



STIP A-0009CA

Concurrence Point 4B Hydraulic Design Review Meeting Minutes

Date/Time: March 17th, 2021 from 1:00 PM to 3:00 PM

Subject: STIP No. A-0009CA, Graham County
Concurrence Point 4B Virtual Meeting

Attendees:

USACE – Crystal Amschler	NCDOT EAU – David Hinnant
USEPA – Amanetta Somerville	NCDOT EAU – Herman Huang
NCWRC – Marla Chambers	NCDOT SMU – Kevin Fischer
NCDCR – Renee Gledhill-Earley	NCDOT EAU – Wes Cartner
NCDCR – Lindsay Ferrante	NCDOT EPU – Mike Sanderson
NCDWR – Kevin Mitchell	NCDOT ECAP – Carla Dagnino
NCDWR – Robert Patterson	NCDOT TMU – Jim Dunlop
USFWS – Holland Youngman	NCDOT TSU – Heather Hildebrandt
FHWA – Clarence Coleman	NCDOT Hydraulics – Jonathan Moore
FHWA – Donna Dancausse	Stantec – Emily Love
ARC – Jim Sinnette	Stantec – Amy Sackaroff
ATC – Morgan Sommerville	TGS – Ben Henegar
ATC – Matt Drury	TGS – Jay Twisdale
SWC RPO – Rose Bauguess	TGS – Randy Henegar
SWC RPO – Roger Castillo	TGS – David Petty
NCDOT Division 14 – Wanda Austin	TGS – Jimmy Terry
NCDOT Division 14 – Dave McHenry	TGS – Briana James
NCDOT Division 14 – Andy Russel	TGS/NCDOT – Stacy Oberhausen
NCDOT Division 14 – Josh Deyton	

Purpose: The purpose of the meeting was to review and discuss the 30% drainage plans for STIP A-0009CA. The project goes from Robbinsville to Stecoah.

General Discussions:

- ROW acquisition for A-0009 CA is August 2021 and Let is August 2022.
- The project was split into three sections for design and construction letting to allow for fair competition for Letting and for efficiency of the design and review process. It is being designed as a one continuous project to avoid losing continuity. The project will be permitted as one.
 - Section CA - US 129 from 0.2 miles south of SR 1275 (Five Point Road) to NC 143, and NC 143 from US 129 to SR 1223 (Beech Creek Road), approximately 4.0 miles.
 - Section CB – NC 143 from SR 1223 (Beech Creek Road) to 0.5 miles north of the Appalachian Trail, approximately 3.9 miles
 - Section CC – NC 143 from 0.5 miles north of the Appalachian Trail to NC 28, and NC 28 from NC 143 to 0.3 miles east of SR 1235 (Gunters Gap Road), approximately 4.0 miles
- TGS has worked through drainage for Section CB which includes the Appalachian Trail. Drainage on Section CC is in progress.

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- Renee Gledhill-Earley asked if there is proposed drainage on the project that may affect historical properties. TGS confirmed that designs avoid impacts to historical and archeological properties to the greatest extent practicable which are delineated with boundaries on the plans. The design maintains existing drainage patterns to the maximum extent practicable.

Meeting Discussions:

PSH 4:

Tulula Creek (WS-III, CA, Tr) is the only jurisdictional feature on this plan sheet. The design features a hazardous spill basin to the right of station 15+00.

- Robert Patterson requested TGS investigate a hybrid hazardous spill basin in this location due to Tulula's trout water classification. This would be a dual-purpose basin providing treatment for both hazardous spills and stormwater.
- There is a similar basin on the I-40 project in Raleigh for reference. Robert clarified that these basins include bioretention. He pointed out that Tulula Creek was misspelled in the final survey; TGS will correct.

PSH 5:

Jurisdictional features on this sheet include:

- Crossing of Tulula Creek (WS-III, Tr) as it parallels US 129. Design features a hazardous spill basin adjacent to Five Points Road and Tulula Creek at 23+50 RT.
- Crossing of UT to Tulula Creek (WS-III, Tr), Stream "SE", at -Y1- 23+50 RT. The crossing is an existing 48" CMP and will be replaced with a proposed 60" RCP buried 1'. The existing 24" CMP downstream of the crossing will be removed and excavated with a new outlet channel to Tulula Creek.
 - Crystal suggested reevaluating details for the stream outlet to ensure that the details reflect existing stream dimensions on outfalls. She recommended omitting the word "ditch" from the details for clarity.
 - Crystal identified that there is no rip rap shown in stream outlet detail (Detail 1) and requested that rip rap be shown only on banks and embedded, and not in stream bed.
 - Dave McHenry asked if JS streams with no rock should be lined with coir fiber matting. Jay Twisdale stated that it depends on stream velocities and whether or not bank stabilization is present.
 - Robert Patterson and Kevin Mitchell requested that Detail 2 show the tributary with channel dimensions and embedded rip rap. The detail should include a note that the rip rap is keyed in.
 - Marla Chambers asked if the UT is big enough to have fish or fish passage concerns and if the stream is perennial or intermittent. Kevin Mitchell confirmed the UT is intermittent. Jay mentioned that the proposed 60" RCP will be buried 1' below the stream bed and sloped 1% to accommodate fish passage.



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- Crystal asked if the drainage plans will show a profile view with slopes, baffles, pipe burials, etc. for any pipes 60" or larger. Ben Henegar stated that profile views will be included in permit drawings.
- Crystal asked if the 1.5' drop from UT to Tulula Creek in the rip rap at embankment detail will present a problem for fish passage. Marla stated that since Tulula Creek is intermittent, fish passage is not a concern.

PSH 6:

The outlet of hazardous spill basin #2 into Tulula Creek is on this sheet as well as a crossing on Tulula Creek (WS-III, CA, Tr) at -L- 17+35. The existing structure, 4 @ 12'x14' RCBC will be retained. The headwall on the upstream side will be raised. There are no impacts.

- Marla mentioned that Tulula Creek is using all four barrels of the existing culvert, which is frowned upon as the facility should span the whole creek. Crystal referred to the CP 2A meeting minutes which indicated a lot of discussion about replacing the existing culvert with a bridge. It was determined at the meeting that while a bridge would be ideal, it would be problematic due to impacts on surrounding businesses. As a result, bridging was dropped from consideration and the Team concurred that existing culvert would be retained.
- Robert suggested that the proposed 30" RCP going into the culvert could outlet on the upstream side into a hazardous spill basin due to proximity to the gas station. Alternatively, Robert suggested the stream could be taken under the road and treated in the grassy area. Jay explained that these options were investigated but with limited room on the upstream side and the archeological boundary on the downstream side, there was no way to add a hazardous spill basin in this area.

PSH 7:

No jurisdictional features are proposed to be impacted on this sheet. Sweetwater Creek is present but outside of project limits. 1.5:1 rock plated fill slopes proposed on the left side of facility will keep project off of creek.

PSH 8:

Jurisdictional features on this sheet include:

- Stream "SG" (Structure #0806) from proposed 30" WSP crossing.
- Impacts to Wetland "WG" (Str. 0804) from proposed 30" WSP crossing.
- Crossing on Sweetwater Creek (WS-III, Tr) at -L- 46+40. This crossing is within a hazardous spill basin boundary. The existing 3@ 12'x9' RCBC will be retained and extended both upstream and downstream. Low flow will be maintained in left barrel while the other two barrels carry larger events to match existing conditions. A 1.5' weir wall upstream will maintain normal depth of flow through low flow barrel. The accumulated silt will be cleaned out of the existing middle and eastern barrels.
 - Crystal noted that this culvert site along with two others were discussed in January and that there are no additional comments since that review.
 - Kevin asked if Detail 36 should show a floodplain bench. Jay responded that Detail 36 shows the outlet end of the three barrel culvert extension and that the middle and



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right barrels need to be fully open to ensure structure is an adequate size to convey design frequency. Jonathan Moore pointed out that hatching on the plans represents excavation, so a boulder wall will maintain low flow not a proposed bench. Kevin requested that the detail and plan view match and suggested changing language in detail and plans for clarity.

- Crystal expressed concern that the boulder wall will not adequately hold back flow and asked if the wall will be backfilled or if the boulders will fit closely together. Randy Henegar responded that the boulders will be similar to those found in natural stream designs and will not be backfilled but instead will naturally silt with overtime. The goal is for the boulders to be constructed to hold back flow. The 1.5' wall at the entrance will ensure low flow is maintained in appropriate barrel.
- Robert asked if rip rap can continue down the slope at the outlet of pipe 0813-0814 or if the slope is already rocky. Jay stated that there is a very small amount of water coming out of the pipe and that standard outlet protection will suffice in this area to dissipate energy as well as match the existing outfall conditions.

PSH 9:

Jurisdictional features on this plan sheet include:

- Crossing on stream "SI" (WS-III, Tr) at L 57+15. The existing structure is a 54" CMP with a 1' scour hole at outlet. The existing 54" CMP will be retained and lined with CIPP and extended upstream and downstream with 54" CSP and junction boxes (including a 1' drop in the outlet-side box to dissipate energy). The JB's were added to accommodate widening of the roadway. The 1' drop in the outlet side box will match the natural channel downstream since there is a scour hole. A supplemental 54" WSP will be added adjacent with an invert 2.5' above existing primary pipe. Low flow will be maintained in the existing 54" lined with CIPP. Bank stabilization is proposed upstream and downstream.
- Crossing on Stream "SJ" (structure number 0901) from proposed 30" WSP
- Crossing on Stream "SK" (Structure number 0927) from proposed 30" CSP
- Crossing on Stream "SI" (Structure number 0928) from proposed 30" CSP
- Fill slopes are 1.5:1 and rock plated.
- Kevin Mitchell requested a key-in detail be provided for the rip rap shown at structure 0928. Ben mentioned that detail numbers and labels will be updated on this plan sheet, specifically Details 35 and 37 after noting inconsistencies.
- Crystal wanted to confirm that a 1' drop in the junction box for the extension on the existing 54" will be allowable for trout passage after noting that this stream is classified as trout water. Marla mentioned that a 6" drop is more desirable for trout and other fish passage and suggested exploring a step pool system to accommodate. Josh Deyton asked Crystal and Marla if a sloping floor in the box from one pipe to the next would suffice as opposed to a step pool system. Marla noted that slopes over 3% make it difficult for fish to pass. TGS will evaluate lowering drop in box and will confirm that outlet velocities will be acceptable with this change.

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PSH 10:

No jurisdictional features are proposed to be impacted on this plan sheet.

PSH 11:

No jurisdictional features are proposed to be impacted on this plan sheet.

PSH 12:

Impacted jurisdictional features on this sheet include the crossing of Slay Bacon Branch (WS-III) at L 108+30. The existing structure is a 66" CMP with a 1' deep scour hole at the outlet. It will be replaced with a proposed 7'x8' RCBC buried 1' with sills and baffles. A temporary onsite detour will be located upstream at crossing. There were no comments on this plan sheet.

PSH 13:

Impacted jurisdictional features on this sheet include the crossing of Sweetwater Creek (WS-III, Tr) at L 113+70. The existing 3 @ 11'x9' RCBC will be retained and extended upstream. Low flow will be maintained in west barrel to match existing conditions. A 1.5' weir wall upstream will maintain normal depth of flow. The accumulated silt will be cleaned out of the middle and eastern barrels. A boulder wall is proposed at the outlet to maintain low flow.

- Crystal asked why a wall is being used on inlet side. Jay and Randy answered that the barrels need to be open for high flow. The floor slab will be extended about 7' upstream and the wall will be placed on floor slab to match existing conditions. The channel bank will tie into wall with rip rap behind.
- Kevin asked if CSRs are included in drainage plans. Jay mentioned that CSRs are not typically included but permit drawings will have profile views and detailed cross sections for culverts.

PSH 14:

Impacted jurisdictional features on this sheet include:

- Crossing on Stream "SM" (WS-III, Tr) at L 129+30. The existing 24" CMP with 4' perched outlet will be replaced with a proposed 54" RCP buried 1'. The pipe outlet will be realigned to eliminate perched condition.
- Crossing on Pigpen Branch (WS-III) at L 134+70. The existing 30" CMP will be replaced with a proposed 66" RCP buried 1'.
- Fill in wetland "WO" from L 133+85 to 135+80 RT (2:1 fill slope).
- Fill in wetland "WP" from -L- 137+00 to 138+00 LT (2:1 Fill Slope).
 - There were no comments on this plan sheet.

PSH 15:

Impacted jurisdictional features on this sheet include:

- Fill in wetland "WP" from -L- 138+00 to 139+50 LT (2:1 Fill Slope).
- Crossing on Harwood Branch (WS-III) at L 144+80. The existing 54" CMP will be replaced with a proposed 2 @ 66" CSP. Low flow will be maintained in east barrel and inverts will be buried 1' below stream bed with 1' sills and baffles (5 baffles with 12' spacing in low flow pipe). The west barrel will have a 1.5' sill at inlet and outlet to form a floodplain

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bench. Inverts of the pipes will be set at the same elevation. The slope of both pipes will be 4.3%.

- Fill in wetland "WR" from -L- 147+00 to 149+50 LT (2:1 Fill Slope).
 - There were no comments on this sheet.

PSH 16:

Impacted jurisdictional features on this sheet include:

- Crossing on Stream "SR" (WS-III; Tr) at L 160+35. The existing 36" CMP (pipe slope=15%) will be replaced with a proposed 60" CSP. Due to steepness of the crossing (11% from 1607 to 1619), inverts are not proposed to be buried to prevent potential head cutting. A 2' drop in the box is proposed at junction box 1619 to reduce outlet velocity into the stream. The slope of the existing channel is 2%.
- Crossing on Stream "ST" (WS-III, Tr) at L 163+00. The existing 30" CMP (pipe slope=10%) with a 1' perched outlet will be replaced with a proposed 36" WSP (trenchless installation) and 36" CSP extension w/ JB on outlet side. Due to steepness of the crossing (10% from 1613 to 1617), inverts are not proposed to be buried to prevent potential head cutting. A 2' drop in the box is proposed at junction box 1617 to reduce outlet velocity into the stream. The slope of the existing channel is 3%.
 - Marla asked if the streams on this sheet are perennial and, if so, the drops in the junction boxes may need to be reconsidered to allow for fish passage. TGS will investigate reducing drop heights since both Streams "SR" and "ST" are perennial per NRTR. Jay pointed out that the existing streams are steep, and the proposed pipes are not as steep as existing conditions which should be an improvement for fish passage.
 - Crystal suggested that the entrance angle of Stream "ST" into the proposed structure should be softened to dissipate energy that would be hitting the bank. TGS will investigate reconfiguring stream entrance.
 - Crystal wanted to confirm that the proposed structure sizes would accommodate the width of existing stream conditions. Ben confirmed they would accommodate the existing stream width. Stream "SR" and Stream "SS" merge at the entrance each with a 2' base and outlets with a 3' base on the downstream side, so a 60" pipe is appropriate. Stream "ST" and Stream "SU" merge at the entrance each with a 2' base and outlets with a 2' base on the downstream side, so a 36" is appropriate.

PSH 17:

Impacted jurisdictional features on this sheet include:

- Crossing on Stream "SV" (WS-III, Tr) at L 167+50. The existing 24" CMP (pipe slope=14%) will be replaced with a proposed 48" CSP. Due to steepness of the crossing (13% from HW to JB), inverts are not proposed to be buried to prevent potential head cutting. A 2' drop in the box is proposed at junction box 1720 to reduce outlet velocity into the stream. The slope of the existing channel is 2%.
- Driveway crossing on Sweetwater Creek (WS-III, Tr) at DR1A 11+95. An existing 3 @ 84" CMP will be replaced with a proposed 16'-4" x 10'x6" CAPA buried 1' with sills and baffles. This will not be a bottomless culvert since it was confirmed that it would not be feasible

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in this area. The proposed culvert will be backfilled with native material. The stream width is 14-16' at entrance of existing culvert which matches the downstream channel.

- Crossing on Stream "SX" (classification WS-III, Tr) at L 177+50 LT. The jurisdictional feature starts at the outlet of pipe. The existing 30" CMP with a 4' perched outlet will be replaced with a proposed 48" CSP with JB on outlet side to correct 4' perch in existing conditions and reduce outlet pipe slope and outlet velocity.
 - Kevin requested that any pipes that will not be buried due to slope need to be labelled on permit drawings.
 - Marla asked if the 24" alt. pipe under DR1A, which carries jurisdictional Stream "SW" on the upstream side of an existing 24" CMP, would outlet on the stream bank or at water's edge. David Petty confirmed it will outlet at the water's edge and has been extended. The plans used during the meeting did not reflect this extension.

PSH 18:

No jurisdictional features are proposed to be impacted on this plan sheet. A historical property boundary is reflected on the right edge of the plan sheet.

PSH 19:

Impacted jurisdictional features on this sheet include:

- Crossing on Beech Creek (WS-III) at L 195+00. The existing 3@ 72" CMP with a 1.5' scour hole at outlet will be replaced with a proposed 2 @ 12'x8' RCBC. Low flow will be in the western barrel and buried 1' with sills and baffles. High flow will be in the eastern barrel and buried 2' with sills and baffles. Floodplain benches will be proposed at the entrance and outlet. A temporary onsite detour will be built on upstream side.
- Fill in wetland "WAD" from L 195+70 to 199+10 RT (2:1 fill slopes).
 - Crystal asked why the low flow is not in the outside barrel. David confirmed that the stream is really straight for about 60' before inlet of culvert and it will behave as such. TGS recommends not realigning more of the stream than is necessary.

Closing Comments:

- Draft meeting minutes will be sent out within two weeks. Participants will have two weeks to review and provide comments.
- The next section of this project is A-0009CB and the 4B meeting is scheduled for Wednesday, April 14th at 1:00 PM.
- Wes Cartner asked if there will be a table of environmental impacts included on the plan sheets. Jay mentioned that it will be included in the permits and an update of impacts will be discussed at the 4C meeting.
- It was noted by meeting participants that having profiles, cross sections and information about stream widths, slopes of pipes, etc. was helpful for this meeting.
- Jay assured attendees that Team will provide CSRs as they are available for major jurisdictional crossings. Materials provided during this meeting are significantly past the 30% progress point that is typical for 4B meetings due to the project's aggressive schedule.