ROY COOPER
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RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

September 26, 2022

DWR # 20221186
Transylvania County

Mr. Kevin Barnett, Division Environmental Officer
NCDOT, Division 14
253 Webster Road
Sylvan, NC 28779

Subject: **APPROVAL OF 401 WATER QUALITY CERTIFICATION WITH ADDITIONAL CONDITIONS**
Intersection Improvements US64 NC 280 & 276 R-5799
Davidson River [French Broad River Basin, 06010105, WS-V, B; Trout]

Dear Mr. Barnett:

You have our approval for the impacts listed below for the purpose described in your application dated September 1, 2022 and received by the Division of Water Resources (Division) on September 1, 2022. These impacts are covered by the attached Water Quality General Certification Number 4135 and the conditions listed below. This certification is associated with the use of General Permit Number 201902350 once it is issued to you by the U.S. Army Corps of Engineers. Please note that you should get any other federal, state, or local permits before proceeding with your project, including those required by (but not limited to) Sediment and Erosion Control, Non-Discharge, and Water Supply Watershed regulations.

The Division has determined that the proposed project will comply with water quality requirements provided that you adhere to the conditions listed in the enclosed certification and to the additional conditions itemized below.

The following proposed impacts are hereby approved. No other impacts are approved, including incidental impacts. [15A NCAC 02H .0506(b)]

Stream Impacts in the French Broad River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
S1			164		164	
S2				10	10	
S3			64		64	
S4				13	13	
S5			11		11	
S6				5	5	
S7				13	13	

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
S8			45		45	
S9				15	15	
S10			17		17	
S11			35		35	
S12				12	12	
S13			35		35	
S14				12	12	
Total			**371**	**80**	**451**	**0**

Total Stream Impact for Project: 371 linear feet of permanent and 80 linear feet of temporary.

Wetland Impacts in the French Broad River Basin (Riverine)

Site	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Total Wetland Impact (ac)
W1	0.01				0.01	0.02
Total	**0.01**				**0.01**	**0.02**

Total Wetland Impact for Project: 0.02 acres.

This approval is for the purpose and design described in your application. The plans and specifications for this project are incorporated by reference as part of this Certification. If you change your project, you must notify the Division and you may be required to submit a new application package with the appropriate fee. If the property is sold, the new owner must be given a copy of this Certification and is responsible for complying with all conditions. [15A NCAC 02H .0507(d)(2)].

If you are unable to comply with any of the conditions of the attached Water Quality General Certification or with the additional conditions itemized below, you must notify the Asheville Regional Office within 24 hours (or the next business day if a weekend or holiday) from the time the permittee becomes aware of the circumstances.

The permittee shall report to the Asheville Regional Office any noncompliance with, and/or any violation of, stream or wetland standards [15A NCAC 02B .0200] including but not limited to sediment impacts to streams or wetlands. Information shall be provided orally within 24 hours (or the next business day if a weekend or holiday) from the time the permittee became aware of the non-compliance circumstances.

Condition(s) of Certification:

Project Specific Conditions

1. The NCDOT Division Environmental Officer or Environmental Assistant will conduct a pre-construction meeting with all appropriate staff to ensure that the project supervisor and essential staff understand potential issues at the permitted site. NCDWR staff shall be invited to the pre-construction meeting. [15A NCAC 02H.0506(b)(2) and (b)(3)]

2. The permittee shall use Design Standards in Sensitive Watersheds (15A NCAC 4B.0124[a]-[e]) in areas draining to Trout waters. [15A NCAC 02H.0225 (d)(3)(B)]

3. The permittee will need to adhere to all appropriate in-water work moratoria (including the use of pile driving or vibration techniques) prescribed by the NC Wildlife Resources Commission. No in-water

work is permitted between October 15 and April 15of any year, without prior approval from the NC Division of Water Resources and the NC Wildlife Resources Commission.

In-stream work and land disturbance within the 25-foot buffer zone are prohibited during the trout-spawning season of October 15 through April 15 to protect the egg and fry stages of trout.

General Conditions

1. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and downstream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by NCDWR. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact NCDWR for guidance on how to proceed and to determine whether or not a permit modification will be required. [15A NCAC 02H.0506(b)(2)]

2. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills. [15A NCAC 02B.0200]

3. During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S. or protected riparian buffers. [15A NCAC 02H.0506(b)(2)]

4. The dimension, pattern, and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions. [15A NCAC 02H.0506(b)(2)]

5. The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage. [15A NCAC 02H.0506(b)(2)]

6. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

7. All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water. [15A NCAC 02H.0506(b)(3) and (c)(3)]

8. Heavy equipment shall be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the introduction of other pollutants into the stream. [15A NCAC 02H.0506(b)(3)]

9. All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials. [15A NCAC 02H.0506(b)(3)]

10. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification. [15A NCAC 02H.0506(b)(3)]

11. Discharging hydroseed mixtures and washing out hydro seeders and other equipment in or adjacent to surface waters is prohibited. [15A NCAC 02H.0506(b)(3)]

12. The permittee and its authorized agents shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State and Federal law. If the NCDWR determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, the NCDWR may reevaluate and modify this certification. [15A NCAC 02B.0200]

13. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification. [15A NCAC 02H.0506(b)(2)]

14. A copy of this Water Quality Certification shall be maintained on the construction site at all times. In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

15. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization shall be clearly marked by highly visible fencing prior to any land disturbing activities. Impacts to areas within the fencing are prohibited unless otherwise authorized by this certification. [15A NCAC 02H.0501 and .0502]

16. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.

17. The Permittee shall report any violations of this certification to the Division of Water Resources within 24 hours of discovery. [15A NCAC 02B.0506(b)(2)]

18. Upon completion of the project (including any impacts at associated borrow or waste sites), the NCDOT Division Engineer shall complete and return the enclosed "Certification of Completion Form" to notify the NCDWR when all work included in the 401 Certification has been completed. [15A NCAC 02H.0502(f)]

19. Native riparian vegetation must be reestablished in the riparian areas within the construction limits of the project by the end of the growing season following completion of construction. [15A NCAC 02B.0506(b)(2)]

20. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities. [15A NCAC 02H.0506(b)(3) and (c)(3)]

21. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards [15A NCAC 02H.0506(b)(3) and (c)(3)]:

    a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*.
    b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.

c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.

d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.

22. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification. [15A NCAC 02H.0506(b)(3) and (c)(3)]

This approval and its conditions are final and binding unless contested. [G.S. 143-215.5] This Certification can be contested as provided in Chapter 150B of the North Carolina General Statutes by filing a Petition for a Contested Case Hearing (Petition) with the North Carolina Office of Administrative Hearings (OAH) **within sixty (60) calendar days**. Requirements for filing a Petition are set forth in Chapter 150B of the North Carolina General Statutes and Title 26 of the North Carolina Administrative Code. Additional information regarding requirements for filing a Petition and Petition forms may be accessed at http://www.ncoah.com/ or by calling the OAH Clerk's Office at (919) 431-3000.

One (1) copy of the Petition must also be served to the North Carolina Department of Environmental Quality:

William F. Lane, General Counsel
Department of Environmental Quality
1601 Mail Service Center
Raleigh, NC 27699-1601

This letter completes the review of the Division under section 401 of the Clean Water Act and 15A NCAC 02H .0500. Please contact Kevin Mitchell at 828-296-4650 or kevin.mitchell@ncdenr.gov if you have any questions or concerns.

Sincerely,

DocuSigned by:
Amy Chapman
3C9986B12DCD474...

Richard E. Rogers, Jr., Director
Division of Water Resources

ec: Crystal Amschler, US Army Corps of Engineers Asheville Regulatory Field Office (via email)
Dave McHenry, NC Wildlife Resources Commission (via email)
Holland Youngman, US Fish and Wildlife Service (via email)

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DEPARTMENT OF THE ARMY
Wilmington District, Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403-1343

Regional General Permit No. SAW-2019-02350 (RGP 50)
Name of Permittee: North Carolina Department of Transportation
Effective Date: May 26, 2020
Expiration Date: May 25, 2025

DEPARTMENT OF THE ARMY
REGIONAL GENERAL PERMIT

A regional general permit (RGP) to perform work in or affecting navigable waters of the United States and waters of the United States, upon recommendation of the Chief of Engineers, pursuant to Section 10 of the Rivers and Harbors Act of March 3, 1899 (33 U.S.C. 403), and Section 404 of the Clean Water Act (33 U.S.C. 1344), is hereby issued by authority of the Secretary of the Army by the

District Commander
U.S. Army Engineer District, Wilmington
Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403-1343

TO AUTHORIZE THE DISCHARGE OF DREDGED OR FILL MATERIAL IN WATERS OF THE UNITED STATES (U.S.), INCLUDING WETLANDS, ASSOCIATED WITH MAINTENANCE, REPAIR, AND CONSTRUCTION PROJECTS CONDUCTED BY THE VARIOUS DIVISIONS OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT), INCLUDING THE NCDOT DIVISION OF HIGHWAYS, RAIL, BICYCLE/PEDESTRIAN, ETC.

Activities authorized by this RGP:

a. (1) Road widening, and/or (2) construction, maintenance, and/or repair of bridges. For bridge projects, work can include the approaches.

b. (1) Improvement of interchanges or intersections, or (2) construction of interchanges or intersections over, or on, existing roads.

Full descriptions/terms of "a" and "b":

a. (1) Road widening, and/or (2) construction, maintenance, and/or repair of bridges. For bridge projects, work can include the approaches.

Permanent impacts that result in a loss of waters of the U.S., excluding stream relocation(s), must be less than or equal to 500 linear feet (lf) of stream and/or one (1) acre of wetland/open water for each single and complete linear project.

Single and complete linear project. As noted in 33 CFR 330.2(i), for linear projects, the ''single and complete project'' (i.e., single and complete crossing) will apply to each crossing of a separate water of the U.S. (i.e., single waterbody) at that location; except that for linear projects crossing a single waterbody several times at separate and distant locations, each crossing is considered a single and complete project. However, individual channels in a braided stream or river, or individual arms of a large, irregularly-shaped wetland or lake, etc., are not separate waterbodies and crossing of such features cannot be considered separately.

Also authorized under "a": (1) stream relocation(s) and (2) temporary impacts, such as those from temporary structures, fills, dewatering, and other work necessary to conduct the activities listed under "a". Stream relocation(s) and temporary impacts will be evaluated independently and are not limited to the permanent loss limits of 500 lf of stream and/or 1 acre of wetland/open water (i.e., stream relocations and/or temporary impacts do not factor into these limits) for each single and complete linear project; however, if the Corps determines that the proposed stream relocation(s) and/or temporary impacts are of such magnitude that they cannot be authorized under this section ("a") of RGP 50, even if the permanent losses from road widening, and/or construction, maintenance, and repair of bridges do not exceed the impact limits for this section ("a") of RGP 50, an Individual Permit will be required.

If the Corps determines, on a case-by-case basis, that the concerns for the aquatic environment so indicate, he/she may exercise discretionary authority to override this RGP and require an Individual Permit.

b. (1) Improvement of interchanges or intersections, or (2) construction of interchanges or intersections, over or, on existing roads.

For activities authorized under "b", the limits for permanent impacts that result in a loss of waters of the U.S. depend on the location of the impacts, as described below:

- In the coastal plain of North Carolina (both inner coastal plain and outer coastal plain) - permanent impacts that result in a loss of waters of the U.S., excluding stream relocation(s), must be less than or equal to 1,000 lf of stream and/or 3 acres of wetland/open water for the entire interchange or intersection project.

• All other areas of North Carolina - permanent impacts that result in a loss of waters of the U.S., excluding stream relocation(s), must be less than or equal to 1,000 lf of stream and/or 2 acres of wetland/open water for the entire interchange or intersection project.

Coastal plain – See http://saw-reg.usace.army.mil/JD/LRRs_PandT.pdf for Land Resource Areas LRRP (inner coastal plain) and LRRT (outer coastal plain).

When proposed impacts to waters of the U.S. are located both inside AND outside of the coastal plain, the Corps will determine, based on the location(s) of proposed impacts to waters of the U.S., if a project is a "coastal plain project".

Single and complete project. For permitting purposes, each interchange or intersection is considered to be one single and complete project. For example, an interchange project cannot result in a permanent loss (excluding stream relocation), of (1) greater than 1,000 lf of stream and/or 3 acres of wetland/open water in the coastal plain OR (2) greater than 1,000 lf of stream and/or 2 acres of wetland/open water in all other areas of North Carolina.

Approach fills may be considered to be part of an interchange or intersection project if the Corps determines that inclusion of these areas meet the terms of this section ("b") of RGP 50. Early coordination with the Corps is encouraged.

Intersections, regardless of the mode of transportation (e.g., railroad, other roadways, etc.), may be at grade or grade separated if the Corps determines that the project would meet the terms of this section ("b") of RGP 50. Early coordination with the Corps is encouraged.

Also authorized under "b": (1) stream relocation(s) and (2) temporary impacts, such as those from temporary structures, fills, dewatering, and other work necessary to conduct the activities listed under "b". Stream relocation(s) and temporary impacts will be evaluated independently and are not limited to the permanent loss limits of (1) 1,000 lf of stream and/or 3 acres of wetland/open water in the coastal plain OR (2) 1,000 lf of stream and/or 2 acres of wetland/open water in all other areas of North Carolina (i.e., stream relocations and/or temporary impacts do not factor into these limits) for each interchange or intersection project; however, if the Corps determines that the proposed stream relocation(s) and/or temporary impacts are of such magnitude that they cannot be authorized under this section ("b") of RGP 50, even if the permanent losses from improvement of interchanges or intersections, or construction of interchanges or intersections over, or on, existing roads do not exceed the impact limits for this section ("b") of RGP 50, an Individual Permit will be required.

If the Corps determines, on a case-by-case basis, that the concerns for the aquatic environment so indicate, he/she may exercise discretionary authority to override this RGP and require an Individual Permit.

1. Special Conditions.

a. The prospective permittee must submit a pre-construction notification (PCN) and applicable supporting information to the District Engineer and receive written verification from the Corps that the proposed work complies with this RGP prior to commencing any activity authorized by this RGP.

b. If the project will not impact a designated "Area of Environmental Concern" (AEC) in the twenty* (20) counties of North Carolina covered by the North Carolina Coastal Area Management Act (CAMA) ("CAMA counties"), a consistency submission is not required. If the project will impact a designated AEC and meets the definition of "development", the prospective permittee must obtain the required CAMA permit. Development activities shall not commence until a copy of the approved CAMA permit is furnished to the appropriate Corps Regulatory Field Office (Wilmington Field Office – 69 Darlington Avenue, Wilmington, NC 28403 or Washington Field Office – 2407 West 5th Street, Washington, NC 27889).

***The 20 CAMA counties in North Carolina include Beaufort, Bertie, Brunswick, Camden, Carteret, Chowan, Craven, Currituck, Dare, Gates, Hertford, Hyde, New Hanover, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Tyrrell, and Washington.**

c. No work shall be authorized by this RGP within the 20* CAMA counties without prior consultation with the National Oceanic and Atmospheric Administration's (NOAA) Habitat Conservation Division. For each activity reviewed by the Corps where it is determined that the activity may affect Essential Fish Habitat (EFH) for federally managed species, an EFH Assessment shall be prepared by the prospective permittee and forwarded to the Corps and NOAA Fisheries for review and comment prior to authorization of work.

d. Culverts and pipes. The following conditions [(1)-(8)] apply to the construction of culverts/pipes, and work on existing culverts/pipes.

Additionally, if the proposed work would affect an existing culvert/pipe (e.g., culvert/pipe extensions), the prospective permittee must include actions (in the PCN) to correct any existing deficiencies that are located:

- At the inlet and/or outlet of the existing culvert/pipe, IF these deficiencies are/were caused by the existing culvert/pipe, or

- Near the inlet or outlet of the existing culvert/pipe, IF these deficiencies are/were caused by the existing culvert/pipe.

These deficiencies may include, but are not limited to, stream over-widening, bank erosion, streambed scour, perched culvert/pipes, and inadequate water depth in culvert(s). Also note if the proposed work would address the existing deficiency or eliminate it – e.g., bank erosion on left bank, but the culvert extension will be placed in this eroded area. If the prospective permittee is unable to correct the deficiencies caused by the existing culvert/pipe, they must document the reasons in the PCN for Corps consideration.

(1) No activity may result in substantial, permanent disruption of the movement of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area. Measures will be included that will promote the safe passage of fish and other aquatic organisms.

(2) The dimension, pattern, and profile of the stream above and below a culvert/pipe shall not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. It is acceptable to use rock vanes at culvert/pipe outlets to ensure, enhance, or maintain aquatic passage. Pre-formed scour holes are acceptable when designed for velocity reduction. The width, height, and gradient of a proposed opening shall be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow will be determined from gauge data, if available. In the absence of such data, bankfull flow will be used as a comparable level.

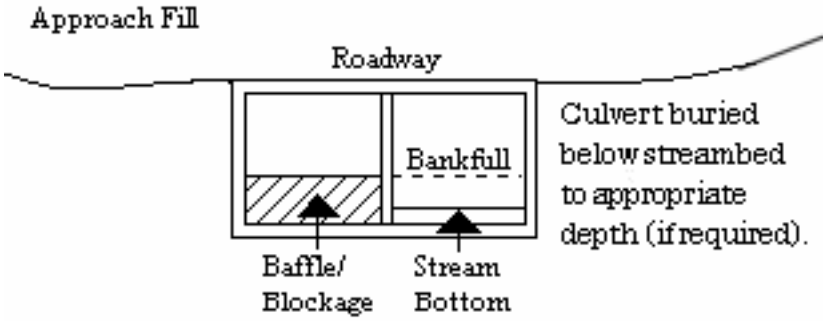
(3) Burial/depth specifications: If the project is located within any of the 20* CAMA counties, culvert/pipe inverts will be buried at least one foot below normal bed elevation when they are placed within the Public Trust AEC and/or the Estuarine Waters AEC as designated by CAMA. If the project is located outside of the 20* CAMA counties, culvert/pipe inverts will be buried at least one foot below the bed of the stream for culverts/pipes that are greater than 48 inches in diameter. Culverts/pipes that are 48 inches in diameter or less shall be buried or placed on the stream bed as practicable and appropriate to maintain aquatic passage, to include passage during drought or low flow conditions. Every effort shall be made to maintain the existing channel slope. A waiver from the burial/depth specifications in this condition may be requested in writing. The prospective permittee is encouraged to request agency input about waiver requests as early as possible, and prior to submitting the PCN for a specific project; this will allow the agencies time to conduct a site visit, if necessary, and will prevent time delays and potential project revisions for the prospective permittee. The waiver will only be issued by the Corps if it can be demonstrated that the impacts of complying with burial requirements would result in more adverse impacts to the aquatic environment.

(4) Appropriate actions to prevent destabilization of the channel and head cutting upstream shall be incorporated in the design and placement of culverts/pipes.

(5) Culverts/pipes placed within riparian and/or riverine wetlands must be installed in a manner that does not restrict the flow and circulation patterns of waters of the U.S. Culverts/pipes placed across wetland fills purely for the purposes of equalizing surface

water do not have to be buried, but must be of adequate size and/or number to ensure unrestricted transmission of water.

(6) Bankfull flows (or less) shall be accommodated through maintenance of the existing bankfull channel cross sectional area in no more than one culvert/pipe or culvert/pipe barrel. Additional culverts/pipes or barrels at such crossings shall be allowed only to receive flows exceeding the bankfull flow. A waiver from this condition may be requested in writing; this request must be specific as to the reason(s) for the request. The waiver will be issued if it can be demonstrated that it is not practicable to comply with this condition.



(7) Where adjacent floodplain is available, flows exceeding bankfull will be accommodated by installing culverts/pipes at the floodplain elevation. When multiple culverts/pipes are used, baseflow must be maintained at the appropriate width and depth by the construction of floodplain benches, sills, and/or construction methods to ensure that the overflow culvert(s)/pipe(s) is elevated above the baseflow culvert(s)/pipe(s).

(8) The width of the baseflow culvert/pipe shall be comparable to the width of the bankfull width of the stream channel. If the width of the baseflow culvert/pipe is wider than the stream channel, the culvert/pipe shall include baffles, benches and/or sills to maintain the width of the stream channel. A waiver from this condition may be requested in writing; this request must be specific as to the reason(s) for the request. The waiver will be issued if it can be demonstrated that it is not practicable or necessary to include baffles, benches or sills.

See the remaining special conditions for additional information about culverts/pipes in specific areas.

e. Discharges into waters of the U.S. designated by either the North Carolina Division of Marine Fisheries (NCDMF) or the North Carolina Wildlife Resources Commission (NCWRC) as anadromous fish spawning areas are prohibited during the period between February 15th and June 30th, without prior written approval from the Corps and the appropriate wildlife agencies (NCDMF, NCWRC, and/or the National Marine Fisheries Service (NMFS)). Discharges into waters of the U.S. designated by NCWRC as primary nursery areas in inland waters are prohibited during the period between February 15th and September 30th, without prior written approval from the Corps and the appropriate wildlife agencies. Discharges into waters of the U.S. designated by NCDMF as primary nursery areas shall be coordinated with NCDMF prior to being authorized by

this RGP. Coordination with NCDMF may result in a required construction moratorium during periods of significant biological productivity or critical life stages.

The prospective permittee should contact:

NC Division of Marine Fisheries	**North Carolina Wildlife Resources Commission**
3441 Arendell Street	**Habitat Conservation Division**
Morehead City, NC 28557	**1721 Mail Service Center**
Telephone 252-726-7021	**Raleigh, NC 27699-1721**
or 800-682-2632	**Telephone (919) 707-0220**

f. This permit does not authorize the use of culverts in areas designated as anadromous fish spawning areas by the NCDMF or the NCWRC.

g. No in-water work shall be conducted in Waters of the U.S. designated as Atlantic sturgeon critical habitat during the periods between February 1st and June 30th. No in-water work shall be conducted in Waters of the U.S. in the Roanoke River designated as Atlantic sturgeon critical habitat during the periods between February 1st and June 30th, and between August 1st to October 31st, without prior written approval from NMFS.

h. Before discharging dredged or fill material into waters of the U.S. in designated trout watersheds in North Carolina, the PCN will be sent to the NCWRC and the Corps concurrently. See https://www.saw.usace.army.mil/Missions/Regulatory-Permit-Program/Agency-Coordination/Trout.aspx for the designated trout watersheds. The PCN shall summarize alternatives to conducting work in waters of the U.S. in trout watersheds that were considered during the planning process and detail why alternatives were or were not selected. For proposals where (1) a bridge in a trout stream will be replaced with a culvert, or (2) a culvert will be placed in a trout stream, the PCN must also include a compensatory mitigation plan for all loss of stream bed, and details of any on-site evaluations that were conducted to determine that installation of a culvert will not adversely affect passage of fish or other aquatic biota at the project site. The evaluation information must include factors such as the proposed slope of the culvert and determinations of how the slope will be expected to allow or impede passage, the necessity of baffles and/or sills to ensure passage, design considerations to ensure that expected baseflow will be maintained for passage and that post-construction velocities will not prevent passage, site conditions that will or will not allow proper burial of the culvert, existing structures (e.g., perched culverts, waterfalls, etc.) and/or stream patterns up and downstream of the culvert site that could affect passage and bank stability, and any other considerations regarding passage. The level of detail for this information shall be based on site conditions (i.e., culverts on a slope over 3% will most likely require more information than culverts on a slope that is less than 1%, etc.). Also, in order to evaluate potential impacts, the prospective permittee will describe bedforms that will be impacted by the proposed culvert – e.g., pools, glides, riffles, etc. The NCWRC will respond to both the prospective permittee and the Corps.

i. For all activities authorized by this RGP that involve the use of riprap material for bank stabilization, the following measures shall be applied:

(1) Where bank stabilization is conducted as part of an activity, natural design, bioengineering, and/or geoengineering methods that incorporate natural durable materials, native seed mixes, and native plants and shrubs are to be utilized, as appropriate to site conditions, to the maximum extent practicable.

(2) Filter cloth must be placed underneath the riprap as an additional requirement of its use in North Carolina waters; however, the prospective permittee may request a waiver from this requirement. The waiver request must be in writing. The Corps will only issue a waiver if the prospective permittee demonstrates that the impacts of complying with this requirement would result in greater adverse impacts to the aquatic environment. Note that filter fabric is not required if the riprap will be pushed or "keyed" into the bank of the waterbody.

(3) The placement of riprap shall be limited to the areas depicted on submitted work plan drawings.

(4) Riprap shall not be placed in a manner that prevents or impedes fish passage.

(5) Riprap shall be clean and free from loose dirt or any pollutant except in trace quantities that will not have an adverse environmental effect.

(6) Riprap shall be of a size sufficient to prevent its movement from the authorized alignment by natural forces under normal conditions.

(7) Riprap material shall consist of clean rock or masonry material such as, but not limited to, granite, marl, or broken concrete.

j. Discharges of dredged or fill material into waters of the U.S., including wetlands, must be minimized or avoided to the maximum extent practicable.

k. Generally, off-site detours are preferred to avoid and minimize impacts to the human and natural environment; however, if an off-site detour is considered impracticable, then an on-site detour may be considered as a necessary component of the actions authorized by this RGP. Impacts from the detour may be considered temporary and may not require compensatory mitigation if the impacted area is restored to pre-construction elevations and contours after construction is complete. The permittee shall also restore natural hydrology and stream corridors (if applicable), and reestablish native vegetation/riparian corridors. If the construction of a detour (on-site or off-site) includes standard undercutting methods, removal of all material and backfilling with suitable material is required. See special condition "s" for additional information.

l. All activities authorized by this RGP shall, to the maximum extent practicable, be

conducted "in the dry", with barriers installed between work areas and aquatic habitat to protect that habitat from sediment, concrete, and other pollutants. Where concrete is utilized, measures will be taken to prevent live or fresh concrete, including bags of uncured concrete, from coming into contact with waters of the U.S. until the concrete has set and cured. All water in the work area that has been in contact with concrete shall only be returned to waters of the U.S. when it no longer poses a threat to aquatic organisms (concrete is set and cured).

m. In cases where new alignment approaches are to be constructed and the existing approach fill in waters of the U.S. is to be abandoned and no longer maintained as a roadway, the abandoned fill shall be removed and the area will be restored to pre-construction elevations and contours. The permittee shall also restore natural hydrology and stream corridors (if applicable), and reestablish native vegetation/riparian corridors, to the extent practicable. This activity may qualify as compensatory mitigation credit for the project and will be assessed on a case-by-case basis in accordance with Special Conditions “q” and “r” in this document. Any proposed on-site wetland restoration area must be void of utility conflicts and/or utility maintenance areas. A restoration plan detailing this activity will be required with the submittal of the PCN.

n. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

o. The project must be implemented and/or conducted so that all reasonable and practicable measures to ensure that equipment, structures, fill pads, and work associated with the project do not adversely affect upstream and/or downstream reaches. Adverse effects include, but are not limited to, channel instability, scour, flooding, and/or shoreline/streambank erosion. During construction, the permittee shall routinely monitor for these effects, cease all work if/when detected, take initial corrective measures to correct actively eroding areas, and notify the Corps immediately. Permanent corrective measures may require additional authorization from the Corps.

p. All PCNs will describe sedimentation and erosion control structures and measures proposed for placement in waters of the U.S. To the maximum extent practicable, structures and measures will be depicted on maps, surveys or drawings showing location and impacts to jurisdictional wetlands and streams. In addition, appropriate soil and erosion control measures must be established and maintained during construction. All fills, temporary and permanent, must be adequately stabilized at the earliest practicable date to prevent erosion of fill material into adjacent waters or wetlands.

q. Compensatory mitigation will be required for permanent impacts resulting in a loss of waters of the U.S. due to culvert/pipe installation and other similar activities. Mitigation may be required for stream relocation projects (see Special Condition "r" below). When compensatory mitigation is required, the prospective permittee will attach a proposed mitigation plan to the PCN. Compensatory mitigation proposals will be written in accordance with currently approved Wilmington District guidance and Corps mitigation regulations, unless the purchase of mitigation credits from an approved mitigation bank or the North Carolina Division of Mitigation Services (NCDMS) is proposed to address all compensatory mitigation requirements. The Corps Project Manager will make the final determination concerning the appropriate amount and type of mitigation.

r. Stream Relocations (non-tidal only) - for the purposes of permitting, stream relocations are considered a loss of waters of the U.S. Depending on the condition and location of (1) the existing stream, and (2) the relocated channel, stream relocation(s) may provide a functional uplift. The Corps will determine if an uplift is possible based on the information submitted with the PCN. If the anticipated uplift(s) occurs, it may offset, either partially or fully, the loss associated with a stream relocation(s) - (i.e., due to the uplift, either no compensatory mitigation would be required for the stream relocation itself, or compensatory mitigation would be required at a reduced ratio).

Because the amount of potential uplift is dependent upon the condition (or quality) of the channel to be relocated, there is no pre-determined amount of uplift needed to satisfy the requirements for a successful relocation project. After performing the evaluation(s) noted in this document, the prospective permittee will propose a certain amount of uplift potential and the Corps project manager will make the final determination. Baseline conditions and subsequent monitoring must show that the relocated channel is providing/will provide aquatic function at, or above, the level provided by the baseline (pre-project) condition. If the required uplift is not achieved, the work will not be in compliance with this special condition of RGP 50 and remediation will be required through repair (and continued monitoring), or by the permittee providing compensatory mitigation (e.g., mitigation credit through an approved bank, mitigation credit through NCDMS, etc.).

Compensatory mitigation, in addition to the stream relocation activity, may be required if the Corps determines that (a) no uplift in stream function is achievable, (b) the proposed uplift in stream function is not sufficient, by itself, (c) the risks associated with achieving potential uplifts in stream function are excessive, and/or (d) the time period for achieving the potential uplifts/functional success is too great.

On-site compensatory mitigation is not the same as stream relocation. While stream relocation simply moves a stream to a nearby, geographically similar area, it does not generate mitigation credits. If NCDOT proposes to generate compensatory mitigation on a project site, NCDOT must submit a mitigation plan that complies with 33 CFR 332.4.

The prospective permittee is required to submit the following information for any proposed project that involves stream relocation, regardless of the size/length of the stream relocation (note that 1-5 below only apply to stream relocations and not to compensatory mitigation):

(1) A statement detailing why relocating the stream is unavoidable. In order to ensure that this action is separate from a compensatory mitigation project, the need for the fill must be related to road/interchange/intersection construction or improvement, and the project must meet the requirements set forth in the full descriptions/terms of "a" and "b" on pages 2 and 3 of this permit.

(2) An evaluation of effects on the relocated stream and buffer from utilities, or potential for impact from utility placement in the future.

(3) An evaluation of the baseline condition of the stream to be relocated. In order to demonstrate a potential uplift, the prospective permittee must provide the baseline (pre-impact) condition of the stream that is proposed for relocation. The prospective permittee will document the baseline condition of the stream by using the Corps' (Wilmington District's) current functional assessment method - e.g., the North Carolina Stream Assessment Method (NCSAM). The functional assessment must be used to identify specific areas where an uplift would reasonably be expected to occur, and also show important baseline functions that will remain after the relocation.

(4) An evaluation of the potential uplifts to stream function for the relocated channel. The amount of detail required in the plan will be commensurate with the functional capacity of the original stream and proposed uplift(s). Low functional capacity will warrant less monitoring and less detail in the plan in order to ensure that the relocated channel provides the same, or better/increased, suite of aquatic functions as the existing channel.

(5) A proposed monitoring plan for the relocated channel (and buffer, if applicable), will be prepared in accordance with current District guidance. The level of detail needed in the plan will be directly related to the quality of baseline functions and the anticipated uplift, therefore it is recommended that a pre-application discussion occur with the Corps Project Manager as early as possible. For example, if the risk for achieving the anticipated functional uplift is moderate or low, or if there is a low amount of proposed uplift, less information and monitoring will be required in the proposed relocation plan; similar to the requirements found in the "2003 Stream Mitigation Guidelines". If the risk for uplift is higher, or if there is a high amount of proposed uplift, additional monitoring and information will be required, trending toward the prescriptions found in the most recent Wilmington District Compensatory Mitigation Guidance – e.g., the 2016 Wilmington District Stream and Wetland Compensatory Mitigation Update. All monitoring will be for at least 5 years unless the Corps project manager determines that (a) a specific project requires less than 5 years due to site conditions or limited risk/uplift potential, and/or complexity (or simplicity) of the existing channel and/or the

relocation work, or (b) the Corps project manager determines (during the monitoring period) that the 5 years of monitoring may be reduced (or that no further monitoring is required) based on monitoring information received once the stream relocation has been completed.

s. Upon completion of any work authorized by this RGP, all temporary fills (to include culverts, pipes, causeways, etc.) will be completely removed from waters of the U.S. and the areas will be restored to pre-construction elevations and contours. The permittee shall also restore natural hydrology and stream corridors (if applicable), and reestablish native vegetation/riparian corridors. This work will be completed within 60 days of completion of project construction. If this timeframe occurs while a required moratorium of this permit is in effect, the temporary fill shall be removed in its entirety within 60 days of the moratorium end date. If vegetation cannot be planted due to the time of the year, all disturbed areas will be seeded with a native mix appropriate for the impacted area, and vegetation will be planted during the next appropriate time frame. A native seed mix may contain non-invasive small grain annuals (e.g. millet and rye grain) to ensure adequate cover while native vegetation becomes established. The PCN must include a restoration plan showing how all temporary fills and structures will be removed and how the area will be restored to pre-project elevations and contours.

t. Once the authorized work in waters of the U.S. is complete, the permittee shall sign and return the compliance certificate that is attached to the RGP verification letter.

u. The District Engineer will consider any comments from Federal and/or State agencies concerning the proposed activity's compliance with the terms and conditions of this RGP.

v. The Corps may place additional special conditions, limitations, or restrictions on any verification of the use of RGP 50 on a project-by-project basis.

2. General Conditions.

a. Except as authorized by this RGP or any Corps approved modification to this RGP, no excavation, fill or mechanized land-clearing activities shall take place within waters or wetlands, at any time during construction or maintenance of the project. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area. This prohibition applies to all borrow and fill activities connected with the project.

b. Authorization under this RGP does not obviate the need to obtain other federal, state, or local authorizations.

c. All work authorized by this RGP must comply with the terms and conditions of the applicable CWA Section 401 Water Quality Certification for this RGP issued by the North Carolina Division of Water Resources (NCDWR).

d. The permittee shall employ all sedimentation and erosion control measures necessary to prevent an increase in sedimentation or turbidity within waters and wetlands outside of the permit area. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4).

e. The activities authorized by this RGP must not interfere with the public's right to free navigation on all navigable waters of the U.S. No attempt will be made by the permittee to prevent the full and free use by the public of all navigable waters at, or adjacent to, the authorized work for a reason other than safety.

f. The permittee understands and agrees that if future operations by the U.S. require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the U.S. No claim shall be made against the U.S. on account of any such removal or alteration.

g. The permittee, upon receipt of a notice of revocation of this RGP for the verified individual activity, may apply for an individual permit, or will, without expense to the U.S. and in such time and manner as the Secretary of the Army or his/her authorized representative may direct, restore the affected water of the U.S. to its former conditions.

h. This RGP does not authorize any activity that would conflict with a federal project's congressionally authorized purposes, established limitations or restrictions, or limit an agency's ability to conduct necessary operation and maintenance functions. Per Section 14 of the Rivers and Harbors Act of 1899, as amended (33 U.S.C. 408), no project that has the potential to take possession of or make use of for any purpose, or build upon, alter, deface, destroy, move, injure, or obstruct a federally constructed work or project, including, but not limited to, levees, dams, jetties, navigation channels, borrow areas, dredged material disposal sites, flood control projects, etc., shall be permitted unless the project has been reviewed and approved by the appropriate Corps approval authority. Permittees shall not begin the activity authorized by this RGP until notified by the Corps that the activity may proceed.

i. The permittee shall obtain a Consent to Cross Government Easement from the appropriate Corps District's Land Use Coordinator prior to any crossing of a Corps easement and/or prior to commencing construction of any structures, authorized dredging, or other work within the right-of-way of, or in proximity to, a federally designated disposal area.

j. The permittee will allow the Wilmington District Engineer or his/her representative to inspect the authorized activity at any time deemed necessary to ensure that the activity is being performed or maintained in strict accordance with the Special and General Conditions of this permit.

k. This RGP does not grant any property rights or exclusive privileges.

l. This RGP does not authorize any injury to the property or rights of others.

m. This RGP does not authorize the interference with any existing or proposed federal project.

n. In issuing this permit, the Federal Government does not assume any liability for the following:

(1) Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

(2) Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the U.S. in the public interest.

(3) Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

(4) Design or construction deficiencies associated with the permitted work.

(5) Damage claims associated with any future modification, suspension, or revocation of this permit.

o. Authorization provided by this RGP may be modified, suspended or revoked in whole, or in part, if the Wilmington District Engineer, acting for the Secretary of the Army, determines that such action would be in the best public interest. The term of this RGP shall be five (5) years unless subject to modification, suspension, or revocation. Any modification, suspension, or revocation of this authorization will not be the basis for any claim for damages against the U.S. Government.

p. No activity may occur in a component of the National Wild and Scenic Rivers System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or "study river" (e.g., National Park Service, U.S. Forest Service, etc.).

q. Endangered Species.

(1) No activity is authorized under this RGP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under this RGP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(2) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal prospective permittees (and when FHWA is the lead federal agency) must provide the District Engineer with the appropriate documentation to demonstrate compliance with those requirements. The District Engineer will review the documentation and determine whether it is sufficient to address ESA compliance for the RGP activity, or whether additional ESA consultation is necessary.

(3) Non-federal prospective permittees - for activities that might affect federally-listed endangered or threatened species or designated critical habitat, the PCN must include the name(s) of the endangered or threatened species that might be affected by the proposed work or that utilize the designated critical habitat that might be affected by the proposed work. The District Engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat. In cases where the non-federal prospective permittee has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the prospective permittee shall not begin work until the Corps has provided notification that the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed.

(4) As a result of formal or informal consultation with the U.S. Fish and Wildlife Service (USFWS) or NMFS, the District Engineer may add species-specific endangered species conditions to the RGP verification letter for a project.

(5) Authorization of an activity by a RGP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the USFWS or the NMFS, the ESA prohibits any person subject to the jurisdiction of the U.S. to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(6) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the USFWS in North Carolina at the addresses provided below, or from the USFWS and NMFS via their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.noaa.gov/fisheries.html respectively.

USFWS offices in North Carolina:

The Asheville USFWS Office covers all NC counties west of, and including, Anson, Stanly, Davidson, Forsyth and Stokes Counties.

US Fish and Wildlife Service
Asheville Field Office
160 Zillicoa Street
Asheville, NC 28801
Telephone: (828) 258-3939

The Raleigh USFWS Office covers all NC counties east of, and including, Richmond, Montgomery, Randolph, Guilford, and Rockingham Counties.

US Fish and Wildlife Service
Raleigh Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
Telephone: (919) 856-4520

r. The Wilmington District, USFWS, NCDOT, and the FHWA have conducted programmatic Section 7(a)(2) consultation for a number of federally listed species and habitat, and programmatic consultation concerning other federally listed species and/or habitat may occur in the future. The result of completed programmatic consultation is a Programmatic Biological Opinion (PBO) issued by the USFWS. These PBOs contain mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" of whichever species or critical habitat is covered by a specific PBO. Authorization under RGP 50 is conditional upon the permittee's compliance with all the mandatory terms and conditions associated with incidental take of the applicable PBO (or PBOs), which are incorporated by reference in RGP 50. Failure to comply with the terms and conditions associated with incidental take of an applicable PBO, where a take of the federally listed species occurs, would constitute an unauthorized take by the permittee, and would also constitute permittee non-compliance with the authorization under RGP 50. If the terms and conditions of a specific PBO (or PBOs) apply to a project, the Corps will include this/these requirements in any RGP 50 verification that may be issued for a project. The USFWS is the appropriate authority to determine compliance with the terms and conditions of its PBO, and with the ESA.

s. Northern long-eared bat (NLEB) (*Myotis septentrionalis*). Standard Local Operating Procedures for Endangered Species (SLOPES) for the NLEB have been approved by the Corps and the U.S. Fish and Wildlife Service. See http://www.saw.usace.army.mil/Missions/Regulatory-Permit-Program/Agency-Coordination/ESA/ . This SLOPES details how the Corps will make determinations of effect to the NLEB when the Corps is the lead federal agency for an NCDOT project that is located in the western 41 counties of North Carolina. This SLOPES does not address NCDOT projects (either federal or state funded) in the eastern 59 counties in North Carolina. Note that if another federal agency is the lead federal agency for a project in the western 41 counties, procedures for satisfying the requirements of Section 7(a)(2) of the ESA will be dictated by that agency and will not be applicable for consideration under the SLOPES; however, information that demonstrates the lead federal agency's (if other than the Corps) compliance with Section 7(a)(2) / 4(d) Rule for the NLEB, will be required in the PCN. Note that at the time of issuance of RGP 50, the federal listing status of the NLEB as "Threatened" is being litigated at the National level. If, as a result of litigation, the NLEB is federally listed as "Endangered", this general condition ("s") will no longer be applicable because the 4(d) Rule, and this NLEB SLOPES, will no longer apply/be valid.

t. For proposed activities the sixteen (16) counties listed below, prospective permittees must provide a copy of the PCN to the USFWS, 160 Zillicoa Street, Asheville, North Carolina 28801. This PCN must be sent concurrently to the USFWS and the Corps Project Manager for that specific county.

The 16 counties with tributaries that drain to designated critical habitat that require notification to the Asheville USFWS are: Avery, Cherokee, Forsyth, Graham, Haywood, Henderson, Jackson, Macon Mecklenburg, Mitchell, Stokes, Surry, Swain, Transylvania, Union and Yancey.

u. If the permittee discovers or observes any live, damaged, injured or dead individual of an endangered or threatened species during construction, the permittee shall immediately notify the Wilmington District Engineer so that required coordination can be initiated with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service.

v. Historic Properties.

(1) In cases where the District Engineer determines that the activity may have the potential to cause effects to properties listed, or eligible for listing, in the National Register of Historic Places (NRHP), the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(2) Federal prospective permittees (or when FHWA is the lead federal agency) should follow their own procedures for complying with the requirements of Section 106 of the NHPA. Federal prospective permittees must provide the District Engineer with the appropriate documentation to demonstrate compliance with those requirements; this includes copies of correspondence sent to all interested, federally recognized tribes and a summary statement about

tribal consultation efforts or, if the Corps enters into a Programmatic Agreement (PA) with the FHWA/NCDOT, documentation that the FHWA/NCDOT has complied with PA requirements. The District Engineer will review the documentation and determine whether it is sufficient to address Section 106 compliance for this RGP activity, or whether additional Section 106 consultation is necessary.

(3) Non-federal prospective permittees - the PCN must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer (SHPO) and/or Tribal Historic Preservation Officer (THPO), as appropriate, and the NRHP (see 33 CFR 330.4(g)). When reviewing PCNs, the District Engineer will comply with the current procedures for addressing the requirements of Section 106 of the NHPA. The District Engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the District Engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties.

(4) Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)).

(5) Section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to a prospective permittee who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit will relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the prospective permittee. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the prospective permittee, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

w. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this general permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

x. Permittees are advised that development activities in or near a floodway may be subject to the National Flood Insurance Program that prohibits any development, including fill, within a floodway that results in any increase in base flood elevations. This general permit does not authorize any activity prohibited by the National Flood Insurance Program.

y. The permittee must install and maintain, at his/her expense, any signal lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, on authorized facilities. For further information, the permittee should contact Coast Guard Sector North Carolina at (910) 772-2191 or email Coast Guard Fifth District at cgd5waterways@uscg.mil.

z. The permittee must maintain any structure or work authorized by this general permit in good condition and in conformance with the terms and conditions of this general permit. The permittee is not relieved of this requirement if the permittee abandons the structure or work. Transfer in fee simple of the work authorized by this general permit will automatically transfer this general permit to the property's new owner, with all of the rights and responsibilities enumerated herein. The permittee must inform any subsequent owner of all activities undertaken under the authority of this general permit and provide the subsequent owner with a copy of the terms and conditions of this general permit.

aa. At his or her sole discretion, any time during the processing cycle, the Wilmington District Engineer may determine that this general permit will not be applicable to a specific proposal. In such case, the procedures for processing an individual permit in accordance with 33 CFR 325 will be available.

bb. Except as authorized by this general permit or any Corps approved modification to this general permit, all fill material placed in waters or wetlands shall be generated from an upland source and will be clean and free of any pollutants except in trace quantities. Metal products, organic materials (including debris from land clearing activities), or unsightly debris will not be used.

cc. Except as authorized by this general permit or any Corps approved modification to this general permit, all excavated material will be disposed of in approved upland disposal areas.

dd. Activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon this general permit will remain authorized provided the activity is completed within twelve months of the date of the general permit's expiration, modification, or revocation. Activities completed under the authorization of this general permit that were in effect at the time the activity was completed continue to be authorized by the general permit.

ee. The permittee is responsible for obtaining any “take” permits required under the USFWS’s regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the USFWS to determine if such “take” permits are required for a particular activity.

ff. The activity must comply with applicable FEMA approved state or local floodplain management requirements.

gg. There will be no unreasonable interference with navigation or the right of the public to riparian access by the existence or use of activities authorized by this RGP.

hh. Unless authorization to fill those specific wetlands or mudflats has been issued by the Corps, heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

ii. This RGP will not be applicable to proposed construction when the Wilmington District Engineer determines that the proposed activity will significantly affect the quality of the human environment and determines that an EIS must be prepared.

BY AUTHORITY OF THE SECRETARY OF THE ARMY:

Robert J. Clark
Colonel, U. S. Army
District Commander

T.I.P.: R-5799

CONTRACT: C204856

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

TIP NO.	SHEET NO.
R-5799	SIGN-1

APPROVED: _____

DATE: _____

SEAL

NORTH CAROLINA PROFESSIONAL SEAL 042357 ENGINEER ALLISON C. DRAKE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SIGNING PLAN

TRANSYLVANIA COUNTY

LOCATION: INTERSECTIONS OF US 64, US 276 AND NC 280
CONSTRUCT INTERSECTION IMPROVEMENTS

ROADWAY STANDARD DRAWING

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
901.10	TYPE 'A' SIGNS
901.50	ARROWS AND SHIELDS
901.70	SIGN STRINGERS AND SUPPORT SPACING
901.80	SIGN MOUNTING DETAILS - FOR TYPE A AND TYPE B SIGNS
903.10	GROUND MOUNTED SIGN SUPPORTS
904.10	ORIENTATION OF GROUND MOUNTED SIGNS
904.30	SUPPLEMENTAL SIGN MOUNTING
904.50	MOUNTING OF TYPE 'D', 'E' AND 'F' SIGNS ON 'U' CHANNEL POSTS
910.40	SINGLE/TWO LANE ROUNDABOUT WITH PEDESTRIAN

GENERAL NOTES

. SIGNS FURNISHED BY DEPARTMENT
. CONFIRM IN WRITING AT LEAST 4 MONTHS IN ADVANCE, THE ACTUAL DATE THE DEPARTMENT FURNISHED SIGNS WILL BE REQUIRED.
. ALL TYPE 'D' SIGNS SHALL BE MOUNTED ON TWO U-CHANNEL POSTS UNLESS OTHERWISE INDICATED ON THE PLANS.
. IF REMOVAL OR RELOCATION OF SIGNS ON PRIVATE STREET (NON-STATE MAINTAINED) IS REQUIRED DUE TO CONSTRUCTION, THE CONTRACTOR SHALL INFORM THE ENGINEER. THE WORK WILL BE COMPLETED BY OTHERS.
. WHEN NOT STATIONED OR DIMENSIONED ON PLANS, ALL 'E' AND 'F' SIGNS SHALL BE FIELD LOCATED BY THE ENGINEER
. ALL EXISTING SIGNS ON "U" CHANNEL POST WITHIN THE PROJECT LIMITS SHALL BE REMOVED AND DISPOSED OF UNLESS OTHERWISE NOTED ON PLANS.
. WHEN EXISTING SIGNS ARE REMOVED AND INSTALLED ON NEW SUPPORTS, THE RE-ERECTION SHALL IMMEDIATELY FOLLOW THE REMOVAL.
. THE BACKGROUND FOR TYPE E & F SIGNS SHALL BE TYPE C REFLECTIVE SHEETING.
. SEE ROADWAY PLANS FPR GUARD/GUIDE RAIL DETAILS.

SUMMARY OF QUANTITIES

ITEM NO. DESC. NO.	ITEM NO. SECT. NO.	ITEM DESCRIPTION	QUANTITY	UNIT
4054000000	902	PLAIN CONCRETE SIGN FOUNDATION	1	C.Y.
4060000000	903	SUPPORTS, BREAKAWAY STEEL BEAM	204	LB.
4072000000	903	SUPPORTS, 3 LB STEEL U-CHANNEL	1410	L.F.
4096000000	904	SIGN ERECTION, TYPE D	11	EA.
4102000000	904	SIGN ERECTION, TYPE E	109	EA.
4108000000	904	SIGN ERECTION, TYPE F	13	EA.
4110000000	904	SIGN ERECTION, TYPE A (GROUND MOUNTED)	1	EA.
4116100000	904	SIGN ERECTION, RELOCATE SIGN TYPE D	27	EA.
4138000000	907	DISPOSAL OF SUPPORT, STEEL BEAM	2	EA.
4155000000	907	DISPOSAL OF SIGN SYSTEM, U-CHANNEL	46	EA.
4192000000	907	DISPOSAL OF SUPPORT, U-CHANNEL	20	EA.
4236000000	907	DISPOSAL OF SIGN, A OR B (GROUND MOUNTED)	1	EA.
4238000000	907	DISPOSAL OF SIGN, D, E OR F	17	EA.

INDEX

PLAN SUBMITTED TO: N.C.D.O.T. SIGNING AND DELINEATION UNIT

KELVIN JORDAN — SIGNING & DELINEATION REGIONAL ENGINEER

WALTER JOHNSON — SIGNING & DELINEATION PROJECT DESIGN ENGINEER

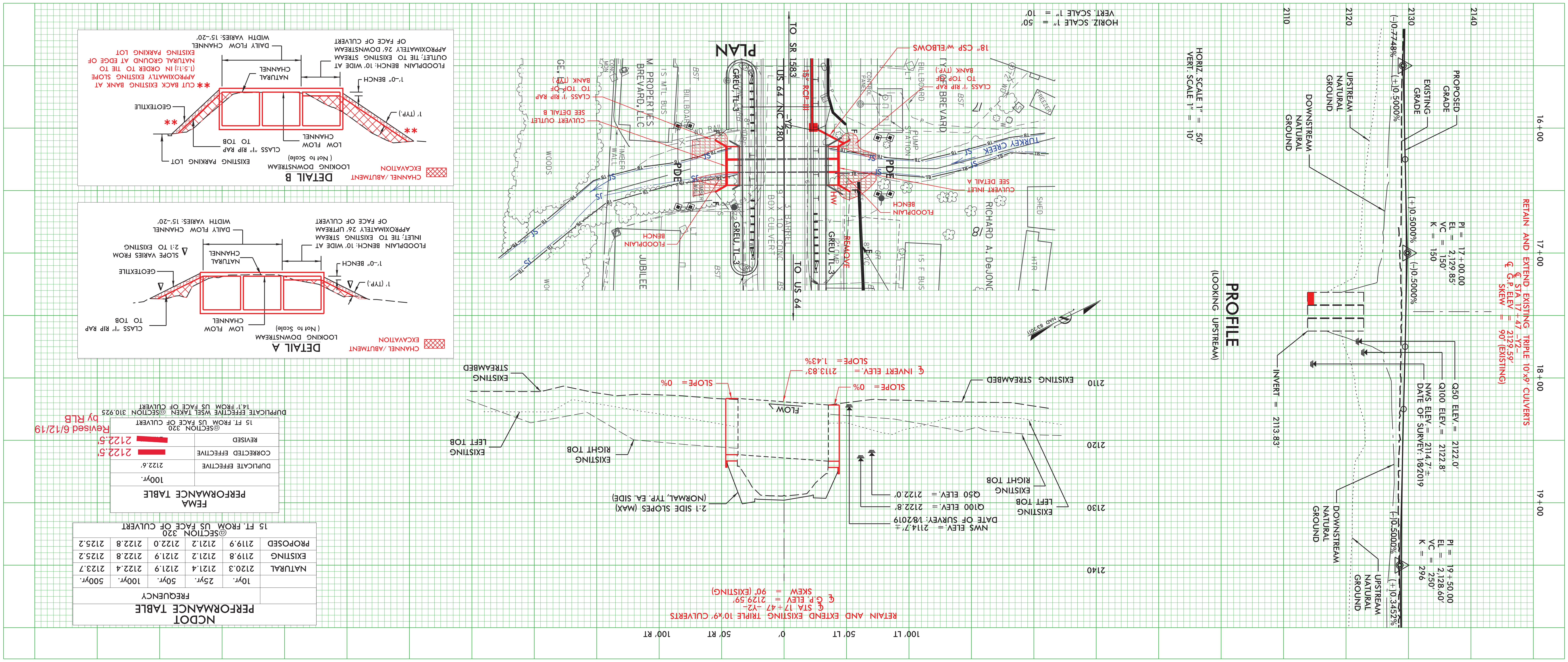
PLAN PREPARED BY: RS&H

ALLISON DRAKE, PE — PROJECT ENGINEER

REBECCA MCLAUGHLIN, EI — PROJECT DESIGN ENGINEER

RS&H 1520 SOUTH BOULEVARD, SUITE 200 CHARLOTTE, NC 28203 NC FIRM LICENSE No: F-0493

5/25/2023
R:\Traffic\Signing\CADD\Signing Layout Plans\R-5799_sign_tsh.dgn
User:MCLaughR



ADDITIONAL INFORMATION AND COMPUTATIONS

USGS SIR 2009–5158 (REGION 2, RURAL BLUE RIDGE)

DRAINAGE AREA = 5.74 SQ. MI.

Q_{10} = 288(DA)$^{0.736}$ = 1040 cfs FEMA Q_{100} = 2200 cfs

Q_{25} = 398(DA)$^{0.724}$ = 1400 cfs FEMA DA AT CONFLUENCE WITH

Q_{50} = 479(DA)$^{0.718}$ = 1700 cfs DAVIDSON RIVER = 5.66 SQ. MI.

Q_{100} = 575(DA)$^{0.713}$ = 2000 cfs

Q_{500} = 794(DA)$^{0.704}$ = 2700 cfs

NATIVE BED MATERIAL:

NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

*A LOCAL RESIDENT STATED THAT THE ROAD HAS NEVER BEEN OVERTOPPED IN THE 50+ YEARS THAT HE HAS LIVED IN THE AREA.

NO UPSTREAM OR DOWNSTREAM STRUCTURES THAT WERE IN PLACE AT THE TIME THAT THE PROJECT WAS DESIGNED WILL BE ADVERSELY IMPACTED BY WSEL'S FROM THIS PROJECT.

SITE DATA

Drainage Area 5.74 SQ.MI. Source DELINEATED USGS STREAMSTATS VERIFIED WITH LIDAR DATA

River Basin FRENCH BROAD Character RURAL

Stream Classification (Such as Trout, High Quality Water, etc.) WS–V, B; Tr

Data on Existing Structure 3 BARREL RCBC @ 10'x9' & HEADWALL W/WING WALLS ABUTMENT HEIGHT BED TO CROWN = 15.0 FT.

Total Waterway Opening 250 s.f. Waterway Opening Below 100yr. WS EL. 250 s.f.

Debris Potential: Low ☐ Moderate ☒ High ☐

Data on Structures Up and Down Stream DOWNSTREAM: CONFLUENCE WITH DAVIDSON RIVER UPSTREAM: SINGLE SPAN BRIDGE ON SR 1511; HEIGHT BED TO CROWN = 8.0 FT.

Gage Station No. N/A Period of Records N/A yrs.

Historical Flood Information: *SEE ADDITIONAL INFORMATION AND COMPUTATIONS SECTION

Date N/A* Elev. <2128'* ft. Est. Freq. N/A* yr. Source LOCAL RESIDENT Period of Knowledge 50+ yrs.

Date N/A Elev. N/A ft. Est. Freq. N/A yr. Source Period of Knowledge yrs.

Allowable HW Elev. 2122.8' EXISTING 100yr WSEL @ RS 320 Normal Water Surface Elev. 2114.7'± ft. DATE OF SURVEY: 1/8/2019

Manning's n : Left O.B. 0.12 Channel 0.04 Right O.B. 0.12 Obtained From EFFECTIVE MODEL, VERIEIFED BY FIELD INVESTIGATION

Flood Study /Status FEMA FIS (ZONE AE) LIMITED STUDY (EFF 10/2/2009; REV 4/19/2010) Non–Encroachment Established? YES

Flood Study 100 yr. Discharge 2200 c.f.s.; WS Elev.: With Non–Encroachment 2123.0** ft. Without Non–Encroachment 2122.0** ft.

@ RIVER STATION 310.925
**EFFECTIVE WSEL = 2124.7' DUE TO BACKWATER FROM THE DAVIDSON RIVER

DESIGN DATA

Hydrological Method USGS SIR 2009–5158 (REGION 2, RURAL BLUE RIDGE)

Hydraulic Design Method HEC RAS VERSION 4.1.0 – R–5799 TURKEY CREEK US–64

Design Tailwater : Q_{10} 6.2 ft.; Q_{25} 7.1 ft.; Q_{50} 7.4 ft.; Q_{100} 7.6 ft.; Q_{500} 8.1 ft.

INV. IN EL.=2114.3' OUT EL.=2113.4'

SIZE & TYPE: 3–10'x9' RCBC @STATION 320, APPROX. 15 FT UPSTREAM OF CULVERT

FREQUENCY	Q (cfs)	Inlet Control HW/D	Inlet Control H.W.	Inlet Control WSEL	Outlet Control H.W.	Outlet Control WSEL	Remarks
25 YR	1400	0.7	6.5	2120.8	6.9	2121.2'	OUTLET CONTROL
50 YR	1700	0.8	7.6	2121.9	7.7	2122.0'	OUTLET CONTROL
100 YR	2000	0.9	8.5	2122.8	8.5	2122.8'	OUTLET CONTROL
500 YR	2700	1.2	10.9	2125.2	10.9	2125.2'	INLET CONTROL

Is a Floodway Revision Required? MOA TYPE 1 Total Proposed Waterway Opening 260 s.f.

AN INCREASE IS ONLY PRESENT AT ONE UPSTREAM RS, WHICH IS CONTROLLED BY BACKWATER FROM DAVIDSON RIVER

Outlet Velocity (V_{10}) 6.8 f.p.s. Natural Channel Velocity (V_{10}) 4.8 f.p.s.

Required Outlet Protection CLASS 'I' RIP RAP ON BANKS

INFORMATION TO BE SHOWN ON PLANS

WS EL. Taken @ River Station 10141

Design: Discharge 1700 c.f.s. Frequency 50 yr. Elev. 2122.0 ft.

Base Flood: Discharge 2000 c.f.s. Frequency 100 yr. Elev. 2122.8 ft.

Overtopping: Discharge 3500 c.f.s. Frequency 500+ yr. Elev. 2128.2 ft. SAG @ –Y2– STA 29+00±

CULVERT SURVEY & HYDRAULIC DESIGN REPORT

N. C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
HYDRAULICS UNIT
RALEIGH, N. C.

I.D. No. R–5799 Project No. 44984.1.1 Proj. Station –Y2– 17+47

County TRANSYLVANIA Stream TURKEY CREEK Stru. No. 0099

On Highway US–64 HENDERSONVILLE HWY Between US 64 /NC 280 ASHEVILLE HWY and SR 1583 DAVIDSON RIVER RD

Recommended Structure RETAIN & EXTEND EXISTING TRIPLE 10'x9' REINFORCED CONCRETE BOX CULVERT 10' UPSTREAM AND 11' DOWNSTREAM

Recommended Width of Roadway 67' SHOULDER PT TO SHOULDER PT Skew 90°

Recommended Location is (Up, At, Down) Stream from Existing Crossing.

Latitude 35.27312 Longitude –82.70170

Statewide Tier ☒ Regional Tier ☐ Sub–Regional Tier ☐

Bench Mark is BM#2 SPIKE NAIL SET IN 36" WHITE OAK STUMP 132.4' RT OF –Y2– STA. 13+01.67

NORTHING: 894976 EASTING: 574980 Elev. 2129.56 ft. Datum: NAVD 88

Temporary Crossing NONE

Designed by: ALEXANDER R VINSON, EI

Assisted by: BENJAMIN J FULLENWIDER, EI

Project Engineer : RICHARD L BOLLINGER, PE

Reviewed by: DocuSigned by: Bradley S. Ridenour 73D412120A31454... 3/15/2019

Date 2/15/2019

RS&H

NORTH CAROLINA PROFESSIONAL ENGINEER RICHARD LEON BOLLINGER, JR. DocuSigned by: 5CB217383F98476...

2/15/2019

88_0099_2018_R-5799_TURKEY CREEK_US64.PDF
Stream TURKEY CREEK Struc. Inv. No. 0099 I.D. No. R–5799 Project No. 44984.1.1 PDF File

ACCOUNTS RECEIVABLE
LANDSCAPE
1000013134

AGREEMENT OVERVIEW

DATE: 3/8/2023

NORTH CAROLINA
TRANSYLVANIA COUNTY

PROJECT NUMBERS

TIP NUMBER: R-5799(L)
WBS ELEMENTS: 44984.3.2

PARTIES TO THE AGREEMENT:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

AND

CITY OF BREVARD

The purpose of this Agreement is to identify the participation in project costs, project delivery and/or maintenance, by the other party to this Agreement, as further defined in this Agreement.

SCOPE OF PROJECT: The Project consists of landscape installation within the Project scope limits of R-5799(L). The City of Brevard shall maintain all landscape post construction. The City of Brevard shall be responsible for all cost above the 1.5% as specified in STIP funding.

ESTIMATED COST OF THE PROJECT: $353,727
ESTIMATED PARTICIPATION BY THE DEPARTMENT: $240,000
ESTIMATED COSTS TO OTHER PARTY: $113,727

PAYMENT TERMS: The Department will bill the other party upon completion of the Project.

MAINTENANCE: Municipality

EFFECTIVE DATES OF AGREEMENT:
START: Upon Full Execution of this Agreement
END: When work is complete and all terms are met.

This **AGREEMENT** is made and entered into on the last date executed below, by and between the North Carolina Department of Transportation, an agency of the State of North Carolina, hereinafter referred to as the **Department** and the City of Brevard, hereinafter referred to as the **Municipality**

The parties to this Agreement, listed above, intend that this Agreement, together with all attachments, schedules, exhibits, and other documents that both are referenced in this Agreement and refer to this Agreement, represents the entire understanding between the parties with respect to its subject matter and supersedes any previous communication or agreements that may exist.

W I T N E S S E T H:

WHEREAS, the **Department** and the **Municipality** propose to make certain landscape/streetscape improvements under Project R-5799(L) in Transylvania, North Carolina; and

WHEREAS, the **Municipality** has requested the **Department** to perform the installation of landscape aesthetics.

WHEREAS, the **Municipality** has agreed to participate in the maintenance responsibilities of the Project as hereinafter set out.

NOW, THEREFORE, the parties hereto, each in consideration of the promises and undertakings of the other as herein provided, do hereby covenant and agree, each with the other, as follows.

I. RESPONSIBILITIES

I. The **Department** shall be responsible for all phases of project delivery to include planning and installation of landscape aesthetics, and the Municipality will be responsible for maintenance as shown in the **PROJECT DELIVERY** Provision.

II. The **Municipality** shall be responsible for payment as shown in the **COSTS AND FUNDING** Provision.

II. PROJECT DELIVERY REQUIREMENTS

PLANNING, DESIGN, AND INSTALLATION

The **Department** will be responsible for preparing the environmental and/or planning document, obtaining any environmental permits and preparing the project plans and specifications.

The **Department** shall install, or caused to be installed, said plantings, streetscape items and lighting in accordance with the plans and specifications of said project as filed with, and approved by, the **Department**.

MAINTENANCE

LANDSCAPING

Upon completion of the plantings, the **Municipality** shall maintain said planting areas and landscape. The **Municipality** will pay to replace the splitter islands with concrete in full if they become a maintenance issue.

The **Municipality** shall assume responsibility for all maintenance and replacement of the landscape materials. Maintenance shall include, but not be limited to, the following: watering, irrigation, mulching, pruning, fertilizing, weeding, pest control, mowing, and replacing plant materials. All costs of maintenance shall be borne by the **Municipality**, in accordance with the following provisions:

A. The **Municipality** agrees to continually maintain all plantings in accordance with generally accepted horticultural practices. The **Department** shall have the right to periodically inspect the maintenance practices being utilized by the **Municipality**.

B. If the **Department** determines that the **Municipality** is not properly maintaining the plantings, the **Department** shall notify the **Municipality**. If proper maintenance is not performed by the **Municipality** within a reasonable time after notification, the **Municipality** agrees that the **Department** shall perform the necessary maintenance, or at the **Department's** option, shall return the planted area to a natural condition (i.e. seeded and mulched, etc.). It is further agreed that the costs of the restoration shall be reimbursed to the **Department** by the **Municipality**. Reimbursement to the **Department** shall be made in one final payment within sixty (60) days of invoicing by the **Department**. The **Department** shall charge a late payment penalty and interest on any unpaid balance due in accordance with N.C.G.S. § 147-86.23.

The **Department**, at the end of the one (1) year establishment period, shall not be responsible for any damage to the plantings that may be done by third parties.

III. COSTS AND FUNDING

The **Department** will participate in costs of landscaping up to 1.5% of the construction contract. Any costs that exceed that amount are the responsibility of the **Municipality.** The estimated cost of the landscaping is $357,727. The **Department's** estimated participation is $240,000. The **Municipality's** estimated responsibility is $113,727.

Upon completion of the Project, the **Department** will bill the **Municipality** all costs that exceed the **Department's** participation. The **Municipality** shall reimburse the **Department** within sixty (60) days of invoicing by the **Department**. The **Department** will charge a late payment penalty and interest on any unpaid balance due in accordance with G. S. 147-86.23.

I. STANDARD PROVISIONS

Agreement Modifications

Any modification to scope, funding, responsibilities, or time frame will be agreed upon by all parties by means of a written Supplemental Agreement.

Assignment of Responsibilities

The Department must approve any assignment or transfer of the responsibilities of the Municipality set forth in this Agreement to other parties or entities.

Agreement for Identified Parties Only

This Agreement is solely for the benefit of the identified parties to the Agreement and is not intended to give any rights, claims, or benefits to third parties or to the public at large.

Other Agreements

The Municipality is solely responsible for all agreements, contracts, and work orders entered into or issued by the Municipality to meet the terms of this Agreement. The Department is not responsible for any expenses or obligations incurred for the terms of this Agreement except those specifically eligible for the funds and obligations as approved by the Department under the terms of this Agreement.

Authorization to Execute

The parties hereby acknowledge that the individual executing this Agreement has read this Agreement, conferred with legal counsel, fully understands its contents, and is authorized to execute this Agreement and to bind the respective parties to the terms contained herein.

Debarment Policy

It is the policy of the Department not to enter into any agreement with parties that have been debarred by any government agency (Federal or State). By execution of this agreement, the Entity certifies that neither it nor its agents or contractors are presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from participation in this transaction by any Federal or State Agency or Department and that it will not enter into agreements with any entity that is debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from participation in this transaction.

Indemnification

To the extent authorized by state and federal claims statutes, the Entity shall be responsible for its actions under the terms of this agreement and save harmless the FHWA (if applicable), the Department, and the State of North Carolina, their respective officers, directors, principals, employees, agents, successors, and assigns to the extent allowed by law, from and against any and all claim for payment, damages and/or liabilities of any nature, asserted against the Department in connection with this Agreement. The Department shall not be liable and shall be held harmless from any and all third party claims that might arise on account of the Entity's negligence and/or responsibilities under the terms of this agreement.

Availability of Funds

All terms and conditions of this Agreement are dependent upon, and, subject to the allocation of funds for the purpose set forth in the Agreement and the Agreement shall automatically terminate if funds cease to be available.

Gift Ban

By Executive Order 24, issued by Governor Perdue, and NCGS 133-32, it is unlawful for any vendor or contractor (i.e. architect, bidder, contractor, construction manager, design professional, engineer, landlord, offeror, seller, subcontractor, supplier, or vendor), to make gifts or to give favors to any State employee of the Governor's Cabinet Agencies (i.e. Administration, Commerce, Correction, Crime Control and Public Safety, Cultural Resources, Environment and Natural Resources, Health and Human Services, Juvenile Justice and Delinquency Prevention, Revenue, Transportation, and the Office of the Governor).

SIGNATURE PAGE

IN WITNESS WHEREOF, this Agreement has been executed the day and year heretofore set out, on the part of the DEPARTMENT and the MUNICIPALITY by authority duly given.

City of Brevard

FED TAX ID NO: 56-6001186

REMITTANCE ADDRESS:

95 West Main St. Brevard, NC 28712

Authorized Signer: DocuSigned by: Wilson Hooper 5AEEEF16B74E406...

Print Name: Wilson Hooper

Title: City Manager

Date Signed: 06/08/2023

If applicable, this Agreement has been pre-audited in the manner required by the Local Government Budget and Fiscal Act:

Finance Officer: DocuSigned by: Dean Luebbe 592A80939B20488...

Print Name: Dean Luebbe

Date Signed: 06/08/2023

DEPARTMENT OF TRANSPORTATION

BY: DocuSigned by: 383C434421994A4...

TITLE: Chief Engineer

DATE: 06/09/2023

APPROVED BY BOARD OF TRANSPORTATION ITEM O: 4/6/2023 (DATE) DS

ACCOUNTS RECEIVABLE
TIP AGREEMENT-ADDITIONAL WORK
CONSTRUCTION
1000017833

AGREEMENT OVERVIEW

DATE: 4/19/2023

NORTH CAROLINA
TRANSYLVANIA COUNTY

PROJECT NUMBERS

TIP NUMBER: R-5799
WBS ELEMENT (PE):
WBS ELEMENT (ROW):
WBS ELEMENT (CON): 44984.3.1

PARTIES TO THE AGREEMENT:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION "DEPARTMENT"

AND

CITY OF BREVARD "MUNICIPALITY"

The purpose of this Agreement is to identify the participation in project costs, project delivery and/or maintenance, by the other party to this Agreement, as further defined in this Agreement.

SCOPE OF TIP Project ("Project"): The Project consists of construction improvements at the intersections of US 64 and US 276 and US 64 and NC 280.

ADDITIONAL WORK: At the request of Municipality the Department will construct sidewalks at the intersection of US 64 and NC 280.

ESTIMATED COST OF THE ADDITIONAL WORK: $202,050
COSTS TO OTHER PARTY: $40,410
DEPARTMENT'S FUNDING: $161,640

PAYMENT TERMS: The Department will bill the City of Brevard upon completion of the Project.

MAINTENANCE: City of Brevard

EFFECTIVE DATES OF AGREEMENT:
START: Upon Full Execution of this Agreement
END: When work is complete and all terms are met.

This **AGREEMENT** is made and entered into on the last date executed below, by and between the North Carolina Department of Transportation, an agency of the State of North Carolina, hereinafter referred to as the **Department** and the **City of Brevard**, hereinafter referred to as the **Municipality.**

The parties to this Agreement, listed above, intend that this Agreement, together with all attachments, schedules, exhibits, and other documents that both are referenced in this Agreement and refer to this Agreement, represents the entire understanding between the parties with respect to its subject matter and supersedes any previous communication or agreements that may exist.

I. WHEREAS STATEMENTS

WHEREAS, this Agreement is made under the authority granted to the **Department** by the North Carolina General Assembly under General Statutes of North Carolina (NCGS), particularly Chapter 136-66.1 and 136-66.3; and,

WHEREAS, the **Department** and the **Municipality** have agreed that the jurisdictional limits of the Parties, as of the date of entering the agreement for the above-mentioned project, are to be used in determining the duties, responsibilities, rights and legal obligations of the Parties hereto for the purposes of this Agreement; and,

WHEREAS, the **Municipality** has requested that the **Department** perform all phases of said work or provide services; and,

WHEREAS, the Parties hereto wish to enter into an agreement for scoped work to be performed or provided by the **Department** (including reviews, goods or services) with reimbursement for the costs thereof by the **Municipality** as hereinafter set out; and,

NOW, THEREFORE, this Agreement states the promises and undertakings of each party as herein provided, and the parties do hereby covenant and agree, each with the other, as follows:

II. RESPONSIBILITIES

- The **Department** shall be responsible for all phases of project delivery to include construction as shown in the **PROJECT DELIVERY** Provision. The **Municipality** shall be responsible for maintenance.
- The **Municipality** shall be responsible for maintenance of the additional work, as shown in the **PROJECT DELIVERY** Provision; and payment as shown in the **COSTS AND FUNDING** Provision.

III. PROJECT DELIVERY REQUIREMENTS

A. PLANNING, DESIGN, AND CONSTRUCTION

The **Department** will be responsible for preparing the environmental and/or planning document, obtaining any environmental permits and preparing the project plans and specifications.

The **Department** shall construct the Project in accordance with the plans and specifications for the Project. The **Department** shall administer the construction contract for said Project. All work shall be done in accordance with Departmental standards, specifications, policies and procedures.

B. RIGHT OF WAY ACQUISITION

The **Department** will be responsible for acquiring any needed right of way required for the Project in accordance with the policies and procedures set forth in the North Carolina Right of Way Manual.

C. MUNICIPAL UTILITY RELOCATIONS

RESPONSIBILITIES

The **Municipality** shall be responsible for the relocation and adjustment of all municipally owned utilities in conflict with the Project and shall exercise any rights that it may have under any franchise to effect all necessary changes, adjustments, and relocations of communications and electric power lines; underground cables, gas lines, and, and other pipelines or conduits; or any privately- or publicly-owned utilities.

1. Said work shall be performed in a manner satisfactory to the **Department** prior to the **Department** beginning construction of the Project. The **Municipality** shall make every effort to promptly relocate said utilities in order that the **Department** will not be delayed in the construction of the Project.

2. The **Municipality** shall make all necessary adjustments to house or lot connections or services lying within the right of way or construction limits, whichever is greater, of the Project.

3. The **Department**, where necessitated by construction, will make vertical adjustments of two (2) feet or less to the existing manholes, meter boxes, and valve boxes at no expense to the Municipality.

4. The **Department** shall not be liable for any work that the **Municipality** undertakes with respect to said utility relocation.

COSTS AND FUNDING

5. If applicable, the **Department** will reimburse the **Municipality** in accordance with NCGS 136-27.1. A separate utility agreement may be prepared to address these costs and payment terms.

UTILITY RELOCATION BY DEPARTMENT

6. If the **Municipality** requests the **Department** to include the relocation and/or adjustment of municipally owned utilities in its construction contract provisions, and the **Department** agrees, then a separate utility agreement will be prepared to state the cost estimate and the reimbursement terms, if applicable. The **Municipality** shall reimburse the **Department** all or a portion of the costs associated with said relocation, in accordance with NCGS 136-27.1. Reimbursement will be based on final project plans and actual costs of relocation.

D. MAINTENANCE

Upon completion of the Project:

1. The **Department** shall be responsible for all traffic operating controls and devices which shall be established, enforced, and installed and maintained in accordance with the North Carolina General Statutes, the latest edition of the Manual on Uniform Traffic Control Devices for Streets and Highways, the latest edition of the "Policy on Street and Driveway Access to North Carolina Highway," and department criteria.

2. The roadway improvements that are within state-owned right of way shall be considered a part of the State Highway System and shall be owned and maintained by the **Department**.

3. The **Municipality** shall maintain the sidewalk within the limits of the Project.

IV. COSTS AND FUNDING

A. ADDITIONAL WORK

At the request of the **Municipality** and in accordance with the **Department**'s Pedestrian Policy Guidelines or the Complete Streets Guidelines, the **Department** shall include provisions in its construction contract for the construction of pedestrian facilities and/or other additional work as indicated in the Table below. Said work shall be performed in accordance with the additional work as indicated in the Table below. Said work shall be performed in accordance with the **Department**'s policies, procedures, standards, and specifications, and the provisions of this Agreement.

Description	Cost to Municipality
• 4,490 SY of 4" Sidewalk	$40,410
Total Estimated Cost to Municipality	**$40,410**

The estimated Municipal share of the additional work is $40,410. The Parties understand that this is an estimated cost and subject to change.

B. PROJECT COSTS

The **Municipality** has agreed to participate in Project costs as follows:

The estimated cost of the additional work is $202,050. The **Municipality** shall participate in 20% of actual costs. The estimated cost to the **Municipality** is $40,410. The **Department** will participate in the amount of $161,640 or 80% of actual costs. The **Municipality** shall be responsible for 20% all costs that exceed the total estimated cost of the Project.

C. CONFERENCE ON COSTS AS PROJECT PROGRESSES

The **Department** may consult with the **Municipality** on changes to cost estimates prior to construction, or changes to costs during construction. Consultation between the **Department** and the **Municipality** is offered as a courtesy to apprise the **Municipality** of potential cost increases and to allow appropriate budgeting. Failure of the **Department** to notify the **Municipality** of cost increases does not affect the payment terms of the agreement.

D. INVOICING BY THE DEPARTMENT

Upon completion of the Project, the **Department** will calculate actual costs of the Project and will invoice the **Municipality** for their share of the actual costs of the Additional Work. Reimbursement to the **Department** shall be made in one final payment within sixty days of invoicing by the **Department**. A late payment penalty and interest will be charged on any unpaid balance due in accordance with G. S. 147-86.23.

If the **Municipality** has pre-paid or made any previous down payment, those funds will be counted against final costs. If costs are less than the funding received, then the **Department** will return any overpayment.

In the event the **Municipality** fails for any reason to pay the **Department** in accordance with the provisions for payment hereinabove provided, North Carolina General Statute 136-41.3 authorizes the **Department** to withhold so much of the **Municipality's** share of funds allocated to said Municipality by North Carolina General Statute, Section 136-41.1, until such time as the **Department** has received payment in full.

V. STANDARD PROVISIONS

A. Agreement Modifications

Any modification to scope, funding, responsibilities, or time frame will be agreed upon by all parties by means of a written Supplemental Agreement.

B. Assignment of Responsibilities

The **Department** must approve any assignment or transfer of the responsibilities of the **Municipality** set forth in this Agreement to other parties or entities.

C. Agreement for Identified Parties Only

This Agreement is solely for the benefit of the identified parties to the Agreement and is not intended to give any rights, claims, or benefits to third parties or to the public at large.

D. Other Agreements

The **Municipality** is solely responsible for all agreements, contracts, and work orders entered into or issued by the **Municipality** to meet the terms of this Agreement. The **Department** is not responsible for any expenses or obligations incurred for the terms of this Agreement except those specifically eligible for the funds and obligations as approved by the **Department** under the terms of this Agreement.

E. Authorization to Execute

The parties hereby acknowledge that the individual executing this Agreement has read this Agreement, conferred with legal counsel, fully understands its contents, and is authorized to execute this Agreement and to bind the respective parties to the terms contained herein.

F. DocuSign

Department and **Municipality** acknowledge and agree that the electronic signature application DocuSign may be used, at the sole election of the **Department** or the **Municipality**, to execute this Agreement. By selecting "I Agree," "I Accept," or other similar item, button, or icon via use of a keypad, mouse, or other device, as part of the DocuSign application, **Department** and **Municipality** consent to be legally bound by the terms and conditions of Agreement and that such act constitutes **Department**'s signature as if actually signed by **Department** in writing or **Municipality**'s signature as if actually signed by **Municipality** in writing. **Department** and **Municipality** also agree that no certification authority or other third-party verification is necessary to validate its electronic signature and that the lack of such certification or third-party verification will not in any way affect the enforceability of its electronic signature. **Department** and **Municipality** acknowledge and agree that delivery of a copy of this Agreement or any other document contemplated hereby through the DocuSign application, will have the same effect as physical delivery of the paper document bearing an original written signature.

G. Debarment Policy

It is the policy of the **Department** not to enter into any agreement with parties that have been debarred by any government agency (Federal or State). By execution of this agreement, the **Municipality** certifies that neither it nor its agents or contractors are presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from participation in this transaction by any Federal or State Agency or **Department** and that it will not enter into agreements with any entity that is debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from participation in this transaction.

H. Indemnification

To the extent authorized by state and federal claims statutes, the **Municipality** shall be responsible for its actions under the terms of this agreement and save harmless the FHWA (if applicable), the **Department**, and the State of North Carolina, their respective officers, directors, principals, employees, agents, successors, and assigns to the extent allowed by law, from and against any and all claim for payment, damages and/or liabilities of any nature, asserted against the **Department** in connection with this Agreement. The **Department** shall not be liable and shall be held harmless from any and all third-party claims that might arise on account of the **Municipality**'s negligence and/or responsibilities under the terms of this agreement.

I. Availability of Funds

All terms and conditions of this Agreement are dependent upon, and, subject to the allocation of funds for the purpose set forth in the Agreement and the Agreement shall automatically terminate if funds cease to be available.

J. Gift Ban

By Executive Order 24, issued by Governor Perdue, and NCGS 133-32, it is unlawful for any vendor or contractor (i.e. architect, bidder, contractor, construction manager, design professional, engineer, landlord, offeror, seller, subcontractor, supplier, or vendor), to make gifts or to give favors to any State employee of the Governor's Cabinet Agencies (i.e. Administration, Commerce, Environmental Quality, Health and Human Services, Information Technology, Military and Veterans Affairs, Natural and Cultural Resources, Public Safety, Revenue, Transportation, and the Office of the Governor).

SIGNATURE PAGE

IN WITNESS WHEREOF, this Agreement has been executed the day and year heretofore set out, on the part of the DEPARTMENT and the MUNICIPALITY by authority duly given.

CITY OF BREVARD

FED TAX ID NO: 56-6001186

REMITTANCE ADDRESS:

95 West Main St., Brevard, NC 28712

Authorized Signer: DocuSigned by: Wilson Hooper 5AEEEF16B74E406...

Print Name: Wilson Hooper

Title: City Manager

Date Signed: 06/08/2023

If applicable, this Agreement has been pre-audited in the manner required by the Local Government Budget and Fiscal Act:

Finance Officer: DocuSigned by: Dean Luebbe 502A80030B20488...

Print Name: Dean Luebbe

Date Signed: 06/08/2023

DEPARTMENT OF TRANSPORTATION

BY: DocuSigned by: 383C434421994A4...

TITLE: Chief Engineer

DATE: 06/09/2023

APPROVED BY BOARD OF TRANSPORTATION ITEM O: 5/4/2023 (DATE) DS

TO: **Allison Drake, P.E., RS&H**

FROM: **Jonathan P. Manke, P.E., Terracon**
David J. Corley, P.E., Terracon

DATE: **February 22, 2019**

MEMO: **Pavement Design Recommendations**
R-5799 (WBS 449841.1)
Transylvania County, NC
Terracon Project Number: 71195003

As requested, Terracon has reviewed the traffic data on the sheets titled "2017 Annual Average Daily Traffic Forecasts" and "2040 Annual Average Daily Traffic Forecasts" and dated August 2017. A summary for the ADT on the -L- alignment between the various cross streets is provided in Table 1a and a summary for the ADT on the various -Y- alignments is provided in Table 1b.

Table 1a. Summary of Traffic Data on -L- Alignment (Asheville Hwy / US64 /US276 / NC280)

Alignment	South of -Y1-	-Y1- to -Y2-	-Y2- to -Y4-	-Y4- to Forest Gate Cir.	North of Forest Gate Cir.
2017 ADT	202	238	187	147	142
2040 ADT	261	298	244	199	194
DUALS	3	3	4	4	4
TTST	1	1	2	2	2

Table 1b. Summary of Traffic Data on -Y- Alignments

Alignment	-Y1-	-Y2-	-Y3-	-Y4-	-Y5-
	Ecusta Rd.	Hendersonville Hwy / US64	Pisgah Hwy / US276	Deavor Road	Forest Gate Drive
2017 ADT	54	95	70	7	61
2040 ADT	66	112	88	10	71
DUALS	2	2	2	2	2
TTST	1	1	1	1	1

Based on the provided traffic data and the NCDOT Pavement Design Procedure AASHTO 1993 Method, dated March 16, 2018, pavement sections with Asphalt and Aggregate Base Course are provided in Table 2a, pavement sections with Full Depth Asphalt and Stabilized Subgrade are provided in Table 2b, and pavement sections with Full Depth Asphalt and Unimproved Subgrade in Table 2c. The pavement analyses are included as attachments. The pavement sections are subject to the commentary in the notes below.

Table 2a. Pavement Section Recommendations (Asphalt and ABC)[a]

Align.	From Intersection	To Intersection	S9.5B	I19.0C	B25.0C	ABC
-L-	South	-Y1-	3”	2.5”	-	8”
-L-	-Y1-	-Y2-	3”	2.5”	-	8”
-L-	-Y2-	-Y4-	3”	2.5”	-	8”
-L-	-Y4-	Forest Gate Cir.	3”	2.5”	-	8”
-L-	Forest Gate Cir.	North	3”	2.5”	-	8”
-Y1-	-	-	2.5”	-	-	6” (b)
-Y2-	-	-	3”	-	-	8” (b)
-Y3-	-	-	3”	-	-	8” (b)
-Y4-	-	-	2.5”	-	-	6” (b)
-Y5-	-	-	2.5”	-	-	6” (b)

(a) All pavement sections to be underlain by stabilized subgrade.

(b) Prime coat required between surface and aggregate base course.

Table 2b. Pavement Section Recommendations (Full Depth Asphalt with Stabilized Subgrade*)

Align.	From Intersection	To Intersection	S9.5B	I19.0C	B25.0C	ABC
-L-	South	-Y1-	3”	3.5”	3”	-
-L-	-Y1-	-Y2-	3”	3.5”	3”	-
-L-	-Y2-	-Y4-	3”	3.5”	3”	-
-L-	-Y4-	Forest Gate Cir.	3”	3.5”	3”	-
-L-	Forest Gate Cir.	North	3”	3.5”	3”	-
-Y1-	-	-	1”	2.5”	3”	-
-Y2-	-	-	1.5”	2.5”	3”	-
-Y3-	-	-	1.5”	2.5”	3”	-
-Y4-	-	-	1”	2.5”	3”	-
-Y5-	-	-	1”	2.5”	3”	-

*Stabilized subgrade consists of 8” of Lime treated or 7” of Cement treated subgrade soil.

Table 2c. Pavement Section Recommendations (Full Depth Asphalt with Unimproved Subgrade)

Align.	From Intersection	To Intersection	S9.5B	I19.0C	B25.0C	ABC
-L-	South	-Y1-	3”	3.5”	4”	-
-L-	-Y1-	-Y2-	3”	3.5”	4”	-
-L-	-Y2-	-Y4-	3”	4”	4”	-
-L-	-Y4-	Forest Gate Cir.	3”	3.5”	4”	-
-L-	Forest Gate Cir.	North	3”	3.5”	4”	-
-Y1-	-	-	1”	2.5”	4”	-
-Y2-	-	-	2”	3”	4”	-
-Y3-	-	-	2”	3”	4”	-
-Y4-	-	-	1”	2.5”	4”	-
-Y5-	-	-	1”	2.5”	4”	-

Notes:

1) Based on the provided traffic volumes, most of the recommended pavement sections are the minimum required for the roadway type classification. We considered US Highways as Primary Roads and the remaining roads as Secondary Roads.
2) Resurfacing is planned for existing pavements that will tie into the new construction pavement. A minimum resurfacing depth of 2 inches should be utilized for the -L-, -Y1-, -Y2-, and -Y3- alignments and 1 inch for the -Y4- and -Y5- alignments. These resurfacing depths are to provide a new riding surface.

Table 3. Existing Pavement Sections

Core	Align.	From Intersection	To Intersection	Asphalt	Approx. ABC Thickness
C-01	-L-	South	-Y1-	8”	11”
C-02	-L-	South	-Y1-	8”	0”
C-03	-Y1-	-	-	7.5”	5”
C-04	-Y1-	-	-	8”	8”
C-05	-L-	-Y1-	-Y2-	8”	8”
C-06	-Y2-	-	-	11”	10”
C-07	-Y2-	-	-	11”	10”
C-08	-Y2-	-	-	11”	10”
C-09	-Y3-	-	-	9.5”	2”
C-10	-Y3-	-	-	7”	5”
C-11	-L-	-Y2-	-Y4-	6”	8”
C-12	-L-	-Y1-	-Y2-	6”	5.5”
C-13	-Y2-	-	-	13.5”	8”
C-14	-L-	-Y2-	-Y4-	6”	6”
C-15	-L-	Forest Gate Circle	North	6”	10”
C-16	-Y4-	-	-	3.5”	0”
C-17	-Y5-	-	-	3”	11”

Figure 1. Core Locations

Project Description: R-5799, US 64/US276/NC280 and US64/US276 Intersection Improvement
Route: -L- Alignment (South of -Y-)
County: Transylvania Division: 14
Date: 2/22/2019

TRAFFIC DATA

Initial Year:	2017	Projection Year:	2040
Initial Year ADT:	20,200	Proj. Yr. ADT:	26,100
% DUALS:	3	% TTST:	1
Road Type:	Primary and Secondary >20,000 ADT	Growth (%):	1.1

DESIGN PARAMETERS

Construction Year:	2017	Des. Life (Years):	30
Constr. Year ADT:	20,200	30 YEAR ADT=	28,217
DIR %:	50	TERM. SI:	2.5
LANES/DIRECT:	2	LANE DIST:	0.9
Rural/Urban:	U	Freeway/Other:	O
DUAL FACT.:	0.25	TTST FACT:	0.8
		ADDITIONAL 18K:	0
DAILY 18K:	167	TOTAL 18K:	**1,833,187**

ADDITIONAL ESAL CALCULATIONS**

TTST		**Duals**	
Trucks Per Day	0	Trucks Per Day	0
Trucks Per Year	0	Trucks Per Year	0
Years	30	Years	30
Total TTST	0	Total Dual	0
ESALs	0	ESALs	0

** (Useful if you expect additional trucks to enter the system that are not accounted for in traffic counts,
but for which you can obtain an estimate of the additional trucks per day generated by the facility.
For instance, a new quarry or distribution center would dramatically increase the ESAL count)

SOILS & REGIONAL DATA

Soil Support Value:	2.23	CBR:	5
Resilient Modulus, M_R (psi)	7157.0	Additional 18K:	0
Zr, Std. Norm. Dev.	-1.282	So, Standard Error	0.45
Daily 18K ESALs:	167	Total 18K:	1,833,187
Required SN:	3.90	Seed Check:	OK

Flexible Pavement Design - Asphalt and ABC

Depth (in.)	Material	Layer Coeff.	Layer SN
3	S9.5B	0.44	1.32
2.5	I19.0C	0.44	1.1
0	B25.0C	0.30	0
8	Aggregate Base Course (ABC)	0.14	1.12
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	4.54
Min. Structure Depth per NCDOT:	5.5" Asphalt and 8" ABC	Req'd =	3.90

Flexible Pavement Design - Full Depth Asphalt over Stabilized Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
3	S9.5B	0.44	1.32
3.5	I19.0C	0.44	1.54
3	B25.0C	0.30	0.9
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	4.76
Min. Structure Depth per NCDOT:	9.5" Asphalt	Req'd =	3.90

Flexible Pavement Design - Full Depth Asphalt over Unimproved Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
3	S9.5B	0.44	1.32
3.5	I19.0C	0.44	1.54
4	B25.0C	0.30	1.2
	Unimproved Subgrade		0
		SN =	4.06
Min. Structure Depth per NCDOT:	9.5" Asphalt	Req'd =	3.90

Project Description: R-5799, US 64/US276/NC280 and US64/US276 Intersection Improvement
Route: -L- Alignment (-Y1- to -Y2-)
County: Transylvania Division: 14
Date: 2/22/2019

TRAFFIC DATA

Initial Year:	2017	Projection Year:	2040
Initial Year ADT:	23,800	Proj. Yr. ADT:	29,800
% DUALS:	3	% TTST:	1
Road Type:	Primary and Secondary >20,000 ADT	Growth (%):	1.0

DESIGN PARAMETERS

Construction Year:	2017	Des. Life (Years):	30
Constr. Year ADT:	23,800	30 YEAR ADT=	31,910
DIR %:	50	TERM. SI:	2.5
LANES/DIRECT:	2	LANE DIST:	0.9
Rural/Urban:	U	Freeway/Other:	O
DUAL FACT.:	0.25	TTST FACT:	0.8
		ADDITIONAL 18K:	0
DAILY 18K:	193	TOTAL 18K:	**2,113,808**

ADDITIONAL ESAL CALCULATIONS**

TTST		**Duals**	
Trucks Per Day	0	Trucks Per Day	0
Trucks Per Year	0	Trucks Per Year	0
Years	30	Years	30
Total TTST	0	Total Dual	0
ESALs	0	ESALs	0

** (Useful if you expect additional trucks to enter the system that are not accounted for in traffic counts, but for which you can obtain an estimate of the additional trucks per day generated by the facility. For instance, a new quarry or distribution center would dramatically increase the ESAL count)

SOILS & REGIONAL DATA

Soil Support Value:	2.23	CBR:	5
Resilient Modulus, M_R (psi)	7157.0	Additional 18K:	0
Zr, Std. Norm. Dev.	-1.282	So, Standard Error	0.45
Daily 18K ESALs:	193	Total 18K:	2,113,808
Required SN:	3.99	Seed Check:	OK

Flexible Pavement Design - Asphalt and ABC

Depth (in.)	Material	Layer Coeff.	Layer SN
3	S9.5B	0.44	1.32
2.5	I19.0C	0.44	1.1
0	B25.0C	0.30	0
8	Aggregate Base Course (ABC)	0.14	1.12
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	4.54
Min. Structure Depth per NCDOT:	5.5" Asphalt and 8" ABC	Req'd =	3.99

Flexible Pavement Design - Full Depth Asphalt over Stabilized Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
3	S9.5B	0.44	1.32
3.5	I19.0C	0.44	1.54
3	B25.0C	0.30	0.9
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	4.76
Min. Structure Depth per NCDOT:	9.5" Asphalt	Req'd =	3.99

Flexible Pavement Design - Full Depth Asphalt over Unimproved Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
3	S9.5B	0.44	1.32
3.5	I19.0C	0.44	1.54
4	B25.0C	0.30	1.2
	Unimproved Subgrade		0
		SN =	4.06
Min. Structure Depth per NCDOT:	9.5" Asphalt	Req'd =	3.99

Project Description: R-5799, US 64/US276/NC280 and US64/US276 Intersection Improvement
Route: -L- Alignment (-Y2- to -Y4-)
County: Transylvania Division: 14
Date: 2/22/2019

TRAFFIC DATA

Initial Year:	2017	Projection Year:	2040
Initial Year ADT:	18,700	Proj. Yr. ADT:	24,400
% DUALS:	4	% TTST:	2
Road Type:	Primary and Secondary >20,000 ADT	Growth (%):	1.2

DESIGN PARAMETERS

Construction Year:	2017	Des. Life (Years):	30
Constr. Year ADT:	18,700	30 YEAR ADT=	26,458
DIR %:	50	TERM. SI:	2.5
LANES/DIRECT:	2	LANE DIST:	0.9
Rural/Urban:	U	Freeway/Other:	O
DUAL FACT.:	0.25	TTST FACT:	0.8
		ADDITIONAL 18K:	0
DAILY 18K:	262	TOTAL 18K:	**2,865,983**

ADDITIONAL ESAL CALCULATIONS**

TTST		**Duals**	
Trucks Per Day	0	Trucks Per Day	0
Trucks Per Year	0	Trucks Per Year	0
Years	30	Years	30
Total TTST	0	Total Dual	0
ESALs	0	ESALs	0

** (Useful if you expect additional trucks to enter the system that are not accounted for in traffic counts, but for which you can obtain an estimate of the additional trucks per day generated by the facility. For instance, a new quarry or distribution center would dramatically increase the ESAL count)

SOILS & REGIONAL DATA

Soil Support Value:	2.23	CBR:	5
Resilient Modulus, M_R (psi)	7157.0	Additional 18K:	0
Zr, Std. Norm. Dev.	-1.282	So, Standard Error	0.45
Daily 18K ESALs:	262	Total 18K:	2,865,983
Required SN:	4.18	Seed Check:	OK

Flexible Pavement Design - Asphalt and ABC

Depth (in.)	Material	Layer Coeff.	Layer SN
3	S9.5B	0.44	1.32
2.5	I19.0C	0.44	1.1
0	B25.0C	0.30	0
8	Aggregate Base Course (ABC)	0.14	1.12
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	4.54
Min. Structure Depth per NCDOT:	5.5" Asphalt and 8" ABC	Req'd =	4.18

Flexible Pavement Design - Full Depth Asphalt over Stabilized Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
3	S9.5B	0.44	1.32
3.5	I19.0C	0.44	1.54
3	B25.0C	0.30	0.9
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	4.76
Min. Structure Depth per NCDOT:	9.5" Asphalt	Req'd =	4.18

Flexible Pavement Design - Full Depth Asphalt over Unimproved Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
3	S9.5B	0.44	1.32
4	I19.0C	0.44	1.76
4	B25.0C	0.30	1.2
	Unimproved Subgrade		0
		SN =	4.28
Min. Structure Depth per NCDOT:	9.5" Asphalt	Req'd =	4.18

Project Description: R-5799, US 64/US276/NC280 and US64/US276 Intersection Improvement
Route: -L- Alignment (-Y4- to Forest Gate Circle)
County: Transylvania Division: 14
Date: 2/22/2019

TRAFFIC DATA

Initial Year:	2017	Projection Year:	2040
Initial Year ADT:	14,700	Proj. Yr. ADT:	19,900
% DUALS:	4	% TTST:	2
Road Type:	Primary and Secondary >20,000 ADT	Growth (%):	1.3

DESIGN PARAMETERS

Construction Year:	2017	Des. Life (Years):	30
Constr. Year ADT:	14,700	30 YEAR ADT=	21,822
DIR %:	50	TERM. SI:	2.5
LANES/DIRECT:	2	LANE DIST:	0.9
Rural/Urban:	U	Freeway/Other:	O
DUAL FACT.:	0.25	TTST FACT:	0.8
		ADDITIONAL 18K:	0
DAILY 18K:	211	TOTAL 18K:	**2,311,103**

ADDITIONAL ESAL CALCULATIONS**

TTST		**Duals**	
Trucks Per Day	0	Trucks Per Day	0
Trucks Per Year	0	Trucks Per Year	0
Years	30	Years	30
Total TTST	0	Total Dual	0
ESALs	0	ESALs	0

** (Useful if you expect additional trucks to enter the system that are not accounted for in traffic counts, but for which you can obtain an estimate of the additional trucks per day generated by the facility. For instance, a new quarry or distribution center would dramatically increase the ESAL count)

SOILS & REGIONAL DATA

Soil Support Value:	2.23	CBR:	5
Resilient Modulus, M_R (psi)	7157.0	Additional 18K:	0
Zr, Std. Norm. Dev.	-1.282	So, Standard Error	0.45
Daily 18K ESALs:	211	Total 18K:	2,311,103
Required SN:	4.05	Seed Check:	OK

Flexible Pavement Design - Asphalt and ABC

Depth (in.)	Material	Layer Coeff.	Layer SN
3	S9.5B	0.44	1.32
2.5	I19.0C	0.44	1.1
0	B25.0C	0.30	0
8	Aggregate Base Course (ABC)	0.14	1.12
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	4.54
Min. Structure Depth per NCDOT:	5.5" Asphalt and 8" ABC	Req'd =	4.05

Flexible Pavement Design - Full Depth Asphalt over Stabilized Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
3	S9.5B	0.44	1.32
3.5	I19.0C	0.44	1.54
3	B25.0C	0.30	0.9
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	4.76
Min. Structure Depth per NCDOT:	9.5" Asphalt	Req'd =	4.05

Flexible Pavement Design - Full Depth Asphalt over Unimproved Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
3	S9.5B	0.44	1.32
3.5	I19.0C	0.44	1.54
4	B25.0C	0.30	1.2
	Unimproved Subgrade		0
		SN =	4.06
Min. Structure Depth per NCDOT:	9.5" Asphalt	Req'd =	4.05

Project Description: R-5799, US 64/US276/NC280 and US64/US276 Intersection Improvement
Route: -L- Alignment (North of Forest Gate Circle)
County: Transylvania Division: 14
Date: 2/22/2019

TRAFFIC DATA

Initial Year:	2017	Projection Year:	2040
Initial Year ADT:	14,200	Proj. Yr. ADT:	19,400
% DUALS:	4	% TTST:	2
Road Type:	Primary and Secondary >20,000 ADT	Growth (%):	1.4

DESIGN PARAMETERS

Construction Year:	2017	Des. Life (Years):	30
Constr. Year ADT:	14,200	30 YEAR ADT=	21,333
DIR %:	50	TERM. SI:	2.5
LANES/DIRECT:	2	LANE DIST:	0.9
Rural/Urban:	U	Freeway/Other:	O
DUAL FACT.:	0.25	TTST FACT:	0.8
		ADDITIONAL 18K:	0
DAILY 18K:	205	TOTAL 18K:	**2,246,763**

ADDITIONAL ESAL CALCULATIONS**

TTST		**Duals**	
Trucks Per Day	0	Trucks Per Day	0
Trucks Per Year	0	Trucks Per Year	0
Years	30	Years	30
Total TTST	0	Total Dual	0
ESALs	0	ESALs	0

** (Useful if you expect additional trucks to enter the system that are not accounted for in traffic counts, but for which you can obtain an estimate of the additional trucks per day generated by the facility. For instance, a new quarry or distribution center would dramatically increase the ESAL count)

SOILS & REGIONAL DATA

Soil Support Value:	2.23	CBR:	5
Resilient Modulus, M_R (psi)	7157.0	Additional 18K:	0
Zr, Std. Norm. Dev.	-1.282	So, Standard Error	0.45
Daily 18K ESALs:	205	Total 18K:	2,246,763
Required SN:	4.03	Seed Check:	OK

Flexible Pavement Design - Asphalt and ABC

Depth (in.)	Material	Layer Coeff.	Layer SN
3	S9.5B	0.44	1.32
2.5	I19.0C	0.44	1.1
0	B25.0C	0.30	0
8	Aggregate Base Course (ABC)	0.14	1.12
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	4.54
Min. Structure Depth per NCDOT:	5.5" Asphalt and 8" ABC	Req'd =	4.03

Flexible Pavement Design - Full Depth Asphalt over Stabilized Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
3	S9.5B	0.44	1.32
3.5	I19.0C	0.44	1.54
3	B25.0C	0.30	0.9
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	4.76
Min. Structure Depth per NCDOT:	9.5" Asphalt	Req'd =	4.03

Flexible Pavement Design - Full Depth Asphalt over Unimproved Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
3	S9.5B	0.44	1.32
3.5	I19.0C	0.44	1.54
4	B25.0C	0.30	1.2
	Unimproved Subgrade		0
		SN =	4.06
Min. Structure Depth per NCDOT:	9.5" Asphalt	Req'd =	4.03

Project Description: R-5799, US 64/US276/NC280 and US64/US276 Intersection Improvement
Route: -Y1- (Ecusta Road)
County: Transylvania Division: 14
Date: 2/22/2019

TRAFFIC DATA

Initial Year:	2017	Projection Year:	2040
Initial Year ADT:	5,400	Proj. Yr. ADT:	6,600
% DUALS:	2	% TTST:	1
Road Type:	Secondary <20,000 ADT	Growth (%):	0.9

DESIGN PARAMETERS

Construction Year:	2017	Des. Life (Years):	20
Constr. Year ADT:	5,400	20 YEAR ADT=	6,429
DIR %:	50	TERM. SI:	2.5
LANES/DIRECT:	1	LANE DIST:	1
Rural/Urban:	U	Freeway/Other:	O
DUAL FACT.:	0.25	TTST FACT:	0.8
		ADDITIONAL 18K:	0
DAILY 18K:	38	TOTAL 18K:	**280,136**

ADDITIONAL ESAL CALCULATIONS**

TTST		**Duals**	
Trucks Per Day	0	Trucks Per Day	0
Trucks Per Year	0	Trucks Per Year	0
Years	20	Years	20
Total TTST	0	Total Dual	0
ESALs	0	ESALs	0

** (Useful if you expect additional trucks to enter the system that are not accounted for in traffic counts, but for which you can obtain an estimate of the additional trucks per day generated by the facility. For instance, a new quarry or distribution center would dramatically increase the ESAL count)

SOILS & REGIONAL DATA

Soil Support Value:	2.23	CBR:	5
Resilient Modulus, M_R (psi)	7157.0	Additional 18K:	0
Zr, Std. Norm. Dev.	-1.036	So, Standard Error	0.45
Daily 18K ESALs:	38	Total 18K:	280,136
Required SN:	2.74	Seed Check:	OK

Flexible Pavement Design - Asphalt and ABC

Depth (in.)	Material	Layer Coeff.	Layer SN
2.5	S9.5B	0.44	1.1
0	I19.0C	0.44	0
0	B25.0C	0.30	0
6	Aggregate Base Course (ABC)	0.14	0.84
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	2.94
Min. Structure Depth per NCDOT:	2.5" Asphalt and 6" ABC	Req'd =	2.74

Flexible Pavement Design - Full Depth Asphalt over Stabilized Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
1	S9.5B	0.44	0.44
2.5	I19.0C	0.44	1.1
3	B25.0C	0.30	0.9
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	3.44
Min. Structure Depth per NCDOT:	6.5" Asphalt	Req'd =	2.74

Flexible Pavement Design - Full Depth Asphalt over Unimproved Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
1	S9.5B	0.44	0.44
2.5	I19.0C	0.44	1.1
4	B25.0C	0.30	1.2
	Unimproved Subgrade		0
		SN =	2.74
Min. Structure Depth per NCDOT:	6.5" Asphalt	Req'd =	2.74

Project Description: R-5799, US 64/US276/NC280 and US64/US276 Intersection Improvement
Route: -Y2- (Hendersonville Highway/US64)
County: Transylvania Division: 14
Date: 2/22/2019

TRAFFIC DATA

Initial Year:	2017	Projection Year:	2040
Initial Year ADT:	9,500	Proj. Yr. ADT:	11,200
% DUALS:	2	% TTST:	1
Road Type:	Primary <20,000 ADT	Growth (%):	0.7

DESIGN PARAMETERS

Construction Year:	2017	Des. Life (Years):	30
Constr. Year ADT:	9,500	30 YEAR ADT=	11,775
DIR %:	50	TERM. SI:	2.5
LANES/DIRECT:	1	LANE DIST:	1
Rural/Urban:	U	Freeway/Other:	O
DUAL FACT.:	0.25	TTST FACT:	0.8
		ADDITIONAL 18K:	0
DAILY 18K:	69	TOTAL 18K:	**754,761**

ADDITIONAL ESAL CALCULATIONS**

TTST		**Duals**	
Trucks Per Day	0	Trucks Per Day	0
Trucks Per Year	0	Trucks Per Year	0
Years	30	Years	30
Total TTST	0	Total Dual	0
ESALs	0	ESALs	0

** (Useful if you expect additional trucks to enter the system that are not accounted for in traffic counts,
but for which you can obtain an estimate of the additional trucks per day generated by the facility.
For instance, a new quarry or distribution center would dramatically increase the ESAL count)

SOILS & REGIONAL DATA

Soil Support Value:	2.23	CBR:	5
Resilient Modulus, M_R (psi)	7157.0	Additional 18K:	0
Zr, Std. Norm. Dev.	-1.282	So, Standard Error	0.45
Daily 18K ESALs:	69	Total 18K:	754,761
Required SN:	3.37	Seed Check:	OK

Flexible Pavement Design - Asphalt and ABC

Depth (in.)	Material	Layer Coeff.	Layer SN
3	S9.5B	0.44	1.32
0	I19.0C	0.44	0
0	B25.0C	0.30	0
8	Aggregate Base Course (ABC)	0.14	1.12
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	3.44
Min. Structure Depth per NCDOT:	3" Asphalt and 8" ABC	Req'd =	3.37

Flexible Pavement Design - Full Depth Asphalt over Stabilized Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
1.5	S9.5B	0.44	0.66
2.5	I19.0C	0.44	1.1
3	B25.0C	0.30	0.9
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	3.66
Min. Structure Depth per NCDOT:	7" Asphalt	Req'd =	3.37

Flexible Pavement Design - Full Depth Asphalt over Unimproved Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
2	S9.5B	0.44	0.88
3	I19.0C	0.44	1.32
4	B25.0C	0.30	1.2
	Unimproved Subgrade		0
		SN =	3.40
Min. Structure Depth per NCDOT:	7" Asphalt	Req'd =	3.37

Project Description: R-5799, US 64/US276/NC280 and US64/US276 Intersection Improvement
Route: -Y3- (Pisgah Highway/US276)
County: Transylvania Division: 14
Date: 2/22/2019

TRAFFIC DATA

Initial Year:	2017	Projection Year:	2040
Initial Year ADT:	7,000	Proj. Yr. ADT:	8,800
% DUALS:	2	% TTST:	1
Road Type:	Primary <20,000 ADT	Growth (%):	1.0

DESIGN PARAMETERS

Construction Year:	2017	Des. Life (Years):	30
Constr. Year ADT:	7,000	30 YEAR ADT=	9,435
DIR %:	50	TERM. SI:	2.5
LANES/DIRECT:	1	LANE DIST:	1
Rural/Urban:	U	Freeway/Other:	O
DUAL FACT.:	0.25	TTST FACT:	0.8
		ADDITIONAL 18K:	0
DAILY 18K:	53	TOTAL 18K:	**580,965**

ADDITIONAL ESAL CALCULATIONS**

TTST		**Duals**	
Trucks Per Day	0	Trucks Per Day	0
Trucks Per Year	0	Trucks Per Year	0
Years	30	Years	30
Total TTST	0	Total Dual	0
ESALs	0	ESALs	0

** (Useful if you expect additional trucks to enter the system that are not accounted for in traffic counts,
but for which you can obtain an estimate of the additional trucks per day generated by the facility.
For instance, a new quarry or distribution center would dramatically increase the ESAL count)

SOILS & REGIONAL DATA

Soil Support Value:	2.23	CBR:	5
Resilient Modulus, M_R (psi)	7157.0	Additional 18K:	0
Zr, Std. Norm. Dev.	-1.282	So, Standard Error	0.45
Daily 18K ESALs:	53	Total 18K:	580,965
Required SN:	3.23	Seed Check:	OK

Flexible Pavement Design - Asphalt and ABC

Depth (in.)	Material	Layer Coeff.	Layer SN
3	S9.5B	0.44	1.32
0	I19.0C	0.44	0
0	B25.0C	0.30	0
8	Aggregate Base Course (ABC)	0.14	1.12
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	3.44
Min. Structure Depth per NCDOT:	3" Asphalt and 8" ABC	Req'd =	3.23

Flexible Pavement Design - Full Depth Asphalt over Stabilized Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
1.5	S9.5B	0.44	0.66
2.5	I19.0C	0.44	1.1
3	B25.0C	0.30	0.9
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	3.66
Min. Structure Depth per NCDOT:	7" Asphalt	Req'd =	3.23

Flexible Pavement Design - Full Depth Asphalt over Unimproved Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
2	S9.5B	0.44	0.88
3	I19.0C	0.44	1.32
4	B25.0C	0.30	1.2
	Unimproved Subgrade		0
		SN =	3.40
Min. Structure Depth per NCDOT:	7" Asphalt	Req'd =	3.23

Project Description: R-5799, US 64/US276/NC280 and US64/US276 Intersection Improvement
Route: -Y4- (Deavor Road)
County: Transylvania Division: 14
Date: 2/22/2019

TRAFFIC DATA

Initial Year:	2017	Projection Year:	2040
Initial Year ADT:	700	Proj. Yr. ADT:	1,000
% DUALS:	2	% TTST:	1
Road Type:	Secondary <20,000 ADT	Growth (%):	1.6

DESIGN PARAMETERS

Construction Year:	2017	Des. Life (Years):	20
Constr. Year ADT:	700	20 YEAR ADT=	955
DIR %:	50	TERM. SI:	2.5
LANES/DIRECT:	1	LANE DIST:	1
Rural/Urban:	U	Freeway/Other:	O
DUAL FACT.:	0.25	TTST FACT:	0.8
		ADDITIONAL 18K:	0
DAILY 18K:	5	TOTAL 18K:	**38,969**

ADDITIONAL ESAL CALCULATIONS**

TTST		**Duals**	
Trucks Per Day	0	Trucks Per Day	0
Trucks Per Year	0	Trucks Per Year	0
Years	20	Years	20
Total TTST	0	Total Dual	0
ESALs	0	ESALs	0

** (Useful if you expect additional trucks to enter the system that are not accounted for in traffic counts, but for which you can obtain an estimate of the additional trucks per day generated by the facility. For instance, a new quarry or distribution center would dramatically increase the ESAL count)

SOILS & REGIONAL DATA

Soil Support Value:	2.23	CBR:	5
Resilient Modulus, M_R (psi)	7157.0	Additional 18K:	0
Zr, Std. Norm. Dev.	-1.036	So, Standard Error	0.45
Daily 18K ESALs:	5	Total 18K:	38,969
Required SN:	1.98	Seed Check:	OK

Flexible Pavement Design - Asphalt and ABC

Depth (in.)	Material	Layer Coeff.	Layer SN
2.5	S9.5B	0.44	1.1
0	I19.0C	0.44	0
0	B25.0C	0.30	0
6	Aggregate Base Course (ABC)	0.14	0.84
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	2.94
Min. Structure Depth per NCDOT:	2.5" Asphalt and 6" ABC	Req'd =	1.98

Flexible Pavement Design - Full Depth Asphalt over Stabilized Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
1	S9.5B	0.44	0.44
2.5	I19.0C	0.44	1.1
3	B25.0C	0.30	0.9
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	3.44
Min. Structure Depth per NCDOT:	6.5" Asphalt	Req'd =	1.98

Flexible Pavement Design - Full Depth Asphalt over Unimproved Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
1	S9.5B	0.44	0.44
2.5	I19.0C	0.44	1.1
4	B25.0C	0.30	1.2
	Unimproved Subgrade		0
		SN =	2.74
Min. Structure Depth per NCDOT:	6.5" Asphalt	Req'd =	1.98

Project Description: R-5799, US 64/US276/NC280 and US64/US276 Intersection Improvement
Route: -Y5- (Forest Gate Drive)
County: Transylvania Division: 14
Date: 2/22/2019

TRAFFIC DATA

Initial Year:	2017	Projection Year:	2040
Initial Year ADT:	6,100	Proj. Yr. ADT:	7,100
% DUALS:	2	% TTST:	1
Road Type:	Secondary <20,000 ADT	Growth (%):	0.7

DESIGN PARAMETERS

Construction Year:	2017	Des. Life (Years):	20
Constr. Year ADT:	6,100	20 YEAR ADT=	6,961
DIR %:	50	TERM. SI:	2.5
LANES/DIRECT:	1	LANE DIST:	1
Rural/Urban:	U	Freeway/Other:	O
DUAL FACT.:	0.25	TTST FACT:	0.8
		ADDITIONAL 18K:	0
DAILY 18K:	42	TOTAL 18K:	**309,630**

ADDITIONAL ESAL CALCULATIONS**

TTST		**Duals**	
Trucks Per Day	0	Trucks Per Day	0
Trucks Per Year	0	Trucks Per Year	0
Years	20	Years	20
Total TTST	0	Total Dual	0
ESALs	0	ESALs	0

** (Useful if you expect additional trucks to enter the system that are not accounted for in traffic counts,
but for which you can obtain an estimate of the additional trucks per day generated by the facility.
For instance, a new quarry or distribution center would dramatically increase the ESAL count)

SOILS & REGIONAL DATA

Soil Support Value:	2.23	CBR:	5
Resilient Modulus, M_R (psi)	7157.0	Additional 18K:	0
Zr, Std. Norm. Dev.	-1.036	So, Standard Error	0.45
Daily 18K ESALs:	42	Total 18K:	309,630
Required SN:	2.79	Seed Check:	OK

Flexible Pavement Design - Asphalt and ABC

Depth (in.)	Material	Layer Coeff.	Layer SN
2.5	S9.5B	0.44	1.1
0	I19.0C	0.44	0
0	B25.0C	0.30	0
6	Aggregate Base Course (ABC)	0.14	0.84
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	2.94
Min. Structure Depth per NCDOT:	2.5" Asphalt and 6" ABC	Req'd =	2.79

Flexible Pavement Design - Full Depth Asphalt over Stabilized Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
1	S9.5B	0.44	0.44
2.5	I19.0C	0.44	1.1
3	B25.0C	0.30	0.9
	8" Lime or 7" Cement Stabilized Subgrade		1
		SN =	3.44
Min. Structure Depth per NCDOT:	6.5" Asphalt	Req'd =	2.79

Flexible Pavement Design - Full Depth Asphalt over Unimproved Subgrade

Depth (in.)	Material	Layer Coeff.	Layer SN
1	S9.5B	0.44	0.44
2.5	I19.0C	0.44	1.1
4	B25.0C	0.30	1.2
	Unimproved Subgrade		0
		SN =	2.74
Min. Structure Depth per NCDOT:	6.5" Asphalt	Req'd =	2.79

DIVISION DESIGN RALEIGH LET (DDRL)

RIGHT OF WAY FIELD CERTIFICATION

TIP No. R-5799
WBS Element: 44984.2.1
County: Transylvania
Description: **INTERSECTIONS OF US 64, US 276, & NC 280**

In connection with the above-referenced project, I certify that there were:

1) No persons displaced for this project or that all individuals and families have been relocated to DSS housing, Comparable replacement housing has been made available to relocates in accordance with applicable Federal and State laws and regulations.
2) The steps relative to relocation advisory assistance and payments as required by current FHWA directive(s) covering the administration of the Highway Relocation Assistance Program have been taken, as required.
3) Any necessary utility easements have been acquired for utility relocations
4) Any land needed by NCDOT from any active or non-active Railroad Company has been acquired in accordance with all state and federal laws.

I further certify that one of the following has application:

__1. All necessary right of way has been acquired or the State has legal right of physical possession of that right of way,

or

X 2. The acquisition or right of occupancy and use of a few remaining parcels is not complete, but all occupants of the residences on such parcels have had replacement housing made available to them in accordance with 49 CFR 24.204. I assure that, if the physical construction of the project proceeds, displaced persons who have not yet moved from the right of way will be protected against unnecessary inconvenience and disproportionate injury or any action coercive in nature. I believe that it will be in the best public interest to proceed with this project. The following information is provided regarding excepted parcels and will be provided in the contract documents. These parcels will require delays of entry noted as follows:

TIP/PARCEL	PROPERTY OWNER	REASON FOR DELAY REQUEST	RELO (Y/N)	DELAY OF ENTRY UNTIL
R-5799 006	Lowes Home Centers Inc.	Awaiting Appraisal for Negotiations		11-15-23
R-5799 008	Brevard Self Storage LLC	Awaiting Appraisal for Negotiations		11-15-23
R-5799 016	S2 Forest Gate Assoc. LLC	Awaiting Appraisal for Negotiations		11-15-23
R-5799 019	Self Help Credit Union	Awaiting Appraisal for Negotiations		11-15-23
R-5799 031	Ogeechee Davidson, LLC	Awaiting Appraisal for Negotiations		11-15-23
R-5799 032	Big, Inc.	Awaiting Appraisal for Negotiations		11-15-23
R-5799 033	Big, Inc.	Awaiting Appraisal for Negotiations		11-15-23

This certification assures compliance with all applicable Federal and State laws, rules and policies.

Date: **2-14-2023**

Franklin J Dills Jr

DIVISION RIGHT OF WAY AGENT

Date: 02/15/2023

DocuSigned by:
Heather L. Fulghum
76686ECD712B469...

MANAGER, RIGHT OF WAY UNIT

FRM3-C
05-18-2020

R-5799 Landscape Quantities

Landscape Element	Quantity	Unit	Cost/Unit	Sum
Boulders: medium	8	Ton	$ 225.00	$ 1,800.00
Boulders: small	20	Each	$ 225.00	$ 4,500.00
Large Flagstone	4.5	Ton	$ 400.00	$ 1,800.00
Riverrock	14	CY	$ 150.00	$ 2,100.00
Mulch	140	CY	$ 50.00	$ 7,000.00
Perennials	800	Each	$ 22.00	$ 17,600.00
Trees	46	Each	$ 500.00	$ 23,000.00
Shrubs	597	Each	$ 100.00	$ 59,700.00
Sod (includes right-of-way between roundabouts)	38,352	SF	$ 2.10	$ 80,539.20
Soil amendment		allowance		$ 4,500.00
Timber Fence Sections	12	Each	$ 2,700.00	$ 32,400.00
Landscape Lighting	38	Each	$ 120.00	$ 4,560.00
PVC Conduit for electrical lighting	890	LF	$ 1.75	$ 1,557.50
Landscape edging	950	LF	$ 7.50	$ 7,125.00
Subtotal				$ 248,181.70
Labor		25%		$ 62,045.43
Total estimate (2 roundabouts and surroundings)				**$ 310,227.13**

*Does not include cost of fill dirt.

Disclaimer: TPD is furnishing this cost estimate as requested by the client. Please note that estimated costs are subject to change based on field conditions, local or regional differences, changes to the plan, and/or changes in unit costs. Cost estimates are provided for use in budgeting, but in no way should this estimate be construed as a final cost for the project. Final costs are contingent on actual bids from contractors. TPD will not be held responsible for differences between this cost estimate and bid costs.

PRE-LET FIELD INSPECTION

Construction WBS#: **44984**

County: **Transylvania**

T.I.P. #: **R-5799**

Team Lead: **Barry Mosteller**

Management Group: **Division Managed**

Instructions

An answer must be provided for **all** questions. If the question is not relevant to the project, then check N/A. Where needed, reply to the requests for additional information with complete statements so that there is not the possibility of a misunderstanding or confusion.

General

Does this project contain any new or unique construction techniques, processes, and/or products that are unfamiliar to the Department, Division, or the assigned Resident Engineer? If "Yes", a draft project special provision, details along with a Technical Bulletin (if available) of this unique construction technique, process, and/or product should be supplied to you for review and comment during this field inspection. Does this project have any constructability issues that should be addressed? If "Yes", briefly describe the issue(s) in the space below: **Additional TMP sheets are needed to explain Phase V.**	☐Yes ☒ No ☒Yes ☐ No
Based on your answers above, do you recommend: • An internal constructability review? • An external constructability review with representation from contractors affiliated with the Association of General Contractors (AGC)? • A Technical Bulletin to be prepared? • Training to be provided for the Resident Engineer and staff? Click here to provide additional information.	 ☐Yes ☒ No ☐Yes ☒ No ☐Yes ☒ No ☐Yes ☒ No
Recommend completion date for project based on a tentative letting date of **August 15, 2023**.	**June 1, 2025**
Recommend the contract method felt most suitable for this project: conventional, A & B, or incentive/disincentive.	**Conventional**
Should a floating date of availability be used for this project? If "Yes", provide any recommendations in the space below: Click here to provide additional information.	☐Yes ☒ No ☐N/A
Are there any issues with the beginning and end of project and construction? If "Yes", list the locations in the space below: Click here to provide additional information.	☐Yes ☒ No ☐N/A
Will the construction surveying on this project be handled by the Department or the Contractor?	**Contractor**

Is the project survey line identified on the ground so it can be found and located by the prospective contractors? If "No", provide the location(s) where issues exist in the space below: Click here to provide additional information.	☒Yes ☐ No
Are there any existing hazardous waste sites or possible existing contaminated properties located within or immediately adjacent to the project right of way? If "Yes", list the locations in the space below: Click here to provide additional information.	☐Yes ☒ No
Are any monitoring wells within project limits? If "Yes", provide locations in the space below so that abandoning work may be coordinated by the Geoenvironmental Section before construction. Click here to provide additional information.	☐Yes ☒ No
Do you have any suggestions for consideration that would reduce the future maintenance costs of this project? If "Yes", list the locations in the space below: Click here to provide additional information.	☐Yes ☒ No
Should "Partnering" be utilized on this project? This concept of creating a cohesive relationship between the NCDOT, the Contractor, subcontractors, and suppliers, is highly encouraged particularly on large, complex projects when safety, efficiency, and completion within the targeted budget and schedule are extremely important. If "Yes", provide additional information on the type of partnering in the space below: Click here to provide additional information.	☐Yes ☒ No
Have the comments from the final design field inspection been incorporated? If "No", provide explanations for not doing so space below: Click here to provide additional information.	☒Yes ☐ No

Barriers

The Roadway Standard Drawing, Std. 846.03 (Sheet 1 of 2), shows guardrail spanning an object that requires a post to be omitted. Does this project require that standard? If "Yes", list each location and the required standard in the space below: Click here to provide additional information.	☐Yes ☒ No
Will removed existing guardrail be stockpiled? Click here to provide additional information.	☐Yes ☒ No ☐N/A
Will the Division be able to furnish the temporary concrete barrier to the contractor for his use during construction of the project? If "Yes", designate the location from which the contractor must take delivery of the barrier and the location to which the contractor must return the barrier at the conclusion of the project in the space below: Click here to provide additional information.	☐Yes ☒ No ☐N/A
If the Contractor is to furnish the temporary concrete barrier, should barrier revert to the Contractor at the conclusion of the project? NOTE: If the Division wants to take possession of the barrier, it must reimburse the project for the salvage value of the barrier, this reimbursement must come from 100% State funds.	☒Yes ☐ No ☐N/A

Constructability/Permitting/Commitments

Have all environmental commitments been reviewed and can they be implemented? If "No", provide more detail below in the space below: Click here to provide additional information.	☒Yes ☐ No ☐N/A
Are any plan changes or modifications required that may jeopardize the status of the permit? If "Yes", list the locations in the space below: Click here to provide additional information.	☐Yes ☒ No ☐N/A
Are historic properties and / or archeological sites clearly identified on the plans? If "No", provide the location(s) where issues exist in the space below: Click here to provide additional information. Do the commitments clearly explain how the impacts to these sites will be avoided or minimized? If "No", provide suggestions on how the comments could be clarified below: Click here to provide additional information.	☒Yes ☐ No ☐N/A ☒Yes ☐ No
Are there any temporary pedestrian impacts listed on the list of environmental commitments (green sheets)? Click here to provide additional information.	☐Yes ☒ No

Driveways

Will high strength or quick cure concrete be required for driveway during construction of replacement operations? Click here to provide additional information.	☐Yes ☒ No

Earthwork

Are there any ways which project generated debris (i.e. removed concrete/asphalt pavement: clearing and grubbing-mulch; native planting) can be safely and economically incorporated into the construction of the project? If "Yes", provide more information in the space below: Click here to provide additional information.	☐Yes ☒ No
Can earthwork be utilized (as shown on the Earthwork Summary) during construction phasing of this project? For widening projects, this includes the ability of the contractor to haul earth material across traffic. If "No", provide more information in the space below: Click here to provide additional information.	☒Yes ☐ No ☐N/A
If this project fits within the guidelines, would you rather the contract be written as "Lump sum grading" or individual grading items? Click here to provide additional information.	☒Yes ☐ No
Is this project a good candidate for earthwork quantity determination using photogrammetric methods? Click here to provide additional information.	☒Yes ☐ No

Geotechnical (Must answer if sub-surface information is not available.)

Are any underdrains anticipated? If "Yes", estimate total length below: Click here to provide additional information.	☒Yes ☐ No

Is additional undercut excavation needed beyond what is shown in the geotech recommendations? If so, provide an estimate of that quantity. (Article 225-4) Click here to enter quantity.	☐Yes ☒ No

Grading

Has any grading occurred since field surveys and contour mapping were made? If "Yes", have these areas been identified and taken into account? Provide additional information in the space below: Click here to provide additional information.	☐Yes ☒ No

Load Restrictions

Are there load limit restrictions on roads and/or bridges in the project vicinity which will limit the contractor in the hauling equipment and materials? If "Yes:, will this be covered by Section 105-15 of the Standard Specifications? Click here to provide additional information.	☐Yes ☒ No ☐Yes ☐ No

Material Usage and Measurement

Specify how borrow material will be measured. In place measurement, or truck measurement. (Article 230-5)	In Place Measurement
On Federal Aid projects, are materials furnished by the contractor or salvaged from the project to become the property of the department? If yes, the salvage value must be reimbursed from State funds for the material as part of the Federal Aid Agreement if the salvage value exceeds $5,000.00 except where the salvaged item will be reused in future projects eligible under Title 23 USC until its useful life is expended.	☐Yes ☐ No ☒N/A

Pavement

Will incidental stone base be required? (Article 545-1) If "Yes", estimate quantity in the space below: Click here to provide additional information.	☐Yes ☒ No
Will asphalt plant mix pavement repair be required for repairing existing pavement? (Exclude pipe installations) If "Yes", estimate quantity in the space below: Click here to provide additional information.	☐Yes ☒ No
Do you have any recommendations for mobile string line or fixed string line for the asphalt plant mix paver? (Article 610-8) If "Yes", provide further details in the space below: Click here to provide additional information.	☐Yes ☒ No

Has the method of rumble strip construction for concrete shoulders been clearly show in the plans? Click here to provide additional information. Do you agree with the method as shown? Click here to provide additional information. Is there another approved method more suitable for this project? If "Yes", provide more information in the space below: Click here to provide additional information.	☒Yes ☒ No ☒Yes ☐ No ☐Yes ☒ No
Are there any resurfacing areas where incidental milling will be required to make a suitable tie back to the existing pavement? If "Yes", estimate quantity in the space below: **1500 sy**	☒Yes ☐ No
Do you want Final Surface Testing performed on this project? Click here to provide additional information.	☐Yes ☒ No

Right of Way

Which method of clearing is to be used? If "Other", please specify in the space below: Click here to provide additional information.	**Method II**
Are there trees which are to be preserved on field inspection prints. (Article 200-3) If "Yes", show on field inspection prints or provide locations in the space below: Click here to provide additional information.	☐Yes ☒ No
Are there areas in the Right-of-Way that are not to be cleared? If "Yes", show on field inspection prints or provide locations below: Click here to provide additional information.	☐Yes ☒ No
What type of Right of Way marker installation is recommended for this project? NOTE: State forces place iron pin and caps as right of way markers. Placement of concrete/granite right of way markers shall be placed by contract. Click here to provide additional information.	**Concrete/Granite Markers by contract**

Traffic Operations

Is the Division aware of any traffic generating events that would require special design considerations and traffic control planning? If "Yes", provide the events below: **White Squrrel Festival, Brevard Events**	☒Yes ☐ No
Are there any locations where a non-gating impact attenuator should be specified (temporary detours, temporary traffic pattern, etc) that the completed project would only require a gating device? If "Yes", provide the locations in the space below: Click here to provide additional information.	☐Yes ☒ No ☐N/A
Have traffic maintenance and constructability issues been reviewed to ensure they will have no bearings on the permit status? If there are any potential conflicts with the permit status, list them in the space below: Click here to provide additional information.	☒Yes ☐ No

Are any street signs and markers to be removed and stockpiled by the Contractor? If "Yes", provide the locations in the space below: Click here to provide additional information.	☐Yes ☒ No
Are there any signing and/or pavement marking to be performed by force account? If "Yes", notify the Division Traffic Engineer who will furnish a cost estimate to the Roadway Design Unit. Click here to provide additional information.	☐Yes ☒ No
Is a $250 penalty ordinance and/or speed reduction ordinance recommended? Click here to provide additional information.	☐Yes ☒ No
Is a towing ordinance recommended? If "Yes", provide areas of concern in the space below: Click here to provide additional information.	☐Yes ☒ No
Has any development occurred recently to influence the project traffic volumes? If "Yes", advise what the impact is so that geometrics and pavement design can reflect the change in the space below: Click here to provide additional information.	☐Yes ☒ No
What will be the probable posted speed limit for this project? Click here to provide additional information.	**35**
In addition to portable changeable message signs (per each), is there a need for *short term* portable changeable message signs (for road closures, girder delivery, etc)? If "Yes", estimate the number of days in the space below: Click here to provide additional information.	☐Yes ☒ No ☐N/A

Temporary Shoring

Is Temporary Shoring for the maintenance of traffic required on this project? (Shoring required to maintain traffic is defined as shoring necessary to provide lateral support to the side of an excavation or embankment parallel to an open travelway when a theoretical 2:1 or steeper slope from the bottom of the excavation or embankment intersects the existing ground line closer than 5 feet (1.5m) from the edge of pavement of the open travelway.) List probable locations of this temporary shoring: **Y2 Retaining Wall and Culvert Extend**	☒Yes ☐ No

Miscellaneous Comments

840-4 All drainage structures over 48" are paid on volume basis. Sheet 3D-5 is incorrect.

Temp Shoring will be needed to construct RW#2 and Culvert Extension. RW#2 needs temp shoring in order to satisfy reinforcement length for MSE design.

NCFMP and NCDOT MOA Project Review

GENERAL INFORMATION

Project TIP / ID:	R-5799
WBS:	44984.1.1
DOT STR. INV. # (6-digit):	880099
Initial Submittal Date:	3/19/2019
MOA Approval Target Date:	5/31/2019
Project LET DATE:	3/16/2021
DOT Project Manager:	Josh Deyton
DOT Design / Review Eng:	
Private Engineering Firm:	RS&H
PEF Design Engineer:	Richard Bollinger

LOCATION INFORMATION

Stream Name (on FIRM Panel):	Turkey Creek
River Basin :	French Broad
Regulating City:	Brevard
Regulating County:	Transylvania
Division:	14
Community ID Number:	370231
Latitude (in decimal degrees):	35.27314
Longitude (in decimal degrees):	-82.70168
Route Number:	US-64
Road Name (on FIRM Panel):	Hendersonville Hwy
Effective FIS date:	10/2/2009
Panel Number (4-digit):	8597
Panel Effective Date:	10/2/2009
Published section # up/down stream	1206.6/104.6

FEMA/FMP STATUS

Status (MOA TYPE):	1
If MOA Type 3a or 3b, CLOMR case number:	
Type of Study (detailed, limited, redelineated):	Limited
Effective Model on File? (Yes or No):	Yes
Effective Model Format (HEC-RAS, HEC2):	HEC-RAS
Model Version No.:	3.1.3
Proposed Model Format (HEC-RAS, HEC2):	HEC-RAS
Model Version No.:	4.1.0

PROJECT SPECIFIC NOTES (pre-model review)

This project has a maximum increase of 0.1-ft, thus it qualifies as a Type 1 MOA.

FMP/DOT NOTES AND REVIEW COMMENTS:

[DOT staff: Add any pertinent notes/ from FMP/DOT coordination meetings/correspondence.]

1. Please verify and revise the WBS/Project No. on the FEMA Coordination Documentation Form as 44984.1.1 if necessary. It differs from the CSR and the Title Sheet.
   Comment Incorporated
   No further comment issued.

2. The stream name "Turkey Creek" is not included in the Title Sheet in the location description and/or the graphics. Please revise as necessary.
   "Turkey Creek" has been added to the main graphics on the title sheet, however not to the vicinity map on the title sheet. A separate vicinity map, with Turkey Creek labeled, has been added to the submittal items.
   No further comment issued.

3. Please verify the Published upstream tie-in XS shown in the FEMA Coordination Documentation Form and revise it as 1206.6.
   After the revisions to the model had been completed and the new BFE comparison sheet was populated, the published tie-in has been verified and revised to 1206.6.
   No further comment issued.

4. It appears that the encroachment stations have been placed outside the 100-yr flood fringe at XS 201 in the CE and REV models. Please verify and revise as necessary.
   The encroachment stations have been placed on the TOB points, so that the floodway will extend at least to the TOB, although this does result in the encroachments being outside of the flood fringe.
   Bank station elevations at XS 105 are 2112.81 and 2113.95 while at XS 201 the elevations are 2125.09 and 2126. Similar to XS 105, the bank stations at XS 201 can be moved further down to be inside the 100-yr flood fringe so that the encroachment stations can be placed inside the flood fringe. Please verify and revise the bank stations at XS 201 in the CE and REV models accordingly.
   The bank stations and encroachment stations have been updated at this cross section. The encroachments are now inside the flood fringe as required.
   No further comment issued.

5. There is a negative surcharge at XS 361 in the CE model. Please verify and revise as necessary.
   There is no longer a negative surcharge at RS 361 (it was eliminated when the silt was removed from the left culvert).
   No further comment issued.

6. The existing culverts are 72-ft long. Per the CSR, they will be extended 10' upstream and 11' downstream. Hence the proposed culverts should be 93-ft long. But the REV model has them as 91-ft long. Please verify and revise as necessary.
   The proposed culvert should be 91' long. The extensions noted in the CSR are taken from the back of the existing headwalls (see culvert extension drafting in the plan view), which is why they are 1' longer. This is now explained in the model narrative.
   No further comment issued.

7. Per the Narrative, the left culvert has sediment accumulation to a depth of 2-ft; it is not a physical obstruction like a concrete sill. Sediment blockages are generally ignored in modeling the culverts. Please verify and revise as necessary.
   The left culvert blockage has been removed in both the CE and REV models.
   No further comment issued.

8. In the Bridge Modeling Approach Editor, please select Pressure and/or Weir as the option for High Flow Methods in the CE and REV models.
   Comment Incorporated.
   No further comment issued.

9. Please verify the contraction ratios in the CE model and revise as necessary. They are not 1:1 and they differ between the left and right side (0.719 and 0.98).
   The left ineffective has been placed on the TOB, because a 1:1 ratio places it inside the stream. The right ineffective bound has been revised slightly to be at a 1:1 as intended.
   Please revise the Narrative to describe this situation and explicitly state that the contraction ratio in the CE model as 0.719:1.
   Comment Incorporated
   No further comment issued.

10. The expansion ratio is 2:1 per the Narrative in the CE model, but the actual values in the model are close to 1.7:1. Please verify and revise as necessary.
    Both Ineffective bounds have been set to the TOB, because the 2:1 ratio sets them inside the stream.
    Please revise the Narrative to state that the expansion ratio in the CE model is approximately 1.7:1 rather than 2:1.
    Due to the changes to the TOB stations at RS 201, we have now set the expansion ratio to 2:1 as intended. This also matches the Revised Model.
    No further comment issued.

11. Please verify the contraction ratios in the REV model and revise as necessary. They are not 1:1 and they differ between the left and right side (0.449 and 0.612).
    The left ineffective has been placed on the TOB, because a 1:1 ratio places it inside the stream. The right ineffective bound has been revised to be at a 1:1 as intended.
    Please revise the Narrative to describe this situation and explicitly state that the contraction ratio in the REV model as 0.449:1.
    Comment Incorporated
    No further comment issued.

12. Please verify and revise the Critical Depth Computation Method as the Parabolic Method in the DE, CE and REV models.
    Comment Incorporated
    No further comment issued.

13. Please mention in the conclusion section of the Narrative that the maximum increase in WSEL is 0.1-ft at XS 452.435.
    There is now no increase which rounds to 0.1'.
    No further comment issued.

14. The Narrative does not confirm that there are no structures impacted by the increase in WSEL caused by this project. Please include appropriate text in the conclusion section.
    A statement has been added to the model narrative.
    No further comment issued.

FINAL DETERMINATION:

R-5799 is recommended for approval as Type 1 MOA.

Cameron Long, PE Date 7/2/2019
Senior Project Manager

R-5799

Item Number	Section	Description		Quantity
7048500000-E	1705	PEDESTRIAN SIGNAL HEAD (16", 1 SECTION W/COUNTDOWN)	EA	10
7060000000-E	1705	SIGNAL CABLE (16-7)	LF	15910
7120000000-E	1705	VEHICLE SIGNAL HEAD (12", 3-SECTION)	EA	42
7132000000-E	1705	VEHICLE SIGNAL HEAD (12", 4-SECTION)	EA	11
7144000000-E	1705	VEHICLE SIGNAL HEAD (12", 5-SECTION)	EA	2
7229000000-N	SP	APS DETECTOR STATIONS	EA	12
7230000000-N	SP	CENTRAL CONTROL UNIT FOR APS DETECTOR STATIONS	EA	2
7264000000-E	1710	MESSENGER CABLE (3/8")	LF	3128
7288000000-E	1715	PAVED TRENCHING (1)(2")	LF	1061
7288000000-E	1715	PAVED TRENCHING (2)(2")	LF	238
7288000000-E	1715	PAVED TRENCHING (3)(2")	LF	2
7288000000-E	1715	PAVED TRENCHING (6)(2")	LF	11
7300000000-E	1715	UNPAVED TRENCHING (1)(2")	LF	148
7300000000-E	1715	UNPAVED TRENCHING (2)(2")	LF	13
7301000000-E	1715	DIRECTIONAL DRILL (2)(2")	LF	230
7324000000-N	1716	JUNCTION BOX (STANDARD SIZE)	EA	18
7348000000-N	1716	JUNCTION BOX (OVER-SIZED, HVY-DUTY)	EA	3
7360000000-N	1720	WOOD POLE	EA	14
7372000000-N	1721	GUY ASSEMBLY	EA	28
7408000000-E	1722	1" RISER WITH WEATHERHEAD	EA	3
7420000000-E	1722	2" RISER WITH WEATHERHEAD	EA	10
7444000000-E	1725	INDUCTIVE LOOP SAWCUT	LF	1226
7456000000-E	1726	LEAD-IN CABLE (14-2)	LF	10720
7484000000-N	SP	MICROWAVE VEHICLE DETECTION SYSTEM - MULTIPLE ZONES	EA	14
7575200000-N	SP	GPS UNIT	EA	3
7576000000-N	SP	METAL STRAIN SIGNAL POLE	EA	4
7613000000-N	SP	SOIL TEST	EA	4
7614100000-E	SP	DRILLED PIER FOUNDATION	CY	40
7636000000-N	1745	SIGN FOR SIGNALS	EA	23
7642100000-N	1743	TYPE I POST WITH FOUNDATION	EA	2
7642200000-N	1743	TYPE II PEDESTAL WITH FOUNDATION	EA	10
7684000000-N	1750	SIGNAL CABINET FOUNDATION	EA	1
7696000000-N	1751	CONTROLLER WITH CABINET (TYPE 2070LX W/ QFREE MAXTIME, BASE MOUNTED)	EA	1
7696000000-N	1751	CONTROLLER WITH CABINET (TYPE 2070LX W/ QFREE MAXTIME, POLE MOUNTED)	EA	3
7744000000-N	1751	DETECTOR CARD (TYPE 170)	EA	10
7901000000-N	1753	CABINET BASE EXTENDER	EA	1
7972000000-N	SP	METAL POLE REMOVAL	EA	8
7980000000-N	SP	PROTECTIVE COATING FOR STRAIN POLE (BLACK)	EA	4
7980000000-N	SP	PROTECTIVE COATING FOR SIGNAL PEDESTAL (BLACK)	EA	36
7980000000-N	SP	PROTECTIVE COATING FOR PUSHBUTTON POST (BLACK)	EA	2
7980000000-N	SP	RECTANGULAR RAPID FLASHING BEACON ASSEMBLY	EA	26
7980000000-N	SP	TYPE 2070LX CONTROLLER	EA	1

Earthwork Balance Sheet

Volumes in Cubic Yards

PROJECT: R-5799 COUNTY: Transylvania DATE: 5/2/2023 COMPILED BY: RS&H SHEET__ OF __ SHEETS

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. +15%		ROCK	SUITABLE	UNSUIT.	TOTAL
PHASE I															
-Y2- 12+00.00 RT	-Y2- 27+10.00 RT	53				53	3,516		3,516	4,043	3,990				
-Y2- 12+00.00 LT	-Y2- 27+10.00 LT	303				303	4,287		4,287	4,930	4,627				
	SUBTOTAL	356				356	7,803		7,803	8,973	8,617				
PHASE II STEP 1															
-L- 9+32.51 MED & LT	-L- 14+30.66 MED & LT	31				31	318		318	366	335				
-Y1- 10+37.18 RT	-Y1- 16+80.00 RT	130				130	317		317	365	235				
	SUBTOTAL	161				161	635		635	731	570				
PHASE II STEP 2															
-L- 14+28.63 LT	-L- 14+88.93 LT	2				2	4		4	5	3				
-Y1- 10+37.18 LT	-Y1- 16+80.00 LT	9				9	1,141		1,141	1,312	1,303				
	SUBTOTAL	11				11	1,145		1,145	1,317	1,306				
PHASE III															
-L- 7+00.00 MED	-L- 12+87.58 MED	74				74	168		168	193	119				
-L- 14+50.00 MED	-L- 18+05.93 MED	47				47	256		256	294	247				
-L- 19+24.22 MED	-L- 22+65.00 MED	51				51	494		494	568	517				
-L- 23+82.00 MED	-L- 26+04.28 MED						122		122	140	140				
-Y3- 10+85.01 LT	-Y3- 11+85.34 LT	31				31	54		54	62	31				
	SUBTOTAL	203				203	1,094		1,094	1,257	1,054				
PHASE IV															
-L- 7+00.00 RT	-L- 18+21.73 RT	75				75	706		706	812	737				
-L- 19+56.61 RT	-L- 21+00.00 RT	8				8	144		144	166	158				
-L- 23+86.93 RT	-L- 27+91.03 RT	2				2	1,151		1,151	1,324	1,322				
-L- 29+31.05 RT	-L- 32+66.00 RT	55				55	707		707	813	758				
-Y2- 10+85.01 LT	-Y2- 12+00.00 LT						142		142	163	163				
-Y2- 10+85.01 RT	-Y2- 11+73.42 RT	1				1	301		301	346	345				
-Y4- 10+84.87	-Y4- 12+85.00	10				10	1,556		1,556	1,789	1,779				
-SL1- 10+16.80	-SL1- 11+94.72	2				2	186		186	214	212				
	SUBTOTAL	153				153	4,893		4,893	5,627	5,474				
PHASE V															
-L- 7+00.00 LT	-L-17+76.80 LT	257				257	1,041		1,041	1,197	940				
-L- 19+09.66 LT	-L- 22+46.93 LT	33				33	232		232	267	234				
-L- 23+86.93 LT	-L- 27+91.03 LT	1,110				1,110	34		34	39			1,071		1,071
-L- 29+31.05 LT	-L- 32+66.00 LT	121				121	6		6	7			114		114
-Y3- 10+85.01 RT	-Y3- 17+20.00 RT	273				273	368		368	423	150				
-Y3- 10+85.01 LT	-Y3- 17+20.00 LT	197				197	420		420	483	286				
-Y5- 10+84.78	-Y5- 12+75.00	1,770				1,770	8		8	9			1,761		1,761
-SL2- 10+29.91	-SL2- 12+07.60	94				94	304		304	350	256				
	SUBTOTAL	3,855				3,855	2,413		2,413	2,775	1,866		2,946		2,946
PHASE VI STEP 3															
-L- 24+58.89 MED	-L-27+43.39 MED						171		171	197	197				
-RA1- 10+00.00 MED	-RA1- 13+45.58 MED						1,466		1,466	1,686	1,686				
-RA2- 10+00.00 MED	-RA2- 13+45.57 MED						1,468		1,468	1,688	1,688				
	SUBTOTAL						3,105		3,105	3,571	3,571				
TOTAL		4,739				4,739	21,088		21,088	24,251	22,458		2,946		2,946
MATERIAL FOR SHOULDER CONSTRUCTION															
LOSS DUE TO CLEARING & GRUBBING		-150				-150					150				
ADDITIONAL UNDERCUT															
ROCK WASTE TO REPLACE BORROW															
ADJUST FOR ROCK WASTE															
WASTE IN LIEU OF BORROW											-2,946		-2,946		-2,946
PROJECT TOTAL		4,589				4,589	21,088		21,088	24,251	19,662				
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT											983				
GRAND TOTAL						4,589	21,088		21,088	24,251	20,645				
SAY						5,280					23,750				

NOTE: EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

EST. SHALLOW UNDERCUT = 500 CY

CLASS IV SUBGRADE STABILIZATION = 1,000 TONS

PER GEOTECH RECOMMENDATION, ESTIMATED 1,450 CUBIC YARDS OF UNDERCUT TO BE USED IN THE DISCRETION OF THE RESIDENT ENGINEER.

PROPOSED DESIGN CRITERIA

TIP: R-5799

STATE PROJECT: 44984.1.1
DIVISION: 14
COUNTY: Transylvania
PROJECT DESCRIPTION: US 64 @ NC 280 / US 64: Intersection Improvements

PAGE: 1 of 3
DATE: 10/9/2017

PREPARED BY: RS&H

ROUTE		US 276/64/ NC 280	Ecusta Road	US 64	US 276	REFERENCE
LINE		-L-	-Y1-	-Y2-	-Y3-	OR REMARKS
TRAFFIC DATA						
ADT CURRENT YR	2023	25,400	5,700	9,900	7,500	See Note 1
ADT DESIGN YR	2043	30,600	6,800	11,400	9,000	See Note 1
TTST		2	1	1	1	See Note 1
DUALS		4	1	2	2	See Note 1
K		9	8	9	9	See Note 1
DIR		55	55	55	60	See Note 1
CLASSIFICATION		Prinicipal Arterial	Major Collector	Principal Arterial	Major Collector	
TERRAIN TYPE		Rolling	Rolling	Rolling	Rolling	
DESIGN SPEED mph		45	40	40	55	
POSTED SPEED mph		40	35	35	50	
PROP. R/W WIDTH ft		Varies	Varies	Varies	Varies	
CONTROL OF ACCESS		N	N	N	N	
RUMBLE STRIPS (Y/N)		N	N	N	N	
TYPICAL SECTION TYPE		Curb & Gutter	Curb & Gutter	Curb & Gutter	Curb & Gutter	
LANE WIDTH ft		11	11	11	11	
SIDEWALKS (Y/N)		Y	Y	Y	Y	See Note 2
BICYCLE LANES (Y/N)		N	N	Y	Y	See Note 3
MEDIAN WIDTH ft		17.5	N/A	N/A	N/A	
MED. PROTECT. (GR/BARRIER)		N/A	N/A	N/A	N/A	
SHOULDER WIDTH (total)						
BERM WIDTH ft		10 (14 w/ GR)	10 (14 w/ GR)	10 (14 w/ GR)	10 (14 w/ GR)	RDM 1-7D, F-1, Note 5
OUTSIDE w/o GR ft		8	N/A	N/A	N/A	RDM 1-4B
OUTSIDE w/ GR ft		11	N/A	N/A	N/A	RDM 1-4B
MEDIAN ft		6	N/A	N/A	N/A	RDM 1-2B
PAVED SHOULDER						
OUTSIDE TOTAL/FDPS ft		4	N/A	N/A	N/A	RDM 1-4O
MEDIAN TOTAL/FDPS ft		2	N/A	N/A	N/A	RDM 1-4O
GRADE						
MAX.		7%	10%	8%	8%	AASHTO Pg. 6-12, 7-29
MIN.		0.3%	0.3%	0.3%	0.3%	AASHTO Pg. 3-119
K VALUE						
SAG		79	64	64	115	AASHTO Pg. 3-161
CREST		61	44	44	114	AASHTO Pg. 3-155
HORIZ. ALIGN.						
MAX. SUPER.		0.06	0.04	0.06	0.06	RDM 1-15
MIN. RADIUS ft		643	533	485	1060	AASHTO Tbl 3-44, 3-45
SPIRAL (Y/N)		N	N	N	N	
CROSS SLOPES						
PAVEMENT		0.02	0.02	0.02	0.02	RDM 1-3B
BERM		0.02	0.02	0.02	0.02	RDM 1-7D, F-1
TURF SHOULDER		N/A	N/A	N/A	N/A	
MEDIAN DITCH		N/A	N/A	N/A	N/A	
DITCH TYPICAL (A,B,C)		A	N/A	N/A	N/A	
CLEAR ZONE ft		28	10	12	12	RDM 1-4N; See Note 4
TYPICAL SECTION NO.						

NOTES:

1. From traffic forecast approved by NCDOT on 10/25/17.
2. 10' multi-use path on -L-, 5' sidewalks on -Y2- and -Y3-.
3. 5' bike lanes on -Y2- and -Y3-.
4. Clear zone based on proposed ROW, PUE, and utility pole memo by Art McMillan, PE dated Feb. 25, 2011.
5. 6' Berm used at locations where there is no sidewalk or MUP. 10' Berm width is for locations with 5' sidewalk.

PROPOSED DESIGN CRITERIA

TIP: R-5799

STATE PROJECT: 44984.1.1
DIVISION: 14 **PAGE:** 2 of 3
COUNTY: Transylvania
PROJECT DESCRIPTION: US 64 @ NC 280 / US 64: Intersection Improvements **DATE:** 10/9/2017

PREPARED BY: RS&H

ROUTE		Deavor Road	Forest Gate Dr	Forest Gate Circle		REFERENCE
LINE		**-Y4-**	**-Y5-**	**-Y6-**		**OR REMARKS**
TRAFFIC DATA						
ADT LET YR	2023	800	6,300	1,800		See Note 1
ADT DESIGN YR	2043	900	7,200	2,200		See Note 1
TTST		1	1	1		See Note 1
DUALS		1	1	1		See Note 1
K		8	9	9		See Note 1
DIR		65	55	65		See Note 1
CLASSIFICATION		Local	Local	Local		
TERRAIN TYPE		Rolling	Mountainous	Mountainous		
DESIGN SPEED mph		35	20	20		
POSTED SPEED mph		30	15	15		
PROP. R/W WIDTH ft		Varies	Varies	Varies		
CONTROL OF ACCESS		N	N	N		
RUMBLE STRIPS (Y/N)		N	N	N		
TYPICAL SECTION TYPE		Curb & Gutter	Curb & Gutter	Curb & Gutter		
LANE WIDTH ft		11	11	11		
SIDEWALKS (Y/N)		N	N	N		
BICYCLE LANES (Y/N)		N	N	N		
MEDIAN WIDTH ft		N/A	N/A	N/A		
MED. PROTECT. (GR/BARRIER)		N/A	N/A	N/A		
SHOULDER WIDTH (total)						
BERM WIDTH ft		10	6	6		RDM 1-7D, F-1, Note 5
OUTSIDE w/o GR ft		N/A	N/A	N/A		
OUTSIDE w/ GR ft		N/A	N/A	N/A		
MEDIAN ft		6	N/A	N/A		RDM 1-2B
PAVED SHOULDER						
OUTSIDE TOTAL/FDPS ft		N/A	N/A	N/A		
MEDIAN TOTAL/FDPS ft		N/A	N/A	N/A		
GRADE						
MAX.		10%	16%	16%		AASHTO Pg. 5-3
MIN.		0.3%	0.3%	0.3%		AASHTO Pg. 3-119
K VALUE						
SAG		49	17	17		AASHTO Pg. 3-161
CREST		29	7	7		AASHTO Pg. 3-155
HORIZ. ALIGN.						
MAX. SUPER.		0.04	0.04	0.04		RDM 1-15
MIN. RADIUS ft		371	86	86		AASHTO Pg. 3-44
SPIRAL (Y/N)		N	N	N		
CROSS SLOPES						
PAVEMENT		0.02	0.02	0.02		RDM 1-3B
BERM		0.02	0.02	0.02		RDM 1-7D, F-1
TURF SHOULDER		N/A	N/A	N/A		
MEDIAN DITCH		N/A	N/A	N/A		
DITCH TYPICAL (A,B,C)		N/A	N/A	N/A		
CLEAR ZONE ft		10	8	8		RDM 1-4N; See Note 4
TYPICAL SECTION NO.						

NOTES:

1. From traffic forecast approved by NCDOT on 8/28/17.
2. 10' multi-use path on -L-, 5' sidewalks on -Y2- and -Y3-.
3. 5' bike lanes on -Y2- and -Y3-.
4. Clear zone based on proposed ROW, PUE, and utility pole memo by Art McMillan, PE dated Feb. 25, 2011.
5. 6' Berm used at locations where there is no sidewalk or MUP. 10' Berm width is for locations with 5' sidewalk.

PROPOSED DESIGN CRITERIA

TIP: R-5799

STATE PROJECT: 44984.1.1
DIVISION: 14 **PAGE:** 3 of 3
COUNTY: Transylvania
PROJECT DESCRIPTION: US 64 @ NC 280 / US 64: Intersection Improvements **DATE:** 10/9/2017

PREPARED BY: RS&H

SCALE:

PLANS	1"=50'			
PROFILES	1"=50'	*horiz.*	1"=10'	*vert.*
INTERCH. DETAIL	N/A			
CROSS-SECTIONS	1"=10'	*horiz.*	1"=10'	*vert.*

SHEET SIZE:

PLANS	22" x 34"
INTERCH. DETAIL	N/A
CROSS-SECTIONS	22" x 34"

BRIDGES and/or CULVERTS:

TYPE (*SINGLE/DUAL/RCBC*)	
SIZE (*LENGTH X WIDTH X HT*)	
LOCATION	
SKETCH #	
HORIZ.CLEARANCE	
VERT. CLEARANCE	

DESIGN EXCEPTIONS: N/A

NOTES: (SPECIAL CONSIDERATIONS)

PROJECT TIP NO. _____ EFF. 01-15-18
COUNTY _____ REV. 10-02-17
PROJECT ENGINEER _____
PROJ. DESIGN ENGINEER _____

REVIEW LIST FOR FINAL CONSTRUCTION PLANS
LET UNDER THE 2018 SPECIFICATIONS

CLICK THE RIGHT BOX TO APPLY "CHECK MARK" WHEN COMPLETED APPLICABLE ITEMS ON THIS REVIEW LIST. USE THE DROPDOWN ARROW TO PLACE "N/A" BY NON-APPLICABLE ITEMS.

TITLE SHEET

(1) _____ LOCATION OF PROJECT IS COMPLETE AND ACCURATE
(2) _____ COUNTY IS SHOWN
(3) _____ TYPE OF WORK INCLUDES ALL ITEMS SHOWN ON CURRENT TENTATIVE LETTING LIST
(4) _____ GRAPHIC SCALES ARE SHOWN FOR PLAN AND PROFILE SHEETS
(5) _____ DESIGN DATA IS SHOWN
(6) _____ CONTROL OF ACCESS NOTE SHOWN (FULL OR PARTIAL)
(7) _____ SHOW ANY ADDITIONAL “CONVENTIONAL SYMBOLS” ON SHEET 1B
(8) _____ VICINITY MAP INCLUDES THE FOLLOWING:
- (A) _____ CITY AND CITY LIMITS
- (B) _____ INTERSTATE, U.S. AND STATE ROUTES
- (C) _____ NORTH ARROW
- (D) _____ BEGINNING AND END OF PROJECT
- (E) _____ TITLE BLOCK
- (F)_____ OFFSITE DETOURS

(9) _____ PROJECT LAYOUT ON NUMBERED SUPERIMPOSED SHEETS INCLUDES THE FOLLOWING:
- (A) _____ PROJECT ALIGNMENT FOR ALL PROPOSED CONSTRUCTION, (-L- LINES, -Y- LINES, SERVICE ROADS, DETOURS, ETC)
- (B) _____ EXISTING ROADS AND STREETS AFFECTED BY CONSTRUCTION BUT NOT A PART OF THE PROJECT
- (C) _____ ROUTE NUMBERS, SURVEY LINE NUMBERS, STREET NAMES, ETC.
- (D) _____ SYMBOLS FOR PROPOSED BRIDGES AND CULVERTS 20'/6 m AND OVER WITH BEGINNING AND ENDING STATIONS
- (E) _____ STREAMS AND RIVERS
- (F)_____ RAILROADS
- (G) _____ CITY LIMITS
- (H) _____ STATE AND COUNTY LIMITS
- (I) _____ BEGINNING AND ENDING STATIONS FOR EACH PROJECT
- (J)_____ BEGIN AND END CONSTRUCTION OUTSIDE PROJECT LIMITS
- (K) _____ DESTINATION POINTS AT BEGINNING AND ENDING OF PROJECT
- (L) _____ NORTH ARROW

(10) _____ PROJECT NUMBER INFORMATION INCLUDES THE FOLLOWING:
- (A) _____ PROJECT CONTRACT NUMBER AND T.I.P. NUMBER ON LEFT END OF SHEET
- (B) _____ P.E., R/W, UTILITY AND CONSTRUCTION F.A. PROJECT NUMBERS IN PROJECT IDENTIFICATION BLOCK (TOP RIGHT CORNER)
- (C) _____ P.E., R/W, UTILITY AND CONSTRUCTION WBS ELEMENTS IN PROJECT IDENTIFICATION BLOCK (TOP RIGHT CORNER)

(11) _____ LENGTH OF PROJECT CORRECT (LENGTH SHOWN FOR ROADWAY, STRUCTURE AND TOTAL PROJECT)
(12) _____ SHOWN PLANS PREPARED BY:
(13) _____ MONTH, DAY AND YEAR OF R/W AND LETTING SHOWN
(14) _____ AREAS NOT PART OF PROJECT NOTED
(15) _____ REMOVE CLEARING METHOD NOTE
(16) _____ REMOVE NOTE FOR MUNICIPAL BOUNDARIES

INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARDS

(1) _____ SUBMIT 8 ½" x 11" WORK SHEETS TO PLAN REVIEW (AFTER REVIEW RETURN WORKSHEETS AND COMPLETED SHEET 1-A TO PLAN REVIEW)

TYPICAL SECTIONS

(1) _____ PAVEMENT SCHEDULE CORRESPONDS WITH PAVEMENT DESIGN LETTER
(2) _____ PAVEMENT COMPOSITIONS LABELED TO CORRESPOND WITH PAVEMENT SCHEDULE
(3) _____ DIMENSIONS SHOWN ON PAVEMENT, SUBGRADES, STABILIZATION, SHOULDERS, DITCHES, SLOPES, CENTERLINE TO CENTERLINE, MEDIANS, SIDEWALKS, UTILITY STRIPS, CURB & GUTTER, ETC.
(4) _____ SLOPES SHOWN ON PAVEMENT, FLEXIBLE PAVEMENT EDGE, SHOULDERS, SUBGRADE, DITCHES, HINGE POINT GRADING, CUTS AND FILLS, RUMBLE STRIPS
(5) _____ STATION TO STATION SHOWN WITH CORRECT LINE REFERENCE
(6) _____ STATIONS ARE BROKEN FOR BRIDGES AND EQUALITIES
(7) _____ GRADING LIMIT LINES SHOWN
(8) _____ GRADE POINT SHOWN ON EACH TYPICAL SECTION
(9) _____ INFORMATION RELATED TO FUTURE CONSTRUCTION SHOWN
(10) _____ VARIABLE LIMITS SHOWN
(11) _____ NECESSARY NOTES OF EXPLANATION SHOWN
(12) _____ TEMPORARY PAVEMENT REQUIRES A TEMPORARY PAVEMENT DESIGN FROM THE PAVEMENT MANAGEMENT UNIT AND A TYPICAL SECTION

DETAILS (WHERE APPLIED)

(1) _____ INTERSECTIONS AND ISLANDS
(2) _____ LAYOUT OF SYMBOLS FOR TYPES OF CONCRETE PAVEMENT (THROUGH LANES, RAMPS AND MISCELLANEOUS)
(3) _____ RIP RAP NOT SHOWN BY STANDARDS
(4) _____ TEMPORARY SHORING

(5) _____ BENCH SLOPES
(6) _____ ROCK PLATING
(7) _____ SPECIAL DRAINAGE STRUCTURE OR ENDWALLS
(8) _____ SPECIAL DITCHES
(9) _____ GUARDRAIL NOT COVERED BY STANDARDS
(10) _____ ASPHALT WEARING SURFACE ON CORED SLAB AND BOX BEAM BRIDGES

PLAN SHEETS

(1) _____ BEGINNING AND ENDING STATIONS ARE SHOWN ON FIRST AND LAST PLAN SHEET TO AGREE WITH TITLE SHEET AND TYPICAL SECTIONS
(2) _____ EXISTING PAVEMENT WIDTH AND TYPE IS SHOWN
(3) _____ GRADE LINES AND DESIGN CORRECT
(4) _____ THE FOLLOWING ARE SHOWN ON EACH PLAN AND/OR PROFILE SHEET:
- (A) _____ NORTH ARROW
- (B) _____ BEARINGS
- (C) _____ CURVE DATA WITH SUPERELEVATION AND RUNOFF
- (D) _____ CONSTRUCTION LIMITS, BERM DITCHES AND LATERAL DITCHES
- (E) _____ PROPERTY OWNERS, PROPERTY LINES AND PARCEL NUMBERS
- (F)_____ R/W, EASEMENT, CONTROL OF ACCESS BREAKS BY STATION AND DISTANCE
- (G) _____ AREAS TO REMAIN UNDISTURBED WITHIN THE RIGHT-OF-WAY ARE CLEARLY MARKED
- (H) _____ FENCE AND TYPE
- (I) _____ STREETS, ROADS AND DRIVEWAYS
- (J)_____ ONSITE DETOURS
- (K) _____ DISPOSITION OF OLD ROADS IF PROJECT IS A RELOCATION
- (L) _____ DIMENSIONS OF PAVEMENT AND SHOULDERS IN RELATION TO PROPOSED BRIDGE WIDTH (SKETCH)
- (M) _____ PROPOSED PAVEMENT AND RIGHT-OF-WAY WIDTHS AT THE BEGINNING AND END OF EACH SHEET
- (N) _____ SHOW LANE LINES AT INTERSECTIONS, TAPERS, AUXILIARY LANES, ETC.
- (O) _____ -Y- LINES WITH BEGINNING AND ENDING CONSTRUCTION STATIONS AND STATION TIES WITH MAIN LINE
- (P)_____ TRAFFIC DATA FOR INTERSECTIONS
- (Q) _____ LIMITS OF PAVED SHOULDERS AT INTERSECTIONS
- (R) _____ NOTE WHERE SIGHT DISTANCE GRADING IS REQUIRED
- (S)_____ BORROW AND/OR WASTE AREAS IF FURNISHED BY DOT
- (T) _____ REMOVAL OF EXISTING PIPES
- (U) _____ PIPES TO BE PLUGGED
- (V) _____ CROSS REFERENCE NOTES CORRECT
- (W) _____ SYMBOL DENOTING PAVEMENT REMOVAL LOCATIONS
- (X) _____ BEGINNING AND END STATION FOR BRIDGES AND CULVERTS
- (Y) _____ UNDERCUT EXCAVATION ON PROFILE
- (Z) _____ STRUCTURAL SHEET NUMBERS, IF COMBINED BID
- (AA) _____ HYDRAULIC DATA (DRAINAGE AREA, FREQUENCY, ETC.)

(BB) _____ FALSE SUMP DETAIL [IF NOT SHOWN ON DITCH DETAILS SHEET (2D-SERIES)]
(CC) _____ BENCH MARKS (PROFILES AND/OR SURVEY CONTROL SHEETS)
(DD) _____ LABEL QUANTITIES AT EACH LOCATION AS FOLLOWS:
1._____RIP RAP
2._____DRAINAGE DITCH EXCAVATION
3._____GEOTEXTILE FOR DRAINAGE
(EE)_____ DRAINAGE
(FF) _____ REMOVE BASELINE AND BASELINE STATIONS
(GG) _____ ENSURE BASELINE DATA IS SHOWN WITH POINT SYMBOL AND POINT NUMBER
(HH) _____ LABEL WELLS TO BE SEALED AND ABANDONED.

INTERCHANGE SHEETS

(1) _____ INTERCHANGE SHEETS PROPERLY MATCHED WITH ADJACENT PLAN SHEET WITH NO OVERLAPPING COVERAGE, IF POSSIBLE
(2) _____ STRUCTURES CHECKED FOR VERTICAL AND HORIZONTAL CLEARANCES
(3) _____ THE FOLLOWING INFORMATION SHOWN ON THE INTERCHANGE DETAILS AND PROFILES:
(A) _____ TRAFFIC DATA
(B) _____ BAR SCALE
(C) _____ ADDITIONAL ITEMS AS LISTED UNDER PLAN SHEETS
(4) _____ CONTOUR GRADING DETAIL SHOWN, IF REQUESTED BY THE DIVISION
(5) _____ CROSS-SECTION LAYOUT DETAIL/SHEAR POINT DIAGRAM(NOT ALWAYS REQUIRED FOR DIAMOND INTERCHANGE)

INTERSECTION SHEETS

THE INFORMATION SHOWN ON THE INTERSECTION DETAILS SHALL BE RESTRICTED TO DESIGN DATA ONLY. THE FOLLOWING SHALL BE SHOWN:
(1) _____ SHOW INFORMATION FOR CONSTRUCTING THREE CENTERED CURVES
(2) _____ ISLAND DETAILS
(3) _____ LEGEND FOR ISLANDS, SIDEWALKS, CURB RAMPS
(4) _____ ALIGNMENT
(5) _____ LANE MARKINGS
(6) _____ BAR SCALE
(7) _____ PROPOSED EDGES OF PAVEMENT
(8) _____ NORTH ARROWS
(9) _____ SUPERELEVATION RATES
(10) _____ PAVED SHOULDER WIDTHS
(11) _____ SUFFICIENT DIMENSIONS AND TIE POINTS FOR FIELD LOCATION

CROSS-SECTIONS

(1) _____ SHOW EXISTING GROUND LINE, STATIONS AND ELEVATIONS
(2) _____ TEMPLATES SHOWING LABELED CUT AND FILL SLOPES, GUARDRAIL WIDENING, DITCHES, CHANNEL CHANGES, ETC.
(3) _____ GEOLOGY REPORT REVIEWED TO ASSURE CONFORMITY WITH PLANS

(4) _____ UNDERCUT EXCAVATION AND/ OR SHALLOW UNDERCUT SYMBOL IS SHOWN
(5) _____ NOTE ON CROSS-SECTION SUMMARY SHEET SHOULD INDICATE WHETHER OR NOT THE EMBANKMENT COLUMN INCLUDES BACKFILL FOR UNDERCUT
(6) _____ EARTHWORK COMPUTATION SHEETS COMPLETE
(7) _____ CROSS-SECTIONS CHECKED TO ASSURE ADEQUATE SIGHT DISTANCES AT BRIDGES AND INTERSECTIONS
(8) _____ NOTE SHOWN ON CROSS-SECTION SUMMARY SHEET
(9) _____ SCALE SHOWN ON EACH SHEET

GUARDRAIL DESIGN

(1) _____ GUARDRAIL SHOWN FOR BRIDGE PIERS, CULVERTS, LARGE PIPE, SIGN SUPPORTS AND OTHER FIXED OBJECTS
(2) _____ GUARDRAIL SHOWN FOR PONDS, RIVERS AND OTHER WATER RELATED HAZARDS
(3) _____ GUARDRAIL SHOWN ON PLANS
(4) _____ GUARDRAIL SHOWN ON THE GUARDRAIL SUMMARY SHEET
(5) _____ SPECIAL DETAILS SHOWN AS REQUIRED
(6) _____ ENSURE THAT THE STRUCTURE GUARDRAIL ANCHOR SHOWN ON THE PLANS ATTACHES TO THE BRIDGE BARRIER

SUMMARY OF QUANTITIES

(1) _____ COMPUTATION SHEET TOTALS FOR EACH PAY ITEM CHECKED AGAINST ESTIMATE
(2) _____ SUMMARY SHEETS INITIALED BY PERSON WHO WORKED AND CHECKED SUMMARIES
(3) _____ REFERENCE PAVEMENT STRUCTURE VOLUME (WHEN APPLICABLE) BELOW EARTHWORK SUMMARY
(4) _____ EARTHWORK SUMMARY (SHOW NOTE RELATED TO GEO-TECH DATA)
(5) _____ DRAINAGE SUMMARY
(6) _____ GUARDRAIL SUMMARY
(7) _____ SHOULDER DRAIN SUMMARY
(8) _____ PAVEMENT REMOVAL SUMMARY
(9) _____ FENCE SUMMARY (URBAN PROJECTS)
(10) _____ GEOTECHNICAL SUMMARIES (SHEET 3G-1)
(11) _____ MISCELLANEOUS SUMMARIES AS NECESSARY

ESTIMATES

(1) _____ ESTIMATE MADE FOR EACH WBS ELEMENT, FEDERAL PROJECT NUMBER, AND OTHER PARTS AS NECESSARY
(2) _____ FINAL TRNS*PORT ESTIMATE CHECKED AGAINST THE QUANTITY CALCULATIONS
(3) _____ DESCRIPTION NUMBER, SECTION NUMBER AND ITEM DESCRIPTION CHECKED AGAINST PAY ITEM LIST
(4) _____ FORCE ACCOUNT ITEMS INCORPORATED INTO THE ESTIMATE ON F.A. PROJECTS
(5) _____ TRNS*PORT ESTIMATE PLACED IN THE PROJECT FILE
(6) _____ PROJECT LENGTH SHOWN ON ESTIMATE AGREES WITH TITLE SHEET

(ROADWAY'S LENGTH ONLY)

(7) _____ COST BASED ESTIMATE QUANTITY BREAKDOWN SUMMARY SHEET COMPLETED

(8) _____ INCLUDE ON ROADWAY ESTIMATE ANY STRUCTURE REMOVAL PAY ITEMS NOT INCLUDED ON THE STRUCTURE ESTIMATE

GENERAL

(1) _____ CHECK SUBSURFACE PLANS WITH GRADE LINE AND EARTHWORK BALANCE SHEET AGAINST FINAL ROADWAY PLANS

(2) _____ ALL FILE FOLDERS IDENTIFIED BY CONSTRUCTION WBS ELEMENT, T.I.P. NUMBER, CONTRACT NUMBER AND COUNTY

(3) _____ ALL QUANTITY CALCULATION SHEETS IDENTIFIED BY THE T.I.P. NUMBER. SHOW CONSTRUCTION WBS ELEMENT AND SIGNATURE ON SHEET NO. 1

(4) _____ EXCAVATION QUANTITIES AT CULVERTS HAVE BEEN COORDINATED WITH STRUCTURE MANAGEMENT

(5) _____ REMOVE "PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION" NOTE FROM ALL SHEETS

(6) _____ DESIGN EXCEPTION REQUESTED, APPROVED, AND NOTED ON PLANS

(7) _____ RIGHT-OF-WAY REVISION NOTES REMOVED FROM THE PLANS

(8) _____ T.I.P. NUMBER IS SHOWN ON ALL SHEETS

(9) _____ COORDINATE FINAL PLANS WITH PLANNING & ENVIRONMENTAL AND HYDRAULICS UNIT TO ENSURE COMPLIANCE WITH PERMIT

(10) _____ UTILITY ITEMS ARE INCLUDED

(11) _____ LANDSCAPE AND EROSION CONTROL ITEMS ARE INCLUDED

(12) _____ SIGNING AND SIGNALIZATION ITEMS ARE INCLUDED

(13) _____ TRAFFIC CONTROL PLAN ITEMS ARE INCLUDED

(14) _____ SHOW RIGHT-OF-WAY PLAN SHEET NUMBER IN THE MARGIN ABOVE THE TITLE BLOCK IF DIFFERENT FROM CONSTRUCTION SHEET NUMBERS (EXAMPLE: R/W 12)

(15) _____ COMPLETE CHECKLIST FOR COORDINATION OF ROADWAY AND STRUCTURE PLANS (CIRCLE TYPE OF APPROACH FILL SPECIFIED IN STRUCTURE PLANS ITEM #8)

(16) _____ PLACE IMAGE OF PROFESSIONAL ENGINEER SEAL (MULTIPLE SEALS MAY BE REQUIRED ON A SINGLE SHEET) WITH ENGINEER'S NAME AND LICENSE NUMBER. ELECTRONIC SIGNATURES ARE NOT REQUIRED AT THE INITIAL TURN-IN TO PLAN REVIEW.

(17) _____ HAS PAVEMENT MANAGEMENT REVIEWED PLANS FOR SHOULDER DRAIN LOCATIONS?

(18) _____ SUBMIT FULL SIZE CROSS-SECTION SHEET IF 30 SHEETS OR LESS. SUBMIT LEDGER CROSS-SECTION SHEETS IF 31 SHEETS OR MORE.

(19) _____ ENSURE PLANS INCLUDE ANY "ENVIRONMENTAL COMMITMENTS".

(20) _____ ALL INDIVIDUAL PDF SHEETS MUST BE SCALED 34" WIDE X 22" HIGH.

(21) _____ BIND PLANS WITH BINDER CLIPS. NO SCREWS, PLEASE.

(22) _____ PROJECT FILE CONTAINS CORRESPONDENCE RELATED TO STANDARD SPECIFICATIONS SECTIONS 210 OR 215.

(23) _____ INCLUDE PARCEL INDEX SHEET (FOR PROJECTS WITH 2 OR MORE PLAN SHEETS AS 3P-1.

(24) _____ INCLUDE BRIDGE "FOUNDATION RECOMMENDATIONS" IN THE BOUND FILE.

(25) _____ RETAINING OR SOUND BARRIER WALLS PLANS INCLUDED AS SPECIFIED BY MR. ART MCMILLIAN, P.E. (PER MEMO 7-29-05)

(26) _____ REFER TO THE ROADWAY DESIGN MANUAL, PART II, CHAPTER 13, SECTION 13-1 FOR PROJECT FILE CONTENT.

(27) _____ AT THE TIME FINAL PLANS ARE SUBMITTED TO THE PLAN REVIEW SECTION, SEND A PDF OF THE TRANSPORT ESTIMATE FOR EACH OF THE DESIGN UNITS TO THE DIVISION CONSTRUCTION ENGINEER.

(28) _____ AT THE TIME FINAL PLANS ARE SUBMITTED TO THE PLANS CHECKING UNIT, NOTIFY LOCATION & SURVEYS (L & S) CENTRAL OFFICE THAT PLANS ARE COMPLETE OF THE CURRENT DIRECTORY OF THE ELECTRONIC DESIGN PLANS (EMAIL TO UNIT HEAD IS SUFFICIENT).

(29) _____ ONCE THE BALANCE SHEET HAS BEEN CHECKED BY THE PLANS AND STANDARDS MANAGEMENT SECTION, PLACE AN ELECTRONIC COPY (EXCEL FORMAT REQUIRED) OF THE EARTHWORK BALANCE SHEET IN THE "PRELETSTAGE\TIP#\ROADWAY\EARTHWORK BALANCE SHEET" FOLDER.

(30) _____ GEOTECHNICAL STANDARD DRAWINGS AND PROVISIONS ARE CURRENT. FOR STANDARD DRAWINGS, COMPARE DRAWING DATE TO EFFECTIVE LET DATE SHOWN HERE: https://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx FOR STANDARD PROVISIONS, COMPARE PROVISION DATE TO EFFECTIVE LET DATE SHOWN HERE https://connect.ncdot.gov/resources/Geological/Pages/Geotech_Provisions_Notes.aspx

(31) _____ HAVE YOU COORDINATED THE "GEOTECHNICAL SUMMARY TABLES" WITH THE GEOTECHNICAL ENGINEERING UNIT? (PER GEOTECH. AUGUST 28, 2012 MEMO)

(32) _____ SEND A PDF OF YOUR PLANS TO PAVEMENT MANAGEMENT AND TO THE HYDRAULICS UNIT FOR REVIEW BEFORE SEALING THEIR PLANS

SPECIAL PROVISIONS

(1) _____ (SPECIAL PROVISIONS WRITTEN FOR ALL PAY ITEMS AND CONTRACT IMPLEMENTATION ITEMS NOT COVERED BY THE CURRENT "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES", PROJECT PROVISIONS OR STANDARD SPECIAL PROVISIONS.

PLANS PREPARED BY: _____

North Carolina Department of Transportation
Preliminary Estimate

TIP No. R-5799 | **100%** | County: **Transylvania**
Route: Intersections of US 64, US 276 and NC 280
Construct Intersection Improvements

CONSTR. COST
$0

Prepared By: RS&H Architects - Engineers - Planners, Inc. Date 5/9/2023
Requested By: Date

Line Item	Des	Sec No.	Description	Quantity	Unit	Price	Amount
0000100000-N		800	Mobilization	1	LS		$ -
0000400000-N		801	Construction Surveying	1	LS		$ -
0036000000-E		225	Undercut Excavatior	1,450	CY		$ -
0050000000-E		226	Supplemental Clearing and Grubbing	1	Acre		$ -
0063000000-N		SP	Grading	1	LS		$ -
			Clearing and Grubbing	0.5	Acre		$ -
			Unclassified Excavation	5,280	CY		$ -
			Fine Grading	16,970	SY		$ -
			Remove Existing Asphalt Pavement	8,340	SY		$ -
			ROADWAY				
0106000000-E		230	Borrow Excavation	23,750	CY		$ -
0127000000-N		235	Embankment Settlement Gauges	3	Each		$ -
0195000000-E		265	Select Granular Material	1,000	CY		$ -
0196000000-E		270	Geotextile for Soil Stabilization	2,000	SY		$ -
0199000000-E		SP	Temporary Shoring	2,300	SF		$ -
0223000000-E		275	Rock Plating	30	SY		$ -
0318000000-E		300	Foundation Conditioning Material, Minor Structures	930	Tons		$ -
0320000000-E		300	Foundation Conditioning Geotextile	2,910	SY		$ -
0342000000-E		310	12" Side Drain Pipe	50	LF		$ -
0343000000-E		310	15" Side Drain Pipe	80	LF		$ -
0345000000-E		310	24" Side Drain Pipe	44	LF		$ -
0354000000-E		310	15" RC Pipe Culverts, Class V	1,124	LF		$ -
0354000000-E		310	18" RC Pipe Culverts, Class V	360	LF		$ -
0354000000-E		310	24" RC Pipe Culverts, Class V	124	LF		$ -
0354000000-E		310	30" RC Pipe Culverts, Class V	44	LF		$ -
0366000000-E		310	15" RC Pipe Culverts, Class III	552	LF		$ -
0372000000-E		310	18" RC Pipe Culverts, Class III	516	LF		$ -
0378000000-E		310	24" RC Pipe Culverts, Class III	368	LF		$ -
0390000000-E		310	36" RC Pipe Culverts, Class III	144	LF		$ -
0408000000-E		310	54" RC Pipe Culverts, Class III	128	LF		$ -
0426000000-E		310	72" RC Pipe Culverts, Class III	77	LF		$ -
0448200000-E		310	15" RC Pipe Culverts, Class IV	2,904	LF		$ -
0448300000-E		310	18" RC Pipe Culverts, Class IV	116	LF		$ -
0448400000-E		310	24" RC Pipe Culverts, Class IV	436	LF		$ -
0448500000-E		310	30" RC Pipe Culverts, Class IV	676	LF		$ -
0588000000-E		310	18" C.S. Pipe Culverts, 0.064" Thick	140	LF		$ -
0636000000-E		310	18" C.S. Pipe Elbows, 0.064" Thick	4	Each		$ -
0995000000-E		340	Pipe Removal	3,106	LF		$ -
1099500000-E		505	Shallow Undercut	500	CY		$ -
1099700000-E		505	Class IV Subgrade Stabilization	1,000	Tons		$ -
1121000000-E		520	Aggregate Base Course	13	Tons		$ -
1220000000-E		545	Incidental Stone Base	233	Tons		$ -
1308000000-E		607	Milling Asphalt Pavement, 0" to 1.25" Depth	200	SY		$ -
1308000000-E		607	Milling Asphalt Pavement, 0" to 1.5" Depth	1,690	SY		$ -
1330000000-E		607	Incidental Milling	1,500	SY		$ -
1491000000-E		610	Asphalt Conc Base Course, Type B25.0C	3,810	Tons		$ -
1503000000-E		610	Asphalt Conc Intermediate Course, Type I19.0C	10,450	Tons		$ -
1519000000-E		610	Asphalt Conc Surface Course, Type S9.5B	8,680	Tons		$ -
1575000000-E		620	Asphalt Binder for Plant Mix	1,240	Tons		$ -
1693000000-E		654	Asphalt Plant Mix, Pavement Repair	1,740	Tons		$ -
			ABC Option Under 2'-6" C&G (Detail 'A')				
1121000000-E		520	Aggregate Base Course	1,133	Tons		$ -
1491000000-E		610	Asphalt Conc Base Course, Type B25.0C	2,850	Tons		$ -
1575000000-E		620	Asphalt Binder for Plant Mix	1,195	Tons		$ -
2044000000-E		815	6" Perforated Subdrain Pipe	1,000	LF		$ -
2209000000-E		838	Endwalls	2	CY		$ -
2220000000-E		838	Reinforced Endwalls	8	CY		$ -
2253000000-E		840	Pipe Collars	2.98	CY		$ -
2264000000-E		840	Pipe Plugs	0.3	CY		$ -
2275000000-E		SP	Flowable Fill	10	CY		$ -
2286000000-N		840	Masonry Drainage Structures	101	Each		$ -
2297000000-E		840	Masonry Drainage Structures	59	CY		$ -
2308000000-E		840	Masonry Drainage Structures	23	LF		$ -
2364000000-N		840	Frame with Two Grates, Std. 840.16	23	Each		$ -
2366000000-N		840	Frame with Two Grates, Std. 840.24	1	Each		$ -

2367000000-N		840	Frame with Two Grates, Std. 840.29	1	Each		$	-
2374000000-N		840	Frame with Grate and Hood, Std. 840.03 Type E	21	Each		$	-
2374000000-N		840	Frame with Grate and Hood, Std. 840.03 Type F	27	Each		$	-
2374000000-N		840	Frame with Grate and Hood, Std. 840.03 Type G	27	Each		$	-
2396000000-N		840	Frame with Cover, Std. 840.54	7	Each		$	-
2451000000-N		852	Concrete Transitional Section for Drop Inlet	8	Each		$	-
2535000000-E		846	8" x 18" Concrete Curb	1,130	LF		$	-
2535000000-E		846	9" x 18" Concrete Curb	470	LF		$	-
2542000000-E		846	1'-6" Concrete Curb and Gutter	2,890	LF		$	-
2549000000-E		846	2'-6" Concrete Curb and Gutter	11,650	LF		$	-
2591000000-E		848	4" Concrete Sidewalk	5,510	SY		$	-
2605000000-N		848	Concrete Curb Ramps	84	Each		$	-
2612000000-E		848	6" Concrete Driveways	320	SY		$	-
2655000000-E		852	5" Monolithic Concrete Island (Keyed-In)	1,040	SY		$	-
2738000000-E		SP	Generic Paving Item - (7" Jointed Concrete Truck Apron with Wire Mesh	1,270	SY		$	-
2815000000-N		858	Adjustment of Drop Inlets	1	Each		$	-
2860000000-N		859	Convert Existing Catch Basin to Junction Box	2	Each		$	-
2905000000-N		859	Convert Existing Drop Inlet to Junction Box	2	Each		$	-
2920000000-N		859	Convert Existing Drop Inlet to Catch Basin	1	Each		$	-
3030000000-E		862	Steel Beam Guardrail	2,250	LF		$	-
3045000000-E		862	Steel Beam Guardrail, Shop Curved	25	LF		$	-
3150000000-N		862	Additional Guardrail Posts	10	Each		$	-
3180000000-N		SP	Guardrail Anchor Units, Type III Shop Curved	1	Each		$	-
3210000000-N		862	Guardrail Anchor End Units, Type CAT-1	8	Each		$	-
3215000000-N		SP	Guardrail Anchor Units, Type III	8	Each		$	-
3287000000-N		SP	Guardrail End Units, Type TL-3	2	Each		$	-
3288000000-N		SP	Guardrail End Units, Type TL-2	17	Each		$	-
3575000000-E		SP	Generic Fencing Item - Handrail	930	LF		$	-
3628000000-E		876	Rip Rap, Class I	189	Tons		$	-
3649000000-E		876	Rip Rap, Class B	112	Tons		$	-
3656000000-E		876	Geotextile for Drainage	1,254	SY		$	-
			SIGNING					
4054000000-E		902	Plain Concrete Sign Foundation	1	CY		$	-
4060000000-E		903	Supports, Breakaway Steel Beam	204	LB		$	-
4072000000-E		903	Supports, 3 LB Steel U-Channel	1,410	LF		$	-
4096000000-N		904	Sign Erection, Type D	11	Each		$	-
4102000000-N		904	Sign Erection, Type E	109	Each		$	-
4108000000-N		904	Sign Erection, Type F	13	Each		$	-
4110000000-N		904	Sign Erection, Type A (Ground Mounted)	1	Each		$	-
4116100000-N		904	Sign Erection, Relocate Type D	27	Each		$	-
4138000000-N		907	Disposal of Support, Steel Beam	2	Each		$	-
4155000000-N		907	Disposal of Sign System, U-Channel	46	Each		$	-
4192000000-N		907	Disposal of Support, U-Channel	20	Each		$	-
4236000000-N		907	Disposal of Sign, A or B (Ground Mounted)	1	Each		$	-
4238000000-N		907	Disposal of Sign, D, E, or F	17	Each		$	-
4360000000-N		SP	Generic Signing Item - End of Median Marker	2	Each		$	-
			TRAFFIC CONTROL					
4400000000-E		1110	Work Zone Signs (Stationary)	348	SF		$	-
4405000000-E		1110	Work Zone Signs (Portable)	336	SF		$	-
4410000000-E		1110	Work Zone Signs (Barricade Mounted)	234	SF		$	-
4415000000-N		1115	Flashing Arrow Board	2	Each		$	-
4420000000-N		1120	Portable Changeable Message Sign	4	Each		$	-
4430000000-N		1130	Drums	300	Each		$	-
4434000000-N		SP	Sequential Flashing Warning Lights	50	Each		$	-
4445000000-E		1145	Barricades (Type III)	80	LF		$	-
4447000000-E		SP	Pedestrian Channelization Devices	180	LF		$	-
4455000000-N		1150	Flagger	170	Day		$	-
4465000000-N		1160	Temporary Crash Cushions	2	Each		$	-
4480000000-N		1165	TMA	2	Each		$	-
4490000000-N		1170	Portable Concrete Barrier (Anchored)	450	LF		$	-
4510000000-N		1190	Law Enforcement	320	HR		$	-
			PAVEMENT MARKINGS					
4685000000-E		1205	Thermoplastic Pavement Marking Lines (4", 90 MILS)	19,903	LF		$	-
4695000000-E		1205	Thermoplastic Pavement Marking Lines (8", 90 MILS)	4,854	LF		$	-
4720000000-E		1205	Thermoplastic Pavement Marking Character (90 MILS)	12	Each		$	-
4725000000-E		1205	Thermoplastic Pavement Marking Symbols (90 MILS)	168	Each		$	-
4726110000-E		1205	Heated-In-Place Thermoplastic Pavement Marking Symbol (90 MILS)	60	Each		$	-
4810000000-E		1205	Pavement Marking Lines (4")	14,360	LF		$	-
4815000000-E		1205	Pavement Marking Lines (6")	1,099	LF		$	-
4820000000-E		1205	Pavement Marking Lines (8")	2,697	LF		$	-
4835000000-E		1205	Pavement Marking Lines (24")	697	LF		$	-
4840000000-E		1205	Pavement Marking Character	4	Each		$	-
4845000000-N		1205	Pavement Marking Symbol	31	Each		$	-
4850000000-E		1205	Removal of Pavement Marking (4")	8,244	LF		$	-
4860000000-E		1205	Removal of Pavement Marking (8")	1,394	LF		$	-
4870000000-E		1205	Removal of Pavement Marking (24")	325	LF		$	-
4875000000-N		1205	Removal of Pavement Marking Symbol & Characters	26	Each		$	-
4891000000-E		1205	Generic Pavement Marking Item (1205)	2,209	LF		$	-
4905100000-N		SP	Non-Cast Iron Snowplowable Pavement Markers	626	Each		$	-
			UTILITIES					

1693000000-E		654	Asphalt Plant Mix, Pavement Repair	770	Tons		$ -
2830000000-N		858	Adjustment of Manholes	4	Each		$ -
5325200000-E		1510	2" Water Line	173	LF		$ -
5325600000-E		1510	6" Water Line	69	LF		$ -
5325800000-E		1510	8" Water Line	359	LF		$ -
5326000000-E		1510	10" Water Line	3,665	LF		$ -
5326200000-E		1510	12" Water Line	328	LF		$ -
5329000000-E		1510	Ductile Iron Water Pipe Fittings	11,040	LB		$ -
5536000000-E		1515	2" Valve (Gate Valve & Valve Box)	1	Each		$ -
5538000000-E		1515	4" Valve (Gate Valve & Valve Box)	1	Each		$ -
5538000000-E		1515	4" Valve (Check Valve)	1	Each		$ -
5540000000-E		1515	6" Valve (Gate Valve & Valve Box)	6	Each		$ -
5546000000-E		1515	8" Valve (Gate Valve & Valve Box)	1	Each		$ -
5552000000-E		1515	10" Valve (Gate Valve & Valve Box)	12	Each		$ -
5572000000-E		1515	10" Tapping Sleeve and Valve	3	Each		$ -
5589100000-E		1515	1" Air Release Valve	9	Each		$ -
5648000000-N		1515	Relocate Water Meter	30	Each		$ -
5649000000-N		1515	Reconnect Water Meter	7	Each		$ -
5666000000-N		1515	Fire Hydrant	2	Each		$ -
5672000000-N		1515	Relocate Fire Hydrant	3	Each		$ -
5673000000-E		1515	Fire Hydrant Leg	52	LF		$ -
5684800000-E		1515	10" Line Stop with Bypass	1	Each		$ -
5686500000-E		1515	Water Service Line	1,502	LF		$ -
5689000000-E		1515	Generic Utility Item - Connection to Existing 10-inch Water Line	9	Each		$ -
5689000000-E		1515	Generic Utility Item - Connection to Existing 8-inch Water Line	1	Each		$ -
5689000000-E		1515	Generic Utility Item - Connection to Existing 6-inch Water Line	2	Each		$ -
5689000000-E		1515	Generic Utility Item - Connection to Existing 4-inch Force Main	1	Each		$ -
5689000000-E		1515	Generic Utility Item - Connection to Existing 6-inch Force Main	4	Each		$ -
5689000000-E		1515	Generic Utility Item - Connect to Existing 4' Dia Manhole	1	Each		$ -
5691100000-E		1520	4" Sanitary Gravity Sewer	24	LF		$ -
5691300000-E		1520	8" Sanitary Gravity Sewer	337	LF		$ -
5709200000-E		1520	4" Force Main Sewer	34	LF		$ -
5709300000-E		1520	6" Force Main Sewer	251	LF		$ -
5768000000-N		1520	Sanitary Sewer Clean-out	1	Each		$ -
5768500000-E		1520	Sewer Service Line	10	LF		$ -
5769000000-E		1520	Ductile Iron Sewer Pipe Fittings	1,225	LB		$ -
5775000000-E		1525	4' Dia Utility Manhole	4	Each		$ -
5781000000-E		1525	Utility Manhole Wall 4' Dia	9	LF		$ -
5800000000-E		1530	Abandon 6" Utility Pipe	552	LF		$ -
5801000000-E		1530	Abandon 8" Utility Pipe	509	LF		$ -
5802000000-E		1530	Abandon 10" Utility Pipe	3,616	LF		$ -
5815500000-N		1530	Remove Fire Hydrant	1	Each		$ -
5816000000-N		1530	Abandon Utility Manhole	1	Each		$ -
5835000000-E		1540	10" Encasement Pipe	10	LF		$ -
5835400000-E		1540	6" Encasement Pipe	10	LF		$ -
5836000000-E		1540	24" Encasement Pipe	402	LF		$ -
5872600000-E		1550	Directional Drilling of 12" HDPE DR7	328	LF		$ -
5888000000-E		SP	Generic Utility Item - Remove 10" Utility Pipe	40	LF		$ -
			EROSION CONTROL				
6000000000-E		1605	Temporary Silt Fence	11,860	LF		$ -
6006000000-E		1610	Stone for Erosion Control, Class A	560	Tons		$ -
6009000000-E		1610	Stone for Erosion Control, Class B	515	Tons		$ -
6012000000-E		1610	Sediment Control Stone	900	Tons		$ -
6015000000-E		1615	Temporary Mulching	8.5	Acre		$ -
6018000000-E		1620	Seed for Temporary Seeding	500	LB		$ -
6021000000-E		1620	Fertilizer for Temporary Seeding	2.5	Tons		$ -
6024000000-E		1622	Temporary Slope Drains	200	LF		$ -
6029000000-E		SP	Safety Fence	560	LF		$ -
6030000000-E		1630	Silt Excavation	1,150	CY		$ -
6036000000-E		1631	Matting for Erosion Control	20,000	SY		$ -
6037000000-E		SP	Coir Fiber Mat	100	SY		$ -
6042000000-E		1632	1/4" Hardware Cloth	2,420	LF		$ -
6070000000-N		1639	Special Stilling Basins	3	Each		$ -
6071012000-E		SP	Coir Fiber Wattle	450	LF		$ -
6071020000-E		SP	Polyacrylamide (PAM)	140	LB		$ -
6071030000-E		1640	Coir Fiber Baffle	80	LF		$ -
6084000000-E		1660	Seeding and Mulching	5	Acre		$ -
6087000000-E		1660	Mowing	3	Acre		$ -
6090000000-E		1661	Seed for Repair Seeding	100	LB		$ -
6093000000-E		1661	Fertilizer for Repair Seeding	0.25	Tons		$ -
6096000000-E		1662	Seed for Supplemental Seeding	200	LB		$ -
6108000000-E		1665	Fertilizer Topdressing	6.00	Tons		$ -
6111000000-E		SP	Impervious Dike	315	LF		$ -
6114500000-N		1667	Specialized Hand Mowing	10	MHR		$ -
6114800000-N		SP	Manual Litter Removal	5	MHR		$ -
6114900000-N		SP	Litter Disposal	1	Tons		$ -
6117000000-N		SP	Response for Erosion Control	75	Each		$ -

6117500000-N		SP	Concrete Washout Structure	6	Each		$	-
6123000000-E		1670	Reforestation	0.10	Acre		$	-
6132000000-N		SP	Generic Erosion Control Item- Fabric Insert Inlet Protection Devic	50	Each		$	-
6132000000-N		SP	Generic Erosion Control Item- Fabric Insert Inlet Protection Device Cleanou	150	Each		$	-
			LANDSCAPING					
6645000000-N		SP	Generic Planting Item - Boulders: Smal	20	Each		$	-
6645000000-N		SP	Generic Planting Item - Landscape Lightin	38	Each		$	-
6645000000-N		SP	Generic Planting Item - Tree	46	Each		$	-
6645000000-N		SP	Generic Planting Item - Shrub	597	Each		$	-
6645000000-N		SP	Generic Planting Item - Perennials	800	Each		$	-
6645000000-N		SP	Generic Planting Item - Timber Fence Section	12	Each		$	-
6676000000-E		SP	Generic Planting Item - Soc	38,352	SF		$	-
6677000000-E		SP	Generic Planting Item - Boulders: Mediun	8	Tons		$	-
6677000000-E		SP	Generic Planting Item - Large Flagston	4.5	Tons		$	-
6680000000-E		SP	Generic Planting Item - Riverrock	14	CY		$	-
6680000000-E		SP	Generic Planting Item - Mulch	140	CY		$	-
6680000000-E		SP	Generic Planting Item - Soil Amendmen	95	CY		$	-
6690000000-E		SP	Generic Planting Item - Landscape edgin	950	LF		$	-
6690000000-E		SP	Generic Planting Item - 1.5" PVC Conduit for electrical for light	690	LF		$	-
6690000000-E		SP	Generic Planting Item - 1" PVC Conduit for inside RAE	200	LF		$	-
			SIGNALS					
7048500000-E		1705	Pedestrian Signal Head (16", 1 Section w/Countdown)	10	Each		$	-
7060000000-E		1705	Signal Cable	15,910	LF		$	-
7120000000-E		1705	Vehicle Signal Head (12", 3 Section)	42	Each		$	-
7132000000-E		1705	Vehicle Signal Head (12", 4 Section)	11	Each		$	-
7144000000-E		1705	Vehicle Signal Head (12", 5 Section)	2	Each		$	-
7229000000-N		SP	APS Detector Station	12	Each		$	-
7230000000-N		SP	Central Control Unit APS Detector Station	2	Each		$	-
7264000000-E		1710	Messenger Cable (3/8")	3,128	LF		$	-
7288000000-E		1715	Paved Trenching (1)(2"	1,061	LF		$	-
7288000000-E		1715	Paved Trenching (2)(2"	238	LF		$	-
7288000000-E		1715	Paved Trenching (3)(2"	2	LF		$	-
7288000000-E		1715	Paved Trenching (6)(2"	11	LF		$	-
7300000000-E		1715	Unpaved Trenching (1)(2"	148	LF		$	-
7300000000-E		1715	Unpaved Trenching (2)(2"	13	LF		$	-
7301000000-E		1715	Directional Drill (2)(2")	230	LF		$	-
7324000000-N		1716	Junction Box (Standard Size)	18	Each		$	-
7348000000-N		1716	Junction Box (Over-sized, Heavy Duty	3	Each		$	-
7360000000-N		1720	Wood Pole	14	Each		$	-
7372000000-N		1721	Guy Assembly	28	Each		$	-
7408000000-E		1722	1" Riser with Weatherhead	3	Each		$	-
7420000000-E		1722	2" Riser with Weatherhead	10	Each		$	-
7444000000-E		1725	Inductive Loop Sawcu	1,226	LF		$	-
7456000000-E		1726	Lead-In Cable (14-2)	10,720	LF		$	-
7484000000-N		SP	Microwave Vehicle Detection System - Multiple Zone	14	Each		$	-
7575200000-N		SP	GPS Unit	3	Each		$	-
7576000000-N		SP	Metal Strain Signal Pole	4	Each		$	-
7613000000-N		SP	Soil Test	4	Each		$	-
7614100000-E		SP	Drilled Pier Foundation	40	CY		$	-
7636000000-N		1745	Sign for Signals	23	Each		$	-
7642100000-N		1743	Type I Post with Foundation	2	Each		$	-
7642200000-N		1743	Type II Pedestal with Foundatior	10	Each		$	-
7684000000-N		1750	Signal Cabinet Foundation	1	Each		$	-
7696000000-N		1751	Controllers with Cabinet (2070LX W/ QFREE MAXTIME, Base Mounted)	1	Each		$	-
7696000000-N		1751	Controllers with Cabinet (2070LX W/ QFREE MAXTIME, Pole Mounted)	3	Each		$	-
7744000000-N		1751	Detector Card (Type 170)	10	Each		$	-
7901000000-N		1753	Cabinet Base Extender	1	Each		$	-
7972000000-N		SP	Metal Pole Removal	8	Each		$	-
7980000000-N		SP	Generic Signal Item - Protective Coating for Strain Pole (Black	4	Each		$	-
7980000000-N		SP	Generic Signal Item - Protective Coating for Signal Pedestal (Black	36	Each		$	-
7980000000-N		SP	Generic Signal Item - Protective Coating for Pushbutton Post (Black	2	Each		$	-
7980000000-N		SP	Generic Signal Item - Rectangular Rapid Flashing Beacon Assembl	26	Each		$	-
7980000000-N		SP	Generic Signal Item - Type 2070LX Controlle	1	Each		$	-
			STRUCTURES					
8126000000-N		414	Culvert Excavation, Sta. 17+47.31, -Y2-	1	LS		$	-
8133000000-E		414	Foundation Conditioning Material, Box Culvert	67	TON		$	-
8196000000-E		420	Class A Concrete (Culvert)	115.2	CY		$	-
8245000000-E		425	Reinforcing Steel (Culvert)	14,161	LB		$	-
8801000000-E		SP	MSE Retaining Wall No. 1	310	SF		$	-
8801000000-E		SP	MSE Retaining Wall No. 2	1300	SF		$	-
8801000000-E		SP	MSE Retaining Wall No. 3	430	SF		$	-
8802014000-E		SP	Soldier Pile Retaining Walls	870	SF		$	-

Lgth **0.461 Mi.**

Contract Cost …….. …….. …….. $ -

E. & C. 10% (State Funded) …….. …….. …….. $ -

Construction Cost …….. …….. …….. **$ -**

February 13, 2020

MEMORANDUM TO:	Allison Drake, PE Transportation Engineer RS&H
FROM:	Jonathan P. Manke, PE Senior Geotechnical Engineer Terracon Consultants
STATE PROJECT:	44984.1.1 (R-5799)
COUNTY:	Transylvania
DESCRIPTION:	US64/NC280 and US64/US276 Intersection Improvements in Transylvania County
SUBJECT:	Geotechnical Report – Design and Construction Recommendations

Terracon Consultants, Inc. makes the following recommendations. A subsurface inventory will be submitted.

I. Slope and Embankment Stability

A. *Slope Design*
Recommend all roadway slopes be constructed no steeper than 2:1 (H:V).

B. *Undercut*
Recommend 1,000 cubic yards of Undercut be included in the contract as a contingency item to be used at the discretion of the Engineer.

C. *Geotextile for Soil Stabilization*
Include 1,000 square yards of Geotextile for Soil Stabilization in the contract as a contingency to be used at the discretion of the Engineer.

II. Subgrade Stability

A. Undercut for Subgrade Stability
Recommend a contingency quantity of 200 cubic yards of Undercut be included in the contract to be used at the discretion of the Engineer.

B. Grade Point Undercut
For inclusion in the contract we recommend 250 cubic yards of grade point Undercut to be used at the discretion of the Engineer.

C. *Aggregate Subgrade – Shallow Undercut*
Include 500 cubic yards of 18" Shallow Undercut as a contingency item to be used at the discretion of the Engineer.

D. *Subsurface Drainage - Underdrains*
Recommend a contingency quantity of 1,000 linear feet of 6-inch perforated subdrain pipe per Roadway Standard Drawing 815.02 – Subsurface Drain be included in the contract to be used at the discretion of the Engineer.

E. *Geotextile for Soil Stabilization*
Include a contingency quantity of 1,000 square yards of geotextile for soil stabilization in the contract for use with items II.A and II.C as a contingency to be used at the discretion of the Engineer.

III. BORROW SPECIFICATIONS

A. *Borrow Criteria*
Common borrow for embankment construction to subgrade shall meet Piedmont and Western criteria outlined in the Standard Specifications, Article 1018-2(A).

B. *Shrinkage Factor*
Recommend a 15% shrinkage factor be used for earthwork calculations.

C. *Select Granular Material*
A quantity of 1,000 cubic yards of Select Granular Material should be included in the contract as a contingency to be used at the discretion of the Engineer in conjunction with section I.C. and II.E and shall meet the criteria outlined in Standard Specifications, Article 1016-3 Class II or III.

D. *Class IV Subgrade Stabilization Material*
Recommend a contingency quantity of 1,000 tons of Class IV Select Material be included in the contract for use with item in Section II.C at the discretion of the Engineer.

IV. MISCELLANEOUS

A. *Reduction of Unclassified Excavation - Clearing and Grubbing*
A loss of 150 cubic yards is estimated on the project due to clearing and grubbing of cut sections.

B. *Construction Procedures – Waiting Period*
The following areas contain deep, compressible soils that will require a waiting period after fill placement:

LINE	FROM STATION	TO STATION	WAITING PERIOD (MONTHS)
-Y4-	10+00	11+75	1
-RA2-	10+00	11+50	1
-L-	27+00, 10’ LT TO 150’ RT	30+00, 10’LT TO 150’RT	1

C. *Construction Procedures – Settlement Gauges*
The following locations require a settlement gauge for settlement monitoring and shall be constructed as outlined in the Standard Specification, Section 235 and on Roadway Standard Drawing 235.01:

GAUGE NO.	LINE	STATION	OFFSET
1	-L-	27+97	81’ RT
2	-L-	28+57	13’ RT
3	-L-	29+20	82’ RT

If you have any questions concerning this memorandum, please contact Jonathan Manke, PE at 704-594-8972.

Prepared by:

Jonathan P. Manke, PE
Senior Geotechnical Engineer
Registered, NC 034441

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
Summary of Quantities

WBS Number: 44984.1.1 | County: Transylvania | Project Engineer: J. Manke
TIP Number: R-5799 | Field Office / PEF: Terracon Consultants, Inc | Project Geologist:
Description: US64 at NC280/US64 Intersection Improvements

Pay Item No.	Pay Item/ Quantity Adjustment	Spec Book Section No. or Special Provision (SP) Reference	Report Section	Alignment	Begin Station	End Station	Quantity	Units / %
0036000000-E	Undercut Excavation	225 - Roadway Excavation	I. B	Contingency	N/A	N/A	1,000	CY
0036000000-E	Undercut Excavation	225 - Roadway Excavation	II. A	Contingency	N/A	N/A	200	CY
0036000000-E	Undercut Excavation	225 - Roadway Excavation	II. B	Contingency	N/A	N/A	250	CY
						Total Quantity of Undercut Excavation =	**1,450**	**CY**
0195000000-E	Select Granular Material	265 - Select Granular Material	III. C	Contingency	N/A	N/A	1,000	CY
						Total Quantity of Select Granular Material =	**1,000**	**CY**
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	I. C	Contingency	N/A	N/A	1,000	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. E	Contingency	N/A	N/A	1,000	SY
						Total Quantity of Geotextile for Soil Stabilization =	**2,000**	**SY**
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. C	Contingency	N/A	N/A	500	CY
						Total Quantity of Shallow Undercut =	**500**	**CY**
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	III. D	Contingency	N/A	N/A	1,000	TON
						Total Quantity of Class IV Subgrade Stabilization =	**1,000**	**TON**
2044000000-E	6" Perforated Subdrain Pipe	815 - Subsurface Drainage	II. D	Contingency	N/A	N/A	1,000	LF
						Total Quantity of 6" Perforated Subdrain Pipe =	**1,000**	**LF**

These Items Only Impact Earthwork Totals								
N/A	Loss Due to Clearing & Grubbing	200 - Clearing and Grubbing	IV. A	N/A	N/A	N/A	150	CY

COMPUTED BY: GTF DATE: 02/11/20
CHECKED BY: JPM DATE: 02/11/20

(5-15-18)

PROJECT NO.	SHEET NO.
44984.1.1	3G-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				UD	1000
				TOTAL LF:	1000

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

SUMMARY OF GEOTEXTILE FOR PAVEMENT STABILIZATION

LINE	Station	Station	Geotextile for Pavement Stabilization SY	Class IV Subgrade Stabilization TONS
CONTINGENCY				
	TOTAL SY/TONS:		0	0*

***Total tons of "Class IV Subgrade Stabilization" is only the estimated quantity for pavement stabilization and may only represent a portion of the subgrade stabilization quantity shown in the Item Sheets of the Proposal.**

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU(1/2)/ AST	Aggregate Thickness INCHES [8" for ASU(2)]	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY					500	1000	2000		
			TOTAL CY/TONS/SY:		500	1000**	2000**	0	0

***ASU(1/2) = Aggregate Subgrade (Type 1 or 2)**
***AST = Aggregate Stabilization**
****Total tons of "Class IV Subgrade Stabilization" and total square yards of "Geotextile for Soil Stabilization" are only the estimated quantities for ASU(1/2)/AST and may only represent a portion of the subgrade stabilization and geotextile quantities shown in the Item Sheets of the Proposal.**

SUMMARY OF ROCK PLATING

LINE	Beginning Slope (H:V)	Approx. Station	Ending Slope (H:V)	Approx. Station	Location LT/RT	Rock Plating Detail No. 1/2/3/4	Riprap Class* 1/2/B	Rock Plating SY
							TOTAL SY:	0

***Use Class 1, 2 or B riprap if riprap class is not shown for rock plating location.**

SUMMARY OF REINFORCED SOIL SLOPES AND SLOPE EROSION CONTROL

LINE	Beginning Slope/ RSS (H:V)	Approx. Station	Ending Slope/ RSS (H:V)	Approx. Station	Location LT/RT	Reinforced Soil Slope (RSS) SY	Geocells SY	Coir Fiber Mat SY	Matting for Erosion Control SY
					TOTAL SY:	0	0	0*	0**

***Total square yards of "Coir Fiber Mat" is only the estimated quantity for slopes steeper than 2:1 (H:V) and may only represent a portion of the coir fiber mat quantity shown in the Item Sheets of the Proposal.**
****Total square yards of "Matting for Erosion Control" is only the estimated quantity for RSS and may only represent a portion of the matting quantity shown in the Item Sheets of the Proposal.**

SUMMARY OF PRE-SPLITTING OF ROCK

LINE	Beginning Rock Cut Slope (H:V)	Approx. Station	Ending Rock Cut Slope (H:V)	Approx. Station	Location LT/RT	Pre-splitting of Rock SY
					TOTAL SY:	0

SUMMARY OF SURCHARGES AND SURCHARGE WAITING PERIODS

LINE	Station	Station	Surcharge Height FT	MONTHS

SUMMARY OF SETTLEMENT GAUGES

Gauge No.	LINE and Station	Offset	
		Distance FT	Direction LT/RT
1	-L- 27+97	81	RT
2	-L- 28+57	13	RT
3	-L- 29+20	82	RT
	TOTAL GAUGES (EACH):		3

SUMMARY OF EMBANKMENT WAITING PERIODS

LINE	Station	Station	MONTHS
-Y4-	10+00	11+75	1
-RA-	10+00	11+50	1
-L-	27+00 (10' LT to 150' RT)	30+00 (10' LT to 150' RT)	1

SUMMARY OF BRIDGE WAITING PERIODS

Bridge Description	End Bent/ Bent No.	MONTHS

February 12, 2020

MEMORANDUM TO:	Allison Drake, PE Transportation Engineer RS&H
FROM:	Jonathan P. Manke, PE Senior Geotechnical Engineer Terracon Consultants
STATE PROJECT:	44984.1.1 (R-5799)
F. A. PROJECT:	N/A
COUNTY:	Transylvania
DESCRIPTION:	US64/NC280 and US64/US276 Intersection Improvements in Transylvania County
SUBJECT:	Recommendations Memo – Culvert 0099, STA 17+47 -Y2-

Terracon has reviewed the proposed extension for both ends of the existing triple-barrel reinforced concrete box culvert located at Station 17+47 -Y2-. Each end of the culvert is proposed to be extended about 10 feet and will have 4 to 5 feet of fill placed over the top. Based on our subsurface investigation and the likely presence of alluvial soils in the creek bottom, the following note(s) should be added to the construction drawings:

VERY SOFT TO SOFT ALLUVIAL SOILS ENCOUNTERED BELOW THE CULVERT EXTENSION ON THE DOWN STREAM SIDE (STA 17+47, 46' RT) SHALL BE REMOVED AND REPLACED WITH FOUNDATION CONDITIONING MATERIAL IN ACCORDANCE WITH ARTICLE 1016-3 FOR CLASS V OR VI SELECT MATERIAL. A REMOVAL DEPTH OF 3 FEET BELOW THE REQUIRED 1 FOOT OF FOUNDATION CONDITIONING MATERIAL IS ANTICIPATED AND SHALL BE PERFORMED AS OUTLINED IN SECTION 414 OF THE STANDARD SPECIFICATIONS.

This undercut excavation should be shown on your structure drawings and can be illustrated as shown on the attached drawings. The volume of the additional removal and replacement beyond the already required 1-foot is approximately 33 cubic yards (about 45 tons of foundation conditioning material) and should be included as a contingency item in the contract.

If you have any questions concerning this memorandum, please contact Jonathan Manke, PE at 704-594-8972.

Prepared by:

Gregory F. Thill, GIT
Staff Geologist

Jonathan P. Manke, PE
Senior Geotechnical Engineer
Registered, NC 034441

0	20	40

FEET

VE = 2:1

PROJECT REFERENCE NO.	SHEET NO.
R-5799	4

PROFILE 44' LEFT OF -Y2- (US 64) OF CULVERT EXTENSION AT TURKEY CREEK

RW-05
17+10 -Y2-
44' LT
SS-147

RB-25
17+90 -Y2-
43' LT
SS-1102
SS-1103A

LOOKING UPSTREAM

EXISTING GROUND LINE 44' LEFT OF -Y2-

ROADWAY EMBANKMENT SOFT TO MEDIUM STIFF,

ALLUVIAL VERY SOFT TO SOFT,

Ⓐ SOFT, BROWN, FINE SANDY SILT WITH CLAY

LOOSE, MEDIUM DENSE,

RESIDUAL VERY STIFF, BROWN, ORANGE, TAN,

WEATHERED ROCK (SCHIST)

6, 3, 2, 2, 9, 20, 100/0.8

01/19

BT

FINE SANDY SILT

TAN, GRAY, BROWN,

RESIDUAL MEDIUM DENSE, GRAY, BROWN,

3, 4, WOH, 3, 39, 12, 23

TAN, BROWN, SANDY SILT

ALLUVIAL DARK GRAY, BROWN, FINE SANDY SILT TO CLAYEY SILT

01/19

DENSE, TAN, BROWN, GRAY, SAND WITH TRACE ROCK FRAGMENTS TO ROCK FRAGMENTS WITH SAND

SILTY FINE TO COARSE SAND

TAN, SILTY SAND WITH TRACE ROCK FRAGMENTS

RESIDUAL

BT
FIAD

* 1 FOOT OF FOUNDATION CONDITIONING MATERIAL INCLUDED IN BASE SCOPE FOR CULVERT REPLACEMENT

Ⓐ VERY LOOSE, BROWN, ORANGE, CLAYEY FINE TO COARSE SAND

TRIPLE BARREL CULVERT DIMENSIONS APPROXIMATED. INVERT ELEVATION CALCULATED FROM CULVERT SURVEY REPORT.

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON THE EXISTING GROUND PROFILE 44' LEFT OF THE CENTERLINE OF -Y2- TAKEN FROM THE PROVIDED TIN FILE (R5799EXT_ls_tnl_180710.tin, 1/7/2019)

2165, 2160, 2155, 2150, 2145, 2140, 2135, 2130, 2125, 2120, 2115, 2110, 2105, 2100, 2095, 2090, 2085, 2080, 2075, 2070

16+10, 16+30, 16+50, 16+70, 16+90, 17+10, 17+30, 17+50, 17+70, 17+90, 18+10, 18+30, 18+50, 18+70

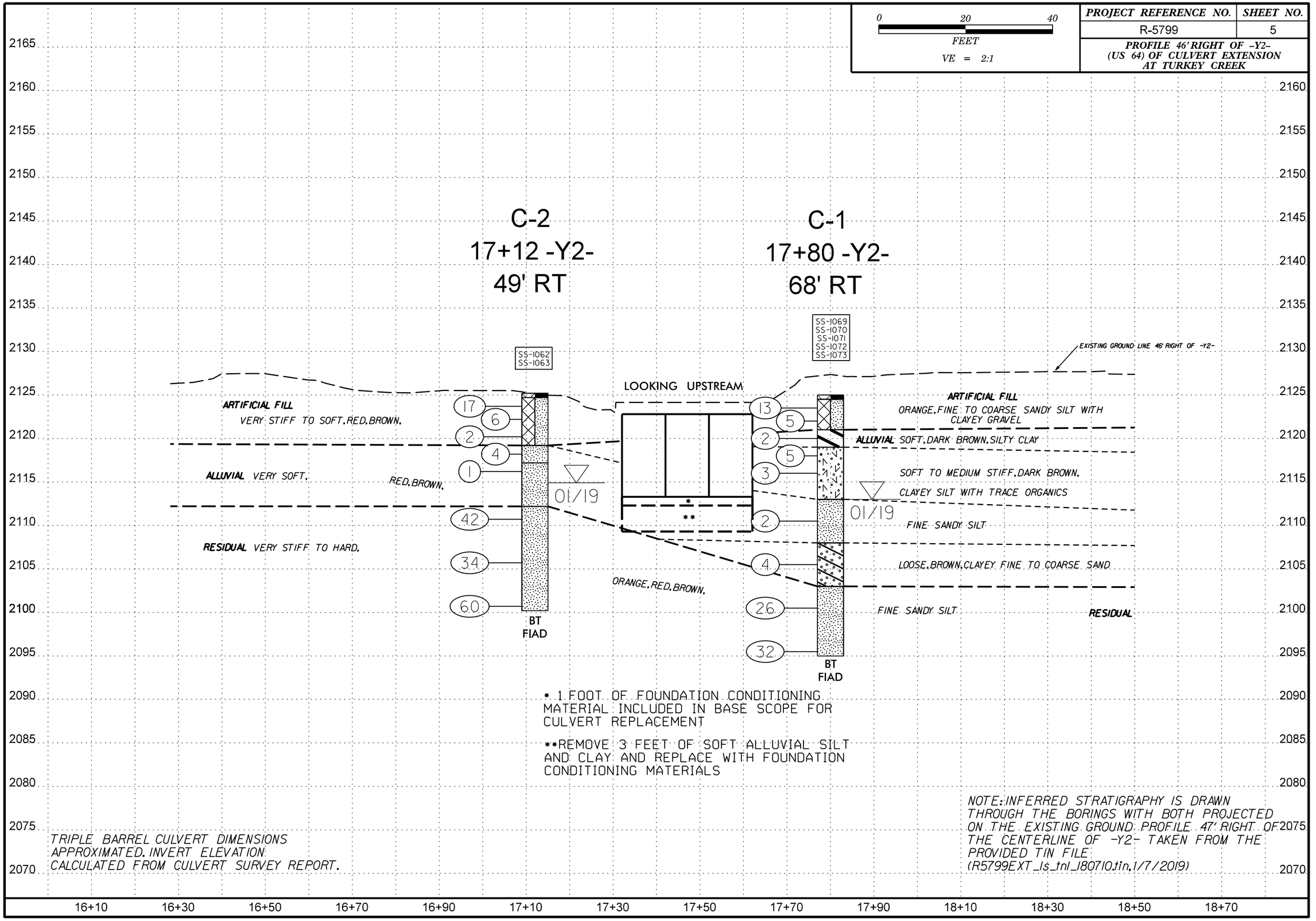
0	20	40

FEET

VE = 2:1

PROJECT REFERENCE NO.	SHEET NO.
R-5799	5

PROFILE 46' RIGHT OF -Y2-
(US 64) OF CULVERT EXTENSION
AT TURKEY CREEK



* 1 FOOT OF FOUNDATION CONDITIONING MATERIAL INCLUDED IN BASE SCOPE FOR CULVERT REPLACEMENT

**REMOVE 3 FEET OF SOFT ALLUVIAL SILT AND CLAY AND REPLACE WITH FOUNDATION CONDITIONING MATERIALS

TRIPLE BARREL CULVERT DIMENSIONS APPROXIMATED. INVERT ELEVATION CALCULATED FROM CULVERT SURVEY REPORT.

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ON THE EXISTING GROUND PROFILE 47' RIGHT OF THE CENTERLINE OF -Y2- TAKEN FROM THE PROVIDED TIN FILE (R5799EXT_ls_tnl_180710.tin, 1/7/2019)

PAVEMENT MARKING SECTIO
ENGINEER'S ESTIMATE FORM
2018 STANDARD SPECIFICATIONS

TIP No.:	R-5799	English
WBS No		
NC Project No:		
FA-Project No:		
County:	TRANSYLVANIA	
Description:	INTERSECTIONS OF US 64, US 276 AND NC 280. CONSTRUCT INTERSECTION IMPROVEMENTS	

Date of Estimate:	5/2/2023
Estimate Prepared By:	NEA
Estimate Reviewed By:	ACD

Estimate Type:

- ☐ Scoping
- ☐ Letting List Verification
- ☐ Preliminary
- ☑ Final

THIS SECTION FOR COST ESTIMATE USE

Scoping Cost

Traffic Control Devices:	
Pavement Markings:	
Pavement Markers:	
Delineation:	

ITEM NO.			ITEM DESCRIPTION	QUANTITY	UNIT
GRP CODE	DESC. NO.	SEC NO.			
PM	4685000000-E	1205	THERMOPLASTIC (4", 90 MILS)	19903	LF
PM	4695000000-E	1205	THERMOPLASTIC (8", 90 MILS)	4854	LF
PM	4720000000-E	1205	THERMOPLASTIC PAVEMENT MARKING CHARACTER (90 MILS	12	EA
PM	4725000000-E	1205	THERMOPLASTIC PAVEMENT MARKING SYMBOLS (90 MILS)	168	EA
PM	4726110000-E	1205	HEATED-IN-PLACE THERMOPLASTIC SYMBOL (90 MILS)	60	EA
PM	4891000000-E	1205	GENERIC PAVEMENT MARKING ITEM (1205)	2209	LF
PM	4905000000-N	1253	SNOWPLOWABLE RAISED PAVEMENT MARKERS	626	EA

Estimates Summary for TIP Project # R-5799

NCProject #:
FA-Project#:
WBS Number
County: TRANSYLVANIA
Description: INTERSECTIONS OF US 64, US 276 AND NC 280. CONSTRUCT INTERSECTION IMPROVEMENTS

Date of Estimate: 5/2/2023
Prepared By: NEA

	THERMOPLASTIC (4", 90 MILS)		
T10	(4") YELLOW EDGELINE	6709	LF
T12	(4") 10 FT. YELLOW SKIP	513	LF
T13	(4") YELLOW DOUBLE CENTER	4694	LF
T1	(4") WHITE EDGELINE	587	LF
T2	WHITE SOLID LANE LINE	5574	LF
T3	(4") 10 FT. WHITE SKIP	888	LF
T4	(4") 3 FT. - 9 FT./SP WHITE MINISKIP	589	LF
T5	(4") 2 FT. - 6 FT./SP WHITE MINISKIP	349	LF
	TOTAL (4", 90 MILS)	**19903**	**LF**
	THERMOPLASTIC (8", 90 MILS)		
T40	(8") WHITE GORELINE	3214	LF
T41	(8") WHITE DIAGONAL	506	LF
T42	(8") YELLOW DIAGONAL	398	LF
T43	(8") WHITE SOLID LANE LINE	295	LF
T44	(8") 3 FT. - 9 FT./SP WHITE MINISKIP	178	LF
T45	(8") 3 FT. - 3 FT./SP WHITE MINISKIP (8", 90 Mil)	263	LF
	TOTAL (8", 90 MILS)	**4854**	**LF**
	THERMOPLASTIC PAVEMENT MARKING CHARACTER (90 MILS)		
T100	ALPHANUMERIC CHAR. (90 MIL)	12	EA

Estimates Summary for
TIP Project # R-5799

NCProject #:
FA-Project#:
WBS Number
County: TRANSYLVANIA
Description: INTERSECTIONS OF US 64, US 276 AND NC 280. CONSTRUCT INTERSECTION IMPROVEMENTS

Date of Estimate: 5/2/2023
Prepared By: NEA

	THERMOPLASTIC PAVEMENT MARKING SYMBOLS (90 MILS)		
T103	24" YIELD LINE TRIANGLE	81	EA
T110	FISH-HOOK STRAIGHT ARROW	3	EA
T112	FISH-HOOK RIGHT/STRAIGHT ARROW	4	EA
T114	FISH-HOOK LEFT/RIGHT/STRAIGHT ARROW	2	EA
T117	FISH-HOOK W/CIRCLE LEFT/STRAIGHT ARROW	9	EA
T70	LEFT TURN ARROW	18	EA
T71	RIGHT TURN ARROW	23	EA
T72	STRAIGHT ARROW	14	EA
T73	COMBO STRAIGHT/LEFT	10	EA
Y78	COMBO LEFT / U-TURN ARROW	2	EA
T79	MERGE ARROW	2	EA
	TOTAL PAVEMENT MARKING SYMBOLS (90 MILS)	**168**	**EA**
	THERMOPLASTIC HEATED-IN-PLACE (90 MILS)		
T90	BICYCLE SYMBOL	30	EA
T91	BICYCLE STRAIGHT ARROW	30	EA
	TOTAL HEATED-IN-PLACE (90 MILS)	**60**	**EA**
	THERMOPLASTIC GENERIC PAVEMENT MARKING ITEM (1205)		
T61	WHITE STOPBAR (24", 90 MIL)	190	LF
T62	WHITE CROSSWALK LINE (24", 90 MIL)	2019	LF
	TOTAL GENERIC PAVEMENT MARKING ITEM (1205)	**2209**	**LF**
	SNOWPLOWABLE RAISED PAVEMENT MARKERS		
MF - CRYSTAL & RED	, (@ 80 FT spacing, w/475 extra)	475	EA
ME - YELLOW & YELLOW	, (@ 80 FT spacing, w/151 extra)	151	EA
	TOTAL SNOWPLOWABLE RAISED PAVEMENT MARKERS	**626**	**EA**

CALCULATION OF QUANTITIES

PROJECT TIP NUMBER: R-5799

CONSTRUCTION WBS NUMBER: 44984.1.2

COUNTY: Transylvania

FEDERAL AID NUMBER: N/A

TOTAL LENGTH [USE EXACT THREE (3) FIGURES BEYOND DECIMAL]

STA.	7+00.000	**TO STA.**	17+76.800	=	1076.800	**LIN. FT.**
STA.	19+09.960	**TO STA.**	32+66.000	=	1356.040	**LIN. FT.**
STA.		**TO STA.**		=		**LIN. FT.**
STA.		**TO STA.**		=		**LIN. FT.**
STA.		**TO STA.**		=		**LIN. FT.**
STA.		**TO STA.**		=		**LIN. FT.**
STA.		**TO STA.**		=		**LIN. FT.**
STA.		**TO STA.**		=		**LIN. FT.**

TOTAL LENGTH * = 2,432.840 **LIN. FT. / 5,280 =** 0.461 **MILES**

STRUCTURE LENGTHS

STA.		**TO STA.**		=		**LIN. FT.**
STA.		**TO STA.**		=		**LIN. FT.**
STA.		**TO STA.**		=		**LIN. FT.**
STA.		**TO STA.**		=		**LIN. FT.**
STA.		**TO STA.**		=		**LIN. FT.**

LENGTH OF STRUCTURES * = _____ **LIN. FT. / 5,280 =** _____ **MILES**

ROADWAY LENGTH (LESS STRUCTURES) = 0.461 **MILES**

NOTE: USED -L- **LANE FOR LENGTH**

*** LENGTH SHOWN TO THREE (3) DECIMAL PLACES USING NORMAL ROUNDING.**

Computed by: Drew Morrow, PE
(Please Print Name)

Checked by: Allison Drake, PE
(Please Print Name)

6/18/2021

PROJECT NO.: R-5799

SHEET 1 OF 1

SECTION: 800

MOBILIZATION

LINE	STATION	STATION	SIDE	LUMP SUM
				1.00
			TOTAL	1.00

COMPUTED BY: DDM

CHECKED BY: CLR

PROJECT NO.: R-5799 SHEET 1 OF 1

SECTION: 801

CONSTRUCTION SURVEYING

LINE	STATION	STATION	SIDE	LUMP SUM
				1.00
			TOTAL	1.00

COMPUTED BY: DDM CHECKED BY: CLR

5/8/2023

PROJECT NO.: R-5799 SHEET 1 OF 1

SECTION: 505

UNDERCUT EXCAVATION

LINE	STATION	STATION	SIDE	CUBIC YARDS
CONTINGENCY				1450.00
			TOTAL	1450.00

COMPUTED BY: DDM CHECKED BY: CLR

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: EWB
CHECKED BY: CJY **SECTION: 226**

SUPPLEMENTARY CLEARING AND GRUBBING

CLEARING AND GRUBBING	=	SUPPLEMENTARY CLEARING AND GRUBBING
0 THRU 10 ACRES	=	1 ACRES
11 THRU 25 ACRES	=	2 ACRES
26 THRU 50 ACRES	=	3 ACRES
51 THRU 80 ACRES	=	4 ACRES
80 ACRES OR MORE	=	5 ACRES

ACRES SUPPLEMENTARY CLEARING AND GRUBBING **1** **ACRES**

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: CJY **SECTION: 226**

GRADING (LUMP SUM)

(THIS COMPUTATION SHEET APPLIES ONLY TO PROJECTS WHICH HAVE BEEN PREDETERMINED TO USE THIS PAY ITEM. SEE ROADWAY DESIGN MANUAL, PART I, 11-6)

ITEM	QUANTITIES	UNIT	UNIT PRICE	PRICE
CLEARING AND GRUBBING	0.50	ACRES	$10,000.00	$ 5,000.00
UNCLASSIFIED EXCAVATION	5,280	YD^3	$6.00	$ 31,680.00
BORROW EXCAVATION		YD^3	$6.25	$ -
SHOULDER BORROW		YD^3	$6.25	$ -
FINE GRADING	16,970	YD^2	$2.50	$ 42,425.00
REMOVAL OF EXISTING ASPHALT PAVEMENT	8,340	YD^2	$2.50	$ 20,850.00
REMOVAL OF EXISTING CONCRETE PAVEMENT		YD^2	$10.00	$ -
BREAKING OF EXISTING ASPHALT PAVEMENT		YD^2	$2.00	$ -
BREAKING OF EXISTING CONCRETE PAVEMENT		YD^2	$5.00	$ -
			TOTAL	$ 99,955.00

IF THE SUMMATION OF THE ITEM AMOUNTS IS $1,000,000.00 OR LESS, THEN THE GRADING MAY BE LET ON A "LUMP SUM" BASIS WITH CONCURRENCE OF THE DIVISION ENGINEER. IF THE COST OF ANY ONE OF THE ITEMS, EXCLUDING CLEARING AND GRUBBING AND FINE GRADING, IS 50% OR MORE OF THE TOTAL COST CALCULATED, THEN THAT ITEM SHALL BE INCLUDED AS AN INDIVIDUAL ITEM WITH THE OTHER ITEMS BEING DONE ON A "LUMP SUM GRADING" BASIS. A SPECIAL PROVISION WILL BE NEEDED IN THIS CASE AND THE PAY ITEM "GRADING" SHOULD BE INDICATED AS A "SP" IN THE ESTIMATE. IF THE SUM OF THE LUMP SUM ITEMS AMOUNTS EXCEEDS $1,000,000.00 OR IS 25% MORE OF THE TOTAL COST OF THE PROJECT, THE PROJECT SHALL CONTAIN THE INDIVIDUAL ITEMS, IT WILL BE NECESSARY TO CALCULATE AND SHOW THE PAVEMENT STRUCTURE VOLUME ON THE SUMMARY OF EARTHWORK.

OTHER CONSIDERATIONS FOR LUMP SUM GRADING MAY UTILIZE A DOLLAR LIMIT. FOR EXAMPLE 3R PROJECTS WITH "TRENCHING & WIDENING" AND MINOR GRADING SHOULD BE CONSIDERED WHEN USE OF CROSS-SECTIONS FOR EARTHWORK BY THE RESIDENT ENGINEER IS NOT PRACTICAL. WHEN APPLYING LUMP SUM GRADING TO THESE SPECIAL APPLICATIONS, APPROVAL BY THE ASSISTANT STATE ROADWAY DESIGN ENGINEER AND PROPOSALS AND CONTRACTS SECTION ENGINEER IS REQUIRED ON A PROJECT-BY-PROJECT BASIS.

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: EWB
CHECKED BY: CJY **SECTION: 200**

CLEARING AND GRUBBING

* Calculate Acreage for Tree Areas Only

LINE	STATION	STATION	LOCATION	AREA FROM CADD OR LENGTH	WIDTH	SQUARE FEET
-L-	7+51.43	8+93.60	LT	944.97		944.97
-L-	8+42.59	8+46.11	RT	12.52		12.52
-L-	11+32.18	13+17.76	LT	3,578.38		3,578.38
-L-	15+95.87	17+11.73	LT	1,373.70		1,373.70
-L-	17+12.54	17+19.64	RT	4.95		4.95
-L-	17+81.89	18+09.95	RT	21.61		21.61
-L-	19+13.67	19+44.78	LT	374.62		374.62
-L-	19+65.61	20+52.99	RT	1,504.89		1,504.89
-L-	22+17.64	22+43.40	LT	160.18		160.18
-L-	24+60.01	25+41.35	RT	693.94		693.94
-L-	25+08.54	25+41.54	RT	79.92		79.92
-L-	25+73.63	26+05.12	RT	484.34		484.34
-L-	31+24.39	31+90.16	RT	752.35		752.35
-L-	32+00.98	32+52.27	RT	223.48		223.48
-Y1-	11+39.55	11+47.34	RT	74.73		74.73
-Y1-	11+50.73	11+83.86	RT	104.32		104.32
-Y1-	12+16.18	12+32.60	LT	39.66		39.66
-Y1-	14+42.72	14+63.52	LT	73.36		73.36
-Y1-	14+70.90	14+82.93	LT	14.83		14.83
-Y1-	15+78.82	15+92.57	LT	90.66		90.66
-Y2-	11+27.20	11+83.55	LT	258.58		258.58
-Y2-	17+56.08	17+67.53	LT	82.83		82.83
-Y2-	17+57.26	17+76.02	RT	236.05		236.05
-Y2-	23+37.48	23+81.00	RT	456.89		456.89
-Y3-	11+05.34	11+58.97	LT	1,131.76		1,131.76
-Y3-	11+62.54	11+74.90	RT	20.53		20.53
-Y3-	11+99.89	12+06.32	LT	20.42		20.42
-Y3-	12+06.60	12+38.98	LT	155.52		155.52
-Y3-	15+70.96	15+73.57	RT	10.79		10.79
-Y4-	10+99.45	11+40.31	LT	810.73		810.73
Total Sq. Feet = **43560 Sq. Feet/ACRE**					**Total Sq. Feet**	13,791.51
					Acres*	0.32
LEVEL: PROP CLEARING AND GRUBBING					**Subtotal**	0.32

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: EWB
CHECKED BY: CJY **SECTION: 200**

CLEARING AND GRUBBING

* Calculate Acreage for Tree Areas Only

LINE	STATION	STATION	LOCATION	AREA FROM CADD OR LENGTH	# OF TREES	SQUARE FEET
-Y4-	11+48.27	12+23.64	RT	309.49		309.49
-Y4-	11+92.99	12+35.75	LT	479.98		479.98
-Y5-	10+74.39	10+99.68	LT	166.67		166.67
-SL2-	11+24.90	11+31.72	RT	1.67		1.67
-L-	8+71.88	30+33.84	LT/RT	25.00	25	625.00
-Y1-	10+88.72	15+75.22	LT/RT	25.00	28	700.00
-Y2-	13+80.49	21+28.73	LT/RT	25.00	23	575.00
-Y3-	10+80.46	15+76.04	LT/RT	25.00	8	200.00
-Y4-	10+73.37	12+63.40	LT/RT	25.00	15	375.00
-Y5-	10+86.40	11+86.54	LT/RT	25.00	10	250.00
					109.00	

Total Sq. Feet / **43560 Sq. Feet/ACRE** =	**Total Sq. Feet**	3,682.81
	Acres*	0.08
	Subtotal	0.08
	Total	0.40
LEVEL: PROP CLEARING AND GRUBBING	**SAY**	0.50

PROJECT NO.: R-5799 **SHEET 1 OF 3**
COMPUTED BY: CLR
CHECKED BY: CJY **SECTION: 500**

FINE GRADING

NOTE: THE WIDTH IS MEASURED FROM EOP TO EOP

LINE	STATION	STATION	LOCATION	SQUARE FEET	FROM CADD OR	SQUARE FEET
-L-	7+00	8+01	RT	462.64		462.64
-L-	8+49	8+76	RT	90.33		90.33
-L-	8+78	8+86	RT	255.04		255.04
-L-	9+11	9+24	RT	270.17		270.17
-L-	9+17	10+28	RT	481.79		481.79
-L-	10+30	10+37	RT	103.40		103.40
-L-	10+63	11+29	RT	614.70		614.70
-L-	11+31	11+47	RT	131.64		131.64
-L-	11+47	12+62	RT	792.35		792.35
-L-	15+08	18+22	RT	1580.86		1,580.86
-L-	19+54	21+00	RT	1041.29		1,041.29
-L-	21+27	21+52	RT	135.26		135.26
-L-	21+75	23+01	RT	2421.39		2,421.39
-L-	21+85	23+08	RT	998.10		998.10
-L-	24+09	26+24	RT	2031.58		2,031.58
-L-	26+32	26+51	RT	355.91		355.91
-L-	26+45	32+66	RT	10897.44		10,897.44
-L-	7+00	7+36	LT	190.55		190.55
-L-	7+33	7+60	LT	262.79		262.79
-L-	7+50	13+57	LT	3230.32		3,230.32
-L-	13+88	17+78	LT	2853.67		2,853.67
-L-	19+09	20+27	LT	695.13		695.13
-L-	20+55	22+41	LT	2260.36		2,260.36
-L-	23+12	28+46	LT	8465.68		8,465.68
-L-	25+25	27+87	LT	2019.00		2,019.00
-L-	28+46	28+74	LT	123.46		123.46
-L-	28+88	30+51	LT	2102.54		2,102.54
-L-	30+94	32+66	LT	934.02		934.02
-L-	7+00	12+88	CL	3710.93		3,710.93
-L-	7+00	12+88	CL	1614.86		1,614.86
-L-	12+88	13+42	CL	873.66		873.66
-L-	14+25	14+31	CL	45.97		45.97
-L-	14+40	17+89	CL	3406.67		3,406.67
-L-	15+50	18+07	CL	1066.26		1,066.26
-L-	19+23	21+81	CL	1101.63		1,101.63
-L-	19+41	21+66	CL	997.80		997.80
-L-	21+78	22+22	CL	689.46		689.46
-L-	22+16	22+49	CL	217.42		217.42
LEVEL: PATTERN 6 AND PATTERN 2				SUBTOTAL IN FT^2		59,526.05
				SUBTOTAL IN YD^2		6,614.01

PROJECT NO.: R-5799 **SHEET 1 OF 3**
COMPUTED BY: CLR
CHECKED BY: CJY **SECTION: 500**

FINE GRADING

NOTE: THE WIDTH IS MEASURED FROM EOP TO EOP

LINE	STATION	STATION	LOCATION	SQUARE FEET	AREA FROM CADD	SQUARE FEET
-L-	22+47	22+60	CL	176.39		176.39
-L-	23+85	24+18	CL	208.33		208.33
-L-	24+57	27+44	CL	1222.08		1,222.08
-L-	24+58	27+46	CL	1223.49		1,223.49
-L-	27+69	27+93	CL	171.35		171.35
-L-	29+30	29+60	CL	195.00		195.00
-Y1-	11+04	13+19	RT	2531.41		2,531.41
-Y1-	13+39	14+07	RT	1255.45		1,255.45
-Y1-	14+03	16+09	RT	3036.54		3,036.54
-Y1-	16+28	16+61	RT	371.35		371.35
-Y1-	10+37	12+73	LT	1863.85		1,863.85
-Y1-	13+08	15+99	LT	1833.04		1,833.04
-Y1-	16+22	16+48	LT	130.72		130.72
-Y1-	10+36	10+45	CL	161.42		161.42
-Y1-	10+39	10+59	CL	228.44		228.44
-Y1-	10+49	11+31	CL	814.95		814.95
-Y2-	10+84	11+46	CL	313.12		313.12
-Y2-	10+85	11+80	RT	1197.31		1,197.31
-Y2-	12+25	13+15	RT	629.80		629.80
-Y2-	13+27	13+90	RT	461.87		461.87
-Y2-	14+30	15+21	RT	1152.89		1,152.89
-Y2-	15+62	16+40	RT	950.72		950.72
-Y2-	16+60	18+37	RT	1677.81		1,677.81
-Y2-	18+34	20+55	RT	2365.03		2,365.03
-Y2-	21+12	21+55	RT	370.30		370.30
-Y2-	21+80	22+96	RT	1328.84		1,328.84
-Y2-	23+20	27+16	RT	3790.41		3,790.41
-Y2-	10+85	12+84	LT	1953.80		1,953.80
-Y2-	13+03	14+90	LT	2784.18		2,784.18
-Y2-	15+30	25+71	LT	5673.62		5,673.62
-Y2-	25+95	27+32	LT	1875.06		1,875.06
-Y3-	10+84	11+52	CL	331.09		331.09
-Y3-	11+00	13+13	RT	2245.25		2,245.25
-Y3-	13+48	14+19	RT	919.05		919.05
-Y3-	14+35	17+20	RT	5084.74		5,084.74
-Y3-	11+25	12+53	LT	1082.26		1,082.26
-Y3-	12+79	13+48	LT	1285.07		1,285.07
-Y3-	13+63	13+94	LT	646.33		646.33
-Y3-	14+14	15+24	LT	2111.40		2,111.40
-Y3-	15+44	17+20	LT	3589.49		3,589.49
-Y4-	10+85	12+15	CL	5584.17		5,584.17
-Y4-	12+15	12+30	RT	25.60		25.60
-Y4-	11+42	12+33	RT	541.26		541.26
LEVEL: PATTERN 6 AND PATTERN 2				SUBTOTAL IN FT^2		65,394.29
				SUBTOTAL IN YD^2		7,266.03

PROJECT NO.: R-5799 **SHEET 3 OF 3**
COMPUTED BY: CLR
CHECKED BY: CJY **SECTION: 500**

FINE GRADING

NOTE: THE WIDTH IS MEASURED FROM EOP TO EOP

LINE	STATION	STATION	LOCATION	SQUARE FEET	AREA FROM CADD	SQUARE FEET
-Y4-	12+15	12+85	LT	362.71		362.71
-Y5-	10+85	12+76	CL	9556.92		9,556.92
-Y5-	11+85	12+45	LT	283.42		283.42
-RA1-	10+00	13+46	CL	5886.80		5886.7992
-RA2-	10+00	13+32	CL	5887.42		5887.4209
-L-	24+59	26+04	CL	1237.29		1237.29
-Y2-	15+64	16+38	RT	1065.42		1065.4233
-Y2-	18+53	19+06	LT	308.98		308.977
-Y3-	11+14	11+82	LT	3184.24		3184.2413

	SUBTOTAL IN FT^2	27,773.19
	SUBTOTAL IN YD^2	3,085.91
	TOTAL IN YD^2	16,965.95
	SAY	**16,970**

LEVEL: PATTERN 6 AND PATTERN 2

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: DDM **SECTION: 250**

REMOVAL OF EXISTING ASPHALT PAVEMENT

LINE	STATION	STATION	LOCATION	LENGTH OR AREA	WIDTH	SQUARE YARDS
-L-	7+00.09	7+36.15	LT	6.29		0.70
-L-	7+56.27	13+57.06	LT	4342.16		482.46
-L-	13+87.95	15+05.11	LT	390.28		43.36
-L-	17+08.26	17+77.93	LT	176.76		19.64
-L-	19+10.43	20+14.98	LT	365.88		40.65
-L-	20+55.25	20+68.45	LT	70.52		7.84
-L-	27+26.29	27+59.33	LT	42.59		4.73
-L-	29+61.12	30+50.66	LT	390.76		43.42
-L-	30+93.62	32+66.00	LT	346.37		38.49
-L-	25+25.07	27+86.70	LT	564.78		62.75
-L-	7+95.36	8+10.66	RT	88.05		9.78
-L-	8+41.56	8+51.79	RT	56.90		6.32
-L-	8+75.05	8+80.12	RT	5.82		0.65
-L-	8+79.83	8+86.05	RT	117.94		13.10
-L-	9+10.54	9+16.28	RT	125.95		13.99
-L-	9+16.00	9+17.06	RT	0.61		0.07
-L-	10+22.10	10+34.54	RT	29.53		3.28
-L-	10+31.65	10+37.19	RT	48.20		5.36
-L-	10+63.29	11+28.72	RT	401.78		44.64
-L-	11+47.94	13+00.44	RT	847.83		94.20
-L-	14+79.40	18+21.73	RT	2121.88		235.76
-L-	19+55.46	20+08.74	RT	118.03		13.11
-L-	20+88.15	20+99.83	RT	21.09		2.34
-L-	21+74.86	21+84.81	RT	48.51		5.39
-L-	24+04.03	25+13.15	RT	189.35		21.04
-L-	26+45.44	26+58.94	RT	58.43		6.49
-L-	31+57.23	32+66.00	RT	117.22		13.02
-L-	15+49.86	18+07.10	CL	1101.97		122.44
-L-	16+74.56	17+89.12	CL	204.58		22.73
-L-	19+22.60	20+05.10	CL	124.72		13.86
-L-	20+23.73	21+05.78	CL	31.47		3.50
-L-	21+14.88	21+76.63	CL	30.96		3.44
-L-	19+40.40	21+79.87	CL	1101.45		122.38
-L-	22+15.64	22+48.85	CL	380.19		42.24
-L-	22+21.85	22+47.11	CL	162.53		18.06
-L-	23+84.73	24+18.24	CL	893.09		99.23
-L-	24+56.88	27+45.68	CL	5440.31		604.48
-L-	27+69.25	27+93.19	CL	628.03		69.78
-L-	29+29.75	29+60.24	CL	686.54		76.28
-RA1-	10+00.00	13+45.58	CL	10207.03		1134.11
					SUBTOTAL (SY)	3,565.15

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: DDM **SECTION: 250**

REMOVAL OF EXISTING ASPHALT PAVEMENT

LINE	STATION	STATION	LOCATION	LENGTH OR AREA	WIDTH	SQUARE YARDS
-RA2-	10+00.00	13+45.57	CL	8996.46		999.61
-Y1-	10+43.73	10+75.98	LT	38.78		4.31
-Y1-	10+75.98	11+39.78	LT	58.38		6.49
-Y1-	11+43.40	12+56.90	LT	267.30		29.70
-Y1-	13+07.82	15+86.85	LT	330.28		36.70
-Y1-	15+88.97	15+90.47	LT	83.55		9.28
-Y1-	16+21.56	16+33.68	LT	33.58		3.73
-Y1-	16+59.22	16+80.00	LT	14.91		1.66
-Y1-	13+80.21	14+07.01	RT	101.84		11.32
-Y1-	14+05.98	14+39.52	RT	151.72		16.86
-Y1-	16+08.08	16+10.08	RT	62.91		6.99
-Y1-	16+28.49	16+60.31	RT	212.62		23.62
-Y2-	10+92.82	12+01.09	LT	1591.69		176.85
-Y2-	12+67.86	12+84.44	LT	99.05		11.01
-Y2-	13+02.71	13+10.01	LT	38.32		4.26
-Y2-	13+29.96	14+89.54	LT	2003.80		222.64
-Y2-	15+29.94	15+35.14	LT	27.05		3.01
-Y2-	18+30.25	25+71.04	LT	1635.58		181.73
-Y2-	18+53.10	19+05.74	LT	308.98		34.33
-Y2-	25+95.17	26+27.37	LT	89.14		9.90
-Y2-	27+00.50	27+31.91	LT	86.72		9.64
-Y2-	10+93.95	11+68.98	RT	482.41		53.60
-Y2-	11+45.98	11+75.38	RT	164.31		18.26
-Y2-	12+36.73	12+98.82	RT	58.66		6.52
-Y2-	14+30.17	15+21.13	RT	1335.58		148.40
-Y2-	15+62.42	16+40.14	RT	1923.50		213.72
-Y2-	16+60.14	17+18.09	RT	549.86		61.10
-Y2-	17+72.71	18+36.83	RT	1331.81		147.98
-Y2-	18+56.84	20+54.76	RT	2923.87		324.87
-Y2-	21+11.97	21+46.47	RT	87.69		9.74
-Y2-	21+81.73	22+79.06	RT	407.07		45.23
-Y2-	21+85.99	22+88.77	RT	313.55		34.84
-Y2-	23+19.60	24+67.23	RT	382.58		42.51
-Y2-	10+84.31	11+46.08	CL	1158.36		128.71
-Y3-	10+94.85	12+30.03	LT	6587.40		731.93
-Y3-	12+12.82	12+53.38	LT	395.69		43.97
-Y3-	12+79.16	12+98.48	LT	421.86		46.87
-Y3-	13+43.61	13+47.61	LT	48.37		5.37
-Y3-	13+62.58	13+64.80	LT	17.57		1.95
-Y3-	13+69.05	13+94.35	LT	425.63		47.29
-Y3-	14+14.35	15+23.61	LT	1720.89		191.21
					SUBTOTAL (SY)	4,107.70

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: DDM **SECTION: 250**

REMOVAL OF EXISTING ASPHALT PAVEMENT

LINE	STATION	STATION	LOCATION	LENGTH OR AREA	WIDTH	SQUARE YARDS
-Y3-	15+44.42	15+66.72	LT	323.62		35.96
-Y3-	10+90.07	11+83.68	RT	534.71		59.41
-Y3-	10+84.57	11+52.25	CL	1145.91		127.32
-Y4-	10+84.35	11+13.33	CL	511.33		56.81
-Y4-	11+55.01	12+85.00	LT	231.35		25.71
-Y4-	11+63.19	12+32.41	RT	117.70		13.08
-Y4-	11+42.51	12+31.56	RT	231.25		25.69
-Y5-	10+82.86	11+08.99	CL	507.87		56.43
-Y5-	10+84.79	11+04.79	CL	100.69		11.19
-Y5-	11+10.89	11+43.35	CL	54.09		6.01
-Y5-	11+12.08	12+31.71	CL	1797.62		199.74
-Y5-	11+92.88	12+39.62	RT	82.27		9.14
-Y5-	12+54.03	12+76.14	RT	36.76		4.08
-Y5-	11+85.21	12+45.06	RT	109.70		12.19
-Y5-	11+76.91	12+12.84	LT	141.24		15.69
					SUBTOTAL (SY)	658.46
					TOTAL (SY)	8,331.31
					SAY	**8,340**

PROJECT NO.: R-5799

SECTION: 235

EMBANKMENT SETTLEMENT GAUGES

GAUGE NO.	LINE STATION	OFFSET	
		DISTANCE (FT)	DIRECTION (LT/RT)
1	-L- 27+97	81	RT
2	-L- 28+57	13	RT
3	-L- 29+20	82	RT
		TOTAL GAUGES (EACH)	3

COMPUTED BY: DDM

CHECKED BY: CLR

PROJECT NO.: R-5799

SECTION: 265

SELECT GRANULAR MATERIAL

LINE	STATION	STATION	SIDE	CUBIC YARDS
CONTINGENCY				1000.00
			TOTAL	1000.00

COMPUTED BY: DDM

CHECKED BY: CLR

PROJECT NO.: R-5799 SHEET 1 OF 1

SECTION: 270

GEOTEXTILE FOR SOIL STABILIZATION

LINE	STATION	STATION	SIDE	SQUARE YARDS
CONTINGENCY				2000.00
			TOTAL	2000.00

COMPUTED BY: DDM CHECKED BY: CLR

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: ACD **SECTION: 848**

TEMPORARY SHORING

LINE	STATION	STATION	LOCATION	LENGTH	HEIGHT	SQUARE FEET
-Y2-	17+00.00	18+00.00	RT	100.00	10.7	1070.00
-Y2-	17+00.00	18+06.00	LT	106.00	11.4	1208.40
					Total	2278.40
					Say	**2300**

3/16/2021

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: DDM **SECTION: 275**

Rock Plating

LINE	STATION TO STATION	SQUARE FEET
-L-	19+16 TO 19+57	264.57
	Column Total	264.57

LINE	STATION TO STATION	SQUARE FEET
	Column Total	
	TOTAL IN SQUARE YARDS	29.40
	SAY	**30**

PROJECT NO. : R-5799 **SHEET OF**
COMPUTED BY: EWB
CHECKED BY: CJY **SECTION: 300**

FOUNDATION CONDITIONING MATERIAL MINOR STRUCTURES

8293	**LIN. FT**	**X**	**0.106**	**=**	879.06	**TONS**
				SAY	930	**TONS**

FOUNDATION CONDITIONING GEOTEXTILE

8293	**LIN. FT**	**X**	**6 FT / 18**	**=**	2764.33	**SY**
				SAY	2910	**SY**

5/8/2023

PROJECT NO.: R-5799

SHEET 1 OF 1

SECTION: 505

SHALLOW UNDERCUT

LINE	STATION	STATION	SIDE	CUBIC YARDS
CONTINGENCY				500.00
			TOTAL	500.00

COMPUTED BY: DDM

CHECKED BY: CLR

PROJECT NO.: R-5799

SECTION: 505

CLASS IV SUBGRADE STABILIZATION

LINE	STATION	STATION	SIDE	TONS
CONTINGENCY				1000.00
			TOTAL	1000.00

COMPUTED BY: DDM

CHECKED BY: CLR

PROJECT NO.: R-5799 SHEET OF

COMPUTED BY: CLR

CHECKED BY: ACD SECTION: 520

AGGREGATE BASE COURSE

LINE	STATION	STATION	LENGTH OR AREA	W (FT)	W1 (FT)	D (FT)	TONS
-L- RT	20+84.39	21+09.30	242.94			0.66	11.93
-Y2- LT	18+53.40	19+16.73	800.90			0.50	30.03
						TOTAL	41.97
						SAY	**46**

8/26/2020

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: DDM
CHECKED BY: SMK **SECTION: 607**

Milling -0" to 1.25" Depth

LINE	BEG. STA.	END STA.	LENGTH	AREA / W	SQ Yds.
-L- CL	32+66	33+06	40.00	1771.52	196.84
				TOTAL	196.84
				SAY	200

6/12/2023

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: CJY **SECTION: 607**

Milling -0" to 1.5" Depth

LINE	BEG. STA.	END STA.	LENGTH	AREA / W	SQ Yds.
-L- LT	7+00	7+50	50.00	1873.21	208.13
-L- RT	7+00	7+50	50.00	1977.28	219.70
-L- LT	17+71	18+21	50.00	1177.19	130.80
-L- RT	17+71	18+21	50.00	1434.62	159.40
-L- LT	19+11	19+61	50.00	1150.88	127.88
-L- RT	19+11	19+61	50.00	1426.38	158.49
-Y1- CL	16+30	16+80	50.00	1598.69	177.63
-Y2- CL	26+60	27+10	50.00	2216.93	246.33
-Y3- CL	16+70	17+20	50.00	1263.20	140.36
-Y4- CL	12+35	12+85	50.00	1028.40	114.27
				TOTAL	1682.98
				SAY	1690

CORRIDOR MODELING - PAVEMENT QUANTITIES

PROJECT NO.: R-5799 SHEET OF

COMPUTED BY: DDM SECTION: 610

CHECKED BY: CJY DATE: 8/24/2020

ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B

Volume to Ton Conversion Factor: 1.9800

LINE	BEG STA	END STA	TYPE	VOLUME (CY)	TONS
L	7+00.00	18+06.66	WEDGE	271.52	538
L	19+55.46	32+66.00	WEDGE	123.18	244
Y1	10+37.18	16+99.67	WEDGE	114.24	226
Y2	10+85.01	27+10.00	WEDGE	292.39	579
Y3	10+85.01	17+50.00	WEDGE	57.37	114
Y4	10+84.87	14+00.00	WEDGE	3.39	7
RA1	10+00.00	13+45.58	WEDGE	23.24	46
RA2	10+00.00	13+45.59	WEDGE	5.79	11

SHEET TOTAL:	1,764
GRAND TOTAL:	
SAY:	

Station range reports per corridor available

[Tip No] R:\Roadway\CorridorModeling\CMQR_*.HTML

CORRIDOR MODELING - PAVEMENT QUANTITIES

PROJECT NO.: R-5799 SHEET OF

COMPUTED BY: DDM SECTION: 610

CHECKED BY: CJY DATE: 8/24/2020

ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C

Volume to Ton Conversion Factor: 2.0520

LINE	BEG STA	END STA	TYPE	VOLUME (CY)	TONS
L	7+00.00	18+06.66	WEDGE	570.16	1,170
L	19+55.46	32+66.00	WEDGE	1,277.82	2,622
Y1	10+37.18	16+99.67	WEDGE	457.29	938
Y2	10+85.01	27+10.00	WEDGE	1,031.49	2,117
Y3	10+85.01	17+50.00	WEDGE	163.33	335
Y4	10+84.87	14+00.00	WEDGE	5.35	11
RA1	10+00.00	13+45.58	WEDGE	333.19	684
RA2	10+00.00	13+45.59	WEDGE	76.40	157

SHEET TOTAL:	8,034
GRAND TOTAL:	
SAY:	

Station range reports per corridor available

[Tip No] R:\Roadway\CorridorModeling\CMQR_*.HTML

PROJECT NO.: R-5799 **SHEET OF**

COMPUTED BY: CLR

CHECKED BY: CJY **SECTION: 610**

WEDGING (-RA1-)

LINE	STATION	LENGTH (FT)	S9.5C (FT^2)	AVG. AREA (FT^2)	CUBIC YARDS	I19.0C (FT^2)	AVG. AREA (FT^2)	CUBIC YARDS
-L-	10+56.46		2.26	0.00	0.00	37.55	0.00	0.00
-L-	11+00.00	43.54	3.50	2.88	4.65	55.48	46.52	75.01
-L-	11+50.00	50.00	1.64	2.57	4.76	27.91	41.70	77.21
-L-	12+00.00	50.00	1.62	1.63	3.02	23.66	25.78	47.75
-L-	12+50.00	50.00	3.15	2.39	4.42	36.64	30.15	55.83
-L-	13+00.00	50.00	3.75	3.45	6.39	46.94	41.79	77.38
				TOTAL	23.24		TOTAL	333.19

PROJECT NO.: R-5799 **SHEET OF**

COMPUTED BY: CLR

CHECKED BY: CJY **SECTION: 610**

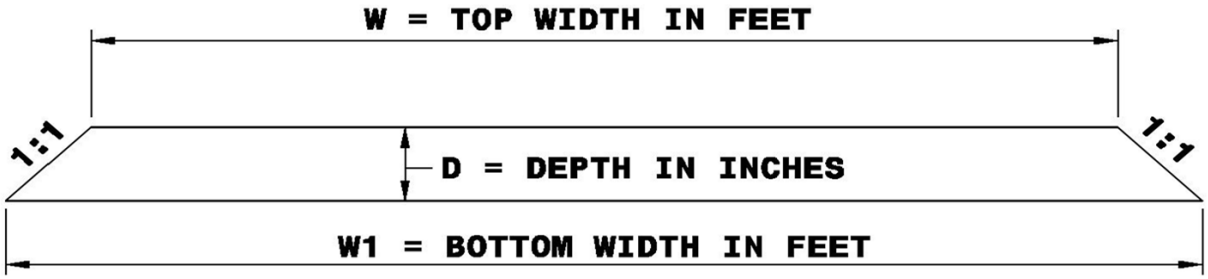
WEDGING (-RA2-)

LINE	STATION	LENGTH (FT)	S9.5C (FT^2)	AVG. AREA (FT^2)	CUBIC YARDS	I19.0C (FT^2)	AVG. AREA (FT^2)	CUBIC YARDS
-L-	10+00.00		1.63	0.00	0.00	29.94	0.00	0.00
-L-	10+50.00	50.00	0.00	0.81	1.50	0.00	14.97	27.72
-L-	11+00.00	50.00	0.00	0.00	0.00	0.00	0.00	0.00
-L-	11+50.00	50.00	0.60	0.30	0.55	11.92	5.96	11.04
-L-	12+00.00	50.00	1.66	1.13	2.09	13.75	12.84	23.77
-L-	12+50.00	50.00	0.00	0.83	1.54	0.00	6.87	12.73
-L-	13+00.00	50.00	0.11	0.06	0.10	1.23	0.62	1.14
				TOTAL	5.79		TOTAL	76.40

6/12/2023

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: CJY **SECTION: 610**

ASPHALT CONCRETE BASE COURSE
TYPE B25.0C



CALCULATE:

LENGTH X ((W+W1)/2) X D X 114# / YD^2 / IN = _____ TONS

9 FT^2 / YD^2 X 2000# / TON

NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

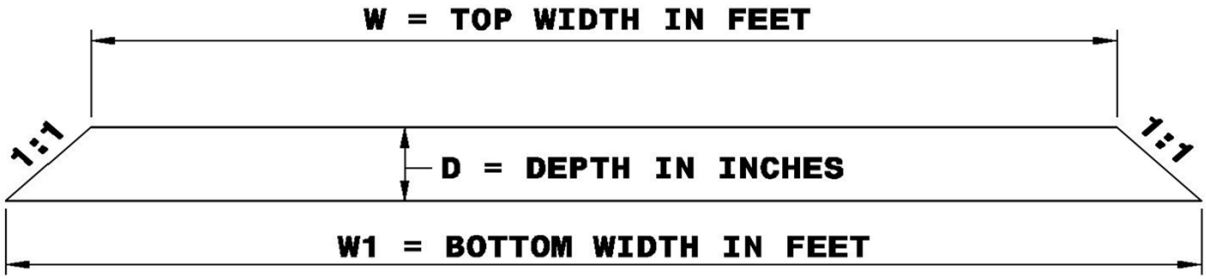
LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - WIDENING							
-L- RT	7+00	8+01		462.64		4	11.51
-L- RT	8+49	8+76		90.33		4	2.25
-L- RT	8+78	8+86		255.04		4	6.35
-L- RT	9+11	9+24		270.17		4	6.72
-L- RT	9+17	10+28		481.79		4	11.99
-L- RT	10+30	10+37		103.40		4	2.57
-L- RT	10+63	11+29		614.70		4	15.30
-L- RT	11+31	11+47		131.64		4	3.28
-L- RT	11+47	12+62		792.35		4	19.72
-L- RT	15+08	18+22		1580.86		4	39.35
-L- RT	19+54	21+00		1041.29		4	25.92
-L- RT	21+27	21+52		135.26		4	3.37
-L- RT	21+75	23+01		2421.39		4	60.27
-L- RT	21+85	23+08		998.10		4	24.84
-L- RT	24+09	26+24		2031.58		4	50.56
-L- RT	26+32	26+51		355.91		4	8.86
-L- RT	26+45	32+66		10897.44		4	271.23
-L- LT	7+00	7+36		190.55		4	4.74
-L- LT	7+33	7+60		262.79		4	6.54
-L- LT	7+50	13+57		3230.32		4	80.40
-L- LT	13+88	17+78		2853.67		4	71.02
						SUBTOTAL	726.79

PATTERN 6 = 4" of Base course

6/12/2023

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: CJY **SECTION: 610**

ASPHALT CONCRETE BASE COURSE
TYPE B25.0C



CALCULATE:

LENGTH X ((W+W1)/2) X D X 112# / YD^2 / IN = _____ TONS

9 FT^2 / YD^2 X 2000# / TON

NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

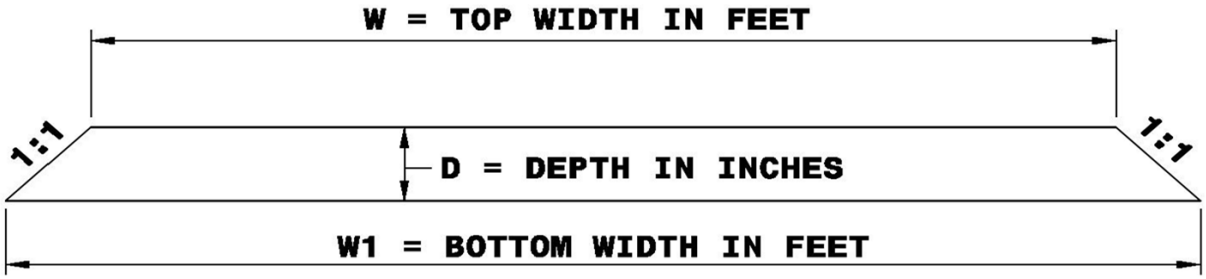
LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - WIDENING							
-L- LT	19+09	20+27		695.13		4	17.30
-L- LT	20+55	22+41		2260.36		4	56.26
-L- LT	23+12	28+46		8465.68		4	210.70
-L- LT	25+25	27+87		2019.00		4	50.25
-L- LT	28+46	28+74		123.46		4	3.07
-L- LT	28+88	30+51		2102.54		4	52.33
-L- LT	30+94	32+66		934.02		4	23.25
-L- CL	7+00	12+88		3710.93		4	92.36
-L- CL	7+00	12+88		1614.86		4	40.19
-L- CL	12+88	13+42		873.66		4	21.74
-L- CL	14+25	14+31		45.97		4	1.14
-L- CL	14+40	17+89		3406.67		4	84.79
-L- CL	15+50	18+07		1066.26		4	26.54
-L- CL	19+23	21+81		1101.63		4	27.42
-L- CL	19+41	21+80		997.80		4	24.83
-L- CL	21+78	22+22		689.46		4	17.16
						SUBTOTAL	749.33

PATTERN 6 = 4" of Base course

6/12/2023

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: CJY **SECTION: 610**

ASPHALT CONCRETE BASE COURSE
TYPE B25.0C



CALCULATE:

LENGTH X ((W+W1)/2) X D X 112# / YD^2 / IN = _____ TONS

9 FT^2 / YD^2 X 2000# / TON

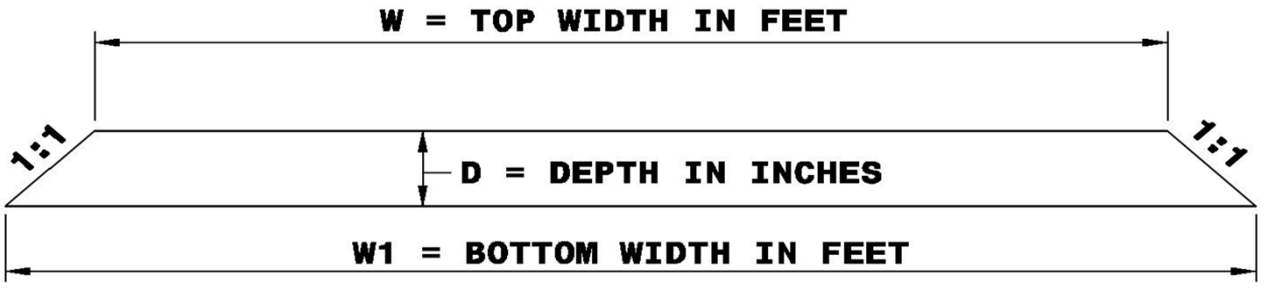
NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - WIDENING							
-L- CL	22+16	22+49		217.42		4	5.41
-L- CL	22+47	22+60		176.39		4	4.39
-L- CL	23+85	24+18		208.33		4	5.19
-L- CL	24+57	27+44		1222.08		4	30.42
-L- CL	24+58	27+46		1223.49		4	30.45
-L- CL	27+69	27+93		171.35		4	4.26
-L- CL	29+30	29+60		195.00		4	4.85
-Y1- RT	11+04	13+19		2531.41		4	63.00
-Y1- RT	13+39	14+07		1255.45		4	31.25
-Y1- RT	14+03	16+09		3036.54		4	75.58
-Y1- RT	16+28	16+61		371.35		4	9.24
-Y1- LT	10+37	12+73		1863.85		4	46.39
-Y1- LT	13+08	15+99		1833.04		4	45.62
-Y1- LT	16+22	16+48		130.72		4	3.25
						SUBTOTAL	359.30

PATTERN 6 = 4" of Base course

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: CJY **SECTION: 610**

ASPHALT CONCRETE BASE COURSE
TYPE B25.0C



CALCULATE:

LENGTH X ((W+W1)/2) X D X 112# / YD^2 / IN = _____ TONS

9 FT^2 / YD^2 X 2000# / TON

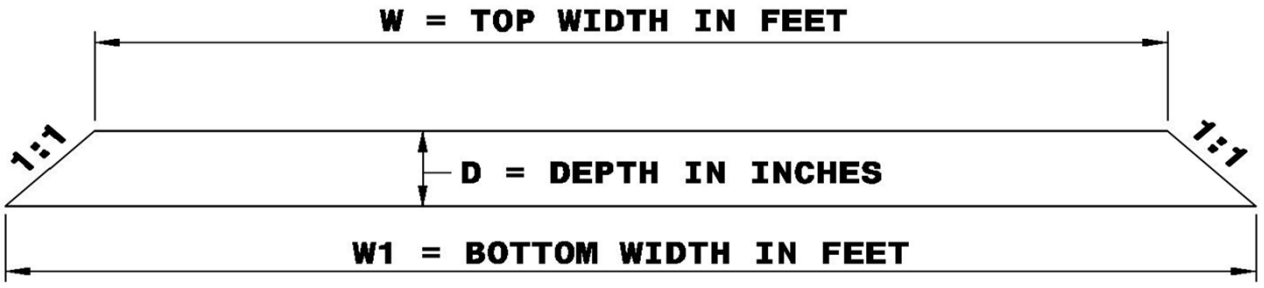
NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - WIDENING							
-Y1- CL	10+36	10+45		161.42		4	4.02
-Y1- CL	10+39	10+59		228.44		4	5.69
-Y1- CL	10+49	11+31		814.95		4	20.28
-Y2- CL	10+84	11+46		313.12		4	7.79
-Y2- RT	10+85	11+80		1197.31		4	29.80
-Y2- RT	12+25	13+15		629.80		4	15.67
-Y2- RT	13+27	13+90		461.87		4	11.50
-Y2- RT	14+30	15+21		1152.89		4	28.69
-Y2- RT	15+62	16+40		950.72		4	23.66
-Y2- RT	16+60	18+37		1677.81		4	41.76
-Y2- RT	18+34	20+55		2365.03		4	58.86
-Y2- RT	21+12	21+55		370.30		4	9.22
-Y2- RT	21+80	22+96		1328.84		4	33.07
-Y2- RT	23+20	27+16		3790.41		4	94.34
-Y2- LT	10+84	12+84		1953.80		4	48.63
-Y2- LT	13+03	14+90		2784.18		4	69.30
-Y2- LT	15+30	25+71		5673.62		4	141.21
-Y2- LT	25+95	27+32		1875.06		4	46.67
						SUBTOTAL	690.16

PATTERN 6 = 4" of Base course

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: CJY **SECTION: 610**

ASPHALT CONCRETE BASE COURSE
TYPE B25.0C



CALCULATE:

LENGTH X ((W+W1)/2) X D X 112# / YD^2 / IN = _____ TONS

9 FT^2 / YD^2 X 2000# / TON

NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

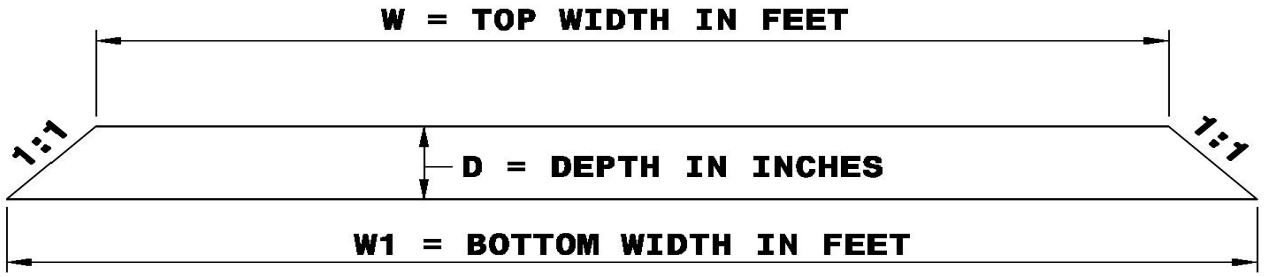
LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - WIDENING							
-Y3- CL	10+84	11+52		331.09		4	8.24
-Y3- RT	11+00	13+13		2245.25		4	55.88
-Y3- RT	13+48	14+19		919.05		4	22.87
-Y3- RT	14+35	17+20		5084.74		4	126.55
-Y3- LT	11+25	12+53		1082.26		4	26.94
-Y3- LT	12+79	13+48		1285.07		4	31.98
-Y3- LT	13+63	13+94		646.33		4	16.09
-Y3- LT	14+14	15+24	.	2111.40		4	52.55
-Y3- LT	15+44	17+20		3589.49		4	89.34
-Y4- CL	10+85	12+15		5584.17		4	138.98
-Y4- RT	12+15	12+30		25.60		4	0.64
-Y4- RT	11+42	12+33		541.26		4	13.47
-Y4- LT	12+15	12+85		362.71		4	9.03
-Y5- CL	10+85	12+76		9556.92		4	237.86
-Y5- RT	11+85	12+45		283.42		4	7.05
-RA1- CL	10+00	13+46		5886.80		4	146.52
-RA2- CL	10+00	13+32		5887.42		4	146.53
						SUBTOTAL	1130.52

PATTERN 6 = 4" of Base course

6/12/2023

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: CJY **SECTION: 610**

ASPHALT CONCRETE BASE COURSE
TYPE B25.0C



CALCULATE:

LENGTH X ((W+W1)/2) X D X 112# / YD^2 / IN = _____ TONS

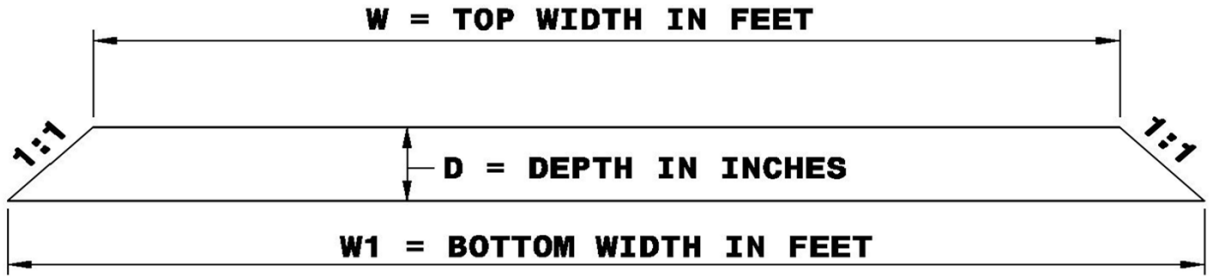
9 FT^2 / YD^2 X 2000# / TON

NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - TEMPORARY PAVEMENT							
-L- CL	24+59	26+04		1237.29		4	30.79
-Y2- RT	15+64	16+38		1065.42		4	26.52
-Y2- LT	18+53	19+06		308.98		4	7.69
-Y3- LT	11+14	11+82		3184.24		4	79.25
						SUBTOTAL	144.25
PATTERN 2 = 4" Temp Pavement						TOTAL	3800.35
						SAY	3810.00

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: CJY **SECTION: 610**

ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C



CALCULATE:

LENGTH X ((W+W1)/2) X D X 112# / YD^2 / IN = _____ TONS

9 FT^2 / YD^2 X 2000# / TON

NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

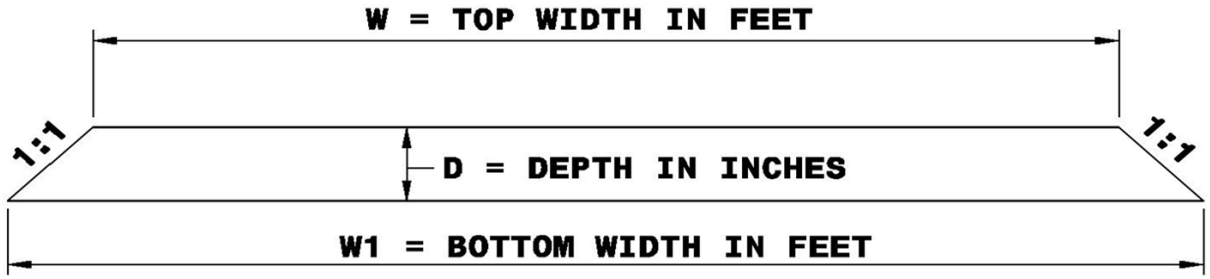
LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - WIDENING							
-L- RT	7+00	8+00		428.52		4	10.67
-L- RT	8+49	8+75		81.41		4	2.03
-L- RT	8+80	8+86		116.81		4	2.91
-L- RT	9+11	9+23		124.53		4	3.10
-L- RT	9+17	10+27		445.89		4	11.10
-L- RT	10+32	10+37		48.20		4	1.20
-L- RT	10+63	11+29		259.00		4	6.45
-L- RT	11+31	11+47		131.64		4	3.28
-L- RT	11+47	12+62		326.41		4	8.12
-L- RT	15+08	18+21		619.54		4	15.42
-L- RT	19+54	21+00		585.94		4	14.58
-L- RT	21+27	21+52		135.26		4	3.37
-L- RT	21+75	23+01		1715.97		4	42.71
-L- RT	21+85	23+08		998.10		4	24.84
-L- RT	24+04	26+24		925.20		4	23.03
-L- RT	26+32	26+51		355.91		4	8.86
-L- RT	26+45	32+66		9073.88		4	225.84
-L- LT	7+00	7+36		178.69		4	4.45
-L- LT	7+33	7+60		262.79		4	6.54
-L- LT	7+56	13+57		1242.13		4	30.92
-L- LT	13+88	17+78		1593.67		4	39.66
						SUBTOTAL	489.08

PATTERN 3 = 4" Intermediate

6/12/2023

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: CJY **SECTION: 610**

ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C



CALCULATE:

LENGTH X ((W+W1)/2) X D X 112# / YD^2 / IN = _____ TONS

9 FT^2 / YD^2 X 2000# / TON

NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

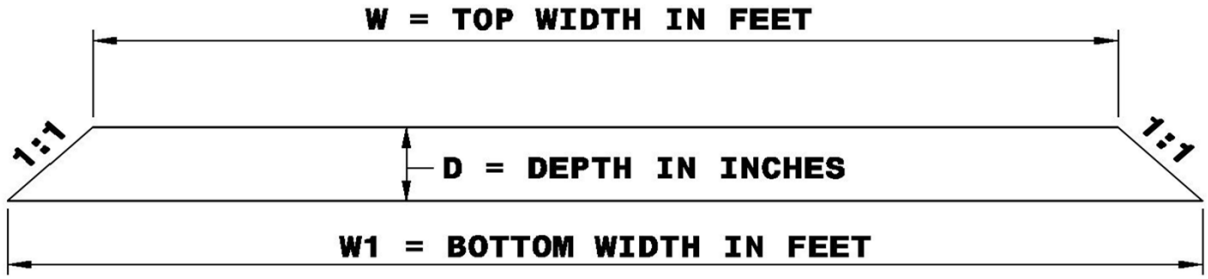
LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - WIDENING							
-L- LT	19+11	20+27		277.23		4	6.90
-L- LT	20+55	22+41		486.76		4	12.11
-L- LT	23+12	28+46		6775.69		4	168.64
-L- LT	25+25	27+87		564.78		4	14.06
-L- LT	28+46	28+74		123.46		4	3.07
-L- LT	28+88	30+51		1514.91		4	37.70
-L- LT	30+94	32+66		365.77		4	9.10
-L- CL	7+00	12+88		3514.74		4	87.48
-L- CL	7+00	12+88		1419.13		4	35.32
-L- CL	12+88	13+42		873.66		4	21.74
-L- CL	14+25	14+31		45.97		4	1.14
-L- CL	14+40	17+89		2884.99		4	71.80
-L- CL	15+50	18+07		513.06		4	12.77
-L- CL	19+23	21+81		533.74		4	13.28
-L- CL	19+41	21+80		477.75		4	11.89
-L- CL	21+78	22+22		689.52		4	17.16
						SUBTOTAL	524.16

PATTERN 3 = 4" Intermediate

6/12/2023

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: CJY **SECTION: 610**

ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C



CALCULATE:

LENGTH X ((W+W1)/2) X D X 112# / YD^2 / IN = _____ TONS

9 FT^2 / YD^2 X 2000# / TON

NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

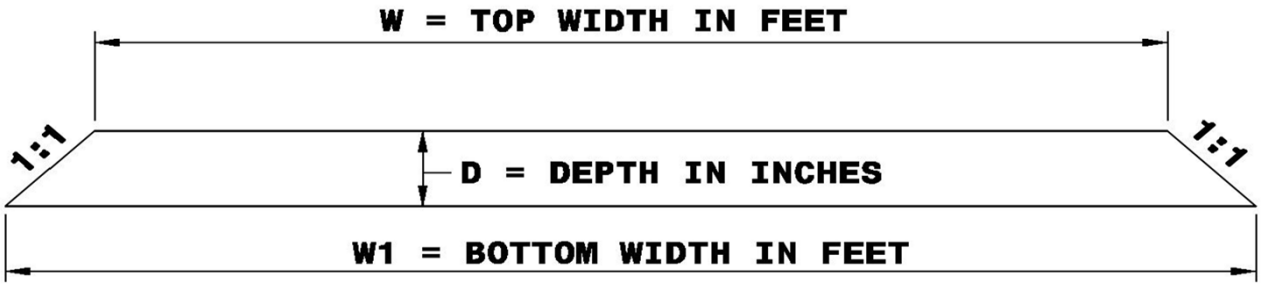
LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - WIDENING							
-L- CL	22+16	22+49		217.42		4	5.41
-L- CL	22+47	22+60		176.39		4	4.39
-L- CL	23+85	24+18		208.33		4	5.19
-L- CL	24+57	27+44		590.82		4	14.70
-L- CL	24+58	27+46		590.98		4	14.71
-L- CL	27+69	27+93		171.14		4	4.26
-L- CL	29+30	29+60		195.00		4	4.85
-Y1- RT	11+04	13+19		1663.61		4	41.41
-Y1- RT	13+39	14+07		856.21		4	21.31
-Y1- RT	14+03	16+09		2174.96		4	54.13
-Y1- RT	16+28	16+61		148.79		4	3.70
-Y1- LT	10+37	12+73		744.63		4	18.53
-Y1- LT	13+08	15+99		725.68		4	18.06
-Y1- LT	16+22	16+48		88.59		4	2.20
						SUBTOTAL	212.85

PATTERN 3 = 4" Intermediate

6/12/2023

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: CJY **SECTION: 610**

ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C



CALCULATE:

LENGTH X ((W+W1)/2) X D X 112# / YD^2 / IN = _____ TONS

9 FT^2 / YD^2 X 2000# / TON

NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

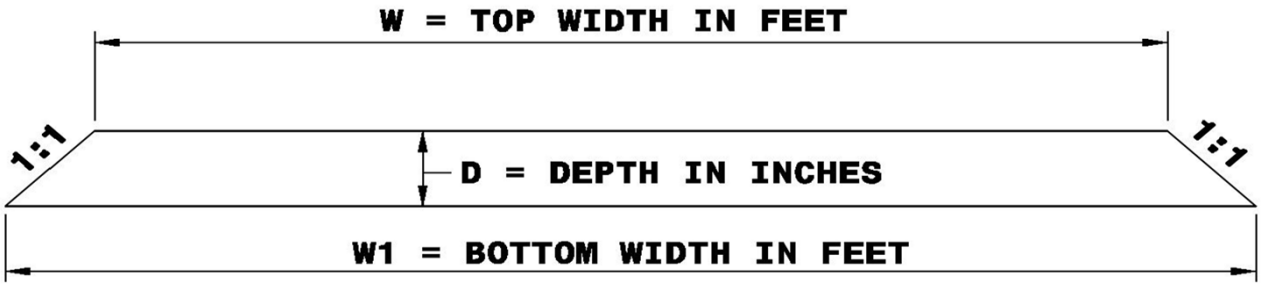
LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - WIDENING							
-Y1- CL	10+36	10+45		161.42		4	4.02
-Y1- CL	10+39	10+59		228.44		4	5.69
-Y1- CL	10+49	11+31		814.95		4	20.28
-Y2- CL	10+84	11+46		313.12		4	7.79
-Y2- RT	10+85	11+80		533.69		4	13.28
-Y2- RT	12+25	13+15		296.42		4	7.38
-Y2- RT	13+27	13+90		237.40		4	5.91
-Y2- RT	14+30	15+21		555.63		4	13.83
-Y2- RT	15+62	16+40		437.56		4	10.89
-Y2- RT	16+60	18+37		740.77		4	18.44
-Y2- LT	18+34	20+55		1090.56		4	27.14
-Y2- RT	21+12	21+55		173.99		4	4.33
-Y2- RT	21+80	22+96		572.27		4	14.24
-Y2- RT	23+20	27+16		2497.85		4	62.17
-Y2- LT	10+85	12+84		665.75		4	16.57
-Y2- LT	13+03	14+90		1579.50		4	39.31
-Y2- LT	15+30	25+71		2336.55		4	58.15
-Y2- LT	25+95	27+32		1362.10		4	33.90
						SUBTOTAL	363.32

PATTERN 3 = 4" Intermediate

6/12/2023

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: CJY **SECTION: 610**

ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C



CALCULATE:

LENGTH X ((W+W1)/2) X D X 112# / YD^2 / IN = _____ TONS

9 FT^2 / YD^2 X 2000# / TON

NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

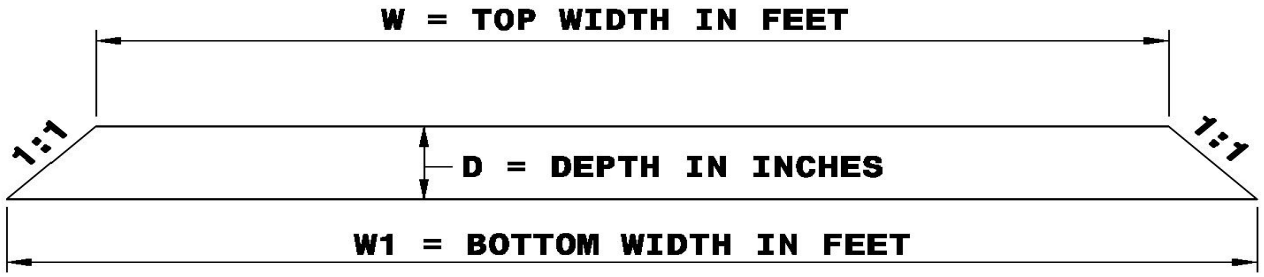
LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - WIDENING							
-Y3- CL	10+84	11+52		331.09		4	8.24
-Y3- RT	11+00	13+13		1482.27		4	36.89
-Y3- RT	13+48	14+19		654.48		4	16.29
-Y3- RT	14+35	17+20		4028.21		4	100.26
-Y3- LT	11+25	12+53		400.80		4	9.98
-Y3- LT	12+79	13+48		985.69		4	24.53
-Y3- LT	13+63	13+94		448.65		4	11.17
-Y3- LT	14+14	15+24	.	1398.26		4	34.80
-Y3- LT	15+44	17+20		2869.84		4	71.43
-Y4- CL	10+85	12+15		4670.18		4	116.24
-Y4- RT	12+15	12+30		25.60		4	0.64
-Y4- RT	11+42	12+33		203.40		4	5.06
-Y4- LT	12+15	12+85		140.37		4	3.49
-Y5- CL	10+85	12+75		8166.87		4	203.26
-Y5- RT	11+85	12+45		109.71		4	2.73
-RA1- CL	10+00	13+46		703.72		4	17.51
-RA2- CL	10+00	13+46		703.72		4	17.51
						SUBTOTAL	680.03

PATTERN 3 = 4" Intermediate

6/12/2023

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: CJY **SECTION: 610**

ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C



CALCULATE:

LENGTH X ((W+W1)/2) X D X 112# / YD^2 / IN = _____ TONS

9 FT^2 / YD^2 X 2000# / TON

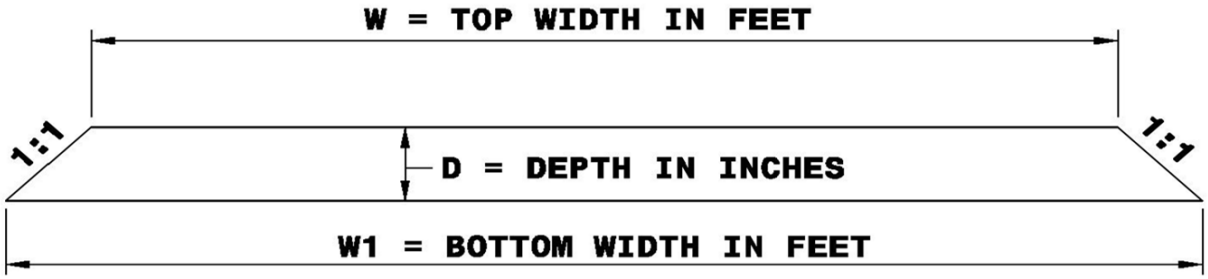
NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - TEMPORARY PAVEMENT							
-L- CL	24+59	26+04		1237.29		4	30.79
-Y2- RT	15+64	16+38		1065.42		4	26.52
-Y2- LT	18+53	19+06		308.98		4	7.69
-Y3- LT	11+14	11+82		3184.24		4	79.25
WEDGING							8034.00
						SUBTOTAL	8178.25
						TOTAL	10447.69
						SAY	10450.00

PATTERN 2 = 4" Temp pavement

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: DDM **SECTION: 610**

ASPHALT CONCRETE SURFACE COURSE
TYPE S9.5B



CALCULATE:

LENGTH X ((W+W1)/2) X D X 112# / YD^2 / IN = _____ TONS

9 FT^2 / YD^2 X 2000# / TON

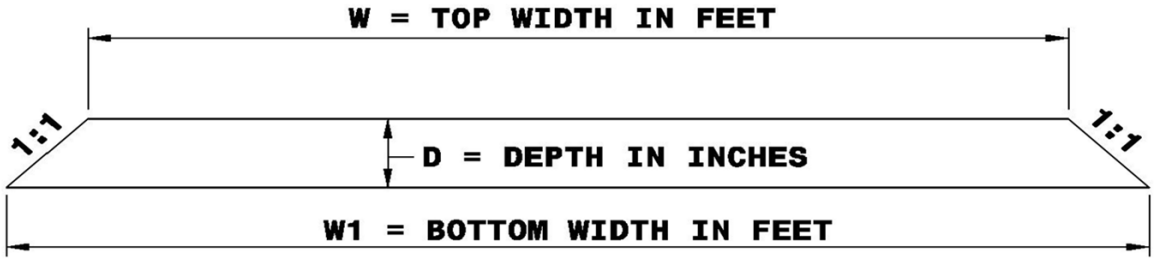
NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - WIDENING							
-L- RT	7+00	8+00		398.82		3	7.44
-L- RT	8+49	8+75		73.82		3	1.38
-L- RT	8+80	8+86		116.81		3	2.18
-L- RT	9+11	9+23		124.53		3	2.32
-L- RT	9+17	10+27		414.70		3	7.74
-L- RT	10+32	10+37		48.20		3	0.90
-L- RT	10+63	11+29		259.00		3	4.83
-L- RT	11+35	11+45		4.29		3	0.08
-L- RT	11+47	12+62		326.41		3	6.09
-L- RT	15+08	18+21		619.54		3	11.56
-L- RT	19+54	21+00		585.94		3	10.94
-L- RT	21+27	21+52		135.26		3	2.52
-L- RT	21+75	23+01		1715.97		3	32.03
-L- RT	21+85	23+08		998.10		4	24.84
-L- RT	24+04	26+24		925.20		3	17.27
-L- RT	26+32	26+51		355.91		3	6.64
-L- RT	26+45	32+66		9073.88		3	169.38
-L- LT	7+00	7+36		168.35		3	3.14
-L- LT	7+33	7+60		262.79		3	4.91
-L- LT	7+56	13+57		1242.13		3	23.19
-L- LT	13+88	17+78		1593.67		3	29.75
						SUBTOTAL	369.13

PATTERN 5 = 3", PATTERN 1 = 3" for L, Y2, Y3, Y4 and 1.5" for Y1

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: DDM **SECTION: 610**

ASPHALT CONCRETE SURFACE COURSE
TYPE S9.5B



CALCULATE:

LENGTH X ((W+W1)/2) X D X 112# / YD^2 / IN = _____ TONS
9 FT^2 / YD^2 X 2000# / TON

NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

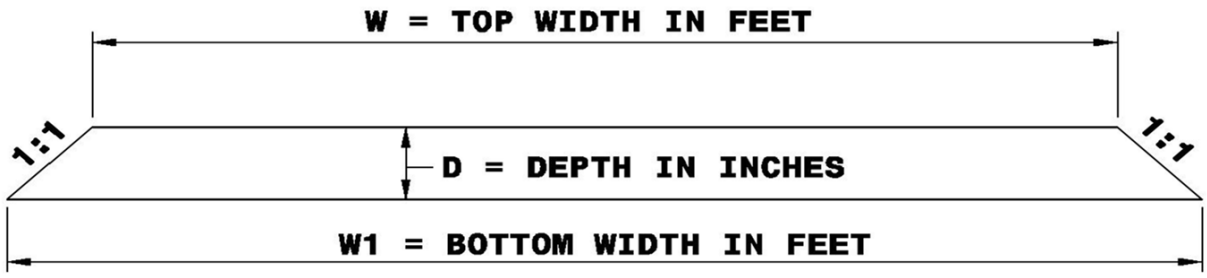
LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - WIDENING							
-L- LT	19+11	20+27		277.23		3	5.18
-L- LT	20+55	22+41		486.76		3	9.09
-L- LT	23+12	28+46		6775.60		3	126.48
-L- LT	25+25	27+87		564.78		3	10.54
-L- LT	28+46	28+74		123.46		3	2.30
-L- LT	28+88	30+51		1514.91		3	28.28
-L- LT	30+94	32+66		365.77		3	6.83
-L- CL	7+00	12+88		3343.07		3	62.40
-L- CL	7+00	12+88		1247.85		3	23.29
-L- CL	12+88	13+42		273.53		3	5.11
-L- CL	14+25	14+31		45.97		3	0.86
-L- CL	14+40	17+89		2392.33		3	44.66
-L- CL	15+50	18+07		513.06		3	9.58
-L- CL	19+23	21+81		533.74		3	9.96
-L- CL	19+41	21+80		477.75		3	8.92
-L- CL	21+79	22+20		497.16		3	9.28
-L- CL	22+16	22+49		217.42		3	4.06
-L- CL	22+47	22+60		176.39		3	3.29
						SUBTOTAL	370.11

PATTERN 5 = 3", PATTERN 1 = 3" for L, Y2, Y3, Y4 and 1.5" for Y1

6/12/2023

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: DDM **SECTION: 610**

ASPHALT CONCRETE SURFACE COURSE
TYPE S9.5B



CALCULATE:

LENGTH X ((W+W1)/2) X D X 112# / YD^2 / IN = _____ TONS

9 FT^2 / YD^2 X 2000# / TON

NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

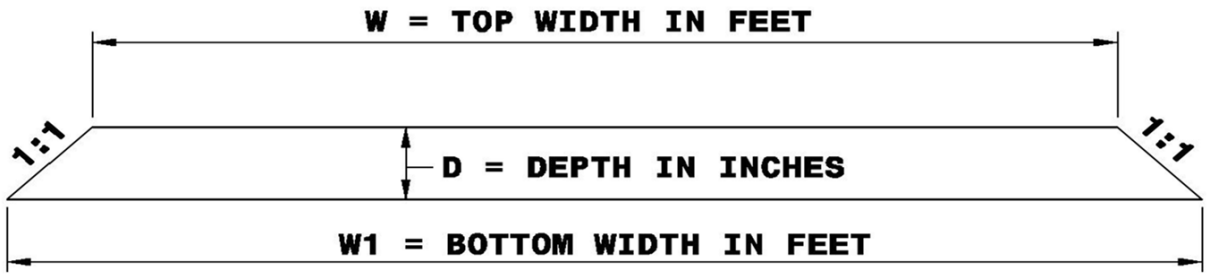
LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - WIDENING							
-L- CL	23+85	24+18		208.33		3	3.89
-L- CL	24+57	27+44		590.82		3	11.03
-L- CL	24+58	27+46		590.98		3	11.03
-L- CL	27+69	27+93		171.35		3	3.20
-L- CL	29+30	29+60		195.00		3	3.64
-Y1- RT	11+04	13+19		1663.61		3	31.05
-Y1- RT	13+39	14+07		856.21		3	15.98
-Y1- RT	14+03	16+09		2174.96		3	40.60
-Y1- RT	16+28	16+61		148.79		3	2.78
-Y1- LT	10+37	12+73		744.63		3	13.90
-Y1- LT	13+08	15+99		725.68		3	13.55
-Y1- LT	16+22	16+48		88.59		3	1.65
-Y1- CL	10+37	10+45		86.73		3	1.62
						SUBTOTAL	153.92

PATTERN 5 = 3", PATTERN 1 = 3" for L, Y2, Y3, Y4 and 1.5" for Y1

6/12/2023

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: DDM **SECTION: 610**

ASPHALT CONCRETE SURFACE COURSE
TYPE S9.5B



CALCULATE:

LENGTH X ((W+W1)/2) X D X 112# / YD^2 / IN = _____ TONS

9 FT^2 / YD^2 X 2000# / TON

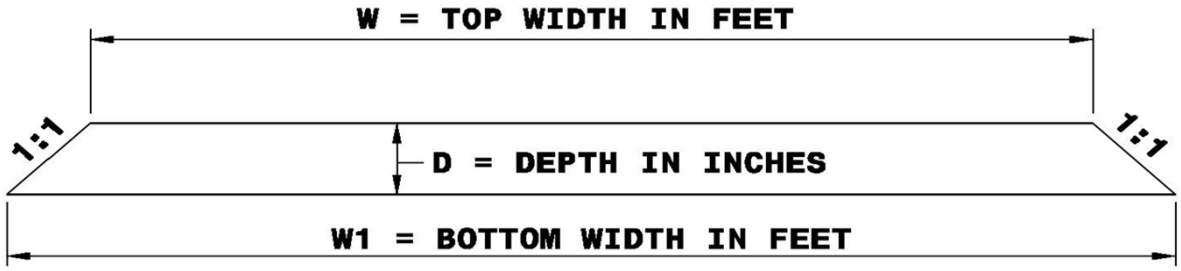
NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - WIDENING							
-Y1- CL	10+39	10+46		59.93		3	1.12
-Y1- CL	10+49	10+59		5.86		3	0.11
-Y1- CL	10+49	11+31		814.95		3	15.21
-Y2- CL	10+84	11+46		313.12		3	5.84
-Y2- RT	10+85	11+80		533.69		3	9.96
-Y2- RT	12+25	13+15		296.42		3	5.53
-Y2- RT	13+27	13+90		237.40		3	4.43
-Y2- RT	14+30	15+21		555.63		3	10.37
-Y2- RT	15+62	16+40		437.56		3	8.17
-Y2- RT	16+60	18+37		740.77		3	13.83
-Y2- LT	18+34	20+55		1090.56		3	20.36
-Y2- RT	21+12	21+55		173.99		3	3.25
-Y2- RT	21+80	22+96		572.27		3	10.68
-Y2- RT	23+20	27+18		2497.85		3	46.63
-Y2- LT	10+85	12+84		665.75		3	12.43
-Y2- LT	13+03	14+90		1579.50		3	29.48
-Y2- LT	15+30	25+71		2336.55		3	43.62
-Y2- LT	25+95	27+32		1362.10		3	25.43
						SUBTOTAL	266.45

PATTERN 5 = 3", PATTERN 1 = 3" for L, Y2, Y3, Y4 and 1.5" for Y1

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: DDM **SECTION: 610**

ASPHALT CONCRETE SURFACE COURSE
TYPE S9.5B



CALCULATE:

LENGTH X ((W+W1)/2) X D X 112# / YD^2 / IN = _____ TONS

9 FT^2 / YD^2 X 2000# / TON

NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

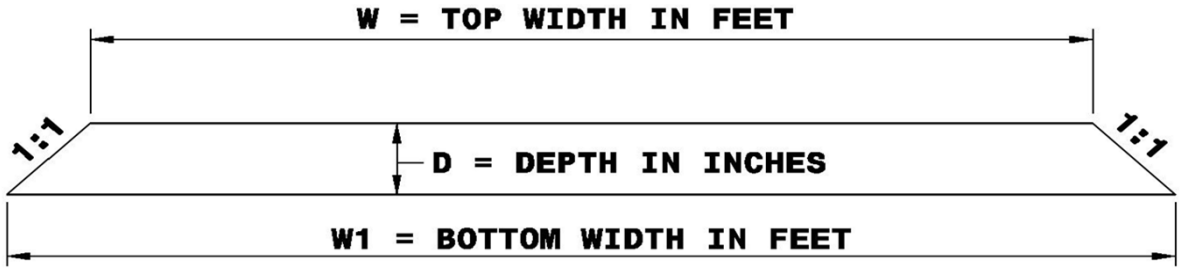
LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - WIDENING							
-Y3- CL	10+84	11+52		331.09		3	6.18
-Y3- RT	11+00	13+13		1482.27		3	27.67
-Y3- RT	13+48	14+19		654.48		3	12.22
-Y3- RT	14+35	17+20		4028.21		3	75.19
-Y3- LT	11+25	12+53		400.80		3	7.48
-Y3- LT	12+79	13+48		985.69		3	18.40
-Y3- LT	13+63	13+94		448.65		3	8.37
-Y3- LT	14+14	15+24		1398.26		3	26.10
-Y3- LT	15+44	17+20		2869.84		3	53.57
-Y4- CL	10+85	12+15		4496.59		3	83.94
-Y4- RT	12+15	12+30		25.60		3	0.48
-Y4- RT	11+42	12+33		203.40		3	3.80
-Y4- LT	12+15	12+85		140.37		3	2.62
-Y5- CL	10+85	12+75		8166.87		3	152.45
-Y5- RT	11+85	12+45		109.71		3	2.05
-RA1- CL	10+00	13+46		703.72		3	13.14
-RA2- CL	10+00	13+46		703.72		3	13.14
						SUBTOTAL	506.80

PATTERN 5 = 3", PATTERN 1 = 3" for L, Y2, Y3, Y4 and 1.5" for Y1

6/12/2023

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: DDM **SECTION: 610**

ASPHALT CONCRETE SURFACE COURSE
TYPE S9.5B



CALCULATE:

LENGTH X ((W+W1)/2) X D X 112# / YD^2 / IN = _____ TONS

9 FT^2 / YD^2 X 2000# / TON

NOTE: IF USING AREA, NO LENGTH OR W1 FIGURE IS NEEDED IN COMPUTATION.

LINE	BEG. STA.	END STA.	LENGTH	AREA / W	W1	DEPTH	TONS
ROADWAY - RESURFACING							
-L- CL	7+00	14+00		48547.31		3	906.22
-L- CL	14+00	18+19		25203.02		3	470.46
-L- LT	19+12	22+91		10236.49		3	191.08
-L- RT	19+42	23+19		14677.24		3	273.98
-L- CL	22+89	28+25		28953.85		3	540.47
-L- CL	28+32	32+66		20780.32		3	387.90
-Y1- CL	10+37	16+80		36192.35		1.5	337.80
-Y2- CL	10+85	27+10		84320.17		3	1573.98
-Y3- CL	11+00	17+20		23258.75		3	434.16
-Y4- CL	12+15	12+85		1312.59		3	24.50
ROADWAY - TEMPORARY PAVEMENT							
-L- CL	24+59	26+04		1237.29		3	23.10
-Y2- RT	15+64	16+38		1065.42		3	19.89
-Y2- LT	18+53	19+06		308.98		3	5.77
-Y3- LT	11+14	11+82		3184.24		3	59.44
WEDGING							1764.00
						SUBTOTAL	7012.75
PATTERN 2 = Temp Pavement						TOTAL	8679.16
						SAY	8680.00

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: ACD **SECTION: 620**

ASPHALT BINDER
FOR PLANT MIX

GRADE PG 64-22

SA-1		**TONS**	**X**	**0.068**	**=**		**TONS**
S4.75A		**TONS**	**X**	**0.070**	**=**		**TONS**
S9.5B	**8,680**	**TONS**	**X**	**0.065**	**=**	**564.20**	**TONS**
S9.5C		**TONS**	**X**	**0.059**	**=**		**TONS**
I19.0C	**10,450**	**TONS**	**X**	**0.048**	**=**	**501.60**	**TONS**
B25.0C	**3,810**	**TONS**	**X**	**0.045**	**=**	**171.45**	**TONS**
PADC, TYPE P-57		**TONS**	**X**	**0.030**	**=**		**TONS**
PADC, TYPE P-78M		**TONS**	**X**	**0.030**	**=**		**TONS**
PATCHING EXISTING PAVEMENT		**TONS**	**X**	**0.048**	**=**		**TONS**

SUBTOTAL TONS ASPHALT BINDER FOR PLANT MIX, GRADE PG 64-22	**=**	**1,237.25**	**TONS**

TOTAL TONS ASPHALT BINDER FOR PLANT MIX	**=**	**1,237.25**	**TONS**
	SAY	**1,240**	**TONS**

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: ACD **SECTION: 654**

REPAIR EXISTING ASPHALT

LINE	STATION	TONS
-L-	9+86.00	11.57
-L-	12+83.00	25.24
-L-	12+94.00	13.58
-L-	13+74.00	27.08
-L-	15+07.00	21.56
-L-	15+21.00	19.98
-L-	17+78.00	13.14
-L-	19+25.00	13.14
-L-	20+42.00	22.61
-L-	20+90.00	13.67
-L-	20+90.00	21.03
-L-	21+36.00	43.64
-L-	23+66.00	8.41
-L-	23+87.00	25.53
-L-	24+05.00	23.35
-L-	24+05.00	16.84
-L-	25+48.00	15.25
-L-	25+48.00	13.67
-L-	26+42.00	21.22
-L-	29+92.00	12.97
-L-	29+92.00	14.66
-L-	30+38.00	47.32
-L-	31+04.00	28.92
-Y1-	12+88.00	28.39
-Y1-	13+28.00	12.09
-Y1-	13+45.00	18.4
-Y1-	14+22.00	16.84
-Y1-	15+83.00	16.82
-Y1-	16+19.00	13.85
-Y1-	16+22.00	22.81
-Y1-	19+88.00	15.11
-Y1-	11+76.00-20+00.00	402.48
-Y2-	11+87.00	8.41
-Y2-	12+11.00	15.25
-Y2-	12+63.00	29.44
-Y2-	13+21.00	13.14
-Y2-	14+09.00	28.39
-Y2-	15+39.00	24.19
-Y2-	15+71.00	19.98
-Y2-	16+51.00	17.35
-Y2-	17+17.00	19.45
-Y2-	19+71.00	22.61
-Y2-	20+88.00	42.06
-Y2-	21+71.00	17.35
-Y2-	23+10.00	24.19
-Y2-	24+18.00	22.61
	SUBTOTAL	1325.59

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: ACD **SECTION: 654**

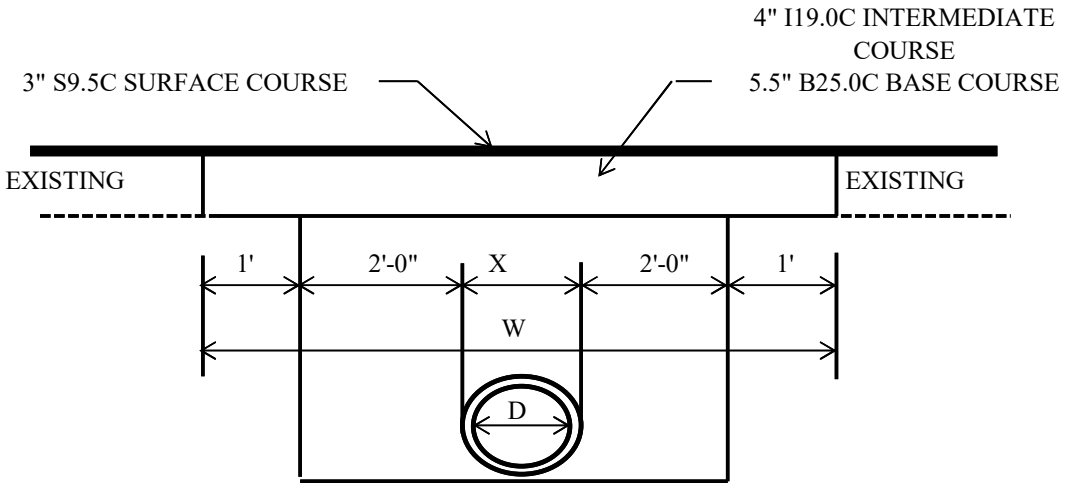
REPAIR EXISTING ASPHALT

LINE	STATION	TONS
-Y3-	13+30.00	27.34
-Y3-	13+82.00	16.5
-Y3-	14+04.00	13.67
-Y3-	14+26.00	12.09
-Y4-	12+30.00	12.09
	SUBTOTAL	81.69
	TOTAL	1652.35
	SAY	**1740**

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 09+86.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-L- WIDTH = 22 ft

LxW = 166.8333 sf

Surface Course in Tons = 3.114222

Intermediate Course in Tons = 4.226444

Base Course in Tons = 4.226444

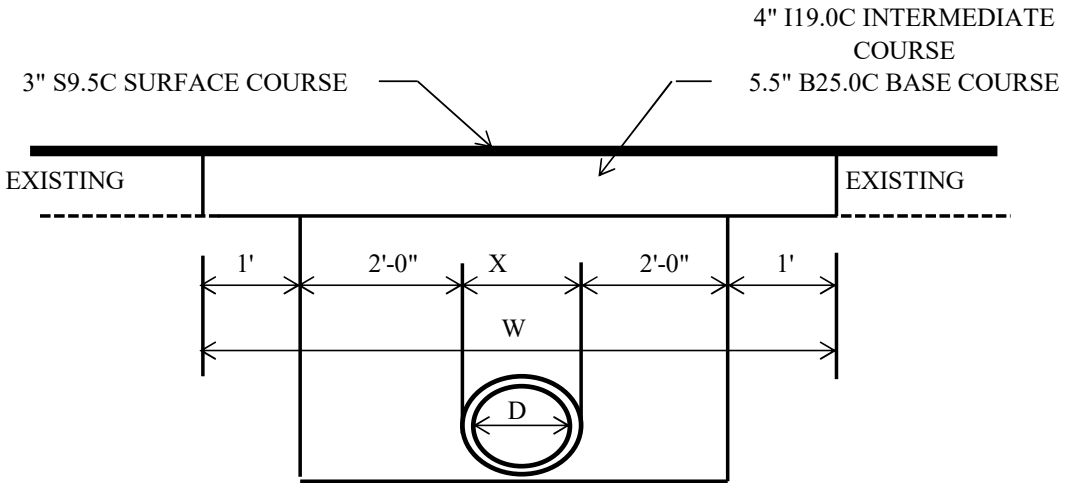
Subtotal 11.57

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 12+83.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-L- WIDTH = 48 ft

LxW = 364 sf

Surface Course in Tons = 6.794666

Intermediate Course in Tons = 9.221333

Base Course in Tons = 9.221333

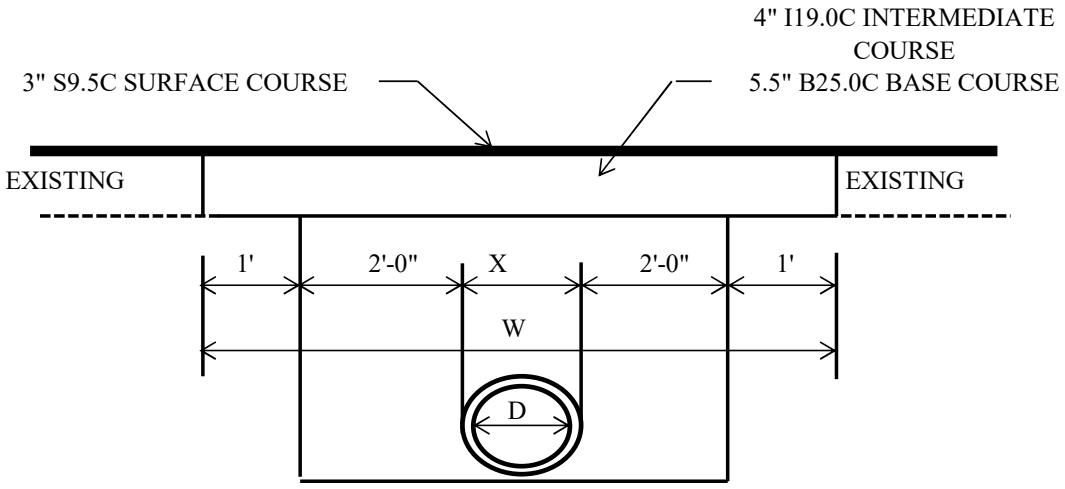
Subtotal 25.24

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 12+94.00

D = 18 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.833333 ft W = 7.833333 ft

L = '-L- WIDTH = 25 ft

LxW = 195.8333 sf

Surface Course in Tons = 3.655555

Intermediate Course in Tons = 4.961111

Base Course in Tons = 4.961111

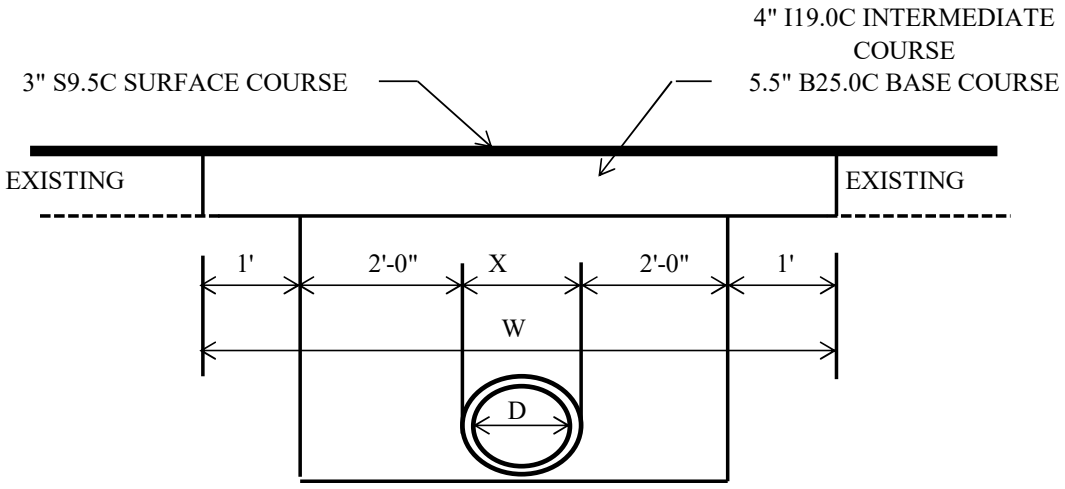
Subtotal 13.58

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 29+92.00

D = 18 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.833333 ft W = 7.833333 ft

L = '-L- WIDTH = 27 ft

LxW = 211.5 sf

Surface Course in Tons = 3.948

Intermediate Course in Tons = 5.358

Base Course in Tons = 5.358

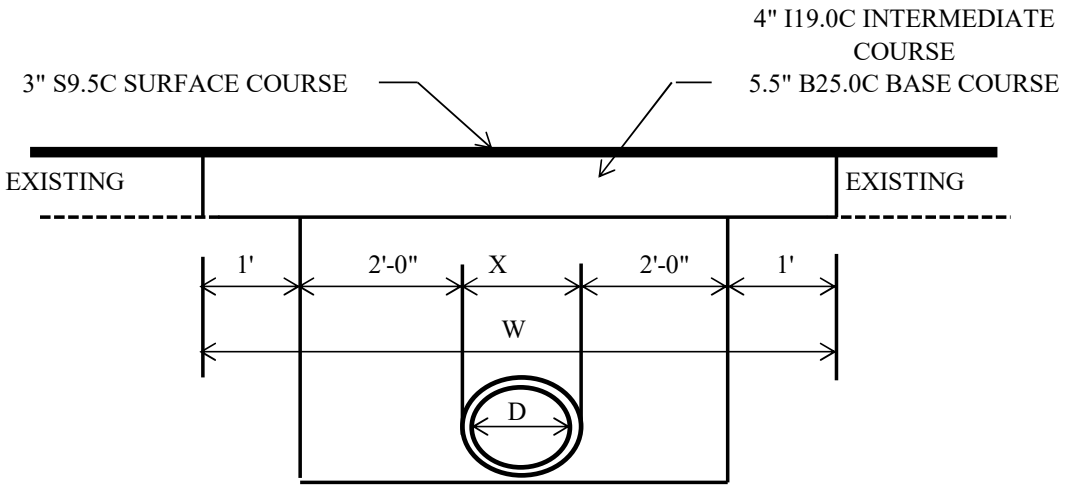
Subtotal 14.66

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 13+74.00

D = 30 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 3.08333 ft W = 9.08333 ft

L = '-L- WIDTH = 43 ft

LxW = 390.5832 sf

Surface Course in Tons = 7.290886

Intermediate Course in Tons = 9.894774

Base Course in Tons = 9.894774

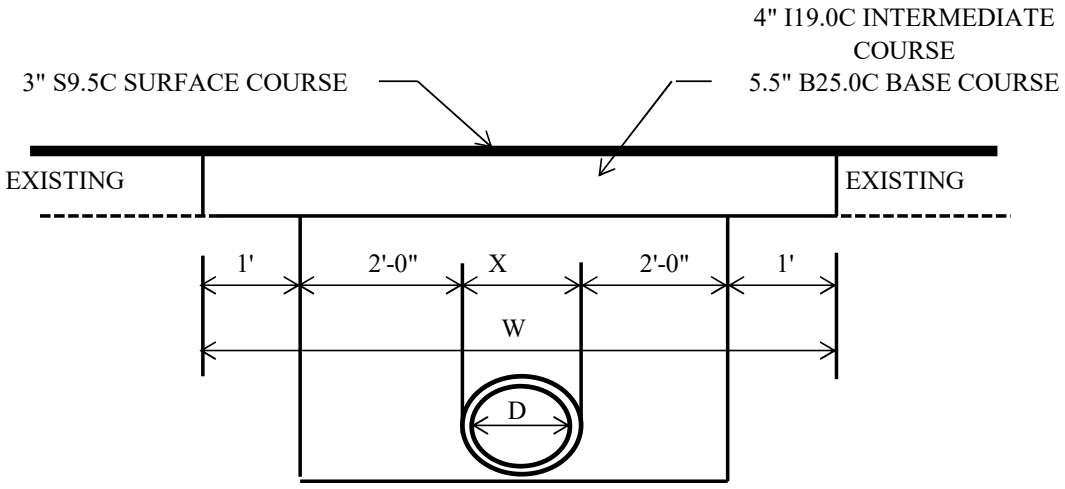
Subtotal 27.08

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 15+07.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-L- WIDTH = 41 ft

LxW = 310.9167 sf

Surface Course in Tons = 5.803778

Intermediate Course in Tons = 7.876555

Base Course in Tons = 7.876555

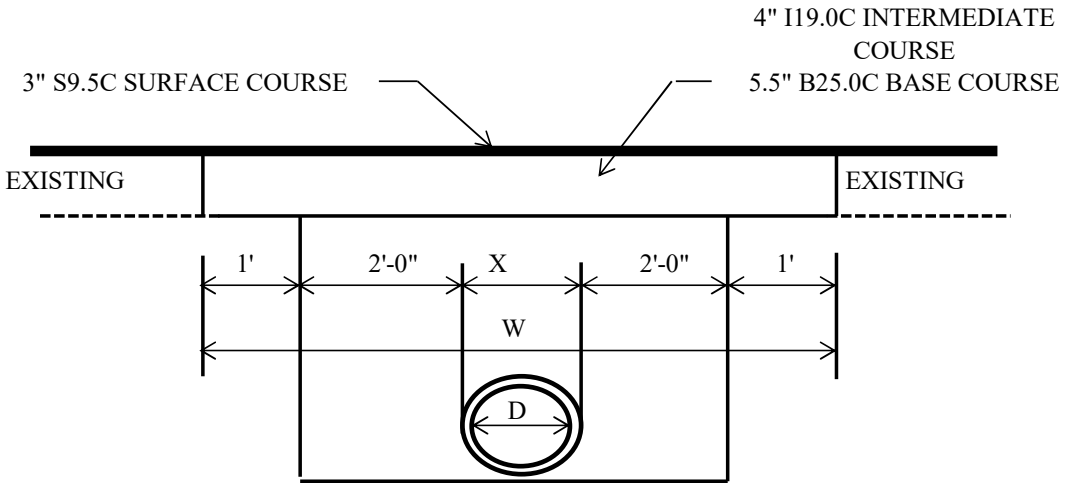
Subtotal 21.56

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 15+21.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 Surface Course

L = '-L- WIDTH = 38 ft

LxW = 288.1667 sf

Surface Course in Tons = 5.379111

Intermediate Course in Tons = 7.300222

Base Course in Tons = 7.300222

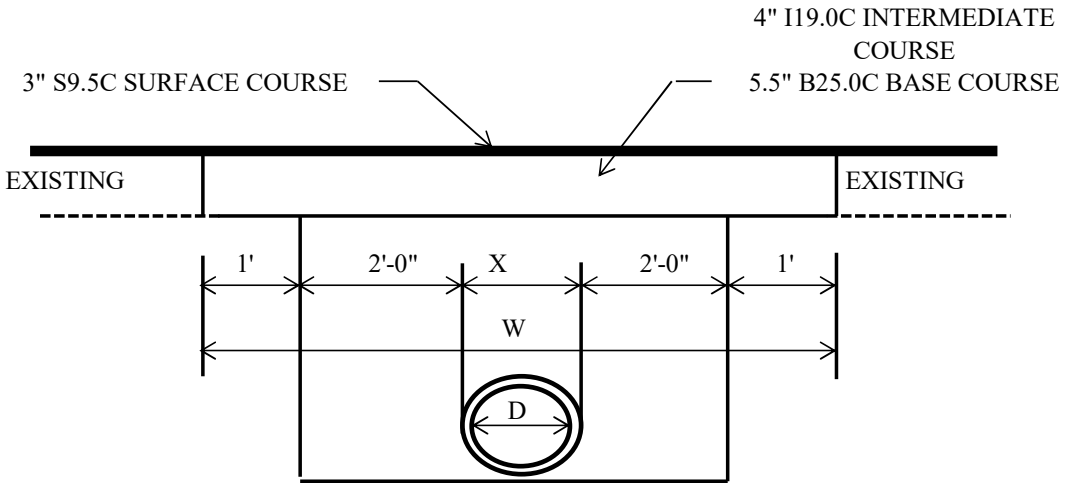
Subtotal 19.98

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 17+78.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-L- WIDTH = 25 ft

LxW = 189.5833 sf

Surface Course in Tons = 3.538889

Intermediate Course in Tons = 4.802778

Base Course in Tons = 4.802778

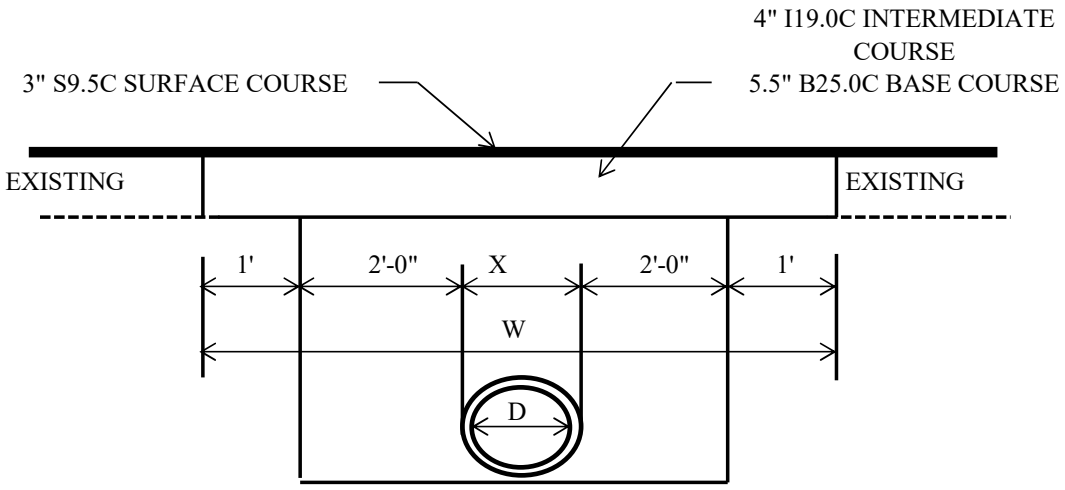
Subtotal 13.14

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 19+25.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-L- WIDTH = 25 ft

LxW = 189.5833 sf

Surface Course in Tons = 3.538889

Intermediate Course in Tons = 4.802778

Base Course in Tons = 4.802778

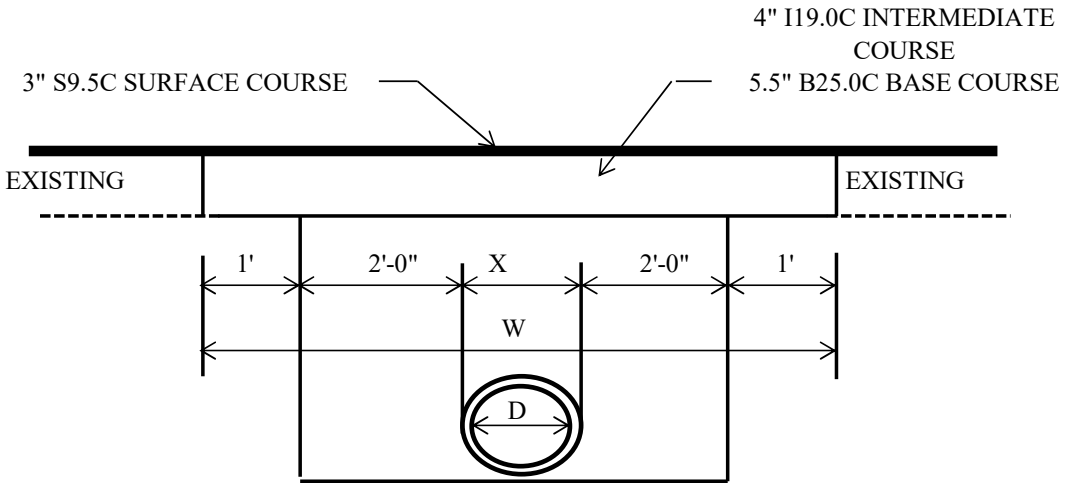
Subtotal 13.14

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 20+42.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-L- WIDTH = 43 ft

LxW = 326.0833 sf

Surface Course in Tons = 6.086889

Intermediate Course in Tons = 8.260777

Base Course in Tons = 8.260777

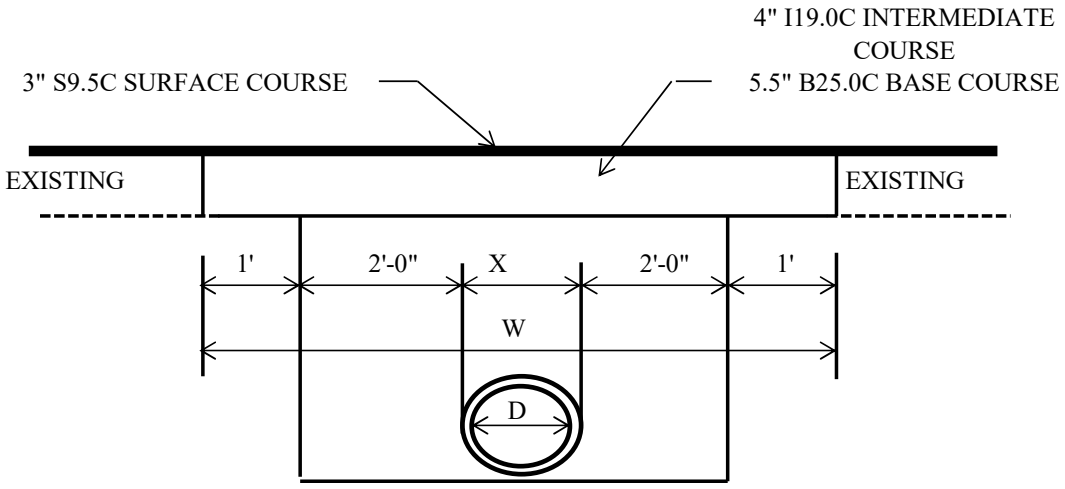
Subtotal 22.61

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 20+90.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-L- WIDTH = 26 ft

LxW = 197.1667 sf

Surface Course in Tons = 3.680444

Intermediate Course in Tons = 4.994889

Base Course in Tons = 4.994889

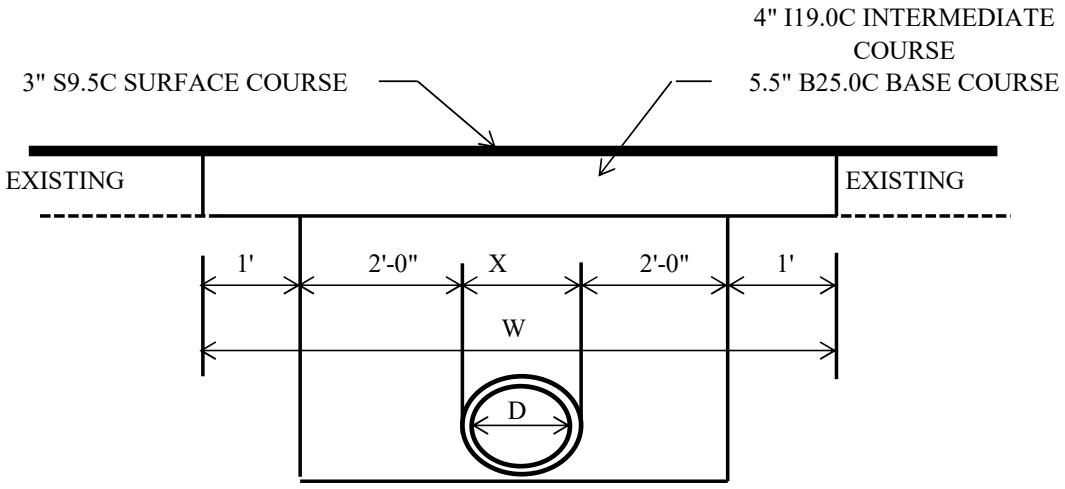
Subtotal 13.67

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 21+36.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-L- WIDTH = 83 ft

LxW = 629.4166 sf

Surface Course in Tons = 11.74911

Intermediate Course in Tons = 15.94522

Base Course in Tons = 15.94522

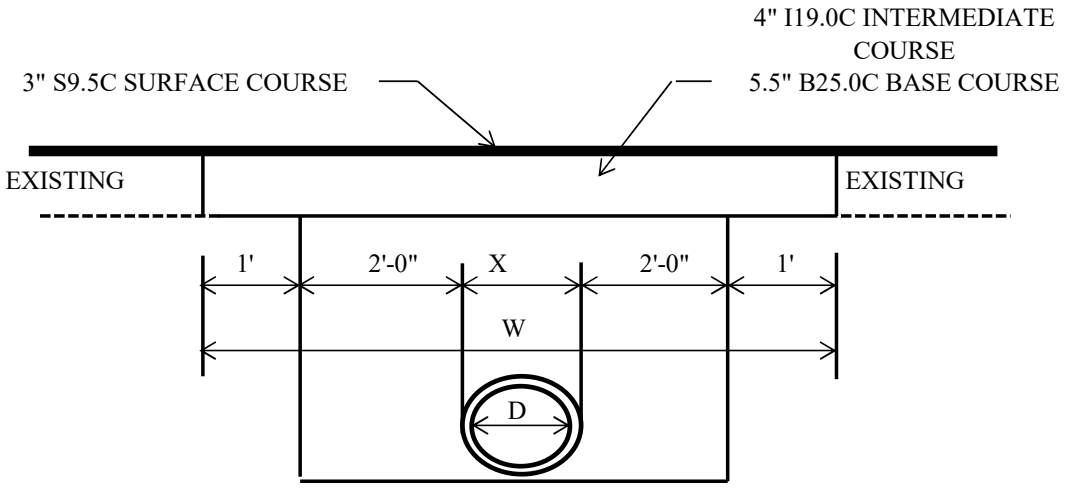
Subtotal 43.64

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 30+38.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-L- WIDTH = 90 ft

LxW = 682.5 sf

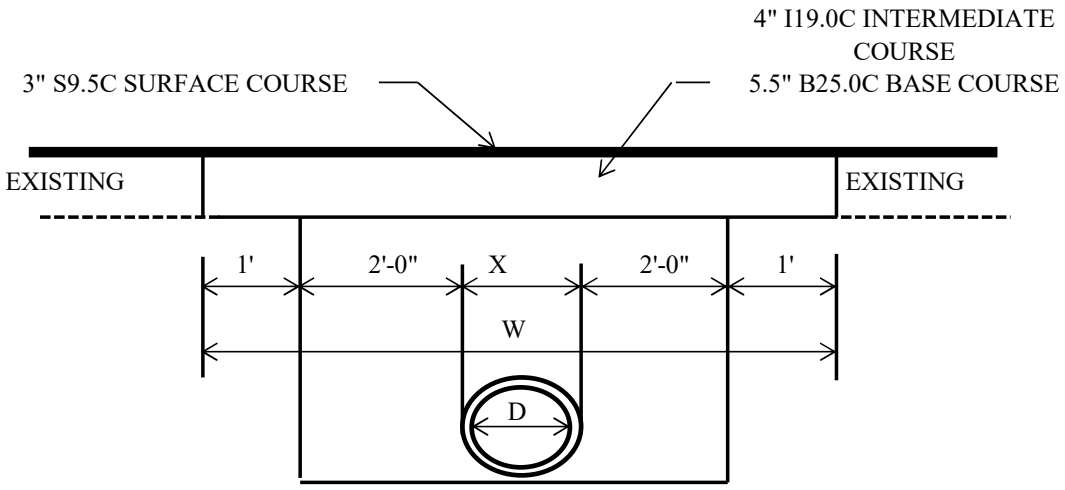
Surface Course in Tons =	12.74
Intermediate Course in Tons =	17.29
Base Course in Tons =	17.29
Subtotal	47.32

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 23+66.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-L- WIDTH = 16 ft

LxW = 121.3333 sf

Surface Course in Tons = 2.264889

Intermediate Course in Tons = 3.073778

Base Course in Tons = 3.073778

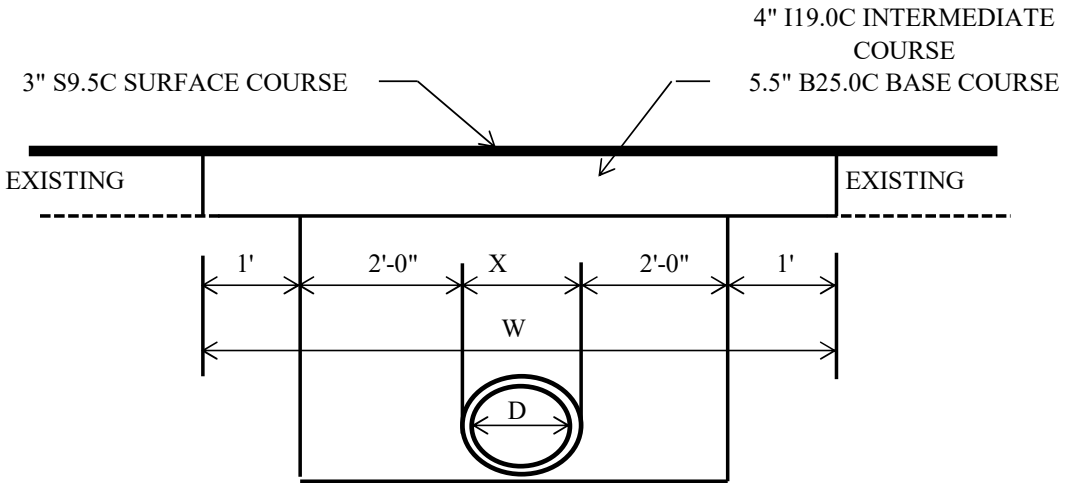
Subtotal 8.41

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 23+87.00

D = 18 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.833333 ft W = 7.833333 ft

L = '-L- WIDTH = 47 ft

LxW = 368.1667 sf

Surface Course in Tons = 6.872444

Intermediate Course in Tons = 9.326888

Base Course in Tons = 9.326888

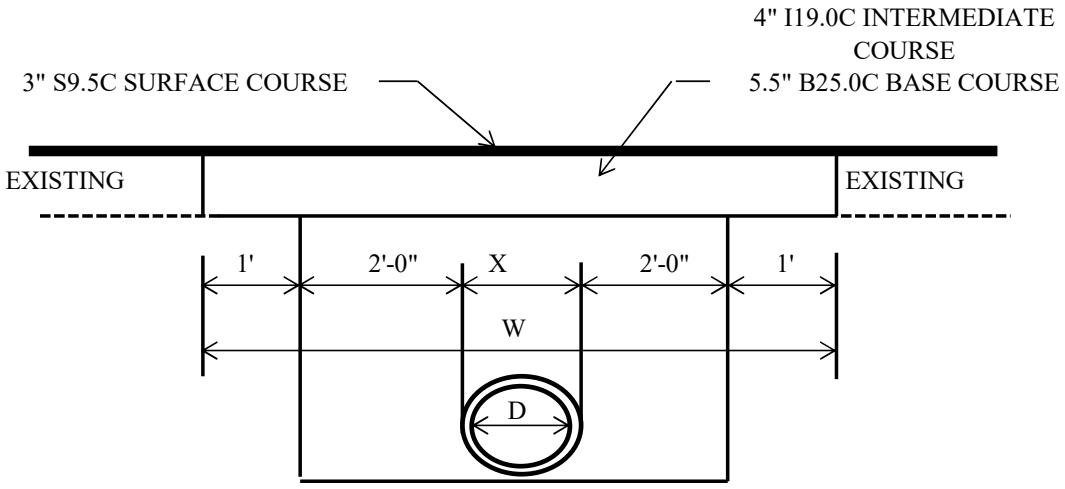
Subtotal 25.53

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 24+05.00

D = 18 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.833333 ft W = 7.833333 ft

L = '-L- WIDTH = 43 ft

LxW = 336.8333 sf

Surface Course in Tons = 6.287555

Intermediate Course in Tons = 8.533111

Base Course in Tons = 8.533111

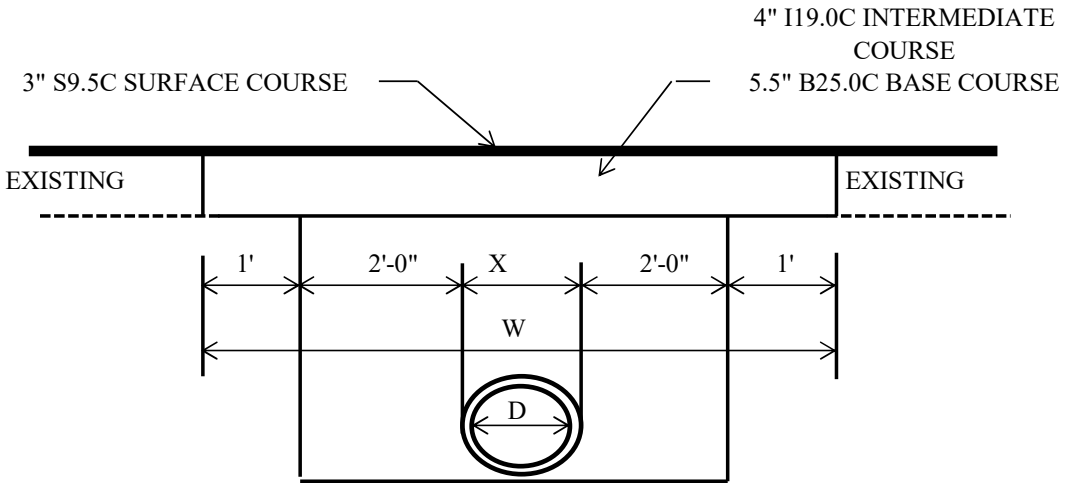
Subtotal 23.35

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 24+05.00

D = 18 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.833333 ft W = 7.833333 ft

L = '-L- WIDTH = 31 ft

LxW = 242.8333 sf

Surface Course in Tons = 4.532889

Intermediate Course in Tons = 6.151778

Base Course in Tons = 6.151778

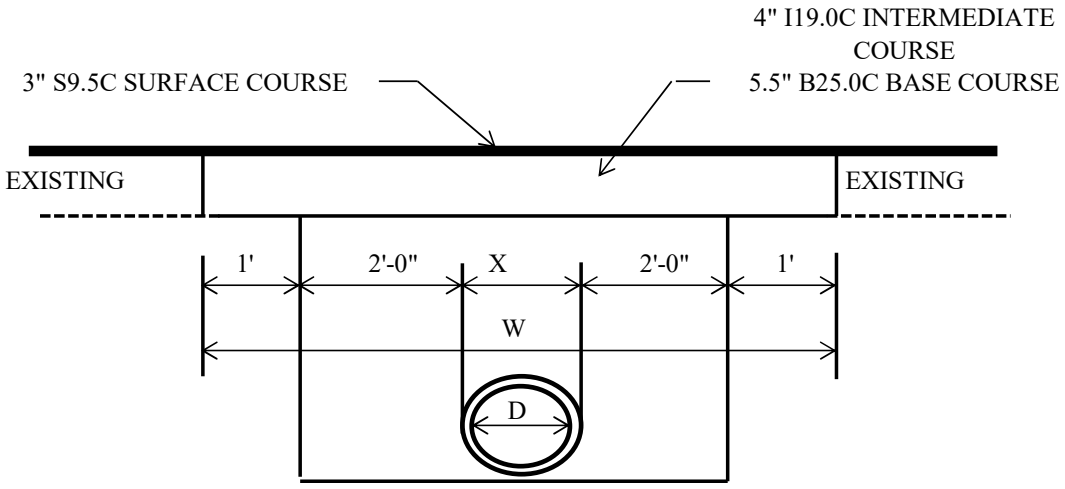
Subtotal 16.84

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 31+04.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-L- WIDTH = 55 ft

LxW = 417.0833 sf

Surface Course in Tons = 7.785555

Intermediate Course in Tons = 10.56611

Base Course in Tons = 10.56611

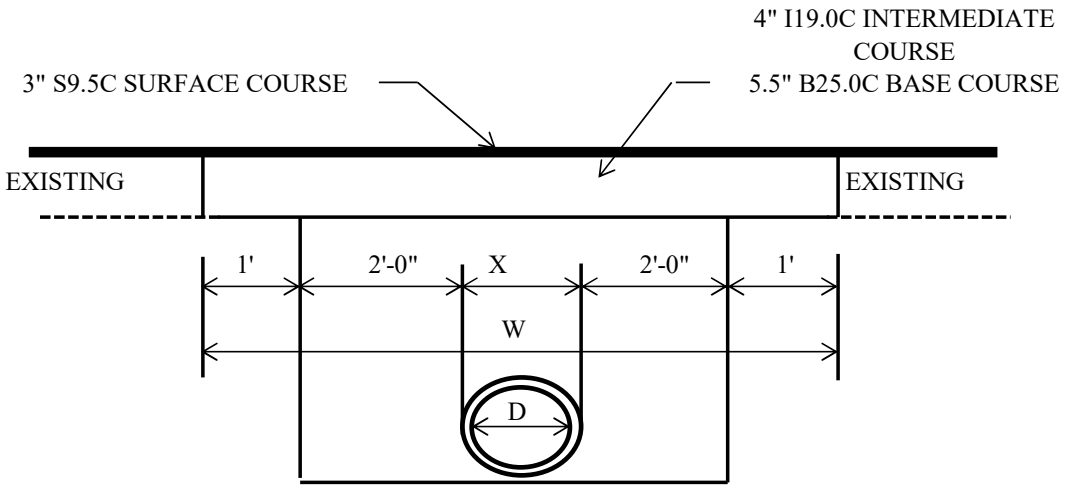
Subtotal 28.92

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 25+48.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-L- WIDTH = 29 ft

LxW = 219.9167 sf

Surface Course in Tons = 4.105111

Intermediate Course in Tons = 5.571222

Base Course in Tons = 5.571222

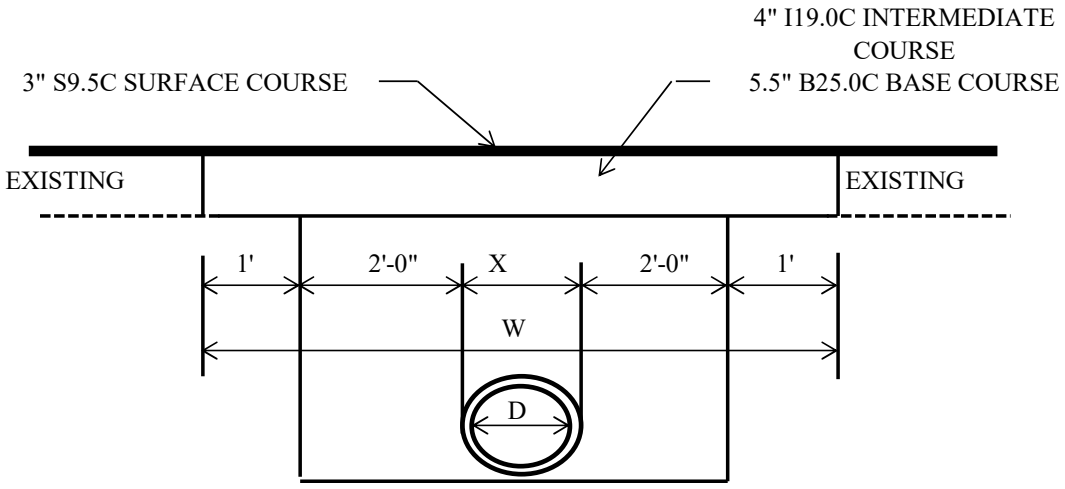
Subtotal 15.25

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 25+48.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-L- WIDTH = 26 ft

LxW = 197.1667 sf

Surface Course in Tons = 3.680444

Intermediate Course in Tons = 4.994889

Base Course in Tons = 4.994889

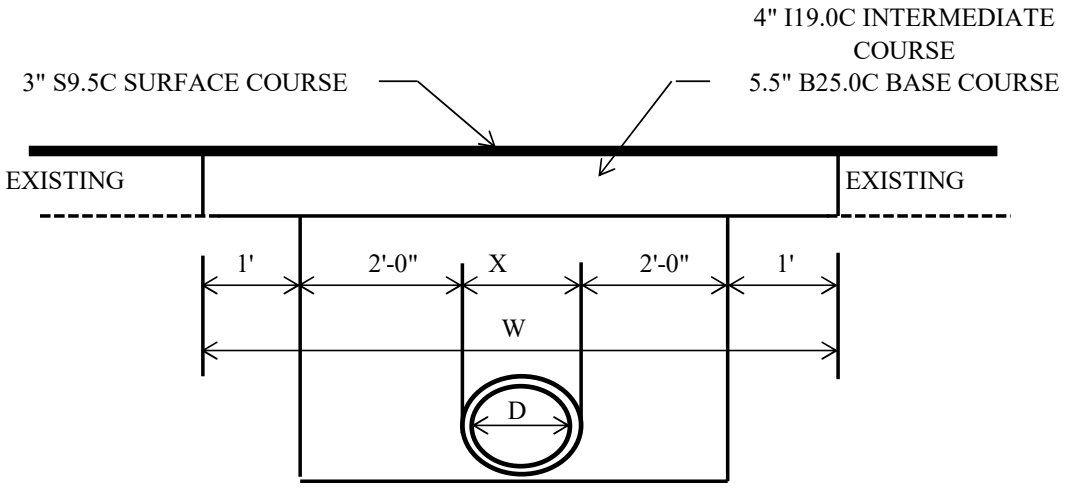
Subtotal 13.67

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 26+42.00

D = 24 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 2.5 ft W = 8.5 ft

L = '-L- WIDTH = 36 ft

LxW = 306 sf

Surface Course in Tons = 5.712

Intermediate Course in Tons = 7.752

Base Course in Tons = 7.752

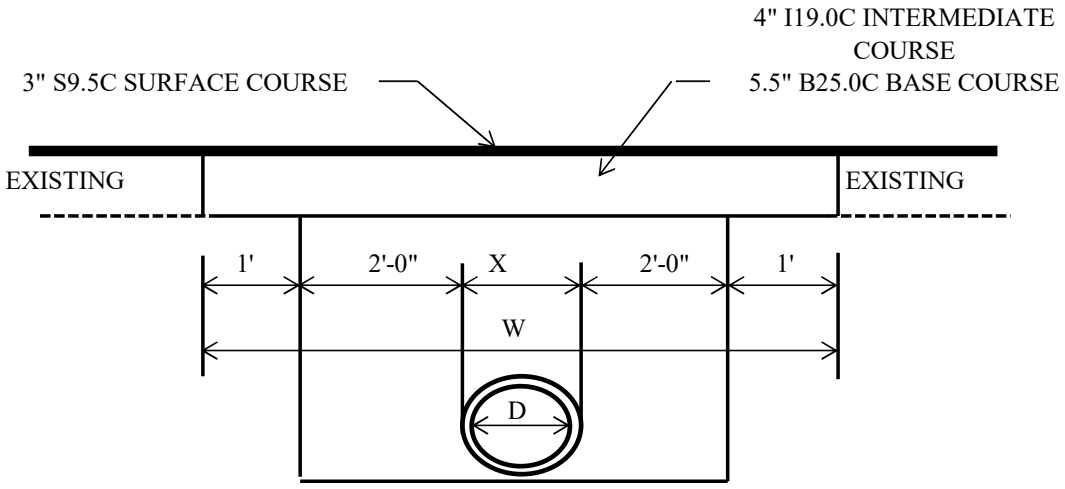
Subtotal 21.22

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 29+92.00

D = 24 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 2.5 ft W = 8.5 ft

L = '-L- WIDTH = 22 ft

LxW = 187 sf

Surface Course in Tons = 3.490667

Intermediate Course in Tons = 4.737333

Base Course in Tons = 4.737333

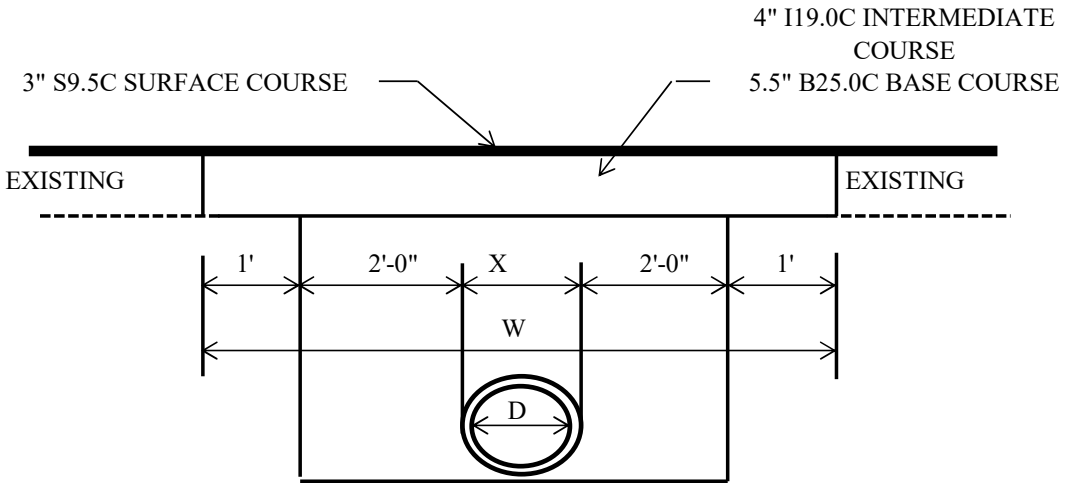
Subtotal 12.97

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-L- STA. 20+90.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-L- WIDTH = 40 ft

LxW = 303.3333 sf

Surface Course in Tons = 5.662222

Intermediate Course in Tons = 7.684444

Base Course in Tons = 7.684444

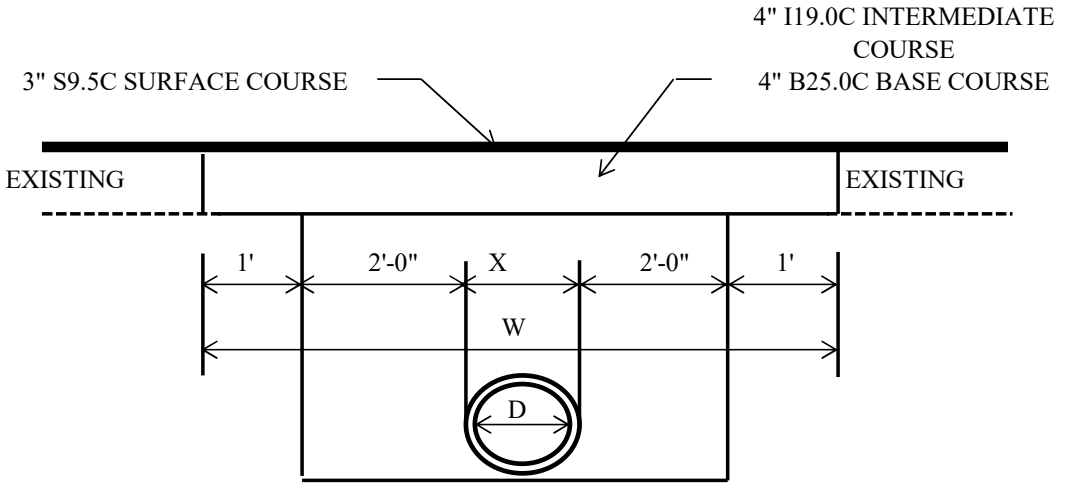
Subtotal 21.03

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y1- STA. 12+88.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y1- WIDTH = 54 ft

LxW = 409.5 sf

Surface Course in Tons = 7.644

Intermediate Course in Tons = 10.374

Base Course in Tons = 10.374

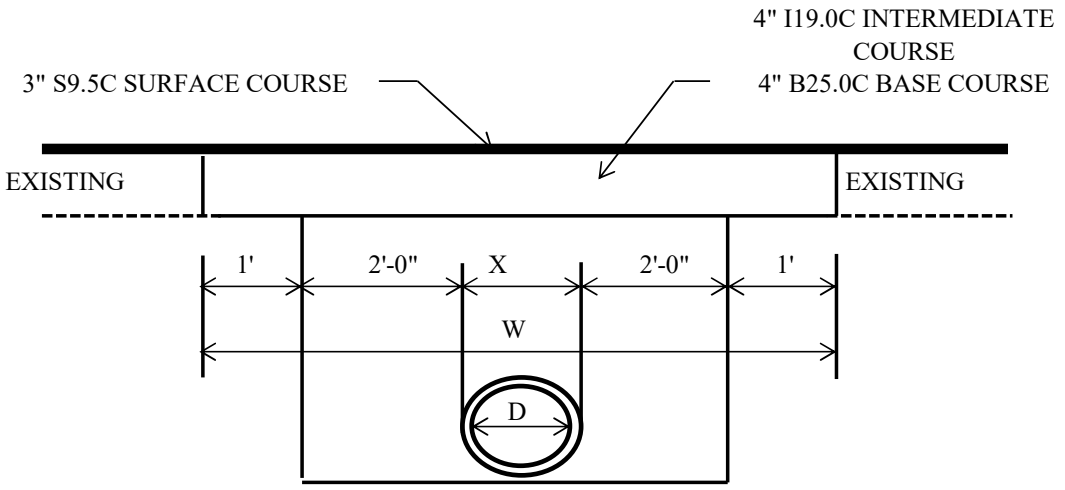
Subtotal 28.39

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y1- STA. 13+28.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y1- WIDTH = 23 ft

LxW = 174.4167 sf

Surface Course in Tons = 3.255778

Intermediate Course in Tons = 4.418555

Base Course in Tons = 4.418555

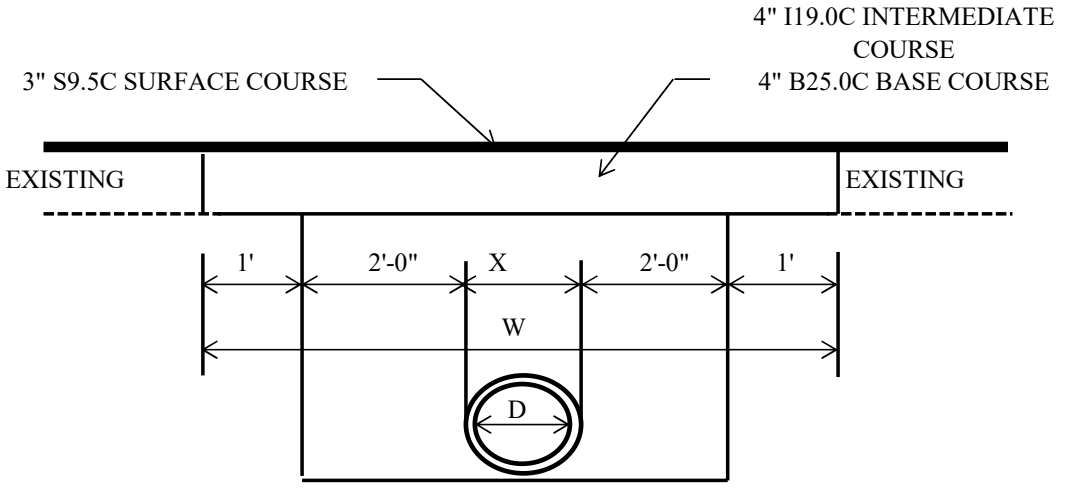
Subtotal 12.09

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y1- STA. 13+45.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y1- WIDTH = 35 ft

LxW = 265.4167 sf

Surface Course in Tons = 4.954444

Intermediate Course in Tons = 6.723889

Base Course in Tons = 6.723889

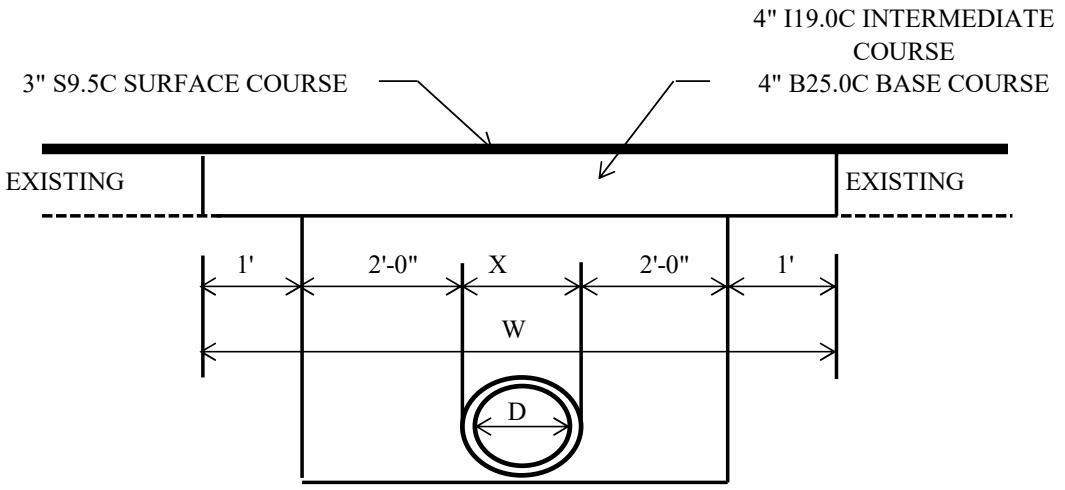
Subtotal 18.40

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y1- STA. 14+22.00

D = 18 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.833333 ft W = 7.833333 ft

L = '-Y1- WIDTH = 31 ft

LxW = 242.8333 sf

Surface Course in Tons = 4.532889

Intermediate Course in Tons = 6.151778

Base Course in Tons = 6.151778

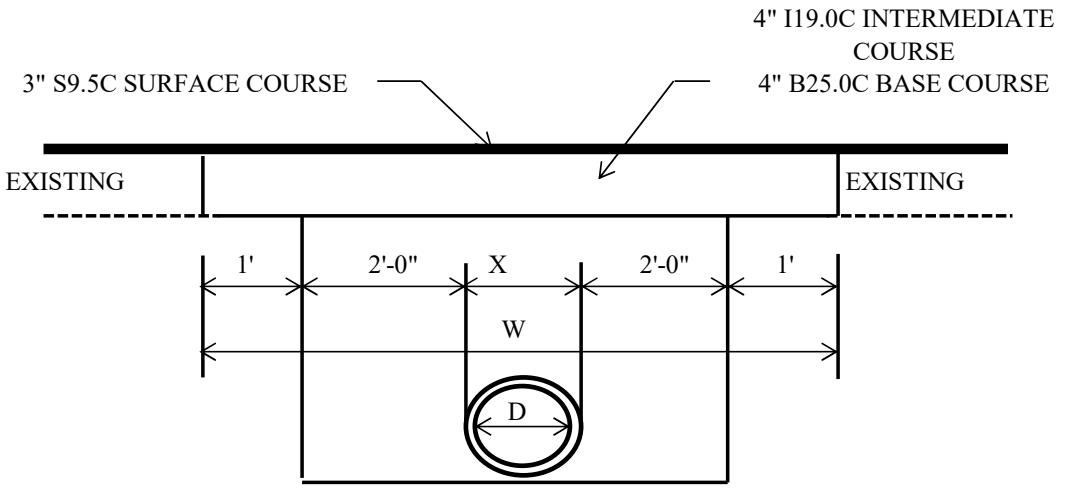
Subtotal 16.84

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y1- STA. 15+83.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y1- WIDTH = 32 ft

LxW = 242.6667 sf

Surface Course in Tons = 4.529778

Intermediate Course in Tons = 6.147555

Base Course in Tons = 6.147555

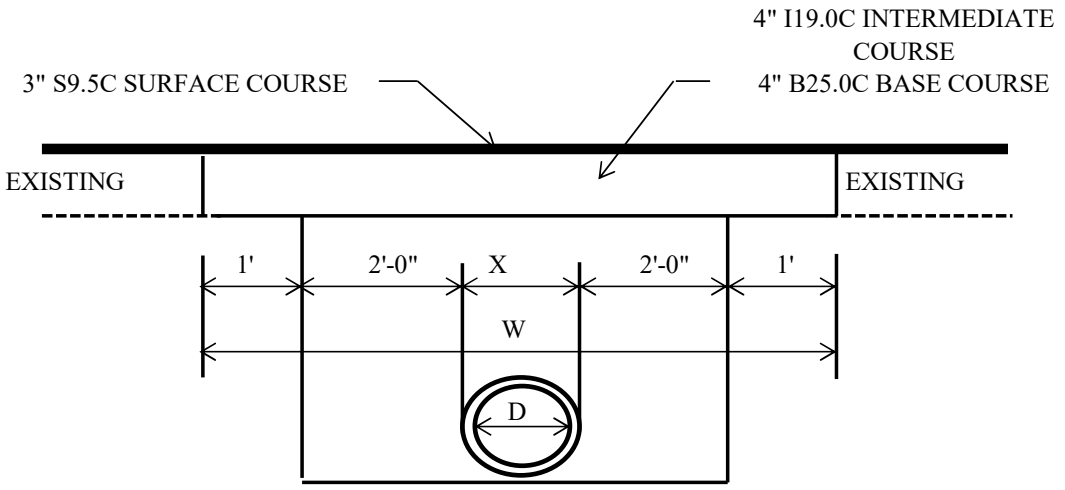
Subtotal 16.82

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y1- STA. 16+22.00

D = 18 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.833333 ft W = 7.833333 ft

L = '-Y1- WIDTH = 42 ft

LxW = 329 sf

Surface Course in Tons = 6.141333

Intermediate Course in Tons = 8.334666

Base Course in Tons = 8.334666

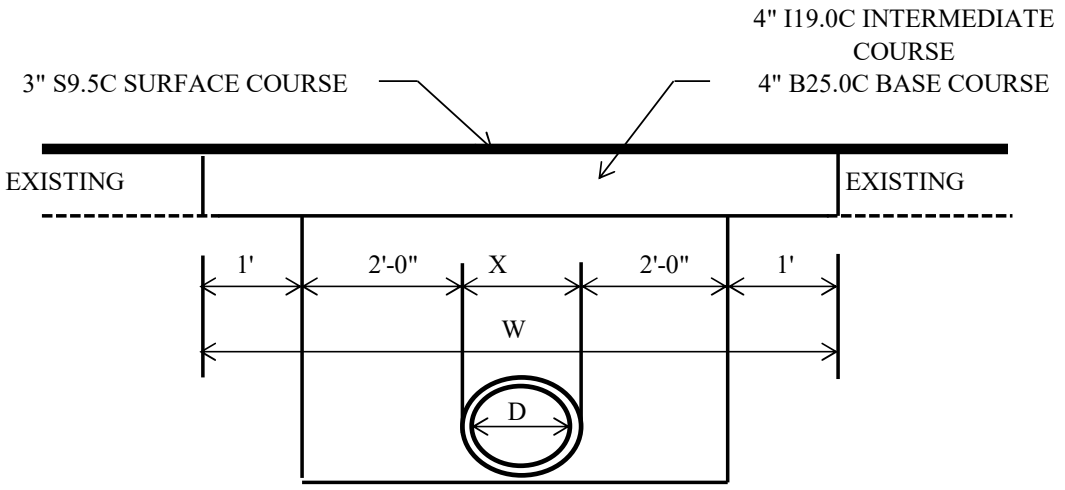
Subtotal 22.81

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y1- STA. 16+19.00

D = 24 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 2.5 ft W = 8.5 ft

L = '-Y1- WIDTH = 23 ft

LxW = 195.5 sf

Surface Course in Tons = 3.649333

Intermediate Course in Tons = 4.952667

Base Course in Tons = 4.952667

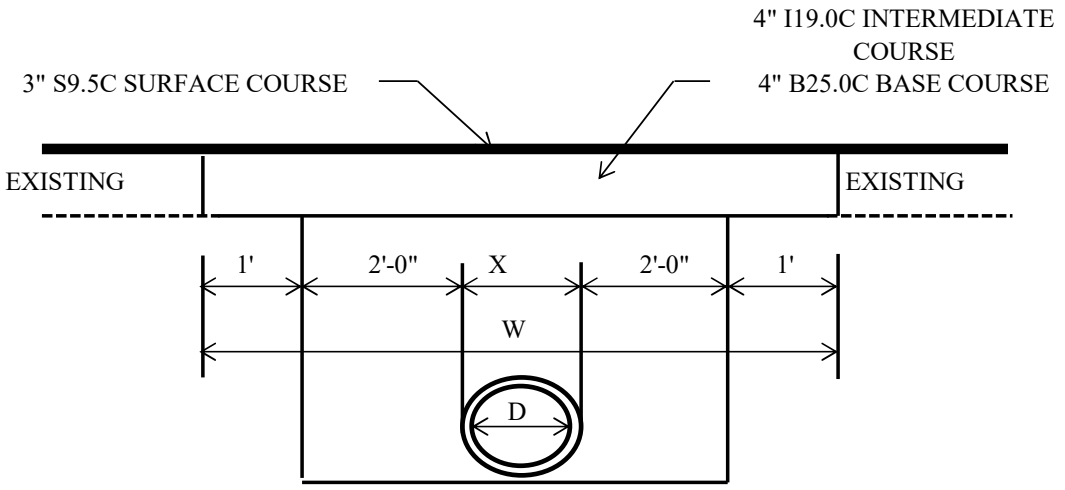
Subtotal 13.55

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y1- STA. 19+88.00

D = 30 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 3.08333 ft W = 9.08333 ft

L = '-Y1- WIDTH = 24 ft

LxW = 217.9999 sf

Surface Course in Tons = 4.069332

Intermediate Course in Tons = 5.522665

Base Course in Tons = 5.522665

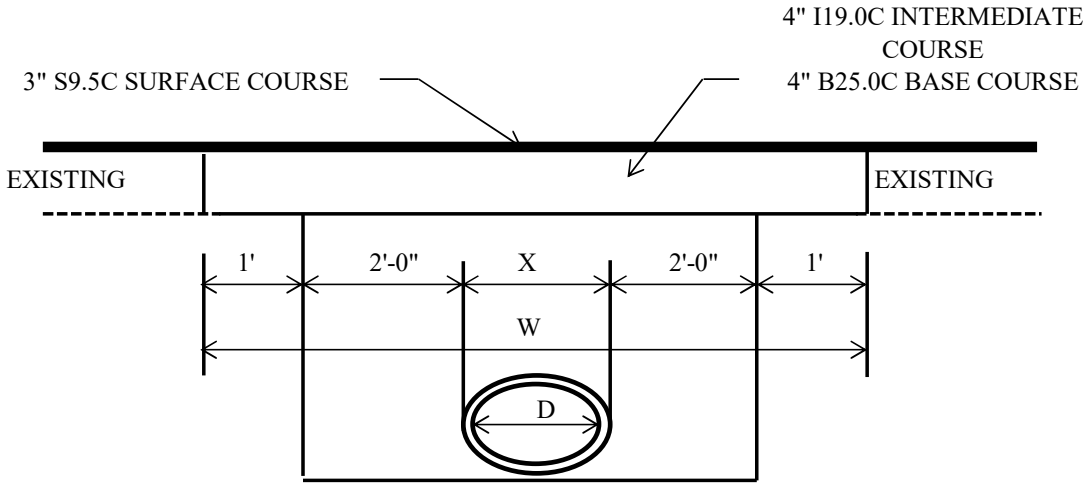
Subtotal 15.11

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y1- STA. 11+76.00 - 19+86.00

D = 10 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.16666 ft W = 7.166660 ft

L = '-Y1- WIDTH = 810 ft

LxW = 5804.995 sf

Surface Course in Tons = 108.3599

Intermediate Course in Tons = 147.0599

Base Course in Tons = 147.0599

Subtotal 402.48

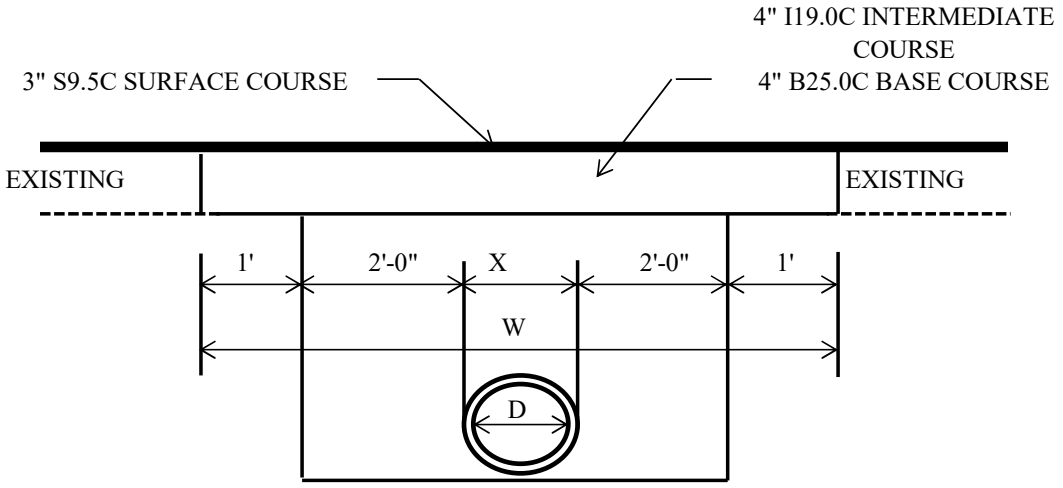
Waterline

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y2- STA. 11+87.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y2- WIDTH = 16 ft

LxW = 121.3333 sf

Surface Course in Tons = 2.264889

Intermediate Course in Tons = 3.073778

Base Course in Tons = 3.073778

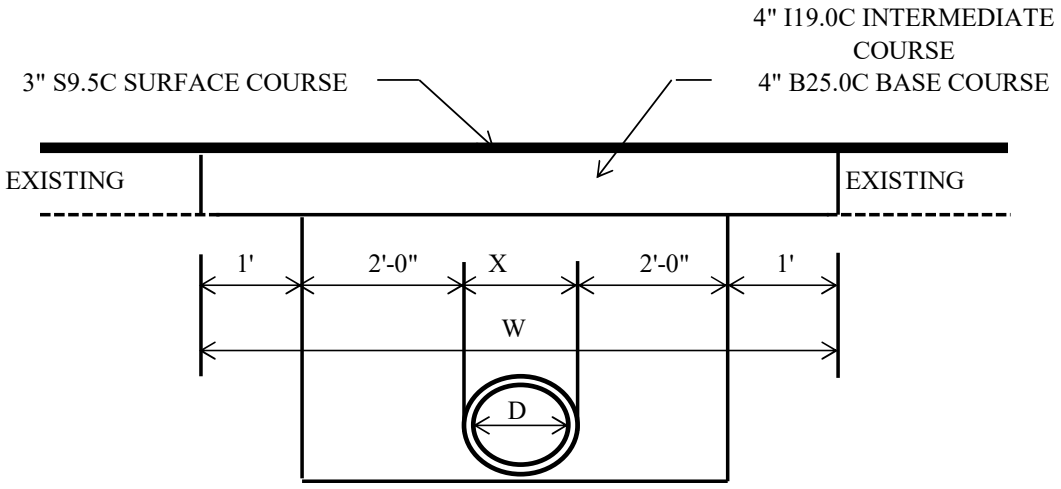
Subtotal 8.41

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y2- STA. 12+11.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y2- WIDTH = 29 ft

LxW = 219.9167 sf

Surface Course in Tons = 4.105111

Intermediate Course in Tons = 5.571222

Base Course in Tons = 5.571222

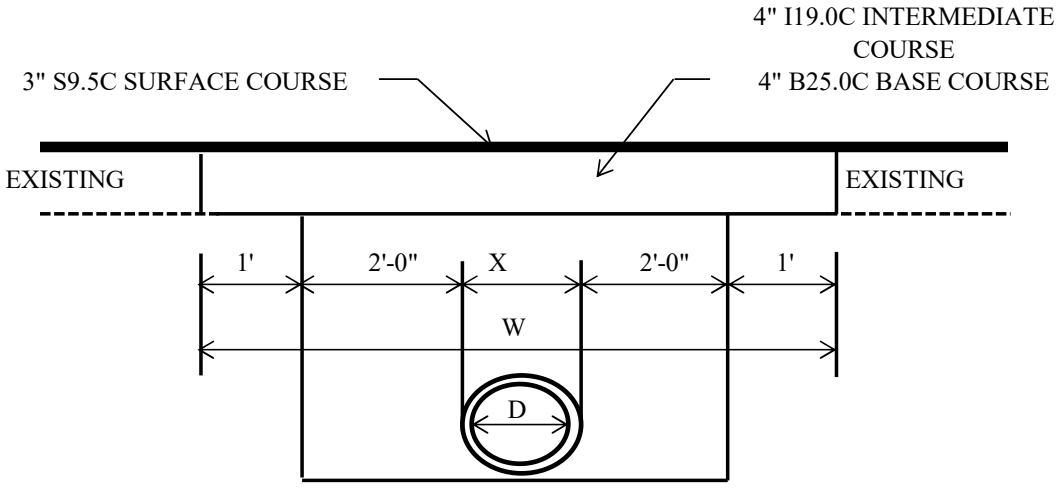
Subtotal 15.25

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y2- STA. 12+63.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y2- WIDTH = 56 ft

LxW = 424.6666 sf

Surface Course in Tons = 7.927111

Intermediate Course in Tons = 10.75822

Base Course in Tons = 10.75822

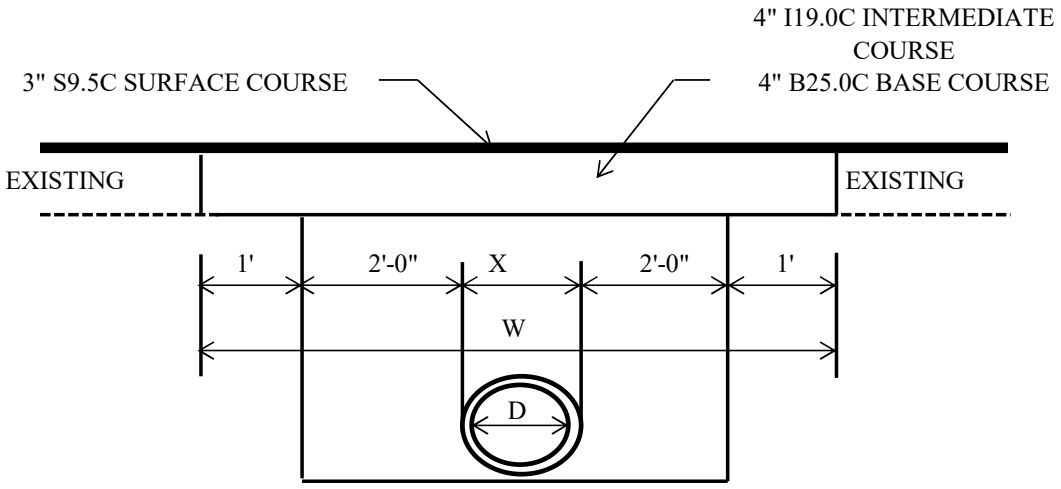
Subtotal 29.44

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y2- STA. 13+21.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y2- WIDTH = 25 ft

LxW = 189.5833 sf

Surface Course in Tons = 3.538889

Intermediate Course in Tons = 4.802778

Base Course in Tons = 4.802778

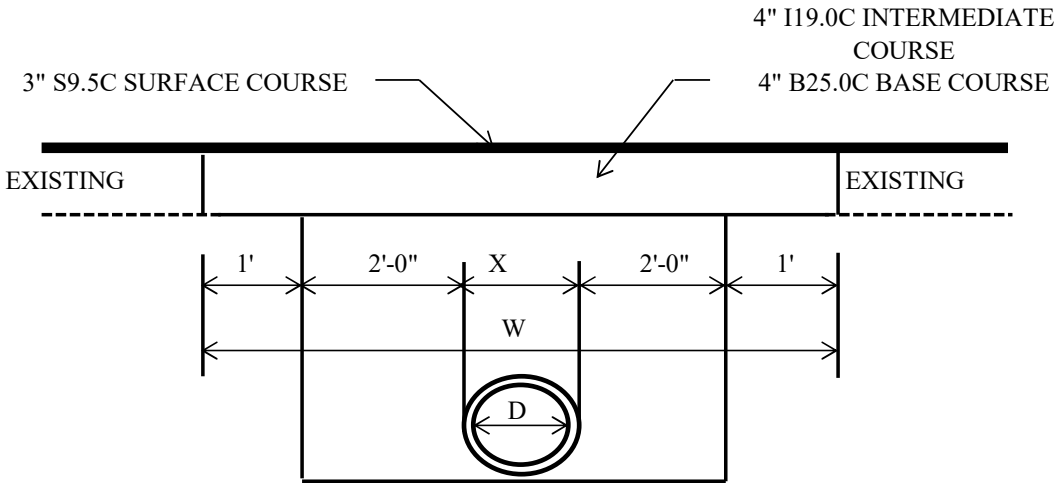
Subtotal 13.14

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y2- STA. 14+09.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y2- WIDTH = 54 ft

LxW = 409.5 sf

Surface Course in Tons = 7.644

Intermediate Course in Tons = 10.374

Base Course in Tons = 10.374

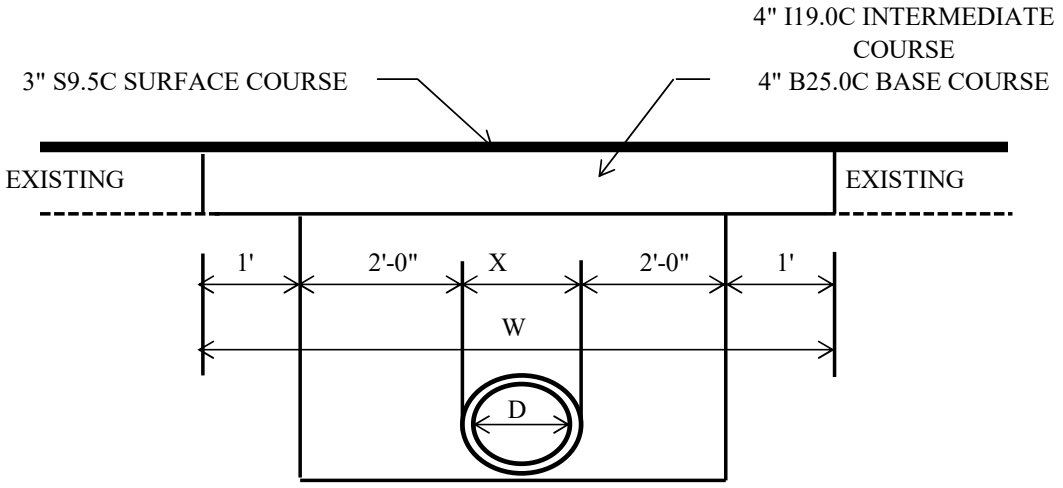
Subtotal 28.39

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y2- STA. 15+39.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y2- WIDTH = 46 ft

LxW = 348.8333 sf

Surface Course in Tons = 6.511555

Intermediate Course in Tons = 8.837111

Base Course in Tons = 8.837111

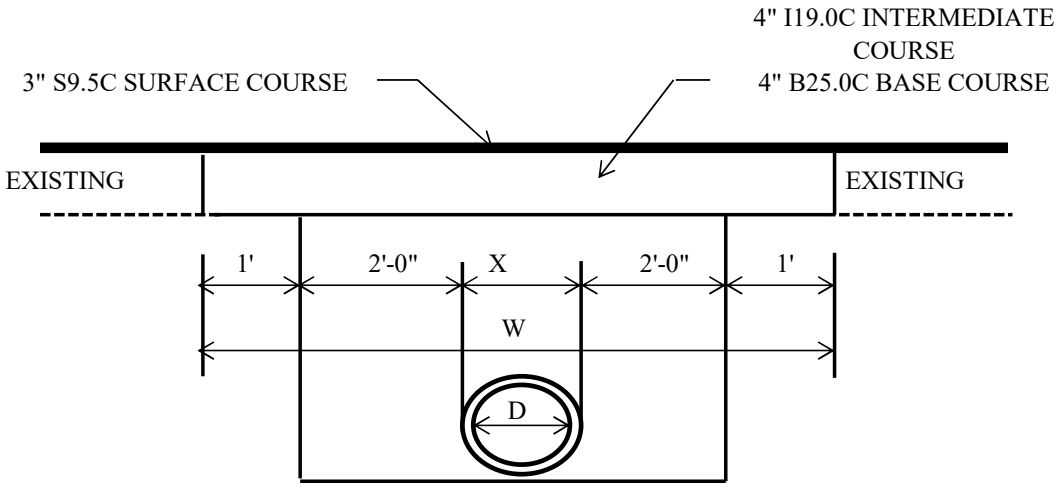
Subtotal 24.19

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y2- STA. 15+71.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y2- WIDTH = 38 ft

LxW = 288.1667 sf

Surface Course in Tons = 5.379111

Intermediate Course in Tons = 7.300222

Base Course in Tons = 7.300222

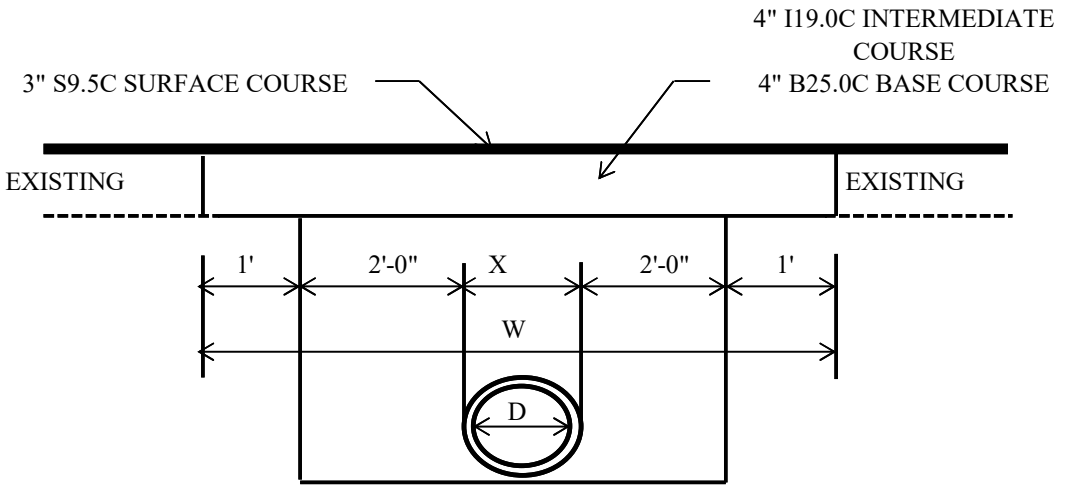
Subtotal 19.98

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y2- STA. 16+51.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y2- WIDTH = 33 ft

LxW = 250.25 sf

Surface Course in Tons = 4.671333

Intermediate Course in Tons = 6.339666

Base Course in Tons = 6.339666

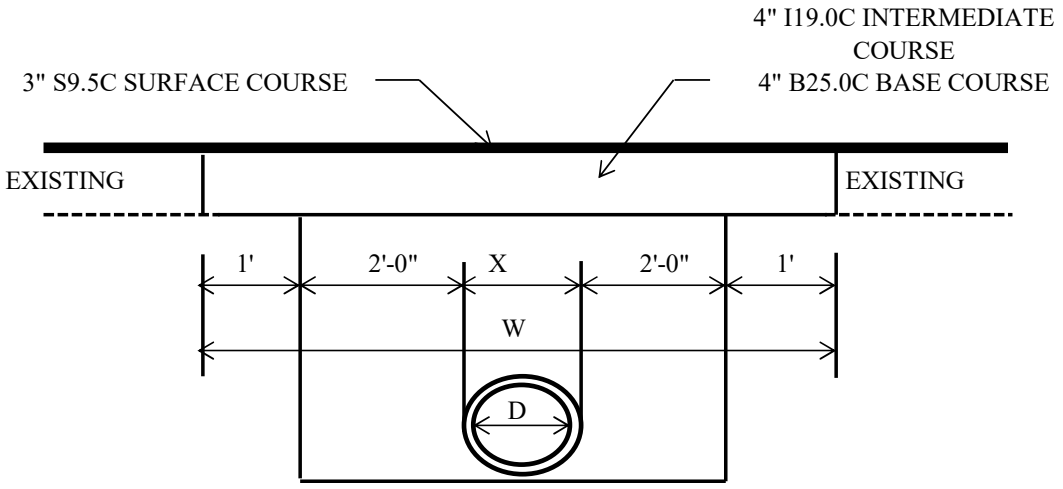
Subtotal 17.35

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y2- STA. 17+17.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y2- WIDTH = 37 ft

LxW = 280.5833 sf

Surface Course in Tons = 5.237555

Intermediate Course in Tons = 7.108111

Base Course in Tons = 7.108111

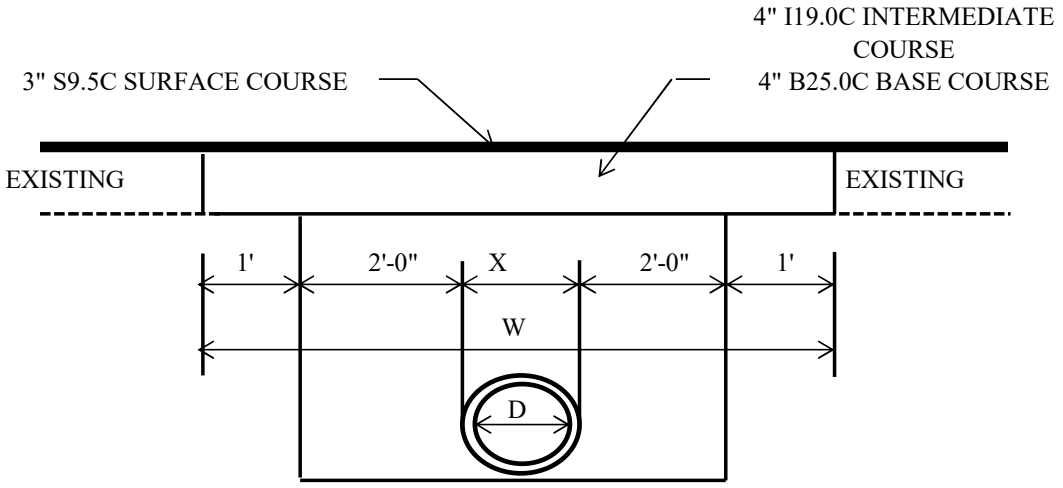
Subtotal 19.45

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y2- STA. 19+71.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y2- WIDTH = 43 ft

LxW = 326.0833 sf

Surface Course in Tons = 6.086889

Intermediate Course in Tons = 8.260777

Base Course in Tons = 8.260777

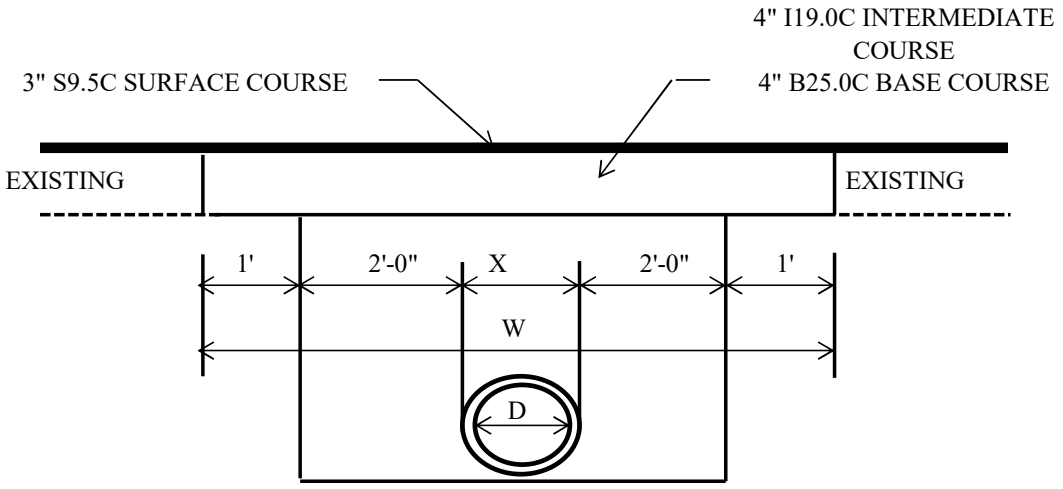
Subtotal 22.61

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y2- STA. 20+88.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y2- WIDTH = 80 ft

LxW = 606.6666 sf

Surface Course in Tons = 11.32444

Intermediate Course in Tons = 15.36889

Base Course in Tons = 15.36889

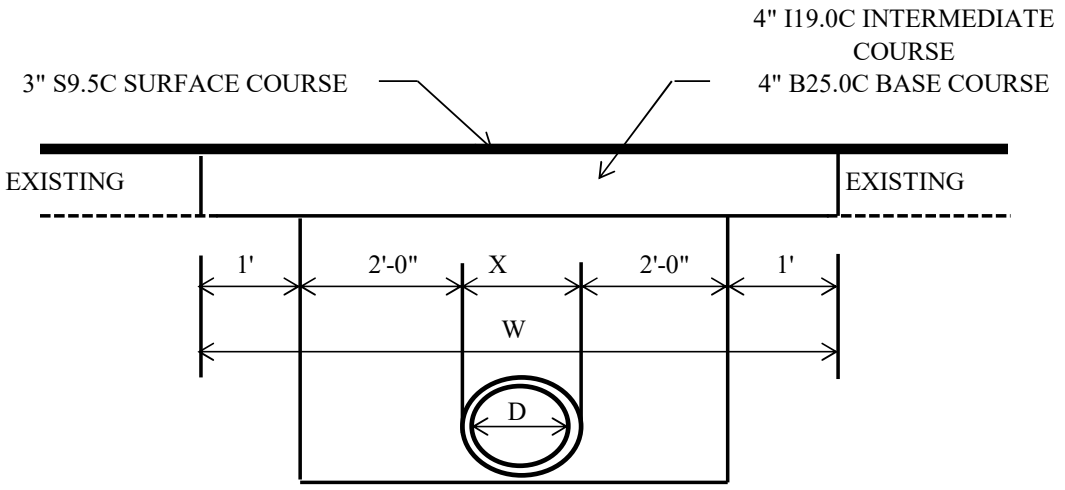
Subtotal 42.06

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y2- STA. 21+71.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y2- WIDTH = 33 ft

LxW = 250.25 sf

Surface Course in Tons = 4.671333

Intermediate Course in Tons = 6.339666

Base Course in Tons = 6.339666

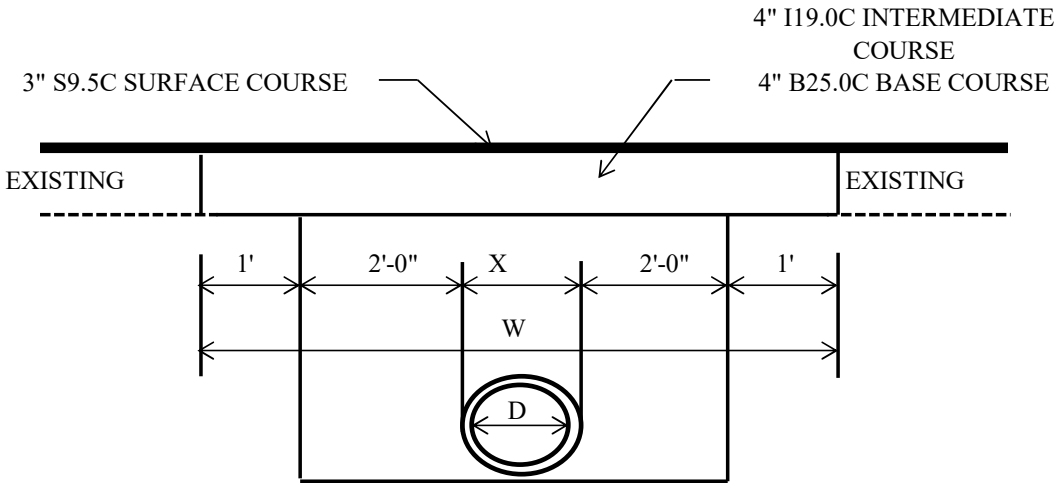
Subtotal 17.35

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y2- STA. 23+10.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y2- WIDTH = 46 ft

LxW = 348.8333 sf

Surface Course in Tons = 6.511555

Intermediate Course in Tons = 8.837111

Base Course in Tons = 8.837111

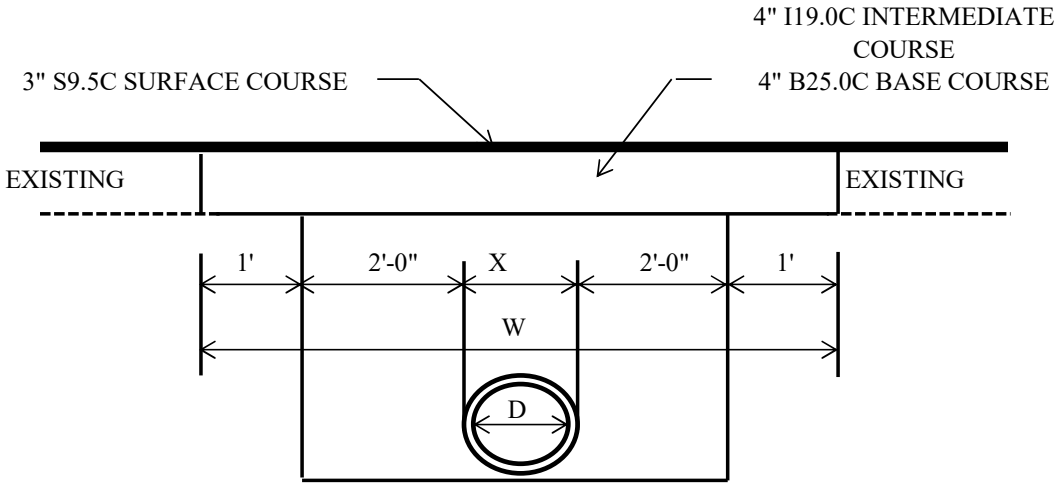
Subtotal 24.19

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y2- STA. 24+18.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y2- WIDTH = 43 ft

LxW = 326.0833 sf

Surface Course in Tons = 6.086889

Intermediate Course in Tons = 8.260777

Base Course in Tons = 8.260777

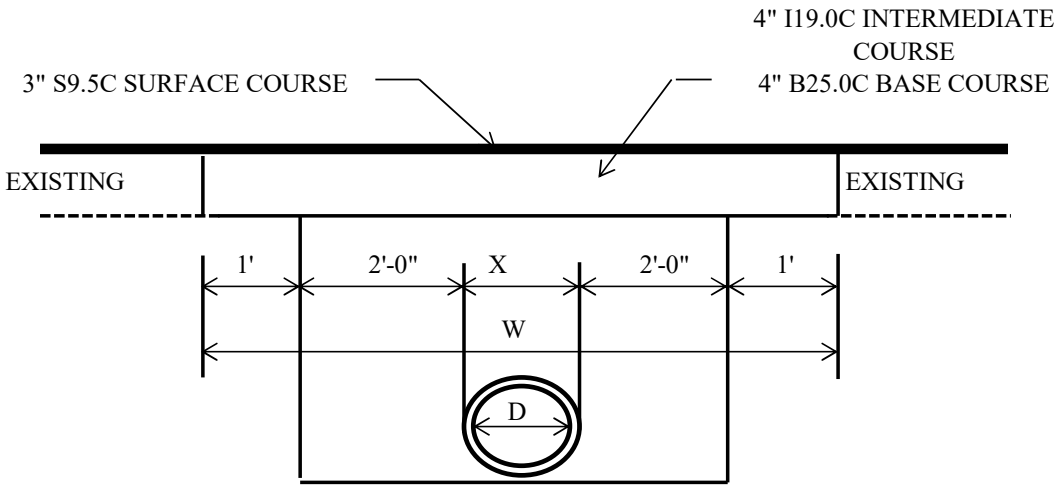
Subtotal 22.61

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y3- STA. 13+30.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y3- WIDTH = 52 ft

LxW = 394.3333 sf

Surface Course in Tons = 7.360889

Intermediate Course in Tons = 9.989777

Base Course in Tons = 9.989777

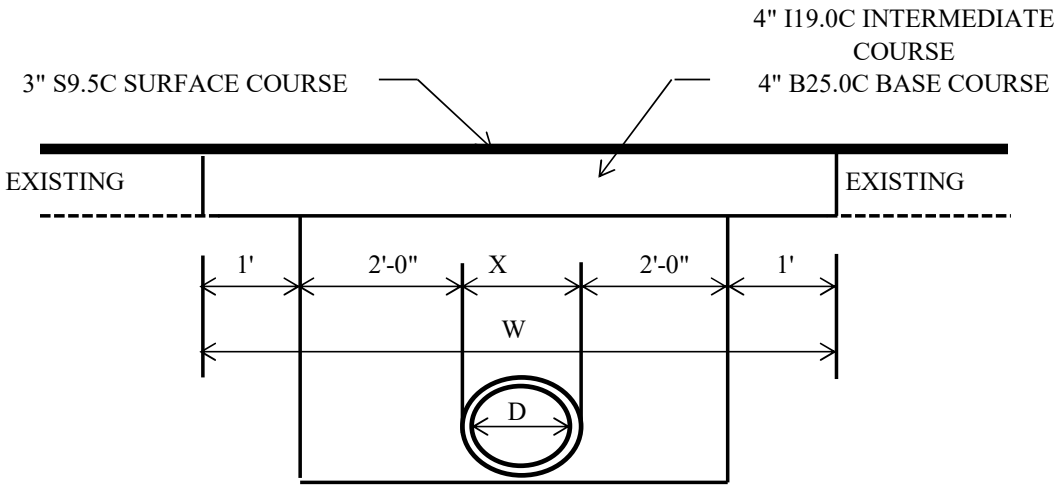
Subtotal 27.34

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y3- STA. 13+82.00

D = 24 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 2.5 ft W = 8.5 ft

L = '-Y3- WIDTH = 28 ft

LxW = 238 sf

Surface Course in Tons = 4.442667

Intermediate Course in Tons = 6.029333

Base Course in Tons = 6.029333

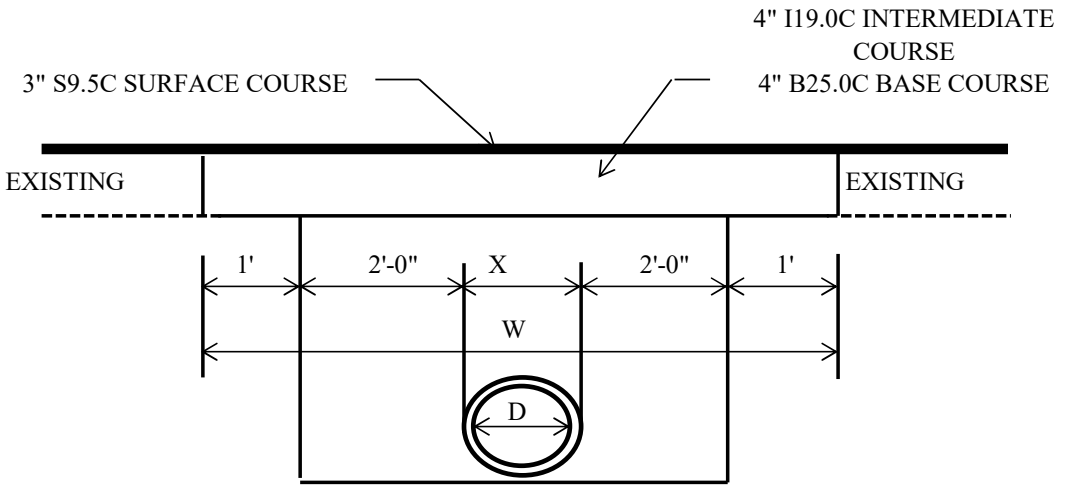
Subtotal 16.50

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y3- STA. 14+04.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y3- WIDTH = 26 ft

LxW = 197.1667 sf

Surface Course in Tons = 3.680444

Intermediate Course in Tons = 4.994889

Base Course in Tons = 4.994889

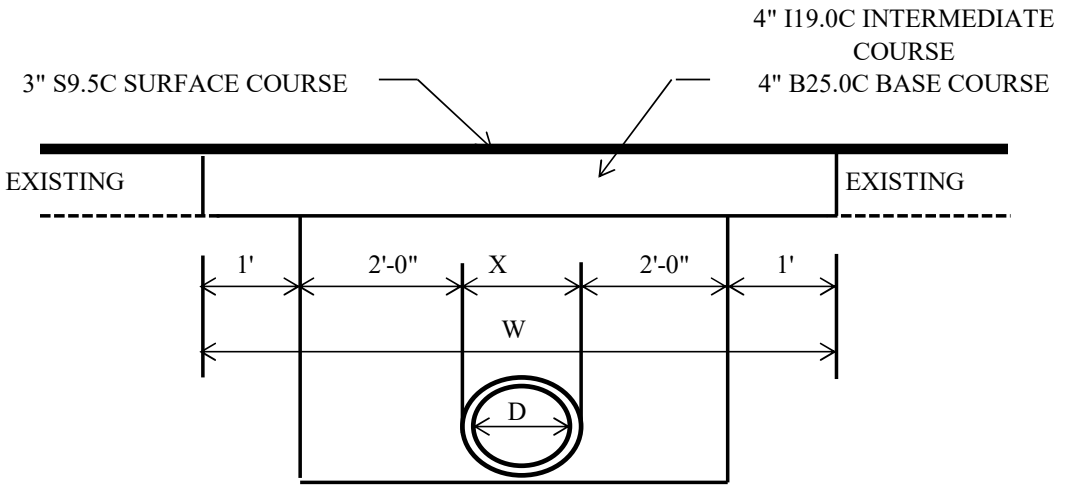
Subtotal 13.67

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y3- STA. 14+26.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y3- WIDTH = 23 ft

LxW = 174.4167 sf

Surface Course in Tons = 3.255778

Intermediate Course in Tons = 4.418555

Base Course in Tons = 4.418555

Subtotal 12.09

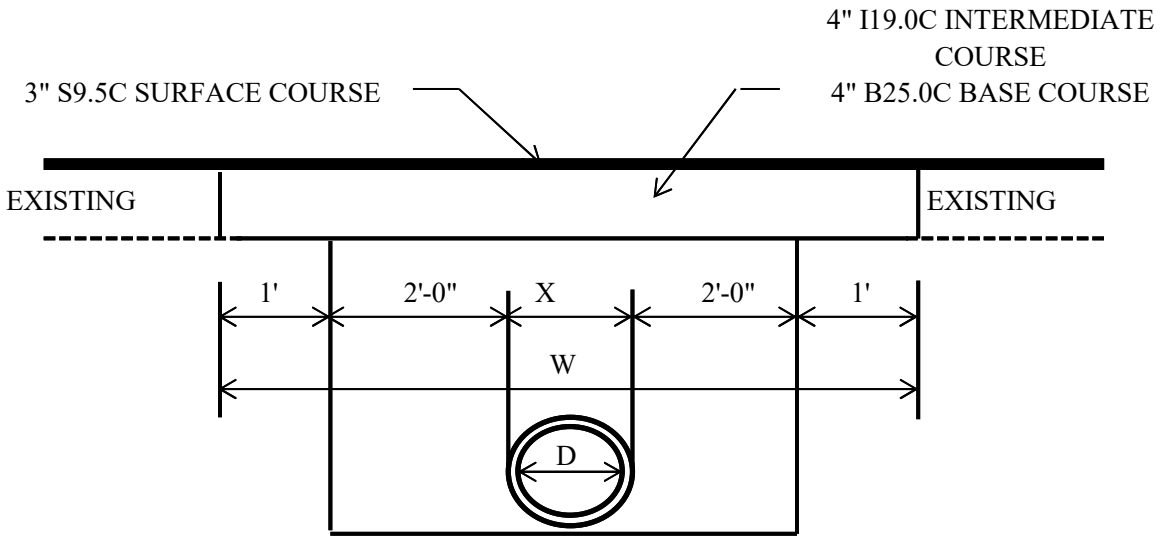
COMPUTED BY: CLR CHECKED BY: ACD

5/1/2023

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y4- STA. 12+30.00

D = 15 " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = 1.583333 ft W = 7.583333 ft

L = '-Y4- WIDTH = 23 ft

LxW = 174.4167 sf

Surface Course in Tons = 3.255778

Intermediate Course in Tons = 4.418555

Base Course in Tons = 4.418555

Subtotal 12.09

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: CLR
CHECKED BY: ACD **SECTION: 654**

REPAIR EXISTING ASPHALT

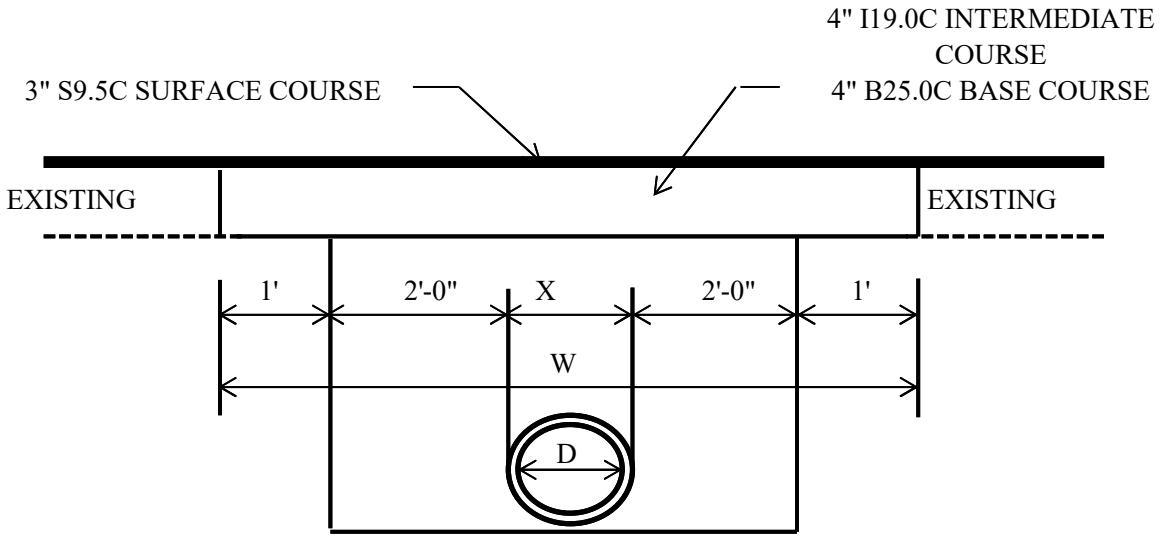
LINE	STATION	TONS
-Y2-	-	730
	SUBTOTAL	730
	TOTAL	730
	SAY	**770**

6/12/2023

PROJECT NO.: R-5799 SHEET OF

SECTION: 654

PAVEMENT REPAIRS



-Y2- Utility Pvmt Repair

D = - " Surface Course (inches)= 3 Intermediate & Base Course (inches) = 4

X = ft W = ft

L = '-Y4- WIDTH = - ft

LxW = sf

Surface Course in Tons = 170

Intermediate Course in Tons = 70

Base Course in Tons = 490

Subtotal 730.00

COMPUTED BY: CLR CHECKED BY: ACD

PROJECT NO.: R-5799 **SHEET OF**
SECTION: 815

SUBSURFACE DRAINS

SUBDRAIN EXCAVATION (USE 6' DEPTH FOR PROOF ROLLING AND 4' DEPTH ELSEWHERE)		224.0	YD^3
GEOTEXTILE FOR SUBSURFACE DRAINS	……...…...…...….....…	1000	YD^2
SUBDRAIN COARSE AGGREGATE (USE 3' DEPTH)	……..……..…	224.0	YD^3
6" PERFORATED SUBDRAIN PIPE	………….…....……..…………..……	1000	LIN. FT.
6" OUTLET PIPE (6 LINEAR FT. PER PIPE OUTLET)	…..…..….....…	12	LIN. FT.
SUBDRAIN PIPE OUTLET (USE 1 PER 500' OF PIPE)	…………...…	2	EACH

EXCAVATION	1000	LIN. FT. x	4	DEPTH x 0.056 =	224.0	YD^3
AGGREGATE	1000	LIN. FT. x	4	DEPTH x 0.056 =	224.0	YD^3

NOTE: USE 6" SUBDRAIN PIPE UNLESS ANOTHER SIZE IS SPECIFICALLY RECOMMENDED BY THE GEOTECHNICAL UNIT.

Calculated by : CLR
Checked by : DDM

PROJECT NO.: R-5799 **SHEET OF**

COMPUTED BY: CLR

CHECKED BY: DDM **SECT. 846**

8" x 18" CONCRETE CURB

LINE	STATION	STATION	SIDE	LENGTH
-L-	22+20.17	22+22.06	CL	105.44
-L-	24+11.33	24+14.02	CL	98.96
-L-	27+74.26	27+77.29	CL	80.39
-L-	29+32.33	29+57.58	CL	91.22
-Y2-	10+86.94	11+43.42	CL	150.28
-Y3-	10+87.23	11+49.58	CL	159.26
-Y4-	10+86.94	11+10.66	CL	79.84
-Y5-	10+85.33	11+06.37	CL	100.60
-Y5-	11+13.47	12+31.45	CL	254.91
			TOTAL	1,120.9
			SAY	**1,130**

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: EWB
CHECKED BY: CJY **SECT. 846**

9" x 18" CONCRETE CURB

LINE	STATION	STATION	SIDE	LENGTH
-RA1-	10+00.00	13+45.58	LT	234.05
-RA2-	10+00.00	13+45.57	LT	234.05
			TOTAL	468.1
			SAY	**470**

7/11/2022

PROJECT NO.: R-5799 **SHEET OF**

COMPUTED BY: EWB

CHECKED BY: CJY **SECTION: 846**

2'-6" CURB & GUTTER

LINE	STATION	STATION	SIDE	GROSS LENGTH	DEDUCTIONS		NET LENGTH
					DRIVES	OTHERS	
-L-	7+51.97	13+53.01	LT	627	38.00		589
-L-	13+92.22	17+75.67	LT	397			397
-L-	19+09.96	20+15.06	LT	131			131
-L-	20+63.71	22+00.00	LT	156			156
-L-	25+25.11	27+88.45	LT	272			272
-L-	25+29.93	28+08.95	LT	289			289
-L-	29+02.98	30+46.78	LT	179			179
-L-	30+97.61	32+65.98	LT	179			179
-L-	10+67.07	11+20.79	RT	73			73
-L-	11+54.87	12+62.31	RT	118			118
-L-	15+68.03	18+21.73	RT	254	55.00		199
-L-	19+56.61	20+96.87	RT	143			143
-L-	24+41.54	26+10.09	RT	202			202
-L-	26+49.81	27+29.77	RT	102			102
-L-	29+81.31	32+66.00	RT	284	25.00		259
-Y1-	11+17.94	13+15.73	RT	272			272
-Y1-	13+41.91	13+78.54	RT	125			125
-Y1-	14+08.18	16+07.47	RT	274			274
-Y1-	16+32.49	16+60.45	RT	70			70
-Y1-	10+33.14	12+52.94	LT	402			402
-Y1-	13+26.92	15+86.80	LT	348			348
-SL1-	11+00.77	12+25.42	RT	201			201
-SL2-	10+00.00	12+11.95	RT	208			208
-Y2-	10+91.44	12+80.43	LT	259			259
-Y2-	13+06.75	14+85.53	LT	378			378
-Y2-	15+35.02	18+26.65	LT	302			302
-Y2-	18+55.60	25+66.88	LT	722			722
-Y2-	25+99.18	27+28.84	LT	161			161
-Y2-	10+60.29	11+71.41	RT	229			229
-Y2-	12+28.97	13+10.97	RT	104			104
-Y2-	13+31.41	13+85.67	RT	70			70
-Y2-	14+34.17	15+17.12	RT	186			186
-Y2-	15+66.42	16+36.14	RT	159			159
-Y2-	17+18.09	17+83.86	RT	293			293
-Y2-	18+60.83	20+50.76	RT	400			400
-Y2-	21+15.47	21+47.86	RT	61			61
-Y2-	21+83.94	22+89.81	RT	236			236
-Y2-	23+23.81	27+11.84	RT	407			407
						SUBTOTAL	9,153

7/11/2022

PROJECT NO.: R-5799 **SHEET OF**

COMPUTED BY: EWB

CHECKED BY: CJY **SECTION: 846**

2'-6" CURB & GUTTER

LINE	STATION	STATION	SIDE	GROSS LENGTH	DEDUCTIONS		NET LENGTH
					DRIVES	OTHERS	
-Y3-	11+07.44	12+12.82	LT	225			225
-Y3-	12+98.45	13+43.67	LT	93			93
-Y3-	13+66.68	13+70.72	LT	60			60
-Y3-	14+18.35	15+19.61	LT	223			223
-Y3-	15+67.40	15+84.24	LT	71			71
-Y3-	16+16.82	16+70.00	LT	119			119
-Y3-	10+89.09	13+09.44	RT	256			256
-Y3-	13+51.48	14+14.81	RT	96			96
-Y3-	14+38.47	15+88.08	RT	176			176
-Y3-	16+18.48	16+74.53	RT	123			123
-Y4-	10+41.03	11+42.07	RT	338			338
-Y4-	10+41.75	12+85.00	LT	298			298
-Y5-	10+79.58	12+74.32	RT	194			194
-Y5-	10+69.47	12+05.22	LT	161			161
-Y5-	11+85.13	12+44.57	RT	55			55
						SUBTOTAL	2,488
						TOTAL	11,641
						SAY	**11,650**

7/11/2022

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: EWB
CHECKED BY: CJY **SECTION: 846**

1'-6" CURB & GUTTER

LINE	STATION	STATION	SIDE	GROSS LENGTH	DEDUCTIONS		NET LENGTH
					DRIVES	OTHERS	
-L-	8+78.98	8+83.05	RT	57			57
-L-	9+17.10	9+23.39	RT	61			61
-L-	10+30.81	10+34.19	RT	23			23
-L-	10+66.29	10+67.07	RT	12			12
-L-	11+08.37	11+20.79	RT	38			38
-L-	11+54.87	11+71.34	RT	37			37
-L-	15+50.00	17+89.38	CL	241			241
-L-	15+50.00	18+05.50	CL	256			256
-L-	19+24.22	21+78.37	CL	263			263
-L-	19+40.35	21+79.81	CL	240			240
-L-	24+58.89	27+42.95	CL	293			293
-L-	24+59.57	27+43.39	CL	292			292
-Y1-	16+24.30	16+35.34	LT	18			18
-Y5-	11+07.09	11+22.41	LT	15			15
-Y5-	11+76.46	12+05.22	LT	47			47
-Y2-/-L-	11+44.08	24+82.90	LT/RT	152			152
-L-/-Y3-	21+40.45	22+26.96	LT/LT	160			160
-RA1-	10+00.00	13+45.58	CL	341			341
-RA2-	10+00.00	13+45.57	CL	341			341
						TOTAL	2,885
						SAY	**2,890**

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: EWB
CHECKED BY: CJY **SECTION: 848**

4" CONCRETE SIDEWALK

LINE	STATION	STATION	LOCATION	AREA	WIDTH	SQUARE YARDS
-L-	11+06.00	11+23.59	RT	111.48	7	12.39
-L-	11+54.21	12+61.69	RT	742.05	7	82.45
-L-	24+69.51	26+14.63	RT	719.10	5	79.90
-L-	26+59.41	27+51.95	RT	478.00	5	53.11
-Y1-	11+10.49	13+13.59	RT	1177.56	5	130.84
-Y1-	13+43.91	14+02.87	RT	285.85	5	31.76
-Y1-	14+34.14	16+04.03	RT	833.81	5	92.65
-Y1-	16+32.70	16+50.98	RT	160.94	5	17.88
-Y1-	10+53.28	12+69.25	LT	2632.86	10	292.54
-Y1-	13+12.57	15+94.68	LT	2808.22	10	312.02
-Y2-	11+95.33	12+75.61	LT	449.10	5	49.90
-Y2-	13+06.75	14+85.53	LT	891.27	5	99.03
-Y2-	15+34.12	18+29.10	LT	1624.73	5	180.53
-Y2-	18+53.10	25+63.70	LT	3544.11	5	393.79
-Y2-	26+01.27	27+23.93	LT	717.03	5	79.67
-Y2-	12+30.35	13+09.02	RT	377.16	5	41.91
-Y2-	13+33.22	13+83.95	RT	236.46	5	26.27
-Y2-	14+34.23	15+17.12	RT	411.98	5	45.78
-Y2-	15+66.45	16+36.11	RT	345.58	5	38.40
-Y2-	16+64.17	18+32.80	RT	838.65	5	93.18
-Y2-	18+60.86	20+50.73	RT	946.61	5	105.18
-Y2-	21+19.93	21+49.47	RT	133.49	5	14.83
-Y2-	21+84.02	22+89.74	RT	521.43	5	57.94
-Y2-	23+25.94	27+11.84	RT	1919.97	5	213.33
-Y3-	12+83.22	13+43.69	LT	324.94	5	36.10
-Y3-	13+66.66	13+90.34	LT	116.18	5	12.91
-Y3-	14+18.41	15+18.88	LT	495.22	5	55.02
-Y3-	15+49.05	15+83.69	LT	154.72	5	17.19
-Y3-	16+16.84	16+69.54	LT	304.82	5	33.87
-Y3-	16+96.40	17+20.00	LT	243.26	10	27.03
-Y3-	13+58.75	14+14.32	RT	259.33	5	28.81
-Y3-	14+39.58	15+87.99	RT	731.89	5	81.32
-Y3-	16+18.54	16+74.47	RT	273.87	5	30.43
-Y4-	11+32.37	12+38.00	LT	573.42	5	63.71
-L-	7+54.95	8+96.02	LT	1338.34	10	148.70
-L-	9+28.54	13+48.01	LT	4316.63	10	479.63
-L-	14+00.84	14+47.01	LT	467.35	10	51.93
-L-	24+30.59	27+66.01	LT	3426.59	10	380.73
-Y2-	10+09.37	11+71.41	RT	2006.50	10	222.94
-Y2-	10+95.86	11+96.22	LT	1640.28	10	182.25
-Y3-	10+14.25	13+01.34	RT	3239.04	10	359.89
-Y3-	11+14.04	12+48.90	LT	1921.13	10	213.46
-Y4-	10+43.31	11+30.63	RT	1195.71	10	132.86
-Y4-	10+44.47	11+32.37	LT	1264.09	10	140.45
-Y5-	10+32.82	11+15.76	RT	1255.52	10	139.50
-Y5-	10+46.77	11+26.84	LT	1065.36	10	118.37
					Total	5502.40
					Say	**5510**

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: EWB
CHECKED BY: CJY **SECTION: 848**

CONCRETE CURB RAMP

LINE	STATION	LOCATION	NO. OF RAMPS
-L-	7+70	LT	1
-L-	13+35	LT	2
-L-	14+10	LT	2
-L-	21+69	LT	1
-L-	27+60	LT	1
-L-	29+60	LT	1
-L-	11+15	RT	1
-L-	11+65	RT	1
-L-	24+63	RT	1
-L-	26+10	RT	1
-L-	26+65	RT	1
-L-	27+60	RT	1
-L-	29+65	RT	1
-Y1-	11+15	RT	1
-Y1-	13+10	RT	1
-Y1-	13+50	RT	1
-Y1-	13+95	RT	1
-Y1-	14+40	RT	1
-Y1-	16+00	RT	1
-Y1-	16+35	RT	2
-Y1-	10+55	LT	1
-Y1-	12+65	LT	1
-Y1-	13+15	LT	1
-Y1-	15+90	LT	1
-SL1-	11+27	RT	1
-SL2-	11+01	RT	1
-Y2-	11+50	LT	1
-Y2-	12+20	LT	1
-Y2-	12+70	LT	1
-Y2-	13+10	LT	1
-Y2-	14+80	LT	1
-Y2-	15+35	LT	1
-Y2-	25+55	LT	1
-Y2-	26+10	LT	1
-Y2-	27+15	LT	1
-Y2-	11+58	RT	2
-Y2-	12+35	RT	1
Column Total			41

LINE	STATION	LOCATION	NO. OF RAMPS
-Y2-	13+05	RT	1
-Y2-	13+35	RT	1
-Y2-	13+80	RT	1
-Y2-	14+35	RT	1
-Y2-	15+15	RT	1
-Y2-	15+70	RT	1
-Y2-	16+30	RT	1
-Y2-	16+70	RT	1
-Y2-	18+30	RT	1
-Y2-	18+65	RT	1
-Y2-	20+50	RT	1
-Y2-	21+25	RT	1
-Y2-	21+45	RT	1
-Y2-	21+90	RT	1
-Y2-	22+85	RT	1
-Y2-	23+35	RT	1
-Y2-	27+05	RT	1
-Y3-	11+60	LT	1
-Y3-	12+45	LT	1
-Y3-	12+85	LT	1
-Y3-	13+35	LT	1
-Y3-	13+70	LT	1
-Y3-	13+85	LT	1
-Y3-	14+25	LT	1
-Y3-	15+15	LT	1
-Y3-	15+55	LT	1
-Y3-	15+80	LT	1
-Y3-	16+20	LT	1
-Y3-	16+45	LT	1
-Y3-	16+65	LT	1
-Y3-	11+55	RT	1
-Y3-	12+90	RT	1
-Y3-	13+70	RT	1
-Y3-	14+10	RT	1
-Y3-	14+45	RT	1
-Y3-	15+80	RT	1
-Y3-	16+25	RT	1
-Y3-	16+45	RT	1
Column Total			38
Subtotal			79

4/7/2023

PROJECT NO.: R-5799
COMPUTED BY: EWB
CHECKED BY: CJY

SHEET OF

SECTION: 848

CONCRETE CURB RAMP

LINE	STATION	LOCATION	NO. OF RAMPS
-Y3-	16+70	RT	1
-Y4-	11+22	RT	1
-Y4-	11+22	LT	1
-Y5-	11+10	RT	1
-Y5-	11+20	LT	1
Column Total			5

LINE	STATION	LOCATION	NO. OF RAMPS
Subtotal			5
Total			84

PROJECT NO.: R-5799
COMPUTED BY: EWB
CHECKED BY: CJY

SHEET OF

SECTION: 848

6" CONCRETE DRIVEWAY

LINE	STATION	LOCATION	WIDTH	ADD'L (SQ. YD.)	SQUARE YARDS
-L-	9+12	LT	33	60.453	80.870
-L-	17+31	RT	50	54.527	84.388
-L-	31+35	RT	20	17.228	30.422
-Y2-	18+42	LT	24	16.000	31.417
-Y4-	12+50	RT	50	87.810	87.810
			TOTAL		314.91
			SAY		**320**

Add'l Areas = Pattern 12

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: EWB
CHECKED BY: CJY **SECTION: 852**

5" MONOLITHIC ISLANDS (KEYED IN)

LINE	STATION TO STATION	SQUARE FEET	LINE	STATION TO STATION	SQUARE FEET
-L-	11+30.64 TO 11+47.21	136.26			
-L-	12+87.58 TO 13+18.08	533.79			
-L-	13+28.08 TO 13+36.83	120.26			
-L-	14+33.76 TO 14+37.01	16.59			
-L-	14+47.01 TO 15+50.00	669.40			
-L-	21+78.45 TO 22+08.37	162.20			
-L-	21+86.67 TO 22+22.06	113.22			
-L-	24+11.33 TO 24+50.57	103.58			
-L-	24+26.48 TO 24+59.49	60.62			
-L-	27+43.47 TO 27+61.85	54.04			
-L-	27+52.60 TO 27+77.29	105.68			
-L-	29+68.24 TO 31+15.97	608.58			
-Y1-	10+48.37 TO 10+73.26	108.77			
-Y1-	10+74.64 TO 10+85.42	59.83			
-Y1-	10+69.78 TO 11+05.44	470.71			
-Y1-	10+34.26 TO 10+40.65	124.44			
-Y1-	10+32.17 TO 10+42.35	228.13			
-Y1-	10+43.68 TO 10+82.37	716.29			
-Y2-	11+54.08 TO 14+90.00	2481.81			
-Y3-	11+60.24 TO 12+78.49	820.77			
-Y4-	11+21.33 TO 11+55.51	173.58			
-Y5-	12+31.32 TO 12+41.17	43.15			
-SL1-	10+84.54 TO 11+18.48	167.45			
-SL1-	11+28.42 TO 12+23.18	529.18			
-SL2-	10+79.92 TO 10+94.31	71.32			
-SL2-	11+03.99 TO 12+13.11	628.38			
				Column Total	
				TOTAL IN SQUARE YARDS	1,034.22
	Column Total	9308.02		**SAY**	**1,040**

8/24/2020

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: EWB
CHECKED BY: CJY **SECTION: SP**

12" CONCRETE TRUCK APRON

LINE	STATION	STATION	LOCATION	LENGTH	WIDTH	SQUARE YARDS
-RA1-	10+00.00	13+45.58	LT	289.8119	16.25	523.27
-RA2-	10+00.00	13+45.57	LT	289.8119	16.25	523.27
-Y2-/-L-	11+44.08	24+82.90	LT/RT		VARIES	91.12
-L-/-Y3-	21+40.45	11+52.84	LT/LT		VARIES	123.25
Length is based on the center of the truck apron going around the roundabout						
					TOTAL	1260.91
					SAY	**1270**

PROJECT NO.: R-5799
COMPUTED BY: DDM
CHECKED BY: CJY

SHEET OF

SECTION: 862

GUARDRAIL

LINE	STATION	STATION	SIDE	LENGTH		ANCHOR UNITS					
				STRAIGHT	SHOP CURVED	GREU TL-3	GREU TL-2	TYPE III	TYPE III, Shop Curved	CAT-1	Attenuator
-L-	9+32.24	12+78.46	LT	312.50			1			1	
-L-	16+42.28	17+89.38	MEDIAN LT	100.00			1	1			
-L-	16+57.80	18+05.50	MEDIAN RT	100.00			1	1			
-L-	17+01.95	17+75.67	LT	50.00				1		1	
-L-	17+49.06	18+21.73	RT	25.00			1	1			
-L-	19+09.96	20+07.63	LT	50.00			1	1			
-L-	19+24.22	20+71.88	MEDIAN LT	100.00			1	1			
-L-	19+40.35	20+87.37	MEDIAN RT	100.00			1	1			
-L-	19+56.61	20+17.77	RT	37.50				1		1	
-L-	24+71.29	25+30.47	RT	25.00			1			1	
-L-	30+48.10	31+20.24	RT	37.50			1			1	
-L-	31+49.84	32+59.06	RT	75.00			1			1	
-Y1-	11+88.81	12+57.79	LT	37.50			1			1	
-Y2-	15+42.30	18+25.20	LT	225.00			2				
-Y2-	16+75.33	18+20.77	RT	87.50			2				
-Y2-	18+62.22	24+30.01	LT	512.50		1				1	
-Y2-	23+32.46	27+12.42	RT	306.25	18.75	1			1		
-Y4-	11+28.16	12+23.50	RT	37.50			2				
			TOTAL	2218.75	18.75	2	17	8	1	8	
			SAY	**2250.00**	**25.00**						

PROJECT NO.: R-5799

HANDRAIL

LINE	STATION	STATION	SIDE	LENGTH
-L-	24+75.00	25+25.00	RT	50.08
-Y1-	12+00.00	12+50.00	LT	53.21
-Y2-	11+25.00	11+75.00	LT	51.79
-Y2-	15+41.73	18+20.00	LT	278.29
-Y2-	15+76.45	16+26.11	RT	49.66
-Y2-	16+74.17	18+22.80	RT	148.63
-Y2-	21+94.02	22+79.74	RT	85.73
-Y4-	11+31.24	12+24.48	RT	93.2
-Y5-	10+65.60	11+69.86	RT	113.61
			TOTAL	924.20
			SAY	**930**

COMPUTED BY: EWB CHECKED BY: CJY

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: JKG
CHECKED BY: CJY **SECTION: 876**

PLAIN RIP RAP, CLASS B

LINE	STATION TO STATION	LOCATION	LENGTH	TONS PER LIN. FT.	TONS
-L-	11+50 to 12+50	LT	100.14	0.86	86
				TOTAL	86

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: JKG
CHECKED BY: CJY **SECTION: 876**

PLAIN RIP RAP, CLASS B

(WITH FILTER FABRIC)

LINE	STATION	LOCATION	DITCH (Y/N)	PIPE DIAMETER	TONS
-L-	16+59.46	LT	N	36	11
-L-	17+64.71	LT	N	15	2
-L-	20+39.17	RT	N	15	1
-Y1-	20+00.52	LT	N	30	8
-Y2-	11+41.25	LT	N	18	2
-Y2-	24+49.94	RT	N	18	2
				TOTAL	26

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: JKG
CHECKED BY: CJY **SECTION: 876**

PLAIN RIP RAP, CLASS I

(WITH OR WITHOUT FILTER FABRIC)

LINE	STATION	LOCATION	DITCH (Y/N)	PIPE DIAMETER	TONS
-L-	25+08.91	RT	N	72	57
-Y2-	17+30.00	LT	N	N/A	25
-Y2-	17+60.00	LT	N	N/A	40
-Y2-	17+30.00	RT	N	18	35
-Y2-	17+60.00	RT	N	N/A	32
				TOTAL	189

PROJECT NO.: R-5799
COMPUTED BY: JKG
CHECKED BY: CJY

SHEET OF

SECTION: 876

GEOTEXTILE FOR DRAINAGE

LINE	BEG. STA.	END STA.	LOCATION	LENGTH	AVERAGE WIDTH	SQUARE YARDS
-L-	11+50	12+50	LT	100.14		120.00
				Erosion Control		800.00
					TOTAL	920

5/19/2023

PROJECT NO.: R-5799 **SHEET OF**
COMPUTED BY: JKG
CHECKED BY: CJY **SECTION: 876**

GEOTEXTILE FOR DRAINAGE

(AT PIPE OUTLETS - CLASS B RIP RAP)

LINE	STATION	PIPE SIZE (in)	PIPE WITH DITCH (Y OR N)	SQUARE YARDS
-L-	17+64.71	15	N	7
-L-	20+39.17	15	N	5
-Y1-	20+00.52	30	N	21
-Y2-	11+41.25	18	N	7
-Y2-	24+45.53	18	N	7
			TOTAL	47

PROJECT NO.: R-5799
COMPUTED BY: JKG
CHECKED BY: CJY

SHEET OF

SECTION: 876

GEOTEXTILE FOR DRAINAGE

(AT PIPE OUTLETS - CLASS I RIP RAP)

LINE	STATION	PIPE SIZE (in)	PIPE WITH DITCH (Y OR N)	SQUARE YARDS
-L- RT	25+08.91	72	N	102
-Y2- LT	17+30.00	N/A	N	35
-Y2- LT	17+60.00	N/A	N	55
-Y2- RT	17+30.00	18	N	50
-Y2- RT	17+60.00	N/A	N	45
			SUBTOTAL	287
			TOTAL	1254

PROJECT R-5799 TRANSYLVANIA COUNTY

TRIPLE 10 FT. X 9 FT. CONCRETE BOX CULVERT
LEFT AND RIGHT EXTENSIONS

Extends Culvert 99
STATION 17+47.31 -Y2-

WORKING DAY ESTIMATES

PREPARED BY:
REYNOLDS, SMITH & HILLS, INC.
8521 SIX FORKS ROAD
SUITE 400
RALEIGH, NC 27615

Structure Design Unit - Working Days

Project	R-5799	Name	RS&H
County	Transylvania	Date	05/2023

Letting Date	8/15/2023		
Availabilty Date	8/15/2023		
No. Bridges		Existing Structure #:	99
No. Culverts			
		Sufficiency Rating:	99.87
No. Culvert Ext	2		
Retaining Walls		Estimated Remaining Life:	Not Provided
MSE Wall			
Noise Walls		Moratorium?	April 1 to October 15

Work Time Required

	One Crew	Crews
Bridge - Days		
Bridge Total		
Culvert - Days	98	
Culvert Total	98	
Walls - Days		
Wall Total		
Total Days	98	
Total Months	6.125	

*Months calculated using 16 working days / month.

RS&H

SUBJECT	WORKING DAYS		**PROJECT**	R-5799	
				TRANSYLVANIA	**COUNTY**
	BY MRA	**DATE** 05/2023	**STATION**	17+47.31 -Y2-	
✓	**BY** NSC	**DATE** 05/2023	**STR NO**	99	**SHEET** 2

	Production Rate	Note	Quantity	Time	
INLET CULVERT EXTENSION STAGE I					
Excavation	200 CY / Day		1	1 Days	
Forming					
Wing Footing and Bottom Slab	3 Days	1	1	3 Days	
Walls	3 Days	1	1	3 Days	
Placing Concrete					
Wing Footing and Bottom Slab	2 Days	2	1	2 Days	
Walls	2 Days	2	1	2 Days	
Cure, Strip, Backfill	10 Days		1	10 Days	
Culvert Extension Work	2 Days		1	2 Days	**23 days**
INLET CULVERT EXTENSION STAGE II					
Excavation	200 CY / Day		1	1 Days	
Forming					
Wing Footing and Bottom Slab	2 Days		1	2 Days	
Walls	2 Days		1	2 Days	
Top Slab	4 Days	3	1	4 Days	
Placing Concrete					
Wing Footing and Bottom Slab	1 Days		1	1 Days	
Walls	1 Days		1	1 Days	
Top Slab	3 Days	3	1	3 Days	
Cure, Strip, Backfill	10 Days		1	10 Days	
Culvert Extension Work	2 Days		1	2 Days	**26 days**
OUTLET CULVERT EXTENSION STAGE I					
Excavation	200 CY / Day		1	1 Days	
Forming					
Wing Footing and Bottom Slab	3 Days	1	1	3 Days	
Walls	3 Days	1	1	3 Days	
Placing Concrete					
Wing Footing and Bottom Slab	2 Days	2	1	2 Days	
Walls	2 Days	2	1	2 Days	
Cure, Strip, Backfill	10 Days		1	10 Days	
Culvert Extension Work	2 Days		1	2 Days	**23 days**
OUTLET CULVERT EXTENSION STAGE II					
Excavation	200 CY / Day		1	1 Days	
Forming					
Wing Footing and Bottom Slab	2 Days		1	2 Days	
Walls	2 Days		1	2 Days	
Top Slab	4 Days	3	1	4 Days	
Placing Concrete					
Wing Footing and Bottom Slab	1 Days		1	1 Days	
Walls	1 Days		1	1 Days	
Top Slab	3 Days	3	1	3 Days	
Cure, Strip, Backfill	10 Days		1	10 Days	
Culvert Extension Work	2 Days		1	2 Days	**26 days**
TOTAL					**98 days**

Notes:

1 - Increased by 50% due to culvert stage being a double barrel

2 - Increased by 1 additional day due to culvert stage being a double barrel

3 - Increased by 2 additional days due to culvert stage being a triple barrel

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

April 21, 2023

MEMORANDUM TO: Wes Jamison, P.E.
Division Project Development Engineer – Division 14

ATTENTION: Barry Mosteller
Division Design Construction Engineer – Division 14

FROM: John L. Pilipchuk, L.G., P.E.
State Geotechnical Engineer

DS EMN

DocuSigned by:
John Pilipchuk
52C44B94B8BE444...

STATE PROJECT: R-5799 (44984.1.1)
F. A. PROJECT: N/A
COUNTY: Transylvania

DESCRIPTION: Culvert No. 0099 for US 64/US 276 Intersection Improvements

SUBJECT: Temporary Shoring Recommendations

The Geotechnical Engineering Unit (GEU) has received the following temporary shoring locations for the referenced project:

Shoring Location No.	Begin Station & Offset	End Station & Offset	Estimated Average Height	Estimated Maximum Height	Shoring Location Type
No. 1	-Y2- STA. 17+00 +/- (32.9' LT)	-Y2- STA. 18+06 +/- (34.4' LT)	12’	16’	Structure
No. 2	-Y2- STA. 17+00 +/- (36.2' RT)	-Y2- STA. 18+00 +/- (34.8' RT)	12’	17’	Structure

The GEU recommends the following notes on plans for the proposed shoring locations:

Shoring Location No. 1

FOR TEMPORARY SHORING AND POSITIVE PROTECTION FOR TEMPORARY SHORING, SEE PLANS AND TEMPORARY SHORING PROVISION.

TEMPORARY SHORING IS REQUIRED FOR THE CULVERT CONSTRUCTION FROM STATION -Y2- STA. 17+00 +/-, 32.9' LT, TO STATION -Y2- STA. 18+06 +/-, 34.4' LT.

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

Telephone: 919-707-6850
Fax: 919-250-4237
Customer Service: 1-877-368-4968

Website: www.ncdot.gov

Location:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

BEFORE BEGINNING TEMPORARY SHORING DESIGN OR CONSTRUCTION, SURVEY EXISTING GROUND ELEVATIONS IN THE VICINITY OF SHORING LOCATIONS TO DETERMINE ACTUAL SHORING HEIGHTS.

DESIGN TEMPORARY SHORING FROM STATION -Y2- STA. 17+00 +/-, 32.9' LT, TO STATION -Y2- STA. 18+06 +/-, 34.4' LT, FOR THE FOLLOWING ASSUMED SOIL PARAMETERS AND GROUNDWATER ELEVATION:

Above Elevation 2110 feet
UNIT WEIGHT (γ) = 120 LB/CF
FRICTION ANGLE (ϕ) = 28 DEGREES
COHESION (c) = 0 LB/SF
GROUNDWATER ELEVATION = 2020 FT

Below Elevation 2110 feet
UNIT WEIGHT (γ) = 125 LB/CF
FRICTION ANGLE (ϕ) = 32 DEGREES
COHESION (c) = 0 LB/SF
GROUNDWATER ELEVATION = 2020 FT

DO NOT USE A TEMPORARY WALL FOR TEMPORARY SHORING FROM STATION -Y2- STA. 17+00 +/-, 32.9' LT, TO STATION -Y2- STA. 18+06 +/-, 34.4' LT.

IT MAY BE PREFERRED TO USE A TEMPORARY SOIL NAIL WALL FOR TEMPORARY SHORING FROM STATION -Y2- STA. 17+00 +/-, 32.9' LT, TO STATION -Y2- STA. 18+06 +/-, 34.4' LT. FOR TEMPORARY SOIL NAIL WALLS, SEE TEMPORARY SOIL NAIL WALLS PROVISION.

Shoring Location No. 2

FOR TEMPORARY SHORING AND POSITIVE PROTECTION FOR TEMPORARY SHORING, SEE PLANS AND TEMPORARY SHORING PROVISION.

TEMPORARY SHORING IS REQUIRED FOR THE CULVERT CONSTRUCTION FROM STATION -Y2- STA. 17+00 +/-, 36.2' RT, TO STATION -Y2- STA. 18+00 +/-, 34.8' RT.

BEFORE BEGINNING TEMPORARY SHORING DESIGN OR CONSTRUCTION, SURVEY EXISTING GROUND ELEVATIONS IN THE VICINITY OF SHORING LOCATIONS TO DETERMINE ACTUAL SHORING HEIGHTS.

DESIGN TEMPORARY SHORING FROM STATION -Y2- STA. 17+00 +/-, 36.2' RT, TO STATION -Y2- STA. 18+00 +/-, 34.8' RT, FOR THE FOLLOWING ASSUMED SOIL PARAMETERS AND GROUNDWATER ELEVATION:

Above Elevation 2110 feet
UNIT WEIGHT (γ) = 120 LB/CF
FRICTION ANGLE (ϕ) = 28 DEGREES
COHESION (c) = 0 LB/SF
GROUNDWATER ELEVATION = 2020 FT

Below Elevation 2110 feet
UNIT WEIGHT (γ) = 125 LB/CF
FRICTION ANGLE (ϕ) = 32 DEGREES
COHESION (c) = 0 LB/SF
GROUNDWATER ELEVATION = 2020 FT

DO NOT USE A TEMPORARY WALL FOR TEMPORARY SHORING FROM STATION -Y2- STA. 17+00 +/-, 36.2' RT, TO STATION -Y2- STA. 18+00 +/-, 34.8' RT.

IT MAY BE PREFERRED TO USE A TEMPORARY SOIL NAIL WALL FOR TEMPORARY SHORING FROM STATION -Y2- STA. 17+00 +/-, 36.2' RT, TO STATION -Y2- STA. 18+00 +/-, 34.8' RT. FOR TEMPORARY SOIL NAIL WALLS, SEE TEMPORARY SOIL NAIL WALLS PROVISION.

The GEU recommends including the Temporary Shoring provision and Temporary Soil Nail Walls provision in the contract for the referenced project.

The estimated height of the proposed shoring locations is taller than what is allowed in our Standard Temporary Shoring Details, as such, these details will not be provided with these recommendations.

Please contact Shane Clark, P.E. or Shiping Yang, Ph.D., P.E. at 980-258-6402 if there are any questions concerning this memorandum.

NORTH CAROLINA PROFESSIONAL SEAL 031361 ENGINEER SHIPING YANG

DocuSigned by:
Shiping Yang
DD0C8EE5EA6E4D4...
04/24/2023

Shiping Yang, Ph.D., P.E.
Engineer III

JLP/ENW/SCC/SY
SCC

Attachments: *Temporary Shoring Provision*
Temporary Soil Nail Walls

TRAFFIC CONTROL SECTION
ENGINEER'S ESTIMATE FORM
2018 STANDARD SPECIFICATIONS

TIP No.: R-5799 English

WBS No 44984.1.1

NC Project No:

FA-Project No:

County: Transylvania

Description: US 64 AT NC 280/US 64 INTERSECTION IMPROVEMENTS

Date of Estimate: 6/6/2023

Estimate Prepared By: REM

Estimate Reviewed By: ACD

Estimate Type:

- ☐ Scoping
- ☐ Letting List Verification
- ☐ Preliminary
- ☑ Final

THIS SECTION FOR COST ESTIMATE USE

Scoping Cost

Traffic Control Devices:

Pavement Markings:

Pavement Markers:

Delineation:

ITEM NO.			ITEM DESCRIPTION	QUANTITY	UNIT
GRP CODE	DESC. NO.	SEC NO.			
Y	4400000000-E	1110	STATIONARY WORK ZONE SIGNS	348	SF
Y	4405000000-E	1110	PORTABLE WORK ZONE SIGNS	336	SF
Y	4410000000-E	1110	BARRICADE MOUNTED WORK ZONE SIGNS	234	SF
Y	4415000000-N	1115	FLASHING ARROW BOARD	2	EA
Y	4420000000-N	1120	PORTABLE CHANGEABLE MESSAGE SIGN	2	EA
Y	4430000000-N	1130	DRUMS	300	EA
Y	4445000000-E	1145	BARRICADES (TYPE III)	80	LF
Y	4447000000-E	SP	PEDESTRIAN CHANNELIZATION DEVICES	180	LF
Y	4455000000-N	1150	FLAGGER (BY DAY)	170	DAY
Y	4465000000-N	1160	TEMPORARY CRASH CUSHIONS	2	EA
Y	4480000000-N	1165	TMA	2	EA
PM	4810000000-E	1205	PAINT (4")	14360	LF
PM	4815000000-E	1205	PAINT (6")	1099	LF
PM	4820000000-E	1205	PAINT (8")	2697	LF
PM	4835000000-E	1205	PAINT (24")	697	LF
PM	4840000000-N	1205	PAINT MARKING CHARACTERS	4	EA
PM	4845000000-N	1205	PAINT MARKING SYMBOLS	31	EA
PM	4850000000-E	1205	REMOVAL OF PAVEMENT MARKING (4")	8244	LF
PM	4860000000-E	1205	REMOVAL OF PAVEMENT MARKING (8")	1394	LF
PM	4870000000-E	1205	REMOVAL OF PAVEMENT MARKING (24")	325	LF
PM	4875000000-N	1205	REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	26	EA

Estimates Summary for
TIP Project # R-5799

NCProject #:
FA-Project#:
WBS Number 44984.1.1
County: Transylvania
Description: US 64 AT NC 280/US 64 INTERSECTION IMPROVEMENTS

Date of Estimate: 6/6/2023
Prepared By: REM

STATIONARY WORK ZONE SIGNS			
BEGIN ROAD WORK	2 signs	32	SF
DETOUR (M4-8)	5 signs	10	SF
DETOUR AHEAD (W20-2)	4 signs	64	SF
END DETOUR (M4-8a)	2 signs	6	SF
END RD WORK (G20-2a)	2 signs	16	SF
NEXT LT (RT) (SP-4)	2 signs	7	SF
NEXT LT (RT) (SP-4)	2 signs	7	SF
RD CLSD 1000 FT (W20-3)	2 signs	32	SF
RD CLSD 500 FT(W20-3)	2 signs	32	SF
RD CLSD AHEAD (W20-3)	6 signs	96	SF
RT TURN ARROW (M6-1)	3 signs	7	SF
SPECIAL SIGN	7 signs	35	SF
STRAIGHT ARROW (M6-3)	2 signs	4	SF
	TOTAL STATIONARY WORK ZONE SIGNS	**348**	**SF**

Estimates Summary for
TIP Project # R-5799

NCProject #:
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WBS Number 44984.1.1
County: Transylvania
Description: US 64 AT NC 280/US 64 INTERSECTION IMPROVEMENTS

Date of Estimate: 6/6/2023
Prepared By: REM

PORTABLE WORK ZONE SIGNS			
BE PREPARED TO STOP (W3-4)	2 signs	32	SF
FLAGGER SIGN (W20-7a)	2 signs	32	SF
LANE REDUCTION SIGN (W4-2)	2 signs	32	SF
ONE LANE RD (W20-4)	2 signs	32	SF
REVERSE TURN (W1-3)	1 signs	16	SF
RT (LT) LANE CLSD (W20-5)	2 signs	32	SF
RT (LT) LANE CLSD (W20-5)	2 signs	32	SF
RT (LT) LANE CLSD (W20-5)	2 signs	32	SF
SHOULDER WORK (W21-5)	2 signs	32	SF
SPECIAL SIGN	2 signs	32	SF
TRAFFIC SHIFT AHD (W31-1)	2 signs	32	SF
	TOTAL PORTABLE WORK ZONE SIGNS	**336**	**SF**
BARRICADE MOUNTED WORK ZONE SIGNS			
DETOUR ARROW (M4-10)	2 signs	12	SF
DETOUR ARROW (M4-10R/L)	2 signs	12	SF
DETOUR ARROW (M4-9)	4 signs	20	SF
RD CLSD (R11-2)	7 signs	70	SF
RD CLSD TO TRAFFIC (R11-4)	3 signs	38	SF
SIDEWALK CLSD (R9-11a)	1 signs	2	SF
SIDEWALK CLSD (R9-9)	40 signs	80	SF
	TOTAL BARRICADE MOUNTED WORK ZONE SIGNS	**234**	**SF**
FLASHING ARROW BOARD			
		2	EA

Estimates Summary for
TIP Project # R-5799

NCProject #:
FA-Project#:
WBS Number 44984.1.1
County: Transylvania
Description: US 64 AT NC 280/US 64 INTERSECTION IMPROVEMENTS

Date of Estimate: 6/6/2023
Prepared By: REM

	PORTABLE CHANGEABLE MESSAGE SIGN		
		2	EA
	DRUMS		
		300	EA
	BARRICADES (TYPE III)		
		80	LF
	PEDESTRIAN CHANNELIZATION DEVICES		
		180	LF
	FLAGGER (BY DAY)		
(2 @ 85 days)		170	DAY
	TEMPORARY CRASH CUSHIONS		
		2	EA
	TMA		
		2	EA

Estimates Summary for
TIP Project # R-5799

NCProject #:
FA-Project#:
WBS Number 44984.1.1
County: Transylvania
Description: US 64 AT NC 280/US 64 INTERSECTION IMPROVEMENTS

Date of Estimate: 6/6/2023
Prepared By: REM

PAINT (4")

P10	(4") YELLOW EDGELINE (1X) PIII	311	LF
P10	(4") YELLOW EDGELINE (1X) PIIS2	148	LF
P10	(4") YELLOW EDGELINE (1X) PVIS2	536	LF
P13	(4") YELLOW DOUBLE CENTER (1X) PI	982	LF
P13	(4") YELLOW DOUBLE CENTER (1X) PIIS1	552	LF
P13	(4") YELLOW DOUBLE CENTER (1X) PIIS2	1740	LF
P13	(4") YELLOW DOUBLE CENTER (1X) PIV	2780	LF
P13	(4") YELLOW DOUBLE CENTER (1X) PV	2728	LF
P1	(4") WHITE EDGELINE (1X) PI	702	LF
P1	(4") WHITE EDGELINE (1X) PIIS1	405	LF
P1	(4") WHITE EDGELINE (1X) PIIS2	417	LF
P1	(4") WHITE EDGELINE (1X) PIV	720	LF
P1	(4") WHITE EDGELINE (1X) PV	1162	LF
P2	(4") WHITE SOLID LANE LINE (1X) PIIS2	22	LF
P2	(4") WHITE SOLID LANE LINE (1X) PIV	274	LF
P2	(4") WHITE SOLID LANE LINE (1X) PV	277	LF
P3	(4") 10 FT. WHITE SKIP (1X) PIIS2	93	LF
P3	(4") 10 FT. WHITE SKIP (1X) PV	306	LF
P4	(4") 3 FT. - 9 FT./SP WHITE MINISKIP (1X) PIIS2	40	LF
P4	(4") 3 FT. - 9 FT./SP WHITE MINISKIP (1X) PIV	63	LF
P4	(4") 3 FT. - 9 FT./SP WHITE MINISKIP (1X) PV	76	LF
P5	(4") 2 FT. - 6 FT./SP WHITE MINISKIP (1X) PV	26	LF
	TOTAL (4")	**14360**	**LF**

Estimates Summary for
TIP Project # R-5799

NCProject #:
FA-Project#:
WBS Number 44984.1.1
County: Transylvania
Description: US 64 AT NC 280/US 64 INTERSECTION IMPROVEMENTS

Date of Estimate: 6/6/2023
Prepared By: REM

	PAINT (6")		
P21	(6") WHITE SOLID LANE LINE (1X) PIIS2	145	LF
P30	(6") YELLOW EDGELINE (1X) PIV	954	LF
	TOTAL (6")	**1099**	**LF**
	PAINT (8")		
P40	(8") WHITE GORELINE (1X) PIV	1731	LF
P42	(8") YELLOW DIAGONAL (1X) PIII	144	LF
P42	(8") YELLOW DIAGONAL (1X) PIIS2	208	LF
P42	(8") YELLOW DIAGONAL (1X) PIV	336	LF
P42	(8") YELLOW DIAGONAL (1X) PV	278	LF
	TOTAL (8")	**2697**	**LF**
	PAINT (24")		
P61	(24") WHITE STOPBAR (1X) PIIS2	145	LF
P61	(24") WHITE STOPBAR (1X) PIV	234	LF
P61	(24") WHITE STOPBAR (1X) PV	218	LF
P62	(24") WHITE CROSSWALK LINE (1X) PIIS2	100	LF
	TOTAL (24")	**697**	**LF**
	PAINT MARKING CHARACTERS		
P100	ALPHANUMERIC CHAR. (1X) PIIS2	4	EA

Estimates Summary for
TIP Project # R-5799

NCProject #:
FA-Project#:
WBS Number 44984.1.1
County: Transylvania
Description: US 64 AT NC 280/US 64 INTERSECTION IMPROVEMENTS

Date of Estimate: 6/6/2023
Prepared By: REM

PAINT MARKING SYMBOLS

P103	24" YIELD LINE TRIANGLE (1X) PIIS1	6	EA
P103	24" YIELD LINE TRIANGLE (1X) PIV	7	EA
P70	LEFT TURN ARROW (1X) PIV	2	EA
P70	LEFT TURN ARROW (1X) PV	3	EA
P71	RIGHT TURN ARROW (1X) PIIS2	3	EA
P71	RIGHT TURN ARROW (1X) PV	2	EA
P72	STRAIGHT ARROW (1X) PIV	1	EA
P72	STRAIGHT ARROW (1X) PV	1	EA
P73	COMBO.STRAIGHT/LEFT (1X) PIIS2	1	EA
P74	COMBO.STRAIGHT/RIGHT (1X) PIIS1	2	EA
P74	COMBO.STRAIGHT/RIGHT (1X) PIV	1	EA
P74	COMBO.STRAIGHT/RIGHT (1X) PV	1	EA
P76	COMBO LEFT/RIGHT/STRAIGHT (1X) PIV	1	EA
	TOTAL MARKING SYMBOLS	**31**	**EA**

(4") PAVEMENT MARKING REMOVAL

(4")	PAVEMENT MARKING REMOVAL	2162	LF
(4")	PAVEMENT MARKING REMOVAL	440	LF
(4")	PAVEMENT MARKING REMOVAL	4354	LF
(4")	PAVEMENT MARKING REMOVAL	614	LF
(4")	PAVEMENT MARKING REMOVAL	460	LF
(4")	PAVEMENT MARKING REMOVAL	26	LF
(4")	PAVEMENT MARKING REMOVAL	188	LF
	TOTAL (4") PAVEMENT MARKING REMOVAL	**8244**	**LF**

Estimates Summary for
TIP Project # R-5799

NCProject #:
FA-Project#:
WBS Number 44984.1.1
County: Transylvania
Description: US 64 AT NC 280/US 64 INTERSECTION IMPROVEMENTS

Date of Estimate: 6/6/2023
Prepared By: REM

REMOVAL OF PAVEMENT MARKING (8")		
REMOVAL OF PAVEMENT MARKING (8")	380	LF
REMOVAL OF PAVEMENT MARKING (8")	1014	LF
TOTAL REMOVAL OF PAVEMENT MARKING (8")	**1394**	**LF**
REMOVAL OF PAVEMENT MARKING (24")		
REMOVAL OF PAVEMENT MARKING (24")	325	LF
REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS		
REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	1	EA
REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	2	EA
REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	11	EA
REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	7	EA
REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	4	EA
REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	1	EA
TOTAL REMOVAL OF PAVEMENT MARKING SYMBOLS & CHARACTERS	**26**	**EA**

RAILROAD CERTIFICATION

TIP / ID NUMBER	R-5799	WBS ELEMENT	44984
COUNTY	Transylvania	FEDERAL AID PROJECT NUMBER	

In connection with the above referenced project, I certify that all necessary and applicable railroad work complies with Federal and State laws and regulations. I further certify that one of the following has application:

_____ 1. Railroad work is complete,

_____ 2. That all necessary arrangements have been made for applicable railroad work to be undertaken and completed as required for proper coordination with the physical construction schedule to the extent deemed necessary. There will be appropriate notification in the contract documents identifying the railroad work that is to be undertaken concurrently with project construction,

Or

____X___ 3. No railroad conflicts.

This certification assures compliance with all applicable Federal and State laws, rules, and policies.

DATE: 02/10/2023 APPROVED DocuSigned by: Keith L Rogers 0C6880CA3764463...

Division Project Engineer

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. **SAW-2022-02043** County: **Transylvania County** U.S.G.S. Quad: **Pisgah Forest**

GENERAL PERMIT (REGIONAL AND NATIONWIDE) VERIFICATION

Permittee: **North Carolina Department of Transportation**
Mr. Kevin Barnett
Address: **253 Webster Road**
Sylva NC, 28779

Nearest Town **Pisgah Forest**
Nearest Waterway **Davidson River** River Basin **French Broad-Holston**
USGS HUC **06010105** Coordinates Latitude: **35.272801;**
Longitude: **-82.705099**

Location description: **The R5799 project is located along US 64, Hwy 276 and Hwy 280 were they intersect at a four way intersection in Pisgah Forest, Transylvania County, North Carolina.**

Description of projects area and activity: **This permit verification authorizes construction of two traffic circles (one at the entrance to Pisgah National Forest and one at Ecusta Rd.) and will result in the permanent impact to 371 lf of stream channel and 0.01 acres of wetland impact.**

Applicable Law: ☒ Section 404 (Clean Water Act, 33 USC 1344);
☐ Section 10 (Rivers and Harbors Act, 33 USC 403)

Authorization: Regional General Permit Number and/or Nationwide Permit Number: **GP 50 - NCDOT - Bridge, Road Widenings and Interchanges**
SEE ATTACHED RGP or NWP GENERAL, REGIONAL AND/OR SPECIAL CONDITIONS

Special Conditions

1) **Endangered Species: In order to avoid and minimize effects to endangered species DOT will comply with the following measure.**
    a. **NCDOT will remove trees between October 15 and April 1, outside the bat active season.**
    b. **NCDOT will comply with Best Management Practices as outlined in the Standards Manual for sensitive waters.**
    c. **NCDOT will conduct bat roost surveys on all culverts and bridges that will be widened, extended, or otherwise impacted by the project within two years of the start of construction. NCDOT will notify the U.S. Fish and Wildlife Service (Service) if bats are discovered.**
    d. **NCDOT or other parties will not install new permanent lighting as part of the project or as a consequence of the proposed action.**
    e. **NCDOT will ensure temporary lighting for night work is shielded and faces away from waterways and riparian areas.**
2) **In order to compensate for impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the**

attached Compensatory Mitigation Responsibility Transfer Form. The requirements of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit authorization.

Your work is authorized by the above referenced permit provided it is accomplished in strict accordance with the attached conditions and your submitted application dated September 1, 2022 and the ensuing record. Any violation of the attached conditions or deviation from your submitted plans may subject the permittee to a stop work order, a restoration order, a Class I administrative penalty, and/or appropriate legal action.

This verification will remain valid until the expiration date identified below unless the nationwide and/or regional general permit authorization is modified, suspended or revoked. If, prior to the expiration date identified below, the nationwide and/or regional general permit authorization is reissued and/or modified, this verification will remain valid until the expiration date identified below, provided it complies with all requirements of the modified nationwide permit. If the nationwide and/or regional general permit authorization expires or is suspended, revoked, or is modified, such that the activity would no longer comply with the terms and conditions of the nationwide permit, activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon the nationwide and/or regional general permit, will remain authorized provided the activity is completed within twelve months of the date of the nationwide and/or regional general permit's expiration, modification or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend or revoke the authorization.

Activities subject to Section 404 (as indicated above) may also require an individual Section 401 Water Quality Certification. You should contact the NC Division of Water Resources (telephone 919-807-6300) to determine Section 401 requirements.

For activities occurring within the twenty coastal counties subject to regulation under the Coastal Area Management Act (CAMA), prior to beginning work you must contact the N.C. Division of Coastal Management in Morehead City, NC, at (252) 808-2808.

This Department of the Army verification does not relieve the permittee of the responsibility to obtain any other required Federal, State or local approvals/permits.

If there are any questions regarding this verification, any of the conditions of the Permit, or the Corps of Engineers regulatory program, please contact **Crystal Amschler at (828) 271-7980 X 4231 or Crystal.C.Amschler@usace.army.mil**.

Corps Regulatory Official: Mark Matthews 2023.05.08 07:06:05 -04'00' Date: **May 8, 2023**
Expiration Date of Verification: **May 25, 2025**

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete our Customer Satisfaction Survey, located online at https://regulatory.ops.usace.army.mil/customer-service-survey/

Action ID Number: SAW-2022-02043 **County:** Transylvania County

Permittee: North Carolina Department of Transportation

Project Name: NCDOT / US 64, US 276, and NC 280 / R-5799 / Transylvania County / Div 14

Date Verification Issued: May 8, 2023

Project Manager: Crystal Amschler

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

US ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT
Attn: Crystal Amschler, Project Manager
WRDA-Transportation Permitting Branch
151 Patton Avenue, Room 208
Asheville, North Carolina 28801

Please note that your permitted activity is subject to a compliance inspection by a U. S. Army Corps of Engineers representative. Failure to comply with any terms or conditions of this authorization may result in the Corps suspending, modifying or revoking the authorization and/or issuing a Class I administrative penalty, or initiating other appropriate legal action.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and condition of the said permit, and required mitigation was completed in accordance with the permit conditions.

_____ _____

Signature of Permittee **Date**

U.S. ARMY CORPS OF ENGINEERS
Wilmington District
Compensatory Mitigation Responsibility Transfer Form

Permittee: NCDOT, Division 12 **Action ID: SAW-2022-02043**
Project Name: US 64, US 276, and NC 280 / R-5799 **County:** Transylvania

Instructions to Permittee: The Permittee must provide a copy of this form to the Mitigation Sponsor, either an approved Mitigation Bank or the North Carolina Division of Mitigation Services (NCDMS), who will then sign the form to verify the transfer of the mitigation responsibility. Once the Sponsor has signed this form, it is the Permittee's responsibility to ensure that to the U.S. Army Corps of Engineers (USACE) Project Manager identified on page two is in receipt of a signed copy of this form before conducting authorized impacts, unless otherwise specified below. If more than one mitigation Sponsor will be used to provide the mitigation associated with the permit, or if the impacts and/or the mitigation will occur in more than one 8-digit Hydrologic Unit Code (HUC), multiple forms will be attached to the permit, and the separate forms for each Sponsor and/or HUC must be provided to the appropriate mitigation Sponsors.

Instructions to Sponsor: The Sponsor must verify that the mitigation requirements (credits) shown below are available at the identified site. By signing below, the Sponsor is accepting full responsibility for the identified mitigation, regardless of whether or not they have received payment from the Permittee. Once the form is signed, the Sponsor must update the bank ledger and provide a copy of the signed form and the updated bank ledger to the Permittee, the USACE Project Manager, and the Wilmington District Mitigation Office (see contact information on page 2). The Sponsor must also comply with all reporting requirements established in their authorizing instrument.

Permitted Impacts and Compensatory Mitigation Requirements

Permitted Impacts Requiring Mitigation*: **8-digit HUC and Basin:** 06010105, French Broad River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
		371				

*If more than one mitigation sponsor will be used for the permit, only include impacts to be mitigated by this sponsor.

Compensatory Mitigation Requirements: **8-digit HUC and Basin:** 06010105, French Broad River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
		742				

Mitigation Site Debited: NC DMS
(List the name of the bank to be debited. For umbrella banks, also list the specific site. For NCDMS, list NCDMS. If the NCDMS acceptance letter identifies a specific site, also list the specific site to be debited).

Section to be completed by the Mitigation Sponsor

Statement of Mitigation Liability Acceptance: I, the undersigned, verify that I am authorized to approve mitigation transactions for the Mitigation Sponsor shown below, and I certify that the Sponsor agrees to accept full responsibility for providing the mitigation identified in this document (see the table above), associated with the USACE Permittee and Action ID number shown. I also verify that released credits (and/or advance credits for NCDMS), as approved by the USACE, are currently available at the mitigation site identified above. Further, I understand that if the Sponsor fails to provide the required compensatory mitigation, the USACE Wilmington District Engineer may pursue measures against the Sponsor to ensure compliance associated with the mitigation requirements.

Mitigation Sponsor Name: _____

Name of Sponsor's Authorized Representative: _____

_____ _____
Signature of Sponsor's Authorized Representative **Date of Signature**

USACE Wilmington District
Compensatory Mitigation Responsibility Transfer Form, Page 2

Conditions for Transfer of Compensatory Mitigation Credit:

- Once this document has been signed by the Mitigation Sponsor and the USACE is in receipt of the signed form, the Permittee is no longer responsible for providing the mitigation identified in this form, though the Permittee remains responsible for any other mitigation requirements stated in the permit conditions.
- Construction within jurisdictional areas authorized by the permit identified on page one of this form can begin only after the USACE is in receipt of a copy of this document signed by the Sponsor, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein. For authorized impacts conducted by the North Carolina Department of Transportation (NCDOT), construction within jurisdictional areas may proceed upon permit issuance; however, a copy of this form signed by the Sponsor must be provided to the USACE within 30 days of permit issuance. NCDOT remains fully responsible for the mitigation until the USACE has received this form, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein.
- Signed copies of this document must be retained by the Permittee, Mitigation Sponsor, and in the USACE administrative records for both the permit and the Bank/ILF Instrument. It is the Permittee's responsibility to ensure that the USACE Project Manager (address below) is provided with a signed copy of this form.
- If changes are proposed to the type, amount, or location of mitigation after this form has been signed and returned to the USACE, the Sponsor must obtain case-by-case approval from the USACE Project Manager and/or North Carolina Interagency Review Team (NCIRT). If approved, higher mitigation ratios may be applied, as per current District guidance and a new version of this form must be completed and included in the USACE administrative records for both the permit and the Bank/ILF Instrument.

Comments/Additional Conditions:

This form is not valid unless signed below by the USACE Project Manager and by the Mitigation Sponsor on Page 1. ***Once signed, the Sponsor should provide copies of this form along with an updated bank ledger to: 1) the Permittee, 2) the USACE Project Manager at the address below, and 3) the Wilmington District Mitigation Office, Attn: Todd Tugwell, 3331 Heritage Trade Drive, Suite 105, Wake Forest, NC 27587 (email: todd.tugwell@usace.army.mil)***. Questions regarding this form or any of the permit conditions may be directed to the USACE Project Manager below.

USACE Project Manager: Crystal Amschler
USACE Field Office: Asheville Regulatory Field Office
US Army Corps of Engineers
151 Patton Avenue, Room 208
Asheville, NC 28801-5006

Email:

Crystal Amschler Digitally signed by Crystal Amschler
Date: 2023.05.05 14:19:06 -04'00'

USACE Project Manager Signature

Click here to enter a date.

Date of Signature

Current Wilmington District mitigation guidance, including information on mitigation ratios, functional assessments, and mitigation bank location and availability, and credit classifications (including stream temperature and wetland groupings) is available at http://ribits.usace.army.mil.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.06; Released June 2016)

WBS Element: 44984.1.1 **TIP No.:** R-5799 **County(ies):** Transylvania

General Project Information

WBS Element:	44984.1.1	**TIP Number:**	R-5799	**Project Type:** Roadway Widening	**Date:** 8/4/2020
NCDOT Contact:	Barry Mosteller	**Contractor / Designer:**	Richard Bollinger, PE		
Address:	253 Webster Road Sylva, NC 28779		**Address:**	8521 Six Forks Rd. Suite 400 Raleigh, NC 27615	
Phone:	(828) 488-0902		**Phone:**	(919) 926-4105	
Email:	bdmosteller@ncdot.gov		**Email:**	richard.bollinger@rsandh.com	
City/Town:	Brevard	**County(ies):**	Transylvania		
River Basin(s):	French Broad	**CAMA County?**	No		
Wetlands within Project Limits?	Yes				

Project Description

Project Length (lin. miles or feet):	0.492 mi	**Surrounding Land Use:**	Commercial, Residential
	Proposed Project		**Existing Site**
Project Built-Upon Area (ac.)	11.8 ac.		9.8 ac.
Typical Cross Section Description:	Along US 64/US 276/NC 280, -L- Sta. 7+00.00 to Sta. 13+25.28 has two 11' lanes eastbound, with an 11' right turn lane, and a variable 0-11' left turn lane. There is a 4' FDPS on the right. There are two 11' lanes westbound, with a variable 0-11' left turn lane and a 10' multi-use path on the far left. Along US 64, -Y2- Sta. 10+85.01 to Sta. 14+29.21 there is one right side lane, with variable 11-15' width, as well as a 5' bike lane, followed by a 4' berm and a 5' sidewalk. The left side has a dual straight/left turn lane of variable 11-15' width, as well as a right turn lane of variable 11-15' width, followed by a 5' bike lane, a 4' berm and a 5' sidewalk.		Along existing US/64/US 276/NC 280, headed eastbound, there are two 11' lanes, with an 11' right turn lane. Westbound, there are two 11' lanes, as well as a variable width left turn lane, and a 4' paved shoulder. Along existing US 64 towards Penrose, there is one 12' lane on either side, as well as a 14' left/right middle turn lane.
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 29,800 Year: 2040		Existing: 23,800 Year: 2017
General Project Narrative: (Description of Minimization of Water Quality Impacts)	This is an intersection improvement project. The current intersection between US 64 and NC 276 is being upgraded to include two roundabouts. There are 5 impact sites, which occur at a channel change, proposed pipe installations, culvert extension, and shoulder widening. Rip rap pads are to be installed at the outlet of each proposed pipe to lower velocities into the jurisdictional streams. The banks will be stabilized with rip rap either side of the extended culvert on the upstream and downstream side. Permanent surface water quality impacts will occur at the first four sites, as well as temporary impacts during construction. The fifth site includes fill in wetland and hand clearing impacts. NCDOT will attempt to avoid and minimize impacts to streams and wetlands to the greatest extent practicable during project design.		

Waterbody Information

Surface Water Body (1):	Davidson River	**NCDWR Stream Index No.:**	6-34-(15.5)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply V (WS-V)	Class B	
		Supplemental Classification:		Trout Waters (Tr)	
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No Comments:				
NRTR Stream ID:	DR			**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	Yes	**Deck Drains Discharge Over Buffer?**	No	**Dissipator Pads Provided in Buffer?**	No
Deck Drains Discharge Over Water Body?	No	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS

(Version 2.06; Released June 2016)

WBS Element: 44984.1.1 **TIP No.:** R-5799 **County(ies):** Transylvania

Additional Waterbody Information

Surface Water Body (2):	Turkey Creek		**NCDWR Stream Index No.:**	6-34-20	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply V (WS-V)	Class B	
		Supplemental Classification:		Trout Waters (Tr)	
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	TC			**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	No	**Dissipator Pads Provided in Buffer?**	No
Deck Drains Discharge Over Water Body?	No	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (3):			**NCDWR Stream Index No.:**		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**			
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:				**Buffer Rules in Effect:**	
Project Includes Bridge Spanning Water Body?		**Deck Drains Discharge Over Buffer?**		**Dissipator Pads Provided in Buffer?**	
Deck Drains Discharge Over Water Body?		(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (4):			**NCDWR Stream Index No.:**		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**			
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:				**Buffer Rules in Effect:**	
Project Includes Bridge Spanning Water Body?		**Deck Drains Discharge Over Buffer?**		**Dissipator Pads Provided in Buffer?**	
Deck Drains Discharge Over Water Body?		(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (5):			**NCDWR Stream Index No.:**		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**			
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:				**Buffer Rules in Effect:**	
Project Includes Bridge Spanning Water Body?		**Deck Drains Discharge Over Buffer?**		**Dissipator Pads Provided in Buffer?**	
Deck Drains Discharge Over Water Body?		(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

09/08/59

TIP PROJECT: R-5799

CONTRACT:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

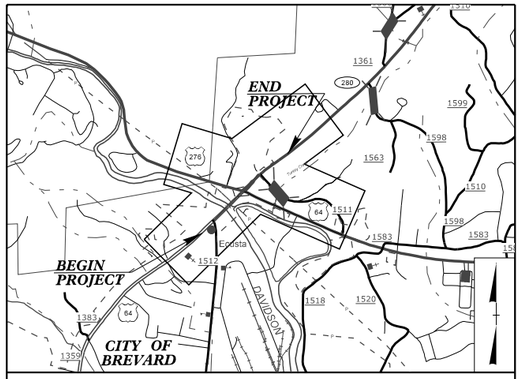
TRANSYLVANIA COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5799	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
44984.1.1	N/A	P.E.
44984.2.1	N/A	ROW, UTIL
44984.3.1	N/A	CONST
44984.3.2	N/A	LANDSCAPE

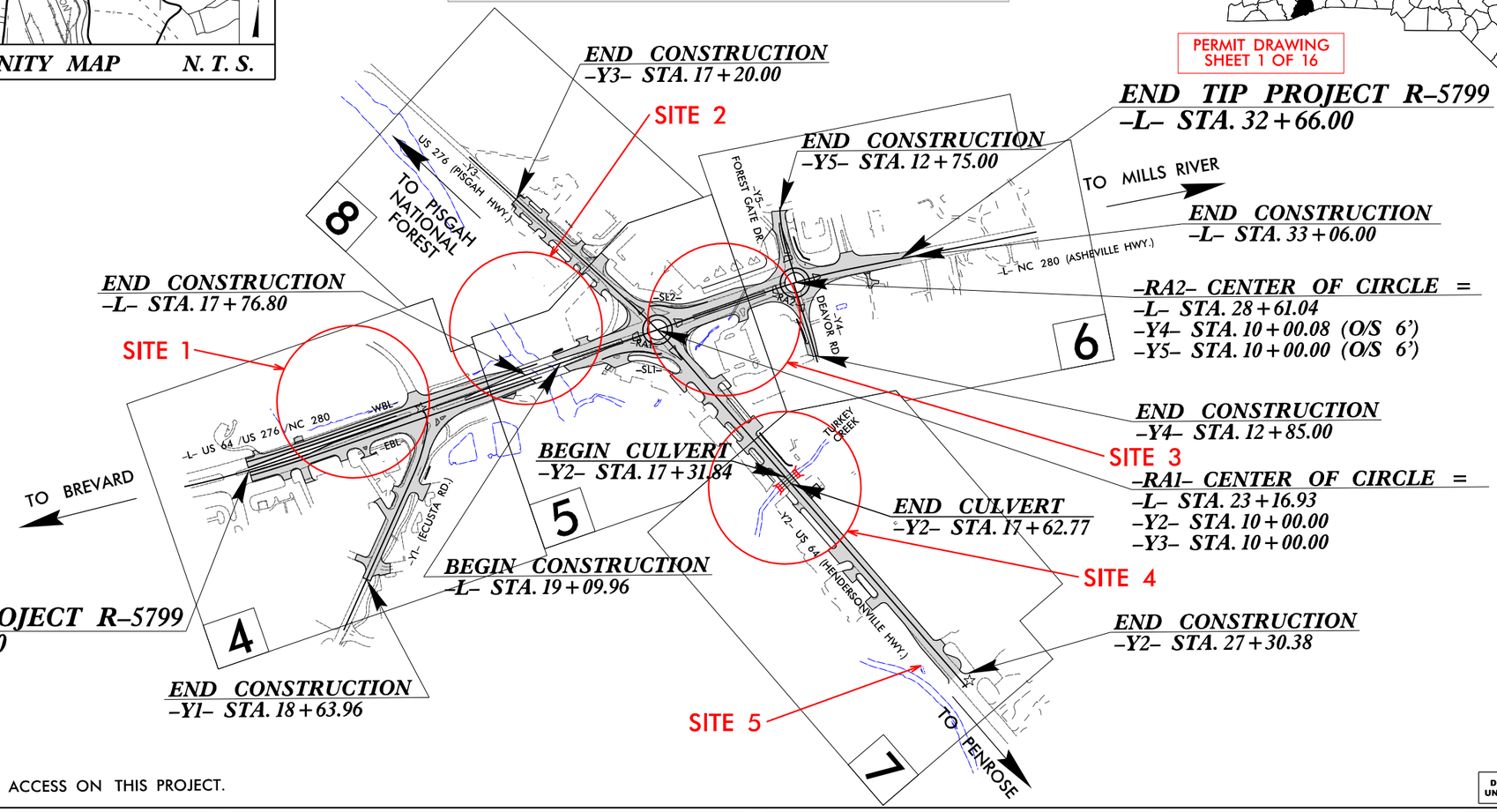
LOCATION: INTERSECTIONS OF US 64, US 276 AND NC 280
CONSTRUCT INTERSECTION IMPROVEMENTS
TYPE OF WORK: GRADING, PAVING, DRAINAGE, CULVERT, RETAINING WALLS, SIGNALS, AND SIGNING

WETLAND AND SURFACE WATER IMPACTS PERMIT



VICINITY MAP N. T. S.

PERMIT DRAWING
SHEET 1 OF 16



NAD 83/NA 2011

☆ EXISTING SIGNAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

THERE IS NO CONTROL OF ACCESS ON THIS PROJECT.

GRAPHIC SCALES

50 0 50 100
PLANS

50 0 50 100
PROFILE (HORIZONTAL)

10 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2021 = 24,900
ADT 2041 = 30,000
K = 9 %
D = 55 %
T = 6 % *
V = 45 MPH
* TTST =2% + DUAL 4%
FUNC CLASS =
PRINCIPAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R–5799 = 0.461 MILES

TOTAL LENGTH TIP PROJECT R–5799 = 0.461 MILES

–L– USED TO CALCULATE PROJECT LENGTH

PREPARED IN THE OFFICE OF:
RS&H
1520 SOUTH BOULEVARD, SUITE 200
CHARLOTTE, NC 28203
NC FIRM LICENSE No: F-0493
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 16, 2021

LETTING DATE:
AUGUST 15, 2023

ALLISON DRAKE, PE
PROJECT ENGINEER

DREW MORROW, PE
PROJECT DESIGN ENGINEER

BARRY MOSTELLER
NCDOT CONTACT

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION ·

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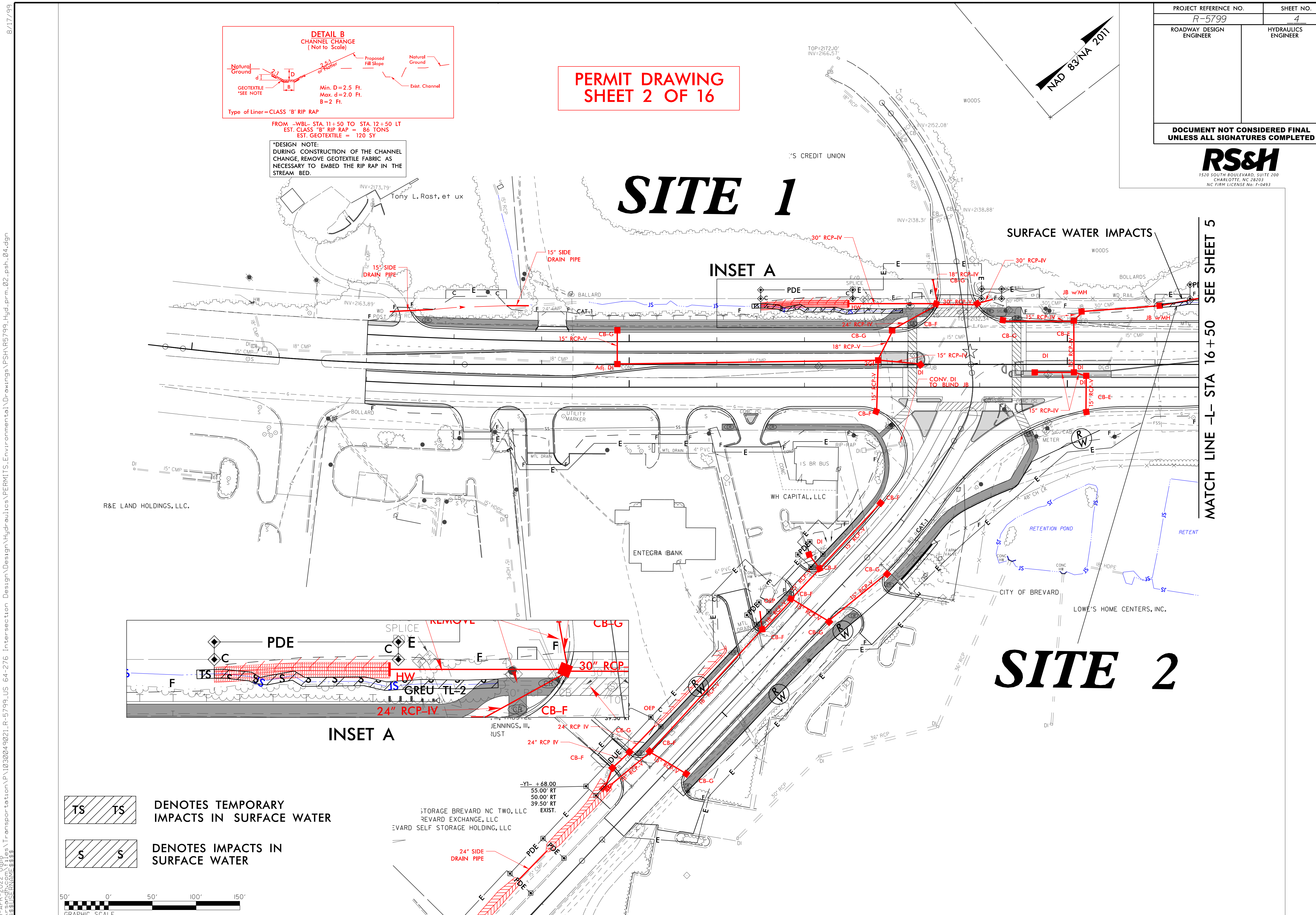

PROJECT REFERENCE NO.
R-5799
SHEET NO.
4
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
RS&H
1520 SOUTH BOULEVARD, SUITE 200
CHARLOTTE, NC 28203
NC FIRM LICENSE No: F-0493
NAD 83/NA 2011
PERMIT DRAWING
SHEET 2 OF 16
DETAIL B
CHANNEL CHANGE
(Not to Scale)
Natural Ground
Proposed Fill Slope
Exist. Channel
GEOTEXTILE *SEE NOTE
Min. D=2.5 Ft.
Max. d=2.0 Ft.
B=2 Ft.
Type of Liner=CLASS 'B' RIP RAP
FROM -WBL- STA. 11+50 TO STA. 12+50 LT
EST. CLASS "B" RIP RAP = 86 TONS
EST. GEOTEXTILE = 120 SY
*DESIGN NOTE:
DURING CONSTRUCTION OF THE CHANNEL CHANGE, REMOVE GEOTEXTILE FABRIC AS NECESSARY TO EMBED THE RIP RAP IN THE STREAM BED.
SITE 1
SITE 2
INSET A
SURFACE WATER IMPACTS
MATCH LINE -L- STA 16+50 SEE SHEET 5
Tony L. Rast, et ux
R&E LAND HOLDINGS, LLC.
ENTEGRA BANK
WH CAPITAL, LLC
CITY OF BREVARD
LOWE'S HOME CENTERS, INC.
RETENTION POND
WOODS
15" SIDE DRAIN PIPE
24" SIDE DRAIN PIPE
30" RCP-IV
24" RCP-IV
CB-F
CB-G
PDE
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
GRAPHIC SCALE
50' 0' 50' 100' 150'

8/17/99

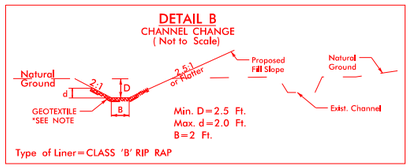
PROJECT REFERENCE NO.	SHEET NO.
R-5799	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

RS&H
1520 SOUTH BOULEVARD, SUITE 200
CHARLOTTE, NC 28203
NC FIRM LICENSE No: F-0493

PERMIT DRAWING
SHEET 3 OF 16

DETAIL B
CHANNEL CHANGE
(Not to Scale)



Type of Liner=CLASS 'B' RIP RAP

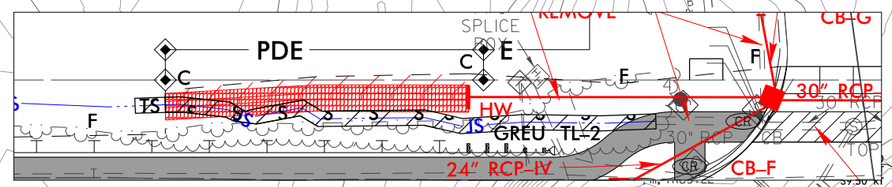
FROM –WBL– STA. 11+50 TO STA. 12+50 LT
EST. CLASS "B" RIP RAP = 86 TONS
EST. GEOTEXTILE = 120 SY

*DESIGN NOTE:
DURING CONSTRUCTION OF THE CHANNEL CHANGE, REMOVE GEOTEXTILE FABRIC AS NECESSARY TO EMBED THE RIP RAP IN THE STREAM BED.

SITE 1

SURFACE WATER IMPACTS

INSET A



MATCH LINE –L– STA 16+50 SEE SHEET 5

SITE 2

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

50' 0' 50' 100' 150'
GRAPHIC SCALE

29-APR-2022 08:03
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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-5799	5

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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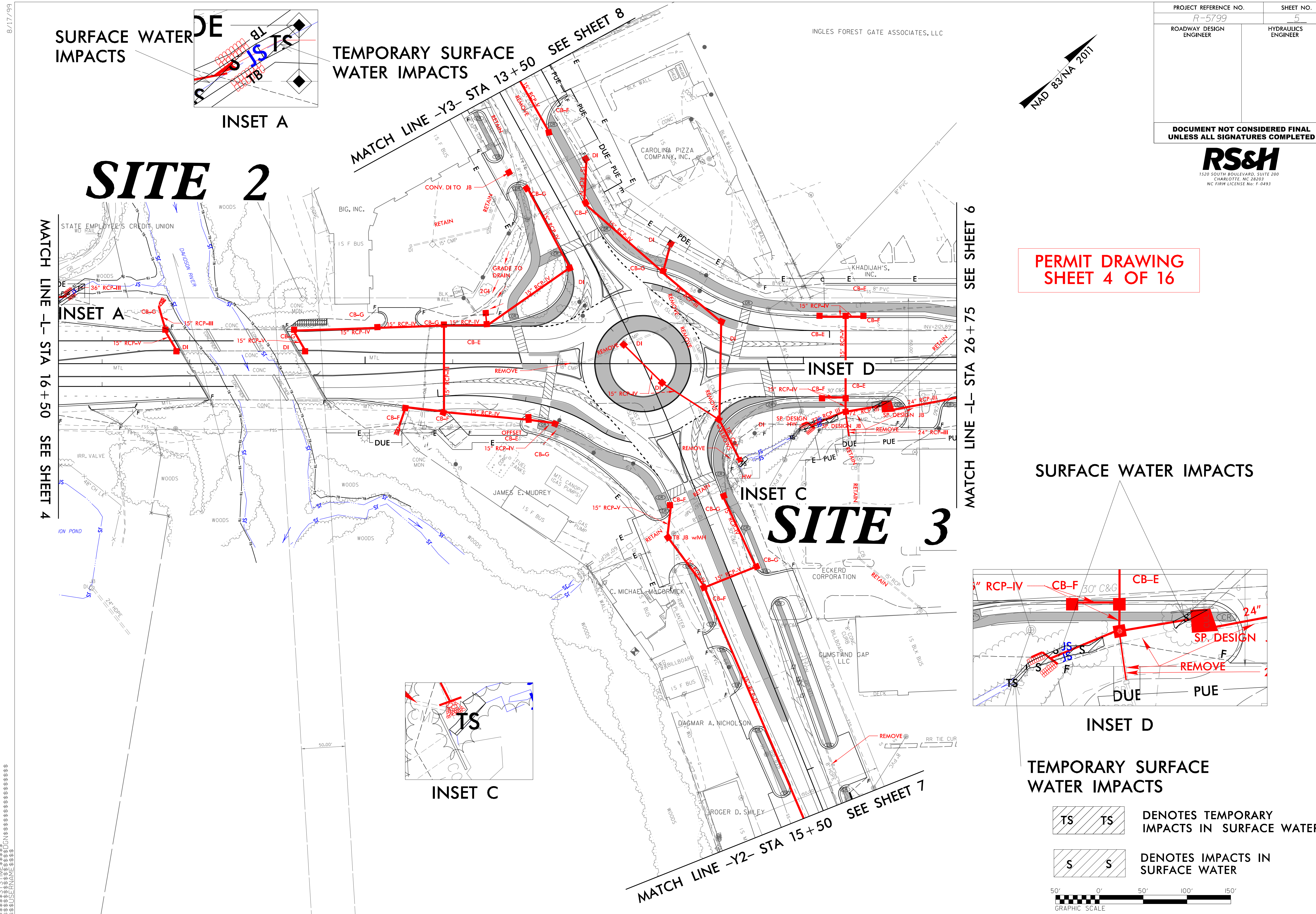
1520 SOUTH BOULEVARD, SUITE 200
CHARLOTTE, NC 28203
NC FIRM LICENSE No: F-0493

PERMIT DRAWING
SHEET 4 OF 16



PROJECT REFERENCE NO.	SHEET NO.
R-5799	5

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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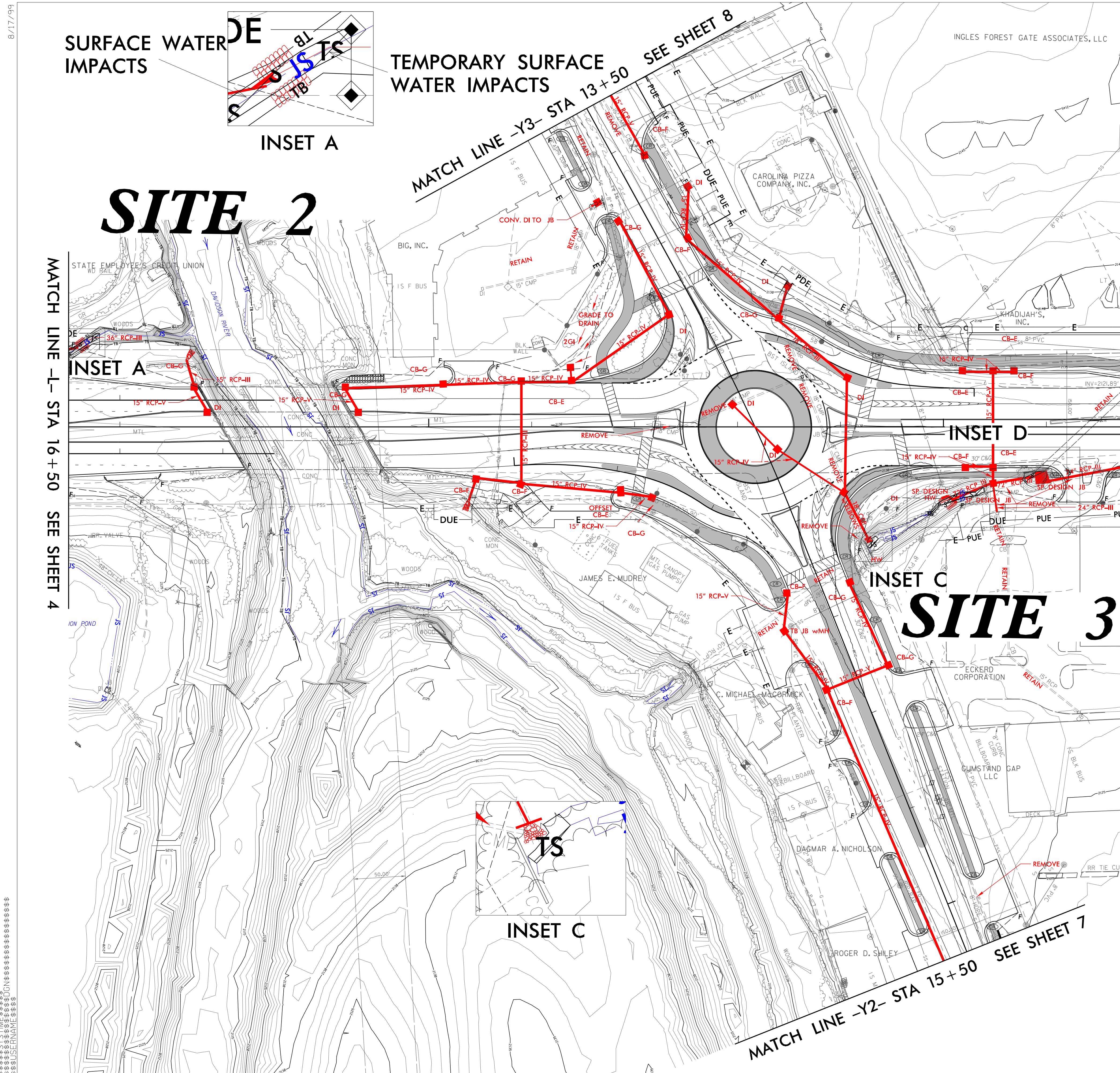
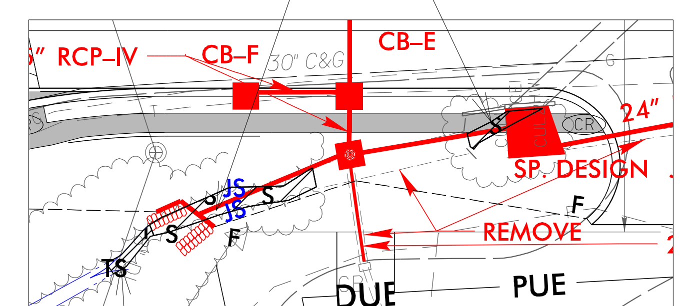
1520 SOUTH BOULEVARD, SUITE 200
CHARLOTTE, NC 28203
NC FIRM LICENSE No: F-0493

PERMIT DRAWING
SHEET 5 OF 16





SURFACE WATER IMPACTS

INSET D

TEMPORARY SURFACE WATER IMPACTS

TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S S	DENOTES IMPACTS IN SURFACE WATER

50' 0' 50' 100' 150'
GRAPHIC SCALE

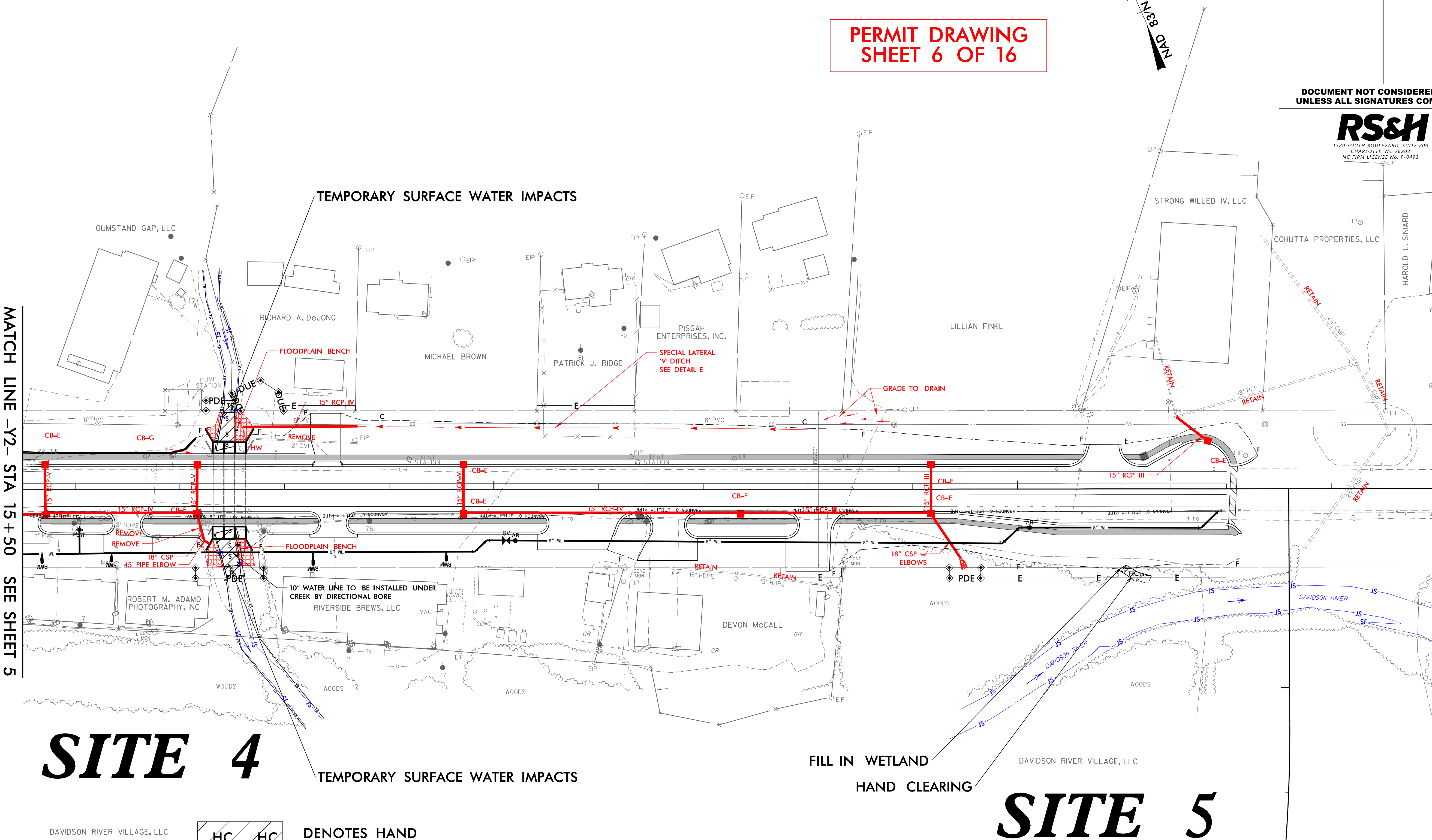
8/17/99

$$$$$$$SYSTIME$$$$$
$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-5799	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

RS&H
1520 SOUTH BOULEVARD, SUITE 200
CHARLOTTE, NC 28203
NC FIRM LICENSE No: F-0493



DAVIDSON RIVER VILLAGE, LLC

Symbol	Meaning
HC HC	DENOTES HAND CLEARING
F F	DENOTES FILL IN WETLAND
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S S	DENOTES IMPACTS IN SURFACE WATER

50' 0' 50' 100' 150'
GRAPHIC SCALE

8/17/99
$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$
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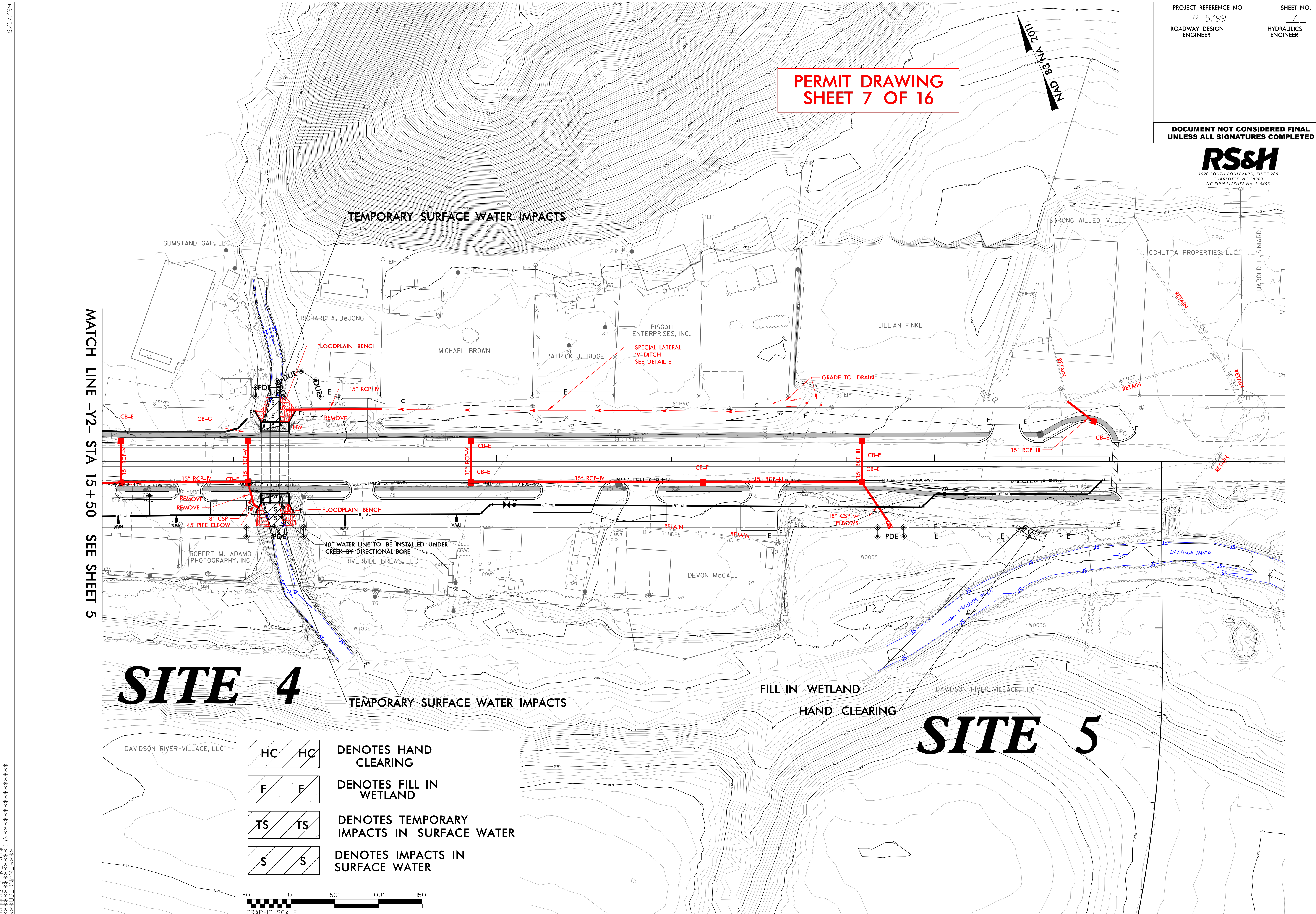
PROJECT REFERENCE NO.
R-5799
SHEET NO.
7
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
RS&H
1520 SOUTH BOULEVARD, SUITE 200
CHARLOTTE, NC 28203
NC FIRM LICENSE No: F-0493
PERMIT DRAWING
SHEET 7 OF 16
NAD 83/NA 2011
MATCH LINE -Y2- STA 15+50 SEE SHEET 5
TEMPORARY SURFACE WATER IMPACTS
GUMSTAND GAP, LLC
RICHARD A. DeJONG
MICHAEL BROWN
PATRICK J. RIDGE
PISGAH ENTERPRISES, INC.
LILLIAN FINKL
STRONG WILLED IV, LLC
COHUTTA PROPERTIES, LLC
HAROLD L. SINIARD
FLOODPLAIN BENCH
SPECIAL LATERAL 'V' DITCH SEE DETAIL E
GRADE TO DRAIN
15" RCP IV
REMOVE 12" CMP
RETAIN
18" RCP
24" CMP
15" RCP III
CB-E
CB-G
CB-F
15" RCP-IV
15" RCP-V
15" RCP-III
REMOVE
18" CSP
45 PIPE ELBOW
18" CSP w/ ELBOWS
15" HDPE
10" WATER LINE TO BE INSTALLED UNDER CREEK BY DIRECTIONAL BORE
ROBERT M. ADAMO PHOTOGRAPHY, INC
RIVERSIDE BREWS, LLC
DEVON McCALL
DAVIDSON RIVER
WOODS
DAVIDSON RIVER VILLAGE, LLC
SITE 4
SITE 5
FILL IN WETLAND
HAND CLEARING
HC HC DENOTES HAND CLEARING
F F DENOTES FILL IN WETLAND
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S S DENOTES IMPACTS IN SURFACE WATER
50' 0' 50' 100' 150'
GRAPHIC SCALE
8/17/99

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-5799	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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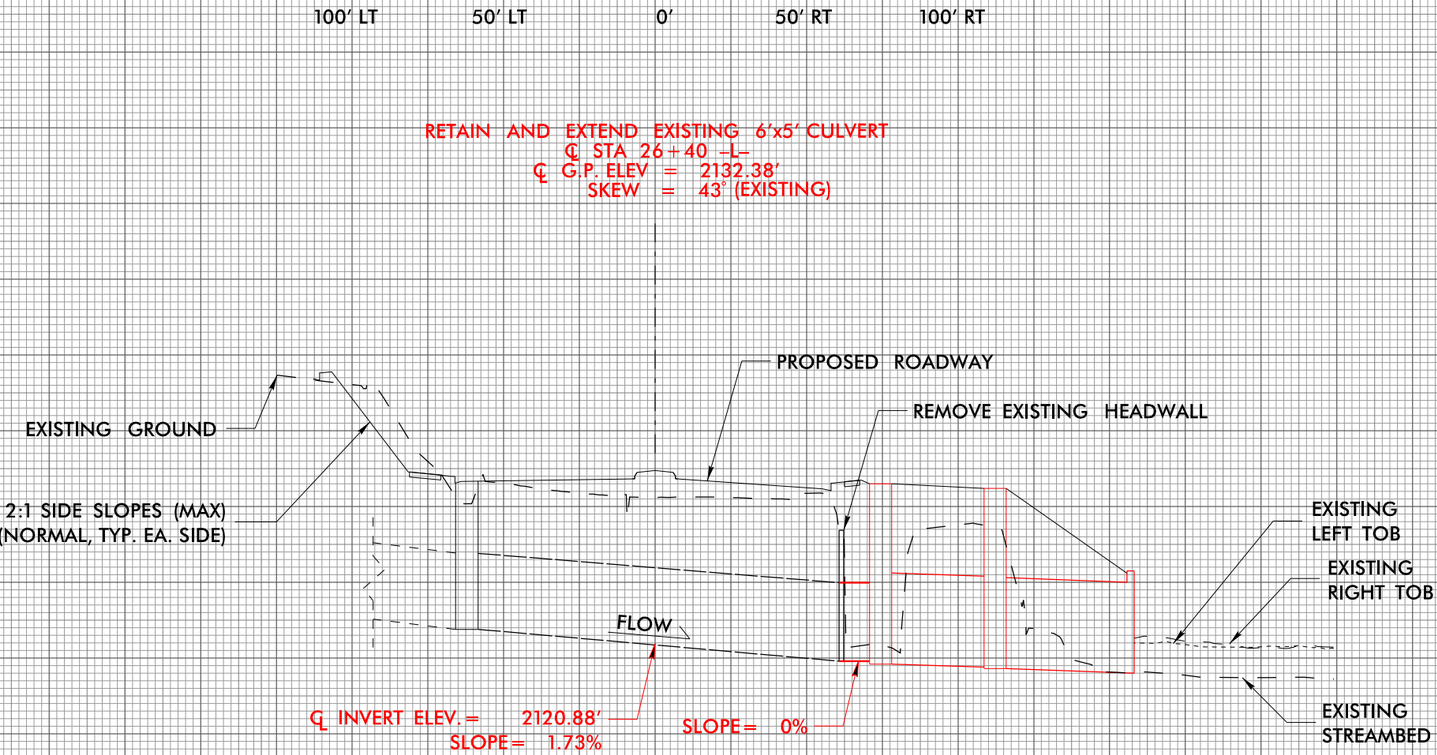
PERMIT DRAWING
SHEET 8 OF 16

SITE 3



PLANS PREPARED BY:

RS&H

1520 SOUTH BOULEVARD, SUITE 200
CHARLOTTE, NC 28203
NC FIRM LICENSE No: F-0493

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PROJECT REFERENCE NO.	SHEET NO.
R-5799	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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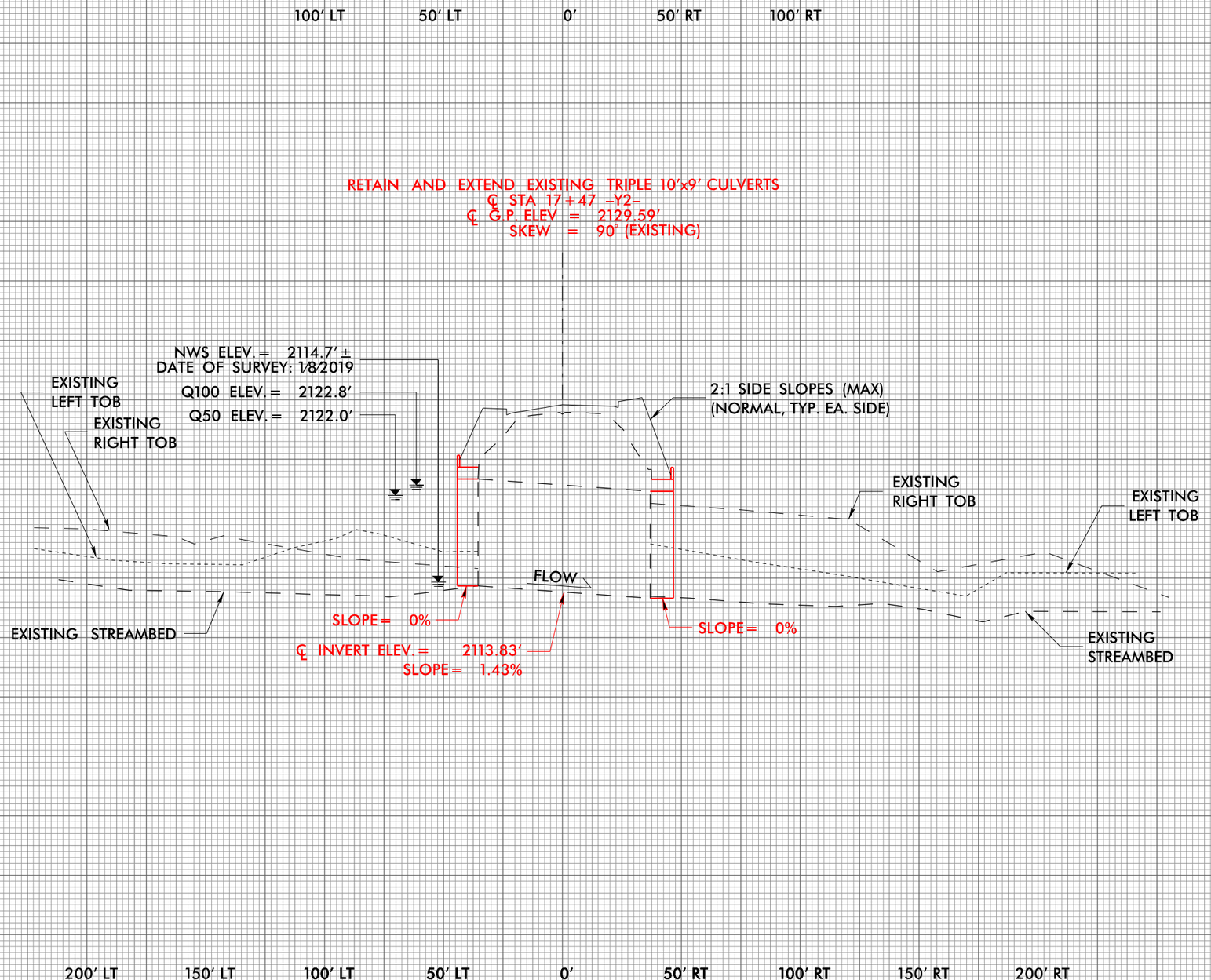
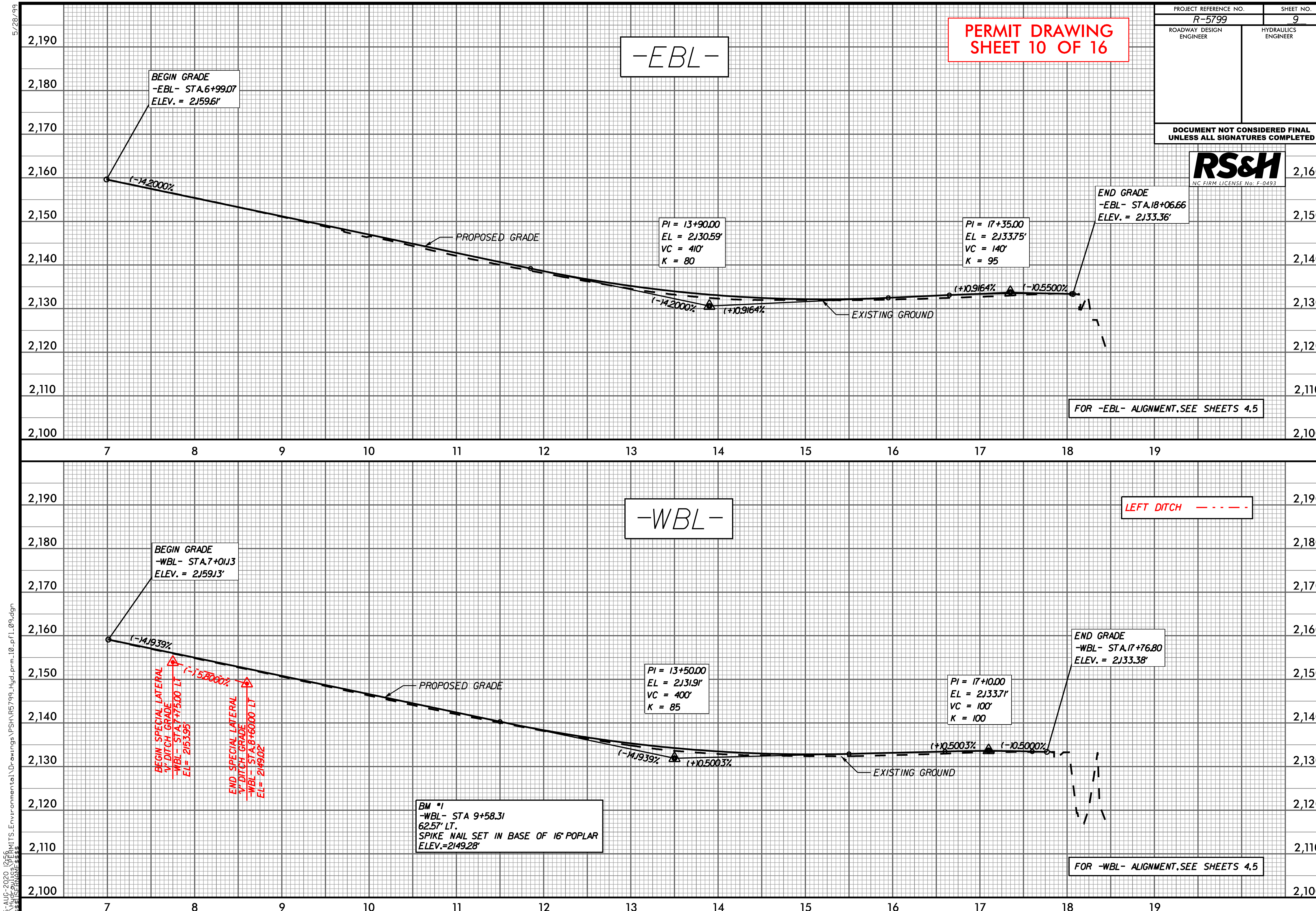
PERMIT DRAWING
SHEET 9 OF 16

SITE 4



PLANS PREPARED BY:

RS&H
1520 SOUTH BOULEVARD, SUITE 200
CHARLOTTE, NC 28203
NC FIRM LICENSE No: F-0493


PROJECT REFERENCE NO.
R-5799
SHEET NO.
9
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
RS&H
NC FIRM LICENSE No: F-0493
PERMIT DRAWING SHEET 10 OF 16
-EBL-
BEGIN GRADE
-EBL- STA.6+99.07
ELEV. = 2,159.61'
(-)4.2000%
PROPOSED GRADE
PI = 13+90.00
EL = 2,130.59'
VC = 410'
K = 80
(-)4.2000%
(+)0.9164%
EXISTING GROUND
PI = 17+35.00
EL = 2,133.75'
VC = 140'
K = 95
(+)0.9164%
(-)0.5500%
END GRADE
-EBL- STA.18+06.66
ELEV. = 2,133.36'
FOR -EBL- ALIGNMENT,SEE SHEETS 4,5
2,190
2,180
2,170
2,160
2,150
2,140
2,130
2,120
2,110
2,100
7
8
9
10
11
12
13
14
15
16
17
18
19
-WBL-
LEFT DITCH
BEGIN GRADE
-WBL- STA.7+01.13
ELEV. = 2,159.13'
(-)4.1939%
(-)5.3000%
BEGIN SPECIAL LATERAL 'V' DITCH GRADE -WBL- STA.7+75.00 LT EL= 2153.95'
END SPECIAL LATERAL 'V' DITCH GRADE -WBL- STA.8+60.00 LT EL= 2149.02'
PROPOSED GRADE
BM #1
-WBL- STA 9+58.31
62.57' LT.
SPIKE NAIL SET IN BASE OF 16" POPLAR
ELEV.=2149.28'
PI = 13+50.00
EL = 2,131.91'
VC = 400'
K = 85
(-)4.1939%
(+)0.5003%
EXISTING GROUND
PI = 17+10.00
EL = 2,133.71'
VC = 100'
K = 100
(+)0.5003%
(-)0.5000%
END GRADE
-WBL- STA.17+76.80
ELEV. = 2,133.38'
FOR -WBL- ALIGNMENT,SEE SHEETS 4,5
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PROJECT REFERENCE NO.	SHEET NO.
R-5799	10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 11 OF 16

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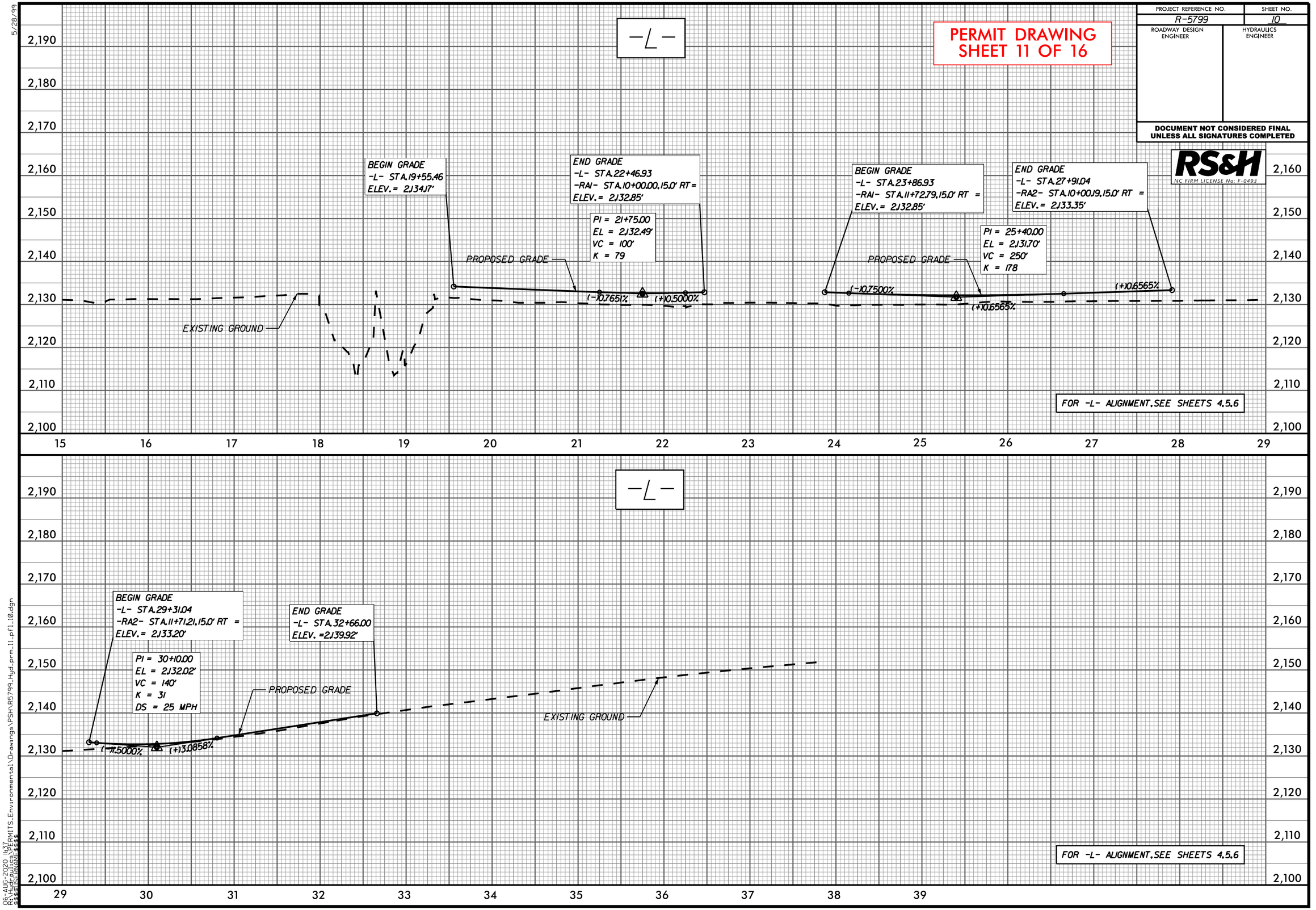

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PROJECT REFERENCE NO.	SHEET NO.
R-5799	11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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NC FIRM LICENSE No: F-0493

PERMIT DRAWING SHEET 12 OF 16

-RA1-

BEGIN GRADE
-RA1- STA.10+00.00
ELEV. = 2133.00'
-L- STA.22+61.93

-RA1- STA.12+83.49
ELEV. = 2133.00'
-Y3- STA.10+55.00

END GRADE
-RA1- STA.13+45.58
ELEV. = 2133.00'

PROPOSED GRADE
(+)0.0000%
(+)0.0000%
EXISTING GROUND

-RA1- STA.11+09.19
ELEV. = 2133.00'
-Y2- STA.10+55.00

-RA1- STA.11+72.79
ELEV. = 2133.00'
-L- STA.23+71.93

FOR -RA1- ALIGNMENT.SEE SHEET 5

-RA2-

BEGIN GRADE
-RA2- STA.10+00.00
ELEV. = 2133.50'
-L- STA.28+06.04

END GRADE
-RA2- STA.13+45.57
ELEV. = 2133.50'

-RA2- STA.12+52.35
ELEV. = 2133.50'
-Y5- STA.10+54.67

PROPOSED GRADE
(+)0.0000%
(+)0.0000%
(+)0.0000%
(+)0.0000%
EXISTING GROUND

-RA2- STA.10+80.49
ELEV. = 2133.50'
-Y4- STA.10+54.75

-RA2- STA.11+71.40
ELEV. = 2133.50'
-L- STA.29+16.04

FOR -RA2- ALIGNMENT.SEE SHEET 6

-SL1-

BEGIN GRADE
-SL1- STA.10+00.00
ELEV. = 2132.44'

PI = 10+87.00
EL = 2131.73'
VC = 80'
K = 50

PI = 11+77.00
EL = 2132.43'
VC = 60'
K = 214

END GRADE
-SL1- STA.12+30.43
ELEV. =2132.70'

PROPOSED GRADE
(-)0.8164%
(+)0.7803%
(+)0.5000%
EXISTING GROUND

FOR -SL1- ALIGNMENT.SEE SHEET 5

-SL2-

BEGIN GRADE
-SL2- STA.10+00.00
ELEV. = 2131.40'

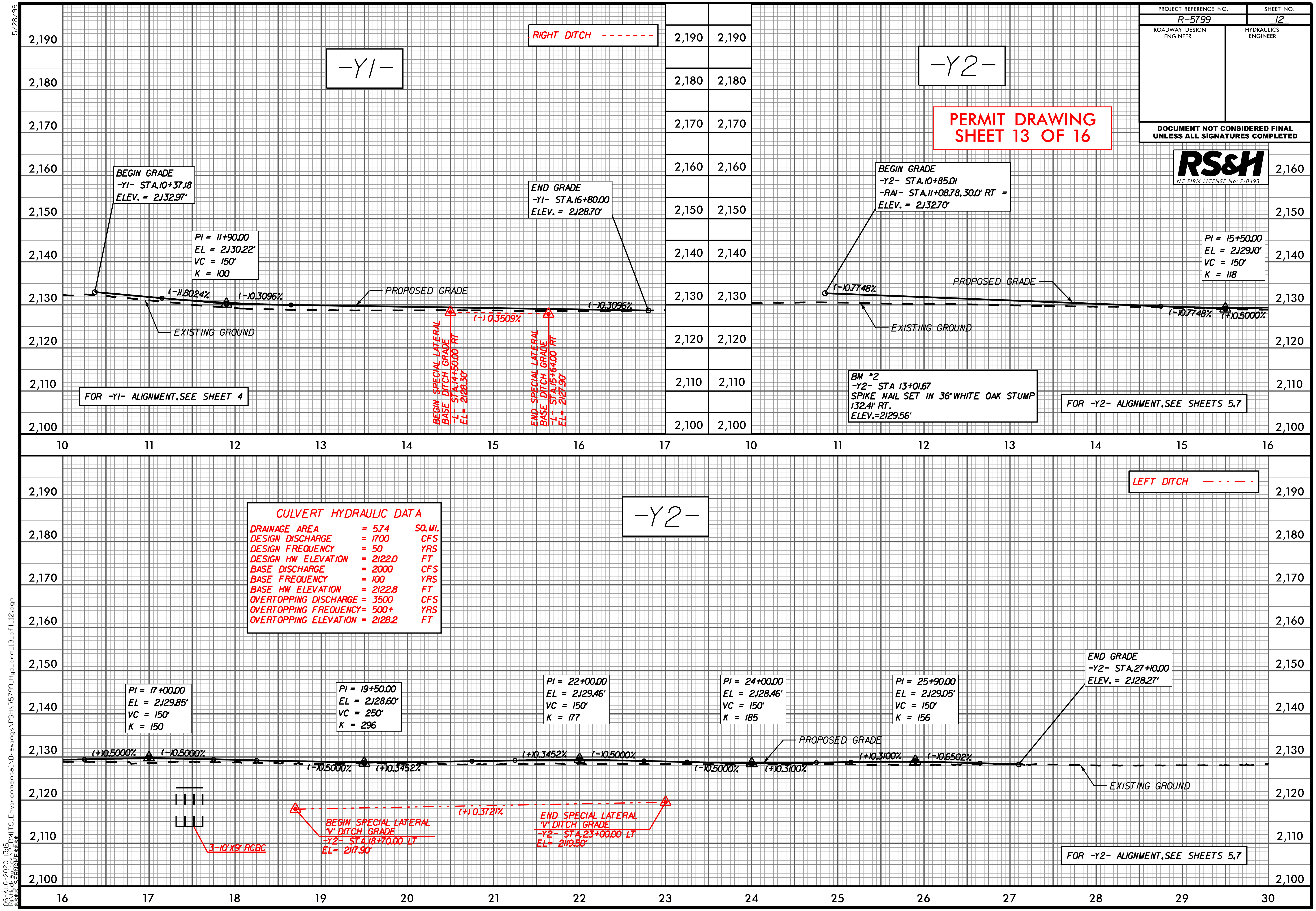
PI = 10+20.00
EL = 2131.34'
VC = 40'
K = 38

PI = 11+90.00
EL = 2132.60'
VC = 60'
K = 136

END GRADE
-SL2- STA.12+23.45
ELEV. = 2132.70'

PROPOSED GRADE
(-)0.3000%
(+)0.7415%
(+)0.3000%
EXISTING GROUND

FOR -SL2- ALIGNMENT.SEE SHEET 5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SHEET NO. 12
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
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NC FIRM LICENSE No: F-0493
PERMIT DRAWING SHEET 13 OF 16
-Y1-
-Y2-
RIGHT DITCH
LEFT DITCH
BEGIN GRADE -Y1- STA.10+37.18 ELEV. = 2,132.97'
PI = 11+90.00 EL = 2,130.22' VC = 150' K = 100
END GRADE -Y1- STA.16+80.00 ELEV. = 2,128.70'
(-)1.8024%
(-)0.3096%
(-)0.3096%
(-) 0.3509%
PROPOSED GRADE
EXISTING GROUND
BEGIN SPECIAL LATERAL BASE DITCH GRADE -L- STA.14+50.00 RT EL= 2128.30'
END SPECIAL LATERAL BASE DITCH GRADE -L- STA.15+64.00 RT EL= 2127.90'
FOR -Y1- ALIGNMENT,SEE SHEET 4
BEGIN GRADE -Y2- STA.10+85.01 -RA1- STA.11+08.78, 30.0' RT = ELEV. = 2,132.70'
PI = 15+50.00 EL = 2,129.10' VC = 150' K = 118
(-)0.7748%
(-)0.7748%
(+)0.5000%
BM #2 -Y2- STA 13+01.67 SPIKE NAIL SET IN 36" WHITE OAK STUMP 132.41' RT. ELEV.=2129.56'
FOR -Y2- ALIGNMENT,SEE SHEETS 5,7
CULVERT HYDRAULIC DATA
DRAINAGE AREA = 5.74 SQ.MI.
DESIGN DISCHARGE = 1700 CFS
DESIGN FREQUENCY = 50 YRS
DESIGN HW ELEVATION = 2122.0 FT
BASE DISCHARGE = 2000 CFS
BASE FREQUENCY = 100 YRS
BASE HW ELEVATION = 2122.8 FT
OVERTOPPING DISCHARGE = 3500 CFS
OVERTOPPING FREQUENCY= 500+ YRS
OVERTOPPING ELEVATION = 2128.2 FT
PI = 17+00.00 EL = 2,129.85' VC = 150' K = 150
PI = 19+50.00 EL = 2,128.60' VC = 250' K = 296
PI = 22+00.00 EL = 2,129.46' VC = 150' K = 177
PI = 24+00.00 EL = 2,128.46' VC = 150' K = 185
PI = 25+90.00 EL = 2,129.05' VC = 150' K = 156
END GRADE -Y2- STA.27+10.00 ELEV. = 2,128.27'
(+)0.5000% (-)0.5000% (-)0.5000% (+)0.3452% (+)0.3452% (-)0.5000% (-)0.5000% (+)0.3100% (+)0.3100% (-)0.6502%
(+) 0.3721%
3-10'X9' RCBC
BEGIN SPECIAL LATERAL 'V' DITCH GRADE -Y2- STA.18+70.00 LT EL= 2117.90'
END SPECIAL LATERAL 'V' DITCH GRADE -Y2- STA.23+00.00 LT EL= 2119.50'
2,100 2,110 2,120 2,130 2,140 2,150 2,160 2,170 2,180 2,190
10 11 12 13 14 15 16 17
10 11 12 13 14 15 16
16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
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PROJECT REFERENCE NO.	SHEET NO.
R-5799	13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 14 OF 16

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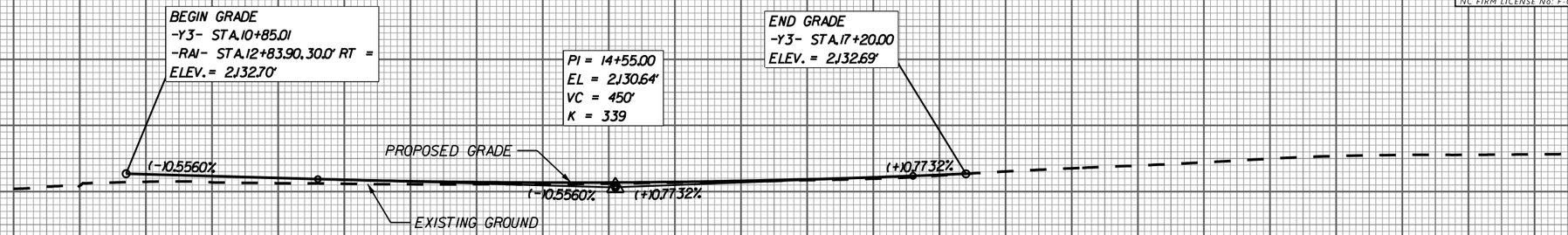
NC FIRM LICENSE No: F-0493

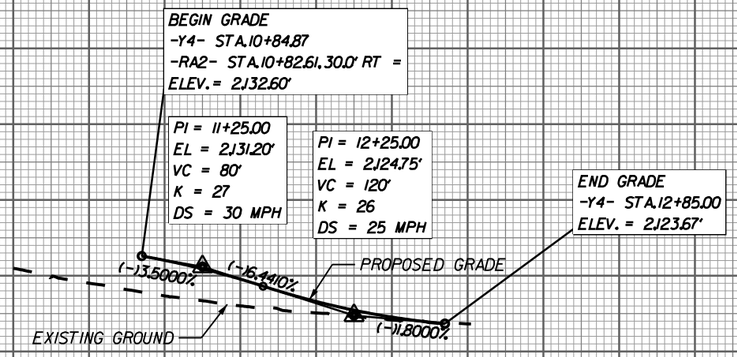
-Y3-



BM #8
-Y3- STA 15+68.39
SPIKE NAIL IN 16" HARDWOOD STUMP
94.71' LT.
ELEV.=2130.56'

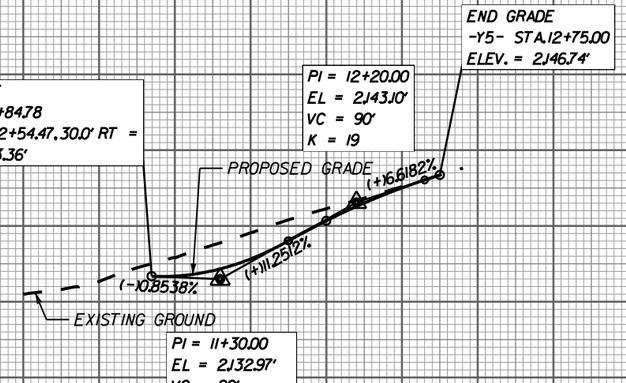
FOR -Y3- ALIGNMENT, SEE SHEETS 5,8

-Y4-



FOR -Y4- ALIGNMENT, SEE SHEET 6

-Y5-



PI = 11+30.00
EL = 2132.97'
VC = 90'
K = 7
DS = < 15 MPH

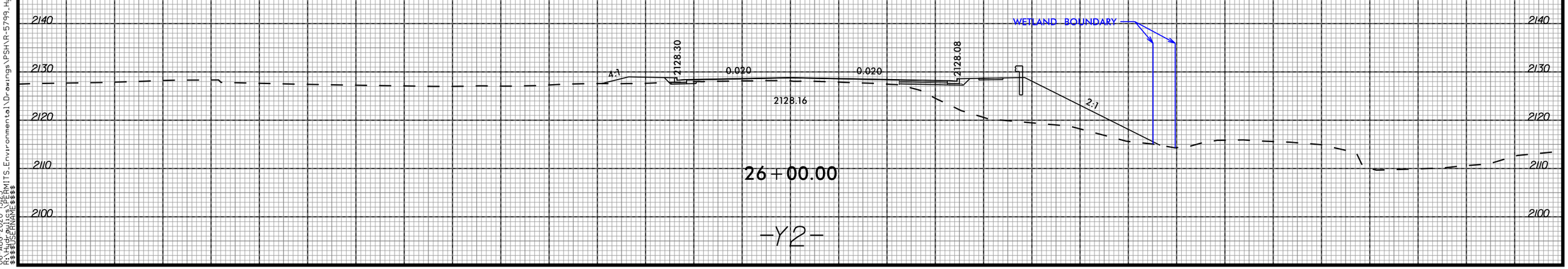
FOR -Y5- ALIGNMENT, SEE SHEET 6

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-5799	X-1

PERMIT DRAWING
SHEET 15 OF 16

SITE 5



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WETLAND AND SURACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 11+40 to 13+12 LT	Channel Change / 30" RCP						0.02	< 0.01	164	10	
2	-L- 16+08 to 16+80 LT	36" RCP / Rip Rap Outlet						< 0.01	< 0.01	64	13	
3	-L- 24+30 RT	Rip Rap Outlet							< 0.01		13	
3	-L- 24+85 to 25+39 RT	72" RCP / HW						< 0.01	< 0.01	45	15	
3	-L- 25+81 to 25+99 RT	Sp. Design JB / RCBC Ext.						< 0.01		17		
4	-Y2- 17+45 RT	Culvert Extension						0.01	< 0.01	35	12	
4	-Y2- 17+45 LT	Culvert Extension						0.01	< 0.01	35	12	
5	-Y2- 26+04 RT	Shoulder Widening/Fill Slope	< 0.01				< 0.01					
TOTALS*:			< 0.01				< 0.01	0.06	0.01	360	75	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
1/31/2023
Transylvania County
R-5799
44984.1.1

UTILITY CERTIFICATION

I. D. No. R-5799 W.B.S. Element: 44984.3.1
County: Transylvania F. A. Project No.

In connection with the above referenced project, I certify that all necessary utility work applicable is in accordance with Federal and State laws and regulations. I further certify that one of the following has application:

_____ 1. Completed,

__X___ 2. That all necessary arrangements have been made for it to be undertaken and completed as required for proper coordination with the physical construction schedule and, to the extent deemed necessary. There will be appropriate notification in the contract documents identifying the utility work that is to be undertaken concurrently with the project construction,

Or

_____ 3. No utility conflicts.

This certification assures compliance with all applicable Federal and State laws, rules and policies.

DATE: 01/11/2023 APPROVED DocuSigned by: Bob Golding

Division Utility Coordinator

bww
08/03/2017