STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

JOSH STEIN
GOVERNOR

October 24, 2025

DANIEL H. JOHNSON
SECRETARY

U. S. Army Corps of Engineers
Regulatory Field Office
151 Patton Avenue, Room 208
Asheville, NC 28805

NC Division of Water Resources
Transportation Permitting Branch
2090 U.S. 70 Highway
Swannanoa, NC 28778-8211

ATTN: Ms. Crystal Amschler, NCDOT Coordinator

Ms. Amy Annino, NCDOT Coordinator

Subject:
1) **Section 404 Nationwide Permit 3/33 & 401 Individual Water Quality Certification** for the "Upper Section" of NC 9 (from "Station 37" to the Buncombe County Line).
2) **Modification to Site 1 of the previously issued permits** for the "Lower Section" (NC 9 from US 74A to Station 37).
3) **Additional Information** pursuant to questions from the September 5, 2025 project "walk-thru"

Henderson County, Division 14, WBS 18314.1045061.

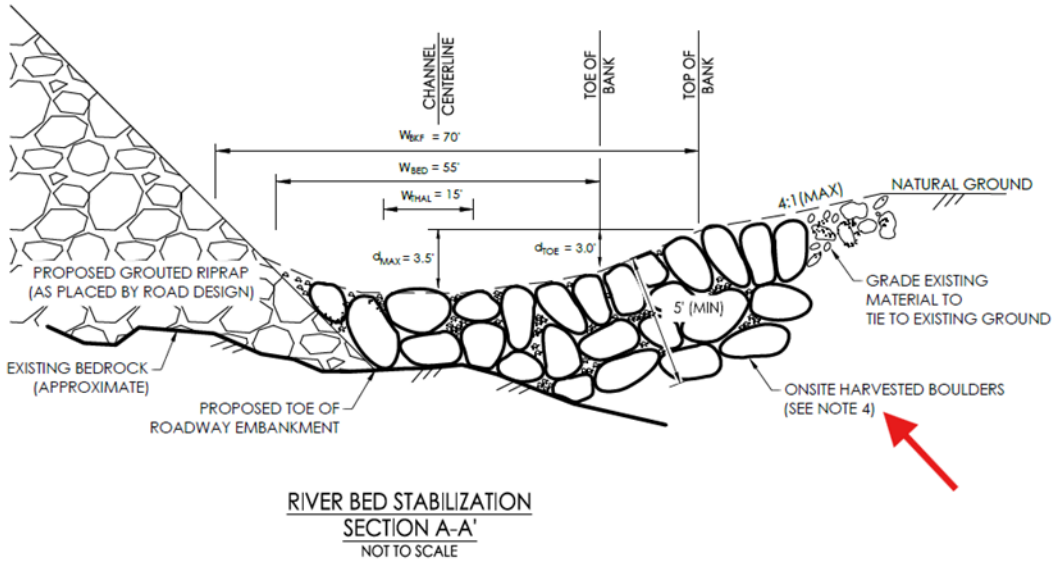
Reference: 404 Permit; Action ID: SAW-2025-00325, dated 8/8/2025.
401 Certification; Project No. 20250664, dated 8/4/2025.

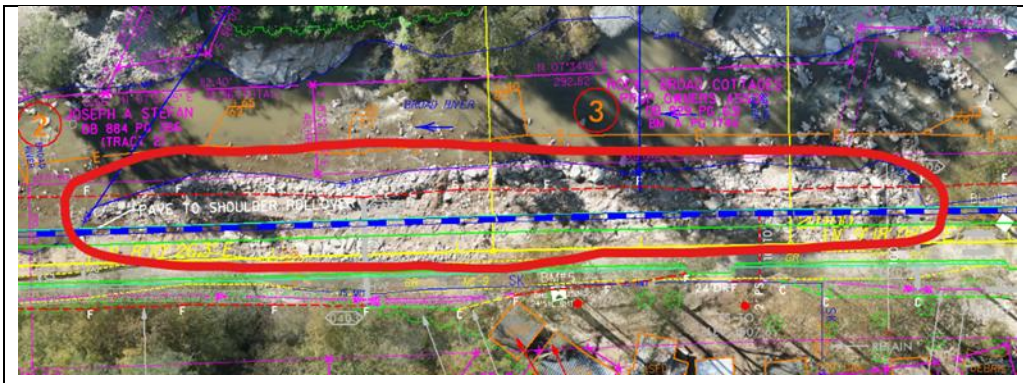
Dear Madams:

The North Carolina Department of Transportation (NCDOT) provides the following supplemental information, provided to answer question and provide additional information after the September 5, 2025 "virtual walk-thru" for the above referenced project.

Please find Walkthrough Comments, questions and NCDOT responses noted below.
Additionally, drawings have been revised as appropriate.

General
Amy Annino (DWR): Please include the dewatering detail(s) that will be used for the project. The detail(s) do not have to be site specific.
Response: The pump around operation detail for dewatering is included with the Erosion Control Plan Set. A pdf printout of the detail has been included with the supplemental packet for convenience.
Amy Annino (DWR): Please show the path of proposed stream channel along with the post-Helene stream channel or pre-Helene stream channel - differentiate by feature color or label.
Response: Estimated pre-Helene stream channel has been added to the drawings along with the suspected location of existing pipes using pre-storm LiDAR from NC Spatial Data. A legend has been added to the drawings to indicate the line style and color of the pre-Helene stream channel and existing pipe crossings.

Site 1
David McHenry (NC WRC): What is the proposed fill material shown in 1st screenshot along and across the river at site 1?
Response: All river material will consist of previously harvested river material which was deposited in upland areas and temporarily used to re-stabilize NC 9, on Sheet 4.
David McHenry (NC WRC): The application mentions the river bed is bedrock, but it also notes; All river material will consist of previously harvested river material which was deposited in upland areas and temporarily used to re-stabilize NC 9, on Sheet 4. Specifically, where is that material coming from? Is it the excavated road bed material in the attached picture (left side) where the single lane NC 9 has been (may still be)? I haven't been down there in a while so I'm not sure what other changes may have occurred down there in last 2-3 months.
Response: Here's an excerpt of the attached in-stream construction detail. Boulders will be harvested on-site along the river including using what's remaining of the temporary berm that was built right after the storm that allowed them to build the temporary gravel "road" right after the storm. Coincidently, the stream morphologists recommended that these boulders be removed because they were causing a high energy concentration that wasn't present in the river pre-Helene so they will be beneficially used to stabilize the river.    RIVER BED STABILIZATION SECTION A-A' NOT TO SCALE Boulders outlined in red below will be used in Site 1.



Note 4 will allow the contractor to use non-native boulders in the lower layer topped with the harvested layer if there are not enough harvested boulders.

NOTES:

1) DIMENSIONS ARE APPROXIMATE AND MAY BE SUBJECT TO CHANGE BASED ON FILED CONDITIONS AND THE DIRECTION OF THE ENGINEER AND/OR THE CLIENT REPRESENTATIVE.
2) CONSTRUCT RUN STRUCTURE BEGINNING AT THE DOWNSTREAM END AND MOVING IN THE UPSTREAM DIRECTION.
3) PLACE BOULDERS SO THEY ARE TOUCHING AND ORIENTED WITH THEIR DOWNSTREAM END PITCHED UP INTO THE FLOW AS SHOWN.
4) NON-NATIVE CLASS VII AND LARGER RIP RAP AND BOULDERS CAN BE USED IN NON-EXPOSED LOWER LAYERS OF THE IN-STREAM CONSTRUCTION WHEN A SUFFICIENT AMOUNT OF ONSITE HARVESTED BOULDERS ARE NOT AVAILABLE.

Crystal Amschler (USACE): How is the stream modification tie-in working?

Response: As discussed in the meeting, the tie-in was left vague since the River Morphologist Engineer would be on site to direct how to tie-in to the existing channel.

Scott Jones (USACE): Where is the debris near the stream mod from?

Response: The debris near the stream modification is all-natural consisting of rocks, trees, and other similar material.

Amy Annino (DWR): No comments on Site 1 from DWR.

David McHenry (NC WRC): Part of my confusion was I didn't notice any rock berm before. I still didn't notice it earlier this week when they were constructing what looks like a construction access and/or embankment base (see photos).

Response: We have been coordinating with Grant Ginn, a River Restoration Engineer hired by NCDOT, to oversee repairs of riverbeds like these damaged by Helene. He was in Bat Cave in September 2025, coordinating with Mike Patton, resident engineer for the projects in the area, and Wright Brothers who is constructing the first 1/4 mile of the project along the river. During his visit, he scouted the river and reported that he believes that there will be enough native boulders to do the in-stream construction. Grant worked directly with our engineers at Stantec to develop the In-Stream construction detail to move the thalweg over at Site 1.

continued

Berm in February 2025:

David McHenry (NC WRC): This week they were bringing in rock, I think, but maybe they had already pulled the berm under the embankment (?).

Response: Wright Brothers has a quarry nearby and the roadway embankment came from there.

David McHenry (NC WRC): I did request in my comments leaving some scattered large rock along that wall (aka embankment). That would provide flow disruption and offer some aquatic habitat heterogeneity and channel roughness (at least for awhile), which are particularly needed when hardened walls (in this case grouted rock) are constructed to line a river bank. I still recommend that, and that would be exposed boulders rather than rock that is fully embedded in the "smooth-ish" channel base (presumably also not grouted) as shown in the cross section.

Response: Cory Anderson and Chris Plummer, two stream engineers from Stantec, will be in the Broad River once the permit is approved, directing Wright Brothers to construct the stream realignment alongside Grant Ginn. They will be able to direct Wright Brothers to leave/place boulders along the grouted embankment as requested.

David McHenry (NC WRC): Per note 4, I hope they can obtain enough native alluvial material to top this channel with, much of which is under the road. That would be good if they could recoup some of that as the top-dressing.

Response: As noted above, Grant Ginn believes that there is enough.

Site 2

No comments.

Site 3

No comments.

Site 4

No comments.

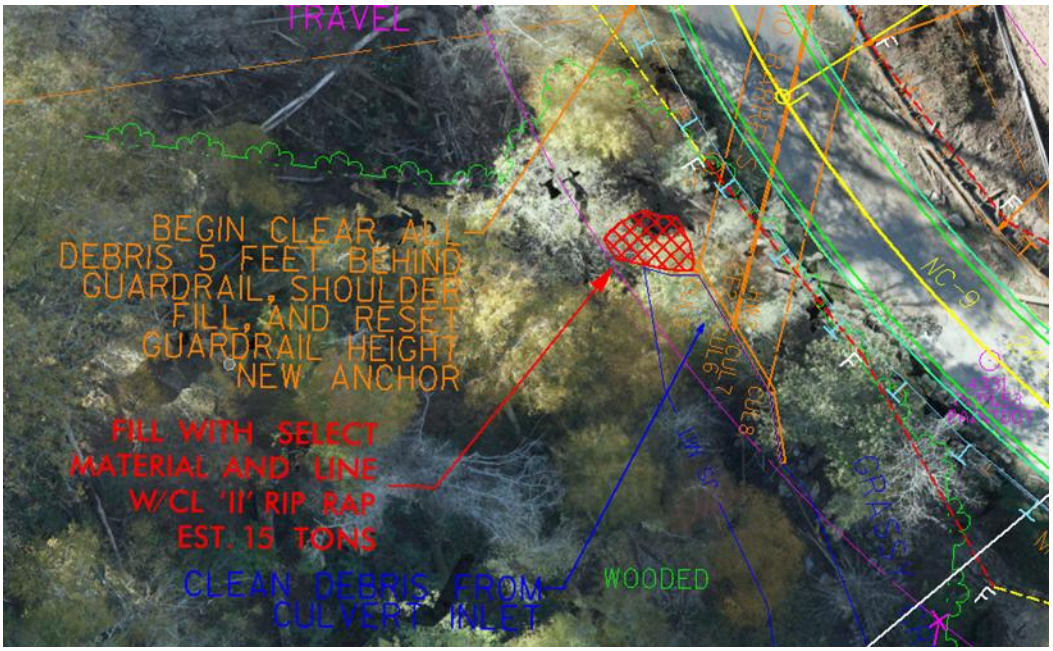
Site 5
Amy Annino (DWR): Please identify and differentiate the LF of proposed impact types (ex. rip rap fill, additional culvert pipe, channel relocation) and include the total LF for each in the impact table. Please differentiate temporary impact types (ex. rip rap fill, culvert pipe, dewatering) and include the total LF for each in the impact table. Please indicate approximate LF of pre-Helene culvert pipe and proposed LF of culvert pipe. Please include a detail showing the stream channel dimensions at the culvert outlet and how this stream will connect to the off-site 24" CMP.
Response: See detail 35. For the quantities, they have been broken out for both the inlet and outlet ends. Changed the verbiage from “Channel Relocation” to “Channel Replacement” since the proposed configuration is establishing the pre-storm streamline as best as possible considering the current existing conditions. The pre-Helene existing LF of the existing culvert has been added as a line item in the summary table. Please note that this estimated value is based solely on LiDAR obtained from NC Spatial Data. We do not have inlet/outlet locations for pipes, therefore, this value is speculative.
Crystal Amschler (USACE) & Amy Annino (DWR): Add outlet channel detail to maintain 2’ width.
Response: See detail 35. A note has been added to in the detail to key-in the supplemental rip rap to maintain the existing stream bed.
Revise clip boundary on Section 329/330 sheets to show full sheet instead of only Section 329.
Response: Clip boundary revised to show full sheet.

Site 6
Amy Annino (DWR): Please identify and differentiate the LF of proposed impact types (ex. rip rap fill, additional culvert pipe, channel relocation) and include the total LF for each in the impact table. Please differentiate temporary impact types (ex. rip rap fill, culvert pipe, dewatering) and include the total LF for each in the impact table. Please indicate approximate LF of pre-Helene culvert pipe and proposed LF of standard base ditch.
Response: Additional line items added to summary table to denote the different impact types. Existing approximate LF of pre-Helene culvert pipe has been added as a separate line item. Please note that this reported value is based solely on LiDAR obtained from NC Spatial Data. We do not have inlet/outlet locations for pipes, therefore, this value is speculative. The standard base ditch along the flow path of the ditch as shown in the plans is 150 LF, but the existing streamline distance is 131 LF.

Site 7

David McHenry (NC WRC): Also, at site 7, is that short class II section the fill planned to fix to the RCBC perch (and stabilize the right bank)? Attached is a picture of this area.

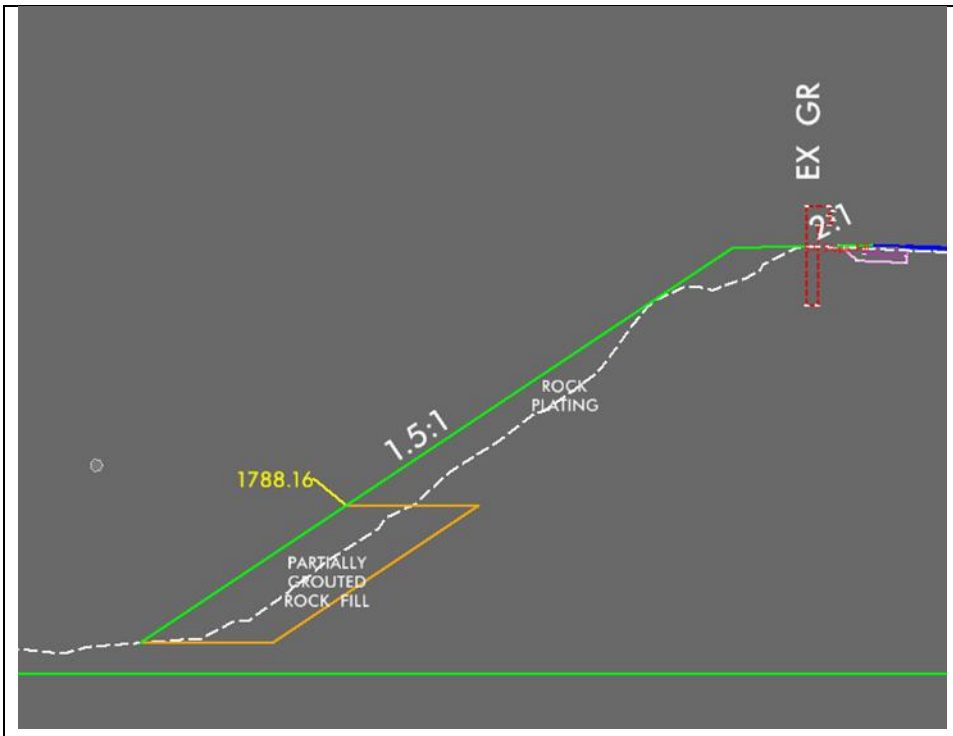
Response: At the Inlet, we proposed to place Class II Rip Rap behind the wingwall to repair some Helene erosion.



At the Outlet, we propose to place Class II Rip Rap in the creek to repair the perched culvert. As requested in the meeting, we have prepared a detail that will direct the contractor to channelize this rip rap.

David McHenry (NC WRC): And, what is the stabilization material and the profile (x-secs available?) proposed to extend 400 feet of so downstream? I didn't see (but may have missed) a description/detail.

Response: Downstream from the outlet will be repaired using the same method we used along the Broad River. The stabilization material will be grouted Class VII rip rap at the toe of the slope and Class II rip rap on up the slope where it is Rock Plating as detailed in the Geotechnical portion of the plans. See below for a typical cross section at station 62+50.



David McHenry (NC WRC): There wasn't rock slope there before and the toe of the fill slope washed-out, but there's still decent width shoulder along much of this area.

Response: There was a little rock at the toe of the slope before in this area but our designs place more, adds grout, and armors the upslope as requested to make it more resilient.

Amy Annino (DWR): Please include a cross section and a detail showing the proposed fill in the stream channel at the culvert outlet where the scour hole will be addressed.

Response: Detail 32 has been added and plan view callout updated.

Crystal Amschler (USACE) & Amy Annino (DWR): Need cross section (ditch detail typical for culvert outlet stabilization) showing the rip-rap at the culvert outlet.

Response: Detail 32 has been added and plan view callout updated.

Crystal Amschler (USACE): Need to break out quantities for rip-rap, pipe, etc. Add short narrative explaining what the Pre-Helene conditions looked like.

Response: Quantities have been broken out in the table and a short narrative describing how Hurricane Helene changed the area has been added to supplemental site narrative document.

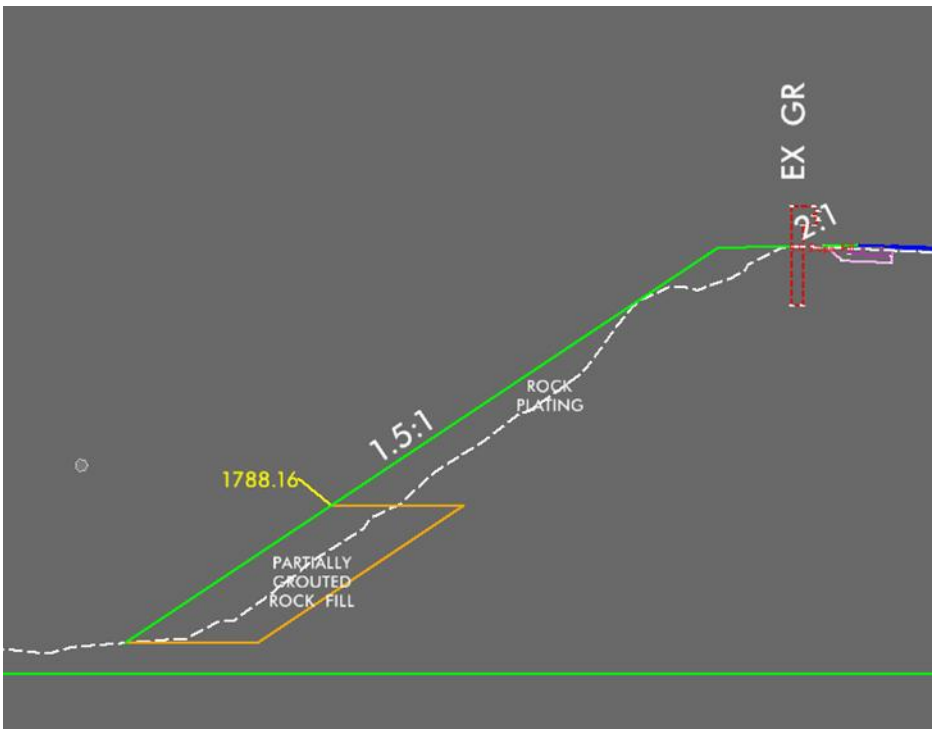
David McHenry (NC WRC): I was somewhat surprised they are constructing a grouted wall on Grassy Creek site 7. For what it's worth that area was not stabilized in 2019 unless somebody went in and did that without coordinating with me – I was out there several times before and during slope construction above the road. There's a lot of bank scour right near the culvert outlet but still a decent amount of road shoulder and remaining fill slope progressing downstream, and the road never washed-out (see attached grassy creek photos). Seems like it is already "resilient" there from that standpoint. Really, a conventional rock fill would certainly be more environmentally benign (and sufficient?) than another grouted rock embankment since the roughness of plain stone would better temper the stream velocity and over time allow some vegetation to grow up through the rock. As many theorize the Broad system is going to cook for awhile, particularly if vegetation can't creep back in naturally and provide some shade where solid structures are on the banks.

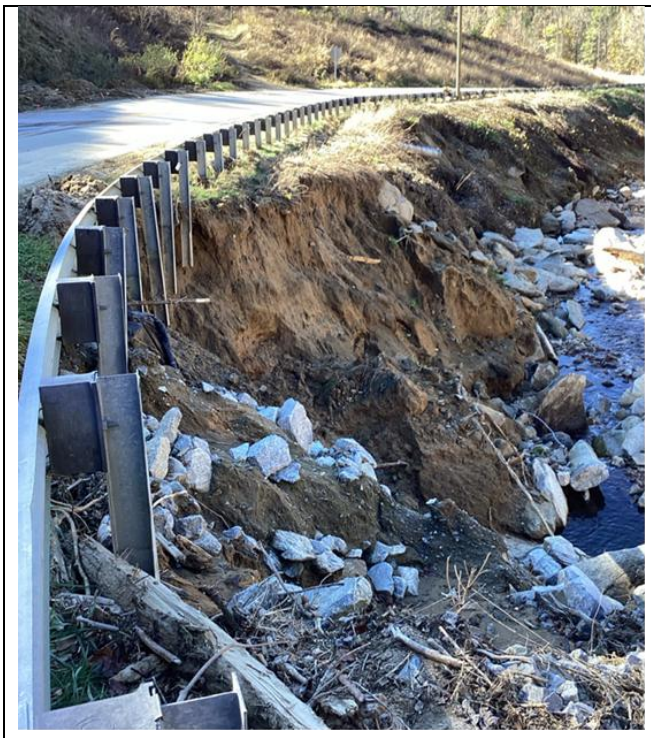
Response: Matt Lauffer, NCDOT, and his stream modeling teams reached a decision to grout the embankment along Grassy Creek after extensive stream modeling was completed. See attached response from Matt justifying the grout.

From: Lauffer, Matthew S <mslauffer@ncdot.gov>
Sent: Wednesday, October 1, 2025 1:59 PM
To: Sarvis, Dean <Dean.Sarvis@stantec.com>; David Markwood, PE <david.markwood@summitde.com>
Subject: RE: [External] RE: Helene NC 9 | Henderson | Application and Modification | SAW-2025-00325 and 20250664

Hi Dean,
Please include this statement.
Statement for partially grouted rock fill:
Partially grouted rock fill is specified for this section to increase the effective median stone size (D50), thereby enhancing resistance to the elevated velocities and shear stresses produced by the steep channel gradient. With an average slope of approximately six percent between the culvert outlet and the downstream waterfall, hydraulic forces are significant. The partially grouted treatment provides additional stability, protects the banks from erosion, and ensures long-term performance and protection of habitat under these high-energy flow conditions.
Best Regards,
Matt

Matthew (Matt) Lauffer, PE, CPM
State Hydraulics Engineer
Hydraulics Unit
Department of Transportation

David McHenry (NC WRC): Anyway, if they go with another grouted embankment here, they should replace those very abundant boulders that are in the active channel (see photos) to retain some existing habitat complexity, like the approach recommended at site 1. I'd hate to see that converted to ditch-like cross-section.
Response: As shown in the cross section at Station 62+00 below, it is not NCDOT's intention to disturb the boulders that are in the stream bed of Grassy Creek shown in your photos, only stabilize the roadside fill slope and not go beyond the pre-Helene edge of creek. From your pictures, we believe grass has grown from the hydroseeding and that grass is hiding some of the damage that needs to be repaired underneath. See photos below. The roadway and geotechnical engineers believe that these unstable areas need to be protected with rip rap.   



Eroded bank along Grassy Creek looking downstream (11/12/2024).

Eroded bank along Grassy Creek looking upstream (11/12/2024).

Site 8
Amy Annino (DWR): Please identify and differentiate the LF of proposed impact types (ex. rip rap fill, additional culvert pipe, channel relocation) and include the total LF for each in the impact table. Please differentiate temporary impact types (ex. rip rap fill, culvert pipe, dewatering) and include the total LF for each in the impact table. Please indicate approximate LF of pre-Helene culvert pipe and proposed LF of culvert pipe. Please include a cross section at the culvert outfall showing how the two culverts will interface with the stream channel.
Response: The impact summary table has been broken out to better illustrate the different impact types. The temporary impact types have been separated out as separate line items. Please see supplemental detail 28A for the cross section at the existing culvert outfall.
Look at/remove dual line in XSC view.
Response: The dual line is a top bank line but has been removed for clarity.

Site 9
Amy Annino (DWR): Please identify and differentiate the LF of proposed impact types (ex. rip rap fill, additional culvert pipe, channel relocation) and include the total LF for each in the impact table. Please differentiate temporary impact types (ex. rip rap fill, culvert pipe, dewatering) and include the total LF for each in the impact table. Please indicate approximate LF of pre-Helene culvert pipe and proposed LF of culvert pipe.
Response: Site 9 in the summary table has been broken out as requested. Since the approximate LF of pre-Helene culvert pipe is included with site 8, the line item is missing from this site to avoiding counting it twice.

Site 10
Amy Annino (DWR): The JS cannot be filled without a culvert pipe installed to carry stream flow to downstream waters. Please show how the JS will be placed in a culvert and verify that the stream will be connected to downstream waters located off project.
Response: Please see the response to the “Why is this a JS?” comment below for explanation on the change to the JS line extents for the site. Using the revised JS line, the stream is currently in a stable condition conveying flow down the slope. Therefore, geocells are no longer needed over the footprint of the channel. I reached out to Geotech for confirmation, and they have confirmed that the geocells can wrap around the existing channel footprint leaving the stream undisturbed. In lieu of geocells filling in the channel, supplemental rip rap has been proposed to compliment the boulders currently located along the stream banks.

Amy Annino (DWR): Why is this a JS?
Response: Pre-Helene, this general area has been the site of historical manipulation including spring boxes, channel re-routes, old road alignments, etc. In September 2024 Helene caused a major slump in this valley and continued to be bare through the winter. The original delineation was completed for this project in February 2025 when the site was still bare and somewhat freshly disturbed. Seeps and drainage had begun to carve channels across the slope below the road and Stream SO appeared to begin in a parallel section along NC-9. To better assess this site due to questions regarding geotechnical activities here. Stantec's biologist revisited site 10 on September 15, 2025 (stream SO). After the effects of a full growing season and some vegetation establishment it appears that the short section parallel to the road is actually a scour channel and does not carry flow sufficient enough to form a jurisdictional intermittent channel. That section does not appear to be fed by groundwater. The current origin of the stream appears to be from a seep downslope from the outlet of the 18" temporary pipe. The portion of the stream parallel to the roadway alignment has been removed from the plan set and the impacts associated with that portion have been removed as well.

Site 11
Include cross section at outlet of 2 existing 48" pipes to show how pipes will tie-in with the channel.
Response: Please see supplemental detail 26A for the cross section at the existing 2@48" CMP outfall. Quantities in impact summary table have been broken out for clarification between reasoning for temporary and permanent impacts.

Site 12
Amy Annino (DWR): Any permanent fill placed in the stream (as part of the energy dissipation pad at stream culvert outlet) must be properly keyed into the stream bed flowing from the culvert AND in the receiving stream, so as not to disrupt stream flow or block aquatic passage of either stream. Please provide a detail showing how energy dissipator pad will interface with both stream channels. Please indicate whether the culvert will be buried to meet low flow and aquatic passage requirements (Condition 11 of DWR GC 7466).
Response: Both inlet and outlet pipes have been upsized to account for the burial depth of the pipe. The proper callouts have been added to the plan view for the burial depths. Detail 33 has been added to the detail sheet to show how the pipe will interact with the stream. The detail indicates that the rip rap shall be keyed-in to not disrupt the natural channel dimensions. The quantities provided in the impact summary table have been broken out to show the differences between impacts caused by the rip rap pad versus temporary dewatering for the installation.

Site 13
Amy Annino (DWR): Please include the LF of additional culvert pipe proposed / LF loss of channel.
Response: This site has been broken out in the summary table for the inlet/outlet locations where the proposed pipe network is causing permanent impacts. The temporary impacts for dewatering has been moved to separate line item as well.

Revised Regulatory Break-Down Tables:

Impact Site	Impact Category	Permanent Fill	Bank Stabilization	Temporary Impacts	Permit Proposed / Impact Description
Site 5 **UT to Broad River**	**Maintenance Exemption**	>>>	--	--	The estimated, pre-Helene length of pipe of 115 lf has been noted in the summary table. This estimated value is based solely on LiDAR from NC Spatial Data.
	Non-Notifying	--	--	--	--
	Notification Required (Not After the Fact)	65 lf (26'+39')	62 lf (inlet: 19' Outlet: 43')	--	**NWP 3:** Hurricane Helene re-routed this stream system. Prior to the storm, the stream was conveyed through a 42" CMP which was subsequently buried. A temporary 24" HDPE was installed after Helene and currently conveys the stream. A 48" pipe is proposed for the permanent restoration of this crossing. The restoration will result in 65 lf (26 + 39) of channel replacement and 62 lf (19 + 43) of outlet stabilization impacts.
	Notification Required (After the Fact)	--	--	32 lf	A temporary/ emergency 24" HDPE, 32 lf in length was installed to temporary handle this stream.

Site 6 **UT to Broad River**	**Maintenance Exemption**	>>>	--	--	The estimated, pre-Helene length of pipe of 166 lf has been noted in the summary table. This estimated value is based solely on LiDAR from NC Spatial Data.
	Non-Notifying	--	--	--	--
	Notification Required (Not After the Fact)	6 lf	125 lf	--	**NWP 3** Prior to the storm, this site was conveyed by an existing 42" CMP that would bypass the pipe and overflow to site 5 during high rainfall events. After the storm, this stream flows within the overflow channel/roadside ditch to flow under NC-9 in the temporary 24" HDPE. The existing 42" CMP was buried by the storm. Upon the hydraulic analysis of the 2 pipes/streams (Site 5 and 6), the drainage area could be consolidated to one crossing (48" CSP). By using a single crossing, the ditch backslopes avoided cutting into the mountainside (the team was asked by NCDOT to avoid cutting into the mountainside where possible). The confluence with site 5 also maintains the existing drainage patterns that are currently present at the site.
		--	--	26 lf	**NWP 33** We anticipate the contractor using dewatering techniques to construct this site. To account for dewatering, impacts are shown to the PDE line.
	Notification Required (After the Fact)	--	--	--	--

Impact Site	Impact Category	Permanent Fill	Bank Stabilization	Temporary Impacts	Permit Proposed / Impact Description
Site 7 **Grassy Creek**	**Maintenance Exemption**	19 lf	379 lf	--	This site includes Grassy Creek impacts. Hurricane Helene caused the creek to widen into the existing fill slope on NC-9 due to erosion during the high flow periods experienced during the storm. The team was tasked with using the proposed fill slope to recreate the pre-Helene stream banks. The impacts for this are the "rip rap embankment" and "dewatering" line items in the summary table. The team was also asked to repair a scour issue at the outlet of the existing 2@8'x10' RCBC. The impact for this improvement is the "outlet rip rap" line item in the summary table (19 lf).
	Non-Notifying	--	--	--	--
	Notification Required (Not After the Fact)	--	--	207 lf	**NWP 3:** This temporary impact is to accomplish the work noted above.
	Notification Required (After the Fact)	--	--	--	--

Impact Site	Impact Category	Permanent Fill	Bank Stabilization	Temporary Impacts	Permit Proposed / Impact Description
	Maintenance Exemption	>>>	--	--	The pre-Helene existing LF of the existing culvert (48 lf) has been added as a line item in the summary table.
	Non-Notifying	--	--	--	--
Site 8 **UT to Grassy Creek**	**Notification Required (Not After the Fact)**	41 lf (Inlet: 11 Outlet: 30)	81 lf (Inlet: 44 Outlet: 37)--	37 lf (Inlet: 17 Outlet: 20)	**NWP 3:** The pre-Helene existing drainage pattern included a confluence point between site 8 and site 9 streams on the upstream side of the road. This confluence point was a large 6'-12' hole at the inlet of the existing 36" CMP. Hurricane Helene filled this hole in by about 7 feet. Since the storm, crews were able to dig down to expose the inlet and make it functional until proposed repairs were complete. Upon analysis of this site, the water from the inlet channel currently flows along a moderately steep slope, then drops down into the excavated hole. NCDOT proposes to create a drop structure to provide a more stable transition down to the pipe invert. Due to the steepness of the pipe, burial is not proposed to avoid head cut issues. On the outlet end of the existing 36" CMP, the pre-Helene condition flowed into a roadside channel just as it turned offsite to a downstream driveway crossing eventually flowing into Grassy Creek (Site 7). Hurricane Helene brought much destruction to this area to the point it was unrecognizable. By the start of the project, relief efforts had been made to repair the downstream driveway crossing. In an internal meeting with NCDOT, it was decided the repairs for the channel flowing offsite downstream of NC-9 would be part of a separate stream restoration contract. Therefore, the proposed outlet channel was designed to tie-in to the post-storm channel.
	Notification Required (After the Fact)	--	--	--	--

Impact Site	Impact Category	Permanent Fill	Bank Stabilization	Temporary Impacts	Permit Proposed / Impact Description
Site 9 **UT to Grassy Creek**	Maintenance Exemption	--	--	--	--
	Non-Notifying	--	--	--	--
	Notification Required (Not After the Fact)	44 ft 13 lf 2 lf	56 lf	--	**NWP 3:** In the pre-Helene condition, the channel met the stream from Site 8 at the existing 36" CMP inlet. Hurricane Helene brought much soil and debris from higher in the watershed and deposited it here. Based on the analysis of the drainage area, an additional proposed pipe crossing is needed. To fit the pipe underneath NC-9 with appropriate cover, the proposed 54" WSP would require lowering the channel elevation at the inlet side. To ensure a smooth and stable transition to a lower elevation, a drop structure is proposed. NCDOT does not propose mitigation for the 59 feet of stream in this scenario. There are no transportation improvements proposed to NC 9, and the resulting loss of water impacts are the result of Hurricane Helene and the sizing of pipes using modern drainage recommendations. Additionally, as the previous pipe was undersized, this site corrects deficiencies and provides a more stable hydraulic situation for this stream. Furthermore, this stream valley contains a significant amount of loose material well outside of NCDOT's purview. NCDOT is constructing an area to help contain this upstream material to help ensure system stability.
		--	--	24 ft	**NWP 33:** Dewatering for the installation of the above-described impacts.
	Notification Required (After the Fact)	--	--	--	--

Impact Site	Impact Category	Permanent Fill	Bank Stabilization	Temporary Impacts	Permit Proposed / Impact Description
Site 10 **UT to Grassy Creek**	Maintenance Exemption	--	--	--	--
	Non-Notifying	--	--	--	--
	Notification Required (Not After the Fact)	--	46 lf	--	**NWP 3:** In the pre-Helene condition, most of the flow for the stream came from a wet weather seepage in the slope as well as very minimal non-jurisdictional flow coming from the poorly functioning 18" cross pipe underneath NC-9. A soil nail wall is being proposed at the existing crossing. Pipes cannot be installed in areas where soil nail walls are present due to the location of the nails not being known until they are built in the field. The nails typically extend all the way across the road where it is being placed. Though the existing crossing could not be replaced, the existing drainage pattern for the area did not change as the existing pipe does not function as intended with most of the mountainside non-jurisdictional flow bypassing the existing cross pipe and continuing downhill along NC-9. The proposed drainage pattern follows the behavior of the existing condition and continues to direct the stormwater to flow along NC-9. The proposed slope stake lines beyond the soil nail wall show the extents of the proposed geocells to be installed to protect an unstable slope caused by a landslide that occurred during Hurricane Helene. After consultation with Geotech, the geocells will be able to be wrapped around the footprint of the channel. Supplemental rip rap has been included to compliment the boulders along the stream banks for stability in lieu of the geocells filling in the channel.
	Notification Required (After the Fact)	--	--	--	--

Impact Site	Impact Category	Permanent Fill	Bank Stabilization	Temporary Impacts	Permit Proposed / Impact Description
Site 11 **Grassy Creek**	Maintenance Exemption	51 lf	--	--	In the pre-Helene condition, the existing 2 @ 48" CMP was perched above the existing bed at the outlet indicating scour issues. Hurricane Helene worsened the scour issues and increased the perched elevation between the existing bed and the existing pipe outlet inverts. The existing crossing was analyzed, and the existing pipes were determined to be sized appropriately and in good condition. The team was asked to help mitigate the scour issues by raising the streambed by filling in the existing scour hole with rip rap. Detail 26A has been added to the detail sheet to show how the outlet of the existing 2 @ 48" CMP will tie-in with the scour hole repair. The detail includes verbiage to key-in the rip rap.
	Non-Notifying	--	--	--	--
	Notification Required (Not After the Fact)	--	--	16 lf	**NWP 33:** It is anticipated the contractor will either use impervious dikes or a pump around operation to dewater the site. To account for this activity, impacts are shown to the PDE line.
	Notification Required (After the Fact)	--	--	--	--

Impact Site	Impact Category	Permanent Fill	Bank Stabilization	Temporary Impacts	Permit Proposed / Impact Description
Site 12 **UT to Broad River**	Maintenance Exemption	--	--	--	--
	Non-Notifying	--	--	--	--
	Notification Required (Not After the Fact)	--	4 lf	15 lf	In the pre-Helene condition, the existing 24" CMP had remnants of an older rip rap pad at the outlet. Hurricane Helene further washed out the existing rip rap pad. For the proposed condition, the crossing was analyzed and the existing 24" CMP was found to be undersized. The crossing was analyzed as a 36" RCP and was upsized to a 42" RCP to account for the burial depth. Burying the proposed outlet of the system ensures the crossing would be compliant with Condition 11 of DWR GC 7466. At the proposed outlet, a rip rap pad was proposed for energy dissipation. Detail 33 has been added to indicate how the pipe will interact with the stream. The detail specifies that the rip rap must be keyed-in.
	Notification Required (After the Fact)	--	--	--	--

Impact Site	Impact Category	Permanent Fill	Bank Stabilization	Temporary Impacts	Permit Proposed / Impact Description
Site 13 **UT to Broad River**	Maintenance Exemption	--	--	--	--
	Non-Notifying	--	--	--	--
	Notification Required (Not After the Fact)	13 lf (3 lf on the inlet side of the 36" pipe & 42" pipe, and 10 lf on the inlet side of the 36" pipe)	--	--	**NWP 3:** In the pre-Helene condition, the existing 24" CMP behaved as a normal driveway pipe. Hurricane Helene did not destroy the channel, but it did bring excessive debris that piled up on the inlet side. Analyzing the crossing indicated that the existing pipe was undersized. The pipe was analyzed as a 30" unburied and was upsized to a 36" to account for the burial depth. Burying the proposed inlet of the system ensures the crossing would be compliant with Condition 11 of DWR GC 7466. The impacts shown for the portion of the stream in between the existing 24" driveway pipe and the 24" pipe under NC-9 (Site 12) has been added as a line item for this site. NCDOT does not propose mitigation for the 13 feet of stream in this scenario. The are no improvements proposed to NC 9, and the resulting loss of water impacts are the result of Hurricane Helene and the sizing of pipes using modern drainage recommendations.
		--	--	10 lf	**NWP 33:** It is anticipated the contractor will use dewatering techniques for the site. To account for the dewatering, impacts have been extended past the area needed for installation.
	Notification Required (After the Fact)	--	--	--	

		Permanent Fill	Bank Stabilization	Temporary Impacts	
Category Totals	**Maintenance Exemption**	Site 7: 19 Site 11: 51 **70 lf**	Site 7: 379 **379 lf**	--	
		449 lf		--	
	Non-Notifying	**--**	**--**	--	
	Notification Required (Not After the Fact)	Site 5: 65 Site 6: 6 Site 8: 41 Site 9: 59 Site 13: 13 **184 lf**	Site 5: 62 Site 6: 125 Site 8: 81 Site 9: 56 Site 10: 46 Site 12: 4 **374 lf**	Site 6: 26 Site 7: 207 Site 8: 37 Site 9: 24 Site 11: 16 Site 12: 15 Site 13: 10 **335 lf**	
		558 lf			
	Notification Required (After the Fact)	**--**	**--**	Site 5: 32 **5 lf***	
NC 9 Upper Section Totals		**254 lf**	**753 lf**	**340 lf**	
		1,007 lf			

NC 9 Lower Section Totals	**1,821 lf**	**1,200 lf**

NC 9 Project Totals	**2,828 lf**	**1,540 lf***

*When comparing this table with the Impact Summary Table, there is a 5 lf difference, as the “after the fact” impact is not shown in Impact Summary Table

The information above is provided in accordance with the " US Army Corps of Engineers, Wilmington District' s Information for Hurricane Helene Recovery and Repair Work Conducted by the North Carolina Dept of Transportation in Waters of the US " dated February 10, 2025.

The total permanent and temporary impacts at Site 1 remain 2,295 linear feet of stream impact.
However, the division of impacts has changed. New values are shown in red.

Impact Site	Impact Category	Permanent Fill	Bank Stabilization	Temporary Impacts	Permit Proposed / Impact Description
Site 1 **Broad River**	**Maintenance Exemption**	—	~~1,073 lf (0.278 ac)~~ 1,129 ft (0.300 ac)	--	See above explanation for in channel work.
	Non-Notifying	--	--	--	--
	Notification Required (Not After the Fact)			~~1,222 lf (1.029)~~ 1,166 lf (1.064 ac)	**NWP 33:** This impact includes an update to impacts requested within the original permit. Adjustments are based on the stream stabilization measures.
	Notification Required (After the Fact)	--	--	--	--

The remaining sites on the lower section (Sites S2, S3 and S4) have not changed.

Endangered Species Act: Protected Species listed from IPaC[1] as of the date of this application:

Common Name	Habitat Present	Survey Dates[2]	Proposed Biological Conclusion	FWS Concurrence Remarks
Gray bat Northern long-eared bat Tricolored bat (Proposed)	Yes	2/24/2025	May Affect, Likely to Adversely Affect (under PBO/PCO)[3]	Concur[4]
Bog turtle	No	n/a	Not Required	n/a
Monarch butterfly (Proposed)[5]	Unknown	n/a	n/a	n/a
Rock gnome lichen	No	n/a	No Effect	n/a
White irisette	No	2/24/2025	No Effect	n/a
Small whorled pogonia	No	2/24/2025	No Effect	n/a

1 IPaC – Information for Planning and Consultation (US Fish and Wildlife Service)
2 Original delineation and habitat survey conducted 2/24/2025.
3 There is a total of 0.34 acre of tree clearing over the entire project.
4 Section 7 consultation was completed for the entire project on July 7, 2025, and included using the NCDOT Bat Programmatic Biological Opinion.
5 Due to the recent listings of monarch butterfly within the proposed action area, NCDOT does not have complete information at this time. It is anticipated that construction will be complete by the timeframes proposed for full listing, should the species be formally listed.

Historic Resources Summary (documentation included)

106 Topic	**Findings**	
Historic Architecture	No Historic Properties Present	
Archaeology	No Surveys Required	
Tribal Coordination	**Tribe**	**Response**
Tribal Coordination Letters were sent to the following Tribes on March 10, 2025:	Catawba Indian Nation	March 27, 2025
	Cherokee Nation	*No response received*
	Eastern Band of Cherokee Indians	*No response received*
	Muscogee (Creek) Nation	*No response received*
	United Keetoowah Band of Cherokee Indians in Oklahoma	*No response received*

Based on this additional information, NCDOT requests resumption of the processing of the environmental permits for this project.

If you have any questions or need additional information, please contact Michael Turchy, at maturchy@ncdot.gov or (919) 707-6157.

Sincerely,

Digitally signed by Michael Turchy

Michael A. Turchy
Environmental Coordination and Permitting Group Leader

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.02; Released April 23, 2024)

WBS Element: 18314.1045 **TIP/Proj No:** NC-9 **County(ies):** Henderson

General Project Information

WBS Element:	18314.1045035	**TIP Number:**	NC-9	**Project Type:**	Roadway Widening	**Date:**	5/1/2025
NCDOT Contact:	Josh Deyton	**Contractor / Designer:**	Sungate Design Group, PA				
Address:	253 Webster Road Sylva, NC 28779			**Address:**	905 Jones Franklin Rd Raleigh, NC 27606		
Phone:	828-331-5211			**Phone:**	919-859-2243		
Email:	jbdeyton@ncdot.gov			**Email:**	jdalton@sungatedesign.com		
City/Town:	Bat Cave	**County(ies):**		Henderson			
River Basin(s):	Broad	**CAMA County?**		No			
Wetlands within Project Limits?	No						

Project Description

Project Length (lin. miles or feet):	1.97	**Surrounding Land Use:**	Residential, Wooded, Conservation Forest				
	Proposed Project			**Existing Site**			
Project Built-Upon Area (ac.)	14.0	ac.		5.8	ac.		
Typical Cross Section Description:	NC-9: Southbound lane includes a 10' paved lane with 4' shoulders (2' paved + 2' grass from 10+12 to 91+00 -L-)(4' grass from 91+00 to 113+77 -L-). Northbound lane includes a 10' paved lane with 3' shoulders (2' paved + 1' grass from 10+12 to 91+00 -L-)(3' grass from 91+00 to 113+77 -L-). Varying cut and fill slopes (see XSC file for detailed information).			Existing NC-9: 10' paved lane with 3' shoulders (1' paved + 2' grass) in each direction. Varying cut and fill slopes.			
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	1000	Year: 2025	Existing:	1000	Year:	2025

General Project Narrative: (Description of Minimization of Water Quality Impacts)

The North Carolina Department of Transportation (NCDOT) has proposed repairs to NC-9 from US 74 ALT to the Henderson County Line. The project, NC-9, was proposed in response to the damage caused by Hurricane Helene (09/2024). There is one major structure within the limits of the project (2@8'x10' RCBC) that is not being impacted by the proposed design. There have been 2 repiars proposed to the structure fixing erosion issues on either end of the culvert (see PSH 08 for inlet/outlet improvements). Erosion and Sediment Control measures to preserve water quality for instream construction activities will include floating turbidity curtains and/or impervious dikes. Rip rap has been added to outlets in jurisdictional features in order to dissipate energy and reduce velocities.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.02; Released April 23, 2024)

WBS Element:	18314.1045	TIP/Proj No.:	NC-9	County(ies):	Henderson	Page	2	of	2

General Project Information

Waterbody Information

Surface Water Body (1):	Broad River		**NCDWR Stream Index No.:**	9-(1)			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C				
		Supplemental Classification:	Trout Waters (Tr)				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?		Comments:					
NRTR Stream ID:	Broad River			**Buffer Rules in Effect:**	N/A		
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in 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)							

Surface Water Body (2):	Grassy Creek		**NCDWR Stream Index No.:**	9-13			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C				
		Supplemental Classification:	Trout Waters (Tr)				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?		Comments:					
NRTR Stream ID:	Grassy Creek			**Buffer Rules in Effect:**	N/A		
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in 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)							

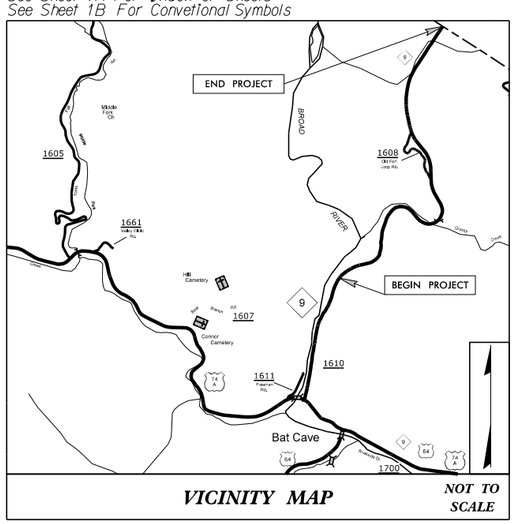
Surface Water Body (3):			**NCDWR Stream Index No.:**				
NCDWR Surface Water Classification for Water Body		**Primary Classification:**					
		Supplemental Classification:					
Other Stream Classification:							
Impairments:							
Aquatic T&E Species?		Comments:					
NRTR Stream ID:				**Buffer Rules in Effect:**			
Project Includes Bridge Spanning Water Body?		**Deck Drains Discharge Over Buffer?**		**Dissipator Pads Provided in Buffer?**			
Deck Drains Discharge Over Water Body?		(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)							

09/08/99

PROJECT: NC-9

CONTRACT: C205121

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



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HENDERSON COUNTY

LOCATION: NC-9 FROM 2700' NORTH OF THE US 74A /NC-9 INTERSECTION TO THE BUNCOMBE COUNTY LINE

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND RETAINING WALLS

PERMIT DRAWING SHEET 1 OF 25

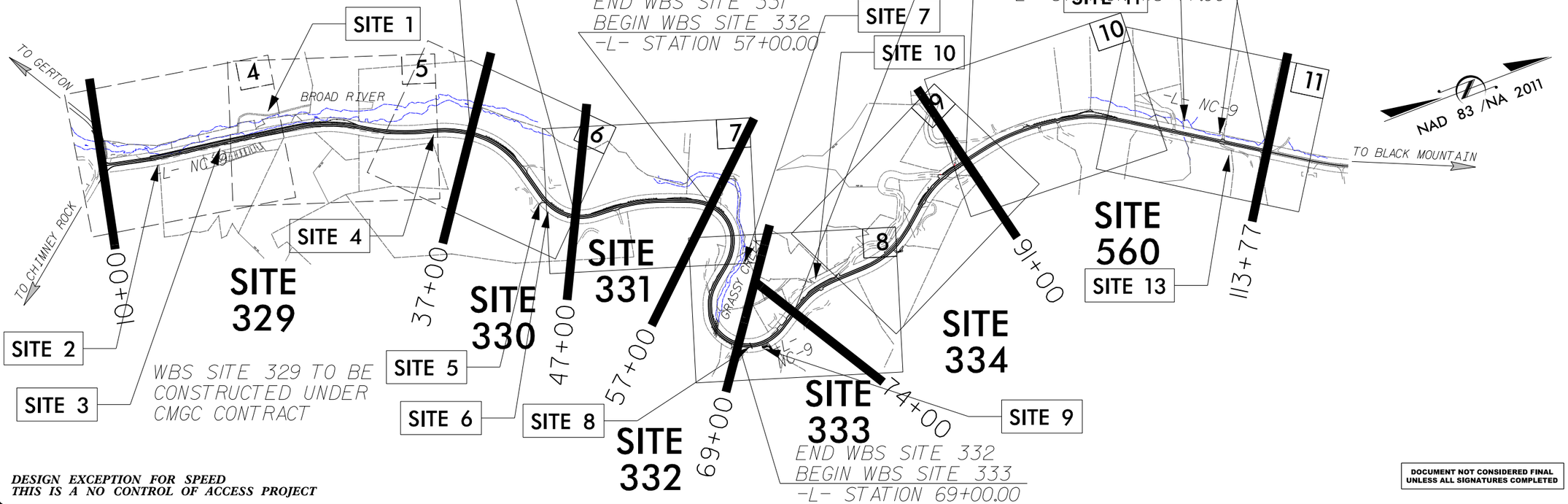
DATE: 10/20/2025

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	NC-9	1	

STATE PROJ. NO.	DESCRIPTION	
18314.1045061	329	
18314.1045035	330	
18314.1045063	331	
18314.1045062	332	
18314.1045074	333	
18314.1045073	334	
18314.1045135	560	

ROADWAY FINAL PLAN SET

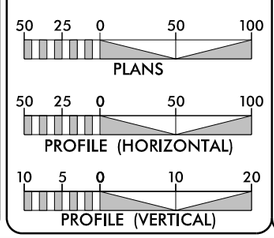
WETLAND AND SURFACE WATER IMPACTS PERMIT



DESIGN EXCEPTION FOR SPEED
THIS IS A NO CONTROL OF ACCESS PROJECT

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2025 = 1000
K = N/A
D = N/A
T = 7%
V = 45 MPH

FUNC CLASSIFICATION = MAJOR COLLECTOR
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT NC-9 = 1.963 MILES
TOTAL LENGTH PROJECT NC-9 = 1.963 MILES

PREPARED IN THE OFFICES OF:

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-690

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2024 STANDARD SPECIFICATIONS 3R GUIDELINES

RIGHT OF WAY DATE: FEBRUARY 6, 2025

LETTING DATE: AUGUST 12, 2025

A. DEAN SARVIS, P.E.
PROJECT ENGINEER

JOSH B DEYTON, P.E.
NCDOT DIVISION 14 CONTACT

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY ENGINEER

P.E.
SIGNATURE:

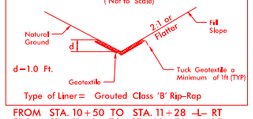
STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

10/20/2025
NC-9_Hyd_prm_wet_psh_01.dgn
JStanovich

8/17/99

REVISIONS

DETAIL 1
TOE PROTECTION
(Not to Scale)

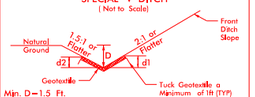


d = 1.0 Ft.

Type of Liner = Grouted Class 'B' Rip-Rap

FROM STA. 10+50 TO STA. 11+28 -L- RT
FROM STA. 11+34 TO STA. 13+50 -L- RT
FROM STA. 53+00 TO STA. 56+80 -L- RT
FROM STA. 73+50 TO STA. 75+50 -L- RT
FROM STA. 77+68 TO STA. 80+00 -L- RT

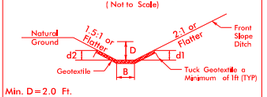
DETAIL 2
SPECIAL 'V' DITCH
(Not to Scale)



Min. D = 1.5 Ft.
d1 = 1.5 Ft.
d2 = Top of Cut or 1.5 Ft. (whichever is greater)
Type of Liner = Grouted Class 'B' Rip-Rap, Keyed-In

FROM STA. 14+00 TO STA. 17+50 -L- RT

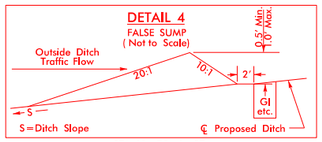
DETAIL 3
SPECIAL BASE DITCH
(Not to Scale)



Min. D = 2.0 Ft.
d1 = 1.5 Ft.
d2 = Top of Cut or 2.0 Ft. (whichever is greater)
B = 2.0 Ft.
Type of Liner = Grouted Class 'B' Rip-Rap, Keyed-In

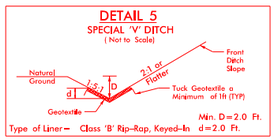
FROM STA. 17+50 TO STA. 18+30 -L- RT

DETAIL 4
FALSE SUMP
(Not to Scale)



STA. 19+75 -L- RT
STA. 29+80 -L- RT
STA. 39+57 -L- RT
STA. 64+86 -L- RT
STA. 81+76 -L- RT
STA. 82+50 -L- RT

DETAIL 5
SPECIAL 'V' DITCH
(Not to Scale)



Min. D = 2.0 Ft.
Type of Liner = Class 'B' Rip-Rap, Keyed-In d = 2.0 Ft.

FROM STA. 20+00 TO STA. 22+00 -L- RT

DETAIL 6
TOE PROTECTION
(Not to Scale)

d = 1.5 Ft.

Type of Liner = Class 'B' Rip-Rap, Keyed-In

FROM STA. 22+00 TO STA. 22+50 -L- RT
FROM STA. 32+50 TO STA. 33+50 -L- RT
FROM STA. 86+50 TO STA. 87+14 -L- LT

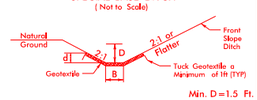
DETAIL 7
TOE PROTECTION
(Not to Scale)

d = 1.5 Ft.

Type of Liner = Grouted Class 'B' Rip-Rap, Keyed-In

FROM STA. 22+50 TO STA. 29+72 -L- RT
FROM STA. 33+50 TO STA. 35+00 -L- RT

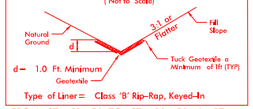
DETAIL 8
SPECIAL BASE DITCH
(Not to Scale)



Min. D = 1.5 Ft.
d = 1.5 Ft.
Type of Liner = Class 'B' Rip-Rap, Keyed-In B = 2.0 Ft.

FROM STA. 30+00 TO STA. 31+50 -L- RT

DETAIL 9
TOE PROTECTION
(Not to Scale)

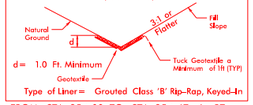


d = 1.0 Ft. Minimum

Type of Liner = Class 'B' Rip-Rap, Keyed-In

FROM STA. 31+50 TO STA. 32+50 -L- RT

DETAIL 10
TOE PROTECTION
(Not to Scale)

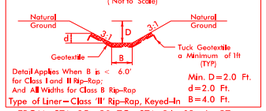


d = 1.0 Ft. Minimum

Type of Liner = Grouted Class 'B' Rip-Rap, Keyed-In

FROM STA. 35+00 TO STA. 35+47 -L- RT

DETAIL 11
STANDARD BASE DITCH
(Not to Scale)



Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap

Min. D = 2.0 Ft.
d = 2.0 Ft.
B = 4.0 Ft.

Type of Liner = Class 'II' Rip-Rap, Keyed-In

FROM STA. 35+90 TO STA. 36+18 -L- RT

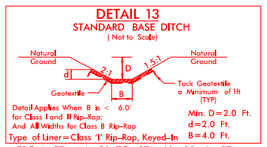
DETAIL 12
SPECIAL 'V' DITCH
(Not to Scale)

Min. D = 1.0 Ft.
d = 1.0 Ft.

Type of Liner = Grouted Class 'B' Rip-Rap, Keyed-In

FROM STA. 41+67 TO STA. 42+00 -L- RT

DETAIL 13
STANDARD BASE DITCH
(Not to Scale)



Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap

Min. D = 2.0 Ft.
d = 2.0 Ft.
B = 4.0 Ft.

Type of Liner = Class 'I' Rip-Rap, Keyed-In

FROM STA. 44+50 TO STA. 46+00 -L- RT

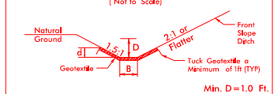
DETAIL 14
TOE PROTECTION
(Not to Scale)

d = Shoulder Point or 1.0 Ft. (whichever is least)

Type of Liner = Grouted Class 'B' Rip-Rap, Keyed-In

FROM STA. 50+25 TO STA. 52+40 -L- RT

DETAIL 15
SPECIAL BASE DITCH
(Not to Scale)

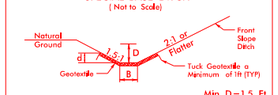


Min. D = 1.0 Ft.
d = 1.0 Ft.
B = 2.0 Ft.

Type of Liner = Grouted Class 'B' Rip-Rap, Keyed-In

FROM STA. 52+50 TO STA. 53+00 -L- RT
FROM STA. 73+28 TO STA. 73+50 -L- RT

DETAIL 16
SPECIAL BASE DITCH
(Not to Scale)



Min. D = 1.5 Ft.
d = 1.5 Ft.
B = 2.0 Ft.

Type of Liner = Class 'B' Rip-Rap, Keyed-In

FROM STA. 59+00 TO STA. 63+50 -L- RT

DETAIL 17
SPECIAL 'V' DITCH
(Not to Scale)

Min. D = 1.0 Ft.

FROM STA. 64+41 TO STA. 65+00 -L- RT
FROM STA. 95+50 TO STA. 97+36 -L- RT
FROM STA. 99+00 TO STA. 101+50 -L- RT

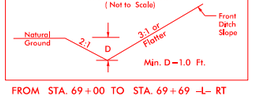
DETAIL 18
SPECIAL 'V' DITCH
(Not to Scale)

Min. D = 1.5 Ft.
d = 1.5 Ft.

Type of Liner = Class 'B' Rip-Rap, Keyed-In

FROM STA. 65+00 TO STA. 66+50 -L- RT

DETAIL 19
SPECIAL 'V' DITCH
(Not to Scale)



Min. D = 1.0 Ft.

FROM STA. 69+00 TO STA. 69+69 -L- RT

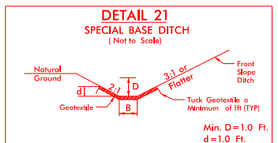
DETAIL 20
SPECIAL BASE DITCH
(Not to Scale)

Min. D = 1.5 Ft.
d = 1.5 Ft.
B = 2.0 Ft.

Type of Liner = Grouted Class 'B' Rip-Rap, Keyed-In

FROM STA. 70+50 TO STA. 72+15 -L- RT

DETAIL 21
SPECIAL BASE DITCH
(Not to Scale)



Min. D = 1.0 Ft.
d = 1.0 Ft.
B = 2.0 Ft.

Type of Liner = Grouted Class 'B' Rip-Rap, Keyed-In

FROM STA. 75+50 TO STA. 77+68 -L- RT

DETAIL 22
SPECIAL 'V' DITCH
(Not to Scale)

Min. D = 1.0 Ft.
d = 1.0 Ft.

Type of Liner = Grouted Class 'B' Rip-Rap, Keyed-In

FROM STA. 80+00 TO STA. 82+00 -L- RT
FROM STA. 83+00 TO STA. 85+50 -L- RT

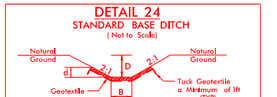
DETAIL 23
SPECIAL BASE DITCH
(Not to Scale)

Min. D = 1.5 Ft.
d = 1.5 Ft.
B = 3.0 Ft.

Type of Liner = Grouted Class 'B' Rip-Rap, Keyed-In

FROM STA. 82+75 TO STA. 83+00 -L- RT

DETAIL 24
STANDARD BASE DITCH
(Not to Scale)



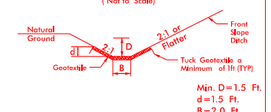
Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap

Min. D = 1.0 Ft.
d = Top of Bank
B = 2.0 Ft.

Type of Liner = Grouted Class 'B' Rip-Rap, Keyed-In

FROM STA. 79+52 TO STA. 80+08 -L- LT

DETAIL 25
SPECIAL BASE DITCH
(Not to Scale)

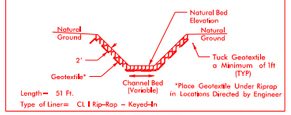


Min. D = 1.5 Ft.
d = 1.5 Ft.
B = 2.0 Ft.

Type of Liner = Grouted Class 'B' Rip-Rap, Keyed-In

FROM STA. 90+70 TO STA. 93+50 -L- RT

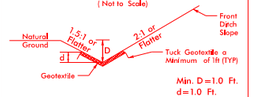
DETAIL 26
PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)



Length = 51 Ft.
Type of Liner = CL I Rip-Rap - Keyed-In

STA. 107+52 -L- LT

DETAIL 27
SPECIAL 'V' DITCH
(Not to Scale)



Min. D = 1.0 Ft.
d = 1.0 Ft.

Type of Liner = Grouted Class 'B' Rip-Rap, Keyed-In

FROM STA. 111+00 TO STA. 113+00 -L- RT

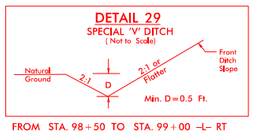
DETAIL 28
STANDARD BASE DITCH
(Not to Scale)

Min. D = 2.0 Ft.
d = 2.0 Ft.
B = 8.0 Ft.

Type of Liner = Class 'II' Rip-Rap, Keyed-In

FROM STA. 69+52 TO STA. 69+89 -L- LT

DETAIL 29
SPECIAL 'V' DITCH
(Not to Scale)



Min. D = 0.5 Ft.

FROM STA. 98+50 TO STA. 99+00 -L- RT

PERMIT DRAWING
SHEET 2 OF 25

DATE: 10/20/2025

PROJECT REFERENCE NO.	SHEET NO.
NC-9	2D-1

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

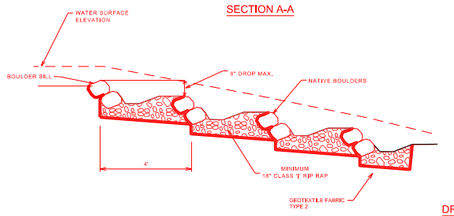
SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

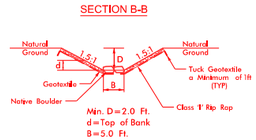
10/20/2025
NC-9_Hyd_prm_wet_psh_02B1.dgn
JStanovich

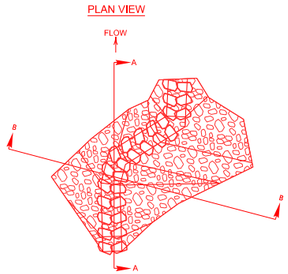
8/17/99

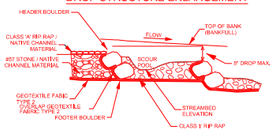
REVISIONS

DETAIL 30
DROP STRUCTURE
(Not to Scale)







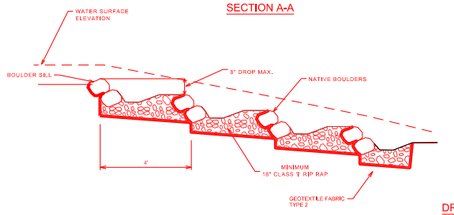


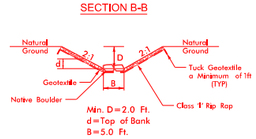
STRUCTURE NOTES:
1. FILL CLASS 'I' RIP RAP VOIDS WITH CLASS 'A' RIP RAP/ #57 STONE/ NATIVE CHANNEL MATERIAL MIXTURE.

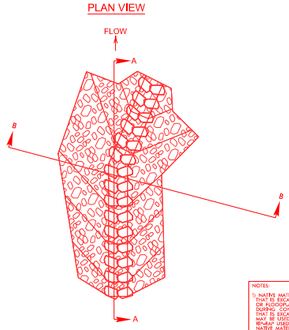
NOTES:
1) NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM OR FLOODPLAIN AT THE PROJECT SITE DURING CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO SEAT THE CHANNEL BED MATERIAL. IMPORTED MATERIAL OR NATIVE MATERIAL FROM THE CHANNEL BED NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS IN THE CHANNEL BED.
2) BOULDERS SHOULD BE NATIVE STONES ANGULAR AND OBLONG WITH AN AXIS APPROXIMATELY 2.0'L x 2.0'W x 2.0'D

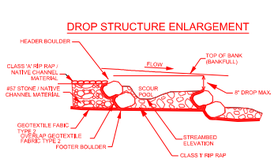
FROM STA. 69+90 TO STA. 70+00 –L– RT

DETAIL 31
DROP STRUCTURE
(Not to Scale)









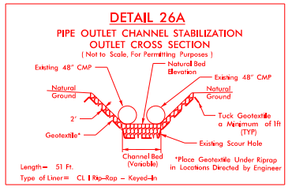
STRUCTURE NOTES:
1. FILL CLASS 'I' RIP RAP VOIDS WITH CLASS 'A' RIP RAP/ #57 STONE/ NATIVE CHANNEL MATERIAL MIXTURE.

NOTES:
1) NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM OR FLOODPLAIN AT THE PROJECT SITE DURING CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO SEAT THE CHANNEL BED MATERIAL. IMPORTED MATERIAL OR NATIVE MATERIAL IN THE CHANNEL BED NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS IN THE CHANNEL BED.
2) BOULDERS SHOULD BE NATIVE STONES ANGULAR AND OBLONG WITH AN AXIS APPROXIMATELY 2.0'L x 2.0'W x 2.0'D

FROM STA. 70+50 TO STA. 70+82 –L– RT

SUPPLEMENTAL DITCH DETAILS FOR PERMITTING

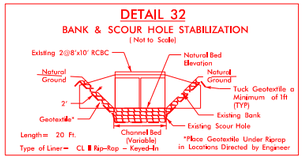
DETAIL 26A
PIPE OUTLET CHANNEL STABILIZATION
OUTLET CROSS SECTION
(Not to Scale, For Permitting Purposes)



Length= 51 Ft.
Type of Liner= CL I Rip-Rap – Keyed-In

STA. 107+52 –L– LT

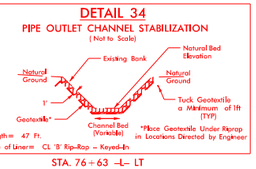
DETAIL 32
BANK & SCOUR HOLE STABILIZATION
(Not to Scale)



Length= 20 Ft.
Type of Liner= CL II Rip-Rap – Keyed-In

STA. 66+45 –L– LT

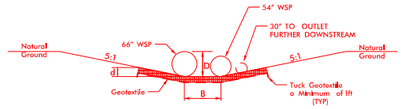
DETAIL 34
PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)



Length= 47 Ft.
Type of Liner= CL 'B' Rip-Rap – Keyed-In

STA. 76+63 –L– LT

DETAIL 28A
STANDARD BASE DITCH
OUTLET CROSS SECTION
(Not to Scale, For Permitting Purposes)



Min. D=2.0 Ft.
d=2.0 Ft.
B=8.0 Ft.
Type of Liner= Class 'II' Rip-Rap, Keyed-In

STA. 69+89 –L– LT

DETAIL 33
PIPE OUTLET BANK STABILIZATION
(Not to Scale)

Length=14 Ft.
d=1.5 Ft.

STA. 110+24 –L– RT

DETAIL 35
PIPE OUTLET BANK STABILIZATION
(Not to Scale)

Length=14 Ft.
d=1.5 Ft.

STA. 110+24 –L– RT

PROJECT REFERENCE NO.	SHEET NO.
NC-9	2D-2

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

PERMIT DRAWING SHEET 3 OF 25

DATE: 10/20/2025

8/17/99

S S SURFACE WATER IMPACTS

TS TS TEMPORARY SURFACE WATER IMPACTS

EXEMPT SURFACE WATER IMPACTS

PRE–HELENE STREAM CHANNEL

PRE–HELENE ASSUMED

EX STORM PIPES

50′ 25′ 0 50′ 100′

SCALE: 1″ = 50′

NAD 83 /NA 2011

PROJECT REFERENCE NO.	SHEET NO.
NC-9	4

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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ENG FIRM LICENSE NO. C-890

PERMIT DRAWING SHEET 4 OF 25

DATE: 10/20/2025

NC9-5

OBSCURED

26 27 28

BROAD RIVER

CONC BRIDGE

WILLIAM M SHERRILL
MARGERY MOORE SHERRILL

JOSEPH A STEFAN

ROCKY BROAD COTTAGES PROP OWNERS ASSOC

ROCKY BROAD COTTAGES PROP OWNERS ASSOC

SITE 1

SITE 2

SITE 3

SEE PERMIT DRAWING SHEET 7 OF 24 FOR ENLARGEMENT

SEE PERMIT DRAWING SHEET 6 OF 24 FOR ENLARGEMENT

MATCHLINE –L– STA 21+00
SEE SHEET 5

10+00

20+00

N 12° 25′ 18.7″ E

N 8° 10′ 26.3″ E

N 9° 18′ 06.0″ E

BEGIN PROJECT NC-9
–L– STA 10+12.00

AVOID COVERING EXISTING INLET W/FILL SLOPE

TOE PROTECTION
EST. 20 TONS
EST. 45 SY GF
SEE DETAIL 1
EST. 15 CY GROUT

TOE PROTECTION
EST. 90 TONS
EST. 190 SY GF
SEE DETAIL 1
EST. 35 CY GROUT

ROCK PLATING
STA. 13+70 TO STA. 15+50 –L– RT
EST. 65 SY GROUTED CLASS 'B' RIP RAP
EST. 65 SY GF
EST. 15 CY GROUT

SPEC. 'V' DITCH
W/GROUTED CL 'B' RIP RAP
EST. 75 TONS
EST. 165 SY GF
SEE DETAIL 2
EST. 30 CY GROUT

SPEC. 'V' DITCH
W/GROUTED CL 'B' RIP RAP
EST. 60 TONS
EST. 125 SY GF
SEE DETAIL 2
EST. 25 CY GROUT

TIE FROM EXISTING LOW POINT

FS TO ELEV. 1507.6

SPEC. 'V' DITCH
W/CL 'B' RIP RAP
EST. 35 TONS
EST. 80 SY GF
SEE DETAIL 5

ROCK PLATING
STA. 20+00 TO STA. 20+87 –L– RT
EST. 35 SY CL 'B' RIP RAP
EST. 35 SY GF

SPEC. 2' BASE DITCH
W/GROUTED CL 'B' RIP RAP
EST. 35 TONS
EST. 75 SY GF
SEE DETAIL 2
EST. 15 CY GROUT

ROCK PLATING
STA. 17+50 TO STA. 18+30 –L– RT
EST. 10 SY CL 'B' RIP RAP
EST. 10 SY GF

REMOVE

RETAIN

EXPT

PAVE TO SHOULDER ROLLOVER

10/20/2025
NC-9_Hyd_prm_wet_psh_04.dgn
jstancyk

PROJECT REFERENCE NO.	SHEET NO.
NC-9	4

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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PERMIT DRAWING SHEET 5 OF 25

DATE: 10/20/2025

S S — SURFACE WATER IMPACTS

TS TS — TEMPORARY SURFACE WATER IMPACTS

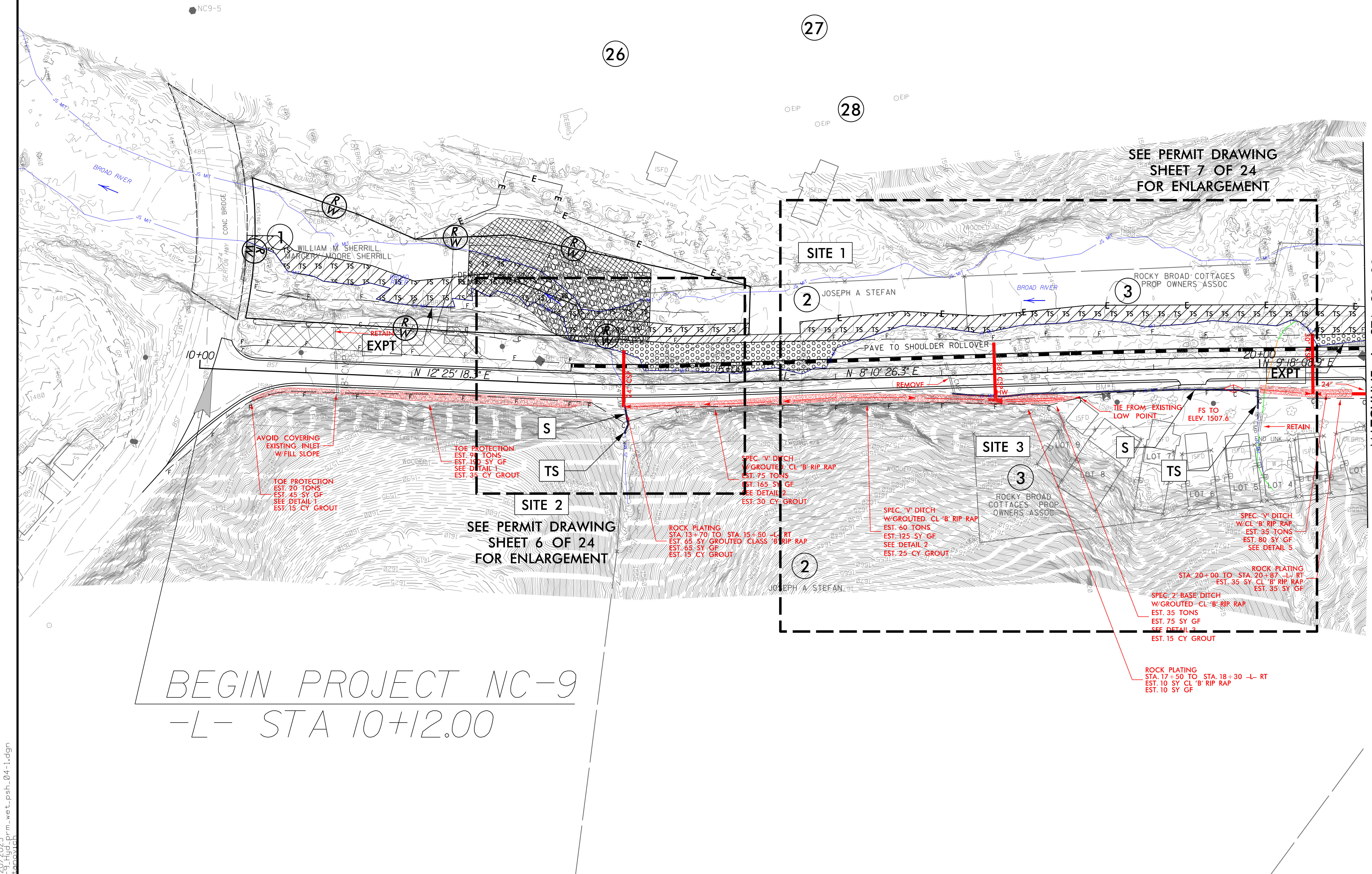
EXEMPT SURFACE WATER IMPACTS

PRE-HELENE STREAM CHANNEL

PRE-HELENE ASSUMED EX STORM PIPES

SCALE: 1" = 50'

NAD 83 /NA 2011



NC9-5
26
27
28
SITE 1
SITE 2
SITE 3
SEE PERMIT DRAWING SHEET 7 OF 24 FOR ENLARGEMENT
SEE PERMIT DRAWING SHEET 6 OF 24 FOR ENLARGEMENT
WILLIAM M SHERRILL
MARCEY MOORE SHERRILL
JOSEPH A STEFAN
ROCKY BROAD COTTAGES PROP OWNERS ASSOC
BROAD RIVER
CONC BRIDGE
PAVE TO SHOULDER ROLLOVER
N 12°25'18.3" E
N 8°10'26.3" E
N 9°18'08.5" E
10+00
20+00
EXPT
RETAIN
REMOVE
AVOID COVERING EXISTING INLET W/FILL SLOPE
TOE PROTECTION EST. 20 TONS EST. 45 SY GF SEE DETAIL 1 EST. 15 CY GROUT
TOE PROTECTION EST. 90 TONS EST. 160 SY GF SEE DETAIL 1 EST. 35 CY GROUT
SPEC. 'V' DITCH W/GROUTED CL 'B' RIP RAP EST. 75 TONS EST. 165 SY GF SEE DETAIL 2 EST. 30 CY GROUT
ROCK PLATING STA 13+70 TO STA 15+80 -L- RT EST. 65 SY GROUTED CLASS 'B' RIP RAP EST. 65 SY GF EST. 15 CY GROUT
SPEC. 'V' DITCH W/GROUTED CL 'B' RIP RAP EST. 60 TONS EST. 125 SY GF SEE DETAIL 2 EST. 25 CY GROUT
TIE FROM EXISTING LOW POINT
FS TO ELEV. 1507.6
SPEC. 'V' DITCH W/CL 'B' RIP RAP EST. 35 TONS EST. 80 SY GF SEE DETAIL 5
ROCK PLATING STA 20+00 TO STA 20+87 -L- RT EST. 35 SY CL 'B' RIP RAP EST. 35 SY GF
SPEC. 2' BASE DITCH W/GROUTED CL 'B' RIP RAP EST. 35 TONS EST. 75 SY GF SEE DETAIL 2 EST. 15 CY GROUT
ROCK PLATING STA. 17+50 TO STA. 18+30 -L- RT EST. 10 SY CL 'B' RIP RAP EST. 10 SY GF
LOT 4
LOT 5
LOT 6
LOT 7
LOT 8
LOT 9
MATCHLINE -L- STA 21+00 SEE SHEET 5
BEGIN PROJECT NC-9
-L- STA 10+12.00

8/17/99

10/20/2025 NC9_Hyd_prm_wet_psh_04-1.dgn

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SUNGATE DESIGN GROUP, P.A.
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RALEIGH, NORTH CAROLINA 27606
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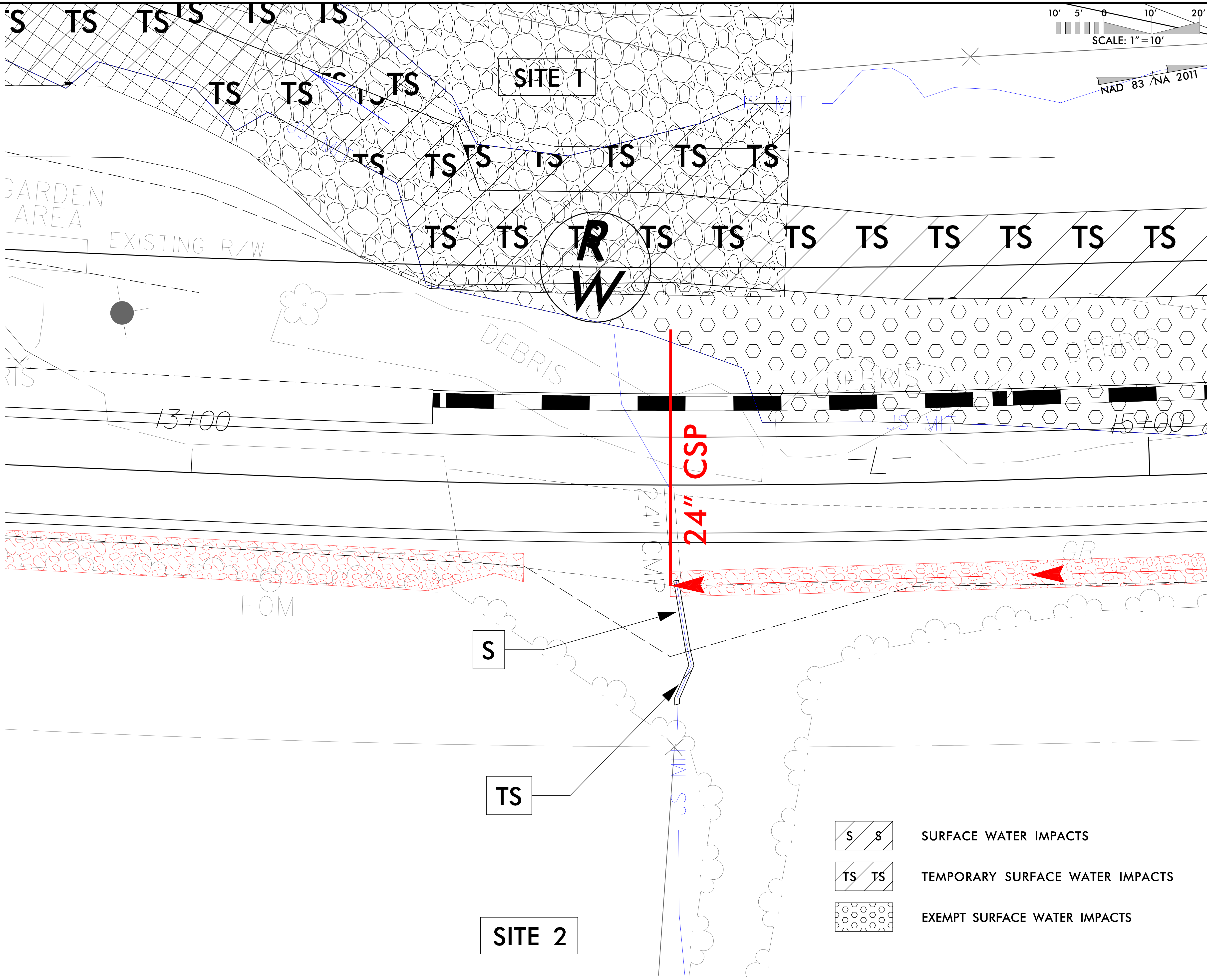

Symbol	Description
S S	SURFACE WATER IMPACTS
TS TS	TEMPORARY SURFACE WATER IMPACTS
(dotted pattern)	EXEMPT SURFACE WATER IMPACTS

PERMIT DRAWING
SHEET 6 OF 25
DATE: 10/20/2025

8/17/99
10/20/2025
NC-9_Hyd_prm_wet_psh_04-2-View1n.dgn

8/17/99

25' 12.5' 0 25' 50'

SCALE: 1"=25'

PROJECT REFERENCE NO.	SHEET NO.
NC-9	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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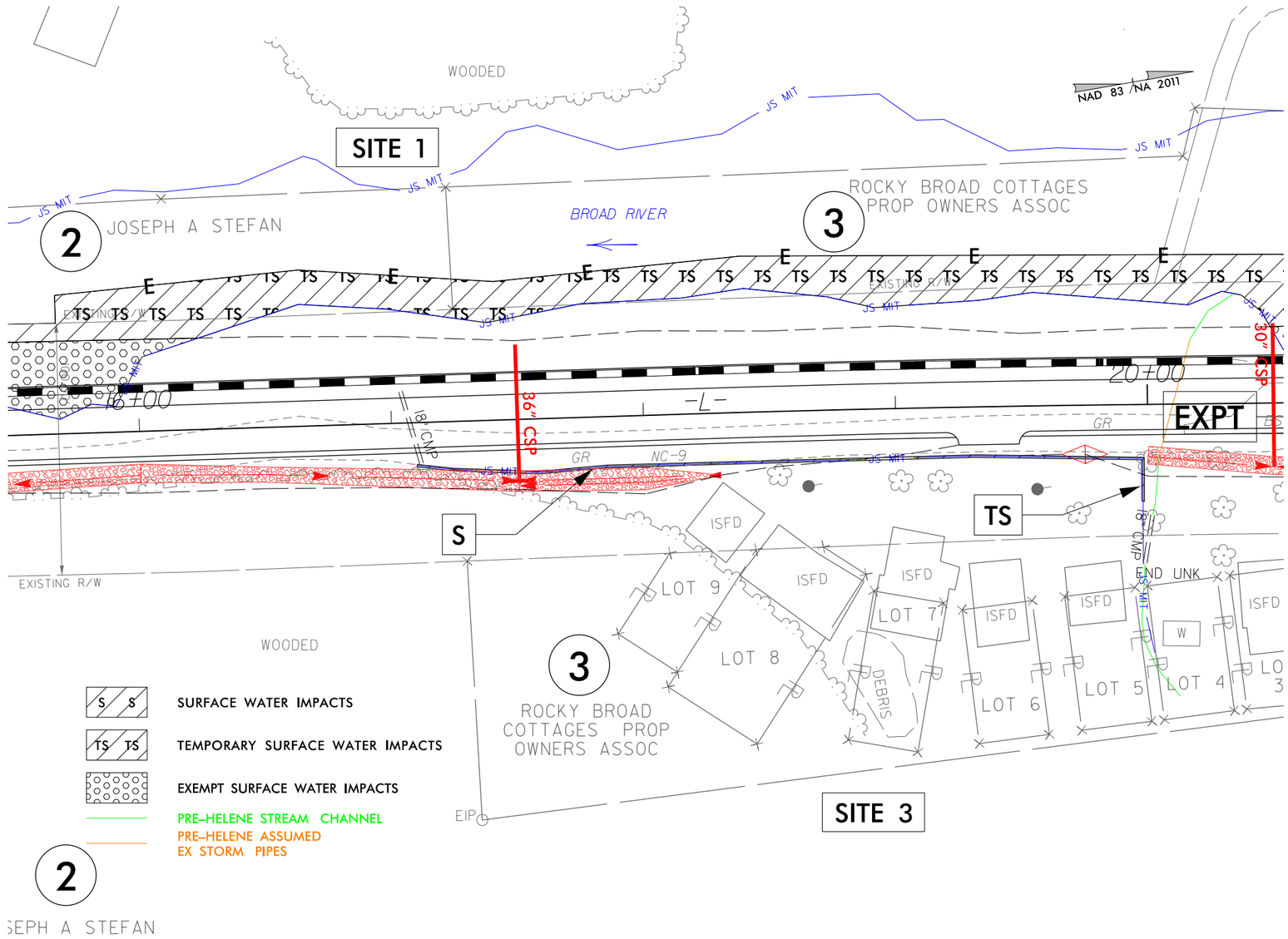
PERMIT DRAWING SHEET 7 OF 25

DATE: 10/20/2025



10/20/2025
NC-9_Hyd_prm_wet_psh_04-3-View1n.dgn
tsamovich

PROJECT REFERENCE NO.	SHEET NO.
NC-9	5

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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SUNGATE DESIGN GROUP, P.A.

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RALEIGH, NORTH CAROLINA 27606
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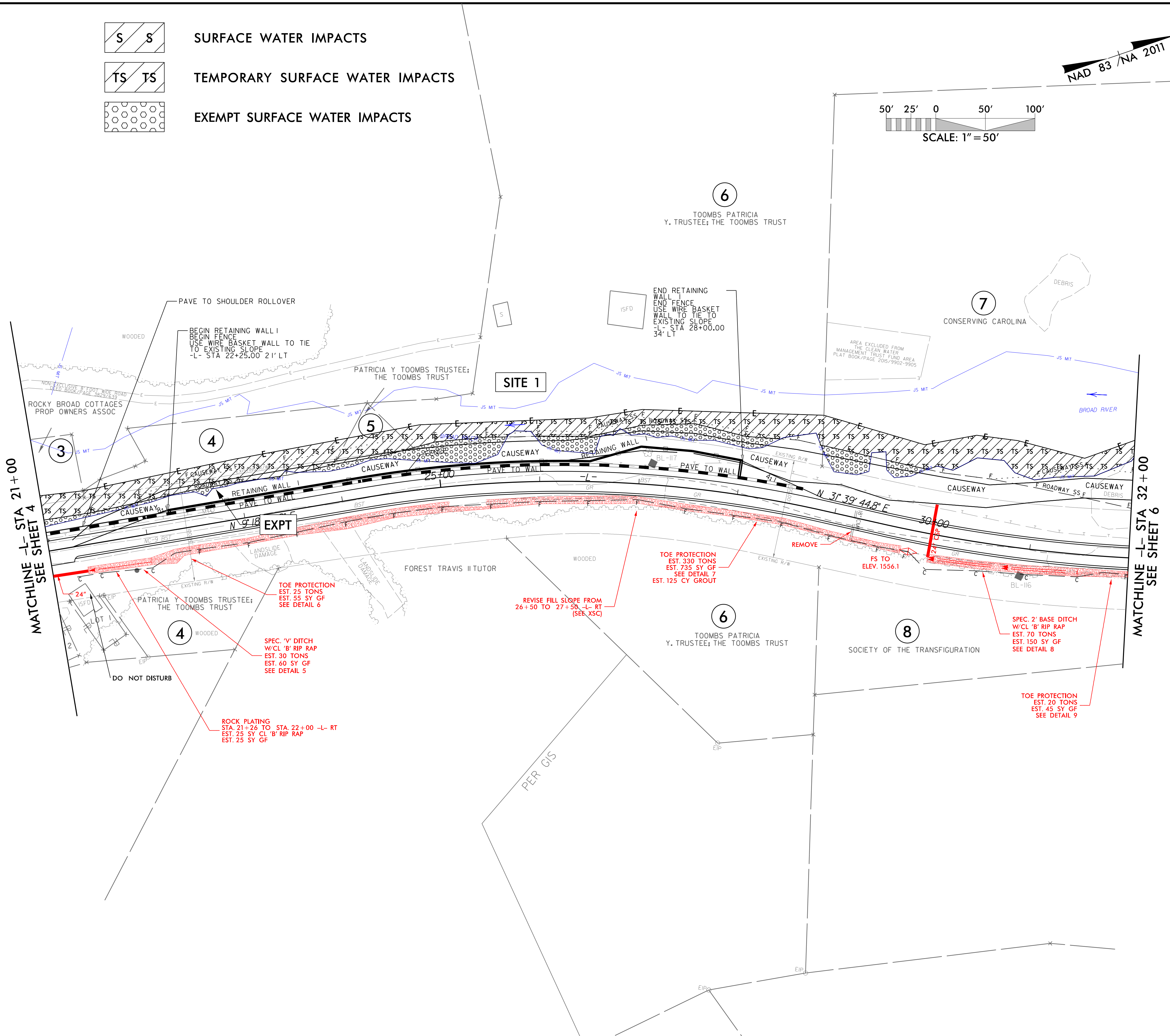
PERMIT DRAWING SHEET 8 OF 25

DATE: 10/20/2025



SURFACE WATER IMPACTS
TEMPORARY SURFACE WATER IMPACTS
EXEMPT SURFACE WATER IMPACTS
NAD 83 /NA 2011
50' 25' 0 50' 100'
SCALE: 1" = 50'
SITE 1
TOOMBS PATRICIA Y. TRUSTEE; THE TOOMBS TRUST
CONSERVING CAROLINA
PATRICIA Y TOOMBS TRUSTEE; THE TOOMBS TRUST
ROCKY BROAD COTTAGES PROP OWNERS ASSOC
PAVE TO SHOULDER ROLLOVER
BEGIN RETAINING WALL I
BEGIN FENCE
USE WIRE BASKET WALL TO TIE TO EXISTING SLOPE
-L- STA 22+25.00 21' LT
END RETAINING WALL I
END FENCE
USE WIRE BASKET WALL TO TIE TO EXISTING SLOPE
-L- STA 28+00.00 34' LT
BROAD RIVER
CAUSEWAY
RETAINING WALL I
PAVE TO WALL
EXPT
N 31° 39' 44.8" E
FOREST TRAVIS II TUTOR
SOCIETY OF THE TRANSFIGURATION
MATCHLINE -L- STA 21+00 SEE SHEET 4
MATCHLINE -L- STA 32+00 SEE SHEET 6
TOE PROTECTION
EST. 25 TONS
EST. 55 SY GF
SEE DETAIL 6
SPEC. 'V' DITCH
W/CL 'B' RIP RAP
EST. 30 TONS
EST. 60 SY GF
SEE DETAIL 5
DO NOT DISTURB
ROCK PLATING
STA. 21+26 TO STA. 22+00 -L- RT
EST. 25 SY CL 'B' RIP RAP
EST. 25 SY GF
REVISE FILL SLOPE FROM 26+50 TO 27+50 -L- RT (SEE XSC)
TOE PROTECTION
EST. 330 TONS
EST. 735 SY GF
SEE DETAIL 7
EST. 125 CY GROUT
REMOVE
FS TO ELEV. 1556.1
SPEC. 2' BASE DITCH
W/CL 'B' RIP RAP
EST. 70 TONS
EST. 150 SY GF
SEE DETAIL 8
TOE PROTECTION
EST. 20 TONS
EST. 45 SY GF
SEE DETAIL 9
PER GIS

8/17/99

10/20/2025

SURFACE WATER IMPACTS

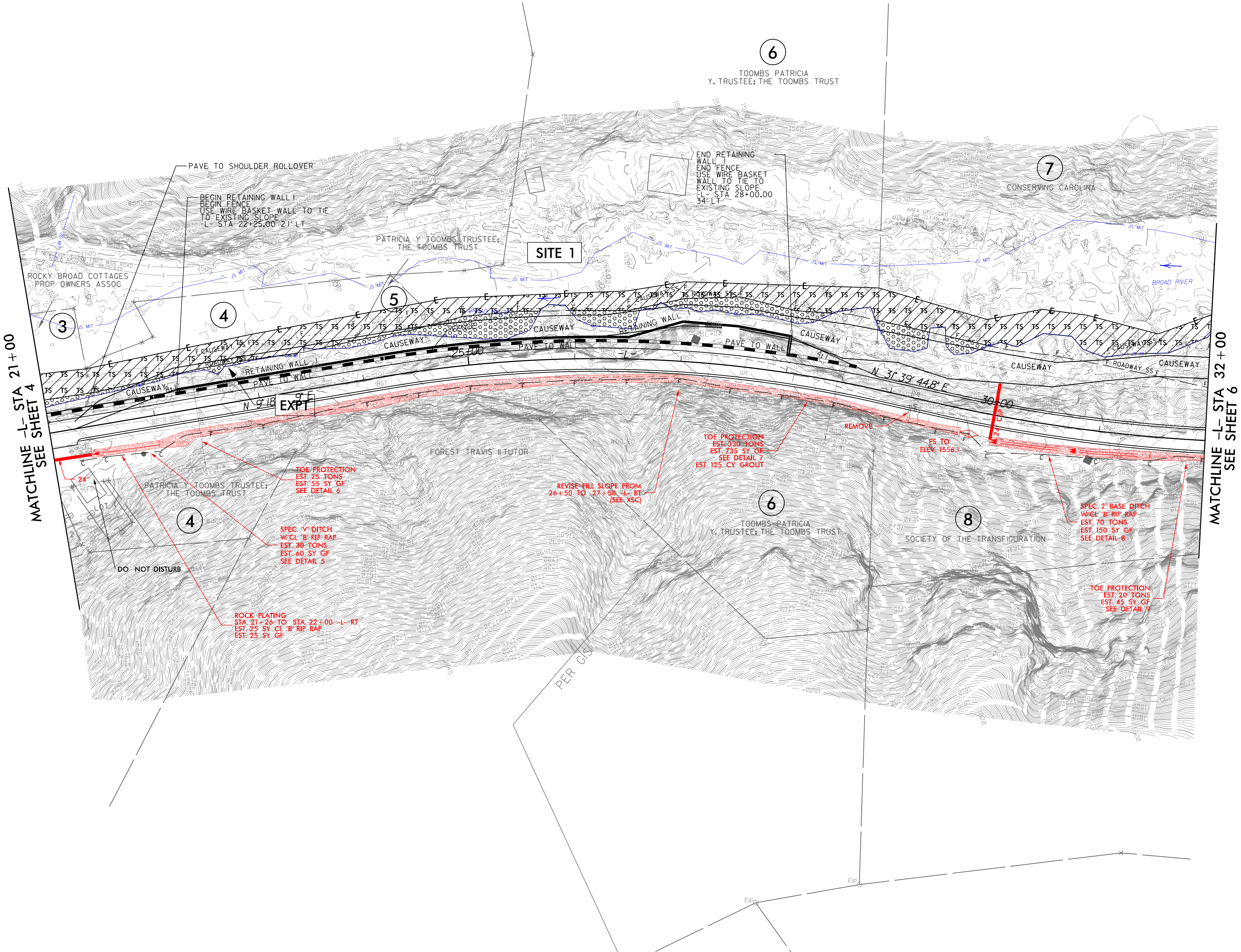
TEMPORARY SURFACE WATER IMPACTS

EXEMPT SURFACE WATER IMPACTS

NAD 83 /NA 2011

50′ 25′ 0 50′ 100′

SCALE: 1″ = 50′



PAVE TO SHOULDER ROLLOVER
BEGIN RETAINING WALL I
BEGIN FENCE
USE WIRE BASKET WALL TO TIE TO EXISTING SLOPE
-L- STA 22+25.00 21′ LT
END RETAINING WALL I
END FENCE
USE WIRE BASKET WALL TO TIE TO EXISTING SLOPE
-L- STA 28+00.00 34′ LT
PATRICIA Y TOOMBS TRUSTEE; THE TOOMBS TRUST
SITE 1
TOOMBS PATRICIA Y. TRUSTEE; THE TOOMBS TRUST
CONSERVING CAROLINA
ROCKY BROAD COTTAGES PROP OWNERS ASSOC
BROAD RIVER
CAUSEWAY
RETAINING WALL
PAVE TO WALL
25+00
30+00
N 31° 39′ 44.8″ E
EXPT
MATCHLINE -L- STA 21+00 SEE SHEET 4
MATCHLINE -L- STA 32+00 SEE SHEET 6
FOREST TRAVIS II TUTOR
SOCIETY OF THE TRANSFIGURATION
TOE PROTECTION
EST. 25 TONS
EST. 55 SY GF
SEE DETAIL 6
SPEC. 'V' DITCH
W/CL 'B' RIP RAP
EST. 30 TONS
EST. 60 SY GF
SEE DETAIL 5
DO NOT DISTURB
ROCK PLATING
STA 21+26 TO STA 22+00 -L- RT
EST. 25 SY CL 'B' RIP RAP
EST. 25 SY GF
REVISE FILL SLOPE FROM 26+50 TO 27+50 -L- RT (SEE XSC)
TOE PROTECTION
EST. 330 TONS
EST. 735 SY GF
SEE DETAIL 7
EST. 125 CY GROUT
REMOVE
FS TO ELEV. 1556.1
SPEC. 2′ BASE DITCH
W/CL 'B' RIP RAP
EST. 70 TONS
EST. 150 SY GF
SEE DETAIL 8
TOE PROTECTION
EST. 20 TONS
EST. 45 SY GF
SEE DETAIL 9
PER GIS

PROJECT REFERENCE NO.	SHEET NO.
NC-9	5

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SUNGATE DESIGN GROUP, P.A.

905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

PERMIT DRAWING
SHEET 9 OF 25

DATE: 10/20/2025

8/17/99

10/20/2025

DATE: 10/20/2025

PROJECT REFERENCE NO.	SHEET NO.
NC-9	6

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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S S — SURFACE WATER IMPACTS

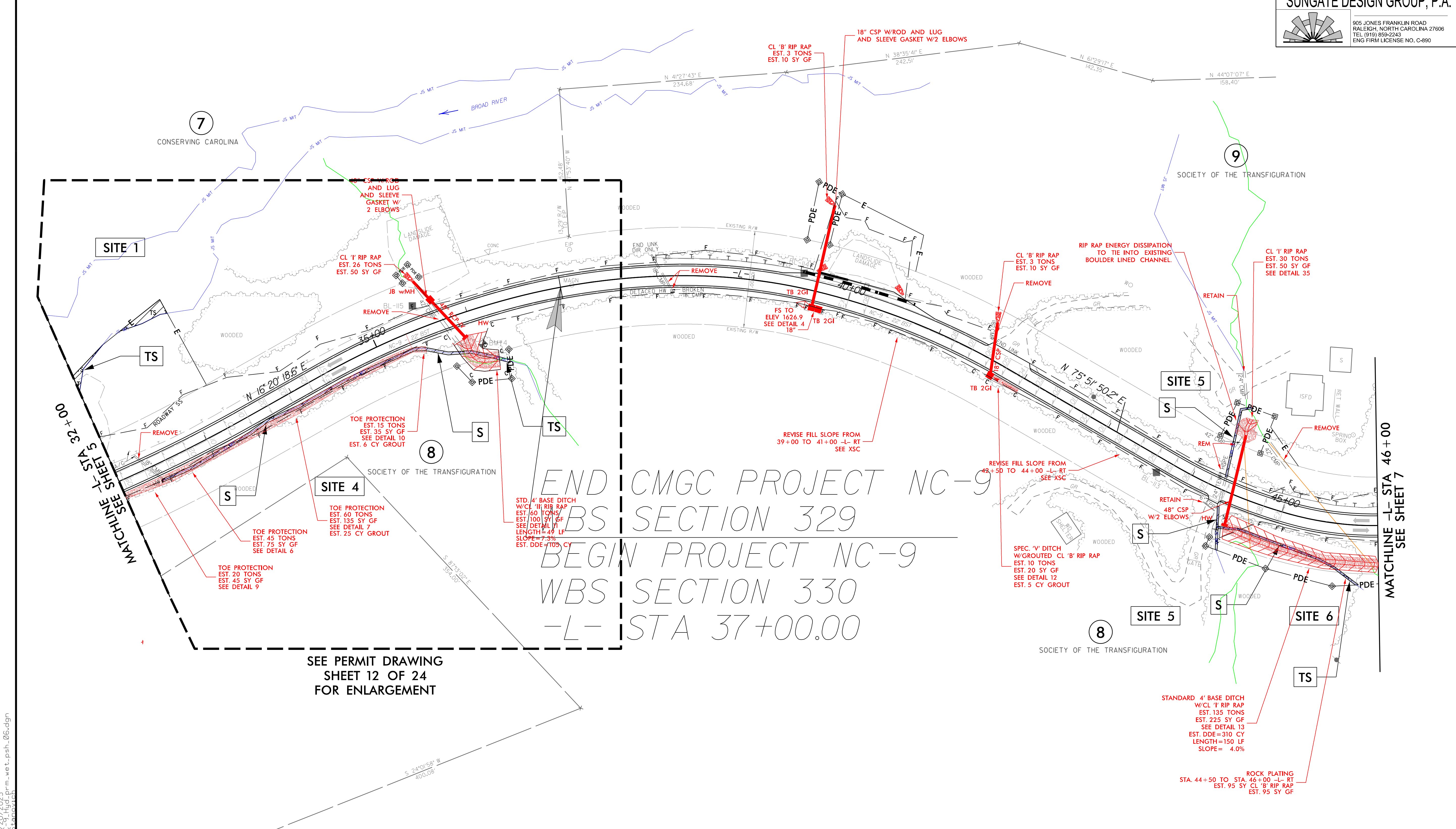
TS TS — TEMPORARY SURFACE WATER IMPACTS

PRE-HELENE STREAM CHANNEL

PRE-HELENE ASSUMED EX STORM PIPES

50' 25' 0 50' 100'
SCALE: 1" = 50'

NAD 83/NA 2011


BROAD RIVER
7
CONSERVING CAROLINA
8
SOCIETY OF THE TRANSFIGURATION
9
SOCIETY OF THE TRANSFIGURATION
SITE 1
SITE 4
SITE 5
SITE 6
MATCHLINE -L- STA 32+00 SEE SHEET 5
MATCHLINE -L- STA 46+00 SEE SHEET 7
N 16°20' 18.6" E
N 75°51' 50.2" E
35+00
40+00
45+00
END CMGC PROJECT NC-9
WBS SECTION 329
BEGIN PROJECT NC-9
WBS SECTION 330
-L- STA 37+00.00
SEE PERMIT DRAWING SHEET 12 OF 24 FOR ENLARGEMENT
18" CSP W/ROD AND LUG AND SLEEVE GASKET W/ 2 ELBOWS
CL 'I' RIP RAP EST. 26 TONS EST. 50 SY GF
JB w/MH
REMOVE
TOE PROTECTION EST. 15 TONS EST. 35 SY GF SEE DETAIL 10 EST. 6 CY GROUT
TOE PROTECTION EST. 60 TONS EST. 135 SY GF SEE DETAIL 7 EST. 25 CY GROUT
TOE PROTECTION EST. 45 TONS EST. 75 SY GF SEE DETAIL 6
TOE PROTECTION EST. 20 TONS EST. 45 SY GF SEE DETAIL 9
STD. 4' BASE DITCH W/CL 'II' RIP RAP EST. 60 TONS EST. 100 SY GF SEE DETAIL 11 LENGTH=49 LF SLOPE=7.3% EST. DDE=105 CY
CL 'B' RIP RAP EST. 3 TONS EST. 10 SY GF
18" CSP W/ROD AND LUG AND SLEEVE GASKET W/2 ELBOWS
TB 2GI
FS TO ELEV 1626.9 SEE DETAIL 4 18"
REVISE FILL SLOPE FROM 39+00 TO 41+00 -L- RT SEE XSC
CL 'B' RIP RAP EST. 3 TONS EST. 10 SY GF
REVISE FILL SLOPE FROM 42+50 TO 44+00 -L- RT SEE XSC
SPEC. 'V' DITCH W/GROUTED CL 'B' RIP RAP EST. 10 TONS EST. 20 SY GF SEE DETAIL 12 EST. 5 CY GROUT
RIP RAP ENERGY DISSIPATION TO TIE INTO EXISTING BOULDER LINED CHANNEL
CL 'I' RIP RAP EST. 30 TONS EST. 50 SY GF SEE DETAIL 35
RETAIN
48" CSP W/2 ELBOWS
STANDARD 4' BASE DITCH W/CL 'I' RIP RAP EST. 135 TONS EST. 225 SY GF SEE DETAIL 13 EST. DDE=310 CY LENGTH=150 LF SLOPE= 4.0%
ROCK PLATING STA. 44+50 TO STA. 46+00 -L- RT EST. 95 SY CL 'B' RIP RAP EST. 95 SY GF
PDE
S
TS
WOODED

8/17/99

10/20/2025

PERMIT DRAWING SHEET 11 OF 25

DATE: 10/20/2025

PROJECT REFERENCE NO.	SHEET NO.
NC-9	6

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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SUNGATE DESIGN GROUP, P.A.
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RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

S / S — SURFACE WATER IMPACTS

TS / TS — TEMPORARY SURFACE WATER IMPACTS

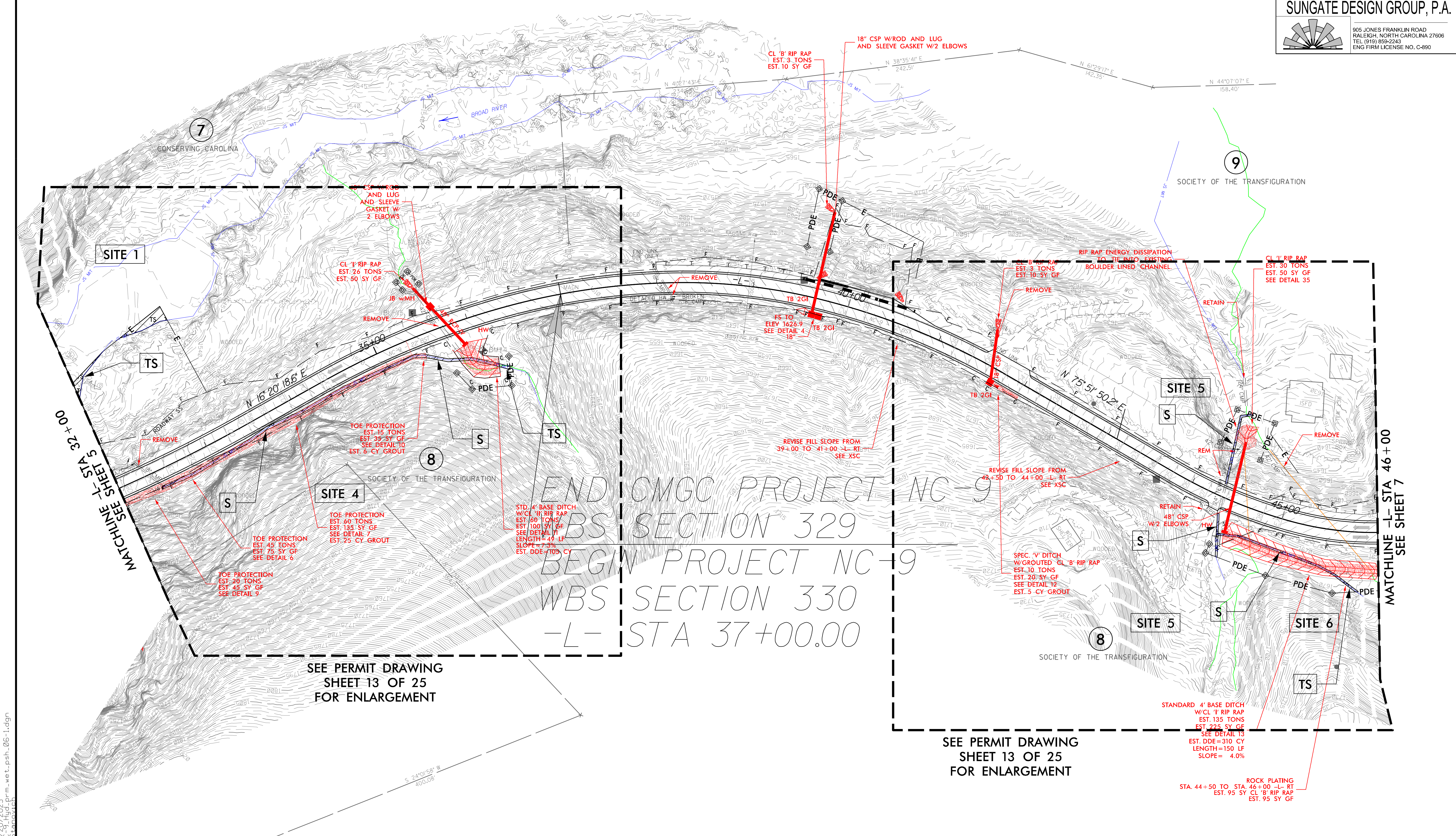
PRE-HELENE STREAM CHANNEL

PRE-HELENE ASSUMED EX STORM PIPES

50' 25' 0 50' 100'

SCALE: 1" = 50'

NAD 83 / NA 2011



SITE 1
SITE 4
SITE 5
SITE 6
7
CONSERVING CAROLINA
8
SOCIETY OF THE TRANSFIGURATION
9
SOCIETY OF THE TRANSFIGURATION
BROAD RIVER
N 16°20' 18.6" E
N 75°51' 50.2" E
35+00
40+00
45+00
END CMGC PROJECT NC-9
WBS SECTION 329
BEGIN PROJECT NC-9
WBS SECTION 330
-L- STA 37+00.00
MATCHLINE -L- STA 32+00 SEE SHEET 5
MATCHLINE -L- STA 46+00 SEE SHEET 7
48" CSP W/ROD AND LUG AND SLEEVE GASKET W/ 2 ELBOWS
CL 'I' RIP RAP EST. 26 TONS EST. 50 SY GF
JB w/MH
REMOVE
TOE PROTECTION EST. 15 TONS EST. 35 SY GF SEE DETAIL 10 EST. 6 CY GROUT
TOE PROTECTION EST. 60 TONS EST. 135 SY GF SEE DETAIL 7 EST. 25 CY GROUT
TOE PROTECTION EST. 45 TONS EST. 75 SY GF SEE DETAIL 6
TOE PROTECTION EST. 20 TONS EST. 45 SY GF SEE DETAIL 9
STD. 4' BASE DITCH W/CL 'II' RIP RAP EST. 60 TONS EST. 100 SY GF SEE DETAIL 11 LENGTH = 49 LF SLOPE = 7.3% EST. DDE = 105 CY
CL 'B' RIP RAP EST. 3 TONS EST. 10 SY GF
18" CSP W/ROD AND LUG AND SLEEVE GASKET W/2 ELBOWS
TB 2GI
FS TO ELEV 1626.9 SEE DETAIL 4 18"
REVISE FILL SLOPE FROM 39+00 TO 41+00 -L- RT SEE XSC
RIP RAP ENERGY DISSIPATION TO TIE INTO EXISTING BOULDER LINED CHANNEL
CL 'B' RIP RAP EST. 3 TONS EST. 10 SY GF
REVISE FILL SLOPE FROM 42+50 TO 44+00 -L- RT SEE XSC
SPEC. 'V' DITCH W/GROUTED CL 'B' RIP RAP EST. 10 TONS EST. 20 SY GF SEE DETAIL 12 EST. 5 CY GROUT
CL 'I' RIP RAP EST. 30 TONS EST. 50 SY GF SEE DETAIL 35
RETAIN
48" CSP W/2 ELBOWS
HW
PDE
STANDARD 4' BASE DITCH W/CL 'I' RIP RAP EST. 135 TONS EST. 225 SY GF SEE DETAIL 13 EST. DDE = 310 CY LENGTH = 150 LF SLOPE = 4.0%
ROCK PLATING STA. 44+50 TO STA. 46+00 -L- RT EST. 95 SY CL 'B' RIP RAP EST. 95 SY GF

SEE PERMIT DRAWING SHEET 13 OF 25 FOR ENLARGEMENT

SEE PERMIT DRAWING SHEET 13 OF 25 FOR ENLARGEMENT

8/17/99

10/20/2025

8/17/99

25' 12.5' 0 25' 50'

SCALE: 1"=25'

PROJECT REFERENCE NO.	SHEET NO.
NC-9	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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PERMIT DRAWING SHEET 12 OF 25

DATE: 10/20/2025

NAD 83

JS MIT

SITE 1

LANDSLIDE DAMAGE

CONC

EIP

MAGN

WOODED

CAUSEWAY

TS

E

PDE

42" CMP

48" RCP IN

35+00

NC-9 - 22' BST

S

SITE 4

TS

33+00

A/G

18" CMP

8

SOCIETY OF THE TRANSFIGURATION

WOODED

S S SURFACE WATER IMPACTS

TS TS TEMPORARY SURFACE WATER IMPACTS

PRE-HELENE STREAM CHANNEL

PRE-HELENE ASSUMED

EX STORM PIPES

10/20/2025
NC-9_Hyd_prm_wet_psh_06-2-View1n.dgn
jstanovich

PROJECT REFERENCE NO.	SHEET NO.
NC-9	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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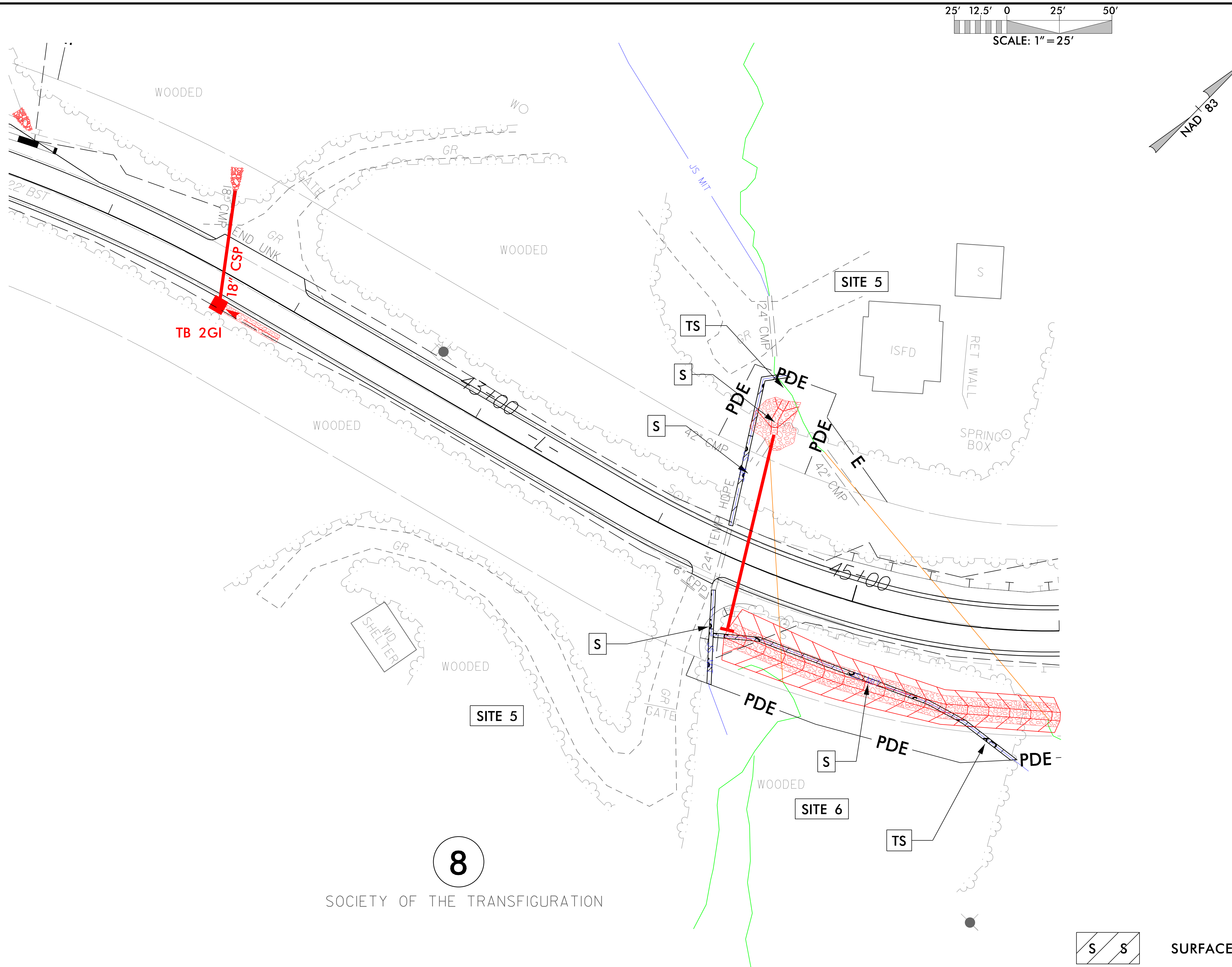


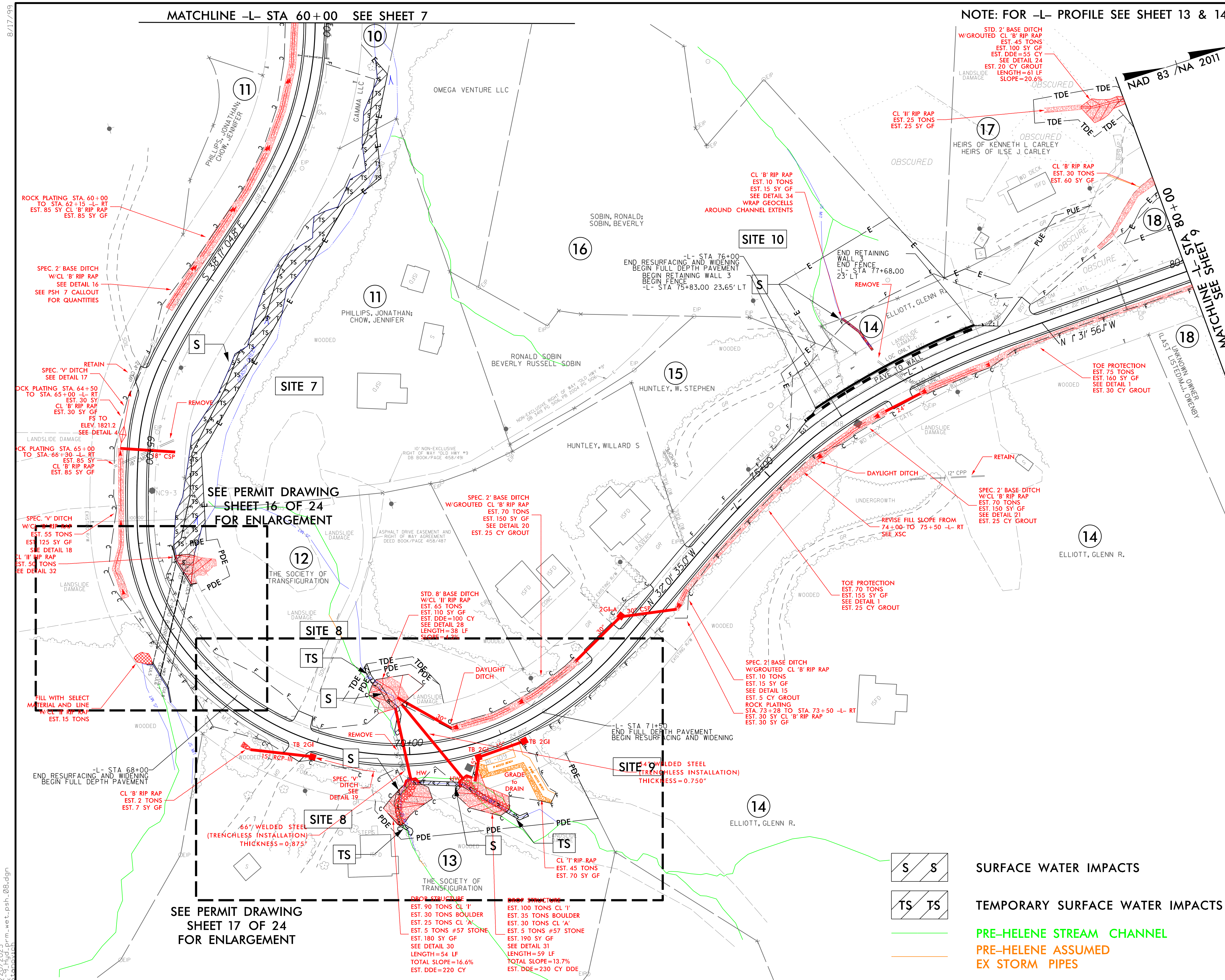
SURFACE WATER IMPACTS

TEMPORARY SURFACE WATER IMPACTS

PRE-HELENE STREAM CHANNEL

PRE-HELENE ASSUMED EX STORM PIPES

8/17/99
10/20/2025


MATCHLINE -L- STA 60+00 SEE SHEET 7
NOTE: FOR -L- PROFILE SEE SHEET 13 & 14
NAD 83 /NA 2011
MATCHLINE -L- STA 80+00 SEE SHEET 9
OMEGA VENTURE LLC
PHILLIPS, JONATHAN; CHOW, JENNIFER
GAMMA LLC
SOBIN, RONALD; SOBIN, BEVERLY
RONALD SOBIN BEVERLY RUSSELL SOBIN
HUNTLEY, W. STEPHEN
HUNTLEY, WILLARD S
HEIRS OF KENNETH L CARLEY HEIRS OF ILSE J CARLEY
ELLIOTT, GLENN R.
THE SOCIETY OF TRANSFIGURATION
UNKNOWN OWNER (LAST LISTED M.J. OWENBY)
SITE 7
SITE 8
SITE 9
SITE 10
ROCK PLATING STA. 60+00 TO STA. 62+15 -L- RT EST. 85 SY CL 'B' RIP RAP EST. 85 SY GF
SPEC. 2' BASE DITCH W/CL 'B' RIP RAP SEE DETAIL 16 SEE PSH 7 CALLOUT FOR QUANTITIES
RETAIN
SPEC. 'V' DITCH SEE DETAIL 17
ROCK PLATING STA. 64+50 TO STA. 65+00 -L- RT EST. 30 SY CL 'B' RIP RAP EST. 30 SY GF
FS TO ELEV. 1821.2 SEE DETAIL 4
ROCK PLATING STA. 65+00 TO STA. 66+30 -L- RT EST. 85 SY CL 'B' RIP RAP EST. 85 SY GF
REMOVE
18" CSP
SPEC. 'V' DITCH W/CL 'B' RIP RAP EST. 55 TONS EST. 125 SY GF SEE DETAIL 18
CL 'II' RIP RAP EST. 50 TONS SEE DETAIL 32
FILL WITH SELECT MATERIAL AND LINE W/CL 'II' RIP RAP EST. 15 TONS
SEE PERMIT DRAWING SHEET 16 OF 24 FOR ENLARGEMENT
SEE PERMIT DRAWING SHEET 17 OF 24 FOR ENLARGEMENT
-L- STA 68+00 END RESURFACING AND WIDENING BEGIN FULL DEPTH PAVEMENT
CL 'B' RIP RAP EST. 2 TONS EST. 7 SY GF
SPEC. 'V' DITCH SEE DETAIL 19
66" WELDED STEEL (TRENCHLESS INSTALLATION) THICKNESS=0.875"
54" WELDED STEEL (TRENCHLESS INSTALLATION) THICKNESS=0.750"
DROP STRUCTURE EST. 90 TONS CL 'I' EST. 30 TONS BOULDER EST. 25 TONS CL 'A' EST. 5 TONS #57 STONE EST. 180 SY GF SEE DETAIL 30 LENGTH=54 LF TOTAL SLOPE=16.6% EST. DDE=220 CY
DROP STRUCTURE EST. 100 TONS CL 'I' EST. 35 TONS BOULDER EST. 30 TONS CL 'A' EST. 5 TONS #57 STONE EST. 190 SY GF SEE DETAIL 31 LENGTH=59 LF TOTAL SLOPE=13.7% EST. DDE=230 CY DDE
CL 'I' RIP RAP EST. 45 TONS EST. 70 SY GF
GRADE TO DRAIN
TB 2GI
STD. 8' BASE DITCH W/CL 'II' RIP RAP EST. 65 TONS EST. 110 SY GF EST. DDE=100 CY SEE DETAIL 28 LENGTH=38 LF SLOPE=4.2%
DAYLIGHT DITCH
SPEC. 2' BASE DITCH W/GROUTED CL 'B' RIP RAP EST. 70 TONS EST. 150 SY GF SEE DETAIL 20 EST. 25 CY GROUT
-L- STA 71+50 END FULL DEPTH PAVEMENT BEGIN RESURFACING AND WIDENING
SPEC. 2' BASE DITCH W/GROUTED CL 'B' RIP RAP EST. 10 TONS EST. 15 SY GF SEE DETAIL 15 EST. 5 CY GROUT
ROCK PLATING STA. 73+28 TO STA. 73+50 -L- RT EST. 30 SY CL 'B' RIP RAP EST. 30 SY GF
TOE PROTECTION EST. 70 TONS EST. 155 SY GF SEE DETAIL 1 EST. 25 CY GROUT
REVISE FILL SLOPE FROM 74+00 TO 75+50 -L- RT SEE XSC
SPEC. 2' BASE DITCH W/CL 'B' RIP RAP EST. 70 TONS EST. 150 SY GF SEE DETAIL 21 EST. 25 CY GROUT
TOE PROTECTION EST. 75 TONS EST. 160 SY GF SEE DETAIL 1 EST. 30 CY GROUT
-L- STA 76+00 END RESURFACING AND WIDENING BEGIN FULL DEPTH PAVEMENT BEGIN RETAINING WALL 3 BEGIN FENCE -L- STA 75+83.00 23.65' LT
END RETAINING WALL 3 END FENCE -L- STA 77+68.00 23' LT
CL 'B' RIP RAP EST. 10 TONS EST. 15 SY GF SEE DETAIL 34 WRAP GEOCELLS AROUND CHANNEL EXTENTS
STD. 2' BASE DITCH W/GROUTED CL 'B' RIP RAP EST. 45 TONS EST. 100 SY GF EST. DDE=55 CY SEE DETAIL 24 EST. 20 CY GROUT LENGTH=61 LF SLOPE=20.6%
CL 'II' RIP RAP EST. 25 TONS EST. 25 SY GF
CL 'B' RIP RAP EST. 30 TONS EST. 60 SY GF
S 38°17'04.8" E
N 32°01'35.0" W
W 1°31'56.1" W

SURFACE WATER IMPACTS

TEMPORARY SURFACE WATER IMPACTS

PRE-HELENE STREAM CHANNEL

PRE-HELENE ASSUMED EX STORM PIPES

PROJECT REFERENCE NO.	SHEET NO.
NC-9	8

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SUNGATE DESIGN GROUP, P.A.

905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

PERMIT DRAWING SHEET 14 OF 25

DATE: 10/20/2025

50' 25' 0 50' 100'

SCALE: 1"=50'

NOTE: FOR -L- PROFILE SEE SHEET 13 & 14

PROJECT REFERENCE NO.	SHEET NO.
NC-9	8

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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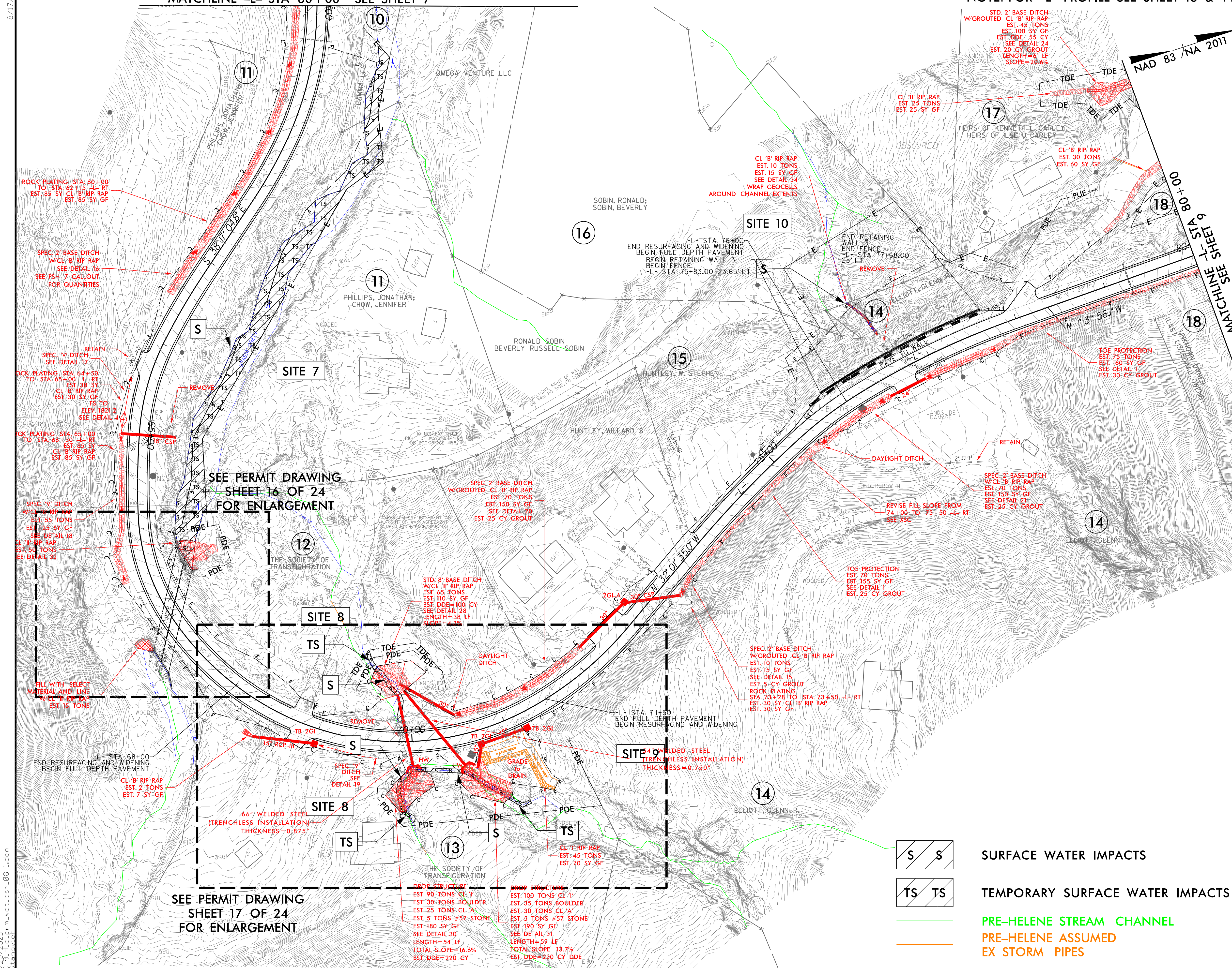
PERMIT DRAWING SHEET 15 OF 25

DATE: 10/20/2025



8/17/99

10/20/2025

PROJECT REFERENCE NO.	SHEET NO.
NC-9	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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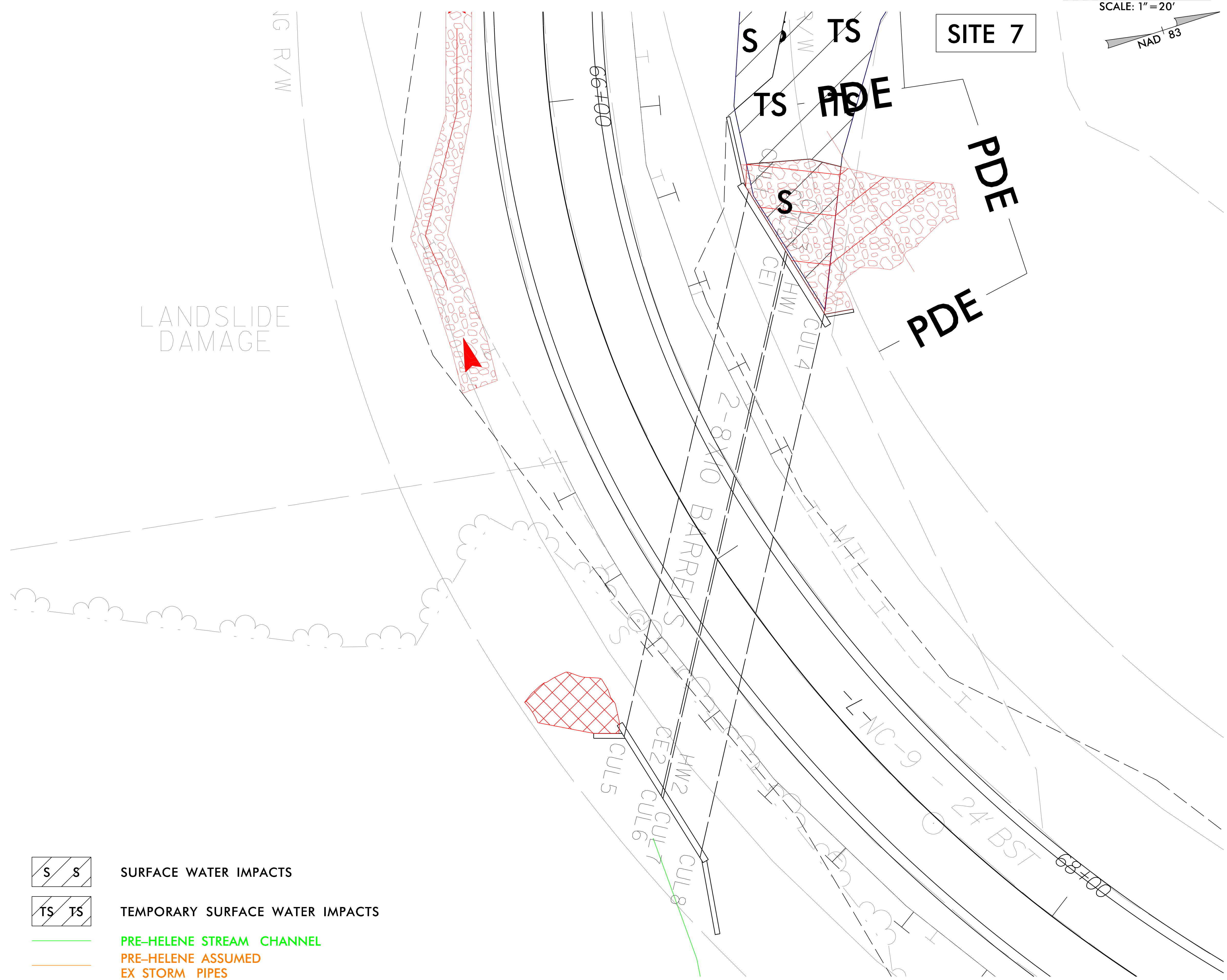

PERMIT DRAWING
SHEET 16 OF 25

DATE: 10/20/2025

S S — SURFACE WATER IMPACTS

TS TS — TEMPORARY SURFACE WATER IMPACTS

PRE-HELENE STREAM CHANNEL

PRE-HELENE ASSUMED EX STORM PIPES

8/17/99

25' 12.5' 0 25' 50'

SCALE: 1" = 50'

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
NC-9	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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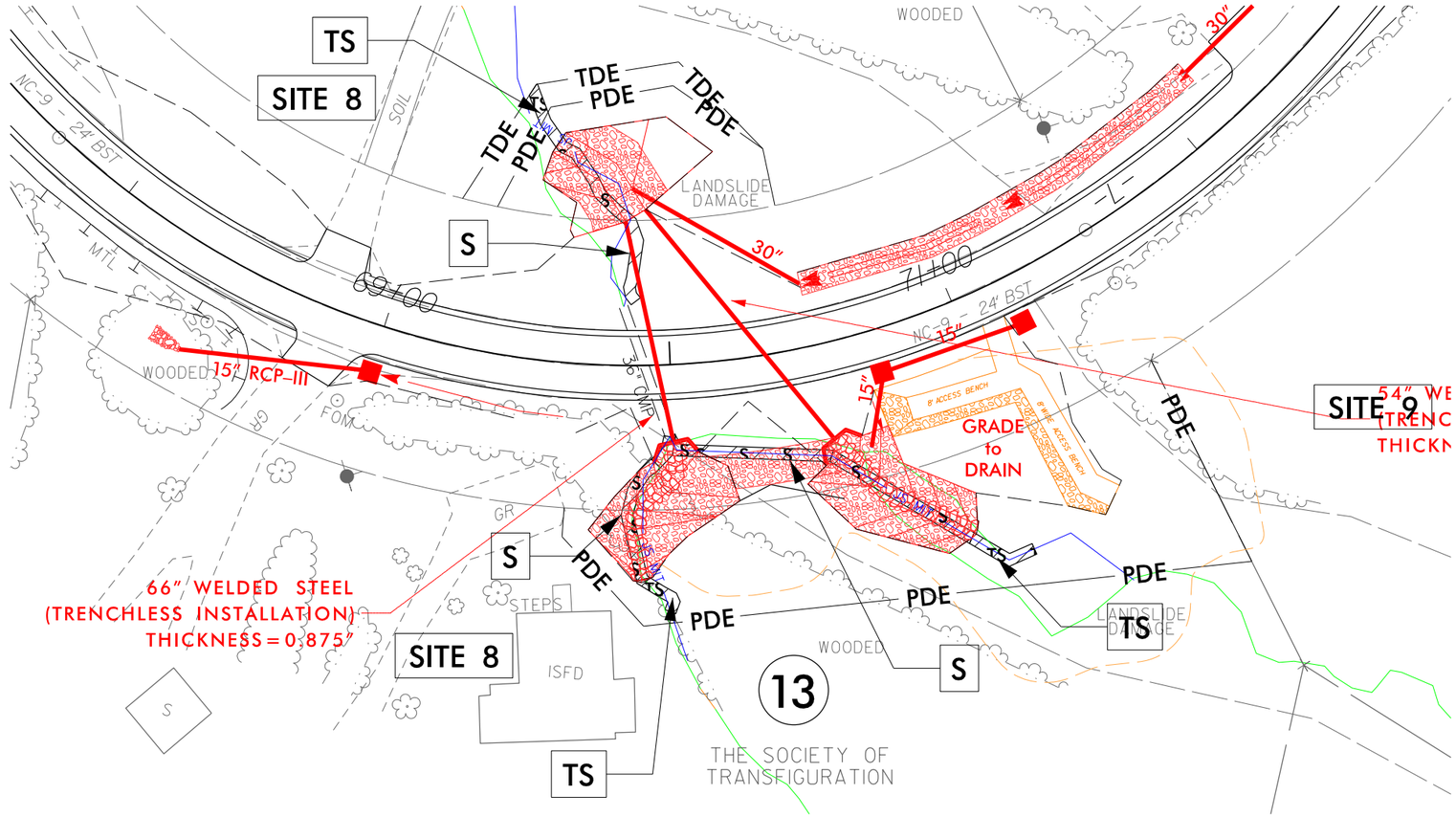
PERMIT DRAWING SHEET 17 OF 25

DATE: 10/20/2025



10/20/2025
NC-9_Hyd_prm_wet_psh_08-3-View1n.dgn
jstanovich

6/23/16

0 12.5 25	PROJ. REFERENCE NO.	SHEET NO.
	NC-9	

PERMIT DRAWING
SHEET 18 OF 25
DATE: 10/20/2025

100 50 0 50 100

CL STA 66+99.77 –L–

1840

1830

1820

1810

1800

SITE 7

2-8X10 BARRELS

10/20/2025
NC-9_Hyd_prm_wet_psh_08-4-Pipe.dgn
JSzanovich

6/23/16

0 12.5 25

PROJ. REFERENCE NO.	SHEET NO.
NC-9	

PERMIT DRAWING
SHEET 19 OF 25
DATE: 10/20/2025

100 50 0 50 100

CL STA 69+96.25 –L–

1870

1860

1850

1840

1830

EX 36" CMP

66" WSP

SITE 8

10/20/2025
NC-9_Hyd_prm_wet_psh_08-5-Pipe.dgn
JStanovich

PROJECT REFERENCE NO.	SHEET NO.
NC-9	11

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

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SUNGATE DESIGN GROUP, P.A.

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RALEIGH, NORTH CAROLINA 27606
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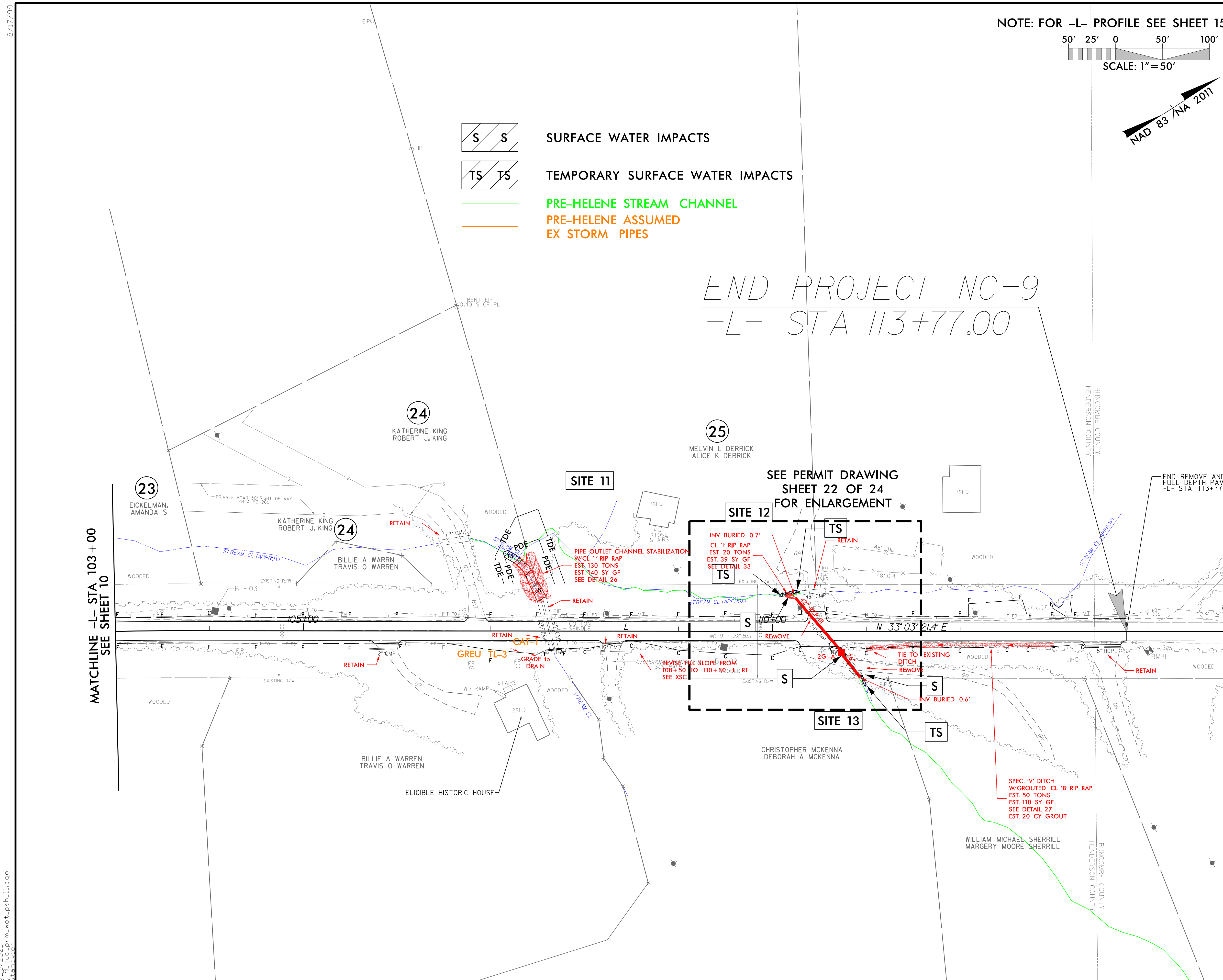
ENG FIRM LICENSE NO. C-890

PERMIT DRAWING
SHEET 20 OF 25

DATE: 10/20/2025

NOTE: FOR -L- PROFILE SEE SHEET 15

SCALE: 1" = 50'



SURFACE WATER IMPACTS
TEMPORARY SURFACE WATER IMPACTS
PRE-HELENE STREAM CHANNEL
PRE-HELENE ASSUMED EX STORM PIPES
NAD 83 / NA 2011
END PROJECT NC-9
-L- STA 113+77.00
MATCHLINE -L- STA 103+00 SEE SHEET 10
SEE PERMIT DRAWING SHEET 22 OF 24 FOR ENLARGEMENT
SITE 11
SITE 12
SITE 13
KATHERINE KING
ROBERT J. KING
MELVIN L DERRICK
ALICE K DERRICK
EICKELMAN, AMANDA S
BILLIE A WARRN
TRAVIS O WARREN
BILLIE A WARREN
TRAVIS O WARREN
ELIGIBLE HISTORIC HOUSE
CHRISTOPHER MCKENNA
DEBORAH A MCKENNA
WILLIAM MICHAEL SHERRILL
MARGERY MOORE SHERRILL
BUNCOMBE COUNTY
HENDERSON COUNTY
PIPE OUTLET CHANNEL STABILIZATION W/CL 'I' RIP RAP
EST. 130 TONS
EST. 140 SY GF
SEE DETAIL 26
INV BURIED 0.7'
CL 'I' RIP RAP
EST. 20 TONS
EST. 39 SY GF
SEE DETAIL 33
INV BURIED 0.6'
SPEC. 'V' DITCH W/GROUTED CL 'B' RIP RAP
EST. 50 TONS
EST. 110 SY GF
SEE DETAIL 27
EST. 20 CY GROUT
END REMOVE AND REPLACE FULL DEPTH PAVEMENT -L- STA 113+77.00
REVISE FILL SLOPE FROM 108+50 TO 110+30 -L- RT SEE XSC
GRADE to DRAIN
GREU TL-3
CAT-1
TIE TO EXISTING DITCH
RETAIN
REMOVE
N 33°03'21.4" E
105+00
110+00
115+00
-L-
STREAM CL (APPROX)
WOODED

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

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NOTE: FOR -L- PROFILE SEE SHEET 15

SCALE: 1" = 50'

NAD 83 / NA 2011

S S — SURFACE WATER IMPACTS

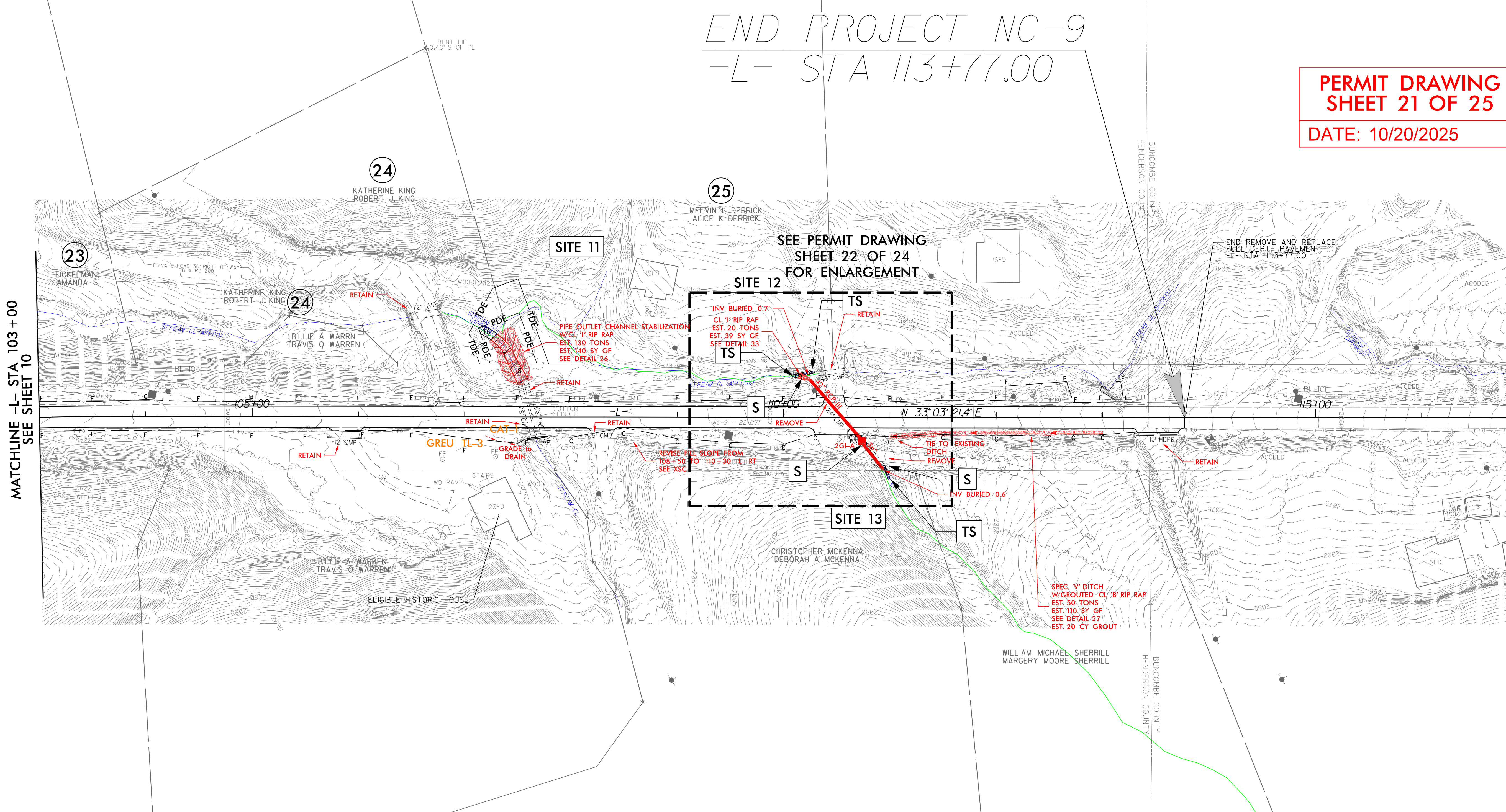
TS TS — TEMPORARY SURFACE WATER IMPACTS

PRE-HELENE STREAM CHANNEL

PRE-HELENE ASSUMED EX STORM PIPES

PERMIT DRAWING SHEET 21 OF 25

DATE: 10/20/2025



END PROJECT NC-9
-L- STA 113+77.00
MATCHLINE -L- STA 103+00
SEE SHEET 10
SITE 11
SITE 12
SITE 13
SEE PERMIT DRAWING SHEET 22 OF 24 FOR ENLARGEMENT
KATHERINE KING
ROBERT J. KING
MELVIN L. DERRICK
ALICE K. DERRICK
EICKELMAN, AMANDA S
BILLIE A. WARREN
TRAVIS O. WARREN
CHRISTOPHER MCKENNA
DEBORAH A. MCKENNA
WILLIAM MICHAEL SHERRILL
MARGERY MOORE SHERRILL
ELIGIBLE HISTORIC HOUSE
PIPE OUTLET CHANNEL STABILIZATION
W/CL 'I' RIP RAP
EST. 130 TONS
EST. 140 SY GF
SEE DETAIL 26
INV. BURIED 0.7'
CL 'I' RIP RAP
EST. 20 TONS
EST. 39 SY GF
SEE DETAIL 33
INV. BURIED 0.6'
REVISE FILL SLOPE FROM 108+50 TO 110+30 -L- RT
SEE XSC
TIE TO EXISTING DITCH
REMOVE
RETAIN
GRADE to DRAIN
GREU TL-3
CAT-1
SPEC. 'V' DITCH
W/GROUTED CL 'B' RIP RAP
EST. 50 TONS
EST. 110 SY GF
SEE DETAIL 27
EST. 20 CY GROUT
END REMOVE AND REPLACE FULL DEPTH PAVEMENT
-L- STA 113+77.00
N 33°03'21.4" E
105+00
110+00
115+00
BUNCOMBE COUNTY
HENDERSON COUNTY

8/17/99

S S SURFACE WATER IMPACTS

TS TS TEMPORARY SURFACE WATER IMPACTS

PRE-HELENE STREAM CHANNEL

PRE-HELENE ASSUMED

EX STORM PIPES

10' 5' 0 10' 20'

SCALE: 1"=20'

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
NC-9	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SUNGATE DESIGN GROUP, P.A.
905 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243
ENG FIRM LICENSE NO. C-890

PERMIT DRAWING
SHEET 22 OF 25

DATE: 10/20/2025

SITE 12

GR

TS

S

TS

EXISTING R/W

GATE

48" CHL

48" CHL

STREAM CL (APPROX)

TS TS

48" CMP

42" RCP-III

EIP

FO

110+00

111+00

-L-

NC-9 - 22' BST

24" CMP

S

FO

GR HW

36"

TIE TO DITCH

ONED

WOODED

EXISTING R/W

S

TS

EIP

SITE 13

10/20/2025
NC-9_Hyd_prm_wet_psh_11-2-Viewln.dgn
jstanovich

WETLAND AND SURFACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	10+40 to 33+27-L-LT	ROADWAY FILL							1.006		1166	
	12+01 to 29+83-L-LT	EXEMPT ROADWAY FILL						0.300		1129		
	12+49 to 14+25 -L- LT	STREAM MODIFICATION							0.058			
2	14+01 to 14+05-L-RT	ROADWAY FILL						0.001	0.001	15	12	
3	17+10 to 19+98-L-RT	ROADWAY FILL						0.007	0.001	295	11	
4	32+41 to 36+29-L-RT	ROADWAY FILL						0.024	0.001	340		
		PIPE INLET						0.003		42	11	
SHEET TOTALS*:			**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.335**	**1.067**	**1821**	**1200**	**0**

*Rounded totals are sum of actual impacts

NOTES:

The linear feet of temporary existing channel impacts not included for Site 1 Stream Modification due to already being accounted for under Site 1 Roadway Fill.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
10-20-2025
HENDERSON COUNTY
NC-9
18314.4045135

WETLAND AND SURFACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
5	44+36 to 45+21-L-RT	CHANNEL REPLACEMENT						0.001		26		
		PIPE INLET						0.001		19		
	44+14 to 44+33-L-LT	PIPE OUTLET						0.002		43		
		CHANNEL REPLACEMENT						0.002		39		
6	44+45 to 45+82-L-RT	DEWATERING							0.001		26	
		INLET CHANNEL BACKSLOPE						0.001		6		
		INLET CHANNEL RIP RAP						0.006		125		
7	60+34 to 66+62-L-LT	RIP RAP EMBANKMENT						0.052		379		
	60+34 to 66+62-L-LT	DEWATERING							0.194		207	
	66+21 to 66+62-L-LT	OUTLET RIP RAP						0.008		19		
8	69+84 to 70+01-L-RT	PIPE INLET						0.001		11		
		INLET CHANNEL RIP RAP						0.004		44		
		DEWATERING							0.002		17	
	69+42 to 69+91-L-LT	PIPE CULVERT						0.003		30		
		OUTLET CHANNEL RIP RAP						0.003		37		
		DEWATERING							0.002		20	
SHEET TOTALS*:			**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.084**	**0.199**	**778**	**270**	**0**

*Rounded totals are sum of actual impacts

NOTES:

Site 5: Existing Pipe Culvert: 115 LF
Site 6: Existing Pipe Culvert: 166 LF
Site 8: Existing Pipe Culvert: 48 LF

NC DEPARTMENT OF TRANSPORTATION
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HENDERSON COUNTY
NC-9
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WETLAND AND SURFACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
9	70+01 to 70+86-L-RT	RESILIENCY						0.004		44		
		PIPE INLET						0.001		13		
	70+46 to 70+86-L-RT	INLET CHANNEL RIP RAP						0.005		56		
		PIPE INLET						0.001		2		
		DEWATERING							0.001		24	
10	76+27 to 76+64-L-LT	SUPPLEMENTAL RIP RAP						0.002		46		
11	107+13 to 107+59-L-LT	OUTLET RIP RAP						0.010		51		
		DEWATERING							0.003		16	
12	110+08 to 110+30-L-LT	OUTLET RIP RAP						0.001		4		
		DEWATERING							0.001		15	
13	110+93 to 111+00-L-RT	PIPE INLET						0.001		3		
		DEWATERING							0.001		10	
	110+70 to 110+79-L-RT	PIPE OUTLET						0.001		10		
	TOTAL SHEET	23 OF 25						0.335	1.067	1821	1200	
	TOTAL SHEET	24 OF 25						0.084	0.199	778	270	
PROJECT TOTALS*:			**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.445**	**1.272**	**2828**	**1535**	**0**

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
10-20-2025
HENDERSON COUNTY
NC-9
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SHEET 25 OF 25