

BERKELEY COUNTY

Procurement Department Scott Maxie, CPPB, Director

Post Office Box 6122 Moncks Corner, South Carolina 29461-6120 PH: (843) 719-4118 FX: (843) 719-4117

TO: All Prospective Offerors

FROM: Scott Maxie

IFB NUMBER: IFB-BCWS-19-19/20

IFB TITLE: Mt. Holly Commerce Park Improvements Phase I

Acknowledge receipt of this addendum by inserting its number, date and signature in the space provided on Page 12- Bid Form Proposal, for receipt of Addenda. Failure to do so may subject Proposer as non-responsive. This addendum should be attached to and become part of the solicitation.

A. Clarification/Changes:

- 1. Section XI, Article 7 (I) was intentionally deleted
- 2. Section XI, Article 2 shall be amended to state:

SCHEDULE OF VALUES: Within ten (10) calendar days of the effective date of the contract, the Successful Bidder shall submit to the County a Schedule of Values allocated to the various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the County may require. This schedule, unless objected to by the County, shall be used only as a basis for the Successful Bidder's Applications for Payments.

3. Delete **Bid Form Page 1 of 12** and replace with attached **Bid Form 1 of 12 REVISED** 5.12.2020

Clarification/Changes Continued:

- 4. SECTION 02733 Page 02733-3 Delete Paragraph 2.03 A and replace with the following:
 - A. 4-inch air release valves shall be Vent-Tech Model SXG- Series C. 145 psi (10 Bar)-Combination Air Valve for Wastewater. 2-inch air release valves shall be Vent-Tech Model SDG- Series C. 145 psi (10 Bar)- Combination Air Valve for Wastewater. Locations shall be as indicated on the Drawings.
- 5. Delete drawing sheets: C201, C202, C203, C205, C206, C207, C209, C210, C211, C212, M103, and MD01 and replace with the attached revised drawing sheets.
- 6. Let it be known: RIA (Rural Infrastructure Authority) is a source of funding for this project in addition to SRF.

B. Question/Answers:

- <u>Question</u>: While reviewing the documents for the above referenced Project I did not see a Bid Bond Form. Is there a specific bid bond form we use? <u>Answer</u>: No.
- Question: From the demolition drawings and notes it would appear through the sequence of construction there would not be a need for bypass pumping on this project. If possible, please confirm.
 <u>Answer</u>: The Owner nor Engineer will direct the means and methods used during construction. It is anticipated that bypass pumping may not be required for this project.
- 3. <u>Question</u>: The bid date is currently scheduled for the Tuesday following Memorial Day. Would the County consider moving the bid date back two days to May 28th? <u>Answer</u>: Bid Date and Time will remain as is (The agenda deadline is 5/28).
- 4. <u>Question</u>: The plans are only showing a limit of disturbance of 10' wide for the force main. Will the Contractor have access to the rest of road right of way for construction? <u>Answer</u>: Use of the SCDOT Right-of-Way during construction of the force main shall be in complete compliance with approved SCDOT Encroachment Permit No. 232242 (see attached).
- 5. <u>Question</u>: From Sta. 92+00 to Sta. 105+00, is the existing 6" force main still in service? <u>Answer</u>: Yes
- <u>Question</u>: From Sta. 107+00 to 14+00, is there any temporary easement or is the contractor confined to the 15' limit of disturbance shown?
 <u>Answer</u>: All work in this section shall be limited to the Limits of Disturbance shown.
- 7. <u>Question</u>: Specification Section 02733 indicates the use of aggregate bedding and foundation stone. Which bedding detail in the drawings applies Type B or Type C?

<u>Answer</u>: Both details will apply, depending upon suitability of in-situ soils for backfilling as defined in Specification Section 02733. Refer to the attached Geotechnical Exploration report for soil borings conducted along the force main route.

- Question: The specifications call for the PVC force main to be DR 25; the drawings call out the force main to be DR 18. Please clarify. <u>Answer</u>: PVC piping shall be DR 18 as indicated on the drawings.
- <u>Question</u>: There are places on the drawings showing ductile iron pipe to be installed under culvert pipes. Under what Pay Item does the ductile iron pipe get paid for? <u>Answer</u>: A pay item has been added to the Bid Form (see attached).
- <u>Question</u>: Specification Section 02340 references installing restrained joint ductile iron pipe in bored crossings. The drawings do not indicate ductile iron pipe. Please verify the pipe material to be installed in bored casings. Answer: PVC piping, fully restrained, shall be used in bored casings.
- 11. <u>Question</u>: Does the Pay Item for Jack & Bore 42" Steel Casing include the carrier pipe? <u>Answer</u>: No, the carrier pipe quantity is included in the total quantity of the PVC force main line item.
- 12. <u>Question</u>: The Bids are due on 05-26-20 at 11:00 AM. That is the Tuesday after a long Holiday weekend. Could the Bid Opening be moved to 05-27-20 or 05-28-20 and the time changed to 3:00 PM?
 <u>Answer</u>: See Answer 3.
- <u>Question</u>: Is a lane closure required to install the FM along Hwy 52?
 <u>Answer</u>: The Owner nor Engineer direct the means and methods used during construction. Please refer to SCDOT Encroachment Permit No. 232242 (attached).
- 14. <u>Question</u>: Are the work hours limited? <u>Answer</u>: Please see Terms and Conditions X, Article 4.
- 15. <u>Question</u>: What type of bedding is required for the FM? Please clarify. <u>Answer</u>: See answer 7
- 16. <u>Question</u>: Will a Precast Wetwell be allowed for the PS? <u>Answer</u>: A precast structure can be considered. This, however, will require a complete design submittal that is signed and sealed by a licensed Professional Engineer in the State of South Carolina.
- 17. <u>Question</u>: We did not see a Bid Bond Form in the Specs. Will a special bid bond form be required? Answer: See Answer 1.

- 18. <u>Question</u>: Have all the Permits been acquired? If so, could you send a copy with the Addendum? <u>Answer</u>: The following permits/approvals have been acquired: Berkeley County Stormwater (MS4), Berkeley County Construction Activity Application (pending approval), BCDGOG Approval, SCDOT Encroachment, SCDHEC Stormwater NOI, SCDHEC Permit to Construct, OCRM CZC Compliance, and USACE Wetland Permit. Copies of permits will be provided to the successful bidder at the time of contract award.
- <u>Question</u>: Specification Section 02340 references Section 0900 (Special Provisions) for specific SCDOT encroachment requirement. Please provide Section 0900 or a copy of the SCDOT permit.
 Answer: Please refer to SCDOT Encroachment Permit No. 232242 (see attached).
 - Answer: Please refer to SCDOT Encroachment Permit No. 232242 (see attached).
- 20. <u>Question</u>: Are any soil borings available at the pump station site? <u>Answer</u>: Yes, see attached Geotechnical Exploration report (see attached).

Invitation for Bid Mount Holly Commerce Park Improvements Phase I BCWS-19-19/20

SECTION 5 BID FORM

Page 1 of 12 – REVISED 5.12.20

IFB TITLE:	Mount Holly Commerce Park Improvements Phase I
IFB NUMBER:	BCWS-19-19/20
CLOSING DATE AND TIME:	May 26, 2020 @ 11:00 PM

In compliance with this Invitation for Bid and subject to the terms conditions therein (including subsequently received written addenda if any) the undersigned offers and agrees, if selected by the County, to execute the entire work in the solicitation documents. The Total Base Bid Amount as indicated herein, is inclusive of all costs, including all labor, supervision, materials, supplies, equipment, taxes, insurance, permits and any other costs incidental or otherwise.

ITEM NO.	ITEM DESCRIPTIONS	UNIT	QTY	UNIT PRICE	TOTAL PRICE
1	Pump Station 094 Replacement (complete)	LS	1		
2	24" PVC Force Main, Fittings, and Appurt	LF	12,174		
3	Jack & Bore 42" Steel Casing (min t=0.563")	LF	505		
4	2" Air Release Valve (Model 02SDG-C)	EA	15		
5	4" Air Release Valve (Model 04SXG-C)	EA	5		
6	24" DIP Force Main	LF	120		
7	Force Main 24" Plug Valve	EA	3		
8	Force Main Pavement/Gravel Driveways R & R	LS	1		
9	36" PVC Gravity Sewer	LF	207		
10	7' Diameter Manholes (8'-10' Depth)	EA	1		
11	7' Diameter Doghouse/Drop Manhole (12'-14'				
11	Depth)	EA	1		
12	7' Diameter Manholes (12'-14' Depth)	EA	1		
13	Sediment & Erosion Control	LS	1		
14	Contingency Cash Allowance*	LS	1	\$500,000	\$500,000
TOTAL OF BASE BID AMOUNT					\$

*Contingency Cash Allowances shall be used at Owners discretion for project overruns or changes in Scope of Work.

TOTAL BASE BID AMOUNT WRITTEN

Company Name

Name of Authorized Representative

Signature of Authorized Representative

Date

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION Encroachment Permit

Permit No : 232242 Permit Decision Date : 2/24/2020 Expiration Date : 2/24/2021

<u>Type Permit :</u>SEWER <u>Location</u>:

	<u>District</u>	Work County	<u>Type</u>	Route	<u>Aux</u>	<u>Begin</u> <u>MP</u>	End MP
	6	Berkeley, SC	US	52	None	8.507	10.440
Contact Information							
Applicant:	BerkeleyCounty	WaterandSanitation			Phone:		
Contact:	Ashley Yeh						
Address:	212 Oakley Pla	ntation Dr.,					
City:	Moncks Corner	r	State:	SC	Zip:	29461	

Comments

Beginning at 2482 Hwy 52 and continuing North along Hwy 52 Right-of-Way to approximately 300' before Central Berkeley Drive and crossing West under Hwy 52 to land that is owned by Berkeley County Water and Sanitation.

Special Provisions:

9999 - See Attached for Additional Special Provisions

3. The undersigned applicant hereby requests the SCDOT to permit encroachment on the SCDOT right of way as described herein. It is expressly understood that the encroachment, if and when constructed, shall be installed in accordance with the sketch attached hereto and made a part hereof. The applicant agrees to comply with and be bound by the SCDOT's "A Policy for Accommodating Utilities on Highways Rights of way", "Standard Specifications for Highway Construction", the "General Provisions" and "Special Provisions", attached hereto or made a part hereof by reference, during the installation, operation and maintenance of said encroachment within the SCDOT's Right of Way. DISCHARGES OF STORM WATER AND NON-STORM WATER: Work within State Highway right-of-way shall be conducted in compliance with all applicable requirements of the National Pollutant Discharge Elimination System (NPDES) permit(s) issued to the Department of Transportation (Department), to govern the discharge of storm water and non-storm water from its properties. Work shall also be in compliance with all other applicable Federal, State and Local laws and regulations, and with the Department's Encroachment Permits Manual and encroachment permit. The encroachment permit will not be issued until the applicant has received an NPDES construction permit from SC Department of Health and Environmental Control.

The applicant agrees to comply with all current SCDOT Standards Specifications for Highway Construction including all Supplemental Technical Specifications. The applicant hereby further agrees, and binds his/her/its heirs, personal representatives, successors, assigns, to assume any and all liability for accidents or injuries to persons. or damage to property, including the highway, that may be caused by the construction, maintenance, use, moving or removing of the physical appurtenances contemplated herein, and the applicant agrees to indemnify and hold SCDOT harmless from and against any and all claims for personal injury and/or property damage which may be sustained by reason of the construction, maintenance or existence of said encroachment on the SCDOT's right of way.

Applicant's Name:	Ashley Yeh
Annlicant's Sig:	(Please print or t

Date: 10/17/2019

Title: Engineering Director

Für Office Use Orly

For Office Use Only

In accordance with your request and subject to all the provisions, terms, conditions, and restrictions stated in the application and the general and special provisions attached hereto, the SCDOT hereby approves your application for an encroachment permit. This permit shall become null and void unless the work contemplated herein shall have been completed prior to:

See Attached Special Provision and/or Permit Requirements

NPDES Permit

(Date received by res. Maint. Engr.)

(Date)

9999 SPECIAL PROVISIONS

UNDERGROUND FORCE MAIN

The South Carolina Department of Transportation reserves the right to impose additional conditions, provisions, and/or requirements on this permit to respond to any unforeseen, specific problems that might arise during the life of this permit, and to take any enforcement action necessary to ensure compliance with SCDOT specifications, standards, or policies.

If in the future the proposed utility work to be performed under this permit is requested to be removed by the SCDOT because of roadway improvements and the facilities are left in place by the permittee, and the improvements are made and the facilities are then located under new pavement or construction, any future access, taps, ties, or maintenance on the covered facilities may be denied by SCDOT.

All of the following provisions may not apply to work being performed under this permit. Any provision listed below along with those stated on the application form, and any other provision added to and made part of this permit, will be required to be executed to the extent expressed in these provisions.

The permittee fully understands and agrees with all conditions, requirements, provisions, and specifications associated with or listed on this permit with the start of any construction described or shown on this permit.

This permit has been approved with one year life duration; all work shown or detailed on this permit must be completed and accepted in that time frame. If all of the work is not finished the permit will be considered in noncompliance and the permittee will be legally responsible for any actions which may result from the construction deficiencies.

Prior to the start of any work shown on this permit the permittee, the contractor, and SCDOT will meet on site to discuss proposed work, these provisions, and all required safety requirements and signage pertaining to this permit.

Approval of this permit is for the construction and installation of a new 42" force main along US Hwy 52. The installation method will be trenching and jack and bore. Project will begin on the eastern shoulder of US Hwy 52 where it will travel north along the shoulder for approx. 10,400' then turn west under US Hwy 52, then leave the right-of-way. Approval of this permit will also include but is not limited to clearing and grubbing of areas included in the work zone, new asphalt paving needed for improvements, right-of-way excavation and final grading.

All work to be performed under this permit will be in accordance with South Carolina Department of Transportation Standard Specifications for Highway Construction, latest edition.

- All locations (2) crossing under existing box culverts shall be installed by jack and bore method to include 42" encasement. Open trench method is not permitted.
- Jack and bore method shall be performed under all roadways to include 42" encasement to extend past edges of roadway. Open cutting is not permitted.
- All driveways cut during installation of utility lines will be restored and completely patched immediately to ensure property owner's access, and shall meet all South Carolina Department of Transportation specifications that apply. <u>All driveways will then be completely overlayed from the road</u> edge to the right-of-way line with the same material used in the construction of the driveway.
- The existing edge of US Hwy 52 is to be saw cut to straight and even edge, and edge is to be clean and free of any loose material then asphalt/concrete placement.
- If any settlement occurs within the open cut(s), the permittee shall repair the settled area and provide an overlay of asphalt covering the entire repair and any additional area to be determined by SCDOT at that time.
- The South Carolina Department of Transportation reserves the right to impose additional conditions, provisions, and/or requirements on this permit to respond to any unforeseen, specific problems that might arise during the life of this permit, and to take any enforcement action necessary to ensure compliance with SCDOT specifications, standards, or policies.
- If in the future the facilities left in place by the permittee and the facilities are located under new pavement or construction, any future access, taps, ties, or maintenance on the covered facilities may be denied by SCDOT.
- All of the following provisions may not apply to work being performed under this permit. Any provision listed below along with those stated on the application form, and any other provision added to and made part of this permit, will be required to be executed to the extent expressed in these provisions.
- The permittee fully understands and agrees with all conditions, requirements, provisions, and specifications associated with or listed on this permit with the start of any construction described or shown on this permit.
- This office is to be notified a minimum of 24 hours prior to any work inside SCDOT rights-of-way being started by calling, faxing or emailing the Permit

Construction Notification form or by immediately calling if an accident should occur during this construction. (843) 761-8481

- If any settlement occurs within the open cut driveways, the permittee shall repair the settled area and provide an overlay of asphalt covering the entire driveway.
- Backfilling of trenches is to be accomplished immediately after placement of pipe.
- Any installation of this sewer main between the ditch line and edge of pavement must have a cover depth of 42 inches below the top of pavement.
- Any installation of this sewer main between the ditch line and right-of-way line must have a minimum cover depth of 36 inches.
- The utility company to the extent required by law, shall hold harmless the Department, its employees, contractors and agents, from any damages caused to the utility installations by routine maintenance operations. The utility company shall be responsible for any damages it causes to other utility installations on the Department right-of-way.
- Any existing pavement markings or traffic signage altered during the installation of this permitted construction will be replaced by the permittee to their original condition as soon as possible. All existing and required construction signage will be maintained at all times during this permit.
- No trenches or open excavations are to be left open overnight.
- All areas disturbed inside SCDOT rights-of-way are to be compacted, graded and grassed as soon as possible to prevent any erosion or sedimentation in the drainage system.
- Any work requiring a shoulder closure is to be done using SCDOT Standard Dwg 610-205-00 for shoulder closure. All shoulder closure work is to be done during daylight hours between 9:00 am to 3:00 pm Monday -Thursday.
- Traffic Control to follow SCDOT Standard Drawing 605-010-02 Construction Signing Permanent Scheme C.
- All construction signage is to be placed and maintained during the construction of this project until SCDOT final approval of work is given for all work shown on this permit. All signage is the responsibility of the permittee.

No lane closure will be allowed on US Hwy 52 for this project

- No excavated material is to be placed or let accumulate on roadway surface during the construction of this project. All material is to be removed from roadway as soon as possible.
- Any excavation within 5' of the edge of pavement along the roadway will be backfilled entirely with flowable fill. The excavated area will be backfilled entirely with flowable fill.

- Any boring operation being made on this project shall be made by method shown in permit and in such a manner <u>as not to disturb</u> the existing pavement. The bore pit must not be any closer than five to six feet from the edge of pavement and constructed as detailed in provision number 8. Notice will be given to the South Carolina Department of Transportation a minimum of 24 hours prior to the start of the boring operation, and immediately if the bore turns and damages the existing roadway pavement or shoulders in any way.
- At all locations of jack and bore crossings, casing will extend from rightof-way line to right-of-way line. Boring pit location will be determined by the depth of boring, i.e. the distance from edge of pavement to the front edge of the pit will be the same or greater than the depth of line crossing, minimum of five or six feet.
- Bore pits shall be closed immediately after installation. Disturbed area will be backfilled in 6" lifts, compacted as required, graded to provide positive drainage, raked, and cleared of all debris, then grassed as required.
- Temporary construction entrances will be covered to form a knock-off area (see attached detail) as required to prevent material from collecting on roadway surface. If material starts to collect on pavement the knock-off area is to be modified as required to eliminate any material from collecting on roadway. Entrance is to be constructed with underlining SCDOT approved geotextile fabric and a 6" thick layer of CR-14 gravel stone (granite) average diameter of two to three inch diameter and having a minimum length of 100' from edge of roadway into the site as shown on attached detail. No material is to be allowed to collect on pavement from leaving vehicles from site. Debris is to be cleaned from roadway pavement during entrance use at all times. When the entrance is not needed for construction operations, the entrance shall be removed and the area restored to its original condition. All areas will have a substantial stand of grass established prior to receiving SCDOT final approval, as required.
- <u>Prior to any work on SCDOT right-of-way the permittee/contractor will</u> <u>install "Trucks Entering Roadway" signs on both sides of entrance,</u> <u>approximately 500' from each entrance.</u> If in the operation of the entrance it becomes apparent that traffic and pedestrians living in the surrounding areas are not taking notice of the signs, additional signs or methods will be required to be installed or used as warranted to ensure public safety.
- All ingress and egress from and to the work area must be made from a safe location providing adequate and safe sight distance for the workers and motorists.
- Construction entrance shall be constructed with SCDOT approved HDPE type S pipe (of appropriate size) of a minimum of 1'-0" of cover
 if available over pipe. If cover is not available, reinforced concrete pipe will be required; SCDOT representative will verify pipe length and size prior to the placement in existing ditch. Once the entrance is no longer needed, pipe shall be removed along with ditch and shoulder regarded and grassed (if applicable).

- The temporary construction entrances need to be monitored to ensure mud and debris are not carried onto the highway. It will be the permittee's responsibility to ensure pavement integrity while the entrance is in use and the vehicles are using public roadways in this operation, and by the installation and use of this entrance assumes the liability of the repair of roadway resulting from any damage associated with this operation for as long as the entrance exists.
- Temporary entrance is to be graded with a negative slope from edge of roadway being tied into.
- Any construction materials or equipment to be stored or parked alongside of roadway or in the right-of-way will be placed a minimum of 30' from the edge of pavement.
- All rocks, pebbles, dirt, mud, loose concrete, boards, other debris along with any other spoil material will be kept clear of roadway at all times as the work progresses.
- This office is to be notified 24 hours prior to the start of any boring or open roadway cut operation is to begin. All necessary equipment and materials needed to accomplish these tasks are to be on site, and inspected by SCDOT inspector prior to the start of each operation. This also includes all traffic control devices and signage. Call (843) 761–8481
- Any work requiring a traffic disruption or lane closure will be performed during daylight hours between the hours of 9:00 AM and 3:00 PM with all traffic control removed from the roadway at that time. Any closure will require notifying all required media outlets, SCDOT, and emergency agencies a minimum of one week prior to the implementation of the closure.

UTILITY LINE CONSTRUCTION PROVISIONS

- 1.) All work to be performed under this permit will be in accordance with South Carolina Department of Transportation manual "A Policy for Accommodating Utilities on Highway Right-of-way", latest edition.
- 2.) All underground utility lines are to be placed as indicated on attached drawings or detailed in the permit. The line is to be placed in a uniform distance either off edge of roadway or right-of-way lines with the least amount of deflective changes as possible. All lines are to be buried with a minimum cover as shown on drawings or indicated in the permit.
- 3.) Contractor will maintain access to all property owners at all times during construction, and until final inspection, and approval is obtained. If in the course of construction driveways are to be cut and access impaired the contractor will be responsible to inform each resident of the inconvenience and the time, date and length of the work to be done.
- 4.) All utility valves, meters, vaults, air release valves, manholes, and others utility structures are to be installed outside existing or proposed roadway surface, flush with the existing ground, and behind ditches if at all possible, and/or 3'-0" inside the right-of-way lines.
- 5.) Any existing pavement markings or traffic signage altered during the installation of this permitted construction will be replaced by the permittee to their original condition as soon

as possible. All existing and required construction signage will be maintained at all times during this permit. Some new construction will require new pavement markings and permanent signage, see permit for details.

6.) Any request for a final inspection of a utility project will be made by either sending this office a letter or email requesting final inspection or by calling and requesting the inspection.

UTILITY LINE BORING PROVISIONS

- 7.) Any boring operation being made on this project shall be made by method shown in permit and in such a manner <u>as not to disturb</u> the existing pavement. The bore pit must not be any closer than five to six feet from the edge of pavement and constructed as detailed in provision number 8. The cover over the casing shall not be less than 48 inches at any point in the casing length from the lowest point of the roadway structure to the top of the casing. Notice will be given to the South Carolina Department of Transportation a minimum of 24 hours prior to the start of the boring operation, and immediately if the bore turns and damages the existing roadway pavement or shoulders in any way.
- 8.) At all locations of jack and bore crossings, casing will extend from right-of-way line to rightof-way line. Boring pit location will be determined by the depth of boring, i.e. the distance from edge of pavement to the front edge of the pit will be the same or greater than the depth of line crossing, minimum of five or six feet.
- 9.) Bore pits shall be closed immediately after installation. Disturbed area will be backfilled in 6" lifts, compacted as required, graded to provide positive drainage, raked, and cleared of all debris, then grassed as required.
- 10.) This office is to be notified 24 hours prior to the start of any boring or open roadway cut operation is to begin. All necessary equipment and materials needed to accomplish these tasks are to be on site, and inspected by SCDOT inspector prior to the start of each operation. This also includes all traffic control devices and signage. Call (843) 761–8481

PAVEMENT PROVISIONS

- 11.) Any pavement to be used in the construction shown on this permit is to be placed as specified and in accordance with the South Carolina Department of Transportation standard specifications for highway construction (latest edition), whichever is greater. The pavement structure listed or shown will be used in all areas where asphalt is to be placed inside SCDOT right-of-way unless indicated differently on the permit.
- 12.) Any existing roadway pavement damaged or removed in connection with this work will be replaced, using the same thickness and type of material destroyed, or according to specifications called for in the South Carolina Department of Transportation construction manual (latest edition), whichever is greater.
- 13.) Where pavement is cut and replaced, the contractor shall cut the edges to a straight and even line before removing the pavement. No ragged edges will be allowed or accepted. All patches and repairs will have squared corners. Prior to placing new asphalt all existing edges are to be tacked as per current SCDOT specifications. In some cases an asphalt surface overlay may be required to smooth riding surface of roadway at patch, see permit for details.
- 14.) Where roadway pavement is cut and is to be replaced, the trench is to be backfilled with SCDOT approved flowable fill from top of pipe to riding surface, and steel plating is to be placed over cut and secured as required. Then maintained until backfill has setup and then surface treatment can to be placed. The top two inches (minimum) of flowable

fill is to be removed and the equivalent amount and type of existing roadway asphalt (minimum two inches) is to be placed in patch.

EXCAVATION PROVISIONS

- 15.) Any required excavation or mucking in connection with this work, will be backfilled in six inch layers, and thoroughly compacted in a manner satisfactory to the South Carolina Department of Transportation specifications. Density tests may be required with the results to be furnished to the departments utility inspector on a weekly basis during construction, see permit for details.
- 16.) Compaction requirements in these provisions apply to crosscuts and longitudinal trench cuts from shoulder break to shoulder break. If compaction tests are required the maximum distance between tests shall be 500 feet. In some cases additional tests may be required, see permit for details.
- 17.) If unsuitable material is excavated, it will <u>not</u> be put back in the excavation, and will be removed from the right-of-way as soon as possible. The material will be replaced with suitable <u>approved</u> backfill, and be in compliance with the South Carolina Department of Transportation specifications for backfill.
- 18.) There shall be no excavation of soil nearer than two feet from any public utility pole or appurtenant facility without the written consent of the owner thereof. Special permission of the South Carolina Department of Transportation after an opportunity to be heard is given the owner of such pole or appurtenant facility may be given.
- 19.) If the side of the trench, pit, or any excavation is less than 3'-0" from the existing edge of pavement, the excavated area will be backfilled entirely with flowable fill to an elevation 6 inches from the existing ground elevation. Then brought to grade with suitable topsoil, compacted, graded, and grassed as required to eliminate any erosion.
- 20.) Existing ditch slopes, if excavated, shall be backfilled in six inch layers and well tamped with a mechanical tamp to 95% density (standard proctor). These lifts will be benched into the existing embankment as required. The new slopes will then be graded to match existing typical roadway cross section.
- 21.) No excavated material or spoil is to be placed on the pavement without the permission of the South Carolina Department of Transportation, and if permission is granted, this material must be removed daily, as soon as possible. The roadway is to be cleaned of all material in a manner as to protect the existing pavement. Any pavement destroyed, or marked by this operation will be removed and replaced as required.
- 22.) When shoulders and ditch slopes are reshaped and graded to a typical section, the section will match existing road section. Where the existing section is less then state standards (6' wide shoulder @ 12:1, front slope of ditch @ 4:1, ditch bottom as required to accommodate existing runoff, and back slope of ditch min. 3:1 or to right-of-way line) the section will be upgraded to the standard. In either case positive drainage must be established and approved by SCDOT.
- 23.) Contractor will maintain positive drainage at all times during construction and until final inspection and approval from South Carolina Department of Transportation is obtained.
- 24.) No excavation located between the edge of roadway pavement and the center of sideline ditch or 15'0" where no ditch is present is to be left open overnight. The exaction is to be either temporarily backfilled or a steel plate is to be secured of hole. In either case reflective traffic cones are to be placed around the area of the excavation until the excavation has been permanently backfilled as required and graded.

CONSTRUCTION CLEANUP PROVISIONS

- 25.) All areas in SCDOT right-of-way disturbed during construction are to be restored to original condition as soon as possible and maintained during entire length of project,
- 26.) All disturbed areas inside SCDOT rights-of-way will be seeded with a mixture of grass seed as specified in the South Carolina Department of Transportation standard specifications for highway construction, section 109b2, or latest edition. <u>No rye grass will be allowed inside SCDOT rights-of-way</u>. A satisfactory stand of grass will be required, prior to any acceptance or final approval is granted on this permit.
- 27.) All rocks, pebbles, boards, other debris along with any spoil material will be kept clear of roadway at all times as the work progresses.

TRAFFIC CONTROL PROVISIONS

- 28.) The permittee, owner, and/or contractor will be responsible for all required traffic control for this construction. SCDOT will be available for any questions concerning the required signage, types, size and placement.
- 29.) Signs are to be covered or removed each night or if no activity is present inside interstate right-of-way.
- 30.) All men working in the SCDOT right-of-way will wear approved safety vests as required.
- 31.) Traffic control, lights, signs, and flagmen will be furnished by the permittee and/or contractor and will conform to "Manual on Uniform Traffic Control Devices", latest edition. All devices and signs will be maintained during all phases of construction. Signs not in use will be removed or coved as required.

GENERAL PROVISIONS

- 32.) All work to be performed under this permit will be in accordance with South Carolina Department of Transportation specifications, latest edition.
- 33.) All work indicated on this permit is to be completed within one (1) year of the approval date of the permit. All utility line construction is to include the surface treatment and all shoulder and ditch stabilization required.
- 34.) All roadway and work performed in the SCDOT right-of-way under this permit including any utility installations will be the responsibility of the owner for the life of the utility placed. If for any reason the utility line fails, this office is to be notified immediately. If in the construction of the project detailed on the permit, the roadway or right-of-way construction or any part of that construction is performed in a manner not specified in the permit or according to SCDOT standards or specifications shall be corrected immediately.
- 35.) Appropriate South Carolina Department of Transportation officials will be notified as of the start of any construction on this project, 24 hours prior to the start, and be kept informed of the progress during construction, and when a final inspection is wanted at the completion of the project.
- 36.) A reliable, properly insured, and licensed contractor will perform this construction.
- 37.) Any construction materials or equipment to be stored or parked alongside of roadway or in the right-of-way will be placed a minimum of 30' from the edge of pavement, or have warning devices as required and approved by this office.
- 38.) Field changes, if necessary must be submitted in writing and approved prior to the start of any actual construction on proposed change. An as-built set of plans will be required upon completion of the project reflecting any and all changes to the original plans.
- 39.) If a time extension or a revision to an approved permit is required, a written request along with any drawings required is to be submitted to this department for review and

approval. No work is to be performed on any item not indicated on the permit, either shown in a sketch or indicated in a description, prior to an amended permit being issued.

- 40.) The permittee shall be responsible for any and all damages that occur as a direct result of this installation.
- 41.) A copy of this approved permit will be made available to the South Carolina Department of Transportation at the work site at all times.



Permit Construction Notification

Submit To: Encroachment Permit Manager – Don Riedel SCDOT Berkeley Encroachment Permit Office Email: <u>RiedelDW@scdot.org</u> Fax: 843-761-5100

This notification is to inform the Department of the upcoming construction commencement of the following permitted work:

Permit Number:

Road Name/Number:

Project Name:

Name of Permitee:

Contractor Name & Contact:

Contractor Office & Mobile Phone No:

Proposed Preconstruction Date:

Estimated Project Completion Time:

Notes:

 Upon completion of all work you must contact the SCDOT-Berkeley Maintenance Permit Office at

(843) 761-8481to schedule a final inspection.

.

• Once work has been satisfactorily completed SCDOT will issue a Letter of Compliance.

Geotechnical Exploration BCWS Pump Station 094 and Force Main Moncks Corner, South Carolina S&ME Project No. 1413-18-076

PREPARED FOR

Hazen and Sawyer 1122 Lady Street, Suite 1230 Columbia, South Carolina 29201

PREPARED BY

S&ME, Inc. 620 Wando Park Boulevard Mount Pleasant, South Carolina 29464

September 13, 2019



September 13, 2019

Hazen and Sawyer 1122 Lady Street, Suite 1230 Columbia, South Carolina 29201

Attention: Mr. Kevin M. Bair, P.E., P.L.S.

Reference: Geotechnical Exploration BCWS Pump Station 094 and Force Main Moncks Corner, South Carolina S&ME Project No. 1413-18-076

Dear Mr. Bair:

We have completed our geotechnical exploration for a new force main and pump station for Berkeley County Water and Sewer (BCWS) in Moncks Corner, South Carolina. Our services were performed pursuant to S&ME Proposal No. 14-1800184 dated July 27, 2018. The purpose of our services was to characterize the subsurface conditions along the proposed force main alignment and provide site preparation and foundation support recommendations for the proposed pump station. This report presents our understanding of the project, the site and subsurface conditions encountered, and our conclusions and recommendations.

Project Information

We understand Hazen and Sawyer is developing plans for a new force main and new pump station in Moncks Corner, South Carolina. The project consists of a new force main that will connect a new pump station to the existing Central Berkeley Wastewater Treatment Plant. The proposed force main alignment traverses north along the east side of Highway 52 from the pump station for approximately 2 miles before crossing underneath Highway 52 near Central Berkeley Drive and traveling south and west of an existing, single-story commercial building into the treatment plant. At each of the road crossings jack-and-bore techniques will be used.

The new pump station is planned to be located approximately 120 ft northeast of the existing Pump Station 094. The pump station will have a top of slab elevation of +22 ft and a wetwell bottom elevation of -2 ft. Based on the provided Site Plan (60% design review dated August 2019), the existing grade at the pump station is approximately +19 ft. Fill heights of up to approximately 3 ft will be required, and that the wetwell will bear approximately 21 ft below existing grade.

This project information is based on e-mails between Mr. Kevin Bair, P.E. of Hazen and Sawyer to Mr. Kyle Murrell, P.E. of S&ME on February 27, 2017 and March 23, 2017. Additional project information was provided by Mr. Leon Fanning, P.E. of Hazen and Sawyer to Mr. Robert Scott, E.I.T. of S&ME during a site meeting on August 3, 2018. Updated site plans, pump station drawings, and test location coordinates were provided via e-mail by Mr. Fanning to Mr. Scott on August 21, 2018 and August 30, 2019.



Geotechnical Exploration BCWS Pump Station 094 and Force Main Moncks Corner, South Carolina S&ME Project No. 1413-18-076

Methods of Exploration

Field Exploration

Our exploration included a site reconnaissance by a geotechnical staff professional and the performance of 12 cone penetrometer test (CPT) soundings. The jack-and-bore location for the Highway 52 crossing and the pump station location were changed after our initial exploration of nine CPT soundings. S&ME remobilized to perform additional CPT soundings at the new Highway 52 jack-and bore and pump station locations. The 12 CPT sounding logs are included in Appendix I, but our conclusions and recommendations are based on the data collected at the revised locations.

The CPT soundings were extended to depths of approximately 42 ft below the existing ground surface at the proposed pump station and approximately 15 ft below the existing ground surface at the proposed jack-and-bore locations. Within each sounding at jack-and-bore locations, a Macro-Core push tube sample was obtained at the assumed depth of the bottom of the jack-and-bore pits for laboratory index-property testing. At locations C-01 and C-02, the initial soundings refused on a buried utility line. We performed additional soundings offset from original locations and reached the target depth.

Hand-auger borings were performed at the CPT sounding locations to depths of approximately 4 ft below the existing ground surface. Three additional hand-auger borings were performed along the proposed force main alignment behind the existing office building at Central Berkeley Drive to explore near surface soil conditions.

Test locations were established in the field by S&ME personnel by referencing existing site features and measuring distances and right angles with the assistance of Hazen and Sawyer personnel. Approximate test locations are shown on the Test Location Plan in Appendix I. Hazen and Sawyer surveyed test locations C-1 through C-8 and provided coordinates and ground elevations. More detailed descriptions of our field-testing procedures, the CPT Sounding Logs, and the Hand Auger Logs are also included in Appendix I.

Laboratory Testing

Selected hand auger borings samples and push tube samples were subjected to laboratory natural moisture content, grain size distribution, and Atterberg limits. The testing was performed in general accordance with ASTM or other applicable standards. The index testing results are presented in Table 1. Laboratory data sheets are included in Appendix II.

BCWS Pump Station 094 and Force Main Moncks Corner, South Carolina S&ME Project No. 1413-18-076



Test	Approximate Sample	USCS	Natural Moisture	% Finer #200	Atteı Lin	berg nits
Location	Depth	Symbol	(%)	Sieve	LL	PI
C-01	3 to 4 ft	CL	44.7	76.8	-	
C-01	10 to 12 ft	СН	36.7	95.8	89	64
C-04	6 to 8 ft	СН	39.3	70.0	78	44
C-06	10 to 12 ft	SC	16.2	35.4	Non-Plastic	
C-07	3 to 4 ft	SC	17.3	40.2	Non-Plastic	
C-08	3 to 4 ft	CL	26.5	58.9	-	

Table 1 – Laboratory Testing Summary

Site and Subsurface Conditions

Site Conditions

The project site starts at Pump Station 094 and continues north for approximately 2 miles to the intersection of Highway 52 and Central Berkeley Road.

The area surrounding the existing Pump Station 094 was grassy with underbrush. The site of the proposed new pump station was occupied with trees. Topographic information was provided at the pump station. Ground elevations range from approximately +18 to +20. The ground elevation gradually rises moving north along the alignment based on the provided elevations at the test locations. The elevation at C-02 was +42 ft at the time of exploration.

Subsurface Conditions

Details of the subsurface conditions encountered by the soundings and hand auger borings are shown on the logs in Appendix I. These logs represent our interpretation of the subsurface conditions based upon field data. Stratification lines on the sounding logs represent approximate boundaries between soil behavior types¹;

¹ Soil Behavior Type is calculated based on empirical correlations with tip resistance, sleeve friction, and pore pressure. A CPT may define a soil based on its behavior as one type while its grain size and plasticity, the traditional basis for soil classification, may define it as a different type.



however, the actual transition may be gradual. The general subsurface conditions and their pertinent characteristics are discussed in the following paragraph.

Pump Station

The exploration initially encountered 4 in. of topsoil, underlain by loose, clayey and silty sands to a depth of approximately 21 ft below the ground surface. Beneath these sands, the exploration encountered stiff to very stiff, over-consolidated clays and silts to the deepest explored depth of approximately 40 ft below the ground surface.

Jack-and Bore Locations

Topsoil thicknesses ranged from 1 to 6in. at the jack-and-bore locations. Below the topsoil, the borings and soundings generally encountered loose, silty and clayey sands and soft to firm, sandy clays in the upper 15 ft. The sands in the upper 4 ft of several borings appears to be fill.

Subsurface Water

Subsurface water was measured five days after the completion of the soundings or at the time of the hand auger borings at depths of approximately 1 to 10 ft along Highway 52 and at a depth of 6 ft below the existing ground surface at the proposed new pump station location. Subsurface water levels at the site will fluctuate during the year due to such things as seasonal and climatic variations and the construction activity in the area.

Conclusions and Recommendations

The exploration indicates the site is adaptable for the proposed construction. The primary concerns will be dewatering during construction and subgrade preparation at the pump station and jack-and bore excavation bearing depths.

The following presents our geotechnical considerations and recommendations regarding the proposed force main and pump station construction. During review of these recommendations, it should be kept in mind that, with any previously developed site, unexpected subsurface conditions will be encountered. These conditions could include such things as deeper fill deposits, buried debris, or remnants of previous development. The unexpected conditions can normally be handled during construction by on-site engineering evaluation.

Wet Well Support

We understand the wet well will bear at an approximate elevation of -2 ft in stiff, over-consolidated clays. We assume the net stress increase (pump station load minus weight of soil removed) at the bearing elevation will be minimal. Therefore, settlement and bearing capacity are not a concern provided the recommendations in the Subgrade Stabilization section are followed. Design of all below-grade structures should include provisions to resist buoyant/uplift forces. We assume uplift forces will be resisted by the weight of the structure. Recommendations for frictional resistance from soil can be provided upon request.



BCWS Pump Station 094 and Force Main Moncks Corner, South Carolina S&ME Project No. 1413-18-076

Lateral Earth Pressure Parameters

Retaining wall structures must be capable of resisting lateral earth pressures that will be imposed on them. Lateral earth pressures to be resisted by the walls will be partially dependent upon the method of construction. Assuming the walls are relatively rigid and structurally braced against rotation, they should be designed for a condition approaching the "at-rest" lateral pressure. However, in the event the walls are not restrained or rigidly braced, the "active" pressure conditions will be applicable for design. The lateral earth pressure parameters in Table 2 are recommended for design. These parameters are based on the excavation backfill material meeting the requirements of the *Controlled Fill* or the *Reuse of Excavation Spoils* sections of this report. These parameters assume a level backfill, a frictionless wall, and no hydrostatic pressure.

Lateral Earth Pressure Condition	Coefficient		Equivalent Fluid Pressure	
At-Rest Condition	(K _o) =	0.47	56.4	psf/ft
Active Condition	(K _A) =	0.31	36.9	psf/ft
Passive Condition	Passive Condition (K _P) = 3.25		390.6	psf/ft
Unit Weight of Soil (Moist)		11	0 pcf	
Friction Factor for Foundations and Bearing Soils		C).39	

Table 2 – Lateral Earth Pressure Parameters

The recommended lateral earth pressure coefficients do not consider the development of hydrostatic pressure behind the earth retaining wall structures. As such, positive wall drainage must be provided for all earth retaining structures. These drainage systems can be constructed of open-graded washed stone isolated from the soil backfill with a geosynthetic filter fabric and drained by perforated pipe, or several wall drainage products are made specifically for this application. Lateral earth pressures arising from surcharge loading and any slopes above the walls should be added to the above earth pressures to determine the total lateral pressure.

Lateral Earth Pressure Parameters with Earthquake Effects using Woods Method.

Section 1803.5.12 of IBC 2015 requires structures that are determined to be in Building Design Category D, E, or F be evaluated for lateral pressures on retaining walls due to earthquake motions. For smooth rigid (i.e., non-yielding) walls, Wood² developed the following equations for determining the dynamic thrust and dynamic overturning moment about the base of the wall:

² "Earthquake-induced soil pressures on structures," *Report EERL 73-05*, California Institute of Technology, Pasadena, California, 311 pp.

BCWS Pump Station 094 and Force Main Moncks Corner, South Carolina S&ME Project No. 1413-18-076

$$\Delta P_{eq} = \gamma H^2 (a_h/g) F_p$$

$$\Delta M_{eq} = \gamma H^3 (a_h/g) F_m$$

Where H is the height of the wall, L is the distance between walls, g is gravity, a_h is the amplitude of the harmonic base acceleration (1.14g for this project), and F_p and F_m are the dimensionless dynamic thrust and moment factors shown in the Figures 2 and 3, respectively.







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Figure 2 – Dimensionless moment factor for various geometries and soil Poisson's ratio values.

The point of application of the dynamic thrust is at a height H_{eq} above the base of the wall where:

$$H_{eq} = \Delta M_{eq} / \Delta P_{eq}$$

A Poisson's ratio of 0.3 may be used for the native soils. If the below grade walls are designed as yielding, cantilevered elements, then the above equations will not apply and those developed by Mononobe-Okabe (MO) will be more applicable. We can provide MO parameters if necessary.

Seismic Considerations

We performed a liquefaction analysis based on the design earthquake prescribed by the 2015 edition of the International Building Code (IBC 2015).³ This analysis indicates sand layers between the subsurface water level and a depth of approximately 20 ft of the site have the potential to liquefy during the design seismic event. Potentially liquefiable soils are not present below the bearing depth of the wet well; therefore, liquefaction settlement is not a concern for the pump station. Our analyses predict up to 5 in. of free-field liquefaction settlements are possible for ancillary structures supported at grade. We assume this magnitude of settlement is acceptable. Ground improvement recommendations for liquefaction mitigation can be provided upon request.

³ Liquefaction, the loss of a soil's shear strength due to the increase in porewater pressure resulting from seismic vibrations, is always a potential concern in coastal South Carolina. Analysis was performed using the "simplified procedure" presented by Youd et al. (2001).

The IBC design earthquake has a 2% probability of exceedance in 50 years. This is statistically equivalent to an event that occurs about once every 2,500 years. Our liquefaction analysis was based on an earthquake with a magnitude of 7.3 and ground surface acceleration of 1.14g.



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Section 1613.3.2 of the IBC 2015 classifies sites with the potential for liquefaction as Seismic Site Class F. However, the IBC 2015 allows the design spectral response accelerations for a site to be determined without regard to liquefaction provided the structures have a fundamental period of less than or equal to 0.5 seconds and the risks of liquefaction are considered in design. The proposed structure should meet this criteria; however, this must be confirmed by the Structural Engineer. The site should be considered a site class F. Provided the above criteria are met, the design accelerations may be calculated on the basis of a Site Class D assumption. The spectral response accelerations and site coefficients for the site are presented in Table 3.

Table 3 – Seismic Design Parameters

Site Class	Ss	S1	Fa	$\mathbf{F}_{\mathbf{v}}$	РСАм	Sds	S_{D1}
F	1.81g	0.63g	0.90	2.40	1.14g	1.08g	1.00g

Construction Considerations

Subgrade Stabilization

We anticipate that each of the jack-and-bore pits will bear between 5 and 15 ft below the existing grade. Based on the subsurface conditions encountered in soundings C-01 to C-06, loose sands and soft to firm clays are present at these depths. At the anticipated wet well bearing depth of 19 ft below existing grade (elevation -2 ft), stiff clay was encountered.

Excavations will likely encounter subsurface water. Subgrade stabilization will likely be required to provide a working surface. Excavation bottoms can be stabilized with placement of a non-woven geotextile fabric and/or placement of 18 to 24 in. of crushed stone. This will aid in dewatering and provide a stable working platform and bedding layer. Slag is not recommended as backfill due to its potentially expansive nature.

Excavations

Permanent and temporary retaining walls and shoring (such as trench boxes) must be capable of resisting lateral earth pressures that will be imposed on them. Final design and construction of excavation support is the responsibility of the contractor. To determine the total lateral pressure, excavation support design should consider the development of hydrostatic pressure behind the earth retaining structures and lateral earth pressures arising from surcharge loading or any slopes above the structure.

All excavations should be sloped or shored in accordance with local, state, and federal regulations, including OSHA (29 CFR Part 1926) excavation trench safety standards. Stockpiles should be placed a distance equal to or greater from the edge of the excavation as the depth of the excavation, and the stockpile height should be controlled so they do not surcharge the sides of the excavation. The responsibility for excavation safety and stability of temporary construction slopes should lie solely with the contractor. This information is provided only as a service, and under no circumstances should S&ME be assumed to be responsible for construction site safety.



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Dewatering

As previously stated, subsurface water was encountered at depths of approximately 1 to 10 ft below the existing ground surface. Excavations for the jack-and-bore pits, wet well, and some open cut trenches will likely extend below the subsurface water levels measured at the time of our exploration. Water level should be maintained at least 2 ft below excavation bottoms throughout construction to maintain bottom stability. This can be accomplished during construction with a combination of temporary well-points and/or pumping from sumps located within the excavation. The effects of dewatering on nearby structures should be evaluated and are the responsibility of the designer of any dewatering system.

Controlled Fill

Off-site borrow used as Controlled Fill material should be cohesionless soil containing no more than 15% fines (material passing the No. 200 sieve) by weight and having a maximum dry density of at least 100 pcf as determined by a laboratory modified Proctor compaction test (ASTM D 1557). The soil should be relatively free of organics, deleterious matter, and elongated or flat particles susceptible to degradation. All fill should be placed in uniform lifts of 10 in. or less (loose measure) and compacted to at least 95% of the modified Proctor maximum dry density.

Excavations, fill placement, and compaction operations should be observed by a qualified engineering technician working under the direction of the Geotechnical Engineer. In addition to this visual evaluation, the technician should perform a sufficient number of in-place field density tests to confirm the contractor's equipment and methods are capable of achieving the required degree of compaction.

Reuse of Excavation Spoils

The soils along the force main alignment, at the jack-and-bore pits, and at the pump station consist of sands with varying fines content, silts, and clays. The majority of the soils are moderately plastic and are moisture sensitive. When wet, these soils will become unstable and difficult to work.

The reuse of excavation spoils will be heavily dependent on final grades; the climatic conditions during construction; the aggressiveness of the earthwork schedule; site drainage; and the grading contractor's experience, equipment, means, and methods.

Limitations of Report

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions and recommendations contained in this report are based upon applicable standards of our practice in this geographic area at the time this report was prepared. No other representation or warranty either express or implied, is made.

We relied on project information given to us to develop our conclusions and recommendations. If project information described in this report is not accurate, or if it changes during project development, we should be



Geotechnical Exploration BCWS Pump Station 094 and Force Main Moncks Corner, South Carolina S&ME Project No. 1413-18-076

notified of the changes so that we can modify our recommendations based on this additional information if necessary.

Our conclusions and recommendations are based on limited data from a field exploration program. Subsurface conditions can vary widely between explored areas. Some variations may not become evident until construction. If conditions are encountered which appear different than those described in our report, we should be notified. This report should not be construed to represent subsurface conditions for the entire site.

Unless specifically noted otherwise, our field exploration program did not include an assessment of regulatory compliance, environmental conditions or pollutants or presence of any biological materials (mold, fungi, bacteria). If there is a concern about these items, other studies should be performed. S&ME can provide a proposal and perform these services if requested.

S&ME should be retained to review the final plans and specifications to confirm that earthwork, foundation, and other recommendations are properly interpreted and implemented. The recommendations in this report are contingent on S&ME's review of final plans and specifications followed by our observation and monitoring of earthwork and foundation construction activities.

Closure

We appreciate the opportunity to be of service on this project. If you have any questions concerning this report, please call.

Sincerely,

S&ME, Inc.

Robert A. Scott, E.I.T. Geotechnical Staff Professional



Kyle Murrell, P.E. Senior Engineer / Project Manager

Appendix I

Test Location Plans (Figures I-1 to I-7)

CPT Sounding Logs

Hand Auger Boring Logs Field Testing

Procedures









8	TEST LOCATION PLAN	SCALE: NTS	FIGURE NO.
μΞ	PUMP STATION 094 IMPROVEMENTS MONCKS CORNER, SOUTH CAROLINA	DATE: 8/22/19 PROJECT NUMBER: 1413-18-076	1-4



PUMP STATION 094 IMPROVEMENTS
MONCKS CORNER, SOUTH CAROLINA

PROJECT NUMBER: 1413-18-076










CPT REPORT - STANDARD - SBT BQ \ 1413-18-076_CPT LOGS.CPJ \ LIBRARY 2011_06_28.GDT \ 9/3/19

























PROJE	CT:	BCWS Force Main In Moncks Corner, So 1413-18-0	mprovements outh Carolina 076	HAND AUGER BORING LOG	HAND AUGER BORING LOG: C-01			
DATES	STARTE	ED: 1/8/19	DATE FINISHED:	1/8/19	NOTES:			
SAMPL	ING M	ETHOD: Hand-Auger	PERFORMED BY:	R. Scott				
WATE	R LEVE	L: 3.5' ATD						
Depth (feet)	GRAPHIC LOG		MATERIA	AL DESCRIP	PTION	ELEVATION (feet)	WATER LEVEL	
	××××	ORGANIC LADEN TOPSOIL =	<u>6 in.</u>					
		FILL: CLAYEY SAND (SC) Grayish brown, moist, fine Yellowish brown						
1 -		Brown with dark gray					-	
2 -							-	
		Small piece of plastic encou	untered					
3 -		<u>CLAYEY SAND (SC)</u> Light reddish brown, moist, fine					_	
		Reddish brown Dark gray					Ā	
4 -		Boring terminated at 4 ft						
	& =	DC HA	P INDEX IS THE DEPTH (IN. MMER FALLING 22.6 IN., DI) OF PENETRATI RIVING A 0.79 IN	ION PER BLOW OF A 10.1 LB N. O.D. 60 DEGREE CONE.	Page 1	of 1	

PROJECT:	BCWS Force Main Imp Moncks Corner, Sout 1413-18-076	rovements h Carolina		HAND AUGER BORING LOG: C-02
DATE STARTED:	1/8/19	DATE FINISHED:	1/8/19	NOTES:
SAMPLING METHOD:	Hand-Auger	PERFORMED BY:	R. Scott	
WATER LEVEL:	Not encountered			
Depth (feet) GRAPHIC LOG		MATERIAI	_ DESCRIP	NOILd (feet) (feet) FVTION
ORGAN	IC LADEN TOPSOIL = 4	in.		
CLAYE Yellowis	<u>Y SAND (SC)</u> h brown, moist, fine			
1 Bro	wn with some yellowish re	d		
2 -				_
Gra 3 -	y with yellowish brown			_
Yell	owish brown			
4 Ligh	nt gray			
4 Boring to	erminated at 4 ft			



PROJE	CT:	BCWS Force Main Im Moncks Corner, Sou 1413-18-07	nprovements th Carolina 76		HAND AUGER BORING LOG: C-	03	
DATE	STARTE	ED: 8/8/18	DATE FINISHED:	8/8/18	NOTES:		
SAMPL	ling me	THOD: Hand-Auger	PERFORMED BY:	R Scott			
WATE	R LEVE	L: Not Encountered					1
Depth (feet)	GRAPHIC LOG		MATERIA	L DESCRIP	PTION	ELEVATION (feet)	WATER LEVEL
		ORGANIC LADEN TOPSOIL =	<u>4 in.</u>				
		FILL: SILTY SAND (SP-SM) Light brown with crushed stone,	moist, fine				
		CLAYEY SAND (SC)					
1 -		Brown with reddish brown, moist	, fine				_
3 -		SANDY LEAN CLAY (CL) Bluish gray, moist, fine					
		Wet					
4 -		Boring terminated at 4 ft					
	&	DCF HAN	P INDEX IS THE DEPTH (IN. IMER FALLING 22.6 IN., DF) OF PENETRATI RIVING A 0.79 IN.	ION PER BLOW OF A 10.1 LB L. O.D. 60 DEGREE CONE. Pag	ne 1	of 1

PROJE	CT:	BCWS Force Main Improvements Moncks Corner, South Carolina 1413-18-076				HAND AUGER BORING LOG: C-04	
DATE	START	ED:	8/8/18	DATE FINISHED:	8/8/18	NOTES:	
				1			
SAMPL	ING N	IETHOD:	Hand-Auger	PERFORMED BY:	R Scott		
WATE	R LEVI	EL:	Not Encountered				
Depth (feet)	GRAPHIC LOG			MATERIA	L DESCRIP	PTION REAL	(feet) WATER LEVEL
		ORGA	NIC LADEN TOPSOIL =	<u>2 in.</u>			
1 -		<u>SILTY</u> Light F	SAND (SP-SM) Brown, Moist, Fine				_
2 -		SILTY Dark E	SAND (SM) Brown, Moist, Fine				_
		SAND Yellow SILTY Dark (<u>(SP)</u> rish Brown, Moist, Fine SAND (SM) Gray, Moist, Fine				
4 -		Boring	terminated at 4 ft				L

DCP INDEX IS THE DEPTH (IN.) OF PENETRATION PER BLOW OF A 10.1 LB HAMMER FALLING 22.6 IN., DRIVING A 0.79 IN. O.D. 60 DEGREE CONE.

PROJE	CT:	BCWS Force Main In Moncks Corner, So 1413-18-0	nprovements uth Carolina 76	HAND AUGER BORING LC	HAND AUGER BORING LOG: C-05			
DATES	STARTE	D: 8/8/18	DATE FINISHED:	8/8/18	NOTES:			
SAMPL	.ING ME	THOD: Hand-Auger	PERFORMED BY:	R Scott				
WATE		L: 3' ATD					1	
Depth (feet)	GRAPHIC LOG		MATERIA	L DESCRIP	PTION	ELEVATION (feet)	WATER LEVEL	
		ORGANIC LADEN TOPSOIL =	<u>2 in.</u>					
		<u>SAND (SP)</u> Yellow, Moist, Fine						
		CLAYEY SAND (SC) Dark Brown, Moist, Fine						
1 -							_	
		Reddish Brown						
2 -		Gray					-	
3 -		Gray with Reddish Brown					Ţ	
4 -		Boring terminated at 4 ft						
	& =	DCI HAI	P INDEX IS THE DEPTH (IN.) MMER FALLING 22.6 IN., DR	OF PENETRATI NVING A 0.79 IN	FION PER BLOW OF A 10.1 LB N. O.D. 60 DEGREE CONE.	Page 1	of 1	

PROJECT:	BCWS Force Main Ir Moncks Corner, So 1413-18-0	nprovements uth Carolina 176	HAND AUGER BORING LOG: C-06			
DATE START	ED: 8/8/18	DATE FINISHED:	8/8/18	NOTES:		
SAMPLING M	IETHOD: Hand-Auger	PERFORMED BY:	R Scott			
WATER LEVE	EL: Not Encountered					
Depth (feet) GRAPHIC LOG		MATERIA	L DESCRIP	TION	ELEVATION (feet)	WATER LEVEL
	ORGANIC LADEN TOPSOIL = CLAYEY SAND (SC) Reddish Brown, Moist, Fine	<u>3 in.</u>				
1-	Brown					_
2 -	Dark Gray					-
3 -	Encountered 1/8" wood roo	ts				_
4	Greenish Gray Boring terminated at 4 ft					
	DC HA	P INDEX IS THE DEPTH (IN. MMER FALLING 22.6 IN., DF) OF PENETRATI RIVING A 0.79 IN.	ION PER BLOW OF A 10.1 LB . O.D. 60 DEGREE CONE.	Page 1	of 1

PROJE	CT:	BCWS Force Main Ir Moncks Corner, So 1413-18-0	nprovements uth Carolina 76	HAND AUGER BORING LO	HAND AUGER BORING LOG: C-07			
DATES	STARTE	ED: 8/8/18	DATE FINISHED:	8/8/18	NOTES:			
SAMPL	.ING ME	ETHOD: Hand-Auger	PERFORMED BY:	R Scott				
WATE	RLEVE	L: Not Encountered						
Depth (feet)	GRAPHIC LOG		MATERIA	L DESCRIP	PTION	ELEVATION (feet)	WATER LEVEL	
1 -		ORGANIC LADEN TOPSOIL = FILL: SILTY SAND (SM) Dark Brown, Moist, Fine	<u>1 in.</u>				-	
2 -		Light Brown					-	
3 -							—	
4 -		CLAYEY SAND (SC) Reddish Brown, Moist, Fine Finer #200 Sieve= 40.3%, Moi Dark Gray Boring terminated at 4 ft	sture Content = 17.3%					
		DC HAI	P INDEX IS THE DEPTH (IN.) MMER FALLING 22.6 IN., DR	OF PENETRATI VING A 0.79 IN.	TION PER BLOW OF A 10.1 LB N. O.D. 60 DEGREE CONE.	Page 1	of 1	

PROJECT:	BCWS Force Main Improvements Moncks Corner, South Carolina 1413-18-076					ND AUGER BORING LOG: C	-08	
DATE START	ED:	8/8/18	DATE FINISHED:	8/8/18	1	NOTES:		
			1					
SAMPLING M	ETHOD:	Hand-Auger	PERFORMED BY:	R Scott				
WATER LEVE	EL:	Not Encountered						
Depth (feet) GRAPHIC LOG			MATERIAL	_ DESCRIP	PTION		ELEVATION (feet)	WATER LEVEL
1 -	ORGA FILL: Dark E	<u>NIC LADEN TOPSOIL = 1</u> <u>SILTY SAND (SM)</u> Brown, Trace Red, Moist, Fir	i <u>n.</u> ne					_
2-	<u>SAND</u> Reddis	<u>Y CLAY (CL)</u> sh Brown, Moist, Fine						_
	Gi Finer ‡	′ay ¢200 Sieve = 58.9%, Moistu	re Content = 26.5%					
	Re	ed with Reddish Brown						
4 1 2 . 2	Boring	terminated at 4 ft					1	L

PROJE	ECT:	BCWS Force Main Ir Moncks Corner, So 1413-18-0	nprovements uth Carolina 76	HAND AUGER BORING L	HAND AUGER BORING LOG: C-09				
DATE	STARTEI	D: 3/5/19	DATE FINISHED:	3/5/19	NOTES:				
SAMPL	LING ME	THOD: Hand-Auger	PERFORMED BY:	R Scott					
WATE	R LEVEL	.: Not Encountered					1		
Depth (feet)	GRAPHIC LOG		MATERIA	L DESCRIP	PTION	ELEVATION (feet)	WATER LEVEL		
		ORGANIC LADEN TOPSOIL =	<u>4 in.</u>						
		<u>SILTY SAND (SM)</u> Dark Gray, Moist, Fine							
		CLAYEY SAND (SC) Gray with Red, Moist, Fine							
1 -		Yellowish brown with reddis	h brown				-		
2 -		Reddish yellow with gray an	ıd red				-		
3 -		Gray with brownish yellow					_		
		Dark gray with red and yello	W						
		SANDY LEAN CLAY (CL) Greenish Gray moist find							
		Greenish Gray, moist, nine							
4 -		Boring terminated at 4 ft]	L		
		DC HAI	P INDEX IS THE DEPTH (IN. MMER FALLING 22.6 IN., DF) OF PENETRATI RIVING A 0.79 IN	TON PER BLOW OF A 10.1 LB I. O.D. 60 DEGREE CONE.	Page 1	of 1		

PROJE	CT:	BCWS Force Main In Moncks Corner, Sou 1413-18-0	nprovements uth Carolina 76		HAND AUGER BORING LOG: HA	-01	
DATE S	STARTE	ED: 1/8/19	DATE FINISHED:	1/8/19	NOTES:		
SAMPL	ING MI	ETHOD: Hand-Auger	PERFORMED BY:	R. Scott			
WATE	RLEVE	L: 1' ATD					
Depth (feet)	GRAPHIC LOG		MATERIA	L DESCRIP	TION	ELEVATION (feet)	WATER LEVEL
		ORGANIC LADEN TOPSOIL =	<u>6 in.</u>				
		SLIGHTLY CLAYEY SAND (SP Grayish brown, moist, fine	<u>-SC)</u>				
1 -		Yellow					∇
		CLAYEY SAND (SC) Reddish brown, moist, fine					
2 -			brown				_
		Gray with red and yellowish	prown				
3 -							-
4 -	////	Boring terminated at 4 ft					E
	&	DCF	P INDEX IS THE DEPTH (IN.) MMER FALLING 22.6 IN., DF) OF PENETRATIC RIVING A 0.79 IN.	ON PER BLOW OF A 10.1 LB O.D. 60 DEGREE CONE.		
					Pa	ge 1	of 1

PROJE	CT:	BCWS Force Main Ir Moncks Corner, So 1413-18-0	nprovements uth Carolina 76		HAND AUGER BORING LOG: HA	-02	
DATE S	TARTE	ED: 1/8/19	DATE FINISHED:	1/8/19	NOTES:		
SAMPL	ING ME	THOD: Hand-Auger	PERFORMED BY:	R. Scott			
WATER		L: Not encountered					
Depth (feet)	GRAPHIC LOG		MATERIA	AL DESCRIP	TION	ELEVATION (feet)	WATER LEVEL
		ORGANIC LADEN TOPSOIL =	<u>4 in.</u>				
		SLIGHTLY CLAYEY SAND (SF Brownish yellow, moist, fine	<u>P-SC)</u>				
		CLAYEY SAND (SC) Yellowish brown, moist, fine					
1 -		1/2" root encounered					-
2 -							-
		Yellowish brown with red ar	nd gray				
3 -							_
		Red with yellowish brown a	nd gray				
4							
		Boring terminated at 4 ft					
Ξ	&	DC HAI	P INDEX IS THE DEPTH (IN. MMER FALLING 22.6 IN., DF) OF PENETRATI RIVING A 0.79 IN.	ON PER BLOW OF A 10.1 LB . O.D. 60 DEGREE CONE. Pag	e 1	of 1

PROJE	CT:	CT: BCWS Force Main Improvements Moncks Corner, South Carolina 1413-18-076				HAND AUGER BORING	G LOG: HA-03
DATE S	STARTE	D: 1/8/19		DATE FINISHED:	1/8/19	NOTES:	
SAMPL	ING ME	THOD: H	and-Auger	PERFORMED BY:	R. Scott		
WATE		: Not end	countered				
Depth (feet)	GRAPHIC LOG			MATERIA	L DESCRIP	TION	ELEVATION (feet) WATER LEVEL
		ORGANIC LAD	DEN TOPSOIL =	<u>6 in.</u>			
1 -		Red with g	ray and yellowish	brown			
2 -							_
3 -							_
4 -	L <u></u>	Boring terminal	ed at 4 ft				
	&		DCP HAW	INDEX IS THE DEPTH (IN.) IMER FALLING 22.6 IN., DR	OF PENETRATIO	ON PER BLOW OF A 10.1 LB . O.D. 60 DEGREE CONE.	Page 1 of 1

FIELD TESTING PROCEDURES

Cone Penetrometer Test (CPT) Sounding

The cone penetrometer test soundings (ASTM D 5778) were performed by hydraulically pushing an electronically instrumented cone penetrometer through the soil at a constant rate. As the cone penetrometer tip was advanced through the soil, nearly continuous readings of point stress, sleeve friction and pore water pressure were recorded and stored in the on-site computers. Using theoretical and empirical relationships, CPT data can be used to determine soil stratigraphy and estimate soil properties and parameters such as effective stress, friction angle, Young's Modulus and undrained shear strength.

The consistency and relative density designations, which are based on the cone tip resistance, q_t for sands and cohesive soils (silts and clays) are as follows:

SANDS	5	SILTS AND CLAYS							
Cone Tip Resistance, qt (tsf)	Relative Density	Cone Tip Resistance, qt (tsf)	Consistency						
<20	Very Loose	<5	Very Soft						
20 - 40	Loose	5 - 10	Soft						
40 - 120	Medium Dense	10 - 15	Firm						
		15 - 30	Stiff						
120 - 200	Dense	30 - 60	Very Stiff						
>200	Very Dense	>60	Hard						

CPT Correlations

References are in parenthesis next to the appropriate equation.

General

 $\begin{array}{l} p_{a} = atmospheric \mbox{ pressure (for unit normalization)} \\ q_{t} = corrected \mbox{ cone tip resistance (tsf)} \\ f_{s} = friction \mbox{ sleeve resistance (tsf)} \\ R_{f} = 100\% * (f_{s}/q_{t}) \\ u_{2} = \mbox{ pore pressure behind cone tip (tsf)} \\ u_{2} = \mbox{ pore pressure behind cone tip (tsf)} \\ u_{0} = \mbox{ hydrostatic pressure} \\ B_{q} = (u_{2}-u_{0})/(q_{t}-\sigma_{v_{0}}) \\ Q_{t} = (q_{t}-\sigma_{v_{0}})/\sigma_{v_{0}} \\ F_{r} = 100\% * f_{s}/(q_{t}-\sigma_{v_{0}}) \\ I_{c} = ((3.47-\mbox{log}Q_{t})^{2} + (\mbox{log}F_{r}+1.22)^{2})^{0.5} \end{array}$

 $\frac{\text{N-Value}}{N_{60}} = (q_t/pa)/[8.5(1-l_c/4.6)]$ (6)

(6) Jefferies, M.G. and Davies, M.P., (1993), "Use of CPTu to estimate equivalent SPT N60", ASTM Geotechnical Testing Journal, Vol. 16, No. 4

CPT Soil Classification Legend



	Robertson's Soil Behavior Type (SBT), 1990													
Group #	Description		C											
Group #	Description	Min	Max											
1	Sensitive, fine grained	N	I/A											
2	Organic soils - peats	3.60	N/A											
3	Clays - silty clay to clay	2.95	3.60											
4	Silt mixtures - clayey silt to silty clay	2.60	2.95											
5	Sand mixtures - silty sand to sandy silt	2.05	2.60											
6	Sands - clean sand to silty sand	1.31	2.05											
7	Gravelly sand to dense sand	N/A	1.31											
8	Very stiff sand to clayey sand (High OCR or cemented)	N	/A											
9	Very stiff, fine grained (High OCR or cemented) N/A													

Soil behavior type is based on empirical data and may not be representative of soil classification based on plasticity and grain size distribution.

Relative Density and Consistency Table												
SANDS		SILTS and CLAYS										
Cone Tip Stress, qt (tsf)	Relative Density	Cone Tip Stress, qt (tsf)	Consistency									
Less than 20	Very Loose	Less than 5	Very Soft									
20 - 40	Loose	5 - 15	Soft to Firm									
40 - 120	Medium Dense	15 - 30	Stiff									
120 - 200	Dense	30 - 60	Very Stiff									
Greater than 200	Very Dense	Greater than 60	Hard									

Appendix II

Laboratory Data Sheets

Laboratory Testing Procedures

SIEVE ANALYSIS OF SOILS

Form No: TR-D422-WH-1Ga Revision No. 1 Revision Date: 8/10/17



	ASTM D 422 S&ME, Inc Charleston: 620 Wando Park Boulevard, Mt. Pleasant, SC 29464													
	S&ME, Inc Ch	harleston: 6	20 Wando	Park Boule	evard, Mt.	Pleasant	, SC 29464							
Project #: 12	113-18-076				ŀ	Report D	ate:	9-10-18						
Project Name: PS	5904 Improveme	ents				lest Date	e(s):	8-20-18						
Client Name: H	azen and Sawye	r <u>c : 1220 c</u>		6 20201		_								
Client Address:	122 Lady Street,	Suite 1230: Co	Siumbia, S	C 29201		6	-la Datas	0/14/	10					
Sample Id. C-01		<u> </u>	Type:	Grad Sam	pie	Samp	Denth	8/14/	18					
Location.	Sandy	Sal	niple.	# I			Depth	5 - 4	IL					
	Sandy C	ay (CL), Greer	lish Glay, I	TIOISC										
100%	1.5" 1" 3/4"	3/8" #4	#10	#20	#40 #0	50 #100	#200							
10070														
90%									_					
80%														
8														
									- 1					
30%									_					
20%														
2070														
10%									_					
0%														
100.00		10.00	Aillimeters	1.00			0.10		0.01					
Calification	. 200	(1211)			· Ca		0.425							
Gravel	< 300 mm	(12) and > 4.75 m	mm (3) n (#4)	F	Silt		< 0.425 m	m and > 0.0	5 mm					
Coarse Sand	< 4.75 mm	n and >2.00 mn	n (#10)		Clay		< 0.075	0.005 mm	,					
Medium Sand	< 2.00 mm	and > 0.425 m	m (#40)		Colloids		<	0.001 mm						
Maximum Partic	le Size 1/2'	ı	Coa	arse Sand	0.2%		Fine	Sand	15.6%					
	Gravel 4.1%	0	Med	ium Sand	3.3%		Silt 8	k Clay	76.8%					
Liqui	d Limit		Pla	astic Limit			Plastic	Index						
Specific (Gravity						Moisture Co	ontent	44.7%					
Coars	e Sand 0.2%	0	3.3%		Fine	Sand	15.6%							
Descriptio	cription of Sand & Gravel Particles: Rounded Angular													
Hard &	Durable		Soft I			Weathe	red & Friabl	e 🗆						
Notes / Deviations / Re	ferences:													
	have l													
Telford V	Telford Wood Group Leader 8/6/2018													
Technical Respo	cal Responsibility Signature Position Date													
	This report shall	not be reproduce	ed, except in j	full, without th	e written ap	proval of S	&ME, Inc.							

3201 Spring Forest Road Raleigh, NC. 27616 Grain - C-01A - #1 - 9-10-18.xlsx Page 1 of 1

SIEVE ANALYSIS OF SOILS



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Project #:		14	13-1	18-0)76														Rep	oort D)ate:				9-	10-1	18	
Project Na	me:	PS	904	Imp	orove	emer	nts												Tes	st Dat	e(s):				8-	20-1	18	
Client Nam	ne:	Ha	azen	and	d Sav	wyer																						
Client Add	ress:	11	22 L	ady	' Stre	eet, S	Suit	e 1	230): C	olu	mbia	a, SC I	292()1													
Sample Id.	C-	·01									Тур	e:	F	Push	Τι	Jbe	Ð			Sam	ple [Dat	e:			8/14	4/18	
Location:										Sai	mpl	e:		#	ŧ2						D	ер	th		1	0 to	12 ft	
Sample De	script	ion:		5	Sand	y Fat	: Cla	ay	(C⊢	l) G	ree	nish	Gray	, mc	ist	, fi	ne											
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Cok	obles			< 3	800 m	าm (1	2")	and	<	75	mm	(3")				Fir	ne S	and			<	0.4	425	mn	n an	d > (0.075 r	nm
Gr	avel				< 75	mm a	and	> 4	1.75	mn	n (#	4)					Silt	t				<	0.0	75 a	and	> 0.0	05 mr	n
Coars	e Sano	d		<	4.75	mm	and	>2	2.00	mn	n (#	10)					Cla	<u>у</u>						< (0.00	5 mr	n	
Mediu	m Sar	nd Dortio		< 2	2.00 r	nm a #20	nd	> 0	.42	5 m	m (i	#40)			- d	С	ollo	ids	,) >	0.00	1 mr	n 2.0	2/
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Notes / Dev	Notes / Deviations / References:																											
	Telford Wood Clapsezional Group Leader 8/6/2018																											
Т	echnica	l Respo	nsibili	<u>u</u> ty						Siar	natur	е		-					Pos	ition						<u></u>	Date	<u> </u>
			Tł	, nis re	port s	hall n	ot b	e re	pro	duce	ed, ex	xcept	in full,	with	out	the	e wri	tten	appro	oval of	S&M	E, Ir	IC.					

SIEVE ANALYSIS OF SOILS



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	S&ME, Inc Charleston: 620 Wando Park Boulevard, Mt. Pleasant, SC 29464 Project #: 1413-18-076 Report Date: 9-10-18																							
Project	#:	1	413	-18-	076											Re	port D	Date:			9-	-10-1	8	
Project	Name:	Ρ	°S90	4 In	nprov	emei	nts									Te	st Dat	:e(s):			8.	-20-1	8	
Client N	lame:	F	laze	n ar	nd Sav	wyer																		
Client A	ddress:	1	122	Lad	ly Stre	eet, S	Suite	e 12	30:	Colu	mbia	, SC 2	9201											
Sample	Id. C	-04								Тур	be:	P	ush T	ub	e		Sam	ple D	ate	:		8/14	4/18	
Location	n:								S	ampl	le:		#1					De	epth	٦		6 to	8 ft	
Sample	Descrip	tion:			Sand	ly Fat	t Cla	ay (C	CH)	Gray	to G	reenis	sh Gra	ay,	moist	t, fine								
	4000/	3''		1.5"	1''3	/4''	3/8	8''	#	4	#1	10	#20)	#40	#60	#100	#2	200					
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	Cobbles			<	300 r	nm (1	12")	and	> 75	5 mm	1 (3")			Fi	ne Sar	nd		<	0.42	25 m	im ar	$\frac{1d > 0}{1d}$	0.075 m	nm
C	Gravel	nd			< 15	mm a	and and	> 4. >2	75 m 00 m	1m (# 1m (#	⊧4) ±10)				Clay				< 0	.075	and	> 0.0	05 mm	1
Me	dium Sa	nd		<	2.00	mm a	and :	> 0.4	425 r	nm (:	#40)			C	Clay	s				<	0.00	1 mn	n	
Ma	ximum	Parti	cle S	Size		#10					C	oarse	Sanc	1	0.1	%				Fine	e Sar	nd	26.2	%
			Gra	avel	(0.0%					Me	edium	Sanc	ł	3.7	'%			9	Silt a	& Cla	ау	70.0	%
		Liqu	id Li	imit		78					F	Plastic	Limit	t	34	4			Pla	astic	Inde	ex	44	
																		Mois	stur	e Co	onte	nt	39.39	%
	(Coars	se S	and	().1%					Me	edium	Sanc	1	3.7	'%				Fine	e Sar	nd	26.29	%
	Desc	ripti	on c	of Sa	ind &	Grav	vel I	Part	icles	::			Rou	Ind	led				An	igula	ar			
	Ha	rd &	ιDu	rabl	е]			Sc	oft					N	/eathe	ered 8	ያ Fi	riab	le			
Notes / L	Deviation	ns / R	efere	ences	5:																			
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SIEVE ANALYSIS OF SOILS



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	S8	&ME, Inc.	- Charlesto	n: 620 V	Vando Pa	rk Boule	vard, M	t. Pleasar	nt, SC 29464		
Project #:	1413	3-18-076						Report I	Date:	9-10-18	
Project Name:	PS90	04 Improv	/ements					Test Da	te(s):	8-20-18	
Client Name:	Haze	en and Sa	iwyer								
Client Address:	1122	2 Lady Str	eet, Suite ´	230: Colun	nbia, SC	29201					
Sample Id. C	-06			Туре	e: F	Push Tub	e	Sam	ple Date:	8/14/18	
Location:				Sample	e:	#1			Depth	10 to 12 ft	
Sample Descript	tion:	Clay	ey Sand (S	C) Gray to I	Reddish I	Brown, m	noist, fin	e			
	3''	1.5" 1"3	3/4'' 3/8''	#4	#10	#20	#40	#60 #100) #200		
100%							• • • • • • • • • • • • • • • • • • •	• •			
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Cobbles		< 300	mm (12") an	d > 75 mm	(3")	Fi	ine Sand		< 0.425 mr	n and > 0.075 mi	m
Gravel		< 75	mm and >	4.75 mm (#4	4)		Silt		< 0.075 a	and > 0.005 mm	
Coarse San	d	< 4.75	5 mm and >	2.00 mm (#1	0)		Clay		<	0.005 mm	
Medium Sai	nd Particla	< 2.00 Sizo	mm and > $($).425 mm (#	(40)) Sand			< Fino	$\frac{0.001 \text{ mm}}{2.09}$	/
	Gr	SIZE Size	#4 0.0%		Modium	e Sanu	20.2%	<u> </u>	Sil+ 8	-3410 + 45.9%	0 (
	l iquid I	imit	0.076		Plasti	r Sanu c Limit	20.27		Plastic	Indev	0
					T lastr	C Linne			Moisture Co	ntent 16.2%	6
(Coarse S	Sand	0.5%		Medium	n Sand	20.2%	,)	Fine	Sand 43.9%	6
Desc	ription	of Sand 8	k Gravel Pa	rticles:		Round	led		Angula	r 🗆	
На	rd & Dι	urable		Sof	ft 🗆			Weath	ered & Friable	e 🗆	
Notes / Deviation	s / Refer	ences:									
Talfa	ord Ma	od	C	Sopat 24	ord		Gr		der	8/6/J010	2
Technico	al Resnonsi	bilitv		Sianature		-	<u> </u>	Position		0/0/2010 Date	<u>,</u>
, cennee		This report	shall not be r	eproduced, ex	cept in full,	without th	e written d	approval of	^r S&ME, Inc.	Dutt	
		·									

SIEVE ANALYSIS OF SOILS



ASTM D 422

	S&ME, Inc Charleston:620 Wando Park Boulevard, Mt. Pleasant, SC 29464Project #:1413-18-076Report Date:9-10-18																							
Project #	:	141	3-1	8-076												Rep	oort D	ate:			9	-10-	18	
Project N	lame:	PSS	904	Improv	/eme	ents										Te	st Date	e(s):			8	-20-	18	
Client Na	ime:	Ha	zen	and Sa	wye	ſ											_							
Client Ad	dress:	112	22 La	ady Sti	reet,	Suite	e 123	30: C	olur	nbia	, SC 2	9201	1											
Sample Io	d. C	-07							Тур	e:	Gra	ab Sa	amp	ple			Samp	ole D	ate	:		8/1	4/18	
Location:								Sa	mple	e:		#1	1					De	epth	۱		3 to	94 ft	
Sample D	Descript	tion:		Clay	ey Sa	and	(SC)	Dark	Bro	wn	to Re	ddisł	n Br	rowi	n, m	oist,	fine							
		3''	1.	5" 1":	3/4''	3/8	8''	#4		#1	10	#2	0	#4	40	#60	#100	#2	200					
1	100%		•	••	+	+						-			•	•	• • • • • • • • • • • • • • • • • • •		•	1				٦ [
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ant P	50%																							
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	0% 100	.00				10.0	00		1:11:-			1.00				1		0.10	•	_			(0.01
									/11111	neter	S													
C	obbles			< 300	mm (12")	and	> 75	mm	(3")			Fi	ine S	Sand			<	0.42	25 m	m ar	nd >	0.075 ı	nm
(Gravel		_	< 75	mm	and	> 4.7	'5 mr	n (#4	4)				Sil	t				< 0.	.075	and	> 0.0)05 mr	n
Coa	rse San	d ad	-	< 4.7	5 mm	and	>2.0	$\frac{10}{25}$ m	n (#*	10)					ay Nide					<	0.00	05 mr	n m	
Maxi	imum l	Particle	Siz	< 2.00	3/8"	anu	> 0.4	25 M	111 (#	-40) C	Oarse	San	d (2011C () 5%	<u></u>				< Fine	Sar	n mi nd	50 F	%
TT CAL	innann i	G C	irave		0.8%					Me	dium	San	d d	-	7 9%	, ,			c	Silt 8	v Cla	av	40.2	%
		, Dianid	lim	it	0.070	,				F	Plastic	Limi	it			5			Pla	ostic	Inde	ay ay	-10.2	. 70
		Liquid	2								lastic	L						Moig	stur	e Co	onte	nt	17 3	%
	0	Coarse	San	d	0.5%)				Me	dium	San	d	7	7.9%	, D				Fine	Sar	nd	50.6	5%
	Desc	ription	of S	Sand 8	k Gra	ivel f	Parti	cles:				Ro	unc	bed		-			An	gula	ar			-
	Ha	rd & D	oura	ble	[3			So	ft						W	'eathe	red &	ይ Fr	riabl	e			
Notes / De	eviation	s / Refe	erenc	ces:																				
	Tolfa	ord W	004	I		C	-l.	ope	150		R				G		امحم	or				<i>ر</i> و	6/201	8
	Technic	al Respon	sibilit	<u>.</u> v				Sia	nature	2					<u>u</u>	<u>oup</u> Por	sition					0/	Date	0
			Thi	, is report	shall	not be	e repr	oduce	ed, ex	cept i	n full, v	vithou	ıt th	e wr	itten	appro	oval of S	S&ME	, Inc.					
							•																	
Form No: TR-D422-WH-1Ga Revision No. 1 Revision Date: 8/10/17

SIEVE ANALYSIS OF SOILS



ΔS.	тм	D	422
72	1 1 1 1		466

		S&I	ME,	Inc	Chai	rlest	on:	62	20 Wa	and	o Parl	k Bo	ule	varo	d, N	lt. Ple	easant	t, SC i	294	164				
Project #:	1	413-	-18-	076												Rep	ort D	ate:			9-	10-1	8	
Project Name:	Р	S904	4 Im	prov	emen	ts										Tes	st Date	e(s):			8-	20-1	8	
Client Name:	F	lazer	n an	d Sav	wyer																			
Client Address	5: 1	122	Lady	y Stre	eet, S	uite	123	30: C	oluml	bia,	SC 29	9201	1											
Sample Id.	C-08							-	Туре:		Gra	b Sa	amp	ole			Samp	ole Da	ate	:		8/14	1/18	
Location:								Sar	mple:			#1	1					De	pth	1		3 to	4 ft	
Sample Descri	ption:			Sand	y leai	n CL	AY	(CL)	Redd	ish	Browr	ז, m	ois	t, fir	ne									
	3''		1.5''	1''3	/4''	3/8		#4		#1(D	#2	0	#4	10	#60	#100	#2	00					
100%			+	-	•	•				+						_	-							1
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Cobble	s		<	300 n	nm (1)	2") a	nd :	> 75 ı	mm (3	3")			Fi	ne S	and			< ().42	.5 m	m an	d > ().075 n	nm
Gravel				< 75	mm a	nd >	· 4.7	'5 mn	n (#4)					Sil	t				< 0.	075	and	> 0.0	05 mm	۱
Coarse Sa	and		<	4.75	mm a	and :	>2.0	0 mn	n (#10))	_			Cla	<u>у</u>					<	0.00	5 mm	<u>ו</u>	
Medium S	and		<	2.00 ı	nm ai	nd >	0.4	25 m	m (#4	0)		<u> </u>	(,			_	< 	0.00	1 mm	ו 272	0/
waximum	Parti	cie S	ize	:	5/8 \ 10/						arse :	Sano	a a	1).5% ว 10	0 //			ç	Fine	san	a	27.2	70 07
	Liqui	Gra Gra	wei mit	C	J.4 <i>7</i> 0				ļ	iviec DI	aum . actic	Sano	u i+	1	5.17	0			DIa		x Cla Inda	iy X	50.9	70
	Liqu		iiiit							FI	astic		IL.					Mois	r ia tur		nter	:x >t	26 5	%
	Coars	se Sa	nd	() 5%					Mer	dium (Sani	h	1	3 19	/	1	1013	tur	Fine	San	n d	20.5	%
Des	criptio	on o	f Sai	nd &	Grav	el P	arti	cles:		ivice		Ro	unc	led	5.17				An	qula	ar			70
Н	ard &	L Dur	able	3					Soft							W	eathei	red 8	٤Fr	iabl	е			
Notes / Deviatio	ons / R	efere	nces.	:																				
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<u>lei</u>	rord \	VVOO	<u>d</u>					Circu	atura						Gr	oup	Lead	<u>er</u>				8/6	0/201	<u>ŏ</u>
Techn	icai Resp	onsibi T	uty This ri	onort a	hall n	nt hø	renr	sıgr oduce	iature d exce	ont in	full w	ithou	ıt th	e wri	tten	Pos	uion wal of S	&MF	Inc				Date	
		,		sports	and the		, cpi	Judie	u, cale	Prul	1011, 11		•••••	C VVII	uc11	appit	, ut of S	SALL,						

LABORATORY TESTING PROCEDURES

Atterberg Limits Test (ASTM D-4318)

Atterberg Limits tests were performed to determine the soil plasticity characteristics. The soil plasticity index (PI) is representative of this characteristic and is bracketed by the liquid limit (LL) and the plastic limit (PL). The liquid limit is the moisture content at which the soil will flow as a heavy viscous fluid. The plastic limit is the moisture content at which the soil begins to lose its plasticity. The difference between the liquid limit and plastic limit is the plasticity index.

Grain Size Tests (ASTM D 1140 and ASTM D 422)

Grain size tests were performed to determine the soil particle size distribution. The amount of material finer than the #200 sieve was determined by washing the sample over that particular size sieve. The grain size distribution of the soil retained on the #200 sieve was then determined by passing the retained portion through a standard set of nested sieves.

Natural Moisture Content Test (ASTM D 2216)

Moisture content tests were conducted to determine the ratio, expressed as a percentage, of the weight of water in a given amount of soil to the weight of the solid particles.





				PROJECT ENGINEER:	K. BAIR	
				DESIGNED BY:	L FANNING	
				DRAWN BY:	L FANNING	
2	ADDENDUM No. 1	MAY 2020	HAZEN	CHECKED BY:	B ORNE	
1	CONSTRUCTION	MAR 2020	HAZEN	IE THIS BAR DOES NOT	0 1/2" 1"	
0	REGULATORY REVIEW	OCT 2019	HAZEN	MEASURE 1" THEN DRAWING IS		
REV	ISSUED FOR	DATE	BY	NOT TO FULL SCALE		



MOUNT HOLLY COMMERCE PARK IMPROVEMENTS PHASE 1

BERKELEY COUNTY WATER & SANITATION

MONCKS CORNER, SOUTH CAROLINA



PROFILE H: 1" = 40' V: 1" = 4'

NOTES:

1. FORCEMAIN PIPING TO BE RESTRAINED AT ALL BENDS, TEES, REDUCERS, AND VALVES. REFER TO DETAIL 10/CD03 FOR MINIMUM LENGTHS.

	DATE:	MARCH 2020
PUMP STATION 094	HAZEN NO.:	30557-004
24-INCH FORCEMAIN	CONTRACT NO.	
PLAN AND PROFILE		
STA 0+00 TO STA 10+40	NUMBER.	
		C201





							AVEL DRIVE		
			EX GRADE				GR		
4.0' MIN COVER									
		24" C900 DF	2-18 PVC FM						
14+	+00 1	5+00	16-	+00	17+	+00	18-	-00	

	DATE:	MARCH 2020
PUMP STATION 094	HAZEN NO.:	30557-004
24-INCH FORCEMAIN	CONTRACT NO.	.: 01
PLAN AND PROFILE STA 10+40 TO STA 20+80	DRAWING NUMBER:	
		C202





				PROJECT ENGINEER:	K. BAIR	
				DESIGNED BY:	L FANNING	
				DRAWN BY:	L FANNING	
2	ADDENDUM No. 1	MAY 2020	HAZEN	CHECKED BY:	B ORNE	
1	CONSTRUCTION	MAR 2020	HAZEN	IE THIS BAR DOES NOT	0 1/2" 1"	
0	REGULATORY REVIEW	OCT 2019	HAZEN	MEASURE 1" THEN DRAWING IS		1
REV	ISSUED FOR	DATE	BY	NOT TO FULL SCALE		

CONTH CAROUND HAZEN & ROLL SAWYER CO0638

END			— 24" FM	2 STA 26- 4" AIR F SEE DE	RELEASE VALVE TAIL 1/CD02	$\left(\right)$	SILT FENCE	, TYP	EX 6" FM,	PREVIOUSLY A
	17.5'±				US HI	GHWAY	52 (NOR	T H)		
///iód////	25+00 ≠≠≠≠/µ∕øø≠¥	<u>++++</u> 160 <u>+++++</u> 16	26+00	<u>++++</u> ¢øø <u>++26+</u>	27+00	2010/ //////////////////////////////////	<u>28+00</u> ז <u>ו∕ / / / / √</u> 40₫//		29+00	20///////
STOD	SFLOD =	SF LOD - SF - 1	<u>OD</u> _SFLOD S	25 23 23 2 2 2	-LSD	BOD SI	EOD SF			GRAVEL DRIVE
					GF	RAVEL CONSTR	UCTION ENTRANC 0257701	:e, typ _/ 		CUT & R

PLAN 1" = 40'

> MONCKS CORNER, SOUTH CAROLINA MOUNT HOLLY COMMERCE PARK IMPROVEMENTS

> > PHASE 1

BERKELEY COUNTY WATER & SANITATION







30 25 20 20 15 10 00 30+00 31+0091+20

ISSUED FOR CONSTRUCTION

	DATE:	MARCH 2020
PUMP STATION 094	HAZEN NO.:	30557-004
24-INCH FORCEMAIN	CONTRACT NO.	.: 01
PLAN AND PROFILE	DRAWING NUMBER:	
STA 20+80 TO STA 31+20		
		C203

NOTES:

1. FORCEMAIN PIPING TO BE RESTRAINED AT ALL BENDS, TEES, REDUCERS, AND VALVES. REFER TO DETAIL 10/CD03 FOR MINIMUM LENGTHS.



0

MAR 2020 HAZEN OCT 2019 HAZEN

ΒY

DATE

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

CONSTRUCTION

REGULATORY REVIEW

ISSUED FOR

IMPROVEMENTS PHASE 1

LICENSE NO.: C00638

				1						
					EX GRADE					
								ב µ:		
								4.0' A COVE		
				241 0000 5						
				24° C900 L	R-18 PVC FM					
154	-00	16-	FUU	/7-	- - -	18-	- - -	10-	+00	

30 25 20 15 10 52+00

	DATE:	MARCH 2020
PUMP STATION 094	HAZEN NO.:	30557-004
24-INCH FORCEMAIN	CONTRACT NO	
PLAN AND PROFILE STA 41+60 TO STA 52+00	DRAWING NUMBER:	
		C205

2 1 0 ADDENDUM No. 7 CONSTRUCTION REGULATORY REVIE REV

			PROJECT ENGINEER:	K. BAIR
			DESIGNED BY:	L FANNING
			DRAWN BY:	L FANNING
DDENDUM No. 1	MAY 2020	HAZEN	CHECKED BY:	B ORNE
CONSTRUCTION GULATORY REVIEW	MAR 2020 OCT 2019	HAZEN HAZEN	IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS	0 1/2" 1"
ISSUED FOR	DATE	BY	NOT TO FULL SCALE	

			1. FORCEMAIN PIL BENDS, TEES, F DETAIL 10/CD03	PING TO BE RESTRAINED AT ALL REDUCERS, AND VALVES. REFER TO 3 FOR MINIMUM LENGTHS.
LT FENCE, TYP 227000R	DOUBLE ROW OF SILT FENCE STA 58+00 TO STA 69+85 0227000R 24" FM	40 LF 42" STEEL CASING, CENTERED ON 48"x48" E E, 20' x 40'	STA 60+79 45° VERT BEND STA 60+89 45° VERT BEND 45° VERT BEND 2° AIR RELEASE VALVE SEE DETAIL 1/CD02 STA 61+9 45° HOR	98 Z BEND
$\frac{1 \text{WAY 52 (NORTH)}}{56+00} = \frac{5}{56+00} = \frac{100}{100} = \frac{100}{100$	//////////////////////////////////////	////////////////////////////////////	4'x4' BOX CULVERT 4'x4' BOX CULVERT HOD HOD HOD LOD LOD LOD A HOD HOD TOL LOD LOD A HOD HOD TOL LOD BF	
<u>PLA</u> 1" = 40	N.	BETWEEN	Marchinect	
4.0' MIN COVER	EX GRADE		STA 60+21 STA 60+21 45° VERT BEND STA 60+29 45° VERT BEND 45° VERT BEND 45° VERT BEND 45° VERT BEND 45° HORZ BEND 45° HORZ BEND	25
24" C900 DR-18 PVC F		EX 48"x48" BO	DX CULVERT	20 15 10
56+00 57+00 <u>PROF</u> H: 1" = 40' \	<u>58+00</u>	40 LF 42" STEEL CAS 59+00	SING, MIN T=0.563" 60+00 61+00 62+00 62+4	5 0 SSUED FOR CONSTRUCTION
HAZEN AND SAWYER	BERKELEY COUNTY WA MONCKS CORNER, SC MOUNT HOLLY CON	TER & SANITATION OUTH CAROLINA MERCE PARK	PUMP STATION 094 24-INCH FORCEMAIN PLAN AND PROFILE	DATE: MARCH 2020 HAZEN NO.: 30557-004 CONTRACT NO.: 01 DRAWING NUMBER:

MOUNT HOLLY COMMERCE PARK IMPROVEMENTS PHASE 1

C206

STA 52+00 TO STA 62+40

FORCEMAIN PIPING TO BE RESTRAINED AT ALL BENDS, TEES, REDUCERS, AND VALVES. REFER TO DETAIL 10/CD03 FOR MINIMUM LENGTHS.

	DATE:	MARCH 2020
PUMP STATION 094	HAZEN NO.:	30557-004
24-INCH FORCEMAIN	CONTRACT NO.	
PLAN AND PROFILE STA 62+40 TO STA 72+80	DRAWING NUMBER:	
		C207

		STA 87+19 45° VERT BEND STA 87+27 45° VERT BE	ND						, TYP	
				_/ - 2	24" FM					
	-36"RCP		5.0'±					/		
87+(00 / /	29 88+	00							
(X/X/) = SI	LOD SE	D/ # 28 1 1 1 0 7 7 7	LqD	<u>/////////89</u> ⊭ LODLODLOD	0,0/ <i>//////////////////////////////////</i>	<u>:/ :/ :/ :/ :/ :/ :/ :/ ?</u> 90 LOD	+00/:/:/:/// LOD	//////////////////////////////////////		1111700 <u>111111</u>
	2	24 LOD		= \$5DSF	OD SF LOD	SF LOD S	SF LOD SF	- LOD ^{SE}	LOT 29 LO	
	22. E=17.37		24 25 NO NO	NO	<u>Короло не</u>		NG	-NG	NO	
								<u>_</u> <u>_</u>		/
										/

PUMP STATION 094					
24-INCH FORCEMAIN					
PLAN AND PROFILE					
STA 83+20 TO STA 93+60					

DATE:	MARCH 2020
HAZEN NO.:	30557-004
CONTRACT NO.	01
DRAWING NUMBER:	
	C209

	24" FM	2 STA 100+50 4" AIR RELEASE VALVE SEE DETAIL 1/CD02	EX 6" FM		MATCH LINE - STA 1 SEE DWG C211	
WAY 52 (NORTH) 42 - 98+00 42 - 98+00 40 - 55 FM EC 40 - 55 FM EC 40 - 55 FM EC	9+00 DD LOD SE TOD 100+00 SE LOD SE LOSE 42 41 40	-45_ €ODI LOD LOD = €DD SF_LOD SFLOD	102+00 102+00 102+00 100<	103+00 <u>- LOD^{SSEM}</u> 44 Эбр — LSTD — SEOD SF	$\frac{ARV MH}{TOP=46.3}$ $104+00$ $LOD - LOD$ $LOD - SF - LOD - S$	
онь	39 NO NO 		40 <u>NC NC NO</u> - aho aho	NGNGNONO 	dHo	
	<u>PLAN</u> 1" = 40'					
						50
4.0' MIN COVER	EX GRADE	24" C90	00 DR-18 PVC FM	EX UGE		45
						- 35

NOTES:

FORCEMAIN PIPING TO BE RESTRAINED AT ALL BENDS, TEES, REDUCERS, AND VALVES. REFER TO

ISSUED FOR CONSTRUCTION

30

25

104+00

	DATE:	MARCH 2020
PUMP STATION 094	HAZEN NO.:	30557-004
24-INCH FORCEMAIN	CONTRACT NO	.: 01
PLAN AND PROFILE STA 93+60 TO STA 104+00	DRAWING NUMBER:	
		C210

103+00

102+00

				PROJECT ENGINEER:	K. BAIR	
				DESIGNED BY:	L FANNING	
				DRAWN BY:	L FANNING	
2	ADDENDUM No. 1	MAY 2020	HAZEN	CHECKED DT.	D ORNE	
1	CONSTRUCTION	MAR 2020	HAZEN	IE THIS BAR DOES NOT	0 1/2" 1"	
0	REGULATORY REVIEW	OCT 2019	HAZEN	MEASURE 1" THEN DRAWING IS		
REV	ISSUED FOR	DATE	BY	NOT TO FULL SCALE		

MOUNT HOLLY COMMERCE PARK IMPROVEMENTS PHASE 1

BERKELEY COUNTY WATER & SANITATION

MONCKS CORNER, SOUTH CAROLINA

							STA 111+11 45° HORZ BEND	STA 111+21 45° HORZ BEND		
		– EX GRADI	E							
		ŗ								
4.0' MIN COVER										
•				24" C900 DR-	-18 PVC FM					
108	+00	109	+00	110	+00	111	+00		11	2+00

	DATE:	MARCH 2020
PUMP STATION 094	HAZEN NO.:	30557-004
24-INCH FORCEMAIN	CONTRACT NO.	: 01
PLAN AND PROFILE STA 104+00 TO STA 114+40	DRAWING NUMBER:	
		C211

VPER VD, SUITE 102 CAROLINA 29464 D0638 IMPROVEM PHASE	AWYER BLVD, SUITE 102 H CAROLINA 29464 C00638
---	--

				EX (GRADE				REMOVE 2 CONNECT	24" PLU TO 24
		24" C900 DR-18	PVC FM	9.9 •						
E										
STA 117+50	2" AIR RELEASE SEE DETAIL 1/C									
	118	+00	119	+00	120	+00	121	+00	122-	+00

	DATE:	MARCH 2020
PUMP STATION 094	HAZEN NO.:	30557-004
24-INCH FORCEMAIN	CONTRACT NO.	: 01
PLAN AND PROFILE STA 114+40 TO STA 122+94	DRAWING NUMBER:	
		C212

				PROJECT ENGINEER: K. BAI		IR		
				DESIGNED BY:	L FANNING			
				DRAWN BY:	L FANNING			
				CHECKED BY: E				
2	ADDENDUM No. 1	MAY 2020	HAZEN					
1	CONSTRUCTION	MAR 2020	HAZEN	IE THIS BAR DOES NOT	0	1/2"	1"	
0	REGULATORY REVIEW	OCT 2019	HAZEN	MEASURE 1" THEN DRAWING IS			_ 1	
REV	ISSUED FOR	DATE	BY	NOT TO FULL SCALE				

BERKELEY COUNTY WATER & SANITATION MONCKS CORNER, SOUTH CAROLINA

> MOUNT HOLLY COMMERCE PARK IMPROVEMENTS PHASE 1

735 JOHNNIE DODDS BLVD, SUITE 102 MOUNT PLEASANT, SOUTH CAROLINA 29464 LICENSE NO.: C00638

NOTES:

1. ALL EXPOSED SURFACES OF CONCRETE AND PIPING INSIDE OF WETWELL SHALL BE EPOXY LINED.

ISSUED FOR CONSTRUCTION

DATE:

PLIMP STATION 094	HAZEN NO.:		
MECHANICAL	CONTRACT NO .:		
SECTION	DRAWING NUMBER:		

M103

MARCH 2020

30557-004

01

MOUNT HOLLY COMMERCE PARK **IMPROVEMENTS** PHASE 1

BERKELEY COUNTY WATER & SANITATION MONCKS CORNER, SOUTH CAROLINA

1691004

PRESSURE GAUGE OR SWITCH INSTALLATION WITH THREADED TAP (SHOWN WITHOUT REQUIRED DIAPHRAGM SEAL) **USED FOR PIPES 2" AND LARGER**

6" MIN SEE NOTE 3 120° - #4 EF, TYP -CONC FLOORωL #5 DOWELS @12" EF SEE NOTE 1 DOWEL - ADHESIVE - ROTATE HOOK 90° FROM SHOWN SO THAT HOOK IS PARALLEL TO PIPE, TYP

CRADLE PIPE SUPPORT

0331601

MD01