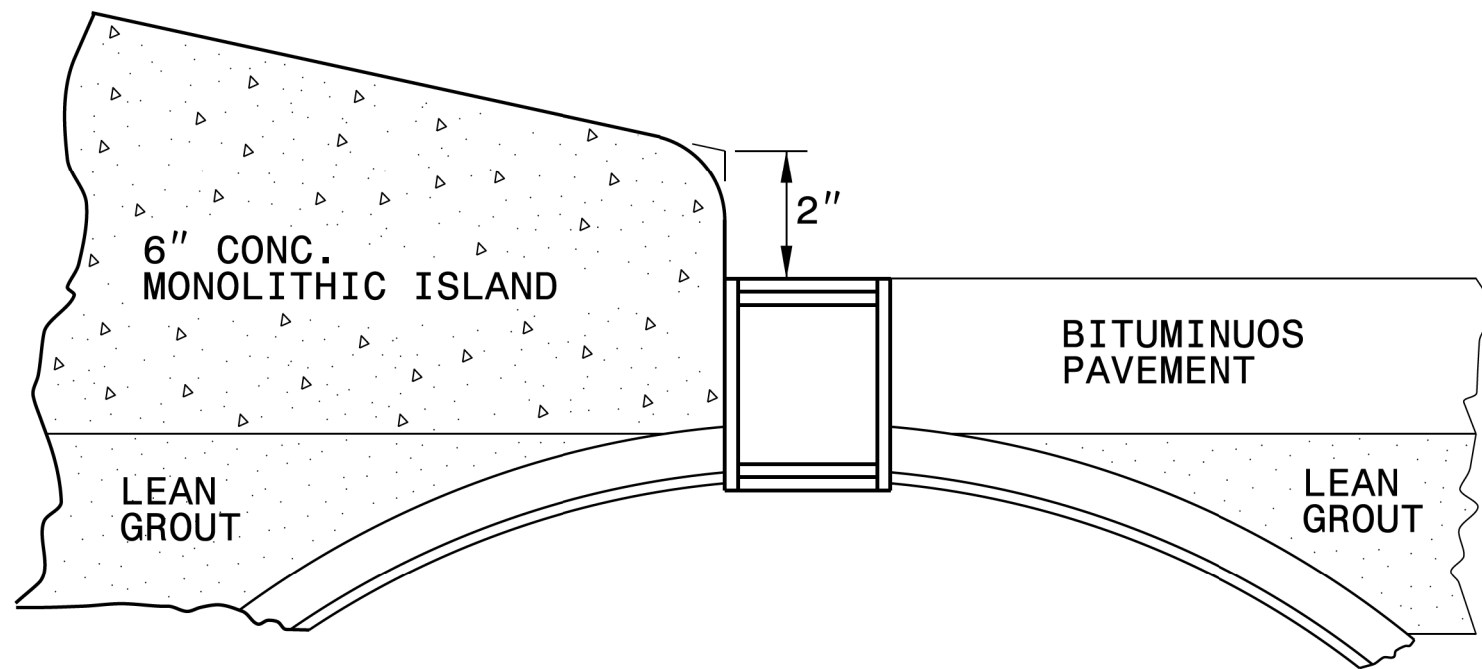
ALTERNATE NO.1



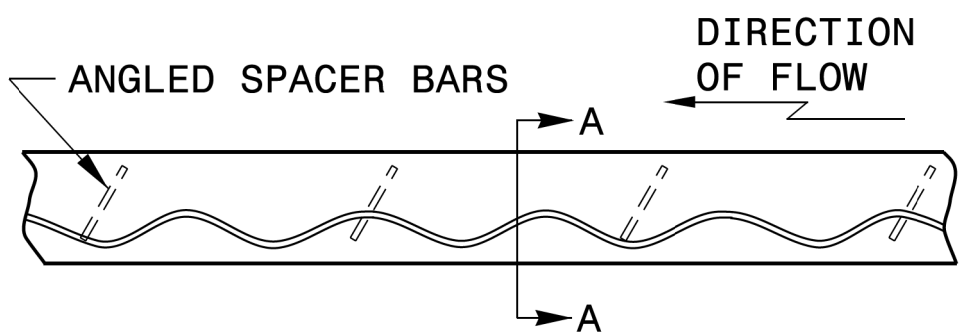
ALTERNATE NO.2



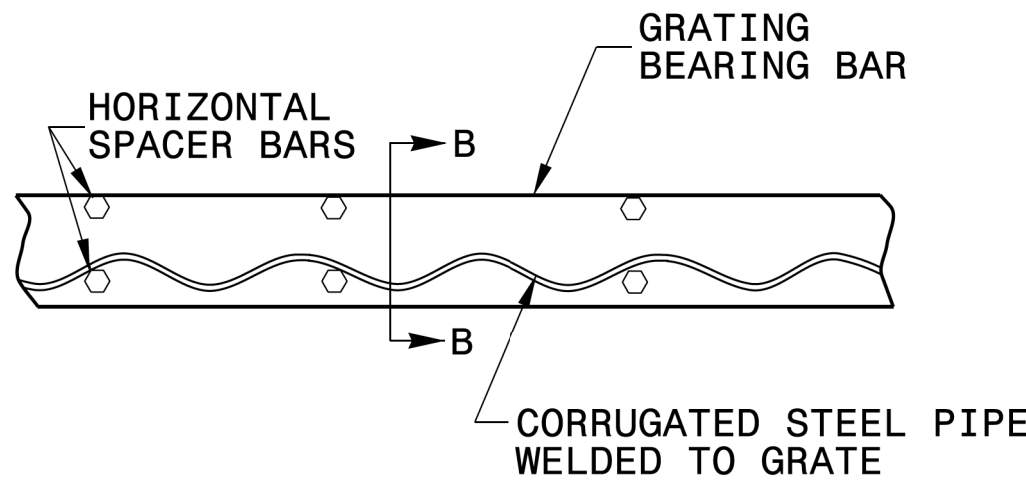
ALTERNATE NO.3



ALTERNATE NO.4

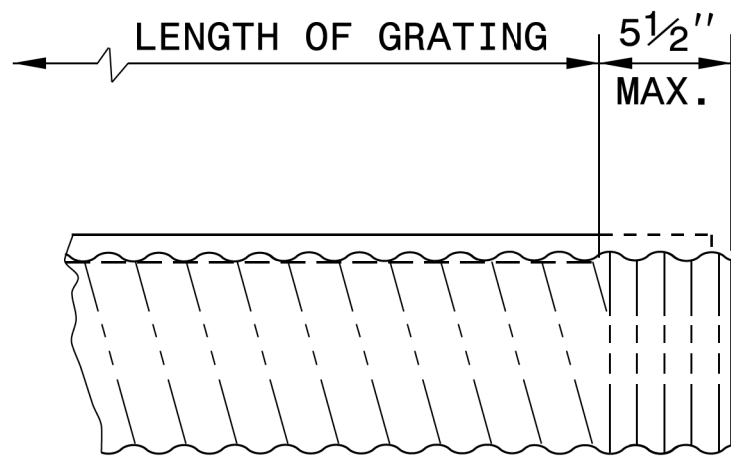


SECTION A-A

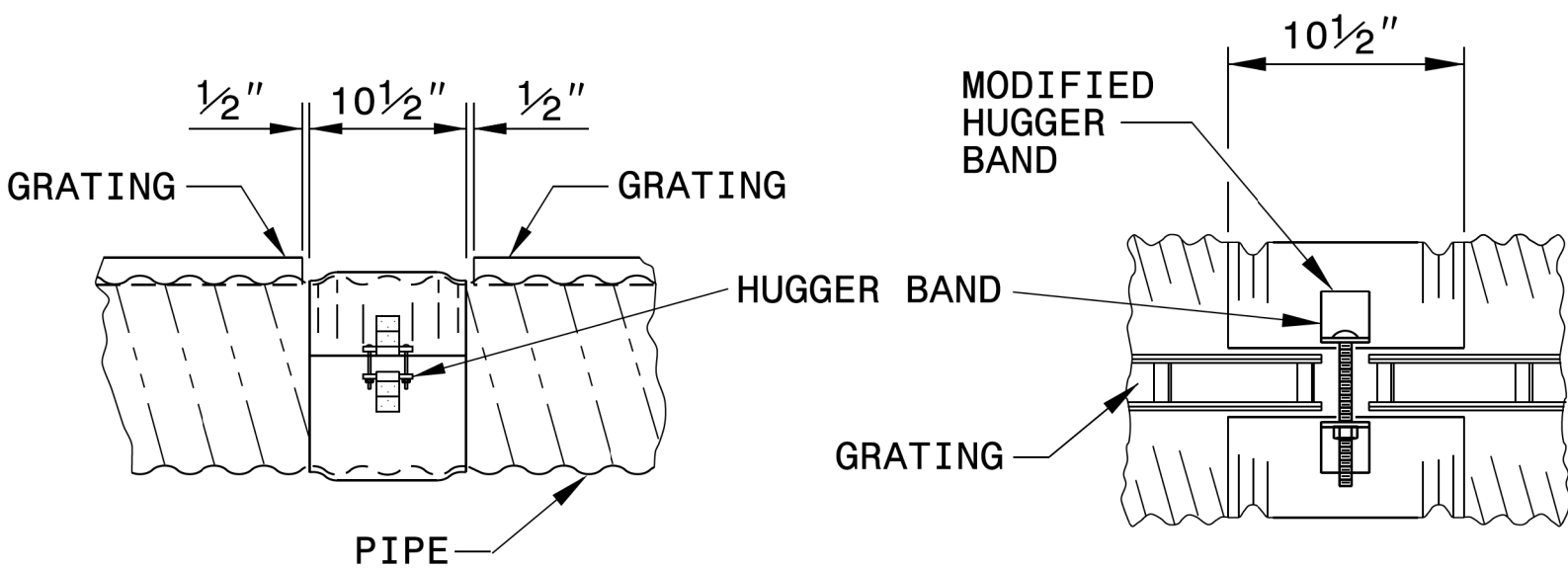


SECTION B-B

TYPICAL GRATE DETAILS

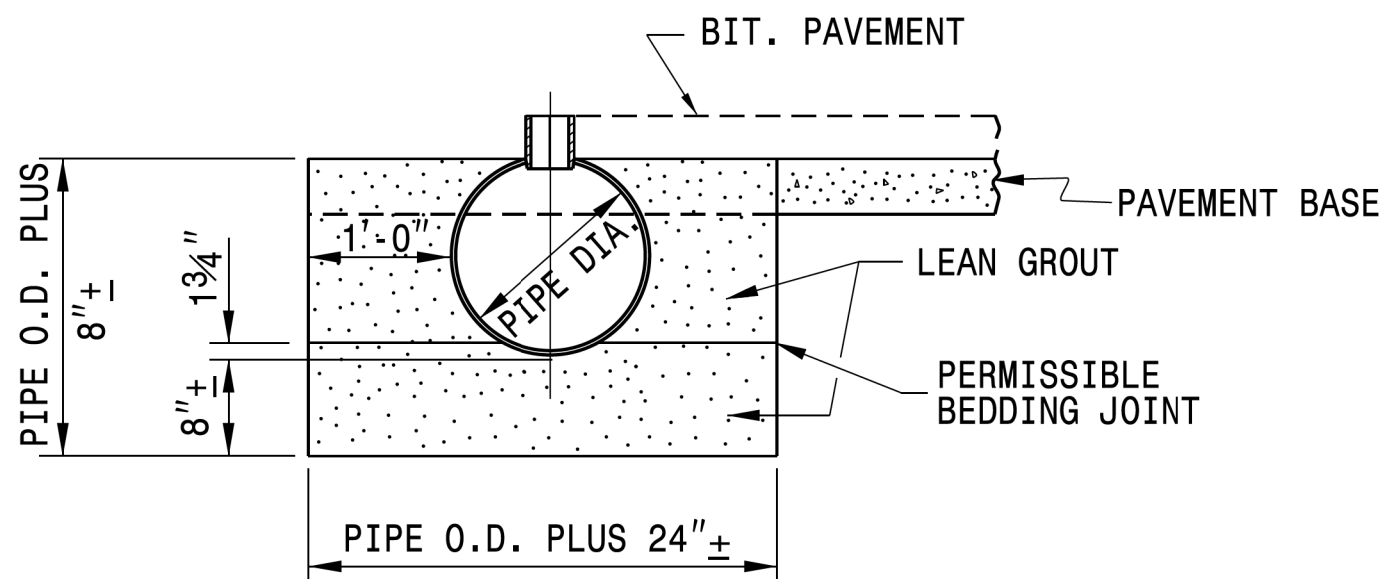


DETAIL AT END OF PIPE



TYPICAL COUPLING BAND

MODIFIED COUPLING BAND



SLOTTED DRAIN PIPE INSTALLATION

NOTES:

USE GRATE ASSEMBLIES FABRICATED FROM STRUCTURAL STEEL MEETING THE REQUIREMENTS OF ASTM A 570, GRADE 36 OR ASTM A 36.

HOT-DIP GALVANIZE GRATES AFTER FABRICATION TO MEET ASTM A123.

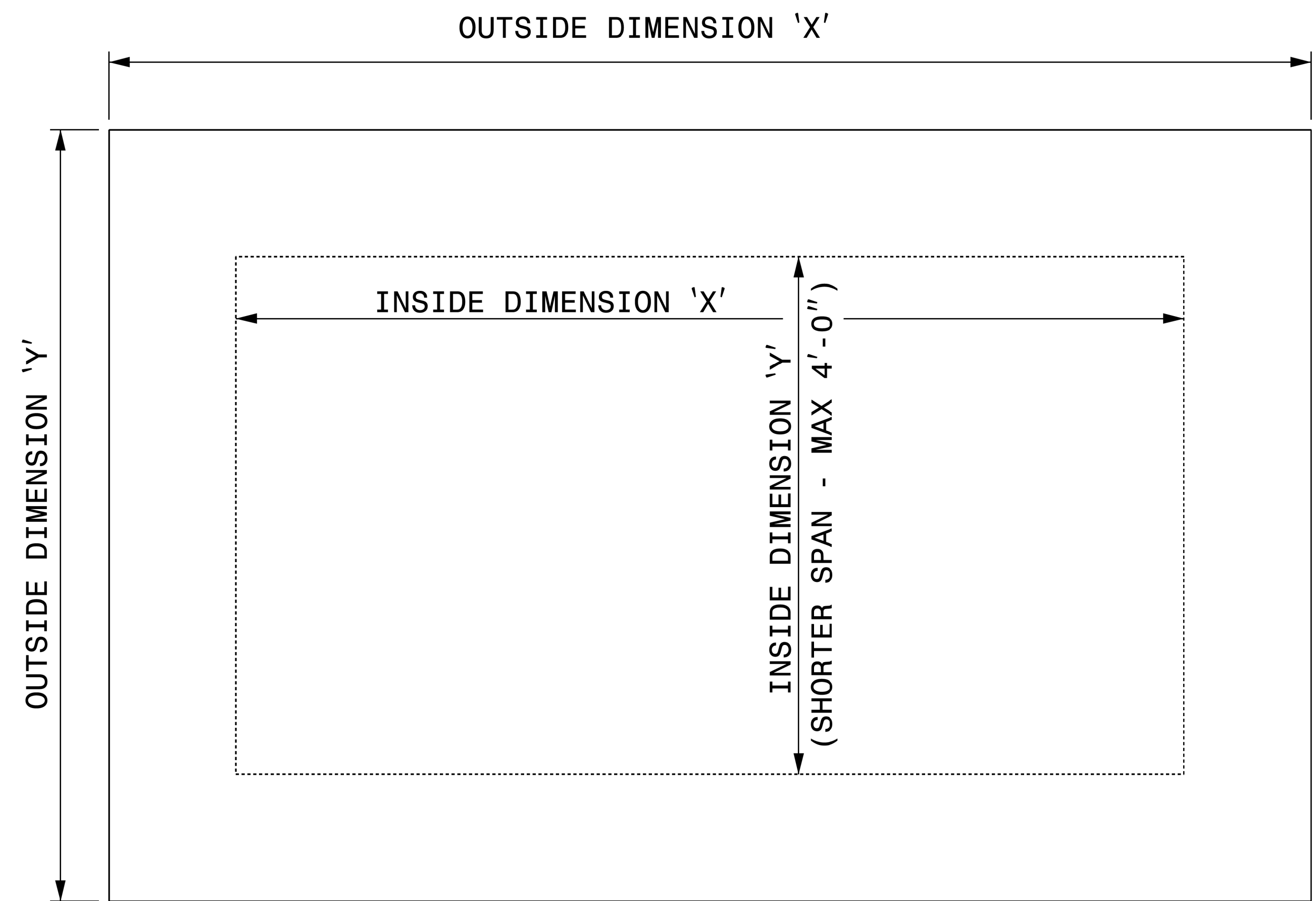
USE SLOTTED DRAIN PIPE THAT IS ADEQUATE FOR AASHTO H20 LOADING WHEN INSTALLED AS SHOWN.

USE SLOTTED DRAIN PIPE FABRICATED FROM ALUMINIZED CORRUGATED STEEL PIPE MEETING THE REQUIREMENTS OF AASHTO M274 TYPE 2.

NCDOT ALLOWS THE USE OF SIMILAR GRATE CONFIGURATIONS MEETING THE REQUIREMENTS OF THIS DETAIL, THE REQUIREMENTS OF THE SPECIAL PROVISIONS, AND THE APPROVAL OF THE ENGINEER.

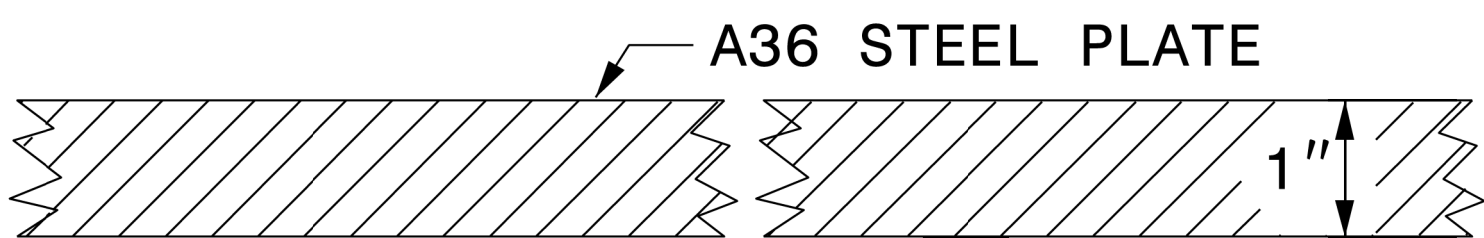


CONTRACT STANDARDS AND DEVELOPMENT UNIT	
Office 919-707-6950	FAX 919-250-4119
DETAILS OF SLOTTED DRAIN 12" THRU 36" DIAMETER PIPE	
ORIGINAL BY: T. Spell	DATE: 5-21-99
MODIFIED BY:	DATE:
CHECKED BY:	DATE:
FILE SPEC.: s:\usr\details\stand\slottedrain.dgn	



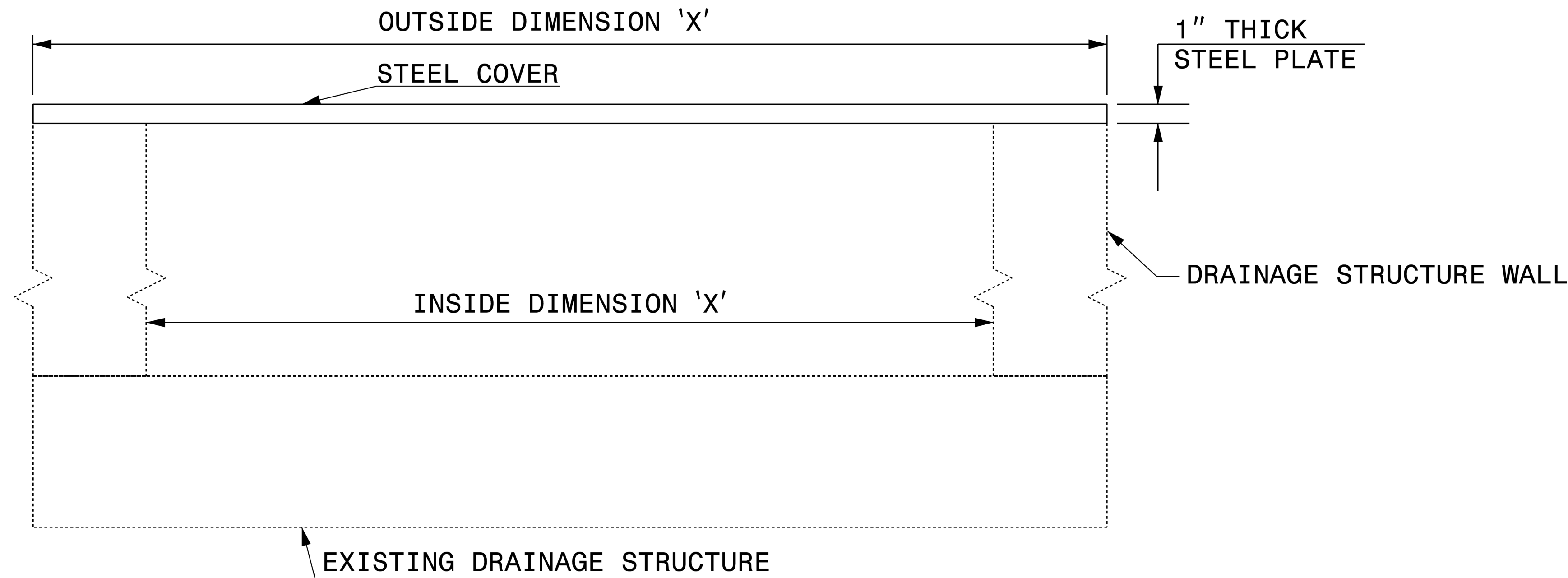
GENERAL NOTES:

- USE GRADE A36 STEEL
- STEEL COVERS ARE FOR TEMPORARY USE DURING PHASE CONSTRUCTION.
- FILL SHALL BE PLACED DIRECTLY OVER THE STEEL PLATES.
- SEE ROADWAY PLANS AND PROVISIONS FOR LOCATIONS
- QUANTITIES TO BE PAID FOR AT THE UNIT PRICE BID PER EACH.



SECTION VIEW OF STEEL TOP PLATE

PLAN VIEWS



ELEVATION VIEWS



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

CONTRACT STANDARDS
AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

DETAIL OF TEMPORARY
1" STEEL COVER
OVER DRAINAGE STRUCTURE

ORIGINAL BY: E.E. WARD DATE: 2-2-98
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.: eric:/usr/details/metric/stand/stlcvr2.dgn

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
GUIDE FOR PAVING
SHOULDERS UNDER BRIDGES
METHOD III

SHEET 1 OF 1
610D03

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

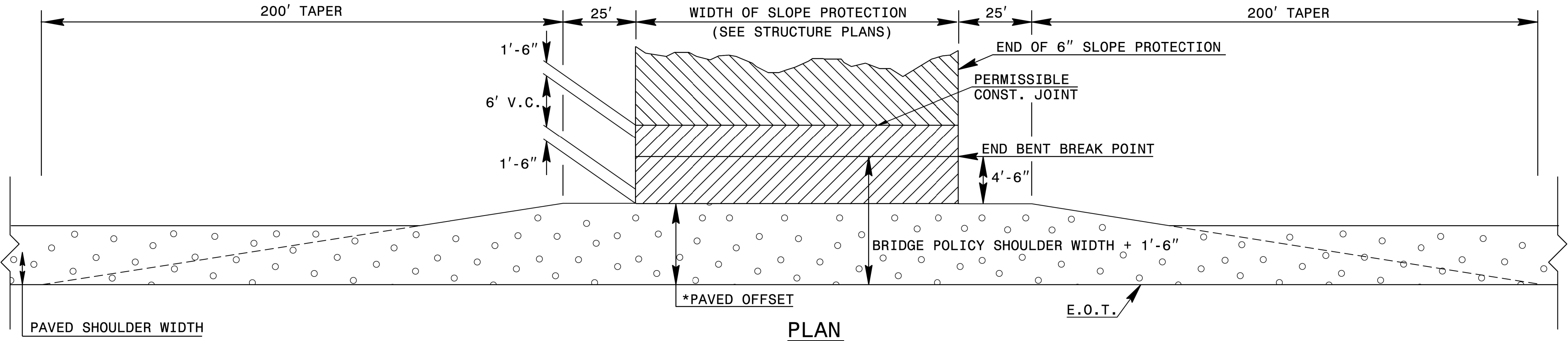
ENGLISH DETAIL DRAWING FOR
GUIDE FOR PAVING
SHOULDERS UNDER BRIDGES
METHOD III

SHEET 1 OF 1
610D03

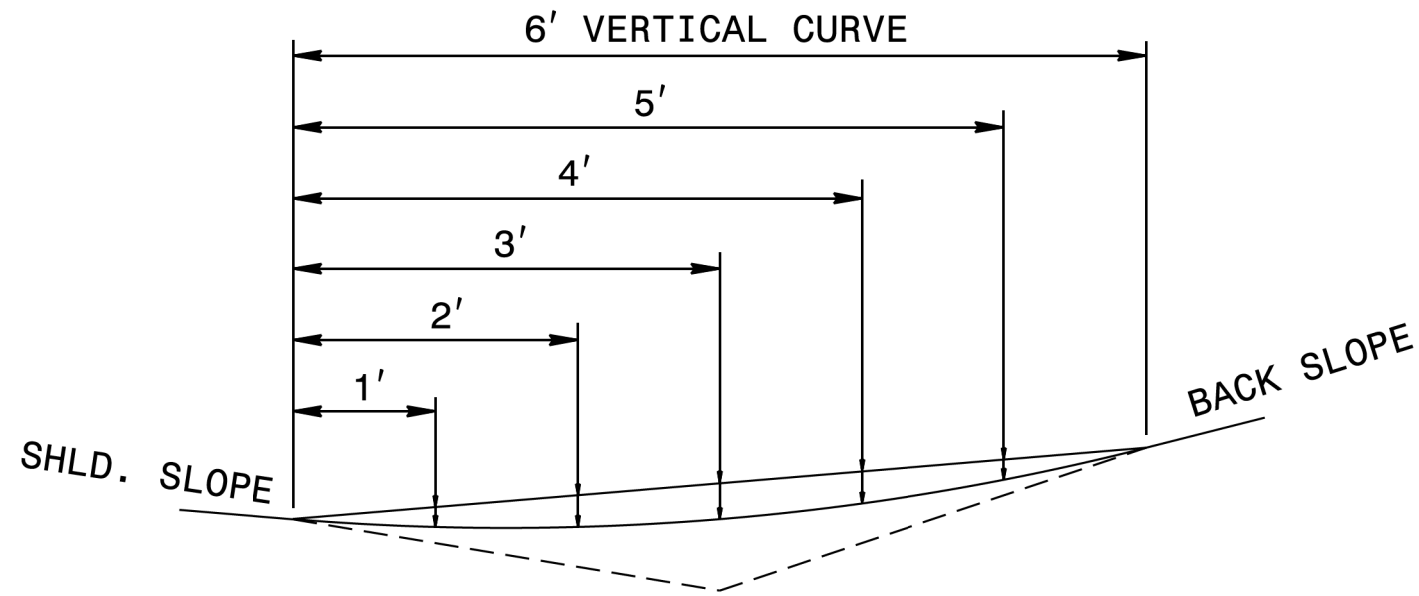
HORZ. DIM.	1½:1 BACK SLOPE									
	SHOULDER SLOPE									
	.04	.03	.02	.01	.00	-.01	-.02	-.03	-.04	-.05
1'	0.26'	0.27'	0.27'	0.27'	0.28'	0.28'	0.28'	0.29'	0.30'	0.31'
2'	0.42'	0.42'	0.43'	0.44'	0.44'	0.45'	0.46'	0.46'	0.47'	0.48'
3'	0.47'	0.48'	0.49'	0.49'	0.50'	0.51'	0.52'	0.52'	0.53'	0.54'
4'	0.42'	0.42'	0.43'	0.44'	0.44'	0.45'	0.46'	0.46'	0.47'	0.48'
5'	0.26'	0.27'	0.27'	0.27'	0.28'	0.28'	0.28'	0.29'	0.30'	0.31'

HORZ. DIM.	2:1 BACK SLOPE									
	SHOULDER SLOPE									
	.04	.03	.02	.01	.00	-.01	-.02	-.03	-.04	-.05
1'	0.19'	0.20'	0.20'	0.20'	0.21'	0.21'	0.22'	0.22'	0.23'	0.23'
2'	0.31'	0.31'	0.32'	0.33'	0.33'	0.34'	0.35'	0.35'	0.36'	0.37'
3'	0.35'	0.35'	0.36'	0.37'	0.38'	0.38'	0.39'	0.40'	0.41'	0.41'
4'	0.31'	0.31'	0.32'	0.33'	0.33'	0.34'	0.35'	0.35'	0.36'	0.37'
5'	0.19'	0.20'	0.20'	0.20'	0.21'	0.21'	0.22'	0.22'	0.23'	0.23'

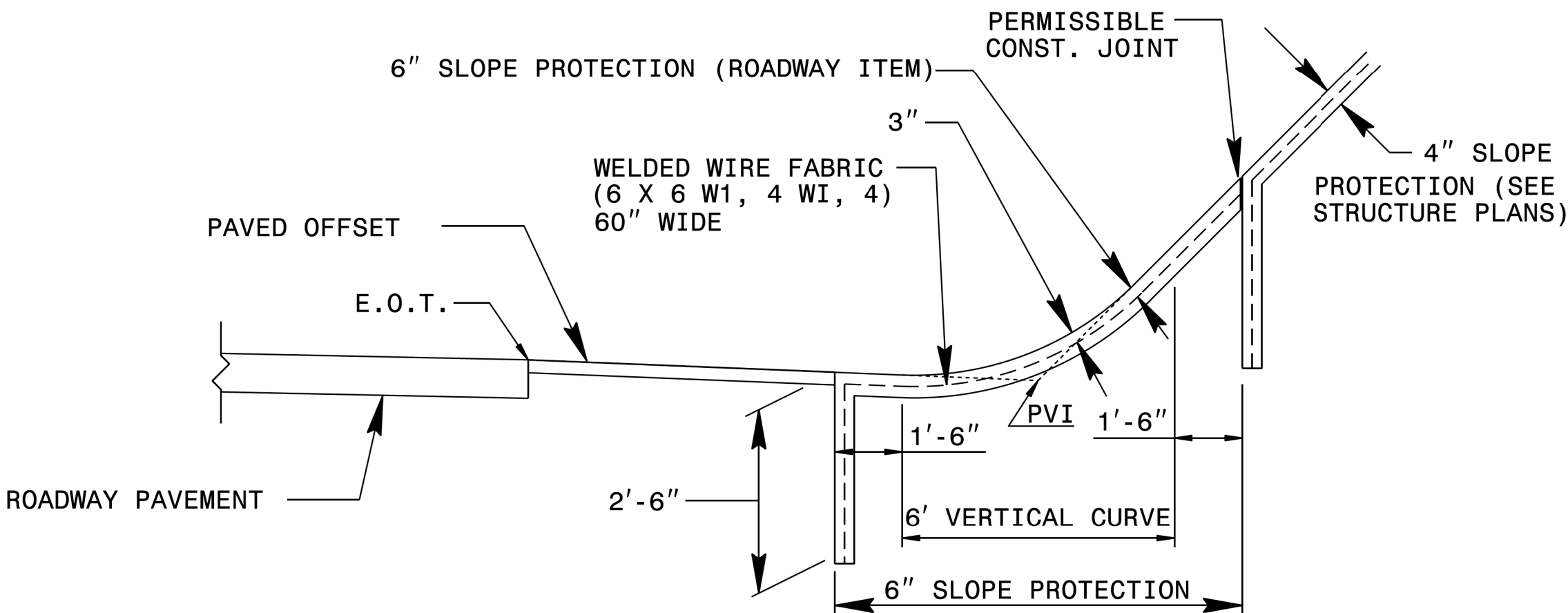
VERTICAL CURVE OFFSET
(FOR 6' V.C. AT BRIDGES)



NOTES:
PAVE THE FULL WIDTH OF THE SHOULDER AS SHOWN WITH SHOULDER PAVEMENT MATERIAL AS SHOWN ON PLANS.
* PAVED OFFSET BASED ON BRIDGE POLICY (SEE STRUCTURE PLANS).
PROTECT SLOPE WITH REINFORCED CONCRETE PAVING. CONCRETE BLOCK PAVING WILL NOT BE PERMITTED.
OFFSETS FOR 6' V.C. DENOTES FINISHED GRADE OF SLOPE PROTECTION.



TYPICAL SECTION



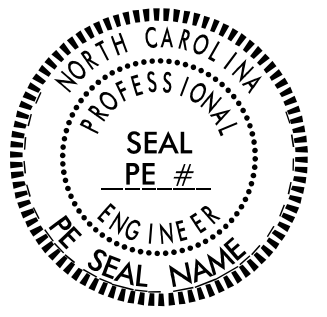
ELEVATION



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

CONTRACT STANDARDS AND DEVELOPMENT UNIT Office 919-707-6950 FAX 919-250-4119	
SEE TITLE BLOCK	
ORIGINAL BY: J. HOWERTON	DATE: 06-22-12
MODIFIED BY:	DATE:
CHECKED BY:	DATE:
FILE SPEC.:	

GEOTECHNICAL ENGINEER



ENGINEER

SIGNATURE _____ DATE _____

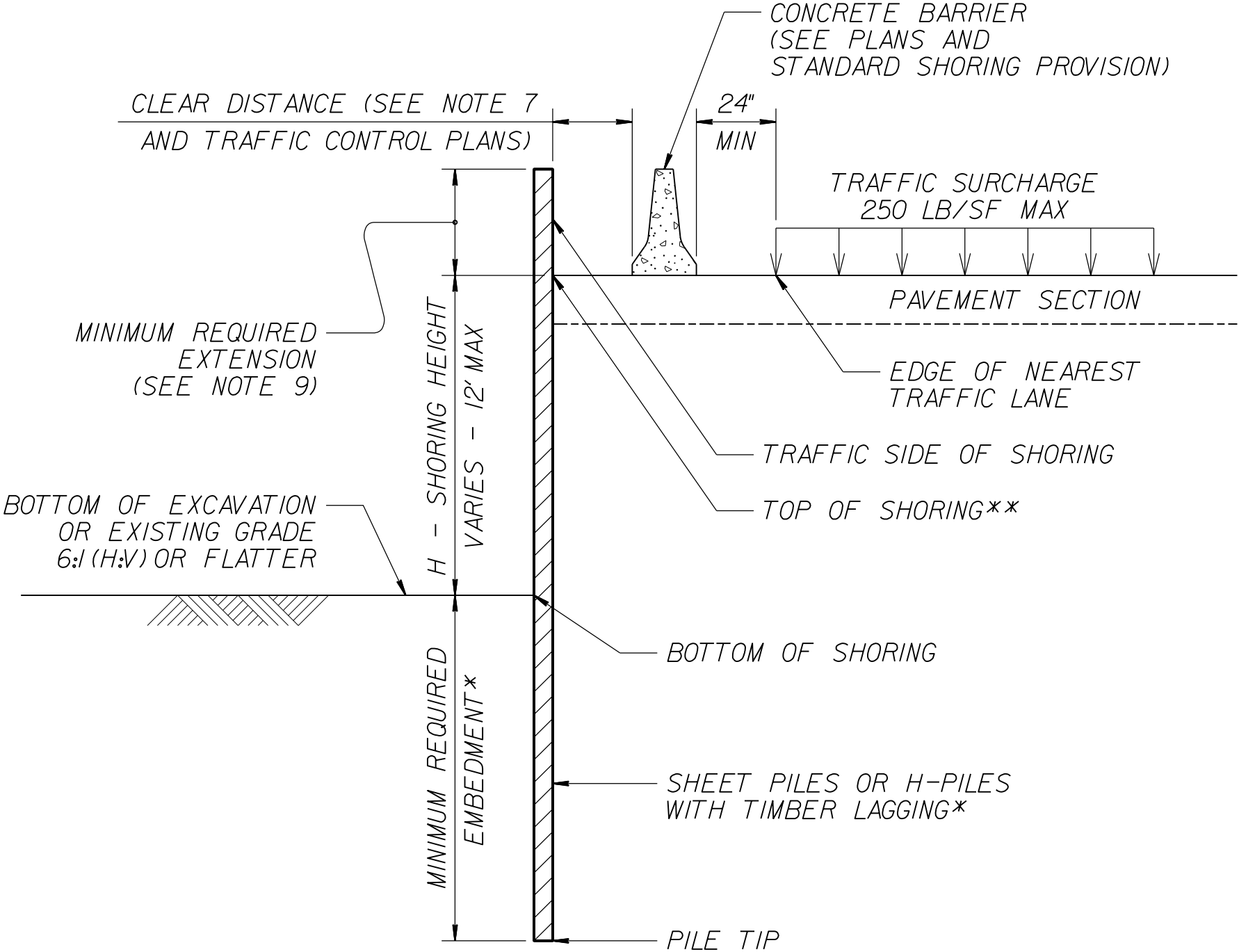
SIGNATURE _____ DATE _____

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

- NOTES:
- AT THE CONTRACTOR'S OPTION,USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
 - FOR STANDARD TEMPORARY SHORING,SEE STANDARD SHORING PROVISION.
 - STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
UNIT WEIGHT, γ = 120 LB/CF
FRICTION ANGLE, ϕ = 30 DEGREES
COHESION, c = 0 LB/SF
 - DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
 - DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
 - USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS,USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
 - AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER,SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
 - AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL,ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
 - MINIMUM REQUIRED EXTENSION IS 6' FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
 - MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION,EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
 - SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM:
connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
 - CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.

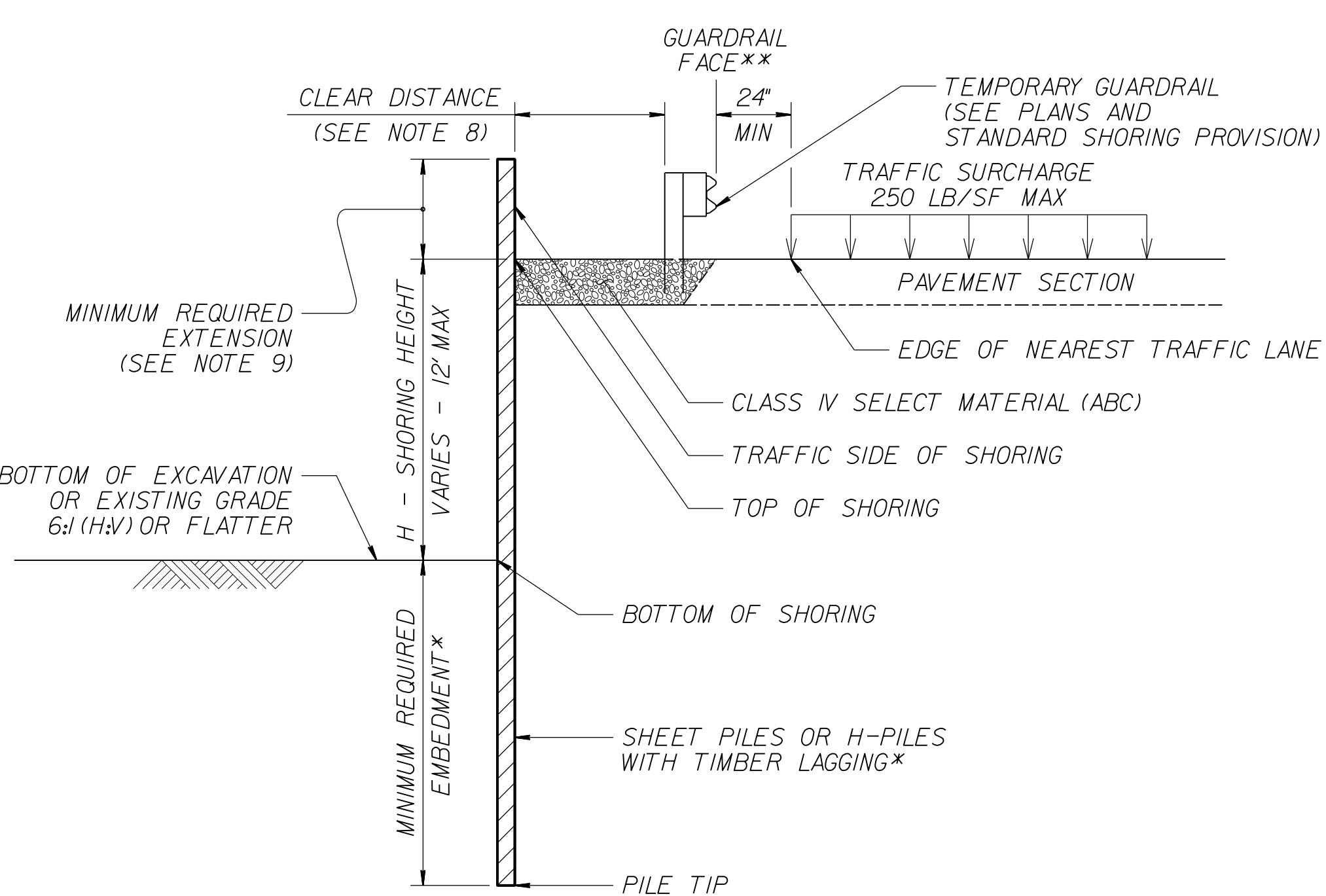
MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

***DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".**



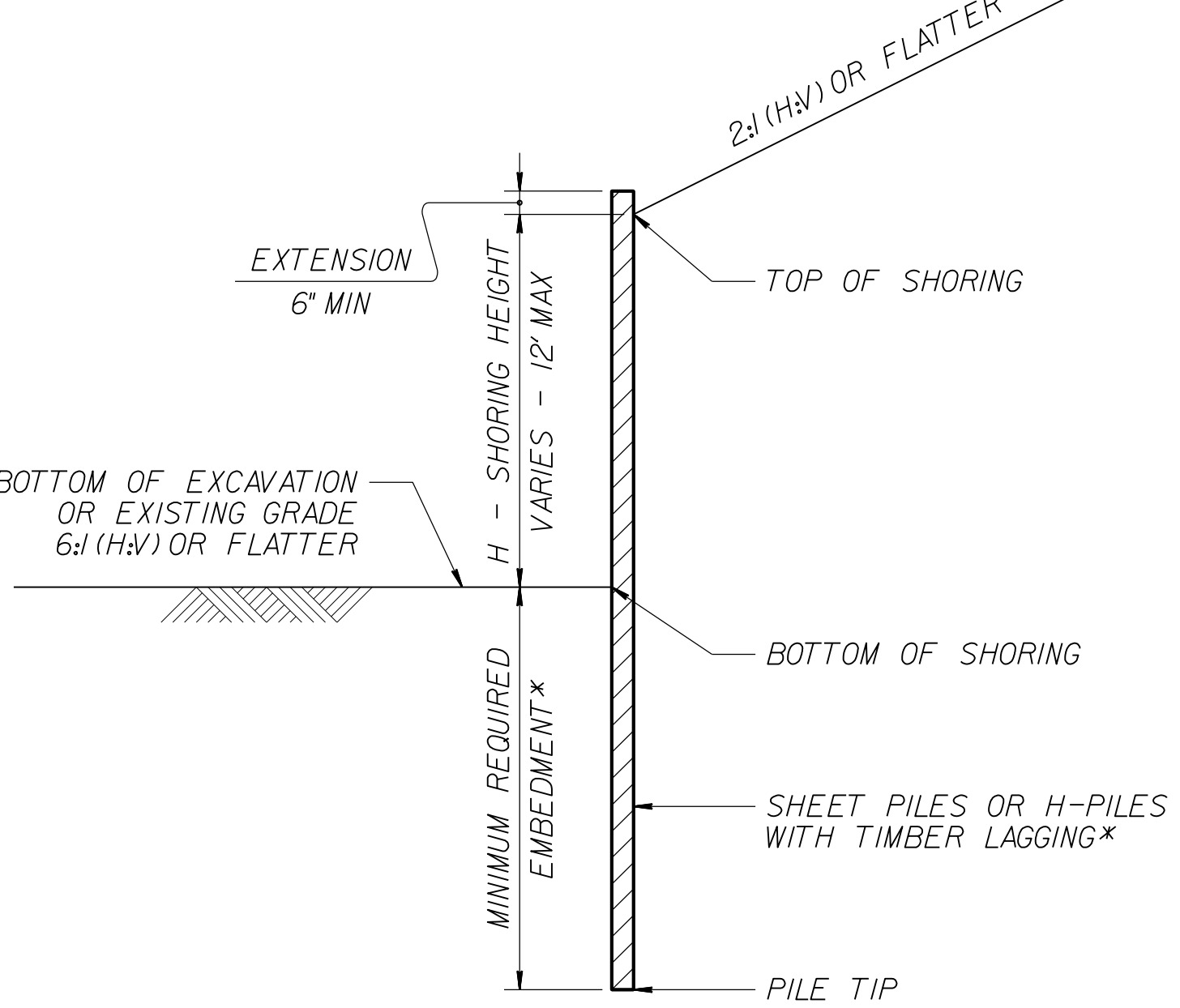
CONCRETE BARRIER

****TOP OF SHORING = EDGE OF PAVEMENT**



TEMPORARY GUARDRAIL

****GUARDRAIL FACE = EDGE OF PAVEMENT**



STANDARD TEMPORARY SHORING

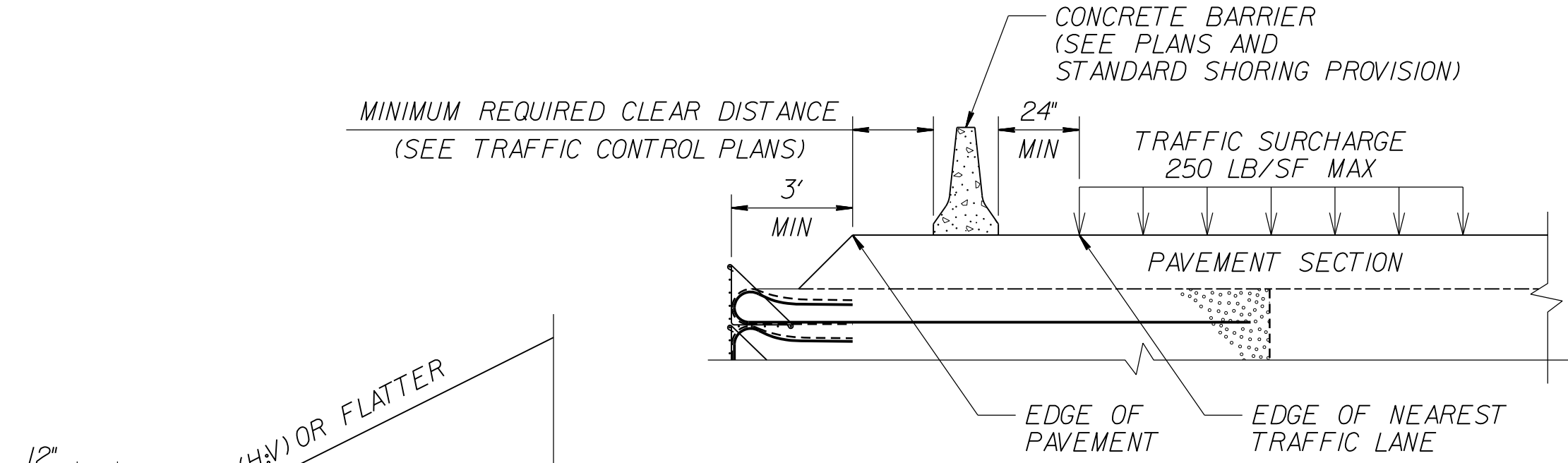
(SLOPE CASE)

***SEE TABLE ABOVE.**

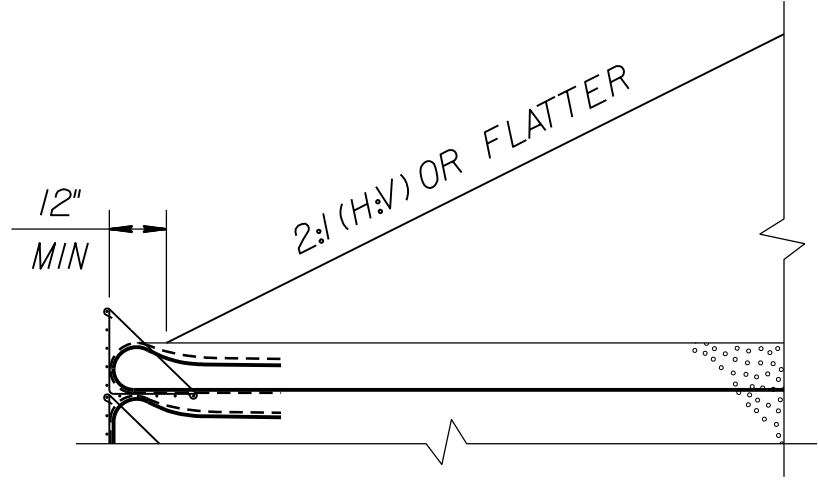
STANDARD TEMPORARY SHORING

(SURCHARGE CASE)

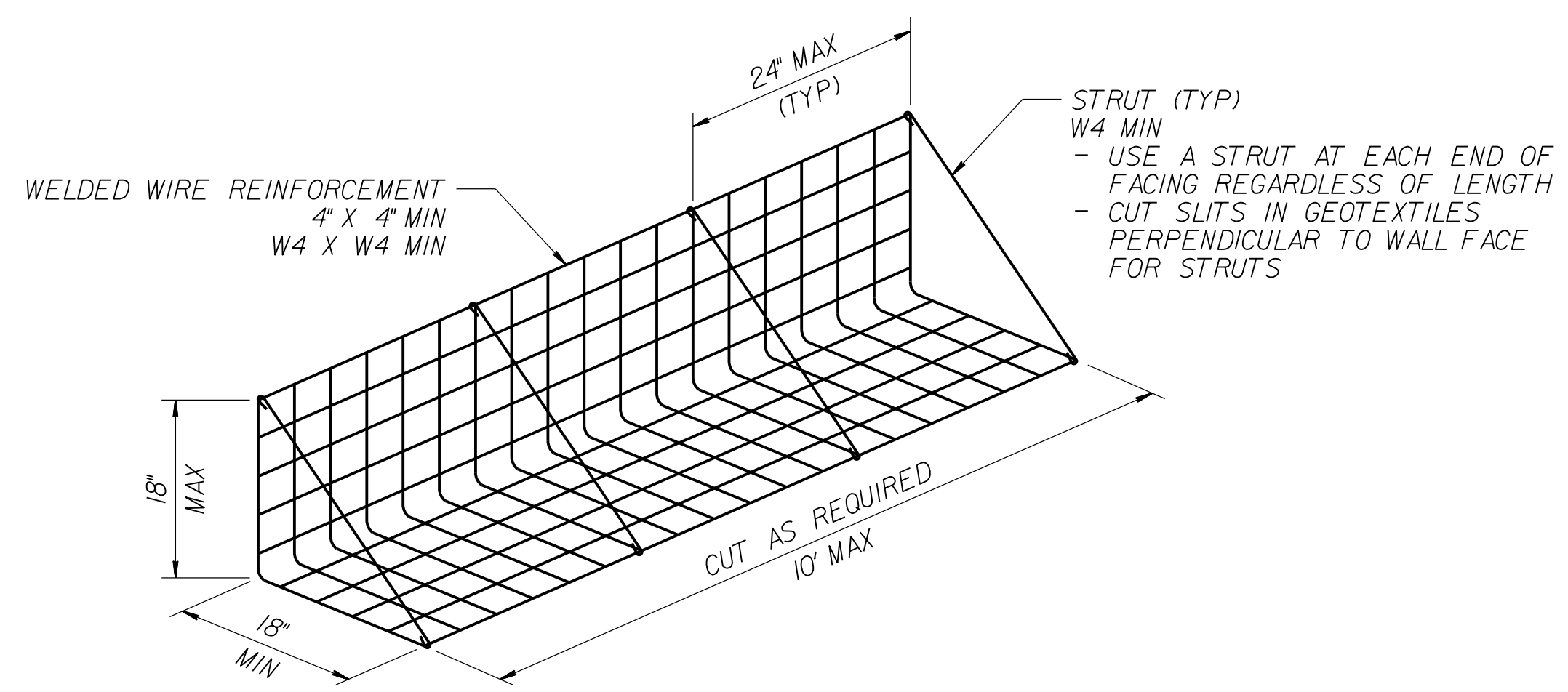
***SEE TABLE ABOVE.**



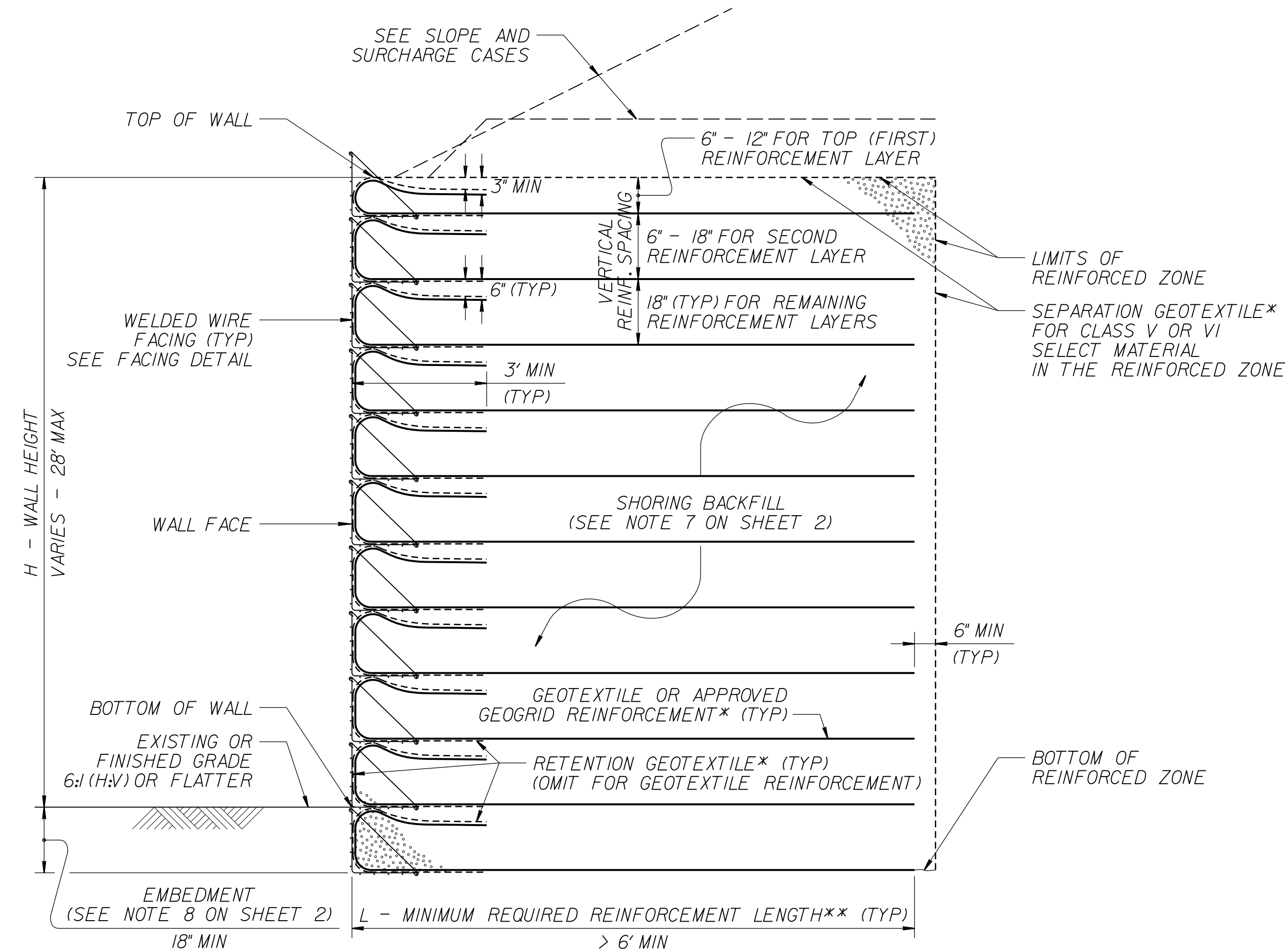
SURCHARGE CASE



SLOPE CASE

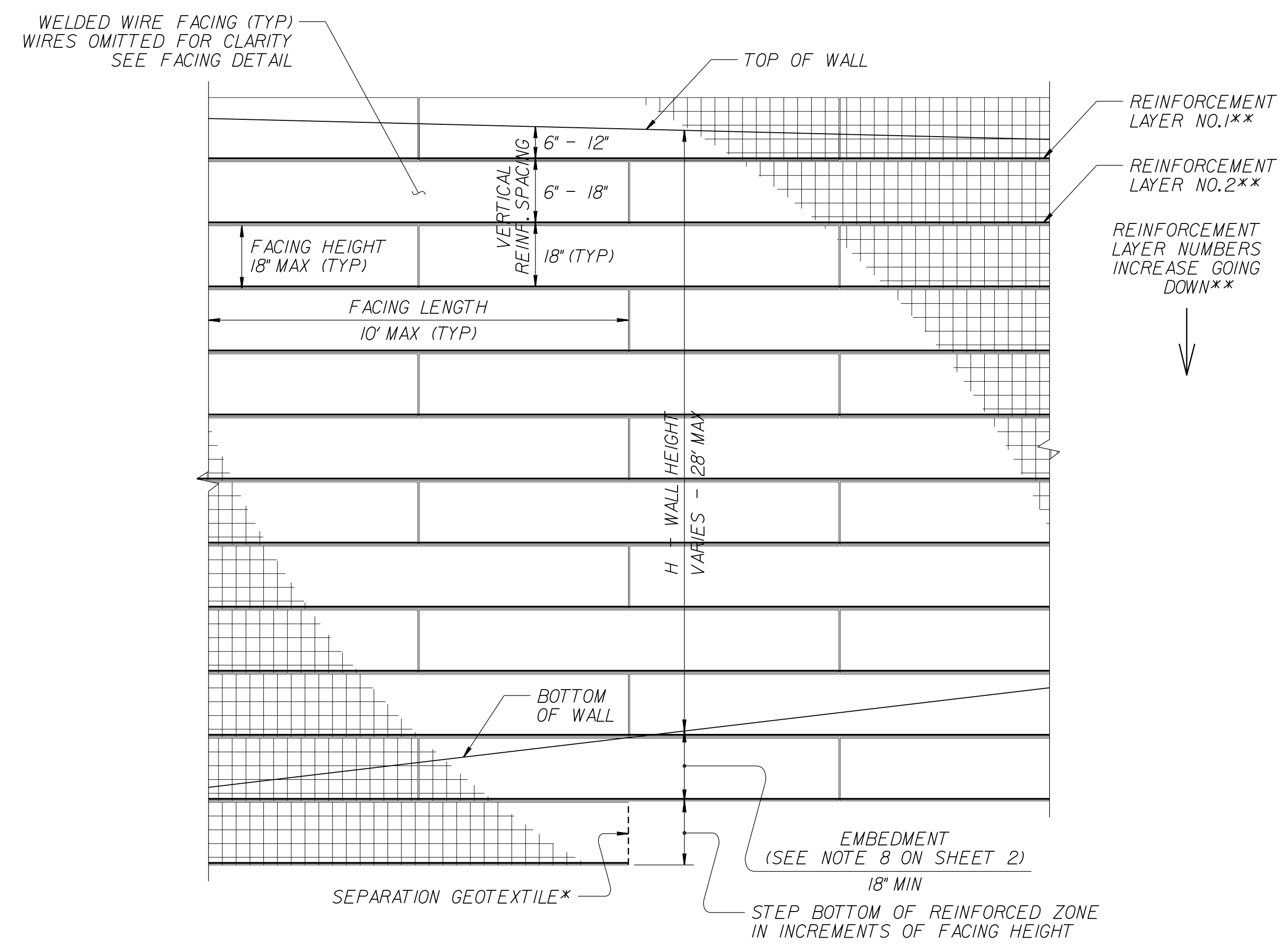


FACING DETAIL



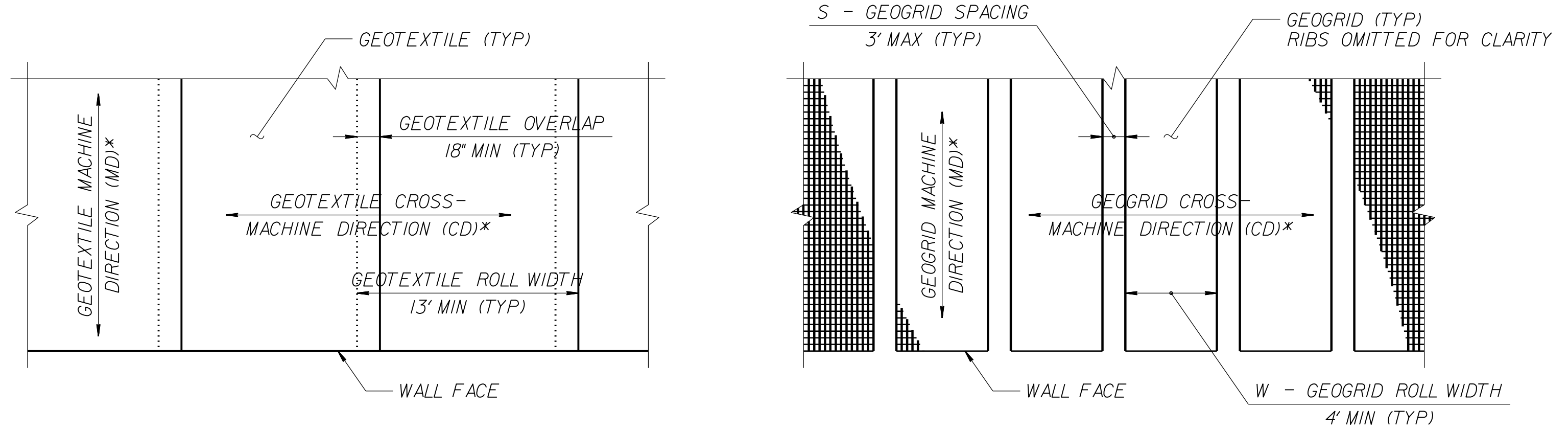
STANDARD TEMPORARY WALL

(FOR STANDARD TEMPORARY WALLS ON STRUCTURES, SEE TEMPORARY WALL ON STRUCTURE DETAIL ON SHEET 2.)
*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
**SEE REINFORCEMENT TABLES ON SHEET 3.



STANDARD TEMPORARY WALL – PARTIAL ELEVATION

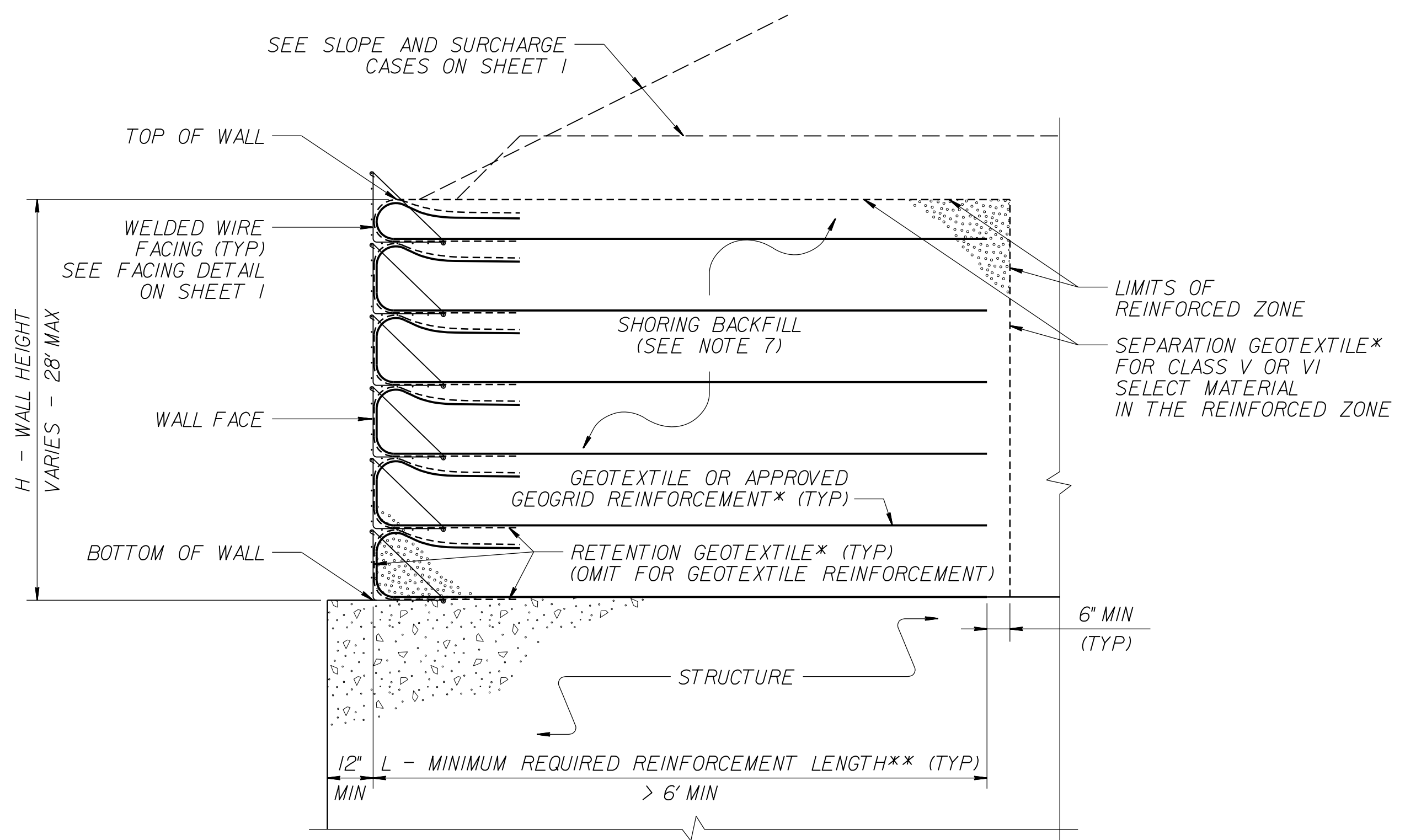
*SEE GEOSYNTHETIC PLACEMENT DETAILS ON SHEET 2.
**SEE REINFORCEMENT TABLES ON SHEET 3.



GEOTEXTILE PLACEMENT
(100% COVERAGE MIN FOR
GEOTEXTILE REINFORCEMENT)

GEOGRID PLACEMENT
(80% COVERAGE MIN FOR
GEOGRID REINFORCEMENT –
 $\frac{W}{W+S} \times 100 \geq 80\%$,
SEE NOTE 11)

GEOSYNTHETIC PLACEMENT DETAILS
(PLAN VIEW)
*SEE NOTE 12.



TEMPORARY WALL ON STRUCTURE DETAIL
*SEE GEOSYNTHETIC PLACEMENT DETAILS.
**SEE REINFORCEMENT TABLES ON SHEET 3.

- NOTES:
1. AT THE CONTRACTOR'S OPTION,USE STANDARD TEMPORARY WALLS AS NOTED IN THE PLANS.
 2. FOR STANDARD TEMPORARY WALLS,SEE STANDARD SHORING PROVISION.
 3. STANDARD TEMPORARY WALLS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
UNIT WEIGHT, γ = 120 LB/CF
FRICTION ANGLE, ϕ = 30 DEGREES
COHESION, c = 0 LB/SF
 4. DO NOT USE STANDARD TEMPORARY WALLS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
 5. DO NOT USE STANDARD TEMPORARY WALLS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW TEMPORARY WALLS.
 6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS.IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS,ASSUME GROUNDWATER DEPTH IS LESS THAN 7'BELOW BOTTOM OF REINFORCED ZONE.DO NOT USE STANDARD TEMPORARY WALLS IF GROUNDWATER IS ABOVE BOTTOM OF REINFORCED ZONE.
 7. DO NOT USE A-2-4 SOIL FOR STANDARD TEMPORARY WALLS AROUND CULVERTS OR IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS FOR SLOPE CASES.DO NOT USE CLASS VISELECT MATERIAL IN THE REINFORCED ZONE OF STANDARD TEMPORARY WALLS WITH GEOTEXTILE REINFORCEMENT.
 8. EMBEDMENT IS NOT REQUIRED FOR STANDARD TEMPORARY WALLS ON STRUCTURES OR ROCK AS DETERMINED BY THE ENGINEER.
 9. DO NOT USE MORE THAN 4 DIFFERENT REINFORCEMENT STRENGTHS FOR EACH STANDARD TEMPORARY WALL.
 10. GEOGRIDS ARE TYPICALLY APPROVED FOR ULTIMATE TENSILE STRENGTHS IN THE MACHINE DIRECTION (MD)AND CROSS-MACHINE DIRECTION (CD)OR SHORT-TERM DESIGN STRENGTHS FOR A 3-YEAR DESIGN LIFE IN THE MD BASED ON MATERIAL TYPE.THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM:
connect.ncdot.gov/resources/Materials/Pages/SoilsLaboratory.aspx
DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SHORING BACKFILL AS FOLLOWS:

MATERIAL TYPE	SHORING BACKFILL
BORROW	A-2-4 SOIL
FINE AGGREGATE	CLASS II,TYPE I OR CLASS III SELECT MATERIAL
COARSE AGGREGATE	CLASS V OR VI SELECT MATERIAL

- IF THE WEBSITE DOES NOT LIST A SHORT-TERM DESIGN STRENGTH FOR AN APPROVED GEOGRID,USE A SHORT-TERM DESIGN STRENGTH EQUAL TO THE ULTIMATE TENSILE STRENGTH DIVIDED BY 3.5 FOR THE GEOGRID REINFORCEMENT.
11. FOR GEOGRID REINFORCEMENT WITH LESS THAN 100% COVERAGE,STAGGER REINFORCEMENT SO GEOGRIDS ARE CENTERED OVER GAPS IN THE REINFORCEMENT LAYER BELOW.
 12. AT THE CONTRACTOR'S OPTION,REINFORCEMENT MAY BE INSTALLED WITH THE MD PARALLEL TO THE WALL FACE IF BOTH OF THE FOLLOWING CONDITIONS OCCUR:
- W (REINFORCEMENT ROLL WIDTH) $\geq$ (MINIMUM REQUIRED REINFORCEMENT LENGTH) + 4.5' AND
- REINFORCEMENT STRENGTH IN CD $\geq$ MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD.
 13. SUBMIT A "STANDARD TEMPORARY WALL SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY WALL CONSTRUCTION.STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM:
connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx
 14. DO NOT PLACE SHORING BACKFILL OR REINFORCEMENT UNTIL EXCAVATION DIMENSIONS AND FOUNDATION MATERIAL ARE APPROVED.
 15. FOR STANDARD TEMPORARY WALLS WITH PILE FOUNDATIONS IN THE REINFORCED ZONE,DRIVE PILES THROUGH REINFORCEMENT AFTER CONSTRUCTING TEMPORARY WALLS.
 16. DO NOT SPLICE OR OVERLAP REINFORCEMENT SO SEAMS ARE PARALLEL TO THE WALL FACE.
 17. CONTACT THE ENGINEER WHEN EXISTING OR FUTURE OBSTRUCTIONS SUCH AS FOUNDATIONS,PAVEMENTS,PIPES,INLETS OR UTILITIES WILL INTERFERE WITH REINFORCEMENT.
 18. FOR STANDARD TEMPORARY WALLS WITH INTERIOR ANGLES LESS THAN 90 DEGREES,WRAP GEOSYNTHETICS AT ACUTE CORNERS AS DIRECTED BY THE ENGINEER.
 19. FOR STANDARD TEMPORARY WALLS WITH TOP OF WALL WITHIN 5'OF FINISHED GRADE,REMOVE TOP FACING AND INCORPORATE TOP REINFORCEMENT LAYER INTO FILL WHEN PLACING FILL IN FRONT OF WALL.

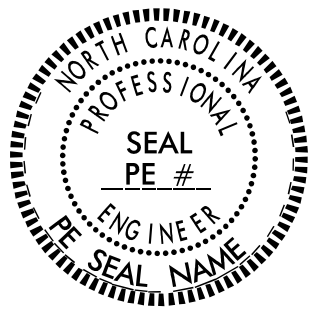
PROJECT REFERENCE NO.

B-4447

SHEET NO.

2G-4

GEOTECHNICAL ENGINEER



SIGNATURE _____ DATE _____

ENGINEER

SIGNATURE _____ DATE _____

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

WALL HEIGHT (H) + EMBEDMENT (FT)	NUMBER OF REINFORCEMENT LAYERS*
2.5 - 4	3
4 - 5.5	4
5.5 - 7	5
7 - 8.5	6
8.5 - 10	7
10 - 11.5	8
11.5 - 13	9
13 - 14.5	10
14.5 - 16	11
16 - 17.5	12
17.5 - 19	13
19 - 20.5	14
20.5 - 22	15
22 - 23.5	16
23.5 - 25	17
25 - 26.5	18
26.5 - 28	19
28 - 29.5	20

*BASED ON VERTICAL REINFORCEMENT SPACING SHOWN ON SHEET 1.

SLOPE OR SURCHARGE CASE	GROUNDWATER DEPTH BELOW BOTTOM OF REINFORCED ZONE (SEE NOTE 6 ON SHEET 2) (FT)	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)	H - WALL HEIGHT (FT)																											
			< 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28			
SLOPE CASE	> 0	CLASS II,TYPE I, CLASS III,CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	8	9	11	12	13	13	14	15	16	17	18	19	20	21	22	23	24	24	25	26	27	27			
SURCHARGE CASE	> 0 TO 7 FOR H < 20' > 0 TO 10 FOR H ≥ 20'	ALL SHORING BACKFILL TYPES	6	7	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	17	17	18	19	19	20	21	22			
	> 7 FOR H < 20' > 10 FOR H ≥ 20'	A-2-4 SOIL	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16	17	18	18	19	20	20	21			
		CLASS II,TYPE I OR CLASS III SELECT MATERIAL	6	6	7	7	8	8	9	10	10	11	11	12	12	13	14	15	15	16	16	17	17	18	18	19	20			
		CLASS V OR CLASS VI SELECT MATERIAL	6	6	7	7	7	8	8	9	9	10	10	11	12	13	13	14	14	15	15	16	17	17	18	19	19			

L – MINIMUM REQUIRED REINFORCEMENT LENGTH (FT)
(FOR ALL REINFORCEMENT TYPES)

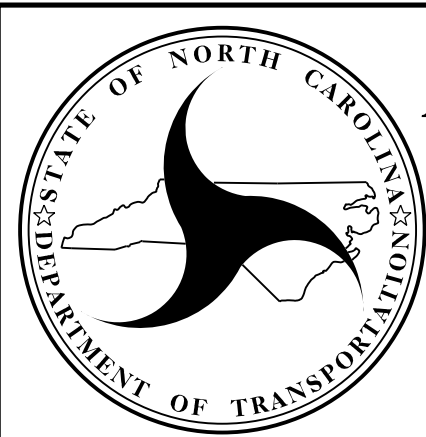
REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL	A-2-4 SOIL	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V SELECT MATERIAL
1	2400	2400	2400	2400	2400
2	2400	2400	2400	2400	2400
3	2400	2400	2400	2400	2400
4	2400	2400	2500	2400	2400
5	2500	2400	3000	2400	2400
6	3000	2400	3500	2800	2400
7	3500	2700	4000	3200	2600
8	4000	3100	4500	3600	2900
9	4500	3500	5000	4000	3200
10	5000	3900	5500	4400	3500
11	5500	4300	6000	4800	3800
12	6000	4700	6500	5200	4100
13	6500	5100	7000	5600	4400
14	7000	5400	7500	6000	4700
15	7500	5800	8000	6400	5000
16	8000	6200	8500	6800	5300
17	8500	6600	9000	7200	5600
18	9000	7000	9500	7600	5900
19	9500	7400	10000	8000	6200
20	10000	7800	10500	8400	6500

GEOTEXTILE REINFORCEMENT
ULTIMATE TENSILE STRENGTH (LB/FT)

REINFORCEMENT LAYER NUMBER*	SHORING BACKFILL TYPE IN THE REINFORCED ZONE (SEE NOTE 7 ON SHEET 2)				
	SLOPE CASE		SURCHARGE CASE		
	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL	A-2-4 SOIL	CLASS II,TYPE I OR CLASS III SELECT MATERIAL	CLASS V OR CLASS VI SELECT MATERIAL
1	240	200	340	290	240
2	380	310	520	430	350
3	530	420	700	570	460
4	690	550	870	720	570
5	860	690	1050	860	680
6	1030	830	1220	1000	790
7	1200	970	1400	1150	900
8	1370	1110	1580	1290	1010
9	1550	1240	1750	1430	1120
10	1720	1380	1930	1580	1230
11	1890	1520	2100	1720	1340
12	2060	1660	2280	1860	1450
13	2240	1800	2450	2010	1560
14	2410	1940	2630	2150	1670
15	2580	2080	2800	2290	1780
16	2750	2220	2980	2440	1890
17	2930	2360	3160	2580	2000
18	3100	2500	3330	2720	2110
19	3270	2640	3510	2860	2220
20	3440	2780	3690	3000	2330

GEOGRID REINFORCEMENT
SHORT-TERM DESIGN STRENGTH (LB/FT)
(SEE NOTE 10 ON SHEET 2.)

MINIMUM REQUIRED REINFORCEMENT STRENGTH IN MD
(SEE NOTE 9 ON SHEET 2.)
*SEE PARTIAL ELEVATION ON SHEET 1
FOR REINFORCEMENT LAYER NUMBERING.



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL
ENGINEERING UNIT

STANDARD DETAIL NO. 1801.02

STANDARD
TEMPORARY WALL
SHEET 3 OF 3

IN CUBIC YARDS

UNDERCUT EXCAVATION = 400 CY (Contingency) GRADE POINT UNDERCUT = 220 CY TOTAL UNDERCUT = 620 CY SELECT GRANULAR MATERIAL = 620 CY (Contingency) GEOTEXTILE FOR SOIL STABILIZATION = 400 SY (Contingency) UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE = 100 CY (Contingency)	Note: Approximate quantities only. Unclassified Excavation, Fine Grading, Clearing and Grubbing, and Removal of Existing Pavement will be paid for at the contract lump sum price for grading.
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Note: Approximate quantities only. Unclassified Excavation, Fine Grading, Clearing and Grubbing, and Removal of Existing Pavement will be paid for at the contract lump sum price for grading.

TEMPORARY GUARDRAIL SUMMARY

STATION TO STATION	LT. OR RT.	FABRIC L.F.	4" POSTS	5" POSTS
16+60 TO 25+36	RT.	946.50	59	16
24+25 TO 25+15	LT	115.00	6	4
25+94 TO 26+52	LT	81.00	4	4
26+53 TO 26+67	RT.	72.00	3	4
TOTAL		1,214.50	72	28
SAY		1,220	72	28

IN SQUARE YARDS

IN LINEAR FEET

TEMPORARY GUARDRAIL SUMMARY

GUARDRAIL SUMMARY

GUARDRAIL SUMMARY

[illegible]

G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

[illegible]

4/04/06

COMPUTED BY: DB	DATE :	10/9/15
CHECKED BY:	DATE :	

PROJECT REFERENCE NO.	SHEET NO.
B-4447	30-1

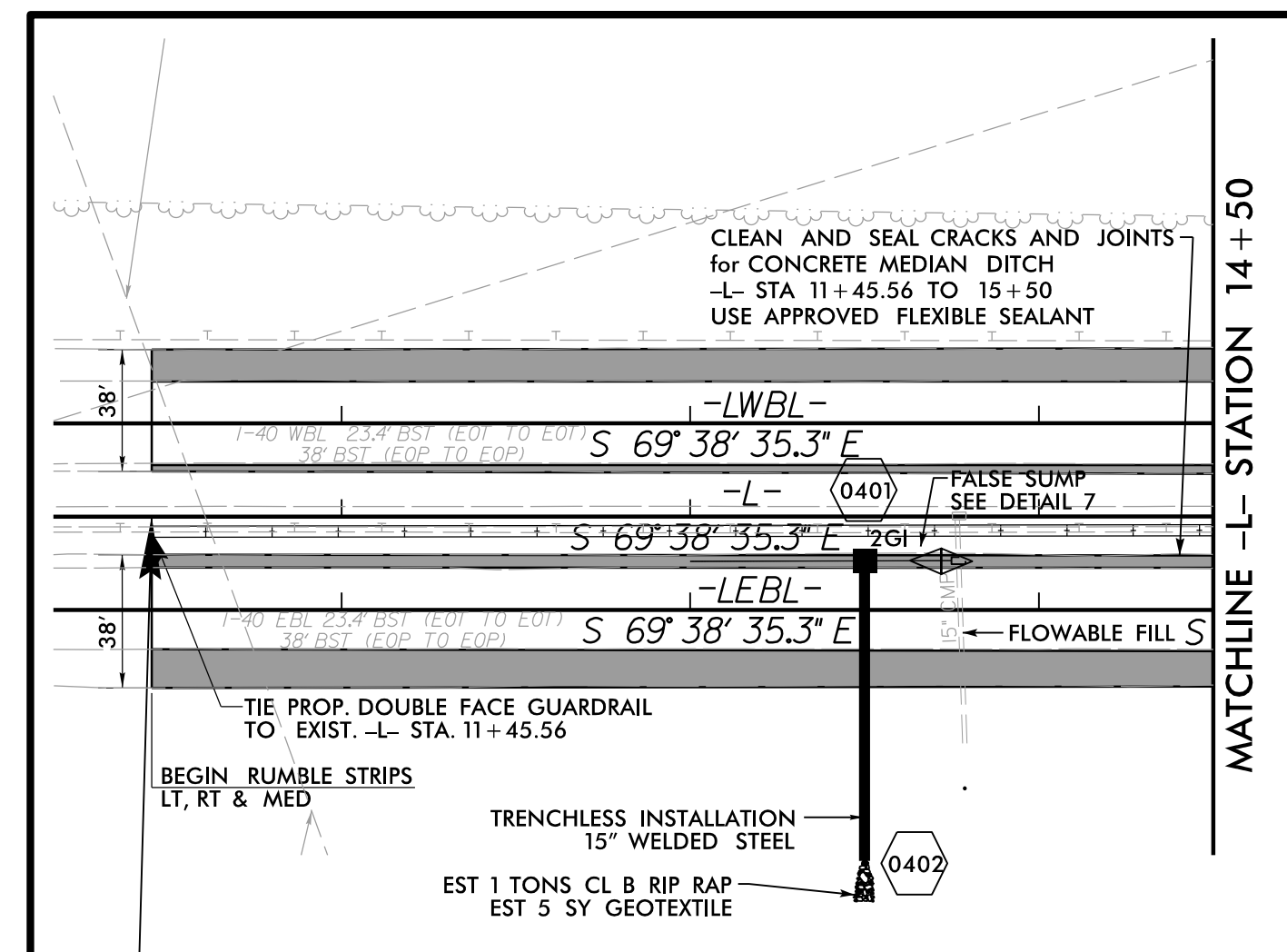
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

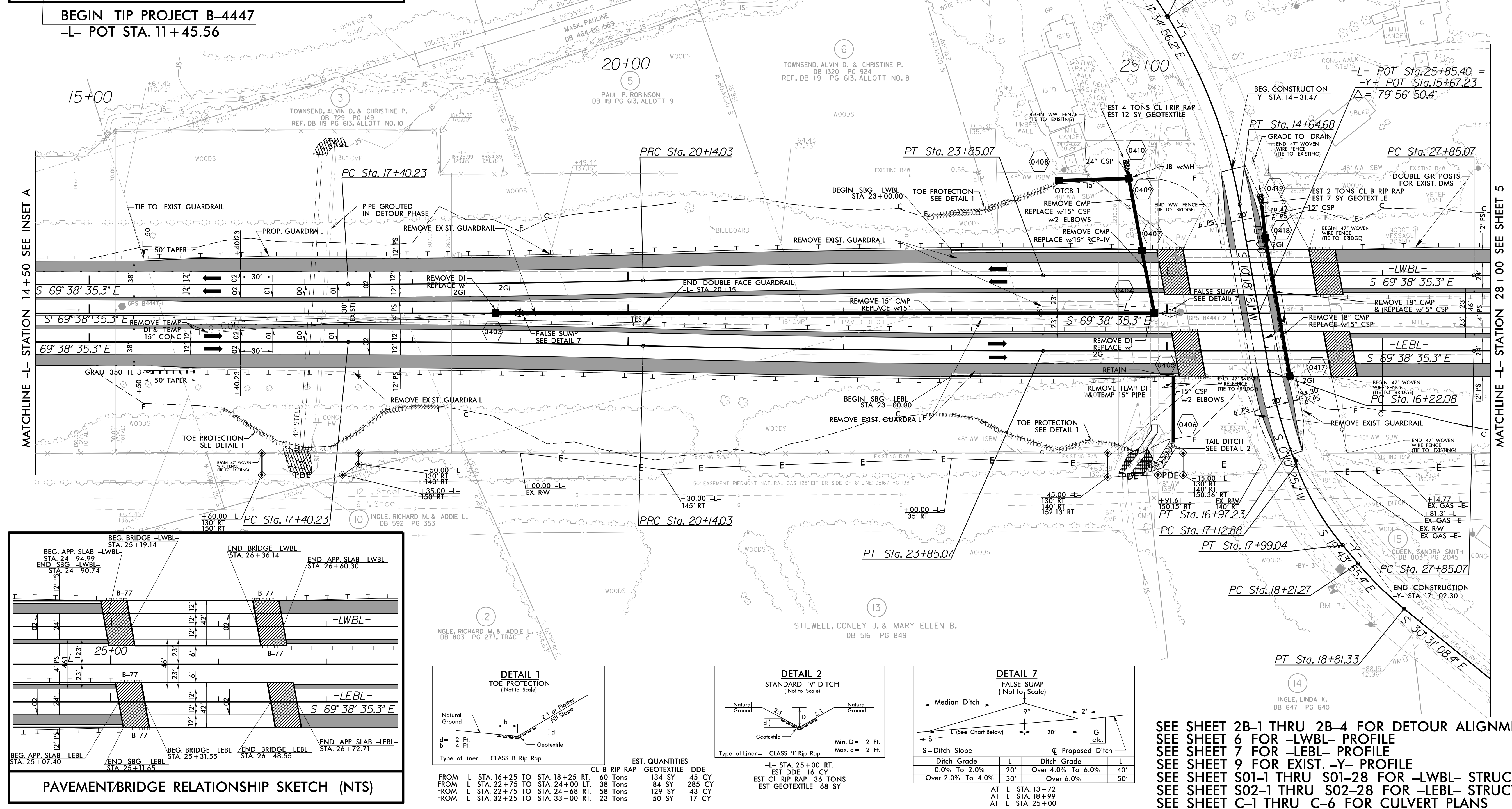
LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				UD	1,000
				TOTAL LF:	1,000

*UD = Underdrain
*BD = Blind Drain
*SD = Subsurface Drain

INSET A



BEGIN TIP PROJECT B-4447
-L- POT STA. 11+45.56



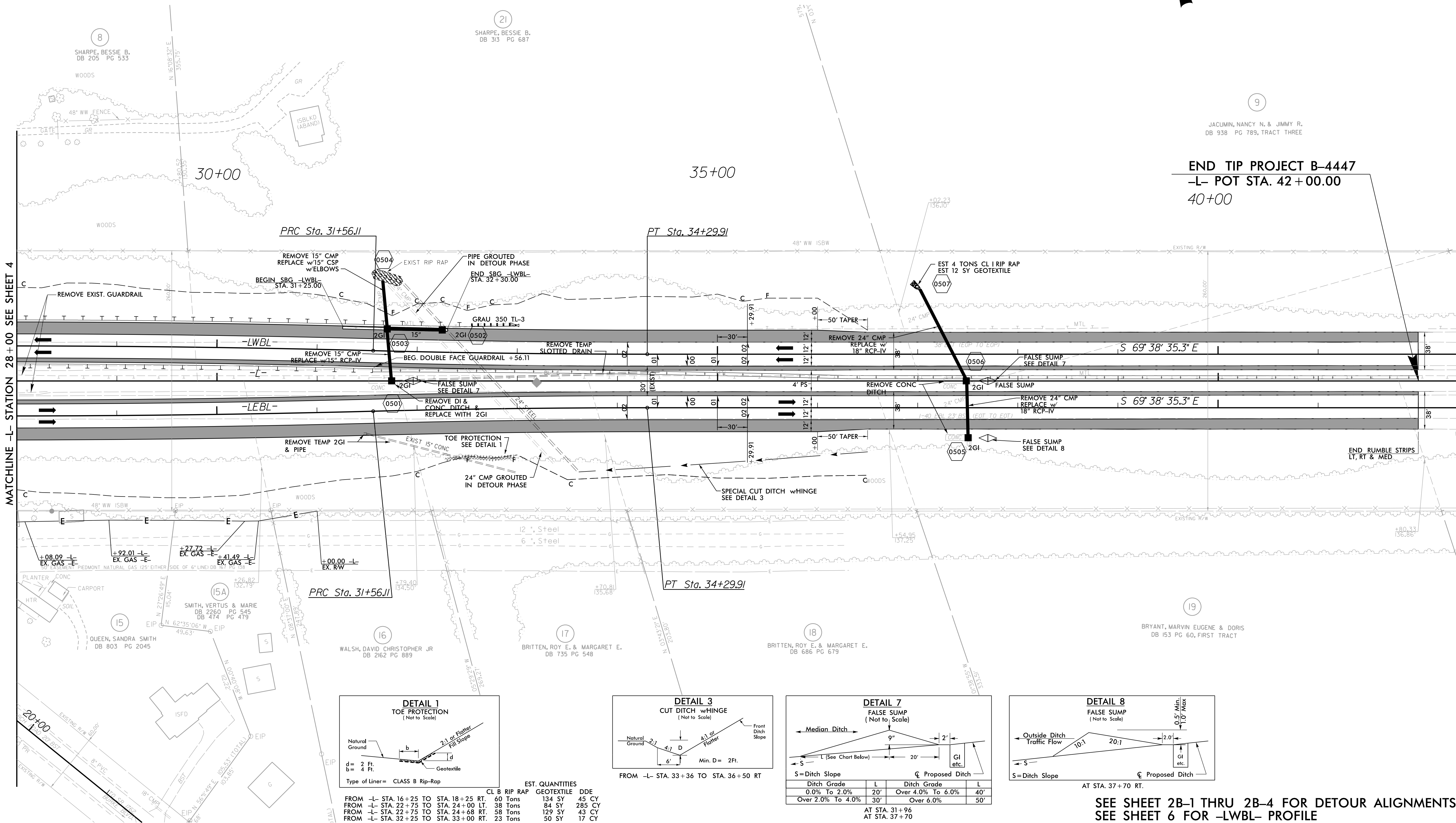
SEE SHEET 2B-1 THRU 2B-4 FOR DETOUR ALIGNMENTS
SEE SHEET 6 FOR -LWBL- PROFILE
SEE SHEET 7 FOR -LEBL- PROFILE
SEE SHEET 9 FOR EXIST.-Y- PROFILE
SEE SHEET S01-1 THRU S01-28 FOR -LWBL- STRUCTURE PLANS
SEE SHEET S02-1 THRU S02-28 FOR -LEBL- STRUCTURE PLANS
SEE SHEET C-1 THRU C-6 FOR CULVERT PLANS

8/17/99

REVISIONS

5/3/2017 B4447_Pd.dwg
USER:REK

-LWBL-		-LEBL-	
PI Sta 29+70.60	PI Sta 32+93.02	PI Sta 29+70.60	PI Sta 32+93.02
$\Delta = 1' 27' 58.1''$ (RT)	$\Delta = 1' 27' 58.1''$ (LT)	$\Delta = 1' 27' 58.1''$ (LT)	$\Delta = 1' 27' 58.1''$ (RT)
$D = 0' 23' 42.5''$	$D = 0' 32' 07.7''$	$D = 0' 23' 42.5''$	$D = 0' 32' 07.7''$
$L = 371.04'$	$L = 273.80'$	$L = 371.04'$	$L = 273.80'$
$T = 185.53'$	$T = 136.91'$	$T = 185.53'$	$T = 136.91'$
$R = 14,500.00'$	$R = 10,700.00'$	$R = 14,500.00'$	$R = 10,700.00'$
$SE = NC$	$SE = .02$	$SE = NC$	$SE = .02$
	$RO = 60'$		$RO = 60'$



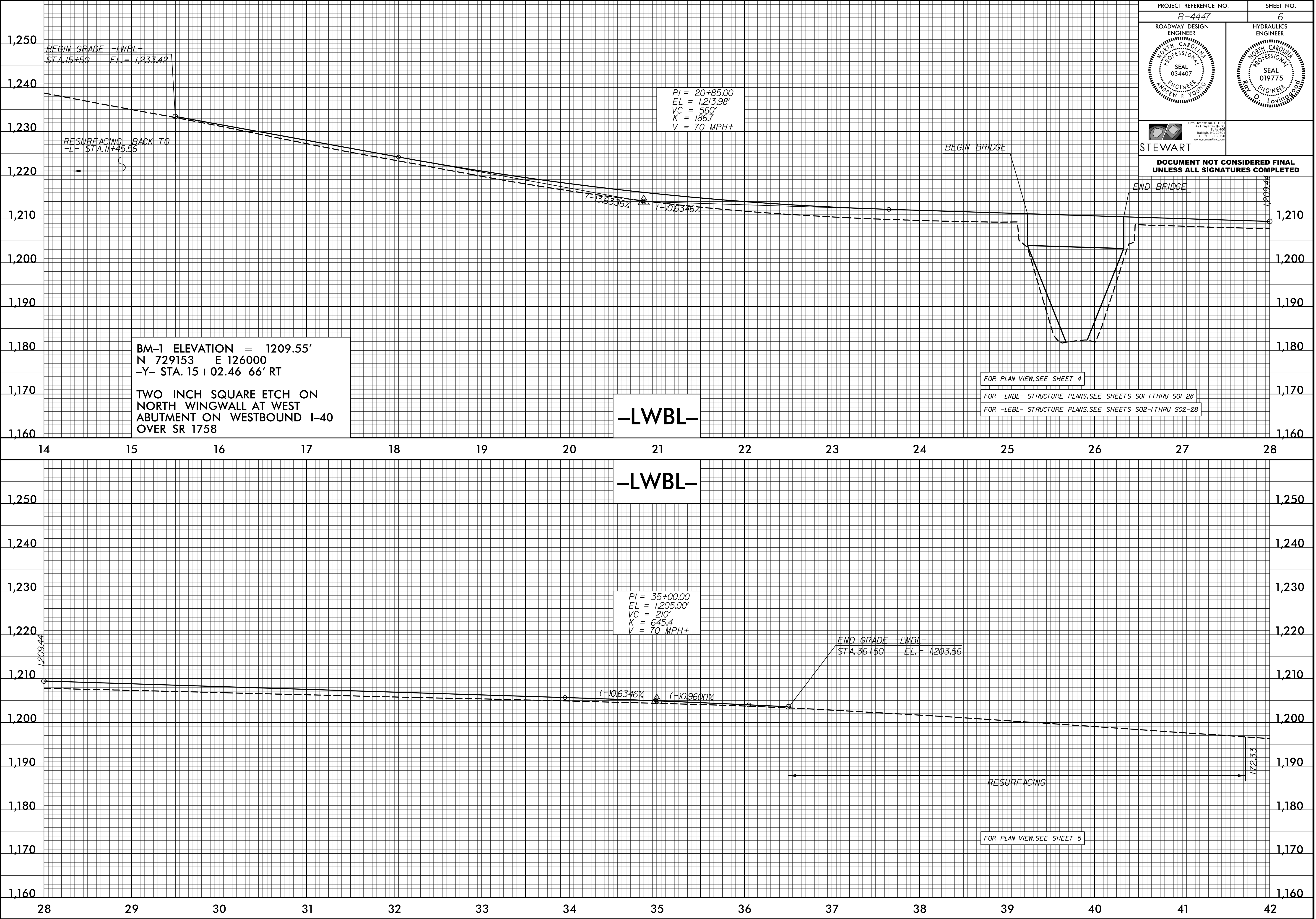
PROJECT REFERENCE NO. B-4447		SHEET NO. 5	
ROADWAY DESIGN ENGINEER SEAL 034407 ENGINEER ANDREW P. THOMAS		HYDRAULICS ENGINEER SEAL 019775 ENGINEER RAY D. LOVINGGOOD	
 STEWART			
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SEE SHEET 2B-1 THRU 2B-4 FOR DETOUR ALIGNMENTS
SEE SHEET 6 FOR -LWBL- PROFILE
SEE SHEET 7 FOR -LEBL- PROFILE

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USF666666

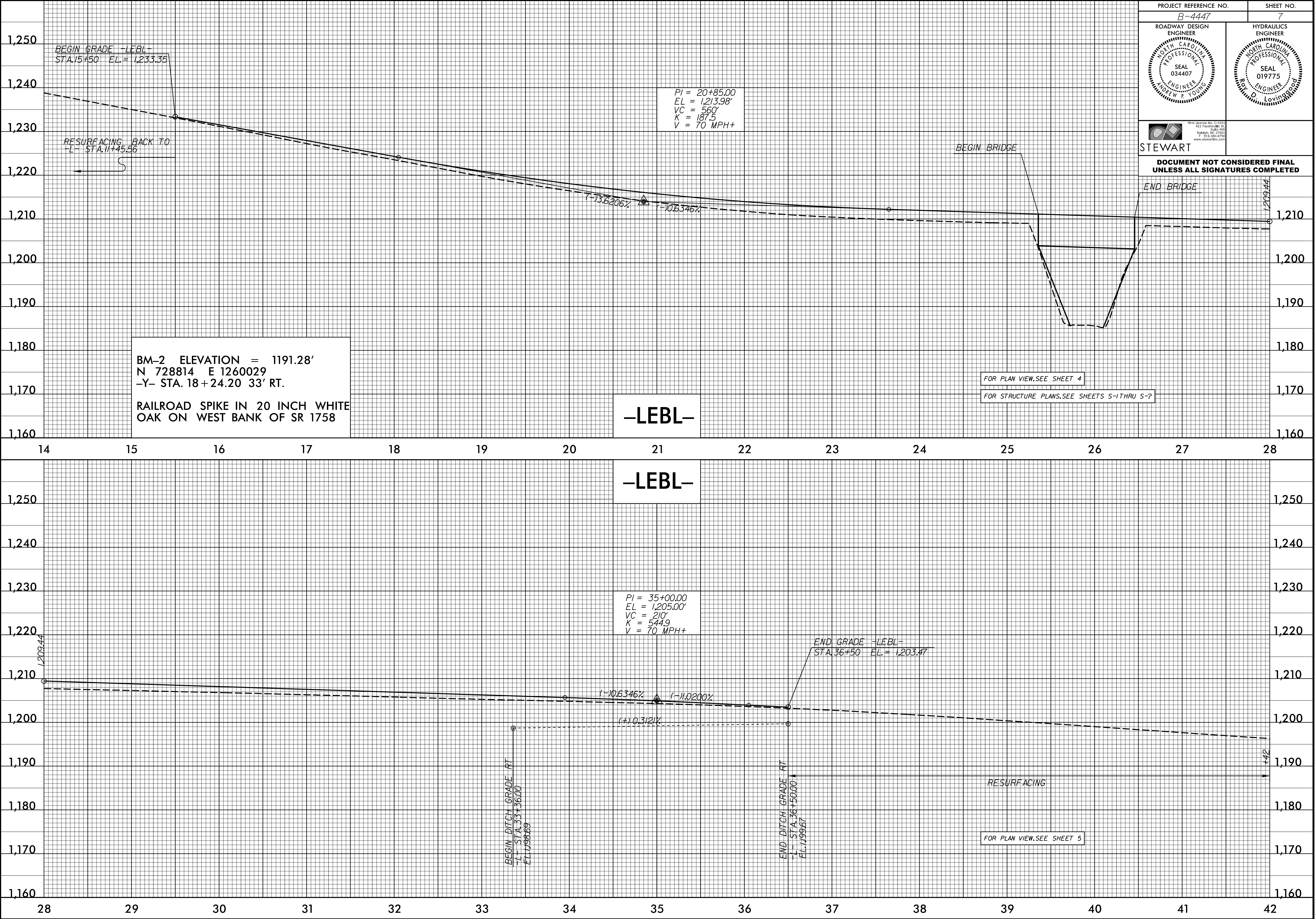


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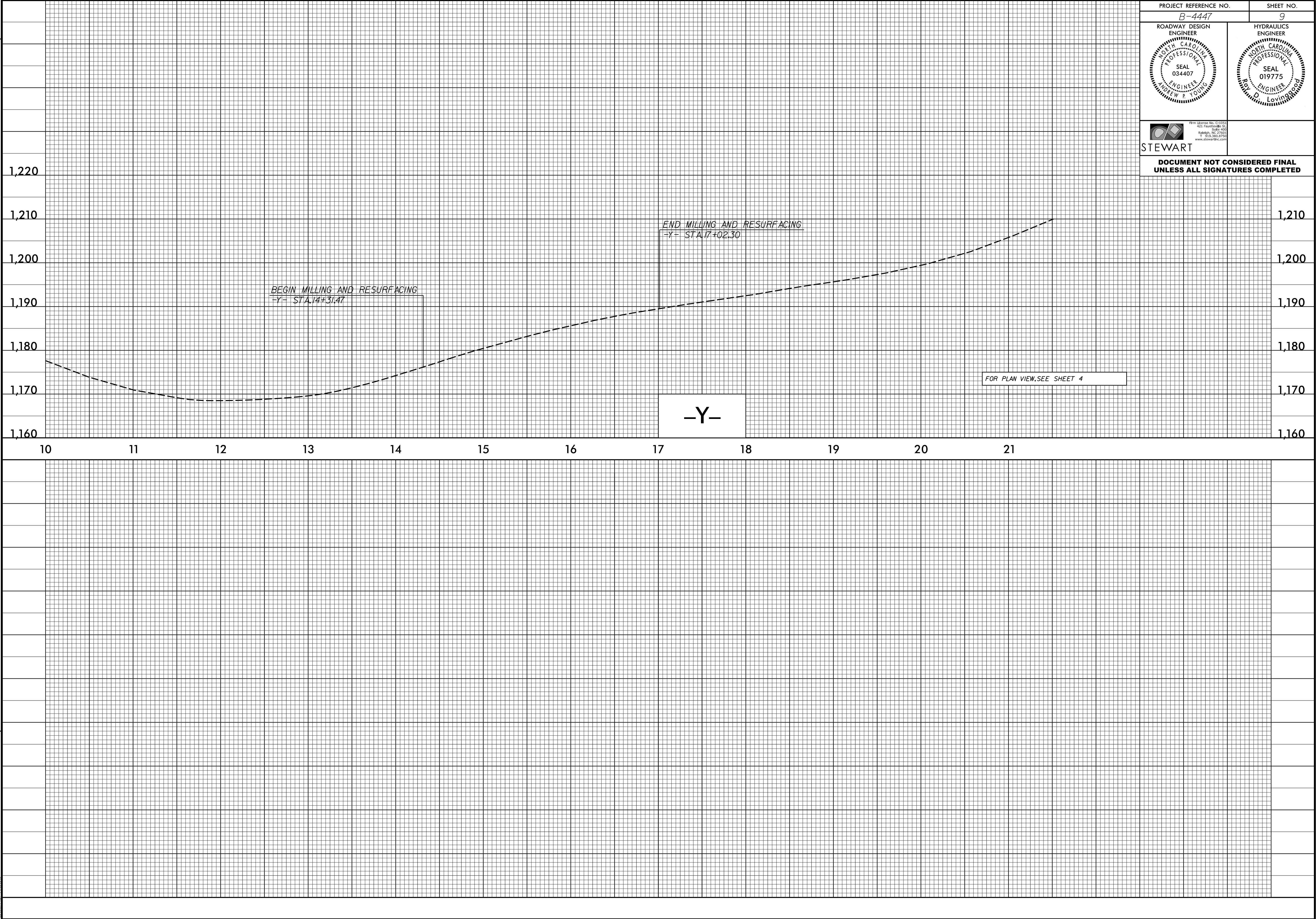
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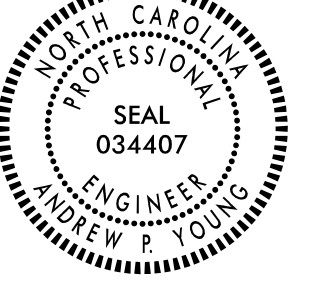
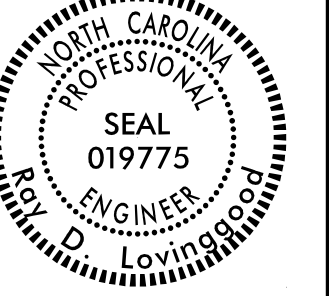


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PROJECT REFERENCE NO. <i>B-4447</i>		SHEET NO. <i>9</i>
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