

**WATER OBSTRUCTION & ENCROACHMENT
ENGINEERING RECORD OF DECISION**


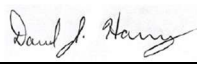
APPLICATION NO. E4129225-017

GENERAL INFORMATION:

Permittee: [Pennsylvania General Energy Co., LLC](#) {[Kendra Schiappa – kendraschiappa@penngeneralenergy.com](#)}
 Application Type: New-Standard New-Small Project Chapter 106 Major Amendment
 Project Name: [Saluda Access Road and Staging Area](#)
 County: [Lycoming](#)
 Municipality: [Gamble & Cascade Townships](#)
 Does the application require a P.E. Seal? Yes [Peter Staudenmeier {\[pstaudenmeier@cecinc.com\]\(mailto:pstaudenmeier@cecinc.com\)}](#)

Recommendation: ISSUANCE **DENIAL**

With the provided information and the results of this engineering review, it has been determined that the proposed project does not meet the engineering requirements of Chapter 105. The project is proposed in a manner that will have a significant adverse effect upon safety or the protection of life, health, property or the environment. This application is therefore recommended for denial.

<p style="text-align: center;">Chris Mileto</p> <hr/> <p style="text-align: center;">Name of Engineering Reviewer (print)</p> <div style="text-align: center; margin-top: 20px;">  </div> <hr/> <p style="text-align: center;">Signature of Engineering Reviewer</p>	<p style="text-align: center;">05/06/2026</p> <hr/> <p style="text-align: center;">Date</p>
<p style="text-align: center;">Daniel Harvey, P.E.</p> <hr/> <p style="text-align: center;">Name of Section Chief (print)</p> <div style="text-align: center; margin-top: 20px;">  </div> <hr/> <p style="text-align: center;">Signature of Section Chief</p>	<p style="text-align: center;">05/06/2026</p> <hr/> <p style="text-align: center;">Date</p>

TIMELINE FOR REVIEW:

- 6/5/2025 – Pre-Application meeting
- 10/3/2025 – Application ESG294125011-00 received
- 10/3/2025 – Application E4129225-017 received
- 10/7/2025 – Application ESG294125011-00 administratively complete
- 10/14/2025 – Application E4129225-017 administratively complete
- 10/30/2025 – Technical Deficiency sent for ESG294125011-00
- 11/1/2025 – E4129225-017 application notice published in the PA Bulletin.
- 11/08/2025 – Department received first public comments.
- 11/12/2025 – Conference call (PGE, CEC and DEP) CEC – (Laura Wibble, Pete Staudenmeier), PGE (Kendra Schiappa) and DEP – (Alex Barravecchio, Dan Harvey, Chris Yeakel, Erin Chambers, & Chris Mileto)
- 11/14/2025 – Conference call DEP – (AB, DH, CY, EC and CM)
- 11/18/2025 – Department received agency comments from the PFBC for E4129225-017
- 11/20/2025 – Department sent technical deficiency letter for E4129225-017
- 12/10/2025 – Department sent draft response matrix to Legal (Nicole Ippolito). Pa Bulletin comments requested public hearing.
- 12/12/2025 – Conference call with Legal (Nicole Ippolito) & DEP – (AB, DH, CY and CM). Agreed to have virtual public hearing
- 12/22/2025 – Department meeting with DCNR (Rich Glinski, Charles Engel, Craig Chapman & Stephanie Livelsberger) & DEP (AB, DH, CY, EC and CM).
- 12/26/2025 – Technical deficiency response comments received for ESG294125011-00.
- 1/3/2026 – Notice of Public Hearing Published

1/7/2026 – Technical deficiency response comments received for E4129225-017
 1/13/2026 – Department sent Pre-Denial Letter for ESG294125011-00.
 1/26/2026 – Department sent email guidance for Pre-Denial Letter
 2/3/2026 – Virtual Public Hearing to receive public comments
 2/9/2026 – Department sent Pre-Denial Letter for E4129225-017
 2/18/2026 – Pre-Denial Meeting. CEC – (Laura Wibble, Pete Staudenmeier, Josh Reffner, Julia Pflugrath), PGE (Kendra Schiappa, Logan Langer & Nathan Harris) & DEP – (AB, DH, CY, EC and CM).
 2/25/2026 – Conference call Mike Dombroskie (USACOE) & DEP – (DH, CY, EC and CM)
 3/9/2026 – Conference call CEC & ACOE–(Laura Wibble, Pete Staudenmeier, Josh Reffner, Julia Pflugrath), PGE (Kendra Schiappa, Logan Langer & Nathan Harris), DEP – (DH, CY, EC and CM) & USACOE (Mike Dombroskie)
 3/9/2026 – Formal request from the applicant for a 14-day time extension to respond to TDL (due 3/20/2026)
 3/20/2026 – Predenial technical deficiency response comments received for the ESG294125011-00 & E4129225-017
 4/1/2026 – Sent Public Comment Response Matrix (RM) to legal for review Elevated Review Process.
 04/24/2026 – E4129225-017 application review completed. Permit documents and application sent for denial
 05/06/2026 – Elevated Review completed

PROJECT DESCRIPTION:

Individual – Joint Permit to construct, operate and maintain twenty (20) permanent stream crossings, nineteen (19) temporary stream crossings, eight (8) permanent wetland crossings and ten (10) temporary wetland crossings in Gamble & Cascade Township, Lycoming County. The work involves the construction of a permanent access road and staging area.

The proposed project includes the construction of a 3.9-mile-long permanent access road and staging area. The proposed road will facilitate access to an existing well pad and future well pads proposed on the state forest tract. The proposed staging area will be used to store equipment and materials for the construction of future well pads and will later be used as a well pad. The proposed limit of disturbance is approximately 40 acres.

The project will result in a total of 724 LF (4538 SF) of permanent stream impacts, 594 LF (4599 SF) of temporary stream impacts, 84553 SF (1.9411 acres) of permanent floodway impacts, 90825 SF (2.0851 acres) of temporary floodway impacts, 2252 SF (0.0517 acres) of permanent wetland impacts and 4810 SF (0.1104 acres) of temporary wetland impacts all for the purpose of Marcellus Shale well development. All stream and wetland crossings will be open cut.

APPLICATION REVIEW:

County: Lycoming	Proposed Activity: Access Road	Date to Engineer: 10/06/2025
Municipality: Gamble & Cascade	E&S Plan Review By: ESG294125011-00	Date to Biologist: 10/06/2025
Quadrangle: Bodines, Barbours	Pre-app Meeting: N/A	Admin. Complete: 10/10/2025
Stream: Wallis Run & UNTs, UNT to Bar Bottom Hol UNT to Jacoby Hollow	Municipal Consistency: Cascade → 9/22/25 Gamble → 9/22/25 Lycoming → 9/22/25	PA Bulletin: Published 11/1/2025 Expired 12/1/2025
Latitude: 41.397231°	Cultural Resource Notice: Cleared 7/22/2025 & 9/9/2025 841801; 8/6/2025. See below – Project Coordination 7.	SLLA: N/A
Longitude: 76.876063°		Temp. Wetland Impact: 4810 SF (0.1104 ac)
E-facts Tracking: YES	PNDI Receipt:	Perm. Wetland Impact: 2252 SF (0.0517 ac)
APS & AUTH: 1147529 1544360	PASPGP - 6: YES	Temp. Stream Impact: 4599 SF (0.1056 ac)
P.E. Seal: YES – Staudenmeier	ACOE Reporting: Reporting	Perm. Stream Impact: 4538 SF (0.1042 ac)
Public Access: NO	Chapter 93: HQ-CWF & EV	Temp. Floodway Impact: 90825 SF (2.0851 ac)
FEMA Floodway: Assume 50 ft	Listed Trout: Wild Trout	Perm. Floodway Impact: 84553 SF (1.9411 ac)

PROJECT COORDINATION :

1. Individual **Pre-App Meeting:** Pre-application was held on June 5, 2025.
2. **ACOE Reporting:** Reporting an sent to ACOE on October 8, 2025
3. **SLLA Submittal History:** YES NO N/A
4. **Susquehanna River Basin Commission (SRBC) Approval:** YES NO N/A
5. **PA Bulletin Submittal History:** Published in Volume 52 #44 on November 1, 2025 and expired on December 1, 2025 with 171 public comments received. See PA Bulletin section for response matrix summarizing comments and responses. On February 3, 2026, a Virtual Public Hearing was held to receive public comments.
6. **PHMC Submittal History:** No Above-Ground Properties Affected, 07/22/2025. No Archaeological Properties Affected, 09/09/2025. **PNDI Search History:** PNDI search {841801} was submitted on 8/6/2025
PGC – Defers comments on potential impacts to federally listed species to the U.S. Fish and Wildlife Service. No further coordination with the Pennsylvania Game Commission is required at this time.
 - On November 13, 2025 – Amber Nolder determined that potential impacts to threatened, endangered, or special concern species of birds and mammals may be associated with your project for Northern Long-eared bat and Little brown bat.

DCNR – Conservation Measure: Minimize project footprint to limit adverse impacts to the plant community of concern. Use stringent erosion and sedimentation controls before, during, and after project implementation to ensure that sediment and contaminants do not enter any waterway(s). Herbaceous Vernal Pond

- On August 28, 2025 – Greg Podniesinski recommended conservation measures. *No threatened, endangered, or special concern species were found on the project site during the most recent survey. With the avoidance of Herbaceous Vernal Ponds, DCNR has determined that no impact is likely.*

PAFB – Further review of this project is necessary to resolve the potential impact(s)

- On August 8, 2025 – Jordan Allison requested Timber Rattlesnake Assessment. *Given the proximity of the project to known critical Timber Rattlesnake habitat, we recommend that a Timber Rattlesnake habitat assessment be conducted in the project area by a qualified Timber Rattlesnake surveyor.*
- On 11/4/2025, Jordan Allison provided conservation measures.

USFWS – Further review of this project is necessary to resolve the potential impact(s). formation Request: Your project is within the range of the federally listed northern long-eared bat. Enter project information into IPaC

- On July 23, 2025, **no effect Determination** was provided for Northeastern Bulrush via Ipac.
- On July 3, 2025, **no effect Determination** was provided for Tricolored Bat (*Perimyotis subflavus*)
- On January 30, 2026, Richard Novak provide an email stating...*Based on the existing forest availability and what is to remain following construction, proximity of known roosts to the work area and other knowledge gained from bat survey effort along this project, and implementation of seasonal cutting avoidance measures, you concluded that **the project is not likely to adversely affect the northern long eared bat.** You also made no effect determinations for tricolored bat and northeastern bulrush. Therefore, no further coordination with our office is necessary.*

7. **ATONs plan approved by PAFB?** YES NO N/A
8. **PAFB approval?** YES NO N/A Comments and approval provided by Jordan Allison on November 18, 2025
9. **P.E. Seal Required?** YES NO N/A Pete Staudenmeier
10. **Risk Assessment Required?** YES NO N/A
11. **Flowage Easement Required?** YES NO N/A
12. **Antidegradation Analysis:** The project location was chosen based on property acquisition and resource mapping. It is not possible to relocate this well pad to a non-exceptional value watershed while still meeting the project's purpose. Following is a list of non-discharge BMPs and a discussion of why or how each of them was or was not used: Alternative Siting – The project location is selected based on property ownership, access limitations, and feasibility to develop resources at the proposed site location. Discharge locations have been chosen in an effort to minimize the potential for impacts to existing natural resources. Limited Disturbed Area – The disturbed area is limited to that required to safely construct the access road, PCSM BMPs, and associated activities (Site access, stockpiling, etc.) Limiting Extent and Duration – The extent of disturbance was minimized by proposing the minimum area of disturbance that will allow for safe construction of the project. The duration of disturbance will be minimized by constructing the site as quickly as practicable and through immediate stabilization of disturbed areas as they reach final grade.

OUTSTANDING TECHNICAL DEFICIENCIES & DENIAL:

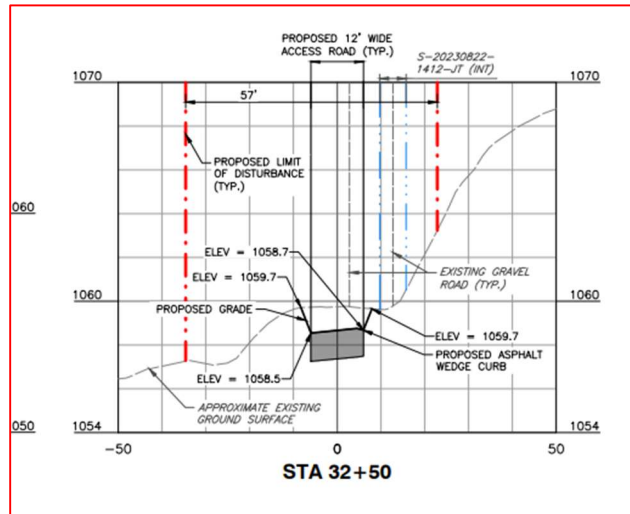
On September 26, 2025 the Department of Environmental Protection (DEP) received the above referenced application package. On October 10, 2025 you were notified that the application was complete and that a technical review would be performed and were then subsequently notified by letters dated, November 20, 2025 and February 9, 2026 that the application was technically deficient and included a list of the required information. You were also notified at that time that in accordance with 25 Pa. code § 105.13a of DEP's Chapter 105 Rules and Regulations (regarding Complete applications) that all of the required information was to have been received by DEP within sixty (60) calendar days of the receipt of that letter.

The sixty (60) day time period has expired. The deficiencies noted in DEP's technical deficiency letter are based on applicable laws and regulations, as set forth therein. Your response failed to adequately address all of the deficiencies noted in that letter and the application remains deficient and DEP hereby denies E4129225-017 for a permit and no further action will be taken by DEP. Fees are not refunded when an application is denied unless requested and eligible under Payback.

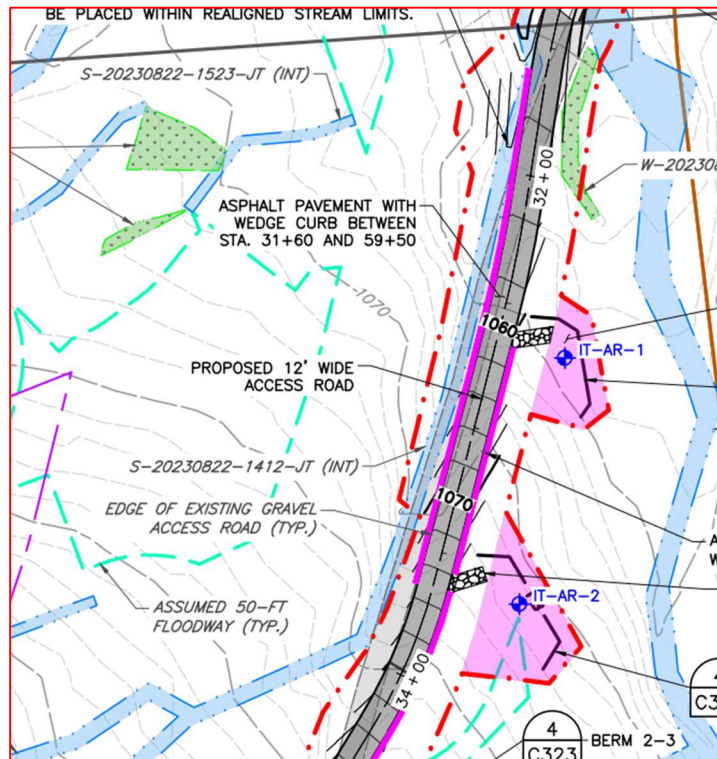
The deficiencies in the application that have not been adequately addressed are as follows:

Technical Deficiencies

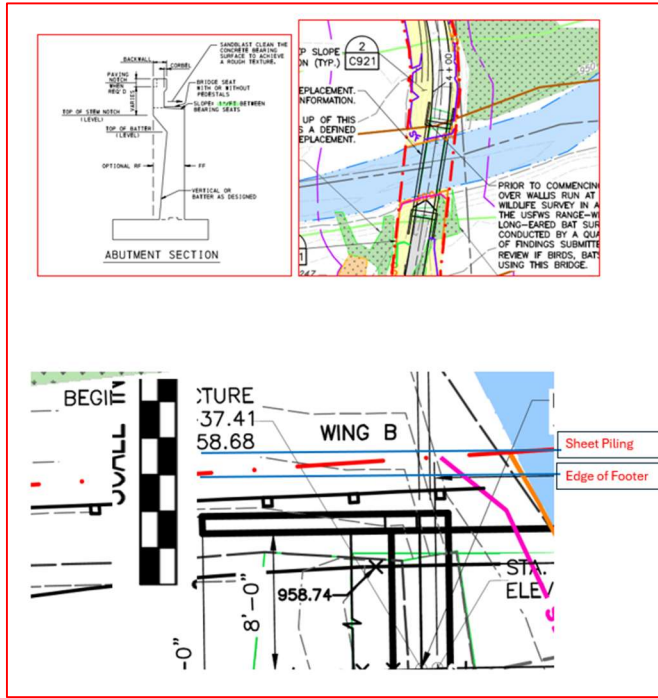
1. Plan drawings and cross sections (plans) have been updated based on responses to technical deficiency notices sent by the Department on 11/20/2025 & 2/9/2026 but still include at least the following deficiencies:
 - Plans at station 32+50 depict the proposed access road cut within existing grades lower than the grades proposed on either side of the roadway. The proposed grading fails to:
 - i. Maximize protection of existing drainage by maintaining flow of the proposed stream relocation within the proposed stream channel as required by §105.13(e)(1)(x)



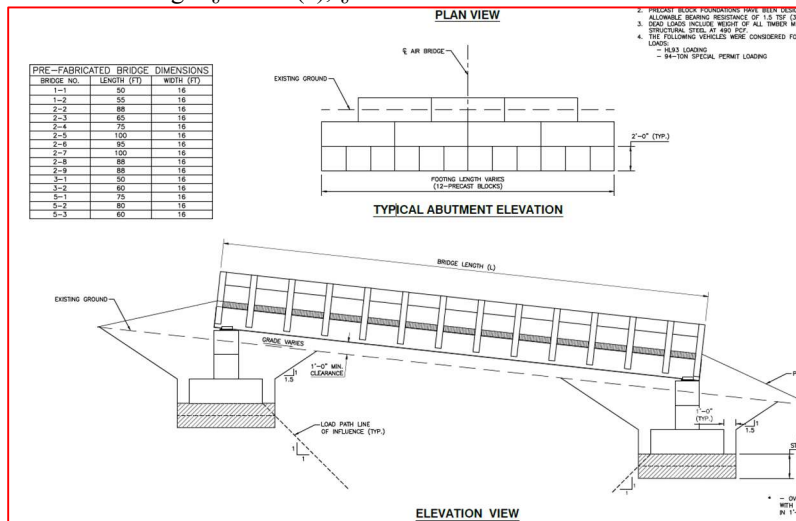
- ii. Manage stormwater runoff from the access roadway through the designed SCM (infiltration berm 2-1) as required by §105.13(e)(1)(v)



- Plans provided are inconsistent with each other not meeting the requirements of §105.13(e)(1)(i). Sheets C314 & C914 depict Culvert 23A with a drop inlet structure located approximately at ST140+50 and a bridge located approximately at ST139+50 but sheets C401 and C503 depict Culvert 23 at ST139+58.
- Plans have been updated to show sheet piling installed for the bridge construction at Wallis Run located near ST4+00 to detail excavation limits. Sheet piling is proposed immediately adjacent to Wing B but plans appear to indicate a spread footing design for wingwalls. Please clarify if excavation limits are feasible as proposed at this location. §105.13(e)(1)(i).



- Plans have been revised to show additional bridge crossings at multiple locations but provide only typical abutment construction details with the note “*Abutment and wingwalls for bridge structure will be designed by the bridge manufacture in accordance with appropriate loading and will accommodate the grading as shown on these plans*” despite the bridges ranging from 50 to 100 feet in length. Clarify if any geotechnical studies have been performed at these locations and evaluate whether excavation limits for bridge construction can remain within the LOD, if sheet piling is needed at any of these areas, or if bridge specific abutment designs are needed requiring larger areas of disturbance at each bridge. §105.13(e), §105.151



PUBLIC NOTICE/PARTICIPATIONS:

INTRODUCTION:

On October 3, 2025, the Pennsylvania Department of Environmental Protection (“DEP” or “Department”) received an Erosion and Sediment Control General Permit – 4 application (DEP File No. ESG294125011) (“ESCGP-4”). On October 6, 2025, DEP received a Chapter 105 State Water Obstruction and Encroachment Application (DEP File No. E4129225-017) (“Joint Permit Application or JPA”).

The JPA was submitted to construct, operate and maintain twenty (20) permanent stream crossings, nineteen (19) temporary stream crossings, eight (8) permanent wetland crossings and ten (10) temporary wetland crossings in Gamble & Cascade Township, Lycoming County. The work involves the construction of a permanent access road and staging area.

The proposed project includes the construction of a 3.9-mile-long permanent access road and staging area. The proposed road will facilitate access to an existing well pad and future well pads proposed on the state forest tract. The proposed staging area will be used

to store equipment and materials for the construction of future well pads and will later be used as a well pad. The proposed limit of disturbance is approximately 40 acres. All stream and wetland crossings will be open cut. The ESCGP-3 was submitted for permit coverage of the earth disturbance activities associated with the project construction.

The applications include Act 14 notifications that were sent to Lycoming County, Cascade Township and Gamble on September 22, 2025. On November 1, 2025, DEP published notice in the Pennsylvania Bulletin (52 Pa.B 3443) regarding the receipt of an application for the JPA. The thirty (30) day comment period remained open until December 1, 2025.

On February 3, 2026, DEP conducted a virtual public hearing during which the applicant provided additional information on about the proposed project and the alternate routes evaluated. Public testimony was recorded and added as part of the JPA application documents.

This comment response document contains the public comments submitted to DEP by 171 commentors since the receipt of both applications, including the thirty (30) day Bulletin comment period for the JPA. The following pages contain the submitted comments and DEP's responses. Comments are listed with identifying Commentor ID number and all pertinent responses.

The thirty (30) day comment period remained open until December 1, 2025. Multiple commentors requested a public meeting. On January 3, 2026, the Department published notice of a public hearing to be held on February 3, 2026. On February 3, 2026, the Department conducted a virtual public hearing during which the applicant provided additional information on the proposed project and the alternative routes evaluated. Public testimony was recorded and added as part of the project application documents.

A Comment Response Document was prepared by the Department and contains the public comments submitted to the Department by 171 commentors since the receipt of both applications, including the thirty (30) day Bulletin comment period for the JPA and the additional comment period used to capture the elevated interest in this project. The document contains the submitted comments and the Department's responses.

SUBCHAPTER A. – GENERAL PROVISIONS

N/A

REVIEW OF APPLICATIONS

- 105.14(a): *Was the application reviewed to determine the proposed project's effect on health, safety and the environment, in accordance with prevailing practices in the engineering profession?* Yes No N/A
- 105.14(b): *Were the following factors used to make a determination of impact?*
- (1) *Potential threats to life or property created by the dam, water obstruction or encroachment.*
 Yes N/A
 - (2) *Potential threats to safe navigation created by the dam, water obstruction or encroachment.*
 Yes N/A
 - (3) *Effect of the dam, water obstruction or encroachment on the property or riparian rights of owners upstream, downstream or adjacent to the project.* Yes No N/A
 - (4) *Effect of the dam, water obstruction or encroachment on regimen and ecology of the watercourse or other body of water, water quality, stream flow, fish and wildlife, aquatic habitat, instream and downstream uses and other significant environmental factors.*
Comments: **See the Environmental Record of Decision**
 - (5) *Impacts of the dam, water obstruction or encroachment on nearby natural areas, wildlife sanctuaries, public water supplies, other geographical or physical features including cultural, archaeological and historical landmarks, National wildlife refuges, National natural landmarks, National, State or local parks or recreation areas or National, State or local historical sites.*
Comments: **See the Environmental Record of Decision**
 - (6) *Compliance by the dam, water obstruction or encroachment with applicable laws administered by the Department, the Fish and Boat Commission and river basin commissions created by interstate compact.*
Comments: **See the Environmental Record of Decision**
 - (7) *Extent to which a project is water dependent and thereby requires access or proximity to or siting within water to fulfill the basic purposes of the project used as a factor to make a determination of impact. The dependency must be based on the demonstrated unavailability of any alternative location, route or design and the use of location, route or design to avoid or minimize the adverse impact of the dam, water obstruction or encroachment upon the environment and protect the public natural resources of this Commonwealth.*
Comments: **See the Environmental Record of Decision**

- (8) *Present conditions and the effects of reasonably foreseeable future development within the affected watershed upstream and downstream of the dam, water obstruction or encroachment.*
 Yes N/A
- (9) *Consistency with State and local floodplain and stormwater management programs, the State Water Plan and, if applicable, the Coastal Zone Management Plan.*
 Yes N/A
- (10) *Consistency with the designations of wild, scenic and recreational streams under the Wild and Scenic Rivers Act of 1968 or the Pennsylvania Scenic Rivers Act, including identified I-A candidates used as a factor to make a determination of impact.*
 Comments: **See the Environmental Record of Decision**
- (11) *Consistency with State antidegradation requirements contained in Chapters 93, 96 and 102 (relating to water quality standards; wastewater treatment requirements; and erosion and sediment control) and the Clean Water Act.*
 Comments: **See the Environmental Record of Decision**
- (12) *Secondary impacts associated with but not the direct result of the construction or substantial modification in the area of the project and in areas adjacent thereto and future impacts, the construction of which would result in the need for additional dams, water obstructions or encroachments to fulfill the project purpose.*
 Comments: **See the Environmental Record of Decision**
- (13) *For dams, water obstructions or encroachments in, along, across or projecting into a wetland, as defined in § 105.1 (relating to definitions), the Department will consider the impact on the wetlands values & functions used in making a determination of adverse impact?*
 Comments: **See the Environmental Record of Decision**
- (14) *The cumulative impact of this project and other potential or existing projects. In evaluating the cumulative impact, the Department will consider whether numerous piecemeal changes may result in a major impairment of the wetland resources. The Department will evaluate a particular wetland site for which an application is made with the recognition that it is part of a complete and interrelated wetland area.* Comments: **See the Environmental Record of Decision**

105.14(c): *Does the application include operation and maintenance of existing water obstructions and encroachments?* Yes No

If yes, were the following factors considered?

- (1) *Potential threats to life, property or safe navigation created by the continuing operation or maintenance of the project.* Yes N/A
- (2) *Adverse impact on stream flow, water quality or the environment which might be reduced or mitigated by reasonable changes in the operation of the project.* Yes No N/A
- (3) *Compliance of the operation and maintenance of the project with applicable laws administered by the Department, the Fish and Boat Commission and river basin commissions created by interstate compact.* Yes N/A

105.14(d): *The Department may review a permit application for the operation and maintenance of existing projects without regard to the design criteria and construction requirements in Subchapters B—J. If the Department finds that an existing dam, water obstruction or encroachment is unsafe or adversely affects property or the environment, it may consider application of criteria and requirements reasonably necessary to correct the conditions.*

Has any design criteria and construction requirements in Subchapters B—J been waived?

Yes No *If yes, indicate in respective Subchapter*

SUBCHAPTER B. – DAMS AND RESERVOIRS

N/A

SUBCHAPTER C. – CULVERTS & BRIDGES

N/A

GENERAL INFORMATION

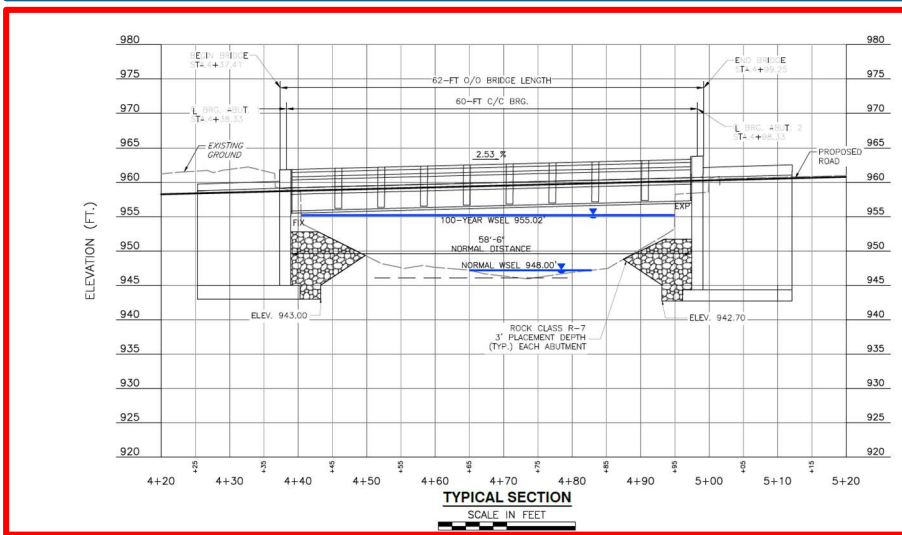
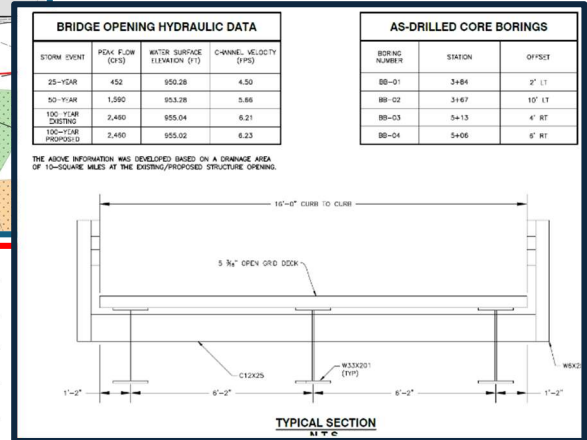
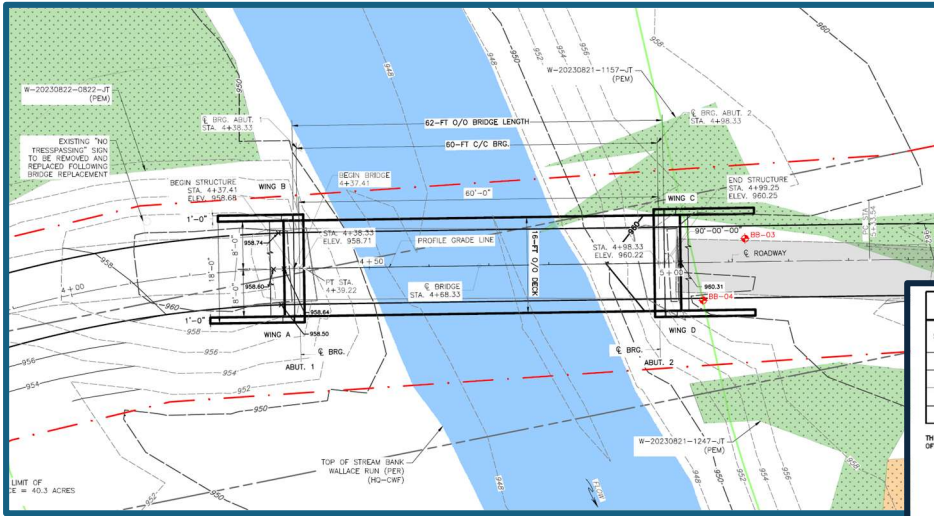
The Saluda Access and Staging Area Project is located in Gamble and Cascade Townships, Lycoming County, Pennsylvania. It consists of the construction of a 12 feet wide access road with a proposed bridge crossing of Wallis Run.

Station 4+70 – Existing single span, open grate deck, steel bridge over Wallis Run

Floodway Determination: FEMA Delineated (FIRM) Number 42081C0225F with an effective date of June 2, 2016

Hydrologic and Hydraulic Analysis Required? Yes No Waived

If yes, complete Hydrology & Hydraulics Section



APPLICABILITY OF STREAM ENCLOSURE RULES

105.142: *Is the culvert of greater than 100 feet in upstream to downstream length? If so, the culvert shall be considered to be a stream enclosure, subject to Subchapter D.* Yes No N/A

HYDRAULIC CAPACITY

- 105.161(a)(1): *Will the structure pass flood flows without loss of stability?* Yes No N/A
- 105.161(a)(2): *Will the structure create or constitute a hazard to life or property?* Yes No N/A
- 105.161(a)(3): *Will the structure materially alter the natural regimen of the stream?* Yes No N/A
- 105.161(a)(4): *Will the structure increase velocity or direct flow in a manner which results in erosion of stream beds and banks?* Yes No N/A
- 105.161(a)(5): *Will the structure significantly increase water surface elevations?* Yes No N/A
- 105.161(a)(6): *Is the structure consistent with local flood plain management Programs?* Yes No N/A
- 105.161(b): *Was the hydrologic analysis used in the determination of flood flows and frequencies, by methods generally accepted in the engineering profession?* Yes No N/A
- 105.161(c): *Was the following general criteria for design flows used?* Yes No N/A

Check the appropriate box, indicating whether the structure is located in a rural, suburban or urban area. Rural area—25-year frequency flood flow.

Suburban area—50-year frequency flood flow.

Urban area—100-year frequency flood flow.

- 105.161(d): *Was the determination of flood flows for design made with reasonable consideration of development which may alter the runoff characteristics of the watershed during the anticipated life of the structure?*
 Yes No N/A

Were the specific design requirements in 105.161(c) varied to fit the conditions at the site or varied to meet the requirements of flood plain management regulations and ordinances? Yes No N/A

- 105.161(e): *If the floodway is not delineated on a FEMA map, does the structure pass the 100-year frequency flood with less than a 1.0-foot increase in the natural unobstructed 100-year water surface elevation?*
 Yes No N/A

If the floodway is delineated on a FEMA map, does the structures pass the 100-year frequency flood with no increase in the 100-year water surface elevation? Yes No N/A

Has the applicant requested an exception to this criteria and, if so, has the applicant prepared a risk assessment which demonstrates that the structure will not significantly increase the flooding threat to life and property or the environment, and if applicable, is consistent with municipal floodplain management programs adopted under the National Flood Insurance Program and a FEMA Flood Insurance Study?

Yes No N/A

Has the risk assessment been reviewed and determined adequate in demonstrating that the structure will not significantly increase the flooding threat to life and property or the environment?

Yes No N/A

MULTIPLE PIPES AND SPANS

- 105.162: *Have multiple pipes and multiple span bridges and culverts which may tend to collect debris, contribute to the formation of ice jams and increase head losses been avoided to the maximum practicable extent?*
 Yes No N/A

Are crossings having a span of less than 15 feet single span, except where conditions make it impractical to effect the crossing without multiple spans? Yes No N/A

BRIDGE PIERS

- 105.163(a): *Have bridge piers been kept to a minimum in number and cross-sectional area and have bridge piers been designed to offer the least obstruction to the passage of water and ice, consistent with safety?*
 Yes No N/A

- 105.163(b): *If bridge piers are in channels subject to unstable or super critical flow, has special investigation been performed and are the bridge piers designed as to prevent the creation of excessive backwater and waves downstream of the pier?* Yes No N/A

BRIDGE ABUTMENTS

- 105.164(a): *Are bridge abutments set well into the banks in such manner as to assure minimal increase in flood elevations?* Yes No N/A

- 105.164(b): *Are bridge abutments aligned with the flow of the stream?* Yes No N/A
Are wing walls at the upstream side of the bridge? It is at the discretion of DEP to require wing walls to assist in directing flood flows through the bridge opening. Yes No N/A

HEIGHT OF BRIDGES AND CULVERTS

105.165: Are bridges and culverts sufficient height and clearance to allow the use of the stream or other body of water in its customary manner? Yes No N/A

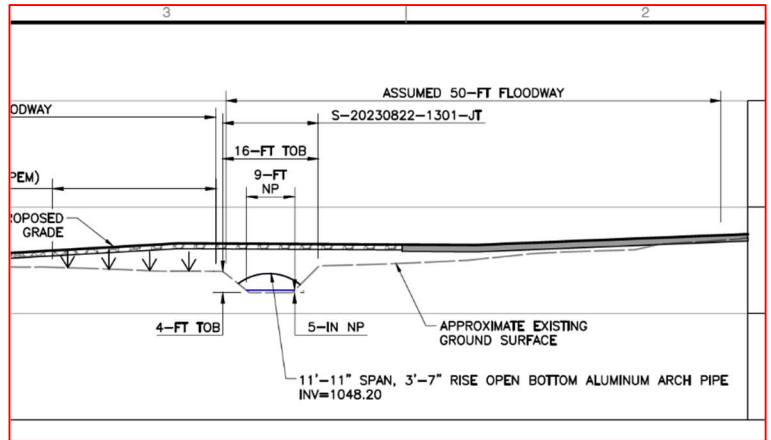
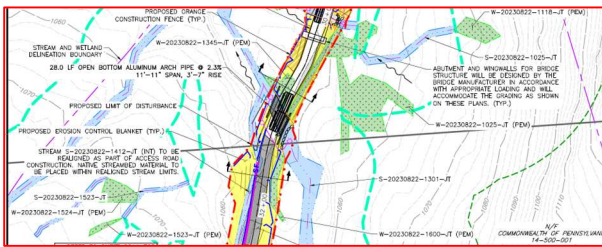
PLACEMENT OF CULVERTS

- 105.166(a): Are culverts aligned with the stream flow? Yes No N/A
- 105.166(b): Are culverts of sufficient width to minimize narrowing of the stream channel? Yes No N/A
- 105.166(c): Is the upstream side of culverts protected by wing walls or other structures sufficient to assist in directing flood flows to and through the culvert opening? Yes No N/A

Station 32+00 – Proposed single span, open bottom aluminum arch pipe

Floodway Determination: FEMA Delineated Assumed 50' Other (Evidence to Contrary to 50' Rule)

Hydrologic and Hydraulic Analysis Required? Yes No Waived



APPLICABILITY OF STREAM ENCLOSURE RULES

105.142: Is the culvert of greater than 100 feet in upstream to downstream length? If so, the culvert shall be considered to be a stream enclosure, subject to Subchapter D. Yes No N/A

HYDRAULIC CAPACITY

- 105.161(a)(1): Will the structure pass flood flows without loss of stability? Yes No N/A
- 105.161(a)(2): Will the structure create or constitute a hazard to life or property? Yes No N/A
- 105.161(a)(3): Will the structure materially alter the natural regimen of the stream? Yes No N/A
- 105.161(a)(4): Will the structure increase velocity or direct flow in a manner which results in erosion of stream beds and banks? Yes No N/A
- 105.161(a)(5): Will the structure significantly increase water surface elevations? Yes No N/A
- 105.161(a)(6): Is the structure consistent with local flood plain management Programs? Yes No N/A
- 105.161(b): Was the hydrologic analysis used in the determination of flood flows and frequencies, by methods generally accepted in the engineering profession? Yes No N/A
- 105.161(c): Was the following general criteria for design flows used? Yes No N/A
 - Check the appropriate box, indicating whether the structure is located in a rural, suburban or urban area.
 - Rural area—25-year frequency flood flow.
 - Suburban area—50-year frequency flood flow.
 - Urban area—100-year frequency flood flow.
- 105.161(d): Was the determination of flood flows for design made with reasonable consideration of development which may alter the runoff characteristics of the watershed during the anticipated life of the structure? Yes No N/A

105.161(e): *Were the specific design requirements in 105.161(c) varied to fit the conditions at the site or varied to meet the requirements of flood plain management regulations and ordinances?* Yes No N/A
If the floodway is not delineated on a FEMA map, does the structure pass the 100-year frequency flood with less than a 1.0-foot increase in the natural unobstructed 100-year water surface elevation?
 Yes No N/A

If the floodway is delineated on a FEMA map, does the structures pass the 100-year frequency flood with no increase in the 100-year water surface elevation? Yes No N/A

Has the applicant requested an exception to this criteria and, if so, has the applicant prepared a risk assessment which demonstrates that the structure will not significantly increase the flooding threat to life and property or the environment, and if applicable, is consistent with municipal floodplain management programs adopted under the National Flood Insurance Program and a FEMA Flood Insurance Study?
 Yes No N/A

Has the risk assessment been reviewed and determined adequate in demonstrating that the structure will not significantly increase the flooding threat to life and property or the environment?
 Yes No N/A

MULTIPLE PIPES AND SPANS

105.162: *Have multiple pipes and multiple span bridges and culverts which may tend to collect debris, contribute to the formation of ice jams and increase head losses been avoided to the maximum practicable extent?*
 Yes No N/A

Are crossings having a span of less than 15 feet single span, except where conditions make it impractical to effect the crossing without multiple spans? Yes No N/A

BRIDGE PIERS

105.163(a): *Have bridge piers been kept to a minimum in number and cross-sectional area and have bridge piers been designed to offer the least obstruction to the passage of water and ice, consistent with safety?*
 Yes No N/A

105.163(b): *If bridge piers are in channels subject to unstable or super critical flow, has special investigation been performed and are the bridge piers designed as to prevent the creation of excessive backwater and waves downstream of the pier?* Yes No N/A

BRIDGE ABUTMENTS

105.164(a): *Are bridge abutments set well into the banks in such manner as to assure minimal increase in flood elevations?* Yes No N/A

105.164(b): *Are bridge abutments aligned with the flow of the stream?* Yes No N/A
Are wing walls at the upstream side of the bridge? It is at the discretion of DEP to require wing walls to assist in directing flood flows through the bridge opening. Yes No N/A

HEIGHT OF BRIDGES AND CULVERTS

105.165: *Are bridges and culverts sufficient height and clearance to allow the use of the stream or other body of water in its customary manner?* Yes No N/A

PLACEMENT OF CULVERTS

105.166(a): *Are culverts aligned with the stream flow?* Yes No N/A

105.166(b): *Are culverts of sufficient width to minimize narrowing of the stream channel?* Yes No N/A

105.166(c): *Is the upstream side of culverts protected by wing walls or other structures sufficient to assist in directing flood flows to and through the culvert opening?* Yes No N/A

GENERAL INFORMATION

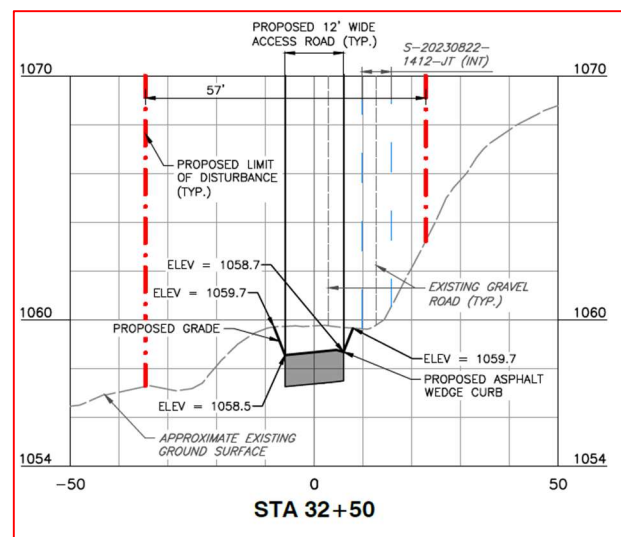
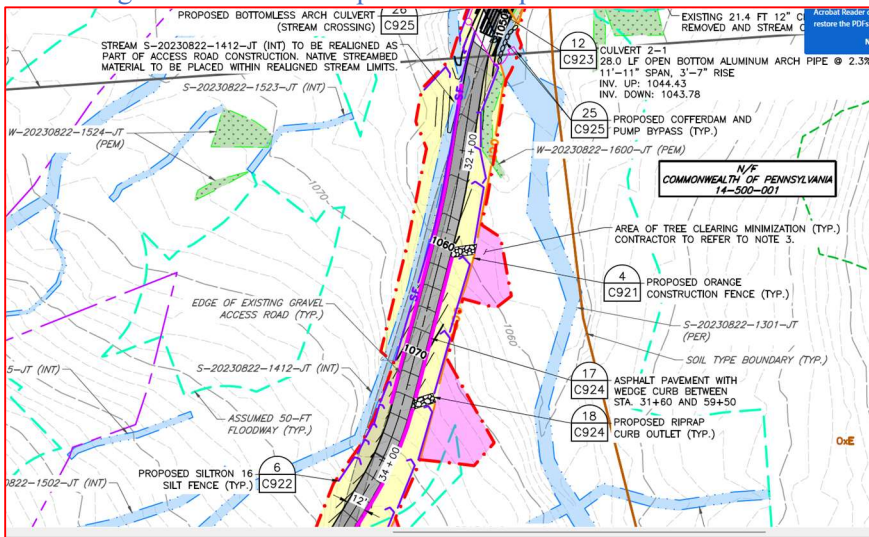
Individual – Joint Permit to construct, operate and maintain twenty (20) permanent stream crossings, nineteen (19) temporary stream crossings, eight (8) permanent wetland crossings and ten (10) temporary wetland crossings in Gamble & Cascade Township, Lycoming County.

Floodway Determination: FEMA Delineated Assumed 50' Other (Evidence to Contrary to 50' Rule)

Hydrologic and Hydraulic Analysis Required? Yes No Waived

PGE does not propose mitigation for stream S-20230822-1412-JT (UNT to Wallis Run; 41.406855, -76.869182), which would be realigned during construction. Stream relocations are permanent impacts and require mitigation under §105.1.

Additionally, this stream would be located immediately adjacent to the proposed road and at sections, would be at a higher elevation than the road surface and proposed curbing. The Department is not favorable of this design as proposed because the proximity of the road would affect stream flow dynamics and in-stream habitat resulting in significant adverse impacts to the aquatic resource.



REMOVAL OF SAND, GRAVEL AND OTHER VALUABLE MINERALS

105.233: Does the project include removal of sand, gravel or other valuable minerals from submerged lands of this Commonwealth in quantities which are commercially usable or marketable, in conjunction with a channel change or dredging permitted under this chapter? If yes, it shall be subject to the royalty and agreement provisions. Yes No N/A

FLOOD EFFECT

105.241: Does the channel change create a flooding potential greater than that created by the natural conditions of the existing channel? Yes No N/A

CHANNEL ALIGNMENT AND CROSS SECTION

105.242(a): Are there abrupt bends in the channel change that are not necessitated by the alignment of existing bridges or encroachments? Yes No N/A

105.242(b): Does the relocated channel rejoin the natural channel of the stream at a point on the permittee's property to insure that alignment of stream flow at the downstream property line is identical to the flow alignment prior to the channel change? Yes No N/A

105.242(c): Is the grade of the changed channel significantly greater than or significantly less than the grade of the original channel, unless the length of the relocated channel requires? Yes No N/A

105.242(d): *Where the width of a channel change is greater than the width of the preexisting channel, have provisions been made to assure proper depth and velocity of normal flows, subchannels and installation of stream habitat improvement devices?* Yes No N/A

105.242(e): *In streams having substantial fisheries value, have provisions been made in channel changes to maintain existing pool-riffle ratios?* Yes No N/A

Comments: **Coordinate with Environmental Review**

TEMPERATURE OF WATER AND SHADING

105.243: *Have Channel changes been designed and implemented to assure that the water temperature does not substantially increase over that in the preexisting channel?* Yes No N/A

Comments: **Coordinate with Environmental Review**

Where necessary, have provisions been made to provide adequate shading of the relocated channel to duplicate, to the maximum extent possible, the preexisting conditions? Yes No N/A

Comments: **Coordinate with Environmental Review**

PROTECTION OF FISH LIFE

105.244: *Has the Fish Commission determined that a low flow channel and habitat improvement device is necessary to provide a satisfactory channel for maintenance of fish life? If yes, a low flow channel and habitat improvement device is required.* Yes No N/A

Comments: **Coordinate with Environmental Review**

Has a low flow channel and habitat improvement device been provided? Yes No N/A

Comments: **Coordinate with Environmental Review**

DISPOSAL OF WASTE MATERIALS

105.245(a): *Will there be a discharge of dredged material into the regulated waters of this Commonwealth? If yes, the activity is subject to Subchapter J (relating to discharges of dredged and fill material).*

Yes No N/A

105.245(b): *Will there be dredged spoil and sludge deposits collected during the operation? If yes, the dredged spoil and sludge deposits must be deposited in a location and a manner approved by the Department.*

Yes No N/A

105.245(c): *Will bilge, ballast or wastewater from dredging operations be discharged to the stream? If yes, will oils, petroleum products or toxic or hazardous compounds as defined by the Conservation and Recovery Act of 1976 (42 U.S.C.A. §§ 6901–6986) be removed in a manner approved by the Department?*

Yes No N/A

SUBCHAPTER F. – FILLS, LEVEES, FLOODWALLS & STREAMBANK RETAINING DEVICES N/A

SUBCHAPTER G. – STREAM CROSSINGS, OUTFALLS, & HEADWALLS N/A

GENERAL INFORMATION

Description of activities reviewed under this Subchapter:

Individual – Joint Permit to construct, operate and maintain twenty (20) permanent stream crossings, nineteen (19) temporary stream crossings, eight (8) permanent wetland crossings and ten (10) temporary wetland crossings in Gamble & Cascade Township, Lycoming County. The work involves the construction of a permanent access road and staging area.

~Station 4+70. S-20230821-1148-JT (Wallis Run): 41.414301, -76.868102. The work at this site consists of the replacement of an existing bridge and abutments. Single Span Steel I-beam bridge with 60.0 ft c/c bearing.

~Station 16+00. S-20230821-1402-JT (UNT to Wallis Run): 41.411236, -76.868866. The work at this site consists of removal of an existing culvert and installation of a prefabricated bridge and abutments 1-1. Length 50 ft

~Station 30+00. S-20230822-1015-JT (UNT to Wallis Run): 41.407576, -76.868770. The work at this site consists of removal of an existing culvert and installation of a prefabricated bridge and abutments 1-2. Length 55 ft

~Station 32+00. S-20230822-1301-JT (UNT to Wallis Run): 41.407273, -76.868962. The work at this site consists of removal of an existing culvert and installation of a open-bottom arch culvert 2-1. Length 12 ft.

~Station 35+50. S-20230822-1218-JT (UNT to Wallis Run): 41.406169, -76.869373. The work at this site consists of removal of an existing culvert and installation of a prefabricated bridge and abutments 2-2. Length 88 ft

~Station 37+00. S-20230822-1243-JT (UNT to Wallis Run): 41.405820, -76.869232. The work at this site consists of installation of a prefabricated bridge and abutments 2-3. Length 65 ft

~Station 39+25. S-20230823-1130-JT (UNT to Wallis Run): 41.405201, -76.868974. The work at this site consists of installation of a prefabricated bridge and abutments 2-4. Length 75 ft

~Station 41+00. S-20230823-1225-JT (UNT to Wallis Run): 41.404767, -76.868817. The work at this site consists of installation of a prefabricated bridge and abutments 2-5. Length 100 ft

~Station 44+50. S-20230823-1240-JT (UNT to Wallis Run): 41.403873, -76.868515. The work at this site consists of installation of a prefabricated bridge and abutments 2-6. Length 95 ft

~Station 48+00. S-20230823-1338-JT (UNT to Wallis Run): 41.402756, -76.868335. The work at this site consists of installation of a prefabricated bridge and abutments 2-7. Length 100 ft

~Station 53+00. S-20230823-1433-JT (UNT to Wallis Run): 41.401320, -76.868293. The work at this site consists of installation of a prefabricated bridge and abutments 2-8. Length 88 ft

~Station 58+00. S-20230824-1355-DJ (UNT to Wallis Run): 41.400225, -76.869063. The work at this site consists of installation of a prefabricated bridge and abutments 2-9. Length 88 ft

~Station 60+00. S-20230824-1304-JT (UNT to Bar Bottom Hollow): 41.399807, -76.869382. The work at this site consists of installation of a prefabricated bridge and abutments 3-1. Length 50 ft

~Station 60+50. S-20230824-1305-DJ (UNT to Bar Bottom Hollow): 41.399630, -76.869446. The work at this site consists of installation of a prefabricated bridge and abutments 3-2. Length 60 ft

~Station 135+00. S-20230823-1117-DJ (UNT to Jacoby Hollow): 41.391460, -76.888282. Work at this site consists of installation of a prefabricated bridge and abutments 5-1. Length 75 ft

~Station 135+00. S-20231017-1725-JR (UNT to Jacoby Hollow): 41.390655, -76.889243. Work at this site consists of installation of a prefabricated bridge and abutments 5-2. Length 80 ft

~Station 139+50. S-20230822-0014-DJ (UNT to Jacoby Hollow): 41.390630, -76.889325. Work at this site consists of installation of a prefabricated bridge and abutments 5-2. Length 80 ft

~Station 170+00. S-20230821-0005-DJ (UNT to Jacoby Hollow): 41.385904, -76.897534. Work at this site consists of installation of a prefabricated bridge and abutments 5-3. Length 60 ft

Floodway Determination: FEMA Delineated Assumed 50' Other (Evidence to Contrary to 50' Rule)
Hydrologic and Hydraulic Analysis Required? Yes No Waived

GENERAL CRITERIA

- 105.311: *In evaluating applications for stream crossings, outfalls, headwalls, pipelines, aerial crossings and other analogous structures, the Department will not approve an application if one or more of the following is true:*
- 105.311(1): *Is the stream crossing placed in such a manner as to be displaced by flood waters?* Yes No N/A
- 105.311(2): *Does the stream crossing alter the cross section of the stream and its banks?* Yes No N/A
- 105.311(3): *Is there unnecessary paralleling or crossing of streams by pipelines or cables?* Yes No N/A
- 105.311(4): *Are pipelines or cables are placed on the bed of streams?* Yes No N/A

COVER MATERIAL

105.312: *Will waste material of any type be used as cover material for stream crossings?* Yes No N/A

105.313 PIPELINES UNDER STREAM BEDS N/A

105.313(a): Are pipelines under stream beds located such that there will be a minimum of 3 feet of cover between the top of the pipe or encasement and the lowest point in the stream bed? Yes No N/A

If no, is the pipeline in rock and does the pipeline have a minimum of 1-foot of cover between the top of the pipe or encasement and the lowest point in the stream bed? Yes No N/A

105.313(b): Are pipelines under the stream bed as near to horizontal as possible? Yes No N/A

105.313(c): In specific cases where the cover requirement of 105.313(a) has not been met, has the Department required additional information or waived the requirements of 105.313(a)? Yes No N/A

105.314 PIPELINES ALONG STREAMS N/A

105.314: Are pipelines along streams located a sufficient distance away from the bank to prevent damage to the bank as a result of erosion? Pipelines shall be located a minimum of 25 feet away from the streambank unless other erosion protection measures are approved by the Department. Yes No N/A

105.315 AERIAL CROSSINGS N/A

105.315: Do aerial crossings comply with the criteria of Subchapter C (pertaining to culverts and bridges) with regard to hydraulic capacity, height and clearance? Reviewer to complete appropriate sections of Subchapter C. Yes No N/A

SUBCHAPTER H. – DOCKS, WHARVES, & BULKHEADS N/A

SUBCHAPTER I. – COMMERCIAL DREDGING N/A

SUBCHAPTER J. – DISCHARGES OF DREDGED OR FILL MATERIAL N/A

CHAPTER 106-FLOODPLAIN MANAGEMENT N/A

TEMPORARY ACTIVITIES REVIEW N/A

HYDROLOGY AND HYDRAULICS N/A

Hydrology and Hydraulic (H&H) provided by David Smulski PE087871

The subject property is included in the Federal Emergency Management Agency’s (FEMA) Flood Insurance Rate Map (FIRM) Number 42081C0225F with an effective date of June 2, 2016 (see Attachment 1). The included FIRMette shows the proposed crossing is located within FEMA Zone A, a special flood hazard area without base flood elevations.



The existing single span, open grate deck, steel bridge over Wallis Run, currently on private property, is proposed to be replaced by a 17.67’ wide, single span steel rolled beam bridge with an open grate deck. It is designed to facilitate the movement of a 10 axle, 200,000 lb. vehicle across Wallis Run. CEC developed a hydraulic model using HEC-RAS version 6.5 for the purpose of comparing the existing and proposed conditions and conducting a scour analysis for the proposed structure. The scour analysis provides potential for scour of the streambed and proposed abutments and is used to size anti-scour measures.

HYDROLOGY:

Drainage Area: 10 square miles or 6400 acres

Was drainage area verified? Yes No

Floodway Determination: FEMA Delineated Assumed 50' Other (Evidence to Contrary to 50' Rule)

Hydrologic Method: The Hydrologic data was gathered using USGS StreamStats (SIR 2019 5094), a generally accepted data source for drainage areas greater than 1 square mile. The total drainage area to the point of interest at the proposed stream crossing is 10 square miles.

Is the hydrologic method acceptable? Yes No

Were input variables reviewed and found reasonable? Yes No

Design Flow (Chap 105): 25-yr 50-yr 100-yr Other:

Design Flow (Applicant): 25-yr 50-yr 100-yr Other:

HYDRAULICS:

Hydraulic Method: U.S. Army Corps of Engineers (USACOE) River Analysis – HEC-RAS

Is the hydraulic method acceptable? Yes No

Were input variables reviewed and found reasonable? Yes No

Does the structure pass the Chap 105 design flow? Yes No

Does the structure cause an increase in 100-yr WSE? Yes No

§ 105.161. Hydraulic capacity. (e) The structures shall pass the 100-year frequency flood with less than a 1.0-foot increase in the natural unobstructed 100-year water surface elevation, except where the structure would be located in a floodway which is delineated on a FEMA map, in which case no increase in the 100-year water surface elevation will be permitted.

Based on the results of the HEC-RAS model, the 100-year water surface elevations at cross section 8, directly upstream of the structure, the proposed water surface elevation of 955.02 is 0.02 ft lower than the existing watersurface elevation of 955.04.

Has a Risk Assessment been provided? Yes No N/A

Has the Risk Assessment been determined adequate? Yes No N/A

Are Flowage Easement's Required? Yes No N/A

EXISTING-Standard Table 1

HEC-RAS Plan: EX River: Wallis Run Reach: Study Reach (Continued)												
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Study Reach	16	2 YR (50%)	452.00	950.32	954.56	953.16	954.84	0.002520	4.23	106.94	36.41	0.43
Study Reach	16	5 YR (20%)	812.00	950.32	955.80	954.07	956.23	0.002790	5.27	154.11	40.13	0.47
Study Reach	16	10 YR (10%)	1120.00	950.32	956.66	954.72	957.20	0.002914	5.90	189.99	42.89	0.49
Study Reach	16	25 YR (4%)	1590.00	950.32	958.55	955.59	959.06	0.002041	5.74	276.88	49.25	0.43
Study Reach	16	50 YR (2%)	2000.00	950.32	958.98	956.26	959.68	0.002567	6.70	298.82	52.28	0.48
Study Reach	16	100 YR (1%)	2460.00	950.32	959.50	956.94	960.39	0.002946	7.58	327.37	59.02	0.52
Study Reach	16	500 YR (0.2%)	3760.00	950.32	960.77	958.59	962.20	0.003729	9.61	414.84	81.64	0.61
Study Reach	15.5		Bridge									
Study Reach	15	2 YR (50%)	452.00	951.25	953.61	953.55	954.46	0.013728	7.39	61.14	32.32	0.95
Study Reach	15	5 YR (20%)	812.00	951.25	954.44	954.44	955.74	0.014099	9.16	88.63	34.03	1.00
Study Reach	15	10 YR (10%)	1120.00	951.25	955.09	955.09	956.67	0.013407	10.06	111.38	35.35	1.00
Study Reach	15	25 YR (4%)	1590.00	951.25	955.96	955.96	957.89	0.012838	11.13	142.80	37.06	1.00
Study Reach	15	50 YR (2%)	2000.00	951.25	956.65	956.65	958.83	0.012423	11.86	168.67	38.43	1.00
Study Reach	15	100 YR (1%)	2460.00	951.25	957.34	957.34	959.79	0.012129	12.55	195.95	39.83	1.00
Study Reach	15	500 YR (0.2%)	3760.00	951.25	959.13	959.13	962.11	0.010924	13.86	279.08	58.56	0.98

Study Reach	8	2 YR (50%)	452.00	946.31	950.28	949.48	950.60	0.007797	4.50	100.43	58.57	0.57
Study Reach	8	5 YR (20%)	812.00	946.31	951.41	950.33	951.78	0.005842	4.90	165.83	87.36	0.52
Study Reach	8	10 YR (10%)	1120.00	946.31	952.21	950.82	952.63	0.004897	5.22	214.38	90.86	0.49
Study Reach	8	25 YR (4%)	1590.00	946.31	953.28	951.43	953.77	0.004197	5.65	281.21	96.23	0.47
Study Reach	8	50 YR (2%)	2000.00	946.31	954.13	951.90	954.68	0.003806	5.95	335.95	103.57	0.46
Study Reach	8	100 YR (1%)	2460.00	946.31	955.04	952.41	955.64	0.003458	6.21	395.89	112.38	0.45
Study Reach	8	500 YR (0.2%)	3760.00	946.31	957.71	953.65	958.02	0.001226	4.47	935.37	185.51	0.28
Study Reach	7.5		Bridge									
Study Reach	7	2 YR (50%)	452.00	945.86	949.57	948.76	949.98	0.009018	5.14	87.88	40.56	0.62
Study Reach	7	5 YR (20%)	812.00	945.86	950.33	949.73	951.04	0.011596	6.75	120.30	44.42	0.72
Study Reach	7	10 YR (10%)	1120.00	945.86	950.90	950.33	951.81	0.012600	7.63	146.75	47.90	0.77
Study Reach	7	25 YR (4%)	1590.00	945.86	951.69	951.12	952.80	0.013780	8.45	188.12	56.34	0.82
Study Reach	7	50 YR (2%)	2000.00	945.86	952.28	951.75	953.54	0.013244	8.99	222.48	58.70	0.81
Study Reach	7	100 YR (1%)	2460.00	945.86	952.79	952.29	954.26	0.013835	9.73	252.75	64.76	0.84
Study Reach	7	500 YR (0.2%)	3760.00	945.86	953.79	953.66	955.98	0.016568	11.88	319.31	95.41	0.95

EXISTING-Standard Table 2

HEC-RAS Plan: EX River: Wallis Run Reach: Study Reach											
Reach	River Sta	Profile	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Study Reach	16	2 YR (50%)	954.84	954.56	0.28	0.04	0.01		452.00		36.41
Study Reach	16	5 YR (20%)	956.23	955.80	0.43	0.05	0.02		812.00		40.13
Study Reach	16	10 YR (10%)	957.20	956.66	0.54	0.05	0.04		1120.00		42.89
Study Reach	16	25 YR (4%)	959.06	958.55	0.51				1590.00		49.25
Study Reach	16	50 YR (2%)	959.68	958.98	0.70			0.00	1999.94	0.06	52.28
Study Reach	16	100 YR (1%)	960.39	959.50	0.89			0.10	2458.31	1.59	59.02
Study Reach	16	500 YR (0.2%)	962.20	960.77	1.43			2.28	3730.26	27.46	81.64
Study Reach	15.5		Bridge								
Study Reach	15	2 YR (50%)	954.46	953.61	0.85	0.38	0.05		452.00		32.32
Study Reach	15	5 YR (20%)	955.74	954.44	1.30	0.49	0.02		812.00		34.03
Study Reach	15	10 YR (10%)	956.67	955.09	1.57	0.50	0.04		1120.00		35.35
Study Reach	15	25 YR (4%)	957.89	955.96	1.93	0.51	0.08		1590.00		37.06
Study Reach	15	50 YR (2%)	958.83	956.65	2.18	0.52	0.10		2000.00		38.43
Study Reach	15	100 YR (1%)	959.79	957.34	2.45	0.52	0.13		2460.00		39.83
Study Reach	15	500 YR (0.2%)	962.11	959.13	2.98	0.50	0.22	8.78	3751.22		58.56
Study Reach	8	2 YR (50%)	950.60	950.28	0.31	0.17	0.07		452.00		58.57
Study Reach	8	5 YR (20%)	951.78	951.41	0.37	0.15	0.13		812.00		87.36
Study Reach	8	10 YR (10%)	952.63	952.21	0.42	0.13	0.18		1120.00		90.86
Study Reach	8	25 YR (4%)	953.77	953.28	0.50	0.13	0.29		1590.00		96.23
Study Reach	8	50 YR (2%)	954.68	954.13	0.55	0.12	0.36		2000.00		103.57
Study Reach	8	100 YR (1%)	955.64	955.04	0.60	0.12	0.47		2460.00		112.38
Study Reach	8	500 YR (0.2%)	958.02	957.71	0.30	0.05	0.76	4.08	3635.83	120.09	185.51
Study Reach	7.5		Bridge								
Study Reach	7	2 YR (50%)	949.98	949.57	0.41	0.51	0.03		452.00		40.56
Study Reach	7	5 YR (20%)	951.04	950.33	0.71	0.54	0.10		812.00		44.42
Study Reach	7	10 YR (10%)	951.81	950.90	0.91	0.52	0.16		1120.00		47.90
Study Reach	7	25 YR (4%)	952.80	951.69	1.11	0.49	0.23		1590.00		56.34
Study Reach	7	50 YR (2%)	953.54	952.28	1.26	0.41	0.32		2000.00		58.70
Study Reach	7	100 YR (1%)	954.26	952.79	1.47	0.39	0.43		2460.00		64.76
Study Reach	7	500 YR (0.2%)	955.98	953.79	2.19	0.39	0.76		3753.29	6.71	95.41

PROPOSED

HEC-RAS Plan: PROP River: Wallis Run Reach: Study Reach											
Reach	River Sta	Profile	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Study Reach	16	2 YR (50%)	954.84	954.56	0.28	0.04	0.01		452.00		36.41
Study Reach	16	5 YR (20%)	956.23	955.80	0.43	0.05	0.02		812.00		40.13
Study Reach	16	10 YR (10%)	957.20	956.66	0.54	0.05	0.04		1120.00		42.89
Study Reach	16	25 YR (4%)	959.06	958.55	0.51				1590.00		49.25
Study Reach	16	50 YR (2%)	959.68	958.98	0.70			0.00	1999.94	0.06	52.28
Study Reach	16	100 YR (1%)	960.39	959.50	0.89			0.10	2458.31	1.59	59.02
Study Reach	16	500 YR (0.2%)	962.20	960.77	1.43			2.28	3730.26	27.46	81.64
Study Reach	15.5		Bridge								
Study Reach	15	2 YR (50%)	954.46	953.61	0.85	0.38	0.05		452.00		32.32
Study Reach	15	5 YR (20%)	955.74	954.44	1.30	0.49	0.02		812.00		34.03
Study Reach	15	10 YR (10%)	956.67	955.09	1.57	0.50	0.04		1120.00		35.35
Study Reach	15	25 YR (4%)	957.89	955.96	1.93	0.51	0.08		1590.00		37.06
Study Reach	15	50 YR (2%)	958.83	956.65	2.18	0.52	0.10		2000.00		38.43
Study Reach	15	100 YR (1%)	959.79	957.34	2.45	0.52	0.13		2460.00		39.83
Study Reach	15	500 YR (0.2%)	962.11	959.13	2.98	0.50	0.22	8.78	3751.22		58.56

Study Reach	8	2 YR (50%)	950.60	950.28	0.31	0.17	0.07			452.00		58.67
Study Reach	8	5 YR (20%)	951.78	951.40	0.37	0.15	0.14			812.00		87.35
Study Reach	8	10 YR (10%)	952.63	952.20	0.43	0.13	0.19			1120.00		90.84
Study Reach	8	25 YR (4%)	953.77	953.28	0.50	0.13	0.28			1590.00		96.22
Study Reach	8	50 YR (2%)	954.67	954.12	0.55	0.12	0.35			2000.00		103.49
Study Reach	8	100 YR (1%)	955.62	955.02	0.60	0.12	0.45			2460.00		112.21
Study Reach	8	500 YR (0.2%)	958.77	958.54	0.23				13.79	3559.15	187.06	200.48
Study Reach	7.5	Bridge										
Study Reach	7	2 YR (50%)	949.98	949.57	0.41	0.51	0.03			452.00		40.56
Study Reach	7	5 YR (20%)	951.04	950.33	0.71	0.54	0.10			812.00		44.42
Study Reach	7	10 YR (10%)	951.81	950.90	0.91	0.52	0.16			1120.00		47.90
Study Reach	7	25 YR (4%)	952.80	951.69	1.11	0.49	0.23			1590.00		56.34
Study Reach	7	50 YR (2%)	953.54	952.28	1.26	0.41	0.32			2000.00		58.70
Study Reach	7	100 YR (1%)	954.26	952.79	1.47	0.39	0.43			2460.00		64.76
Study Reach	7	500 YR (0.2%)	955.98	953.79	2.19	0.39	0.76			3753.29	6.71	95.41

EPHEMERAL HEC-RAS

HEC-RAS River: Stream 1 Reach: S-20230821-1402-

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
S-20230821-1402-	215.5	25 Year	Exist	16.89	987.10	988.09	987.61	988.16	0.003099	2.06	8.19	8.50	0.37
S-20230821-1402-	215.5	25 Year	Proposed	16.89	987.10	988.07	987.61	988.14	0.003319	2.11	8.01	8.49	0.38
S-20230821-1402-	215.5	100 Year	Exist	20.43	987.10	988.20	987.68	988.28	0.003289	2.25	9.10	8.55	0.38
S-20230821-1402-	215.5	100 Year	Proposed	20.43	987.10	988.18	987.68	988.26	0.003507	2.29	8.91	8.54	0.40
S-20230821-1402-	160.77	25 Year	Exist	16.89	987.00	987.51	987.51	987.77	0.025677	4.05	4.17	8.26	1.01
S-20230821-1402-	160.77	25 Year	Proposed	16.89	987.00	987.77	987.51	987.88	0.006992	2.68	6.30	8.38	0.55
S-20230821-1402-	160.77	100 Year	Exist	20.43	987.00	987.58	987.58	987.87	0.025021	4.31	4.74	8.29	1.01
S-20230821-1402-	160.77	100 Year	Proposed	20.43	987.00	987.85	987.58	987.99	0.007317	2.91	7.01	8.43	0.56
S-20230821-1402-	117.03	25 Year	Exist	16.89	985.10	985.47	985.61	985.96	0.073983	5.64	2.99	8.18	1.65
S-20230821-1402-	117.03	25 Year	Proposed	16.89	985.10	985.61	985.61	985.87	0.025677	4.05	4.17	8.26	1.01
S-20230821-1402-	117.03	100 Year	Exist	20.43	985.10	985.52	985.68	986.09	0.074319	6.07	3.36	8.21	1.67
S-20230821-1402-	117.03	100 Year	Proposed	20.43	985.10	985.88	985.68	985.97	0.025021	4.31	4.74	8.29	1.01
S-20230821-1402-	51.95	25 Year	Exist	16.89	982.06	982.54	982.57	982.83	0.032740	4.38	3.86	8.24	1.13
S-20230821-1402-	51.95	25 Year	Proposed	16.89	982.06	982.41	982.57	982.97	0.092043	6.04	2.80	8.17	1.82
S-20230821-1402-	51.95	100 Year	Exist	20.43	982.06	982.59	982.64	982.94	0.032807	4.70	4.35	8.27	1.14
S-20230821-1402-	51.95	100 Year	Proposed	20.43	982.06	982.45	982.64	983.11	0.093020	6.51	3.14	8.19	1.86

HEC-RAS River: Stream 2 Reach: S-20230822-1015-

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
S-20230822-1015-	155.17	25 Year	Existing	2.91	1049.94	1050.21	1050.31	1050.57	0.097975	4.83	0.60	2.53	1.74
S-20230822-1015-	155.17	25 Year	Proposed	2.91	1049.94	1050.21	1050.31	1050.57	0.097975	4.83	0.60	2.53	1.74
S-20230822-1015-	155.17	100 Year	Existing	4.02	1049.94	1050.26	1050.40	1050.71	0.097824	5.37	0.75	2.64	1.78
S-20230822-1015-	155.17	100 Year	Proposed	4.02	1049.94	1050.26	1050.40	1050.71	0.097824	5.37	0.75	2.64	1.78
S-20230822-1015-	138.27	25 Year	Existing	2.91	1046.92	1047.11	1047.29	1047.86	0.295588	6.94	0.42	2.38	2.92
S-20230822-1015-	138.27	25 Year	Proposed	2.91	1046.92	1047.11	1047.29	1047.84	0.280953	6.83	0.43	2.39	2.85
S-20230822-1015-	138.27	100 Year	Existing	4.02	1046.92	1047.16	1047.38	1048.06	0.278520	7.81	0.53	2.47	2.90
S-20230822-1015-	138.27	100 Year	Proposed	4.02	1046.92	1047.16	1047.38	1048.03	0.263619	7.47	0.54	2.48	2.83
S-20230822-1015-	105.87	25 Year	Existing	2.91	1044.67	1045.03	1045.04	1045.21	0.034448	3.40	0.86	2.73	1.07
S-20230822-1015-	105.87	25 Year	Proposed	2.91	1044.67	1045.04	1045.04	1045.21	0.030990	3.28	0.89	2.75	1.02
S-20230822-1015-	105.87	100 Year	Existing	4.02	1044.67	1045.10	1045.13	1045.33	0.036048	3.82	1.05	2.86	1.11
S-20230822-1015-	105.87	100 Year	Proposed	4.02	1044.67	1045.13	1045.13	1045.33	0.028668	3.53	1.14	2.92	1.00
S-20230822-1015-	61.56	25 Year	Existing	2.91	1038.96	1039.09	1039.33	1040.73	0.994659	10.26	0.28	2.27	5.11
S-20230822-1015-	61.56	25 Year	Proposed	2.91	1038.96	1039.09	1039.33	1040.95	1.224840	10.97	0.27	2.25	5.63
S-20230822-1015-	61.56	100 Year	Existing	4.02	1038.96	1039.14	1039.42	1040.87	0.756740	10.55	0.38	2.35	4.62
S-20230822-1015-	61.56	100 Year	Proposed	4.02	1038.96	1039.12	1039.42	1041.35	1.122484	11.98	0.34	2.31	5.54

HEC-RAS River: Stream 3 Reach: S-20230822-1218-

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
S-20230822-1218-	239.15	25 Year	Existing	2.53	1103.20	1103.40	1103.54	1103.88	0.180844	5.57	0.45	2.50	2.31
S-20230822-1218-	239.15	25 Year	Proposed	2.53	1103.20	1103.40	1103.54	1103.88	0.180844	5.57	0.45	2.50	2.31
S-20230822-1218-	239.15	100 Year	Existing	3.65	1103.20	1103.45	1103.63	1104.07	0.180651	6.31	0.58	2.63	2.37
S-20230822-1218-	239.15	100 Year	Proposed	3.65	1103.20	1103.45	1103.63	1104.07	0.180651	6.31	0.58	2.63	2.37
S-20230822-1218-	214.52	25 Year	Existing	2.53	1093.95	1094.08	1094.29	1095.41	0.864932	9.26	0.27	2.32	4.75
S-20230822-1218-	214.52	25 Year	Proposed	2.53	1093.95	1094.08	1094.29	1095.37	0.824266	9.12	0.28	2.32	4.65
S-20230822-1218-	214.52	100 Year	Existing	3.65	1093.95	1094.11	1094.38	1095.76	0.804598	10.31	0.35	2.40	4.73
S-20230822-1218-	214.52	100 Year	Proposed	3.65	1093.95	1094.11	1094.38	1095.71	0.764835	10.14	0.36	2.41	4.62
S-20230822-1218-	173.56	25 Year	Existing	2.53	1088.80	1089.09	1089.14	1089.31	0.055270	3.76	0.67	2.71	1.33
S-20230822-1218-	173.56	25 Year	Proposed	2.53	1088.80	1089.14	1089.14	1089.29	0.030177	3.06	0.83	2.85	1.00
S-20230822-1218-	173.56	100 Year	Existing	3.65	1088.80	1089.15	1089.23	1089.44	0.058014	4.30	0.85	2.87	1.39
S-20230822-1218-	173.56	100 Year	Proposed	3.65	1088.80	1089.23	1089.23	1089.40	0.028749	3.38	1.08	3.07	1.00
S-20230822-1218-	119.18	25 Year	Existing	2.53	1083.51	1083.71	1083.85	1084.21	0.188841	5.65	0.45	2.50	2.36
S-20230822-1218-	119.18	25 Year	Proposed	2.53	1083.51	1083.65	1083.85	1084.75	0.644566	8.43	0.30	2.35	4.15
S-20230822-1218-	119.18	100 Year	Existing	3.65	1083.51	1083.76	1083.94	1084.36	0.171094	6.19	0.59	2.64	2.31
S-20230822-1218-	119.18	100 Year	Proposed	3.65	1083.51	1083.69	1083.94	1085.06	0.608498	9.41	0.39	2.44	4.16

HEC-RAS River: Stream 4 Reach: S-20230822-1243-													
Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
S-20230822-1243-	302.72	25 Year	Existing	5.35	1113.05	1113.28	1113.48	1114.00	0.215057	6.78	0.79	3.78	2.61
S-20230822-1243-	302.72	25 Year	Proposed	5.35	1113.05	1113.28	1113.48	1114.00	0.215057	6.78	0.79	3.78	2.61
S-20230822-1243-	302.72	100 Year	Existing	7.96	1113.05	1113.34	1113.59	1114.28	0.215126	7.76	1.03	3.98	2.70
S-20230822-1243-	302.72	100 Year	Proposed	7.96	1113.05	1113.34	1113.59	1114.28	0.215126	7.76	1.03	3.98	2.70
S-20230822-1243-	252.63	25 Year	Existing	5.35	1104.69	1104.96	1105.12	1105.49	0.136032	5.83	0.92	3.89	2.12
S-20230822-1243-	252.63	25 Year	Proposed	5.35	1104.69	1104.96	1105.12	1105.48	0.134971	5.82	0.92	3.89	2.11
S-20230822-1243-	252.63	100 Year	Existing	7.96	1104.69	1105.03	1105.23	1105.72	0.137015	6.88	1.19	4.12	2.19
S-20230822-1243-	252.63	100 Year	Proposed	7.96	1104.69	1105.03	1105.23	1105.71	0.135845	6.86	1.20	4.12	2.18
S-20230822-1243-	223.34	25 Year	Existing	5.35	1101.86	1102.18	1102.28	1102.53	0.075535	4.80	1.12	4.05	1.61
S-20230822-1243-	223.34	25 Year	Proposed	5.35	1101.86	1102.28	1102.28	1102.46	0.027250	3.40	1.57	4.41	1.00
S-20230822-1243-	223.34	100 Year	Existing	7.96	1101.86	1102.26	1102.40	1102.72	0.076441	5.49	1.45	4.32	1.67
S-20230822-1243-	223.34	100 Year	Proposed	7.96	1101.86	1102.40	1102.40	1102.62	0.025436	3.76	2.12	4.81	1.00
S-20230822-1243-	171.92	25 Year	Existing	5.35	1093.53	1093.72	1093.96	1094.82	0.416179	8.40	0.64	3.64	3.54
S-20230822-1243-	171.92	25 Year	Proposed	5.35	1093.53	1093.64	1093.96	1097.44	2.925460	15.65	0.34	3.36	8.65
S-20230822-1243-	171.92	100 Year	Existing	7.96	1093.53	1093.78	1094.07	1095.14	0.379617	9.37	0.85	3.83	3.50
S-20230822-1243-	171.92	100 Year	Proposed	7.96	1093.53	1093.68	1094.07	1097.95	2.214263	16.57	0.48	3.49	7.86

HEC-RAS River: Stream 5 Reach: S-20230823-1130-													
Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
S-20230823-1130-	463.42	25 Year	Existing	2.19	1128.47	1128.79	1128.84	1128.98	0.055821	3.51	0.62	2.91	1.34
S-20230823-1130-	463.42	25 Year	Proposed	2.19	1128.47	1128.79	1128.84	1128.98	0.055821	3.51	0.62	2.91	1.34
S-20230823-1130-	463.42	100 Year	Existing	2.79	1128.47	1128.83	1128.89	1129.05	0.055843	3.74	0.75	3.15	1.36
S-20230823-1130-	463.42	100 Year	Proposed	2.79	1128.47	1128.83	1128.89	1129.05	0.055843	3.74	0.75	3.15	1.36
S-20230823-1130-	394.54	25 Year	Existing	2.19	1124.86	1125.19	1125.23	1125.37	0.050575	3.38	0.65	2.96	1.28
S-20230823-1130-	394.54	25 Year	Proposed	2.19	1124.86	1125.39	1125.23	1125.43	0.006381	1.58	1.39	4.20	0.48
S-20230823-1130-	394.54	100 Year	Existing	2.79	1124.86	1125.23	1125.28	1125.43	0.050587	3.61	0.77	3.21	1.30
S-20230823-1130-	394.54	100 Year	Proposed	2.79	1124.86	1125.45	1125.28	1125.50	0.006673	1.71	1.63	4.54	0.50
S-20230823-1130-	362.91	25 Year	Existing	2.19	1121.36	1121.61	1121.73	1122.02	0.160494	5.15	0.43	2.47	2.19
S-20230823-1130-	362.91	25 Year	Proposed	2.19	1121.36	1121.73	1121.73	1121.85	0.029708	2.78	0.79	3.23	0.99
S-20230823-1130-	362.91	100 Year	Existing	2.79	1121.36	1121.64	1121.78	1122.10	0.157329	5.47	0.51	2.67	2.20
S-20230823-1130-	362.91	100 Year	Proposed	2.79	1121.36	1121.78	1121.78	1121.91	0.029217	2.95	0.95	3.51	1.00
S-20230823-1130-	312.74	25 Year	Existing	2.19	1113.03	1113.27	1113.40	1113.71	0.172328	5.29	0.41	2.44	2.26
S-20230823-1130-	312.74	25 Year	Proposed	2.19	1113.03	1113.14	1113.40	1116.58	3.197968	14.87	0.15	1.66	8.81
S-20230823-1130-	312.74	100 Year	Existing	2.79	1113.03	1113.30	1113.45	1113.80	0.175328	5.69	0.49	2.62	2.32
S-20230823-1130-	312.74	100 Year	Proposed	2.79	1113.03	1113.16	1113.45	1116.76	2.765066	15.22	0.18	1.79	8.38

HEC-RAS River: Stream 6 Reach: S-20230823-1225-													
Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
S-20230823-1225-	278.76	25 Year	Existing	1.85	1144.00	1144.16	1144.28	1144.58	0.201507	5.18	0.36	2.41	2.37
S-20230823-1225-	278.76	25 Year	Proposed	1.85	1144.00	1144.16	1144.28	1144.58	0.201507	5.18	0.36	2.41	2.37
S-20230823-1225-	278.76	100 Year	Existing	2.28	1144.00	1144.18	1144.32	1144.67	0.201237	5.57	0.41	2.46	2.41
S-20230823-1225-	278.76	100 Year	Proposed	2.28	1144.00	1144.18	1144.32	1144.67	0.201237	5.57	0.41	2.46	2.41
S-20230823-1225-	224.88	25 Year	Existing	1.85	1132.07	1132.22	1132.35	1132.74	0.281749	5.77	0.32	2.37	2.77
S-20230823-1225-	224.88	25 Year	Proposed	1.85	1132.07	1132.22	1132.35	1132.73	0.280963	5.77	0.32	2.37	2.76
S-20230823-1225-	224.88	100 Year	Existing	2.28	1132.07	1132.24	1132.39	1132.84	0.281796	6.22	0.37	2.42	2.81
S-20230823-1225-	224.88	100 Year	Proposed	2.28	1132.07	1132.24	1132.39	1132.84	0.280406	6.21	0.37	2.42	2.81
S-20230823-1225-	179.57	25 Year	Existing	1.85	1125.87	1126.11	1126.15	1126.29	0.053782	3.36	0.55	2.60	1.29
S-20230823-1225-	179.57	25 Year	Proposed	1.85	1125.87	1126.15	1126.15	1126.27	0.032151	2.83	0.65	2.70	1.01
S-20230823-1225-	179.57	100 Year	Existing	2.28	1125.87	1126.14	1126.19	1126.34	0.054062	3.60	0.63	2.68	1.31
S-20230823-1225-	179.57	100 Year	Proposed	2.28	1125.87	1126.19	1126.19	1126.33	0.030229	2.96	0.77	2.80	1.00
S-20230823-1225-	143.78	25 Year	Existing	1.85	1123.24	1123.48	1123.52	1123.65	0.051606	3.31	0.56	2.61	1.26
S-20230823-1225-	143.78	25 Year	Proposed	1.85	1123.24	1123.44	1123.52	1123.70	0.094356	4.04	0.46	2.51	1.67
S-20230823-1225-	143.78	100 Year	Existing	2.28	1123.24	1123.52	1123.56	1123.71	0.051402	3.54	0.64	2.69	1.28
S-20230823-1225-	143.78	100 Year	Proposed	2.28	1123.24	1123.46	1123.56	1123.77	0.102131	4.46	0.51	2.56	1.76

HEC-RAS River: Stream 7 Reach: S-20230823-1240-													
Reach	River Sta	Profile	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
S-20230823-1240-	388.03	25 Year	Existing	4.55	1170.28	1170.49	1170.68	1171.25	0.256189	7.00	0.65	3.27	2.77
S-20230823-1240-	388.03	25 Year	Proposed	4.55	1170.28	1170.49	1170.68	1171.25	0.256189	7.00	0.65	3.27	2.77
S-20230823-1240-	388.03	100 Year	Existing	6.62	1170.28	1170.54	1170.79	1171.54	0.256147	8.02	0.83	3.33	2.84
S-20230823-1240-	388.03	100 Year	Proposed	6.62	1170.28	1170.54	1170.79	1171.54	0.256147	8.02	0.83	3.33	2.84
S-20230823-1240-	333.53	25 Year	Existing	4.55	1160.02	1160.26	1160.42	1160.81	0.149441	5.90	0.77	3.31	2.15
S-20230823-1240-	333.53	25 Year	Proposed	4.55	1160.02	1160.27	1160.42	1160.80	0.148465	5.89	0.77	3.31	2.15
S-20230823-1240-	333.53	100 Year	Existing	6.62	1160.02	1160.33	1160.53	1161.04	0.150475	6.76	0.98	3.39	2.22
S-20230823-1240-	333.53	100 Year	Proposed	6.62	1160.02	1160.33	1160.53	1161.03	0.149109	6.74	0.98	3.39	2.21
S-20230823-1240-	293.1	25 Year	Existing	4.55	1149.58	1149.75	1149.98	1150.87	0.469738	8.48	0.54	3.22	3.66
S-20230823-1240-	293.1	25 Year	Proposed	4.55	1149.58	1149.88	1149.98	1150.23	0.074530	4.72	0.96	3.39	1.56
S-20230823-1240-	293.1	100 Year	Existing	6.62	1149.58	1149.80	1150.09	1151.23	0.446139	9.58	0.69	3.28	3.68
S-20230823-1240-	293.1	100 Year	Proposed	6.62	1149.58	1149.92	1150.09	1150.50	0.109861	6.10	1.09	3.43	1.91
S-20230823-1240-	238.07	25 Year	Existing	4.55	1139.99	1140.27	1140.39	1140.68	0.095466	5.11	0.89	3.36	1.75
S-20230823-1240-	238.07	25 Year	Proposed	4.55	1139.99	1140.16	1140.39	1141.39	0.547177	8.90	0.51	3.21	3.93
S-20230823-1240-	238.07	100 Year	Existing	6.62	1139.99	1140.34	1140.50	1140.88	0.099254	5.90	1.12	3.45	1.82
S-20230823-1240-	238.07	100 Year	Proposed	6.62	1139.99	1140.24	1140.50	1141.30	0.279932	8.25	0.80	3.33	2.96

HEC-RAS River: Stream 8 Reach: S-20230823-1338-

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
S-20230823-1338-	315.38	25 Year	Existing	1.07	1225.69	1225.85	1225.96	1226.25	0.237500	5.10	0.21	1.64	2.51
S-20230823-1338-	315.38	25 Year	Proposed	1.07	1225.69	1225.85	1225.96	1226.25	0.237500	5.10	0.21	1.64	2.51
S-20230823-1338-	315.38	100 Year	Existing	1.46	1225.69	1225.88	1226.01	1226.37	0.237416	5.61	0.26	1.76	2.57
S-20230823-1338-	315.38	100 Year	Proposed	1.46	1225.69	1225.88	1226.01	1226.37	0.237416	5.61	0.26	1.76	2.57
S-20230823-1338-	265.38	25 Year	Existing	1.07	1212.53	1212.68	1212.80	1213.15	0.291026	5.48	0.20	1.60	2.76
S-20230823-1338-	265.38	25 Year	Proposed	1.07	1212.53	1212.68	1212.80	1213.15	0.290185	5.47	0.20	1.60	2.76
S-20230823-1338-	265.38	100 Year	Existing	1.46	1212.53	1212.71	1212.85	1213.27	0.289959	6.01	0.24	1.72	2.82
S-20230823-1338-	265.38	100 Year	Proposed	1.46	1212.53	1212.71	1212.85	1213.27	0.289244	6.01	0.24	1.72	2.81
S-20230823-1338-	220.41	25 Year	Existing	1.07	1205.32	1205.54	1205.59	1205.72	0.074300	3.40	0.31	1.88	1.46
S-20230823-1338-	220.41	25 Year	Proposed	1.07	1205.32	1205.59	1205.59	1205.69	0.032770	2.54	0.42	2.09	1.00
S-20230823-1338-	220.41	100 Year	Existing	1.46	1205.32	1205.58	1205.64	1205.79	0.074845	3.73	0.39	2.03	1.50
S-20230823-1338-	220.41	100 Year	Proposed	1.46	1205.32	1205.64	1205.64	1205.76	0.031528	2.73	0.53	2.30	1.00
S-20230823-1338-	154.8	25 Year	Existing	1.07	1198.64	1198.80	1198.91	1199.18	0.215378	4.93	0.22	1.65	2.40
S-20230823-1338-	154.8	25 Year	Proposed	1.07	1198.64	1198.74	1198.91	1200.11	1.427312	9.40	0.11	1.38	5.77
S-20230823-1338-	154.8	100 Year	Existing	1.46	1198.64	1198.84	1198.96	1199.28	0.210496	5.38	0.27	1.78	2.43
S-20230823-1338-	154.8	100 Year	Proposed	1.46	1198.64	1198.76	1198.96	1200.38	1.349308	10.21	0.14	1.46	5.76

HEC-RAS River: Stream 9 Reach: S-20230823-1433-

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
S-20230823-1433-	164.97	25 Year	Existing	5.09	1266.81	1267.21	1267.44	1268.00	0.174455	7.16	0.71	2.59	2.41
S-20230823-1433-	164.97	25 Year	Proposed	5.09	1266.81	1267.21	1267.44	1268.00	0.174455	7.16	0.71	2.59	2.41
S-20230823-1433-	164.97	100 Year	Existing	5.84	1266.81	1267.24	1267.48	1268.09	0.174407	7.43	0.79	2.70	2.43
S-20230823-1433-	164.97	100 Year	Proposed	5.84	1266.81	1267.24	1267.48	1268.09	0.174407	7.43	0.79	2.70	2.43
S-20230823-1433-	106.39	25 Year	Existing	5.09	1255.14	1255.48	1255.77	1256.68	0.303479	8.75	0.58	2.38	3.12
S-20230823-1433-	106.39	25 Year	Proposed	5.09	1255.14	1255.49	1255.77	1256.67	0.299746	8.71	0.58	2.38	3.10
S-20230823-1433-	106.39	100 Year	Existing	5.84	1255.14	1255.51	1255.81	1256.79	0.302276	9.08	0.64	2.48	3.14
S-20230823-1433-	106.39	100 Year	Proposed	5.84	1255.14	1255.51	1255.81	1256.78	0.298012	9.03	0.65	2.48	3.12
S-20230823-1433-	69.85	25 Year	Existing	5.09	1253.06	1253.69	1253.69	1253.89	0.027401	3.62	1.40	3.50	1.01
S-20230823-1433-	69.85	25 Year	Proposed	5.09	1253.06	1253.69	1253.69	1253.89	0.027401	3.62	1.40	3.50	1.01
S-20230823-1433-	69.85	100 Year	Existing	5.84	1253.06	1253.73	1253.73	1253.95	0.026839	3.73	1.57	3.68	1.01
S-20230823-1433-	69.85	100 Year	Proposed	5.84	1253.06	1253.73	1253.73	1253.95	0.026839	3.73	1.57	3.68	1.01
S-20230823-1433-	16.77	25 Year	Existing	5.09	1247.06	1247.33	1247.69	1249.75	0.814674	12.49	0.41	2.06	4.96
S-20230823-1433-	16.77	25 Year	Proposed	5.09	1247.06	1247.33	1247.69	1249.75	0.814674	12.49	0.41	2.06	4.96
S-20230823-1433-	16.77	100 Year	Existing	5.84	1247.06	1247.35	1247.73	1249.89	0.781567	12.79	0.46	2.16	4.90
S-20230823-1433-	16.77	100 Year	Proposed	5.84	1247.06	1247.35	1247.73	1249.89	0.781567	12.79	0.46	2.16	4.90

HEC-RAS River: Stream 10 Reach: S-20230824-1355-

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
S-20230824-1355-	197.47	25 Year	Existing	0.84	1320.19	1320.31	1320.36	1320.48	0.125542	3.32	0.25	2.36	1.79
S-20230824-1355-	197.47	25 Year	Proposed	0.84	1320.19	1320.31	1320.36	1320.48	0.125542	3.32	0.25	2.36	1.79
S-20230824-1355-	197.47	100 Year	Existing	1.05	1320.19	1320.32	1320.38	1320.52	0.125566	3.60	0.29	2.41	1.83
S-20230824-1355-	197.47	100 Year	Proposed	1.05	1320.19	1320.32	1320.38	1320.52	0.125566	3.60	0.29	2.41	1.83
S-20230824-1355-	144.31	25 Year	Existing	0.84	1309.60	1309.68	1309.77	1310.05	0.411173	4.85	0.17	2.25	3.08
S-20230824-1355-	144.31	25 Year	Proposed	0.84	1309.60	1309.93	1309.77	1309.94	0.003602	1.02	0.82	3.02	0.35
S-20230824-1355-	144.31	100 Year	Existing	1.05	1309.60	1309.69	1309.79	1310.12	0.407133	5.25	0.20	2.29	3.13
S-20230824-1355-	144.31	100 Year	Proposed	1.05	1309.60	1309.97	1309.79	1309.99	0.003790	1.12	0.94	3.14	0.36
S-20230824-1355-	100.96	25 Year	Existing	0.84	1300.16	1300.27	1300.33	1300.47	0.157656	3.58	0.23	2.34	1.99
S-20230824-1355-	100.96	25 Year	Proposed	0.84	1300.16	1300.33	1300.33	1300.40	0.035238	2.20	0.38	2.53	1.00
S-20230824-1355-	100.96	100 Year	Existing	1.05	1300.16	1300.30	1300.35	1300.49	0.117667	3.52	0.30	2.42	1.77
S-20230824-1355-	100.96	100 Year	Proposed	1.05	1300.16	1300.35	1300.35	1300.44	0.034123	2.35	0.45	2.61	1.00
S-20230824-1355-	49.19	25 Year	Existing	0.84	1295.07	1295.21	1295.24	1295.33	0.071729	2.78	0.30	2.43	1.39
S-20230824-1355-	49.19	25 Year	Proposed	0.84	1295.07	1295.14	1295.24	1295.65	0.704847	5.75	0.15	2.22	3.94
S-20230824-1355-	49.19	100 Year	Existing	1.05	1295.07	1295.22	1295.26	1295.38	0.089224	3.22	0.33	2.46	1.56
S-20230824-1355-	49.19	100 Year	Proposed	1.05	1295.07	1295.15	1295.26	1295.77	0.734185	6.32	0.17	2.24	4.10

HEC-RAS River: Stream 11 Reach: S-20230824-1304-

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
S-20230824-1304-	285.75	25 Year	Existing	7.92	1328.73	1329.37	1329.57	1330.00	0.082381	6.37	1.24	2.91	1.72
S-20230824-1304-	285.75	25 Year	Proposed	7.92	1328.73	1329.37	1329.57	1330.00	0.082381	6.37	1.24	2.91	1.72
S-20230824-1304-	285.75	100 Year	Existing	10.66	1328.73	1329.47	1329.71	1330.20	0.082319	6.88	1.55	3.21	1.74
S-20230824-1304-	285.75	100 Year	Proposed	10.66	1328.73	1329.47	1329.71	1330.20	0.082319	6.88	1.55	3.21	1.74
S-20230824-1304-	230.98	25 Year	Existing	7.92	1321.00	1321.47	1321.84	1323.00	0.276958	9.94	0.80	2.40	3.04
S-20230824-1304-	230.98	25 Year	Proposed	7.92	1321.00	1321.47	1321.84	1322.95	0.263667	9.76	0.81	2.42	2.97
S-20230824-1304-	230.98	100 Year	Existing	10.66	1321.00	1321.55	1321.98	1323.30	0.265880	10.60	1.01	2.65	3.03
S-20230824-1304-	230.98	100 Year	Proposed	10.66	1321.00	1321.56	1321.98	1323.24	0.252992	10.41	1.02	2.67	2.96
S-20230824-1304-	192.08	25 Year	Existing	7.92	1316.75	1317.46	1317.59	1317.92	0.053749	5.44	1.46	3.12	1.40
S-20230824-1304-	192.08	25 Year	Proposed	7.92	1316.75	1317.59	1317.59	1317.86	0.026842	4.20	1.88	3.51	1.01
S-20230824-1304-	192.08	100 Year	Existing	10.66	1316.75	1317.56	1317.73	1318.11	0.055800	5.95	1.79	3.43	1.45
S-20230824-1304-	192.08	100 Year	Proposed	10.66	1316.75	1317.72	1317.72	1318.03	0.025680	4.46	2.39	3.92	1.01
S-20230824-1304-	137.29	25 Year	Existing	7.92	1308.55	1308.94	1309.39	1311.47	0.551042	12.76	0.82	2.17	4.21
S-20230824-1304-	137.29	25 Year	Proposed	7.92	1308.55	1308.87	1309.39	1313.36	1.225859	17.01	0.47	1.95	6.13
S-20230824-1304-	137.29	100 Year	Existing	10.66	1308.55	1309.03	1309.53	1311.70	0.476234	13.12	0.81	2.42	4.00
S-20230824-1304-	137.29	100 Year	Proposed	10.66	1308.55	1308.94	1309.53	1313.74	1.065808	17.58	0.61	2.15	5.84

HEC-RAS River: Stream 12 Reach: S-20230824-1305-

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
S-20230824-1305-	410.3	25 Year	Proposed	4.55	1329.99	1330.40	1330.54	1330.85	0.082368	5.37	0.85	2.61	1.66
S-20230824-1305-	410.3	25 Year	Existing	4.55	1329.99	1330.40	1330.54	1330.85	0.082368	5.37	0.85	2.61	1.66
S-20230824-1305-	410.3	100 Year	Proposed	5.84	1329.99	1330.46	1330.63	1330.98	0.082360	5.78	1.01	2.78	1.69
S-20230824-1305-	410.3	100 Year	Existing	5.84	1329.99	1330.46	1330.63	1330.98	0.082360	5.78	1.01	2.78	1.69
S-20230824-1305-	360.3	25 Year	Proposed	4.55	1324.17	1324.51	1324.72	1325.23	0.160634	6.79	0.67	2.42	2.28
S-20230824-1305-	360.3	25 Year	Existing	4.55	1324.17	1324.51	1324.72	1325.23	0.160634	6.79	0.67	2.42	2.28
S-20230824-1305-	360.3	100 Year	Proposed	5.84	1324.17	1324.56	1324.80	1325.39	0.158343	7.28	0.80	2.57	2.30
S-20230824-1305-	360.3	100 Year	Existing	5.84	1324.17	1324.56	1324.80	1325.39	0.158343	7.28	0.80	2.57	2.30
S-20230824-1305-	330		Bridge										
S-20230824-1305-	315.61	25 Year	Proposed	4.55	1322.58	1323.13	1323.13	1323.34	0.028159	3.66	1.24	3.00	1.00
S-20230824-1305-	315.61	25 Year	Existing	4.55	1322.58	1323.13	1323.13	1323.34	0.028159	3.66	1.24	3.00	1.00
S-20230824-1305-	315.61	100 Year	Proposed	5.84	1322.58	1323.21	1323.21	1323.45	0.027711	3.90	1.50	3.22	1.01
S-20230824-1305-	315.61	100 Year	Existing	5.84	1322.58	1323.21	1323.21	1323.45	0.027711	3.90	1.50	3.22	1.01
S-20230824-1305-	260	25 Year	Proposed	4.55	1315.37	1315.56	1315.92	1316.59	1.326529	13.98	0.33	2.00	6.12
S-20230824-1305-	260	25 Year	Existing	4.55	1315.37	1315.56	1315.92	1316.59	1.326529	13.98	0.33	2.00	6.12
S-20230824-1305-	260	100 Year	Proposed	5.84	1315.37	1315.59	1316.00	1316.83	1.145888	14.44	0.40	2.11	5.81
S-20230824-1305-	260	100 Year	Existing	5.84	1315.37	1315.59	1316.00	1316.83	1.145888	14.44	0.40	2.11	5.81

HEC-RAS River: Stream 13 Reach: S-20230823-1117-

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
S-20230823-1117-	365.84	25 Year	Proposed	14.89	1694.13	1694.74	1694.87	1695.17	0.056159	5.28	2.82	7.40	1.50
S-20230823-1117-	365.84	25 Year	Existing	14.89	1694.13	1694.74	1694.87	1695.17	0.056159	5.28	2.82	7.40	1.50
S-20230823-1117-	365.84	100 Year	Proposed	18.96	1694.13	1694.80	1694.96	1695.31	0.056145	5.74	3.35	9.00	1.53
S-20230823-1117-	365.84	100 Year	Existing	18.96	1694.13	1694.80	1694.96	1695.31	0.056145	5.74	3.35	9.00	1.53
S-20230823-1117-	309.21	25 Year	Proposed	14.89	1692.18	1692.90	1692.92	1693.23	0.006459	2.61	7.12	19.17	0.56
S-20230823-1117-	309.21	25 Year	Existing	14.89	1692.18	1692.90	1692.92	1693.15	0.024739	4.03	3.86	10.59	1.03
S-20230823-1117-	309.21	100 Year	Proposed	18.96	1692.18	1693.22	1693.02	1693.34	0.006632	2.88	9.01	23.08	0.58
S-20230823-1117-	309.21	100 Year	Existing	18.96	1692.18	1692.96	1693.02	1693.27	0.025069	4.37	4.75	12.70	1.05
S-20230823-1117-	290		Bridge										
S-20230823-1117-	273.46	25 Year	Proposed	14.89	1690.15	1690.93	1690.93	1691.10	0.015527	3.38	6.55	34.90	0.83
S-20230823-1117-	273.46	25 Year	Existing	14.89	1690.15	1690.86	1690.93	1691.42	0.121548	7.00	2.13	6.42	2.14
S-20230823-1117-	273.46	100 Year	Proposed	18.96	1690.15	1691.01	1691.01	1691.18	0.014151	3.51	9.76	46.77	0.80
S-20230823-1117-	273.46	100 Year	Existing	18.96	1690.15	1690.73	1691.01	1691.55	0.114508	7.30	2.60	7.03	2.12
S-20230823-1117-	213.4	25 Year	Proposed	14.89	1685.75	1686.11	1686.49	1686.21	0.469231	11.63	1.28	5.14	4.11
S-20230823-1117-	213.4	25 Year	Existing	14.89	1685.75	1686.37	1686.49	1686.78	0.051296	5.13	2.91	7.86	1.43
S-20230823-1117-	213.4	100 Year	Proposed	18.96	1685.75	1686.16	1686.59	1686.49	0.470368	12.25	1.55	5.57	4.10
S-20230823-1117-	213.4	100 Year	Existing	18.96	1685.75	1686.43	1686.59	1686.92	0.053427	5.64	3.45	9.96	1.49

HEC-RAS River: Stream 14 Reach: S-20231017-1725-

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
S-20231017-1725-	730	25 Year	Existing	2.72	1704.42	1704.54	1704.54	1704.57	0.034073	1.49	1.83	22.05	0.91
S-20231017-1725-	730	25 Year	Proposed	2.72	1704.42	1704.54	1704.54	1704.57	0.034073	1.49	1.83	22.05	0.91
S-20231017-1725-	730	100 Year	Existing	4.39	1704.42	1704.56	1704.56	1704.62	0.040252	1.87	2.34	22.70	1.03
S-20231017-1725-	730	100 Year	Proposed	4.39	1704.42	1704.56	1704.56	1704.62	0.040252	1.87	2.34	22.70	1.03
S-20231017-1725-	675	25 Year	Existing	2.72	1694.97	1695.03	1695.12	1697.60	10.895720	12.86	0.21	7.61	13.60
S-20231017-1725-	675	25 Year	Proposed	2.72	1694.97	1695.04	1695.12	1696.10	3.628826	8.26	0.33	10.09	8.06
S-20231017-1725-	675	100 Year	Existing	4.39	1694.97	1695.05	1695.16	1696.90	5.708512	10.90	0.40	11.43	10.24
S-20231017-1725-	675	100 Year	Proposed	4.39	1694.97	1695.05	1695.16	1696.69	4.947256	10.25	0.43	11.99	9.55
S-20231017-1725-	624	25 Year	Existing	2.72	1684.04	1684.22	1684.23	1684.30	0.051172	2.22	1.22	10.99	1.17
S-20231017-1725-	624	25 Year	Proposed	2.72	1684.04	1684.23	1684.23	1684.29	0.036276	1.98	1.37	11.26	1.00
S-20231017-1725-	624	100 Year	Existing	4.39	1684.04	1684.24	1684.28	1684.38	0.072970	2.94	1.49	11.49	1.44
S-20231017-1725-	624	100 Year	Proposed	4.39	1684.04	1684.28	1684.28	1684.36	0.032784	2.25	1.95	12.29	1.00
S-20231017-1725-	560	25 Year	Existing	2.72	1675.28	1675.45	1675.58	1676.19	0.669867	6.92	0.39	4.42	4.08
S-20231017-1725-	560	25 Year	Proposed	2.72	1675.28	1675.42	1675.58	1677.00	1.842342	10.09	0.27	3.67	6.56
S-20231017-1725-	560	100 Year	Existing	4.39	1675.28	1675.52	1675.65	1676.03	0.293295	5.73	0.77	6.14	2.86
S-20231017-1725-	560	100 Year	Proposed	4.39	1675.28	1675.45	1675.65	1677.57	1.978962	11.70	0.38	4.31	6.99

HEC-RAS River: Stream 16 Reach: S-2020230821-000

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
S-2020230821-000	316.18	25 Year	Existing	11.74	1599.27	1599.95	1600.22	1600.67	0.078642	6.81	1.72	3.57	1.73
S-2020230821-000	316.18	25 Year	Proposed	11.74	1599.27	1599.95	1600.22	1600.67	0.078642	6.81	1.72	3.57	1.73
S-2020230821-000	316.18	100 Year	Existing	25.00	1599.27	1600.22	1600.58	1601.33	0.078757	8.64	3.87	12.71	1.82
S-2020230821-000	316.18	100 Year	Proposed	25.00	1599.27	1600.22	1600.58	1601.33	0.078757	8.64	3.87	12.71	1.82
S-2020230821-000	261.62	25 Year	Existing	11.74	1592.98	1593.53	1593.90	1594.86	0.183704	9.27	1.27	3.15	2.58
S-2020230821-000	261.62	25 Year	Proposed	11.74	1592.98	1593.53	1593.90	1594.83	0.177048	9.14	1.28	3.17	2.53
S-2020230821-000	261.62	100 Year	Existing	25.00	1592.98	1593.79	1594.31	1595.75	0.166715	11.25	2.33	5.70	2.59
S-2020230821-000	261.62	100 Year	Proposed	25.00	1592.98	1593.80	1594.31	1595.70	0.159374	11.08	2.37	5.74	2.53
S-2020230821-000	227.24	25 Year	Existing	11.74	1589.70	1590.53	1590.62	1590.93	0.033918	5.13	2.52	6.56	1.17
S-2020230821-000	227.24	25 Year	Proposed	11.74	1589.70	1590.62	1590.62	1590.90	0.020951	4.35	3.16	7.00	0.93
S-2020230821-000	227.24	100 Year	Existing	25.00	1589.70	1590.81	1591.05	1591.50	0.038599	6.87	4.75	10.44	1.32
S-2020230821-000	227.24	100 Year	Proposed	25.00	1589.70	1591.05	1591.05	1591.39	0.014884	5.02	7.92	15.84	0.85
S-2020230821-000	176.61	25 Year	Existing	11.74	1581.96	1582.33	1582.87	1585.99	0.755510	15.35	0.77	2.63	5.01
S-2020230821-000	176.61	25 Year	Proposed	11.74	1581.96	1582.29	1582.87	1587.21	1.151017	17.79	0.66	2.50	6.11
S-2020230821-000	176.61	100 Year	Existing	25.00	1581.96	1582.59	1583.34	1586.58	0.467864	16.01	1.56	3.42	4.18
S-2020230821-000	176.61	100 Year	Proposed	25.00	1581.96	1582.51	1583.34	1588.55	0.830933	19.72	1.27	3.15	5.48

Access Road Station	Aquatic Resource Unique Resource Identifier	Crossing Type	Latitude (4-D)	Longitude (4-D)	Drainage Area(ac)	Perennial Stream	Wetland - 1984	Disturbance																Grand Total				
								Wetland Crossing Length (200 Ft.)	LOD Width (ft.)	Permanent Disturb				Temporary Disturb				Subtotal		Perennial Disturb		Temp. Disturb		Subtotal	Total (ft.)	Total (ac)		
										Stream (ft.)	Stream (ac)	Floodway (ft.)	Floodway (ac)	Stream (ft.)	Stream (ac)	Floodway (ft.)	Floodway (ac)	Stream (ft.)	Floodway (ft.)	Wetland (ft.)	Wetland (ac)	Wetland (ft.)	Wetland (ac)					
41+00	S-20230823-1225-JT	Culvert Reclamation	41.406572	-76.809980	14.0	Waiver	-	-	30	-	-	-	-	551	0.013	2,756	0.063	551	2,756	-	-	-	-	-	-	1,507	0.076	
44+50	S-20230823-1240-JT	Culvert Reclamation	41.407753	-76.809224	18.0	Waiver	-	-	30	-	-	-	-	223	0.005	1,824	0.042	223	1,824	-	-	-	-	-	-	2,047	0.107	
80+00	S-20230823-1456-DJ	Culvert Reclamation	41.394253	-76.876256	18.0	Waiver	-	-	30	-	-	-	-	333	0.008	1,756	0.040	333	1,756	-	-	-	-	-	-	2,089	0.107	
123+50	S-20230823-1206-DJ	Culvert Reclamation	41.394007	-76.860227	36.0	Waiver	-	-	30	-	-	-	-	59	0.001	4,871	0.112	59	4,871	-	-	-	-	-	-	4,930	0.113	
126+00	S-20230823-1208-DJ	Culvert Reclamation	41.393702	-76.860594	19.0	Waiver	-	-	30	-	-	-	-	210	0.005	8,975	0.206	210	8,975	-	-	-	-	-	-	9,183	0.211	
135+00	S-20230823-1117-DJ	Culvert Reclamation	41.391764	-76.801168	12.0	IRA	-	-	30	-	-	-	-	390	0.009	4,710	0.108	390	4,710	-	-	-	-	-	-	1,100	0.117	
	S-20230823-1053-DJ	Temporary Construction Easement	41.391298	-76.801371	<1.0	Waiver	-	-	30	-	-	-	-	76	0.002	411	0.009	76	411	-	-	-	-	-	-	487	0.011	
	S-20230823-1108-DJ	Temporary Construction Easement	41.391485	-76.801313	<1.0	Waiver	-	-	30	-	-	-	-	20	0.000	1,855	0.064	20	1,855	-	-	-	-	-	-	1,875	0.066	
129+00	S-20230823-0014-DJ	Culvert Reclamation	41.398957	-76.804881	115.0	IRA	-	-	30	-	-	-	-	128	0.002	3,424	0.079	128	3,424	-	-	-	-	-	-	3,552	0.082	
Total - Stream										3,012	8,077			8,413	0.194			11,725							11,725	0.278		
Total - Floodway												8,428	1,328			10,824	3,201		22,852							22,852	5.129	
Total - Wetland																			2,084	0.048	3,205	0.082	5,679	5,679			5,679	0.130
GRAND TOTAL																										246,096	8,836	

STREAM IMPACT TABLE:

Impact# Station	Resource Name	Municipality Quadrangle	Activity	Chapter 93	Listed Trout	Impact Length Temp. (LF)	Impact Area Temp. (SF)	Impact Length Perm. (LF)	Impact Area Perm. (SF)	Lat. Long.
4+75	Wallis Run S-20230821-1148-JT	Cascade Bodines	Permanent Access Road	HQ-CWF; EV	Wild	25	628	25	374	41.414301° 76.868102°
16+00	UNT to Wallis Run S-20230821-1402-JT	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild	16	163	38	385	41.411236° 76.868866°
30+00	UNT to Wallis Run S-20230822-1015-JT	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild	17	134	21	167	41.407576° 76.868770°
31+00	UNT to Wallis Run S-20230822-1301-JT	Gamble Bodines	Permanent Access Road	PEM	Wild	39	703	62	430	41.407273° 76.868962°
32+00	UNT to Wallis Run S-20230822-1412-JT	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild	170	1021	33	199	41.406855° 76.869182°
35+40	UNT to Wallis Run S-20230822-1218-JT	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild	29	205	21	144	41.406169° 76.869373°
36+80	UNT to Wallis Run S-20230822-1243-JT	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild	16	130	44	354	41.405820° 76.869232°
37+00	UNT to Wallis Run S-20230823+1150-JT	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild			8	48	41.405409° 76.869456°
39+25	UNT to Wallis Run S-20230823+1130-JT	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild	14	96	29	201	41.405201° 76.868974°
40+85	UNT to Wallis Run S-20230823-1225-JT	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild	20	140	54	378	41.404767° 76.868817°
44+35	UNT to Wallis Run S-20230823-1258-JT	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild	36	364	33	333	41.403873° 76.868515°
48+40	UNT to Wallis Run S-20230823-1338-JT	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild	26	130	35	175	41.402756° 76.868335°
53+55	UNT to Wallis Run S-20230823-1433-JT	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild	30	181	36	214	41.401320° 76.868293°
58+10	UNT to Wallis Run S-20230824-1355-DJ	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild	27	93	35	124	41.400225° 76.869063°
59+90	UNT to Bottom Bar Hollow S-20230824-1304-JT	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild	7	27	49	196	41.399807° 76.869382°
60+60	UNT to Bottom Bar Hollow S-20230824-1305-DJ	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild	24	115	40	189	41.399630° 76.869446°
134+90	UNT to Jacoby Hollow S-20230823-1117-DJ	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild	32	259	28	225	41.391460° 76.888282°
139+00	UNT to Jacoby Hollow S-20231017-1725-JR	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild	20	26	47	61	41.390655° 76.889243°
139+20	UNT to Jacoby Hollow S-20230822-0014-DJ	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild	25	100	53	210	41.390630° 76.889325°
170+60	UNT to Jacoby Hollow S-20230821-0005-DJ	Gamble Bodines	Permanent Access Road	HQ-CWF; EV	Wild	21	84	33	131	41.385904° 76.897534°
TOTAL						594	4599	724	4538	

TOTAL STREAM IMPACTS:	121	1690	168	1239
TOTAL WAIVER 2 IMPACTS:	473	2909	556	3299

WETLAND IMPACT TABLE:

Impact# Station	Resource Name	Municipality Quadrangle	Activity	Cowardin Class	Listed Trout	Impact Length Temp. (LF)	Impact Area Temp. (SF)	Impact Length Perm. (LF)	Impact Area Perm. (SF)	Lat. Long.
5+50	W-20230821-1157-JT	Cascade Bodines	Permanent Access Road	PEM	Wild	75	333	75	614	41.413999° 76.868121°
13+50	W-20230821-1334-JT	Cascade Bodines	Permanent Access Road	PFO	Wild	92	1616	71	116	41.411644° 76.868854°
14+50	W-20230821-1334-JT	Gamble Bodines	Permanent Access Road	PEM	Wild	71	786	71	707	41.411463° 76.868903°
15+50	W-20230821-1351-JT	Gamble Bodines	Permanent Access Road	PEM	Wild	33	170			41.411482° 76.869004°
16+40	W-20230821-1417-JT	Gamble Bodines	Permanent Access Road	PEM	Wild	100	407	7	148	41.411120° 76.868857°
17+00	W-20230821-1425-JT	Gamble Bodines	Permanent Access Road	PEM	Wild	120	480	8	16	41.411104° 76.868696°
30+50	W-20230822-1025-JT	Gamble Bodines	Permanent Access Road	PEM	Wild	111	462	8	244	41.407430° 76.868826°
30+80	W-20230822-1345-JT	Gamble Bodines	Permanent Access Road	PEM	Wild	21	160	21	314	41.407385° 76.868936°
31+75	W-20230822-1600-JT	Gamble Bodines	Permanent Access Road	PEM	Wild	20	309	55	93	41.407128° 76.868967°
135+00	W-20231017-1503-JR	Gamble Bodines	Permanent Access Road	PEM	Wild	20	87			41.391374° 76.888272°
TOTAL WETLAND IMPACTS						663	4810	316	2252	

FLOODWAY IMPACT TABLE:

Impact# Station	Resource Name	Municipality Quadrangle	Activity	Impact Length Temp. (LF)	Impact Area Temp. (SF)	Impact Length Perm. (LF)	Impact Area Perm. (SF)	Lat. Long.
4+75	Wallis Run S-20230821-1148-JT	Cascade Bodines	Permanent Access Road	189	3214	151	2417	41.414301° 76.868102°
16+00	UNT to Wallis Run S-20230821-1402-JT	Gamble Bodines	Permanent Access Road	100	3031	100	3034	41.411236° 76.868866°
28+00	UNT to Wallis Run S-20250606-1045-PMS	Gamble Bodines	Permanent Access Road	65	1316	65	1440	41.408125° 76.869093°
30+00	UNT to Wallis Run S-20230822-1015-JT	Gamble Bodines	Permanent Access Road	100	2485	100	2704	41.407576° 76.868770°
31+00	UNT to Wallis Run S-20230822-1301-JT	Gamble Bodines	Permanent Access Road	742	9833	742	12902	41.407273° 76.868962°
32+00	UNT to Wallis Run S-20230822-1412-JT	Gamble Bodines	Permanent Access Road	350	3277	350	4475	41.406855° 76.869182°
35+40	UNT to Wallis Run S-20230822-1218-JT	Gamble Bodines	Permanent Access Road	100	4595	100	2600	41.406169° 76.869373°
36+80	UNT to Wallis Run S-20230822-1243-JT	Gamble Bodines	Permanent Access Road	100	3939	100	2930	41.405820° 76.869232°
37+00	UNT to Wallis Run S-20230823+1150-JT	Gamble Bodines	Permanent Access Road	95	1156	95	1425	41.405409° 76.869456°
38+00	UNT to Wallis Run S-20230823+1211-JT	Gamble Bodines	Permanent Access Road	86	332	86	1234	41.405283° 76.869432°
39+25	UNT to Wallis Run S-20230823+1130-JT	Gamble Bodines	Permanent Access Road	100	3418	100	2927	41.405201° 76.868974°
40+85	UNT to Wallis Run S-20230823-1225-JT	Gamble Bodines	Permanent Access Road	158	3310	158	3962	41.404767° 76.868817°
41+50	UNT to Wallis Run S-20230823-1258-JT	Gamble Bodines	Permanent Access Road	55	299	55	962	41.404552° 76.868962°
44+35	UNT to Wallis Run S-20230823-1258-JT	Gamble Bodines	Permanent Access Road	100	3240	100	5000	41.403873° 76.868515°
48+40	UNT to Wallis Run S-20230823-1338-JT	Gamble Bodines	Permanent Access Road	368	6470	259	5495	41.402756° 76.868335°
51+00	UNT to Wallis Run S-20230823-1500-JT	Gamble Bodines	Permanent Access Road	267	4177	267	4874	41.402087° 76.868170°
53+55	UNT to Wallis Run S-20230823-1433-JT	Gamble Bodines	Permanent Access Road	100	3547	100	2862	41.401320° 76.868293°
54+00	UNT to Wallis Run S-20230824-1351-DJ	Gamble Bodines	Permanent Access Road	96	2369	96	1236	41.400782° 76.868955°

55+40	UNT to Wallis Run S-20230823-1423-JT	Gamble Bodines	Permanent Access Road	105	2349			41.400791° 76.868148°
58+10	UNT to Wallis Run S-20230824-1355-DJ	Gamble Bodines	Permanent Access Road	100	3221	100	3248	41.400225° 76.869063°
58+60	UNT to Wallis Run S-20230824-1304-DJ	Gamble Bodines	Permanent Access Road	98	787	98	690	41.400034° 76.869223°
59+90	UNT to Bottom Bar Hollow S-20230824-1304-JT	Gamble Bodines	Permanent Access Road	100	1338	100	1982	41.399807° 76.869382°
60+60	UNT to Bottom Bar Hollow S-20230824-1305-DJ	Gamble Bodines	Permanent Access Road	100	2924	100	3242	41.399630° 76.869446°
61+00	UNT to Bottom Bar Hollow S-2023084-1303-DJ	Gamble Bodines	Permanent Access Road	51	98	51	247	41.399572° 76.869670°
73+25	UNT to Bottom Bar Hollow S-20230824-1215-DJ	Gamble Bodines	Permanent Access Road	95	2891			41.396588° 76.871855°
84+00	UNT to Bottom Bar Hollow S-20230824-1140-DJ	Gamble Bodines	Permanent Access Road	51	490			41.396780° 76.875664°
86+00	UNT to Bottom Bar Hollow S-20231018-1612-AC	Gamble Bodines	Permanent Access Road	50	1790	50	548	41.397486° 76.876383°
90+00	UNT to Bottom Bar Hollow S-20230823-1415-DJ	Gamble Bodines	Permanent Access Road	218	4279	218	289	41.396340° 76.876544°
111+75	UNT to Jacoby Hollow S-20230823-1233-DJ	Gamble Bodines	Permanent Access Road	73	1957			41.397122° 76.884999°
134+90	UNT to Jacoby Hollow S-20230823-1117-DJ	Gamble Bodines	Permanent Access Road	100	3057	100	3186	41.391460° 76.888282°
135+50	UNT to Jacoby Hollow S-20230822-1512-DJ	Gamble Bodines	Permanent Access Road	32	313			41.391304° 76.888150°
139+00	UNT to Jacoby Hollow S-20231017-1725-JR	Gamble Bodines	Permanent Access Road	34	177	43	692	41.390655° 76.889243°
139+20	UNT to Jacoby Hollow S-20230822-0014-DJ	Gamble Bodines	Permanent Access Road	100	2271	100	4675	41.390630° 76.889325°
170+60	UNT to Jacoby Hollow S-20230821-0005-DJ	Gamble Bodines	Permanent Access Road	100	2875	100	3275	41.385904° 76.897534°
TOTAL				4578	90825	4084	84553	

ENVIRONMENTAL COMMENTS:

Biologist Erin Gocek has reviewed this project and recommended denial on April 22, 2026 in attached ROD.

PGE's application includes implementation of required ABACT erosion and sediment control and post-construction stormwater management BMPS, incorporates the best practices recommended by other reviewing agencies, and minimizes impacts to aquatic resources to the extent practicable. However, some engineering design concerns were identified and are discussed in the engineering record of decision for this permit and the application does not provide mitigation for a stream realignment as discussed in Section 3.b., below. With the provided information and the results of this environmental review, it has been determined that the proposed project does not meet the environmental requirements of Chapter 105. The project is proposed in a manner that will have a significant adverse effect upon safety or the protection of life, health, property or the environment. This application is therefore recommended for denial.

Biologist Jordan Allison (PAFB) has reviewed this project and recommended approval on November 18, 2025.

According to Chapter 93, The Wallis Run watershed is classified as a High Quality, Cold Water Fishery. Additionally, Pennsylvania Fish and Boat Commission field surveys have documented the natural reproduction of trout in Wallis Run. The proposed project will cross 34 streams within the watershed classified as ephemeral, intermittent, or perennial and their floodplains impacting 0.21 acres and 4.03 acres of these aquatic resources respectively. Although many of the proposed impacts occur on ephemeral and intermittent waterways, three perennial streams will be impacted. Given this, it is the Commission's opinion that additional alternatives that avoid aquatic resource impacts in the project area should be investigated, or compensatory mitigation to offset impacts to riparian buffer zones and/or address stream erosion issues should be provided.

TD sent on 11/20/2025 - Provide a more detailed alternative analysis that details alternate routes and/or alignments evaluated to avoid and/or minimize impacts to aquatic resources

The Pennsylvania Fish and Boat Commission manages Wallis Run and its tributaries as waterways supporting the natural reproduction of trout. The Commission respectfully requests that a special condition be added to the permit which prohibits instream construction from October 1st through December 31st to protect the spawning and egg deposition behavior of these wild trout populations. We recommend the applicant and contractor understand the implications of this restriction and plan all instream construction accordingly.

Stream restrictions will be required from October 1 through December 31

According to the proposed Erosion and Sedimentation Control Plan, rock aprons of various dimensions are to be installed at the outlets of stream crossings to avoid erosion. As with the culverts at these crossings, the rock aprons should also be depressed at least six inches below the existing streambed level and native streambed materials stockpiled during construction should be replaced to fill the interstitial spaces of the rock to ensure surface flows are not lost.

TD sent on 11/20/2025 - Provide additional evaluation on minimization of disturbance within stream areas. Drop inlets, manholes and riprap aprons within streams have been designed as E&S BMPs to remove energy and spread out water from culverts. Please reevaluate the need for and consider greatly reducing or removing the E&S BMPs minimize impacts to the stream resources. The project plans indicate that a portion Stream 20230822-1412-JT will be 'reconstructed' between Stations 31+00 and 34+00. The project plans do not include cross sections or plan details of the stream relocation. Please provide cross sections and plan details of the proposed stream relocation, and an explanation of why the road could not be designed to avoid relocating the stream.

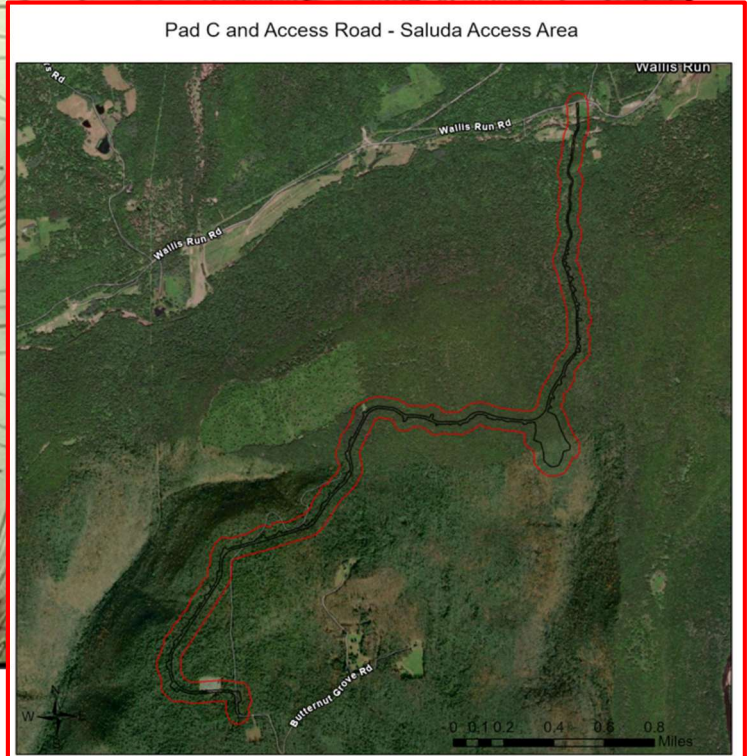
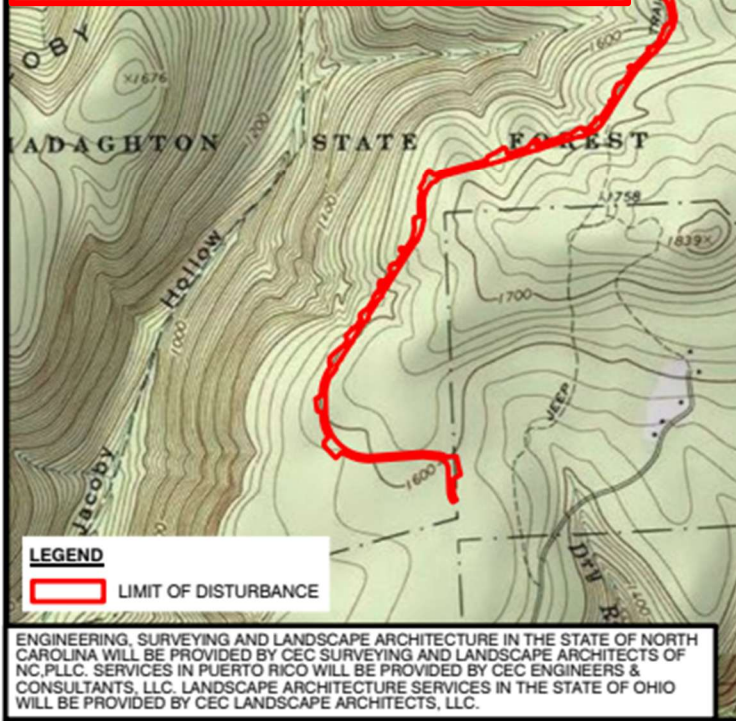
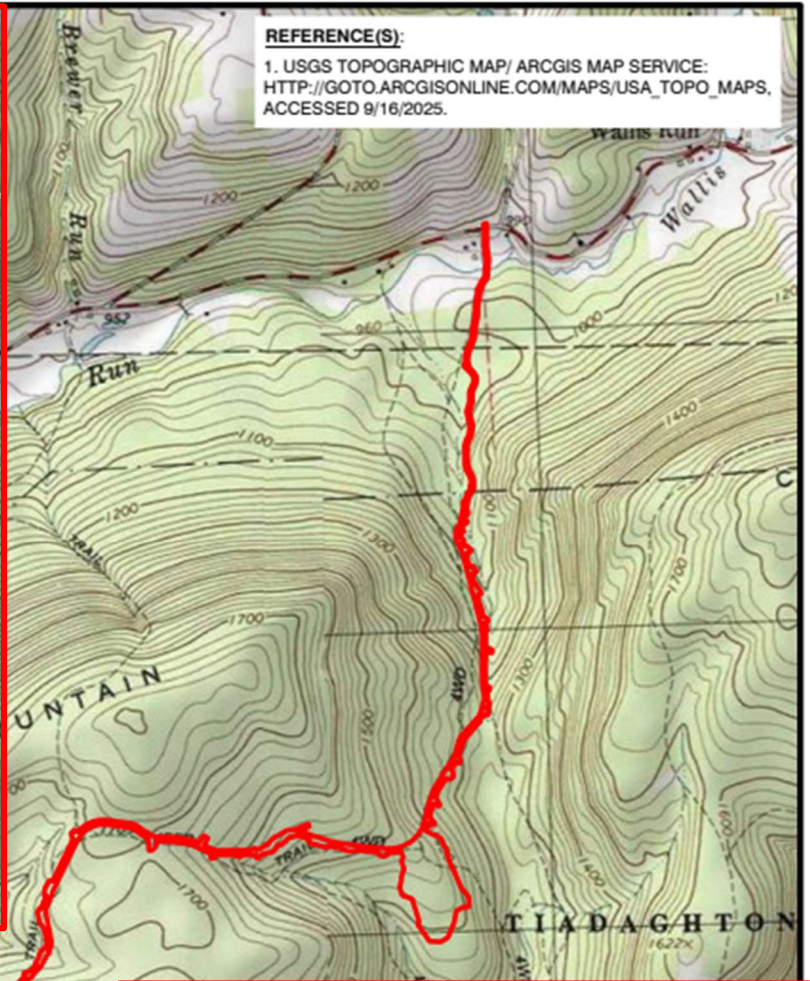
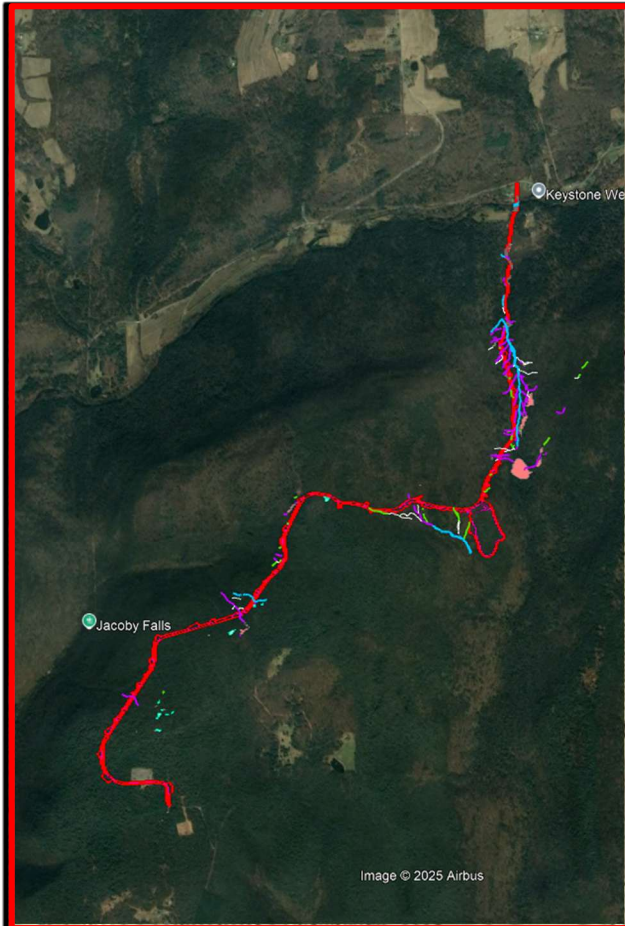
Due to the proposed alignment of the access road, stream channel S-20230822-1412-JT and its floodway are to be impacted for an unknown length. This will require relocation of the existing channel. Please provide a longitudinal profile and cross sections of the existing channel as well as construction details depicting the location, profile, and cross section of the reconstructed channel.

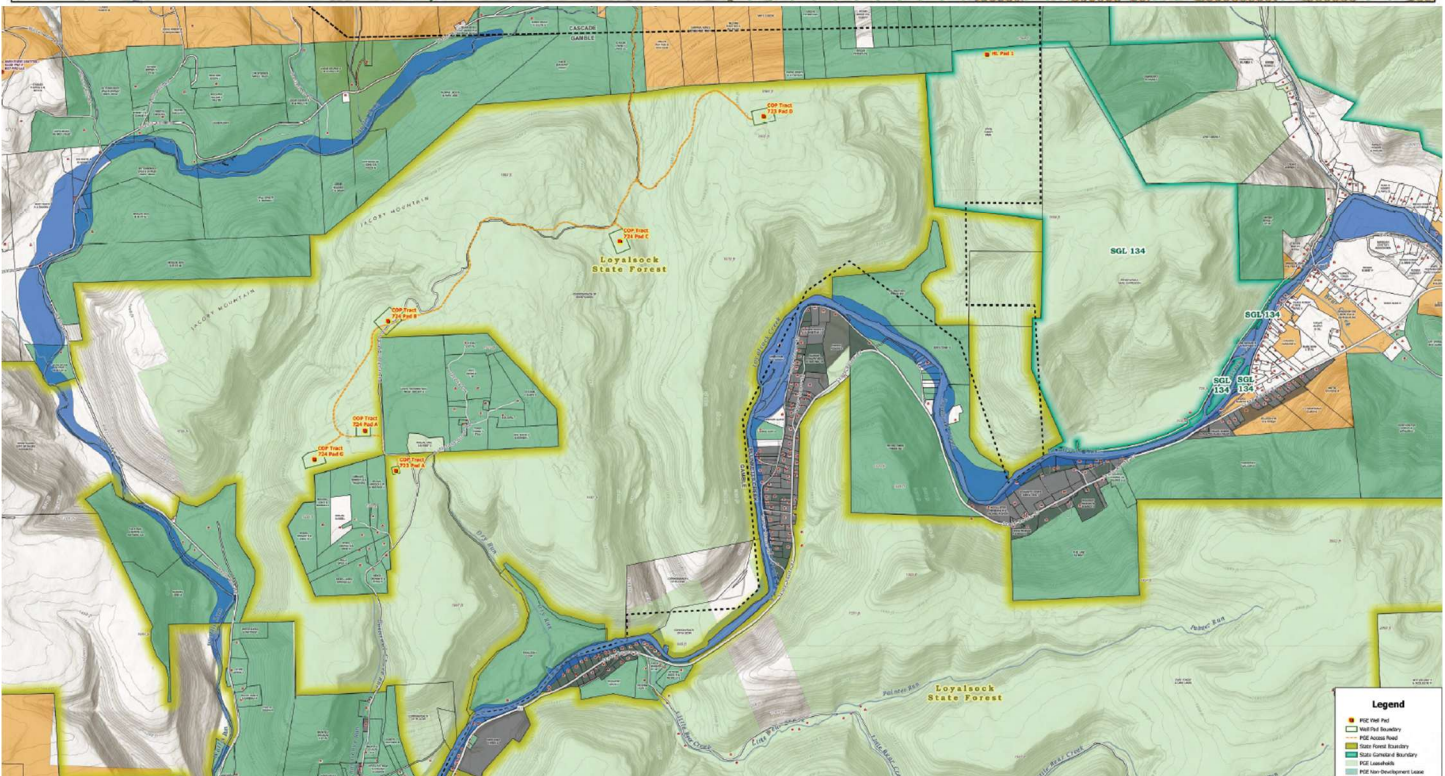
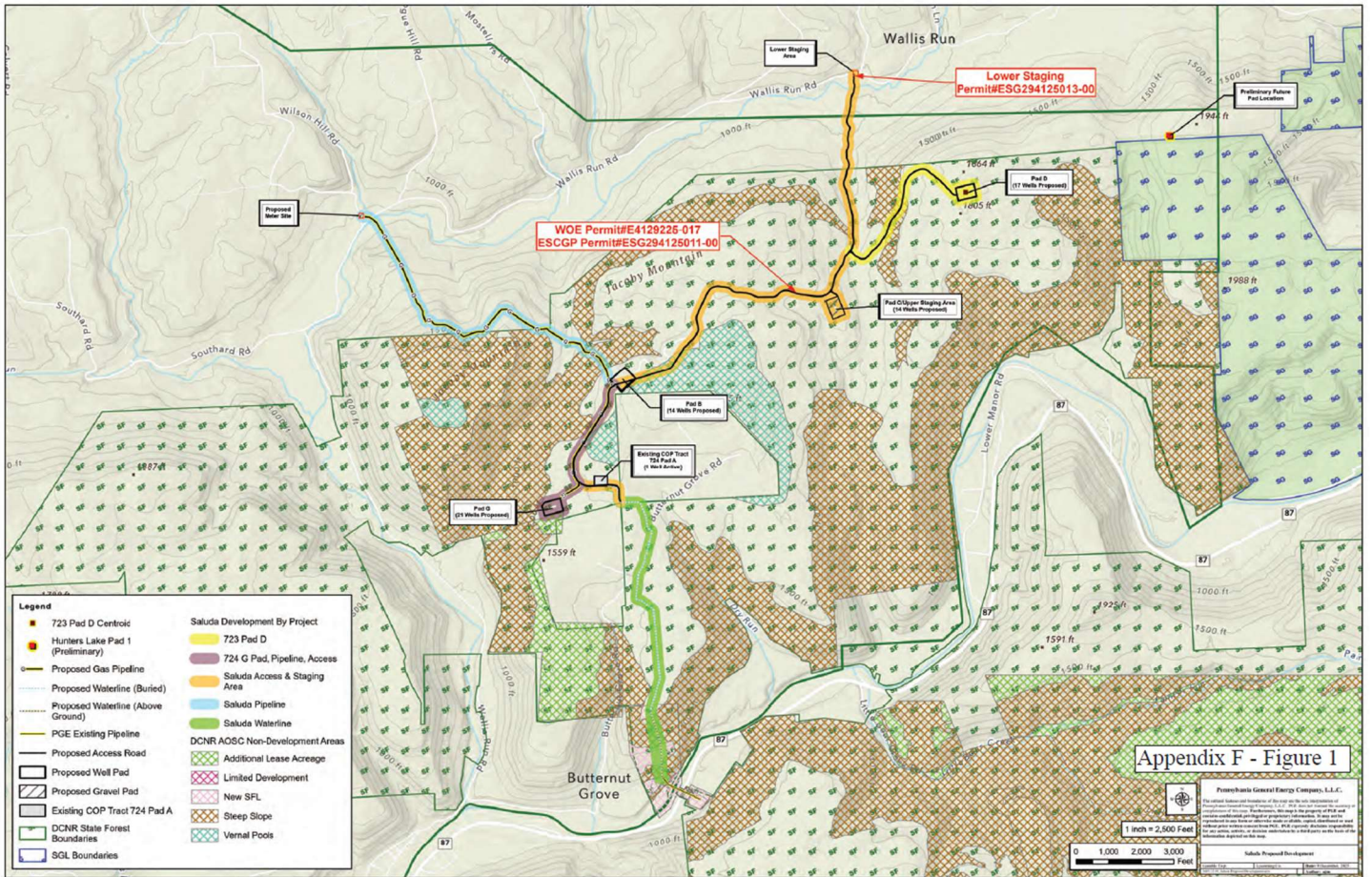
TD sent on 11/20/2025 - The project plans indicate that a portion Stream 20230822-1412-JT will be 'reconstructed' between Stations 31+00 and 34+00. The project plans do not include cross sections or plan details of the stream relocation. Please provide cross sections and plan details of the proposed stream relocation, and an explanation of why the road could not be designed to avoid relocating the stream.

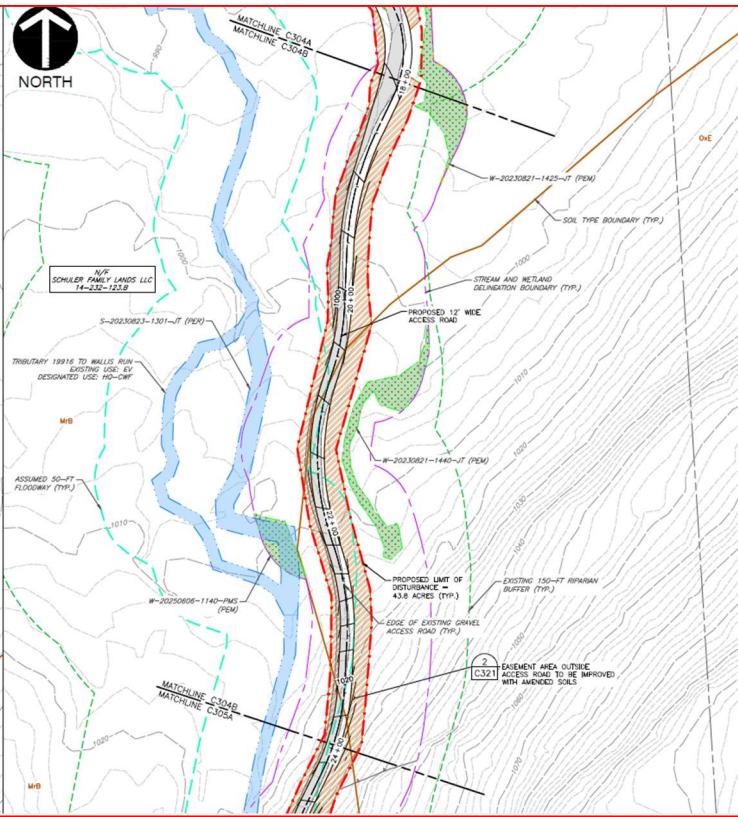
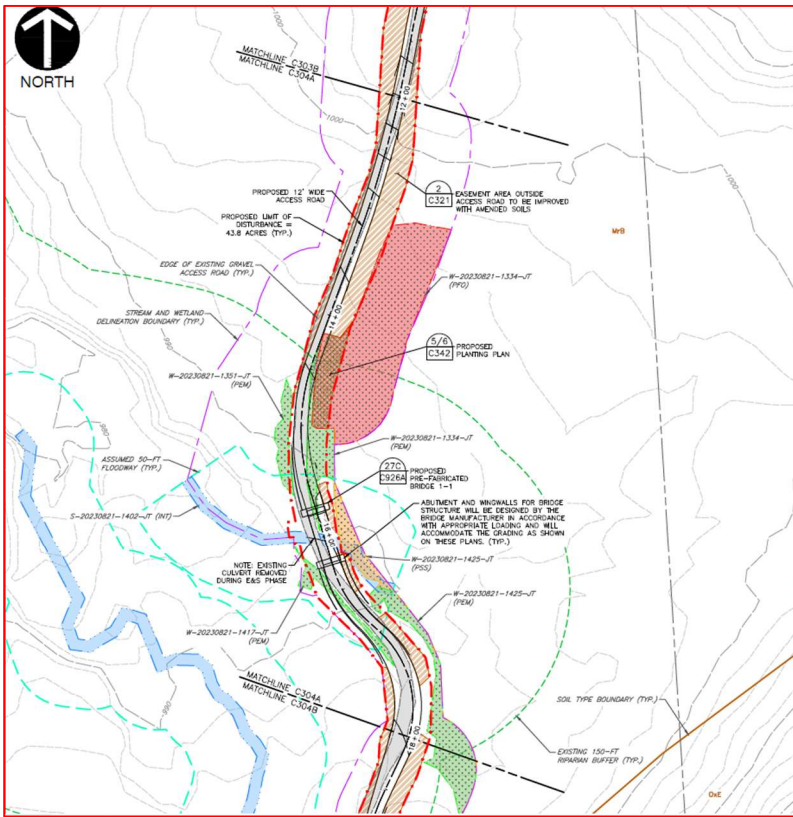
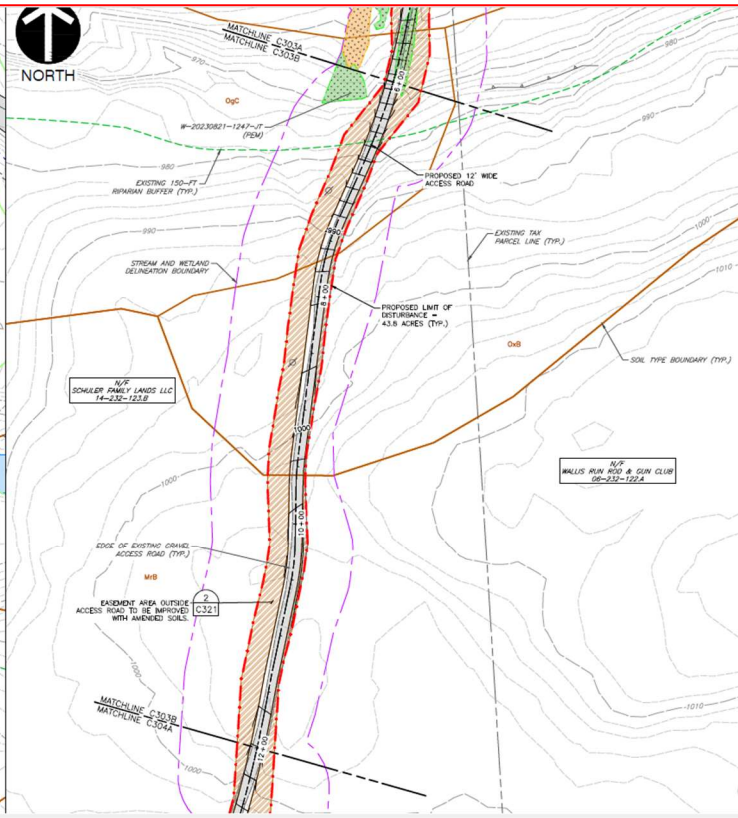
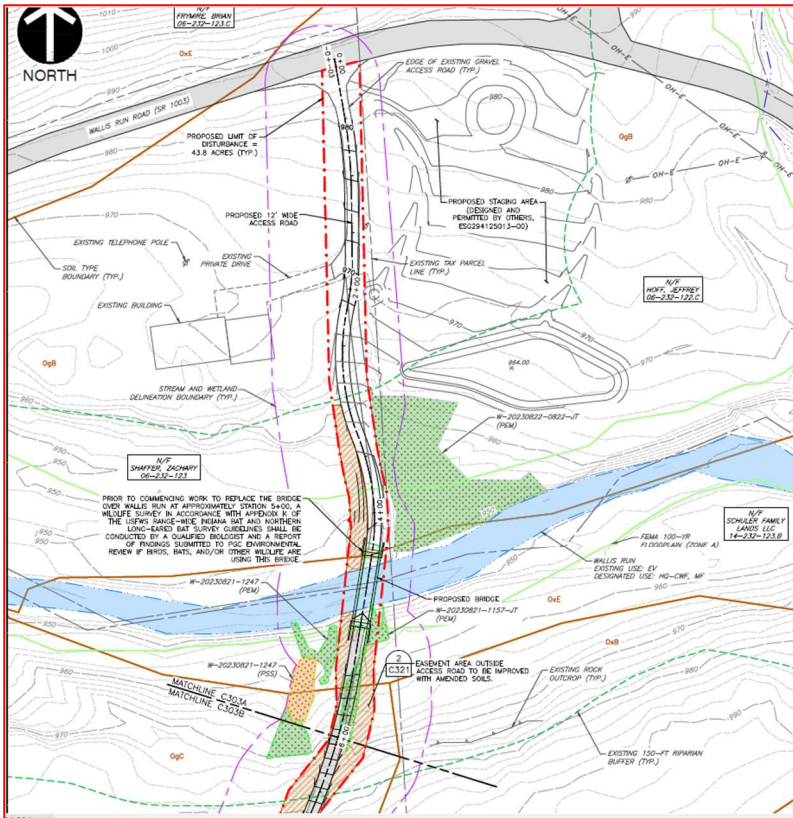
Wetland impacts totaling 0.051 acres are proposed to be mitigated off site at Resource Environmental Solution's Babb Creek Mitigation Bank which services subbasin 09 as defined in the Pennsylvania State Water Plan. Impacts occurring to wetlands in the Wallis Run watershed, a tributary to Loyalsock Creek, fall within subbasin 10 which is outside the approved service area. Therefore, the applicant should identify alternative mitigation opportunities.

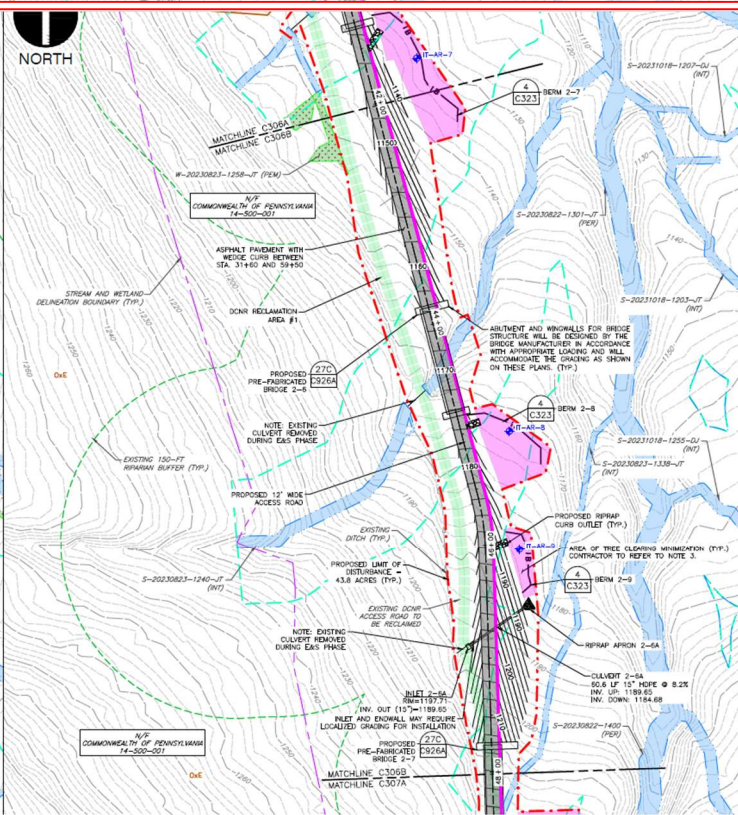
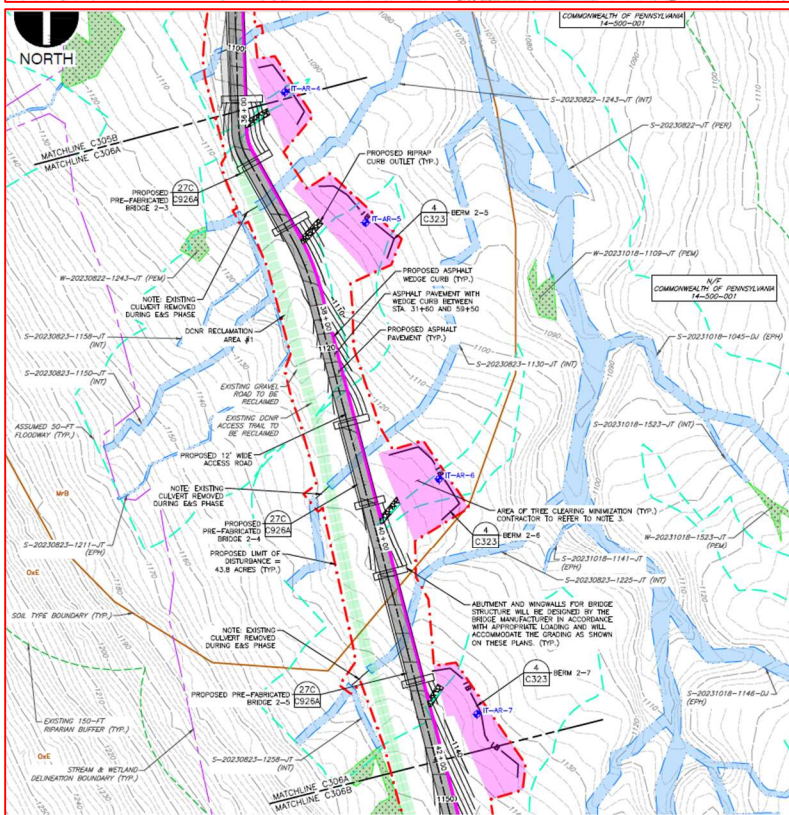
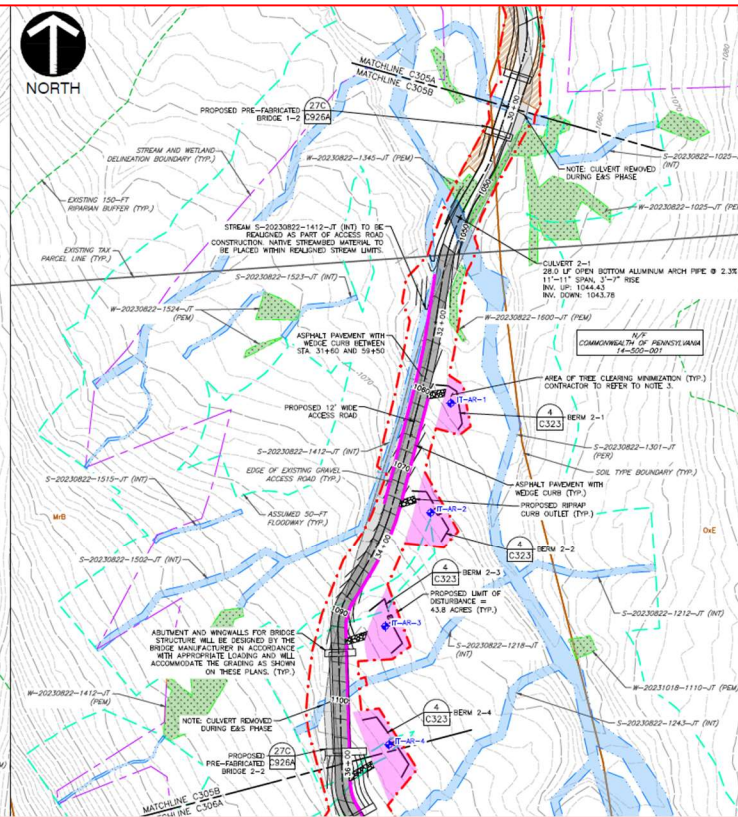
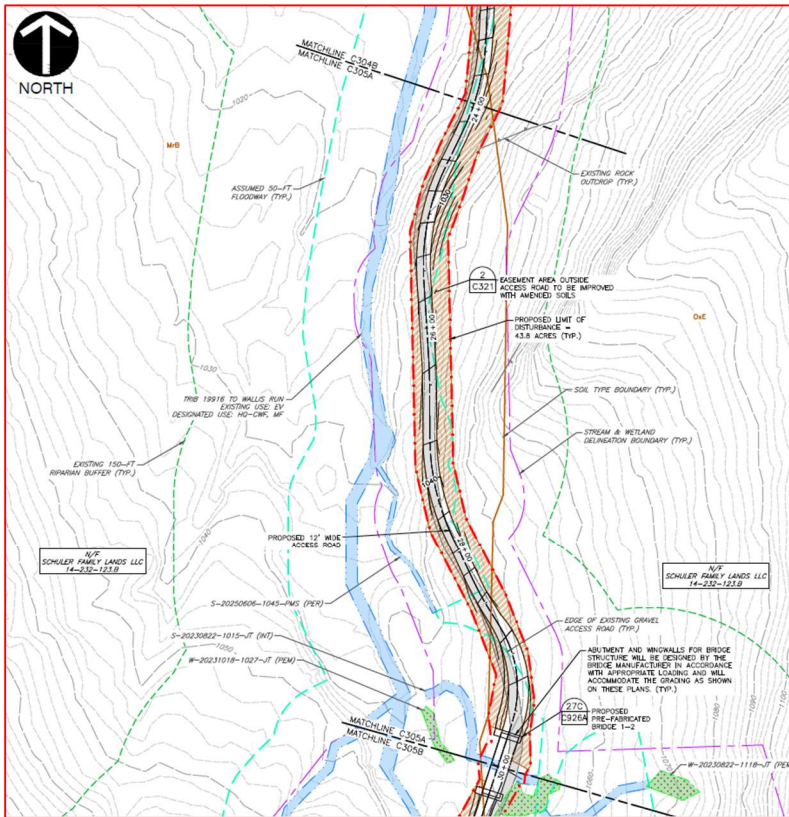
TD sent on 11/20/2025 - The application states that compensatory mitigation for permanent wetland impacts (0.049 ac. PEM, 0.002 PFO) would be provided by purchasing credits at the Babb Creek Mitigation Bank at 1:1 ratio. The Department does not feel this is adequate to offset the project impacts since the project proposes impacts to EV surface waters and requests a 3:1 ratio for all permanent project impacts for both streams and wetlands.

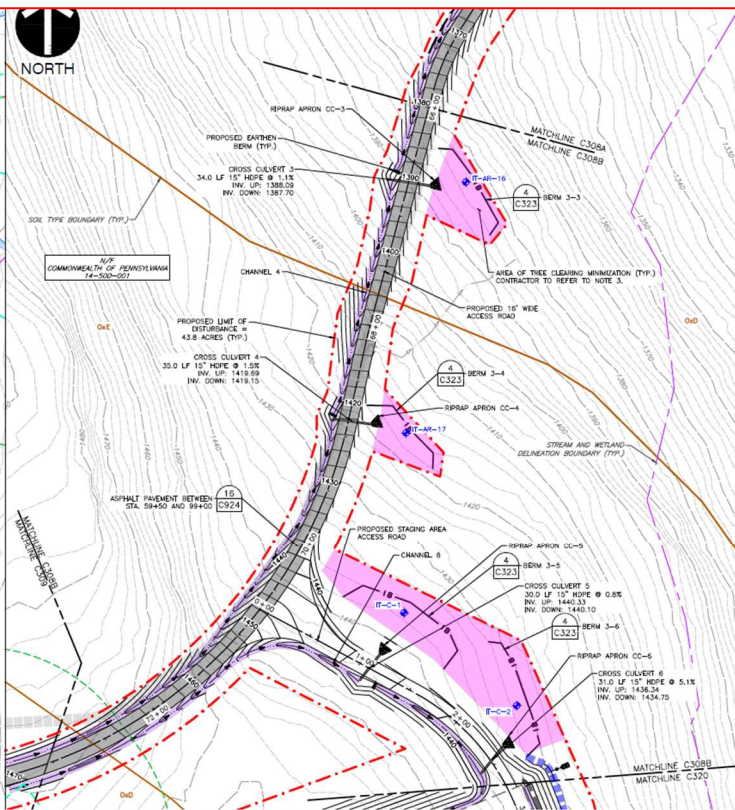
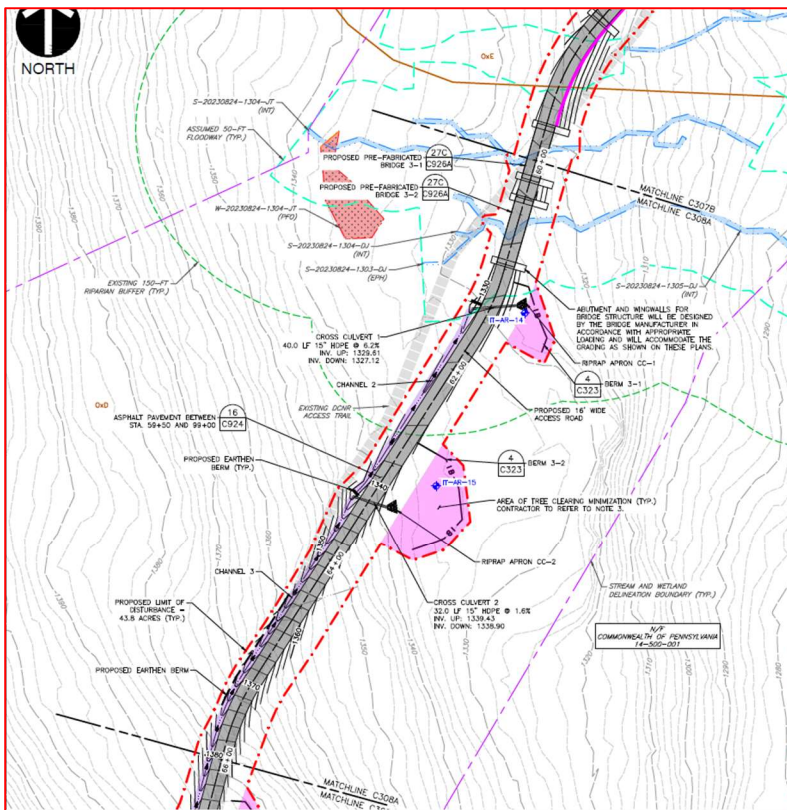
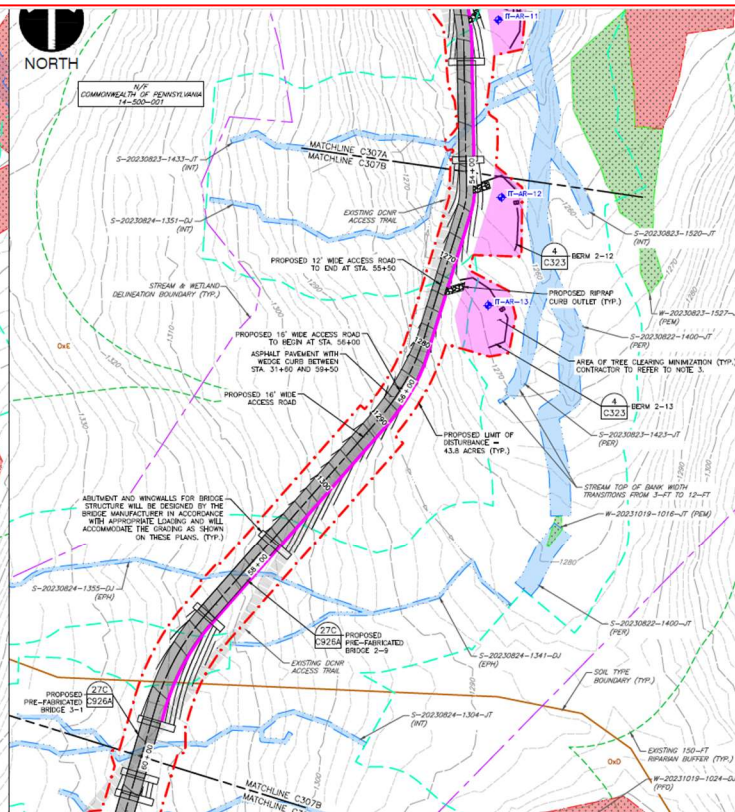
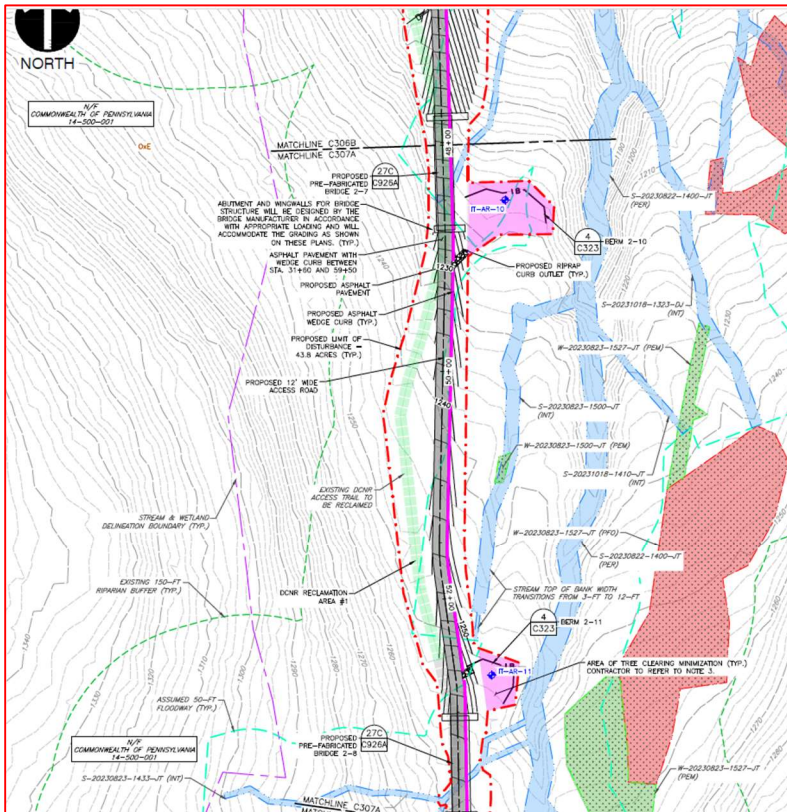
LOCATION MAP & PLAN SETS

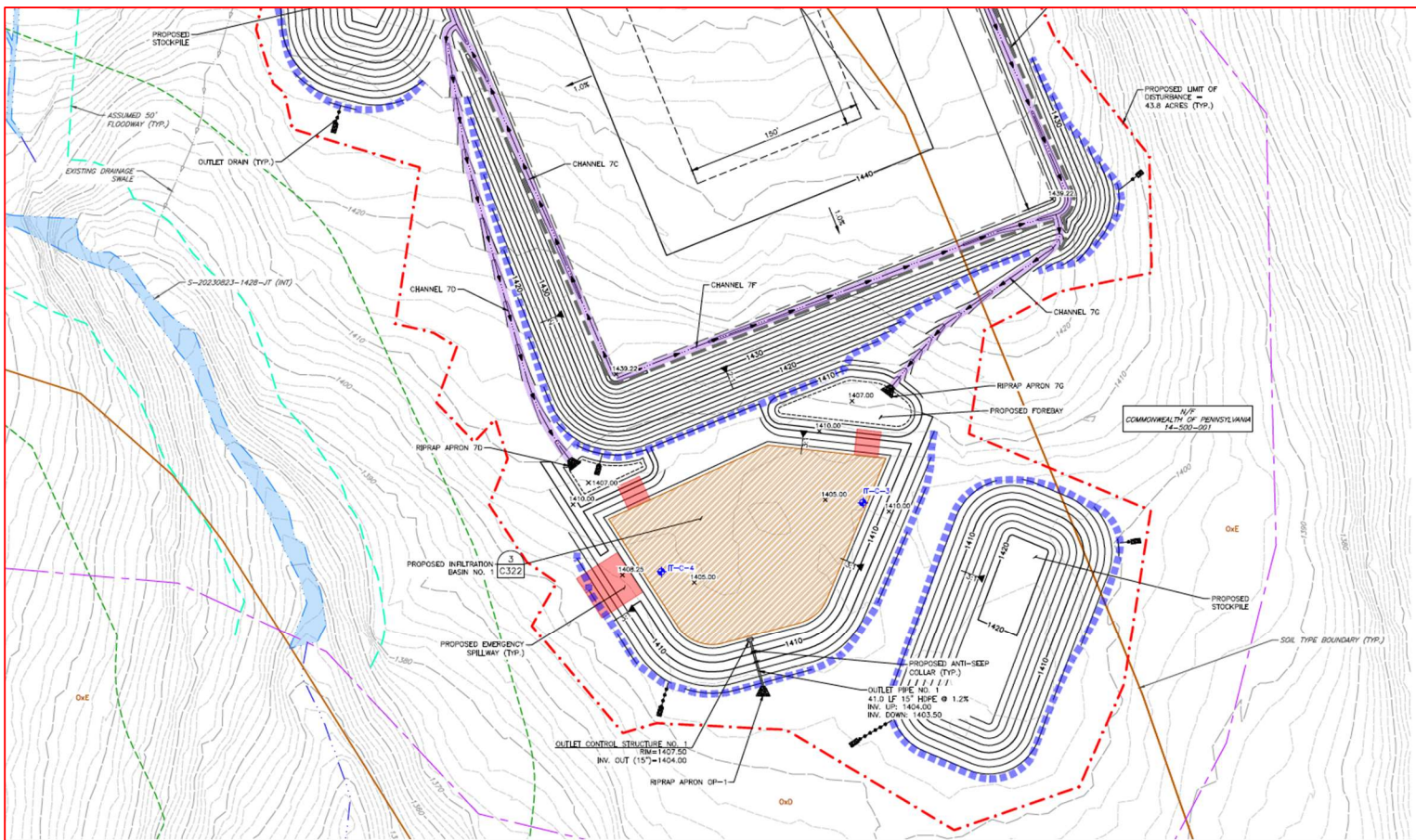
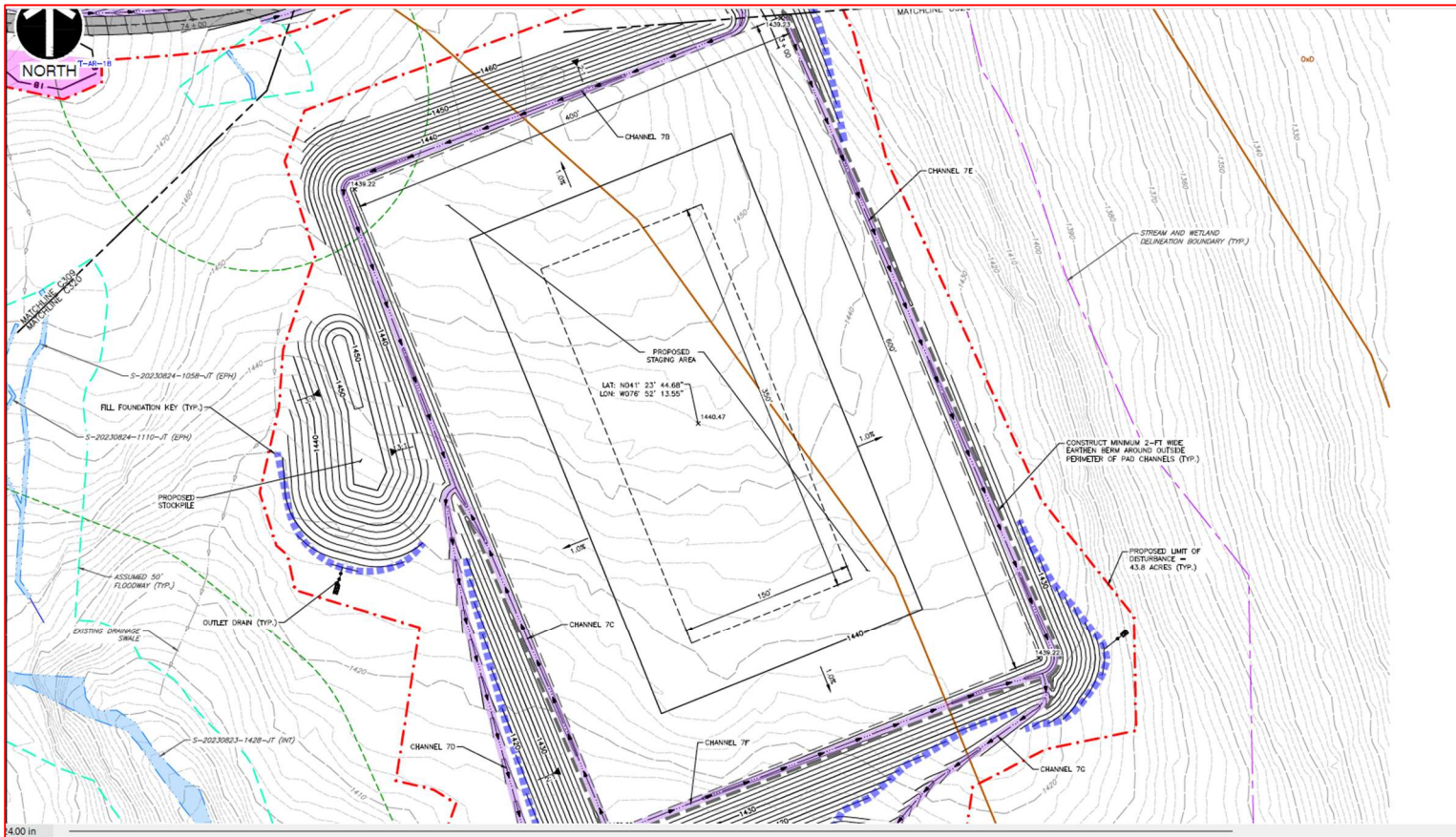


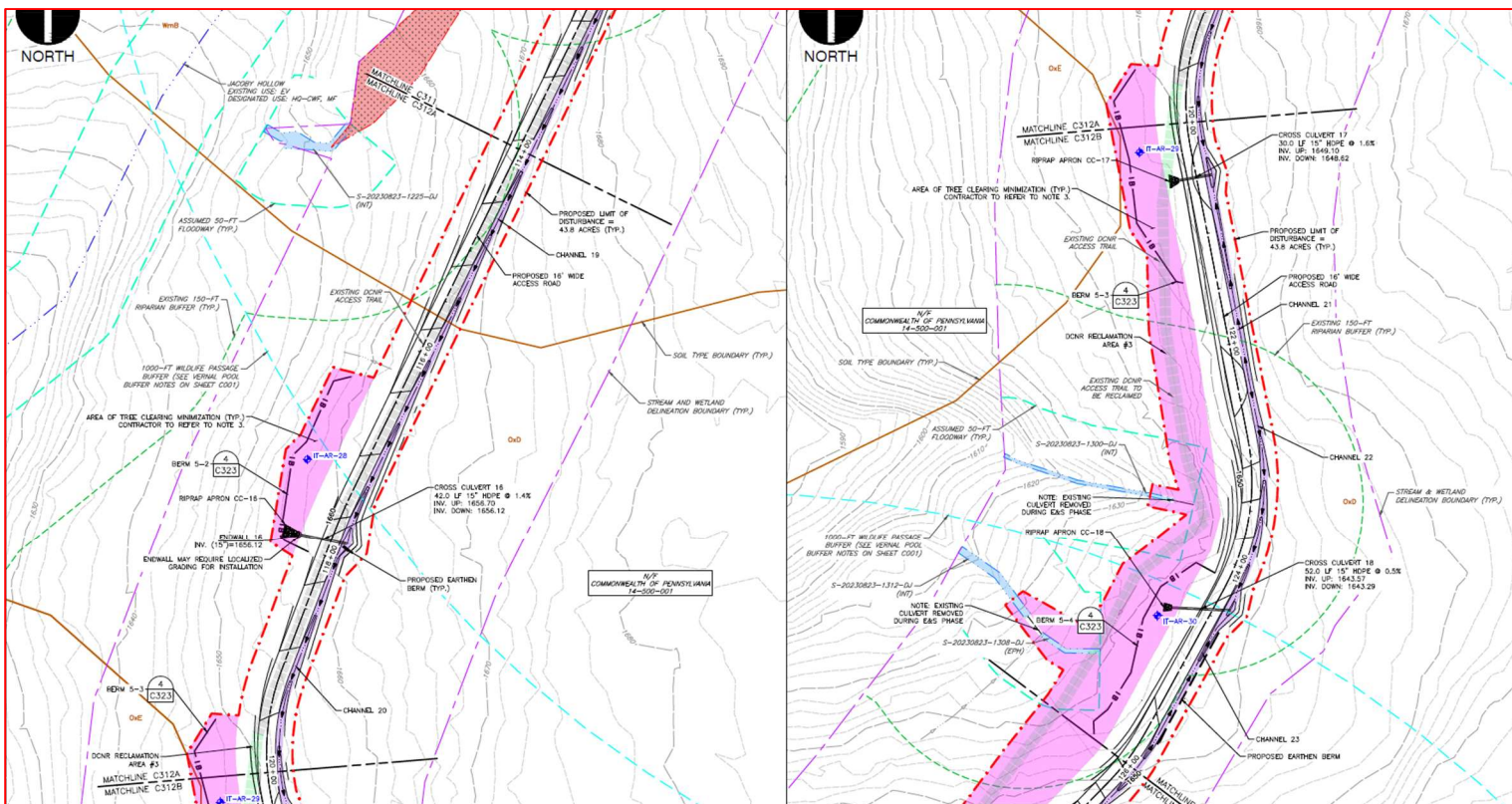
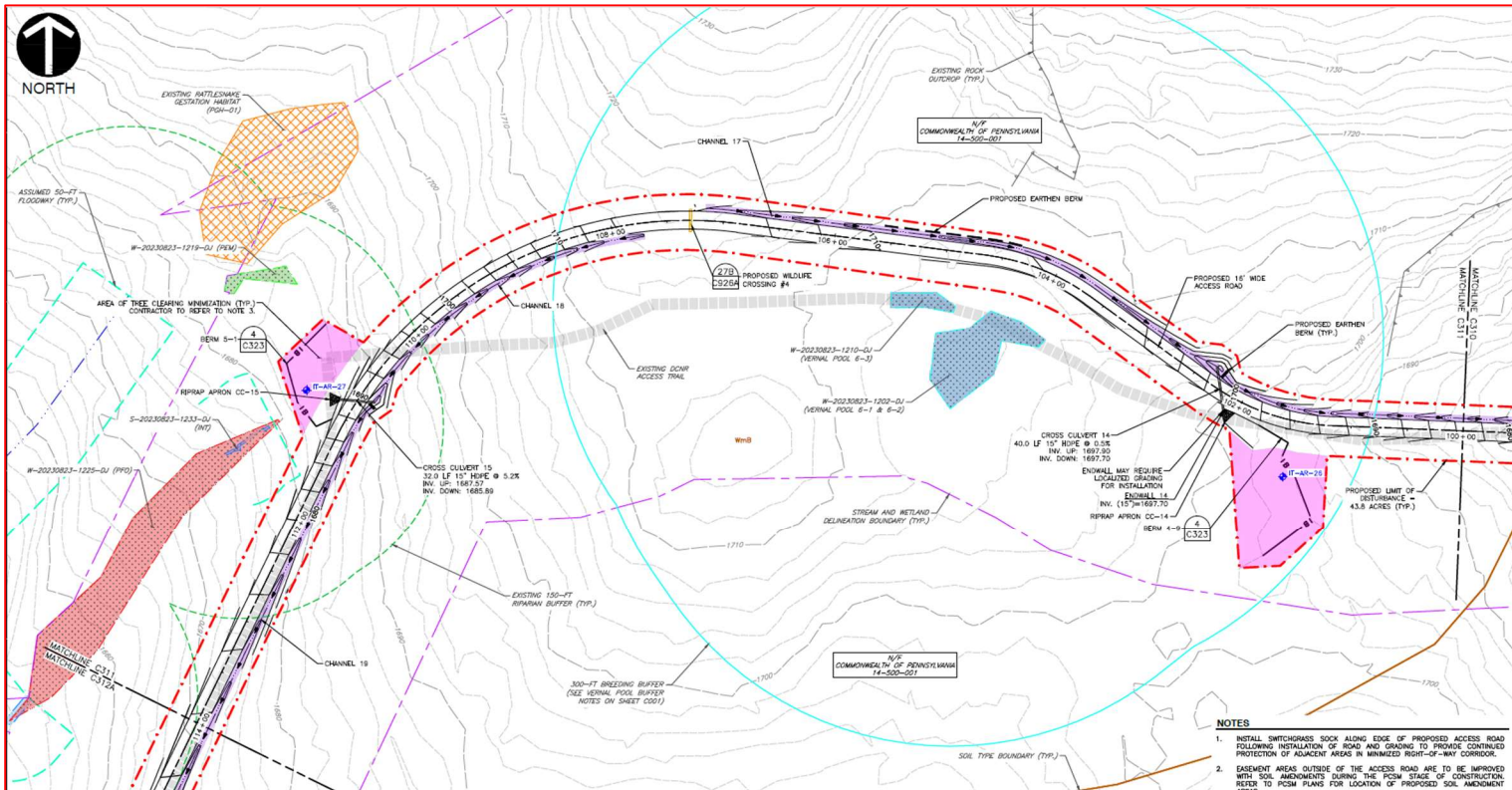


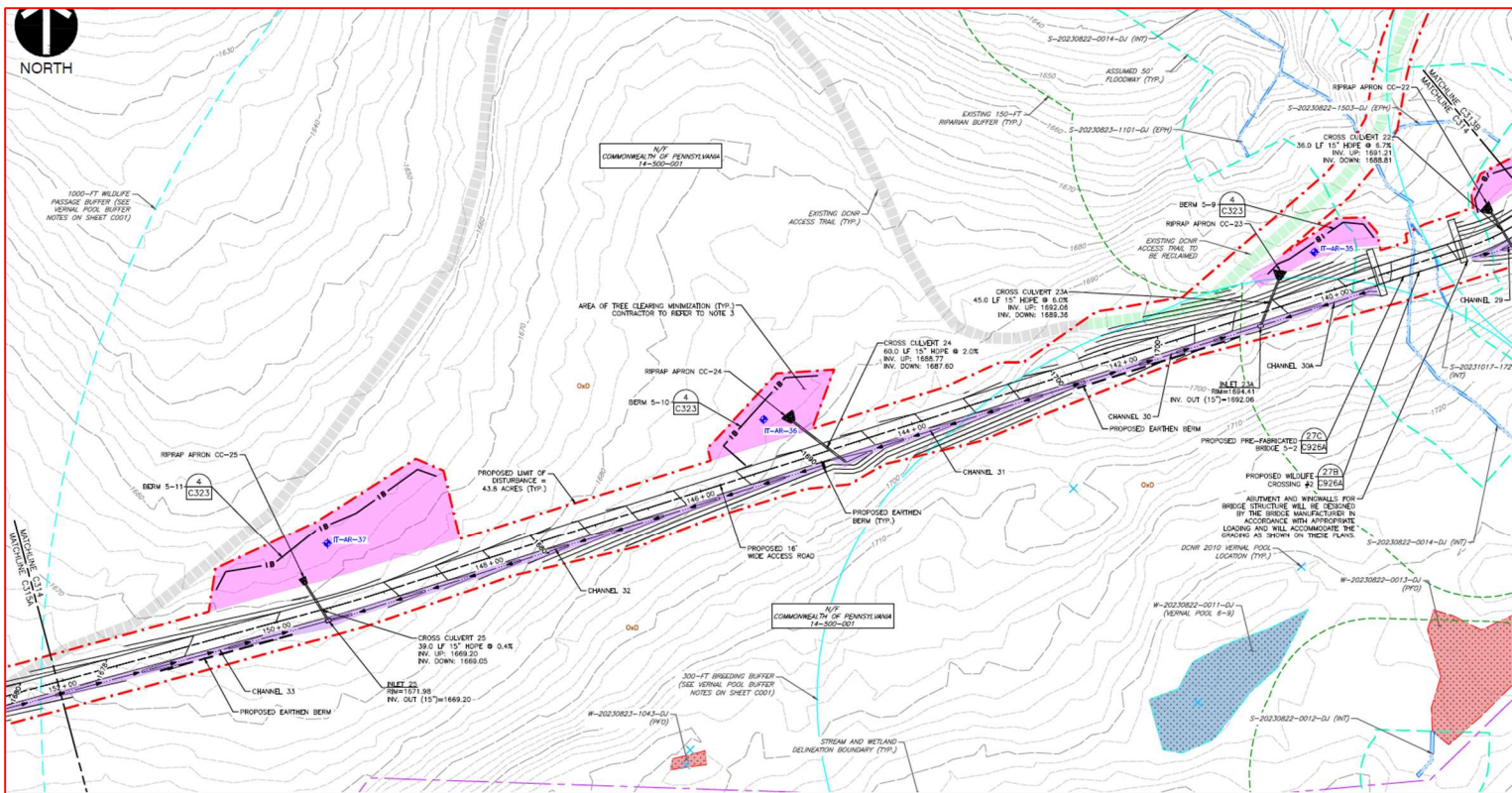
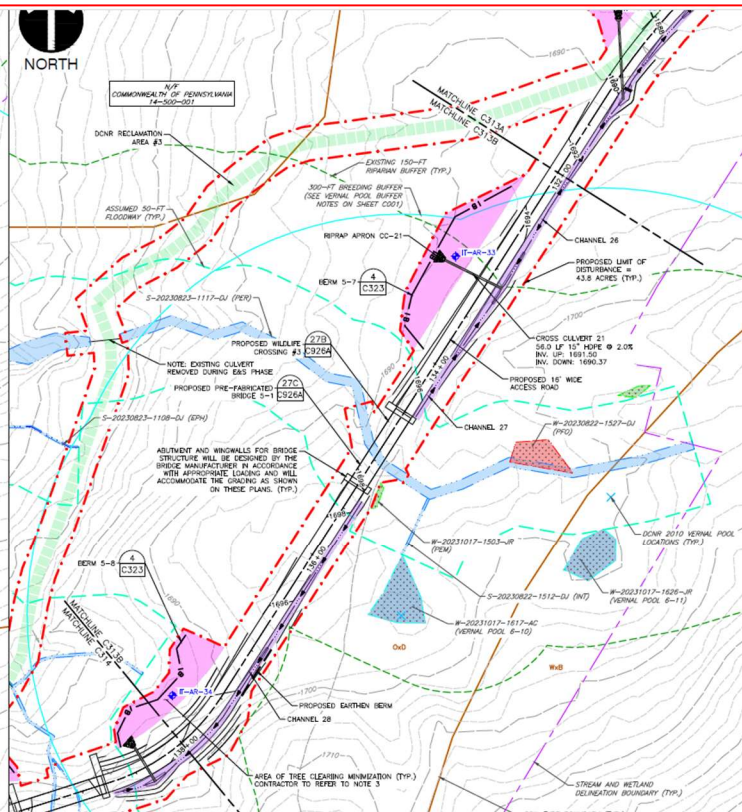
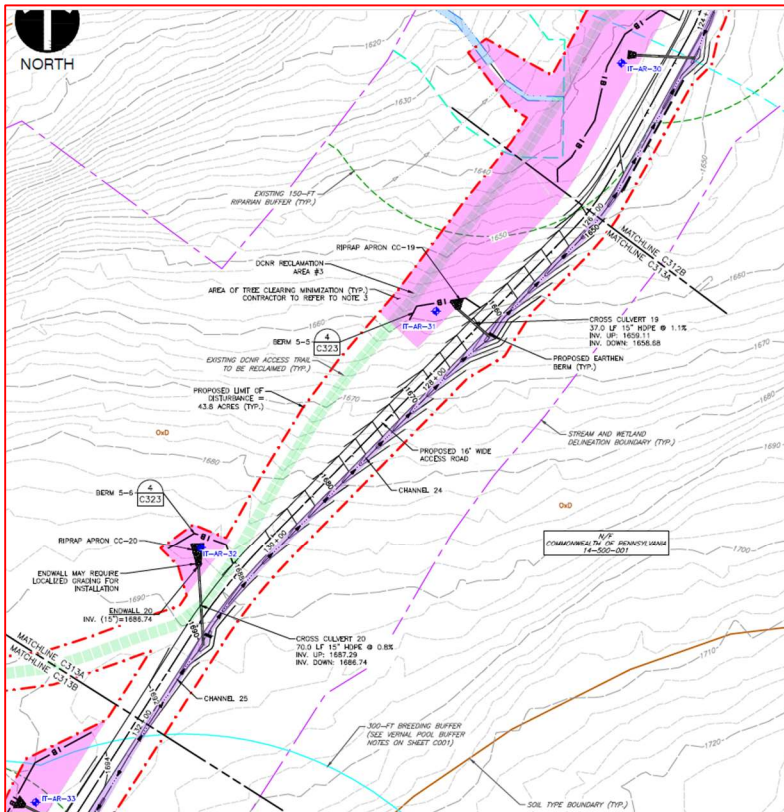


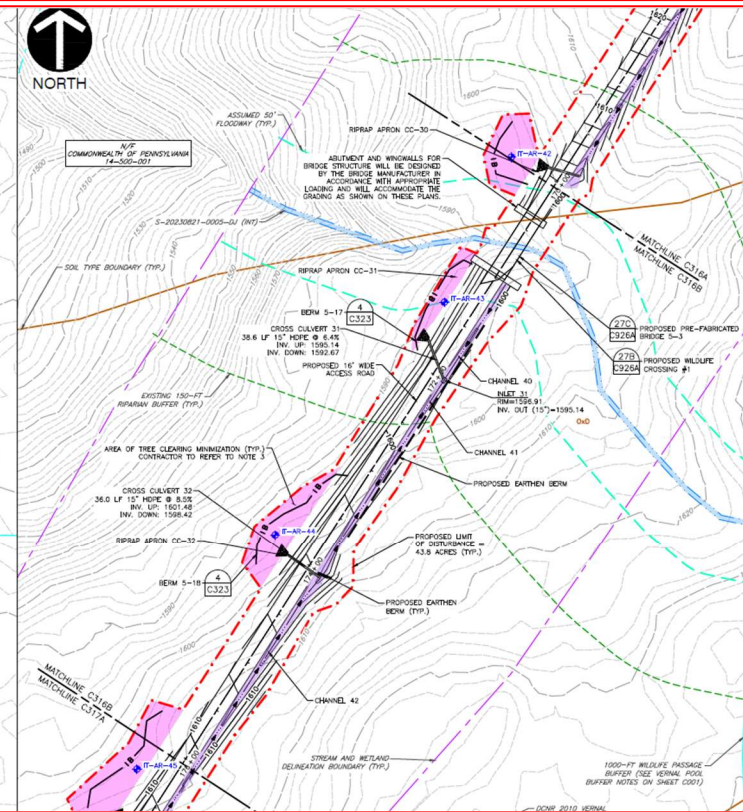
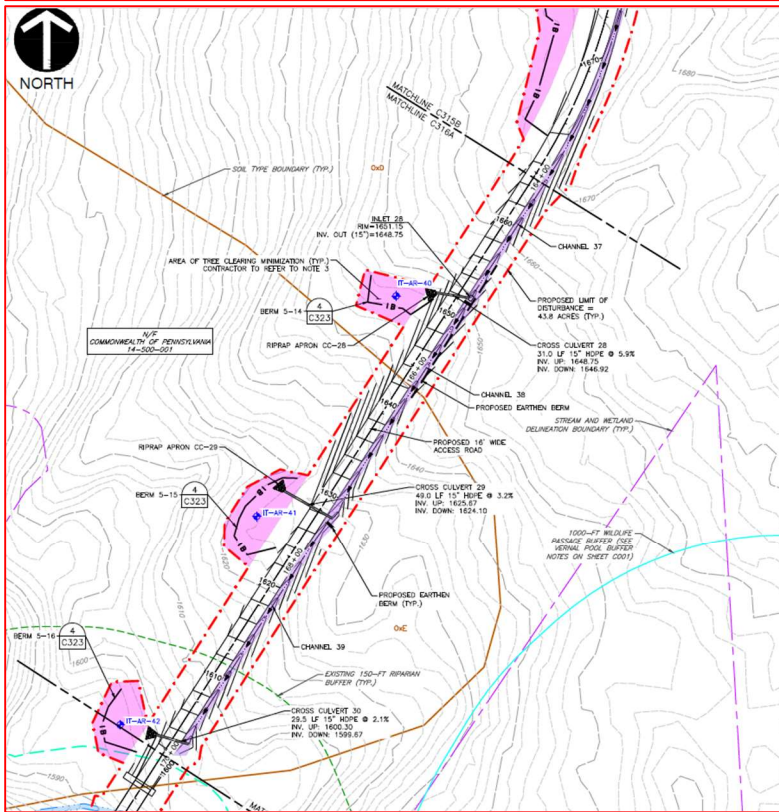
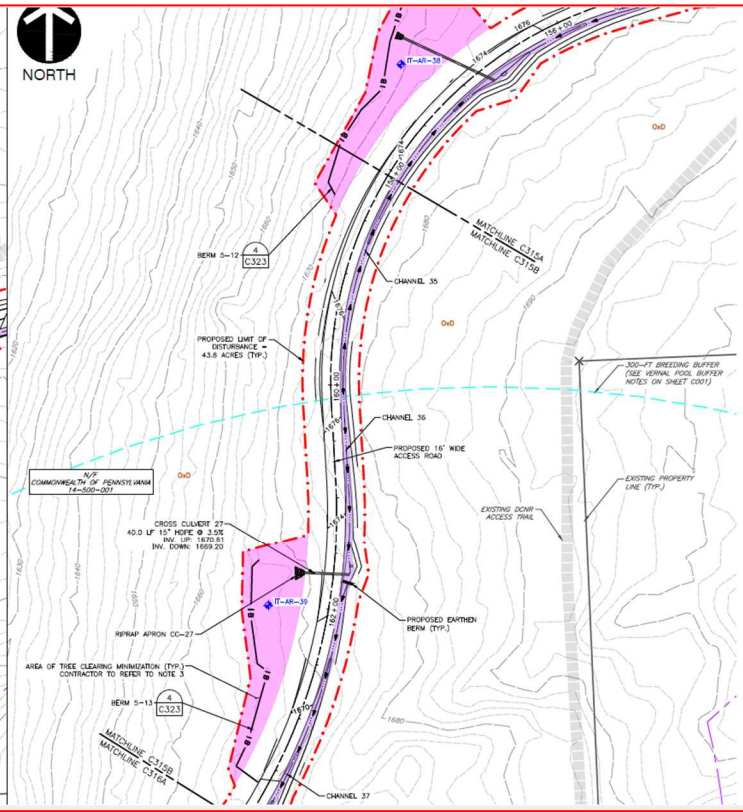
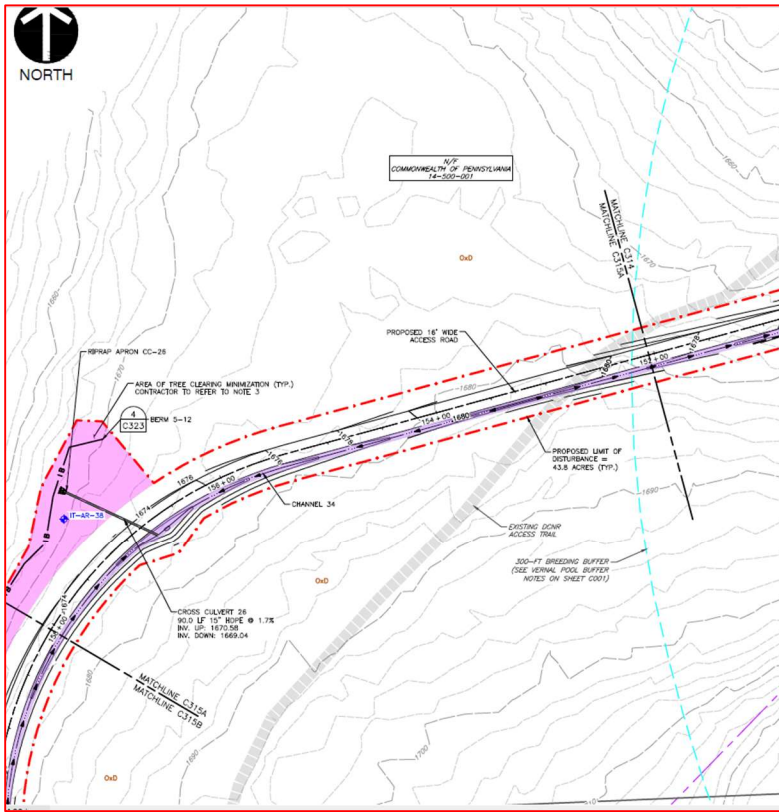


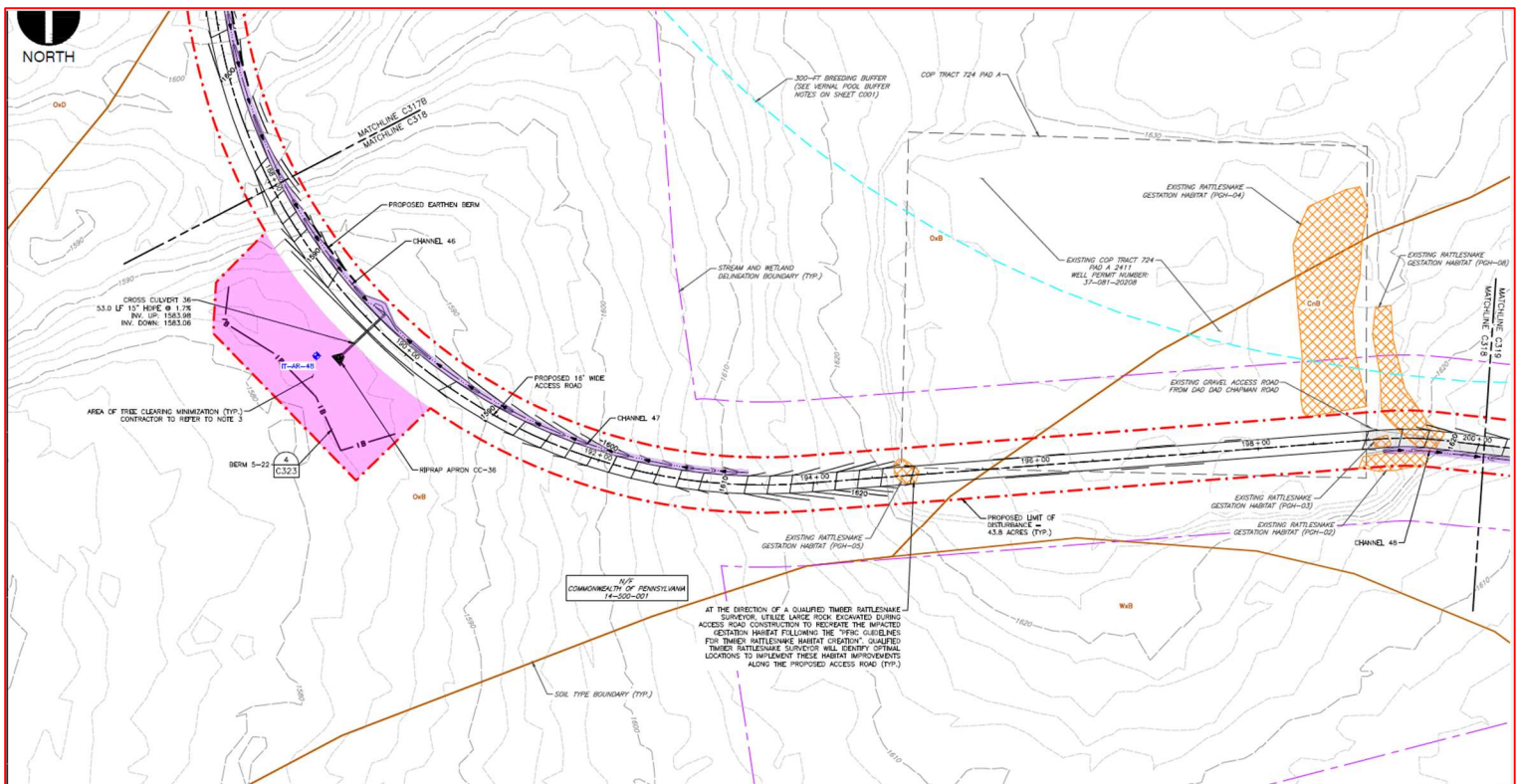
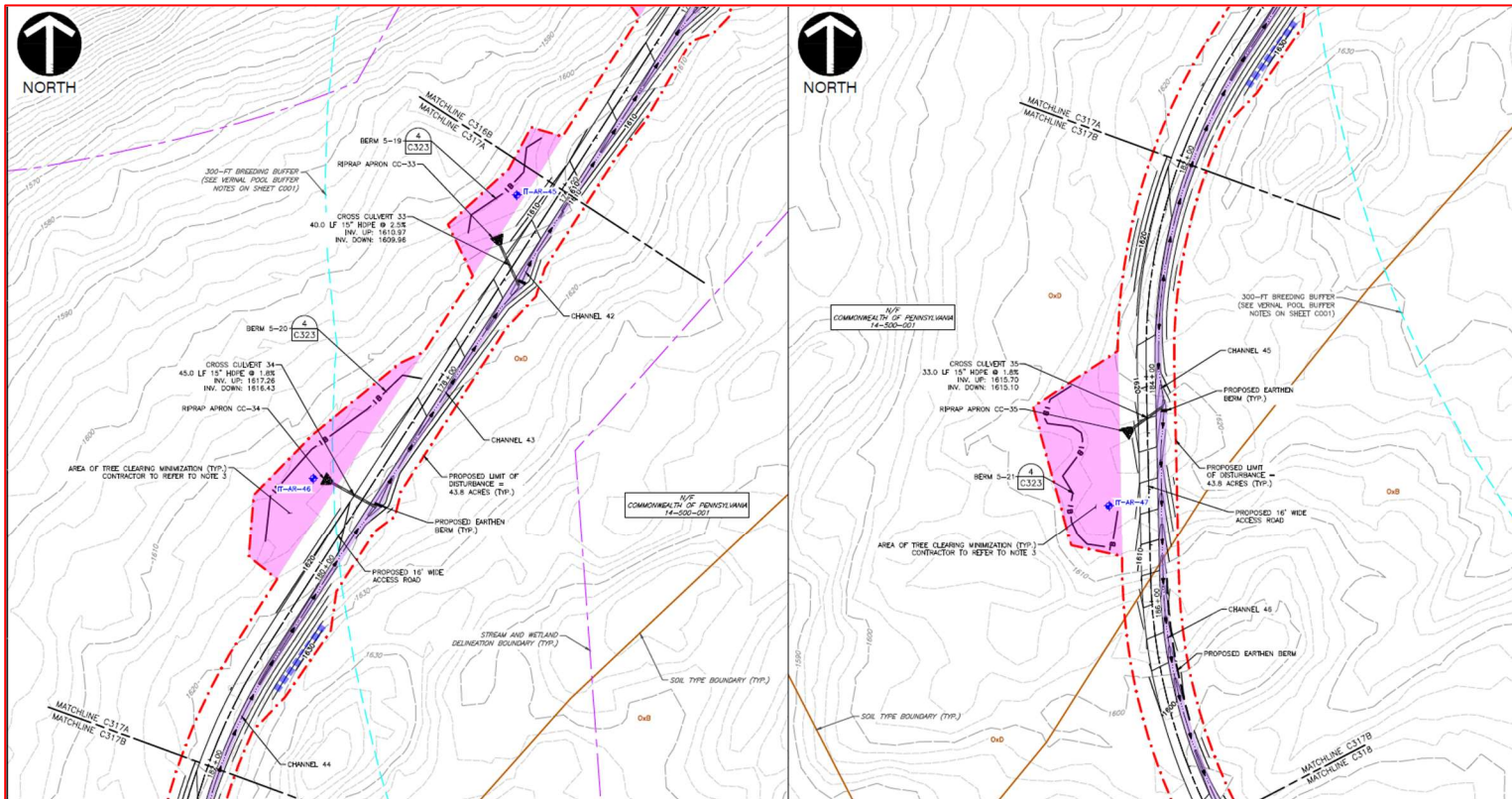


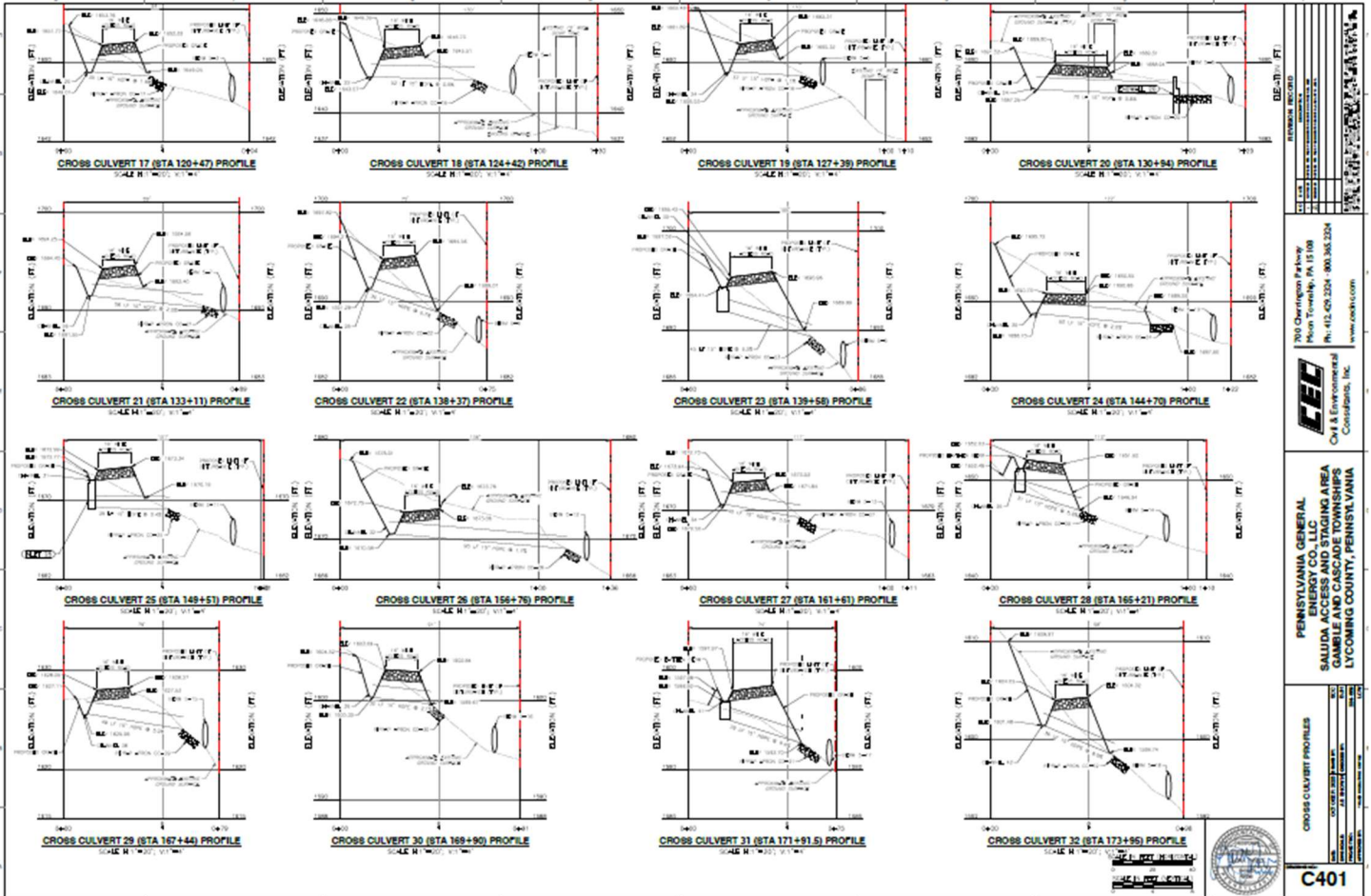
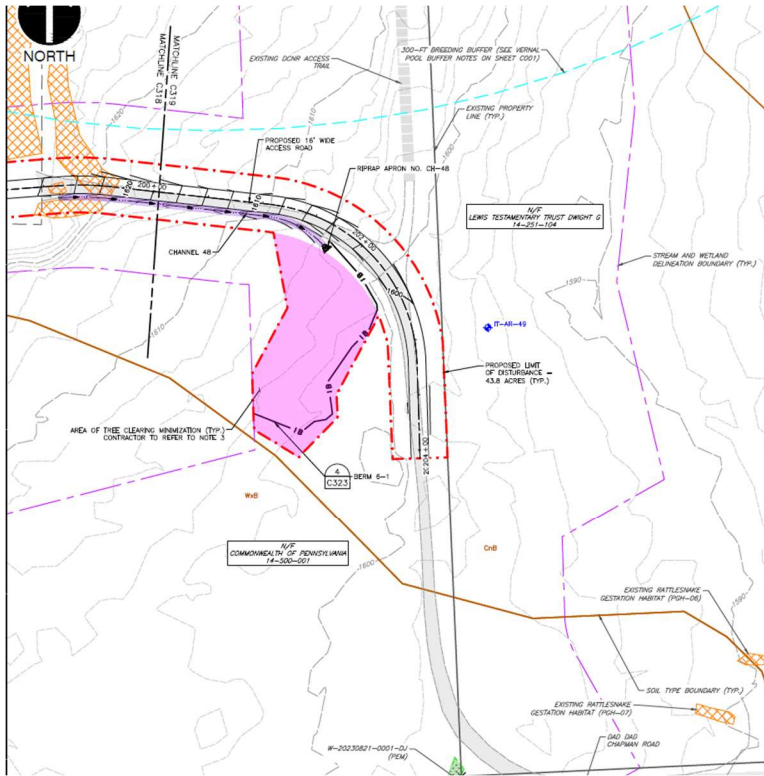












CONTRACT NO. 14-000-001

PROJECT NO. 14-000-001

DATE: 08/14/2014

SCALE: H=1"=20', V=1"=4'

PROJECT LOCATION: 190 Overington Parkway, Moon Township, PA 15108

PHONE: (412) 324-9900 FAX: (412) 324-9901

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Civil & Environmental Consultants, Inc.

PENNSYLVANIA GENERAL ENERGY CO., LLC TRADING AREA
GAMING FACILITY AND CASINO
LYCOMING COUNTY, PENNSYLVANIA

CROSS CULVERT PROFILES

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