Union County Government
EST. 1842

UNION COUNTY 1842 PLANNED PROGRESS NORTH CAROLINA

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER

2021.02.26 11:19:27-05'00'

Invitation for Bid# 2021-051

853W Zone Improvements – Phase 1 Transmission Mains Rocky River Road & Secrest Shortcut Road

ADDENDUM No. 1

ISSUE DATE: February 26, 2021

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Bidders on this project are hereby notified that this Addendum shall be made a part of the above named IFB document.

The following items add to, modify, and/or clarify the IFB documents and shall have the full force and effect of the original documents. This Addendum shall be acknowledged by the bidder in the IFB document.

Union County, NC
853W Zone Improvements – Phase 1 Transmission Mains Rocky River Road & Secrest Shortcut Road
Black & Veatch Project # 186110

ADDENDUM NUMBER 1 February 26, 2021

BID DATE: March 4, 2021 at 2:00 p.m. EST

TO ALL BIDDERS:

This Addendum forms a part of the Contract Documents and modifies the Bidding Documents and all previous Addenda.

Acknowledge receipt of this Addendum in the space provided in the Bid Form. Failure to do so may disqualify the Bidder.

Below are changes, additions, and/or clarifications to the bid documents for this project.

Scope

This Addendum No. 1 consists of pages 1 through 10 and covers the following additions and changes to the Specifications and Drawings for this Project and contains the following attachments.

- C-410 – BID FORM
- C-430 – BID BOND
- Additional Geotechnical Data (additional borings not shown on Drawings)
- Approved Piedmont Natural Gas (Duke Energy) Encroachment Permit
- Revised Drawings Sheets: C1, C2, C3, C5, C6, C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C23, C24, C25, C26, C27, C28, D1, D5, AND D6
- Current Planholders List

Drawings

1. DRAWINGS C1 THRU C3, C5 THRU C28, D1, D5, AND D6 shall be replaced with the attached revised drawings – Revisions include incorporation of various erosion & sedimentation control measures throughout, pipeline alignment revisions on Drawings C3 and C13, jack & bore revisions on Drawings C3 and C14, deletion of sidewalk on Drawings C7 and C8, addition of concrete encasement on Drawing C8, and update of bend stationing in profile to match plan on Drawing C20.

Specifications

1. Project Manual, Section C-410 – BID FORM. DELETE the Bid Form in its entirety and replace with the revised Bid Form attached herein.

2. Project Manual, Section C-430 – BID BOND. DELETE the Bid Bond (with “SAMPLE” watermark) in its entirety and replace with the revised Bid Bond attached herein.

3. Project Manual, Section 01015 – PROJECT REQUIREMENTS, Paragraph 4, delete the first sentence and replace with, "Provisions for evaluation of proposed "or equal" items of materials or equipment are covered in Paragraph 6.05 of the General Conditions."

4. Project Manual, Section 01025 – MEASUREMENT AND PAYMENT, Paragraph 11 UNIT PRICE,
   a. AFTER the first sentence of Item 19a, 19b, and 19c – Abandon Water Main, ADD the following sentence.

   "The lump sum price shall also include filling all abandoned water mains with grout or flowable fill as defined in NCDOT Standard Specifications for Roads and Structures Section 1530-Abandon or Remove Utilities."

   b. AFTER Item 29 F, ADD the following paragraphs.

   "G. Check Dam. Payment for this item shall be per check dam in accordance with the detail on the Drawings.

   H. Diversion Ditch. Payment for this item shall be lump sum including the diversion ditch in accordance with the detail on the Drawings, erosion control matting to stabilize the diversion ditch, temporary culvert pipe, and gravel driveway repair as shown on the Drawings."

   I. Silt Basin. Payment for this item shall be per silt basin in accordance with the detail on the Drawings."

   c. AFTER Item 36, ADD the following paragraph.

   "Item 37 – Cast-in-Place Concrete Encasement. Payment for this item shall be per linear foot of concrete encasement in accordance with the detail on the Drawings and as specified where shown on the Drawings. The price shall include all labor, materials, equipment, and incidentals associated with furnishing and installing cast-in-place concrete encasement above and beyond the cost of the pipeline including, but not limited to; additional site work excavation, additional dewatering, excavation support, concrete reinforcement, backfill, compaction, coordination with all private and public utilities as necessary, concrete support, concrete forms, together with all other appurtenant work and miscellaneous costs required to complete the work as shown on the Drawings and /or specified.

5. Project Manual, Section 01025 – MEASUREMENT AND PAYMENT, Paragraph 11 UNIT PRICE, DELETE Item 23 – Short Side Water Service and REPLACE with the following, "Item 23 – Short Side Water Service. Short side water services shall be installed by open cut at the grades and locations shown on the Drawings. Payment will be made on the basis of the unit price bid. The unit price bid for construction of the short side water service shall include, but not limited to 10 linear feet of ¾" copper tubing, appurtenances, new meter box, furnish new meter assembly, relocating/resetting existing water meter, excavation, backfill, restoration and all of the Contractor's cost of the complete construction of the water service, exclusive of the items provided elsewhere on the Bid Form."

6. Project Manual, Section 01025 – MEASUREMENT AND PAYMENT, DELETE Item 24 – Long Side Water Service and REPLACE with the following, "Item 24 – Long Side Water Service. Long side water services shall be installed by trenchless methods where services cross an existing road and shall include, but not limited to 30 linear feet of ¾" copper tubing, appurtenances, new meter box, furnish new meter assembly, relocating/resetting existing water meter, excavation, backfill, restoration and all of the Contractor's cost of the complete construction of the water service, exclusive of the items provided elsewhere on the Bid Form."

7. Project Manual, Section 02330 – TUNNEL ANNULAR BACKFILLING, Paragraph 1-1. SCOPE, DELETE the reference to, "fiberglass reinforced polymer mortar carrier pipe" and REPLACE with "ductile iron carrier pipe".

Q/A & Clarifications

1. There is no vicinity map in either the printed set or the electronic file for the geotechnical information. Can you please have that sent out to the bidders?
   The boring locations are shown on the plans with the boring symbol and respective number. Refer to the legend in sheet A1 for the boring symbol.

2. Are there portions to be bored?
   Yes.

3. Will the portions be directionally bored or jack and bored?
   Portions will be installed using trenchless methods as shown and specified.

4. What are the lengths and sizes of the portions to be bored?
   Approximately 2,000 linear feet of 54" and 30" steel casings in various locations will be installed using trenchless methods.

5. How much is the required bid bond for the project?
   A Bid must be accompanied by Bid security made payable to Owner in an amount of [5%] percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.

6. How much is the cost estimate of the project?
   The Opinion of Probable Construction Costs for the project is $22,420,000.

7. The contract documents that I received have a bid bond that has SAMPLE stamped across the form. In the ITB it states that there was a loose bid form/bond form but I didn't receive that. Should we just use the one stamped SAMPLE or do you want to issue a clean one?
   An unbound Section C-430 Bid Bond without the "SAMPLE" watermark has been included as an attachment to this Addendum.

8. I noticed that Minority Business/Small Business good faith efforts are encouraged. Where can I look for more information on this?
   There are no MWBE requirement on this project. Bidders are encouraged to use MWBE subs but no credit will be given for it.

9. There are 57 soil borings reported in the Exploration Report by ESP. However, it does not give the locations. Can you assist us finding what these locations are?
   The boring locations are shown on the plans with the boring symbol and respective number. Refer to the legend in sheet A1 for the boring symbol. Additionally, borings B6, B7, B47, B48, B49, B50, B51, B52, B53, and B54 were collected earlier in the design phase and are not within the project area. These bore logs shall be removed in their entirety from the Geotechnical Report.

10. Regarding the waterline abandonment, there was some language in the plans and specs about abandoning in place and capping it off with a plug as needed. Can you clarify that all the waterlines we are to abandon are to be filled in with a flowable fill or sand?
    The existing waterline shall be abandoned per NCDOT Specification Section 1530 as noted in the revised Specification Section 01025 – Measurement & Payment revised per this addendum.

11. Are we correct to assume that the bore & jack crossings are to be priced as guaranteed bores with rock excavation to be included?
    Yes.

12. It appears that the 16" & 8" (depending on pipe material) pipes to be abandoned within the NCDOT ROW need to be removed or grouted per NCDOT specifications, but the bid documents don't mention grouting or removal, just cutting/capping. Please provide guidance.
    The existing waterline shall be abandoned per NCDOT Specification Section 1530 as noted in the revised Specification Section 01025 – Measurement & Payment revised per this addendum.

13. Section 02330 calls for cellular concrete grouting around FRP, but all carrier pipes appear to be DIP. Please clarify if the design life for the crossings is 100 years to avoid having to grout the annular space, or if 02330 should be used for grouting the annular space on cased DIP crossings within the NCDOT ROW.
    Specification Section 02330 has been revised per this Addendum as noted above and Section 02330 shall be used for grouting the annular space between all steel casing and carrier pipes as specified and shown on the Drawings.

14. Are you intending the 36” Ductile Iron Fittings to be manufactured restrained?
    36” Ductile Iron Fittings shall be as specified in Section 15061, Paragraph 2.2.

15. In section 2.3 of 15061, you are calling out for tangential outlets for your blow-off assemblies. Will you accept MJ Tees as an alternate to tangential outlets in this instance?
    No, tangential outlets will be required for all blow-off assemblies as specified in Section 15061 – Ductile Iron Pipe and shown on the Drawings.

16. What is the anticipated Notice to Proceed date?
    The anticipated Notice to Proceed is approximately May 2021.

17. “The notes on the plans indicate that the contractor is to deal with conflicts between the new water line and existing utilities. There are several locations where power poles or guy wires for poles are in direct conflict with the new pipe. What is an acceptable means for dealing with this conflict – i.e. move the center line over, add fittings, relocate the pole (*this would have to be approved by the owner of the utility*) etc….? If extra fittings or power pole relocation is utilized to mitigate the conflict, will the contractor be paid the additional

cost required to correct the issue or is such cost to be estimated and included in the bid as incidental cost to build the project?"
Refer to Section 01025 Measurement and Payment, Paragraph 5 and 6 for powerline temporary supports and shielding and utility locations and relocations. Regarding direct conflicts, relocation of the water main within the permanent utility easement will be allowed on a case-by-case basis with approval from the Engineer/Owner. Any adjustment to the alignment will be paid for under the pipeline and fittings bid items and shall include all materials, labor and equipment to adjust the alignment of the pipe around the conflict.

18. When we encounter rock on the project, I understand we won't be allowed to backfill it over the pipe, but can we bury the rock on the permanent easement and use suitable materials mined while burying the rock to backfill the pipe trench?
    No.

19. What are the rates for water usage during testing, flushing and disinfecting?
    Contractor will be required obtain hydrant meter from the County which requires a $300 deposit. The water usage is billed at the current bulk rate of $4.85/1,000gal.

20. Would HDPE or stainless-steel bolt on type seep collars be acceptable in lieu of cast in place concrete seep collars?
    Per paragraph 4, Section 01015 – Project Requirements, "Requests for review of equivalency will not be accepted by Engineer from anyone except Contractor, and such requests will not be considered until after the Effective Date of the Agreement."

21. Would bolt on HDPE or stainless steel seep collars be acceptable for use in lieu of soil plugs in embedment stone every 400 feet?
    Per paragraph 4, Section 01015 – Project Requirements, "Requests for review of equivalency will not be accepted by Engineer from anyone except Contractor, and such requests will not be considered until after the Effective Date of the Agreement."

22. Please confirm that connections (Items 12-18) do not include the proposed fittings on the proposed main line but that the lump sum price includes all piping, fittings and hardware from that point to the connection to the existing watermain being connected.
    For Bid Item 12, the MJ coupling for the connection to the existing 36" main shall be included in the lump sum price. For Bid Items 13-18, the proposed fittings for the connection to the 36" and 16" mains are excluded from these items and are included in items 3A and 3B.

23. We see that Permalok by Northwest pipe is allowed in lieu of butt welded pipe. Will you allow Tri-LOC by Trinity as well if it meets the same watertightness and tensile strength specs? I have attached a cut sheet and list of completed projects using this product. The product is also included under interlocking joints approved for use under railways in the AREMA handbook.
    Per paragraph 4, Section 01015 – Project Requirements, "Requests for review of equivalency will not be accepted by Engineer from anyone except Contractor, and such requests will not be considered until after the Effective Date of the Agreement."

24. Is the hydrant tee considered part of the hydrant assembly or paid per pound with fittings?
    The hydrant tee is included as part of Bid Item 22, Fire Hydrant Assembly.

25. Spec section 01310 states that payment is to be based on monthly schedule and that cost loading is to match the contract total. How do you propose cost loading items which are at engineer's discretion such as stabilization stone?
    Items that are at the engineer's discretion can be initially spread out equally over the entire contract and adjusted monthly for actual values. The exact schedule implementation can be coordinated after contract award.

26. Please consider adding a bid item for fabric embedment stone barrier discussed in section 02202 3-4.03.01.
    Type A filter fabric for encapsulating embedment stone as specified in Specification 02202 – Trenching and Backfilling paragraph 3-4.03.01 shall be included as incidental to Bid Items 2A-2D – Pipeline.

27. Spec section 02231 Jack and Bore 1.1 states that drill and blast method is unacceptable. In trenchless applications where geotechnical suggests a split faced condition between PWR and competent rock will the contractor be allowed to raise or lower the casing to pass in either solid rock or PWR? Non-explosive hand mining of split faced material will not support the project schedule. It is understood that explosives will not be allowed in the Railroad ROW but will the use of explosives be allowed in DOT crossings and off ROW applications?
    Drill and blast methods are not acceptable as specified in section 02231 - Jack and Bore. The casing pipe may be lowered to pass in solid rock or PWR, but all costs associated with adjustments to the alignment shall be incidental to the respective trenchless bid item.

28. Can you confirm that steel trench shields will be allowed for jacking and receiving pits?
    The Contractors trench and excavation support system shall be installed in accordance with the project specifications and in accordance with OSHA requirements.

29. Does the 11" base and 2" surface asphalt section included in the plan set apply to parking lot and driveway crossings?
    Refer to the note shown on Detail D, Drawing D2, "FOR NCDOT ROADWAYS OR COMMERCIAL/INDUSTRIAL DRIVEWAYS, MATCH EXISTING ASPHALT BASE THICKNESS OR PROVIDE 11" ACBC TYPE B 25.0C (WHICHEVER IS GREATER). FOR RESIDENTIAL DRIVEWAYS, MATCH EXISTING ASPHALT BASE THICKNESS OR PROVIDE 6" ACBC TYPE B 25.0C (WHICHEVER IS GREATER)"

30. On drawing sheet C12 note 3 states that work shall proceed without stoppage referencing the Jack and bore under the CSX railroad. Is this for the entire bore or only for the portion within the influence lines of the track (1:1) shown on the profile? Normally 24 hour tunneling is only required within the influence line.
    The trenchless installation under the CSX railroad ROW shall be in accordance with the Drawings and specifications.

31. Drawing sheet C12 note 3 also states that work stoppage is only allowed when adding lengths of pipe. Does this mean that auger may not be withdrawn to validate line and grade?
    The Contractor is required to prevent settlement and progress the work as expeditiously as possible. It is not the intent of the Engineer to dictate means and methods of the Contractor.

32. Drawing sheet C12 note 4 states that the boring head must be capable of being withdrawn through the casing. I assume this precludes the use of microtunneling and weld on disc cutter heads if the bore is in solid rock as they cannot be withdrawn. Please confirm.
    Alternate trenchless installation methods are not precluded, but the work must be performed in accordance with CSX standard design and construction specifications.

33. Drawing sheet C12 note 12 states that casing shall be minimum wall thickness of 0.781". Specifications state minimum thickness of 1". Please confirm that the wall thickness cannot be less for the railroad bore.
    The minimum thickness for a 54" casing pipe at railroad crossings shall be 0.781" as shown on sheet C12 and as noted in detail A, Drawing D2. Refer to the table included in detail A, Drawing D2 for minimum casing thickness for both street and railroad crossings.

34. Drawing sheet C12 note 12 also states the casing is to be spiral welded while the specifications do not indicate a spiral weld option. Would Tri-LOC spiral weld with interlocking joints be allowable in this case? Specifications provided in previous email of questions.
    As noted in Note 12 on Sheet C12 the steel casing for the crossing shall be spiral welded steel with a minimum wall thickness equal to 0.781 inches and a minimum yield strength equal to 35,000 psi. Additionally, CSX Pipeline Design and Construction Specifications state that joints can be either constructed through butt welding or through the use of interlocking joints.

    Regarding Tri-LOC, Per paragraph 4, Section 01015 – Project Requirements, "Requests for review of equivalency will not be accepted by Engineer from anyone except Contractor, and such requests will not be considered until after the Effective Date of the Agreement."

35. Will the gravel lot at Sta. 127+00 be allowable as use for laydown while working in other areas or only while working in the immediate area of the lot?
    This area may be utilized for a laydown and staging area when actively working in the general vicinity of the lot (within 1 mile of the lot). Usage of this lot for laydown and staging will not be permitted for the duration of the project.

36. There are inconsistencies between the bend angle shown on plan and profile views between Sta. 136+37 and 138+02. Please advise.
    The bends between the stations have been revised in the attached Drawing C13 to reflect the correct bend angles.

37. In section 1310 it specifies to use Primavera P6. Will other scheduling software's like Microsoft Project be allowed?
    Yes.

38. In section 1380 it references that pictures must be taken by a professional photographer. Would someone on the contractor's staff that regularly takes photos of construction projects be considered a professional photographer?
    Yes.

39. Will we be able to hold progress meetings at UCPW office or at our office located in Union County or do we have to establish a field office to hold meetings?
    Yes.

40. Who is to pay for railroad flagman as needed, contractor or owner?
    The Contractor. Per paragraph 10, Section 01025 – Measurement & Payment, "No separate payment shall be made in connection with any insurance, training, coordination, traffic control, flagging, inspections or other permitting requirements associated with Work within railroad right-of-way. All such costs associated with Work within railroad right-of-way shall be included in the cost of the railroad crossing bore & jack."

41. Are the water mains that are to be abandoned to be filled with flowable fill or just capped. I saw the section under CSX has to be filled with flowable fill but do any of the others?
    The existing waterline shall be abandoned per NCDOT Specification Section 1530 as noted in the revised Specification Section 01025 – Measurement & Payment revised per this addendum.

42. There is a location in front of Union Power Coop. that it appears we are in between 2 power poles (only 1 shown on plans) and there is not enough room to fit a track machine in between them to dig safely. There are also some huge power boxes right behind one of them. This would be near station 83+75. Would you consider adding a bore and jack in this location?
    For bidding purposes, pipeline shall be installed as shown on the plans.

43. From about stations 155+00 to 165+00 there is only a 20' wide easement. On the road side of the easement there is an overhead power line with low hanging wires so that leaves only a 10' wide easement on the back side. Is there any way we could get some temporary easement in this location so that we have some where to place the dirt during excavation?
    Additional easement outside of what is currently shown on the drawings would have to be obtained by the Contractor.

44. There are some buildings that are in line with the water main. Is it the contractors or home owners responsibility to relocate these? And if it is the contractors do they go back where they are or will they stay where we move them to?
    The Contractor is responsible, Per paragraph 11, Section 01025 – Measurement & Payment, Items 2a thru 2d. – Pipeline Subparagraph p, "All required easement provisions noted on the Contract Drawings including sign removal, stockpile and replacement; mailbox removal and replacement; temporary gravel parking area; temporary gravel walkway; topsoil removal, stockpile and replacement; additional clearing area outside of easement areas; relocated sheds and doghouses and any associated fencing; temporary fencing for dog containment; location, protection, and repair of existing irrigation systems; tree protection with one-year inspection and replacement if needed; and removal and replacement of existing backflow preventer and associated piping."

    They will be reinstalled in the existing location unless otherwise noted or specified.

45. Under letter G of Article 7- Attachments to This Bid for the 853W Zone Improvements- Phase 1 project, it states we are to submit a Required Bidder Qualification Statement with supporting data. I was unable to locate the qualification statement in the project manual. Can you please provide the qualification statement to complete?
    It is up to the Bidder to submit enough information to ascertain if the Bidder is qualified. The bid package allows Union County to request more information after the bids are opened if there is any question as to the qualifications.

46. The Short Side and Long Side Water Service bid items 23 and 24 appear to be just unit price items that are meant to cover services as needed, unless I missed them somewhere on the plans. Can you tell us what are the service sizes, how much footage of pipe should we account for on each, and will we need to include meters or backflow preventors?
    The short side service is shown on Drawing C27 at approximately STA 274+65. The long side service item is to cover long services as needed. The descriptions for Bid Items 23 and 24 have been revised per this addendum as noted above to include additional specifics for these pay items.

This addendum and all attachments will be distributed to registered plan holders via email.

Receipt of this addendum must be acknowledged on Page 1 of EJCDC C-410, Bid Form.
Sincerely,
Black & Veatch

2021.02.26 11:20:51-05'00'
Patrick Stout, P.E.
Engineering Manager

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END OF ADDENDUM No.1

Add documents below

C-410 – BID FORM

BID FORM

853W Zone Improvements - Phase I Transmission Mains

Rocky River Road & Secrest Short Cut Road

UCPW Project No. WT-061

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ARTICLE 1 – BID RECEIPIENT

1.01 This Bid is submitted to:

Vicky Watts, Senior Procurement Specialist
Union County Procurement Department
500 N. Main Street, Suite 709
Monroe, NC 28112
704-283-3601
Email: vicky.watts@unioncountync.gov

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

Addendum No.	**Addendum, Date**
_____	_____
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2)

reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.

F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.

I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.

J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at

artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the e execution of the Contract.

ARTICLE 5 – BASIS OF BID

5.01 Bidder acknowledges that (1) each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and (2) estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
1	Mobilization (Shall Not Exceed 3% of the Total Bid)	LS	1		
2a	Pipeline – 36" Ductile Iron Pipe	LF	7,830		
2b	Pipeline – 36" Restrained Joint Ductile Iron Pipe	LF	14,350		
2c	Pipeline – 16" Ductile Iron Pipe	LF	1,890		
2d	Pipeline – 16" Restrained Joint Ductile Iron Pipe	LF	1,310		
3a	36" Ductile Iron Fittings	LBS	262,100		
3b	16" Ductile Iron Fittings	LBS	4,700		
4a	36" Gate Valves	EA	9		
4b	16" Gate Valves	EA	3		
5a	Bore & Jack Creek Crossing – 54" Steel Casing with 36" Carrier Pipe	LF	98		
5b	Bore & Jack Roadway Crossing – 54" Steel Casing with 36" Carrier Pipe (Rocky River Road Sta 35+56.94)	LF	55		
5c	Bore & Jack Roadway Crossing – 54" Steel Casing with 36" Carrier Pipe (Goldmine Road)	LF	274		

	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
5d	Bore & Jack Roadway Crossing – 54" Steel Casing with 36" Carrier Pipe (Westwood Industrial Dr)	LF	102		
5e	Bore & Jack Roadway Crossing – 54" Steel Casing with 36" Carrier Pipe (Union Power Way)	LF	62		
5f	Bore & Jack Roadway Crossing – 54" Steel Casing with 36" Carrier Pipe (Aeropointe Pkwy)	LF	130		
5g	Bore & Jack Roadway Crossing – 54" Steel Casing with 36" Carrier Pipe (Rocky River Road STA 114+39.61)	LF	61		
5h	Bore & Jack Roadway Crossing – 30" Steel Casing with 16" Carrier Pipe (Rocky River Road W/L Sta 0+15.17 – Sheet C12)	LF	67		
5i	Bore & Jack Railroad Crossing – 54" Steel Casing with 36" Carrier Pipe	LF	200		
5j	Bore & Jack Roadway Crossing – 54" Steel Casing with 36" Carrier Pipe (Old Charlotte Highway)	LF	81		
5k	Bore & Jack – 54" Steel Casing with 36" Carrier Pipe (STA 136+47.11)	LF	146		
5l	Bore & Jack – 54" Steel Casing with 36" Carrier Pipe (STA 140+20.02)	LF	330		
5m	Bore & Jack Roadway Crossing– 54" Steel Casing with 36" Carrier Pipe (US Route 74)	LF	149		
5n	Bore & Jack Roadway Crossing – 54" Steel Casing with 36" Carrier Pipe (James Hamilton Road)	LF	136		
5o	Bore & Jack Roadway Crossing – 54" Steel Casing with 36" Carrier Pipe (Chatterleigh Drive)	LF	105		
5p	Bore & Jack Roadway Crossing – 54" Steel Casing with 36" Carrier Pipe (Rocky River Road STA 228+96.13)	LF	80		

	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
5q	Bore & Jack Roadway Crossing – 54" Steel Casing with 36" Carrier Pipe (Myers Road)	LF	66		
5r	Bore & Jack Roadway Crossing – 30" Steel Casing with 16" Carrier Pipe (Secrest Short Cut Road)	LF	57		
6a	Open Cut Crossing – 54" Steel Casing with 36" Carrier Pipe (James Hamilton Road)	LF	136		
6b	Open Cut Crossing – 54" FRP SN46 Casing with 36" Carrier Pipe	LF	90		
7	Anti-Seep Collar – 36" Pipe	EA	3		
8a	Stream/Creek Crossing w/ Matting – 16" Pipe	LF	20		
8b	Stream/Creek Crossing w/ Matting – 36" Pipe	LF	105		
8c	Stream/Creek Crossing w/ Riprap – 36" Pipe	LF	140		
8d	Stream/Creek Crossing w/ Riprap – 36" Pipe (Dry Fork Creek)	LF	20		
8e	Stream/Creek Crossing w/ Riprap – 36" Pipe (Stewarts Creek)	LF	20		
9a	Air release valve manhole for 36" Transmission Main	EA	7		
9b	Air release valve manhole for 16" Transmission Main	EA	1		
10a	Manual air release valve for 36" Transmission Main	EA	18		
10b	Manual air release valve for 16" Transmission Main	EA	6		
11a	10" Blow Off	EA	5		
11b	2" Blow Off	EA	1		
12	Connection to Existing 36" Transmission Main (STA 10+00)	LS	1		
13	Existing 16" Water Main Connection to Proposed 36" Water Main (Station 58+21)	LS	1		

	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
14	Existing 16” Water Main Connection to Proposed 16” Water Main (W/L Station 1+01.94 – Sheet C12)	LS	1		
15	Existing 16” Water Main Connection to Proposed 36” Water Main (Station 133+03)	LS	1		
16	Existing 16” Water Main Connection to Proposed 36” Water Main (Station 165+37)	LS	1		
17	Existing 6” Water Main Connection to Proposed 16” Water Main (Station 275+95)	LS	1		
18	Existing 8” Water Main Connection to Proposed 16” Water Main (Station 284+51)	LS	1		
19a	Abandon 16” Water Main	LS	1		
19b	Abandon 8” Water Main	LS	1		
19c	Abandon 2” Water Main	LS	1		
20	Remove and Replace Existing 8” & 12” Gravity Sewer	LF	400		
21	Asphalt Pavement Removal and Replacement	SY	1,900		
22	Fire Hydrant Assembly	EA	3		
23	Short Side Water Service	EA	1		
24	Long Side Water Service	EA	1		
25a	Gravel Driveway Repair	SY	2,250		
25b	Concrete Driveway Repair	SY	380		
26	Miscellaneous Concrete	CY	20		
27	Curb & Gutter Removal and Replacement	LF	200		
28	Trench Stabilization Stone	CY	2,300		
29a	Erosion Control – Construction Entrance	EA	36		
29b	Erosion Control – Stone Outlet	EA	175		
29c	Erosion Control – Silt Fence	LF	41,000		

	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
29d	Erosion Control – Half-ring Inlet Protection	EA	45		
29e	Erosion Control – Erosion Control Matting	SY	21,100		
29f	Erosion Control – Wattle	EA	185		
29g	Erosion Control – Check Dam	EA	2		
29h	Erosion Control – Diversion Ditch	LS	1		
29I	Erosion Control – Silt Basin	EA	2		
30	Pipeline Pressure Leakage Testing	LF	27,572		
31	Cleaning and Disinfection of Pipelines	LS	1		
32	Fertilizing and Seeding	LF	24,865		
33	Clearing & Grubbing	LS	1		
34	Landscaping	LS	1		
35a	Additional Restorative Planting – Lot #52	LS	1		
35b	Additional Restorative Planting – Lot #53/54	LS	1		
35c	Additional Restorative Planting – Lot #36	LS	1		
36	Magnetic Markers	LS	1		
37	Cast-in-Place Concrete Encasement	LF	290		
A. Total of All Unit Price Bid Items					$

5.02 A Contingency line item of 5% is to be added to the base bid. This allowance shall be used only upon issuance of a written work order by the Engineer for work not included in other items. The amount paid will be negotiated as a lump sum or unit price per each item of additional work. Any unused portion of the allowance remaining at the completion of the contract shall revert to the Owner as a credit. The Owner reserves the right to delete the allowance from the contract prior to award. Should an amount other than 5% of the subtotal be entered in the space below, the Owner reserves the right to change this amount to the correct figure.

B. Owner Contingency Allowance, A times 5% $ _____

Total Bid Price = A + B $ _____

_____

(total bid price in words)

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 The following documents are submitted with and made a condition of this Bid:

A. Required Bid security;

B. List of Proposed Subcontractors;

C. List of Proposed Suppliers;

D. List of Project References;

E. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time for acceptance of Bids;

F. Contractor's License No.: _____

G. Required Bidder Qualification Statement with supporting data

ARTICLE 8 – DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 9 – BID SUBMITTAL

BIDDER: *[Indicate correct name of bidding entity]*

_____

By:
[Signature] _____

[Printed name] _____
(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:
[Signature] _____

[Printed name] _____

Title: _____

Submittal Date: _____

Address for giving notices:

_____

_____

_____

Telephone Number: _____

Fax Number: _____

Contact Name and e-mail address: _____

_____

Bidder's License No.: _____
(where applicable)

C-430 – BID BOND

BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER *(Name and Address)*:

SURETY *(Name and Address of Principal Place of Business)*:

OWNER *(Name and Address)*:
Union County
500 N. Main Street
Monroe, NC 28112

BID
Bid Due Date:
Description *(Project Name and Include Location)*:

BOND
Bond Number:
Date *(Not earlier than Bid due date)*:
Penal sum _____ $ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

Note: Above addresses are to be used for giving any required notice. Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

Additional Geotechnical Data
(additional borings not shown on Drawings)

ECS Southeast, LLP

Data Report of Subsurface Exploration

Rocky River Road (853W Zone Improvements)

Monroe, Union County, North Carolina

ECS Project No. 08:14472

February 8, 2021

ECS SOUTHEAST, LLP
"Setting the Standard for Service"
Geotechnical • Construction Materials • Environmental • Facilities

February 8, 2021

Mr. Fred Braun, P.E.
Union County Government – Public Works
500 N. Main Street, Suite 615
Monroe, North Carolina 28112

ECS Project No. 08:14472

Reference: Data Report of Subsurface Exploration
Rocky River Road (853W Zone Improvements)
Monroe, Union County, North Carolina

Dear Mr. Braun:

ECS Southeast, LLP (ECS) has completed the subsurface exploration and laboratory testing for the above-referenced project. Our services were performed in general accordance with our agreed to scope of work. This submittal presents the results of the field exploration and laboratory testing conducted.

It has been our pleasure to be of service to you during this phase of the project. We would appreciate the opportunity to remain involved during the continuation of the design and construction phase. Should you have any questions concerning the information contained in this submittal, or if we can be of further assistance to you, please contact us.

Respectfully submitted,

ECS Southeast, LLP

Efrem W. Emhatsion, P.E.
Staff Project Manager
EEmhatsion@ecslimited.com

Christopher J. Conway, P.E.
Principal Engineer
CConway@ecslimted.com

NORTH CAROLINA PROFESSIONAL SEAL 049706 02/08/2021 ENGINEER MATTHEW J. CHIPKO

Matthew J. Chipko, P.E.
Project Engineer
MChipko@ecslimited.com
N.C. Registration No. 049706

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

The purpose of this study was to provide subsurface data and laboratory results at the client selected boring locations along the proposed water transmission main. The project site is located on the east side of North Rocky River Road and north of Old Charlotte Highway within the transmission main easement in Monroe, Union County, North Carolina.

Our services were provided in accordance with ECS Proposal No. 08:25626P and Union County Task Order 2017-5, as authorized by the client. This report contains the procedures and results of our subsurface exploration and laboratory testing programs.

The report includes the following items.

- Information on site conditions including surface drainage, geologic information, and special site features.
- Description of the field exploration and laboratory tests performed.
- Final logs of the soil borings, rock coring, and records of the field exploration and laboratory tests.

2.0 PROJECT INFORMATION

2.1 PROJECT LOCATION/CURRENT SITE USE/PAST SITE USE

The site is located north of the intersection of Old Charlotte Highway and North Rocky River Road within the transmission main easement along the east side of N. Rocky River Road in Monroe, Union County, North Carolina as shown in the figure below, and included on the Site Location Diagram in Appendix A.

The southern portion of the proposed water transmission main alignment that runs around the existing building and parking area is moderately wooded undeveloped land. The northern portion of the alignment that runs adjacent to North Rocky River Road primarily consist of open green space. Based on available historic aerial images, N. Rocky River Road and the existing commercial structure were constructed prior to 1993. Additionally, clearing was performed from approximately Station 140+00 to 141+00 sometime before 1993. The site has remained similar to its present condition since at least 1993. The previous use discussion is not considered a comprehensive or in-depth review of the site history, rather a quick overview of available aerial imagery and our site visits.

2.2 PROPOSED CONSTRUCTION

Based on our review of the provided site plans, a new 36-inch diameter ductile iron pipe water transmission main and 54-inch diameter steel casings will be constructed along the proposed utility easement. The proposed steel casings will be approximately 113 feet (approximately from Station 136+63 to 137+86) and 325 feet (approximately from Station 140+25 to 143+50) long. The proposed steel casings will be installed at depths ranging from approximately 12 to 15 feet below existing ground surface. We understand that the proposed transmission main and steel casings will be installed using open cut and/or microtunnel installation methods.

3.0 FIELD EXPLORATION AND LABORATORY TESTING

3.1 SOIL BORINGS

Our exploration procedures are explained in greater detail in Appendix B including the insert titled Subsurface Exploration Procedures. Our scope of work included drilling five (5) borings (Borings B-1 through B-5). Rock coring was performed upon auger refusal in each of the borings. The borings were located using GPS technology and existing site features as reference and their approximate locations are shown on the Boring Location Diagram in Appendix A.

3.2 ROCK CORING

Upon auger refusal, rock cores were performed at each boring location. Rock coring was performed using wireline methods in general accordance with ASTM D2113. Rock coring was performed using a five foot long, double barrel core barrel and NQ (1.88 inch diameter) sized bit. Coring was performed in five foot runs and each foot of advancement was timed. Each core was logged for rock type, grain size, color, weathering, hardness, fracturing and additional characteristics. For each core run, the recovery was recorded, and the Rock Quality Designation (RQD) was calculated. The RQD is the total length of competent (fresh to slightly weathered) rock four inches or longer over the length of the run and listed as a percentage. Rock core descriptions and photographs are included in Appendix B.

3.3 SUBSURFACE CHARACTERIZATION

The site is located in the Piedmont Physiographic Province of North Carolina. The native soils in the Piedmont Province consist mainly of residuum with underlying saprolites weathered from the parent bedrock, which can be found in both weathered and unweathered states. In a mature weathering profile of the Piedmont Province, the soils are generally found to be finer grained at the surface where more extensive weathering has occurred. The particle size of the soils generally becomes more granular with increasing depth and gradually changes first to weathered and finally to unweathered parent bedrock.

The subsurface conditions were generally consistent with published geological mapping. The following sections provide generalized characterizations of the soil and rock strata. Please refer to the boring logs in Appendix B.

GENERALIZED SUBSURFACE CONDITIONS			
Approximate Depth (ft)	**Stratum**	**Description**	**Ranges of SPT(1) N-values (bpf)**
0 to 0.3	N/A	Surficial organic laden soil. (2)	N/A
0 to 5.5	I	RESIDUUM – Sandy Lean CLAY (CL) and Sandy SILT (ML).	4 to 63
3 to 11	II	PARTIALLY WEATHERED ROCK (PWR) - Sampled as Sandy Lean CLAY (CL). (3)(4)(5)	100+ (50/5" to 50/0")
5.1 to 16	III	Rock-Argillite. (6)(7)(8)	N/A

Notes:
(1) Standard Penetration Testing in blows per foot (bpf).
(2) Surficial materials were reported by the driller and therefore should not be used in surficial material removal takeoffs.
(3) PWR is defined as residual material exhibiting SPT N-values greater than 100 bpf.
(4) PWR was encountered at each of the borings beginning at depths ranging from approximately 3 to 5.5 feet below existing ground surface.
(5) Auger refusal (i.e. possible rock) was encountered at each of the borings at depths ranging from approximately 5.1 to 11 feet below existing ground surface.
(6) Rock coring was performed upon auger refusal at each boring location.
(7) Rock core recovery values ranged between 93 to 100 percent.
(8) Rock Quality Designation (RQD) for rock cores ranged between 42 to 68 percent.

3.4 GROUNDWATER OBSERVATIONS

Groundwater measurements were attempted at the termination of drilling and prior to demobilization from the site. Groundwater was encountered at Borings B-4 and B-5 at the time of drilling at depths of approximately 2 and 2.5 feet below existing ground surface, respectively. Stabilized groundwater levels were measured on January 27, 2021 in temporary piezometers installed at each boring location and ranged from approximately 0.4 to 3.2 feet below existing ground surface.

Based on our subsurface exploration at the site and shallow PWR depths, perched groundwater conditions may be encountered. The highest groundwater observations are normally encountered in late winter or early spring. Variations in locations of the long-term water table may occur as a result of changes in precipitation, evaporation, surface water runoff, and other factors not immediately apparent at the time of this limited exploration.

3.5 LABORATORY TESTING

The laboratory testing consisted of selected tests performed on samples obtained during our field exploration operations. Classification and index property tests were performed on representative soil samples. Moisture contents, percent fines (-200 wash) test, Atterberg limits tests were performed on select samples. Three (3) rock compression tests were also performed on representative rock samples.

3.5.1 Visual/Manual Classification

Each sample was visually classified on the basis of texture and plasticity in accordance with ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedures) and including USCS classification symbols, and ASTM D2487 Standard Practice for Classification for Engineering Purposes (Unified Soil Classification System, USCS). After classification, the samples were grouped in the major zones noted on the boring logs in Appendix B. The group symbols for each soil type are indicated in parentheses along with the soil descriptions. The stratification lines between strata on the logs are approximate; in situ, the transitions may be gradual.

3.5.2 Rock Laboratory Testing

Unconfined compression tests were performed on three (3) rock samples obtained from the rock cores performed. The test results are summarized in the table below and are detailed in Appendix C.

SUMMARY OF UNCONFINED COMPRESSION TESTS ON ROCK

Sample No.	Boring No.	Sample Depth (ft)	Unconfined Compression Strength (psi)	Run Length (ft)	Recovery (%)	RQD (%)	Rock Type
RC-1	B-1	15.5 – 15.9	9,520	5	100	48	Argillite
RC-1	B-3	12.9 – 13.3	8,625	5	98	68	Argillite
RC-1	B-4	8.5 – 8.9	13,800	5	100	42	Argillite

4.0 CLOSING

ECS has prepared this data report to guide the geotechnical-related design and construction aspects of the project. We performed these services in accordance with the standard of care expected of professionals in the industry performing similar services on projects of like size and complexity at this time in the region. No other representation, expressed or implied, and no warranty or guarantee is included or intended in this report.

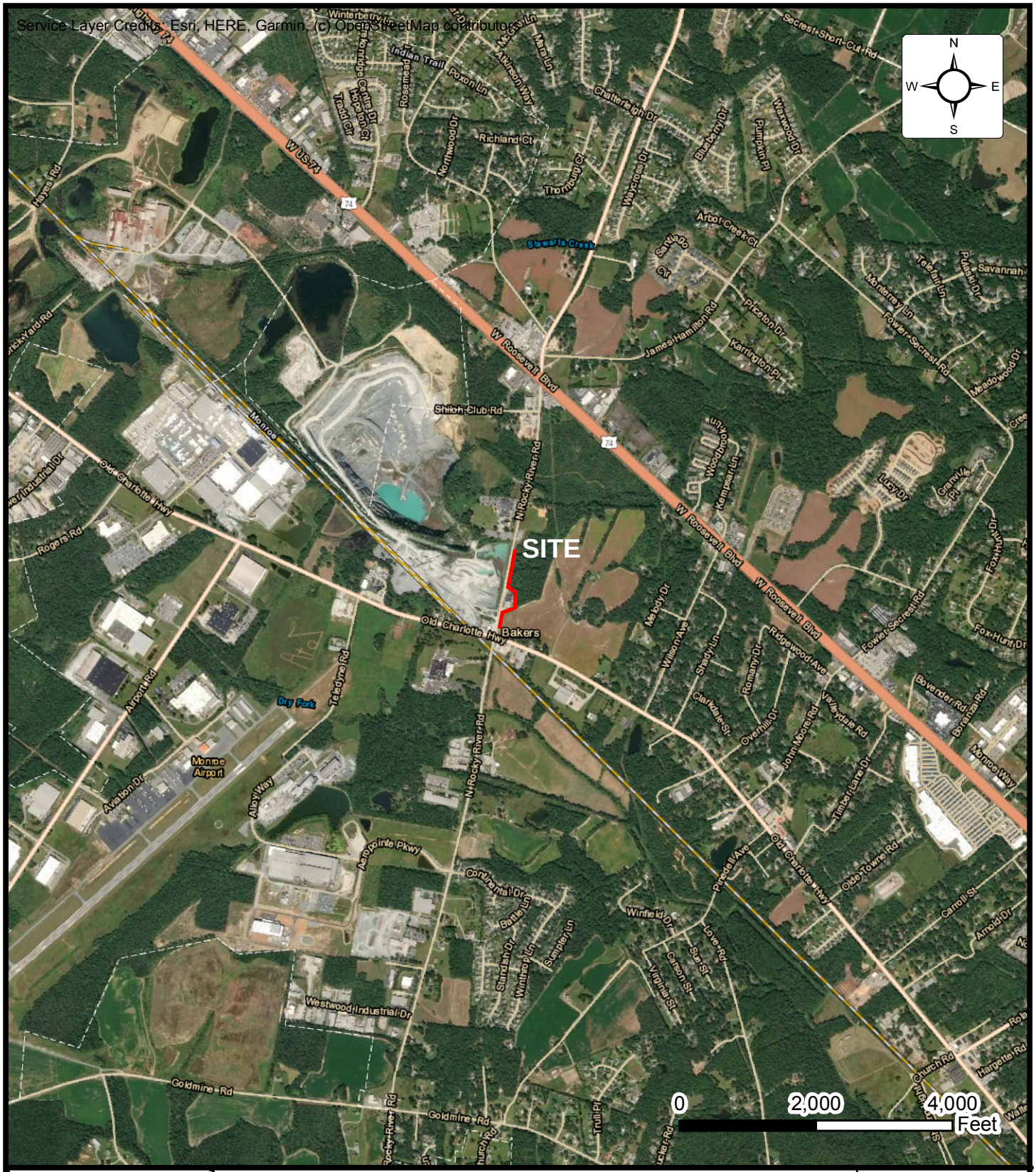
The description of the proposed project is based on information provided to ECS by Client. If any of this information is inaccurate or changes, either because of our interpretation of the documents provided or site or design changes that may occur later, ECS should be contacted so we can review our recommendations and provide additional or alternate recommendations that reflect the proposed construction.

We recommend that ECS review the project plans and specifications. Field observations, and quality assurance testing during earthwork and foundation installation are an extension of, and integral to, the geotechnical design. We recommend that ECS be retained to apply our expertise throughout the geotechnical phases of construction, and to provide consultation and recommendation should issues arise.

ECS is not responsible for the conclusions, opinions, or recommendations of others based on the data in this report.

APPENDIX A – Diagrams & Reports

Site Location Diagram
Boring Location Diagram



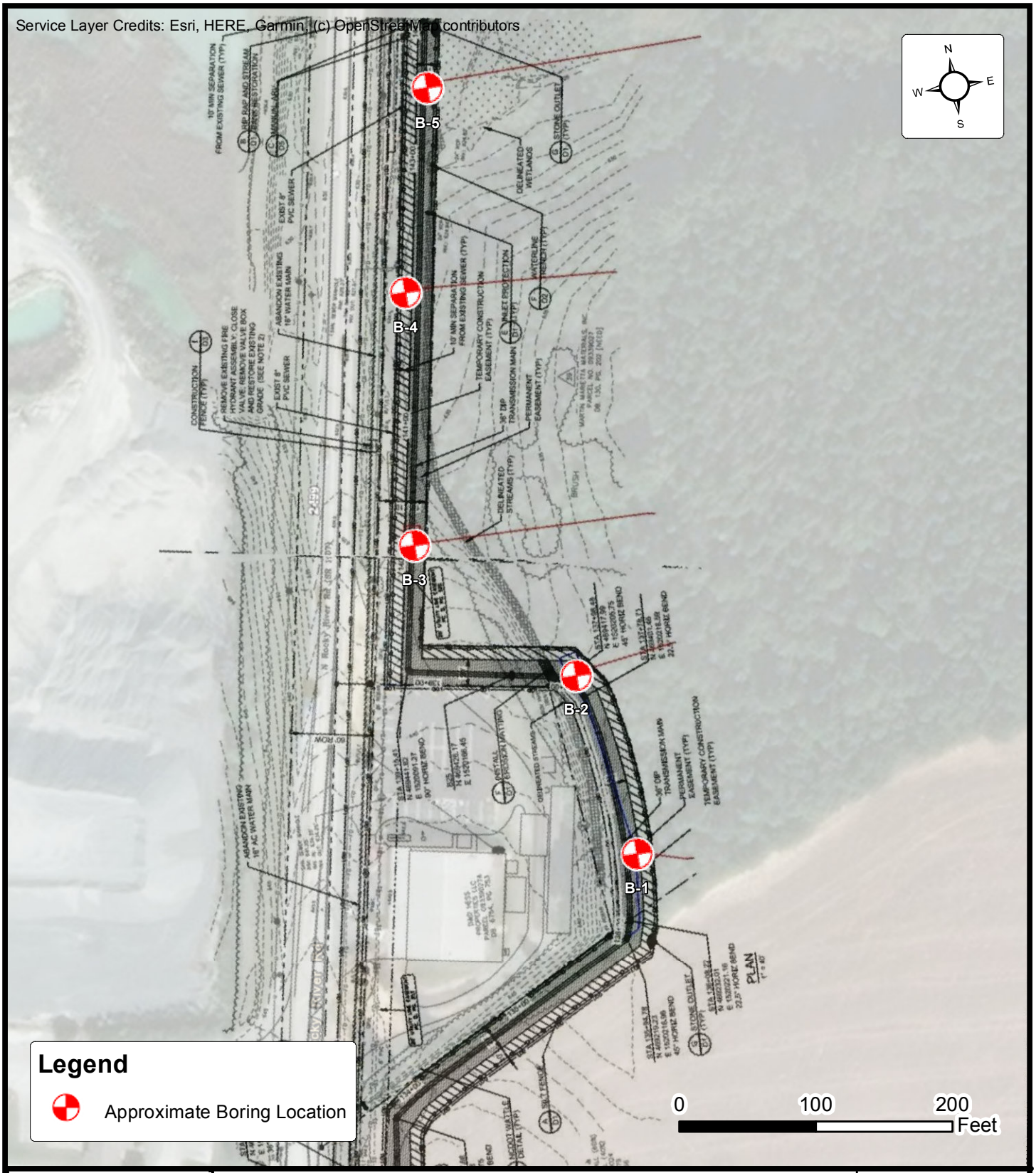
Site Location Diagram

ROCKY RIVER ROAD (853W ZONE IMPROVEMENTS)

ROCKY RIVER RD & OLD CHARLOTTE HWY, MONROE, NC

UNION COUNTY GOVERNMENT PUBLIC WORKS

ENGINEER	CJC2
SCALE	AS NOTED
PROJECT NO.	08:14472
FIGURE	1
DATE	2/8/2021



Boring Location Diagram

ROCKY RIVER ROAD (853W ZONE IMPROVEMENTS)

ROCKY RIVER RD & OLD CHARLOTTE HWY, NC

UNION COUNTY GOVERNMENT PUBLIC WORKS

ENGINEER	CJC2
SCALE	AS NOTED
PROJECT NO.	08:14472
FIGURE	2
DATE	2/8/2021

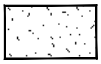
APPENDIX B – Field Operations

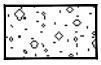
Reference Notes for Boring Logs
Subsurface Exploration Procedure: Standard Penetration Testing (SPT)
Boring Logs B-1 through B-5
Rock Core Photographs

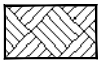
REFERENCE NOTES FOR BORING LOGS

MATERIAL[1,2]


ASPHALT


CONCRETE


GRAVEL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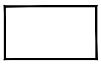
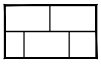
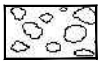
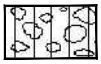

VOID


BRICK

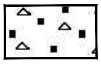

AGGREGATE BASE COURSE

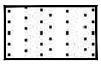

GW **WELL-GRADED GRAVEL**
gravel-sand mixtures, little or no fines

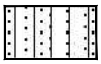

GP **POORLY-GRADED GRAVEL**
gravel-sand mixtures, little or no fines


GM **SILTY GRAVEL**
gravel-sand-silt mixtures

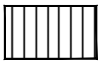

GC **CLAYEY GRAVEL**
gravel-sand-clay mixtures

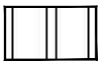

SW **WELL-GRADED SAND**
gravelly sand, little or no fines

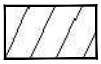

SP **POORLY-GRADED SAND**
gravelly sand, little or no fines


SM **SILTY SAND**
sand-silt mixtures

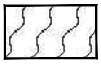

SC **CLAYEY SAND**
sand-clay mixtures

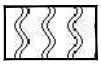

ML **SILT**
non-plastic to medium plasticity

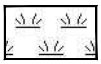

MH **ELASTIC SILT**
high plasticity


CL **LEAN CLAY**
low to medium plasticity


CH **FAT CLAY**
high plasticity


OL **ORGANIC SILT or CLAY**
non-plastic to low plasticity


OH **ORGANIC SILT or CLAY**
high plasticity


PT **PEAT**
highly organic soils

DRILLING SAMPLING SYMBOLS & ABBREVIATIONS

SS	Split Spoon Sampler	PM	Pressuremeter Test
ST	Shelby Tube Sampler	RD	Rock Bit Drilling
WS	Wash Sample	RC	Rock Core, NX, BX, AX
BS	Bulk Sample of Cuttings	REC	Rock Sample Recovery %
PA	Power Auger (no sample)	RQD	Rock Quality Designation %
HSA	Hollow Stem Auger		

PARTICLE SIZE IDENTIFICATION

DESIGNATION		PARTICLE SIZES
Boulders		12 inches (300 mm) or larger
Cobbles		3 inches to 12 inches (75 mm to 300 mm)
Gravel:	Coarse	¾ inch to 3 inches (19 mm to 75 mm)
	Fine	4.75 mm to 19 mm (No. 4 sieve to ¾ inch)
Sand:	Coarse	2.00 mm to 4.75 mm (No. 10 to No. 4 sieve)
	Medium	0.425 mm to 2.00 mm (No. 40 to No. 10 sieve)
	Fine	0.074 mm to 0.425 mm (No. 200 to No. 40 sieve)
Silt & Clay ("Fines")		<0.074 mm (smaller than a No. 200 sieve)

COHESIVE SILTS & CLAYS

UNCONFINED COMPRESSIVE STRENGTH, Q_P[4]	SPT[5] (BPF)	CONSISTENCY[7] (COHESIVE)
<0.25	<3	Very Soft
0.25 - <0.50	3 - 4	Soft
0.50 - <1.00	5 - 8	Firm
1.00 - <2.00	9 - 15	Stiff
2.00 - <4.00	16 - 30	Very Stiff
4.00 - 8.00	31 - 50	Hard
>8.00	>50	Very Hard

GRAVELS, SANDS & NON-COHESIVE SILTS

SPT[5]	DENSITY
<5	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
>50	Very Dense

RELATIVE AMOUNT[7]	COARSE GRAINED (%)[8]	FINE GRAINED (%)[8]
Trace	≤5	≤5
With	10 - 20	10 - 25
Adjective *(ex: "Silty")*	25 - 45	30 - 45

WATER LEVELS[6]


WL (First Encountered)


WL (Completion)


WL (Seasonal High Water)


WL (Stabilized)

FILL AND ROCK

FILL | POSSIBLE FILL | PROBABLE FILL | ROCK

[1]Classifications and symbols per ASTM D 2488-17 (Visual-Manual Procedure) unless noted otherwise.

[2]To be consistent with general practice, "POORLY GRADED" has been removed from GP, GP-GM, GP-GC, SP, SP-SM, SP-SC soil types on the boring logs.

[3]Non-ASTM designations are included in soil descriptions and symbols along with ASTM symbol [Ex: (SM-FILL)].

[4]Typically estimated via pocket penetrometer or Torvane shear test and expressed in tons per square foot (tsf).

[5]Standard Penetration Test (SPT) refers to the number of hammer blows (blow count) of a 140 lb. hammer falling 30 inches on a 2 inch OD split spoon sampler required to drive the sampler 12 inches (ASTM D 1586). "N-value" is another term for "blow count" and is expressed in blows per foot (bpf). SPT correlations per 7.4.2 Method B and need to be corrected if using an auto hammer.

[6]The water levels are those levels actually measured in the borehole at the times indicated by the symbol. The measurements are relatively reliable when augering, without adding fluids, in granular soils. In clay and cohesive silts, the determination of water levels may require several days for the water level to stabilize. In such cases, additional methods of measurement are generally employed.

[7]Minor deviation from ASTM D 2488-17 Note 14.

[8]Percentages are estimated to the nearest 5% per ASTM D 2488-17.

SUBSURFACE EXPLORATION PROCEDURE: STANDARD PENETRATION TESTING (SPT) ASTM D 1586 Split-Barrel Sampling

Standard Penetration Testing, or **SPT**, is the most frequently used subsurface exploration test performed worldwide. This test provides samples for identification purposes, as well as a measure of penetration resistance, or N-value. The N-Value, or blow counts, when corrected and correlated, can approximate engineering properties of soils used for geotechnical design and engineering purposes.

SPT Procedure:

- Involves driving a hollow tube (split-spoon) into the ground by dropping a 140-lb hammer a height of 30-inches at desired depth
- Recording the number of hammer blows required to drive split-spoon a distance of 12 inches (in 3 or 4 Increments of 6 inches each)
- Auger is advanced* and an additional SPT is performed
- One SPT typically performed for every two to five feet
- Obtain two-inch diameter soil sample

**Drilling Methods May Vary*— The predominant drilling methods used for SPT are open hole fluid rotary drilling and hollow-stem auger drilling.

ECS provides Boring Location Diagrams and Boring Logs for each project!

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Union County Public Works	**08:14472**	**B-1**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Rocky River Road (853W Zone Improvements)	**Patriot Drilling**		
SITE LOCATION:			LOSS OF CIRCULATION
Rocky River Rd & Old Charlotte Hwy, Monroe, North Carolina 28110			
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:
469283.5	**1520237.2**		**632.0**

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0	S-1	SS	18	18	(CL) Residuum, SANDY LEAN CLAY, contains slight rock fragments, grayish brown, moist, stiff			6-7-8 (15)
	S-2	SS	17	17	(CL) Residuum, SANDY LEAN CLAY, contains slight rock fragments, grayish brown, moist, very hard	▽	627	13-13-50 (63)
5	S-3	SS	8	8	(PWR) PARTIALLY WEATHERED ROCK SAMPLED AS SANDY LEAN CLAY, grayish brown			24-50/2" (50/2")
	S-4	SS	8	8				21-50/2" (50/2")
10					Refusal encountered at 11.5 feet.		622	
		RC	60	60	ARGILLITE, [REC=100%,RQD=48%], Slightly Weathered, Hard, Moderately Fractured/Jointed, Light Gray			
15					**END OF DRILLING AT 16.5 FT**		617	
20							612	
25							607	
30							602	

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

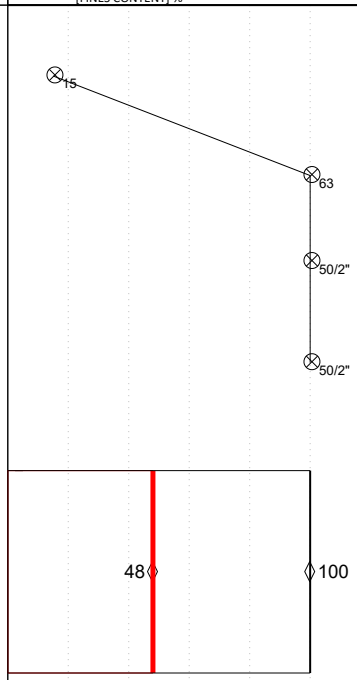
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**GNE**	BORING STARTED: **Jan 22 2021**		CAVE IN DEPTH:
▼ WL (Completion)	**GNE**	BORING COMPLETED: **Jan 22 2021**		HAMMER TYPE: **Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV D-50**	LOGGED BY:	DRILLING METHOD: **2.25 HSA**
▽ WL (Stabilized)	**3.20**			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Union County Public Works	**08:14472**	**B-2**	**1 of 1**

PROJECT NAME:	DRILLER/CONTRACTOR:
Rocky River Road (853W Zone Improvements)	**Patriot Drilling**

SITE LOCATION: **Rocky River Rd & Old Charlotte Hwy, Monroe, North Carolina 28110**

LOSS OF CIRCULATION

NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:	BOTTOM OF CASING
469283.5	**1520214.6**		**635.0**	

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0	S-1	SS	18	18	(CL) Residuum, SANDY LEAN CLAY, contains slight rock fragments, grayish brown, moist, firm to stiff	▽	635	1-3-5 (8)
	S-2	SS	18	18				3-5-9 (14)
5	S-3	SS	11	11	(PWR) PARTIALLY WEATHERED ROCK SAMPLED AS SANDY LEAN CLAY, grayish brown		630	21-50/5" (50/5")
	~~S-4~~	~~SS~~	~~3~~	~~3~~	Refusal encountered at 10.2 feet.			50/3" (50/3")
10		RC	60	33	ARGILLITE, [REC=55%,RQD=93%], Slightly Weathered, Hard, Slightly Fractured/Jointed, Light Gray		625	
15					**END OF DRILLING AT 15.2 FT**		620	
20							615	
25							610	
30							605	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

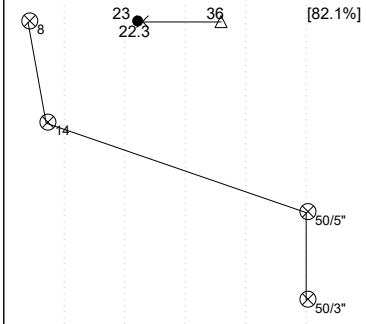
ROCK QUALITY DESIGNATION & RECOVERY

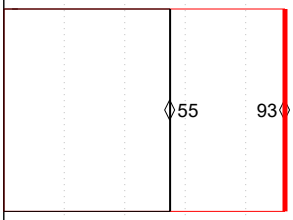
RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %





THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**GNE**	BORING STARTED: **Jan 22 2021**	CAVE IN DEPTH:	
▼ WL (Completion)	**GNE**	BORING COMPLETED: **Jan 22 2021**	HAMMER TYPE: **Auto**	
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV D-50**	LOGGED BY:	DRILLING METHOD: **2.25 HSA**
▽ WL (Stabilized)	**1.30**			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Union County Public Works	**08:14472**	**B-3**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Rocky River Road (853W Zone Improvements)	**Patriot Drilling**		
SITE LOCATION:			LOSS OF CIRCULATION
Rocky River Rd & Old Charlotte Hwy, Monroe, North Carolina 28110			
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:
469532.5	**1520112.8**		**635.0**

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
					Topsoil Thickness[3.00"]			
	S-1	SS	18	18	(CL) Residuum, SANDY LEAN CLAY, contains slight rock fragments, grayish brown, moist, hard			4-11-30 (41)
	S-2	SS	16	16	(PWR) PARTIALLY WEATHERED ROCK SAMPLED AS SANDY LEAN CLAY, grayish brown			26-38-50/4" (50/4")
5	S-4	SS	8	8			630	38-50/2" (50/2")
	S-5	SS	2	2				50/2" (50/2")
10					Refusal encountered at 11.0 feet.		625	
		RC	60	59	ARGILLITE, [REC=98%,RQD=68%], Slightly Weathered, Hard, Slightly Fractured/ Jointed, Light Gray			
15					**END OF DRILLING AT 16.0 FT**		620	
20							615	
25							610	
30							605	

Plastic Limit Water Content Liquid Limit

⊗ STANDARD PENETRATION BLOWS/FT

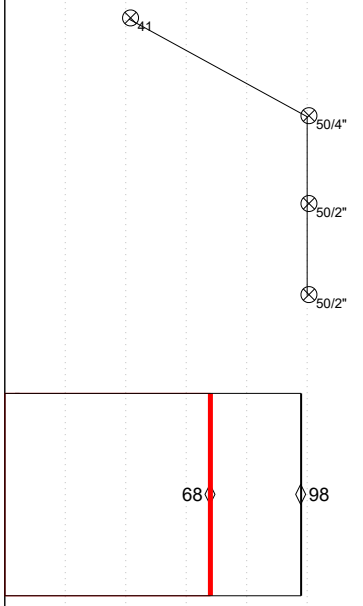
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

○ CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**GNE**	BORING STARTED: **Jan 21 2021**		CAVE IN DEPTH:
▼ WL (Completion)	**GNE**	BORING COMPLETED: **Jan 21 2021**		HAMMER TYPE: **Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV D-50**	LOGGED BY:	DRILLING METHOD: **2.25 HSA**
▽ WL (Stabilized)	**1.30**			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Union County Public Works	**08:14472**	**B-4**	**1 of 1**
PROJECT NAME:	DRILLER/CONTRACTOR:		
Rocky River Road (853W Zone Improvements)	**Patriot Drilling**		
SITE LOCATION:			LOSS OF CIRCULATION
Rocky River Rd & Old Charlotte Hwy, Monroe, North Carolina 28110			
NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:
469716.0	**1520136.6**		**626.0**

BOTTOM OF CASING

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0					Topsoil Thickness[3.00"]			
	S-1	SS	18	18	(CL) Residuum, SANDY LEAN CLAY, contains rock fragments, grayish brown, moist, hard			4-7-24 (31)
	S-2	SS	11	11	(PWR) PARTIALLY WEATHERED ROCK SAMPLED AS SANDY LEAN CLAY, grayish brown Refusal encountered at 5.1 feet.			34-50/5" (50/5")
5	~~S-3~~	~~SS~~	~~0~~	~~0~~			621	50/0" (50/0")
		RC	60	60	ARGILLITE, [REC=100%,RQD=42%], Slightly Weathered, Hard, Moderately Fractured/Jointed, Light Gray			
10					**END OF DRILLING AT 10.1 FT**		616	
15							611	
20							606	
25							601	
30							596	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

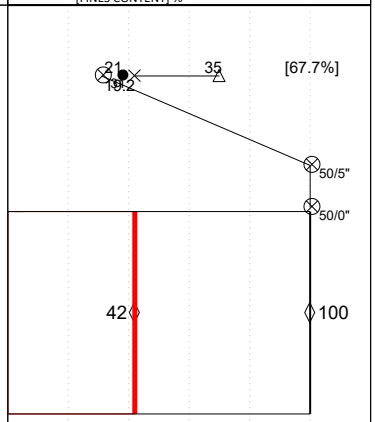
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)	**2.00**	BORING STARTED: **Jan 21 2021**		CAVE IN DEPTH:
▼ WL (Completion)		BORING COMPLETED: **Jan 21 2021**		HAMMER TYPE: **Auto**
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV D-50**	LOGGED BY:	DRILLING METHOD: **2.25 HSA**
▽ WL (Stabilized)	**1.30**			

GEOTECHNICAL BOREHOLE LOG

CLIENT:	PROJECT NO.:	BORING NO.:	SHEET:
Union County Public Works	**08:14472**	**B-5**	**1 of 1**

PROJECT NAME:	DRILLER/CONTRACTOR:
Rocky River Road (853W Zone Improvements)	**Patriot Drilling**

SITE LOCATION: **Rocky River Rd & Old Charlotte Hwy, Monroe, North Carolina 28110**

LOSS OF CIRCULATION

NORTHING:	EASTING:	STATION:	SURFACE ELEVATION:	BOTTOM OF CASING
469860.8	**1520176.7**		**625.0**	

DEPTH (FT)	SAMPLE NUMBER	SAMPLE TYPE	SAMPLE DIST. (IN)	RECOVERY (IN)	DESCRIPTION OF MATERIAL	WATER LEVELS	ELEVATION (FT)	BLOWS/6"
0	S-1	SS	18	18	(ML) Residuum, SANDY SILT, contains slight rock fragments, grayish brown, moist, soft		625	2-2-2 (4)
	S-2	SS	13	13	(PWR) PARTIALLY WEATHERED ROCK SAMPLED AS SANDY LEAN CLAY, grayish brown Refusal encountered at 5.1 feet.			5-15-50/1" (50/1")
5	~~S-3~~	~~SS~~	~~0~~	~~0~~			620	50/0" (50/0")
		RC	60	60	ARGILLITE, [REC=100%,RQD=60%],Slightly Weathered, Hard, Slightly Fractured/Jointed, Light Gray			
10					**END OF DRILLING AT 10.1 FT**		615	
15							610	
20							605	
25							600	
30							595	

Plastic Limit Water Content Liquid Limit

STANDARD PENETRATION BLOWS/FT

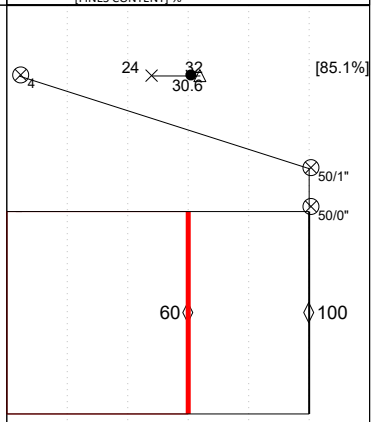
ROCK QUALITY DESIGNATION & RECOVERY

RQD

REC

CALIBRATED PENETROMETER TON/SF

[FINES CONTENT] %



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY LINES BETWEEN SOIL TYPES. IN-SITU THE TRANSITION MAY BE GRADUAL

▽ WL (First Encountered)		BORING STARTED: **Jan 21 2021**	CAVE IN DEPTH:	
▼ WL (Completion)	**2.50**	BORING COMPLETED: **Jan 21 2021**	HAMMER TYPE: **Auto**	
▼ WL (Seasonal High Water)		EQUIPMENT: **ATV D-50**	LOGGED BY:	DRILLING METHOD: **2.25 HSA**
▽ WL (Stabilized)	**0.40**			

GEOTECHNICAL BOREHOLE LOG

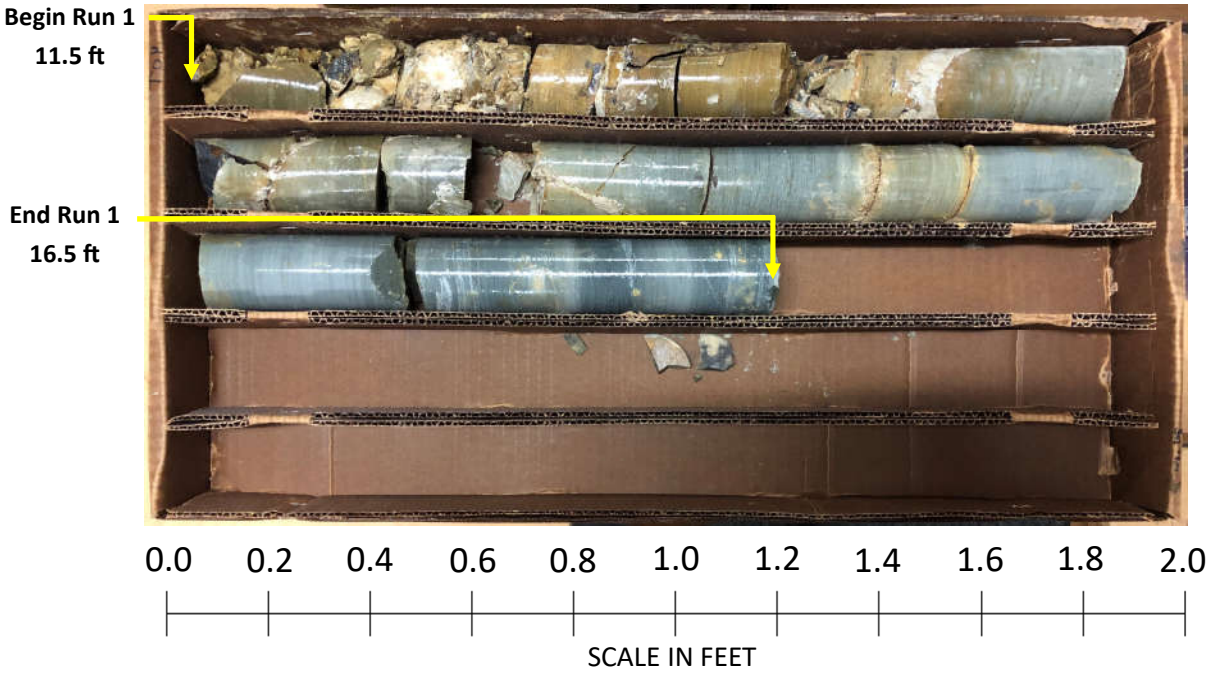
UC 853W Zone Improvements

Rocky River Road

Monroe, Union County, North Carolina

ECS Southeast Project No. 08:14472

Rock Core Photographs: Boring B-1



UC 853W Zone Improvements

Rocky River Road

Monroe, Union County, North Carolina

ECS Southeast Project No. 08:14472

Rock Core Photographs: Boring B-2

Begin Run 1
10.2 ft

End Run 1
15.2 ft

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

UC 853W Zone Improvements

Rocky River Road

Monroe, Union County, North Carolina

ECS Southeast Project No. 08:14472

Rock Core Photographs: Boring B-3

Begin Run 1
11.0 ft

End Run 1
16.0 ft

0.0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0

SCALE IN FEET

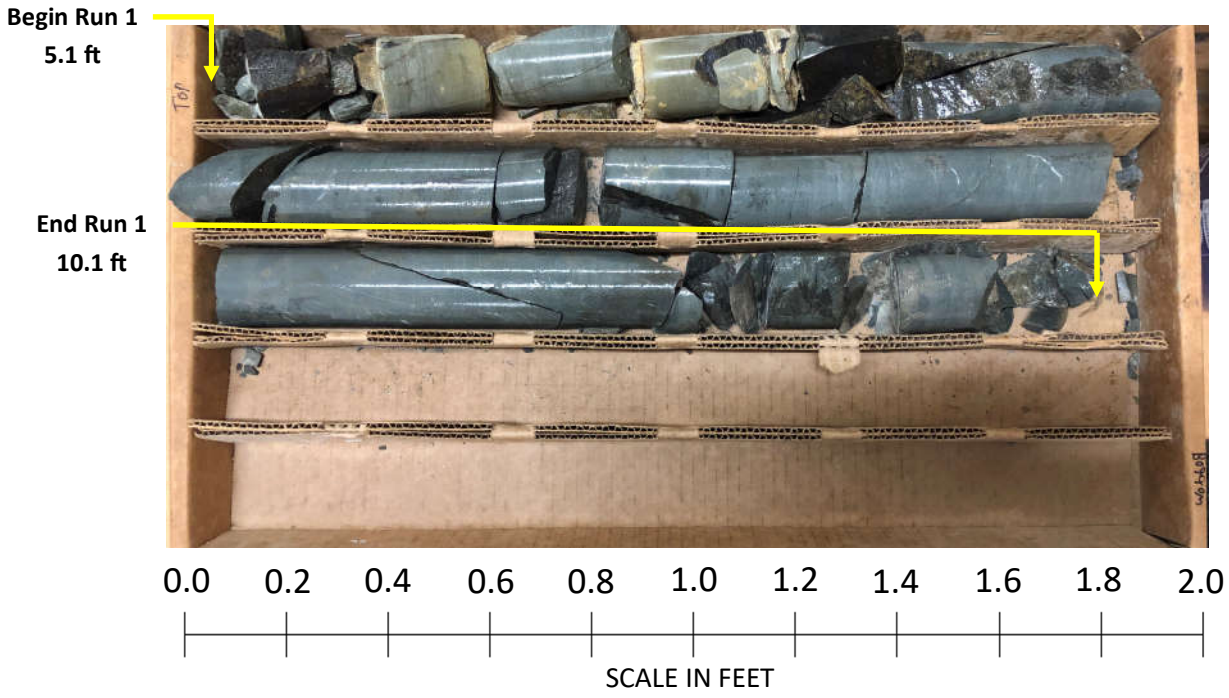
UC 853W Zone Improvements

Rocky River Road

Monroe, Union County, North Carolina

ECS Southeast Project No. 08:14472

Rock Core Photographs: Boring B-4



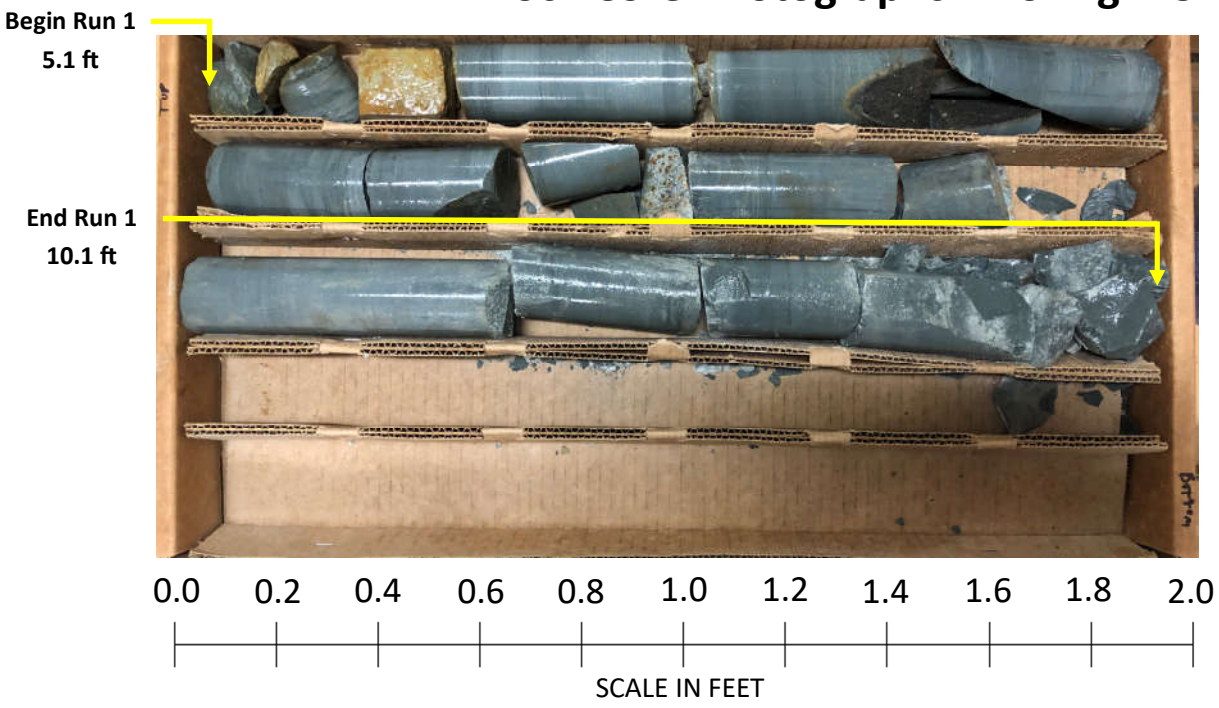
UC 853W Zone Improvements

Rocky River Road

Monroe, Union County, North Carolina

ECS Southeast Project No. 08:14472

Rock Core Photographs: Boring B-5



APPENDIX C – Laboratory Testing

Laboratory Testing Summary
Rock Unconfined Compressive Strength Tests

Laboratory Testing Summary

Sample Location	Sample Number	Depth (feet)	^MC (%)	Soil Type	Atterberg Limits			**Percent Passing No. 200 Sieve	Moisture - Density		CBR (%)		#Organic Content (%)
					LL	PL	PI		Maximum Density (pcf)	Optimum Moisture (%)	0.1 in.	0.2 in.	
B-2	S-1	1-2.5	22.3	CL	36	23	13	82.1					
B-4	S-1	1-2.5	19.2	CL	35	21	14	67.7					
B-5	S-1	1-2.5	30.6	ML	32	24	8	85.1					

Notes: See test reports for test method, ^ASTM D2216-19, *ASTM D2488, **ASTM D1140-17, #ASTM D2974-20e1

Definitions: MC: Moisture Content, Soil Type: USCS (Unified Soil Classification System), LL: Liquid Limit, PL: Plastic Limit, PI: Plasticity Index, CBR: California Bearing Ratio, OC: Organic Content

Project: Rocky River Road (853W Zone Improvements)
Client: Union County Public Works
Project No.: 08:14472
Date Reported: 2/8/2021

Office / Lab	Address	Office Number / Fax
ECS Southeast LLP - Charlotte	1812 Center Park Drive Suite D Charlotte, NC 28217	(704)525-5152 (704)357-0023

Tested by	Checked by	Approved by	Date Received
CER		Project	

ECS SOUTHEAST, LLP
1812 Center Park Drive, STE D
Charlotte, North Carolina 28217

ECS Project No.:	08:14472
Project Name:	Rocky River Road (853W Zone Improvements)
Boring:	B-1
Run No.:	1
Depth (ft.):	15.5-15.9
Sample No.:	RS-1
Rock Type:	ARGILLITE

Tested By:	A. Suttle	**Date:**	2/3/2021
Reviewed By:	C.Conway	**Date:**	2/8/2021

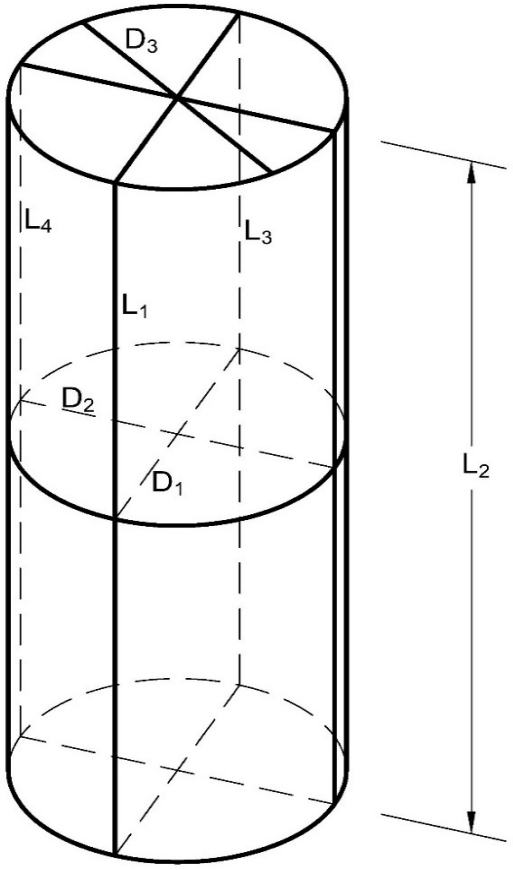
Equipment	Model	Identification No.
Calipers	Westward	61113339
Scale	Ohaus	129113925
Data Logger	Humboldt	171223

Length/Diameter Ratio (ASTM D4543-08, Sections 5.2 and 6.6):

(Check that L_{AVG} / D_{AVG} = 2.0 to 2.5 as per ASTM)

Mass (g):	553.9
L_1 (in):	4.035
L_2 (in):	4.035
L_3 (in):	4.036
L_{AVG} (in):	4.035
D_1 (in):	1.981
D_2 (in):	1.981
D_3 (in):	1.981
D_{AVG} (in):	1.981
Area (in²):	3.082
Volume (in³):	12.438
L_{AVG}/D_{AVG}:	2.0
Within Tolerance:	YES
Unit Weight (pcf):	169.6
Test Run Time (min):	5:56

End 1



End 2

Comments:

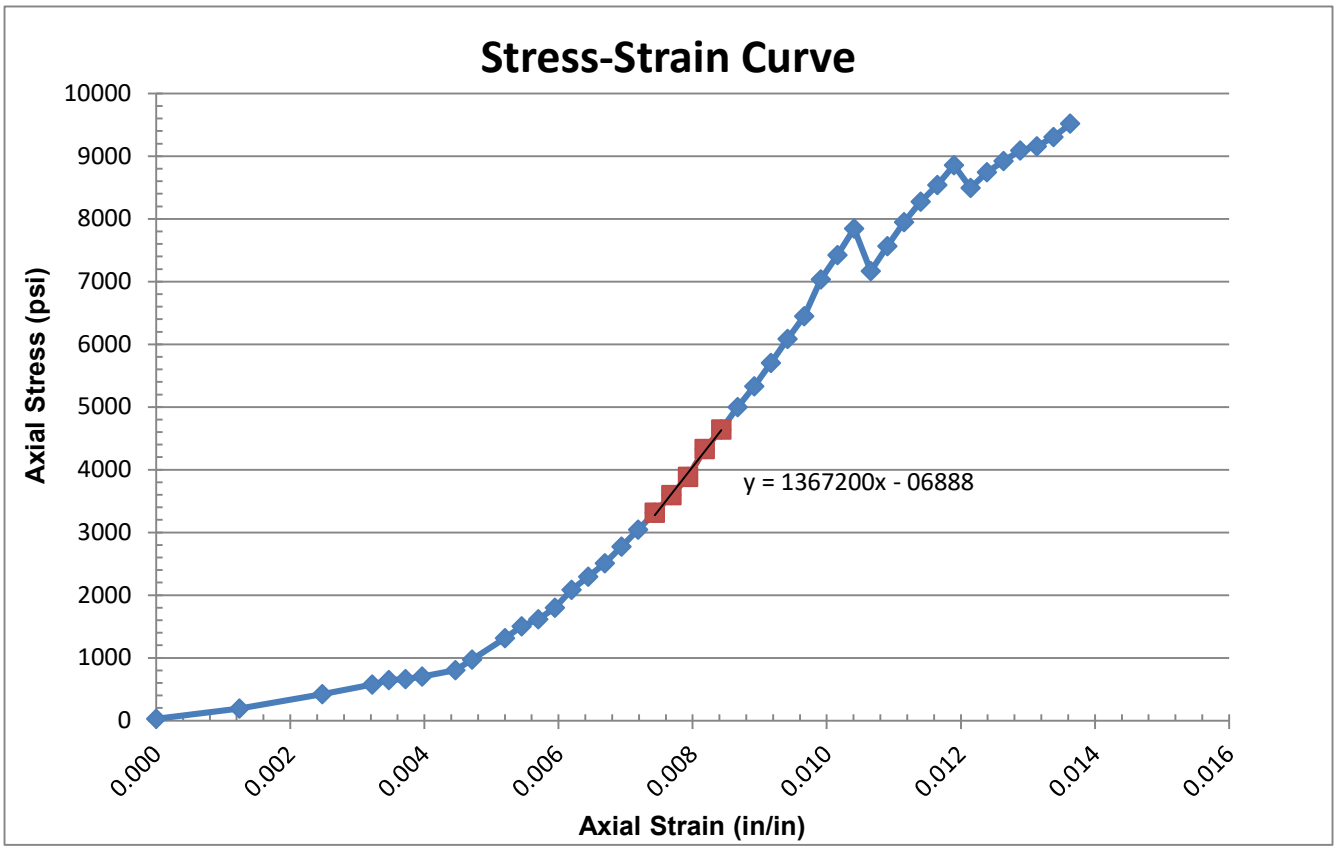
ECS SOUTHEAST, LLP
1812 Center Park Drive, STE D
Charlotte, North Carolina 28217

ECS Project No.:	08:14472
Project Name:	Rocky River Road (853W Zone Improvements)
Boring:	B-1
Run No.:	1
Depth (ft.):	15.5-15.9
Sample No.:	RS-1
Rock Type:	ARGILLITE

Tested By:	A. Suttle	**Date:**	2/3/2021
Reviewed By:	C.Conway	**Date:**	2/8/2021

TEST RESULTS

Specimen Diameter (in):	1.981
Specimen Length (in):	4.035
$Length_{AVG}$ / $Diameter_{AVG}$:	2.0
Dimensional Requirements in Tolerance?:	YES
Unit Weight (pcf):	169.6
Loading Rate (lb/sec)	2005
Test Duration (min):	0.2
Uniaxial Compressive Strength (psi):	**9519**
Young's Modulus (psi):	**1367200**
Young's Modulus (ksf):	**196877**



Remarks: No lateral strain applied to sample

ECS SOUTHEAST, LLP
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ECS Project No.:	08:14472
Project Name:	Rocky River Road (853W Zone Improvements)
Boring:	B-1
Run No.:	1
Depth (ft.):	15.5-15.9
Sample No.:	RS-1
Rock Type:	ARGILLITE

Tested By:	A. Suttle	**Date:**	2/3/2021
Reviewed By:	C.Conway	**Date:**	2/8/2021

Reading No.	Dial Gauge Reading (in)	Axial Load (lbs)	Axial Strain (in/in)	Corrected Area (in^2)	Axial Stress (psi)
1	0.000	87	0.000	3.0822	28
2	0.005	592	0.001	3.0860	192
3	0.010	1300	0.002	3.0898	421
4	0.013	1770	0.003	3.0921	572
5	0.014	1998	0.003	3.0929	646
6	0.015	2045	0.004	3.0937	661
7	0.016	2178	0.004	3.0945	704
8	0.018	2484	0.004	3.0960	802
9	0.019	3010	0.005	3.0968	972
10	0.021	4067	0.005	3.0983	1313
11	0.022	4664	0.005	3.0991	1505
12	0.023	5015	0.006	3.0999	1618
13	0.024	5584	0.006	3.1006	1801
14	0.025	6461	0.006	3.1014	2083
15	0.026	7121	0.006	3.1022	2295
16	0.027	7782	0.007	3.1029	2508
17	0.028	8615	0.007	3.1037	2776
18	0.029	9455	0.007	3.1045	3046
19	0.030	10297	0.007	3.1053	3316
20	0.031	11167	0.008	3.1060	3595
21	0.032	12079	0.008	3.1068	3888
22	0.033	13452	0.008	3.1076	4329
23	0.034	14433	0.008	3.1084	4643
24	0.035	15534	0.009	3.1092	4996
25	0.036	16580	0.009	3.1099	5331
26	0.037	17743	0.009	3.1107	5704
27	0.038	18943	0.009	3.1115	6088
28	0.039	20070	0.010	3.1123	6449
29	0.040	21906	0.010	3.1130	7037
30	0.041	23118	0.010	3.1138	7424

Remarks: No lateral strain applied to sample

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Charlotte, North Carolina 28217

ECS Project No.:	08:14472
Project Name:	Rocky River Road (853W Zone Improvements)
Boring:	B-1
Run No.:	1
Depth (ft.):	15.5-15.9
Sample No.:	RS-1
Rock Type:	ARGILLITE

Tested By:	A. Suttle	**Date:**	2/3/2021
Reviewed By:	C.Conway	**Date:**	2/8/2021

Reading No.	Dial Gauge Reading (in)	Axial Load (lbs)	Axial Strain (in/in)	Corrected Area (in^2)	Axial Stress (psi)
31	0.042	24435	0.010	3.1146	7845
32	0.043	22337	0.011	3.1154	7170
33	0.044	23579	0.011	3.1162	7567
34	0.045	24767	0.011	3.1169	7946
35	0.046	25794	0.011	3.1177	8273
36	0.047	26626	0.012	3.1185	8538
37	0.048	27630	0.012	3.1193	8858
38	0.049	26500	0.012	3.1201	8493
39	0.050	27287	0.012	3.1209	8743
40	0.051	27850	0.013	3.1216	8922
41	0.052	28384	0.013	3.1224	9090
42	0.053	28595	0.013	3.1232	9156
43	0.054	29077	0.013	3.1240	9308
44	0.055	29746	0.014	3.1248	9519

Remarks: No lateral strain applied to sample

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ECS Project No.:	08:14472
Project Name:	Rocky River Road (853W Zone Improvements)
Boring:	B-1
Run No.:	1
Depth (ft.):	15.5-15.9
Sample No.:	RS-1
Rock Type:	ARGILLITE

Tested By:	A. Suttle	**Date:**	2/3/2021
Reviewed By:	C.Conway	**Date:**	2/8/2021

Rock Core Break Photo (after break)

Remarks: _____

ECS SOUTHEAST, LLP
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Charlotte, North Carolina 28217

ECS Project No.:	08:14472
Project Name:	Rocky River Road (853W Zone Improvements)
Boring:	B-3
Run No.:	1
Depth (ft.):	12.9-13.3
Sample No.:	RS-1
Rock Type:	ARGILLITE

Tested By:	A. Suttle	**Date:**	2/3/2021
Reviewed By:	C.Conway	**Date:**	2/8/2021

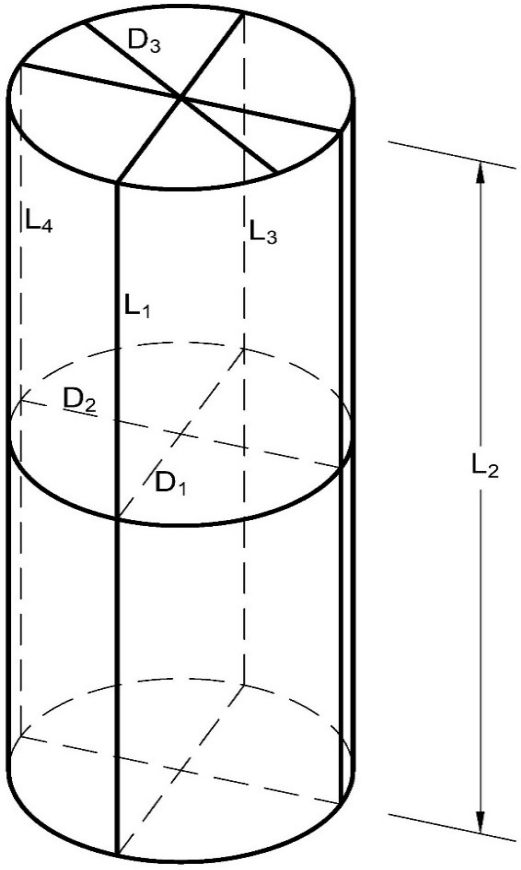
Equipment	Model	Identification No.
Calipers	Westward	61113339
Scale	Ohaus	129113925
Data Logger	Humboldt	171223

Length/Diameter Ratio (ASTM D4543-08, Sections 5.2 and 6.6):

(Check that L_{AVG} / D_{AVG} = 2.0 to 2.5 as per ASTM)

Mass (g):	553.1
L_1 (in):	4.093
L_2 (in):	4.093
L_3 (in):	4.093
L_{AVG} (in):	4.093
D_1 (in):	1.975
D_2 (in):	1.975
D_3 (in):	1.975
D_{AVG} (in):	1.975
Area (in²):	3.064
Volume (in³):	12.539
L_{AVG}/D_{AVG}:	2.1
Within Tolerance:	YES
Unit Weight (pcf):	168.0
Test Run Time (min):	4:50

End 1



End 2

Comments:

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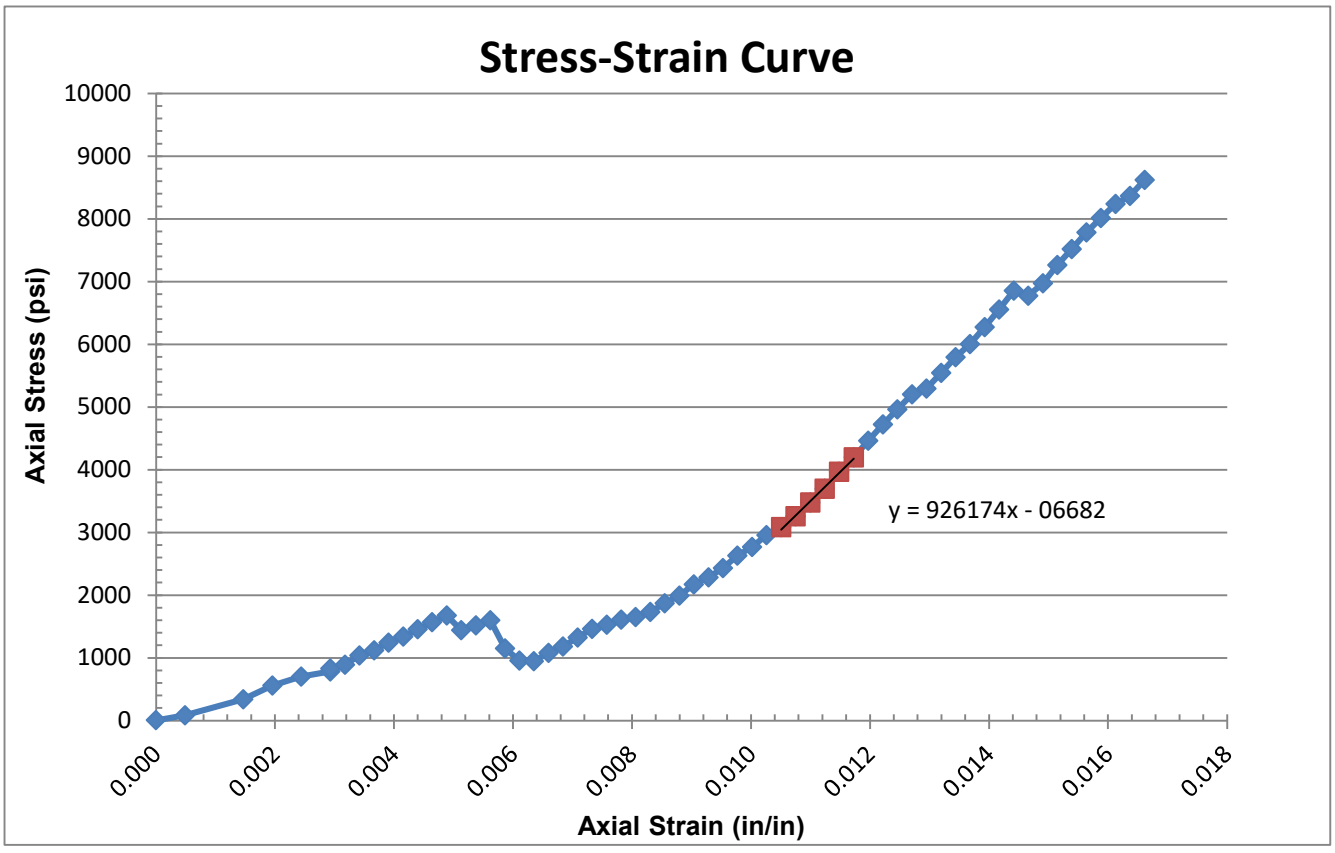
Charlotte, North Carolina 28217

ECS Project No.:	08:14472
Project Name:	Rocky River Road (853W Zone Improvements)
Boring:	B-3
Run No.:	1
Depth (ft.):	12.9-13.3
Sample No.:	RS-1
Rock Type:	ARGILLITE

Tested By:	A. Suttle	**Date:**	2/3/2021
Reviewed By:	C.Conway	**Date:**	2/8/2021

TEST RESULTS

Specimen Diameter (in):	1.975
Specimen Length (in):	4.093
$Length_{AVG}$ / $Diameter_{AVG}$:	2.1
Dimensional Requirements in Tolerance?:	YES
Unit Weight (pcf):	168.0
Loading Rate (lb/sec)	2065
Test Duration (min):	0.2
Uniaxial Compressive Strength (psi):	**8623**
Young's Modulus (psi):	**926174**
Young's Modulus (ksf):	**133369**



Remarks: No lateral strain applied to sample

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1812 Center Park Drive, STE D
Charlotte, North Carolina 28217

ECS Project No.:	08:14472
Project Name:	Rocky River Road (853W Zone Improvements)
Boring:	B-3
Run No.:	1
Depth (ft.):	12.9-13.3
Sample No.:	RS-1
Rock Type:	ARGILLITE

Tested By:	A. Suttle	**Date:**	2/3/2021
Reviewed By:	C.Conway	**Date:**	2/8/2021

Reading No.	Dial Gauge Reading (in)	Axial Load (lbs)	Axial Strain (in/in)	Corrected Area (in^2)	Axial Stress (psi)
1	0	17	0.000	3.0635	6
2	0.002	263	0.000	3.0650	86
3	0.006	1043	0.001	3.0680	340
4	0.008	1718	0.002	3.0695	560
5	0.01	2157	0.002	3.0710	702
6	0.012	2412	0.003	3.0726	785
7	0.012	2556	0.003	3.0726	832
8	0.013	2744	0.003	3.0733	893
9	0.014	3186	0.003	3.0741	1036
10	0.015	3440	0.004	3.0748	1119
11	0.016	3821	0.004	3.0756	1242
12	0.017	4127	0.004	3.0763	1342
13	0.018	4488	0.004	3.0771	1459
14	0.019	4827	0.005	3.0778	1568
15	0.02	5155	0.005	3.0786	1674
16	0.021	4445	0.005	3.0793	1443
17	0.022	4682	0.005	3.0801	1520
18	0.023	4927	0.006	3.0809	1599
19	0.024	3547	0.006	3.0816	1151
20	0.025	2952	0.006	3.0824	958
21	0.026	2917	0.006	3.0831	946
22	0.027	3324	0.007	3.0839	1078
23	0.028	3651	0.007	3.0846	1184
24	0.029	4079	0.007	3.0854	1322
25	0.03	4518	0.007	3.0862	1464
26	0.031	4715	0.008	3.0869	1527
27	0.032	4967	0.008	3.0877	1609
28	0.033	5094	0.008	3.0884	1649
29	0.034	5348	0.008	3.0892	1731
30	0.035	5785	0.009	3.0900	1872

Remarks: No lateral strain applied to sample

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Charlotte, North Carolina 28217

ECS Project No.:	08:14472
Project Name:	Rocky River Road (853W Zone Improvements)
Boring:	B-3
Run No.:	1
Depth (ft.):	12.9-13.3
Sample No.:	RS-1
Rock Type:	ARGILLITE

Tested By:	A. Suttle	**Date:**	2/3/2021
Reviewed By:	C.Conway	**Date:**	2/8/2021

Reading No.	Dial Gauge Reading (in)	Axial Load (lbs)	Axial Strain (in/in)	Corrected Area (in^2)	Axial Stress (psi)
31	0.036	6158	0.009	3.0907	1992
32	0.037	6711	0.009	3.0915	2171
33	0.038	7067	0.009	3.0923	2285
34	0.039	7515	0.010	3.0930	2430
35	0.04	8133	0.010	3.0938	2629
36	0.041	8570	0.010	3.0945	2769
37	0.042	9152	0.010	3.0953	2957
38	0.043	9552	0.011	3.0961	3085
39	0.044	10085	0.011	3.0968	3257
40	0.045	10770	0.011	3.0976	3477
41	0.046	11461	0.011	3.0984	3699
42	0.047	12294	0.011	3.0991	3967
43	0.048	13015	0.012	3.0999	4199
44	0.049	13842	0.012	3.1007	4464
45	0.05	14648	0.012	3.1014	4723
46	0.051	15401	0.012	3.1022	4965
47	0.052	16148	0.013	3.1030	5204
48	0.053	16429	0.013	3.1037	5293
49	0.054	17216	0.013	3.1045	5545
50	0.055	17996	0.013	3.1053	5795
51	0.056	18644	0.014	3.1060	6002
52	0.057	19494	0.014	3.1068	6275
53	0.058	20369	0.014	3.1076	6555
54	0.059	21306	0.014	3.1084	6854
55	0.06	21059	0.015	3.1091	6773
56	0.061	21680	0.015	3.1099	6971
57	0.062	22596	0.015	3.1107	7264
58	0.063	23392	0.015	3.1114	7518
59	0.064	24230	0.016	3.1122	7785
60	0.065	24953	0.016	3.1130	8016

Remarks: No lateral strain applied to sample

ECS SOUTHEAST, LLP
1812 Center Park Drive, STE D
Charlotte, North Carolina 28217

ECS Project No.:	08:14472
Project Name:	Rocky River Road (853W Zone Improvements)
Boring:	B-3
Run No.:	1
Depth (ft.):	12.9-13.3
Sample No.:	RS-1
Rock Type:	ARGILLITE

Tested By:	A. Suttle	**Date:**	2/3/2021
Reviewed By:	C.Conway	**Date:**	2/8/2021

Reading No.	Dial Gauge Reading (in)	Axial Load (lbs)	Axial Strain (in/in)	Corrected Area (in^2)	Axial Stress (psi)
61	0.066	25653	0.016	3.1138	8239
62	0.067	26063	0.016	3.1145	8368
63	0.068	26862	0.017	3.1153	8623

Remarks: No lateral strain applied to sample

ECS SOUTHEAST, LLP
1812 Center Park Drive, STE D
Charlotte, North Carolina 28217

ECS Project No.:	08:14472
Project Name:	Rocky River Road (853W Zone Improvements)
Boring:	B-3
Run No.:	1
Depth (ft.):	12.9-13.3
Sample No.:	RS-1
Rock Type:	ARGILLITE

Tested By:	A. Suttle	**Date:**	2/3/2021
Reviewed By:	C.Conway	**Date:**	2/8/2021

Rock Core Break Photo (after break)

Remarks:

ECS SOUTHEAST, LLP
1812 Center Park Drive, STE D
Charlotte, North Carolina 28217

ECS Project No.:	08:14472
Project Name:	Rocky River Road (853W Zone Improvements)
Boring:	B-4
Run No.:	1
Depth (ft.):	8.5-8.9
Sample No.:	RS-1
Rock Type:	ARGILLITE

Tested By:	A. Suttle	**Date:**	2/3/2021
Reviewed By:	C.Conway	**Date:**	2/8/2021

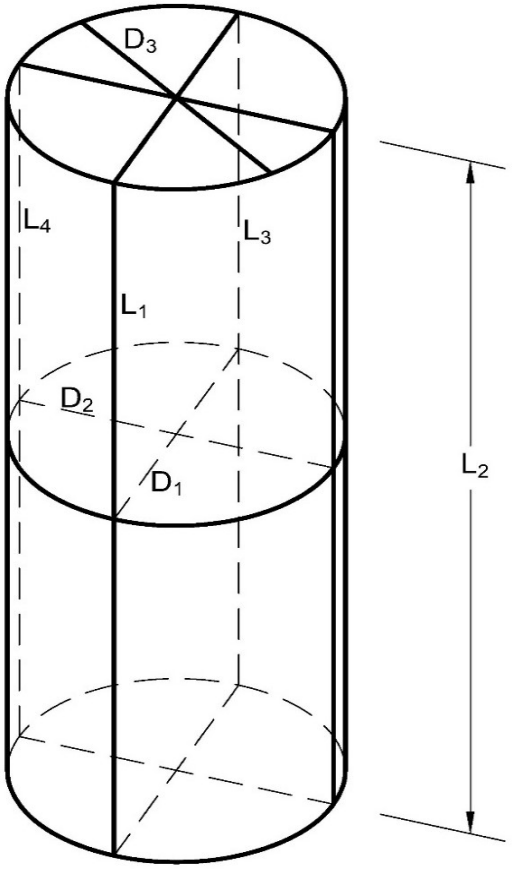
Equipment	Model	Identification No.
Calipers	Westward	61113339
Scale	Ohaus	129113925
Data Logger	Humboldt	171223

Length/Diameter Ratio (ASTM D4543-08, Sections 5.2 and 6.6):

(Check that L_{AVG} / D_{AVG} = 2.0 to 2.5 as per ASTM)

Mass (g):	561.6
L_1 (in):	4.010
L_2 (in):	4.010
L_3 (in):	4.010
L_{AVG} (in):	4.010
D_1 (in):	1.981
D_2 (in):	1.981
D_3 (in):	1.981
D_{AVG} (in):	1.981
Area (in²):	3.082
Volume (in³):	12.360
L_{AVG}/D_{AVG}:	2.0
Within Tolerance:	YES
Unit Weight (pcf):	173.1
Test Run Time (min):	7:44

End 1



End 2

Comments:

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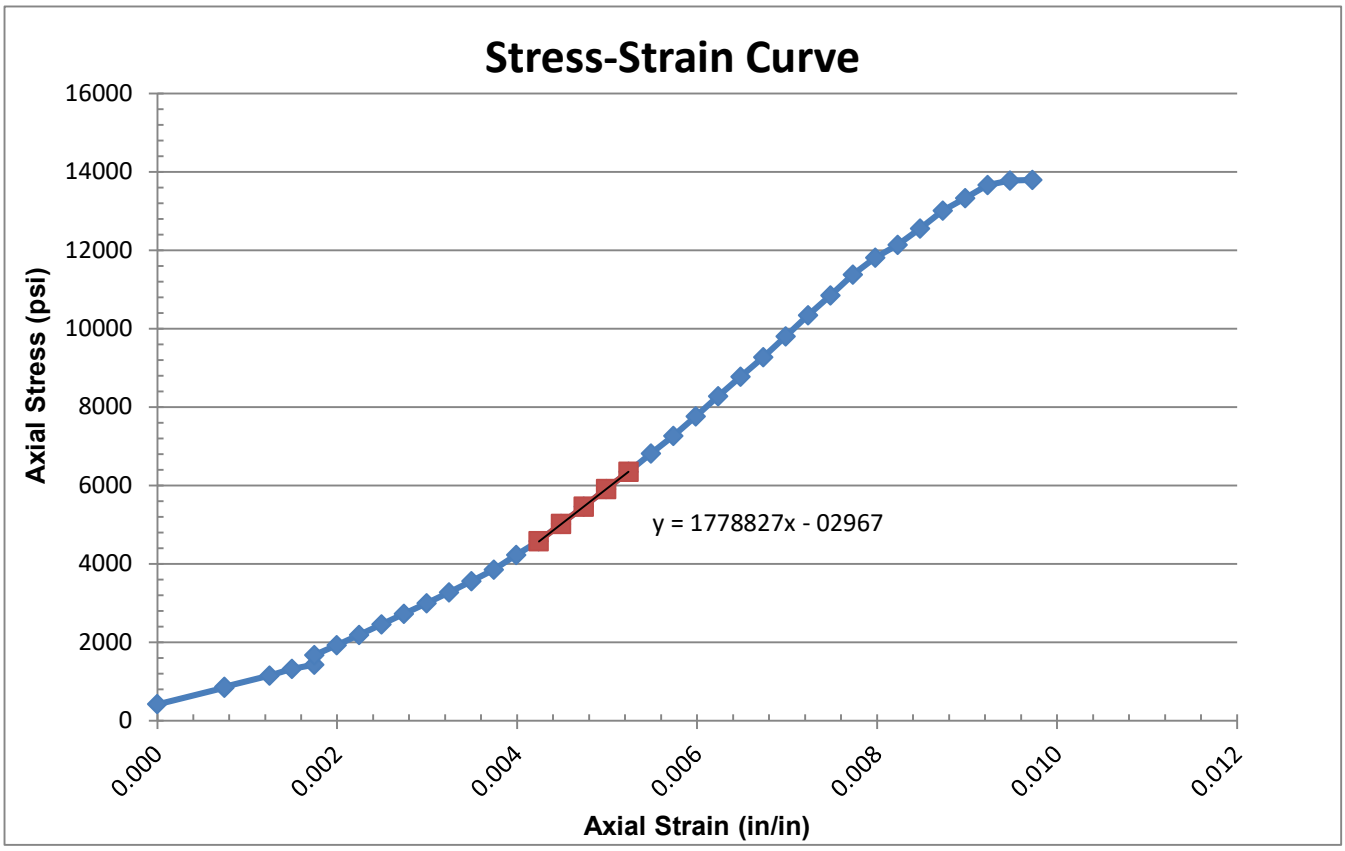
1812 Center Park Drive, STE D
Charlotte, North Carolina 28217

ECS Project No.:	08:14472
Project Name:	Rocky River Road (853W Zone Improvements)
Boring:	B-4
Run No.:	1
Depth (ft.):	8.5-8.9
Sample No.:	RS-1
Rock Type:	ARGILLITE

Tested By:	A. Suttle	**Date:**	2/3/2021
Reviewed By:	C.Conway	**Date:**	2/8/2021

TEST RESULTS

Specimen Diameter (in):	1.981
Specimen Length (in):	4.010
$Length_{AVG}$ / $Diameter_{AVG}$:	2.0
Dimensional Requirements in Tolerance?:	YES
Unit Weight (pcf):	173.1
Loading Rate (lb/sec)	2221
Test Duration (min):	0.3
Uniaxial Compressive Strength (psi):	**13797**
Young's Modulus (psi):	**1778827**
Young's Modulus (ksf):	**256151**



Remarks: No lateral strain applied to sample

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1812 Center Park Drive, STE D
Charlotte, North Carolina 28217

ECS Project No.:	08:14472
Project Name:	Rocky River Road (853W Zone Improvements)
Boring:	B-4
Run No.:	1
Depth (ft.):	8.5-8.9
Sample No.:	RS-1
Rock Type:	ARGILLITE

Tested By:	A. Suttle	**Date:**	2/3/2021
Reviewed By:	C.Conway	**Date:**	2/8/2021

Reading No.	Dial Gauge Reading (in)	Axial Load (lbs)	Axial Strain (in/in)	Corrected Area (in^2)	Axial Stress (psi)
1	0.000	1285	0.000	3.0822	417
2	0.003	2582	0.001	3.0845	837
3	0.003	2666	0.001	3.0845	864
4	0.005	3529	0.001	3.0860	1144
5	0.006	4073	0.001	3.0868	1319
6	0.007	4388	0.002	3.0876	1421
7	0.007	5167	0.002	3.0876	1673
8	0.008	5948	0.002	3.0883	1926
9	0.009	6745	0.002	3.0891	2183
10	0.010	7582	0.002	3.0899	2454
11	0.011	8409	0.003	3.0907	2721
12	0.012	9242	0.003	3.0914	2990
13	0.013	10112	0.003	3.0922	3270
14	0.014	10994	0.003	3.0930	3554
15	0.015	11900	0.004	3.0938	3846
16	0.016	13067	0.004	3.0945	4223
17	0.017	14173	0.004	3.0953	4579
18	0.018	15528	0.004	3.0961	5015
19	0.019	16899	0.005	3.0969	5457
20	0.020	18292	0.005	3.0976	5905
21	0.021	19681	0.005	3.0984	6352
22	0.022	21110	0.005	3.0992	6811
23	0.023	22527	0.006	3.1000	7267
24	0.024	24058	0.006	3.1007	7759
25	0.025	25671	0.006	3.1015	8277
26	0.026	27226	0.006	3.1023	8776
27	0.027	28776	0.007	3.1031	9273
28	0.028	30425	0.007	3.1039	9802
29	0.029	32113	0.007	3.1046	10344
30	0.030	33689	0.007	3.1054	10848

Remarks: No lateral strain applied to sample

ECS SOUTHEAST, LLP
1812 Center Park Drive, STE D
Charlotte, North Carolina 28217

ECS Project No.:	08:14472
Project Name:	Rocky River Road (853W Zone Improvements)
Boring:	B-4
Run No.:	1
Depth (ft.):	8.5-8.9
Sample No.:	RS-1
Rock Type:	ARGILLITE

Tested By:	A. Suttle	**Date:**	2/3/2021
Reviewed By:	C.Conway	**Date:**	2/8/2021

Reading No.	Dial Gauge Reading (in)	Axial Load (lbs)	Axial Strain (in/in)	Corrected Area (in^2)	Axial Stress (psi)
31	0.031	35344	0.008	3.1062	11379
32	0.032	36691	0.008	3.1070	11809
33	0.033	37713	0.008	3.1078	12135
34	0.034	39019	0.008	3.1085	12552
35	0.035	40444	0.009	3.1093	13007
36	0.036	41457	0.009	3.1101	13330
37	0.037	42500	0.009	3.1109	13662
38	0.038	42871	0.009	3.1117	13777
39	0.039	42943	0.010	3.1125	13797

Remarks: No lateral strain applied to sample

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1812 Center Park Drive, STE D
Charlotte, North Carolina 28217

ECS Project No.:	08:14472
Project Name:	Rocky River Road (853W Zone Improvements)
Boring:	B-4
Run No.:	1
Depth (ft.):	8.5-8.9
Sample No.:	RS-1
Rock Type:	ARGILLITE

Tested By:	A. Suttle	**Date:**	2/3/2021
Reviewed By:	C.Conway	**Date:**	2/8/2021

Rock Core Break Photo (after break)

Remarks: _____

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed*. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

Approved Piedmont Natural Gas (Duke Energy) Encroachment Permit

Permit Number:	**EN2020-219 21**	**RC: 21-Indian Trail**
Easement TRACT:	**221-UNIO-055_000, 027-UNIO-016_000**	
Atlas Page:	**21 2220 – C**	
Station(s):	**117+56**	
Approval Date:	2/24/21	

APPROVED

PERMIT TO ENCROACH UPON PIEDMONT NATURAL GAS RIGHT OF WAY AND EASEMENT

Union County Public Works (the "PROJECT OWNER") hereby requests a **PERMIT TO ENCROACH UPON PIEDMONT NATURAL GAS RIGHT OF WAY AND EASEMENT (the "Permit") from PIEDMONT NATURAL GAS COMPANY, INC.** ("PIEDMONT") with **(1) 54-inch FRP SN46 casing for 36-inch DIP water main.** This installation is located at or near **N. Rocky River Rd. and James Hamilton Rd. in Monroe, NC and within Union County.** If said Permit is granted, PROJECT OWNER agrees all facilities will be installed pursuant to the following specifications unless specific written waivers are granted by PIEDMONT:

Part I. GOVERNANCE FOR ALL LAND USES

1. If PROJECT OWNER has already retained a contractor to install or construct the facilities constituting the encroachment, then such contractor shall also be required to execute this Permit as a condition of Piedmont granting the Permit. PROJECT OWNER further acknowledges and understands that it must ensure that any current or future contractors, subcontractors, vendors, agents, and representatives comply with all terms and conditions of this Permit and that the execution of this Permit by a contractor shall not reduce, eliminate, or otherwise alter any of the terms, obligations, or requirements assigned to PROJECT OWNER herein.

2. PROJECT OWNER, or its agent, will give the following PIEDMONT Resource Center representatives a three working day notice of the day on which the encroachment(s) will be made, in order that arrangements can be made for necessary representatives of PIEDMONT to be present at PIEDMONT's election. PROJECT OWNER shall ensure construction plans reference the PIEDMONT contact requirement.

RC REP:	**Marshel Herring**	**RC:**	**21-Indian Trail**
PHONE:	**704-282-8475**	**E-MAIL:**	**Marshel.Herring@duke-energy.com**

3. To the extent allowed by law, PROJECT OWNER shall indemnify, defend, and hold harmless PIEDMONT, its affiliates, partners, successors, assigns, and the respective officers, directors, employees, agents, and representatives of each such entity from and against any and all actions, suits, claims, damages, loss, liability, attorney fees, cost and expense, including death, personal injury, and property damage occurring to PROJECT OWNER, its contractor, subcontractors, or PIEDMONT, and their respective officers, directors, employees, agents, and representatives, or to any third parties, which arise out of or in connection with, or by reason of, performance of the work herein contemplated, the existence of said installations and facilities, failure to comply with any applicable local, state or federal law or regulation and/or release of contaminants or other hazardous substances, or the acts, errors or omissions of the PROJECT OWNER or anyone for whom PROJECT OWNER is legally responsible (excluding those claims which have been solely caused by the intentional or negligent acts or omissions of PIEDMONT, its contractors, agents, and/or representatives).

4. As long as PROJECT OWNER continues to operate installations or facilities under this Permit, PROJECT OWNER shall maintain adequate comprehensive general liability insurance coverage, either through a policy or policies of insurance or an approved program of self-insurance, and any other insurance required by law. PROJECT OWNER further agrees to comply with the specific insurance requirements required by PIEDMONT in its sole discretion, if any, pursuant to Section 15 of this Permit, and PROJECT OWNER agrees to provide copies of the certificates of insurance to PIEDMONT if requested in PIEDMONT's sole discretion.

5. It is further understood and agreed between PROJECT OWNER and PIEDMONT:

    a. That PIEDMONT does not, by consenting to the proposed encroachment upon PIEDMONT's right of way and easement, assume any responsibility for the protection, maintenance, or operation of PROJECT OWNER's facilities. Furthermore, all work performed in connection with any of the encroaching facilities and installations will be without any expense, risk, or liability to PIEDMONT or any of its directors, officers, agents, representatives, or employees except as otherwise expressly provided herein.

b. That all work shall be conducted in a prudent, workmanlike manner and in conformity with any applicable statutes, orders, rules, or regulations and specifications of any governmental or regulatory authority having jurisdiction over the installations or facilities, and the work shall be in accordance with any applicable design, plans, drawings and specifications approved by Piedmont.

c. That PIEDMONT reserves the right to maintain and repair the existing natural gas facilities and pipelines, to construct additional pipelines, and to fully exercise its easement rights which exist now or in the future, at any time and from time to time in such manner as PIEDMONT determines in its reasonable discretion to be necessary for the proper operation of its pipeline system or natural gas facilities. PIEDMONT'S exercise of such rights shall be without liability for repairing or restoring the installation or facilities, or for the interruption of service or use of such installations or facilities, except to the extent such damage or interruption is caused by Piedmont's negligence or willful misconduct.

d. That except to the extent made necessary by the construction and maintenance of such permitted encroachments, and the reasonable use thereof, the exercise of any rights permitted to PROJECT OWNER shall not interfere with or supersede the rights of PIEDMONT under its easements. Furthermore, nothing herein shall be construed as expanding, creating, or granting PROJECT OWNER any authority greater than the express terms of this Permit or as required by applicable law.

e. That except for approved permanent surface crossings or grade changes, any disturbance to the easement area or right of way resulting from any construction activities permitted hereunder shall be restored to its pre-construction condition and to the reasonable satisfaction of PIEDMONT.

6. This Permit shall not be assigned by PROJECT OWNER except as approved by PIEDMONT in writing in its reasonable discretion. Any approved assignee shall be required to assume and accept, in writing, the entirety of PROJECT OWNER'S rights, obligations and responsibilities set forth herein.

7. Execution below by PROJECT OWNER acknowledges agreement and acceptance of the conditions expressed herein for PROJECT OWNER's particular encroachment, and PROJECT OWNER agrees to adhere to the general requirements for permitting encroachments contained in Piedmont's GUIDELINES FOR PROPOSED LAND USES, as amended from time to time. PROJECT OWNER further agrees not to begin any work within the confines of the easement or right of way until this Permit has been executed by the Parties.

8. That this Permit may only be terminated by mutual consent or for PROJECT OWNER's failure to cure a material breach of the terms of this Permit within 30 days (or such additional time as PIEDMONT may approve in its sole discretion after written notice by PIEDMONT to PROJECT OWNER of the default, including a description of the default).

9. That if PIEDMONT, in its sole discretion, determines that the encroachment interferes with the exercise of its easement rights, then upon written notice to PROJECT OWNER, PROJECT OWNER shall, at its expense and within 30 days of such notice, modify or relocate its installations and facilities in such manner as to facilitate PIEDMONT's continuing exercise of its easement rights; provided that PIEDMONT shall provide reasonable alternatives to accommodate the relocation of the installations or facilities within PIEDMONT'S easement or right of way. In such an event, when feasible, PIEDMONT agrees to use good faith efforts to minimize the adverse impact on PROJECT OWNER, including providing longer notice of any necessary relocation.

10. In the event of an emergency, in order to protect or safeguard its property, operations, equipment and/or employees from damage or injury, PIEDMONT may reasonably request immediate repair or renewal of the installations and facilities, and if the same is not performed within such period of time as Piedmont reasonably requires under the circumstances, PIEDMONT may make or contract to make such repairs or renewals, at the sole risk and actual cost and expense of PROJECT OWNER.

11. This Permit is based on PIEDMONT's representation to PROJECT OWNER, and acceptance by PROJECT OWNER, that PIEDMONT's easement is exclusive and that the PROJECT OWNER cannot cross PIEDMONT's easement without PIEDMONT's Permit as expressed herein.

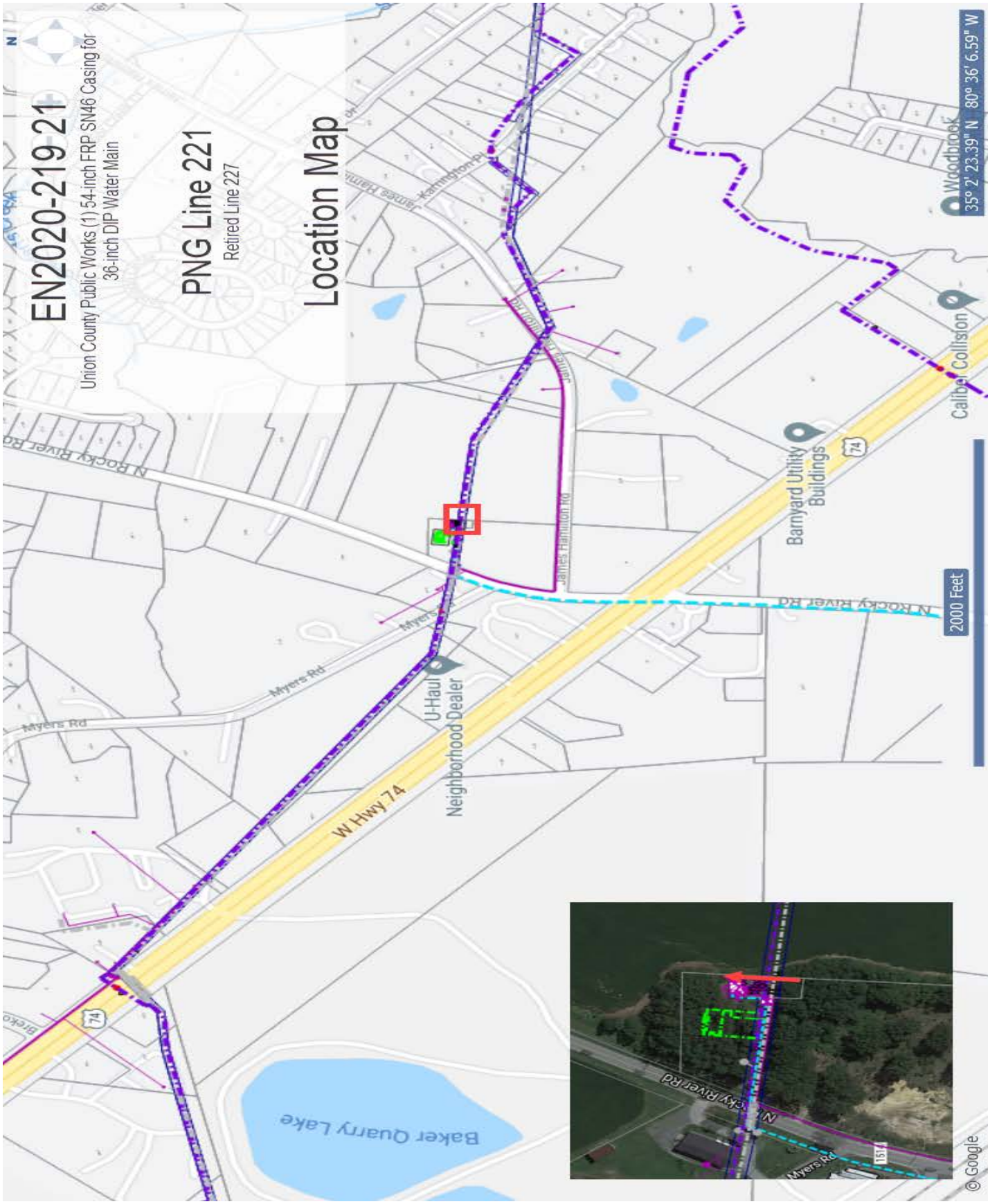
12. Crossings are to be scheduled during PIEDMONT's normal working hours. If PROJECT OWNER, or its agent, requests crossing to be done outside of PIEDMONT's normal working hours, PROJECT OWNER shall reimburse PIEDMONT at PIEDMONT's overtime rate for all hours required for crossing and travel time.

13. PROJECT OWNER will contact the applicable 811 OneCall in the state in which the work is performed to have all underground pipelines, installations and facilities located prior to any construction activity within PIEDMONT'S easement. All underground pipelines, installations and facilities are to be clearly marked during the construction process.

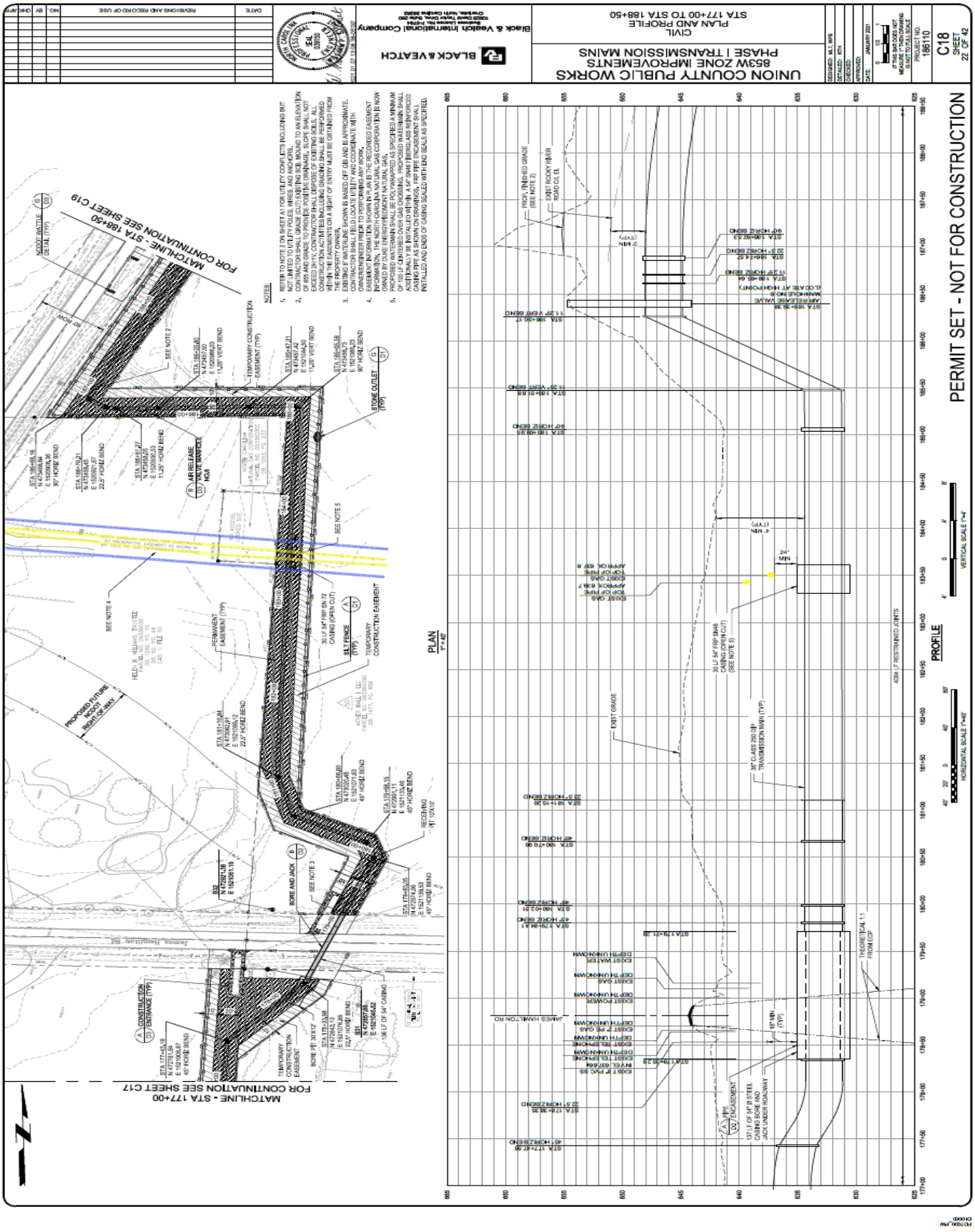
14. Proposed encroachments that are not installed within (1) year from the approval date need to be re-reviewed and reapproved by PIEDMONT Engineering before construction may begin.

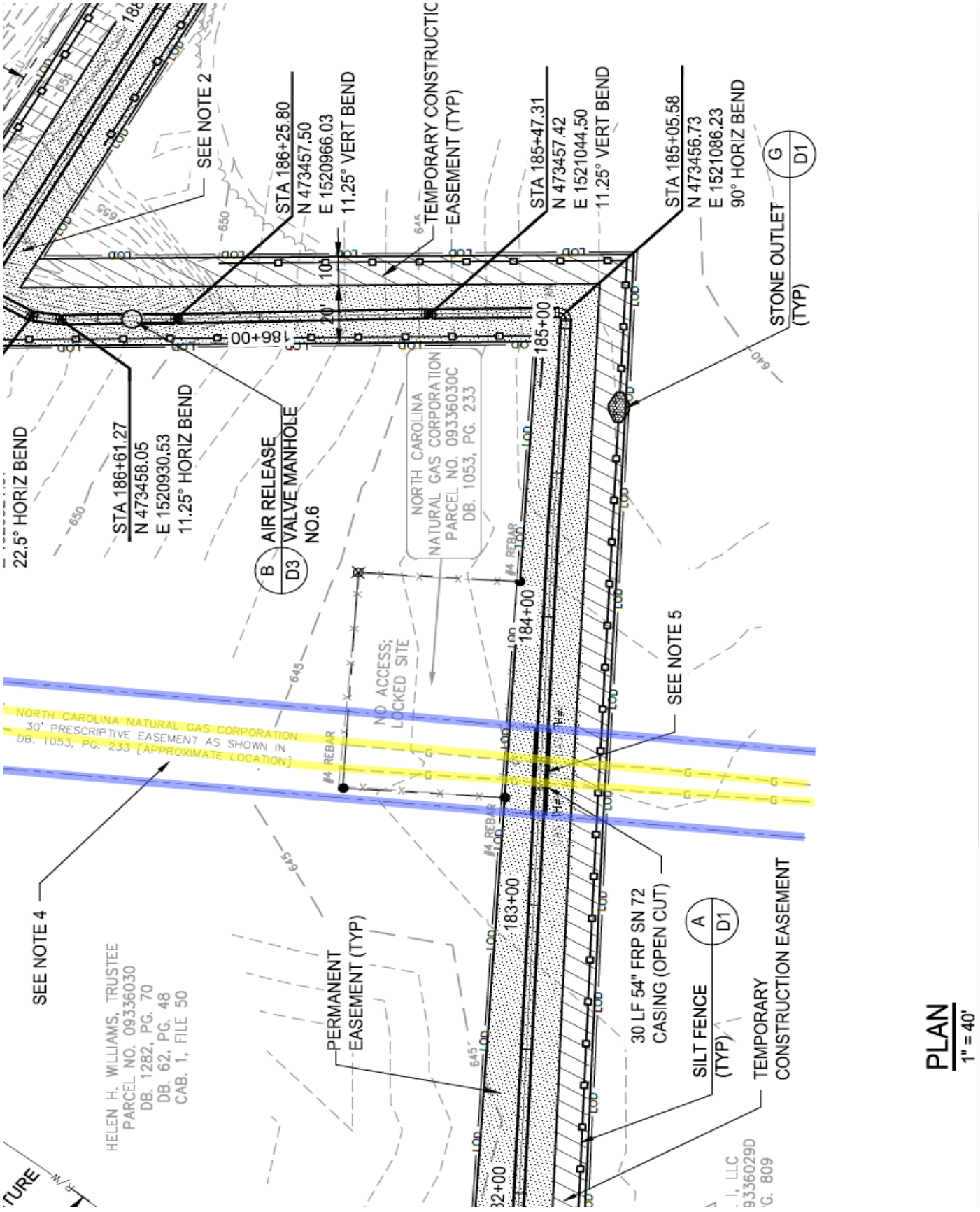
15. SPECIAL PROVISIONS:

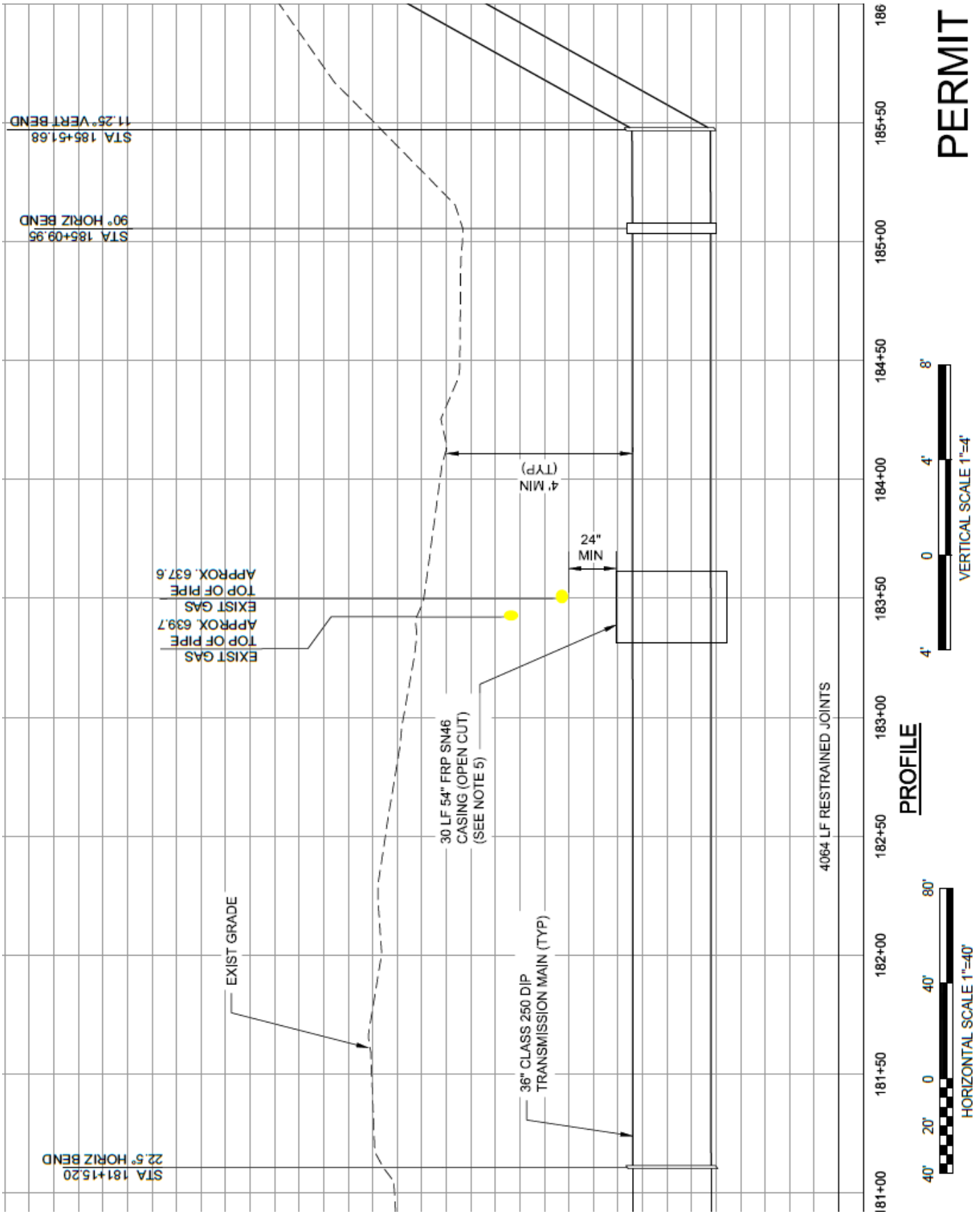
    a. Crossing MUST meet all Federal, State and local requirements with respect to safety and protection of the environment.
    b. PIEDMONT representative must be on site during installation.
    c. All crossing must be kept as close to perpendicular as possible or as approved per submitted encroachment application.
    d. Depth of pipeline crossing is to be maintained for the full distance across PIEDMONT Right of Way.
    e. No equipment should be used while stationary on top of pipelines (i.e. excavator sitting directly on top of pipeline while in use).
    f. Installations shall maintain a minimum of 2' of separation from PIEDMONT's high pressure gas main, within the easement.
    g. Installation shall be via open trench. Boring is not permitted within the easement at this location.
    h. During backfilling operations, PROJECT OWNER shall provide and install color coded warning ditch tape 12"-18" above their installation.
    i. Neither sheep's foot rollers nor vibratory feature on roller type compaction equipment is permitted within 5' of PIEDMONT's marked gas line; No **vibratory** or sheep's foot equipment may be used over the pipelines at any time.
    j. Cables must be encased in PVC or similar for the entire length across PIEDMONT's easement.
    k. MUST hand dig within 3' of each pipeline crossing unless onsite representative authorizes mechanical digging.
    l. If depth drops below 5' then all work must cease until depth can be re-established or further evaluation is completed.
    m. This permit is limited to the activities specifically noted herein; any additional activities to performed within the Piedmont Natural Gas Easement will require additional Encroachment permitting prior to performance.


EN2020-219 21
Union County Public Works (1) 54-inch FRP SN46 Casing for 36-inch DIP Water Main
PNG Line 221
Retired Line 227
Location Map
Woodbrook
35° 2' 23.39" N 80° 36' 6.59" W
Caliber Collision
Barnyard Utility Buildings
2000 Feet
N Rocky River Rd
James Hamilton Rd
Myers Rd
U-Haul Neighborhood Dealer
W Hwy 74
Baker Quarry Lake
© Google

PERMIT TO ENCROACH UPON PIEDMONT NATURAL GAS
RIGHT OF WAY AND EASEMENT
EN2020-219 21 Line/Tract: 221-UNIO-055_000, 027-UNIO-016_000




SEE NOTE 2
STA 186+25.80
N 473457.50
E 1520966.03
11.25° VERT BEND
TEMPORARY CONSTRUCTION EASEMENT (TYP)
STA 185+47.31
N 473457.42
E 1521044.50
11.25° VERT BEND
STA 185+05.58
N 473456.73
E 1521086.23
90° HORIZ BEND
STONE OUTLET (TYP)
G
D1
22.5° HORIZ BEND
STA 186+61.27
N 473458.05
E 1520930.53
11.25° HORIZ BEND
AIR RELEASE VALVE MANHOLE NO.6
B
D3
NORTH CAROLINA NATURAL GAS CORPORATION PARCEL NO. 09336030C DB. 1053, PG. 233
NO ACCESS; LOCKED SITE
#4 REBAR
SEE NOTE 5
NORTH CAROLINA NATURAL GAS CORPORATION 30' PRESCRIPTIVE EASEMENT AS SHOWN IN DB. 1053, PG. 233 [APPROXIMATE LOCATION]
SEE NOTE 4
HELEN H. WILLIAMS, TRUSTEE PARCEL NO. 09336030 DB. 1282, PG. 70 DB. 62, PG. 48 CAB. 1, FILE 50
PERMANENT EASEMENT (TYP)
30 LF 54" FRP SN 72 CASING (OPEN CUT)
SILT FENCE (TYP)
A
D1
TEMPORARY CONSTRUCTION EASEMENT
186+00
185+00
184+00
183+00
182+00
PLAN
1" = 40'


PERMIT
PROFILE
STA 185+51.68
11.25° VERT BEND
STA 185+09.95
90° HORIZ BEND
4' MIN
(TYP)
24"
MIN
EXIST GAS
TOP OF PIPE
APPROX. 639.7
EXIST GAS
TOP OF PIPE
APPROX. 637.6
30 LF 54" FRP SN46
CASING (OPEN CUT)
(SEE NOTE 5)
4064 LF RESTRAINED JOINTS
EXIST GRADE
36" CLASS 250 DIP
TRANSMISSION MAIN (TYP)
STA 181+15.20
22.5° HORIZ BEND
186
185+50
185+00
184+50
184+00
183+50
183+00
182+50
182+00
181+50
181+00
8'
4'
0
4'
VERTICAL SCALE 1"=4'
80'
40'
0
20'
40'
HORIZONTAL SCALE 1"=40'

Part II. EXECUTION

This Permit shall be binding upon the parties hereto and their respective heirs, successors and assigns. The parties acknowledge that each has had an opportunity to review and understand the terms of the Permit.

Union County	500 North Main Street, Monroe, NC 28112
(PROJECT OWNER's Name)	(Address) (State) (Zip)
Engineering Division Director	john.shutak@unioncountync.gov
(Print Signer's Name and Title)	E-MAIL
BY:	02/24/21 704.283.3651
(Signature of Signer)	(Date) (Telephone)
(CONTRACTOR's Name)	(Address) (State) (Zip)
(Print Signer's Name and Title)	E-MAIL
BY:	
(Signature of Signer)	(Date) (Telephone)

Part III. APPROVAL

To the extent of its rights or interest and without warranty, PIEDMONT hereby approves this Permit for the encroachment described in this request for Permit to Encroach Upon Piedmont Natural Gas Easement and Right of Way.

Adam C. Spry 2/24/21

Signature **Date**

ADAM C. SPRY
Director - Land Services Enablement
Piedmont Natural Gas Company, Inc.

APPROVED

PLEASE RETURN SIGNED DOCUMENT TO:

PIEDMONT NATURAL GAS
4720 Piedmont Row Drive - Charlotte, NC 28210
LandTransmissionROW@duke-energy.com
Attn: Land Management

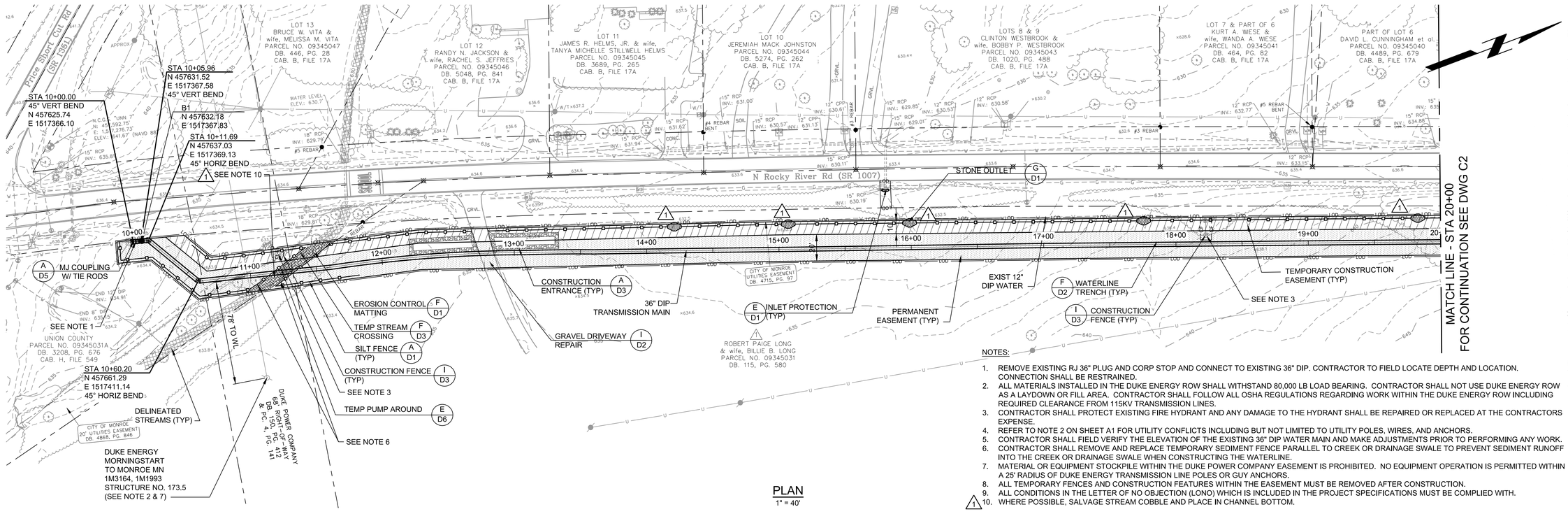
Part IV. COMPLETION

Company Use Only			
Completion Log	**Date**	**PNG Rep**	**Action**
Approved Permit	2/24/21	Elia Martin	Copy to RC & Project Owner
Archive-Land Department			Filed in Land Records Storage
Encroachment Work Complete by RC			Date & return to LandTransmissionROW@duke-energy.com
Encroachment Object Entry			Permit sent to GIS
GIS Entry Complete			Acknowledge & Return to Land Department

Elia Martin

Digitally signed by Elia Martin
Date: 2021.02.24 11:00:59 -05'00'

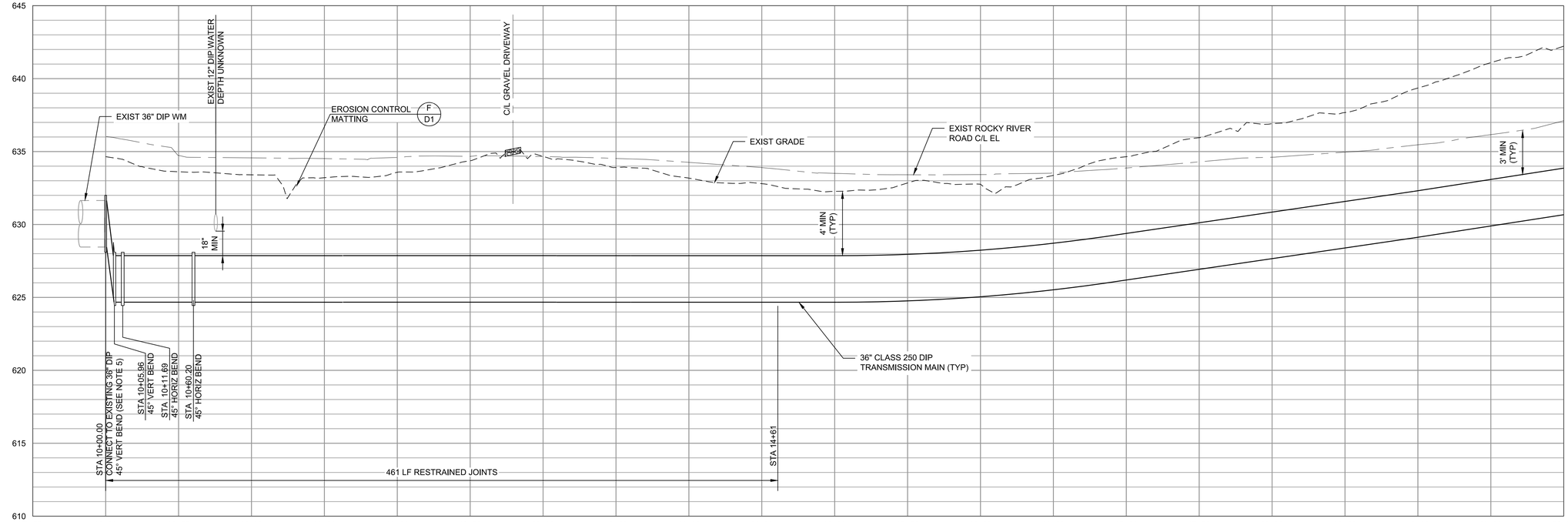
Revised Drawings



PLAN
1" = 40'

NOTES:

1. REMOVE EXISTING RJ 36" PLUG AND CORP STOP AND CONNECT TO EXISTING 36" DIP. CONTRACTOR TO FIELD LOCATE DEPTH AND LOCATION. CONNECTION SHALL BE RESTRAINED.
2. ALL MATERIALS INSTALLED IN THE DUKE ENERGY ROW SHALL WITHSTAND 80,000 LB LOAD BEARING. CONTRACTOR SHALL NOT USE DUKE ENERGY ROW AS A LAYDOWN OR FILL AREA. CONTRACTOR SHALL FOLLOW ALL OSHA REGULATIONS REGARDING WORK WITHIN THE DUKE ENERGY ROW INCLUDING REQUIRED CLEARANCE FROM 115KV TRANSMISSION LINES.
3. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
4. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
5. CONTRACTOR SHALL FIELD VERIFY THE ELEVATION OF THE EXISTING 36" DIP WATER MAIN AND MAKE ADJUSTMENTS PRIOR TO PERFORMING ANY WORK.
6. CONTRACTOR SHALL REMOVE AND REPLACE TEMPORARY SEDIMENT FENCE PARALLEL TO CREEK OR DRAINAGE SWALE TO PREVENT SEDIMENT RUNOFF INTO THE CREEK OR DRAINAGE SWALE WHEN CONSTRUCTING THE WATERLINE.
7. MATERIAL OR EQUIPMENT STOCKPILE WITHIN THE DUKE POWER COMPANY EASEMENT IS PROHIBITED. NO EQUIPMENT OPERATION IS PERMITTED WITHIN A 25' RADIUS OF DUKE ENERGY TRANSMISSION LINE POLES OR GUY ANCHORS.
8. ALL TEMPORARY FENCES AND CONSTRUCTION FEATURES WITHIN THE EASEMENT MUST BE REMOVED AFTER CONSTRUCTION.
9. ALL CONDITIONS IN THE LETTER OF NO OBJECTION (LONO) WHICH IS INCLUDED IN THE PROJECT SPECIFICATIONS MUST BE COMPLIED WITH.
10. WHERE POSSIBLE, SALVAGE STREAM COBBLE AND PLACE IN CHANNEL BOTTOM.



PROFILE

HORIZONTAL SCALE 1"=40'

VERTICAL SCALE 1"=4'

BID SET

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE
1	MLT	WPS	SLT	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER WILLIAM P. SCHMIDT

2021.02.25 23:47:01-05'00'

BLACK & VEATCH
Black & Veatch International Company
Building a World of Difference.
10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 9+50 TO STA 20+00

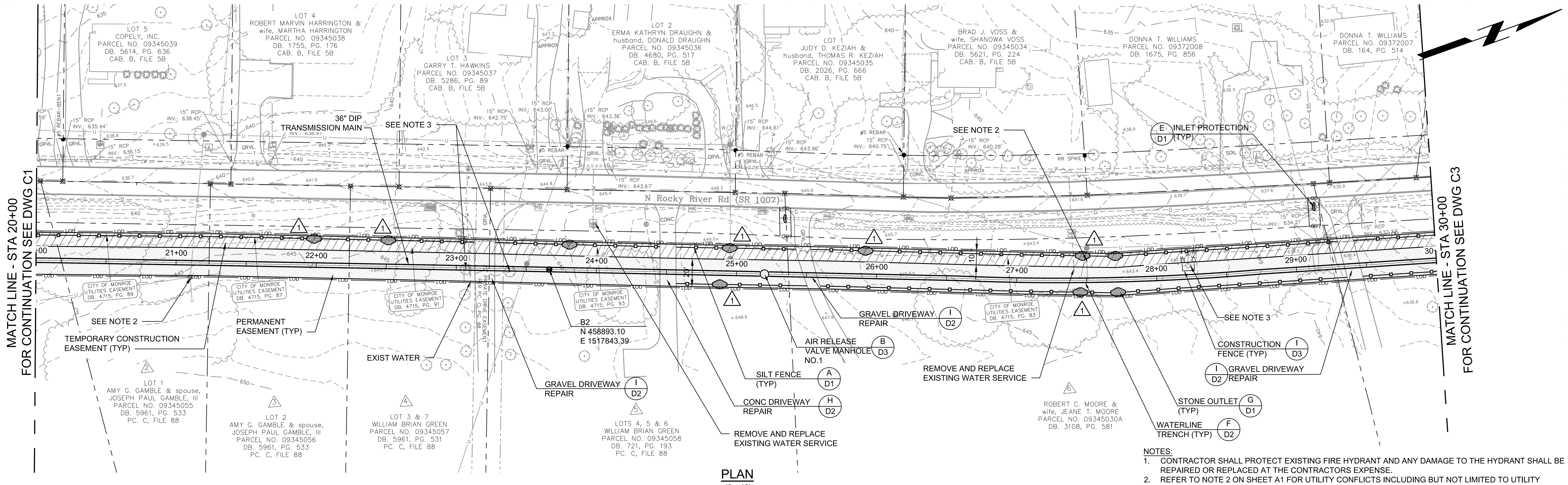
DESIGNED:	MLT, WPS
DETAILED:	KTH
CHECKED:	CES
APPROVED:	SLT
DATE:	JANUARY 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

C1
SHEET
5 OF 42

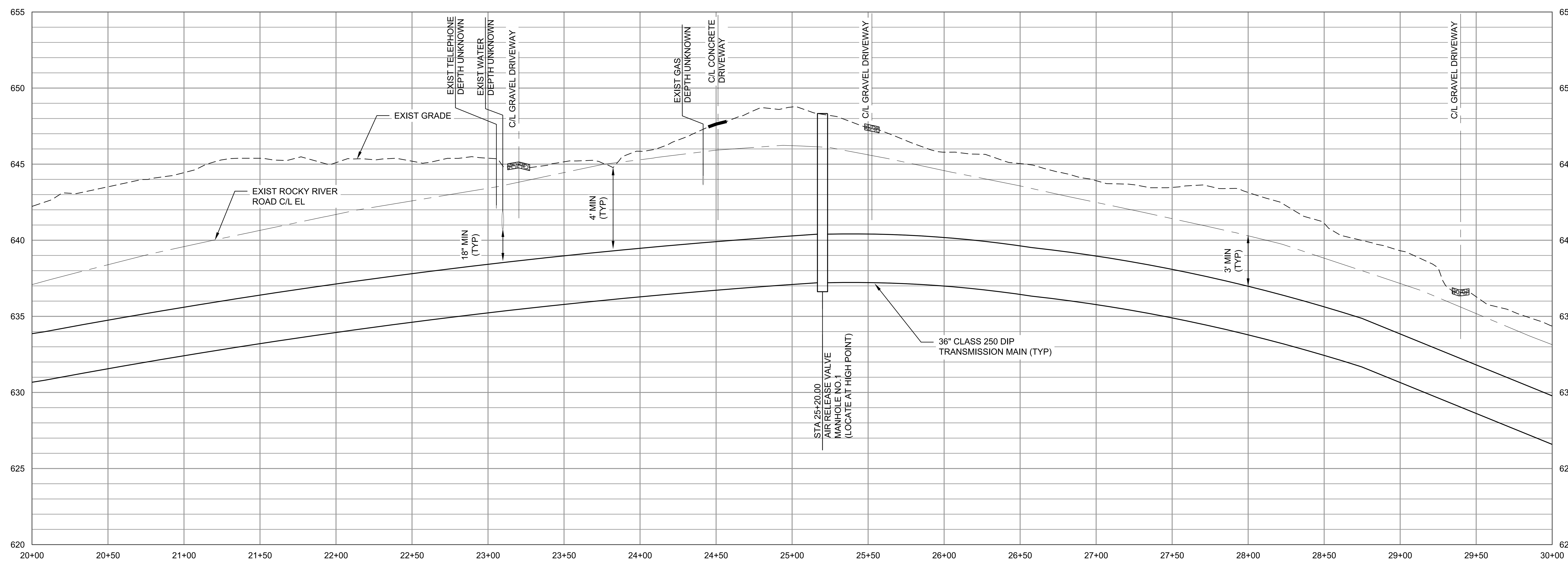
FD7000_PW
D10000



PLAN
1" = 40'

NOTES:

1. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
2. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
3. CONTRACTOR WILL REPLANT TREES OF LIKE-KIND THAT MAY BE REMOVED AS PART OF THE WORK. TREES WILL BE "STARTER TREES" IN SIZE RANGING IN HEIGHT OF 6FT-8FT. CALIPER MEASUREMENT OF TREE AT BASE SHALL NOT EXCEED 3-INCH DIAMETER. CONTRACTOR SHALL COORDINATE WITH OWNER/ENGINEER AS TO DESIRED LOCATION OF SAID TREES ON PARCEL.



PROFILE

40' 20' 0 40' 80'
HORIZONTAL SCALE 1"=40'

4' 0 4' 8'
VERTICAL SCALE 1"=4'

BID SET

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE
1	MLT	WPS	SLT	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER
2021.02.25 23:47:02-05'00'

BLACK & VEATCH
Black & Veatch International Company
Business License No. F-0794
10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 20+00 TO STA 30+00

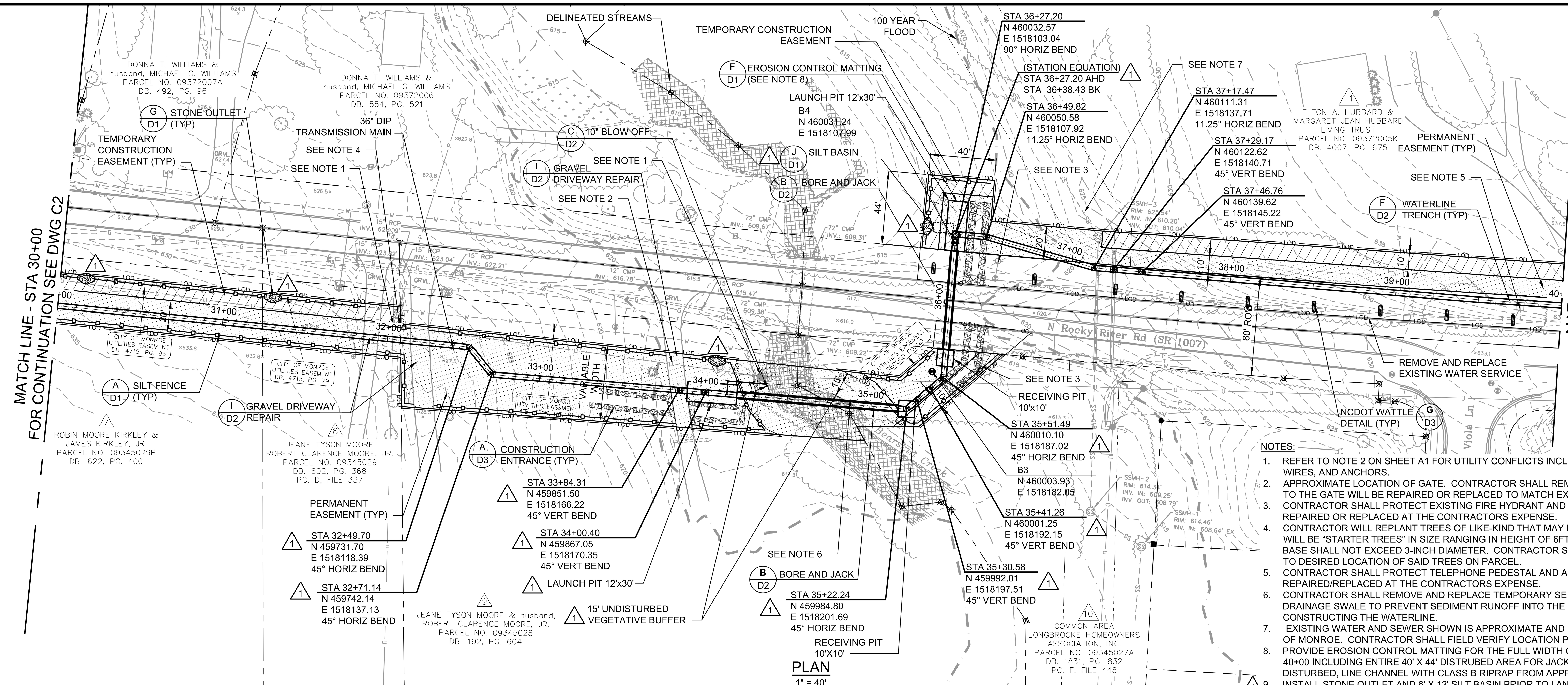
DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

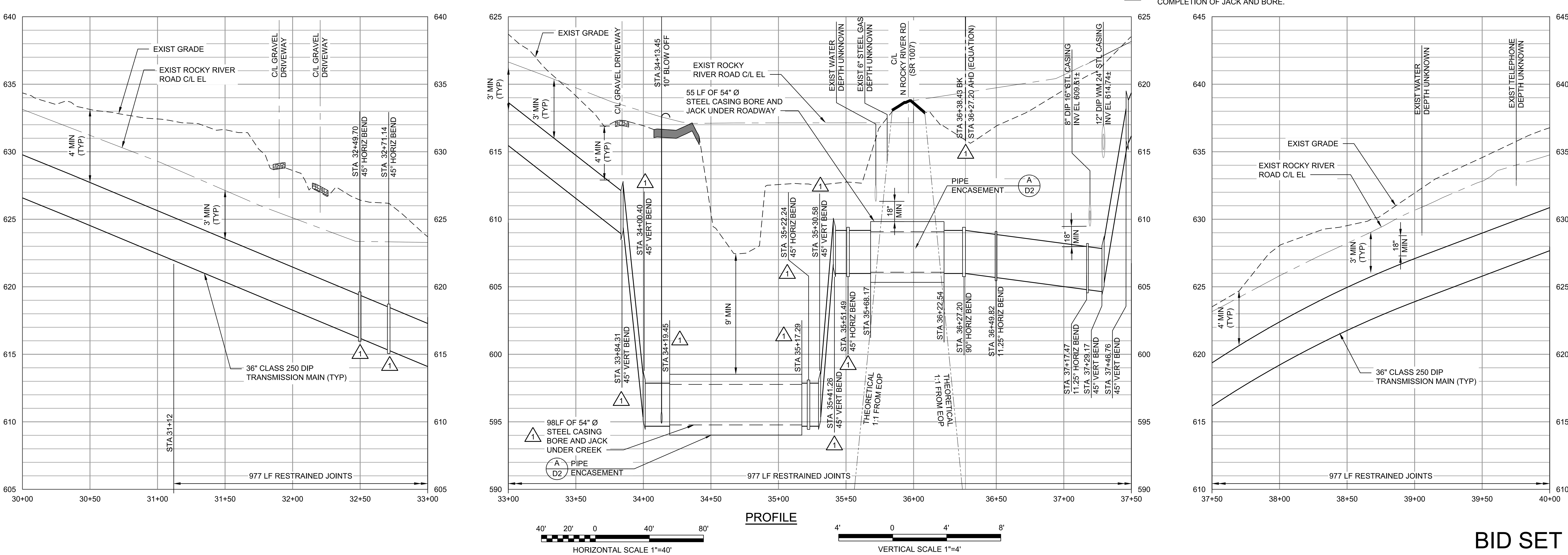
C2
SHEET
6 OF 42

FD7000_PW
D10000



NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. APPROXIMATE LOCATION OF GATE. CONTRACTOR SHALL REMOVE, STOCKPILE, AND REPLACE. ANY DAMAGE TO THE GATE WILL BE REPAIRED OR REPLACED TO MATCH EXISTING AT THE CONTRACTORS EXPENSE.
3. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
4. CONTRACTOR WILL REPLANT TREES OF LIKE-KIND THAT MAY BE REMOVED AS PART OF THE WORK. TREES WILL BE "STARTER TREES" IN SIZE RANGING IN HEIGHT OF 6FT-8FT. CALIPER MEASUREMENT OF TREE AT BASE SHALL NOT EXCEED 3-INCH DIAMETER. CONTRACTOR SHALL COORDINATE WITH OWNER/ENGINEER AS TO DESIRED LOCATION OF SAID TREES ON PARCEL.
5. CONTRACTOR SHALL PROTECT TELEPHONE PEDESTAL AND ANY DAMAGE SHALL BE IMMEDIATELY REPAIRED/REPLACED AT THE CONTRACTORS EXPENSE.
6. CONTRACTOR SHALL REMOVE AND REPLACE TEMPORARY SEDIMENT FENCE PARALLEL TO CREEK OR DRAINAGE SWALE TO PREVENT SEDIMENT RUNOFF INTO THE CREEK OR DRAINAGE SWALE WHEN CONSTRUCTING THE WATERLINE.
7. EXISTING WATER AND SEWER SHOWN IS APPROXIMATE AND IS BASED ON INFORMATION PROVIDED BY CITY OF MONROE. CONTRACTOR SHALL FIELD VERIFY LOCATION PRIOR TO PERFORMING ANY WORK IN THIS AREA.
8. PROVIDE EROSION CONTROL MATTING FOR THE FULL WIDTH OF DISTURBED AREA FROM STA 36+00 TO STA 40+00 INCLUDING ENTIRE 40' X 44' DISTRUBED AREA FOR JACK AND BORE. IF ROADSIDE CHANNEL IS DISTURBED, LINE CHANNEL WITH CLASS B RIPRAP FROM APPROX STA 37+00 TO STA 40+00.
9. INSTALL STONE OUTLET AND 6' X 12' SILT BASIN PRIOR TO LAND DISTURBANCE AND REINSTALL FOLLOWING COMPLETION OF JACK AND BORE.



BID SET

NO.	DATE	REVISIONS AND RECORD OF USE	BY	CHK	APP
1	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1	MLT	WPS	SLT

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER — 2021.02.25 23:47:03-05'00'

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UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 30+00 TO STA 40+00

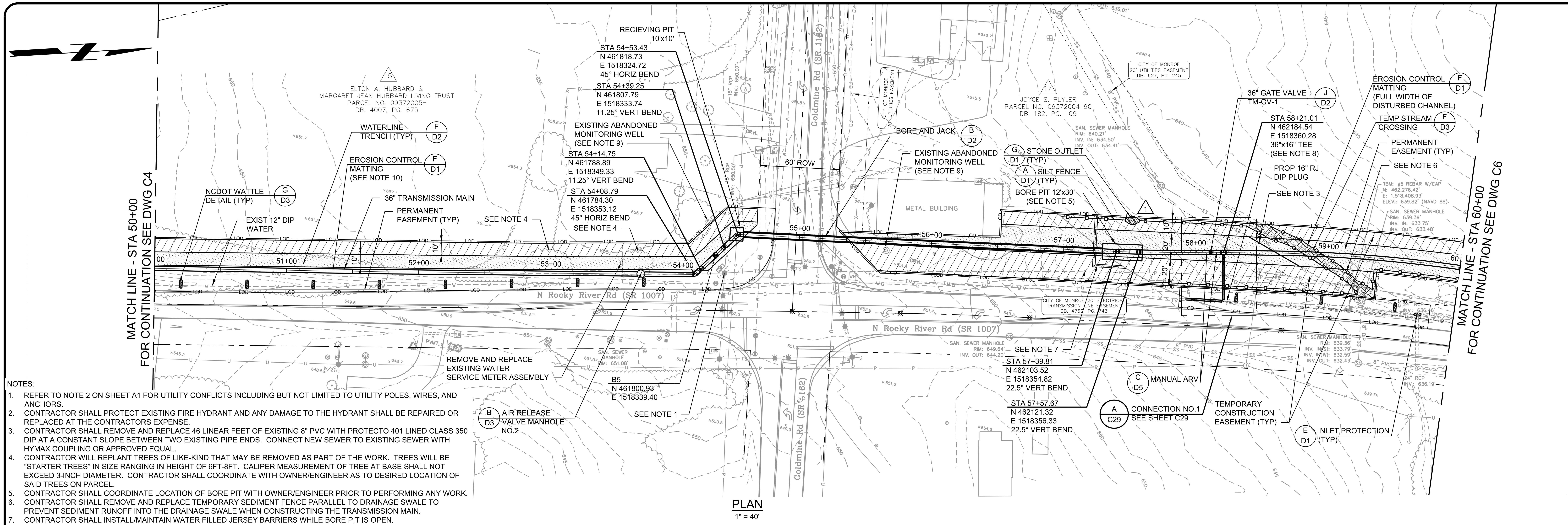
DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 186110

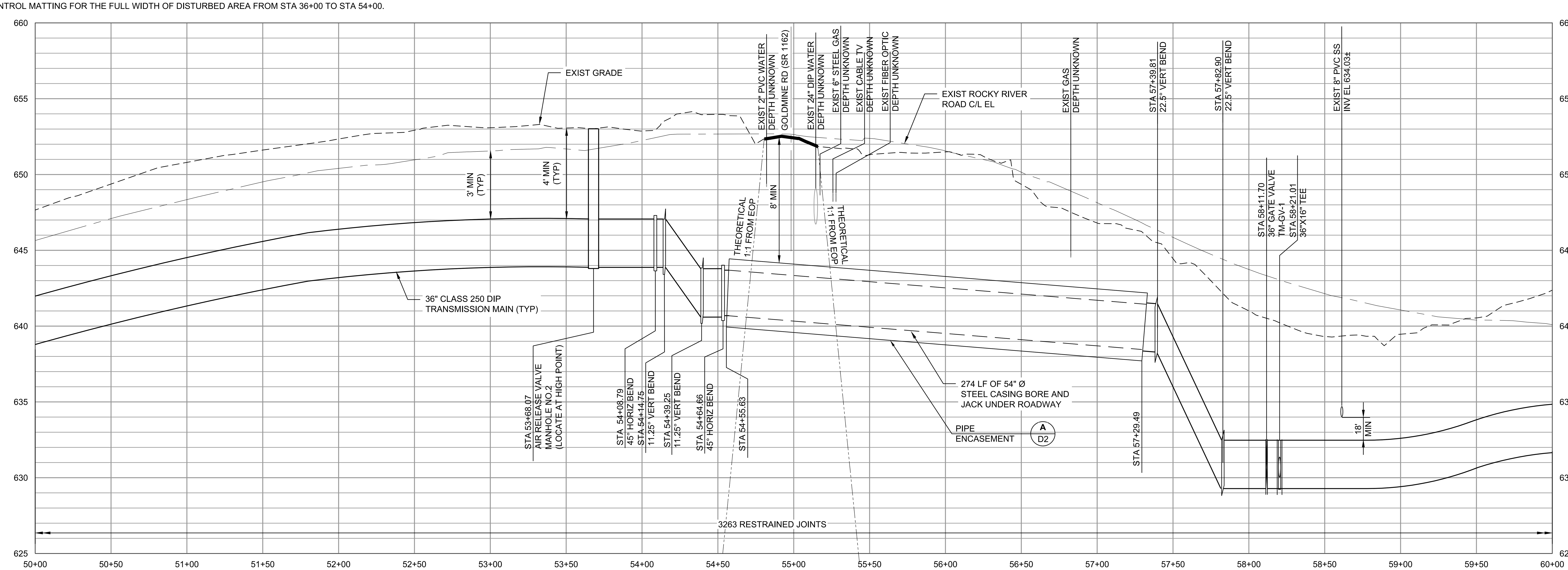
C3
SHEET 7 OF 42

FD7000_PW
D10000



NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
3. CONTRACTOR SHALL REMOVE AND REPLACE 46 LINEAR FEET OF EXISTING 8" PVC WITH PROTECTO 401 LINED CLASS 350 DIP AT A CONSTANT SLOPE BETWEEN TWO EXISTING PIPE ENDS. CONNECT NEW SEWER TO EXISTING SEWER WITH HYMAX COUPLING OR APPROVED EQUAL.
4. CONTRACTOR WILL REPLANT TREES OF LIKE-KIND THAT MAY BE REMOVED AS PART OF THE WORK. TREES WILL BE "STARTER TREES" IN SIZE RANGING IN HEIGHT OF 6FT-8FT. CALIPER MEASUREMENT OF TREE AT BASE SHALL NOT EXCEED 3-INCH DIAMETER. CONTRACTOR SHALL COORDINATE WITH OWNER/ENGINEER AS TO DESIRED LOCATION OF SAID TREES ON PARCEL.
5. CONTRACTOR SHALL COORDINATE LOCATION OF BORE PIT WITH OWNER/ENGINEER PRIOR TO PERFORMING ANY WORK.
6. CONTRACTOR SHALL REMOVE AND REPLACE TEMPORARY SEDIMENT FENCE PARALLEL TO DRAINAGE SWALE TO PREVENT SEDIMENT RUNOFF INTO THE DRAINAGE SWALE WHEN CONSTRUCTING THE TRANSMISSION MAIN.
7. CONTRACTOR SHALL INSTALL/MAINTAIN WATER FILLED JERSEY BARRIERS WHILE BORE PIT IS OPEN.
8. INSTALL CONCRETE THRUST BLOCK AT PROPOSED TEE PER DETAIL 16 ON DETAIL SHEET D4.
9. CONTRACTOR SHALL PROVIDE GAS AND OIL RESISTANT GASKETS PER SPECIFICATION 15061 FROM STA 53+00 TO STA 58+00. CONTRACTOR SHALL NOTIFY ENGINEER IF ANY EXCAVATED MATERIAL APPEARS TO CONTAIN ANY HAZARDOUS MATERIALS.
10. PROVIDE EROSION CONTROL MATTING FOR THE FULL WIDTH OF DISTURBED AREA FROM STA 36+00 TO STA 54+00.



PROFILE

HORIZONTAL SCALE 1"=40'

VERTICAL SCALE 1"=4'

BID SET

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE
1	MLT	WPS	SLT	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER

2021.02.25 23:47:04-05'00'

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Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 50+00 TO STA 60+00

DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 186110

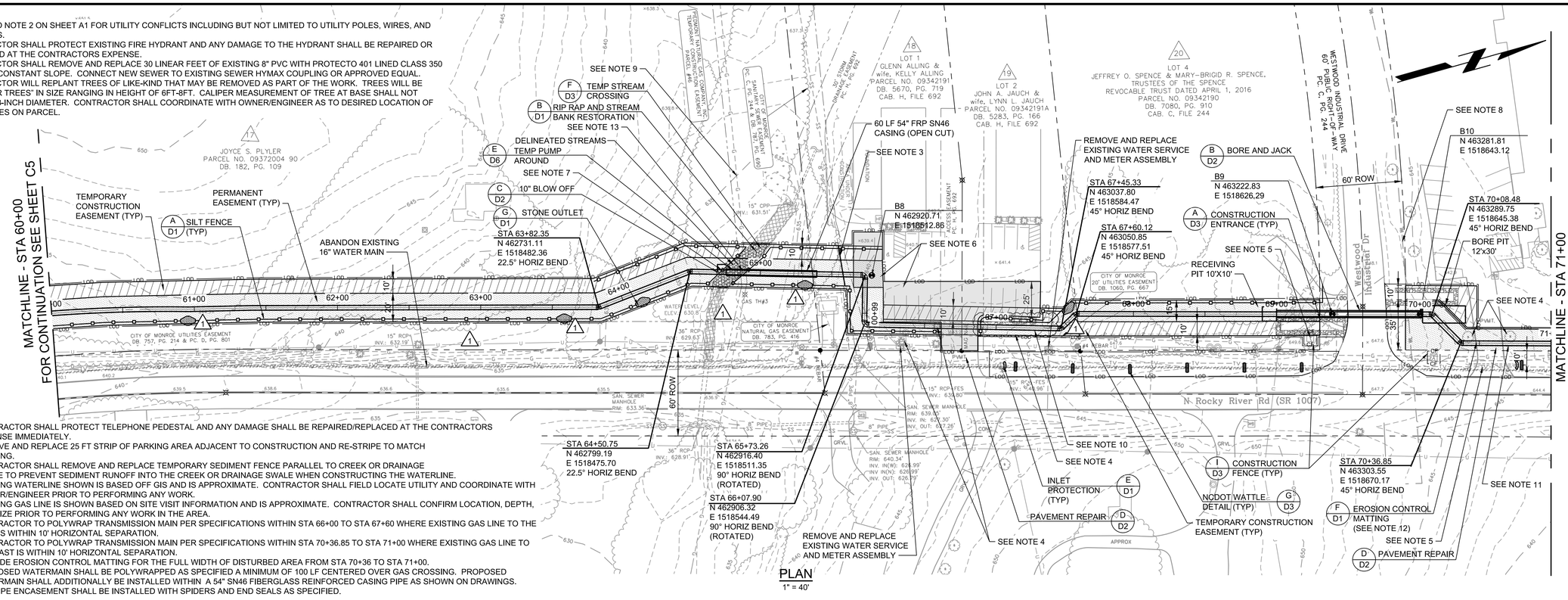
C5

SHEET 9 OF 42

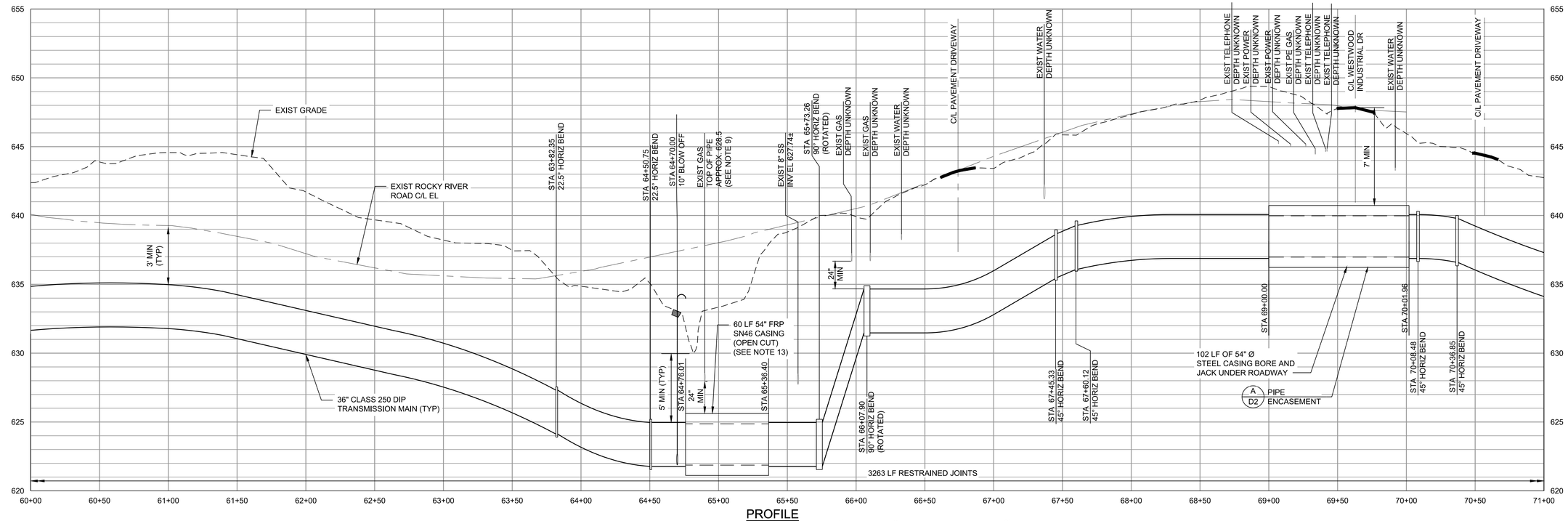
FD7000_PW
D10000

NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
3. CONTRACTOR SHALL REMOVE AND REPLACE 30 LINEAR FEET OF EXISTING 8" PVC WITH PROTECTO 401 LINED CLASS 350 DIP AT A CONSTANT SLOPE. CONNECT NEW SEWER TO EXISTING SEWER HYMAX COUPLING OR APPROVED EQUAL.
4. CONTRACTOR WILL REPLANT TREES OF LIKE-KIND THAT MAY BE REMOVED AS PART OF THE WORK. TREES WILL BE "STARTER TREES" IN SIZE RANGING IN HEIGHT OF 6FT-8FT. CALIPER MEASUREMENT OF TREE AT BASE SHALL NOT EXCEED 3-INCH DIAMETER. CONTRACTOR SHALL COORDINATE WITH OWNER/ENGINEER AS TO DESIRED LOCATION OF SAID TREES ON PARCEL.
5. CONTRACTOR SHALL PROTECT TELEPHONE PEDESTAL AND ANY DAMAGE SHALL BE REPAIRED/REPLACED AT THE CONTRACTORS EXPENSE IMMEDIATELY.
6. REMOVE AND REPLACE 25 FT STRIP OF PARKING AREA ADJACENT TO CONSTRUCTION AND RE-STRIPE TO MATCH EXISTING.
7. CONTRACTOR SHALL REMOVE AND REPLACE TEMPORARY SEDIMENT FENCE PARALLEL TO CREEK OR DRAINAGE SWALE TO PREVENT SEDIMENT RUNOFF INTO THE CREEK OR DRAINAGE SWALE WHEN CONSTRUCTING THE WATERLINE.
8. EXISTING WATERLINE SHOWN IS BASED OFF GIS AND IS APPROXIMATE. CONTRACTOR SHALL FIELD LOCATE UTILITY AND COORDINATE WITH OWNER/ENGINEER PRIOR TO PERFORMING ANY WORK.
9. EXISTING GAS LINE IS SHOWN BASED ON SITE VISIT INFORMATION AND IS APPROXIMATE. CONTRACTOR SHALL CONFIRM LOCATION, DEPTH, AND SIZE PRIOR TO PERFORMING ANY WORK IN THE AREA.
10. CONTRACTOR TO POLYWRAP TRANSMISSION MAIN PER SPECIFICATIONS WITHIN STA 66+00 TO STA 67+60 WHERE EXISTING GAS LINE TO THE EAST IS WITHIN 10' HORIZONTAL SEPARATION.
11. CONTRACTOR TO POLYWRAP TRANSMISSION MAIN PER SPECIFICATIONS WITHIN STA 70+36.85 TO STA 71+00 WHERE EXISTING GAS LINE TO THE EAST IS WITHIN 10' HORIZONTAL SEPARATION.
12. PROVIDE EROSION CONTROL MATTING FOR THE FULL WIDTH OF DISTURBED AREA FROM STA 70+36 TO STA 71+00.
13. PROPOSED WATERMAIN SHALL BE POLYWRAPPED AS SPECIFIED A MINIMUM OF 100 LF CENTERED OVER GAS CROSSING. PROPOSED WATERMAIN SHALL ADDITIONALLY BE INSTALLED WITHIN A 54" SN46 FIBERGLASS REINFORCED CASING PIPE AS SHOWN ON DRAWINGS. FRP PIPE ENCASEMENT SHALL BE INSTALLED WITH SPIDERS AND END SEALS AS SPECIFIED.



PLAN
1" = 40'



PROFILE

HORIZONTAL SCALE 1"=40'

VERTICAL SCALE 1"=4'

BID SET

NO.	BY	CHK	APP
1	MLT	WPS	SLT

DATE	REVISIONS AND RECORD OF USE
02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER WILLIAM P. SLUSSER
2021.02.25 23:47:05-05'00'

BLACK & VEATCH

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10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 60+00 TO STA 71+00

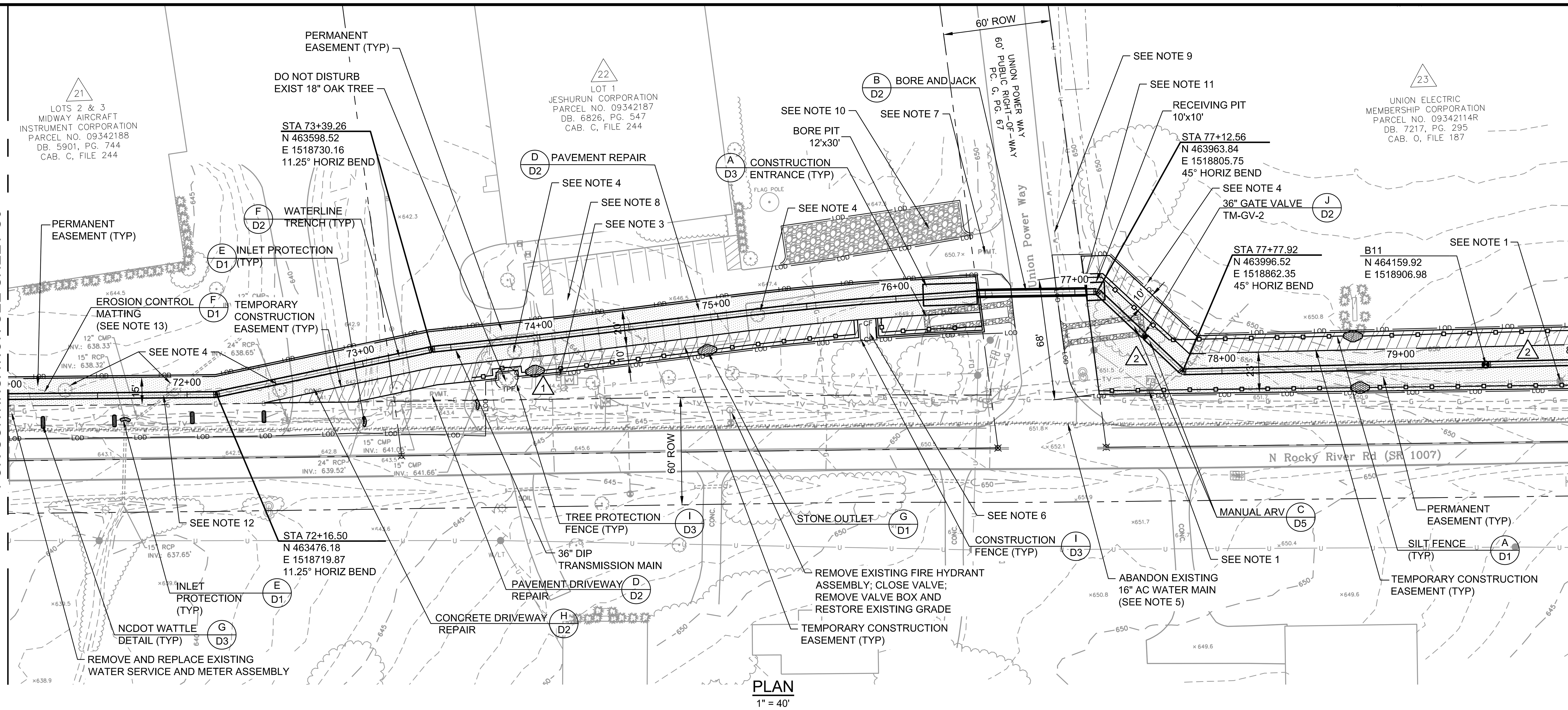
DESIGNED:	MLT, WPS
DETAILED:	KTH
CHECKED:	CES
APPROVED:	SLT
DATE:	JANUARY 2021

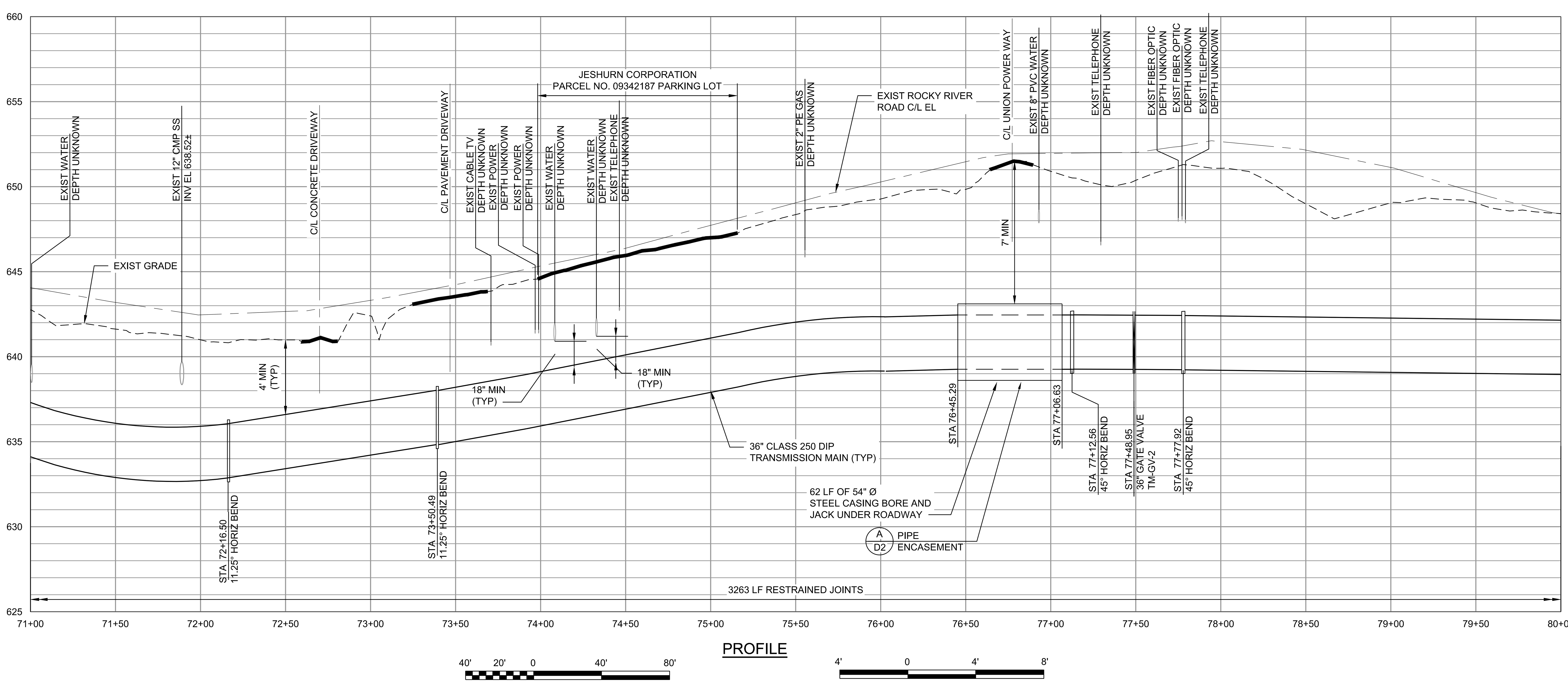
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

C6
SHEET
10 OF 42

FD7000_PW
D10000





NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
3. CONTRACTOR SHALL PROTECT EXISTING WATER SERVICE, VAULT, AND HYDRANT AND MAINTAIN WATER SERVICE. ANY INTERRUPTION TO WATER SERVICE SHALL BE COORDINATED AND APPROVED WITH THE OWNER/ENGINEER AND BUSINESS OWNER PRIOR TO PERFORMING ANY WORK.
4. CONTRACTOR WILL REPLANT TREES OF LIKE-KIND THAT MAY BE REMOVED AS PART OF THE WORK. TREES WILL BE "STARTER TREES" IN SIZE RANGING IN HEIGHT OF 6FT-8FT. CALIPER MEASUREMENT OF TREE AT BASE SHALL NOT EXCEED 3-INCH DIAMETER. CONTRACTOR SHALL COORDINATE WITH OWNER/ENGINEER AS TO DESIRED LOCATION OF SAID TREES ON PARCEL.
5. APPROXIMATE LOCATION OF EXISTING AC WATERLINE IS SHOWN IN PLAN. CONTRACTOR SHALL FIELD VERIFY LOCATION PRIOR TO PERFORMING ANY WORK. CONTRACTOR SHALL TAKE NECESSARY MEASURES TO PROTECT AND TEMPORARILY SUPPORT EXISTING WATERLINE DURING CONSTRUCTION.
6. CONTRACTOR SHALL PROTECT EXISTING SIGN, AND PLANTING AREA; AND IF CONSTRUCTION ACTIVITIES REQUIRE REMOVAL AND STOCKPILE, CONTRACTOR SHALL COORDINATE REPLACEMENT LOCATION WITH THE OWNER/ENGINEER. REMOVAL, STOCKPILE, AND REPLACEMENT IF REQUIRED IS AT THE CONTRACTORS EXPENSE.
7. CONSTRUCTION EQUIPMENT / TRAFFIC ARE AT NO TIME ALLOWED TO USE ASPHALT DRIVEWAY EXCEPT FOR CONSTRUCTION OF TEMPORARY PARKING AREA.
8. ASPHALT PARKING LOT AND SOUTH DRIVEWAY ARE TO BE REPAIRED AND PAVED WITHIN ONE WEEK OF COMPLETION OF PIPE INSTALLATION ACROSS ASPHALT AREAS ON THE PROPERTY. PROVIDE TEMPORARY STRIPING IMMEDIATELY TO MATCH EXISTING. PROVIDE PERMANENT STRIPING ONCE PAVEMENT HAS CURED.
9. EXISTING WATERLINE SHOWN IS APPROXIMATE AND CONTRACTOR SHALL FIELD LOCATE THE WATERLINE AND COORDINATE WITH OWNER/ENGINEER PRIOR TO PERFORMING ANY WORK.
10. INSTALL TEMPORARY GRAVEL PARKING AREA. UPON COMPLETION OF CONSTRUCTION ALONG PARCEL 20 REMOVE TEMPORARY GRAVEL PARKING AREA AND RESEED DISTURBED AREA.
11. APPROXIMATE LOCATION OF EXISTING ABOVE GRADE UTILITY BOX. CONTRACTOR SHALL FIELD LOCATE UTILITY BOX AND REMOVE AND REPLACE TO PERFORM PROPOSED WORK. ALL COSTS ASSOCIATED WITH REMOVAL AND REPLACEMENT OF UTILITY BOX WILL BE AT THE CONTRACTORS EXPENSE.
12. CONTRACTOR TO POLYWRAP TRANSMISSION MAIN PER SPECIFICATIONS WITHIN STA 71+00 TO STA 72+50 WHERE EXISTING GAS LINE TO THE EAST IS WITHIN 10' HORIZONTAL SEPARATION.
13. PROVIDE EROSION CONTROL MATTING FOR THE FULL WIDTH OF DISTURBED AREA FROM STA 71+00 TO STA 72+50.

NO.	DATE	REVISIONS AND RECORD OF USE	BY	CHK	APP
2	02/25/2021	ENGINEERING REVISION - DELETE SIDEWALK - ADDENDUM #1	MLT	WPS	SLT
1	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1	MLT	WPS	SLT

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER
2021.02.25 23:47:06-05'00'

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Charlotte, North Carolina 28262

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853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 71+00 TO STA 80+00

DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

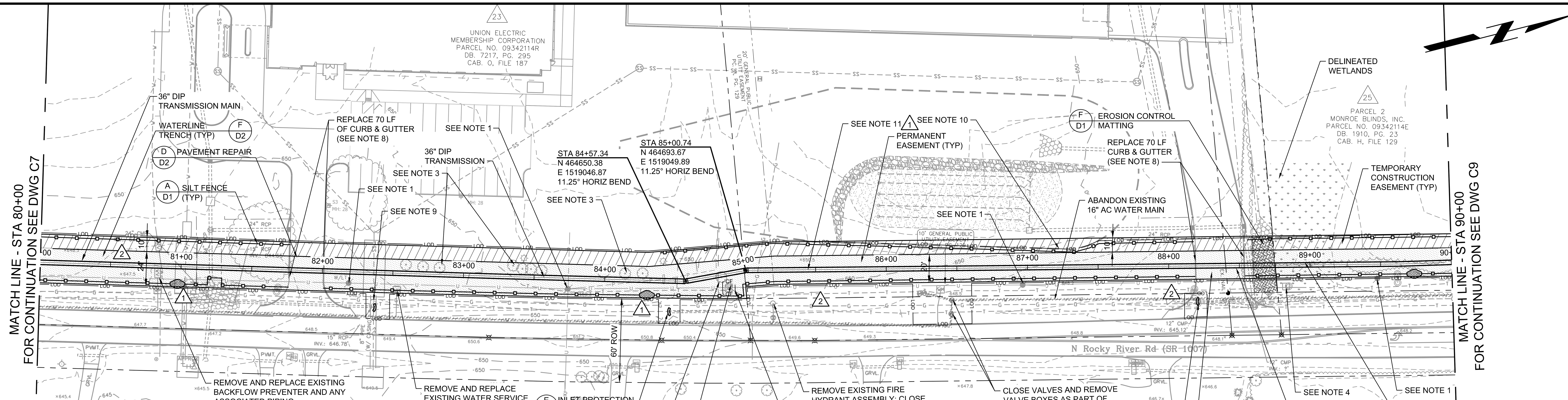
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 186110

C7
SHEET 11 OF 42

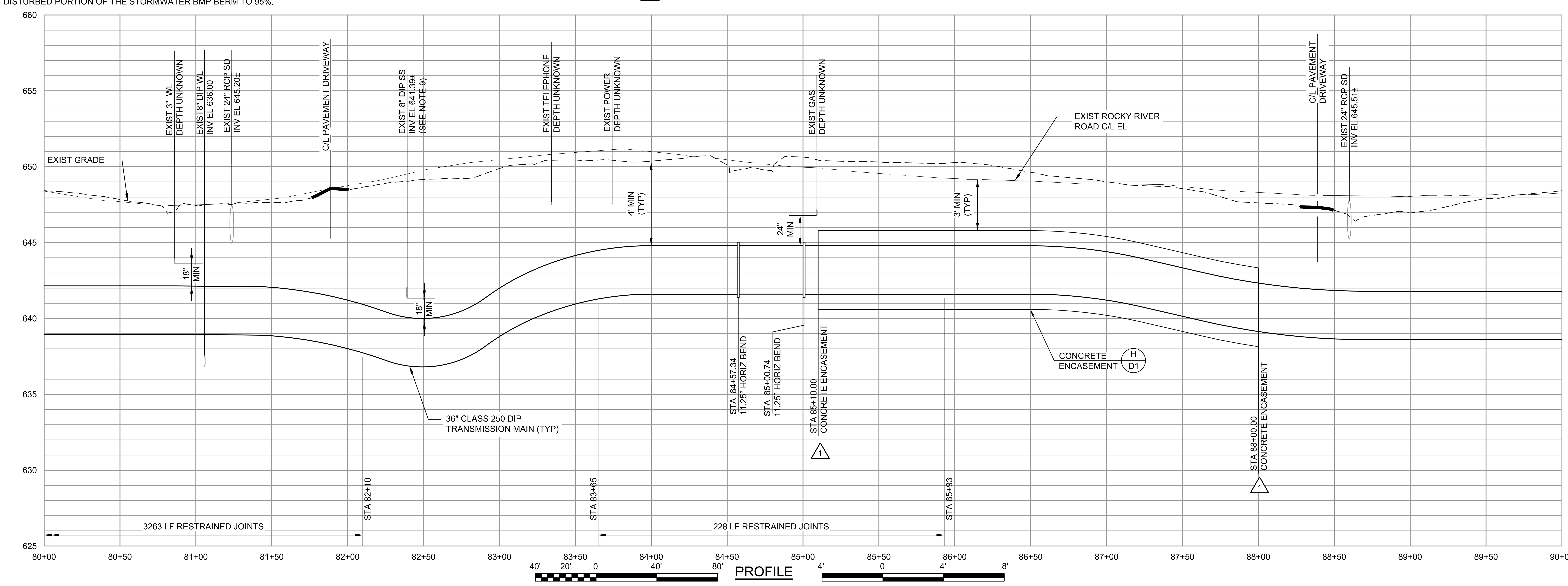
BID SET

FD7000_PW
D10000



PLAN
1" = 40'

NOTES
1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE. FOLLOWING ABANDONMENT OF EXISTING WATER MAIN CONTRACTOR SHALL REMOVE FIRE HYDRANT AS NOTED.
3. CONTRACTOR WILL REPLANT TREES OF LIKE-KIND THAT MAY BE REMOVED AS PART OF THE WORK. TREES WILL BE "STARTER TREES" IN SIZE RANGING IN HEIGHT OF 6FT-8FT. CALIPER MEASUREMENT OF TREE AT BASE SHALL NOT EXCEED 3-INCH DIAMETER. CONTRACTOR SHALL COORDINATE WITH OWNER/ENGINEER AS TO DESIRED LOCATION OF SAID TREES ON PARCEL.
4. CONTRACTOR SHALL PROTECT TELEPHONE PEDESTAL AND ANY DAMAGE SHALL BE REPAIRED/REPLACED AT THE CONTRACTORS EXPENSE IMMEDIATELY.
5. EXISTING UTILITIES INSTALLED AS PART OF THE REDEVELOPMENT OF PARCEL 23 ARE SHOWN BASED ON CONSTRUCTION DRAWINGS AND INFORMATION FROM PROPERTY OWNER. CONTRACTOR SHALL LOCATE ALL UTILITIES PRIOR TO PERFORMING ANY WORK AND ADVISE ENGINEER AND OWNER OF ANY CONFLICTS.
6. REDEVELOPMENT OF PARCEL 23 INCLUDED REGRADING ALONG THE PIPELINE CORRIDOR. THE REVISED GRADE IS NOT SHOWN ON THE PROFILE. IN ALL AREAS, THE NEW TRANSMISSION MAIN SHALL BE INSTALLED 4' MIN BELOW EXISTING GRADE AND 3' MIN BELOW THE EXISTING ROCKY RIVER ROAD C/L.
7. WATER SERVICE SHALL NOT BE INTERRUPTED AND CONTRACTOR SHALL PROVIDE TEMPORARY WATER SERVICE DURING RELOCATION AND REPLACEMENT OF THE EXISTING BACKFLOW PREVENTER AND ASSEMBLY. ANY COST ASSOCIATED WITH THIS SHALL BE INCIDENTAL TO THE WORK. CONTRACTOR SHALL PERFORM NIGHT OR WEEKEND WORK AS NECESSARY TO MAINTAIN WATER SERVICE DURING HOURS OF OPERATION. CONTRACTOR SHALL COORDINATE WITH OWNER/ENGINEER PRIOR TO PERFORMING NIGHT/WEEKEND WORK.
8. CONTRACTOR SHALL REPLACE CURB AND GUTTER TO THE NEXT JOINT TO MATCH EXISTING. 2
9. .CONTRACTOR SHALL REPLACE EXISTING 8" DIP WITH 8" PC 350 DIP AS NEEDED TO CONSTRUCT TRANSMISSION MAIN. SEWER SERVICE SHALL NOT BE INTERRUPTED AND CONTRACTOR SHALL PROVIDE BYPASS PUMPING. ANY COST ASSOCIATED WITH THIS SHALL BE INCIDENTAL TO THE WORK.
10. CONTRACTOR SHALL LIMIT ALL WORK TO OUTSIDE STORMWATER BMP.
11. CONCRETE ENCASE PIPELINE FROM STA 85+10 TO STA 88+00 PER DETAIL H ON SHEET D1. NO GRANULAR EMBEDMENT SHALL BE USED IN THIS AREA. PIPELINE SHALL BE CONSTRUCTED WHEN STORMWATER BMP IS DRY. PROVIDE EROSION CONTROL MATTING FOR THE FULL WIDTH OF THE DISTURBED AREA FROM STA 85+10 TO STA 88+00 AND COMPACT ANY DISTURBED PORTION OF THE STORMWATER BMP BERM TO 95%. 1



PROFILE

BID SET

NO.	DATE	REVISIONS AND RECORD OF USE	BY	CHK	APP
2	02/25/2021	ENGINEERING REVISION - DELETE SIDEWALK - ADDENDUM #1	MLT	WPS	SLT
1	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1	MLT	WPS	SLT

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER
2021.02.25 23:47:07-05'00'

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Business License No. F-0794
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Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 80+00 TO STA 90+00

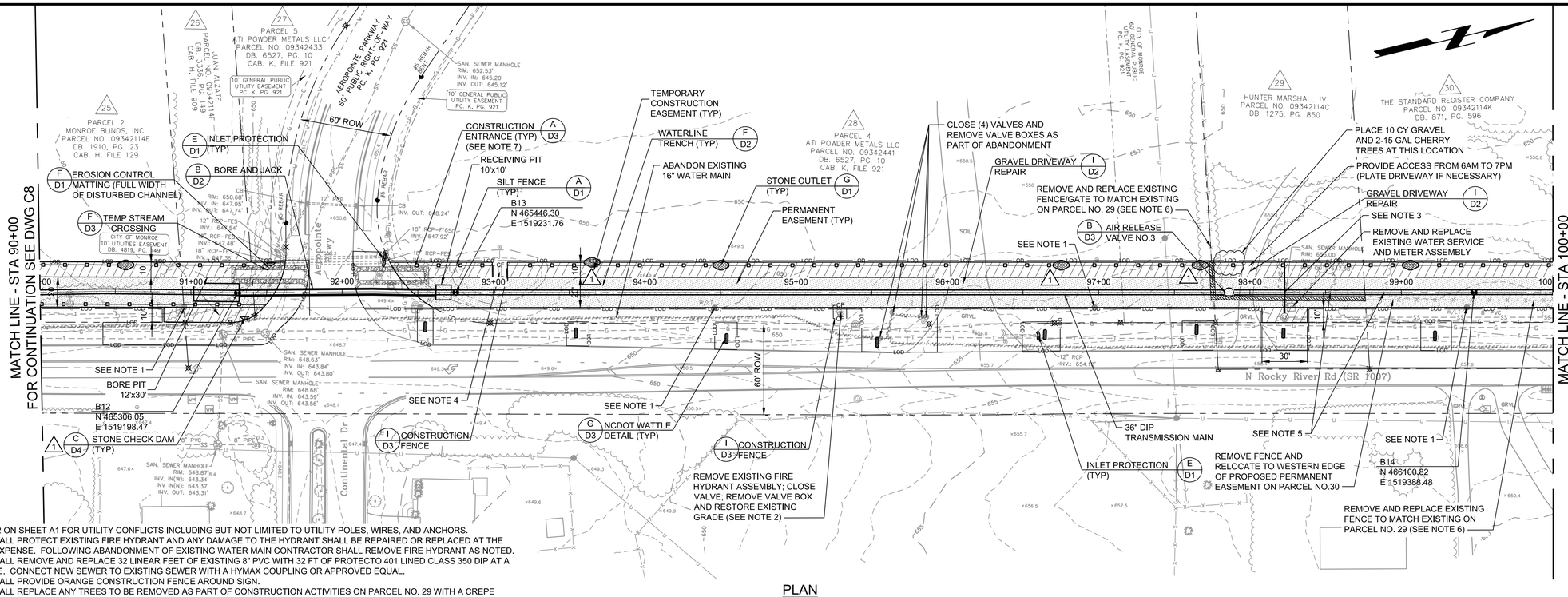
DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 186110

C8
SHEET 12 OF 42

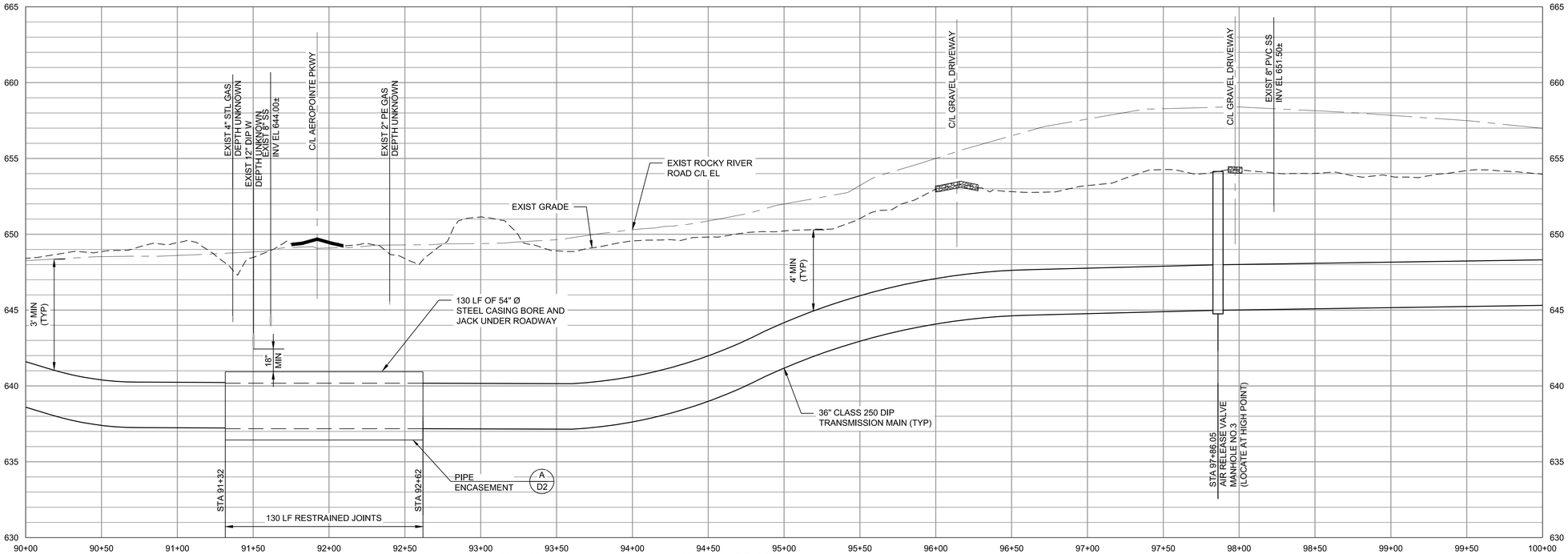
FD7000_PW
D10000



PLAN
1" = 40'

NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE. FOLLOWING ABANDONMENT OF EXISTING WATER MAIN CONTRACTOR SHALL REMOVE FIRE HYDRANT AS NOTED.
3. CONTRACTOR SHALL REMOVE AND REPLACE 32 LINEAR FEET OF EXISTING 8" PVC WITH 32 FT OF PROTECTO 401 LINED CLASS 350 DIP AT A CONSTANT SLOPE. CONNECT NEW SEWER TO EXISTING SEWER WITH A HYMAX COUPLING OR APPROVED EQUAL.
4. CONTRACTOR SHALL PROVIDE ORANGE CONSTRUCTION FENCE AROUND SIGN.
5. CONTRACTOR SHALL REPLACE ANY TREES TO BE REMOVED AS PART OF CONSTRUCTION ACTIVITIES ON PARCEL NO. 29 WITH A CREPE MYRTLES. CONTRACTOR SHALL COORDINATE LOCATION OF CREPE MYRTLES WITH PROPERTY OWNER.
6. CONTRACTOR SHALL PROVIDE TEMPORARY 6' CHAIN LINK FENCE AND GATES TO SECURE PARCEL NO. 29 AND 30 UNTIL EXISTING FENCE IS REINSTALLED/REPLACED. REMOVE AND DO NOT REPLACE EXISTING FENCE PER THE EXTENTS SHOWN IN THE PLANS. TEMPORARY FENCE SHALL BE INSTALLED ALONG WESTERN EDGE OF TEMPORARY CONSTRUCTION EASEMENT
7. CONTRACTOR SHALL ADJUST CONSTRUCTION ENTRANCE TO PREVENT DAMAGE TO EXISTING STORMWATER FLARED-END-SECTIONS ON EITHER SIDE OF AEROPOINTE PKWY. ANY DAMAGE TO EXISTING STORMWATER PIPES OR STRUCTURES SHALL BE REPAIRED/REPLACED AT THE CONTRACTORS EXPENSE IN ACCORDANCE WITH THE CITY OF MONROE REQUIREMENTS.



PROFILE

HORIZONTAL SCALE 1"=40'

VERTICAL SCALE 1"=4'

BID SET

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE
1	MLT	WPS	SLT	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER WILLIAM P. SLOAT

2021.02.25 23:47:08-05'00'

BLACK & VEATCH

Black & Veatch International Company
Building a World of Difference
10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 90+00 TO STA 100+00

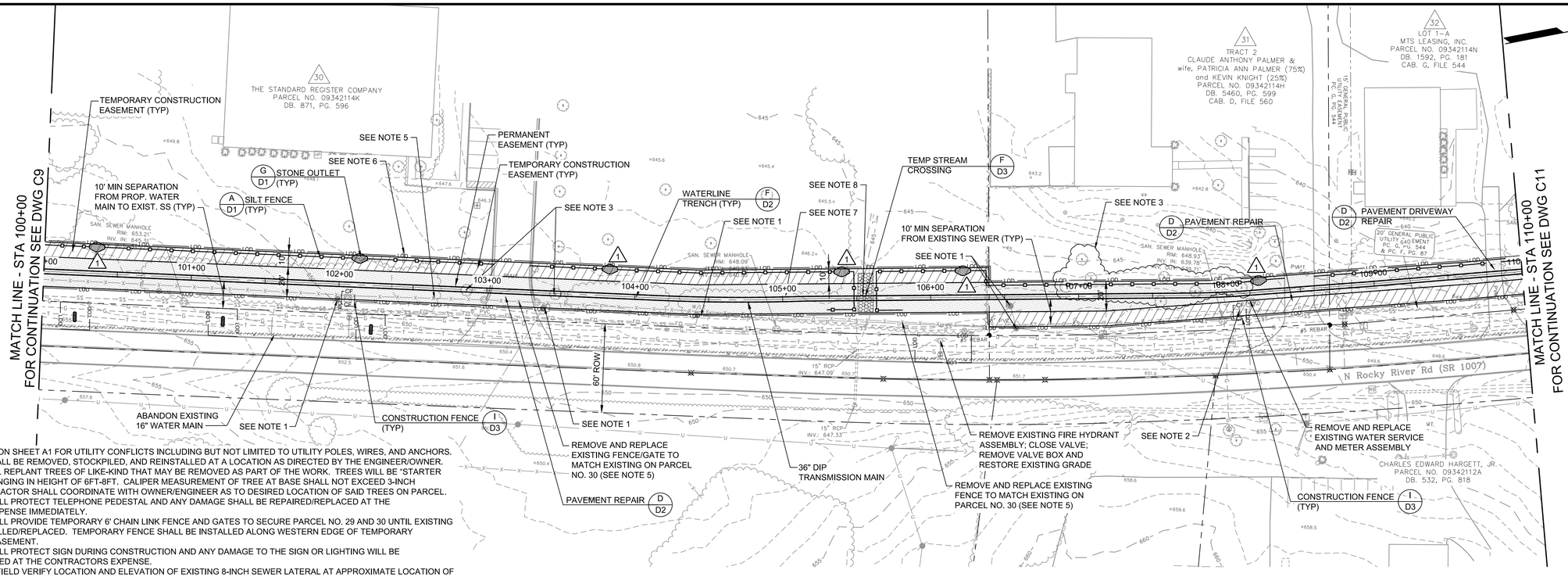
DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

C9
SHEET
13 OF 42

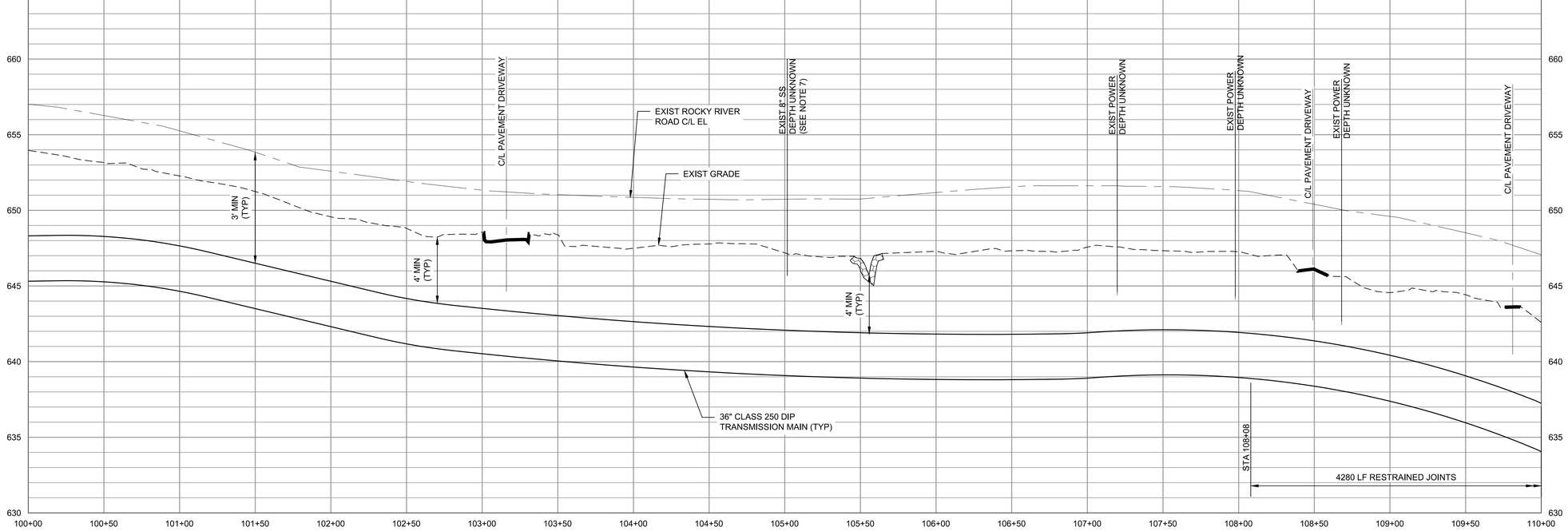
FD7000_PW
D10000



NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. EXISTING SIGN SHALL BE REMOVED, STOCKPILED, AND REINSTALLED AT A LOCATION AS DIRECTED BY THE ENGINEER/OWNER.
3. CONTRACTOR WILL REPLANT TREES OF LIKE-KIND THAT MAY BE REMOVED AS PART OF THE WORK. TREES WILL BE "STARTER TREES" IN SIZE RANGING IN HEIGHT OF 6FT-8FT. CALIPER MEASUREMENT OF TREE AT BASE SHALL NOT EXCEED 3-INCH DIAMETER. CONTRACTOR SHALL COORDINATE WITH OWNER/ENGINEER AS TO DESIRED LOCATION OF SAID TREES ON PARCEL.
4. CONTRACTOR SHALL PROTECT TELEPHONE PEDESTAL AND ANY DAMAGE SHALL BE REPAIRED/REPLACED AT THE CONTRACTORS EXPENSE IMMEDIATELY.
5. CONTRACTOR SHALL PROVIDE TEMPORARY 6' CHAIN LINK FENCE AND GATES TO SECURE PARCEL NO. 29 AND 30 UNTIL EXISTING FENCE IS REINSTALLED/REPLACED. TEMPORARY FENCE SHALL BE INSTALLED ALONG WESTERN EDGE OF TEMPORARY CONSTRUCTION EASEMENT.
6. CONTRACTOR SHALL PROTECT SIGN DURING CONSTRUCTION AND ANY DAMAGE TO THE SIGN OR LIGHTING WILL BE REPAIRED/REPLACED AT THE CONTRACTORS EXPENSE.
7. CONTRACTOR TO FIELD VERIFY LOCATION AND ELEVATION OF EXISTING 8-INCH SEWER LATERAL AT APPROXIMATE LOCATION OF STA 105+00 PRIOR TO BEGINNING ANY WORK IN THE AREA.
8. LINE DISTURBED CHANNEL WITH CLASS B RIPRAP FOR FULL WIDTH OF PERMANENT AND TEMPORARY EASEMENT.

PLAN
1" = 40'



PROFILE

40' 20' 0 40' 80'
HORIZONTAL SCALE 1"=40'

4' 0 4' 8'
VERTICAL SCALE 1"=4'

BID SET

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE
1	MLT	WPS	SLT	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER WILLIAM P. SCHMIDT
2021.02.25 23:47:10-05'00'

BLACK & VEATCH
Black & Veatch International Company
Raleigh, North Carolina
10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 100+00 TO STA 110+00

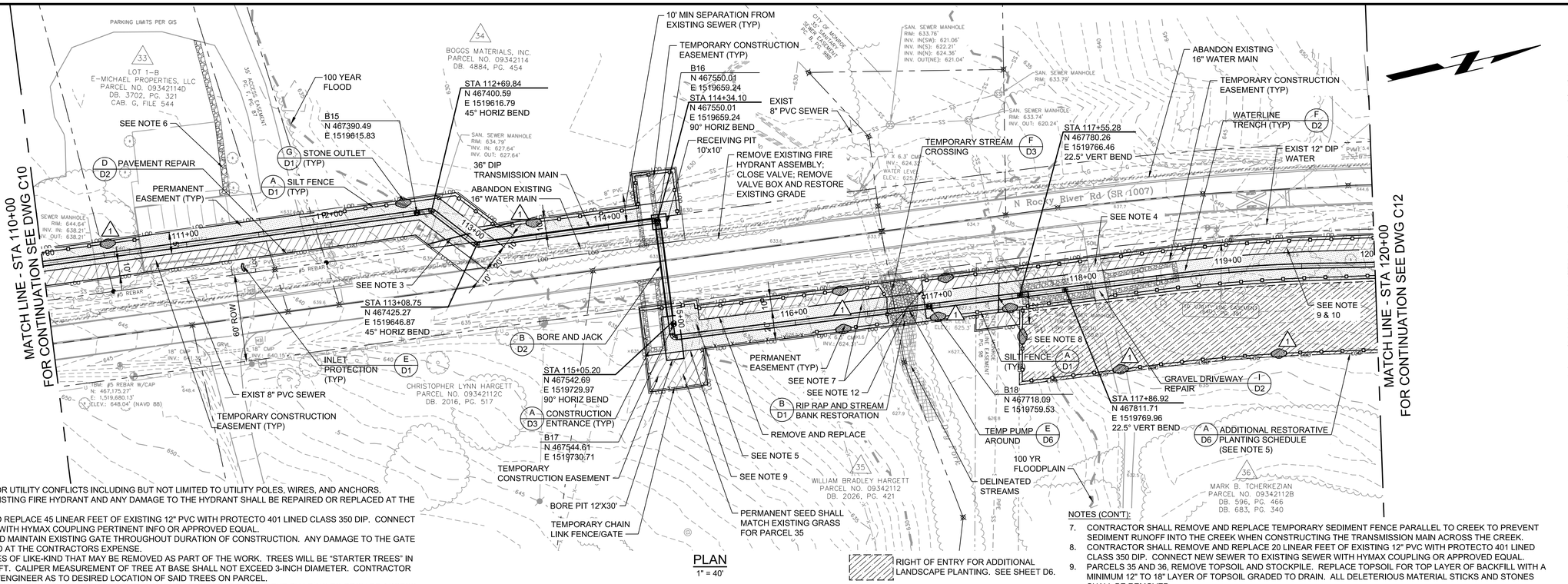
DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

C10
SHEET
14 OF 42

FD7000_PW
D10000



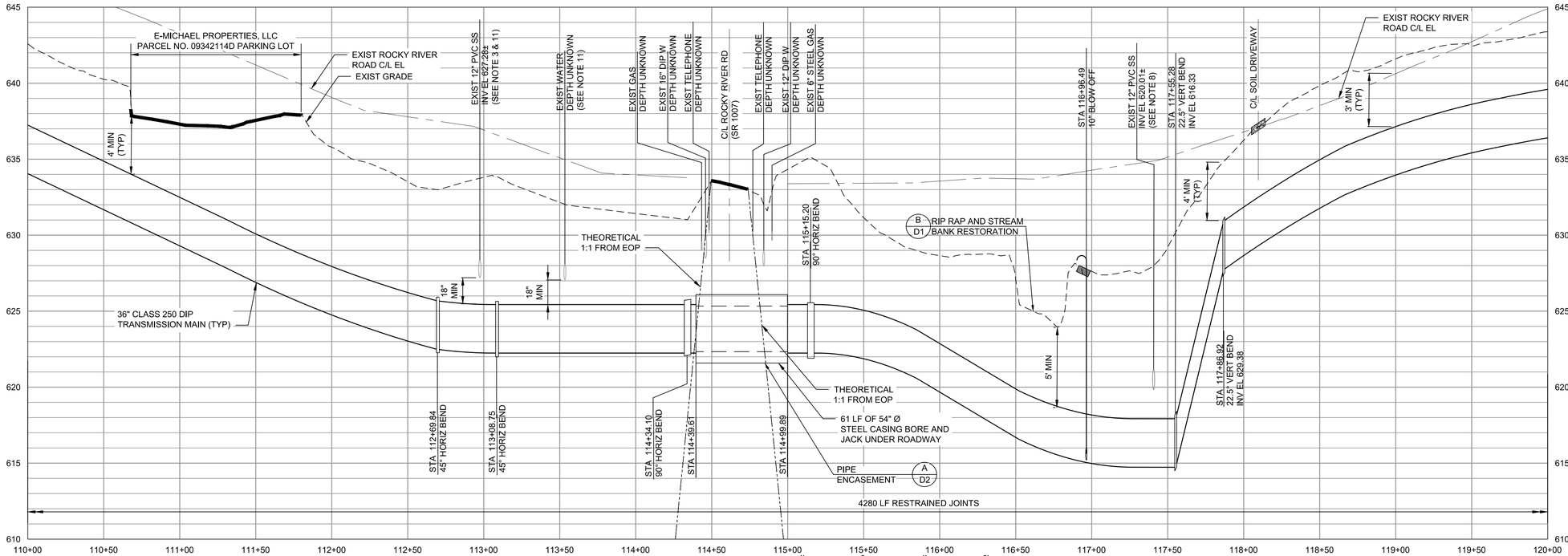
PLAN
1" = 40'

NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
3. CONTRACTOR SHALL REMOVE AND REPLACE 45 LINEAR FEET OF EXISTING 12" PVC WITH PROTECTO 401 LINED CLASS 350 DIP. CONNECT NEW SEWER TO EXISTING SEWER WITH HYMAX COUPLING PERTINENT INFO OR APPROVED EQUAL.
4. CONTRACTOR SHALL PROTECT AND MAINTAIN EXISTING GATE THROUGHOUT DURATION OF CONSTRUCTION. ANY DAMAGE TO THE GATE SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
5. CONTRACTOR WILL REPLANT TREES OF LIKE-KIND THAT MAY BE REMOVED AS PART OF THE WORK. TREES WILL BE "STARTER TREES" IN SIZE RANGING IN HEIGHT OF 6FT-8FT. CALIPER MEASUREMENT OF TREE AT BASE SHALL NOT EXCEED 3-INCH DIAMETER. CONTRACTOR SHALL COORDINATE WITH OWNER/ENGINEER AS TO DESIRED LOCATION OF SAID TREES ON PARCEL.
6. ON PARCEL NO.33 CONTRACTOR SHALL CONSTRUCT A TEMP GRAVEL WALKWAY ALONG THE SIDE OF THE BUILDING TO PROVIDE ACCESS FROM THE REAR PARKING LOT TO THE FRONT DOOR. THE WALKWAY SHALL BE APPROX 4 FT WIDE AND EXTEND AS SHOWN OR NO MORE THAN 100 LF. GRAVEL WALKWAY SHALL BE NCDOT # 57 STONE 2" THICK UNDERLAIN WITH TYPE A FABRIC AS SPECIFIED ON COMPACTED SUBGRADE. LOCATION SHALL BE COORDINATED WITH THE PROPERTY OWNER. UPON COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE WALKWAY AND RESTORE AREA TO EXISTING OR BETTER CONDITION.

NOTES (CON'T):

7. CONTRACTOR SHALL REMOVE AND REPLACE TEMPORARY SEDIMENT FENCE PARALLEL TO CREEK TO PREVENT SEDIMENT RUNOFF INTO THE CREEK WHEN CONSTRUCTING THE TRANSMISSION MAIN ACROSS THE CREEK.
8. CONTRACTOR SHALL REMOVE AND REPLACE 20 LINEAR FEET OF EXISTING 12" PVC WITH PROTECTO 401 LINED CLASS 350 DIP. CONNECT NEW SEWER TO EXISTING SEWER WITH HYMAX COUPLING OR APPROVED EQUAL.
9. PARCELS 35 AND 36, REMOVE TOPSOIL AND STOCKPILE. REPLACE TOPSOIL FOR TOP LAYER OF BACKFILL WITH A MINIMUM 12" TO 18" LAYER OF TOPSOIL GRADED TO DRAIN. ALL DELETERIOUS MATERIAL STICKS AND STONES SHALL BE REMOVED.
10. PRESERVE TREES/SHRUBS IN THE TEMPORARY CONSTRUCTION EASEMENT ON PARCEL 36.
11. CONTRACTOR SHALL CONFIRM THE DEPTH OF THE EXISTING WATER MAINS PRIOR TO PERFORMING ANY WORK IN THE AREA.
12. CONTRACTOR SHALL SUBMIT A PLAN TO ENGINEER FOR REVIEW FOR CONSTRUCTION OF PIPELINE IN THE DRY WHILE MAINTAINING STREAM FLOW.



PROFILE

BID SET

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE
1	MLT	WPS	SLT	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER W. PHILLIPS SLOAN
2021.02.25 23:47:11-05'00'

BLACK & VEATCH

Black & Veatch International Company
Building a World of Difference
10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 110+00 TO STA 120+00

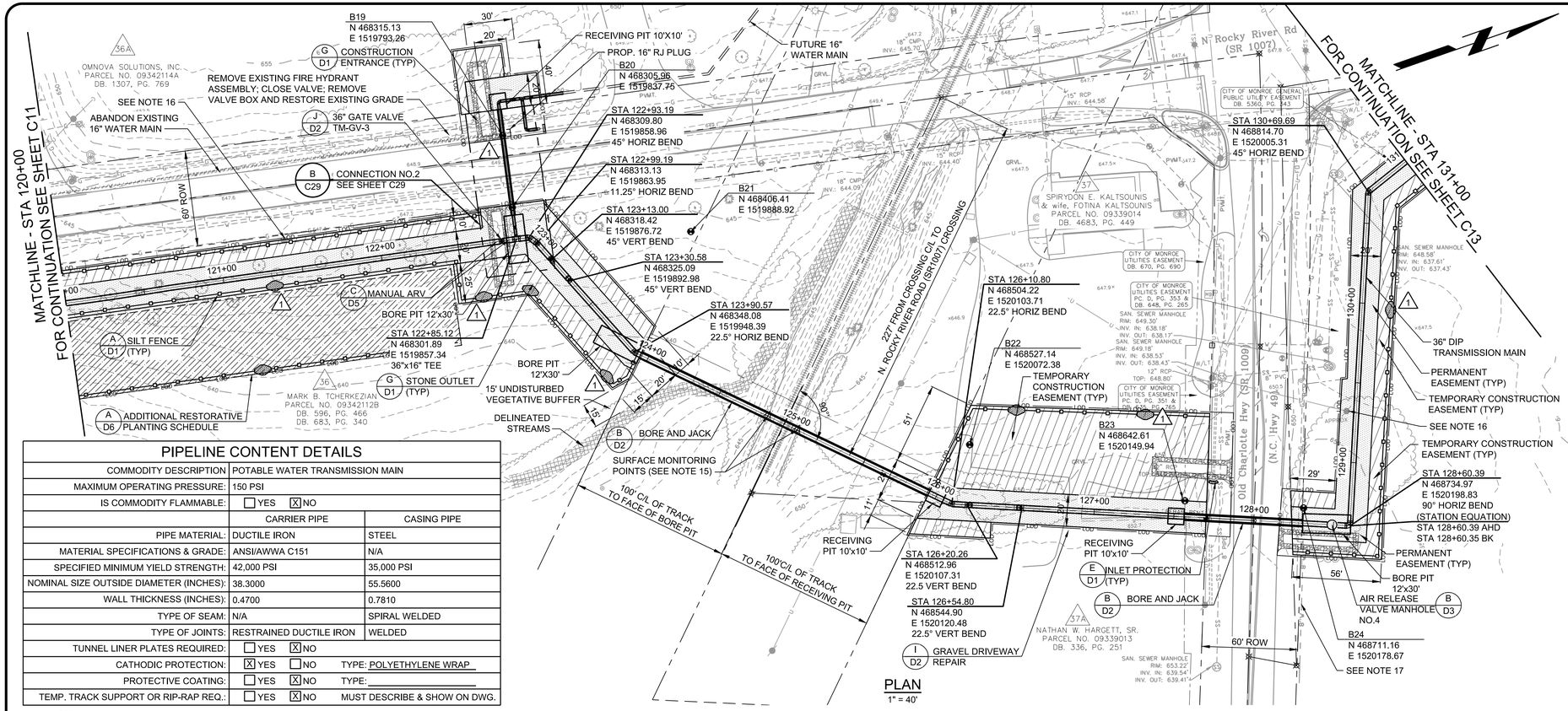
DESIGNED:	MLT, WPS
DETAILED:	KTH
CHECKED:	CES
APPROVED:	SLT
DATE:	JANUARY 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

C11
SHEET
15 OF 42

FD7000_PW
D10000



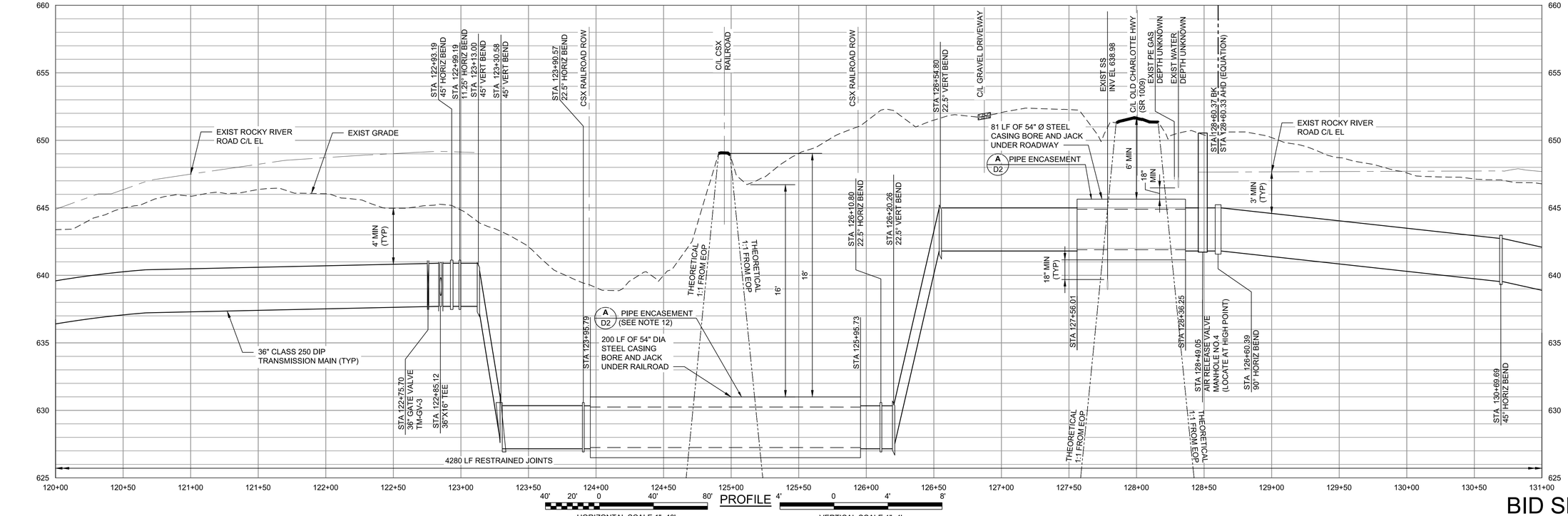
PLAN
1" = 40'

PIPELINE CONTENT DETAILS

	CARRIER PIPE	CASING PIPE
COMMODITY DESCRIPTION	POTABLE WATER TRANSMISSION MAIN	
MAXIMUM OPERATING PRESSURE:	150 PSI	
IS COMMODITY FLAMMABLE:	☐ YES ☒ NO	
PIPE MATERIAL:	DUCTILE IRON	STEEL
MATERIAL SPECIFICATIONS & GRADE:	ANSI/AWWA C151	N/A
SPECIFIED MINIMUM YIELD STRENGTH:	42,000 PSI	35,000 PSI
NOMINAL SIZE OUTSIDE DIAMETER (INCHES):	38.3000	55.5600
WALL THICKNESS (INCHES):	0.4700	0.7810
TYPE OF SEAM:	N/A	SPIRAL WELDED
TYPE OF JOINTS:	RESTRAINED DUCTILE IRON	WELDED
TUNNEL LINER PLATES REQUIRED:	☐ YES ☒ NO	
CATHODIC PROTECTION:	☒ YES ☐ NO TYPE: POLYETHYLENE WRAP	
PROTECTIVE COATING:	☐ YES ☒ NO TYPE:	
TEMP. TRACK SUPPORT OR RIP-RAP REQ.:	☐ YES ☒ NO MUST DESCRIBE & SHOW ON DWG.	

NOTES:

1. REFER TO THE CSX PIPELINE DESIGN & CONSTRUCTION SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. THE FRONT OF THE PIPE SHALL BE PROVIDED WITH MECHANICAL ARRANGEMENTS OR DEVICES THAT WILL POSITIVELY PREVENT THE AUGER FROM LEADING THE PIPE SO THAT NO UNSUPPORTED EXCAVATION IS AHEAD OF THE PIPE.
3. THE OPERATION SHALL BE PROGRESSED ON A 24-HOUR BASIS WITHOUT STOPPAGE (EXCEPT FOR ADDING LENGTHS OF PIPE) UNTIL THE LEADING EDGE OF THE PIPE HAS REACHED THE RECEIVING PIT.
4. THE AUGER AND CUTTING HEAD ARRANGEMENT SHALL BE REMOVABLE FROM WITHIN THE PIPE IN THE EVENT AN OBSTRUCTION IS ENCOUNTERED.
5. PIPELINE SHALL BE PROMINENTLY MARKED AT BOTH SIDES OF THE CSX PROPERTY LINES BY DURABLE, WEATHERPROOF SIGNS LOCATED OVER THE CENTERLINE OF THE PIPE IN ACCORDANCE WITH CSX SPECIFICATIONS.
6. NO CONSTRUCTION OR ENTRY UPON THE CSX CORRIDOR IS PERMITTED UNTIL THE DOCUMENT TRANSACTION IS COMPLETED, YOU ARE IN RECEIPT OF A FULLY EXECUTED DOCUMENT, AND YOU HAVE OBTAINED AUTHORITY FROM THE LOCAL ROADMASTER.
7. IF REQUIRED, A DEWATERING PLAN IN ACCORDANCE WITH CSX SPECIFICATIONS WILL BE SUBMITTED TO THE CSX REPRESENTATIVE FOR REVIEW AND APPROVAL PRIOR TO ANY DEWATERING OPERATIONS.
8. BLASTING IS NOT PERMITTED UNDER OR ON CSX PROPERTY. SEE CSX873182 EXHIBIT A.
9. CSX DOES NOT GRANT OR CONVEY AN EASEMENT FOR THIS INSTALLATION.
10. EXISTING PIPES TO BE ABANDONED WILL BE COMPLETELY FILLED WITH CEMENT GROUT, COMPACTED SAND , OR FLOWABLE FILL.
11. REFER TO PROJECT SPECIFICATIONS FOR CSX RAILROAD ENCROACHMENT AGREEMENT.
12. STEEL CASING PIPE SHALL BE SPIRAL WELDED STEEL WITH A MINIMUM WALL THICKNESS EQUAL TO 0.781 INCHES AND A MINIMUM YIELD STRENGTH EQUAL TO 35,000 PSI.
13. CONTRACTOR SHALL PROVIDE DURABLE WEATHERPROOF SIGNS ON BOTH SIDES OF TRACK AT RR R/W LINES LOCATED OVER THE CENTERLINE OF THE PIPE PER CSX TRANSPORTATION DESIGN AND CONSTRUCTION STANDARD SPECIFICATIONS.
14. CONTRACTOR SHALL FOLLOW THE LATEST EDITION OF THE CSX TRANSPORTATION DESIGN & CONSTRUCTION STANDARD SPECIFICATIONS.
15. CONTRACTOR SHALL PROVIDE GEOTECHNICAL MONITORING POINTS PER SPECIFICATION 02309. LOCATION OF SURFACE MONITORING POINT IS APPROX. CONTRACTOR SHALL ADJUST AS NEEDED.
16. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES AND ANCHORS.
17. EXISTING 8" WATERLINE SHOWN IS BASED OFF GIS AND IS APPROXIMATE. CONTRACTOR SHALL FIELD LOCATE UTILITY AND COORDINATE WITH OWNER/ENGINEER PRIOR TO PERFORMING ANY WORK.



PROFILE
HORIZONTAL SCALE 1"=40'
VERTICAL SCALE 1"=4'

BID SET

NO.	BY	CHK	APP'D
1	MLT	WPS	SLT

DATE	REVISIONS AND RECORD OF USE
02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER WILLIAM P. SHORT
2021.02.25 23:47:12-05'00'

BLACK & VEATCH
Black & Veatch International Company
Power, Water, Infrastructure
10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 120+00 TO STA 131+00

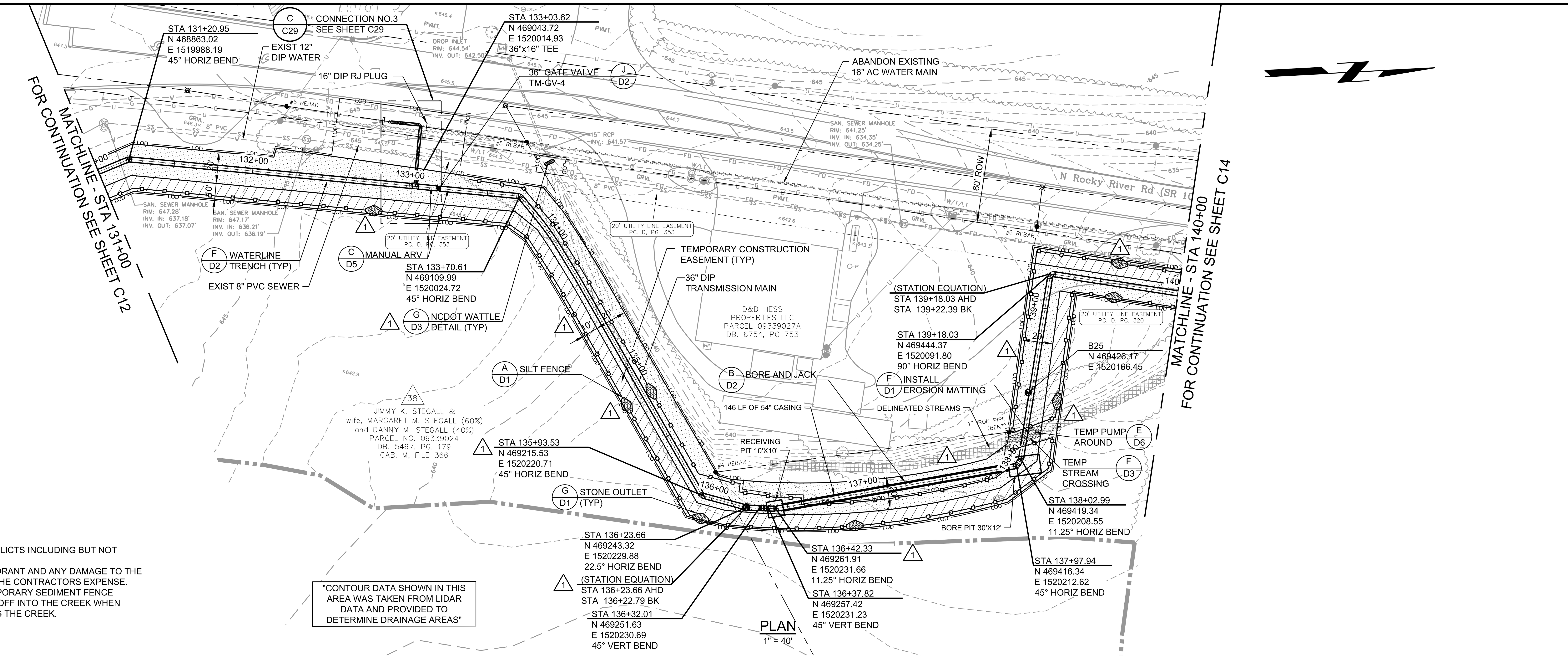
DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

C12
SHEET
16 OF 42

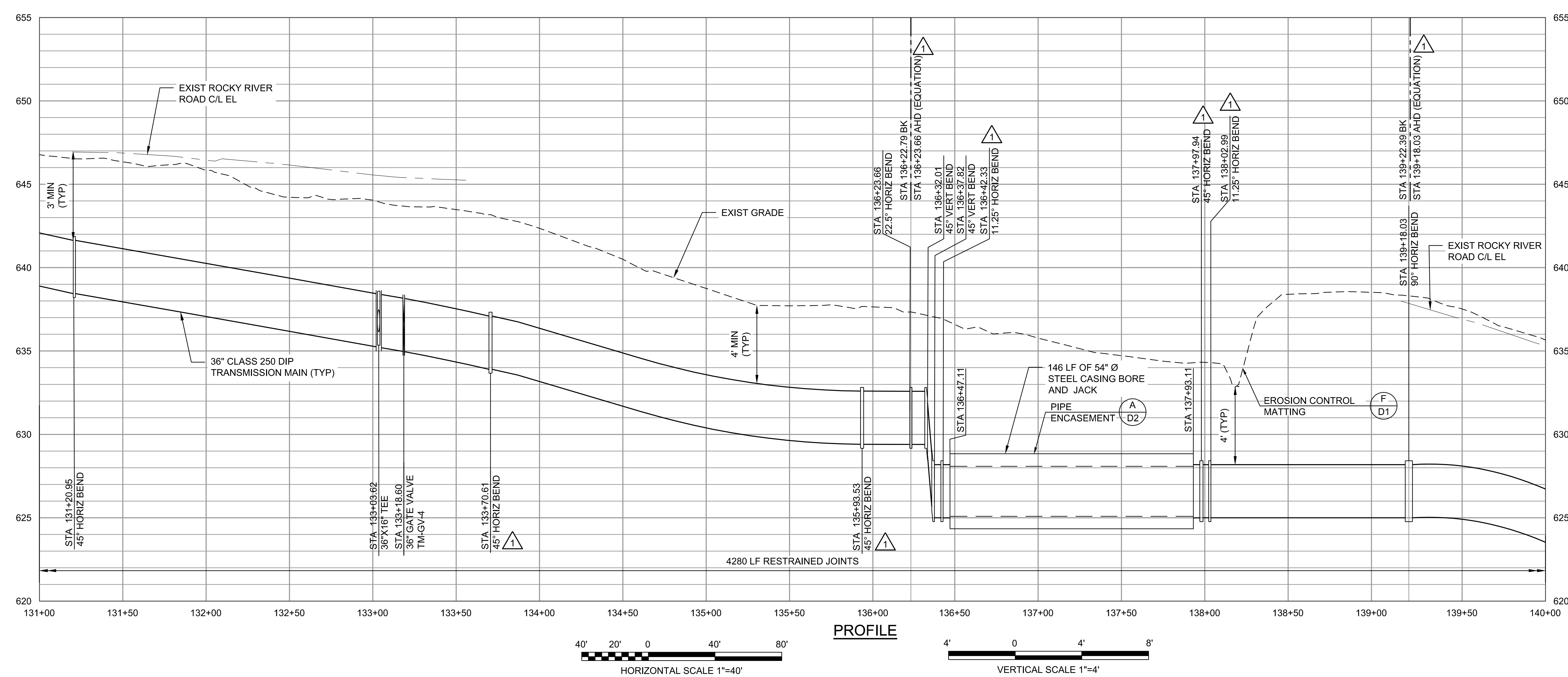
FD7000_PW
D10000



PLAN
1" = 40'

NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
3. (1) CONTRACTOR SHALL REMOVE AND REPLACE TEMPORARY SEDIMENT FENCE PARALLEL TO CREEK TO PREVENT SEDIMENT RUNOFF INTO THE CREEK WHEN CONSTRUCTING THE TRANSMISSION MAIN ACROSS THE CREEK.



PROFILE

HORIZONTAL SCALE 1"=40'

VERTICAL SCALE 1"=4'

BID SET

NO.	DATE	REVISIONS AND RECORD OF USE	BY	CHK	APP
1	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1	MLT	WPS	SLT

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 039150
2021.02.25 23:47:13-05'00'

BLACK & VEATCH
Black & Veatch International Company
Business License No. F-0794
10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 131+00 TO STA 140+00

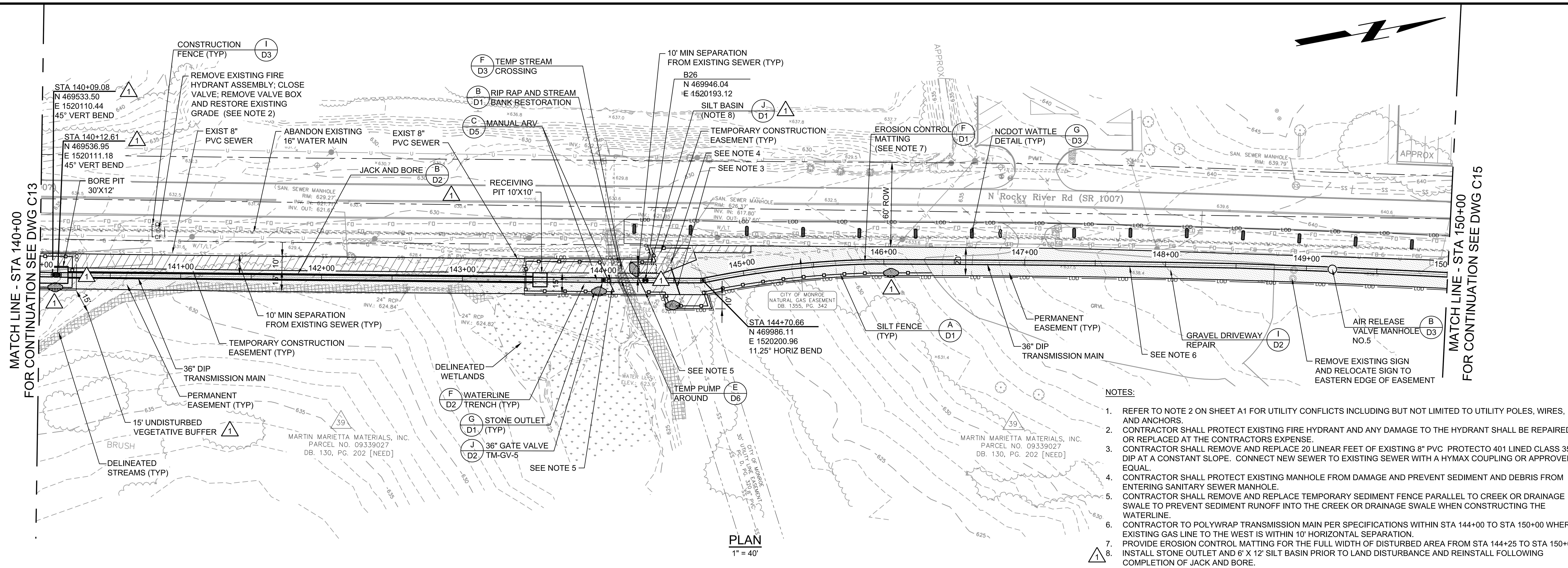
DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

C13
SHEET
17 OF 42

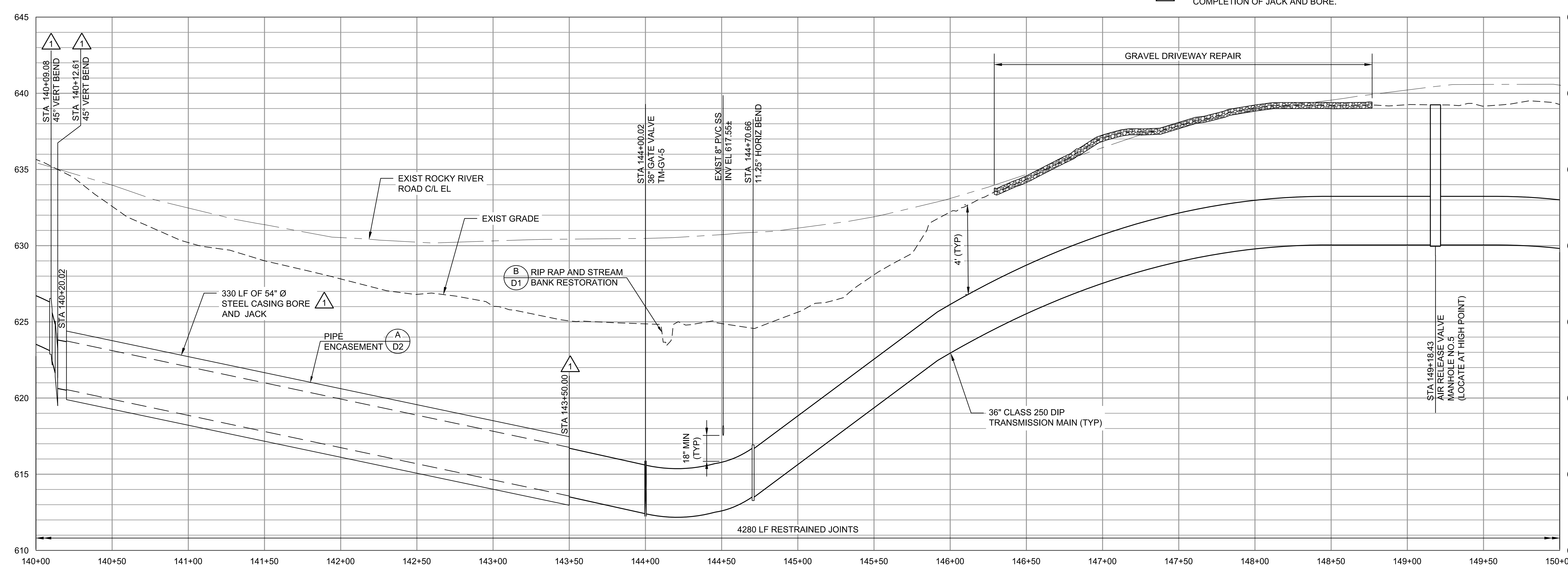
FD7000_PW
D10000



PLAN
1" = 40'

NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
3. CONTRACTOR SHALL REMOVE AND REPLACE 20 LINEAR FEET OF EXISTING 8" PVC PROTECTO 401 LINED CLASS 350 DIP AT A CONSTANT SLOPE. CONNECT NEW SEWER TO EXISTING SEWER WITH A HYMAX COUPLING OR APPROVED EQUAL.
4. CONTRACTOR SHALL PROTECT EXISTING MANHOLE FROM DAMAGE AND PREVENT SEDIMENT AND DEBRIS FROM ENTERING SANITARY SEWER MANHOLE.
5. CONTRACTOR SHALL REMOVE AND REPLACE TEMPORARY SEDIMENT FENCE PARALLEL TO CREEK OR DRAINAGE SWALE TO PREVENT SEDIMENT RUNOFF INTO THE CREEK OR DRAINAGE SWALE WHEN CONSTRUCTING THE WATERLINE.
6. CONTRACTOR TO POLYWRAP TRANSMISSION MAIN PER SPECIFICATIONS WITHIN STA 144+00 TO STA 150+00 WHERE EXISTING GAS LINE TO THE WEST IS WITHIN 10' HORIZONTAL SEPARATION.
7. PROVIDE EROSION CONTROL MATTING FOR THE FULL WIDTH OF DISTURBED AREA FROM STA 144+25 TO STA 150+00.
8. (1) INSTALL STONE OUTLET AND 6' X 12' SILT BASIN PRIOR TO LAND DISTURBANCE AND REINSTALL FOLLOWING COMPLETION OF JACK AND BORE.



PROFILE

HORIZONTAL SCALE 1"=40' (40' 20' 0 40' 80')

VERTICAL SCALE 1"=4' (4' 0 4' 8')

BID SET

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE
1	MLT	WPS	SLT	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER
2021.02.25 23:47:14-05'00'

BLACK & VEATCH
Black & Veatch International Company
Business License No. F-0794
10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 140+00 TO STA 150+00

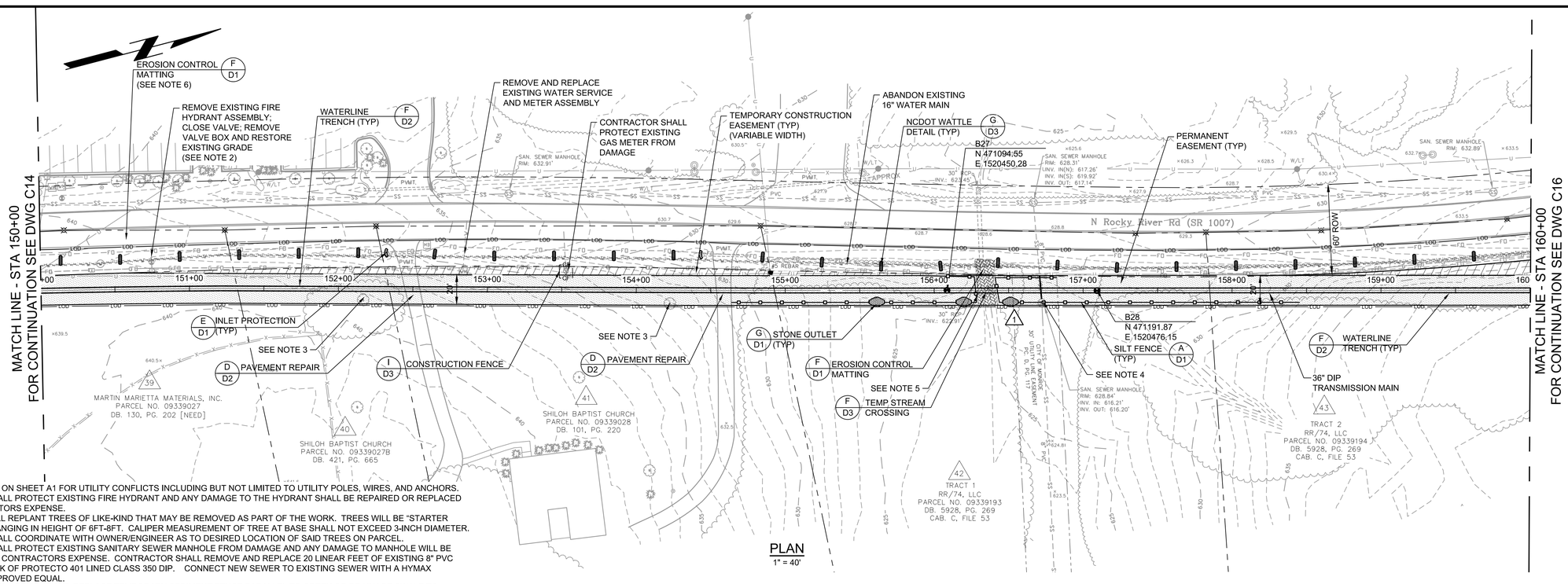
DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

C14
SHEET
18 OF 42

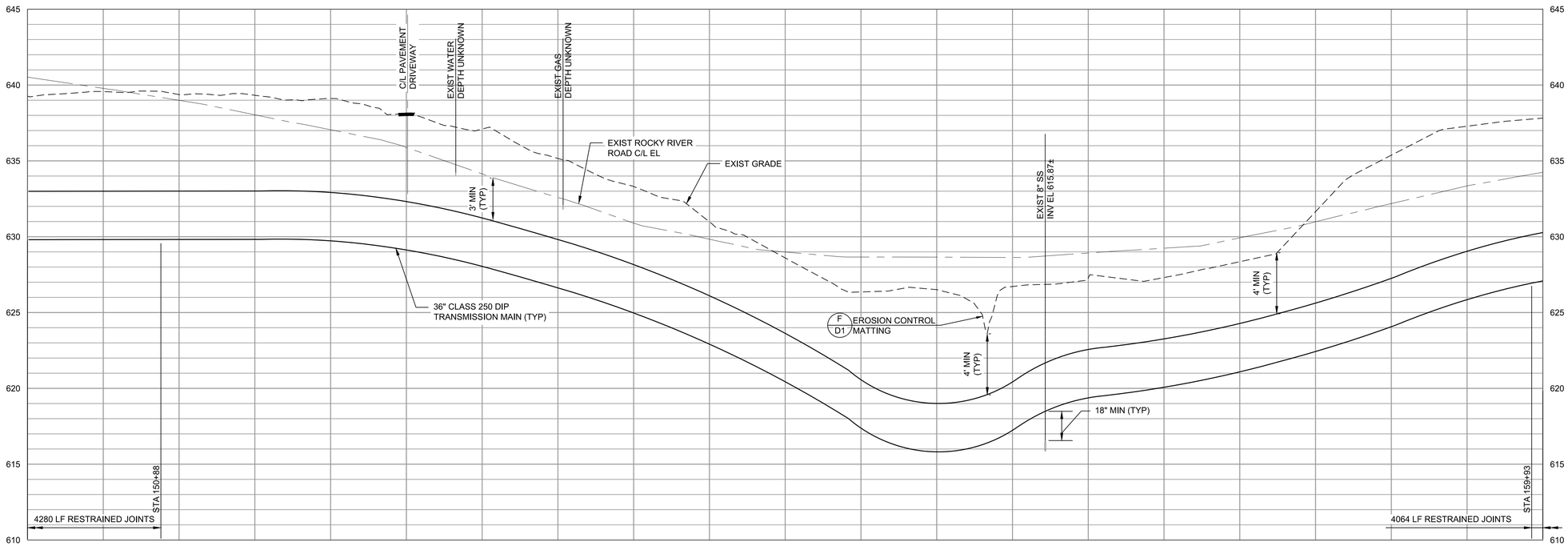
FD7000_PW
D10000



PLAN
1" = 40'

NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
3. CONTRACTOR WILL REPLANT TREES OF LIKE-KIND THAT MAY BE REMOVED AS PART OF THE WORK. TREES WILL BE "STARTER TREES" IN SIZE RANGING IN HEIGHT OF 6FT-8FT. CALIPER MEASUREMENT OF TREE AT BASE SHALL NOT EXCEED 3-INCH DIAMETER. CONTRACTOR SHALL COORDINATE WITH OWNER/ENGINEER AS TO DESIRED LOCATION OF SAID TREES ON PARCEL.
4. CONTRACTOR SHALL PROTECT EXISTING SANITARY SEWER MANHOLE FROM DAMAGE AND ANY DAMAGE TO MANHOLE WILL BE REPAIRED AT THE CONTRACTORS EXPENSE. CONTRACTOR SHALL REMOVE AND REPLACE 20 LINEAR FEET OF EXISTING 8" PVC WITH A 20 FT STICK OF PROTECTO 401 LINED CLASS 350 DIP. CONNECT NEW SEWER TO EXISTING SEWER WITH A HYMAX COUPLING OR APPROVED EQUAL.
5. CONTRACTOR SHALL REMOVE AND REPLACE TEMPORARY SEDIMENT FENCE PARALLEL TO CREEK OR DRAINAGE SWALE TO PREVENT SEDIMENT RUNOFF INTO THE CREEK OR DRAINAGE SWALE WHEN CONSTRUCTING THE WATERLINE.
6. PROVIDE EROSION CONTROL MATTING FOR THE FULL WIDTH OF DISTURBED AREA FROM STA 150+00 TO STA 160+00.



PROFILE

40' 20' 0 40' 80'
HORIZONTAL SCALE 1"=40'

4' 0 4' 8'
VERTICAL SCALE 1"=4'

BID SET

NO.	BY	CHK	APP'D	DATE	REVISIONS AND RECORD OF USE
1	MLT	WPS	SLT	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER WILLIAM P. STOUT
2021.02.25 23:47:15-05'00'

BLACK & VEATCH
Black & Veatch International Company
Building a sustainable future.
10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 150+00 TO STA 160+00

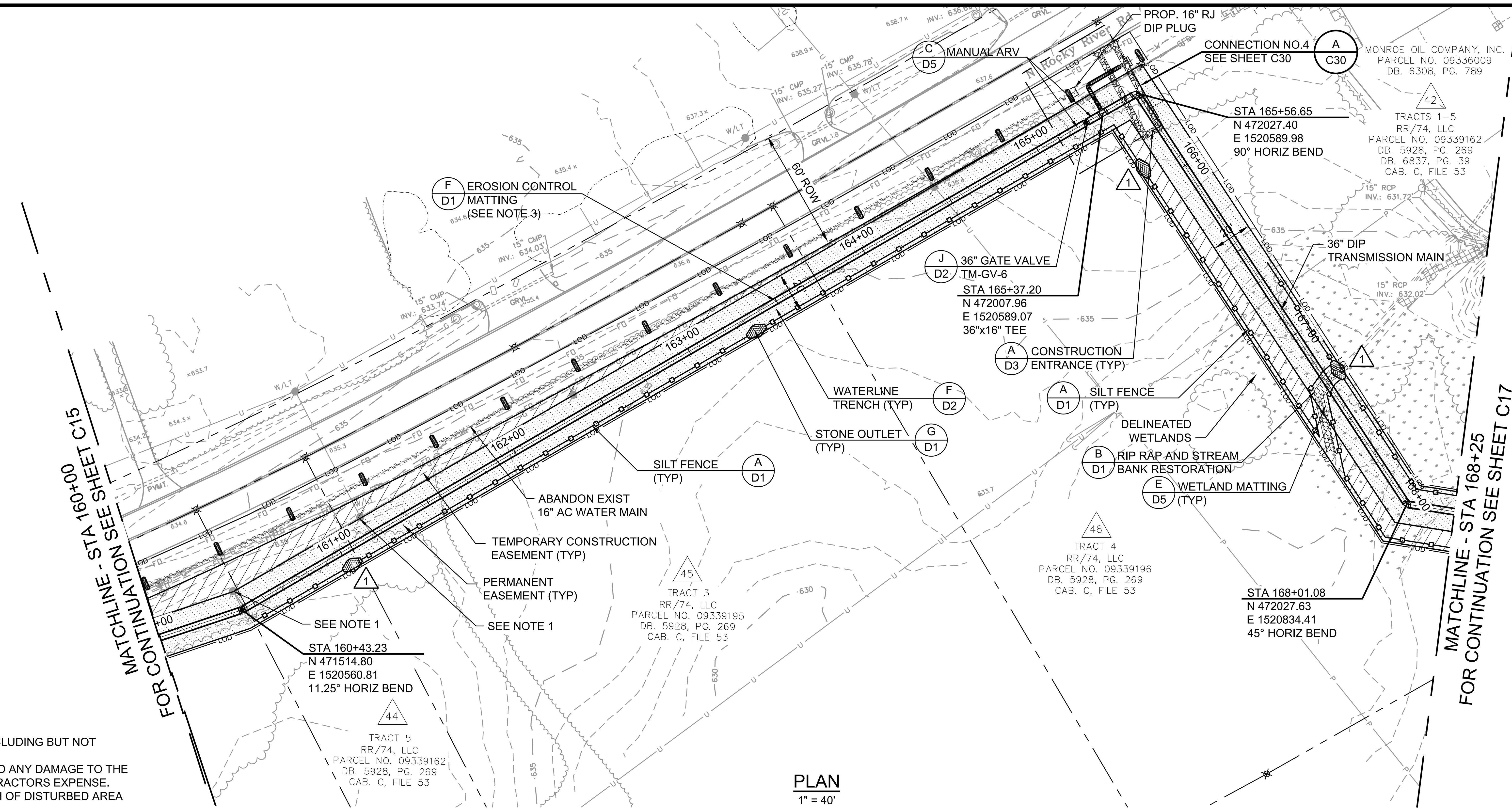
DESIGNED:	MLT, WPS
DETAILED:	KTH
CHECKED:	CES
APPROVED:	SLT
DATE:	JANUARY 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

C15
SHEET
19 OF 42

FD7000_PW
D10000

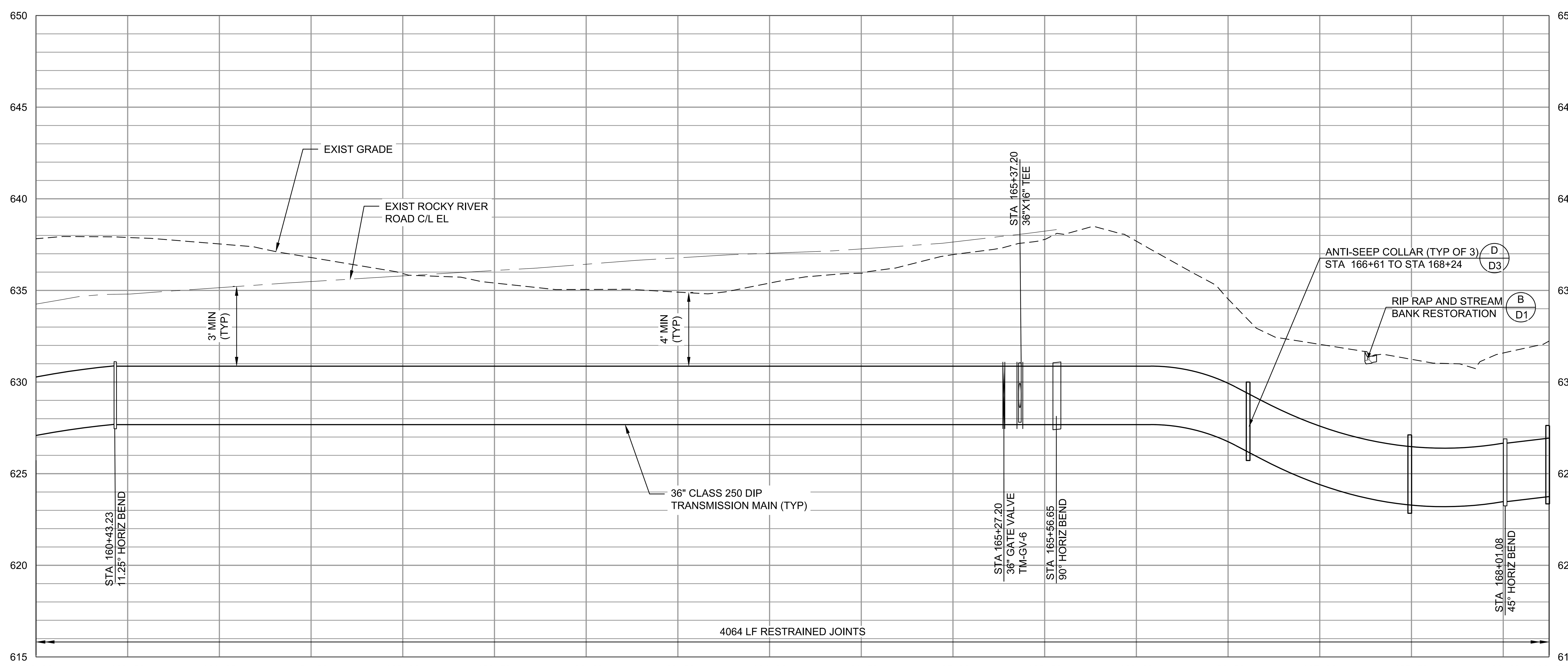


PLAN

1" = 40'

NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
3. PROVIDE EROSION CONTROL MATTING FOR THE FULL WIDTH OF DISTURBED AREA FROM STA 160+00 TO STA 165+57.



PROFILE

40' 20' 0 40' 80'
HORIZONTAL SCALE 1"=40'

4' 0 4' 8'
VERTICAL SCALE 1"=4'

FD7000_PW
D10000

BID SET

NO.	DATE	REVISIONS AND RECORD OF USE	BY	CHK	APP
1	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1	MLT	WPS	SLT

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER WILLIAM P. SCOTT

2021.02.25 23:47:16-05'00'

BLACK & VEATCH

Black & Veatch International Company
Business License No. F-0794
10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

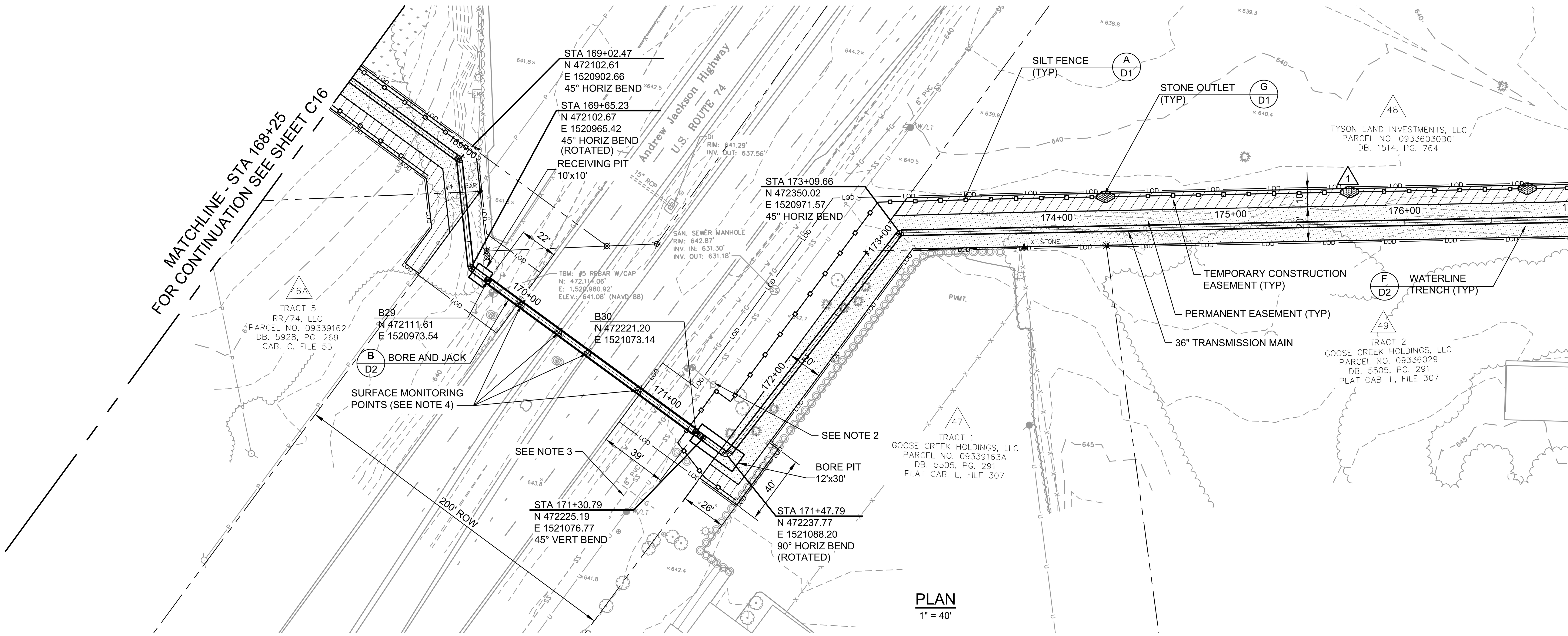
CIVIL
PLAN AND PROFILE
STA 160+00 TO STA 168+25

DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

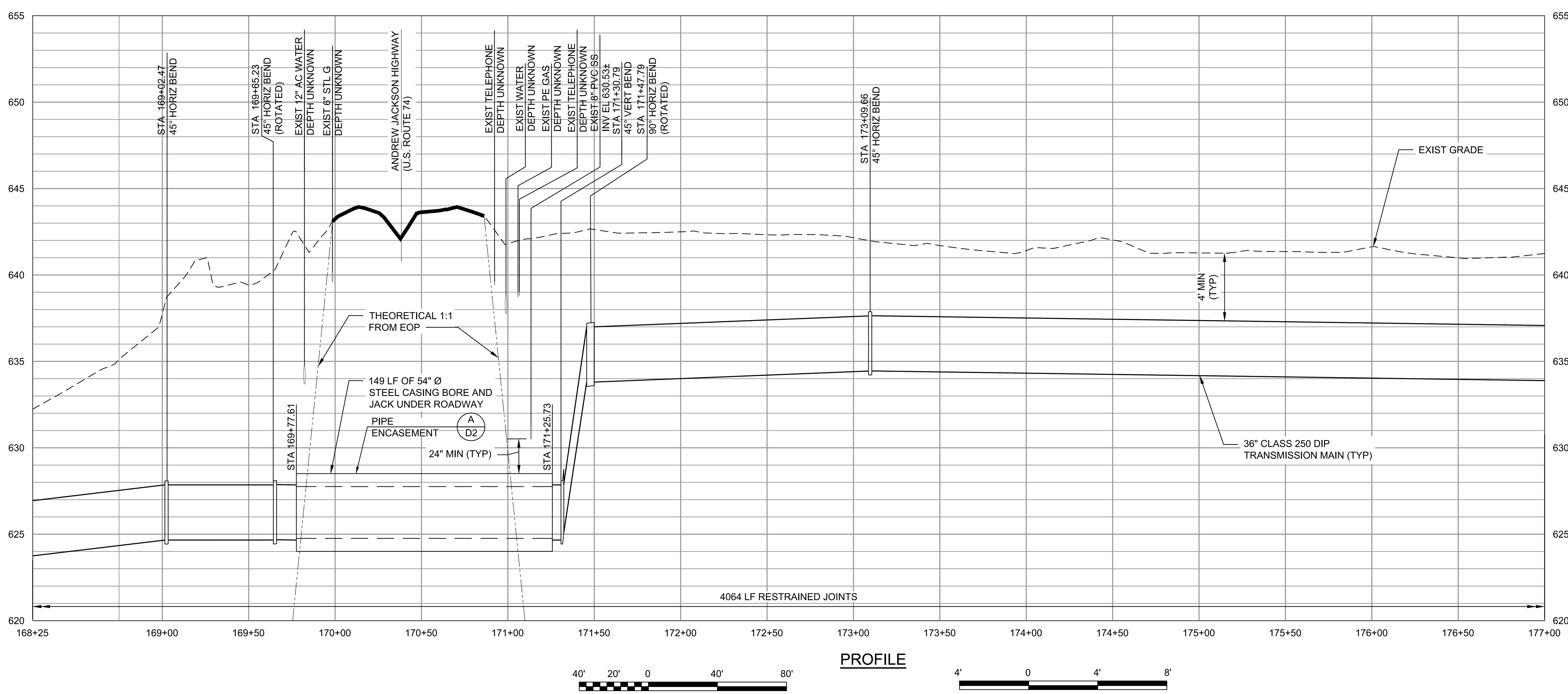
C16
SHEET
20 OF 42



MATCHLINE - STA 177+00
FOR CONTINUATION SEE SHEET C18

NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
3. EXISTING DOWNSTREAM SANITARY SEWER MANHOLE IS LOCATED APPROXIMATELY 395 LF SOUTHEAST OF UPSTREAM MANHOLE.
4. CONTRACTOR SHALL PROVIDE GEOTECHNICAL MONITORING POINTS PER SPECIFICATION 02309. LOCATION OF SURFACE MONITORING POINT IS APPROX. CONTRACTOR SHALL ADJUST AS NEEDED.



BID SET

FD7000_PW
D10000

NO.	DATE	REVISIONS AND RECORD OF USE	BY	CHK	APP
1	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1	MLT	WPS	SLT

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER
2021.02.25 23:47:17-05'00'

BLACK & VEATCH
Black & Veatch International Company
Business License No. F-0794
10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

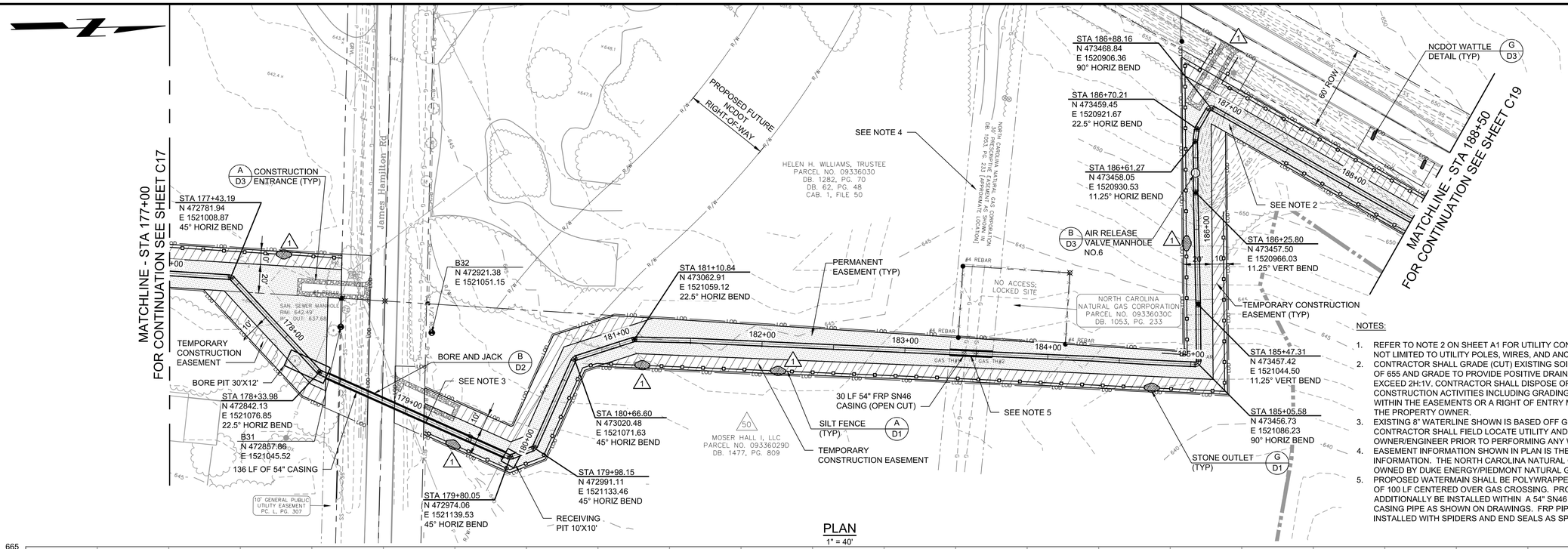
CIVIL
PLAN AND PROFILE
STA 168+25 TO STA 177+00

DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

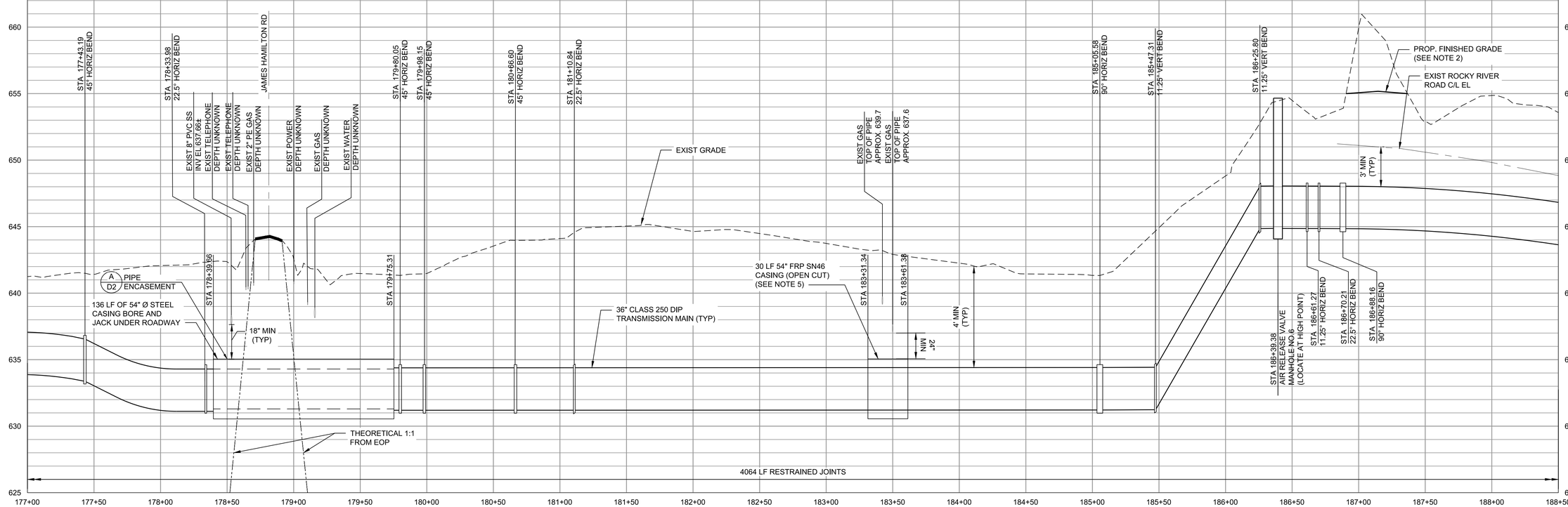
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

C17
SHEET
21 OF 42



PLAN
1" = 40'



PROFILE

HORIZONTAL SCALE 1"=40'

VERTICAL SCALE 1"=4'

NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL GRADE (CUT) EXISTING SOIL MOUND TO AN ELEVATION OF 655 AND GRADE TO PROVIDE POSITIVE DRAINAGE. SLOPE SHALL NOT EXCEED 2H:1V. CONTRACTOR SHALL DISPOSE OF EXISTING SOILS. ALL CONSTRUCTION ACTIVITIES INCLUDING GRADING SHALL BE PERFORMED WITHIN THE EASEMENTS OR A RIGHT OF ENTRY MUST BE OBTAINED FROM THE PROPERTY OWNER.
3. EXISTING 8" WATERLINE SHOWN IS BASED OFF GIS AND IS APPROXIMATE. CONTRACTOR SHALL FIELD LOCATE UTILITY AND COORDINATE WITH OWNER/ENGINEER PRIOR TO PERFORMING ANY WORK.
4. EASEMENT INFORMATION SHOWN IN PLAN IS THE RECORDED EASEMENT INFORMATION. THE NORTH CAROLINA NATURAL GAS CORPORATION IS NOW OWNED BY DUKE ENERGY/PIEDMONT NATURAL GAS.
5. PROPOSED WATERMAIN SHALL BE POLYWRAPPED AS SPECIFIED A MINIMUM OF 100 LF CENTERED OVER GAS CROSSING. PROPOSED WATERMAIN SHALL ADDITIONALLY BE INSTALLED WITHIN A 54" SN46 FIBERGLASS REINFORCED CASING PIPE AS SHOWN ON DRAWINGS. FRP PIPE ENCASEMENT SHALL BE INSTALLED WITH SPIDERS AND END SEALS AS SPECIFIED.

NO.	DATE	REVISIONS AND RECORD OF USE	BY	CHK	APP
1	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1	MLT	WPS	SLT

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER WILLIAM P. SLOAN
2021.02.25 23:47:18-05'00'

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STA 177+00 TO STA 188+50

DESIGNED:	MLT, WPS
DETAILED:	KTH
CHECKED:	CES
APPROVED:	SLT
DATE:	JANUARY 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

C18
SHEET
22 OF 42

BID SET

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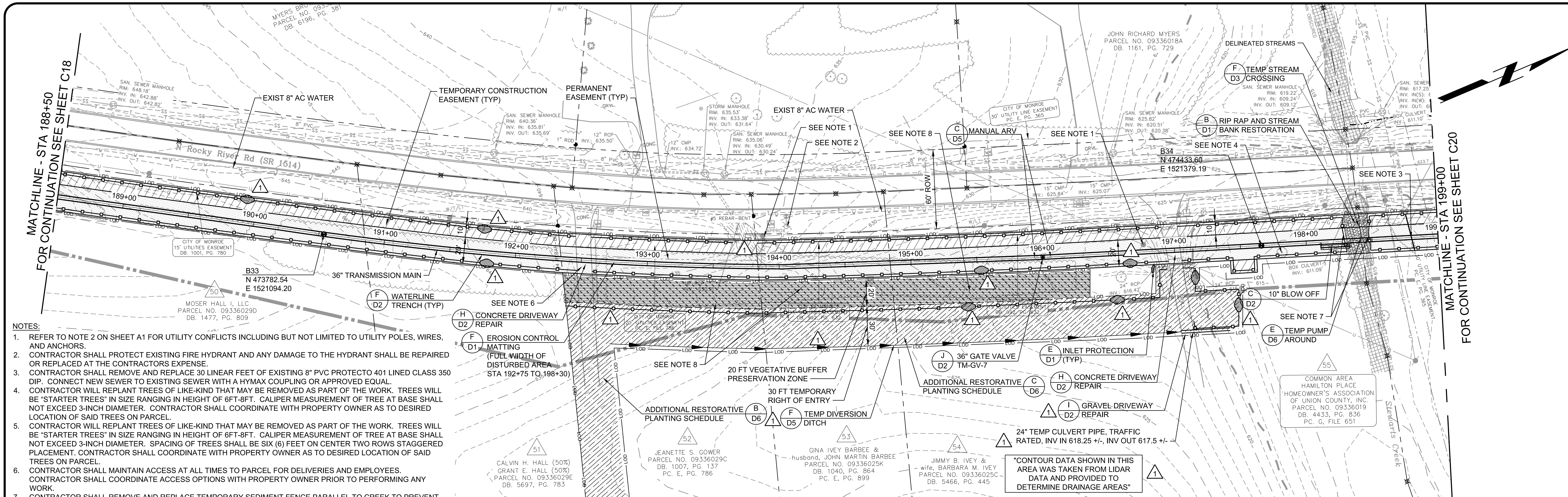
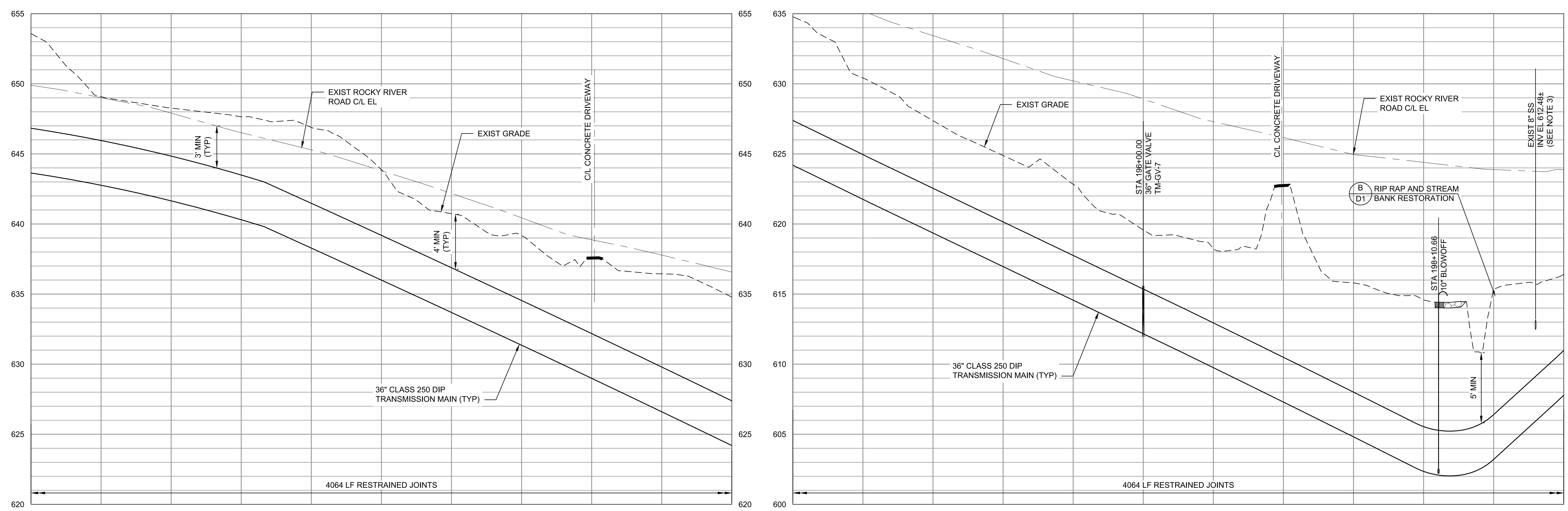
D10000



NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
3. CONTRACTOR SHALL REMOVE AND REPLACE 30 LINEAR FEET OF EXISTING 8" PVC PROTECTO 401 LINED CLASS 350 DIP. CONNECT NEW SEWER TO EXISTING SEWER WITH A HYMAX COUPLING OR APPROVED EQUAL.
4. CONTRACTOR WILL REPLANT TREES OF LIKE-KIND THAT MAY BE REMOVED AS PART OF THE WORK. TREES WILL BE "STARTER TREES" IN SIZE RANGING IN HEIGHT OF 6FT-8FT. CALIPER MEASUREMENT OF TREE AT BASE SHALL NOT EXCEED 3-INCH DIAMETER. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER AS TO DESIRED LOCATION OF SAID TREES ON PARCEL.
5. CONTRACTOR WILL REPLANT TREES OF LIKE-KIND THAT MAY BE REMOVED AS PART OF THE WORK. TREES WILL BE "STARTER TREES" IN SIZE RANGING IN HEIGHT OF 6FT-8FT. CALIPER MEASUREMENT OF TREE AT BASE SHALL NOT EXCEED 3-INCH DIAMETER. SPACING OF TREES SHALL BE SIX (6) FEET ON CENTER TWO ROWS STAGGERED PLACEMENT. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER AS TO DESIRED LOCATION OF SAID TREES ON PARCEL.
6. CONTRACTOR SHALL MAINTAIN ACCESS AT ALL TIMES TO PARCEL FOR DELIVERIES AND EMPLOYEES. CONTRACTOR SHALL COORDINATE ACCESS OPTIONS WITH PROPERTY OWNER PRIOR TO PERFORMING ANY WORK.
7. CONTRACTOR SHALL REMOVE AND REPLACE TEMPORARY SEDIMENT FENCE PARALLEL TO CREEK TO PREVENT SEDIMENT RUNOFF INTO CREEK WHEN CONSTRUCTING THE TRANSMISSION MAIN.
8. PROVIDE 24-7 DRIVEWAY ACCESS FOR BUSINESS.
9. DO NOT REMOVE TREES OR BRUSH WITHIN PRESERVATION ZONE. ALLOW OVERHANG OF TREES INTO PERMANENT EASEMENT UP TO 24".
10. PLANT RESTORATIVE PLANTING WITHIN RIGHT OF ENTRY AREA.

PLAN
1" = 40'



PROFILE

HORIZONTAL SCALE 1"=40'

VERTICAL SCALE 1"=4'

BID SET

NO.	DATE	REVISIONS AND RECORD OF USE	BY	CHK	APP
1	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1	MLT	WPS	SLT

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER

2021.02.25 23:47:19-05'00'

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Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 188+50 TO STA 199+00

DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

C19
SHEET
23 OF 42

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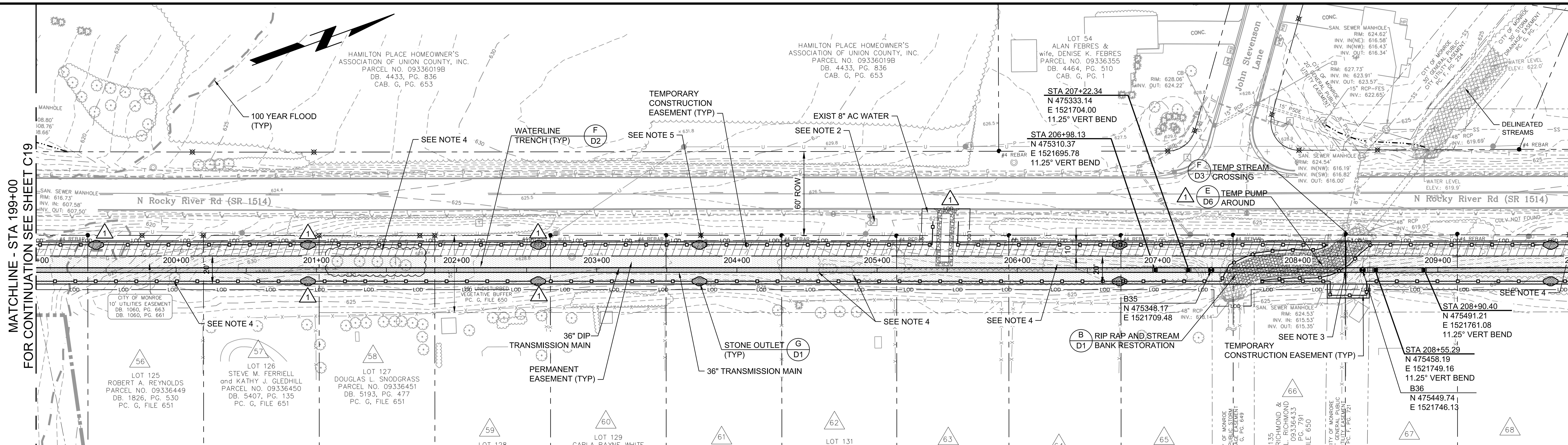
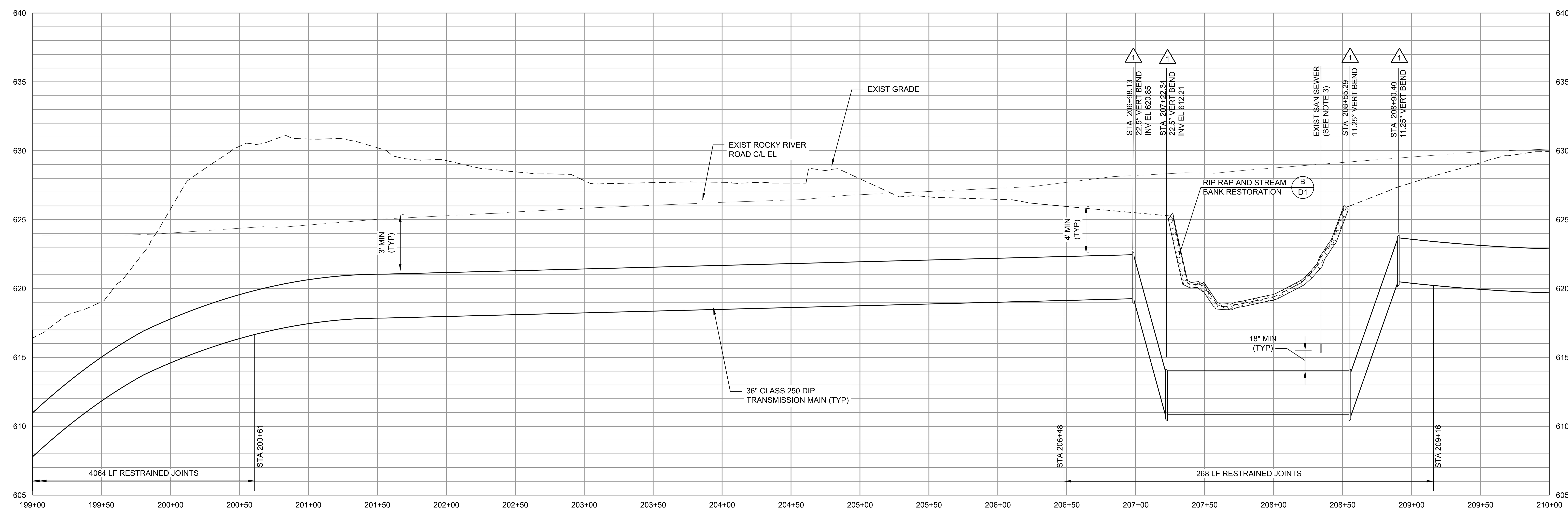
D10000



NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
3. CONTRACTOR SHALL REMOVE AND REPLACE 30 LINEAR FEET OF EXISTING 8" PVC WITH A 30 FT STICK OF PROTECTO 401 LINED CLASS 350 DIP. CONNECT NEW SEWER TO EXISTING SEWER WITH A HYMAX COUPLING OR APPROVED EQUAL.
4. CONTRACTOR WILL REPLANT TREES OF LIKE-KIND THAT MAY BE REMOVED AS PART OF THE WORK. TREES WILL BE "STARTER TREES" IN SIZE RANGING IN HEIGHT OF 6FT-8FT. CALIPER MEASUREMENT OF TREE AT BASE SHALL NOT EXCEED 3-INCH DIAMETER. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER AS TO DESIRED LOCATION OF SAID TREES ON PARCEL.
5. CONTRACTOR TO COORDINATE LOCATION OF EXISTING GAS LINE WITH STONE OUTLET LOCATION, 3 LOCATIONS.

PLAN
1" = 40'



PROFILE

HORIZONTAL SCALE 1"=40'

VERTICAL SCALE 1"=4'

BID SET

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE
1	MLT	WPS	SLT	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER
2021.02.25 23:47:19-05'00'

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Charlotte, North Carolina 28262

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853W ZONE IMPROVEMENTS
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STA 199+00 TO STA 210+00

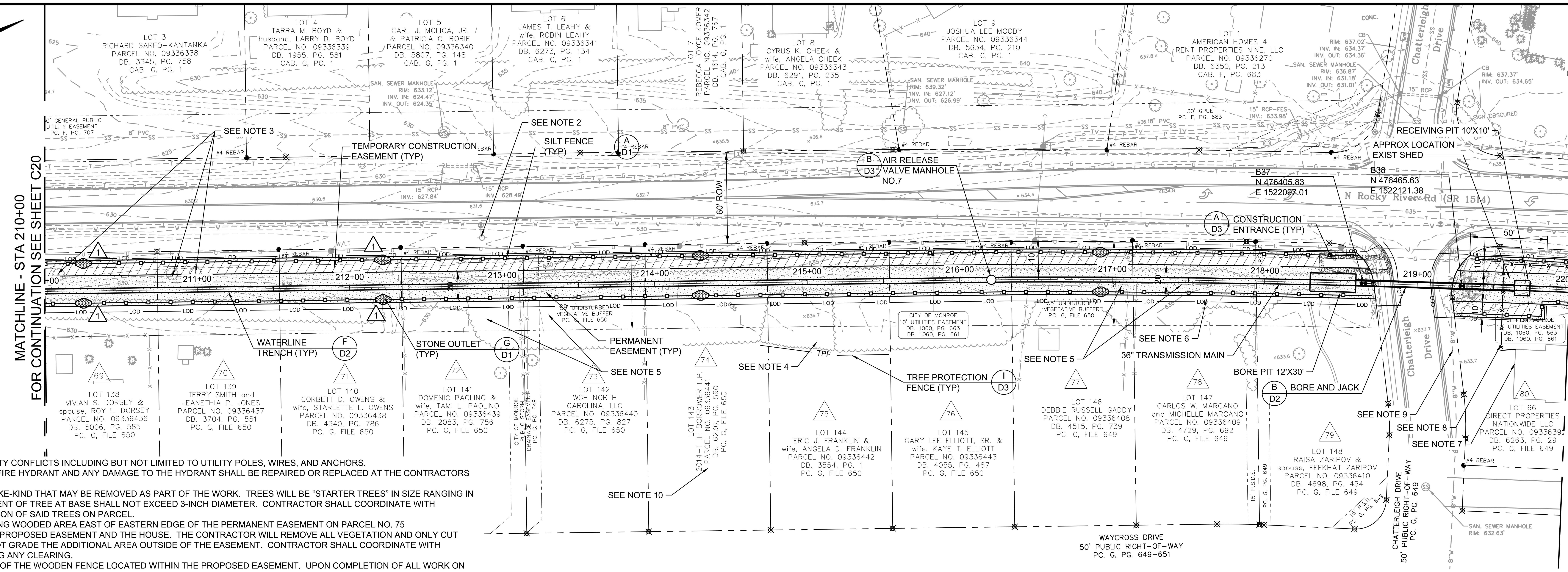
DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 186110

C20
SHEET 24 OF 42

FD7000_PW
D10000



NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
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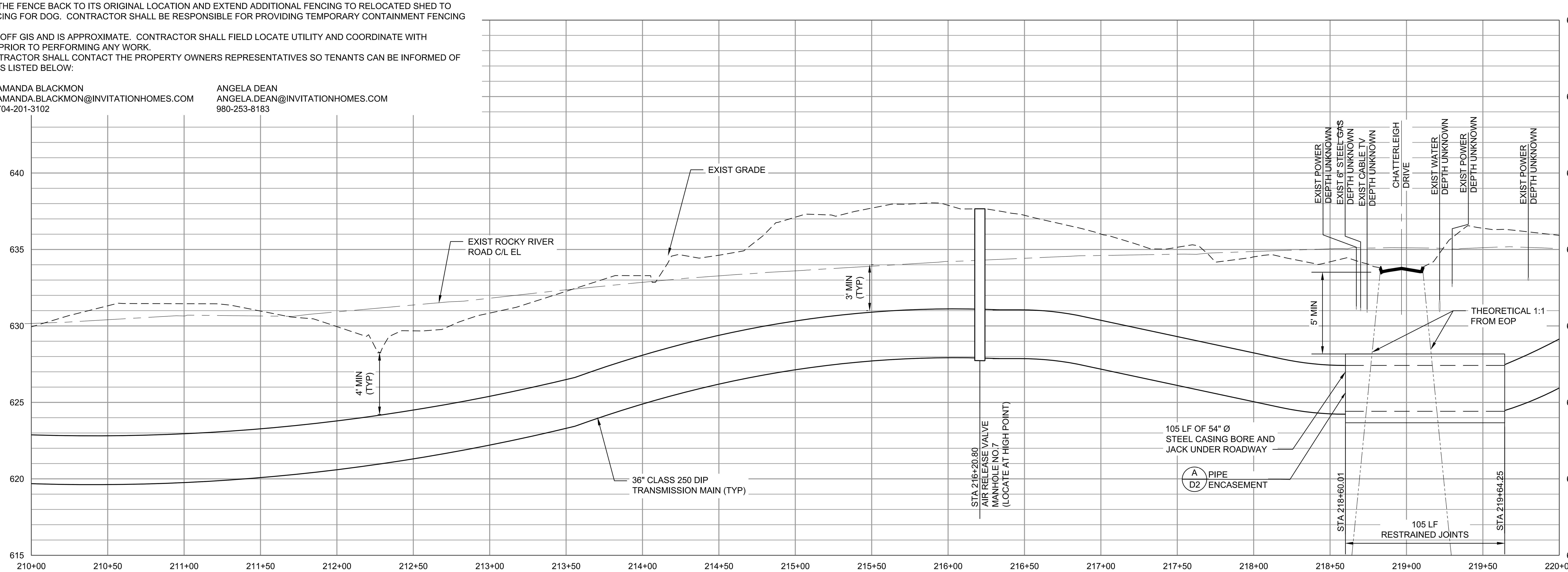
4. CONTRACTOR SHALL CLEAR THE REMAINING WOODED AREA EAST OF EASTERN EDGE OF THE PERMANENT EASEMENT ON PARCEL NO. 75 (APPROXIMATELY 25 FEET) BETWEEN THE PROPOSED EASEMENT AND THE HOUSE. THE CONTRACTOR WILL REMOVE ALL VEGETATION AND ONLY CUT TREES DOWN TO THE STUMP AND WILL NOT GRADE THE ADDITIONAL AREA OUTSIDE OF THE EASEMENT. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER PRIOR TO PERFORMING ANY CLEARING.
5. CONTRACTOR SHALL REMOVE A PORTION OF THE WOODEN FENCE LOCATED WITHIN THE PROPOSED EASEMENT. UPON COMPLETION OF ALL WORK ON THIS PROPERTY THE FENCE SHALL BE PUT BACK IN ORIGINAL OR BETTER CONDITION AND LOCATION.
6. CONTRACTOR WILL REPLANT TREES OF LIKE-KIND THAT MAY BE REMOVED AS PART OF THE WORK. TREES WILL BE "STARTER TREES" IN SIZE RANGING IN HEIGHT OF 6FT-8FT. CALIPER MEASUREMENT OF TREE AT BASE SHALL NOT EXCEED 3-INCH DIAMETER. SPACING OF TREES SHALL BE SIX (6) FEET ON CENTER TWO ROWS STAGGERED PLACEMENT. CONTRACTOR SHALL COORDINATE WITH OWNER/ENGINEER AS TO DESIRED LOCATION OF SAID TREES ON PARCEL.
7. CONTRACTOR WILL RELOCATE SHED AND DOG HOUSE TO JUST OUTSIDE PERMANENT EASEMENT AND CONNECT RELOCATED FENCE.
8. CONTRACTOR WILL REMOVE ANY PORTION OF THE WOODEN FENCE LOCATED WITHIN THE PROPOSED EASEMENTS AND UPON COMPLETION OF THE PROJECT, CONTRACTOR WILL REINSTALL THE FENCE BACK TO ITS ORIGINAL LOCATION AND EXTEND ADDITIONAL FENCING TO RELOCATED SHED TO PROVIDE COMPLETE ENCLOSURE OF FENCING FOR DOG. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY CONTAINMENT FENCING FOR DOG DURING CONSTRUCTION.
9. EXISTING 8" WATERLINE SHOWN IS BASED OFF GIS AND IS APPROXIMATE. CONTRACTOR SHALL FIELD LOCATE UTILITY AND COORDINATE WITH OWNER/ENGINEER AND CITY OF MONROE PRIOR TO PERFORMING ANY WORK.
10. PRIOR TO WORKING ON PARCEL # 74, CONTRACTOR SHALL CONTACT THE PROPERTY OWNERS REPRESENTATIVES SO TENANTS CAN BE INFORMED OF THE WORK. THE CONTACT INFORMATION IS LISTED BELOW:

JEREMIAH APONTE	AMANDA BLACKMON	ANGELA DEAN
JAPONTE@INVITATIONHOMES.COM	AMANDA.BLACKMON@INVITATIONHOMES.COM	ANGELA.DEAN@INVITATIONHOMES.COM
704-774-0082	704-201-3102	980-253-8183

PLAN
1" = 40'



PROFILE

HORIZONTAL SCALE 1"=40'

VERTICAL SCALE 1"=4'

BID SET

FD7000_PW
D10000

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE
1	MLT	WPS	SLT	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER W. PATRICK STOUT
2021.02.25 23:47:20-05'00'

BLACK & VEATCH
Black & Veatch International Company
Business License No. F-0794
10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
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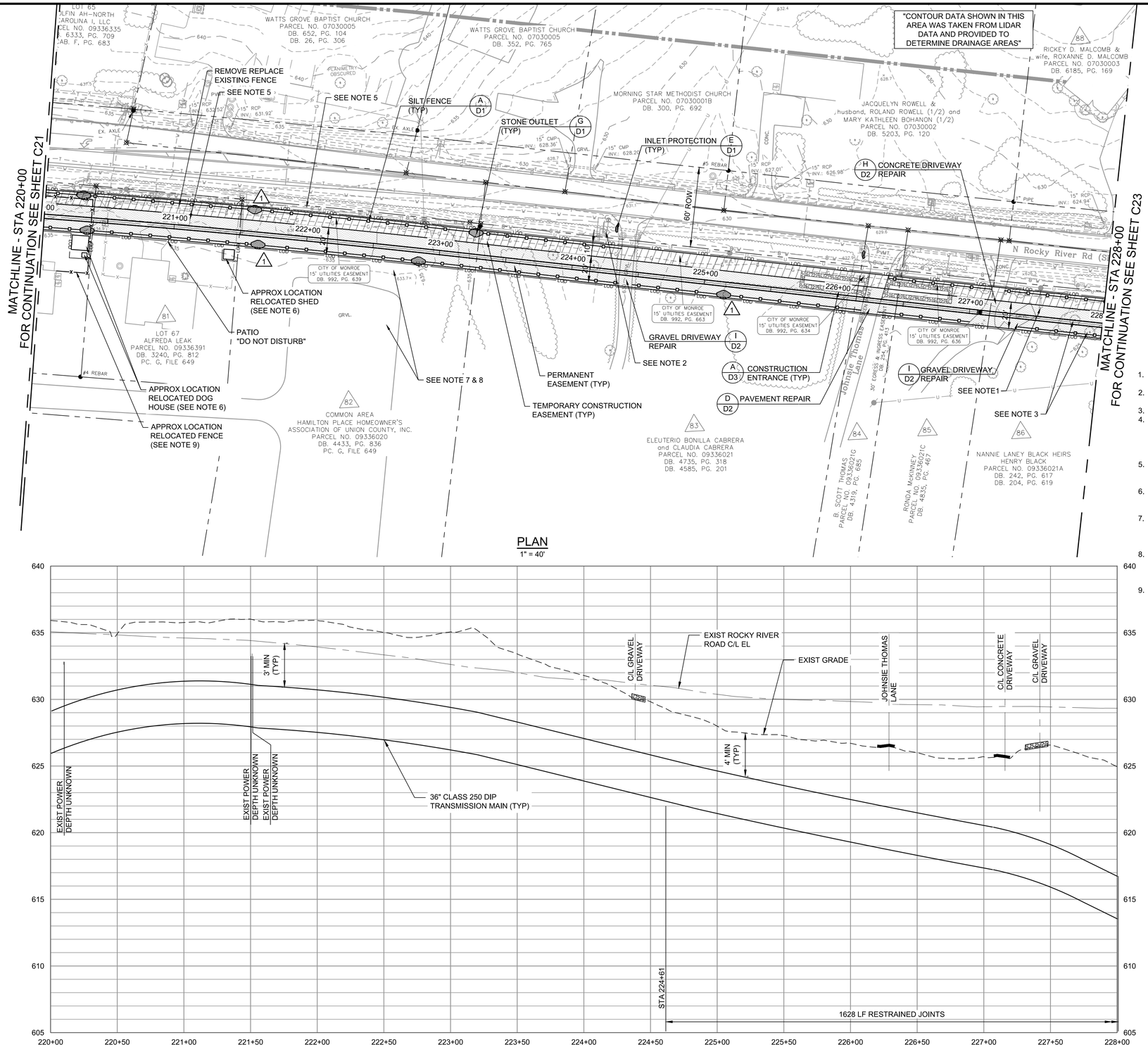
CIVIL
PLAN AND PROFILE
STA 210+00 TO STA 220+00

DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

C21
SHEET
25 OF 42



PLAN
1" = 40'

PROFILE

40' 20' 0 40' 80'
HORIZONTAL SCALE 1"=40'

4' 0 4' 8'
VERTICAL SCALE 1"=4'

NOTES

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
3. NOTE NOT INCLUDED IN SET
4. CONTRACTOR WILL REPLANT TREES OF LIKE-KIND THAT MAY BE REMOVED AS PART OF THE WORK. TREES WILL BE "STARTER TREES" IN SIZE RANGING IN HEIGHT OF 6FT-8FT. CALIPER MEASUREMENT OF TREE AT BASE SHALL NOT EXCEED 3-INCH DIAMETER. CONTRACTOR SHALL COORDINATE WITH OWNER/ENGINEER AS TO DESIRED LOCATION OF SAID TREES ON PARCEL.
5. EXISTING 8" WATERLINE SHOWN IS BASED ON GIS AND IS APPROXIMATE. CONTRACTOR SHALL FIELD LOCATE UTILITY AND COORDINATE WITH OWNER/ENGINEER PRIOR TO PERFORMING ANY WORK.
6. CONTRACTOR SHALL COORDINATE WITH PROPERTY OWNER PRIOR TO PERFORMING WORK TO RELOCATE EXISTING SHED AND DOG HOUSE TO OUTSIDE PROPOSED PERMANENT EASEMENT.
7. CONTRACTOR SHALL ATTEMPT TO LOCATE EXISTING IRRIGATION SYSTEM WITHIN THE PROPOSED EASEMENT AND PROTECT IRRIGATION SYSTEM FROM DAMAGE. THE EXISTING COMMUNITY SIGN SHALL NOT BE DISTURBED. ANY DAMAGE TO THE EXISTING SHALL BE REPAIRED TO LIKE OR NEWER CONDITION.
8. CONTRACTOR SHALL KEEP ALL MATERIALS AND EQUIPMENT WITHIN BOUNDARIES OF THE EASEMENT LIMITS AND SHALL NOT USE HAMILTON PLACE HOMEOWNER'S ASSOCIATION PROPERTY AS A STORAGE OR PARKING AREA WITHOUT WRITTEN CONSENT OF THE HOMEOWNER'S ASSOCIATION.
9. CONTRACTOR WILL REMOVE ANY PORTION OF THE WOODEN FENCE LOCAED WITHIN THE PROPOSED EASEMENTS AND UPON COMPLETION OF THE PROJECT, CONTRACTOR WILL REINSTALL THE FENCE BACK TO ITS ORIGINAL LOCATION AND EXTEND ADDITIONAL FENCING TO RELOCATED SHED TO PROVIDE COMPLETE ENCLOSURE OF FENCING FOR DOG. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY CONTAINMENT FENCING FOR DOG DURING CONSTRUCTION

BID SET

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE
1	MLT	WPS	SLT	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER WILLIAM P. SHOUSE
2021.02.25 23:47:23-05'00'

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Black & Veatch International Company
Black & Veatch Corporation
10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 220+00 TO STA 228+00

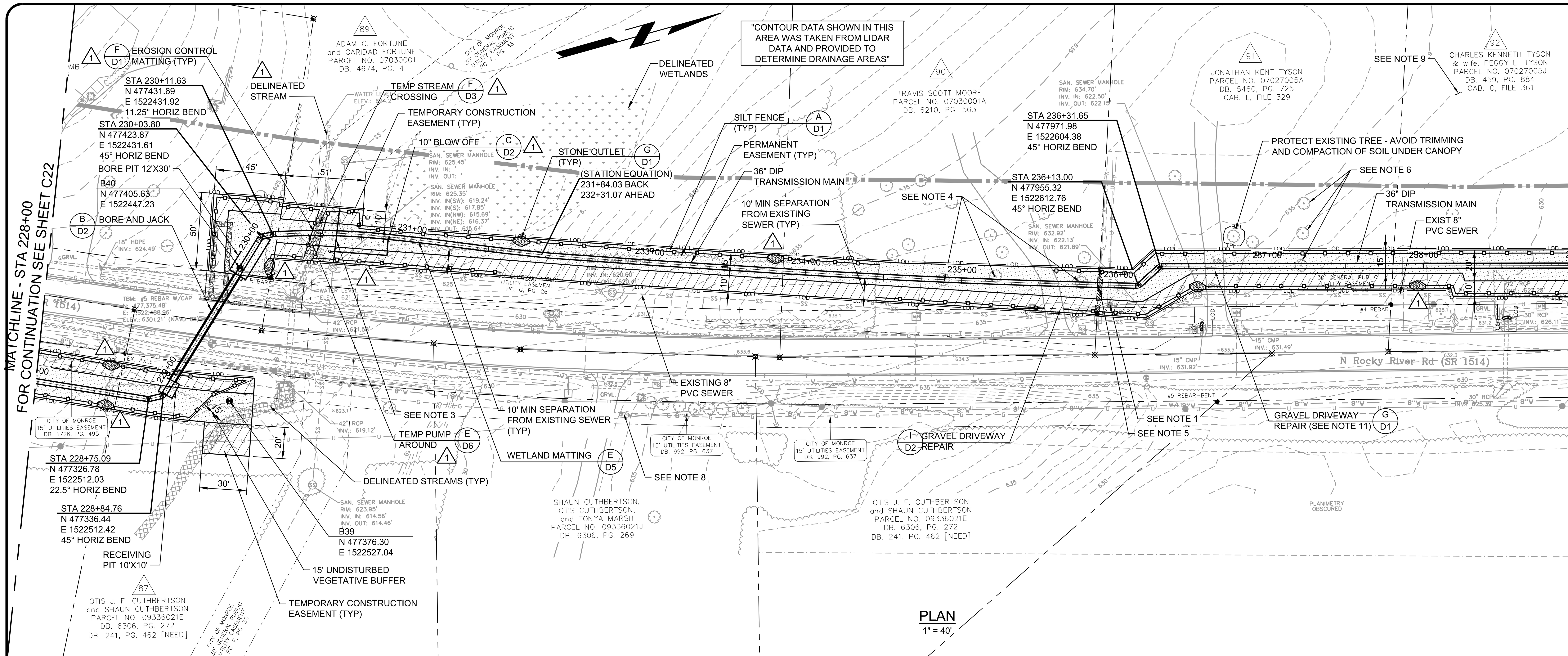
DESIGNED:	MLT, WPS
DETAILED:	KTH
CHECKED:	CES
APPROVED:	SLT
DATE:	JANUARY 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

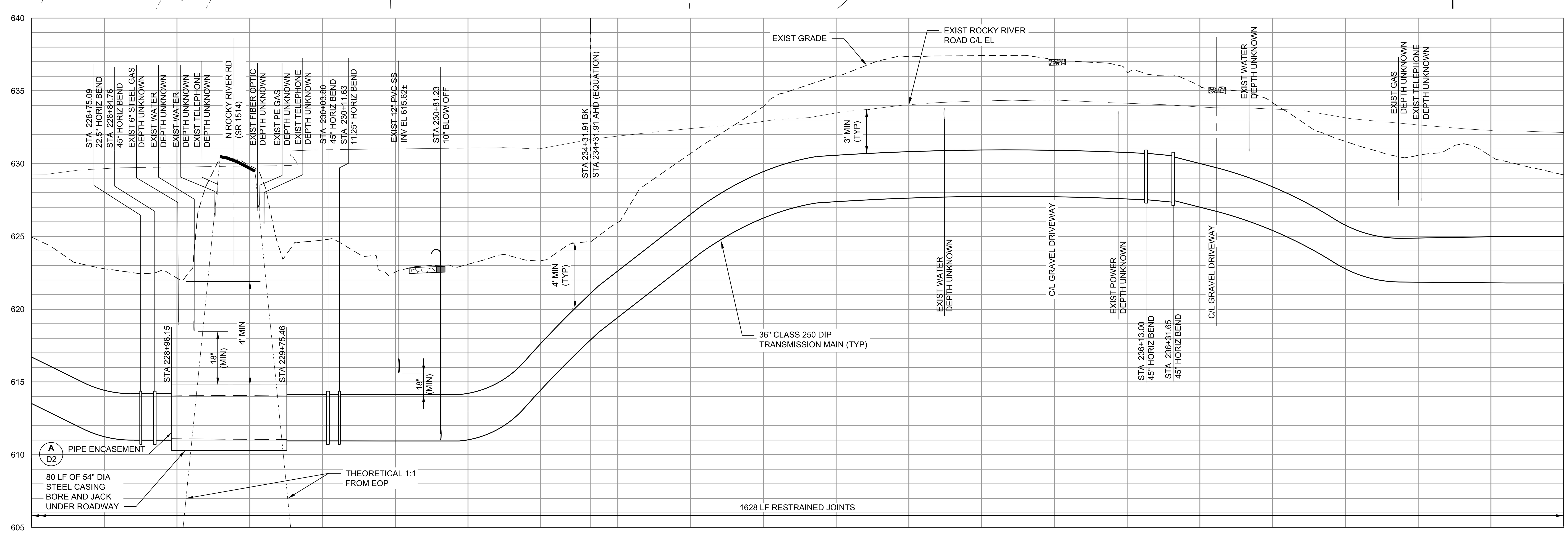
PROJECT NO.
186110

C22
SHEET
26 OF 42

FD7000_PW
D10000



PLAN
1" = 40'



PROFILE

HORIZONTAL SCALE 1"=40'

VERTICAL SCALE 1"=4'

NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL PROTECT EXISTING FIRE HYDRANT AND ANY DAMAGE TO THE HYDRANT SHALL BE REPAIRED OR REPLACED AT THE CONTRACTORS EXPENSE.
3. CONTRACTOR SHALL REMOVE AND REPLACE 35 LINEAR FEET OF EXISTING 12" PVC PROTECTO 401 LINED CLASS 350 DIP. CONNECT NEW SEWER TO EXISTING SEWER WITH A HYMAX COUPLING OR APPROVED EQUAL.
4. CONTRACTOR WILL REPLANT TREES OF LIKE-KIND THAT MAY BE REMOVED AS PART OF THE WORK. TREES WILL BE "STARTER TREES" IN SIZE RANGING IN HEIGHT OF 6FT-8FT. CALIPER MEASUREMENT OF TREE AT BASE SHALL NOT EXCEED 3-INCH DIAMETER. CONTRACTOR SHALL COORDINATE WITH OWNER/ENGINEER AS TO DESIRED LOCATION OF SAID TREES ON PARCEL.
5. CONTRACTOR SHALL CAREFULLY REMOVE AND REPLACE EXISTING SPLIT RAIL FENCE TO EXISTING LOCATION UPON COMPLETION OF WORK. ANY DAMAGE TO THE EXISTING FENCE SHALL BE REPAIRED TO LIKE OR NEW CONDITION.
6. CONTRACTOR SHALL REMOVE EXISTING CREPE MYRTLE TREE AND REPLACE WITH 2 CREPE MYRTLE TREES 15 GAL SIZE. CONTRACTOR SHALL RELOCATE TO LOCATION ON PARCEL AS DETERMINED BY PROPERTY OWNER.
7. CONTRACTOR SHALL PROTECT EXISTING DECIDUOUS TREE LOCATED ALONG THE EXISTING DRIVEWAY AND ABUTTING THE PROPOSED EASEMENTS FROM PHYSICAL/ROOT DAMAGE. WITHIN THE ONE YEAR PERIOD THE TREE SHALL BE INSPECTED TO DETERMINE IF THE TREE HAS DIED. IF THE TREE HAS DIED A REPLACEMENT TREE SHALL BE INSTALLED AND SHALL BE 6 TO 8 FEET IN HEIGHT AND NO GREATER THAN 3-INCH DIAMETER AT THE BASE. CONTRACTOR SHALL COORDINATE WITH CONTRACTOR SHALL FOLLOW TREE PROTECTION DETAIL AS SPECIFIED ON THE CONSTRICTION DRAWING DETAILS AND SPECIFICATIONS TO PROTECT THIS TREE.
8. EXISTING 8" WATERLINE SHOWN IS BASED OFF GIS AND IS APPROXIMATE. CONTRACTOR SHALL FIELD LOCATE UTILITY AND COORDINATE WITH OWNER/ENGINEER PRIOR TO PERFORMING ANY WORK.
9. CONTRACTOR SHALL STOCKPILE ALL TOPSOIL REMOVED DURING THE PIPELINE CONSTRUCTION AND ENSURE POSITIVE DRAINAGE AND NO PONDING ON PARCEL NO. 92.
10. CONTRACTOR SHALL CAREFULLY GRADE AND RESEED LAWN TO MATCH ON PARCEL NO. 91.
11. CONTRACTOR SHALL PROVIDE CONTINUOUS DRIVEWAY ACCESS AND PLATE IF NECESSARY DURING CONSTRUCTION. RESTORE AND GRADE DRIVEWAY TO PRE-EXISTING OR BETTER CONDITION ON PARCEL NO. 91.

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE
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NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER
2021.02.25 23:47:23-05'00'

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10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
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CIVIL
PLAN AND PROFILE
STA 228+00 TO STA 239+00

DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

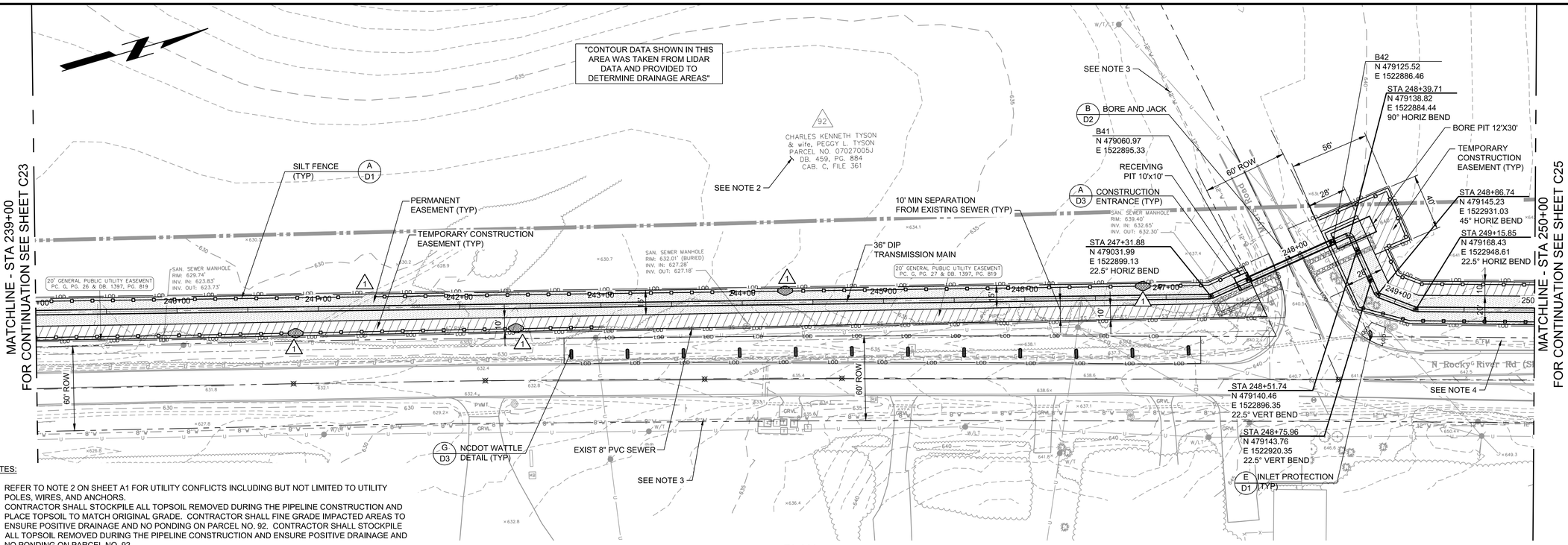
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 186110

C23
SHEET
27 OF 42

BID SET

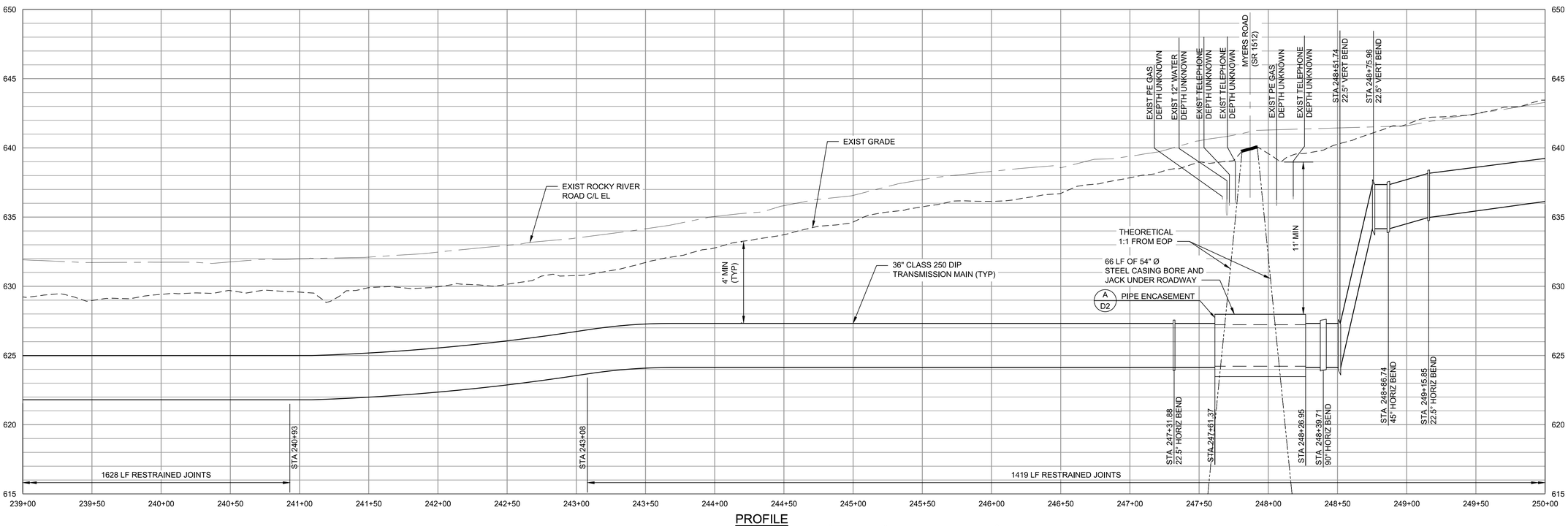
FD7000_PW
D10000



PLAN
1" = 40'

NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. CONTRACTOR SHALL STOCKPILE ALL TOPSOIL REMOVED DURING THE PIPELINE CONSTRUCTION AND PLACE TOPSOIL TO MATCH ORIGINAL GRADE. CONTRACTOR SHALL FINE GRADE IMPACTED AREAS TO ENSURE POSITIVE DRAINAGE AND NO PONDING ON PARCEL NO. 92. CONTRACTOR SHALL STOCKPILE ALL TOPSOIL REMOVED DURING THE PIPELINE CONSTRUCTION AND ENSURE POSITIVE DRAINAGE AND NO PONDING ON PARCEL NO. 92.
3. EXISTING 8" WATERLINE SHOWN IS BASED OFF GIS AND IS APPROXIMATE. CONTRACTOR SHALL FIELD LOCATE UTILITY AND COORDINATE WITH OWNER/ENGINEER PRIOR TO PERFORMING ANY WORK.
4. EXISTING 6" FORCE MAIN SHOWN IS BASED OFF GIS AND IS APPROXIMATE. CONTRACTOR SHALL FIELD LOCATE UTILITY AND COORDINATE WITH OWNER/ENGINEER PRIOR TO PERFORMING ANY WORK.



PROFILE

40' 20' 0 40' 80'
HORIZONTAL SCALE 1"=40'

4' 0 4' 8'
VERTICAL SCALE 1"=4'

BID SET

NO.	BY	CHK APP
1	MLT	WPS SLT

REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

DATE 02/12/2021

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER WILLIAM P. STOUT

2021.02.25 23:47:24-05'00'

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Building a sustainable world
10925 David Taylor Drive, Suite 280
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CIVIL
PLAN AND PROFILE
STA 239+00 TO STA 250+00

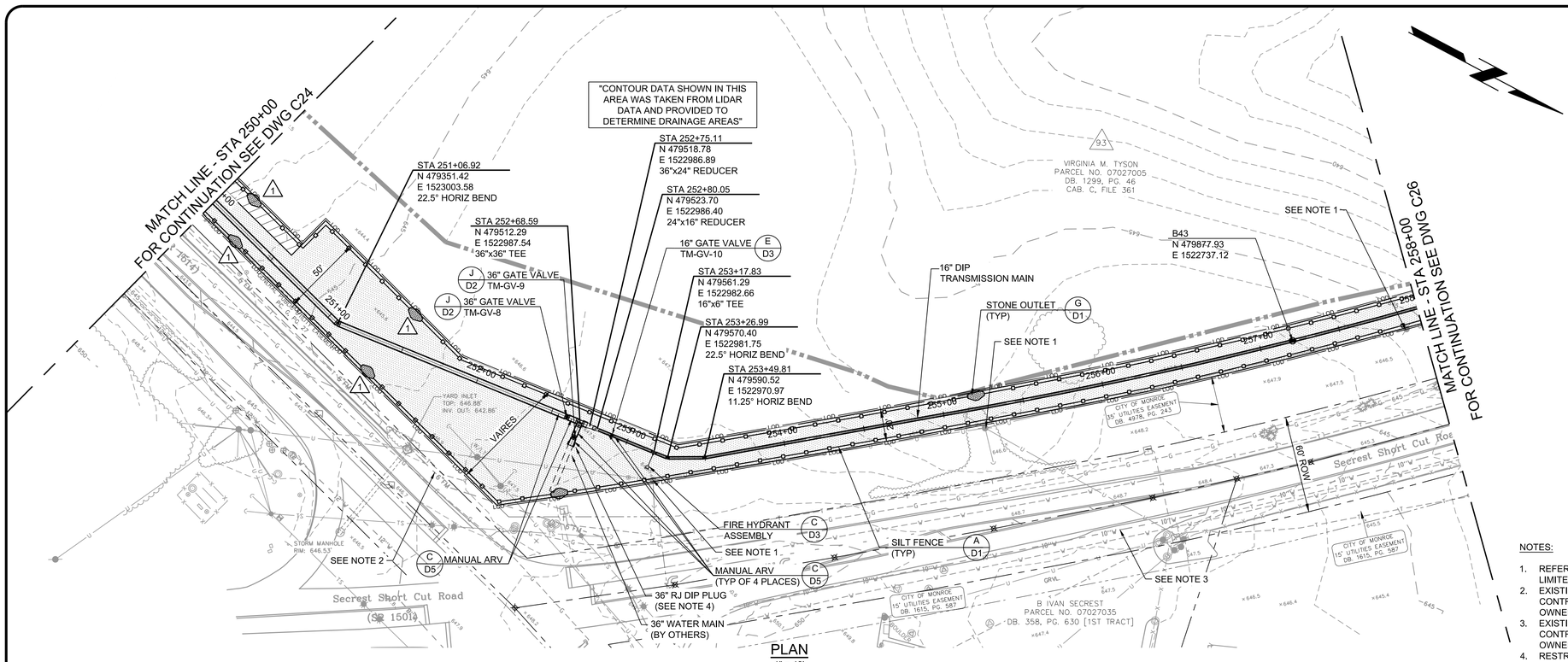
DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

C24
SHEET
28 OF 42

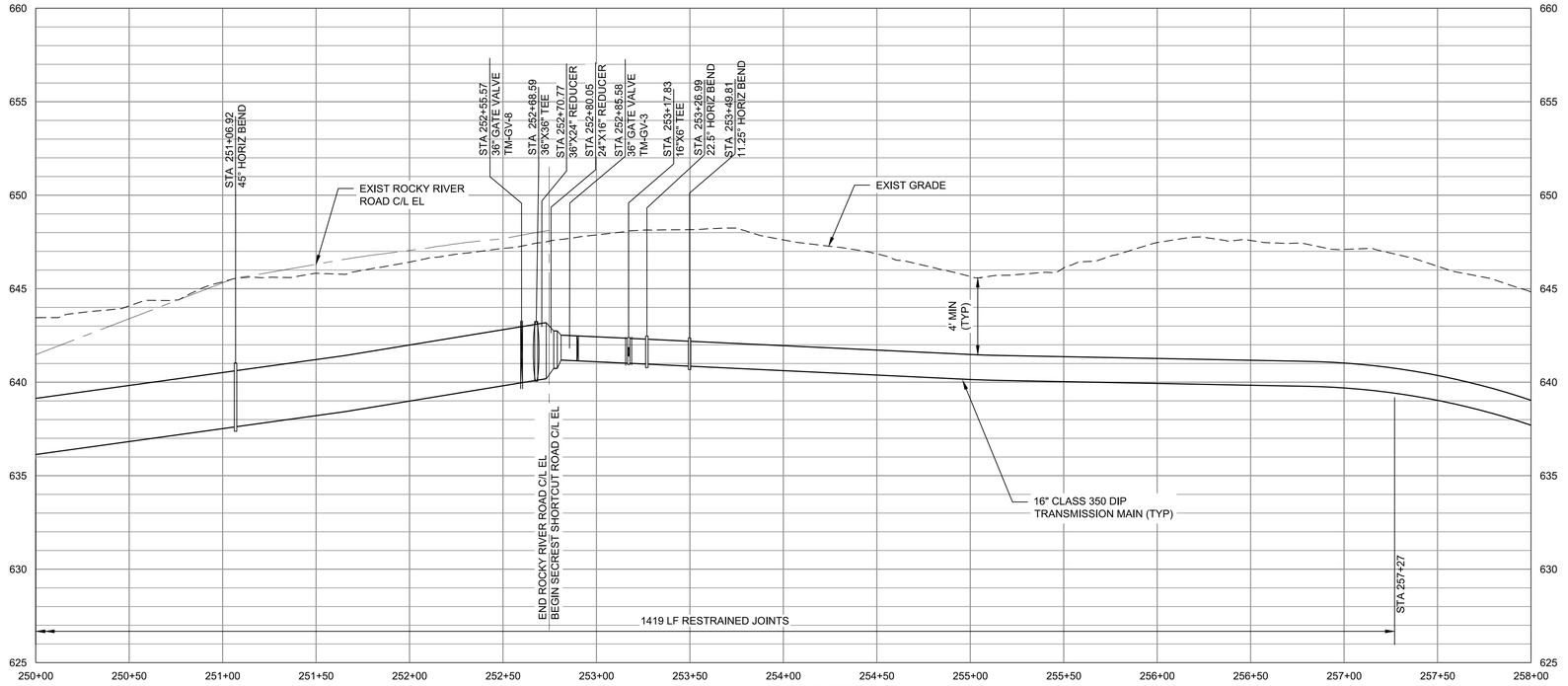
FD7000_PW
D10000



PLAN
1" = 40'

NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. EXISTING 6" FORCEMAIN SHOWN IS BASED OFF GIS AND IS APPROXIMATE. CONTRACTOR SHALL FIELD LOCATE UTILITY AND COORDINATE WITH OWNER/ENGINEER PRIOR TO PERFORMING ANY WORK.
3. EXISTING 10" WATERLINE SHOWN IS BASED OFF GIS AND IS APPROXIMATE. CONTRACTOR SHALL FIELD LOCATE UTILITY AND COORDINATE WITH OWNER/ENGINEER PRIOR TO PERFORMING ANY WORK.
4. RESTRAIN ALL PIPE FROM 36" PLUG TO 36"X36" TEE.



PROFILE

40' 20' 0 40' 80'
HORIZONTAL SCALE 1"=40'

4' 0 4' 8'
VERTICAL SCALE 1"=4'

NO.	BY	CHK APP
1	MLT	WPS, SLT

REVISIONS AND RECORD OF USE — ADDENDUM #1

02/12/2021 — DATE

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER WILLIAM P. STOUT
2021.02.25 23:47:25-05'00'

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Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 250+00 TO STA 258+00

DESIGNED:	MLT, WPS
DETAILED:	KTH
CHECKED:	CES
APPROVED:	SLT
DATE:	JANUARY 2021

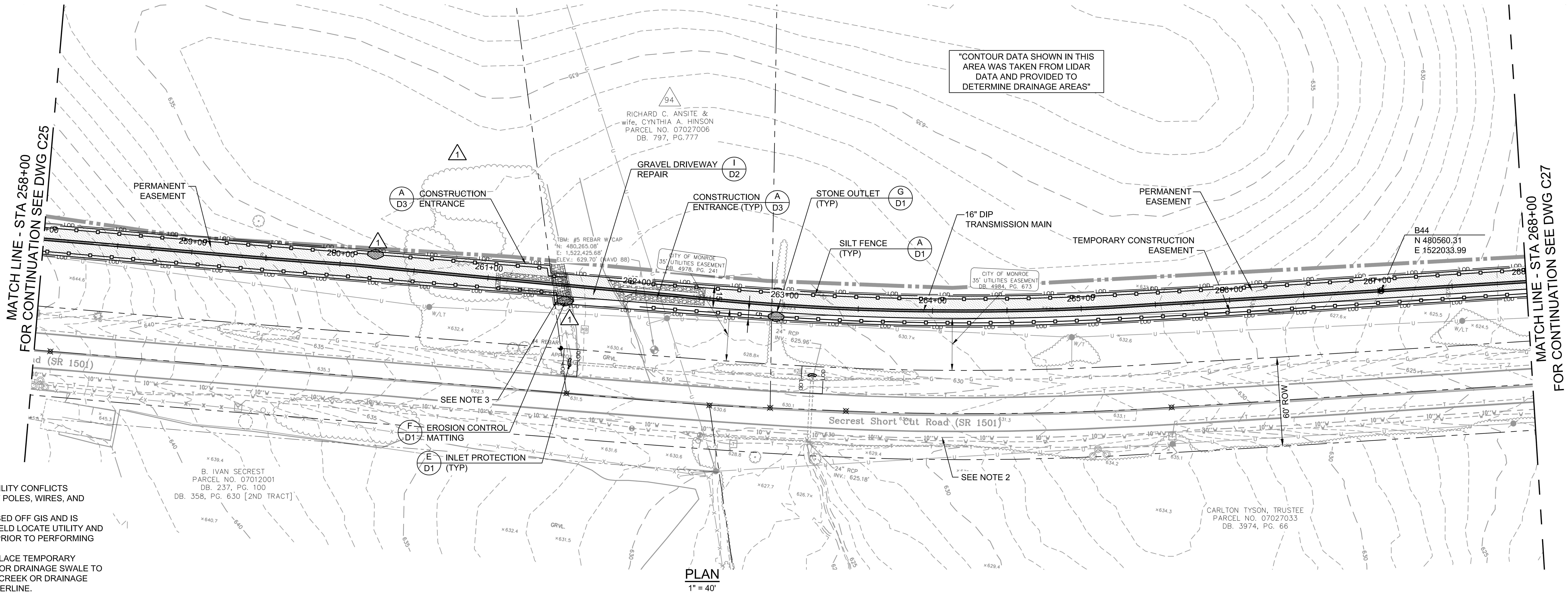
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

C25
SHEET
29 OF 42

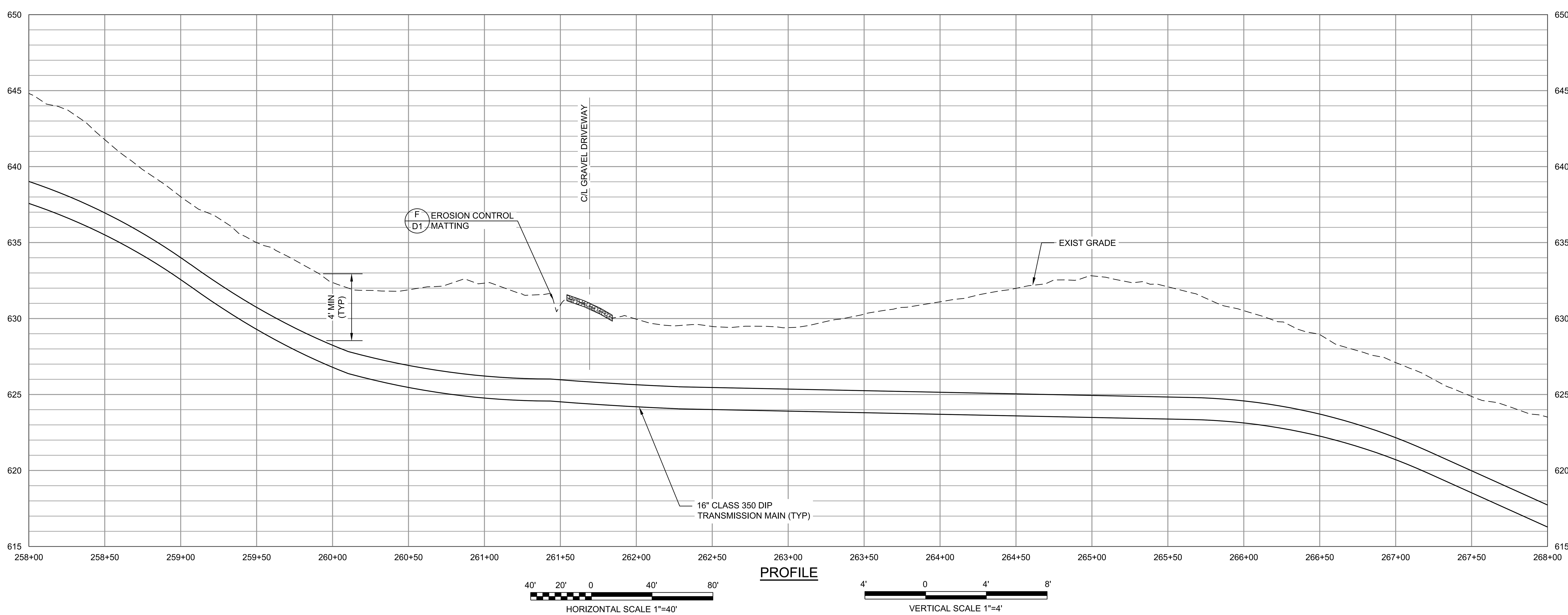
BID SET

FD7000_PW
D10000



NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. EXISTING 10" WATERLINE SHOWN IS BASED OFF GIS AND IS APPROXIMATE. CONTRACTOR SHALL FIELD LOCATE UTILITY AND COORDINATE WITH OWNER/ENGINEER PRIOR TO PERFORMING ANY WORK.
3. CONTRACTOR SHALL REMOVE AND REPLACE TEMPORARY SEDIMENT FENCE PARALLEL TO CREEK OR DRAINAGE SWALE TO PREVENT SEDIMENT RUNOFF INTO THE CREEK OR DRAINAGE SWALE WHEN CONSTRUCTING THE WATERLINE.



BID SET

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE
1	MLT	WPS	SLT	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER
2021.02.25 23:47:26-05'00'

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Business License No. F-0794
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Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 258+00 TO STA 268+00

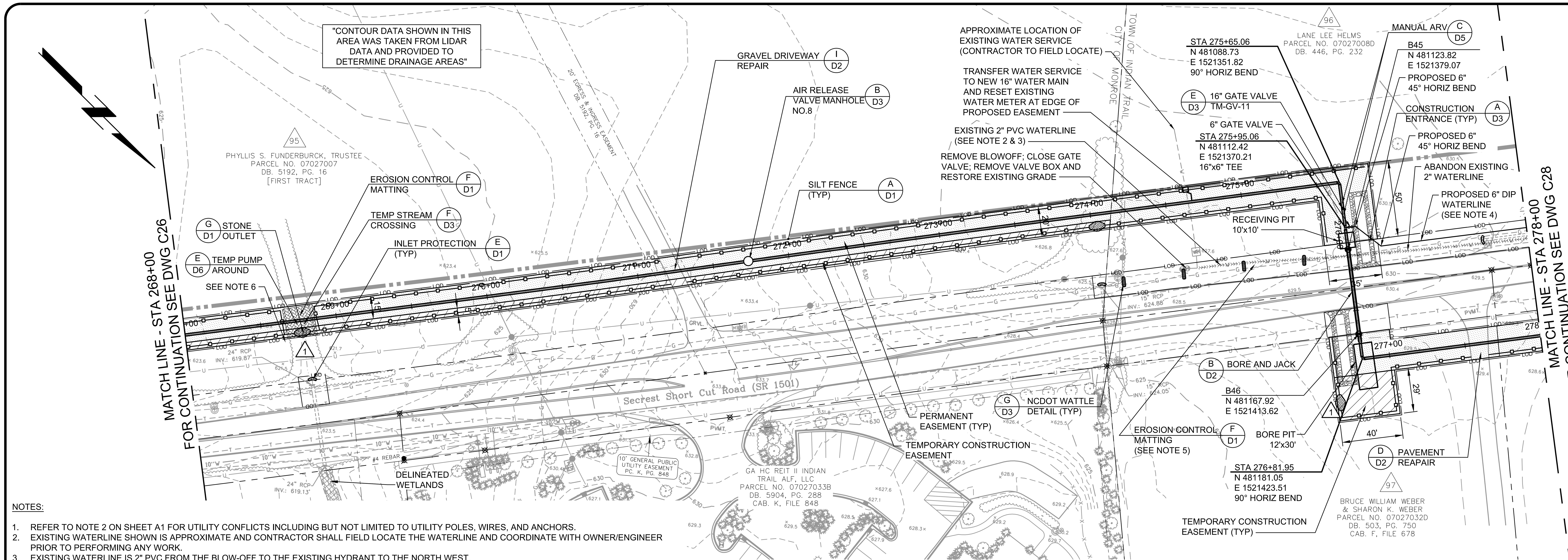
DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 186110

C26
SHEET 30 OF 42

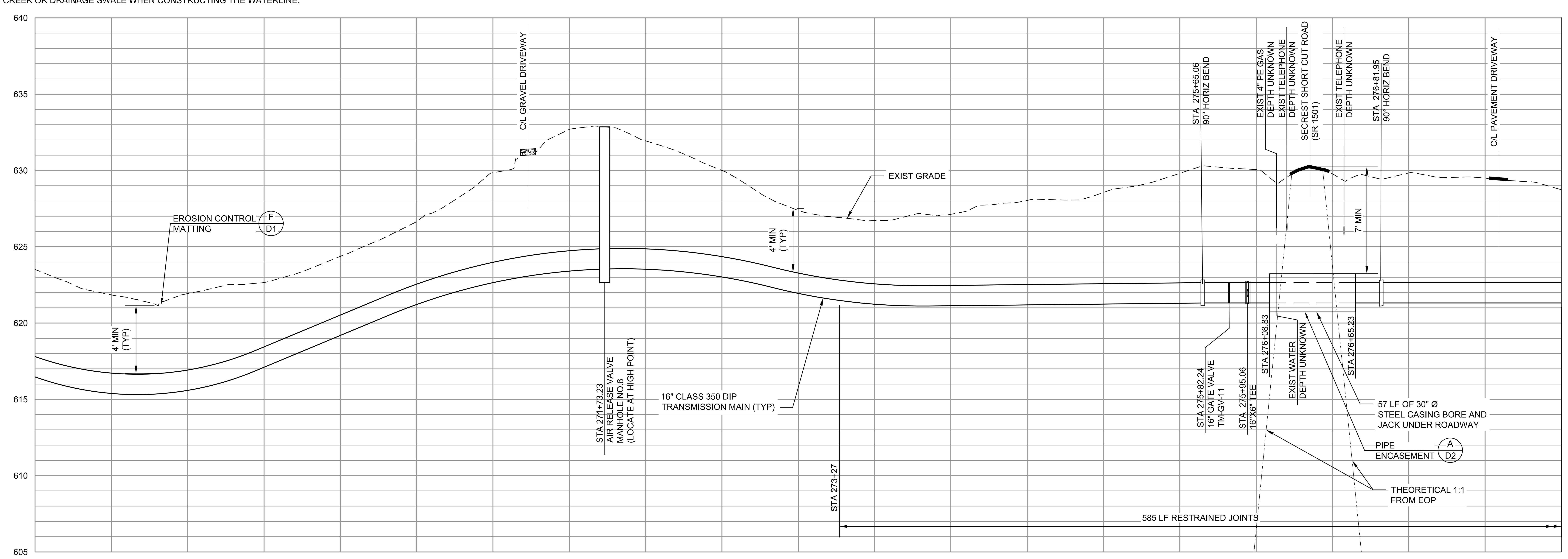
FD7000_PW
D10000



PLAN
1" = 40'

NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. EXISTING WATERLINE SHOWN IS APPROXIMATE AND CONTRACTOR SHALL FIELD LOCATE THE WATERLINE AND COORDINATE WITH OWNER/ENGINEER PRIOR TO PERFORMING ANY WORK.
3. EXISTING WATERLINE IS 2" PVC FROM THE BLOW-OFF TO THE EXISTING HYDRANT TO THE NORTH WEST.
4. ALL 6" DIP SHALL BE RESTRAINED FROM 16"X6" TEE TO PLUG. PROVIDE A MINIMUM 3' OF COVER OVER THE PROPOSED PIPE AT EXISTING GRADE. CONTRACTOR SHALL INSTALL A THRUST BLOCK ON 16"X6" TEE PER UNION COUNTY STANDARD DETAILS AND SPECIFICATIONS (SEE DETAIL SHEETS).
5. PROVIDE EROSION CONTROL MATTING FOR THE FULL WIDTH OF DISTURBED AREA WITHIN THE RIGHT OF WAY DUE TO THE INSTALLATION OF THE NEW 6" WATER LINE AND THE ABANDONMENT OF THE EXISTING WATER LINE.
6. CONTRACTOR SHALL REMOVE AND REPLACE TEMPORARY SEDIMENT FENCE PARALLEL TO CREEK OR DRAINAGE SWALE TO PREVENT SEDIMENT RUNOFF INTO THE CREEK OR DRAINAGE SWALE WHEN CONSTRUCTING THE WATERLINE.



PROFILE

HORIZONTAL SCALE 1"=40' (40' 20' 0 40' 80')

VERTICAL SCALE 1"=4' (4' 0 4' 8')

BID SET

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE
1	MLT	WPS	SLT	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER
2021.02.25 23:47:27-05'00'

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Charlotte, North Carolina 28262

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853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 268+00 TO STA 278+00

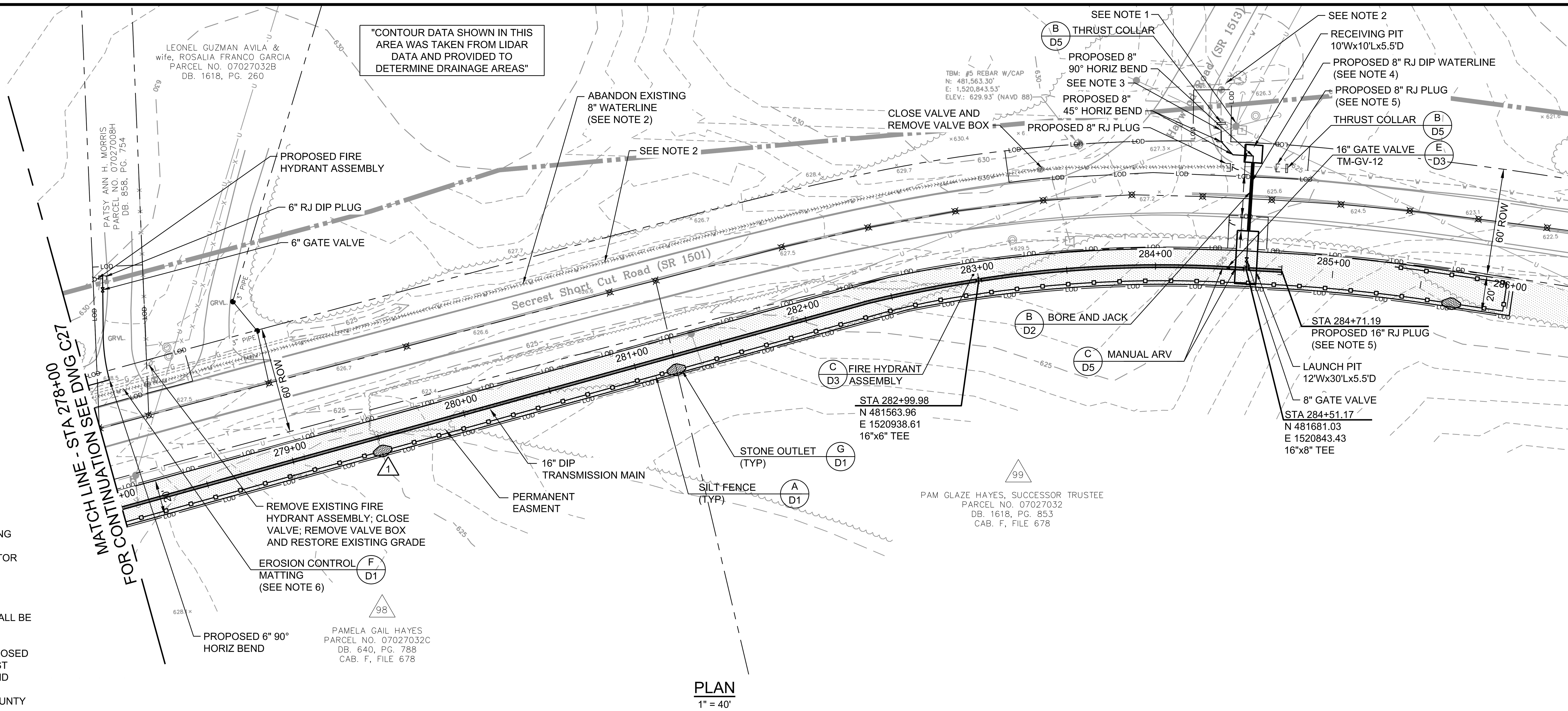
DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 186110

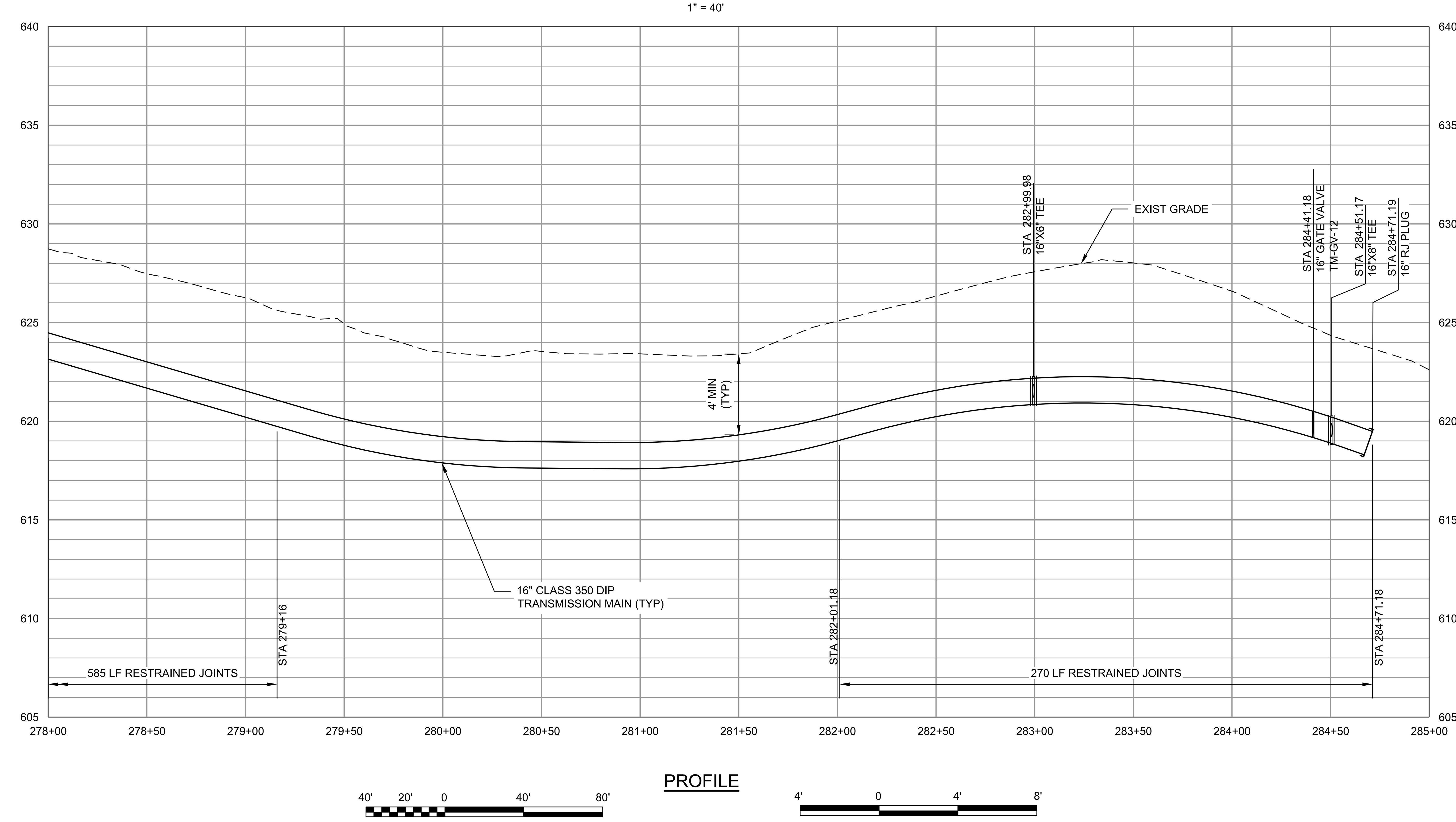
C27
SHEET 31 OF 42

FD7000_PW
D10000



NOTES:

1. REFER TO NOTE 2 ON SHEET A1 FOR UTILITY CONFLICTS INCLUDING BUT NOT LIMITED TO UTILITY POLES, WIRES, AND ANCHORS.
2. EXISTING 8" WATERLINE SHOWN IS APPROXIMATE AND CONTRACTOR SHALL FIELD LOCATE THE WATERLINE AND COORDINATE WITH OWNER/ENGINEER PRIOR TO PERFORMING ANY WORK.
3. CONTRACTOR SHALL CONNECT TO EXISTING 8" WATERLINE. CONTRACTOR SHALL FIELD VERIFY DEPTH AND LOCATION OF CONNECTION PRIOR TO MAKING CONNECTION. CONNECTION SHALL BE RESTRAINED.
4. ALL 8" DIP SHALL BE RESTRAINED FROM 16"X8" TEE TO EXISTING CONNECTION. PROVIDE A MINIMUM 3' OF COVER OVER THE PROPOSED PIPE AT EXISTING GRADE. CONTRACTOR SHALL INSTALL A THRUST BLOCK ON 16"X8" TEE PER UNION COUNTY STANDARD DETAILS AND SPECIFICATIONS (SEE DETAIL SHEETS).
5. PROPOSED RJ PLUGS SHALL BE IN ACCORDANCE WITH UNION COUNTY STD DETAIL 2A.
6. PROVIDE EROSION CONTROL MATTING FOR THE FULL WIDTH OF DISTURBED AREA WITHIN THE RIGHT OF WAY DUE TO THE INSTALLATION OF THE NEW 6" AND 8" WATER LINES AND THE ABANDONMENT OF THE EXISTING WATER LINE.
7. CONTRACTOR SHALL COORDINATE WITH ENGINEER/OWNER TO CLOSE VALVES ON EITHER SIDE OF CONNECTION TO REMOVE PRESSURE ON EXISTING WATER MAIN PRIOR TO MAKING CONNECTIONS.



BID SET

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE
1	MLT	WPS	SLT	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER
2021.02.25 23:47:28-05'00'

BLACK & VEATCH
Black & Veatch International Company
Business License No. F-0794
10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

CIVIL
PLAN AND PROFILE
STA 280+00 TO STA 284+71.19

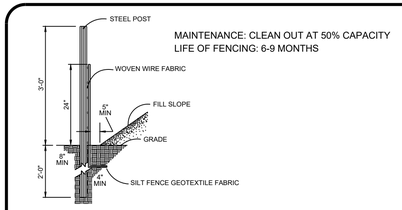
DESIGNED: MLT, WPS
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

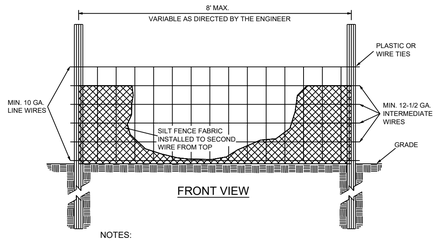
PROJECT NO.
186110

C28
SHEET
32 OF 42

FD7000_PW
D10000



SIDE VIEW

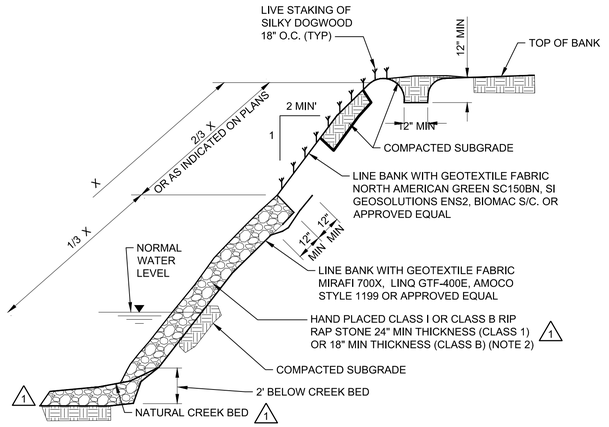


FRONT VIEW

NOTES:

1. FLOW SHALL NOT RUN PARALLEL WITH THE FENCE.
2. END OF SILT FENCE NEEDS TO BE TURNED UPHILL.
3. SEE NC DEQ SEDIMENT DESIGN MANUAL FOR CONSTRUCTION SPECIFICATIONS, WHERE PRACTICE APPLIES AND PLANNING CONSIDERATIONS.
4. SILT FENCE SHOULD NOT BE USED ALONE BELOW GRADED SLOPES GREATER THAN 10' IN HEIGHT.

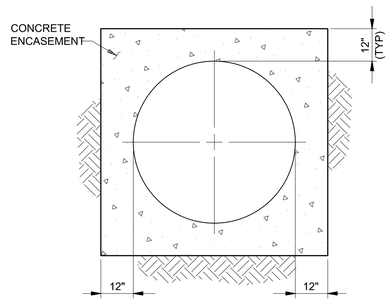
SILT FENCE (A)
NO SCALE



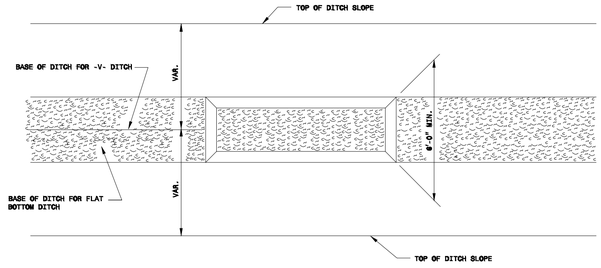
NOTES:

1. "X" IS DEFINED AS THE DISTANCE FROM THE NORMAL WATER LEVEL TO THE TOP OF BANK. CONTRACTOR SHALL DETERMINE THIS DISTANCE.
2. CLASS B RIPRAP SHALL BE INSTALLED FOR THE CROSSINGS ON PLAN SHEETS C6, C10, C11, C14, AND C16. CLASS 1 RIPRAP SHALL BE INSTALLED FOR THE CROSSINGS ON PLAN SHEETS C19 AND C20.
3. WHERE POSSIBLE PLACE STREAM COBBLE BACK IN STREAM BED.

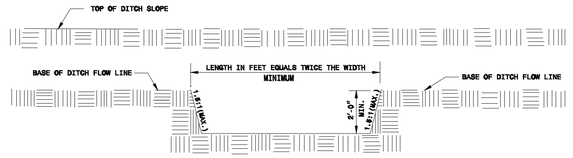
RIP RAP AND STREAM BANK RESTORATION (TYP BOTH SIDES) (B)
NTS



CONCRETE ENCASEMENT (H)
NO SCALE

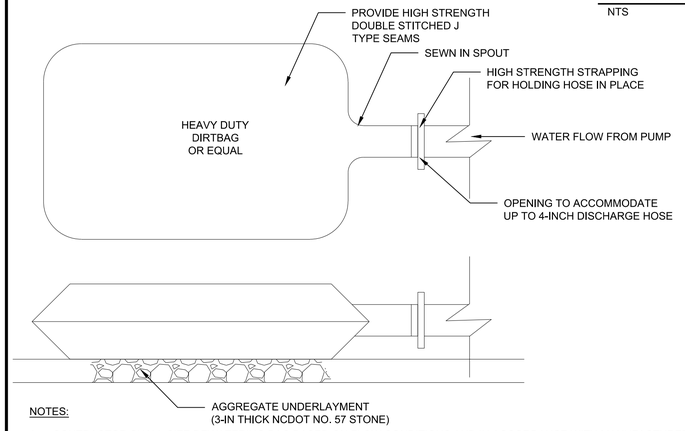


PLAN



ELEVATION

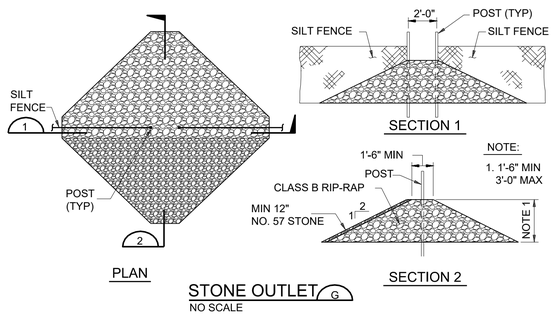
SILT BASIN (J)
NO SCALE



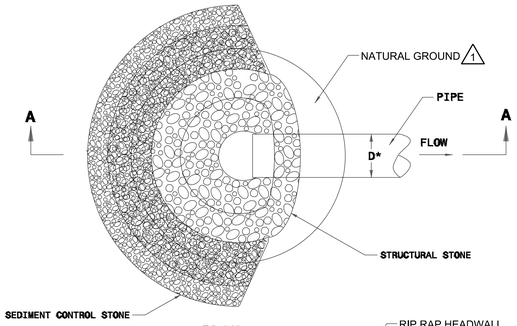
NOTES:

1. CONTRACTOR SHALL SIZE DEWATERING BAG BASED ON FLOW CONDITIONS AND IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
2. FLOW FROM THE DEWATERING BAG(S) SHALL NOT HAVE A TURBIDITY GREATER THAN 50 NTU.
3. THE DEWATERING BAG SHALL BE MADE OF NON-WOVEN GEOTEXTILE WITH A MIN. SURFACE AREA OF 225 SQUARE FEET PER SIDE.
4. ALL STRUCTURAL SEAMS SHALL BE SEWN WITH A DOUBLE STITCH USING A DOUBLE NEEDLE MACHINE HIGH STRENGTH THREAD.
5. THE SEAM STRENGTH SHALL WITHSTAND 100 LB/IN USING ASTM D-4884 TEST METHOD.
6. THE GEOTEXTILE FABRIC SHALL BE A 10 OZ NON-WOVEN FABRIC.
7. DISCHARGE FROM THE DEWATERING BAG SHALL BE DIRECTED SUCH THAT PRE-DISTURBANCE HYDROLOGY IS NOT CHANGED.
8. SECURE DEWATERING BAG IN PLACE OUTSIDE OF STREAM CHANNEL WITH STAKES AND ROPE TO AVOID ROLLING.

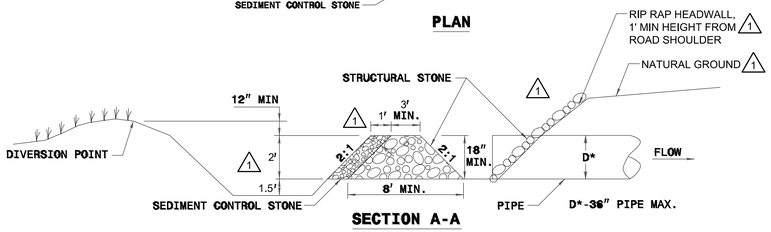
DEWATERING BAG DETAIL (D)
NO SCALE



STONE OUTLET (G)
NO SCALE



PLAN

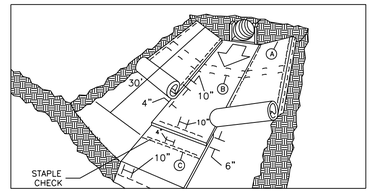


SECTION A-A

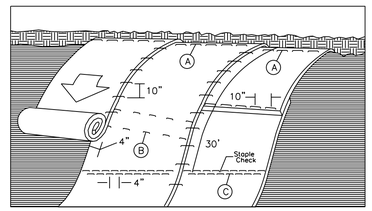
NOTES:

1. USE CLASS B EROSION CONTROL STONE FOR STRUCTURAL STONE.
2. USE NO. 5 OR NO.57 STONE FOR SEDIMENT CONTROL STONE.
3. CONSTRUCT TOP OF BERM A MINIMUM OF ONE FOOT BELOW THE SHOULDER OF DIVERSION POINT.
4. PROVIDE A TOTAL SEDIMENT TRAP VOLUME OF 3600 ± CUBIC FEET PER ACRE OF DISTURBED AREA. SOME OF THE REQUIRED VOLUME MAY BE PROVIDED BY UP OR DOWNSTREAM CONTROLS.
5. DO NOT INSTALL WHEN DEVICE WILL BE WITHIN 30 FEET OF VEHICULAR TRAVEL LANE.

INLET PROTECTION (E)
NO SCALE



MATTING IN DITCHES



MATTING IN SLOPES

Staple Check Pattern

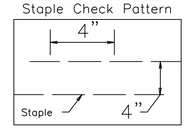


DIAGRAM (C)

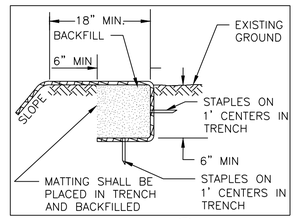


DIAGRAM (A)

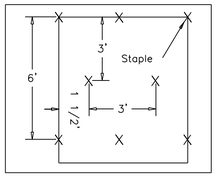


DIAGRAM (B)

NOTES:

THIS DETAIL APPLIES TO STRAW, EXCELSIOR, AND PERMANENT SOIL REINFORCEMENT MAT (PSRM) INSTALLATION.

STAPLES SHALL BE NO. 11 GAUGE STEEL WIRE FORMED INTO A "U" SHAPE WITH A MINIMUM THROAT WIDTH OF 1 INCH AND NOT LESS THAN 6 INCHES IN LENGTH.

EROSION CONTROL MATTING SHALL BE NORTH AMERICAN GREEN BIONET SC150BN WITH SHEER STRESS OF 2.1PSF OR APPROVED EQUAL.

EROSION CONTROL MATTING (F)
NO SCALE

NO.	BY	CHK	APP
1	MLT	WPS	SLT

02/12/2021 — DATE — REVISED FOR PERMITTING COMMENTS - ADDENDUM #1 — REVISIONS AND RECORD OF USE

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER WILLIAM P. STOCKTON

2021.02.25 23:47:29-05'00'

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Black & Veatch International Company
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10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

EROSION CONTROL DETAILS

DESIGNED:	MLT, WPS
DETAILED:	KTH
CHECKED:	CES
APPROVED:	SLT
DATE:	JANUARY 2021

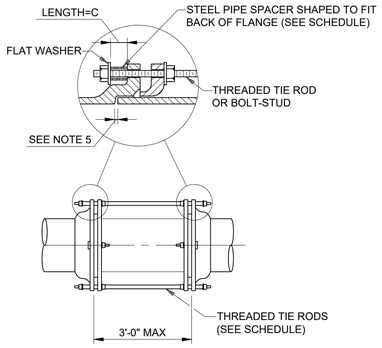
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
186110

D1
SHEET
35 OF 42

BID SET

FD9000A
D10000
PLOTTED: 2/25/2021 9:35 AM FILE: C:\pw_working\cngpw\d13062381D00.dwg



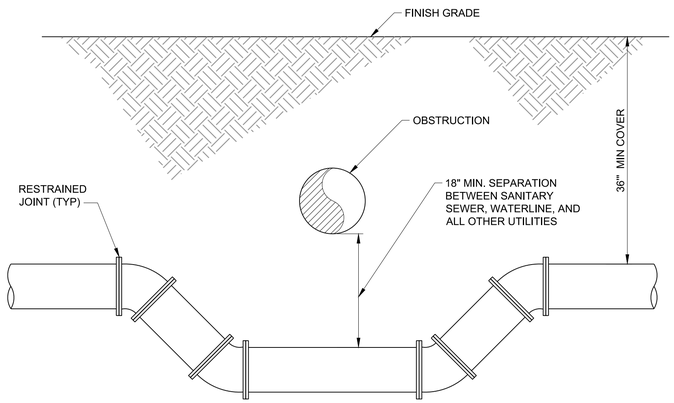
NOTES:

1. PRESSURE SHALL BE THE PRESSURE AT WHICH THE PIPE IS HYDROSTATICALLY TESTED, OR IF THERE IS NO HYDROSTATIC FIELD TEST, IT SHALL BE THE SPECIFIED SHOP TEST PRESSURE.
2. UNLESS OTHERWISE INDICATED, TIE RODS SHALL BE SPACED UNIFORMLY AROUND THE PIPE, BEGINNING WITH THE FIRST TWO AT THE HORIZONTAL CENTERLINE OF THE PIPE, SUBJECT TO THE APPROVAL OF THE ENGINEER.
3. EXCEPT WHERE TIE RODS ARE REQUIRED, BOLTS FOR FOLLOWER RINGS SHALL BE TEE HEAD BOLTS.
4. FOR PIPING FLEXIBILITY, PROVIDE GAP LARGE ENOUGH TO FACILITATE PIPE ASSEMBLY AND DISASSEMBLY AT ASSOCIATED FLANGED PIPE JOINTS.

MECHANICAL TIE ROD SCHEDULE

PIPE SIZE (INCHES)	MINIMUM PRESSURE (PSI) (NOTE 1)	TIE RODS		PIPE SPACERS		
		NO. OF RODS (NOTE 2)	DIA OF RODS (INCHES)	DIA OF SPACERS (INCHES)	LENGTH=C (INCHES)	PIPE SCHEDULE
16	150 OR LESS 250 350	4 6 8	3/4	1	3 1/2	80
36	100 OR LESS 150 200 250	8 12 18 22	1	1 1/4	4	80

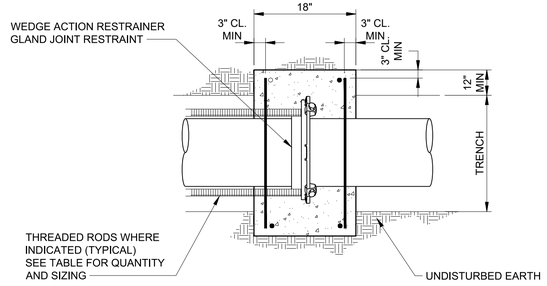
DIP MECHANICAL JOINT COUPLING WITH TIE RODS (A)
NO SCALE



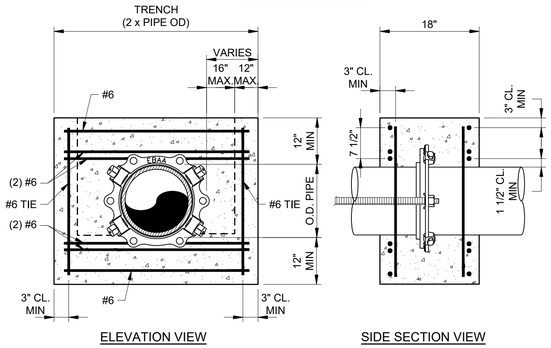
STANDARD WATER AND SEWER SEPARATION REQUIREMENTS:

1. LATERAL SEPARATION OF SEWERS AND WATER MAINS SHALL BE LAID AT LEAST 10 FEET LATERALLY FROM EXISTING OR PROPOSED SEWERS, UNLESS LOCAL CONDITIONS OR BARRIERS PREVENT A 10-FOOT LATERAL SEPARATION - IN WHICH CASE:
   A. THE WATER MAIN IS LAID IN A SEPARATE TRENCH, WITH HE ELEVATION OF THE BOTTOM OF THE WATER MAIN AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER; OR
   B. THE WATER MAIN IS LAID IN THE SAME TRENCH AS THE SEWER WITH THE WATER MAIN LOCATED AT ONE SIDE ON A BENCH OF UNDISTURBED EARTH, AND WITH THE ELEVATION OF THE BOTTOM OF THE WATER MAIN AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER.
2. CROSSING A WATER MAIN OVER A SEWER. WHENEVER IT IS NECESSARY FOR A WATER MAIN TO CROSS OVER A SEWER, THE WATER MAIN SHALL BE LAID AT SUCH AN ELEVATION THAT THE BOTTOM OF THE WATER MAIN IS AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER, UNLESS LOCAL CONDITIONS OR BARRIERS PREVENT AN 18 INCH VERTICAL SEPARATION - IN WHICH CASE BOTH THE WATER MAIN AND SEWER SHALL BE CONSTRUCTED OF FERROUS MATERIALS AND WITH JOINTS THAT ARE EQUIVALENT TO WATER MAIN STANDARDS FOR A DISTANCE OF 10 FEET ON EACH SIDE OF THE POINT OF CROSSING.
3. CROSSING A WATER MAIN UNDER A SEWER. WHENEVER IT IS NECESSARY FOR A WATER MAIN TO CROSS UNDER A SEWER, BOTH THE WATER MAIN AND THE SEWER SHALL BE CONSTRUCTED OF FERROUS MATERIALS AND WITH JOINTS EQUIVALENT TO WATER MAIN STANDARDS FOR A DISTANCE OF 10 FEET ON EACH SIDE OF THE POINT OF CROSSING. A SECTION OF WATER MAIN PIPE SHALL BE CENTERED AT THE POINT OF CROSSING.
4. A VERTICAL DISTANCE OF 18 INCHES SHALL BE MAINTAINED FOR ALL OTHER UTILITY CROSSINGS.

UTILITY CROSSING (D)
NO SCALE



TOP SECTION VIEW



ELEVATION VIEW SIDE SECTION VIEW

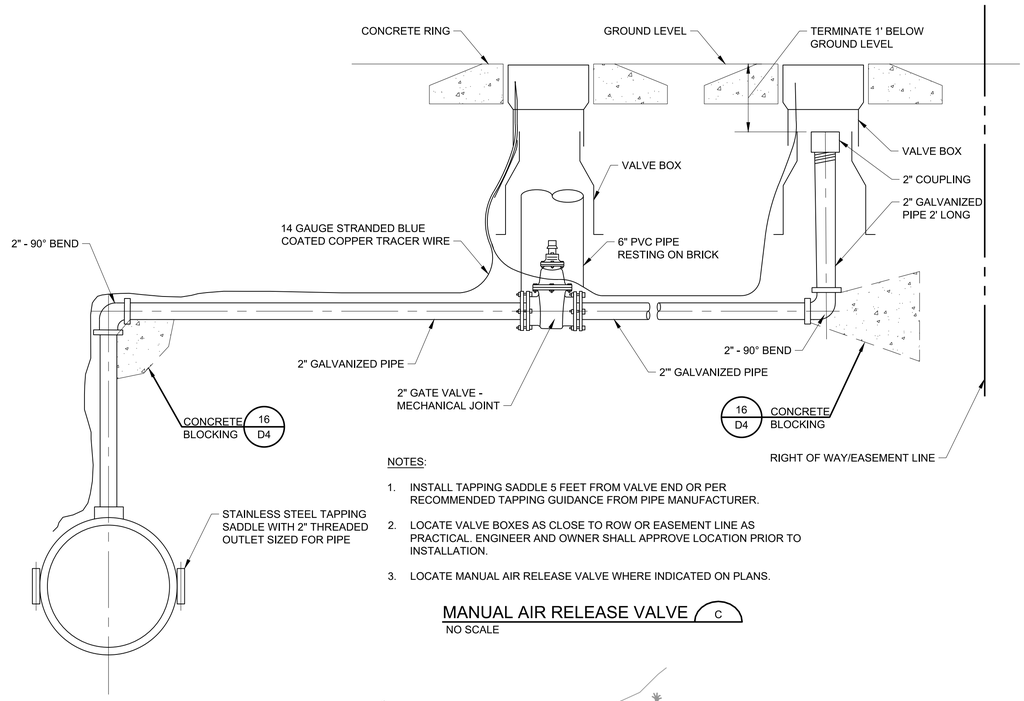
NOTES:

1. CONCRETE SHALL 3000 P.S.I.
2. REINFORCING BARS SHALL BE DEFORMED BARS, AND TIED TOGETHER.
3. BACKFILL AND COMPACT IN 6" LAYERS.
4. PLACE THRUST COLLAR ON ONE FULL JOINT OF PIPE.
5. PLACE WEDGE ACTION RESTRAINER GLAND JOINT RESTRAINT 4 FEET FROM PLUG AND END OF PIPE.
6. 6. ASTM A307 CADIUM COATED TIE RODS.

TIE ROD ANCHORS DATUM

PIPE SIZE (INCHES)	ROD DIAMETER	NO. OF A307 RODS REQUIRED
8	3/4"	4
16	3/4"	12

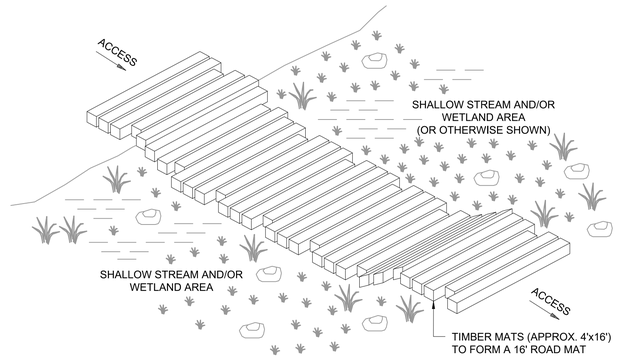
THRUST COLLAR (B)
NO SCALE



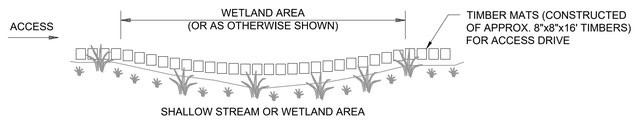
NOTES:

1. INSTALL TAPPING SADDLE 5 FEET FROM VALVE END OR PER RECOMMENDED TAPPING GUIDANCE FROM PIPE MANUFACTURER.
2. LOCATE VALVE BOXES AS CLOSE TO ROW OR EASEMENT LINE AS PRACTICAL. ENGINEER AND OWNER SHALL APPROVE LOCATION PRIOR TO INSTALLATION.
3. LOCATE MANUAL AIR RELEASE VALVE WHERE INDICATED ON PLANS.

MANUAL AIR RELEASE VALVE (C)
NO SCALE

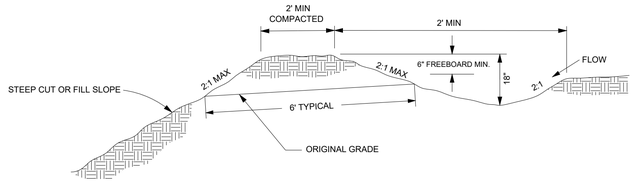


PERSPECTIVE VIEW



SECTION VIEW

WETLAND MATTING (E)
NTS



CROSS SECTION

NOTES:

1. SLOPE TEMP DIVERSION DITCH TO TEMP CULVERT SHOWN ON PLANS.
2. STABILIZE TEMP DIVERSION DITCH WITH EROSION CONTROL MATTING.

TEMPORARY DIVERSION DITCH (F) 1
NO SCALE

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE
1	MLT	WPS	SLT	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER WILLIAM P. SMITH
2021.02.25 23:47:31-05'00'

BLACK & VEATCH
Black & Veatch International Company
Building a World of Difference
10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

MISCELLANEOUS DETAILS

DESIGNED: MLT
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 186110

D5
SHEET 39 OF 42

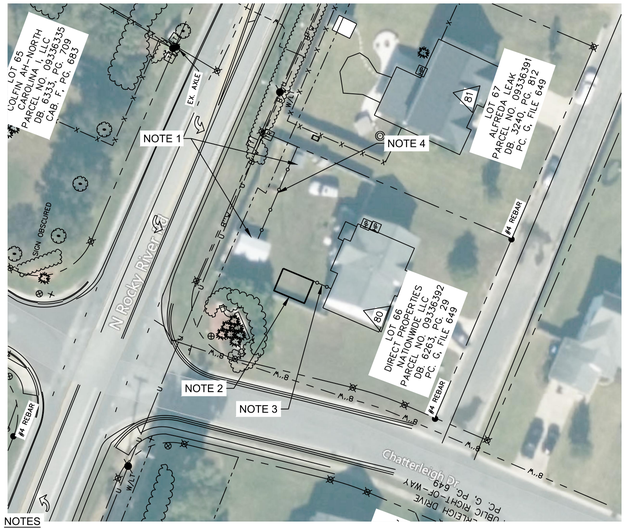
BID SET

FD9000A
D10000
PLOTTED: 2/24/2021 1:07 PM FILE: C:\pw_working\cngpw\d13062381D00.dwg

RESTORATIVE PLANTING SCHEDULE		
NO.	SIZE	COMMON NAME
15	15 GAL	MAGNOLIA " BETTY"
11	5 GAL	CRYPTOMERIA JAPONICA
37	5 GAL	NELLY R STEVENS HOLLY

LOT # 36 PLANTING SCHEDULE (A)

NO SCALE

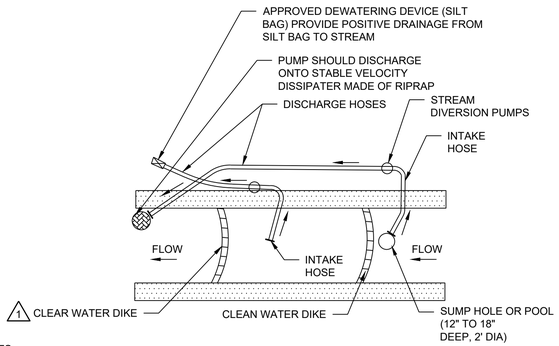


NOTES

1. TEMPORARILY RELOCATE EXISTING BUILDINGS AND RESET AS SHOWN.
2. TEMPORARY RELOCATION SITE FOR LARGER BUILDING.
3. INSTALL TEMPORARY DOG FENCING AT THIS LOCATION.
4. INSTALL PERMANENT 6 FT DOG-RUN FENCING WITH GATE AT THIS LOCATION.
5. REMOVE AND RESET WOOD PERIMETER FENCE IN EXISTING LOCATION. REPLACE WITH NEW MATERIAL IF DAMAGE.

LOT # 80 RELOCATION PLAN (D)

1"=40'



NOTES:

1. SANDBAG DIKES SHALL BE SITUATED AT THE UPSTREAM AND DOWNSTREAM ENDS OF THE WORK AREA AND STREAM FLOW SHALL BE PUMPED AROUND THE WORK AREA. THE PUMP SHOULD DISCHARGE ONTO A STABLE VELOCITY DISSIPATER CONSTRUCTED OF RIP RAP OR SANDBAGS.
2. WATER FROM THE WORK AREA SHALL BE PUMPED TO A SEDIMENT FILTERING MEASURE SUCH AS A SEDIMENT BAG OR OTHER APPROVED DEVICE. THE MEASURE SHALL BE LOCATED SUCH THAT THE WATER DRAINS BACK INTO THE CHANNEL BELOW THE DOWNSTREAM SANDBAG DIKE WITHOUT CAUSING FURTHER EROSION BETWEEN THE SILT BAG AND STREAM. CONTRACTOR SHALL KEEP AN EXTRA SILT BAG ON SITE AT ALL TIMES DURING CONSTRUCTION.
3. CONTRACTOR SHALL MINIMIZE CREEK BANK DISTURBANCE, CLEARING AND GRUBBING WITHIN CREEK BANKS SHALL BE LIMITED TO THAT REQUIRED BY CONTRACTOR FOR INSTALLATION OF THE PIPELINE.
1. 4. CLEAN WATER DIKE SHALL AT A MINIMUM BE 3 FOOT TALL OR EXTEND TO THE TOP OF BANK AND BE CONSTRUCTED OF SAND BAGS OR STONE WITH AN IMPERMEABLE LINER.
1. 5. CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND CONSTRUCTION OF THE CLEAN WATER DIKE AND TEMPORARY PUMP AROUND PER THE CONTRACTORS MEANS AND METHODS. ALTERNATE CONFIGURATIONS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.

TEMPORARY PUMP AROUND (E)

NTS

RESTORATIVE PLANTING SCHEDULE			
NO.	SIZE	COMMON NAME	BOTANICAL NAME
25	15 GAL	CREPE MYRTLE	LAGERSTROEMIA INDICA
5	15 GAL	WHITE OAK	QUERCUS ALBA
5	15 GAL	RED MAPLE	ACER RUBRUM
5	15 GAL	BLACK GUM	NYSSA SYLVATCA
5	15 GAL	AMERICAN ELM	ULMUS AMERICANA
0	15 GAL	WILLOW OAK	QUERCUS PHELLOS
5	15 GAL	SHAGBARK HICKORY	CARYA OVATE

LOT # 52 PLANTING SCHEDULE (B)

NO SCALE

SEEDING & SEEDBED PREPARATION REQUIREMENTS

DURING CONSTRUCTION THE CONTRACTOR SHALL BE REQUIRED TO CONTROL EROSION ON ALL DISTURBED SLOPES BEFORE THE ESTABLISHMENT OF PERMANENT VEGETATION. TEMPORARY AND PERMANENT SEEDING SHALL BE AS SPECIFIED IN SECTION 02920 OF THE CONTRACT DOCUMENTS AND AS INDICATED BELOW. THE CONTRACTOR SHALL PERFORM MAINTENANCE AS NECESSARY TO KEEP PERMANENT SEEDED AREAS IN A SATISFACTORY CONDITION UNTIL TURNED OVER TO THE CARE OF THE OWNER'S PERSONNEL.

PREPARATION OF SUBSOIL

A. COMPLETE OPERATIONS IN THE AREA TO BE SEEDED AND PREPARE SUBSOIL TO ELIMINATE UNEVEN AREAS AND LOW SPOTS. BRING SURFACE TO THE APPROXIMATE DESIGN CONTOURS.
B. SCARIFY SUBSOIL TO A DEPTH OF 3 INCHES. REMOVE WEEDS, ROOTS, STONES AND FOREIGN MATERIALS 1-1/2 INCHES IN DIAMETER AND LARGER.

PLACING TOPSOIL

MATERIALS: FERTILE, AGRICULTURAL SOIL, TYPICAL FOR LOCALITY, CAPABLE OF SUSTAINING VIGOROUS PLANT GROWTH, TAKEN FROM DRAINED SITE; FREE OF SUBSOIL, CLAY OR IMPURITIES, PLANTS, WEEDS, AND ROOTS; PH VALUE OF MINIMUM 5.4 AND MAXIMUM OF 7.0.

A. PLACE TOPSOIL DURING DRY WEATHER AND ON DRY UNFROZEN SUBSOIL WHERE INDICATED ON DRAWINGS.
B. SPREAD TOPSOIL TO A MINIMUM DEPTH OF 4 INCHES. REMOVE VEGETABLE MATTER AND FOREIGN NON-ORGANIC MATERIAL FROM TOPSOIL WHILE SPREADING. GRADE SURFACE TO PROVIDE POSITIVE DRAINAGE AND PREVENT WATER PONDING. LIGHTLY COMPACT TOPSOIL WITH AT LEAST ONE PASS OF A CULTIPACKER OR SIMILAR EQUIPMENT
C. MAINTAIN THE FINISHED SURFACES BY PROTECTING, AND REPLACING TOPSOIL AND SUBSOIL AS NECESSARY UNTIL THE AREA IS ACCEPTED UNDER THE CONTRACT.

APPLICATION OF LIME

MATERIALS: GROUND DOLOMITIC AGRICULTURAL LIMESTONE, NOT LESS THAN 85 PERCENT TOTAL CARBONATES, GROUND SO THAT 50 PERCENT PASSES 100 MESH SIEVE AND 90 PERCENT PASSES 30 MESH SIEVE. COARSER MATERIAL WILL BE ACCEPTABLE, PROVIDED THE SPECIFIED RATES OF APPLICATION ARE INCREASED PROPORTIONATELY ON THE BASIS OF QUANTITIES PASSING NO. 100 MESH SIEVE.

A. LIMING SHALL BE DONE IMMEDIATELY AFTER GRADING HAS REACHED THE FINE GRADING STAGE, EVEN THOUGH ACTUAL SEEDING MAY NOT BE DONE UNTIL SEVERAL MONTHS LATER.
B. SPREAD LIME EVENLY BY MEANS OF A MECHANICAL DISTRIBUTOR.
C. WHEN LIME IS DISTRIBUTED BY COMMERCIAL LIMING DEALERS, SALES SLIPS SHOWING THE TONNAGE DELIVERED SHALL BE FILED WITH THE ENGINEER AND SHALL SHOW THE FULL TONNAGE REQUIRED FOR THE ACRES TREATED.
D. INCORPORATE LIME IN THE TOP 2 TO 3 INCHES OF SOIL BY HARROWING, DISKING, OR OTHER APPROVED MEANS. LIME SHALL BE APPLIED AT A MINIMUM OF 2 TONS PER ACRE WITH 3 TONS PER ACRE IN CLAY SOILS OR PER SOILS TEST.

APPLICATION OF FERTILIZER

MATERIALS: FERTILIZER: MIXED, COMMERCIAL, FERTILIZER CONTAINING 10-10-10 PERCENTAGES OF AVAILABLE NITROGEN, PHOSPHORIC ACID, AND POTASH RESPECTIVELY, PLUS SUPERPHOSPHATE WITH 20 PERCENT P2O5 CONTENT. FERTILIZER SHALL BE DRY, IN GRANULAR (PELLET) FORM, SHALL BE DELIVERED TO THE SITE IN THE MANUFACTURER'S ORIGINAL BAG OR CONTAINER WHICH SHALL BE PLAINLY MARKED AS TO FORMULA.

A. SPREAD FERTILIZER NOT MORE THAN 2 WEEKS IN ADVANCE OF SEEDING.
B. TO VERIFY APPLICATION RATE, DETERMINE ACREAGE TO BE FERTILIZED AND PROVIDE ENGINEER WITH TOTAL WEIGHT OF FERTILIZER APPLIED TO THE AREA.
C. PROVIDE MECHANICAL SPREADER FOR EVEN DISTRIBUTION AND SPREAD HALF OF THE RATE IN ONE DIRECTION, AND THE OTHER HALF AT RIGHT ANGLES TO THE FIRST. MIX THOROUGHLY INTO UPPER 2 TO 3 INCHES OF SOIL BY DISKING, HARROWING OR OTHER APPROVED METHODS.

SEEDING

MATERIALS:
SEED: FRESH SEED GUARANTEED 95 PERCENT PURE WITH A MINIMUM GERMINATION RATE OF 85 PERCENT WITHIN ONE YEAR OF TESTS. PROVIDE THE FOLLOWING SEED MIXTURES WITH LIME AND FERTILIZER IN DISTURBED AREAS INCLUDING NCDOT RIGHTS-OF-WAY:

1. TEMPORARY SEEDING

TEMPORARY SEEDING		
PLANTING DATES	GRASS TYPE	POUNDS/ACRE
JAN 1 - MAY 1	RYE (GRAIN)	120
MAY 1 - AUG 15	GERMAN MILLET	50
AUG 15 - DEC 30	RYE (GRAIN)	120
LIME		2,000
FERTILIZER (JAN 1 - AUG 15)	10-10-10	750
FERTILIZER (AUG 15 - DEC 30)	10-10-10	1,000
MULCH	STRAW	4,000

2. PERMANENT SEEDING (MAXIMUM SLOPE 3:1)

PERMANENT SEEDING (MAXIMUM SLOPE 3:1)		
PLANTING DATES	GRASS TYPE	POUNDS/ACRE
AUG. 15 - NOV. 1	TALL FESCUE	300
NOV. 1 - MAR. 1	TALL FESCUE	300
&	ABRUZZI RYE	25
MAR. 1 - APR 15	TALL FESCUE	300
APR. 15 - JUN. 30	HULLED COMMON	25
	BERMUDA GRASS	
JUL. 1 - AUG. 15	TALL FESCUE	120
&	BROWNTOP MILLET	35
&	SORGHUM-SUDAN HYBRIDS	30
LIME		4,000
FERTILIZER	10-10-10	1,000
MULCH	STRAW	4,000

RESTORATIVE PLANTING SCHEDULE			
NO.	SIZE	COMMON NAME	BOTANICAL NAME
11	15 GAL	RED MAPLE	ACER RUBRUM
10	15 GAL	WHITE OAK	QUERCUS ALBA
4	15 GAL	OKAME CHERRY	PRUNUS X INCAM
3	15 GAL	JAPANESE RED MAPLE	ACER PALMATUM
2	15 GAL	NATCHEZ CREPE MYRTLE	LAGERSTROEMIA NATCHEZ

LOT # 53/54 PLANTING SCHEDULE (C)

NO SCALE

SEEDING & SEEDBED PREPARATION REQUIREMENTS (CON'T)

3. PERMANENT SEEDING (MAXIMUM SLOPE 3:1 TO 2:1)

PERMANENT SEEDING (MAXIMUM SLOPE 3:1 TO 2:1)		
PLANTING DATES	GRASS TYPE	POUNDS/ACRE
MAR. 1 - JUN. 1	SERICEA LESPEDEZA	50
	&	
MAR. 1 - APR. 15	ADD TALL FESCUE	120
MAR. 1 - JUN 30 OR	ADD HULLED COMMON	25
	BERMUDAGRASS	
JUL. 1 - SEPT. 1	TALL FESCUE	120
&	BROWNTOP MILLET	35
&	SORGHUM-SUDAN HYBRIDS	30
SEPT. 1 - MAR. 1	SERICEA LESPEDEZA	70
	UNHULLED-UNSCARIFIED)	
&	TALL FESCUE	120
	&	
NOV. 1 - MAR. 1	ADD ABRUZZI RYE	25
LIME		4,000
FERTILIZER	10-10-10	1,000
MULCH	STRAW	4,000

4. THE CONTRACTOR SHALL PROVIDE SEEDING AND FOLLOW FERTILIZING METHODS AS REQUIRED BY THE U.S. ARMY CORPS OF ENGINEERS TO REESTABLISH DISTURBED AREAS IN DESIGNATED WETLANDS.

A. ACCOMPLISH SEEDING BY MEANS OF AN APPROVED POWER-DRAWN SEED DRILL, COMBINATION CORRUGATED ROLLER-SEEDER, APPROVED HAND OPERATED MECHANICAL SEEDER, OR OTHER APPROVED METHODS TO PROVIDE EVEN DISTRIBUTION OF SEED.
B. DO NOT SEED WHEN GROUND IS EXCESSIVELY WET OR EXCESSIVELY DRY. AFTER SEEDING, ROLL AREA WITH A ROLLER, NOT LESS THAN 18 INCHES IN DIAMETER AND WEIGHING NOT MORE THAN 210 POUNDS PER FOOT OF WIDTH. UPON COMPLETION OF ROLLING, WATER AREA WITH A FINE SPRAY.
C. IMMEDIATELY FOLLOWING SEEDING APPLY MULCH OR MATTING AS LISTED BELOW. DO NOT SEED AREAS IN EXCESS OF THAT WHICH CAN BE MULCHED ON SAME DAY.
D. APPLY WATER WITH A FINE SPRAY IMMEDIATELY AFTER EACH AREA HAS BEEN MULCHED. SATURATE TO 4 INCHES OF SOIL DEPTH.
E. WETLAND SEEDING.

1

WETLAND SEEDING		
PLANTING DATES	GRASS TYPE	POUNDS/ACRE
AUG 15 - APR 15	RYE (GRAIN)	40
MAY 1 - AUG 15	GERMAN MILLET	10
DEC 1 - APR 1	SWEET WOODREED	1.5
DEC 1 - APR 1	RICE CUTGRASS	4.0
DEC 1 - MAY 15 & SEPT 1 - NOV 1	SOFT RUSH	1.5
DEC 1 - MAY 15 & SEPT 1 - NOV 1	SHALLOW SEDGE	1.5
FEB 15 - APR 1 & AUG 15 - OCT 15	VIRGINIA WILD RYE	4.0
FEB 15 - APR 1 & AUG 15 - OCT 15	INDIAN WOODOATS	1.5
LIME		PER SOIL TEST
FERTILIZER	10-10-10	PER SOIL TEST
MULCH	STRAW	4,000

MULCHING AND MATTING

MATERIALS: MATTING / EROSION CONTROL FABRIC (RECP): MATTING AND RECP SHALL BE AS NOTED ON DETAIL F ON SHEET D1. MATTING SHALL BE FULLY DEGRADABLE BUT SUITABLE UNTIL VEGETATION HAS BEEN ESTABLISHED.
MATERIALS: MULCH: THRESHED STRAW OF OATS, WHEAT, OR RYE; FREE FROM SEED OF OBNOXIOUS WEEDS; OR CLEAN SALT HAY. STRAW WHICH IS FRESH AND EXCESSIVELY BRITTLE OR STRAW WHICH IS IN SUCH AN ADVANCED STAGE OF DECOMPOSITION AS TO SMOTHER OR RETARD GROWTH OF GRASS WILL NOT BE ACCEPTABLE.

A. APPLY MULCH OR MATTING AS REQUIRED TO RETAIN SOIL AND GRASS, BUT NO LESS THEN THE FOLLOWING:
   1. SLOPES FROM 0 TO 20 PERCENT BY SPREADING A LIGHT COVER OF MULCH OVER SEEDED AREA AT THE RATE OF NOT LESS THAN 85 LBS. PER 1000 SQ. FT. USE TACK TO PREVENT DISRUPTION OF MULCH.
   2. SLOPES GREATER THAN 20 PERCENT MULCH WITH MATTING. PIN MATTING TO THE GROUND WITH WIRE STAPLES AT 5 FOOT INTERVALS, IMMEDIATELY AFTER SEEDING.
B. FOR TACK USE AN ASPHALT TIE-DOWN OF EMULSIFIED ASPHALT GRADE AE-3 OR CUT-BACK ASPHALT GRADE RC-2 OR OTHER APPROVED EQUAL. THE APPLICATION RATE SHALL BE 0.10 GAL/SY (11 GAL / 1000 SQ FT). AN APPROVED JUTE MESH OR NET MAY BE USED IN LIEU OF TACKING STRAW MULCH.
C. OTHER TYPES OF MULCH AND ANCHORING METHODS MAY BE USED UPON APPROVAL BY THE ENGINEER.

BID SET

NO.	BY	CHK	APP'D	DATE	REVISIONS AND RECORD OF USE
1	MLT	WPS	SLT	02/12/2021	REVISED FOR PERMITTING COMMENTS - ADDENDUM #1

NORTH CAROLINA PROFESSIONAL SEAL 039150 ENGINEER W. PAUL SLOAT
2021.02.25 23:47:32-05'00'

BLACK & VEATCH
Black & Veatch International Company
Building a world of difference.
10925 David Taylor Drive, Suite 280
Charlotte, North Carolina 28262

UNION COUNTY PUBLIC WORKS
853W ZONE IMPROVEMENTS
PHASE I TRANSMISSION MAINS

RESTORATIVE PLANTING
DETAILS AND SCHEDULES

DESIGNED: MLT
DETAILED: KTH
CHECKED: CES
APPROVED: SLT
DATE: JANUARY 2021

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 186110

D6
SHEET 40 OF 42

FD9000A
D10000
PLOTTED: 2/24/2021 1:07 PM FILE: C:\pw_working\cngpw\d1306238\D00.dwg

Current Planholders List

Plan Holders List

The following is a list of companies who have received Bidding Documents from Black & Veatch for the following Project:

Union County Public Works 853W Zone Improvements Phase 1 Transmission Mains

Company	Contact	Address	Phone	*Fax*
State Utility Contractors, Inc	**Scott Little**	**4417 Old Charlotte Highway Monroe NC 28110**	704-289-6400	
Fuller & Co. Construction, LLC	**Jared Fuller**	**3089 W Old NC Hwy Crouse NC 28033**	980-241-8453	
Garney Construction	**Marissa Vona**	**3959 Pender Drive, Suite 100, Fairfax, VA 22030**	615-953-2818	
D.H. Griffin Infrastructure	**Taylor Hippert**	**4716 Hilltop Road | Greensboro, NC 27407**	336.601.4740	
Ruby-Collins, Inc.	**Nikki Carr**	**4875 Martin Court | Smyrna, Georgia 30082**	770-432-2900	
Reynolds Construction, LLC	**Sandra Murphy**	**300 East Broad Street | Fairburn, GA | 30213**	770-969-4040	
Hall Contracting Corp.	**Candace Boyce**	**6415 Lakeview Road Charlotte, NC 28269**	980-771-3204	
Two Brothers Utilities	**Jaida Wesson**	**714 Poplar Springs Church Road Shelby, NC 28152**	704-406-9099	
Moorhead Construction, Inc.	**Katie Thompson**	**1513 Anderson St. Belton, SC 29627**	864-338-0888	
Legacy Water Group	**Karen Kimble**	**10130 Bob Williams Parkway Covington, GA 30014**	678-712-5244	
Dellinger, Inc.	**Marie Lathan**	**2631 Old Charlotte Hwy Monroe, NC 28110**	704-283-7551	
DS Utilities Inc	**Bob McClam**	**1644 Holy Trinity Church Road Little Mountain, SC 29075**	803-345-9106	
Thalle Construction Co Inc	**Don Tutterow**	**900 NC Hwy 86 North Hillsborough, NC 27278**	336-451-5307	
S.J. Louis Companies	**Chris de Cathelineau**	**1351 Broadway Street W. Rockville, MN 56369**	320-253-9291	