



STIP No. A-0009CB

Concurrence Point 4B, Hydraulic Design Review Meeting Minutes

Wednesday, April 14th, 2021 from 1:00 PM to 3:00 PM

706 Hillsborough St. SUITE 200 Raleigh, NC 27603
PHONE (919) 773-8887 FAX (919) 773-8839

TGS Engineers

Attendees:

- | | |
|-------------------------------------|-----------------------------------|
| USACE – Crystal Amschler | NCDOT SMU – Kevin Fischer |
| USEPA – Amanetta Somerville | NCDOT EAU – Marissa Cox |
| USFWS – Holland Youngman | NCDOT EAU – Wes Cartner |
| USFS – Michelle Aldridge | NCDOT EPU – Mike Sanderson |
| USFS – Erik Crews | NCDOT ECAP – Carla Dagnino |
| FHWA – Aaron Williams | NCDOT EAU – David Hinnant |
| FHWA – Donna Dancausse | NCDOT TSU – Heather Hildebrandt |
| Cherokee Nation – Elizabeth Toombs | NCDOT TPB – Pam Cook |
| ARC – Jim Sinnette | NCDOT Hydraulics – Jonathan Moore |
| NCWRC – Marla Chambers | ATC – Morgan Sommerville |
| NCDCR – Lindsay Ferrante | Stantec – Emily Love |
| NCDWR – Kevin Mitchell | TGS – Jay Twisdale |
| NCDWR – Robert Patterson | TGS – Ben Henegar |
| SWC RPO – Rose Bauguess | TGS – Randy Henegar |
| NCDOT Division 14 – Wanda Austin | TGS – David Petty |
| NCDOT Division 14 – Garrett Higdon | TGS – Jimmy Terry |
| NCDOT Division 14 – Dave McHenry | TGS – Zachary Richards |
| NCDOT Division 14 – Steven Buchanan | TGS/NCDOT – Stacy Oberhausen |
| NCDOT Division 14 – Josh Dayton | |

Purpose: The purpose of the meeting was to review and discuss the 30% drainage plans for STIP A-0009CB. The limits of the A-0009 CB Section are NC 143 from SR 1223 (Beech Creek Road) to 0.5 miles north of the Appalachian Trail.

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
- USACE requested impact tables for the project.
 - TGS responded that the tables will be available for the 4C meetings



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- USACE had questions regarding Site 8 from the CP 2A meeting and asked if we had completed a revised CP 2A form. TGS and Division 14 responded that there was not a revised CP 2A form.
- USFS requested a meeting to review design on USFS lands.
 - TGS asked USFS to send date and times of availability.
 - USFS responded in the affirmative.
- USFS asked about rock and retaining walls
 - TGS responded
- AT Stakeholders meeting will be scheduled to review proposed typical at the AT and land bridge.

Meeting Discussions:

PSH 20:

Stream "SY" (WS-III, Tr), perennial, on -L- at Station 212+90 LT & RT

- Stream is approximately 3-4 feet wide on a 5-8% slope. The existing 24-inch CMP is perched 2-feet. A 42-inch RCP-IV on a 4.8% slope, buried 0.7-feet is proposed and Class I Rip-Rap outlet protection.
- NCWRC asked if the proposed was pipe large enough for fish (trout) passage and if fish are present in the stream. NCWRC suggested the use of stepped pipes or a wider culvert to allow stream to meander with alternating baffles and utilizing a 3% slope. NCWRC will meet internally with biologist and/or fish expert to see if any of the streams could be improved for better fish passage.
 - TGS responded that the stream is identified as trout on the PJD. TGS stated that the proposed slope matches the natural gradient of the stream.
 - NCWRC affirmed but stated without pools which trout are known to use to get to the next step up. NCWRC asked that TGS design the crossing to make the stream as flat as possible.
- USACE asked if it was possible to up size outlet 2002 and add baffles.
 - TGS responded that it is not NCDOT standard practice to use sills or baffles in a small pipe.
 - USACE stated that they appreciate the Team trying to maintain the existing slope but suggested that someone go to the area and look for fish.
 - NCDOT will investigate as requested but stated that fish would likely not be present.
- TGS stated that the existing pipe is perched 2-feet and the proposal has the pipe increasing by 3 pipe sizes.
- USACE questioned if the proposed pipe was too wide for streambed.
 - TGS responded no. The proposed pipe size is good and will match the stream width when buried.



Stream "SZ" (WS-III, TR), perennial, on -L- at Station 216+00

- Stream is approximately 1-3 feet wide on a 6% slope. The existing 30-inch CMP perched 2-feet will be replaced by a 48-inch RCP-IV on a 4.9% grade with the inlet and outlet buried 0.8-feet. Class I Rip-Rap will be utilized for outlet protection.
- USACE stated that the proposed 4-foot pipe maybe a little wide for a 1.5 -2 foot stream.
 - TGS responded that the stream is basically 3-feet, and we are proposing to bury it, therefore, the pipe will match the stream width.
- USACE asked NCWRC if they would have the same concerns with the stream width.
 - NCWRC confirmed and stated that they will investigate the stream details further.

PSH 21:

Stream "SAA" (WS-III, TR), perennial, on -L- at Station 222+60, 2104 outlet

- Stream is approximately 2-foot wide on a 2% slope. The existing 18-inch HDPE will be replaced with a 24-inch RCP-IV on a 2.4% slope. Banks will be stabilized with Class I Rip-Rap.
- Stream is only jurisdictional at pipe outlet

Wetland "WAI" on -L- at 227+00 LT

- No known impacts at this time to WAI

PSH 22:

Wetland "WAI" on -L- from Station 235+70 RT to Station 238+60 RT

- Mostly under the proposed paved shoulder of proposed roadway improvements
- Unavoidable parallel impacts
- NCDWR requested that the system at the beginning of Sheet 22 (currently cut off) to be blown up on the 4C plans
 - TGS agreed.

Stream "SAB" (WS-III, TR), perennial, on -L- at Station 239+50 RT, upstream only

- Stream is approximately 2-4 feet wide on an approximately 4% slope. The existing 30-inch CMP perched 1.1-feet will be replaced with a 48-inch RCP-IV on a 3% slope. Class I Rip-Rap will be utilized for bank stabilization.
- TGS will update stream Rip-Rap at outlet 2204 to match newly surveyed JS line

Stream "SAC" (WS-III, TR), intermittent, on -L- at Station 245+50 RT, upstream only

- Stream is approximately 2-3 feet wide on a 10-11% slope. The existing 18-inch CMP will be replaced with a 30-inch RCP-IV on a 1.1% slope. Class I Rip-Rap will be utilized for bank stabilization.

PSH 23:

Stream "SAD" (WS-III, Tr), perennial, on -L- Station 250+00 → Hydraulic Site 9

- Stream is approximately 4-7 feet wide on a 9-11% slope. The existing 48-inch CMP with scour hole will be replaced with a 95" x 67" CAA pipe arch at 6.2% and buried at inlet and outlet. Class II Rip-Rap will be utilized for outlet protection.



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- USACE concerned that proposed width of pipe does not match stream width.
 - TGS responded that width of pipe and stream will match when the pipe is buried. The pipe is a horizontal oval with a maximum width of 95-inches. The pipe will have a rise of 67-inches.
- USACE asked the if the proposed pipe was concrete with a smooth bottom.
 - TGS responded that the pipe is corrugated.
 - NCWRC confirmed that a corrugated bottom is better than a slick pipe but stated concern for the lack of a stepped pool.
- NCWRC will check with staff biologist regarding fish passage but does not believe 6.2% is passable for fish.
 - TGS responded that culvert should be passable at 6.2% since the 7-9% stream is passable for fish
- NCWRC stated there is a difference between a stream at that slope and a culvert at the same slope
 - TGS agreed to evaluate adding baffles or sills at this site

Stream "SAE" (WS-III, Tr), perennial, on -L- Station 250+50 RT to Station 251+80 RT

- This is an unavoidable loss due to roadway improvements

Wetland "WAN" on -L- Station 262+00 to Station 264+00

- This is a total take due to roadway improvements.

PSH 24:

Sweetwater Creek on -L- at Station 267+30 to Station 267+80 LT

- Banks to be stabilized using Class II Rip-Rap at outlet of proposed pipe and to restore eroded bank at existing outlet. The existing 24-inch pipe will be relocated to address erosion at the outlet.

Stream "SAF" (WS-III, Tr) perennial, on -L- at Station 271+00

- Stream is approximately 3-feet wide on a 40% slope upstream and 6-8% downstream. The existing 36-inch CMP will be replaced with a 36-inch RCP-IV on a 2.3% slope across the road. A short link of 36-inch CSP is proposed at a 50% slope at the upstream end to replace the existing 36-inch CSP at a 50% slope. Class I Rip-Rap will be utilized to dissipate energy at the outlet.
- Pipe shifted to north of existing to minimize jurisdictional stream and wetland impacts at outlet. Design was limited by the topography. There were no options except to match the existing pipe slope at the upstream end.

Wetland "WAO" on -L- at Station 271+00 RT to Station 275+00 RT

- This is a total take due to roadway improvements
- FHWA reminded Team that NCDNR was not present to discuss cultural resources, and all should be mindful to avoid impacts to these resources
 - TGS responded that they strived to avoid/minimize to cultural resources in the design



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Stream "SAG" (WS-III, Tr), perennial, on -L- at Station 275+60 LT & RT

- Stream is approximately 3-feet wide upstream on an 8-11% slope and 5-7 feet wide on a 3% slope downstream.
- The existing 24-inch CMP will be replaced with a 64" x 43" CAA pipe arch at a 1.1% slope and buried at inlet and outlet. Class I Rip-Rap will be utilized for outlet protection.

PSH 25:

Stream "SAJ" (WS-III, Tr), perennial, on -L- at Station 279+50 RT

- Asymmetrical widening to minimize impacts and avoid parallel loss to stream.

Sweetwater Creek crossing on -L- at Station 278+75, Hydraulic Site 10

- The existing stream is on a 3-4% slope. The existing 72-inch CMP will be replaced with a 12'-10" x 8'-3" aluminum pipe arch on 3% slope, buried 1-foot with baffles, and a 5-foot low flow channel to match existing streambed width. Banks will be stabilized with Class II Rip-Rap.
- NCWRC stated approval of proposed slope

Wetland "WAQ" on -L- at Station 280+50 LT to Station 282+15 LT

- TGS explained the design details/ minimization efforts and impacts

Nathan Garland Road Bridge No. 26 over Sweetwater Creek on -Y4- at Station 12+00

- Stream is approximately 4-6 feet wide on a 4-6% slope. The existing bridge is 20-feet long.
- Nathan Garland Road is proposed for use as a detour during the replacement of the downstream 72-inch culvert on NC 143. Bridge No. 26 is considered functionally obsolete and needs to be replaced.
- The proposed replacement will be a 20'-11" x 6'-1" aluminum pipe arch on 3.9% slope, buried 1-foot with baffles, and a 5-foot low flow channel to match existing streambed width. Banks will be stabilized with Class II Rip-Rap.

Stream "SAK" (WS-III, Tr), perennial, on -L- at Station 289+75 LT

- Stream is approximately 1-3 feet wide on a 15-25% slope. The existing pipe will be retained and extended at entrance and outlet.
- NCDWR ask about the outlet protection and requested the JS typicals at the 4C meeting
 - TGS responded that supplemental surveys were conducted for this area and TGS will adjust the outlet rip-rap if needed. TGS stated that the outlet will be protected and Stream SAJ" will be impacted due to extension. TGS agreed to add a detail depicting the outlet protection here and any other applicable locations.

Stream "SAH" (WS-III, Tr), intermittent, on -L- at Station 279+87 LT to Station 280+72 LT

- Stream is approximately 5-feet wide on a 3.8% slope
- The existing 18-inch CMP will be replaced with a 36-inch RCP-IV buried 0.6-feet on a 3.9% slope. Class II rip-rap will be utilized at the outlet.
- The stream will be realigned
- USACE questioned if pond is shown on PJD as it was not identified in the JD when it was reviewed prior to meeting



- TGS responded that if the pond has a JS line then it was a JS on the PJD, otherwise it was a wet area the surveyors picked up. The pond is not jurisdictional,
- USACE stated approval of preservation of pond on the opposite side of NC 143 at Station 288+00 RT.

PSH 26:

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

PSH 27:

Stream "SAM" (WS-III, Tr), perennial, on -L- at Station 312+00 LT & RT

- Stream is approximately 1-foot wide upstream on a 15-30% slope. The stream is approximately 2-3 feet wide on a 14-20% slope downstream.
- The existing 24-inch CMP will be replaced with a 36-inch WSP Trenchless at 19% slope to a 36-inch CSP on a 0.8% slope to dissipate the energy before approaching the Class I Rip-Rap protection at the outlet. With proposed pipe slope of approximately 19%, the proposed pipe will not be buried to eliminate potential for head cutting.

Stillhouse Branch (WS-III), perennial, on -L- at Station 316+00 LT & RT

- Stream is approximately 2-feet wide upstream on a 24% slope. The stream is approximately 2-3 feet wide on a 7-15% slope downstream.
- The existing 36-inch CMP will be replaced with a BDO 48-inch CSP on a 48% slope to a 60-inch RCP-IV on a 0.5% slope. Class I Rip-Rap protection will be used at the outlet. The pipes will not be buried due to the steep slopes and to reduce potential for head cutting.
 - TGS stated that the base of the stream may have to lined.
 - NCWRC stated that the existing stream is not passable for fish and it would be good to improve if possible.
 - USACE stated streamline from "SAN" to "SAM" JS is not a jurisdictional stream and should be removed. USACE suggested that changing blue-line that are not jurisdictional to another level for the 4B and 4C plans.
 - TGS responded in the affirmative

PSH 28:

Wetlands "WAY" and "WAZ" on -L- at Station 329+00 to Station 332+00 LT

- Impacts are unavoidable due to roadway improvements.
 - Wetland "WAY" will be a partial take.
 - Wetland "WAZ" will be a total take.

Stream "SAT" (WS-III, Tr), perennial, on -L- at Station 328+00 RT

- The existing stream is 1-foot wide on a 19-24% slope. The existing 18-inch system will be replaced with an 18-inch system to match the existing flat steep to outlet flat at a 1% maximum slope. Class B Rip-Rap will be used for outlet protection.



- Stream is only jurisdictional on downstream side
 - TGS noted that the outlet will be shifted 20-feet upstream to outlet in jurisdictional stream per updated surveys. A detail will be prepared per NCDWR request earlier.
- Sweetwater Creek (WS-III, Tr), perennial, on -L- at Station 329+50

- The existing stream is 2-5 feet wide upstream at a 13-32% slope and 2-6 feet wide downstream on a 22% slope.
- The existing 30-inch system will be replaced with a 48-inch CSP on a 51% slope to a 48-inch RCP-IV on a 9% slope to a 48-inch Alt on a 3.9% slope. The proposed outlet channel change will be on a 3.5% slope embedded with Class I Rip-Rap at outlet.
- USACE questioned why the system is not being replaced in a straight line because it looks as three pipes with junction boxes. Further explaining that the system could go straight across NC 143 instead of off-line because it is not ideal to create a longer system. USACE stated that justification is required for the longer system.
 - TGS responded that the system is not in a straight line due to constructability reasons.
- USACE stated additional information is needed to explain why the existing alignment can be maintained. USACE further stated that Sweetwater Creek is a big stream, and it would be ideal to keep it on a straight line.
 - TGS stated that the flow must be maintain because it perennial. TGS agreed to look further into this crossing as there is nothing easy that could be done to construct.
- USACE stated that the slope is a concern at 51%. More information is required to understand the constructability concerns/issues for this crossing. USACE believes that a shorter, straighter system with minimal slope would be ideal, if possible.

Stream "SED" (WS-III, TR), perennial, on -L- at Station 324+00 LT

- The existing stream is 1-foot wide on a 7-40% slope. The existing system drops 9-feet at the catch basin then to a 24-inch CMP at an average 8% slope with some areas slightly steeper.

The existing 24-inch CMP on an average 8% slope will be replaced with a 36-inch system to minimize the slopes and velocities and remove the 9-foot drop.
- The proposed system layout restores the pre-1950's drainage pattern (per 1941 USGS quad) and minimizes jurisdictional impacts. The section of NC 143 was realigned to the current alignment in the 1950's.
 - NCDWR voiced concern regarding the erosive velocity going down the new outlet valley.
 - TGS responded that they were still coordinating with the NCDOT Hydraulic Unit and Division 14 Construction on Stream "SED". TGS further stated that in the 1950's the proposed location is where the jurisdictional stream went and felt confident the area was stable.
 - NCDWR asked if the dissipator pad was for a 10-year design.



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- TGS responded in the affirmative and will show V10 on the 4C plans.

PSH 29:

Stream "SAY" (WS-III, Tr), perennial, on -L- at Station 334+00

- The existing stream is 1-2 feet wide upstream at a 16-30% slope and 1-5 feet wide downstream with a 13-24% slope. The existing 18-inch CMP will be replaced with a 36-inch RCP on a 1.4% slope to a 36-inch CSP with elbows on a 1% maximum outlet slope. Bank will be stabilized with Class I Rip-Rap.
- The last section of proposed pipe will be at a flat slope to reduce outlet velocities.

Stream "SAX" (WS-III, Tr), perennial, on -L- at Station 339+50

- The existing stream is 1-1.5 feet wide on a 14-29% slope. The existing 36-inch CMP will be replaced with a 42-inch RCP on an 11% slope to a 48-inch CSP with elbows on a maximum 1% outlet slope. Bank will be stabilized with Class I Rip-Rap.
 - USACE inquired about the burial of the new pipes.
 - TGS responded that the slope was too steep to bury.
 - USACE requested that a note be added to the plans stating "DO NOT BURY INVERT"
 - TGS agreed to add a note here and at similar locations.
 - USACE stated that entrance at 2915 is going in at a 90-degree angle which is sharp and could be an issue
 - TGS responded that Rip-Rap will be added at inlet to avoid erosion.
 - Division 14 reminded the Team that Tribal land is present in this area. USACE suggested that Division 14 reach out to Gary Snead to discuss permitting on Tribal lands.
 - FHWA confirmed Mr. Snead was the correct point of contact and asked to be copied on correspondence.

PSH 30:

No jurisdictional features to be impacted.

PSH 31:

No jurisdictional features to be impacted.

PSH 32:

No jurisdictional features to be impacted but proposed Land bridge is on this plan sheet.

- USFS stated that in a previous meeting it was indicated that geotechnical boring denoted rock would be present on both sides of the land bridge and the land bridge would not be needed. They asked as this information changed or is the proposed wall and drainage a contingency.
 - TGS responded that rock is present. The previous conversation was regarding construction stepped walls, which were difficult to construct and maintain. A



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retaining wall will be constructed but it will be a vertical shotcrete wall instead of a stepped wall. We are preparing additional renderings and will schedule a meeting with the AT Stakeholders to present.

- USFS responded in the affirmative stating they wanted the opportunity to provide input

PSH 33:

No jurisdictional features to be impacted.

PSH 34:

No jurisdictional features to be impacted.

Closing Comments:

- There were no jurisdictional impacts past the land bridge and no comments were raised.
- Draft meeting minutes will be provided to meeting participants by April 28, 2021.
- The CP 4B for A-0009CC is tentatively scheduled for June 16, 2021. A meeting invite will go to attendees upon confirmation.
- NCWRC stated that more project design details may be needed in the future as several culverts did not have slopes indicated; therefore, NCWRC will presume that they are suited for fish passage.
- TGS reminded Team that all three sections of A-0009C are on very aggressive schedules and requested any input on the designs be submitted quickly to keep the project on its current schedule.