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DATE: 03/26/2018 **ADDENDUM CONSISTS OF 297 PAGES**
(Including this Cover Sheet)

PROJECT NAME: Torrington WPCF Comprehensive Upgrade Project

SUBJECT: **Addendum No. 1 for BID # WPU-041-040318**

FROM: Wright-Pierce

PROJECT NO.: 13164H

REQUIRED

Confirmation of receipt of this addendum is required.
Please sign below and e-MAIL to: brenda.strohm@wright-pierce.com
Thank You.

NAME: _____ **TITLE:** _____
(Please print)

SIGNATURE: _____ **COMPANY:** _____

ADDENDUM NO. 1

TO

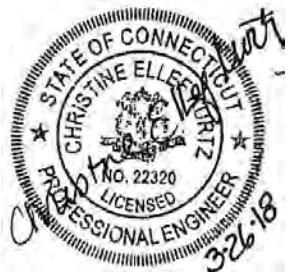
CITY OF TORRINGTON, CONNECTICUT
WATER POLLUTION CONTROL FACILITY COMPREHENSIVE UPGRADE

BIDDING AND CONTRACT REQUIREMENTS AND SPECIFICATIONS

FOR

BID # WPU-041-040318

March 26, 2018



PREPARED BY:

WRIGHT-PIERCE ENGINEERS
169 Main Street, 700 Plaza Middlesex
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ADDENDUM NO. 1

CITY OF TORRINGTON, CONNECTICUT

WATER POLLUTION CONTROL FACILITY COMPREHENSIVE UPGRADE

As a point of clarification, it should be understood that the Contract Documents govern all aspects of the project. Informal discussions held during the Pre-Bid Conference, or over the telephone are informational only. All official changes to the Contract Documents are made only by addenda. The following changes and additional information are hereby made a part of the Contract Documents:

CLARIFICATIONS

1. A mandatory pre-bid conference was held on March 15, 2018 at 10:00 A.M. A copy of the sign in sheet is included as an attachment to this addendum. To be considered a responsive Bidder, General Contractor must have attended the pre-bid conference and signed in using the name that is to appear in the Bid Documents. The Bid will not be awarded to a Bidder that does not meet this requirement.

2. There will be no bid extension on this project.

SPECIFICATIONS

1. Table of Contents – Volume 2 of 3: Under Division 16 – Electrical, **DELETE** 16722 – Security System from the list of specifications.

2. Table of Contents – Volume 3 of 3: **INSERT** the following after Appendix E:

   "F Local Permit Approvals
   GP for Discharge of Stormwater & Dewatering Wastewaters from Construction Activities – Application and SWPCP"

3. Section 00100 Instruction to Bidders: Article 12, paragraph 12.03, **DELETE** "the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening,".

4. Section 00405 – Qualifications Statement: **DELETE** page 7 in its entirety and **INSERT** the revised page 7 in lieu thereof (attached).

5. Section 00800 – Supplementary Conditions: In Section SC-6.06, **DELETE** the sentence in its entirety and **INSERT** the following new sentence:

   "DELETE Paragraph 6.06.A and renumber 6.06.B and 6.06.C as 6.06.A and 6.06.B,

respectively."

6. Section 00800 – Supplementary Conditions: In Section SC-7.06, **DELETE** the phrase "within five days of" and **INSERT** "with". INSERT the following after Item 9:
   "10. Mechanical Bar Screens
   11. Aeration Mixers
   12. Aeration Blowers
   13. Tertiary Effluent Pumps
   14. Dewatering Units"

7. Section SC-20 – CT DEEP CWF Required Construction Contract Provisions: **DELETE** pages SC-20-33 and SC-20-34 in their entirety.

8. Section SC-32 Wage Rates: **INSERT** the State of CT DOL wage rates attached herein after page SC-32-1.

9. Section 03930 Concrete Coatings: **DELETE** the entire specification and **INSERT** the attached revised specification in its entirety.

10. Section 06606, 1.4.A **DELETE:** "All weirs and baffles" in the first sentence and **INSERT** "Weirs and baffles as indicated on the Contract Drawings"

11. Section 11231 - Under "PUMP SCHEDULE/Feed Pump Range, Min-Max" **DELETE** "2.75 – 87 GPH" and **REPLACE** with "2.75-55 GPH"

12. Section 11353 – Gravity Thickener Mechanism: In part 2.5.C, **DELETE** the portion of the first sentence following the word "system".

13. Section 11365 – Sludge Dewatering Equipment
    a. **DELETE** paragraph 2.3.J in its entirety and **INSERT**:
       "J. All process setpoints, timers, alarm points, etc. will be adjustable though a 10-inch touchscreen operator interface terminal (OIT). Maintenance related setpoints will require a password to change."
    b. **INSERT** the following paragraph immediately after paragraph 2.3.P and revise the subsequent lettering:
       "Q. The Dewatering Control Panel shall have a pause function to temporarily stop the press, the Operator will be able to resume operations, or after an adjustable amount of time initiate a shutdown sequence. Refer to coordination section."
    c. **INSERT** the following paragraph immediately after paragraph 2.3.D.10 and revise the subsequent lettering:
       "11. Industrial VPN Router, Ewon, MB Connect, Or Equal. VPN Router shall be connected to internet connection for Manufacturer to modify programming or troubleshoot remotely."

14. Section 11378, 2.3, D, 4 **DELETE**: "Air distribution headers shall be provided (minimum 6-inches)." and **INSERT:** "Air distribution headers shall be provided (minimum 4-inches)."

15. Section 13440 – Instrumentation and Process Control
    a. **DELETE** the phone number in paragraph 1.1.B.6 and **INSERT** "(860) 529.0110".
    b. In Section 2.1.C – Instrumentation Equipment, Item 20 – Ammonia Analyzer, **DELETE** sub-paragraph 'a' in its entirety and **INSERT** the following new sub-paragraph in its entirety:
       "a. Provide ammonia analyzers as indicated in the Instrumentation Schedule, with the following requirements."
    c. In sub-paragraph 'b', item 'i', **DELETE** "Colorimetric measurement' and **INSERT** "Gas Sensitive Electrode" in lieu thereof.
    d. In sub-paragraph 'e', **DELETE** item 'i' in its entirety and **INSERT** the following in lieu thereof:
       'i. Hach Amtax with SC1000 and Filtrax filtration unit'

16. Section 14551 – Shaftless Screw Conveyors: Paragraph 2.1.B.2.c.ii, **DELETE** "Each chute" in the second sentence and **INSERT** "A chute" in lieu thereof.

17. Section 15050 – Pipe& Pipe Fittings – General: **DELETE** the table at the end of the specification and **INSERT** the complete table attached herein.

18. Section 16415 – Automatic Delayed Transition & Bypass Isolation Switches: **DELETE** the second sentence of paragraph 1.3 in its entirety.

19. Section 16620 – Diesel Standby Power System: **DELETE** paragraph 1.1.A Item 4 in its entirety and **INSERT** the following in lieu thereof:

    "4. Refer to section 16415 for additional information. Regarding automatic load transfer controls."

20. Appendix F – **INSERT** the attached permit related documents after Appendix E.

DRAWINGS

1. Drawing C-3: **DELETE** the 

symbol to the north of the Operations Building and **INSERT** 

in lieu thereof.

2. Drawing A-6: **DELETE** the sentence in Note 2 and **INSERT** " Not Used." in lieu thereof.

3. Drawing A-11: **INSERT** the following note: "Provide smooth faced block at all items mounted on the block veneer."

4. Drawing A-17: Reference Modification Note 36 – **DELETE** "522" and **INSERT** "523" in lieu thereof.

5. Drawing PR-6: **INSERT** the following to the end of Note No.4:

   "At locations where gate frames interrupt the railings, gate frame shall function as a guard: provide horizontal cross member welded to gate frame at 21-inches above the walkway elevation. The horizontal member at the top of the frame shall be 3'-6" above walkway elevation, or provide additional horizontal cross member welded to gate frame at that elevation. Cross member material shall match gate frame material."

6. Drawing PR-8: **INSERT** the following note in the area of the UV system: "UV System Cleaning Tank not shown, refer to PR-44 and PR-45 for location and associated piping."

7. PR-8, PR-46, PR-47 and PR-48: **INSERT** a 12-inch check valve in the horizontal portion of the discharge pipe from each TEPS.

8. Drawing PR-15: In the Effluent Water & Foam Spray Water Schematic, **"INSERT"** the following note to the detail: "Provide ½" NPT Tap with ½" isolation ball valve at pressure transducer / element installations."

9. Drawing PR-40: **INSERT** the following notes to Detail A:

   "Notes:
   1. Stainless steel shall be 316 Schedule 40.
   2. Drain plug to be 316 SS threaded connection with 2-inch nut."

10. Drawing PR-42: In section 2, **DELETE** the " 24"x18" " note referring to the reducer and **INSERT** " 24" x 12" " in lieu thereof.

11. Drawing PR-43: In Section 1, **INSERT** "DI" to the " 18" RSL " label.

12. Drawing PR-44 and In Section 2 of PR-47: Downstream of FE-6075 on the 6-inch TSL, ***DELETE***  *(gate valve **s**ymbol) and* ***INSERT***  *(plug valve **s**ymbol).*

13. Drawing PR-44 and In Section 2 of PR-47: Downstream of FE-6076 on the 6-inch TSLR, ***DELETE***  *(gate valve **s**ymbol) and* ***INSERT***  *(plug valve **s**ymbol).*

14. Drawing PR-44: At the end of the note "UV CLEANING TANK" **INSERT** "(SEE NOTE 6)". After Note 5, **INSERT** the following new note:
    "6. Provide 2" DR and gate valve from underside of the UV Cleaning Tank to the western wall of the Tertiary Sludge Wet Well at centerline elevation of 520.00. Core and sleeve pipe penetrations as required. All piping, valves and/or gaskets and related materials of construction in contact with the cleaning solution shall be compatible with citric acid; provide secondary containment piping for all UV cleaning tank drain piping."

15. Drawing PR-71: INSERT the following new note to the Fixed Weir Plate Schedule:
"2. Weirs labeled as future are not to be fabricated or installed as part of this Contract."

16. Drawing I-17: **REVISE** the Effluent Water Pumps to show a seal water solenoid that is interlocked with the VFD. Seal water will be configured similar to the Return Sludge Pumps on I-13.

QUESTIONS AND ANSWERS

General

Several manufacturers or their representatives have submitted written questions seeking consideration of their product as an or equal and identifying deviations from the specifications for their products or asking to have their product's name included in the specifications. Please note that as defined in Section 00100 – Instructions to Bidders, Article 11, Paragraph 11.01, the Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or "or-equal" items. Where the Contract allows for substitute or "or-equal" items of material or equipment, application for such acceptance ***may not be made to and will not be considered by Engineer*** until after the Effective Date of the Contract. As stated in Paragraph 11.03, If an award is made, Contractor shall be allowed to submit proposed substitutes and "or-equals" in accordance with the General Conditions. This response applies to requests made in the following email:

- GE Energy Connections - RFI dated March 9, 2018
- The Maher Corporation - RFI dated March 21 and 23, 2018
- Wescor Associates - RFI dated March 22, 2018 via Email
- Walker Wellington - RFI dated March 22, 2018 via Email

C.H. Nickerson RFI E-1537-01 dated February 17,2018 via Email

1. Please clarify the requirement for listing Major Subcontractors and Vendors.
   a. Instruction to Bidders (00100), Article 3.01.H & I requires a list of proposed Subcontractors and Suppliers to be submitted w/ the bid, as does the bid form.

      Response: *Correct.*

   b. The Supplementary Conditions (00800), Article 7.06 requires the listing major subcontractors within 5 days of the bid opening.

      Response: *This article is modified by this addendum.*

   c. The CT DEEP Clean Water Fund Memo (2016-003) requires the submission of certified MBE/WBE Subcontracts within 14 days after the bid opening.

Response: *Correct, The CWF Memo states that the Subcontractor Verification Form be submitted, along with corresponding DBE certification for each subcontractor, within 14 calendar days of the Bid.*

Note that the Subcontractor Verification Form states "In the event that this form is not submitted with the bid application, the bid could be rendered nonresponsive and rejected."

Separate from the CT DEEP requirements, Wright-Pierce is requiring a list of intended subcontractors, and suppliers, with the Bid.

d. RGSA, Title 22a – Section J (Construction Contract Procurement Requirements), paragraph 2.H.vi, states "The municipality shall not reject a bid as non-responsive for failure to indicate the selection of subcontractor(s) or equipment, unless the municipality has unambiguously stated in the solicitation documents that failure to list shall render a bid nonresponsive and shall cause rejection of the bid." Will a bidder's failure to list subcontractor and equipment suppliers render their bid nonresponsive and cause the rejection of their bid?

Response: *It may.*

e. Can more than one subcontractor or equipment supplier for each item be listed?

Response: *Yes*

f. Are there specific pieces of equipment that should be listed, or should we list all, regardless of size?

Response: *Refer to the modification to Article 7.06 for the Supplemental Conditions.*

g. If possible, can we provide the list of vendors and subcontractors within 14 days after the bid opening, which is consistent w/ DEEP requirements for MBE/WBE Subcontractors?

Response: *The final list of vendors and subcontractors and those requiring certificates, must be provided within 14 calendar days of the Bid.*

2. Section 00510 (Agreement) – Article 1.01.B – Does the initial performance testing of the UV Disinfection System need to be completed prior to 4/01/2020?

Response: *The 4/1/2020 date is in reference to Phosphorus removal only to allow the WPCF to meet their NPDES requirement. The WPCF has a seasonal disinfection limit; as part of construction sequencing the Contractor must keep the current disinfection system in operation or provide the new system (installed, tested, operator training and accepted by the Owner) during the disinfection season.*

3. MBE/WBE Subcontractor Participation Memo SC-20-33 notes a 6% MBE & 2.5% WBE

requirement and the DEEP Clean Water Memo 2016-003 notes a 3% MBE & 5%WBE requirement. Please clarify which is correct.

Response: The last two pages of SC-20 will be deleted.

4. Measurement and Payment – Bid Item 17 – Does the allowance for the Town of Harwinton's Building Department Fees include the State of CT ADA fee?

   Response: The Bid Item is called "Town of Harwinton Permit and Inspection Allowance" and is not specific to the Building Department. The allowance is established to pay for any permit fees or inspection fees collected by the Town.

5. Section 11234 (Ultraviolet Disinfection System) – Please clarify the following items;
   a. Paragraph 1.2.J – "The control panel shall accommodate a 6" by 6" space designated for the installation of a communication protocol converter furnished by the System Provider and shall be installed, powered, and configured by the Contractor". Where is the supply of this potential converter specified and would it not be easier for the Owners Programing System Provider, NIC, to perform this task?

      Response: The need for a converter depends on whether Allen Bradley is provided or not, or not; General Contractor to coordinate and supply accordingly.

   b. Suez Base Proposal & Scope, page 7 item #10 – please clarify if a drain is required for the cleaning tank?

      Response: Yes. Refer to modification to the Drawing as outlined in this addendum.

   c. Does the UV Equipment suppliers 1 year warrantee begin at the completion of the Initial Performance Testing or after acceptance of the Extended Performance Testing?

      Response: The UV equipment suppliers one-year warranty will begin when the unit is accepted by the Owner. The soonest the warranty could start would be after the successful completion of the Initial Performance Test and when all other Contract requirements are met, i.e. training of WPCF staff, spare parts, final O&M turn over, etc.)

6. Section 11200 (Ballasted Flocculation System) Please clarify the following:
   a. Paragraph 1.1.G.3.s – Some of this system is installed in un-tempered space, please clarify what should be winterized and/or heat traced.

      Response: Effluent water lines, dilute polymer lines, coagulant line and sample lines in un-tempered spaces such as inside tanks and channels shall be winterized with elastomeric pipe insulation and pipe jacketing per Seciton15180.

   b. Paragraph 2.1.B.7 - Can an approximate quantity of polymer and coagulant needed for startup be provided? Also, please clarify which proposed coagulant will be used.

<u>Response:</u> Actual polymer and coagulant usage during start-up/commissioning and Performance Testing are subject to the flows and loads at the time of the testing and successful demonstration that Performance Requirements are met. The start-up testing/ commissioning and performance testing require a minimum of 11 total days of testing (Three 24hr tests for startup, 5 days of Performance Testing for Effluent Total Phosphorous limit of 0.10 mg/L and 3 days of performance Testing for Effluent Total Phosphorous limit of 0.29 mg/L). At average daily flow of 7 MGD and using Kruger's chemical dosages identified in their Performance Guarantee the minimum coagulant usage would be approximately 3,200 gal and the minimum polymer usage would be approximately 200 gal. At maximum month flows of 13.3 MGD chemical usages could be expect be double that of average daily flow. Additional chemicals will need to be provided in the event of unsuccessful start-up/ commissioning and performance testing. Contractor to coordinate with the manufacturer.

Coagulant shall be as identified in Bid Form of Kruger's Pre-Selection Proposal included in Appendix B. Liquid Aluminum Sulfate (48% solution). Product data sheet is include in Appendix B of these Contract Documents in Ballasted Flocculation Pre-Selection Addendum No.1 BF.

c. Paragraph 2.19.A.3 & 4 & 5 – Can you please clarify how many heated NEMA 4X, enclosures we will need to provide for each instrument noted?

<u>Response:</u> With regards to paragraph 2.19.A.3 &4 &5, a total of four heated NEMA 4X enclosures will be required. Each of the two trains shall require heated NEMA 4X enclosures for Coagulation TSS meter for sub-total of two. Each of two trains shall require heated NEMA 4X encloses for Settled Water Turbidimeter and pH which will use the same AIT, so the sub-total will be two.

d. Kruger Scope of Work by Others, item 33 - Please confirm Kruger is supplying the structural support, platforms and railings required for the settling tank scrappers.

<u>Response:</u> Kruger's Scope of Supply related to the settling tank scrappers is identified in Section 11200 Paragraph 2.3 - Clarifier Equipment, Part C - Support Bridge and in their Pre-Selection Proposal under Section 3.1 Scope of Supply / Settling Tank Equipment (pg.9). The Scrapper Assembly Access / Support Walkway (Support Bridge) will be supported by concrete tank walls / beams as shown in the Contract Documents and installed in accordance with Manufactures recommendations.

7. Section 15050, Pipe & Fittings, the schedule at the back of the section skips from page 1 to page 9. Is this just a miss-numbering issue?

<u>Response:</u> Refer to modification to this specification to address this.

C.H. Nickerson RFI E-1537-02 dated March 13, 2018 via Email

8. Drawing S-48 – The area of grating over the Influent Channel does not show support angle along the walls for the grating, only C8 beams. Is it the intent to not have support angle between the C8 beams? This is typical at the large areas of grating over the Coagulation Tanks and Settling Tanks as well.

   Response: Yes, the intent as described is correct.

9. Drawing PR-42 – The scum baffle and clarifier weir detail have a note stating materials of construction per spec section 05500. Section 06606, paragraph 1.4 states all weirs and baffles shall be fabricated of fiberglass reinforce polyester. Please clarify if the scum baffle and clarifier weir should be of aluminum construction per 05500 or FRP per 06606.

   Response: The Scum Baffle and clarifier weir shall be of aluminum construction per the details on the Contract Drawings.

10. Drawing PR-53 – Please clarify if the V-notch weir is to be constructed per Section 05500 or Section 06606.

    Response: The V-notch weirs shall be constructed of aluminum per the Contract Drawings.

11. Drawing PR-71 – Fixed Weir Plate Schedule: Fixed Weir No.'s FW-6021A and FW-714, structure No.2A and Structure No. 5A, are indicated as "Future". Do we supply and install these fixed weirs under this contract?

    Response: The future fixed weir plates FW-6021A and FW-714 for structure No. 2A and 5A are not part of this contract work.

12. Drawing I-7 indicates CA-301 as a motor operated three-way valve. Drawing PR-19 shows it @ EL 520.39 in section 3. CA-301 is not listed in Section 15120 Valve Operators Schedule. Please provide more information for this valve.

    Response: Valve is included in Section 11318 - Submersible Recirculating Chopper Pump and Mixing System.

13. Drawings PR-22 and PR-24 show 4" SC in Primary Scum Box. Drawings PR-4 and I-9 show valves that are not indicated on PR-22 and 24. Please clarify what valves are required.

    Response: Yes, the check valve and plug valve shown on PR-4 are required and shall be installed as part of the 4" SC piping as shown on PR-22 and PR-24.

14. Drawing PR-4 shows a 6" PSL bypass with 2 valves. Drawing PR-24 seems to only show one new valve above FE-400? Is the second valve the one indicated as "relocate existing 6" PV"? Also, please provide the material type that we are to tie into on the existing 6" PSL. Are we to use same material for the new portions?

Response: *The second valve is shown on PR-23, "First Floor Modification Plan" Drawing in plan view. The new valve shall match the existing pipe material.*

15. Drawing PR-40, Detail A.
    a. Please clarify if 304 stainless steel acceptable.
    Response: *Provide 316 SS Schedule 40.*

    b. What is the type of material on the existing RSL?
    Response: *We understand the material to be ductile iron; contractor to verify existing conditions prior to fabrication of connections.*

    c. Please provide more information as to the type of drain plug.
    Response: *Plug shall be 316 SS threaded connection with 2-inch nut.*

16. Drawing PR-41 indicates a 24" x 12" reducer on the 24" RSL. Drawing PR-42 indicates a 24" x 18" reducer. Which is correct?

    Response: *The correct reducer size is 24X12" and not 24X18".*

17. Drawing PR-43 Section 1 - 18" RSL. Is the 18" RSL intended to be ductile iron or is it stainless steel as indicated on Drawing PR-40.

    Response: *The 18" RSL pipe is intended to be ductile iron.*

18. Drawing PR-44 12" EW at the Duel Basket Strainer. The plan view shows 2 butterfly valves and 1 gate valve, Section 5 on Drawing PR-48 shows 3 butterfly valves and 1 GV. I-17 show 2 BF. How many butterfly valves are required?

    Response: *The butterfly valves shown in PR-44 and on Section 5 of PR-48 are anticipated to be provided as part of the Duplex Strainer specified in Section 11332. The duplex strainer shown on the drawings contains four butterfly valves. Drawing I-17is showing 2 ball valves for isolation of the pressure element.*

19. Drawing PR-44 shows 6" TSL to FE-6075 with a gate valve, Drawing PR-8 appears to show a plug valve in this location. Which is correct?

    Response: *The valve on 6" TSL directly downstream of FE-6075 shall be a plug valve as shown on PR-8. PR-44 and Section 2 on PR4-7 incorrectly shows a gate valve.*

20. Drawing PR-44 shows 6" TSLR to FE-6076 with a Gate Valve, Drawing PR-8 appears to show a plug valve in this location. Which is correct?

    Response: *The valve on 6" TSLR directly downstream of FE-6076 shall be a plug valve as shown on PR-8. PR-44 and Section 2 on PR-47 incorrectly shows a gate valve.*

21. Drawing PR-44 shows 4" DR thru Settling tank area into Gallery. Please provide additional

section or more details on what is between the 2 Plug valves and drops.

Response: The 4" DR that run north/south from SG-6179 (and separately from SG-6178) to the suction header for the BFRPs is to be installed within the concrete fill of the respective Settling Tanks. The 4" DR that run east/west run from the 4" plug valves to the Tertiary Sludge Wet Well at elevation 519.45'. The two DR piping systems are not connected.

22. Drawing PR-45 shows what appears to be proposed piping just to the left of SLD-6080B/90B. Please provide a clarification as to what it is.

    Response: PR-45 shows 4" mud valve and 4" DR piping for purposes of draining individual UV channels. Valves and piping are called out on PR-47/Section 2

23. Drawing I-15 shows a check valve off TEPs 6151 through 6155. Drawings PR-8, PR-46, PR-47 and PR-48 do not show a check valve. Is it required?

    Response: Check valves are required on the effluent piping of TEP-6151 through 6155.

24. Drawing PR-49 shows what appears to be an expansion joint on the 6" air line from the post aeration blower. Is this correct?

    Response: Yes, the fitting on the horizontal 6" air line from the post aeration blower (PAB 6005), shown in the section view of the tertiary room is an expansion joint.

25. Drawing PR-51 shows 6" SL/SC/FOG and 6" TPSL. The labels are bolded. Are they existing or new?

    Response: We are relabeling the pipes with different labels and hence shown as bold. The extent of pipe replacement on that is as shown in PR-50 Sludge Storage Tanks – Demolition Plan

26. Drawing A-1 – Architectural Note #21 states flood barriers shall provide protection to elevation 523.00'. The flood barriers shown on Sheets A-6 and A-17 have notes the flood barrier goes to elevation 522.00. Should all flood barriers protect to elevation 523 or to the notes for the specific area?

    Response: Reference Note #25. Yes, all flood barriers shall provide protection to elevation 523.00.

27. Drawing A-21 – Modification Note states to provide flood vent stacking frame with interior trim flange and inner sleeve kit for 7" to 12" walls. The elevations on A-25 only show a single vent, not a stacking vent. Please advise which vents to supply.

    Response: Stacking vents are required at the Maintenance Building as described in the note on Drawing A-21. On the exterior elevations the vents are only shown schematically and not to scale.

28. Drawing C-27 42" FSE from the Tertiary Building to the Effluent Meter Vault. Based on the change in elevation from invert 503.50 to 500.75 the 42" FSE will require 2 vertical bends and a 42" x 36" reducer, all within a distance of approximately 16 feet. Could you provide a profile with a configuration of fittings to accomplish this? Can the Effluent Meter Vault be moved west if necessary?

    Response: We reviewed the layout again and found that the required fittings will fit. The Effluent Meter Vault can be shifted to the west to allow for the required fittings to transition FSE pipe to elevations shown on PR-27.

29. Drawing C-19. Please clarify Note #8. Is this work part of the base bid or an alternate?
    Response: This note is identifying what the function of the pipe is – a connection point for accepting septage.

C.H. Nickerson RFI E-1537-03 dated March 15,2018 via Email

30. Section 00510 (Agreement), paragraph 1.01.B requires the Contractor to have the phosphorous removal system on line prior to April 1, 2020. The existing secondary effluent piping connecting to the existing chlorine contact tank will be removed when connecting the secondary's to the new Tertiary building which contains both the proposed prosperous removal system and the UV. Is the Contractor responsible for providing both prosperous removal and disinfection prior to April 1, 2020? Additionally, if the proposed UV is not available by April 1, 2020, would the Contractor need to direct flow to the existing CCT No 1, or could we utilize just the existing post aeration tank for disinfection?

    Response: The NPDES permit does not require the new UV system to be online by April 1, 2020. Both CCT No.1 and CCT No.2 are required to be in use to maintain the existing contact time when chlorine is being used for disinfection.

31. There was mention made at the pre-bid of rock anchors at the proposed Clarifier 3. These are not shown on the contract drawings. Are they required and if so please provide a design criteria?

    Response: Pressure regulating valves as shown on the Contract Drawings will be used in lieu of rock anchors to drain ground water into the tanks when empty.

32. The existing sludge handling system for the treatment plant runs through one gravity thickener, which is being renovated. According to the summery of work the Contractors will need to provide temporary sludge processing while the existing thickener is being modified. Can you please provide an approximate volume of primary and wasted secondary sludge so we can calculate how much material per day needs to be processed for disposal?

    Response: The following information should be used as guidance only; current data can be obtained from the WPCF based on the timing of the modifications to be performed.

    WAS TSS (lbs / day) at Current Annual Average – 3,610 lbs / day (so say 3,600 lbs / day)

WAS TSS (lbs / day) at Current Maximum Month – 5,086 lbs / day (so say 5,100 lbs / day)

Primary Sludge (lbs / day) at CAA – 3,753 lbs / day (so say 3,800 lbs / day)
Primary Sludge (lbs / day) at CMM – 5,684 lbs / day (so say 5,700 lbs / day)

33. The existing gravity belt thickener is being removed and the new rotary screw presses are being installed in its location. The summary of work requires the Contractor to provide temporary sludge processing during this renovation. Can you please provide us with an approximate amount of wasted pressed sludge that is currently processed per day?

    Response: Note that the GBT is currently being used during the summer months only. The unthickened secondary sludge is pumped from the waste sludge storage tanks to the gravity belt thickener by positive displacement feed pumps. The three sludge feed pumps (TF-1, TF-2, and TF-3) are 4-inch Penn Valley Double-Disc pumps. Each pump has a rated capacity of 170 gpm at 32-ft TDH. Consideration should be given to co-settling WAS while the GBT is taken offline.

34. Drawing PR-9 shows a 4" and a 6" plug valve on the SC/FOG lines after the primary scum well that are not shown on the site or process drawings. Are these required and if so, where should they be located?

    Response: Refer to Contract Drawings C-24 – Site Piping Modification Plan I. The south-east end of the primary scum box shows the two existing valves that need replacement.

C.H. Nickerson RFI dated March 20,2018 via Email

35. We cannot find a Geotech report for the project & the borings taken at the proposed secondary clarifier are not included in the information provide in volume 3 of the specifications. Is there a Geotech report available and/or at minimum can we get the boring info @ the proposed secondary clarifier?

    Response: Boring logs from the Geotech report are included with this addendum; this includes boring logs from past projects.

Methuen Construction - RFI 1 dated March 25,2018 via Email

36. Due to the substantial size and amount of detail for this comprehensive upgrade; the proximity of the bid date from the pre-bid meeting date and requests from potential subcontractors and vendors requesting more time, we request a 4-week extension to the bid date to allow the necessary time for questions and to be able to provide the most competitive bid for the city.

    Response: The Contract Documents were available for one month prior to the Pre-Bidi meting; there is no plan to extend the bid date for this project.

37. Specification 11337 requires two Automatic Samplers, AS-1 and AS-2. AS-2 is listed as being installed at the final plant effluent. Drawing PR-5 and PR-29 (section 4) show a final

plant effluent sampler "AS-3". Please confirm there are only two auto samplers and that AS-3 should be AS-2 on PR-5 and PR-29.

Response: Specification 11337 indicates AS-2 being installed at the effluent end of the primary tank (Refer to Sheet PR-22 and PR-24). Sampler AS-3 at the Post Aeration Tank effluent is existing and will be maintained; new piping and electrical work is required.

38. Specification 14551 paragraph 2.1.B.2.c.ii. notes that C-171 is to have a manual slide gate for each discharge chute. However, in paragraph 1.1.D.5. and on drawing PR-10 only one gate on the discharge to conveyor C-172 is indicated or shown. Please clarify the number and location of the C-171 conveyor discharge slide gate(s).

    Response: Only one manual gate is required on conveyor C-171.

39. Specification 01800 paragraph 3.4.C. requires Clear Water Testing of specific sections of the WPCF using potable water.
    a. Please confirm if clean, non-potable water could be used for the Clear Water Test. If not, please confirm if the existing plant potable water can be used for the testing and if the plant will waive the cost of the water.

       Response: Potable water is not required for testing. Plant effluent and/or groundwater from well points (if determined clean enough) may be used; Contractor will have to provide means for transferring the water source to the testing locations. Use of effluent water must be coordinated with the Owner.

    b. The water that is used in the Clear Water Test is supposed to be stored and disposed of after the testing. Since the water is from a clean water source and is being used in new or rehabilitated systems, could the water be pumped in to the primary influent upon completion for treatment through the normal process?

       Response: After testing of new structures, effluent water can be pumped back to the plant influent and/or groundwater can be pumped into storm drain system. All discharges must be coordinated with the Owner.

40. Sheet C-35. Please confirm depth of existing flag pole foundation?

    Response: Record Drawings are available for viewing as necessary. A cursory review of these documents did not indicate the depth of the flag pole foundation. Contractor to assume 10 – 12 feet deep.

41. Sheet C-35 – C-38. Please confirm the total quantity of exterior 6" diameter bollards required for the entire project is 59 each. The symbol is being confused with other similar ones.

    Response: Quantity shall be as shown on Layout Drawings.

42. Note 2 on sheet C-3 at operations building appears to be next to an existing catch basin.

Please confirm this should be note 8?

*Response: Yes this should **be** Note 008.*

43. Sheet C-11. Please confirm "precast curb & transition section" at Preliminary Treatment Building does not run along the front of the building and is only approximately 5' long connecting with edge of building?

Response: The precast curb ties into the building corner and does not run along the length of the building. Length of the new curb shall be measured off the drawings.

Electrical Energy Systems Corporation - RFI dated March 19 ,2018 via Email

44. Section 16722 Security Systems is missing from the specifications

Response: The Table of Contents incorrectly listed this specification.

GE Energy Connections - RFI dated March 9 ,2018 via Email

45. Our main question / concern is the Allen Bradley PM5000 meter that is specified in most of the (4) swbd's and (11) MCC's. The specs go on to say this Allen Bradley meter "must be programmed, tested and certified by Allen Bradley services with a written documentation confirming of a complete and operational system." Our concern is that no other manufactures other than Allen Bradley will be able to meet this requirement. What we are proposing is to see if our GE equivalent EPM 6000 meter will be accepted in lieu of the Allen Bradley PM5000 meter? With all this said, I was hoping you could help with answering below (4) RFI's:
    a. Attached GE ML crosses the PM5000 to our EPM 6000. EPM 6000 has loss of power contact shown and Ethernet out to remote Ethernet switches in "CP-X" panels. Will GE EPM 6000 meter be accepted in lieu of the Allen Bradley PM 5000 meter?

    Response: Refer to the General statement at the beginning of this sub-section.

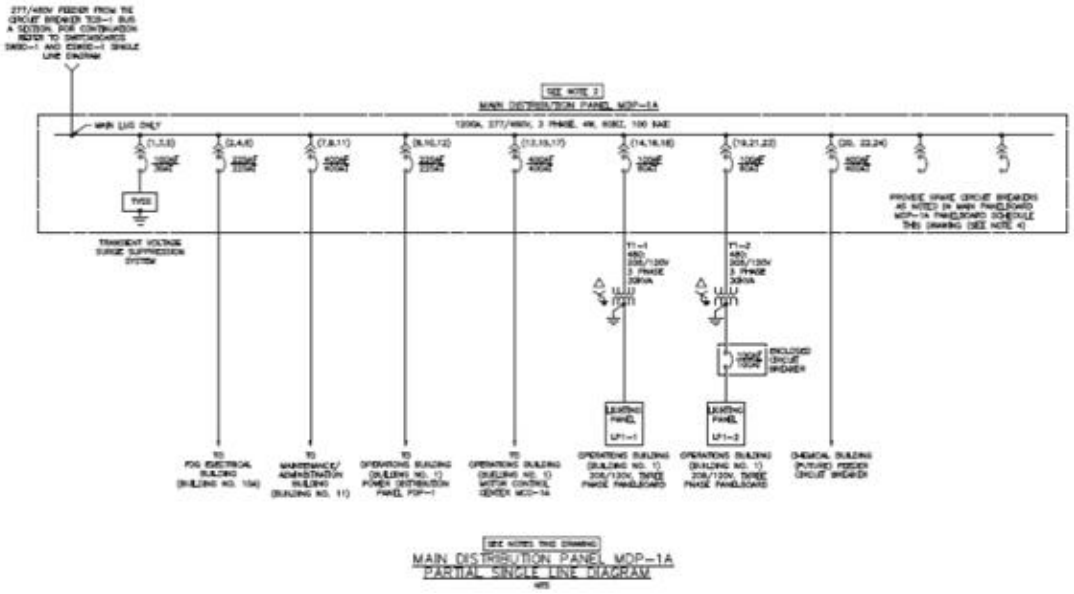
    b. Only Eaton, Sq D & approved equal are listed in specs, will GE will be accepted?

    Response: Refer to the General statement at the beginning of this sub-section.

    c. The one-line shows ATS-1 & ATS-12 are cable connected. However, the elevation views show them integral of the switchboard, Please advise if the ATS's should be quoted remote or integral of the switchboards? Also, are these ATS's to be supplied by the generator vendor?

    Response: Refer to Drawings E-62 and E-65; these drawings denote cabled connection between two required automatic by-pass transfer switches ATS-1 and ATS-2. These automatic by-pass transfer switches are to be provided remote and as separate equipment and not part of the switchboards.

d. Please clarify “plug-in” symbol on switchboard and panelboard E-62, E-63, E-65 and other one-lines per below:



<u>Response:</u> This symbol refers to incoming feeder and does not have anything to do with “plug-in” reference.

<u>Atlantic Fluid Solutions - RFI dated March 9 ,2018 via Email</u>

46. Per the gate schedule on PR-69, Slide Gate SLD 6056B is to be “MANUAL-CRANK (FUTURE MOTORIZED)”. Per the schedule under the electric actuator section (Section 15120), Slide Gate 6056B is called out to have an actuator. This creates a conflict. Can you please clarify if Slide Gate 6056B is to be supplied with an electric actuator or if it shall be supplied with a manual hoist, but designed to be able to be operated in the future with an electric actuator.

<u>Response:</u> The gate shall be supplied with a manual hoist, but designed to be able to be operated in the future with an electric actuator.

<u>The Maher Corporation - RFI dated March 5 ,2018 via Email</u>

47. Section 11231 has WM named for 530 pumps but the flow rates exceed that model (630 can handle it). Can you (provide) clarification?

Coagulant Metering Pumps	
Location	**Tertiary Building/Coagulant Room**
Feed Pump Tag	COAG-6261, -6262,-6263,-6264
Feed Pump Type	Peristaltic, Duplex
Feed Pump Range, Min - Max	2.75 - 87 GPH
Operating Pressure, Avg.	15 psi
Operating Pressure, Max.	30 psi
Gearbox RPM range	0.1-220
Suction Head	36-in lift, max.
Tubing, Inside Diameter	2-inch, 0.5-inch
Tubing Material	Marprene
Tubing Wall Thickness	3/32-inch

Response: Refer to the changes to this specification, above.

Wescor Associates - RFI dated March 22, 2018 via Email

48. Para 1.3.B.5 calls Certified test reports conducted for other installations or "in-house" testing are acceptable. We read it as certified previous test results are acceptable whereas 2.4.B.1 factory oxygen transfer performance test calls “A clean water oxygen Transfer test shall be performed to verify the Standard”

    Response: Previous tests are acceptable if the testing matches the performance conditions of this Project.

49. Oxygen Transfer Rate (SOTR) of the aeration equipment. The SOTR of the diffused aeration equipment at specified air flow conditions shall equal or exceed the SOTR specified herein for Oxic 1A in Aeration Tank 3. Please confirm Previous test result are enough or SOTE test for grid configuration of Oxic 1A to be conducted.

    Response: See response above.

50. Para 2.1.A.5.a: The diffused aeration equipment shall be capable of diffusing the following quantities of air into each zone of each aeration tank: But table in 2.1.5.b calls minimum airflow for mixing SCFM in three basin information, with minimum mixing standard of 0.12SCFM/diffuser we are getting quite low airflow per zone please confirm

Zone	Min Airflow for mixing (SCFM)	SOR (Std Oxygen Required) lbs/day (All 3 Tanks)				Minimum Diffusers/Zone (Per Tank)
		MIN	AVG	Max Month (Condition 1)	Max Month (Condition 2)	
Anaerobic	122	---	---	7,964	---	175
Pre-Anoxic	243	---	---	7,433	---	225
Swing	405	---	8,192	7,661	17,142	280
Aerobic 1	636	7,050	7,509	10,164	15,661	250
Aerobic 2	470	2,781	3,708	5,192	6,510	125
Aerobic 3	470	2,094	3,177	4,358	4,647	110
Post-Anoxic 1	186	---	1,214	1,749	---	48
Post- Anoxic 2	186	---	910	1,285	---	35
Reaeration	81	567	359	513	1,790	30

Response: The minimum mixing air requirement is 0.12 scfm per square foot of floor in an aeration tank and not 0.12 scfm per diffuser.

51. And we also feel SOR for swing zones and Aerobic zones are misplace while comparing airflow table in 2.1.A.5.a

    Response: Please note, SOR is listed as lbs/day and not SCFM. However minimum air flow is listed as SCFM in table 2.1.A.5.a (SOR is not included in that table).

52. Para.2.3. D.4 calls Air distribution headers shall be provided (minimum 6-inches). This should be typo and should be minimum of 4 inches for air distribution headers please check and confirm

    Response: The air distribution header provided shall be a minimum of 4-inches.

53. Para 2.3.D.4.d The minimum header spacing shall not be less than 3.5 ft and the maximum header spacing shall not be greater than 6.0 ft. This is not appropriate for 9" diffusers per industry standard please check and confirm.

    Response: The minimum and maximum header spacing shall be as listed in 2.3.D.4.d; exceptions will be reviewed during shop drawing submittals if necessary.

Walker Wellington - RFI dated March 22, 2018 via Email

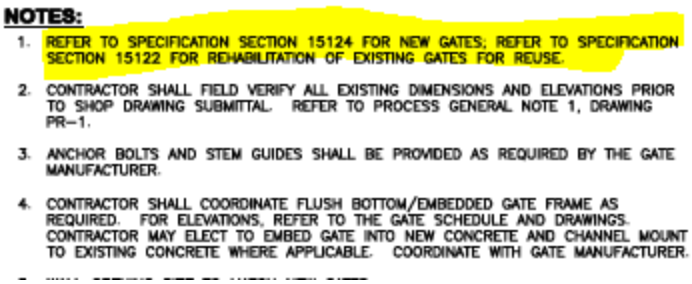
54. Materials of construction: Would Stainless Steel be an acceptable material of construction for the gates listed in section 15124

    Response: Please refer to the General note at the beginning of this sub-section.

55. Gate schedule- please identify gates that are to be refurbished and gates that are new:

    Response: There are 5 gates in Aeration Tank No.1 and 1 gate in the gravity thickener as identified on the drawings. The gravity thickener gate is not indicated on the Slide Gate Schedule as it is being reinstalled in the same location.

56. Section 15122 Rehabilitation of Existing Gates and Section 15124 Aluminum Slide Gates and Guide Frames: There is a schedule on DWG PR 69, with a list of gates, not clear which is to be refurbished or which is to be provided new.



NOTES:

1. REFER TO SPECIFICATION SECTION 15124 FOR NEW GATES; REFER TO SPECIFICATION SECTION 15122 FOR REHABILITATION OF EXISTING GATES FOR REUSE.
2. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING DIMENSIONS AND ELEVATIONS PRIOR TO SHOP DRAWING SUBMITTAL. REFER TO PROCESS GENERAL NOTE 1, DRAWING PR–1.
3. ANCHOR BOLTS AND STEM GUIDES SHALL BE PROVIDED AS REQUIRED BY THE GATE MANUFACTURER.
4. CONTRACTOR SHALL COORDINATE FLUSH BOTTOM/EMBEDDED GATE FRAME AS REQUIRED. FOR ELEVATIONS, REFER TO THE GATE SCHEDULE AND DRAWINGS. CONTRACTOR MAY ELECT TO EMBED GATE INTO NEW CONCRETE AND CHANNEL MOUNT TO EXISTING CONCRETE WHERE APPLICABLE. COORDINATE WITH GATE MANUFACTURER.

<u>Response:</u> *See response above.*

Attachments A through E to follow.

Attachment A
Pre-Bid Agenda & Sign-in Sheet

WRIGHT-PIERCE
Engineering a Better Environment

CITY OF TORRINGTON, CONNECTICUT
WATER POLLUTION CONTROL
FACILITIES UPGRADE

Pre-Bid Conference Agenda
March 15, 2018 - 10:00 am

Identifications

Owner: City of Torrington,
Water Pollution Control Authority
140 Main Street
Torrington, CT 06790

Team Members:

Jerry Rollett	Director of Public Works
Ray Drew	Administrator
Ed Tousey	Operations Manager
Victor Cristiano	Maintenance Manager

Engineer: Wright-Pierce Engineers
169 Main Street
700 Plaza Middlesex
Middletown, Connecticut 06457
Phone: 860-343-8297

Team Members:

Christopher Pierce	Principal in Charge
Christine Kurtz	Project Manager
Ryan Bodnaruk	Lead Project Engineer
Prashanth Emmanuel	Lead Project Engineer
Elliott Lagner	Process Designer

Agenda Items

1. Introduction

2. Objectives:

   a. Attendance of this meeting is mandatory for prospective bidders. The purpose of the Pre-Bid Conference is to receive questions from potential bidders relating to the Contract Documents. We will answer those that we can during the meeting.

   b. It is extremely important to note that bids must be based solely on information contained in the Contract Documents, including any addenda. Nothing stated in this meeting modifies the Contract Documents unless it is followed up in the context of an Addendum to the Contract Documents.

3. The location of this project is the Torrington Water Pollution Control Facilities located at 252 Lower Bogue Road, Harwinton, CT. A site walk through will be conducted following this meeting for all interested parties.

4. Bids will only be accepted from those who are on record as having purchased a set of Bidding Documents from the Issuing Office and who are on record as having attended this meeting. The Issuing Office for the Bidding Documents is the Wright-Pierce Online Plan Room (www.wright-pierce.com/projects.aspx). Prospective Bidders may examine the Bidding Documents at the following locations:

   a. City of Torrington Purchasing Department, Room 206, City Hall, 140 Main Street, Torrington, CT 06790;
   b. Wright-Pierce Online Plan Room (http://www.wright-pierce.com/projects.aspx)

   Bidding Documents may be obtained in PDF format on-line at http://www.wright-pierce.com/projects.aspx. Interested parties will be furnished one PDF download set of Bidding Documents at a cost of $50 per download.

5. There have been no addenda issued to date for this project. Any questions regarding specifications, policies, or procedures are to be directed, in writing, to the Engineer of Record, **Prashanth Emmanuel (860) 343-8297 or Prashanth.Emmanuel@wright-pierce.com.**

6. An addendum will be issued following this meeting. Addenda may be issued up to 5-days prior to the bid opening. Questions received less than 7-days prior to the bid opening may not be answered. All addenda will be issued by the Engineer in the form of email only.

7. Any contract or contracts awarded under this invitation for bids are expected to be funded in part by the State of Connecticut Department of Energy and Environmental Protection (DEEP). Neither the State of Connecticut nor any of its departments, agencies or employees is or will be a party to this invitation for bids or any resulting contract. This procurement will be subject to the requirements contained in Section 22a-482-4, (h), (j), and (o) of the Regulations of Connecticut State Agencies, as provided in the Supplemental Conditions.

8. Bids must include:

   a. This Bid Form in its Entirety.
   b. Required Bid Security.
   c. Completed and signed Qualifications Statement (Section 00405) with supporting data.

d. Completed and signed Compliance Statement (Section 00406)
e. Non-Collusion Affidavit of Prime Bidder (Section 00408)
f. Signed Understanding Statement for MBE/WBE Participation (Section 00800, SC-20).
g. Bidder's Department of Administrative Services Update (Bid) Statement / Prequalification Certificate (SC-22).
h. A tabulation of Subcontractors, Suppliers and other persons and organizations required to be identified in this Bid with estimated value of work.
i. List of Project References
j. Signed American Iron and Steel Clause Form (Section 00800, SC-21).
k. Certification of Bidder Regarding Equal Employment Opportunity (SC-40)
l. Labor Union Notice (SC-41)
m. Bid Guarantee in the form of a bid bond, certified check, bank check or money order made payable to the City of Torrington in an amount equal to 5% of the bid.

9. The requirements for MBE/WBE subcontractor participation shall be a minimum of 8.0% of the total contract amount, made up of at least 3.0% MBE and 5.0% WBE as outlined in 00800 SC-20. The final MBE/WBE Subcontractor Verification form(s) must then be submitted by the apparent low bidder within 14 days after the receipt of Bids. A separate form must be submitted for each proposed subcontractor to meet the MBE/WBE participation goals along with a copy of each subcontractor's current certificate. This information, along with the project costs, must be reviewed and approved by the Funding Agency before the Owner is authorized to award the Contract.

10. Sealed bids are due at the City of Torrington, Office of the Purchasing Agent, Room 206, City Hall, 140 Main Street, Torrington, CT 06032 by 11:00 AM on April 3, 2018. Bids will be opened and publicly read aloud immediately thereafter.

11. The contract, if awarded, will be awarded to the lowest responsive and responsible bidder within 90 days of the bid opening. A Compliance Statement, Performance and Payment Bonds and Insurance Certificates must then be submitted for approval by the Owner before the Notice to Proceed is issued.

12. Bidders wishing to institute any additional site visits or subsurface explorations should coordinate with the Engineer; contact Prashanth Emmanuel (860) 343-8297 or Prashanth.Emmanuel@wright-pierce.com.

13. The work under this contract is subject to the provisions of both the State (Department of Labor) and Federal (Davis-Bacon) wage rates per the supplementary conditions. The higher of the two rates shall apply. State wage rates will be issued by addendum.

14. Prospective bidders should familiarize themselves with coordination requirements pertaining to the organizations listed below. Refer to Section 01050.

a. City of Torrington
b. Town of Harwinton
c. Water Pollution Control Facility Staff
d. Call Before You Dig
e. Eversource
f. Torrington Water Company
g. Telephone/Internet Company
h. PCB Abatement Monitoring Consultant
i. Resident Project Representative
j. Program Services Provider (NIC)

15. General restrictions related to construction sequencing are discussed in Specification Section 01010. A construction-sequencing plan must be prepared by the Contractor for review and approval by the Owner and Engineer. Flow and treatment capacity must be maintained always which will likely require by-pass pumping.

16. Exterior staging areas are available on-site and indicated on the site plan. An additional area south of the WPCF fence line can also be made available. All proposed staging areas must be coordinated with the Owner.

17. The Engineer is providing a full-time Resident Project Representative on-site during construction.

18. The Owner is paying for Material Testing (refer to Section 01400); the Contractor is required to coordinate when testing needs to occur.

19. The Owner is paying for Programming Services Provider (NIC); a draft of control descriptions is included in Appendix E. The Contractor is responsible for coordination of the work they are responsible for by Contract with the Owner's Programming Services Provider.

20. Existing control points shall be provided by the Owner prior to construction. Contractor must maintain these and layout all work.

21. Refer to Layout Notes: after award, W-P will provide AutoCad drawings to the selected Contractor.

22. There will be 1,095 days for Substantial Completion and 1,155 days for Final Completion. There is also an interim milestone in the Contract Documents that requires a phosphorus reduction system to be operational by April 1, 2020 in order for the WPCF to meet their NPDES permit requirements (refer to Section 00510).

23. Permits obtained by the Owner are listed in the Section 00800 - Supplementary Conditions of the Contract Documents. All other permits shall be the responsibility of the Contractor. Bid Item No. 17 in the Bid Schedule includes an allowance of $102,000 for permit related costs to be paid to the Town of Harwinton. The local permit approvals that have been obtained will be provided by addendum. The application for the *General Permit for Discharge of Stormwater and Dewatering Wastewaters from Construction Activities* is completed and will be provided by addendum.

24. Sole Source Items. Some items have been pre-approved as sole source items including:
    a. UV Disinfection System (Section 11234). Item No. 2 in the Bid Schedule includes a $505,000 allowance for the UV System Equipment.
    b. Tertiary Treatment System (Section 11200). Item No. 3 in the Bid Schedule includes a $ 1,300,000 allowance for the Tertiary Treatment System.

    The cost included in these bid items is only for the cost of the manufacturer's equipment and services described in the Pre-Selection Bidding Documents provided in the Appendices of the Contract Documents. Any costs related to: Contract arrangements between the Contractor and the equipment supplier, installation, incidentals, etc. required by the Contractor to provide a complete operational system shall be included in the lump sum bid under Item No. 1.

25. Boring logs are included in the Bidding Documents as Appendix A.

26. Lead paint, PCB, mercury and asbestos have been identified on the project site. Testing results and abatement requirements are included in the Bidding Documents as Appendix C and D. Contractor shall include all costs for the removal and off-site disposal of the above mentioned hazardous material as necessary to accomplish the work as identified in Appendix C and D in Item 1 of the base bid. An additional allowance of $100,000 is included in the bid (Item 16) to account for the removal and off-site disposal of additional hazardous material identified during construction that was not visible during the initial testing. Contractor shall also coordinate with the Owners Hazardous Material Abatement Monitoring Consultant during this work.

27. Review of Project Scope

28. Questions

29. Site Walk

CITY OF TORRINGTON, CT
WATER POLLUTION CONTROL FACILITY
COMPREHENSIVE UPGRADE

SIGN-IN-SHEET
PRE-BID CONFERENCE
10:00 A.M.
March 15, 2018

BIDS DUE DATE: April 3, 2018
AT: 11:00 A.M.

Name *(please print legible)*	Organization Name Mailing Address	Phone Number	Fax Number	Email
Marek Durkin	Holzner Construction	203-335-4704	203-368-3475	estimating@holznerelectric.com
Michael Kinstler	Vortex Turnkey Solutions	860-753-2432		mkinstler@vortexcompanies.com
Chris Pierce	Wright-Pierce	860-343-8297	860-343-9504	chris.pierce@wright-pierce.com
Prashanth Emmanuel	Wright-Pierce	860-343-8297	860-343-9504	prashanth.emmanuel@wright-pierce.ca
Jerry May	C H Nickerson	860-489-6455		JMay@CHNickerson.com

Name *(please print legible)*	Organization Name Mailing Address	Phone Number	Fax Number	Email
Victor Cristiano	WPCA	860 485 9166		
Jim Berg-Johnson	Simplex	203 886 9475		James.BergJohnson@JCI.com
Christine Kurtz	Wright-Pierce	800 343 8297		Christine.Kurtz@wright-pierce.com

Name *(please print legible)*	Organization Name Mailing Address	Phone Number	Fax Number	Email
MARK CARROLL	OGG INDUSTRIES Wall St. Torrington	860 4899261	860 496-4227	markcarroll@oggind.com

Name *(please print legible)*	Organization Name Mailing Address	Phone Number	Fax Number	Email
Rich Vasquez	Spinello Companies	201-563-4027	973-808-9591	rvasquez@spinelloco.com
HIMANSHU TAILOR	MORGANTI GROUP 100, Mill-Plain Rd. 4th Flr DANBURY-CT.	203-830-3310		htailor@morganti.com
Adam Bisson	C. H. Nickerson 49 Hayden Hill Rd Torrington	860-489-0455	860-496-0481	abisson@chnickerson.com
PETER CESCA	C.H. NICKERSON	860-489-0455		
STELA MARUSIN	DEEP	860-424-3742	—	STELA.MARUSIN@CT.gov.
Clay Coppinger	Lawrance Brunoli INC	860-676-9900	860-676-0455	bids@lbi.com
MOE LEMAY	UNITED RENTALS 8 ALLIANCE DR BERLIN FALLS CT	484-373-6977		DLEMay@UR.COM
RAY DREW	CITY of TORRINGTON	860-485-9166	860-485-0130	ray_drew@torringtonct.org
RON BERGGREN	NIC SYSTEMS	860-529-0110	860-529-0105	rberggren@nicsystems.com
Carlo Marchi	"	"	"	cmarchi@nicsystems.com

Name *(please print legible)*	Organization Name Mailing Address	Phone Number	Fax Number	Email
Chris Jablonski	Daniel O'Connells Sons Inc. 234 Church St New Haven	203-672-0688	203-772-2732	cjablonski@oconnells.com
Elliott Lagner	WA	860-335-8015		elliott.lagner@wright-pierce.com
RYAN BODNARUK	W-P	401-808-8302		
JOHN KENNEDY	C.H. NICKERSON	860-489-0455		jkennedy@chnickerson.com
Mike Weinzimmer	CH Nickerson	860-489-0455		mweinzimmer@chnickerson.com
PETER PASTORE	G.A. FLEET	914 490 2250		PPASTORE@GAFLEET.COM
Scott Paradis	Electrical Energy System Corp	860-621-9657		sparadis@eesc-ct.com
Warren Horton	Horton Electrical Service	860-693-6398		whorton@hortonelectric.com
Dom Ursone	Simplex Grinnell 429 Hayden Station Rd. Windsor, CT	860-302-2540		Dursone@SimplexGrinnell.com
KEN O'HARA	CH NICKERSON	860 489-0455		KOHARA@CHNICKERSON.COM

Name *(please print legible)*	Organization Name Mailing Address	Phone Number	Fax Number	Email
Andy Culver	Godwin Pumps Andrew.Culver@xyleminc.com	207-233-8322		Andrew.Culver@xyleminc.com
Michael Loiselle	Methuen Construction	603-328-2222	603-328-2233	Estimating@methuenconstruction.com
Brigitte Jurczyk	Baker Corp	508-455-7142		bjurczyk@bakercorp.com
ROGER ROUGEOT	ADDISON ELEC	8604892972		pm@ADDISONELECTRICAL.COM
Ralph Monaco	WESCO	860-306-2921		rmonaco@wesco.com
Brian Picard	TAMKO	417-434-6079		brian_picard@tamko.com
JIM DOWNING	BAKER CORP.	508-277-5888		jdowning@bakercorp.com
Malcolm Beeker	Weston + Sampson 273 Dividend Rd RH 06067	860-213-1473		beekerm@wseinc.com
Sarah Rocklin	Weston + Sampson	(413) 841-1666		rocklins@wseinc.com
Jim Kinch	Northeast Shoring Installation	781 589 7434		JKinch@Neshoring.com

Name *(please print legible)*	Organization Name Mailing Address	Phone Number	Fax Number	Email
Ed Tousey	Torrington WPCA	860 485-9166		edward_tousey@Torringtonct.org
Evan Bradley	Badger Daylighting	860-227-3771		EBradley@Badgerinc.com
Kim Hardy	United Rentals Trench Safety	860-384-2070		hardyK@ur.com
RAY BAHR	BLAKE EQUIPMENT	860-986-1072		ray.bahr@bghusa.com

Attachment B
Specifications:
00405 – Qualifications Statement
03930 Concrete Coatings
15050 Pipe Schedule

WRIGHT-PIERCE
Engineering a Better Environment

Total Recordable Frequency Rate (TRFR) for the last 5 years:

YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____
YEAR	_____	TRFR	_____

Total number of man-hours worked for the last 5 Years:

YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____
YEAR	_____	TOTAL NUMBER OF MAN-HOURS	_____

Provide Contractor's (and Contractor's proposed Subcontractors and Suppliers furnishing or performing Work having a value in excess of 10 percent of the total amount of the Bid) Days Away From Work, Days of Restricted Work Activity or Job Transfer (DART) incidence rate for the particular industry or type of Work to be performed by Contractor and each of Contractor's proposed Subcontractors and Suppliers) for the last 5 years:

YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____
YEAR	_____	DART	_____

13. EQUIPMENT:

MAJOR EQUIPMENT: List on Schedule C all pieces of major equipment available for use on Owner's Project.

14. MAJOR SUBCONTRACTORS:

Identify any subcontractors that will represent a subcontract value estimated at greater than $750,000.

Earthwork/ Site Work Subcontractor: _____

Support of Excavation Subcontractor: _____

Concrete Subcontractor: _____

Mechanical/ HVAC Subcontractor: _____

Mechanical/ Plumbing Subcontractor: _____

Instrumentation Subcontractor: _____

Electrical Subcontractor: _____

SECTION 03930

CONCRETE COATINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Materials, surface preparation and application of specified coatings to all indicated concrete surfaces. The specified coating systems are intended to serve the following functions:
   1. Type 1 - Protect the concrete surfaces from hydrogen sulfide gas and sulfuric acid within the indicated areas.
   2. Type 3 - Serve as a flexible coating that will bridge existing hairline cracks.

B. List of Applicators who are approved to install the specified coatings.

1.2 RELATED SECTIONS

A. Section 01340 - Submittals
B. Section 03300 - Cast-In-Place Concrete
C. Section 03346 – Concrete Placing, Curing, Finishing and Repairs

1.3 REFERENCES

A. This section contains references that are applicable to this Specification Section. The applicable edition of the indicated references shall be the version that was the most current at the time of the Advertisement of Bids. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued, or replaced.
B. ASTM C1583 - Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method)
C. ASTM D2247 - Practice for Testing Water Resistance of Coatings in 100 Percent Relative Humidity
D. ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
E. ASTM D4138 - Standard Practices for Measurement of Dry Film Thickness of Protective Coating Systems by Destructive, Cross-Sectioning Means
F. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating
G. ASTM D4259 - Standard Practice for Abrading Concrete
H. ASTM D4260 - Standard Practice for Acid Etching Concrete
I. ASTM D4262 - Standard Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces
J. ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the

Plastic Sheet Method.

K. ASTM D4285 - Test Method for Indicating Oil or Water in Compressed Air
L. ASTM D4414 - Standard Practice for Measurement of Wet Film Thickness by Notch Gages
M. ASTM D4417 - Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel
N. ASTM D4541 – Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
O. ASTM D4787 - Standard Practice for Continuity Verification of Liquids or Sheet Linings Applied to Concrete Substrates.
P. ASTM D5162 - Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates
Q. ASTM D6132 - Standard Test Method for Nondestructive Measurement of Dry Film Thickness of Applied Organic Coatings Using an Ultrasonic Coating Thickness Gage
R. ASTM D6677 - Standard Test Method for Evaluating Adhesion by Knife
S. ASTM D7234 - Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers
T. ASTM D7682 - Standard Test Method for Replication and Measurement of Concrete Surface Profiles Using Replica Putty
U. ASTM E84-11a – Standard Test Method for Surface Burning Characteristics of Building Materials.
V. ASTM E337 - Standard Test Method for Measuring Humidity with a Psychrometer (the Measurement of Wet- and Dry-Bulb Temperatures)
W. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
X. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in Situ Probes
Y. ASTM G210 - Standard Practice for Operating the Severe Wastewater Analysis Testing Apparatus
Z. Federal Test Method No. 141 - Method 6141, Stain Removal.
AA. ICRI - International Concrete Repair Institute
BB. ICRI Technical Guideline 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair
CC. NACE SP0188 (Item No. 21038) – Standard Practice for Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates
DD. SSPC - Steel Structures Painting Council.
EE. SSPC QP 1 - Field Application To Complex Industrial And Marine Structures
FF. SSPC QP 2 - Field Removal Of Hazardous Coatings
GG. SSPC QP 3 - Shop Painting Certification Program
HH. SSPC C7 - Abrasive Blasting Program
II. SSPC C12 - Spray Application Certification
JJ. SSPC Coating Application Specialist (CAS) Certification Program
KK. SSPC PCAC - Plural Component Application For Polyureas And High Solid Coatings- Certification Program
LL. SSPC Basics Of Concrete Surface Preparation

MM. SSPC CCB - Concrete Coating Basics
NN. SSPC-SP13/NACE No. 6 "Surface Preparation of Concrete".
OO. SSPC-PA-2 – Procedures for Determining Compliance to Required Dry Film Thickness
PP. SSPC-PA-9 - Measurement of Dry Coating Thickness on Cementitious Substrates Using Ultrasonic Gages
QQ. VOC Standards - All coatings shall be in accordance with all applicable State and Federal VOC Standards.
    1. OSHA 29 CFR 1925.55 Gases, Vapors, Fumes, Dusts and Mists.
    2. Ozone Transportation Commission (OTC) 2005 VOC Regulation.

1.4 RESPONSIBILITIES

A. Following are the responsibilities of each of the listed parties as they relate to the installation of the Type 1 coatings:
    1. General Contractor:
        a. Attend the Pre-Coating Meeting.
        b. Provide oversight of the surface preparation, application, testing and any subsequent repairs of the coating system.
        c. Provide repairs to concrete substrate prior to application of parge coat (or coordinate the work if the Applicator will provide the repairs). Ensure that the repair materials are compatible with the coating materials. Install and ensure that all embedded and drilled items are in place prior to application of parge coat.
        e. Provide environmental controls.
        f. Coordinate and schedule the required site visits by the Manufacturer.
        g. Obtain daily field reports from Applicator and Inspection reports from the Manufacturer and submit to the Engineer within 24 hours of work or inspections, respectively.
        h. Coordinate and facilitate communication, coordination, and procedures in accordance with the Contract Documents.
    2. Engineer:
        a. Attend the Pre-Coating Meeting.
        b. Review field reports.
        c. Perform final inspection of coatings.
    3. Engineer’s Resident Project Representative (herein referred to as “RPR”)
        a. Attend the Pre-Coating Meeting.
        b. Provide daily review of the work
        c. Inspect concrete substrate and identify areas requiring repair prior to installation of parge coat.
        d. Coordinate with the Applicator and General Contractor on scheduling of work.
        e. Coordinate inspections and testing by the Independent Coatings Inspector.
        f. Perform final inspection of coatings
    4. Coating Manufacturer (herein referred to as “Manufacturer”)
        a. Attend the Pre-Coating Meeting.

b. Confirm that the mock-up wall for the surface preparation of the concrete substrate (Section 1) meets the Manufacturers recommendations for the following conditions (based on the testing or measurements by Inspector):
   i. Required surface profile and soundness
   ii. Required pH
   iii. Required moisture content
   iv. Required temperature
   v. Required cleanliness
c. Confirm that the mock-up wall for the surface preparation of the parge coat (Section 2) meets the Manufacturers recommendations for the following conditions (based on the testing or measurements by Inspector):
   i. Required surface profile and soundness
   ii. Required pH
   iii. Required moisture content
   iv. Required temperature
   v. Required cleanliness
d. Confirm that the mock-up wall for the top coat (Section 3) meets the Manufacturers recommendations.
e. Provide periodic site visits as required.
f. Recommend repairs of deficient coating applications
g. Provide field reports to General Contractor for all site visits

5. Coating Applicator (herein referred to as "Applicator")
   a. Attend the Pre-Coating Meeting.
   b. Remove existing coatings
   c. Provide repairs to concrete substrate prior to application of parge coat (if the repairs are not provided by the General Contractor).
   d. Perform surface preparation of substrates.
   e. Install the coating systems, including primer, parge coat and top coats.
   f. Measure and document the temperature and relative humidity of the atmosphere prior to and every 2 hours during installation of the coating. The relative humidity shall be measured in accordance with ATM E337.
   g. Measure wet film thickness of coatings in accordance with ASTM D4414.
   h. Provide daily field reports to the General Contractor at the end of each day the work is performed.
6. Independent Coatings Inspector (herein referred to as "Inspector")
   a. Attend the Pre-Coating Meeting.
   b. Provide periodic inspection when requested by the RPR.
   c. Ensure general conformance with the Contract Documents. Inspector will not approve or accept work.
   d. Test the concrete surfaces to be coated to determine if they are conductive and the holiday testing can be performed.
   e. Measure, test and document the following conditions:
      i. pH of the concrete substrate

ii. Moisture content of the concrete substrate
iii. Surface profile of the concrete substrate
iv. Temperature of the concrete substrate
v. Soundness of the concrete substrate
vi. Coating thicknesses (in accordance with ASTM D6132)
vii. Pull-off strength (in accordance with ASTM D4541)
viii. Holiday test (in accordance with NACE SP0188 or ASTM D5162)

f. Notify the Engineer and General Contractor of any failed test results at the end of each day the work is performed.
g. Submit inspection and test reports to the Engineer within 48 hours of the inspections and tests

1.5 SUBMITTALS

A. Submit product data under provisions of Section 01340 for all coating materials.
B. Submit Safety Data Sheets (SDS) for all coating products.
C. Submit schedule with list of items to be coated, type and manufacturer of all coating materials, dry mil thickness of all materials, details of surface preparation methods and application procedures.
D. Storage requirements including temperature, humidity, and ventilation for resurfacing system materials.
E. Submit details of how the coating will terminate at embedded items (such as pipes, stop gate frames and anchors), tops of walls, control and construction joints and all wall surfaces at the termination of the coating.
F. Submit Manufacturer's proposed schedule for reviewing the work in progress.
G. Submit Applicator's proposed schedule for application of the coatings listing dates for each phase of each type of coating at each structure.
H. If an alternate coating system (than those specified) is proposed, submit Manufacturer's certification stating that the proposed coating system is a proper system and meets the performance criteria specified in Part 1.6.
I. Submit Manufacturer's certification that the proposed coatings meet all applicable State and Federal VOC regulations.
J. Applicator:
1. Submit name and qualifications of the Applicator.
2. Submit letter from Manufacturer stating that the Applicator is an approved installer of the submitted coating system.
K. Submit full test report and letter from an independent testing laboratory stating the Type 1 coatings were successfully tested in accordance with ASTM G210.
L. Submit warranty.
M. Submit Applicator's Daily Field Reports and Manufacturer's Inspection Reports within 24 hours of the daily work. The reports shall include the following:
1. Date of work
2. Area of work. Copies of appropriate Drawings from the Contract Documents may be used to highlight the area of work
3. Environmental conditions during work
4. Summary of products installed, including locations, thicknesses and quantities.
5. Summary of all tests performed (by Manufacturer and Inspector)

6. Summary of surface preparations and installations approved by the Manufacturer.

1.6 QUALITY ASSURANCE

A. Coating systems:
   1. The coating systems specified are intended to serve the following functions as indicated:
      a. Type 1 - Protect the concrete surfaces from hydrogen sulfide gas at an average concentration of 20 parts per million (ppm) annually and sulfuric acid concentration of up to 7.5%
      b. Type 3 - Provide a general flexible coating that will bridge existing hairline cracks.
   2. The intent of the specifications is to establish minimum performance requirements for each type of coating system. The specified systems represent the minimum required to achieve the required protection. The coating manufacturer shall be responsible for providing a coating system that will serve the required function. Alternate systems may be proposed if they meet the requirements of this specification and provide the total specified coating thickness, including that of the parge coat.
   3. All Type 1 Coatings shall have been subjected to laboratory testing performed in strict accordance with ASTM G210 to demonstrate the applicability of the coating to the anticipated chemical exposures. Laboratory testing shall have been conducted by an independent testing laboratory. The Engineer shall reserve final judgment as to whether a coating will be applicable based on the submitted test results. Adherence to ASTM G210 will include initial and final "LogZ" permeation values of 8.0
   4. Materials selected for each of the different coating systems for each type of surface shall be supplied by of a single manufacturer.

B. Applicator shall have the following qualifications:
   1. Applicator has been approved by the Manufacturer to apply the submitted product.
   2. Applicator shall employ personnel who will be on the Project site that have the following SSPC Qualifications and Certifications:
      a. SSPC QP 1
      b. SSPC QP 2
      c. SSPC QP 3
      d. SSPC C7
      e. SSPC C12
      f. SSPC CAS
      g. SSPC PCAC
      h. SSPC Basics of Concrete Surface Preparation
      i. SSPC CCB
   3. Applicator has the appropriate equipment to apply the coatings, including plural-component spray equipment (if required for the product).

C. Field Quality Control (Type 1 Coatings):

1. An Inspector, hired and paid for by the Owner and working under the direction of the Engineer, shall provide periodic inspections and perform the duties identified in Part 1.4.
2. Mock-up wall sections shall be constructed as indicated in Part 1.7.
3. A qualified technical field representative from the Manufacturer shall be present during the milestones indicated herein and at appropriate intervals deemed necessary to ensure the work is done in strict accordance with the Manufacturer's recommendations and requirements of the Contract Documents.
4. Each layer of the coating system shall not be applied until the Inspector has reviewed and approved the completed work up to that point. If deficiencies are discovered, the Inspector shall consult with the Manufacturer and submit a written statement documenting all deficiencies and make recommendations for repair.
5. After the Applicator has repaired the noted deficiencies, the Inspector shall inspect the repaired work until all deficiencies are repaired.
6. Recoating of materials failing to meet the requirements of the Contract Documents, shall be performed by the coating applicator, at no additional cost to the Owner.
7. The number of coats and total mil thickness specified in the coating schedule are minimums. If the specified minimum film thickness is not achieved, additional coats shall be applied to achieve the total film thickness specified.

1.7 MOCK-UP WALL SECTIONS

A. Provide mock-up sections of a new or existing wall that will demonstrate the proposed work for surface preparation, parge coat and top coat (or coats) for Type 1 coatings. The required sections of the mock-up wall shall include the following:
   1. Section 1 - One section that is a minimum 4’-0” wide x 6’-0” tall to demonstrate the required surface preparation of the concrete substrate.
   2. Section 2 - One section that is a minimum 4’-0” wide x 6’-0” tall to demonstrate the required surface preparation of the parge coat. This Section is not required if epoxy based parge materials are used.
   3. Section 3 - One section that is a minimum 4’-0” wide x 6’-0” tall to demonstrate the required application of the top coat.

B. The mock-up wall sections shall be constructed on the same wall and will remain in place until all of the coatings have been installed and accepted by the Engineer.

C. After each mock-up section in constructed, the Inspector and Manufacturer shall review. If the mock-up sections do not meet the requirements of the Manufacturer, they shall be repaired as follows:
   1. Section 1 – Provide additional abrasive blasting until the required surface profile is achieved.
   2. Section 2 – Remove and reapply the parge coat.
   3. Section 3 - Remove and reapply the top coat.
   4. All mock-up panels shall be re-inspected and repaired until they are acceptable to the Manufacturer.

D. After the mock-up sections are accepted, they shall serve as the minimum standard of detail and workmanship for the remainder of the work.

1.8 DELIVERY AND STORAGE

A. Deliver coating materials in sealed containers with labels legible and intact. Materials exceeding the storage life recommended by the Manufacturer shall be rejected. Include on label of all containers:
   1. Name or title of product
   2. Federal Specification Number if applicable
   3. Manufacturer's batch number and date of manufacture
   4. Manufacturer s name
   5. Generic type of material
   6. Application and mixing instructions
   7. Hazardous material identification label
   8. Shelf life date
   9. Storage requirements

B. All containers shall be clearly marked indicating any personnel safety hazards associated with the use of or exposure to the materials.

C. Store only acceptable project materials on the project site. General Contractor shall provide a suitable storage area for coating materials delivered to the site. Coating materials shall not be stored in existing facilities.

D. Environmental conditions of the storage area shall comply with Manufacturer's recommendations.

E. Confine mixing, thinning, clean-up and associated operations, and storage of materials-related debris before authorized disposal, to these areas. All materials are to be stored on pallets or similar storage/handling skids off the ground in sheltered areas in which the temperature is maintained between 70°F and 90°F.

F. Do not use floor drains, dikes or storm drains for disposal of materials.

G. Comply with all applicable health and fire codes and regulations including safety precautions recommended by the manufacturer. Storage space shall be provided with a suitable fire extinguisher fully charged at all times.

1.9 SEQUENCING

A. Refer to Section 01010 "Summary of Work" for sequence of work requirements. The facility shall remain on line at all times and the work will be sequenced accordingly to accommodate this requirement.

B. The General Contractor shall coordinate the schedule and sequencing of coatings. The surfaces indicated on the structural drawings to receive a coating system will be out of service and available for coating at various stages throughout the duration of the construction project.

C. Due to the nature of this project and the sequencing required to maintain treatment during the project, a significant amount of construction sequencing will be required. Manufacturer and Applicator shall include all costs as needed to accommodate the Contractor's construction schedule, include multiple mobilization and demobilizations.

1.10 PRE-COATING MEETING

A. Engineer shall hold meeting more than 14 days prior to commencement of surface preparation to review coating products and procedures.

B. Meeting Minutes: Engineer shall record minutes of meeting and distribute to

attending parties within 10 business days of meeting.

C. Attendance: General Contractor shall coordinate the attendance of the following parties: General Contractor, Applicator and technical representative from the Manufacturer. Engineer shall coordinate the attendance of the following parties: Engineer, RPR and Inspector.

1.11 WARRANTY

A. Manufacturer shall provide a warranty for defects of the supplied coating materials. Defects shall be defined as when the coating either cracks, delaminates or otherwise fails and does not perform as a protective coating for the concrete surface. All warranties shall be effective for a period from the Date of Substantial Completion as indicated in the Contract Documents. Warranty periods are as follows:
   1. Type 1 coating - five (5) years.
   2. Type 3 coating - one (1) year.

PART 2 - PRODUCTS

2.1 COATING SYSTEMS

A. General:
   1. The systems shown are meant to show a representative system of each specified manufacturer. Equivalent systems that meet the requirements of this specification may be proposed.
   2. All indicated coating thicknesses shall be measured as follows:
      a. All thicknesses are dry film thicknesses (DFT)
      b. Minimum thicknesses shall be as measured from the peak of the surface profile.
      c. Coating thicknesses that exceed the Manufacturers recommended maximum thickness per lift will require application in multiple lifts.
   3. All indicated coats shall be applied over the entire concrete surface to be coated.

B. Type 1 Coatings:
   1. Tnemec Company, Inc:
      a. Surface Preparation: Abrasive Blast (SSPC-SP13/NACE No. 6) to achieve a minimum ICRI profile CSP 5
      b. Parge Coat: Series 218 Mortarclad (epoxy modified cementitious repair mortar) (1/8"-1/4” thick) or Series 217 Mortarcrete (cementitious repair mortar) (greater than 1/4” thick)
      c. Top Coat: Series 436 Perma-Shield FR (80 mils)
   2. Sauereisen:
      a. Surface Preparation: Abrasive Blast (SSPC-SP13/NACE No. 6) to achieve a minimum ICRI profile CSP 5
      b. Parge Coat: RestoKrete No. 208 (epoxy modified cementitious repair mortar) (1/8" minimum) or RestoKrete No F-120 (cementitious repair mortar) (1/8" minimum)
      c. Top Coat: Sewergard No. 210X (100 mils)
   3. Sherwin-Williams:

a. Surface Preparation: Abrasive Blast (SSPC-SP13/NACE No. 6) to achieve a minimum ICRI profile CSP 5
b. Parge Coat: A.W. Cook CEMTEC Thin Patch (microsilica cementitious repair mortar) (1/8"-1/2" thick) or A.W. Cook CEMTEC Silatec MSM (microsilica cementitious repair mortar) (greater than 1/2" thick)
c. Top Coat: Dura-Plate 5900 (100 mils)

5. Sealant - All joints within the Type 1 coating system shall be sealed with a sealant that will provide resistance to the hydrogen sulfide and sulfuric acid concentrations specified and is compatible with the coating system. Thiokol 2235 by PolySpec, Duoflex by Sika Corporation or equal.

C. Type 3 Coatings:
1. Tnemec Company, Inc:
a. Surface Preparation: Abrasive Blast (SSPC-SP13/NACE No. 6) to achieve ICRI profile CSP 5
b. Primer: Series 161HS Tneme-Fascure (6-8 mils)
c. Top Coat: Series 462 Elasto-Shield (60 mils)
2. Sauereisen:
a. Surface Preparation: Abrasive Blast (SSPC-SP13/NACE No. 6) to achieve ICRI profile CSP 5
b. Primer: No. 502 Conoprime (6-8 mils)
c. Top Coat: No. 381 ConoFlex Urethane (60 mils)
3. Sherwin-Williams:
a. Surface Preparation: Abrasive Blast (SSPC-SP13/NACE No. 6) to achieve ICRI profile CSP 5
b. Primer: Dura-Plate 235 Primer (6-8 mils)
c. Top Coat: Sherflex (60 mils)

2.2 APPLICATORS

A. The following is a list of Applicators who are authorized by the specified Manufacturers to install their respective Type 1 coatings. Equal or alternate applicators will not be considered.
1. Knowles Industrial Services Corporation, Gorham, ME
2. Van De Graff Painting Co., Portland, ME
3. Copia Specialty Contractors, Inc., Brewer, ME
4. Venture Construction, Concord, NH
5. Industrial Corrosion Services, Southwick, MA
6. R.J. Forbes Painting Contractor, Inc., Attleboro, MA
7. John W. Egan Company, Newtonville, MA
8. Soep Painting, Lawrence, MA
9. Frank J. Ryan & Sons, Troy, NY

PART 3 - EXECUTION

3.1 GENERAL

A. All equipment and procedures used for the coating system application shall be as recommended by the Manufacturer. Unless specified elsewhere herein, the Applicator shall comply with the Manufacturer's most recent written instructions

with respect to the following:

1. Mixing of all materials
2. Protection and handling of all materials
3. Recoat limitation and cure times
4. Application procedures
5. Final curing
6. Use of proper application equipment

B. The environmental conditions under which the coatings and coating systems are applied shall be in strict accordance with the Manufacturer's recommendations. Environmental conditions that shall be controlled include:

1. Temperature of the surrounding air and substrate
2. Relative humidity and dew point of the surrounding air
3. Moisture content of the concrete substrate
4. pH of the concrete substrate
5. Presence of dust and other external conditions that affect the proper installation and curing of the coating
6. Presence of wind or direct sunlight
7. Presence of rain, snow, dew or fog

Provide additional heat, shelter, dehumidification and other means as required to bring the environmental conditions to those required by the Manufacturer.

C. Protection:

1. Cover or otherwise protect finish work or other surfaces not being resurfaced.
2. Erect and maintain protective tarps, enclosures and/or masking to contain debris (such as dust or airborne particles resulting from surface preparation) generated during any and all work activities. This includes, but is not limited to, the use of dust/debris collection apparatus as required.
3. Furnish and lay protective coverings or drop cloths in all areas where the coating is being applied to adequately protect concrete slabs, embedded metals in the concrete, existing piping and other work from damage during the execution of the coating work.
4. Protect adjacent structures not to receive coatings from coating spray.

D. Cleaning and resurfacing shall be scheduled so that dust and other contaminants from the cleaning process will not fall on wet, newly resurfaced areas.

E. Do not apply successive layers until previous layer has cured for the minimum time as recommended by the manufacturer. If a lift has cured beyond the maximum time allowed, prepare the surface as recommended by the Manufacturer prior to applying additional layers.

F. Do not use or retain contaminated, outdated, prematurely opened, diluted materials, or materials which have exceeded their shelf life.

G. General Contractor shall establish a storage area for all coating materials and equipment. The environmental conditions of the storage area shall comply with the Manufacturers recommendations.

1. Remove all soiled and used rags, waste and trash from the storage area at the end of each work day.
2. Clean all coating spills and stains in the storage area caused by painting materials and equipment at no additional cost to the Owner.

3.2 SURFACE PREPARATION FOR TYPE 1 COATINGS

A. All surface preparation procedures specified within are meant to serve as minimum requirements. If the specific coating manufacturer has more stringent requirements for surface preparation, they shall be adhered to.

B. Remove all existing mounted items prior to surface preparation.

C. All existing coatings (as indicated on the Contract Drawings) shall be completely removed prior to application of coatings. Caution shall be exercised not to damage the existing concrete while removing the coatings. If selected method of surface blasting will not remove existing coating, notify the Engineer.

D. Oil and grease shall be removed before mechanical cleaning is started via an alkaline- based emulsifying detergent as recommended by the resurfacing material manufacturer. Where mechanical cleaning is accomplished by blast cleaning, the abrasive used shall be washed, graded and free of contaminants that might interfere with the adhesion of the resurfacing materials.

E. Initial Cleaning/Decontamination: All existing areas to be resurfaced shall be pressure washed with a 2500-5000 PSI spray containing an alkaline based detergent to remove all loose materials, acid constituents, grease, oil, and other contaminants (use potable water only, not plant water). All washing shall be in accordance with SSPC-SP13/NACE 6

F. All new concrete surfaces to receive a coating shall cure for a minimum of 28 days prior to the application of the coating.

G. All concrete surfaces shall be prepared in accordance with Part 2.1 to remove contaminants, laitance and weak concrete, expose subsurface voids and produce a sound concrete surface with the required ICRI profile.

H. Applicator shall select the appropriate method for surface preparation and removal of existing coatings based on existing conditions. Methods of surface preparation and removal of existing coatings shall include the following:

1. Mechanical methods (ASTM D4259):
    a. Abrasive blasting: Dry, wet, vacuum assisted or centrifugal shot blasting.
    b. High pressure water cleaning or waterjetting with potable water
    c. Impact tool methods.
    d. Power tool methods.
2. Chemical methods (acid etching on horizontal surfaces) (ASTM D4260).

I. Abrasive Blasting:

1. Air used for blast cleaning shall be free of oil and moisture to not cause contamination of the surfaces to be resurfaced. Blast equipment shall be tested in accordance with ASTM D4285.
2. Abrasive used in dry blast cleaning operations shall be new, washed, graded and free of contaminants that would interfere with adhesion of coating or paint and shall not be reused.
3. The compressed air used for blast cleaning will be filtered free of condensed water or oil. Moisture traps will be cleaned at least once every four hours or more frequently as is appropriate.

4. Oil separators shall be installed just downstream of compressor discharge valves and at the discharge of the blast pot discharges. Oil separators shall be cleaned at least once every four hours or more frequently as is appropriate.
5. An air dryer or drying unit shall be installed which dries the compressed air prior to blast connections.
6. The Contractor shall keep the area of work in a clean condition and shall not permit blasting materials to accumulate as to constitute a nuisance or hazard to the execution of the work or the operation of the existing Treatment Facility.

J. After concrete surfaces have been blast cleaned, surfaces shall be cleaned of dust and loose particles with compressed air.

K. Repair all surface and structural defects as indicated in Section 03346 and the Contract Drawings.

L. Install all drilled anchors prior to application of parge coat. Cover or otherwise protect anchor threads from coating.

M. After surface preparation is complete, the following conditions shall be verified by the appropriate parties to ensure suitability of the surface for the parge coat:
1. Surface profile
2. Surface cleanliness
3. pH of surface
4. Moisture content of surface
5. Soundness of surface

If the surface conditions do not meet the Manufacturer's required criteria, they shall be modified by a means acceptable to the Manufacturer until the required conditions are met.

N. Surface profile shall be determined by one of the following methods:
1. Visually compare the surface to ICRI CSP Visual Comparators.
2. Use of replica tape in accordance with ASTM D4417 (Method C):
   a. Obtain the surface profile by pressing replica tape against the prepared concrete surface.
   b. Measure the profile of the replica tape using a micrometric thickness gage
3. Determine surface profile at a minimum of three 6" x 6" locations for each work shift or area

O. The pH of the substrate surface profile shall be determined in accordance with ASTM D4262.

P. Moisture content of surface shall be measured by the use of plastic sheets in accordance with ASTM D4263.

3.3 APPLICATION OF TYPE 1 COATING

A. All work indicated herein and as shown on the Contract Drawings are based on specific manufacturer's requirements. Provide all work, including items not specifically addressed herein, in strict accordance with the supplied coating manufacturer's recommendations.

B. Materials shall be applied only by craftsmen approved by the manufacturer in the use of the specific products involved.

C. Install coating prior to installing all mounted items.

D. Initial parge coat shall be applied over the entire surface to receive a topcoat. The

parge coat shall be applied to fill surface voids and establish a continuous uniform surface for the topcoat.

E. The coatings shall be prepared and terminated at all discontinuities, joints and corners in strict accordance with the Contract Drawings and Manufacturers recommendations.

F. After installation of parge coat, prepare surfaces as follows:
   1. Epoxy modified cementitious repair mortars: Provide brushed finish to provide a surface profile
   2. All other cementitious repair mortars – Prepare surface in accordance with SSPC-SP13/NACE No. 6 to expose subsurface voids and produce a sound concrete surface with an ICRI profile of CSP 3 or CSP 4.

G. Comply with the recommendation of the Manufacturer for drying and curing time between subsequent coats at the given temperature. The topcoat shall be properly cured and tested prior to immersion in liquid.

H. Finish coats shall be monolithic and free of pockmarks, trowel marks, depressions, unconsolidated areas, waviness, ridges, pinholes or holidays.

3.4 CLEANING

A. Upon completion of the work, all staging, scaffolding, containers and other used materials shall be removed from the coating area and Project site. Coating spots on adjacent surfaces shall be removed and the job site cleaned.

B. All damage to surfaces resulting from the work of this section shall be cleaned, repaired, or refinished to the satisfaction of the Engineer at no additional cost to the Owner.

3.5 INSPECTIONS AND TESTS FOR TYPE 1 COATINGS

A. All coatings shall be inspected at various stages of installation by the responsible parties as indicated below. In addition, the Manufacturer's technical field representative shall be required to visit the jobsite on a regular basis to inspect the work in progress and be available for any jobsite consultation and problem resolution involving the coating application. The required inspections and tests and parties responsible for them shall include the following:
   1. Concrete surface to be coated (prior to installation of parge coat):
      a. Surface profile (Inspector)
      b. Surface cleanliness (Manufacturer)
      c. pH of surface (Inspector)
      d. Moisture content of surface (Inspector)
      e. Temperature of surface (Inspector)
   2. Parge coat (prior to installation of top coat)
      a. Surface profile (Inspector)
      b. Surface cleanliness (Manufacturer)
      c. pH of surface (Inspector)
      d. Moisture content of surface (Inspector)
      e. Temperature of surface (Inspector)
      f. Verification of coating thickness (wet film) (Applicator)
      g. Verification of coating thickness (dry film) (Inspector)
   3. Top coat

a. Verification of coating thickness (wet film) (Applicator)
b. Verification of coating thickness (dry film) (Inspector)
c. Discontinuity (Holiday) testing (Inspector)
d. Pull-Off Strength testing (Inspector)
e. Visual inspection (Engineer)

B. Do not apply additional coats until the completed coat has been inspected as indicated above. Only inspected and reviewed coats will be considered in determining the number of and total thickness of coats applied.

C. Verification of Coating Thickness:
1. The wet film dry film thicknesses of each required coating layer shall be verified.
2. The method of verification shall consist of one of the following:
a. The use of notch gages to measure wet film thicknesses (in accordance with ASTM D4414)
b. The use of electronic gages using ultrasonic measurement techniques to measure dry film thicknesses (in accordance with ASTM D6132).
c. Destructive testing (in accordance with ASTM D4138). This method shall be used only after review with no exceptions taken by the Engineer. All damaged areas shall be repaired by a method approved by the coating manufacturer.
3. Frequency of thickness readings:
a. The minimum frequency of coating thickness readings shall be in accordance with SSPC PA-9. Engineer reserves the right to increase the frequency of testing and direct the Inspector to test additional areas as necessary.
b. Definitions:
i. Gage reading: Single instrument reading.
ii. Spot measurement: Average of three gage readings within a 6 inch diameter area.
iii. Area measurement: Average of five spot measurements within a 10 ft x 10 ft (100 SF) area.
c. Coating area ≤ 300 square feet (SF): One area measurement for each 100 SF of coated area.
d. 300 SF < coating area ≤ 1000 SF: One area measurement at each of 3 random 100 SF areas.
e. Coating area > 1000 SF:
i. One area measurement at each of 3 random 100 SF areas (first 1000 SF).
ii. One area measurement at each random 100 SF areas (each remaining 1000 SF or portion thereof).
4. Acceptance criteria:
a. Gage reading: none
b. Spot measurement: Each spot measurement shall be within 80% of the specified range (not less than 80% of the minimum value and not greater than 120% of the maximum value)

c. Area measurement: The average of each area measurement shall fall within the specified range

5. Additional testing of non-conforming area measurements:
   a. Obtain additional spot measurements at 5 foot intervals in 8 equally spaced directions radiating out from the nonconforming area up to the limit of area coated during the work shift.
   b. Each spot measurement shall conform to specified requirements
   c. When 2 consecutive spots measurements conform to requirements, measuring can stop in that direction.
   d. Area within 5 feet of any nonconforming measurement will be considered non-conforming and shall be repaired and retested until all areas are within the specified thickness limit.

D. Holiday Testing:
   1. Holiday testing will be performed by the Inspector with a high voltage spark tester in accordance with NACE SP0188 or ASTM D4787.
   2. Prior to the application of the coatings on each surface, the concrete surface shall be tested to determine if it is conductive and the holiday testing can be performed.
      a. The conductivity shall be tested by attaching a ground wire to exposed reinforcing steel or another metallic ground installed in the concrete and touching the electrode to the bare concrete.
      b. If a metallic ground is not available, the ground wire shall be placed directly against the bare concrete surface and weighed with a damp cloth or wet sand filled paper bag.
      c. If the surface is not conductive, a conductive prime coat shall be applied.
   3. The voltages used for the holiday test will be determined by the Inspector and confirmed by the coating manufacturer. The manufacturers maximum test voltage shall not be exceeded.
   4. Coating shall be fully cured and the surface completely dry to the touch prior to performing the holiday test.
   5. All detected holidays in the coating shall be marked and repaired with a material and procedure recommended by the Manufacturer.
   6. All repaired areas shall be retested.

E. Pull-off Strength Testing: Pull-off strength will be performed on the mock-up wall section by one of the following methods:
   1. Pull-off Strength of Coatings Using Portable Adhesion Testers in accordance with ASTM D7234:
      a. Testing equipment shall be one of the following types:
         i. Type I Fixed Alignment Adhesion Tester
         ii. Type II Fixed Alignment Adhesion Tester
         iii. Type III Self-Aligning Adhesion Tester
         iv. Type IV Self-Aligning Adhesion Tester
      b. The tests shall be conducted as follows:
         i. Clean the coating surface.
         ii. Select surface areas to perform the tests. Test area shall have enough perpendicular and radial clearance to accommodate the

testing apparatus, be flat enough to permit proper alignment and rigid enough to support the counter force of the apparatus.

iii. Score around the loading fixture (2-inch diameter or square dolly or stud) to the concrete surface to ensure that the pulling force is applied only to the area beneath the dolly. Use a water-lubricated diamond-tipped core bit. When using a round dolly, score before the dolly is attached to the coating. When using a square dolly, score after the dolly is attached to the coating.

iv. Scoring shall be performed in a manner that ensures the cut is made normal to the coating surface and in a manner that does not twist or torque the test area and minimizes heat generated and edge damage or microcracks to the coating and the concrete substrate.

v. Attach loading fixture to the coating surface with an appropriate adhesive. Ensure adhesive does not flow into groove.

vi. Remove excessive adhesive around the fixture.

vii. Apply testing apparatus to loading fixture.

viii. Select maximum test force based on Manufacturer's product literature. Test force shall be no less than 100 psi and no more than 250 psi.

ix. Apply a tension force normal to surface.

x. Gradually increase load (no more than 30 psi/sec) until a plug of material detaches or the required value is reached in 30 seconds or less.

xi. Record mode of failure and pulloff force. Convert the indicated force to the actual force using the loading fixture manufacturer's calibration chart. Calculate pulloff stress based on the applied force and surface area that was stressed.

xii. For all tests to failure, designate the failures by one of the following failure mechanisms:

(1) Concrete substrate cohesive failure – This failure mode is defined as failure within the concrete, below the concrete/coating interface.

(2) Coating adhesive failure: This failure mode is defined as failure directly at the concrete/coating interface.

(3) Coating cohesive failure or coating intercoat adhesion failure: This failure mode is defined as failure within the coating system, above the concrete/coating interface.

(4) Fixture adhesive failure: This failure mode is defined as failure within the fixture adhesive or at the fixture adhesive/coating interface. When this failure mode is encountered, the test should be repeated.

c. Number of tests:

i. The minimum number of strength tests conducted shall be three tests per area.

ii. If test results are deficient, more tests shall be performed at the direction of the Engineer.

d. Report the following:
   i. Substrate type
   ii. Coating or coating systems and the thickness, type and test surface orientation
   iii. Whether the testing was performed in the field or in a laboratory environment
   iv. Air temperature and the relative humidity during testing
   v. Test apparatus type (include manufacturer and model number), along with the loading fixture type and size
   vi. Adhesive type used
   vii. Number of tests performed
   viii. Magnitude of applied load
   ix. Average and range of pull-off values
   x. Failure mechanism

2. Knife Test in accordance with ASTM D6677:
   a. Perform 3 three tests per area.
   b. Select an area free of blemishes and minor surface imperfections. For tests in the field, ensure that the surface is clean and dry.
   c. Make two cuts in the film each about 1.5” long that intersect near their middle with a smaller angle of between 30 and 45°.
   d. Starting at the intersection of the “X,” use the tip of the knife blade and attempt to lift the coating from the substrate or the underling coating layer(s).
   e. The adhesion of the coating shall be rated in accordance with the following scale:
      i. 10 - Coating is extremely difficult to remove. Fragments no larger than 1/32” x 1/32” removed with great difficulty
      ii. 8 - Coating is difficult to remove. Coating chips from 1/16” x 1/16” to 1/8” x 1/8” removed with difficulty
      iii. 6 - Coating is somewhat difficult to remove. Coating chips from 1/8” x 1/8” to 1/4” x 1/4” removed with slight difficulty
      iv. 4 - Coating is somewhat difficult to remove. Coating chips in excess of 1/4” x 1/4” removed using light pressure with knife blade
      v. 2 - Coating is easy to remove. Once started with the knife blade, the coating can be grasped with fingers and easily peeled to a length of at least 1/4”
      vi. 0 - Coating is easy to remove. Once started with the knife blade, the coating can be grasped with fingers and easily peeled to a length greater than 1/4”

F. Additional site visits by the Inspector to retest areas that were shown to be deficient shall be paid for by Owner. The cost of retesting will be determined by Engineer, and Owner will invoice Contractor for this cost. If unpaid after 60 days, this invoice amount will be deducted from the Contract Price.

G. Post-Construction Inspection:
   1. All tanks with the Type 1 coating shall be inspected once per year during the warranty period. All tanks with this coating will be taken out of service at

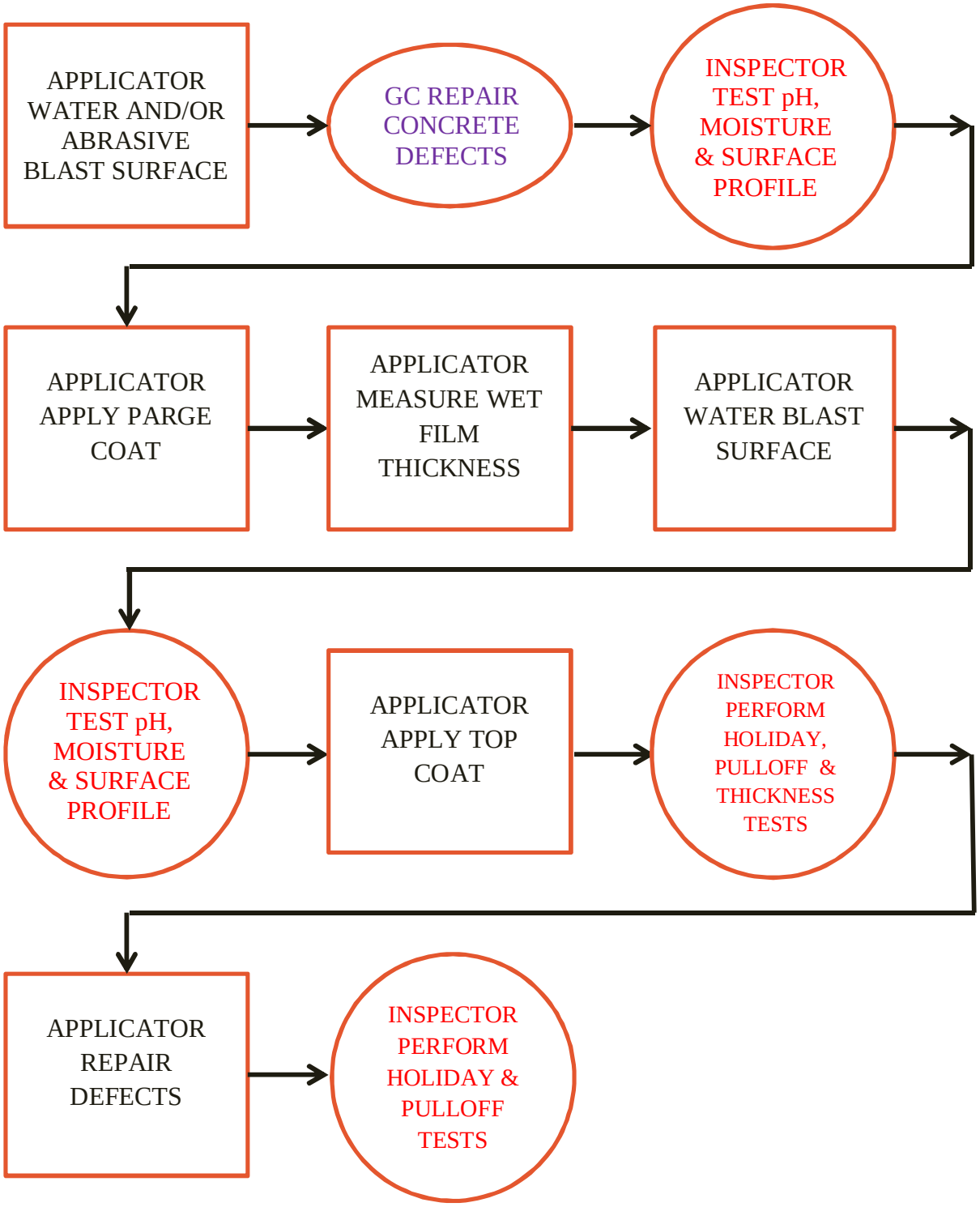
various intervals during each year of the warranty. The exact inspection time for each tank will be determined by the Owner. The Owner may waive any annual inspection during the warranty period if the tank is unable to be taken out of service. This will not relieve the Contractor of subsequent annual warranty inspections.

2. The Owner will be responsible for removal and disposal of the liquid contents of the tanks that were coated and will be inspected. The Owner shall also clean the walls and floors of the tanks as necessary to expose the coating systems to be inspected.
3. The inspection will be in the presence of the Owner, Engineer, Applicator and Manufacturer.
4. All coatings will be inspected for cracks, coating delaminations, and other potential defects. All defects shall be repaired by the General Contractor at no additional cost to the Owner. All repairs shall be submitted to the Engineer for review with no exceptions taken.

3.6 COATING SCHEDULE

A. The structures that shall be coated are as indicated on the Contract Drawings.

END OF SECTION


APPLICATOR WATER AND/OR ABRASIVE BLAST SURFACE
GC REPAIR CONCRETE DEFECTS
INSPECTOR TEST pH, MOISTURE & SURFACE PROFILE
APPLICATOR APPLY PARGE COAT
APPLICATOR MEASURE WET FILM THICKNESS
APPLICATOR WATER BLAST SURFACE
INSPECTOR TEST pH, MOISTURE & SURFACE PROFILE
APPLICATOR APPLY TOP COAT
INSPECTOR PERFORM HOLIDAY, PULLOFF & THICKNESS TESTS
APPLICATOR REPAIR DEFECTS
INSPECTOR PERFORM HOLIDAY & PULLOFF TESTS

TAG	DESCRIPTION	LOCATION [1]	SIZE	MATERIAL [2]	JOINT SYSTEM [6]	PRESSURE TEST CLASS [3]	DELEGATED PE DESIGN OF PIPE SUPPORTS [4]	DELTA OPER. PRESSURE (PSI)	DELTA OPER. TEMP. (degF)
A	AIR	EXPOSED [7] (including Drop Legs)	≥20"	3/16" 304L STAINLESS STEEL	WELD	CLASS III	Yes	15	275
			≤18"	SCH 10S 304L STAINLESS STEEL	WELD & FLANGE AS REQUIRED		Yes	15	275
		BURIED	ALL	SCH 10S 304L STAINLESS STEEL	WELD & FLANGE AS REQUIRED		Yes	15	275
		COARSE BUBBLE MANIFOLD & HEADER	ALL	316 STAINLESS STEEL (PER MANUF.REQTS)	WELD & FLANGE OR VICTAULIC		No	-	-
		FINE BUBBLE MANIFOLD & HEADER	ALL	SCH 40 PVC	SOLVENT WELD		No	-	-
ALK	MAGNESIUM HYDROXIDE SOLUTION	EXPOSED	ALLALL	SCH 80 PVC	SOLVENT WELD OR FLANGED	CLASS IV	No	-	-
		CONTAIN. PIPE	ALL	SCH 80 PVC	SOLVENT WELD		No	-	-
				SDR 32.5 HDPE	FUSES, BEAD TRIMMED		No	-	-
		CHEMICAL PIPE IN CONTAIN.	ALL	BRAIDED PVC TUBING	INSERT FITTING		No	-	-
ATE/ ATI	AERATION TANK EFFLUENT/ INFLUENT	BURIED	ALL	CLASS 52 D.I.	PUSH-ON	CLASS V	N/A		
		EXPOSED	ALL	CLASS 53 D.I.	FLANGED		Yes	150	40
COAG	COAGULANT (ALUM)	EXPOSED	N/A	SCH 80 PVC	SOLVENT WELD	CLASS IV	No	-	-
		CONTAIN. PIPE	ALL	SCH 80 PVC	SOLVENT WELD		No	-	-
				SDR 32.5 HDPE	FUSED, BEAD TRIMMED		No	-	-
		CHEMICAL PIPE IN CONTAIN.	ALL	BRAIDED PVC TUBING	INSERT FITTING		No	-	-
CA	COMPRESSED AIR	EXPOSED	SEE SPEC SECTION 15061				Yes		
		INTERIOR	SEE SPEC SECTION 15061						

TAG	DESCRIPTION	LOCATION [1]	SIZE	MATERIAL [2]	JOINT SYSTEM [6]	PRESSURE TEST CLASS [3]	DELEGATED PE DESIGN OF PIPE SUPPORTS [4]	DELTA OPER. PRESSURE (PSI)	DELTA OPER. TEMP. (degF)
CLS	CHLORINE SOLUTION	EXPOSED	ALL	SCH 80 PVC	SOLVENT WELD	CLASS IV	No		
DPOL	DILUTED POLYMER	INTERIOR	ALL	SCH 80 PVC	SOLVENT WELD OR THREADED	CLASS IV	No		
		CONTAIN. PIPE	ALL	SCH 80 PVC	SOLVENT WELD		No		
				SDR 32.5 HDPE	FUSED, BEAD TRIMMED		No		
		CHEMICAL PIPE IN CONTAIN.	ALL	160 PSI PE TUBING	INSERT FITTINGS		No		
D/ DR/ DW/ RL	DRAIN/ DEWATERING/ RAIN LEADER	BURIED	≥4"	CLASS 51 D.I.	MJ OR PUSH-ON	CLASS V	N/A		
			<4"	SCH 40 PVC	SOLVENT WELD		N/A		
		EXPOSED	SEE SPEC SECTION 15401				No		
EW/ SWS	EFFLUENT WATER/ SERVICE WATER	BURIED	≥4"	CLASS 52 D.I.	PUSH-ON	CLASS IV	N/A		
			<4"	SCH 80 PVC OR 160 PSI PE	SOLVENT WELD OR INSERT FITTINGS		N/A		
		IN FILTRATE WETWELL	ALL	SCH 10S 304L STAINLESS STEEL	WELD & FLANGE AS REQUIRED		Yes		
		EXPOSED	≥4"	CLASS 53 D.I.	FLANGED		Yes		
			<4"	GALV. STEEL, SCH 80 PVC OR TYPE L COPPER	THREADED, SOLVENT WELD OR SOLDERED		No		
FE	FINAL EFFLUENT	EXTERIOR	≤48"	CLASS 52 D.I.	PUSH-ON	CLASS V	N/A		
FIL	FILTRATE	BURIED	ALL	CLASS 52 D.I.	PUSH-ON	CLASS IV	N/A		
		EXPOSED	ALL	CLASS 53 D.I.	FLANGED		No		
FSI/ FSE	FINAL SETTLING TANK EFFLUENT/ INFLUENT	BURIED	≤48"	CLASS 52 D.I.	PUSH-ON	CLASS V	N/A		

TAG	DESCRIPTION	LOCATION [1]	SIZE	MATERIAL [2]	JOINT SYSTEM [6]	PRESSURE TEST CLASS [3]	DELEGATED PE DESIGN OF PIPE SUPPORTS [4]	DELTA OPER. PRESSURE (PSI)	DELTA OPER. TEMP. (degF)
FSW	FOAM SPRAY WATER	BURIED	≥4"	CLASS 52 D.I.	PUSH-ON	CLASS V	N/A		
			<4"	SCH 80 PVC OR 160 PSI PE	SOLVENT WELD OR INSERT FITTINGS		N/A		
		EXPOSED	≥4"	CLASS 53 D.I.	FLANGED		Yes		
			<4"	GALV. STEEL, SCH 80 PVC OR TYPE L COPPER	THREADED, SOLVENT WELD OR SOLDERED		No		
GTO	GRAVITY THICKENER OVERFLOW	BURIED	ALL	CLASS 52 D.I.	PUSH-ON	CLASS V	N/A		
		EXPOSED	ALL	CLASS 53 D.I.	FLANGED		N0		
GTMU	GRAVITY THICKENER MAKEUP WATER	BURIED	ALL	CLASS 52 D.I.	PUSH-ON	CLASS V	N/A		
		EXPOSED	ALL	CLASS 53 D.I.	FLANGED		Yes		
H, HWS/ HWR,	HEAT	INTERIOR (SEE SPEC SECTION 15601)					No		
IR	INTERNAL RECYCLE	BUIRED	ALL	CLASS 52 D.I.	PUSH-ON	CLASS V	N/A		
		EXPOSED	ALL	CLASS 53 D.I.	FLANGE		Yes	150	40
MW	MIXED WATER (TEMPERED WATER)	EXPOSED	SEE SPEC SECTION 15401				No		
NPW	NONPOTABLE WATER	BURIED	≥4"	CLASS 52 D.I.	PUSH-ON	CLASS IV	N/A		
			<4"	SCH 80 PVC	SOLVENT WELD		N/A		
				160 PSI PE	INSERT FITTING		N/A		
		EXPOSED	≥4"	CLASS 53 D.I. [2]	FLANGED		Yes	150	25
			< 4"	SCH 80 PVC OR	SOLVENT WELD		Yes	150	25
				TYPE L COPPER	SOLDERED		Yes	150	25
OCC	ODOR CONTROL CONDENSATE	INTERIOR	ALL	SCH 40 PVC	SOLVENT WELD OR THREADED	CLASS IV	No	-	-
OCD	ODOR CONTROL DUCT WORK	EXTERIOR	FRP (SEE SPECIFICATION SECTION 15841)				Yes		
		EXPOSED	≥6"	FRP (SECTION 15841)	BUTT WELD OR FLANGE	SECTIONS 15841 AND 15907	No		
		EXPOSED	<6"	SCH 40 PVC	SOLVENT WELD	SECTION 15907	No		
OF	OVERFLOW	EXPOSED	ALL	SCH 80 PVC	SOLVENT WELD	-	No		

TAG	DESCRIPTION	LOCATION [1]	SIZE	MATERIAL [2]	JOINT SYSTEM [6]	PRESSURE TEST CLASS [3]	DELEGATED PE DESIGN OF PIPE SUPPORTS [4]	DELTA OPER. PRESSURE (PSI)	DELTA OPER. TEMP. (degF)
POL	POLYMER LINE	INTERIOR	ALL	SCH 80 PVC	SOLVENT WELD OR THREADED	CLASS IV	No	-	-
PSTE/ PSTI	PRIMARY SETTLING TANK EFFLUENT/ INFLUENT	BURIED	≤48"	CLASS 52 D.I.	PUSH-ON	CLASS V	N/A		
S, SEW	SEWER	BURIED	≥30"	CLASS 52 D.I.	PUSH-ON	CLASS II	N/A		
				SDR 35 PVC	PUSH-ON		N/A		
				RCP CLASS III/IV	BELL & SPIGOT		N/A		
			<30"	SDR 35 PVC	PUSH-ON		N/A		
				RCP CLASS III/IV	BELL & SPIGOT		N/A		
		EXPOSED	≥4"	CLASS 51 D.I.	PUSH-ON	SEE SPECIFICATION SECTION 15400-3	No		
			<4"	SDR 40 PVC	SOLVENT WELD		No		
SAM	SAMPLE PUMP PIPING	EXPOSED	ALL	SCH 80 PVC	SOLVENT WELD OR THREADED	CLASS IV	No		
	COMPOSITE SAMPLER CONTAINMENT PIPING	EXPOSED/ BURIED	ALL	SCH 80 PVC ELECT. CONDUIT W/ LONG RADIUS SWEEPS	SOLVENT WELD	NR	No		
SC	SCUM	BURIED		CLASS 52 D.I.	PUSH-ON	CLASS IV	N/A		
		EXPOSED		CLASS 53 D.I.	FLANGED		No		
SD	STORM DRAIN	EXTERIOR	≥30"	RCP CLASS III	BELL & SPIGOT	NR	N/A		
			<30"	RCP CLASS III	BELL & SPIGOT		N/A		
				SDR 35 PVC	PUSH-ON		N/A		
				CPE	PUSH-ON		N/A		
		INTERIOR	SEE SPEC SECTION 15401				No		
SL, BSL, DFSL, RSL, WSL, PSL, SEP, TPSL, TSLR	SLUDGE (BLENDED, DEWATERED FEED, RETURN, WASTE, PRIMARY, SEPTAGE, THICKENED PRIMARY, TERTIARY RECYCLE)	BURIED	ALL	CLASS 52 D.I.	PUSH-ON	CLASS IV	No		
		EXPOSED	ALL	CLASS 53 D.I.	FLANGED		Yes	150	40

TAG	DESCRIPTION	LOCATION [1]	SIZE	MATERIAL [2]	JOINT SYSTEM [6]	PRESSURE TEST CLASS [3]	DELEGATED PE DESIGN OF PIPE SUPPORTS [4]	DELTA OPER. PRESSURE (PSI)	DELTA OPER. TEMP. (degF)
SAM	SAMPLE LINE	EXPOSED	ALL	SCH 80 PVC	SOLVENT WELD	CLASS IV	No		
SPD	SUMP PUMP DISCHARGE	BURIED	ALL	SCH 80 PVC	SOLVENT WELD	CLASS IV	N/A		
		EXPOSED	≥3"	GALVANIZED STEEL	THREADED OR FLANGED		No		
			<3"	SCH 80 PVC	SOLVENT WELD		No		
SW	SEAL WATER	EXPOSED	ALL	TYPE L COPPER	SOLDERED	CLASS IV	No		
TE/ TI	TERTIARY EFFLUENT/ TERTIARY	BURIED	≤48"	CLASS 52 D.I.	PUSH-ON	CLASS V	N/A		
		EXPOSED	ALL	CLASS 53 D.I.	FLANGED		Yes	150	40
TSL	TERTIARY SLUDGE	EXPOSED	>4"	CLASS 53 D.I.	FLANGED	CLASS IV	Yes	150	40
			≤4"	SCH 40 STAINLESS STEEL (304L) DRY AREAS & 316L IN SUBMERGED AREAS	FLANGED & VICTAULIC		No		
W (&CW)	WATER	BURIED	≥4"	CLASS 52 D.I.	PUSH-ON	CLASS I	N/A		
			< 4"	SCH 80 PVC	SOLVENT WELD		N/A		
				160 PSI PE	INSERT FITTING		N/A		
		EXPOSED	≥4" , SEE SPECIFICATION 15401			CLASS IV	Yes	150	25
			<4", SEE SPECIFICATION 15401			CLASS IV	No		
V	VENT	EXPOSED	ALL	SCH 80 PVC	SOLVENT WELD	-	No		

Attachment C
Wage Rates

WRIGHT-PIERCE
Engineering a Better Environment

Wage Rates – Heavy

WRIGHT-PIERCE
Engineering a Better Environment

Project: Torrington WPCF Comprehensive Upgrade

Minimum Rates and Classifications for Heavy/Highway Construction

ID#: **H** 24410

Connecticut Department of Labor
Wage and Workplace Standards Division

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: CWF-546D

Project Town: Harwinton

FAP Number:

State Number:

Project: Torrington WPCF Comprehensive Upgrade

CLASSIFICATION	Hourly Rate	Benefits
01) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters. **See Laborers Group 5 and 7**		
1) Boilermaker	33.79	34% + 8.96
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	33.48	31.66
2) Carpenters, Piledrivermen	32.60	25.34

As of: Thursday, February 22, 2018

Project: Torrington WPCF Comprehensive Upgrade

2a) Diver Tenders	32.60	25.34
3) Divers	41.06	25.34
03a) Millwrights	33.14	25.74
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	48.55	20.45
4a) Painters: Brush and Roller	32.72	20.45
4d) Painters: Blast and Spray	35.72	20.45
4e) Painters: Tanks, Tower and Swing	34.72	20.45

As of: Thursday, February 22, 2018

5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	38.27	25.00+3% of gross wage
6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection	35.47	33.39 + a
7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9)	41.62	30.36
----LABORERS---- -		
8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	29.25	19.50
9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen	29.50	19.50
10) Group 3: Pipelayers	29.75	19.50

11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block paver, curb setter and forklift operators	29.75	19.50
12) Group 5: Toxic waste removal (non-mechanical systems)	31.25	19.50
13) Group 6: Blasters	31.00	19.50
Group 7: Asbestos/lead removal, non-mechanical systems (does not include leaded joint pipe)	30.25	19.50
Group 8: Traffic control signalmen	16.00	19.50
Group 9: Hydraulic Drills	29.30	18.90

----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.----

Project: Torrington WPCF Comprehensive Upgrade

13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	32.22	19.50 + a
13b) Brakemen, Trackmen	31.28	19.50 + a
----CLEANING, CONCRETE AND CAULKING TUNNEL----		
14) Concrete Workers, Form Movers, and Strippers	31.28	19.50 + a
15) Form Erectors	31.60	19.50 + a
----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----		
16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	31.28	19.50 + a

17) Laborers Topside, Cage Tenders, Bellman	31.17	19.50 + a
18) Miners	32.22	19.50 + a
----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ----		
18a) Blaster	38.53	19.50 + a
19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	38.34	19.50 + a
20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	36.41	19.50 + a
21) Mucking Machine Operator	39.11	19.50 + a

Project: Torrington WPCF Comprehensive Upgrade

----TRUCK DRIVERS----(*see note below)

Two axle trucks	29.13	22.32 + a
Three axle trucks; two axle ready mix	29.23	22.32 + a
Three axle ready mix	29.28	22.32 + a
Four axle trucks, heavy duty trailer (up to 40 tons)	29.33	22.32 + a
Four axle ready-mix	29.38	22.32 + a
Heavy duty trailer (40 tons and over)	29.58	22.32 + a

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Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	29.38	22.32 + a

----POWER EQUIPMENT OPERATORS----

Group 1: Crane handling or erecting structural steel or stone, hoisting engineer (2 drums or over), front end loader (7 cubic yards or over), Work Boat 26 ft. & Over, Tunnel Boring Machines. (Trade License Required)	39.30	24.05 + a
Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver ($3.00 premium when operator controls hammer); Bauer Drill/Caisson. (Trade License Required)	38.98	24.05 + a
Group 3: Excavator/Backhoe under 2 cubic yards; Cranes (under 100 ton rated capacity), Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar);Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required)	38.24	24.05 + a
Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	37.85	24.05 + a
Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell)	37.26	24.05 + a

Project: Torrington WPCF Comprehensive Upgrade

Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	37.26	24.05 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	36.95	24.05 + a
Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and Under Mandrel).	36.61	24.05 + a
Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	36.21	24.05 + a
Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder).	35.78	24.05 + a
Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	33.74	24.05 + a
Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	33.74	24.05 + a

Group 12: Wellpoint Operator.	33.68	24.05 + a
Group 13: Compressor Battery Operator.	33.10	24.05 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	31.96	24.05 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	31.55	24.05 + a
Group 16: Maintenance Engineer/Oiler	30.90	24.05 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	35.21	24.05 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	32.79	24.05 + a

Project: Torrington WPCF Comprehensive Upgrade

**NOTE: SEE BELOW

----LINE CONSTRUCTION----(Railroad Construction and Maintenance)----		
20) Lineman, Cable Splicer, Technician	48.19	6.5% + 22.00
21) Heavy Equipment Operator	42.26	6.5% + 19.88
22) Equipment Operator, Tractor Trailer Driver, Material Men	40.96	6.5% + 19.21
23) Driver Groundmen	26.50	6.5% + 9.00
23a) Truck Driver	40.96	6.5% + 17.76

As of: Thursday, February 22, 2018

Project: Torrington WPCF Comprehensive Upgrade

----LINE CONSTRUCTION----

24) Driver Groundmen	30.92	6.5% + 9.70
25) Groundmen	22.67	6.5% + 6.20
26) Heavy Equipment Operators	37.10	6.5% + 10.70
27) Linemen, Cable Splicers, Dynamite Men	41.22	6.5% + 12.20
28) Material Men, Tractor Trailer Drivers, Equipment Operators	35.04	6.5% + 10.45

As of: Thursday, February 22, 2018

Project: Torrington WPCF Comprehensive Upgrade

Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional $1.25 per hour for truck drivers.*

***Note: Hazardous waste premium $3.00 per hour over classified rate*

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra $4.00 premium in addition to the hourly wage rate and benefit contributions:

1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)

2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson

3) Cranes (under 100 ton rated capacity)

Crane with 150 ft. boom (including jib) - $1.50 extra
Crane with 200 ft. boom (including jib) - $2.50 extra
Crane with 250 ft. boom (including jib) - $5.00 extra
Crane with 300 ft. boom (including jib) - $7.00 extra
Crane with 400 ft. boom (including jib) - $10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

~~Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work ~~

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

As of: Thursday, February 22, 2018

Project: Torrington WPCF Comprehensive Upgrade

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of: Thursday, February 22, 2018

Wage Rates - Building

WRIGHT-PIERCE
Engineering a Better Environment

Minimum Rates and Classifications for Building Construction

ID# : B 24410

Connecticut Department of Labor
Wage and Workplace Standards Division

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: CWF-546D
Project Town: Harwinton
State#:
FAP#:

Project: Torrington WPCF Comprehensive Upgrade

CLASSIFICATION	Hourly Rate	Benefits
1a) Asbestos Worker/Insulator (Includes application of insulating materials, protective coverings, coatings, & finishes to all types of mechanical systems; application of firestopping material for wall openings & penetrations in walls, floors, ceilings	38.25	27.96
1b) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters.**See Laborers Group 7**		
1c) Asbestos Worker/Heat and Frost Insulator	39.00	28.76

As of: **Thursday, February 22, 2018**

2) Boilermaker	38.34	26.01
3a) Bricklayer, Cement Mason, Concrete Finisher (including caulking), Stone Masons	33.48	32.06 + a
3b) Tile Setter	34.90	25.87
3c) Terrazzo Mechanics and Marble Setters	31.69	22.35
3d) Tile, Marble & Terrazzo Finishers	26.70	21.75
3e) Plasterer	33.48	32.06

As of: **Thursday, February 22, 2018**

Project: Torrington WPCF Comprehensive Upgrade

------LABORERS------

4) Group 1: Laborers (common or general), acetylene burners, carpenter tenders, concrete specialists, wrecking laborers, fire watchers.	29.25	19.50
4a) Group 2: Mortar mixers, plaster tender, power buggy operators, powdermen, fireproofer/mixer/nozzleman (Person running mixer and spraying fireproof only).	29.50	19.50
4b) Group 3: Jackhammer operators/pavement breaker, mason tender (brick), mason tender (cement/concrete), forklift operators and forklift operators (masonry).	29.75	19.50
4c) **Group 4: Pipelayers (Installation of water, storm drainage or sewage lines outside of the building line with P6, P7 license) (the pipelayer rate shall apply only to one or two employees of the total crew who primary task is to actually perform the mating of pipe sections) P6 and P7 rate is $26.80.	29.75	19.50
4d) Group 5: Air track operator, sand blaster and hydraulic drills.	29.75	19.50

4e) Group 6: Blasters, nuclear and toxic waste removal.	31.00	19.50
4f) Group 7: Asbestos/lead removal and encapsulation (except it's removal from mechanical systems which are not to be scrapped).	30.25	19.50
4g) Group 8: Bottom men on open air caisson, cylindrical work and boring crew.	28.38	19.50
4h) Group 9: Top men on open air caisson, cylindrical work and boring crew.	27.86	19.50
4i) Group 10: Traffic Control Signalman	16.00	19.50
5) Carpenter, Acoustical Ceiling Installation, Soft Floor/Carpet Laying, Metal Stud Installation, Form Work and Scaffold Building, Drywall Hanging, Modular-Furniture Systems Installers, Lathers, Piledrivers, Resilient Floor Layers.	32.60	25.34

As of: **Thursday, February 22, 2018**

5a) Millwrights	33.14	25.74
6) Electrical Worker (including low voltage wiring) (Trade License required: E1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	38.27	25.00 + 3% of gross wage
7a) Elevator Mechanic (Trade License required: R-1,2,5,6)	51.71	32.645+a+b
-----LINE CONSTRUCTION----		
Groundman	26.50	6.5% + 9.00
Linemen/Cable Splicer	48.19	6.5% + 22.00

As of: **Thursday, February 22, 2018**

8) Glazier (Trade License required: FG-1,2)	36.28	20.45 + a
9) Ironworker, Ornamental, Reinforcing, Structural, and Precast Concrete Erection	35.47	33.39 + a
----OPERATORS----		
Group 1: Crane handling or erecting structural steel or stone, hoisting engineer 2 drums or over, front end loader (7 cubic yards or over), work boat 26 ft. and over and Tunnel Boring Machines. (Trade License Required)	39.30	24.05 + a
Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver ($3.00 premium when operator controls hammer); Bauer Drill/Caisson. (Trade License Required)	38.98	24.05 + a
Group 3: Excavator; Backhoe/Excavator under 2 cubic yards; Cranes (under 100 ton rated capacity), Grader/Blade; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar);Grader Operator; Bulldozer Fine Grade. (slopes, shaping, laser or GPS, etc.). (Trade License Required)	38.24	24.05 + a

Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper).	37.85	24.05 + a
Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell)	37.26	24.05 + a
Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller; Pile Testing Machine.	37.26	24.05 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	36.95	24.05 + a
Group 7: Asphalt roller, concrete saws and cutters (ride on types), vermeer concrete cutter, Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and under Mandrell).	36.61	24.05 + a
Group 8: Mechanic, grease truck operator, hydroblaster; barrier mover; power stone spreader; welding; work boat under 26 ft.; transfer machine.	36.21	24.05 + a

Group 9: Front end loader (under 3 cubic yards), skid steer loader regardless of attachments, (Bobcat or Similar): forklift, power chipper; landscape equipment (including Hydroseeder).	35.78	24.05 + a
Group 10: Vibratory hammer; ice machine; diesel and air, hammer, etc.	33.74	24.05 + a
Group 11: Conveyor, earth roller, power pavement breaker (whiphammer), robot demolition equipment.	33.74	24.05 + a
Group 12: Wellpoint operator.	33.68	24.05 + a
Group 13: Compressor battery operator.	33.10	24.05 + a
Group 14: Elevator operator; tow motor operator (solid tire no rough terrain).	31.96	24.05 + a

As of: **Thursday, February 22, 2018**

Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	31.55	24.05 + a
Group 16: Maintenance Engineer/Oiler.	30.90	24.05 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	35.21	24.05 + a
Group 18: Power safety boat; vacuum truck; zim mixer; sweeper; (Minimum for any job requiring a CDL license).	32.79	24.05 + a
------PAINTERS (Including Drywall Finishing)------		
10a) Brush and Roller	32.72	20.45

As of: **Thursday, February 22, 2018**

10b) Taping Only/Drywall Finishing	33.47	20.45
10c) Paperhanger and Red Label	33.22	20.45
10e) Blast and Spray	35.72	20.45
11) Plumber (excluding HVAC pipe installation) (Trade License required: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2)	41.62	30.36
12) Well Digger, Pile Testing Machine	33.01	19.40 + a
13) Roofer (composition)	35.67	19.28

As of: **Thursday, February 22, 2018**

14) Roofer (slate & tile)	36.17	19.28
15) Sheetmetal Worker (Trade License required for HVAC and Ductwork: SM-1,SM-2,SM-3,SM-4,SM-5,SM-6)	42.66	41.24
16) Pipefitter (Including HVAC work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4, G-1, G-2, G-8 & G-9)	41.62	30.36
------TRUCK DRIVERS------		
17a) 2 Axle	29.13	22.32 + a
17b) 3 Axle, 2 Axle Ready Mix	29.23	22.32 + a

17c) 3 Axle Ready Mix	29.28	22.32 + a
17d) 4 Axle, Heavy Duty Trailer up to 40 tons	29.33	22.32 + a
17e) 4 Axle Ready Mix	29.38	22.32 + a
17f) Heavy Duty Trailer (40 Tons and Over)	29.58	22.32 + a
17g) Specialized Earth Moving Equipment (Other Than Conventional Type on-the-Road Trucks and Semi-Trailers, Including Euclids)	29.38	22.32 + a
18) Sprinkler Fitter (Trade License required: F-1,2,3,4)	43.92	15.84 + a

19) Theatrical Stage Journeyman	25.76	7.34

Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional $1.25 per hour for truck drivers.*

***Note: Hazardous waste premium $3.00 per hour over classified rate*

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra $4.00 premium in addition to the hourly wage rate and benefit contributions:

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All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

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As of: **Thursday, February 22, 2018**

Project: Torrington WPCF Comprehensive Upgrade

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All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of: **Thursday, February 22, 2018**

Attachment D
Appendix F

WRIGHT-PIERCE
Engineering a Better Environment

Harwinton Permit Approvals

WRIGHT-PIERCE
Engineering a Better Environment

$2000.00 over 3 yr. period for IWZEO inspections 7-3-17 IWC

Inland Wetlands Commission
Town of Harwinton
100 Bentley Drive
Harwinton, CT 06791

INLAND WETLAND PERMIT APPLICATION

Application fee: (See Fee Schedule) Ø **Date of Application:** 7/3/2017

This is an application for permission to conduct a regulated activity affecting an inland wetlands, watercourse or an upland regulated area in accordance with section 22a-36 to 45 inclusive, of the General Statutes as amended, and the administrative Inland Wetland Regulations of the Town of Harwinton, amended March 24, 2008.

1. Location of Property: Torrington Water Pollution Control Facility

2. Applicant's Name: Raymond E. Drew, WPCA Administrator
   Applicant's Address: 140 Main Street, Torrington, CT 06790
   Day Phone Number: (860) 485-9166 Fax Number: (860) 485-0730

3. Applicant's interest in property: WPCA Administrator, Owner
   (i.e., owner, agent, developer, architect, etc.)

4. Owner's Name: City of Torrington
   Owner's Address: (same as Applicant)
   Day Phone Number: (same as Applicant) Fax Number: (same as Applicant)
   (If more than one owner, attach list to application.)

5. Proposed Regulated Activities: Improvements to WPCF which includes disturbances within the 100-ft Upland
   _____ (check) Non-Regulated Activities Review Zone; see Attachment 2.

6. Nature and Purpose of Project: Torrington Water Pollution Control Facility Upgrade

7. Total Property Acreage: 30.7 Total Acreage of Development: 11.4

8. Total Acreage of Wetlands on Site: 3,132 sq.ft. ~~Acres~~ (see Figure 3, Attachment 2)
   Total Acreage Altered: 0.003 Acres; 396 sq.ft.

9. Total Acreage of Open Water Body on Site: 0.00 Acres
   Total Acreage Altered: 0.00 Acres

10. Total Linear Feet of Watercourses on Site: 0.00 L.F.
    Total Linear Feet Altered: 0.00 L.F.

11. Total of Buffer/Upland Review Area Altered: 1.62 Acres; 70,789 sq.ft. (see Figure 4, Attachment 2)

12. Total Area of Wetlands and/or Watercourses Restored, Enhanced or Created: N/A Acres

13. Were there prudent and feasible alternatives to the proposed wetland, watercourse and upland review area alterations? Yes _____ No X
    If 'Yes', what were they? The alternative proposal would have extended further within and past the 100-foot upland review buffer zone

    If 'No', why not? see Attachment 3

14. Has Torrington Area Health Department reviewed the site plans? Has approval been received?
If Yes, date of approval. N/A

15. Is this property within 500 feet of a town line? Yes X No _____
(If 'Yes', the applicant must notify the adjacent municipal wetlands agency by certified mail, return receipt requested, on the same day of filing this application with the Harwinton Land Use office. Documentation of this notice shall be provided to the Commission.

16. Does any portion of this proposed project fall within a Public Watershed Protection Zone?
Yes _____ No X
If 'Yes", the applicant must notify the Water Company by certified mail, return receipt requested on the same day of filing this application with the Harwinton Land Use office. Documentation of this notice shall be provided to the Commission.

17. Names and addresses of all adjoining property owners (see Section 9.3 IWWC Regulations).
see Attachment 5 for Tax Map Information

The undersigned owner(s) of the subject property (if not applicant), being all owner(s) of record of said property, hereby authorize the undersigned applicant to make this application as their agent, and hereby consents to all activities described in said application.

The undersigned owner(s) of the subject property hereby consents to pay estimated reasonable costs for legal and consultant services provided to the Inland Wetlands and Watercourses Commission. Any portion of the estimated surcharge fee not expended by the Town on such services shall be refunded to the applicant. (Ordinance 102).
RE.D *initialed by applicant*

It is the applicant's responsibility to forward plans to the Town Engineer when the Commission requires Town Engineer review. RED *initialed by applicant*.

The undersigned owner(s) of the subject property hereby consents to necessary and proper inspections of said property by members of the Harwinton Inland Wetlands Commission and/or agents of the Commission at reasonable times both before and after a final decision has been issued by the Commission.

The undersigned applicant and owner(s) of the subject property hereby warrant the truth of all statements contained herein and in all supporting documents, according to their best knowledge, information and belief.

Applicant — Date 6/22/17

Owner — Date 6/22/17

This Application (No. 6301) is hereby (APPROVED) DENIED Patty Redmond I.W.C.
Inland Wetlands Chairman

***Applicant is responsible for obtaining all required State and Local permits.**

Application No. 6301 **to the Zoning Commission of the Town of Harwinton**

Fees: Zoning Application	125.00
DEEP Fee	60.00
Erosion Control Insp.	35.00
Compliance Certificate	50.00
Zoning Enforcement	35.00
Permit Link Fee	$10.00

Application for Permit to Construct ☐ erect ☐ alter

APPLICANT City of Torrington WPCF (252 Bogue Rd) pd 8/28/17 $315.00

ADDRESS OF APPLICANT 140 Main Street, Torrington, CT 06790 PHONE NO. (860) 485-9166

TOWN MAP REFERENCE: MAP 48 BLOCK 01 LOT 0001 ZONE L1-A LOT ACREAGE 30.07

PERMIT FOR Torrington Water Pollution Control Facility Upgrade

TO BE BUILT BY Wright-Pierce PHONE NO. (860) 343-8297

SETBACKS: FRONT 100 REAR 50 (L) SIDE 35 (R) SIDE 35 SIZE: _____ FT. X _____ FT.

APPROXIMATE VALUE OF WORK TO BE DONE (FAIR MARKET VALUE OR CONSTRUCTION PRICE)
$ 60,000,000.00

Approvals

Wetlands	☒	Driveway Permit	☐	TAHD	☐	DOT	☐	Fire Marshal	☒
Historic	☐	Lake Association	☐	WPCA	☐	Flood Plain	☐	Bristol Water	☐

All applications for Zoning Permits shall be accompanied by a plan showing actual dimensions of the lot to be built upon, the size of the structure to be erected, the location of the structure upon the lot, the dimensions of all setbacks and such other information as may be necessary in order to review the application. Structures over 200 square feet may require a site plan prepared by a registered land surveyor. Where the plan proposes substantial grading or new improvements, the plan shall be prepared, signed and sealed by a CT registered professional engineer. See Zoning Regulation 8.5.

*The fee for a permit shall be $5 for each $1,000 (or fraction thereof) of fair market value of permitted construction cost. Minimum application fee shall be $35.00. Maximum application fee shall be $125.00. For other fees see Appendix A in Zoning Regulations.

**The DEEP fee is a Land Use Fee found in Section 22a-27j of the CT General Statutes and is currently set at $60.00. These fees are collected for the DEEP and are reported quarterly by the Town.

Applicant's signature [signature] LWRA ADMINISTRATOR

Present home address 140 Main Street, Torrington, CT 06790 Phone No. (860) 485-9166

This application is hereby Approved/Denied

[signature]
Zoning Commission Chairman

8/28/17
Date

Site Inspection (Is) Is not Required:

Call the Enforcement Officer at 860-485-2784, ext. 141 to schedule inspections for soil and erosion control, setbacks and Certificates of Compliance. See Reverse side.

Doc: Zoning Application 3

HARWINTON, CONNECTICUT
INCORPORATED 1737

TOWN OF HARWINTON

HARWINTON, CONNECTICUT 06791
Tele: (860) 485-9051 • Fax: (860) 485-0051

August 30, 2017

Certified Letter No.
7016 0910 0001 8483 7889

Mr. Ray Drew, Administrator
City of Torrington WPCF
140 Main Street
Torrington, CT 06790

Re: Water Pollution Control Facility, 252 Bogue Road, Harwinton, CT

Dear Mr. Drew:

At the Harwinton Inland Wetlands Commission meeting held on July 3, 2017, the Commission unanimously motioned to approve the City of Torrington's application for upgrades to the Torrington Water Pollution Control Facility located at 252 Bogue Road as a use of right activity for maintenance with provision that erosion control measures be installed, that notification to the Harwinton Wetland Enforcement Officer be made as construction proceeds with progress reports sent to the Town of Harwinton, and that the Harwinton Wetland Enforcement Officer's inspections (over the three year project timeline) be funded by the applicant in the amount of $2000.00 in accordance with Town of Harwinton Ordinance 102. Please send a check for this amount, made out to the Town of Harwinton, to the land use office at your earliest convenience.

At the Harwinton Zoning Commission meeting held on August 28, 2017, the Commission unanimously motioned to approve this project subject to receiving a revised site plan showing the true property line to the west and located in the center of the Naugatuck River according to Christine Kurtz, P.E., Senior Project Manager, Wright Pierce Engineering and a letter to C. Kurtz from Martinez Couch Associates, LLC (engineering/surveying) dated August 18, 2017.

Legal notice of the Wetlands Commission's decision will be published in the Republican American newspaper on Friday, September 1, 2017.

If you have any questions, please call me at 860-485-2784.

Sincerely,

Polly Redmond
Land Use Coordinator

Doc: WPC FACILITY – IWWC and Zoning approval letter of decision 2017

General Permit for Discharge of Stormwater & Dewatering Wastewaters from Construction Activities

WRIGHT-PIERCE
Engineering a Better Environment

Connecticut Department of
Energy & Environmental Protection
Bureau of Materials Management & Compliance Assurance
Water Permitting & Enforcement Division

General Permit Registration Form for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, effective 10/1/13 (electronic form)

Prior to completing this form, you **must** read the instructions for the subject general permit at **DEEP-WPED-INST-015**.
This form must be filled out electronically before being printed.
You must submit the registration fee along with this form.

The status of your registration can be checked on the DEEP's ezFile. Portal. Please note that DEEP will no longer mail certificates of registration.

CPPU USE ONLY

App #: _____

Doc #: _____

Check #: _____

Program: **Stormwater**

Part I: Registration Type

Select the appropriate boxes identifying the registration type and registration deadline.

	Registration Type			Registration Timeline
☐	**Re-registration** **Existing Permit No. GSN** _____			**On or before February 1, 2014*** *Note: Failure to renew a permit by this date will require submission of new registration. Re-registrants must only complete Parts I, II, III, IV - Question 1, VII and submit Attachment A.
☑	**New Registration** (Refer to Section 2 of the permit for definitions of Locally Exempt and Locally Approvable Projects)	☑ **Locally Approvable** **Size of soil disturbance:** 1.60		**New registration - Sixty (60) days prior to the initiation of the construction activity for:** For sites with a total soil disturbance area of 5 or more acres
		☐ **Locally Exempt** **Size of soil disturbance:** _____	☐	**New registration - Sixty (60) days prior to the initiation of the construction activity for:** Sites with a total disturbance area of one (1) to twenty (20) acres except those with discharges to impaired waters or tidal wetlands
			☐	**New registration - Ninety (90) days prior to the initiation of the construction activity for:** (i) Sites with a total soil disturbance area greater than twenty (20) acres, or (ii) Sites discharging to a tidal wetland (that is not fresh-tidal and is located within 500 feet), or (iii) Sites discharging to the impaired water listed in the "Impaired Waters Table for Construction Stormwater Discharges"

Part II: Fee Information

1. New Registrations

   a. Locally approvable projects (registration only):

☑ $625

   b. Locally exempt projects (registration and Plan):

☐ $3,000 total soil disturbance area ≥ one (1) and < twenty (20) acres.

☐ $4,000 total soil disturbance ≥ twenty (20) acres and < fifty (50) acres.

☐ $5,000 total soil disturbance ≥ fifty (50) acres.

2. Re-Registrations

☐ $625 (sites previously registered prior to September 1, 2012)

☐ $0 (sites previously registered between to September 1, 2012 and effective date of this permit)

Total Fee: $625.00

The fees for municipalities shall be half of those indicated in subsections (a), (b) and (c) above pursuant to Section 22a-6(b) of the Connecticut General Statutes. State and Federal agencies shall pay the full fees specified in this subsection. The registration will not be processed without the fee. The fee shall be non-refundable and shall be paid by certified check or money order payable to the Department of Energy and Environmental Protection.

Part III: Registrant Information

- If a registrant is a corporation, limited liability company, limited partnership, limited liability partnership, or a statutory trust, it must be registered with the Secretary of the State. If applicable, the registrant's name shall be stated **exactly** as it is registered with the Secretary of the State. This information can be accessed at **CONCORD**
- If a registrant is an individual, provide the legal name (include suffix) in the following format: First Name; Middle Initial; Last Name; Suffix (Jr, Sr., II, III, etc.).

1. Registrant /Client Name: CITY OF TORRINGTON

   Registrant Type: Municipality

   Secretary of the State business ID #:

   Mailing Address: 140 MAIN ST

   City/Town: TORRINGTON State: CT Zip Code: 06790

   Business Phone: (860) 485-9166 ext.:

   Example:(xxx) xxx-xxxx

   Contact Person: Raymond E. Drew Title : WPCA Administrator

   E-Mail: ray_drew@torringtonct.org

2. List billing contact:

   Name: CITY OF TORRINGTON

   Mailing Address: 140 MAIN ST

   City/Town: TORRINGTON State: CT Zip Code: 06790

   Business Phone: (860) 485-9166 ext.:

   Contact Person: Raymond E. Drew Title : WPCA Administrator

3. List primary contact for departmental correspondence and inquiries:
   Name: CITY OF TORRINGTON
   Mailing Address: 140 MAIN ST
   City/Town: TORRINGTON State: CT Zip Code: 06790
   Business Phone: (860) 485-9166 ext.
   Contact Person: Raymond E. Drew Title: WPCA Administrator

4. List owner of the property on which the activity will take place:
   Name: CITY OF TORRINGTON
   Mailing Address: 140 MAIN ST
   City/Town: TORRINGTON State: CT Zip Code: 06790
   Business Phone: (860) 485-9166 ext.
   Contact Person: Raymond E. Drew
5. List preparer:
   Name: WRIGHT-PIERCE INCORPORATED
   Mailing Address: 169 Main St
   City/Town: Middletown State: CT Zip Code: 06457
   Business Phone: (860) 343-8297 ext.
   Contact Person: Christine E. Kurtz Title: Senior Project Manager
6. List design professional:
   Name: WRIGHT-PIERCE INCORPORATED
   Mailing Address: 11 Bowdoin Mill Is
   City/Town: Topsham State: ME Zip Code: 04086
   Business Phone: (207) 725-8721 ext.
   Contact Person: Jeffrey D. Preble Title: Team Leader
7. List Reviewing Qualified Professional (for locally approvable projects only):
   Name: WRIGHT-PIERCE INCORPORATED
   Mailing Address: 169 Main St
   City/Town: Middletown State: CT Zip Code: 06457
   Business Phone: (860)852-1940 ext.
   Contact Person: Christine E. Kurtz Title: Senior Project Manager

Part IV: Site Information

1. Site Name: Torrington WPCF
   Street Address or Description of Location: 252 Lower Bogue Rd
   City/Town: Harwinton State: CT Zip Code: 06791
   Brief Description of construction activity:
   Improvements to the Torrington Water Pollution Control Facility
   Project Start Date: 1 Jun 2018 Anticipated Completion Date: 31 Aug 2021
   Normal working hours: 7 am to 4 pm

2. **MINING** : Is the activity on the site in question part of mining operations (i.e. sand and gravel)? ☐Yes ☑No

If yes, mining is not authorized by this general permit. You must submit the Registration Form for the General Permit for the Discharge of Stormwater Associated with Industrial Activity.

3. **COMBINED OR SANITARY SEWER:** Does all of the stormwater from the proposed activity discharge to a combined or sanitary sewer (i.e. a sewage treatment plant)? ☐ Yes ☑No

If yes, this activity is not regulated by this permit. Contact the Water Permitting & Enforcement Division at 860-424-3018.

4. **INDIAN LANDS:** Is or will the facility be located on federally recognized Indian lands? ☐ Yes ☑No

5. **COASTAL BOUNDARY:** Is the activity which is the subject of this registration located within the coastal boundary as delineated on DEEP approved coastal boundary maps? ☐ Yes ☑No

The coastal boundaries fall within the following towns: Branford, Bridgeport, Chester, Clinton, Darien, Deep River, East Haven, East Lyme, Essex, Fairfield, Greenwich, Groton (City and Town), Old Lyme, Guilford, Hamden, Ledyard, Lyme, Madison, Milford, Montville, New London, New Haven, North Haven, Norwalk, Norwich, Old Saybrook, Orange, Preston, Shelton, Stamford, Stonington (Borough and Town), Stratford, Waterford, West Haven, Westbrook and Westport.

If "yes", and this registration is for a new authorization or a modification of an existing authorization where the physical footprint of the subject activity is modified, you must provide documentation to the DEEP Office of Long Island Sound Programs or the local governing authority has issued a coastal site plan approval or determined the project is exempt from coastal site plan review. Provide this documentation with your registration as Attachment B. See guidance in Appendix D of the general permit. Information on the coastal boundary is available at the local town hall or on the **Connecticut Coastal Resources Map** . Additional DEEP Maps and Publications are available by contacting DEEP Staff at 860-424-3555.

6. **ENDANGERED OR THREATENED SPECIES:**

In order to be eligible to register for this General permit, each registrant must either perform a self-assessment, obtain a limited one-year determination, or obtain a safe-harbor determination regarding threatened and endangered species. This may include the need to develop and implement a mitigation plan. While each alternative has different limitations, the alternatives are not mutually exclusive; a registrant may register for this General Permit using more than one alternative, See Appendix A of the general Permit. Each registrant must complete this AND Attachment C to this Registration form and a registrant who does not or cannot do so is not eligible to register under this General Permit.

Each registration must perform a review of the Department's Natural Diversity Database maps to determine if the site of the construction activity is located within or in proximity (within ¼ mile) to a shaded area.

a. Provide the date of the NDDB maps were reviewed: 28 Feb 2018 (Print a copy of the NDDB map you viewed since it must be submitted with this registration as part of Attachment C.)

b. For a registrant using a limited one-year determination or safe harbor determination to register for this General Permit, provide the Department's Wildlife Division NDDB identification number for any such determination:

_____ (The number is on the determination issued by the Department's Wildlife Division).

For more information on threatened and endangered species requirements, refer to Appendix A and section 3(b)(2) of this General Permit, Visit the DEEP website at **Natural Diversity Data Base** or call the NDDB at 860-424-3011.

c. I verify that I have completed Attachment C to this Registration Form. ☐ Yes

7. **WILD AND SCENIC RIVERS:** Is the proposed project within the watershed of a designated Wild and Scenic River? (See Appendix H for guidance) ☐ Yes ☑ No

8. **AQUIFER PROTECTION AREAS:** Is the site located within a mapped **Aquifer Protection Area** , as defined in Section 22a-354h of the CT General Statutes? (For additional guidance, please refer to Appendix C of the General Permit) ☐ Yes ☑ No

9. **Connecticut Guidelines for Soil Erosion and Sediment Control Guidelines:** Is the activity in accordance with Connecticut Guidelines for Soil Erosion and Sediment Control Guidelines and local erosion & sediment control ordinances, where applicable? ☑ Yes ☐ No

10. **HISTORIC AND/OR ARCHAEOLOGICAL RESOURCES:**

Has the site of the proposed activity been reviewed (using the process outlined in Appendix G of this permit) for historic and/or archaeological resources? ☑ Yes ☐ No

a. The review indicates the proposed site does not have the potential for historic/ archaeological resources, OR ☑ Yes ☐ No

b. The review indicated historic and/ or archaeological resource potential exists and the proposed activity is being or has been reviewed by the Offices of Culture and Tourism, OR ☐ NA ☐ Yes ☑ No

c. The proposed activity has been reviewed and authorized under an Army Corps of Engineers Section 404 wetland permit. ☐ NA ☐ Yes ☑ No

11. **CONSERVATION OR PRESERVATION RESTRICTION:**

Is the property subject to a conservation or preservation restriction? ☐ Yes ☑ No

If Yes, proof of written notice of this registration to the holder of such restriction or a letter from the holder of such restriction verifying this registration is in compliance with the terms of the restriction, must be submitted as Attachment D.

Part V: Stormwater Discharge Information

Table 1

Outfall #	a) Type	b) Pipe Material	c) Pipe Size	d) Note: To find lat/long, go to: CT ECO . A decimal format is required here. Directions on how to use CT ECO to find lat. /long. and conversions can be found in in Part V, section d of the DEEP-WPED-INST-015 .		e) What method was used to obtain your latitude/longitude information?
				Longitude *(Format: -xx.xxxxx)*	Latitude *(Format: xx.xxxxx)*	
1	Pipe	Plastic	her (Please fill in belo 12"	-73.115466	41.781505	ezFile Portal Map
2	Pipe	Concrete	her (Please fill in belo 30"	-73.115466	41.781505	ezFile Portal Map
3	Pipe	Plastic	18"	-73.115466	41.781505	ezFile Portal Map
4	Pipe	Concrete	24"	-73.115466	41.781505	ezFile Portal Map

Part V: Stormwater Discharge Information Continued

Table 2

2. Provide the following information about the receiving water(s)/wetland(s) that receive stormwater runoff from your site, either directly or through the storm sewer system:

Outfall #	Dates when this outfall will be active:	a) To what system or receiving water does your stormwater runoff discharge? either "storm sewer or wetlands" or "waterbody" (If you select storm sewer or wetlands, columns c.1&2 of this table are not required to be completed)	b) What is your watershed ID (freshwater) or 305b ID (estuary)? (Section 3.b, of the DEP-GP-INST-015 explains how to find this information)	c.1) Is your receiving water identified as an impaired water in the "Impaired Waters Table for Construction Stormwater Discharges"?	*If you answered yes to question c.1, then answer the question below* c.2) Has any Total Maximum Daily Load (TMDL) been approved for your receiving waterbody?	For the drainage area associated with each outfall: Effective Impervious Area Before Construction (sq ft)	For the drainage area associated with each outfall: Effective Impervious Area After Construction (sq ft)
1	Start: 1 Jun 2018 End: 31 Aug 2021	Storm Sewer or Wetlands		☐ Y ☐ N ☑ NA	☐ Y ☐ N ☑ NA	17084	17870
2	Start: 1 Jun 2018 End: 31 Aug 2021	Waterbody		☐ Y ☐ N ☑ NA	☐ Y ☐ N ☑ NA	40107	28377
3	Start: 1 Jun 2018 End: 31 Aug 2021	Waterbody		☐ Y ☐ N ☑ NA	☐ Y ☐ N ☑ NA	54455	47257
4	Start: 1 Jun 2018 End: 31 Aug 2021	Waterbody		☐ Y ☐ N ☑ NA	☐ Y ☐ N ☑ NA	78768	87867
	Start: End:	Select One		☐ Y ☐ N ☐ NA	☐ Y ☐ N ☐ NA		
Provide the total effective impervious area for the entire site(sq ft):						190414	181371

Part V: Stormwater Discharge Information (continued)

Impaired waters: If you answered "yes" to Table 2, question 2.c.1, **verify** that the project's Pollution Control Plan (Plan) addresses the control measures below in Question 1 or 2, as appropriate.

1. **If the impaired water does not have a TMDL,** confirm compliance by selecting 1.a. or 2.b. below:

a. No more than 3 acres is disturbed at any time; ☐ Yes

OR

b. Stormwater runoff from a 2 yr, 24 rain event is **retained.** ☐ Yes

2. **If the impaired water has a TMDL,** confirm compliance by selecting 2.a. and 2.b. below and either question 2.c.1. or 2.c.2. below:

a. The Plan documents there is sufficient remaining Waste Load Allocations (WLA) in the TMDL for the proposed discharge, ☐ Yes

AND

b. Control measures shall be implemented to assure the WLA will not be exceeded, ☐ Yes

AND

c. 1. Stormwater discharges will be monitored for the indicator pollutant identified in the TMDL, ☐ Yes

OR

2. The Plan documents specific requirements for stormwater discharges specified in the TMDL. ☐ Yes

Part VI: Pollution Control Plan Availability (check one of the following four categories)

☐ I am registering a Locally Exempt project and submitting the required electronic Plan (in Adobe™ PDF or similarly publically available format) pursuant to Section 3(c)(2)(E) of this permit.

- ☐ Plan is attached to this registration form
- ☐ Plan is available at the following Internet Address (URL): _____

☐ I am registering a Locally Approvable project and have chosen not to submit the Plan with this registration pursuant to Section 3(c)(1) of this permit.

☑ I am registering a Locally Approvable project and have chosen to make my Plan electronically available pursuant to Section 4(c)(2)(N) of this permit.

- ☑ Plan is attached to this registration form
- ☐ Plan is available at the following Internet Address (URL): _____

☐ I am registering a Locally exempt project and do not have the capability to submit the Plan electronically. Therefore, I am submitting a paper copy with this registration as Attachment E.

Part VII: Registrant Certification

The registrant *and* the individual(s) responsible for actually preparing the registration must sign this part. A registration will be considered incomplete unless all required signatures are provided.

For New Registrants:

"I hereby certify that I am making this certification in connection with a registration under such general permit, submitted to the commissioner by CITY OF TORRINGTON for an activity located at 252 Lower Bogue Rd, Harwinton, CT 06791 and that all terms and conditions of the general permit are being met for all discharges which have been initiated and such activity is eligible for authorization under such permit. I further certify that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the site. I certify that the registration filed pursuant to this general permit is on complete and accurate forms as prescribed by the commissioner without alteration of their text. I certify that I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(b)(8)(A) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I certify that I have made an affirmative determination in accordance with Section 3(b) (8) (B) of this general permit. I understand that the registration filed in connection with such general permit is submitted in accordance with and shall comply with the requirements of Section 22a-430b of Connecticut General Statutes, as amended by Public Act 12-172. I also understand that knowingly making any false statement made in the submitted information and in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under Section 53a-157b of the Connecticut General Statutes and any other applicable law."

For Re-registrants:

"I hereby certify that I am making this certification in connection with a registration under the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, submitted to the commissioner by _____ for an activity located at _____ and that all terms and conditions of the general permit are being met for all discharges which have been initiated and such activity is eligible for authorization under such permit. I further certify that all designs and plans for such activity meet the current terms and conditions of the general permit in accordance with Section 5(b)(5)(C) of such general permit and that a system is in place to ensure that all terms and conditions of this general permit will continue to be met for all discharges authorized by this general permit at the site. I verify that the registration filed pursuant to this general permit is on complete and accurate forms as prescribed by the commissioner without alteration of their text. I certify that I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(b)(8)(A) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this verification is based is true, accurate and complete to the best of my knowledge and belief. I also understand that knowingly making any false statement made in the submitted information and in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under Section 53a-157b of the Connecticut General Statutes and an other applicable law."

Signature of Registrant	
Raymond E. Drew	WPCA Administrator
Name of Registrant (print or type)	Title (if applicable)
Signature of Preparer and Date (if different than above)	
Christine E. Kurtz	Senior Project Manager
Name of Preparer (print or type)	Title (if applicable)

Part VIII: Professional Engineer (or Landscape Architect, where appropriate) Design Certification (for publically approvable and exempt projects)

The following certification must be signed by a Professional Engineer, or Landscape Architect where appropriate.

"I hereby certify that I am a licensed in the State of Connecticut.
I am making this certification in connection with a registration under such general permit, submitted to the commissioner by CITY OF TORRINGTON for an activity located at 252 Lower Bogue Rd, Harwinton, CT 06791 .
I certify that I have thoroughly and completely reviewed the Stormwater Pollution Control Plan for the project or activity covered by this certification. I further certify, based on such review and on the standard of care for such projects, that the Stormwater Pollution Control Plan has been prepared in accordance with the Connecticut Guidelines for Soil Erosion and Sediment Control, as amended, the Stormwater Quality Manual, as amended, and the conditions of the general permit, and that the controls required for such Plan are appropriate for the site. I further certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I also understand that knowingly making any false statement in this certification may subject me to sanction by the Department and/or be punishable as a criminal offense, including the possibility of fine and imprisonment, under Section 53a-157b of the Connecticut General Statutes and any other applicable law."

Signature of Design Professional and Date	
Jeffrey D. Preble	28032
Name of Professional (print or type)	License Number

Affix P.E/L.A Stamp Here

Part IX: Reviewing Qualified Professional Certification

The following certification must be signed by a) a Conservation District reviewer OR, b) a qualified soil erosion and sediment control and/ or professional engineer

☐ **Review Certification by Conservation District:**

1.) District: _____

Date of Affirmative Determination: _____

" I am making this certification in connection with a registration under General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, submitted to the commissioner by _____ for an activity located at _____. I have personally examined and am familiar with the information that provides the basis for this certification, and I affirm, based on the review described in Section 3(b)(11)(C) of this general permit and on the standard of care for such projects, that the Stormwater Pollution Control Plan is adequate to assure that the activity authorized under this general permit will comply with the terms and conditions of such general permit and that all stormwater management systems: (i) have been designed to control pollution to the maximum extent achievable using measures that are technologically available and economically practicable and that conform to those in the Guidelines and the Stormwater Quality Manual; (ii) will function properly as designed; (iii) are adequate to ensure compliance with the terms and conditions of this general permit; and (iv) will protect the waters of the state from pollution."

_____

Signature of District Professional and Date

_____ _____

Name of District Professional License Number (if applicable)

Or

☑ **Review Certification by Qualified Professional:**

Company Name: WRIGHT-PIERCE INCORPORATED

Name: Christine E. Kurtz

License #: 22320

Level of independency of professional:

Required for all projects disturbing over 1 acre:

1. I verify I am not an employee of the registrant. ☑ Yes

2. I verify I have no ownership interest of any kind in the project for which the registration is being submitted. ☑ Yes

Required for projects with 15 or more acres of site disturbance (in addition to questions 1&2):

3. I verify I did not engage in any activities associated with the preparation, planning, designing or engineering of the soil erosion and sediment control plan or stormwater management systems plan for this registrant.

☐ Yes

4. I verify I am not under the same employ as any person associated with the preparation, planning, designing or engineering of the soil erosion and sediment control plan or stormwater management systems plan for this registrant.

☐ Yes

Part IX: Reviewing Qualified Professional Certification (continued)

"I hereby certify that I am a qualified professional engineer or qualified soil erosion and sediment control professional, or both, as defined in the General Permit for Discharge of Stormwater and Dewatering Wastewaters from Construction Activities and as further specified in Sections 3(b)(11)(A) and (B) of such general permit. I am making this certification in connection with a registration under such general permit, submitted to the commissioner by CITY OF TORRINGTON for an activity located at 252 Lower Bogue Rd, Harwinton, CT 06791 .
I have personally examined and am familiar with the information that provides the basis for this certification, including but not limited to all information described in Section 3(b)(11)(C) of such general permit, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining such information, that the information upon which this certification is based is true, accurate and complete to the best of my knowledge and belief. I certify, based on my review of all information described in Section 3(b)(11)(C) of such general permit and on the standard of care for such projects, that I have made an affirmative determination in accordance with Sections 3(b)(11)(D)(i) and (ii) of this general permit. I understand that this certification is part of a registration submitted in accordance with Section 22a-430b of Connecticut General Statutes, as amended by Public Act 12-172, and is subject to the requirements and responsibilities for a qualified professional in such statute. I also understand that knowingly making any false statement in this certification may be punishable as a criminal offense, including the possibility of fine and imprisonment, under Section 53a-157b of the Connecticut General Statutes and any other applicable law."

Signature of Reviewing Qualified Professional

WRIGHT-PIERCE INCORPORATED — Name of Reviewing Qualified Professional

22320 — License No.

Affix P.E./ L.A. Stamp Here

Note: Please submit the fee along with a completed, printed and signed Registration Form and all additional supporting documents to:

CENTRAL PERMIT PROCESSING UNIT
DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

Stormwater Pollution Control Plan (SWPCP)

WRIGHT-PIERCE
Engineering a Better Environment

STORMWATER POLLUTION CONTROL PLAN (SWPCP)

for

TORRINGTON WATER POLLUTION CONTROL FACILITY COMPREHENSIVE UPGRADE

Harwinton, CT

February 2018

WRIGHT-PIERCE
Engineering a Better Environment

STORMWATER POLLUTION CONTROL PLAN
(Including Erosion & Sediment [E&S] Controls)

CITY OF TORRINGTON
WATER POLLUTION CONTROL FACILITY
COMPREHENSIVE UPGRADE PROJECT

Prepared For:
The City of Torrington Water Pollution Control Authority (WPCA)
140 Main Street
Torrington, CT 06790

Facility:
Torrington Water Pollution Control Facility (WPCF)
252 Bogue Road
Harwinton, CT 06791

Prepared to Comply With:
1. Connecticut Department of Energy & Environmental Protection's (CTDEEP's) General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities.
2. Town of Harwinton Zoning Regulations

Prepared:
February 2018

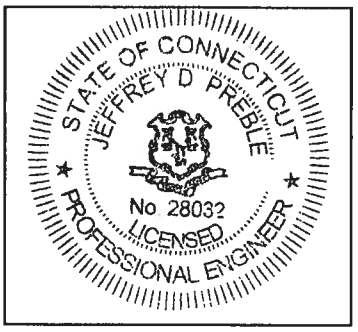
Prepared By:
WRIGHT-PIERCE
Jeffrey D. Preble, PE, Senior Project Manager, Wright-Pierce

Signature of Registered Professional Engineer

Date: 2/15/18

P.E. Stamp:

Reg. No.: 28032
State: CT



TORRINGTON WPCF COMPREHENSIVE UPGRADE PROJECT, TORRINGTON, CT
STORMWATER POLLUTION CONTROL PLAN
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APPENDICES

1.0 Introduction

1.1 OBJECTIVE

This Stormwater Pollution Control Plan (SWPCP) has been prepared for the following project:

City of Torrington Water Pollution Control Facility (WPCF)
Comprehensive Upgrade Project
Torrington, CT

This SWPCP has been prepared to be in conformance with the "*2002 Connecticut Guidelines for Soil Erosion and Sediment Control*", (referred to as "the Guidelines") prepared by the Connecticut Council on Soil and Water Conservation, as amended, and to meet the requirements of the Connecticut Department of Energy and Environmental Protection (CTDEEP) General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities (Construction SW GP) (most recent version). This plan is intended to meet the requirements of the Guidelines, and the Guidelines should be consulted for any measures not included herein, or where a discrepancy is noted. This Plan has also been prepared to satisfy the Town of Harwinton Zoning Regulations.

1.2 PROJECT BACKGROUND

The City of Torrington hired Wright-Pierce to prepare the design for the comprehensive upgrade to the City's Water Pollution Control Facility (WPCF). The project is expected to receive state funding under the Connecticut Department of Energy & Environmental Protection (CTDEEP)'s Clean Water Fund. The facility upgrades are based on the approved Wastewater Facilities Plan and generally include new facilities or modifications to the facility headworks, primary treatment systems, secondary treatment systems, tertiary treatment, solids handling systems, odor control systems, UV disinfection, effluent pump station, and other plant-wide support and building system improvements and modifications. Plant upgrade modifications will improve wastewater treatment and address CT DEEP NPDES Permit effluent requirements including for Nitrogen and Phosphorus limits.

The project was advertised for bid on February 14, 2018 and construction is anticipated to start by mid-2018.

1.3 SWPCP OVERVIEW

This SWPCP is prepared to be in conformance with the CTDEEP Construction SW GP, the Connecticut Guidelines for Soil Erosion and Sediment Control, and the Town of Harwinton Zoning Regulations. The selected Contractor(s) will be responsible for following and implementing the approved SWPCP. This SWPCP includes in **Appendix A** - a USGS Site Location Map and a Zoning Map; in **Appendix B** – select site plans showing existing and proposed conditions, locations and installation details for E&S control measures, dewatering details and stormwater management facilities and details-not attached as provided elsewhere; in **Appendix C** - a soil scientist wetlands report and relevant site soil information; and in **Appendix D** - select project specifications relevant to E&S controls, dewatering and stormwater management. **Appendix E** includes applicable Stormwater Calculations and Design Information. Note that for certain permit applications, some of the appendix information may already be provided in another portion of the application and is therefore not reproduced again as an appendix to this Plan.

This plan includes a project narrative, construction sequencing, descriptions of erosion and sedimentation (E&S) controls and post-construction stormwater management facilities, and a description of inspections, maintenance, monitoring, and plan implementation.

2.0 Project Narrative

2.1 SITE LOCATION

The Torrington WPCF site is located at Lower Bogue Road in Harwinton, CT and adjacent to the Naugatuck River. The site is primarily bordered by a gravel pit operation to the east, the river to the north and west, and remaining city owned land to the south. Refer to **Appendix A** for a USGS Site Location Map.

2.2 SITE DESCRIPTION

The WPCF property is an approximately 31-acre site that contains the local wastewater treatment facilities, public works storage area, and the Dog Pound. The water pollution control facility occupies approximately 16 acres of the site. The facility serves the City of Torrington, as well as small portions of Harwinton and Litchfield. The treatment facility was originally construction in 1939, with process improvements undertaken in 1968, 1995, and 2010. A berm is located at the perimeter of the facility and serves as flood protection for the site. The 100-year flood elevation for the site is listed as elevation 520 per the FIRM Flood Insurance Map, Panel 090147 0003 B. A copy of the Town of Harwinton Zoning Map is also included in **Appendix A**.

A few pockets of wetlands are present around the perimeter of the facility. Wetlands were delineated by Soil Science and Environmental Services, Inc. in June of 2015. Copies of these wetlands reports are included in **Appendix C**. The limits of wetlands (wetlands flags) as well as the limits of the Town of Harwinton 100-foot upland review area are shown on the site plans. There are approximately 3,132 square feet of wetlands located on the Torrington Water Pollution Control Facility site. Less than 400 square feet of wetlands will be disturbed as part of the project.

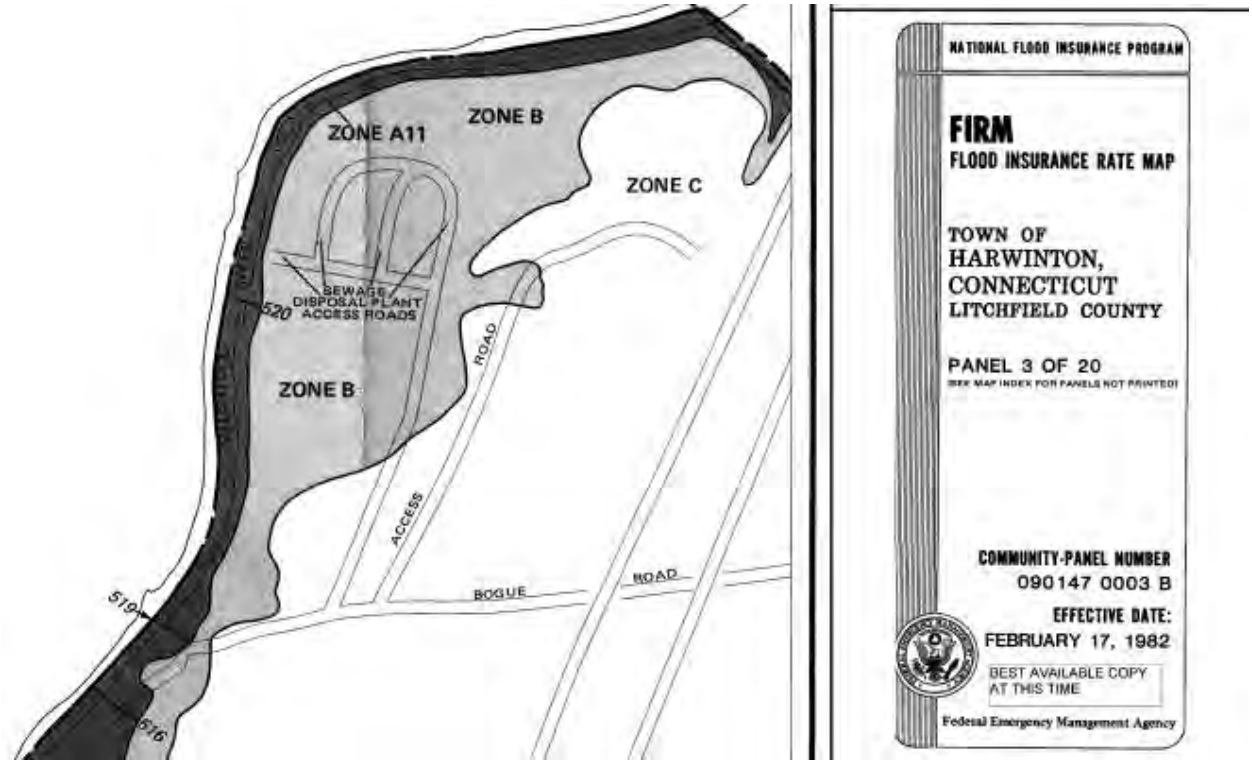

Figure 1: FEMA FIRM Panel Excerpt

Appropriate erosion and sediment controls will be utilized during construction activities to protect the adjacent wetland areas. The total area of the subject property is currently approximately 31 acres, with approximately 11 acres of developed area. The anticipated site disturbance for the WPCF Comprehensive Upgrade Project is estimated at approximately 10 acres (32% of site area) on the actual WPCF site (refer to **Appendix B).** The only planned activity to occur within the wetland areas is the installation of riprap aprons for existing drainage system outlets located on the east side of the site. The outlet apron areas have been designed for velocity dissipation and erosion control. The estimated activity area within the wetlands area is less than 400 SF of disturbance. Some facilities currently are within the 100-foot upland review area for the Town of Harwinton. The total anticipated activities within the URA is approximately 1.63 acres.

2.3 OVERVIEW OF STORMWATER HANDLING

Stormwater runoff from the site is currently directed to four (4) outfalls. The outfalls will be preserved as part of the project upgrades. A majority of the existing site is directed to an outfall located on the west property boundary that drains directly to the Naugatuck River. The headworks area of the site drains to the northeast to an existing 12-inch pipe (outfall #1). This area discharges to a ponded area located on the gravel pit site used for stormwater and sedimentation control. Runoff in the central part of the site is collected by a series of catch basins and directed to the 30-inch outfall pipe located to the west of the existing aeration tanks. The northern section of the drainage area, connects to a junction structure where the stormwater is combined with plant effluent prior to discharge to the river.

Outfall #3 is an 18-inch storm drain located to the west of the existing chlorine contact tank. This outfall collects runoff from the plant drives and roof tops through the middle section of the facility. For the southern portion of the site, stormwater is collected in an existing swale that drains to the west into a large natural infiltration area. This infiltration area drains to a 24-inch drain which discharges to the river. The invert of this pipe is higher than the swale bottom allowing infiltration of runoff prior to discharge.

The middle section of the site between the existing operations building and the waste sludge tanks and gravity thickener drain to a series of trench drains where any collected runoff is routed back through the headworks of the plant. Approximately 0.39 acres of the site is collected through these trench drains and receives full treatment through the plant.

The proposed stormwater design will maintain the existing discharge locations. At Outfall #1, a new riprap outlet will be constructed. No modifications will be required for Outfall #2, while outfall #3 will be lowered by approximately a foot to obtain clearances to new site piping being installed as part of the upgrade. The fourth outfall at the south of the site will not be affected by the proposed improvements, however a new outlet control structure will be constructed over its inlet. No new outfalls will be constructed as part of the project.

The stormwater junction structure located in the west-central portion of the site (associated with discharge 002) will remain. Discharge 002 acts under gravity during average flow conditions. During high flow events, stormwater flows back into the wet well of the outfall pumps and then it is pumped up into the effluent chamber prior to discharge to the river.

2.4 COMPREHENSIVE UPGRADE CONSTRUCTION OVERVIEW

The site plans (included in **Appendix B**) entitled: "City of Torrington, Connecticut, Water Pollution Control Facility, Comprehensive Upgrade" prepared by Wright-Pierce generally show the locations of the work for this project. Work includes demolition or removal of existing structures or facilities, utility relocation, abandonment, construction of new structures and facilities, and other ancillary sitework and utility work. Ancillary activities include relocation of underground utilities, excavation and stockpiling of soils, paving and roadway work, etc.

As shown on the site plans, some facilities will be demolished and several new facilities will be constructed. Provided below is a brief summary of the work activities.

Proposed facility improvements include the following major components:

- Improvements to the Septage Receiving;
- Reconstruction of the Preliminary Treatment Building;
- Construction of a new electrical room at the Primary Settling Tanks;
- Construction of a new electrical room at the Operations Building;
- Improvements in odor control at the facility;
- Aeration Tank Modifications;
- Modifications to Final Settling Tanks 1 and 2 with construction of a third Final Settling Tank;
- Construction of a new Tertiary Treatment Building;
- Construction of Ultraviolet Disinfection System;
- Construction of an Administration Building and Maintenance Garage;
- Electrical system upgrades throughout the facility including new standby emergency generators, and a Secondary Electrical Building;
- New access drives;
- Improvements to the stormwater handling system; and
- Other miscellaneous site and process improvements.

While much of the site is protected from flooding by the perimeter berm around the site, the upgrade project will receive federal funding, and therefore will need to comply with Executive Order 13690 to reduce the risk and cost of future flood disasters by ensuring improvements are constructed to better withstand the impacts of flooding. Flood protection will be achieved by raising to, or protecting structures against, at least 2-feet above the base flood elevation. Critical

functions will be protected to 3-feet above base flood elevation (i.e. Preliminary and Primary Treatment, Disinfection, Electrical).

A variety of different construction equipment is anticipated to be utilized. This may include backhoes, excavators, dump trucks, compactors, paving machinery, cranes, drill rigs, etc. The project specifications will include provisions for sheeting, dewatering, excavation, filling, drainage improvements, and restoration as applicable. It should be noted that, typically, specific construction means and methods will be up to the general contractor. The contractor will be required to submit detailed plans for all technical construction stages for review and approval prior to commencing each significant stage.

2.4.1 Contractor Staging

Contractor staging (laydown/storage) will occur in designated locations on the WPCF site as shown on the site plans and as defined in the General Conditions for the performance of the Work. Other areas for Contractor laydown may be designated or approved by the Engineer prior to construction.

2.4.2 Roadways, Drainage and Site Restoration

Roadways have been designed to match the existing roadways as much as possible, with modifications as necessary to accommodate site conditions and facility requirements. Appropriate erosion and sedimentation controls will be utilized to minimize impacts to stormwater facilities, wetlands, or watercourses during construction. The wetlands in the vicinity of the site and all areas potentially impacted by construction, including existing catch basins, will be protected by some combination of catch basin filter bags, silt fencing, hay bale barriers, construction entrances, and sedimentation basins as necessary or appropriate. The Contractor will also be required to manage construction dewatering waters in accordance with the specifications.

The site plans and project specifications include provisions for appropriate erosion and sediment controls and details and site restoration. Where no new facilities are located, site restoration involves matching previous surrounding features. This includes restoring grassed areas similar to pre-construction, and paving new roads or restoring roads with pavement that were disturbed as a result of construction. The site plans include restoration details.

2.4.3 Stormwater

Stormwater will be routed to the same stormwater discharge locations. Details of stormwater design and management are provided in Section 5.

3.0 Construction Sequencing

Erosion and sedimentation (E&S) control measures are designed to minimize erosion and sedimentation of nearby and surrounding wetlands and watercourses. Existing catch basins located within the immediate vicinity of demolition, construction, utility or site disturbance work will be protected using temporary sediment traps/silt sacks. In addition, silt fence will be installed at appropriate locations near all construction areas involving earth disturbance, or surrounding Contractor staging areas or soil stockpiles, as appropriate. The main focus of these E&S control measures is to minimize conveyance of sediment laden waters into the stormwater conveyance system and to protect all inland wetlands around the project site from any construction related impacts.

Minimum erosion and sedimentation (E&S) controls and details are shown on the site plans, and are described in further detail in the subsequent sections of this plan. The site plans and specifications (Contract Documents) include detailed requirements for protection and restoration of the land, and for installation and maintenance of appropriate E&S controls in conformance with applicable Federal, State and local requirements. The selected Contractors will be responsible for implementing this Plan and for complying with all applicable regulatory requirements.

Construction is anticipated to start during the middle of 2018; the Contract allows the contractor 3 years to substantial completion and allowing an additional 2 months to achieve final completion.

At the start of construction, the Contractor will be required to develop a detailed project sequence and schedule for the work that must comply with the requirements of the SWPCP. It is anticipated that work will be conducted year-round; however, certain elements of the project may be scheduled based on weather conditions or other environmental considerations as appropriate. Wherever possible, the site shall be phased to avoid the disturbance of over five (5) acres at one time, as required by the Construction SW GP. The Engineer and Owner will review the schedules for overall conformance with this Plan.

Refer to the notes on the site plans for general erosion and sedimentation control notes.

In general, construction will be sequenced as follows:

- The limits of work and critical resource areas (e.g., wetlands) will be field staked and/or identified.
- Appropriate E&S control measures will be installed prior to site disturbance, including, but not limited to, installation of silt sacks in catch basins, installation of silt fencing surrounding Contractor Staging Areas and surrounding all areas of work, as shown on the Site Plans included in Appendix B, and installation of gravel construction entrances or anti-tracking aprons at the entrances to disturbed work areas and at appropriate locations along traffic routes through disturbed areas of the site, as shown on the site plans and as appropriate. Other measures may be installed if determined to be necessary, including, but not limited to: construction of sedimentation/dewatering basin(s) or other dewatering measures; or other E&S measures determined to be appropriate or necessary.
- Where shown or required, existing buildings, tanks, structures, utilities, pavement, curbing and/or appurtenances will be demolished and removed off-site. Stockpiles, if any, will be protected by hay bale or silt fence barriers and stabilized.
- Where shown or required, existing utilities will be removed, capped, abandoned, or relocated as specified.
- New facilities or utilities will be installed or constructed, including, but not limited to: the new Preliminary Treatment Building, Primary Treatment Building addition, Aeration Tank (AT) #1, new Tertiary/ UV Disinfection Building, Secondary Electrical Building,, Operations Building Addition, Administration Building / Maintenance Garage, new stormwater management basins, new emergency generator and other ancillary facility modifications and improvements.
- Pavement, curbing, aprons, walkways, or turf establishment will be installed and site restoration per the plans and specifications will be completed.
- Any remaining disturbed areas will be graded and stabilized per the site plans and specifications.

4.0 Soil Erosion & Sediment Controls

4.1 DESCRIPTION OF CONTROL MEASURES

Various E&S control measures will be utilized to prevent or minimize soil erosion and sedimentation of on-site stormwater systems and adjacent wetlands. Refer to the select site plans in **Appendix B** for the locations and details for the installation of E&S control measures. The notes on the drawings also include general requirements for the installation and maintenance of these measures as well.

In addition, copies of the following specifications are also included in **Appendix D** for reference:

- Section 01562 - Dust Control
- Section 02110 – Clearing and Grubbing
- Section 02115 – Stripping and Stockpiling Topsoil
- Section 02200 – Earthwork
- Section 02260 – Filter Fabric
- Section 02270 – Temporary Erosion Control
- Section 02271 – Riprap and Stone Ditch Protection
- Section 02401 – Dewatering
- Section 02485 – Loaming & Seeding

E&S control measures shall be installed as shown or specified. If any additional measures are determined to be necessary, the Guidelines shall be consulted for design criteria and general installation details. In addition, all E&S control measures shall comply with the requirements of the CTDEEP's Construction SW GP. Provided below are descriptions of specific E&S control measures.

4.1.1 Sedimentation Controls

Sedimentation controls mainly include silt sacks (temporary sediment traps), silt fences and silt booms. Anti-tracking aprons (e.g., gravel construction entrances) may also be utilized as shown or if determined to be necessary. These measures will be installed as detailed on the site plans. Land disturbance is also required to be kept to a minimum to reduce soil erosion and

sedimentation. Wherever possible, work shall be phased to avoid disturbance of more than five (5) acres at any one time, inclusive of other work or contracts ongoing at the WPCF site.

4.1.2 Dewatering Wastewaters

Dewatering is likely to be required associated with the excavation for construction of portions of the new facilities. Dewatering systems shall be designed by the Contractor (prepared by a licensed Professional Engineer registered in the State of Connecticut) and submitted to the Engineer and the Owner for approval (refer to specification Section 02401 in **Appendix D**). Any E&S control measures utilized for dewatering and drainage systems will be required to conform to the Guidelines. At a minimum, removal of sediment and solids from the dewatering wastewater discharge will be required, as specified. Dewatering wastewaters discharged to surface waters shall be discharged in a manner that minimizes discoloration of receiving waters, will not cause scouring or erosion or contain suspended solids in amounts that could reasonably be expected to cause pollution of surface waters of the State. All dewatering measures shall be installed on upland soils.

The Contractor will be required to obtain and comply with all applicable dewatering wastewater discharge permit(s), including any conditions or requirements for treatment, flow monitoring, or sampling. The Contractor will be directed to perform groundwater sampling and be responsible for determining applicable permits for allowable discharge. It is anticipated that all dewatering wastewater will be directed to the wetlands to the south of the site, where stormwater from the site is also discharged.

4.1.3 Protection of Stockpiles

Contractor staging and/or soil stockpiles may be placed on-site in the designated areas, or at alternate locations if approved by the Engineer and/or the Owner. Soil stockpiles will be surrounded by either hay bales or silt fencing. The maximum permissible slope of the stockpile will be 2H:1V. The area selected for stockpiling shall be dry and stable and the location approved by the Engineer and/or the Owner. Stockpiles will also be required to be stabilized or covered. Stockpiles that are not to be used within 30 days shall be seeded or mulched immediately after formation of the stockpile.

4.1.4 Dust Control

Dust control measures will be implemented in accordance with the Guidelines if determined to be necessary. Off-site vehicle tracking of sediments and the generation of dust shall be minimized. Wet dust suppression methods shall comply with section 22a-174-18(c) of the Regulations of Connecticut State Agencies. It is recommended that water be used for dust control due to the proximity of wetlands at the site (refer to specification Section 01562 in **Appendix D**). The volume of water sprayed to minimize dust shall be minimized to prevent the runoff of water, and any water running off shall contain no visible oil sheen, floating solids, discoloration or cause foaming in the receiving stream.

4.1.5 Restoration and Site Stabilization

Disturbed areas will be stabilized with mulch or temporary seeding in accordance with the requirements and timeframes noted on the site plans and in accordance with the specifications. At a minimum, any disturbed area left exposed for a period of greater than 14 days will be stabilized. Stabilization should occur within seven (7) days after suspension of work in the disturbed area(s).

Site restoration will include installation of pavement, curbing, aprons, walkways, turf establishment, or other restoration as shown on the site plans and detailed in the project specifications.

4.2 DETAILS AND INSTALLATION

Refer to the site plans for all E&S control measure details and installation requirements.

4.3 MAINTENANCE

During construction, various measures will be used to conserve soil and minimize erosion until disturbed areas are stabilized. The selected Contractor will be responsible for inspecting, maintaining and periodically cleaning all E&S control measures in accordance with the site plans and contract specifications.

Remove sediments when deposits reach one-half the height of a silt fence or hay bale barrier. Replace silt sacks or temporary sediment traps in accordance with manufacturer's instructions or as necessary to maintain catch basin in proper working function.

For anti-tracking aprons, construction entrances will be maintained in a condition to prevent tracking and washing of sediment onto paved surfaces. This may include the need for periodic top dressing with additional stone as conditions may warrant. The anti-tracking apron may be required to be modified (e.g., increasing the length, and/or installing wash racks) if the apron is determined not to be sufficient to remove the majority of sediment.

For sediment/dewatering systems or basins, inspections should be frequent, if not continuous, during operation for proper functioning. Accumulated sediment should be removed from systems or basins periodically, as appropriate.

For concrete washout areas, hardened concrete shall be removed when materials have accumulated to ½ the height of the container or washout area.

The Contractor will also be responsible for periodically cleaning any E&S control measures as determined to be necessary. Minimum requirements for cleaning are detailed on the site plans, or the Guidelines should be referenced.

After construction and site stabilization, it is anticipated that the potential for erosion will be minimal. The Contractor will be responsible for post-construction restoration determined to be necessary and in accordance with the Contract Documents.

4.4 HOUSEKEEPING AND OTHER CONTROL MEASURES

The Contractor will be required to implement this Plan and shall follow good housekeeping practices, materials management and spill prevention practices that will minimize the risk of spills or accidental exposure of materials to stormwater runoff or wetland areas. These minimum practices are outlined below.

4.4.1 Good Housekeeping and Waste Disposal

The following general practices will apply:

- The Contractor shall make an effort to store only enough products on-site required to do the job.
- All materials stored on-site will be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof, plastic or other weatherproof enclosure.
- Products will be kept in their original containers with the original manufacturer's labels intact.
- Original labels and material safety data sheets will be retained.
- Substances will not be mixed with one another unless in accordance with the manufacturer’s recommendations.

- Whenever possible, all of a product will be used up before properly disposing of the container.
- Manufacturers' recommendations for proper use and disposal will be followed. If surplus product must be disposed of, follow manufacturer, State or Federal recommended methods for proper disposal (whichever is most stringent).
- The Contractor shall take measures to ensure that no litter, debris, building materials, or similar materials are discharged to waters of the State.
- The Contractor will inspect periodically to ensure proper use and disposal of materials. All wastes will be properly managed in accordance with applicable regulatory requirements.
- All on-site vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage.
- Care will be taken in the selection of the location and method of storage of any petroleum products, hazardous materials, or similar, so as to minimize the potential for accidental spillage, leakage, or release to the environment. All chemical and petroleum product containers stored on the site shall be provided with impermeable containment which will hold at least 110% of the volume of the largest container, or 10% of the total volume of all containers in the area, whichever is larger, without overflow from the containment area. All chemicals and their containers shall be stored under a roofed area except for those chemicals stored in containers of 100-gallon capacity or more in which case a roof is not required. Double-walled tanks satisfy this requirement.
- No washout of concrete trucks shall be allowed on-site with a discharge to a surface water or to the stormwater system. Washout of applicators, containers, vehicles and equipment for concrete, paint and other materials shall be conducted in a designated washout area with no surface discharge. The washout area shall be located outside any buffers and at least 50 feet from any stream, wetlands, or sensitive area, or in an entirely self-contained system. Washout areas shall be clearly flagged and marked, inspected weekly, and immediately repaired upon discovery of any holes, leaks, or overflows. All hardened concrete waste shall be properly removed and disposed.

4.4.2 Spill Prevention and Response Practices

In addition to the good housekeeping and material management practices discussed above, the following general practices will be followed for spill prevention, response and cleanup:

- Materials and equipment necessary for spill response will be maintained on-site. Equipment and materials may include, but are not limited to: gloves, safety glasses, speedi-dri, spill “pigs”, sorbent materials, poly sheeting, and miscellaneous containers (e.g., drums).
- Adequate personnel will be trained in spill response procedures.
- The Contractor shall designate a specific person to be responsible for spill prevention and response.
- All spills will be properly reported and cleaned up immediately after discovery.

The Contractor will be required to prepare their own Contingency Plan that will detail preventive measures and response procedures to be utilized in the event of a spill or unplanned release.

4.5 FLOOD CONTINGENCY PLANNING

Because portions of the site are located within the floodplain, certain floodplain management standards are included in the design of the facility upgrades. A more detailed description of the flood-proofing design elements is be included with various permit applications required for this project. As part of certain permit applications, a Flood Contingency Plan may be prepared for this project. The Contractor will be required to follow the requirements of any Flood Contingency Plan developed for the project. In addition, the Contractor shall be required to prepare their own Flood Contingency Plan to address procedures and timeframes for either securing or removing materials from the site in the event of a flood.

4.6 INSPECTIONS

The Contractor is required to submit the name(s) of any designated inspectors and their qualifications in accordance with the definition of "Qualified Inspector" in the Construction SW GP. The Contractor is also required to submit the designated "normal working hours" for the Contract.

4.6.1 Plan Implementation Inspections

The Contractor shall coordinate inspection of the site for compliance with the General Permit and proper initial implementation of all control measures for the initial phase of construction within the first 30 days following commencement of the construction activity. The inspection shall be conducted by either the local North Central Conservation District or by a Qualified Professional Engineer (QPE) or a Qualified Soil Erosion and Sediment Control Professional (QSESCP) at least once during first 90 days. For sites not inspected by District personnel, the inspector shall be someone who is not an employee of the registrant (City of Torrington); and has no ownership interest of any kind in the project. Refer to Section 5(b) of the GP.

4.6.2 Routine Inspections

At a minimum, the Contractor shall conduct weekly inspections and inspections within 24 hours of a storm that generates a discharge. For storms that end on a weekend or holiday, an inspection is required within 24 hours only for a storm that equals or exceeds 0.5 inches. For

storms <0.5 inches, inspection shall occur immediately upon the start of the subsequent normal working hours. In addition, areas that have been temporarily or finally stabilized shall be inspected at least monthly for three (3) months. **Appendix F** contains blank inspection forms. Contractor(s) may revise or amend these forms to suit the particular work activities if they still meet these requirements and are approved by the Owner or the Engineer.

Qualified personnel shall be used for inspections. Areas to be inspected include the following:

- Any disturbed areas and areas used for storage of materials that are exposed to precipitation shall be inspected for the potential for pollutants to enter the drainage system;
- E&S control measures or devices and any structural control measures shall be observed to ensure they are operating properly;
- Any designated washout areas;
- Any stockpiles;
- Where discharge locations are accessible, they shall be inspected to assess if erosion control measures are effective; and
- Site or construction area entrances and exits shall be inspected for evidence of off-site tracking.

The report shall include a statement that, in the judgment of the qualified inspector, the site is either in or out of compliance with the terms and conditions of this SWPCP and the Construction SWGP. If, based on the results of the inspection, it is determined that potential sources and pollution prevention measures require modification, the inspection report shall include a summary of remedial actions required to bring the site back into compliance. Non-engineered corrective actions shall be implemented within 24 hours and any necessary revisions shall be made to the Plan within three (3) calendar days following the inspection. Any necessary engineered corrective actions shall be implemented on site within seven (7) days and any necessary revisions shall be made to the Plan within ten (10) calendar days following the inspection. During the period in which any corrective actions are being developed or are not yet fully implemented, interim measures shall be implemented to minimize the potential for the discharge of pollutants from the site.

The completed inspection form (report) shall also summarize the scope of the inspection, name and qualifications of personnel making the inspection, the date of the inspection, weather conditions including precipitation information, the major observations, a description of the stormwater discharge(s) from the site, any water quality monitoring performed during the inspection, and any actions taken, and shall be signed by the permittee (City of Torrington) or

his/her authorized representative (e.g., the Contractor), including the requisite certification statement on the form. All completed inspection forms (reports) shall be signed (refer to Section 6.4.3) and retained as part of the Plan for at least five (5) years after the date of inspection.

4.7 MONITORING

The Contractor is required to submit proposed sampling points and specific proposed turbidity monitoring procedures. The Contractor is also required to submit the designated "normal working hours" for the Contract.

The Contractor shall maintain a rain gauge on-site to document rainfall amounts.

The Contractor shall sample stormwater point source discharges (e.g., SW outfalls DSN 1, 2, 3 or 4; refer to Section 5) associated with construction activities *monthly* (if there is a stormwater discharge) for turbidity. All samples collected shall be grab samples and will be analyzed in accordance with methods in 40 CFR Part 136. Sample locations shall be approved by the Engineer. All monitoring shall be conducted in conformance with the current version of the CTDEEP Construction SW GP. Specific monitoring requirements include:

- Contractor shall sample all point source stormwater discharges from disturbed areas at least monthly for turbidity.
- Contractor shall clearly flag, mark or field stake all sampling point(s).
- Samples shall be collected when there is a discharge of stormwater from the site while construction activity is ongoing, until final stabilization of the drainage area associated with each outfall is achieved
- Samples are only required to be taken during normal working hours.
- Sampling may be temporarily suspended if unsafe conditions exist.
- If there is no stormwater discharge during a month, sampling is not required.
- All samples shall be collected from a storm event occurring at least 24 hours after a previous storm event generating a discharge. Sampling of snow or ice melt in the absence of a storm event is not a valid sample.
- Samples shall be grab samples. Three separate samples shall be taken from each sampling point during a storm event and monitored for turbidity using 40 CFR 136 methods (e.g., a field turbidity meter). The first sample shall be taken within the first hour of stormwater discharge from the site. Turbidity values for each sampling point shall be determined by taking the average of the turbidity values taken for the sampling point during the storm event.
- Turbidity monitoring may be conducted manually or by using an in-situ turbidity probe or other automatic sampling device equipped to take individual turbidity readings (i.e., not composite readings).

- Samples must be collected from all point source discharges of stormwater from disturbed areas, though substantially identical outfalls may be grouped. No more than five (5) substantially identical outfalls may be identified for one representative discharge.
- Within 30 days of the end of the month, the Contractor shall prepare and submit results on the CTDEEP's Stormwater Monitoring Report (SMR) form to CTDEEP. Section 6.4.1 further describes monitoring reporting requirements.

5.0 Stormwater Management Facilities

5.1 DESCRIPTION OF EXISTING AND PROPOSED STORMWATER FACILITIES

The WPCF site is also authorized under the CTDEEP's General Permit for the Discharge of Stormwater Associated with Industrial Activity (Industrial SW GP), and therefore, maintains a Stormwater Pollution Prevention Plan (SWPPP). As previously described, stormwater on the site is collected in catch basins and swales that discharge to the west and eventually discharge to the Naugatuck River. The WPCF occupies approximately 16.44 acres of the 30.7-acre parcel. The remaining portion of the parcel is associated with the Animal Control Facilities for the Town of Harwinton.

The existing stormwater collection system at the WPCF site includes a total of four (4) stormwater outfalls (001, 002, 003 and 004). The grass swale leading to outfall #4 will be modified to allow construction of the third final settling tank. Much of the new developed area will be directed to this treatment measure.

Peak runoff flows are at or below existing flows at the outfall locations. Outfalls 2, 3, and 4 are all located along the Naugatuck River and therefore combined to a single analysis point.

As prescribed by the facility's SWPPP, select stormwater outfalls are monitored periodically and the results reported to the CTDEEP per the requirements of the Industrial SW GP. The facility's SWPPP will be modified as necessary as a result of the construction activities associated with this project.

The following table presents a summary of changes to facility stormwater outfalls.

Outfall	**Changes**
001	Small increase in percentage of impervious area resulting in a new riprap apron.
002	Decrease in watershed by 0.16 acres; decrease in runoff peak rate: no change in existing outfall.
003	Decrease in watershed by 0.67 acres; decrease in runoff peak rate: Outfall lowered to avoid piping conflicts with new process piping. New riprap apron.
004	Increase in watershed 0.64 acres; slight increase in runoff peak rate: Q25 year decrease = 1.3cfs. Offset by decrease in flow from points 2 and 3.

A comparison of pre-developed impervious area and post development impervious area is shown below.

Total pre-developed impervious area = 291,520 sf
Total post-development impervious area = 315,440 sf
Increase in impervious area = 23,920 sf = 8.2% increase

(Note that open tank areas and similar are not included in the area calculations. Any rainfall into the tanks will be processed and discharged through the plant outfall so will not have any affect upon the stormwater calculations)

As part of the stormwater management design, the site has been divided into four (4) watersheds and outfalls for design and analysis purposes. Watershed #1 at the northeast part of the site drains to a large water quality pond on adjacent property with no apparent outlet. The remaining outfalls drain directly to the Naugatuck River on the west side of the site. Peak runoff flow rates have been calculated for the 10 and 25-year storm events using the SCS TR-55 Method and HydroCAD software. See the project Stormwater Management Report in Appendix E and for Historical and Post-Development runoff flow calculations.

An overall summary of the runoff flow calculations for the entire site (all nodes) as follows:

Storm Event (yrs)	Pre-Developed Q peak (cfs)	Post-Developed Q peak (cfs	Change in Qpeak (cfs)
10	77.75	76.80	0.95 Decrease
25	96.57	94.5	2.07 Decrease

5.2 DESCRIPTION OF POST-CONSTRUCTION STORMWATER MANAGEMENT

5.2.1 Water Quality Volume (WQV) Retention

In accordance with Section 5(b)(2)(C)(i)(a) of the Construction SW GP, sites that are currently developed with more than forty (40) % effective impervious cover shall be designed to retain half of the WQV for the site. The existing WPCF site is approximately 40.75% developed and therefore meets the 40% threshold. The WQV calculated for the WPCF portion of the site is 0.57 ac-ft. Half of the WQV (0.29 ac-ft) for the WPCF site will be retained by all of the flow from Study Point 1 being directed to the sediment pond with no outlet, directing approximately 0.4 acres of impervious area from Study Points 2 & 3 to existing trench drains that routes runoff through the treatment process, and directing the new impervious area on the southern end of the site to wet swale (Study Point 4). A small portion of the drainage area leading to Outfall #1 is directed to the treatment process in the septage receiving area.

Treatment facilities are typically low risk TSS sites when compared to typical commercial developments. Given the low loading of sand and salt during snow removal operations through the winter time, treatment measures were selected to take advantage of the low loading rates. The WPCF sweeps their parking areas and access drives in the early spring months to clean up any remaining sand from winter maintenance activities. In addition, all new catch basins will be equipped with outlet protection and deep sumps to trap any floatable materials that may be present on site. The Massachusetts TSS removal spreadsheet was utilized to determine the level of TSS removal for each outfall. Note that the existing stormwater system does not have any water quality treatment devices employed. For more detailed information, reference Section 1.7 Water Quality Provisions and Section 1.8 Stormwater Management Basin Design sections of the Stormwater Management Report located in Appendix E.

Outfall #001 is located at the northeast portion of the site and drains to a wet pond located on adjacent property. This pond is also used for sedimentation controls associated with the gravel pit operation and does not have a direct discharge to the river. For Outfall #002, a Hydrodynamic Separator will be installed to the east of the new Generator Enclosure to treat the new impervious surfaces in this portion of the site. Outfall #003 is located in the central portion of the WPCF. The

main new impervious surface within this watershed is the new Tertiary Treatment Building. Roof drains from this new structure will be directed to a dry well to allow runoff to infiltrate back into the groundwater. Groundwater depths in this portion of the site are approximately 9-feet below grade. Outfall #004 encompasses the southern portion of the site where the bulk of the new impervious surfaces are located. A wet swale will be constructed to the south of this subcatchment which drains to a natural infiltration area prior to discharge to the river. An outlet control structure will be added to the existing outfall to achieve the water quality depths required.

5.2.2 Runoff Reduction and Low Impact Development (LID) Practices

The site design has incorporated LID technology where feasible. However due to the nature of the site, required access to the various plant infrastructure and the necessity to keep land available for future process expansion greatly limits the ability of incorporating LID technology on the site. One of the LID measures selected for use is a dry well to collect drainage from the roof of the Tertiary Treatment Building and allow it to infiltrate into the groundwater. The south end of the site includes a majority of the new development associated with the water pollution control facility improvements. In this area, an existing grass swale will be relocated and redirected around Final Settling Tank No. 3 and connected to a natural infiltration area on the southwest end of the site. This grass swale will provide treatment to the stormwater as it directs runoff towards the infiltration area and outfall 004. The northerly portion of the site is utilized for treatment purposes with little opportunity for LID measures to be implemented.

5.2.3 Suspended Solids and Floatables Removal

The permittee shall install post-construction stormwater management measures designed to minimize the discharge of suspended solids and floatables (e.g. oil and grease, other floatable liquids, floatable solids, trash, etc.) from stormwater. A goal of 80 percent removal of the annual sediment load from the stormwater discharge shall be used in designing and installing stormwater management measures. The Plan shall provide calculations supporting the capability of such measures in achieving this goal and any third-party verification, as applicable, of the sediment removal efficiencies of such measures.

All site catch basins will be fitted with a tees type outlet arrangement designed to prevent floatables from entering the piping system. Additionally, site sub-watersheds leading to outfall 1

drain to a pond with no outlet to the river. Watersheds leading to outfall 4 drain through a nearly 450-foot long grass swale prior to discharge. This swale will trap any floatables in the runoff and allow suspended solids to settle out prior to discharge. For more detailed information, reference Section 1.7 Water Quality Provisions section of the Stormwater Management Report located in Appendix E.

5.2.4 Velocity Dissipation

Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive velocity flow to the receiving watercourse so that the natural physical and biological characteristics and functions are maintained and protected.

Two of the four outfalls will require new riprap aprons, and include outfalls 1 and 3. The outlet aprons will dissipate potentially erosive discharge velocities and permanently stabilize the piping outlet location. The outlet protection will be located at the system discharge location. Outfalls 2 and 4 are not being disturbed as part of the proposed project. The outlet protection devices have been sized in accordance with the latest edition of the Connecticut Department of Transportation Drainage Manual. Outfall #1 at Study Point 1 is a Type A apron which requires a minimum length of 3 feet per the CTDOT design tables. A 10-foot apron will be provided based on field conditions at the outlet. For Outfall #3 at Study Point 3, a Type B apron is needed since it is discharging adjacent to the river. Utilizing the CTDOT design tables an apron length of 3.9 feet is required and a length of 17 feet will be constructed to match bank conditions at the outfall location. For more detailed information, refer to the Stormwater Management Report located in application Appendix E.

5.3 MAINTENANCE

During construction, affected stormwater catch basins will be protected with silt sacks, as detailed on the site plans, until disturbed areas are stabilized. Other E&S controls, including anti-tracking apron(s), silt fencing, or other control measures deemed necessary will also be utilized as appropriate. The selected Contractor will be responsible for inspecting, maintaining and periodically cleaning all E&S control measures in accordance with the site plans. At a minimum,

this will include weekly inspections and inspections within 24 hours of the end of a storm that generates a discharge (refer to Section 4.5).

After final site stabilization, it is anticipated that the potential for erosion will be minimal. The Contractor will be responsible for inspecting all areas that have been temporarily or finally stabilized at least monthly for three (3) months. All post-construction stormwater structures shall be cleaned of construction sediment and any remaining silt fence shall be removed upon final stabilization of the site. After construction is complete and the site is fully stabilized, stormwater facility maintenance will be coordinated with the City of Torrington's and the Town of Harwinton's site stormwater preventive maintenance and pollution prevention practices and any applicable regulatory requirements.

6.0 Plan Implementation

The site plans and specifications include requirements for protection and restoration of the land, and for installation and maintenance of appropriate E&S controls in conformance with applicable Federal, State and local requirements. The site plans also require that all work be performed in accordance with the Guidelines.

The Contractors for the various construction Contracts will be responsible for implementing the SWPCP, or Erosion and Sediment Control Plan, including installation, maintenance and inspection of all E&S control measures. The Contractors will also be responsible for notifying all other parties engaged in construction on the site of the requirements and objectives of the SWPCP.

6.1 PLAN CERTIFICATIONS

As required by Section 5(b)(7) of the Construction SW GP, this Plan includes the requisite signed certification statement by the permittee (City of Torrington). Registrant certifications by both the registrant (City of Torrington) and by the preparer and the Professional Engineer (licensed in the State of Connecticut) design certification will be and submitted to the CTDEEP with the registration forms. These completed certifications are included in **Appendix G**.

6.2 CONTRACTOR CERTIFICATIONS

Appendix H includes a blank table for listing the pertinent information regarding the names of Contractors and Subcontractors for each construction Contract that will perform construction activities on the site that have the potential to cause pollution of waters of the State. The list of Contractors and Subcontractors will be updated and maintained in this appendix if there are any changes, additions or deletions. Each Contractor and Subcontractor shall sign the certification statement in **Appendix I**. The completed Contractor and Subcontractor signed certifications will be maintained in this appendix.

6.3 PLAN AMENDMENTS

This plan may be modified or updated as necessary to comply with any updates to any E&S Guidelines or to the CTDEEP Construction SW GP. The Plan shall also be amended whenever there is a change in Contractors or Subcontractors, or a change in design, construction, operation or maintenance at the site which has the potential for the discharge of pollutants to waters of the State and which has not otherwise been addressed in the Plan, or if the actions required by the Plan fail to prevent pollution. If substantial engineered design changes are made, the Plan shall be updated and an updated P.E. certification completed.

6.4 RECORDKEEPING AND REPORTING

Copies of the Plan and all (inspection) reports required by the Construction SW GP and records of all data shall be retained for a period of at least five (5) years from the date that construction at the site is completed. An updated copy of this Plan shall be retained at the construction site at all times from the date construction is initiated until the date construction is completed.

Upon learning of a violation of a condition of the Construction SW GP, actions must be taken immediately to determine the cause, to correct and mitigate the results of such violation, and to prevent further violation. A report must be made in writing to the Commissioner of CTDEEP within five (5) days of learning of the violation describing the nature of the violation and any corrective measures undertaken. The Contractor responsible for the work activity that caused the violation will be responsible for investigating the violation, implementing appropriate corrective measures, and completing the written report. Any report submitted to the CTDEEP must be certified in accordance with Section 6.4.3 below.

6.4.1 Stormwater Monitoring Reports (SMRs)

Within 30 days of the end of the month, the Contractor shall enter the stormwater sampling results on the CTDEEP's Stormwater Monitoring Report (SMR) form and submit it to CTDEEP. A blank SMR form is included in **Appendix J**.

Hardcopies of the SMRs should be submitted to the following address:

Bureau of Materials Management and Compliance Assurance
Water Permitting and Enforcement Division (Attn: DMR Processing)
Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

NetDMR (an electronic filing system) must be used starting 180 days after the issuance of the Construction SW GP, unless the permittee has opted out of NetDMR (refer to Section 5(c)(2)(F)(i)(c) of the Construction SW GP).

Reporting requirements and considerations also include:

- If there was no discharge during a given monitoring period, the permittee shall submit the SMR as required with the words "no discharge" entered in place of monitoring results.
- If monitoring for any discharge is conducted more frequently than what is required by the Construction SW GP, the results of this monitoring must also be included on a separate SMR to be submitted to CTDEEP.
- If sampling protocols are modified due to limitations of normal working hours or due to unsafe field conditions, a description of and the reason for the modifications will be included in the SMR.
- If a discharge sampled is considered representative of two (2) or more substantially identical discharge points, the names or locations of the other discharge points shall be included on the SMR.
- The SMR shall include all of the prescribed information on the form and be signed by the authorized official (e.g., the Contractor's designated representative).

6.4.2 Notice of Termination

At the completion of the construction project, a Notice of Termination Form must be filed with the Commissioner of CTDEEP. The project is considered complete after the site has been stabilized for at least three (3) months following completion of construction activities. No active erosion or sedimentation, and no disturbed areas can be present. Once the site has been stabilized for at least three (3) months, the site must be inspected by a qualified inspector to confirm final stabilization (called "final inspection").

Once all post-construction stormwater measures have been installed and cleaned of any construction sediment or debris, the registrant shall have the site inspected to confirm compliance with the post-construction stormwater measures (called the "post-construction inspection"). This inspection must be conducted by either a representative of the local Conservation District (Northwest Conservation District), or by a qualified soil erosion and sediment control professional

and/or by a qualified professional engineer, as appropriate, as defined in the Construction SW GP. This inspector shall not be an employee of the permittee and shall have no ownership interest of any kind in the project.

Appendix K _ includes a copy of the Notice of Termination Form. This form must be fully completed including the date that all storm drainage structures were cleaned of construction debris, the date of completion of construction, the date of the post-construction inspection, and the date of the final inspections. The form must also be signed by the permittee (City of Torrington) and by the person certifying the post-construction inspection. The form shall be submitted to the following address:

Central Permits Processing Unit
Bureau of Materials Management and Compliance Assurance
Connecticut Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

6.4.3 Certification of Documents

Any document or report submitted to the Commissioner of CTDEEP under this General Permit shall be signed by the permittee (the City of Torrington), or a duly authorized representative of the permittee, *and* by the individual or individuals responsible for actually preparing such document (e.g., the Contractor), each of whom shall sign the certification statement included in **Appendix L**.

APPENDIX A: USGS SITE LOCATION MAP AND TOWN OF HARWINTON ZONING MAP

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WPCF Location
Torrington, CT

PROJ NO:	DATE:
13164D	6/22/2017

WRIGHT-PIERCE
Engineering a Better Environment

FIGURE:
1

Parcel Map
Torrington, CT

PROJ NO:	DATE:
13164D	5/31/2017

WRIGHT-PIERCE
Engineering a Better Environment

FIGURE: 2

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APPENDIX B: SELECT SITE PLANS

(Under Separate Cover)

APPENDIX C: JUNE 2015 WETLANDS REPORT

SOIL SCIENCE AND ENVIRONMENTAL SERVICES, INC.

Wetland Delineations Ecological Studies Site Assessments Project Planning Soil Testing

June 2, 2015

ATTN: Rafael Martinez
Martinez Couch & Associates, LLC
1084 Cromwell Avenue
Rocky Hill, CT 06067

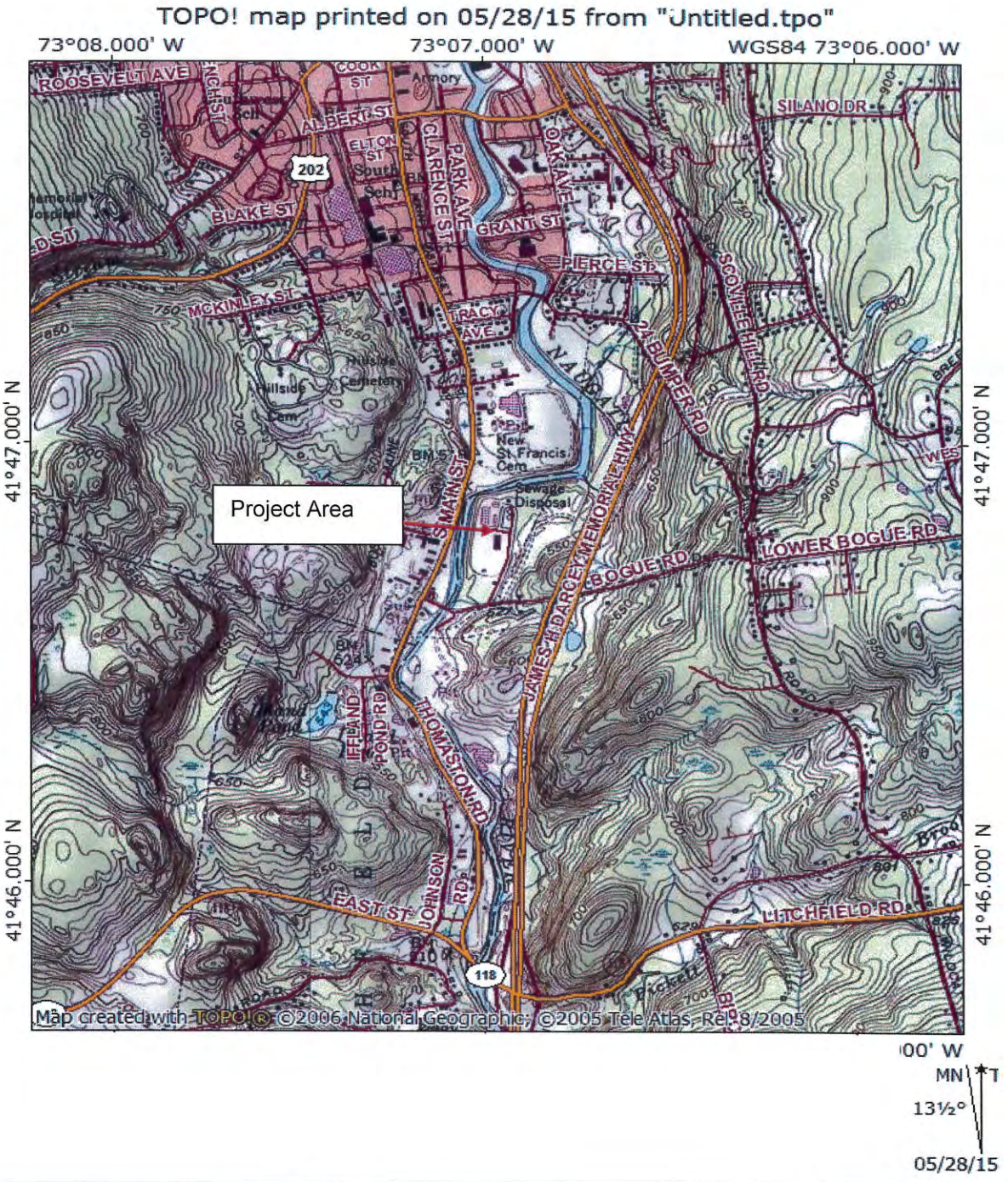
Re: <u>Wetlands Delineation Report</u>
Torrington Water Pollution Control Facility, 252 Bogue Road, Harwinton, CT

Dear Mr. Martinez:

In accordance with your request, Scott D. Stevens, Soil Scientist and Jennifer L. Beno, Biologist/Wetland Scientist, with Soil Science And Environmental Services, Inc. (SSES) inspected the ± 17 acre Torrington Water Pollution Control Facility project area on May 7, 2015. The purpose of the inspection was to identify regulated wetlands and watercourses within the project area.

The project area is located in the northwest portion of the Town of Harwinton within a commercially developed area east of the Naugatuck River (Figure 1). The project area consists of the Torrington Water Pollution Control Facility and the area immediately adjacent to the facility.

Regulated wetlands and watercourses are present in and near the project area, including CT Inland Wetlands, Federal Wetlands, intermittent watercourses and the Naugatuck River. Definitions of waters and wetlands that are regulated by the State of Connecticut and Federal Government are presented in Appendix I. Rivers and streams are regulated by the State of CT as watercourses according to the Inland Wetlands and Watercourses Act. Rivers and streams are regulated by the Federal Government as "Waters of the U.S." Wetlands are defined differently by the State of CT and the Federal Government. CT Inland Wetlands are defined by soil types that are either poorly drained, very poorly drained, floodplain or alluvial. Federal Wetlands consist of areas that are inundated or saturated by ground or surface water at a frequency and duration sufficient to support, and that under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.



SOIL SCIENCE and ENVIRONMENTAL SERVICES, INC.	U.S.G.S. Topography Map Torrington Water Pollution Control Facility off of Bogue Road, Harwinton, CT	Date 5/28/15 Figure No. 1

A spade and auger were used to dig test holes for soils identification during the investigation. The vegetation communities and any physical indicators of hydrology on the site were also examined. The limits of the CT Inland Wetlands and the Federal Wetlands were determined to differ within the limits of the project area. The CT Inland Wetland boundaries were delineated with consecutively numbered orange survey tapes, while Federal Wetland boundaries were delineated with consecutively numbered blue survey tapes. Sketch maps of the delineated wetland boundaries are included as Figures 2 and 3.

CONNECTICUT INLAND WETLANDS & SOIL TYPES

CT inland wetlands were delineated within the project area. See Figure 2. The wetland soils within the project area include:

Aq Aquents - This is a poorly to very poorly drained, disturbed soil where two or more feet of the original soil surface has been altered by filling, excavation and/or grading. Aquents are characterized by a seasonal to prolonged high groundwater table at or near the ground surface. Aquents are capable of supporting a prevalence of hydrophytic plants.

13 Walpole sandy loam (Aeric Endoaquepts)- This is a deep, poorly drained, friable, coarse-loamy textured soil that developed over sandy and gravelly, glacial outwash. Outwash soils occur in valleys, outwash plains and terraces.

101 Occum fine sandy loam (Fluventic Dystrudepts) – This is a deep, well drained, friable, coarse-loamy textured soil that formed in alluvial sediments principally derived from schist, gneiss and granite. Occum soils occur in nearly level floodplains which are subject to occasional flooding.

102 Pootatuck fine sandy loam (Fluvaqentic Dystrudepts) – This is a deep, moderately well drained, friable, coarse-loamy textured soil that formed in alluvial sediments principally derived from schist, gneiss and granite. Pootatuck soils occur in nearly level floodplains and along rivers and streams which are subject to frequent flooding. The Pootatuck soil was formerly mapped in Connecticut as the Podunk fine sandy loam.

109 Fluvaquents-Udifluvents This soil map unit consists of well drained to very poorly drained, nearly level soils that formed in very recent alluvium deposited by rivers and streams. The soils are occasionally to frequently flooded, which often results in stream scouring, lateral erosion and shifting of soil from place to place. Soil characteristics, such as texture and stoniness, are usually highly variable within short distances.

The non-wetland soils within the project area include:

306 Udorthents-Urban land complex This map unit consists of extensive areas where soils have been disturbed from land development along with large areas of impervious surfaces associated with streets, parking lots, buildings and other structures.

307 Urban land This map unit consists of land which is mostly covered with streets, parking lots, buildings and other structures. Generally, more than 75% of the map unit consists of impervious

surface.

308 Udorthents, smoothed This is a well drained to moderately well drained soil area that has had two or more feet of the original soil surface altered by filling, excavation or grading activities. Udorthents, smoothed soils commonly occur on leveled land and fill landforms.

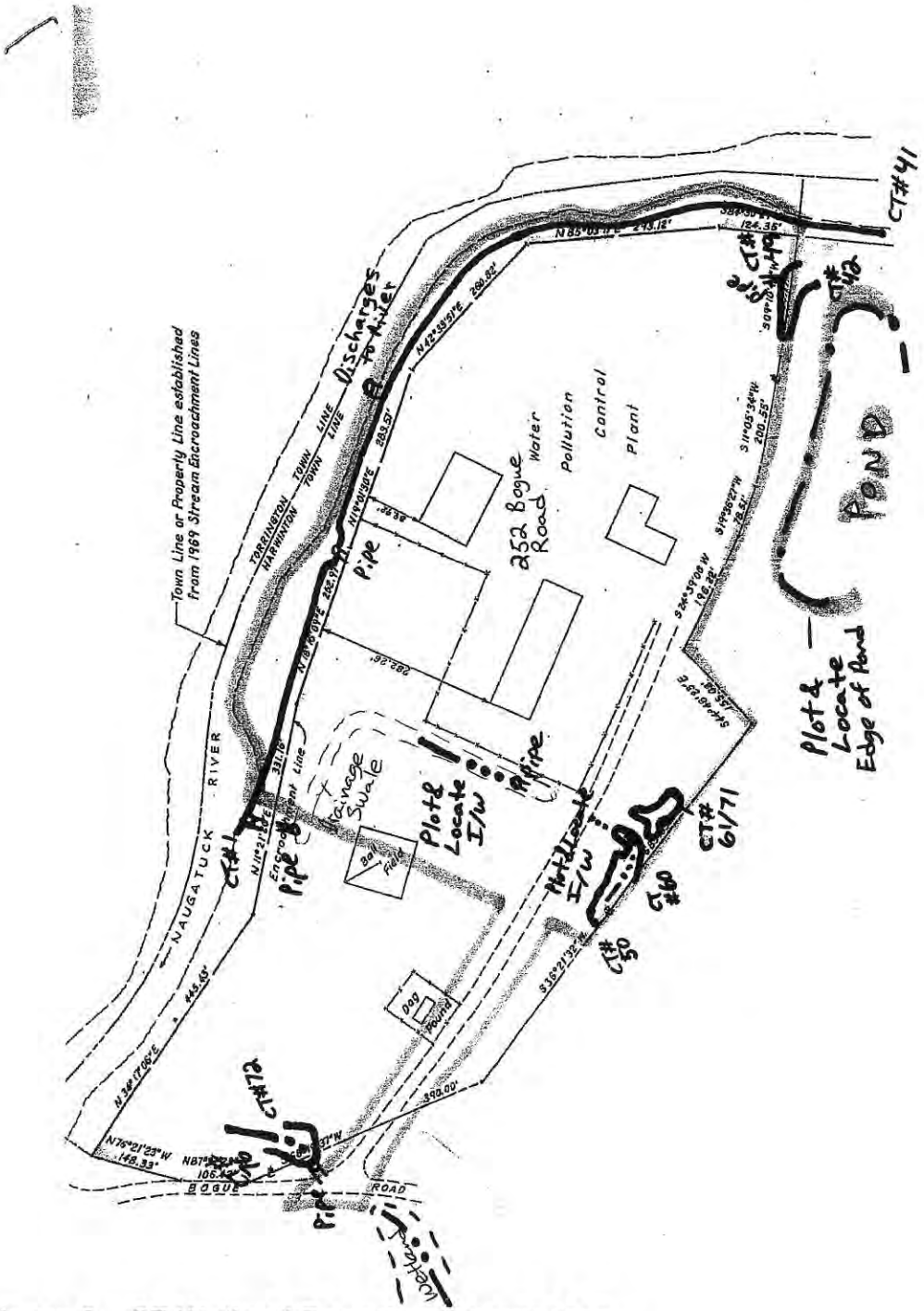


Figure 2 – CT Wetland Boundary Sketch Map

FEDERAL WETLANDS

Federal wetlands were delineated within the project area. The Federal wetland boundary differs from the CT wetland boundary. See Figure 3. The Federal wetlands consist of a complex of forested swamp and shallow marsh communities. One transect with two Federal Wetland Data Plots was established. The transect is located within the shallow marsh complex along the eastern property boundary (Data Plot 203-W and 203-U). The approximate location of the transect and data plots are shown in Figure 3. The information gathered from each data plot was recorded on Federal Wetland Data Sheets. These sheets are included with this report.

Federal data transect 203-U and 203-W (5/7/15).

Respectfully submitted,

SOIL SCIENCE AND ENVIRONMENTAL SERVICES, INC.

Scott D. Stevens
Registered Professional Soil Scientist

Jennifer L. Beno
Biologist/Wetland Scientist

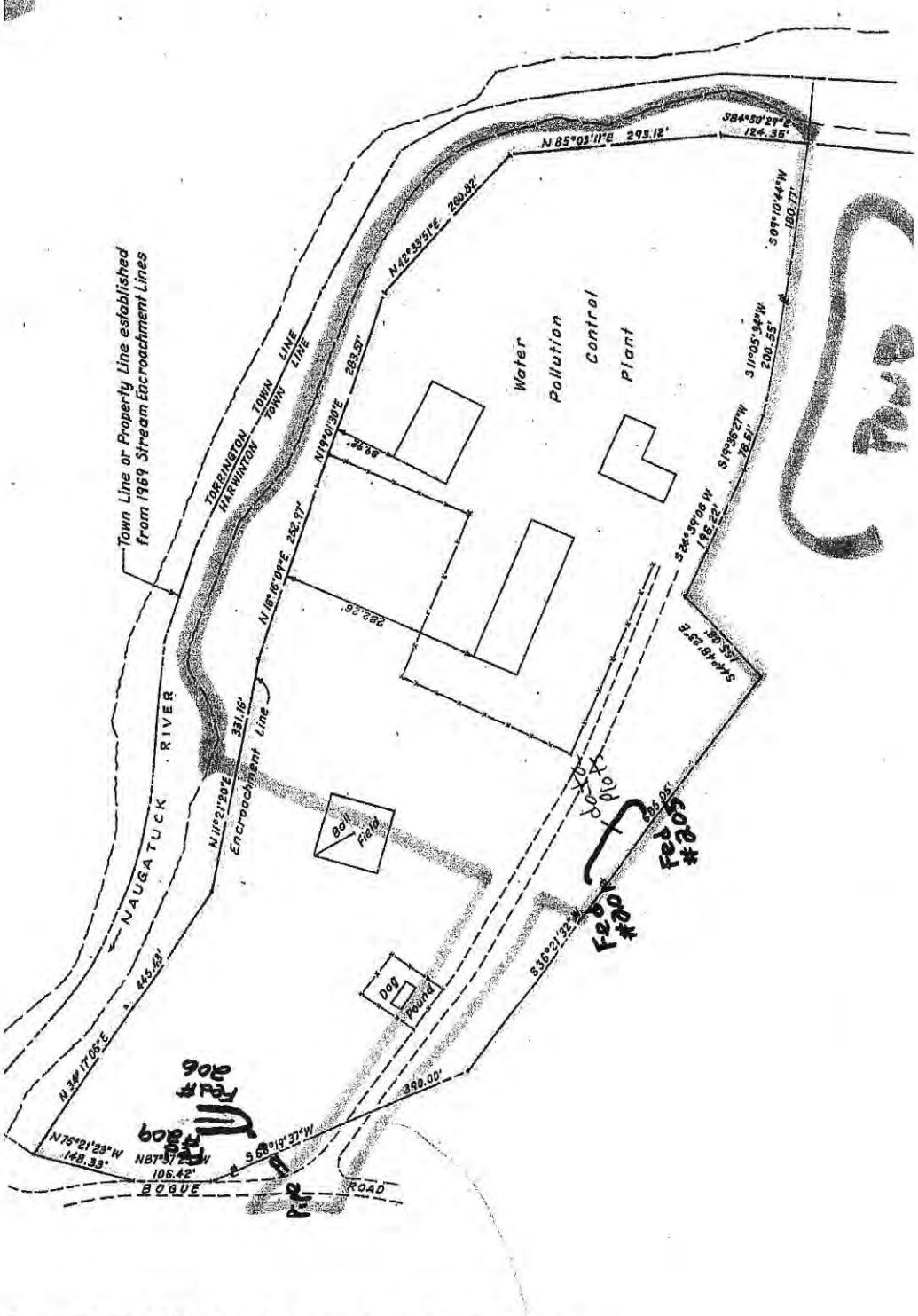


Figure 3 – Federal Wetland Boundary Sketch Map

APPENDIX I
REGULATED WATERS AND WETLANDS BY THE STATE OF CT AND FEDERAL GOVERNMENT

I. State of Connecticut

Wetlands and watercourses are regulated in the State of Connecticut by the Connecticut General Statutes, Chapter 440, section 22a-28 to 22a-45. These Statutes are divided into the Inland Wetlands and Watercourses Act (sections 22a-36 to 22a-45) and the Tidal Wetlands Act (sections 22a-28 to 22a-35). Definitions of the resources are provided in the statutes.

Inland Wetlands, "means land, including submerged land, not regulated pursuant to sections 22a-28 to 22a-35, inclusive, which consist of any of the soil types designated as poorly drained, very poorly drained, alluvial, and floodplain by the National Cooperative Soils Survey, as may be amended from time to time, of the Natural Resources Conservation Service of the United States Department of Agriculture" section 22a-38(15).

Watercourses "means rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, vernal or intermittent, public or private which are contained within, flow through or border upon this state or any portion thereof, not regulated pursuant to sections 22a-28 to 22a-35, inclusive. Intermittent watercourses shall be delineated by a defined permanent channel and bank and the occurrence of two or more of the following characteristics: (A) Evidence of scour or deposits of alluvium or detritus, (B) the presence of standing or flowing water for a duration longer than a particular storm incident, and (C) the presence of hydrophytic vegetation" section 22a-38(16).

Tidal Wetlands are defined as "those areas which border on or lie beneath tidal waters, such as, but not limited to banks, bogs, salt marsh, swamps, meadows, flats, or other low lands subject to tidal action, including those areas now or formerly connected to tidal waters, and whose surface is at or below an elevation of one foot above local extreme high water; and upon which may grow or be capable of growing some but not necessarily all, of the following:" (includes plant list) section 22a-29(2).

II. Federal Government

The Federal Government regulates waters and wetlands in accordance with the Code of Federal Regulations, Title 33, Parts 320 through 330 (33 CFR parts 320 to 330). Regulated areas include navigable waters; interstate waters; tributaries to navigable and interstate waters, including adjacent wetlands; and certain other waters and wetlands of the U.S. The United States Army Corps of Engineers has been authorized to regulate these waters and wetlands by Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. Definitions of wetlands and watercourses that are regulated by the Corps are found in Parts 328 and 329 of the Code.

Waters of the United States as defined in Part 328 means, " (1) all waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (2) all interstate waters including interstate wetlands; (3) all other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce; (4) all impoundments of waters otherwise defined as waters of the U.S. under the definition; (5) tributaries of waters indentified in 1 thru 4; (6) territorial seas; and (7) wetlands adjacent to waters that were identified in 1 thru 6. Waters of the United States do not include prior converted cropland" (33 CFR Part 328.3 (a)).

Wetlands are a subset of waters of the United States and are defined as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33CFR Part 328.3(b)). The 1987 U.S. Corps of Engineers Delineation Manual and the Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (dated July 2008) provide information and procedures for conducting Federal Wetland delineation. The methodology established by the Federal Government uses a three parameter approach utilizing hydrologic indicators, hydrophytic vegetation and hydric soils for identifying Federal Wetlands.

Navigable waters of the United States as defined in Part 329 mean "those waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce" (33CFR Part 329.2).

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Torrington Water Pollution Control Facility City/County: Harwinton / Litchfield Sampling Date: May 7, 2015

Applicant/Owner: Torrington Water Pollution Control Facility State: CT Sampling Point: 203-U

Investigator(s): Scott Stevens + John Bono - SSES Section, Township, Range: _____

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 10

Subregion (LRR or MLRA): LRR Lat: ± 41°46'43.64" Long: ± -73°06'55.03" Datum: _____

Soil Map Unit Name: Ninigret + Tisbury / Udorthents Complex NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil ✓, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: 203-U

Tree Stratum (Plot size: ±30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus strobus	60	Y	FACU
2. Acer rubrum	10	N	FAC
3. Quercus rubra	10	N	FACU
4.			
5.			
6.			
7.			
	80%	= Total Cover	

Sapling/Shrub Stratum (Plot size: ±15')			
1. Alnus serrulata	20	Y	FACW
2. Lonicera tatarica	20	Y	FACU
3. Prunus serotina	10	N	FACU
4.			
5.			
6.			
7.			
	50%	= Total Cover	

Herb Stratum (Plot size: ±5')			
1. Lonicera tatarica	10	Y	FACU
2. Solidago canadensis	10	Y	FACU
3. Toxicodendron radicans	5	N	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	25%	= Total Cover	

Woody Vine Stratum (Plot size: ± 30')			
1. Toxicodendron radicans	10	Y	FAC
2. Vitis labrusca	10	Y	FACU
3.			
4.			
	20%	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 28% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 203-U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2						fine sandy loam	
8-18	10YR 3/3						gravelly loamy sand with asphalt	
18-24	10YR 3/3						gravelly loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Torrington Water Pollution Control Facility City/County: Harwinton / Litchfield Sampling Date: May 7, 2015

Applicant/Owner: Torrington Water Pollution Control Facility State: CT Sampling Point: 203-W

Investigator(s): Scott Stevens + Jenn Bono - SSES Section, Township, Range: _____

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 10

Subregion (LRR or MLRA): LRR Lat: ±41°46'43.100" Long: -73°06'54.92" Datum: _____

Soil Map Unit Name: Aquents NWI classification: PEMAE

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil ✓, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

Data Plot 203-W appears to be located in an excavated basin area alongside a dirt roadway.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes ✓	No _____	Depth (inches): ±13
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): ±8

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: 203-W

Tree Stratum (Plot size: ±30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	20	Y	FAC
2. Pinus strobus	20	Y	FACU
3. Populus deltoides	20	Y	FAC
4.			
5.			
6.			
7.			
	60%	= Total Cover	

Sapling/Shrub Stratum (Plot size: ±15')			
1. Alnus serrulata	20	Y	FACW
2. Populus deltoides	10	N	FAC
3. Spiraea tomentosa	10	N	FACW
4.			
5.			
6.			
7.			
	40%	= Total Cover	

Herb Stratum (Plot size: ±5')			
1. Typha latifolia	25	Y	OBL
2. Phragmites australis	10	N	FACW
3. Equisetum arvense	10	N	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	45%	= Total Cover	

Woody Vine Stratum (Plot size: ±30')			
1.			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- ✓ 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: 203-W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 2/1						Silt Loam	with wood chips
18-40	10YR 2/1						Silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ✓ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR R, MLRA 149B)**
- ___ Polyvalue Below Surface (S8) **(LRR R, MLRA 149B)**
- ___ Thin Dark Surface (S9) **(LRR R, MLRA 149B)**
- ___ Loamy Mucky Mineral (F1) **(LRR K, L)**
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) **(LRR K, L, MLRA 149B)**
- ___ Coast Prairie Redox (A16) **(LRR K, L, R)**
- ___ 5 cm Mucky Peat or Peat (S3) **(LRR K, L, R)**
- ___ Dark Surface (S7) **(LRR K, L)**
- ___ Polyvalue Below Surface (S8) **(LRR K, L)**
- ___ Thin Dark Surface (S9) **(LRR K, L)**
- ___ Iron-Manganese Masses (F12) **(LRR K, L, R)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149B)**
- ___ Mesic Spodic (TA6) **(MLRA 144A, 145, 149B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

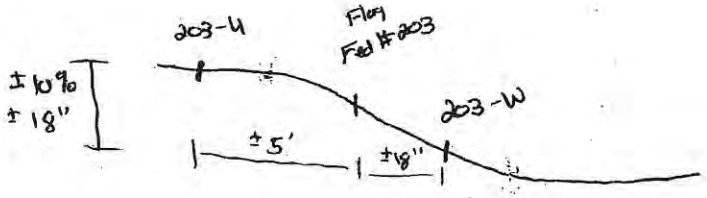
Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ____

Remarks:



APPENDIX D: SELECT PROJECT SPECIFICATIONS

- **Section 01562 - Dust Control**
- **Section 02110 – Clearing and Grubbing**
- **Section 02115 – Stripping and Stockpiling Topsoil**
- **Section 02200 – Earthwork**
- **Section 02260 - Filter Fabric**
- **Section 02270 – Temporary Erosion Control**
- **Section 02270 – Riprap and Stone Ditch Protection**
- **Section 02401 – Dewatering**
- **Section 02485 – Loaming & Seeding**

SECTION 01562

DUST CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Furnish and apply water on the road surfaces within the construction site, when required to control dust and when directed by the Engineer.
2. When dust control is not included as a separate item in the Contract, the work shall be considered incidental to the appropriate items of the Contract.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Water for Sprinkling:

1. Clean, free of salt, oil, and other injurious matter.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Water:

1. Apply water by methods approved by the Engineer.
2. Use approved equipment including a tank with gauge equipped pump and spray bar.

END OF SECTION

SECTION 02110

CLEARING AND GRUBBING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Clearing includes, but is not limited to, removal of trees, brush, stumps, wooded growth, grass, shrubs, poles, posts, signs, fences, culverts and other vegetation and minor structures; the protection of designated wooded growth; the storage and protection of minor structures and materials which are to be replaced; and the disposal of nonsalvageable structures and materials, and necessary preliminary grading.

B. Limits of Work:
   1. Perform clearing and grubbing work within the areas required for construction, or as shown on the Drawings, to a depth of l2 inches below the existing grade.
   2. Perform additional clearing and grubbing work within areas and to depths which, in the opinion of the Engineer, interfere with excavation and/or construction, or are otherwise objectionable.

C. Work Not Included:
   1. Clearing and grubbing work performed for the convenience of the Contractor will not be considered for payment.

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:
   1. Dispose of combustible material by burning only when permitted by and in accordance with all applicable local and state laws, ordinances and code requirements.

B. Remove and dispose of nonsalvageable structures and material in accordance with all applicable local and state laws, ordinances and code requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide all materials required to complete the work.

B. All timber and wood shall become the property of the Contractor unless other agreements are made between the Owner and the Contractor.

C. Repair any damage to structures to the complete satisfaction of the Owner and Engineer.

PART 3 - EXECUTION

3.1 PREPARATION

A. Carefully preserve and protect from injury all trees and/or shrubs not to be removed.

B. Right-of-way:

1. Where excavation is required on public or private rights-of-way containing trees, shrubs, other growth, or any structure or construction, obtain the Engineer's direction concerning the extent to which such obstacles can be cleared or stripped prior to performing the Work.
2. In all rights-of-way, remove only those particular growths or structures which are, in the opinion of the Engineer, essential for construction operations.
3. All other removals or damage shall be replaced or restored at the Contractor's expense.

3.2 PERFORMANCE

A. Clearing:

1. Remove and dispose of all trees, brush, slash, stubs, bushes, shrubs, plants, debris and obstructions within the area to be cleared, except any areas that may be designated as "Selective Clearing", and except as otherwise shown on the Drawings or as directed by the Engineer.
2. Remove all stumps unless otherwise directed by the Engineer.
3. Dispose of material to be removed daily as it accumulates.
4. Take special care to completely dispose of all elm trees and branches immediately after cutting either by burial in approved locations or, when permitted, by burning in areas well removed from standing elm growth.

B. Protection of Wooded Growth:

1. Fell trees toward the center of the area being cleared to protect trees and shrubs to be left standing.
2. Cut up, remove and dispose of trees unavoidably falling outside the area to be cleared.
3. Employ skilled workmen or tree surgeons to trim and repair all trees that are damaged but are to be left standing.

C. Selective Clearing:

1. When shown on the Drawings and when directed by the Engineer, perform selective clearing work to preserve natural tree cover.
2. Perform selective clearing work only under the direction and supervision of the Engineer.
3. Remove all dead and uprooted trees, brush, roots and other material which, in the opinion of the Engineer, are objectionable.
4. Cut flush with the ground and remove only those trees indicated by the Engineer.
5. Employ skilled workmen or tree surgeons to carefully trim all branches requiring cutting on trees to be left standing. Wood exposed as the result of removal of branches is to be left exposed to air and sunlight.
6. Bituminous paint shall not be used on wood exposed as a result of branch removal, excavation around roots, or damage to tree bark.

D. Grubbing:
   1. Perform grubbing work beneath new roads, driveways, walks, seeded areas and other areas and as directed by the Engineer.
   2. Grub out all sod, vegetation and other objectionable material to a minimum depth of l2 inches below the existing grade.
   3. Completely remove all stumps, including major root systems.

E. Disposal:
   1. Remove from the site and dispose of material not being burned.
   2. Provide an approved disposal area unless otherwise specified.

F. Burning:
   1. Dispose of combustible materials by burning, only if approved by local and state officials.
   2. Employ competent workmen to perform burning work in such a manner and at such locations that adjacent properties, trees and growth to remain, overhead cables, wires and utilities will not be jeopardized.
   3. Do not leave fires unguarded.
   4. Do not burn poison oak, poison ivy or other plants of similar nature.
   5. Do not use tires or other combustible waste material to augment burning.
   6. Burn combustible materials daily as the work progresses.
   7. The Contractor shall be responsible for all damage caused by burning and shall be responsible for obtaining all necessary permits for burning.

3.3 REPLACEMENT OF MATERIALS

A. Paving, Curbing and Miscellaneous Material:
   1. Remove all paving, subpaving, curbing, gutters, brick, paving block, granite curbing, flagging and minor structures that are over the area to be filled or excavated.
   2. Remove and replace bituminous asphaltic and portland cement concrete in accordance with the appropriate sections of these Specifications.
   3. Properly store and preserve all material to be replaced in a location approved by the Engineer.

B. Shrubs and Bushes:
   1. Remove, store, and replace ornamental shrubs and bushes to be preserved in accordance with accepted horticultural practices.

C. Topsoil:
   1. When applicable, carefully remove, store, and protect topsoil in accordance with the appropriate section of this division.

D. Responsibility:
   1. Replace, at no additional cost to the Owner, materials lost or damaged because of careless removal or neglectful or wasteful storage, disposal or use of these materials.

END OF SECTION

SECTION 02115

STRIPPING AND STOCKPILING TOPSOIL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Segregate topsoil approved by the Engineer prior to excavation, trenching and grading operations and stockpile it for use in the work.

B. Related Work Specified Elsewhere (When Applicable):
   1. Demolition, clearing, grading, embankment, excavation and landscaping are specified in the appropriate sections in this division.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil shall consist of friable loam of at least two percent decayed organic matter (humus), free of subsoil, and reasonably free of clay lumps, brush, roots, weeds, and other objectionable vegetation, stones and similar objects larger than one (1) inch in any dimension, litter and other materials unsuitable or harmful to plant growth. It shall contain no toxic materials.

B. The quality of the topsoil material to be used shall be subject to approval by the Engineer.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Remove topsoil from the areas that are likely to be disturbed as a result of construction operations to a depth based on the soil profile, as approved by the Engineer.

B. Remove topsoil from all designated areas prior to the performance of normal excavation.

3.2 STORAGE

A. Transport topsoil and deposit in storage piles convenient to the areas which are subsequently to receive the application of topsoil.

B. Stockpile topsoil separate from other excavated materials in areas approved by the Engineer.

C. Take all necessary precautions to prevent other excavated material and objectionable material from becoming intermixed with the topsoil before, during and after stripping and stockpiling operations.

D. Neatly trim and grade stockpiles to provide drainage from surfaces and to prevent depressions where water may become impounded.

E. Construct temporary erosion control devices for all stockpiled material, subject to the Engineer's approval.

F. All loam stripped and stockpiled shall be immediately seeded with 70% Domestic/30% Perennial Rye Grass.

END OF SECTION

SECTION 02200

EARTHWORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. The Work described by this Section consists of all earthwork encountered and necessary for construction of the project as indicated in the Contract Documents, and includes but is not limited to the following:
   1. Excavation
   2. Backfilling and Filling
   3. Compaction
   4. Grading
   5. Providing soil material and related materials as necessary
   6. Disposal of excess suitable material and unsuitable materials

B. Related Work Specified Elsewhere:
   1. Clearing and Grubbing, Filter Fabric, Temporary Erosion Control, Stripping and Stockpiling of Topsoil, Dewatering, Sheeting, Loaming and Seeding, and Paving are specified in the appropriate sections of this Division.
   2. Section 01450 - Quality Control.

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:
   1. All work shall be performed and completed in accordance with all local, state and federal regulations.
   2. The General Contractor shall secure all other necessary permits unless otherwise indicated from, and furnish proof of acceptance by, the municipal and state departments having jurisdiction and shall pay for all such permits, except as specifically stated elsewhere in the Contract Documents.

B. Line and Grade:
   1. The Contractor shall establish the lines and grades in conformity with the Drawings and maintain same to properly perform the work.

C. Testing Methods:
   1. Gradation Analysis: Where a gradation is specified the testing shall be in accordance with ASTM D-422-72 (or latest revision).
   2. Compaction Control:
      a) Unless otherwise indicated, wherever a percentage of compaction for backfill is indicated or specified, it shall be the in-place density divided by the maximum density and multiplied by 100. The maximum density shall be the density at optimum moisture as determined by ASTM Standard Methods of Test for Moisture-Density Relations of Soil Using 10-lb. Hammer and 18-in. Drop, Designation D-1557-78 (Modified Proctor), or latest revision, unless otherwise indicated.
      b) The in-place density shall be determined in accordance with ASTM Standard Method of Test for Density of Soil in Place by the Sand Cone

method, Designation D 1556-82, (or latest revision) or Nuclear method Designation D2922.

c) Wherever specifically indicated, maximum density at optimum moisture may be determined by ASTM Standard Methods of Test for Moisture Density Relations of Soils, ASTM D-698-78 (Standard Proctor).

d) An Independent Testing Laboratory will be retained by the Owner to conduct all laboratory and field soil sampling and testing, and to observe earth work and foundation construction activities. Laboratory testing will consist of sieve analyses, natural water content determinations, and compaction tests. Field testing will consist of field unit weight tests and determination of water contents.

1.3 SUBMITTALS

A. Collection of samples and testing of all materials for submittals shall be performed by the Independent Testing Laboratory and paid for by the Contractor until the submitted materials conform to the specifications as determined by the Owner or Engineer.

B. Submit test results for materials specified in this section.

C. Submit test results (including gradation analysis) and source location for all aggregate and all borrow material to be used at least 10 working days prior to its use on the site. Contractor shall identify and provide access to borrow sites.

D. Submit moisture density curve indicating the maximum density range for each type of aggregate or soil (on site or off site borrow material) to be used for embankment construction or fill beneath structures or pavement.

1.4 TESTS

The Independent Testing Laboratory shall conform to the following procedures and standards:

A. Submit test results in accordance with the procedure specified in the General and Supplementary Conditions.

B. All testing shall be performed by a qualified Independent Testing Laboratory acceptable to the Engineer and Contractor at the Owner's expense unless otherwise indicated (see Section 01450 - Quality Control).

C. Field density tests on soil materials shall be as follows:

1. Embankment Material:
   a. Tests shall be taken, as a minimum, on every 200 cubic yards of embankment material or as determined by the Engineer. In order to determine the optimum rates content, maximum allowable lift, and numbers of equipment passes required, one test section shall be constructural and thoroughly tested.
2. Trenches and Sewer Structures:
   a. Average of one test in initial backfill (screened stone shall also be compacted), and in each lift of the backfill and one test in the aggregate base course between each manhole for sewers.
   b. Average of one test for each 200 linear feet of gravity sewer and water main.

3. Once the degree of compaction effort (number of passes) is established for each type of soil material used in the backfill process and the Contractor has consistently achieved the degree of compaction required, the Owner or Engineer may elect to reduce the testing level, providing the compaction effort is maintained and the degree of compaction continues to pass intermittent lift testing.
4. The level of testing by the Owner does not relieve the Contractor from providing compacted backfill that meets the specification or from repairing any settlement that occurs during the one year warranty period. The Contractor may choose to do additional testing for his process control to monitor compaction levels at no additional cost to the owner.
5. If any test results indicate the Contractor's compaction effort failed to meet the requirements of these specifications, the Contractor shall undertake whatever action is necessary, at no additional cost to the Owner, to obtain the required compaction. The cost of retesting failed areas will be the responsibility of the Contractor, but will initially be paid by Owner to the testing agency. The cost of retesting will be determined by Engineer and Owner will invoice Contractor for this cost. If unpaid after 60 days, the invoice amount for retesting will be deducted from the Contract Price. No allowance will be considered for delays in the performance of the work.
6. In addition to the above tests the Independent Testing Laboratory will perform additional density tests at locations and times requested by the Engineer if the Engineer is not satisfied with the apparent results of the Contractor's compaction operation. If the testing indicates "under compaction" then Item 4 above, applies. If the test results pass and meet the requirements of these Specifications, the cost of the testing service will be borne by the Owner, but no allowance will be considered for delays in the performance of the work.

D. Paved Areas and Building Slab Subgrade: Make at least on field density test of subgrade for every 2,000 sq. ft. of paved area or building slab, but in no case less than 3 tests. In each compacted fill layer, make one field density test for every 2,000 sq. ft. of overlaying building slab or paved area, but in no case less than 3 tests.
E. Foundation Wall Backfill: Take at least one (1) field density test per lift per wall at locations and elevations as designated by the Engineer.
F. In addition to the above tests the Independent Testing Laboratory will perform additional density tests at locations and times requested by the Engineer.

1.5 JOB CONDITIONS

A. Site Information:
1. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that Owner and Engineer will not be responsible for interpretations or conclusions drawn therefrom by the Contractor. Data are made available for the convenience of Contractor.
2. Additional test borings and other exploratory operations may be made by Contractor at no additional cost to Owner.

B. Existing Utilities and Structures:
   1. The locations of utilities and structures shown on the Drawings are approximate as determined from physical evidence on or above the surface of the ground and from information supplied by the utilities. The Engineer in no way warranties that these locations are correct. It shall be the responsibility of the Contractor to determine the actual locations of any utilities or structures within the project area. The Contractor shall contact "Call Before You Dig" and/or all utilities for accurate location of buried utilities and take all precautions to avoid disturbing them

PART 2 - PRODUCTS

2.1 SOIL MATERIAL

A. Satisfactory Soil Materials: Shall be defined as those complying with American Association of State Highway and Transportation Officials (AASHTO) M145, soil classification Groups A-1, A-2-4, A-2-5 and A-3.

B. Unsuitable Soil Materials: Shall be those defined in AASHTO A145, soil classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7; also, peat and other highly organic soils.

C. Rolled Bank Gravel Surface: Shall consist of sound, tough, durable particles of bank or crushed gravel. Material shall be free from thin or elongated pieces, lumps of clay, loam, or vegetative matter. Rolled bank gravel surface shall conform to Section M02.03 Grading C and M.02.06 of the STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION, Standard Specifications for Roads, Bridges and Incidental Construction, Supplemented FORM 816 January 2005, and all Addenda and Supplements thereto.

D. Gravel Subbase: Processed gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances, shall be used in the subbase for all paved areas and in the base for concrete walks. Processed gravel shall conform to Section M.02.02 and M.02.06 Grading B of the STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION, Standard Specifications for Roads, Bridges and Incidental Construction, Supplemented FORM 816 January 2005, and all Addenda and Supplements thereto.

E. Base Course: Shall be dense graded crushed stone, consisting of hard durable particles which are free from vegetable matter, lumps or balls of clay and other deleterious substances, shall be used for all paved areas and base for granite curbing. Dense graded crushed stone shall conform to Section M.02.03 and M.05.01-2 and M.05.01-3 of the STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION, Standard Specifications for Roads, Bridges and Incidental Construction, Supplemented FORM 816 January 2005, and all Addenda and Supplements thereto.

F. Common Borrow: Shall consist of approved material required for the construction of the work where designated. Common borrow shall be free from frozen material, perishable rubbish, peat, organic, and other unsuitable material.

Sieve	Percentage by Weight

Designation	Passing Square Mesh Sieves
6-inch	100
No. 200	0-20

Common borrow may be used for embankments unless otherwise indicated and provided that the material is at a moisture content suitable for compaction to the specified density. No rocks shall exceed 3/4 of the depth of the specified lift thickness.

G. Crushed Stone: Shall be a uniform material consisting of clean, hard, and durable particles or fragments, free from vegetable or other objectionable matter, containing angular pieces, as are those which come from a mechanical crusher. Crushed stone shall conform to Section M02.06 grading B, M.02.02-2(a) of the STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION, Standard Specifications for Roads, Bridges and Incidental Construction, Supplemented FORM 816 January 2005, and all Addenda and Supplements thereto.

H. Screened Stone: Shall be a well graded stone consisting of clean, hard, and durable particles or fragments, free from vegetable or other objectionable matter, meeting the following gradation requirements:

Sieve Designation	Percent by Weight Passing Square Mesh Sieve
1 inch	100
3/4 inch	90-100
3/8 inch	20-55
No. 4	0-10
No. 8	0-5

I. Structural Fill/Structure Backfill (Select Fill): Shall consist of well graded granular material free of organic material, loam, wood, trash, snow, ice, frozen soil and other objectionable material and having no rocks with a maximum dimension of over 3.5 inches and meeting the following gradation requirements, except where it is used for pipe bedding in which case the maximum size shall be 2 inches. Shall meet section M.02.05 (structure backfill) of the STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION, Standard Specifications for Roads, Bridges and Incidental Construction, Supplemented FORM 816 January 2005, and all Addenda and Supplements thereto.

J. Sand: Shall be well graded durable material free of organic matter and conform to the following gradation requirements:

Sieve Designation	Percent by Weight Passing Square Mesh Sieve
3/8 inch	100
No. 4	95-100
No. 16	50-85
No. 50	10-30
No.100	2-10
No.200	0-5

Sand conforming to the requirement for fine aggregate in ASTM Standard Specifications for Concrete Aggregate, Designation C-33, will meet the above requirement.

K. Gravel Borrow:

1. Well graded granular material having no rocks with a maximum dimension over 6-inches, except where it is used for pipe bedding in which case the maximum size shall be 2-inches.
2. Free from frozen material and other unsuitable material.
3. That portion passing a three-inch square mesh sieve shall contain not more than 70 percent passing a l/4 inch mesh sieve and not more than l0 percent passing a number 200 mesh sieve when used as pipe bedding material and not more than 5 percent passing a number 200 mesh sieve when used as backfill around structures.

L. Aggregate Leveling Course and Untreated Surface Course: Shall be screened or crushed gravel consisting of hard durable particles which are free from vegetable matter, lumps or balls of clay and other deleterious substances. The gradation of the material shall meet the grading requirements of the following table:

Sieve Designation	Percentage by Weight Passing Square Mesh Sieves
1 inch	95-100
3/4 inch	90-100
No. 4	40-65
No. 10	10-45
No. 200	0-7

M. Impervious Dam Material: The impervious dam material shall be uniform natural or selected cohesive soil with minimum of 30 percent of the material passing a No. 200 sieve. It shall not contain vegetation, masses of roots, individual roots larger than 12 in. long or 1/2 in. in diameter or other porous or organic matter.

2.2 CONCRETE

A. If concrete is required for excess excavation, provide 3,000 psi concrete complying with requirements of Section 03300.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions under which excavating, backfilling, filling, compaction and grading are to be performed and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 EXCAVATION

A. General:
   1. Excavation consists of removal, storage and/or disposal of all material encountered when establishing line and grade elevations required for execution of the work.
   2. The Contractor shall make excavations in such manner and to such widths as will give suitable room for building the structures or laying and jointing the piping; shall furnish and place all sheeting, bracing, and supports; shall do all cofferdamming, pumping, and draining; and shall render the bottom of the excavations firm, dry and acceptable in all respects.
   3. All excavation shall be classified as either earth or ledge.
      a) Earth Excavation shall consist of the removal, hauling, storage for reuse and/or disposal of all earth materials encountered during excavation including but not limited to native soil or fill, pavement (bituminous or concrete), existing sewers and manholes, ashes, loam, clay, swamp muck, debris, soft or disintegrated rock or hard pan which can be removed with a backhoe, or a combination of such materials, and boulders measuring less than **two** cubic yard.
      b) Ledge Excavation: Shall consist of the removal, hauling, storage for reuse and/or disposal of all ledge or rock encountered during excavation. "Ledge" and "rock" shall be defined as any natural or man-made compound or mixture that in the opinion of the Engineer can be removed from its existing position and state only by drilling and blasting, wedging, sledging, boring or breaking up with power operated tools. No boulder, ledge, slab, or other single piece of excavated material less than **two** cubic yard in total volume shall be considered to be rock unless, in the opinion of the Engineer it must be removed from its existing position by one of the methods mentioned above.
   4. The Contractor shall not have any right of property in any materials taken from any excavation. Do not remove any such materials from the construction site without the approval of the Engineer. This provision shall in no way relieve the Contractor of his obligations to remove and dispose of any material determined by the Engineer to be in excess or unsuitable for backfilling. The Contractor shall dispose of unsuitable or excess material at locations in

accordance with all State and local laws and the provisions of the Contract. The District reserves the right to approve of the disposal site and/or to choose a disposal or stockpile site at the Districts discretion. The District has indicated unsuitable excavated material, as determined by the Engineer, and removed pavement shall become the property of the Contractor for his disposal as indicated above. The District retains the right to accept or refuse suitable excess excavation material for stockpiling by the Contractor at site determined by the Owner. The Contractor must obtain the Engineer's approval prior to disposing/reusing of any surplus material off site. The surplus material shall not be placed within wetlands, watercourses, floodplains, or stream channel encroachment lines. In additions, sensitive land use areas such as daycare centers, schools, healthcare facilities, public water supply watersheds etc. should be avoided. The Contractor must provide an approval letter from the owner of the property where the surplus material is to be placed.

a. Unsuitable material: If, in the opinion of the Engineer, the material encountered above the indicated grade, shown on the Drawings, for excavation is unsuitable material, remove and dispose of the material to the widths and depths as directed by the Engineer. Replace this material with suitable excavated native soil from the work, or select fill. It is the responsibility of the Contractor to protect excavated native soil from detrimental effects of over water saturation that would render native soil unsuitable for compacted backfill. The Contractor shall sufficiently investigate the work site to determine if additional backfill would be required and carry the cost for supplying the select backfill in his bid.

B. Additional Excavation: When excavation has reached required subgrade elevations, notify the Engineer and Resident Project Representative who will observe the conditions.

1. If unstable material unsuitable for the support of the structure, paved area or pipeline (in the opinion of the Engineer and as defined in paragraph 2.1.B.) is found at or below the grade to which excavation would normally be carried in accordance with the Drawings and/or Specifications, the Contractor shall remove such material to the required width and depth (typically 12 -inches) and replace it with thoroughly compacted select fill, or screened stone if ground water makes compaction of select fill not practical, as directed by the Engineer. If the native soils are fine sands silts or clays a 6-inch layer of sand or filter fabric shall be places prior to the compacted backfill placement. Excavation and disposal of unsuitable materials below grade and replacement backfill as noted above are paid for separately as indicated in the Bid Schedule.
2. All over excavated materials designated by the Engineer as defined in paragraph 2.1.B to be unsuitable, shall become the property of the Contractor. The Contractor shall dispose of unsuitable or excess material at locations in accordance with all State and local laws and the provisions of the Contract. The District reserves the right to approve of the disposal site or to choose a disposal or stockpile site at the Districts discretion.

C. Unauthorized Excavation: Shall consist of removal of materials beyond indicated subgrade elevations or dimensions without specific authorization of Engineer.

Unauthorized excavation, as well as remedial work required by the Engineer shall be at the Contractor's expense. Remedial work required is as follows:

1. Under footings, structures, foundation bases, or retaining walls, fill unauthorized excavation with select fill or screened stone compacted to 95%. Provide 12" minimum select fill or crushed stone directly under footings. Concrete fill may be used to bring elevations to proper position, when acceptable to Engineer.
2. If the bottom of a trench is excavated beyond the limits indicated, replace the unauthorized excavation with thoroughly compacted select fill, or screened stone if ground water makes compaction of select fill not practical.
3. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Engineer.

D. Structural Excavation:

1. Shall consist of the removal, hauling, storage disposal, of all material encountered in the excavation to permit proper installation of structures. (applies to manholes, catchbasins, wetwells, precast pump stations as well as cast-in-place concrete structures.)
2. Excavations for structures shall be carried to the lines and subgrades shown on the Drawings.
3. Excavate areas large enough to provide suitable room for building or placing the structures.
4. The extent of open excavation shall be controlled by prevailing conditions subject to any space limits designated by the Engineer.
5. Provide, install, and maintain sheeting and bracing as necessary to support the sides of the excavation and to prevent any movement of earth which could diminish the width of the excavation or otherwise injure the work, adjacent structures, or persons and property in accordance with all state and OSHA safety standards.
6. Erect suitable fences around structure excavation and other dangerous locations created by the work, at no additional cost to the Owner.
7. Exposed subgrade surfaces shall remain undisturbed, protected, and maintained as uniform, plane areas, proof rolled and shaped to receive the foundation components of the structure.
    a. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 feet, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.
    b. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade and trim bottoms to required lines and grades to leave solid base to receive the structure.

E. Trench Excavation: Shall consist of removal, hauling, storage of all material encountered in the excavation to the widths and depths shown on the Drawings to permit proper installation of underground utilities and disposal of excess or unsuitable materials.

1. Excavate trenches to the uniform width shown on the Drawings sufficiently wide to provide sufficient space for installation, backfilling, and compaction. Every effort should be made to keep the bottom and sides of the trenches firm and undisturbed until backfilling has been completed and consolidated.
2. Trenches shall be excavated with approximately vertical sides between the elevation of the center of the pipe and an elevation one foot above the top of the pipe.
3. Grade bottoms of trenches as indicated for pipe and bedding to establish the indicated slopes and invert elevations. (Notching under pipe joints to provide solid bearing for the entire body of the pipe, where applicable.)
4. If pipe is to be laid in embankments or other recently filled material, the material shall first be placed to the top of the fill or to a height of at least two feet above the top of the pipe, whichever is the lesser. Particular care shall be taken to ensure maximum consolidation of material under the pipe location. The pipe trench shall be excavated as though in undisturbed material.
5. Unless otherwise specifically directed or permitted by the Engineer, begin excavation at the low end of sewer and storm lines and proceed upgrade.
6. Perform excavation for gravity sewers, force mains and water mains in a logical sequence if applicable.
7. The extent of open excavation shall be controlled by prevailing conditions subject to any space limits prescribed by the Engineer.
8. As the excavation progresses, install such shoring and bracing necessary to prevent caving and sliding and to meet the requirements of the state and OSHA safety standards, as outlined in the appropriate section of this Specification.

F. Protection of Persons, Property and Utilities:
1. Barricade open excavations occurring as part of this work and post with warning lights in compliance with local and State regulations.
2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations. Exercise extreme caution and utilize sheeting, bracing, and whatever other precautionary measures that may be required.
3. Rules and regulations governing the respective utilities shall be observed in execution all work. Active utilities and structures shall be adequately protected from damage, and removed or relocated only as indicated or specified. Inactive and abandoned utilities encountered in excavation and grading operations shall be removed, plugged or capped only with written authorization of the utility owner. Report in writing to the Engineer, the locations of such abandoned utilities. Extreme care shall be taken when performing work in the vicinity of existing utility lines, utilizing hand excavation in such areas, as far as practicable.
4. Repair, or have repaired, all damage to existing utilities, structures, street, drive, walkway pavements, lawns, other public and private property which results from construction operations, at no additional expense to the Owner, to the complete satisfaction of the Engineer, the utility, the property owner, and the Owner.

G. Use of Explosives:
   1. Do not bring explosives onto site or use in work without prior written permission from authorities having jurisdiction. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted.
   2. All blasting shall be performed in accordance with all pertinent provisions of the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, Inc.

H. Stability of Excavations:
   1. Slope sides of excavations to comply with all codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
   2. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.

I. Shoring and Bracing:
   1. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.
   2. Provide trench shoring and bracing to comply with local codes and authorities having jurisdiction. Refer to Specification Section 02156.
   3. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Install shoring and bracing as excavation progresses.
   4. All excavations work shall be performed in accordance with OSHA 29 CFR 1926 "Subpart P Excavations".

J. Material Storage:
   1. Stockpile excavated materials which are satisfactory for use on the work until required for backfill or fill. Place, grade and shape stockpiles for proper drainage and protect with temporary seeding or other acceptable methods to control erosion. Temporary siltation fences shall be installed if erosion from stockpiled materials is present.
   2. Locate and retain soil materials away from edge of excavations.
   3. Dispose of excess soil material and waste materials as herein specified.

K. Dewatering:
   1. To ensure proper conditions at all times during construction, the Contractor shall provide and maintain ample means and devices (including spare units kept ready for immediate use in case of breakdowns) with which to intercept and/or remove promptly and dispose properly of all water entering trenches and other excavations (including surface and subsurface waters).
   2. Excavations shall be kept dry until the structures, pipes, and appurtenances to be built therein have been completed to such extent that they will not be floated or otherwise damaged. Refer to Specification Section 02401.

L. Cold Weather Protection:
   1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35°F.

2. No frozen material shall be used as backfill or fill and no backfill shall be placed on frozen material.

M. Separation of Surface Material:
1. The Contractor shall remove only as much of any existing pavement as is necessary for the prosecution of the work.
2. Prior to excavation, existing pavement shall be cut where in the opinion of the Engineer it is necessary to prevent damage to the remaining road surface.
3. Where pavement is removed in large pieces, it shall be disposed of before proceeding with the excavation.
4. From areas within which excavations are to be made, loam and topsoil shall be carefully removed and separately stored to be used again as direct; or, if the Contractor prefers not to separate surface materials, he shall furnish, as directed, loam and topsoil at least equal in quantity and quality to that excavated.

N. Dust Control:
1. During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities, including sweeping and sprinkling of streets as necessary, so as to minimize the creation and dispersion of dust. Refer to Specification Section 01562.
2. If the Engineer decides that it is necessary to use calcium chloride for more effective dust control, the contractor shall furnish and spread the material, as directed.

3.3 BACKFILL AND FILL

A. General:
1. Backfilling shall consist of replacing material removed to permit installation of structures or utilities, as indicated in the Contract Documents.
2. Filling shall consist of placing material in areas to bring them up to grades indicated on the Drawings.
3. The Contractor shall provide and place all necessary backfill and fill material, in layers to the required grade elevations.
4. Backfill excavations as promptly as work permits, but not until completion of the following:
   a. Acceptance by Engineer of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation of structures.
   b. Inspection, approval, and recording locations of underground utilities.
   c. Removal of concrete formwork if applicable.
   d. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Temporary sheet piling driven below bottom of structures shall be removed in manner to prevent settlement of the structure or utilities, or cut off and left in place if required.
   e. Removal of trash and debris.
   f. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
   g. Density testing having results meeting requirements specified herein.

5. In general, and unless otherwise indicated, material used for backfill of trenches and excavations around structures shall be suitable excavated material which was removed in the course of making the construction excavation. Unless otherwise specified or allowed by the Engineer the backfill and fill shall be placed and compacted in layers not to exceed 12-inches in final compacted thickness.
6. All fill and backfill under structures and pavement, and adjacent to structures, shall be compacted screened stone, select fill, or crushed stone as specified or as indicated on the Drawings. The fill and backfill materials shall be placed in layers not exceeding 12-inches in thickness.
7. All structures (including manholes, stormwater treatment units, transformers vaults) shall be placed on a 6-inch mat of crushed stone unless otherwise indicated in as specific specification section or on the Drawings. Venturi metering vault structure shall be placed on a minimum 12-inch material crushed stone and as indicated on the Drawings.
8. Suitable excavated material shall meet the following requirements:
    a. Free from large clods, silt lumps or balls of clay.
    b. Free from stones and rock fragments with larger than 12-inch max. dimension.
    c. Free from organics, peat, etc.
    d. Free from frozen material.
    e. As defined in Paragraph 2.1.A.
9. If sufficient suitable excavated material is not available from the excavations, the backfill material shall be select fill, common borrow unless otherwise indicated, as required and as indicated on the Drawings, or as required and directed by the Engineer.
10. Do not backfill with, or on, frozen materials.
11. Remove, or otherwise treat as necessary, previously placed material that has frozen prior to placing backfill.
12. Do not mechanically or hand compact material that is, in the opinion of the Engineer, too wet.
13. Do not continue backfilling until the previously placed and new materials have dried sufficiently to permit proper compaction.
14. The nature of the backfill materials will govern the methods best suited for their placement and compaction. Compaction methods and required percent compaction is covered in Compaction section.
15. Before compaction, moisten or aerate each layer as necessary to provide a water content necessary to meet the required percentage of maximum dry density for each area classification specified.
16. Do not allow large masses of backfill material to be dropped into the excavation in such a manner that may damage pipes and structures. No material shall be dropped from a height greater than five (5) feet, unless a timber chute is used to break the fall.
17. Place material in a manner that will prevent stones and lumps from becoming nested.
18. Completely fill all voids between stones with fine material.

19. Do not place backfill on or against new concrete until it has attained sufficient strength to support loads without distortion, cracking, and other damage.
20. Deposit backfill and fill material evenly on all sides of structures to avoid unequal soil pressures.
21. Keep stones or rock fragments with a dimension greater than two inches at least one foot away from the pipe or structure during backfilling.
22. Leave sheeting in place when damage is likely to result from its withdrawal.
23. Completely fill voids left by the removal of sheeting with screened stone which is compacted thoroughly.

B. Pipe Bedding, Initial Backfill and Trench Backfill:
1. Place bedding, initial backfill, impervious dam backfill and remaining backfill in layers of uniform thickness specified herein, and as shown on the Drawings.
2. Thoroughly compact each layer (including screened stone) by means of a suitable vibrator or mechanical tamper.
3. Install and compact pipe bedding and initial backfill in layers of uniform thickness not greater than twelve (12) inches. The Contractor shall compact around the spring line of the pipe by means of a hand V-saw or other piece of equipment acceptable to the Engineer and Owner.
4. Deposit and compact the remainder of the backfill in uniform layers not greater than twelve (12) inches.
5. Provide underground sewer marking tape for the full length of sewer trenches as shown on the Drawings. See Section 02650. Buried Utility Markings
6. Where soft silt and clay soils are encountered the trench shall be excavated six inches below the normal bedding and backfilled with 6-inches of compacted sand and 6-inches screened or crushed stone for wet conditions as directed by the Engineer.
7. Backfill trenches with concrete where trench excavations pass within 18-inches of column or wall footings and which are carried below the bottom of such footings, or which pass under wall footings. Place concrete to the level of the bottom of adjacent footings. If applicable near existing or new structures.
8. No stone 2-inches in diameter or larger shall be allowed within 6-inches of the pipe.
9. No stone or rock greater than 12-inches measured at any point shall be placed in the trench backfill
10. The following schedule gives the bedding requirements for various types of pipe. Distances refer to vertical thickness below the pipe.

BEDDING REQUIREMENTS

DI, PVC, P.E. and Copper Pipe	6-inches minimum screened stone.
Culverts and Under Drains	6-inches minimum crushed stone.

11. The following schedule gives the initial backfill requirements for various types of pipes.

INITIAL BACKFILL REQUIREMENTS

DI, PVC, P.E. and Copper Pipe	6-inches minimum screened stone over top of pipe
Culverts and Under Drains	Crushed stone 6-inches minimum over top of pipe

12. Special bedding and backfill requirements shown on the Drawings supersede requirements of this section.

C. Improper Backfill:
   1. When excavation and trenches have been improperly backfilled, and when settlement occurs, reopen the excavation to the depth required, as directed by the Engineer.
   2. Refill and compact the excavation or trench with suitable material and restore the surface to the required grade and condition.
   3. Excavation, backfilling, and compacting work performed to correct improper backfilling shall be performed at no additional cost to the Owner.

D. Ground Surface Preparation: (If applicable)
   1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, scarify or break-up sloped surface steeper than 1 vertical to 4 horizontal.
   2. When existing ground surface has a density less than that specified under "compaction" for the particular area classification, break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to required depth and percentage of maximum density.

3.4 COMPACTION

A. General:
   1. Control soil compaction during construction to provide not less than the minimum percentage of density specified for each area classification.

B. Percentage of Maximum Density Requirements:
   1. Compact soil to not less than the following percentages of maximum dry density determined in accordance with ASTM D1557 as indicated.

a. Structures: Compact each layer of backfill or fill material below or adjacent to structures to at least 95% of maximum dry density (ASTM D1557).
b. Off Traveled Way Areas: Compact each layer of backfill or fill material to at least 90% of maximum dry density (ASTM D1557).
c. Walkways: Compact each layer of backfill or fill material to at least 93% of maximum dry density (ASTM D1557).
d. Roadways, Drives and Paved Areas: Compact each layer of aggregate base material to at least 95% of maximum dry density (ASTM D1557).
e. Pipes: Compact bedding material and each layer of backfill to at least 90% maximum dry density (ASTM D1557). Where backfilling with excavated material, compact to native field density.

C. Moisture Control:
1. Where subgrade or a layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, in quantities controlled to prevent free water appearing on surface during or subsequent to compaction operations.
2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
3. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory level.

D. Trench Compaction:
1. After each trench layer has been spread to the required maximum 12 inches and its moisture content has been adjusted as necessary, it shall be rolled with a sufficient number of passes to obtain the required compaction. One pass is defined as the required number of successive trips which by means of sufficient overlap will insure complete coverage and uniform compaction of an entire lift. Additional passes shall not be made until the previous pass has been completed.
2. When any section of trench sinks or weaves excessively under the roller or under hauling units and other equipment, it will be evident that the required degree of compaction is not being obtained and that a reduction in the moisture content is required. If at any place or time such sinking and weaving produces surface cracks which, in the judgment of the Engineer are of such character, amount, or extent to indicate an unfavorable condition, he will recommend operations on that part of the embankment or trench to be suspended until such time as it shall have become sufficiently stabilized. The ideal condition of the embankment or trench is that attained when the entire embankment or trench below the surface being rolled is so firm and hard as to show only the slightest weaving and deflection as the roller passes.
3. If the moisture content is insufficient to obtain the required compaction, the rolling shall not proceed except with the written approval of the Engineer, and in that event, additional rolling shall be done to obtain the required compaction. If the moisture content is greater than the limit specified, the

material of such water content may be removed and stockpiled for later use or the rolling shall be delayed until such time as the material has dried sufficiently so that the moisture content is within the specified limits. No adjustment in price will be made on account of any operation of the Contractor in removing and stockpiling, or in drying the materials or on account of delays occasioned thereby.

4. If because of insufficient overlap, too much or too little water, or other cause attributable to defective work, the compaction obtained over any area is less than that required, the condition shall be remedied, and if additional rollings are ordered, they will be done at no cost to the Owner. If the material itself is unsatisfactory or if additional rolling or other means fails to produce satisfactory results, the area in question shall be removed down to material of satisfactory density and the removal, replacement, and re-rolling shall be done by the Contractor, without additional compensation.
5. Material compaction by hand-operated equipment or power-driven tampers shall be spread in layers not more than 6 inches thick. The degree of compaction obtained by these tamping operations shall be equal in every respect to that secured by the rolling operation.

E. Embankment Compaction:

1. After each embankment layer has been spread to the required maximum thickness (12-inch maximum) and its moisture content has been adjusted as necessary, it shall be rolled with a sufficient number of passes to obtain the required compaction. One pass is defined as the required number of successive trips which by means of sufficient overlap will insure complete coverage and uniform compaction of an entire lift. Additional passes shall not be made until the previous pass has been completed.
2. When any section of an embankment sinks or weaves excessively under the roller or under hauling units and other equipment, it will be evident that the required degree of compaction is not being obtained and that a reduction in the moisture content is required. If at any place or time such sinking and weaving produces surface cracks which, in the judgement of the Engineer are of such character, amount, or extent to indicated an unfavorable condition, he will recommend operations on that part of the embankment to be suspended until such time as it shall have become sufficiently stabilized. The ideal condition of the embankment is that attained when the entire embankment below the surface being rolled is so firm and hard as to show only the slightest weaving and deflection as the roller passes.
3. If the moisture content is insufficient to obtain the required compaction, the rolling shall not proceed except with the written approval of the /engineer, and in that event, additional rolling shall be done to obtain the required compaction. If the moisture content is greater than the limit specified, the material of such water content may be removed and stockpiled for later use or the rolling shall be delayed until such time as the material has dried sufficiently so that the moisture content is within the specified limits. No adjustment in price will be made on account of any operation of the Contractor in removing

and stockpiling, or in drying the materials or on account of delays occasioned thereby.

4. If because of insufficient overlap, too much or too little water, or other cause attributable to defective work, the compaction obtained over any area is less than that required, the condition shall be remedied, and if additional rollings are ordered, they will be done at no cost to the Owner. If the material itself is unsatisfactory or if additional rolling or other means fails to produce satisfactory results, the area in question shall be removed down to material of satisfactory density and the removal, replacement, and re-rolling shall be done by the Contractor, without additional compensation.
5. Material compaction by hand-operated equipment or power-driven tampers shall be spread in layers not more than 6 inches thick. The degree of compaction obtained by these tamping operations shall be equal in every respect to that secured by the rolling operation.

F. Compaction Methods: The Contractor may select any method of compaction that is suitable to compact the material to the required density.
1. General: Whatever method of compacting backfill is used, care shall be taken that stones and lumps shall not become nested and that all voids between stones shall be completely filled with fine material. All voids left by the removal of sheeting shall be completely backfilled with suitable materials and thoroughly compacted.
2. Tamping or Rolling: If the material is to be compacted by tamping or rolling, the material shall be deposited and spread in uniform, parallel layers not exceeding the uncompacted thicknesses specified. Before the next layer is placed, each layer shall be tamped as required so as to obtain a thoroughly compacted mass. Care shall be taken that the material close to the excavation side slopes, as well as in all other portions of the fill area, is thoroughly compacted. When the excavation width and the depth to which backfill has been placed are sufficient to make it feasible, and it can be done effectively and without damage to the pipe or structure, backfill may, on approval, be compacted by the use of suitable rollers, tractors, or similar powered equipment instead of by tamping. For compaction by tamping or rolling, the rate at which backfilling material is deposited shall not exceed that permitted by the facilities for its spreading, leveling, and compacting as furnished by the Contractor.

G. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

3.5 GRADING

A. General:
1. Grading shall consist of that work necessary to bring all areas to the final grades.
2. Uniformly grade areas within limits of work requiring grading, including adjacent transition areas.

3. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.

B. Grading Outside Building Lines:
   1. Grade areas adjacent to building to drain away from structures and to prevent ponding.
   2. Grade surfaces to be free from irregular surface changes, and as follows:
      a. Lawn or Unpaved Areas: Finish grade areas to receive topsoil to within not more than 1-inch above or below the required subgrade elevations.
      b. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than ½-inch above or below the required subgrade elevation.
      c. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 3/8-inch above or below the required subgrade elevation.

C. Grading Surface of Fill Under Structures and Building Slabs:
   1. Grade surface to be smooth and even, free of voids, and compacted as specified, to the required elevation.
   2. Provide final grades within a tolerance of ½-inch when tested with a 10-foot straight edge.

D. Compaction:
   1. After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.

E. Protection of Graded Areas:
   1. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
   2. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

3.6 AGGREGATE BASE COURSE AND LEVELING COURSE

A. General:
   1. Base course consists of placing the specified materials in layers to support a leveling course or paved surface, as indicated in the Drawings.

B. Grade Control:
   1. During construction, maintain lines and grades including crown and cross-slope of base course and leveling course.

C. Placing:
   1. Place aggregate base course in two equal lifts on prepared subbase conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting base materials.
   2. Place leveling course, if indicated on the Drawings, on prepared base course, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compaction.

D. Shaping and Compacting:
   1. All layers of aggregate base course and leveling course shall be compacted to the required density (95% max dry density) immediately after placing. As soon

as the compaction of any layer has been completed, the next layer shall be placed.

2. The Contractor shall bear full responsibility for and make all necessary repairs to the base leveling courses and the subgrade until the full depth of the base leveling courses is placed and compacted. Repairs shall be made at no additional cost to the Owner.
3. If the top of any layer of the aggregate base or leveling course becomes contaminated by degradation of the aggregate or addition of foreign materials, the contaminated material shall be removed and replaced with the specified material at the Contractor's expense.

E. Surface Tolerancing:

1. The completed surface of the aggregate base and subbase courses shall be shaped and maintained to a tolerance, above or below the required cross-sectional shape, of 3/8 inch for aggregate base course

END OF SECTION

SECTION 02260

FILTER FABRIC

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Furnish all materials and install filter fabric of the types, dimensions and in the location(s) shown on the Drawings and specified herein.

B. Related Work Specified Elsewhere:

2. Temporary Erosion Control, Riprap and Stone Ditch Protection, and Gabions and Revet Mattresses are specified in the appropriate sections of this Division.

1.2 QUALITY ASSURANCE

A. A competent laboratory must be maintained by the manufacturer of the fabric at the point of manufacture to ensure quality control.

B. During all periods of shipment and storage, the fabric shall be wrapped in a heavy duty protective covering to protect the fabric from direct sunlight, ultraviolet rays, temperatures greater than 140^{O}F, mud, dirt, dust and debris.

1.3 SUBMITTALS

A. Manufacturer shall furnish certified test reports with each shipment of material attesting that the fabric meets the requirements of this Specification.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Filter fabric for use in stabilization, drainage, underdrains, landscaping and beneath structures shall be formed in widths of not less than six (6) feet and shall meet the requirements of Table 1. Both woven and non-woven geotextiles are acceptable; however no "slit-tape" woven fabrics will be permitted for drainage, underdrain, and erosion control applications.

Table 1

Geotextile Mechanical Property	Test Method	Minimum Permissible Value
Grab Tensile Strength (both directions)	ASTM D4595-86	120 pounds
Grab Elongation	ASTM D4632-86	50 percent
Mullen Burst Strength	ASTM D3786-87	210 psi
Puncture Strength	ASTM D3787	60 pounds
Trapezoid Tear Strength	ASTM D4533-85	50 pounds
Water Flow Rate	ASTM D4491-85	120 gal/min/sf
Equivalent Opening Size (EOS)	ASTM D4751	U.S. Std. Sieve #80
Coefficient of Permeability	ASTM D4491-85	0.2 cm/sec

The geotextile shall have property values expressed in "typical" values that meet or exceed the values stated above as determined by the most recent test methods specified above.

B. Filter fabric for use in reinforcement shall meet the requirements of Table 2. Woven and non-woven geotextiles are acceptable.

Table 2

Geotextile Mechanical Property	Test Method	Minimum Permissible Value
Grab Tensile Strength (both directions)	ASTM 4595-86	195 pounds
Grab Elongation	ASTM D4632-86	20 percent
Mullen Burst Strength	ASTM D3786-87	340 psi
Puncture Strength	ASTM D3787	85 pounds
Trapezoid Tear Strength	ASTM D4533-85	85 pounds
Equivalent Opening Size (EOS)	ASTM D4751	U.S. Std. Sieve number(s) between #20 and #100

The geotextile shall meet or exceed the "typical" values stated above as determined by the most recent test methods specified above.

C. Filter Fabric for use under riprap shall meet the requirements as specified in Section 02271 - Riprap and Stone Ditch Protection.

D. For Silt Fence, refer to Section 02270 - Temporary Erosion Control.

PART 3 - EXECUTION

3.1 Install filter fabric as shown on the drawings or as directed in appropriate specifications in this division or in accordance with manufacturer's instructions or as directed by the Engineer.

END OF SECTION

SECTION 02270

TEMPORARY EROSION CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. The work under this section shall include provision of all labor, equipment, materials and maintenance of temporary erosion control devices as specified herein, and as directed by the Engineer.
2. Erosion control measures shall be provided as necessary to correct conditions that develop prior to the completion of permanent erosion control devices or as required to control erosion that occurs during normal construction operations.
3. Construction operations shall comply with all federal, state and local regulations pertaining to erosion control.
4. After awarded the Contract, prior to commencement of construction activities, meet with the Engineer to discuss erosion control requirements and develop a mutual understanding relative to details of erosion control.

B. Related Work Specified Elsewhere:

1. Site work is specified in appropriate sections of this Division.

C. Design Criteria:

1. Conduct all construction in a manner and sequence that causes the least practical disturbance of the physical environment.
2. Stabilize disturbed earth surfaces in the shortest time and employ such temporary erosion control devices as may be necessary until such time as adequate soil stabilization has been achieved.

1.2 SUBMITTALS

A. The Contractor shall furnish the Engineer, in writing, his work plan giving proposed locations for storage of topsoil and excavated material before beginning construction. A schedule of work shall accompany the work plan. Acceptance of this plan will not relieve the Contractor of the responsibility of completion of the work as specified.

1.3 QUALITY ASSURANCE

A. All materials and methods of erosion control shall meet the guidelines established by the "2002 Connecticut Guidelines for Soil Erosion and Sediment Control" prepared by the Connecticut Council on Soil and Water Conservation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Baled Hay:

1. At least 14" by 18" by 30" securely tied to form a firm bale, staked as necessary to hold the bale in place.

B. Sand Bags:
   1. Heavy cloth bags of approximately one cubic foot capacity filled with sand or gravel.

C. Mulches:
   1. Loose hay, straw, peat moss, wood chips, bark mulch, crushed stone, wood excelsior, or wood fiber cellulose.
   2. Type and use shall be as specified in "2002 Connecticut Guidelines for Soil Erosion and Sediment Control" prepared by the Connecticut Department of Energy and Environmental Protection, herein after referred to as the CTDEEP.

D. Mats and Nettings:
   1. Twisted Craft paper, yarn, jute, excelsior wood fiber mats, glass fiber and plastic film.
   2. Type and use shall be as specified in the CTDEEP.

E. Permanent Seed:
   1. Conservation mix appropriate to the predominant soil conditions as specified in the CTDEEP and subject to approval by the Engineer.

F. Temporary Seeding:
   1. Use species appropriate for soil conditions and season as specified in the CTDEEP and subject to approval by the Engineer.

G. Water:
   1. The Contractor shall provide water and equipment to control dust, as directed by the Engineer.

H. Silt Fence:
   1. Silt Fence shall be one of the commercially available brands, meeting the following requirements:

Geotextile Mechanical Property	Test Method	Minimum Permissible Value
Grab Tensile Strength (both directions)	ASTM D-4632	124 pounds
Puncture Strength	ASTM D-4833	60 pounds
Apparent Opening Size	ASTM D-4751	#30
Flow Rate	ASTM D-4491	8 gal/min/ft^2

2.2 CONSTRUCTION REQUIREMENTS

A. Temporary Erosion Checks:
   1. Temporary erosion checks shall be constructed in ditches and other locations as necessary.
   2. Baled hay, sand bags or siltation fence may be used in an arrangement to fit local conditions.

B. Temporary Berms:
   1. Temporary barriers shall be constructed along the toe of embankments when necessary to prevent erosion and sedimentation.

C. Temporary Seeding:
Areas to remain exposed for a time exceeding 3 weeks shall receive temporary seeding as indicated in the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control.

D. Silt Fence shall be supported by posts and installed per the manufacturer's recommendations.

E. Mulch All Areas Receiving Seeding:
Use either wood cellulose fiber mulch (750 lbs/acre); or straw mulch with chemical tack (as per manufacturers specifications). Wetting for small areas may be permitted. Biodegradable netting is recommended in areas to be exposed to drainage flow.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Temporary Erosion Checks:
1. Temporary erosion checks shall be constructed in ditches and at other locations designated by the Engineer. The Engineer may modify the Contractor's arrangement of silt fences, bales and bags to fit local conditions.
2. Baled hay, silt fences, or sandbags, or some combination, may be used in other areas as necessary to inhibit soil erosion.
3. Siltation fence shall be located and installed as shown on plans or as required to comply with all Federal, State and Local Regulations.

B. Maintenance:
Erosion control features shall be installed prior to excavation wherever appropriate. Temporary erosion control features shall remain in place and shall be maintained until a satisfactory growth of grass is established. The Contractor shall be responsible for maintaining erosion control features throughout the life of the construction contract. Maintenance will include periodic inspections by the Owner or Engineer for effectiveness of location, installation and condition with corrective action taken by the Contractor as appropriate.

C. Removing and Disposing of Materials:
1. When no longer needed, material and devices for temporary erosion control shall be removed and disposed of as approved by the Engineer.
2. When removed, such devices may be reused in other locations provided they are in good condition and suitable to perform the erosion control for which they are intended.
3. When dispersed over adjacent areas, the material shall be scattered to the extent that it causes no unsightly conditions nor creates future maintenance problems.

END OF SECTION

SECTION 02271

RIPRAP AND STONE DITCH PROTECTION

PART 1 - GENERAL

1.1 DESCRIPTION

A. This work consists of furnishing all plant, labor, equipment, and materials and performing all work necessary to place a protective covering of erosion-resistant material on the slopes of embankments, spillways, streambanks, slopes of channels, or as directed by the Engineer. The work shall be done in accordance with these Specifications and in conformity with the lines and grades shown on the Drawings or established by the Engineer.

B. Types of riprap included in this specification:

1. Riprap - Riprap consists of stone dumped in place on a prepared slope of either a filter blanket or a filter fabric backing to form a well-graded mass with a minimum of voids.
2. Filter Blanket - A filter blanket consists of one or more layers of graded material placed on the bank before placing the riprap in order to prevent the bank material from passing through the riprap protection. The thickness and gradation of filter blanket will be shown on the plans.
3. Filter Fabric Backing - A filter fabric backing consists of a filter fabric overlain by a layer of coarse aggregate placed on the bank before placing the riprap to prevent the bank material from passing through the riprap protection. Filter fabric backing shall be used in lieu of a filter blanket where specifically called for on the plans or where approved by the Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Definition of the materials:

1. Riprap:
   a. Stone used for riprap shall be hard, durable, angular in shape; resistant to weathering and to water action; free from overburden, spoil, shale and organic material; and shall meet the gradation requirements for the class specified. Neither breadth nor thickness of a single stone should be less than one-third its length. Rounded stone or boulders shall not be accepted without written permission of the Engineer. Broken concrete may be substituted for stone with written authorization of the Engineer. Shale and stone with shale seams are not acceptable. The minimum weight of the stone shall be l55 pounds per cubic foot as computed by multiplying the specific gravity (bulksaturated-surface-dry basis, AASHTO Test T 85) times 62.3 pounds per cubic foot.
   b. Each load of riprap shall be reasonably well graded from the smallest to the maximum size specified. Stones smaller than the specified l0 percent size and spalls shall not be permitted in an amount exceeding l0 percent by weight of each load.

2. Filter Blanket - The filter blanket shall consist of one or more layers of screened gravel of the thickness as shown on the plans. The gradation of materials in the filter blanket shall be as shown on the Drawings. All material comprising the filter blanket shall be composed of tough, durable particles, reasonably free from thin, flat and elongated pieces, and shall contain no organic matter nor soft, friable particles in quantities in excess of those approved by the Engineer.
3. Filter Fabric Backing:
   a. Coarse Aggregate:
      1) The coarse aggregate shall be composed of tough, durable particles, reasonably free from thin, flat, and elongated pieces, and shall contain no organic matter or soft, friable particles in quantities in excess of those approved by the Engineer.
   b. Filter Fabric:
      1) The filter fabric shall be formed in widths of not less than six (6) feet.
      2) A competent laboratory must be maintained by the producer of the fabric at the point of manufacture to insure quality control. During all periods of shipment and storage, the fabric shall be maintained, wrapped in a heavy duty protective covering to protect the fabric from direct sunlight, ultraviolet rays, temperatures greater than 140 °F, mud, dirt, dust and debris.
      3) The vendor shall furnish certified test reports with each shipment of material attesting that the fabric meets the requirements of this Specification.

TABLE 1
REQUIREMENTS FOR FILTER FABRIC

Test	**Method**	**Requirements**
Breaking Load & Elongation	ASTM D 1682, Grab Test Method, constant rate of travel 12" per minute.	Tensile Strength: 200 lbs any direction.
Weight Change in Water	CRD-C 575 or 6631 in Fed. Std.	Less than 1%
Bursting Strength	ASTM D751, using Diaphragm Bursting Tester	400 lbs. per square inch
Puncture Strength	ASTM D751, modified	120 lbs.
Seam Breaking Strength	ASTM D 1683, 1" square jaws, constant rate of traverse 12" per min.	180 lbs.
Abrasion Resistance Strength:*	ASTM D1175, modified	Tensile 55 lbs.

Test	Method	Requirements
Percent of Open Area		Not less than 5%
Equivalent Opening Size		U.S. Standard Sieve No. 70
Permeability		0.02 to 0.3 cm/sec.
Specific Gravity Weight		0.95 Approximately .05 lb/sq/ft.
Seam sewn with polypropylene thread at point of manufacture		
Packaged in burlap		

* Tensile strength determined by Breaking Load & Elongation by the method stated in the first listing of Table 1.

B. Gradation of Coarse Aggregate for Filter Fabric Backing shall be in accordance with Section 5 of the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control.

C. Gradation of Riprap Stone:

1. Standard Riprap
   A. Note more than 15% of the riprap shall be scattered spalls and stones less than 6-inches (150mm) in size.
   B. No stone shall be larger than 30-inches (760mm) in size, and at least 75% of the mass shall be stones at least 15-inches (380mm) in size.

2. Intermediate Riprap

Size of Stone	% of Mass
18" +	0
10" to 18"	30 - 50
6" to 10"	30 - 50
4" to 6"	20 - 30
2" to 4"	10
Less than 2"	0 - 10

3. Modified Riprap

Size of Stone	% of Mass
10" or over	0
6" to 10"	20 - 50
4" to 6"	30 - 60
2" to 4"	30 - 40
Less than 1"	0 - 10

PART 3 - EXECUTION

3.1 CONSTRUCTION DETAILS

A. Slopes to be protected by riprap shall be free of brush, trees, stumps, and other objectionable material and be dressed to a smooth surface. All soft or spongy material shall be removed to the depth shown on the Drawings or as directed by the Engineer and replaced with approved material. Filled areas will be compacted thoroughly. A toe trench as shown on the Drawings shall be dug and maintained until the riprap is placed.

1. Riprap
   a. Stone for riprap shall be placed on the prepared slope or area in a manner which will produce a reasonably well- graded mass of stone with the minimum practicable percentage of voids. The entire mass of stone shall be placed in conformance with the lines, grades, and thicknesses shown on the Drawings. Riprap shall be placed to its full course thickness in one operation and in such a manner as to avoid displacing the underlying material. Placing of riprap in layers, or by dumping into chutes, or by similar methods likely to cause segregation will not be permitted.
   b. The larger stones shall be well distributed and the entire mass of stone shall conform to the gradation specified on the Drawings. All material going into riprap protection shall be so placed and distributed so that there will be no large accumulations of either the larger or smaller sizes of stone.
   c. It is the intent of these Specifications to produce a compact riprap protection in which all sizes of material are placed in their proper proportions. Hand placing or rearranging of individual stones by mechanical equipment may be required to the extent necessary to secure the results specified.
   d. Unless otherwise authorized by the Engineer, the riprap protection shall be placed in conjunction with the construction of the embankment with only sufficient lag in construction of the riprap protection as may be necessary to allow for proper construction of the portion of the embankment protected and to prevent mixture of embankment and riprap. The riprap protection shall be maintained until accepted, and any material displaced by any cause shall be replaced.
   e. Riprap stone shall not be dropped from a height greater than one foot onto the filter blanket.
2. Filter Blanket:
   a. A filter blanket shall be placed on the prepared slope or area to the full specified thickness using methods which will not cause segregation of particle sizes within the bedding. The surface of the finished layer should be reasonably even and free from mounds or windrows.
3. Filter Fabric Backing:
   a. A filter fabric shall be placed in the manner and at the locations shown in the Drawings or as directed by the Engineer. At the time of installation, fabric shall be rejected if it has defects, rips, holes, flaws,

deterioration or damage incurred during manufacture, transportation or storage. The fabric shall be placed with the long dimension parallel to the centerline of the channel or shoreline unless otherwise directed by the Engineer, and shall be laid smooth and free of tension, stress, folds, wrinkles, or creases. The strips shall be placed to provide a minimum width of 36 inches of overlap for each joint. Overlap joints and seams shall be measured as a single layer of cloth. Securing pins with washers shall be inserted through both strips of overlapped cloth at not greater than the following intervals along a line through the midpoint of the overlap.

Pin Spacing	Slope
2 feet	Steeper than 3:1
3 feet	3:1 to 4:1
5 feet	Flatter than 4:1

The fabric shall be turned down and buried two (2) feet at all exterior limits.

b. Additional pins regardless of location shall be installed as necessary to prevent any slippage of the filter fabric. The fabric shall be placed so that the upstream strip of fabric will overlap the downstream strip. Should the Engineer direct that the fabric be placed with the long dimension perpendicular to the centerline of the channel or shoreline, the lower strip of fabric shall overlap the next higher strip. Each securing pin shall be pushed through the fabric until the washer bears against the fabric and secures it firmly to the foundation. The fabric shall be protected at all times during construction from contamination by surface runoff and any fabric so contaminated shall be removed and replaced with uncontaminated fabric. Any damage to the fabric during its installation or during placement of riprap shall be replaced by the Contractor. The work shall be scheduled so that the filter blanket shall be covered with riprap as soon as possible following filter blanket placement. Any damage to the filter material during placement of riprap shall be corrected prior to proceeding with the work.

c. Securing pins for anchoring filter fabric shall be 3/16 inch steel bars, pointed at one end and fabricated with a head to retain a steel washer having an outside diameter of not less than 1.5 inches. The length of the pin shall not be less than 18 inches.

d. A layer of coarse aggregate shall be placed on the filter fabric to the full specified thickness using methods which will not cause segregation of particle sizes. The surface of the finished layer shall be reasonably even and free from mounds or windrows.

END OF SECTION

SECTION 02401

DEWATERING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Furnish, operate and maintain, as incidental to the project, dewatering equipment to lower and control ground water table levels and hydrostatic pressures to permit excavation, backfill, and construction to be performed in the dry; collect and dispose of ground and surface water where necessary to complete the work. .

B. Related Work Specified Elsewhere: (When Applicable)
   1. Earthwork and Sheeting are specified in the appropriate section in this division.

1.2 SUBMITTALS

A. Provide submittals in accordance with Specification Section 01340. Submit design calculations, description and complete layout drawings of the proposed dewatering system, stamped and sealed by a Professional Engineer registered in the State of Connecticut. Such review shall not relieve the Contractor of sole responsibility for the dewatering system as necessary to prevent damage and settlement to adjacent structures, utilities, streets adjacent to excavations and for the safety of persons working within the excavated areas.

B. Submittal shall include: location, depth and size of wellpoints, headers, sumps, ditches; size and location of discharge lines; capacities of pumps and standby units, and detailed description of dewatering methods to be employed to convey the water from site to adequate disposal.

C. Submit letter from dewatering system design engineer that the design of the dewatering system has been fully coordinated with the design of the excavation support system.

1.3 DESIGN

A. Dewatering system shall be designed by a Professional Engineer registered in the State of Connecticut who is certified in the design of Dewatering systems

B. Dewatering system shall be of sufficient size and capacity necessary to lower and maintain ground water table to an elevation at least one foot below the lowest foundation subgrade or bottom of pipe trench to allow material to be excavated in a dry condition. Materials to be removed shall be sufficiently dry to permit excavation to grades shown and to stabilize excavation slopes where sheeting is not required. Operate dewatering system continuously until backfill work has been completed.

C. Control of surface and subsurface water is part of dewatering system requirements. Maintain adequate control so that:

1. The stability of excavated and constructed slopes are not adversely affected by saturated soil, including water entering prepared subbase and subgrades where underlying materials are not free draining or are subject to swelling or freeze-thaw action.
2. Erosion is controlled.
3. Flooding of excavations or damage to structures does not occur.
4. Surface water drains away from excavations.
5. Excavations are protected from becoming wet from surface water, or insure excavations are dry before additional work is undertaken
6. Prevent loss of fines, seepage, boils, quick conditions or softening of foundation strata.
7. Maintain stability of sides and bottom of excavation. Construction operations are performed in the dry.
8. Any existing dewatering wells that can affect dewatering and excavation shall be sealed below the excavation subgrade.

D. Design shall include an assessment of how the dewatering operations will affect the stability of all adjacent structures

E. Contractor is responsible to perform whatever additional geotechnical investigations are needed to design the dewatering system to allow for proper construction of new facilities while protecting adjacent structures from damage due to settlement, and in accordance with this specification.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.1 PERFORMANCE

A. General:

1. Prior to any excavation below the ground water table, place system into operation to lower water table as required and operate it continuously 24 hours a day, 7 days a week until utilities and structures have been satisfactorily constructed, which includes the placement of backfill materials and dewatering is no longer required.
2. Keep work areas dewatered until the structures, pipes, and appurtenances to be built there have been completed to such an extent that they will not be damaged by water.
3. Thoroughly brace or otherwise protect against flotation all pipelines and structures which are not stable.
4. Maintain standby backup equipment and power supply throughout the duration of the dewatering operation.
5. Prevent soil particles from entering the discharge points.
6. Ground water level shall be maintained at least one foot below the bottom of the excavation.

B. Disposal of Water:
   1. Dispose of water pumped or drained from the construction site in a suitable manner to avoid siltation of adjacent drainage structures and piping, wetlands or water bodies, injury to public health, damage to public and private property, and damage to the work completed or in progress.
   2. Provide suitable temporary channels for water that may flow along or across the construction site.
   3. Provide treatment as necessary to prevent discharge of contaminated ground water caused by Contractor's operations, or any contaminated ground water that may pass through the excavation support system selected by the Contractor.
   4. Contractor must obtain all necessary regulatory approvals for the disposal of dewatering flows. These may include, among others, approval by the USEPA under the National Pollutant Discharge Elimination System (NPDES) program for construction activities.

C. Damage:
   1. Avoid damage to and settlement of adjacent buildings, roads, structures, utilities and other facilities.
   2. Any damage to or settlement of structures resulting from the dewatering operations, or the failure of the Contractor to maintain the work in a suitably dry condition shall be repaired by the Contractor at no additional cost to the Owner.

D. Temporary Underdrains:
   1. When necessary, temporary underdrains may be placed in excavations.
   2. Underdrain pipe shall be perforated corrugated metal, polyethylene or P.V.C. pipe.
   3. Entirely surround the underdrain and fill the space between the underdrain and the pipe or structure with free draining material.

E. Excavation Sump Pumping:
   1. When necessary and where appropriate to the geotechnical conditions encountered, excavations may be over excavated 6 to 12 inches and filled with screened stone to allow sump pumping of groundwater.
   2. The system shall be installed with suitable screens and filters so that pumping of fines does not occur.

F. Well and Wellpoint System:
   1. If necessary, dewater the excavations and trenches with an efficient well or wellpoint system to drain the soil and prevent saturated soil from flowing into the excavated wells and area.
   2. Wellpoint and well system shall be of the type designed for dewatering work and shall be installed with suitable screens and filters so that pumping of fines does not occur.
   3. Pumping units shall be capable of maintaining sufficient suction to handle large volumes of air and water at the same time.

G. Corrective Action:
   1. If dewatering requirements are not satisfied due to inadequacy or failure of the dewatering system (loosening of the foundation strata, or instability of slopes,

or damage to foundations or structures), perform work necessary for reinstatement of foundation soil and damaged structure resulting from such inadequacy or failure by Contractor, at no additional cost to Owner.

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END OF SECTION

SECTION 02485

LOAMING & SEEDING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Furnish, place, and test topsoil, seed, lime, and fertilizer where shown on the drawings and protect and maintain seeded areas disturbed by construction work, as directed by the Engineer.

B. Related Work Specified Elsewhere (When Applicable): Earthwork and temporary erosion control are specified in the appropriate Sections of this Division.

1.2 SUBMITTALS AND TESTING

A. Seed:

1. Furnish the Engineer with duplicate signed copies of a statement from the vendor, certifying that each container of seed delivered to the project site is fully labeled in accordance with the Federal Seed Act and is at least equal to the specification requirements.
2. This certification shall appear in, or with, all copies of invoices for the seed.
3. The certification shall include the guaranteed percentages of purity, weed content and germination of the seed, and also the net weight and date of shipment. No seed may be sown until the Contractor has submitted the certificates and certificates have been approved.
4. Each lot of seed shall be subject to sampling and testing, at the discretion of the Engineer, in accordance with the latest rules and regulations under the Federal Seed Act.

B. Topsoil:

1. Inform the Engineer, within 30 days after the award of the Contract, of the sources from which the topsoil is to be furnished.
2. Obtain representative soil samples, taken from several locations in the area under consideration for topsoil removal, to the full stripping depth.
3. Have soil samples tested by an independent soils testing laboratory, approved by the Engineer, at the Contractor's expense.
4. Have soil samples tested for physical properties and pH (or lime requirement), for organic matter, available phosphoric acid, and available potash, in accordance with standard practices of soil testing.
5. Approval, by the Engineer, to use topsoil for the work will be dependent upon the results of the soils tests.

C. Lime & Fertilizer:

1. Furnish the Engineer with duplicate copies of invoices for all lime and fertilizer used on the project showing the total minimum carbonates and minimum percentages of the material furnished that pass the 90 and 20 mesh sieves and the grade furnished.
2. Each lot of lime and fertilizer shall be subject to sampling and testing at the discretion of the Engineer.

3. Sampling and testing shall be in accordance with the official methods of the Association of Official Agricultural Chemists.
4. Upon completion of the project, a final check may be made comparing the total quantities of fertilizer and lime used to the total area seeded. If the minimum rates of application have not been met, the Engineer may require the Contractor to distribute additional quantities of these materials to meet the minimum rates.

1.3 DELIVERY, STORAGE & HANDLING

A. Seed:
   1. Furnish all seed in sealed standard containers, unless exception is granted in writing by the Engineer.
   2. Containers shall be labeled in accordance with the United States Department of Agriculture's rules and regulations under the Federal Seed Act in effect at the time of purchase.

B. Fertilizer:
   1. Furnish all fertilizer in unopened original containers.
   2. Containers shall be labeled with the manufacturer's statement of analysis.

1.4 JOB CONDITIONS

A. Topsoil: Do not place or spread topsoil when the subgrade is frozen, excessively wet or dry, or in any condition otherwise detrimental, in the opinion of the Engineer, to the proposed planting or to proper grading.

B. Seeding:
   1. Planting Seasons: The recommended seeding time is from April 1 to September 15. The Contractor may seed at other times. Regardless of the time of seeding, the Contractor shall be responsible for each seeded area until it is accepted.
   2. Weather Conditions:
      a. Do not perform seeding work when weather conditions are such that beneficial results are not likely to be obtained, such as drought, excessive moisture, or high winds.
      b. Stop the seeding work when, in the opinion of the Engineer, weather conditions are not favorable.
      c. Resume the work only when, in the opinion of the Engineer, conditions become favorable, or when approved alternate or corrective measures and procedures are placed into effect.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Seed:
   1. Provide the grass seed mixture approved by the Engineer, as detailed in the 2002 Connecticut Guidelines for Erosion and Sediment Control.
   2. Do not use seed which has become wet, moldy, or otherwise damaged in transit or during storage.

B. Topsoil:

1. Fertile, friable, natural topsoil typical of the locality, without admixture of subsoil, refuse or other foreign materials and obtained from a well-drained site. Mixture of sand, silt, and clay particles in equal proportions.
2. Free of stumps, roots, heavy of stiff clay, stones larger than 1-inch in diameter, lumps, coarse sand, weeds, sticks, brush or other deleterious matter.
3. Not less than 4 percent nor more than 20 percent organic matter.
4. Topsoil depth shall be 4-inches, unless otherwise indicated.

C. Lime:
1. Provide lime which is ground limestone containing not less than 85% of total carbonate and of such fineness that 90% will pass a No. 20 sieve and 50% will pass a No. l00 sieve.
2. Coarser materials will be acceptable provided the specified rates of application are increased proportionately on the basis of quantities passing a No. l00 sieve. No additional payment will be made to the Contractor for the increased quantity.

D. Fertilizer:
1. Provide a commercial fertilizer approved by the Engineer.
2. Provide fertilizer containing the following minimum percentage of nutrients by weight:
l0% Available phosphoric acid
l0% Available potash
l0% Available nitrogen (75% of the nitrogen shall be organic)

PART 3 - EXECUTION

3.1 PREPARATION

A. Equipment:
1. Provide all equipment necessary for the proper preparation of the ground surface and for the handling and placing of all required materials.
2. Demonstrate to the Engineer that the equipment will apply materials at the specified rates.

B. Soil: Perform the following work prior to the application of lime, fertilizer or seed.
1. Scarify the subgrade to a depth of 2 inches to allow the bonding of the topsoil with the subsoil.
2. Apply topsoil to a depth of 4 inches or as directed on areas to be seeded.
3. Trim and rake the topsoil to true grades free from unsightly variations, humps, ridges or depressions.
4. Remove all objectionable material and form a finely pulverized seed bed.

3.2 PERFORMANCE

A. Grading:
1. Grade the areas to be seeded as shown on the Drawings or as directed by the Engineer.
2. Leave all surfaces in even and properly compacted condition.
3. Maintain grades on the areas to be seeded in true and even conditions, including any necessary repairs to previously graded areas.

B. Placing Topsoil:
   1. Uniformly distribute and evenly spread topsoil on the designated areas.
   2. Spread the topsoil in such a manner that planting work can be performed with little additional soil preparation or tillage.
   3. Correct any irregularities in the surface resulting from top soiling or other operations to prevent the formation of depressions where water may stand.
   4. Thoroughly till the topsoil to a depth of at least 3 inches by plowing, harrowing, or other approved method until the condition of the soil is acceptable to the Engineer. The surface shall be cleared of all debris and or stones one inch or more in diameter.

C. Placing Fertilizer:
   1. Distribute fertilizer uniformly at a rate determined by the soils test over the areas to be seeded.
   2. Incorporate fertilizer into the soil to a depth of at least 3 inches by discing, harrowing, or other methods acceptable to the Engineer.
   3. The incorporation of fertilizer may be a part of the tillage operation specified above.
   4. Distribution by means of an approved seed drill equipped to sow seed and distribute fertilizer at the same time will be acceptable.

D. Placing Lime:
   1. Uniformly distribute lime immediately following or simultaneously with the incorporation of fertilizer.
   2. Distribute lime at a rate determined from the pH test, to a depth of at least 3 inches by discing, harrowing, or other methods acceptable to the Engineer.

E. Seeding:
   1. Fine rake and level out any undulations or irregularities in the surface resulting from tillage, fertilizing, liming or other operations before starting seeding operations.
   2. Hydroseeding:
      a. Hydroseeding may be performed where approved and with equipment approved by the Engineer.
      b. Sow the seed over designated areas at a minimum rate of 5 pounds per 1000 square feet.
      c. Seed and fertilizing materials shall be kept thoroughly agitated in order to maintain a uniform suspension within the tank of the hydroseeder.
      d. The spraying equipment must be designed and operated to distribute seed and fertilizing materials evenly and uniformly on the designated areas at the required rates.
   3. Drill Seeding:
      a. Drill seeding may be performed with approved equipment having drills not more than 2 inches apart.
      b. Sow the seed uniformly over the designated areas to a depth of l/2 inch and at a rate of 5 pounds per l,000 square feet.
   4. Broadcast Seeding:
      a. Broadcast seeding may be performed by equipment approved by the Engineer.

b. Sow the seed uniformly over the designated areas at a rate of 5 pounds per l,000 square feet.
c. Sow half the seed with the equipment moving in one direction and the remainder of the seed with the equipment moving at right angles to the first sowing.
d. Cover the seed to an average depth of l/2 inch by means of a brush harrow, spike-tooth harrow, chain harrow, cultipacker, or other approved devices.
e. Do not perform broadcast seeding work during windy weather.

F. Compacting:
1. Seeded areas must be raked lightly after sowing unless seeding is to be directly followed by application of an approved mulch.
2. Compact the entire area immediately after the seeding operations have been completed.
3. Compact by means of a cultipacker, roller, or other equipment approved by the Engineer weighing 60 to 90 pounds per linear foot of roller.
4. If the soil is of such type that a smooth or corrugated roller cannot be operated satisfactorily, use a pneumatic roller (not wobbly wheel) that has tires of sufficient size to obtain complete coverage of the soil.
5. When using a cultipacker or similar equipment, perform the final rolling at right angles to the prevailing slopes to prevent water erosion, or at right angles to the prevailing wind to prevent dust.

3.3 PROTECTION & MAINTENANCE

A. Protection:
1. Protect the seeded area against traffic or other use.
2. Erect barricades and place warning signs as needed.

B. Maintenance:
1. At the time of the first cutting, set mower blades two inches high. All lawns shall receive at least two mowings before acceptance. Coordinate schedule for mowing with Engineer.
2. Maintenance shall also include all temporary protection fences, barriers and signs and all other work incidental to proper maintenance.
3. Maintain grass areas until a full stand of grass is indicated, which will be a minimum of 45 days after all seeding work is completed, and shall not necessarily related to Substantial Completion of the General Contract.
4. Protection and maintenance of grass areas shall consist of watering, weeding, cutting, repair of any erosion and reseeding as necessary to establish a uniform stand for the specified grasses, and shall continue until Acceptance by the Engineer of the work of this section. It shall also include the furnishing and applying of such pesticides as are necessary to keep grass areas free of insects and disease. All pesticides shall be approved by Engineer prior to use.

3.4 ACCEPTANCE

A. At final acceptance of the project all areas shall have a close stand of grass with no weeds present and no bare spots greater than three inches (3") in diameter over greater than five percent (5%) of the overall seeded area.

END OF SECTION

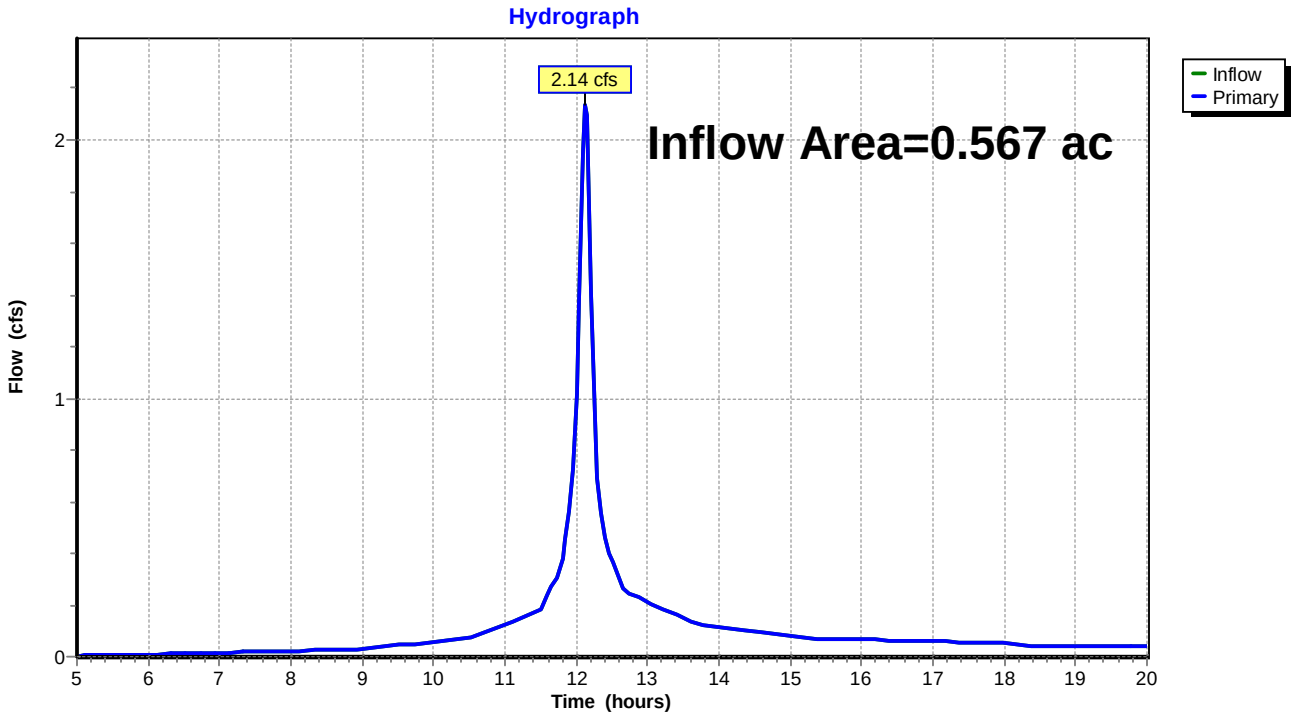
APPENDIX E: STORMWATER CALCULATIONS AND DESIGN INFORMATION

Summary for Pond 2P: Study Point 1 (Proposed)

Inflow Area = 0.567 ac, 61.61% Impervious, Inflow Depth > 2.89" for 10-yr event
Inflow = 2.14 cfs @ 12.13 hrs, Volume= 0.136 af
Primary = 2.14 cfs @ 12.13 hrs, Volume= 0.136 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 2P: Study Point 1 (Proposed)

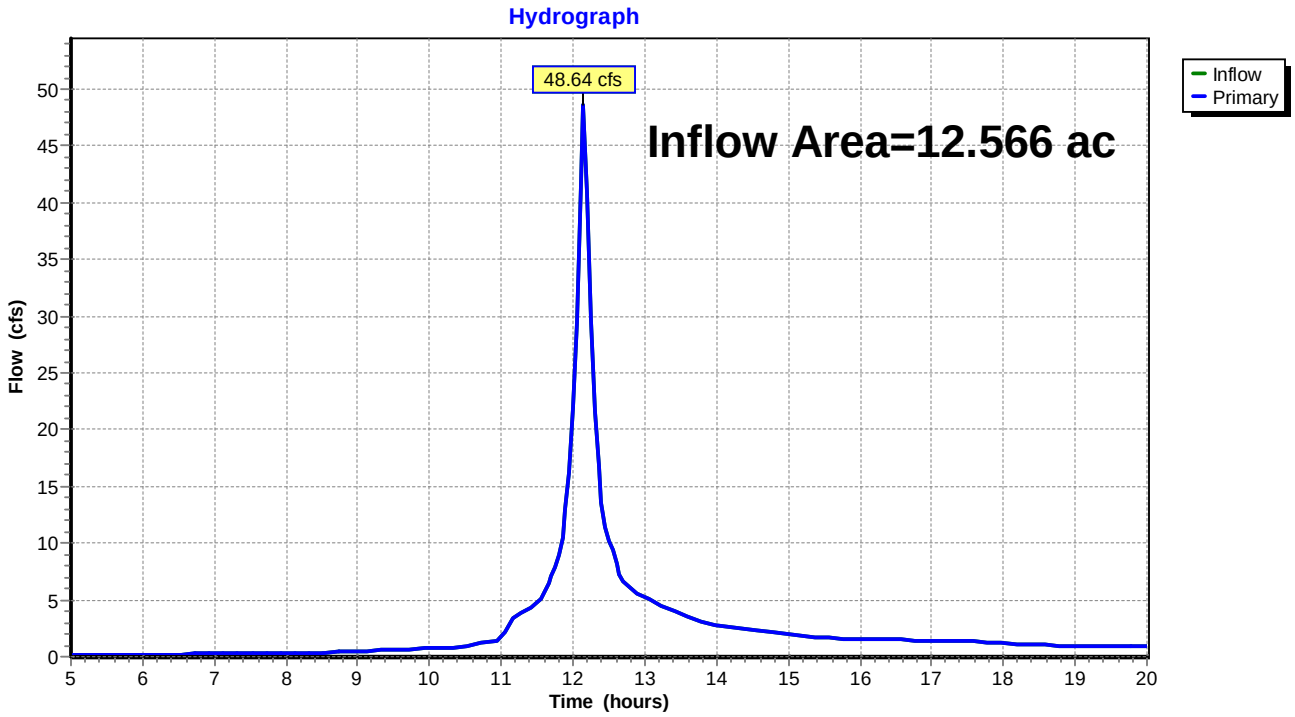


Summary for Pond 7P: Study Point 1 (Existing)

Inflow Area = 12.566 ac, 3.12% Impervious, Inflow Depth > 3.06" for 10-yr event
Inflow = 48.64 cfs @ 12.15 hrs, Volume= 3.207 af
Primary = 48.64 cfs @ 12.15 hrs, Volume= 3.207 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 7P: Study Point 1 (Existing)



Summary for Pond 13P: Study Point 2 (Existing)

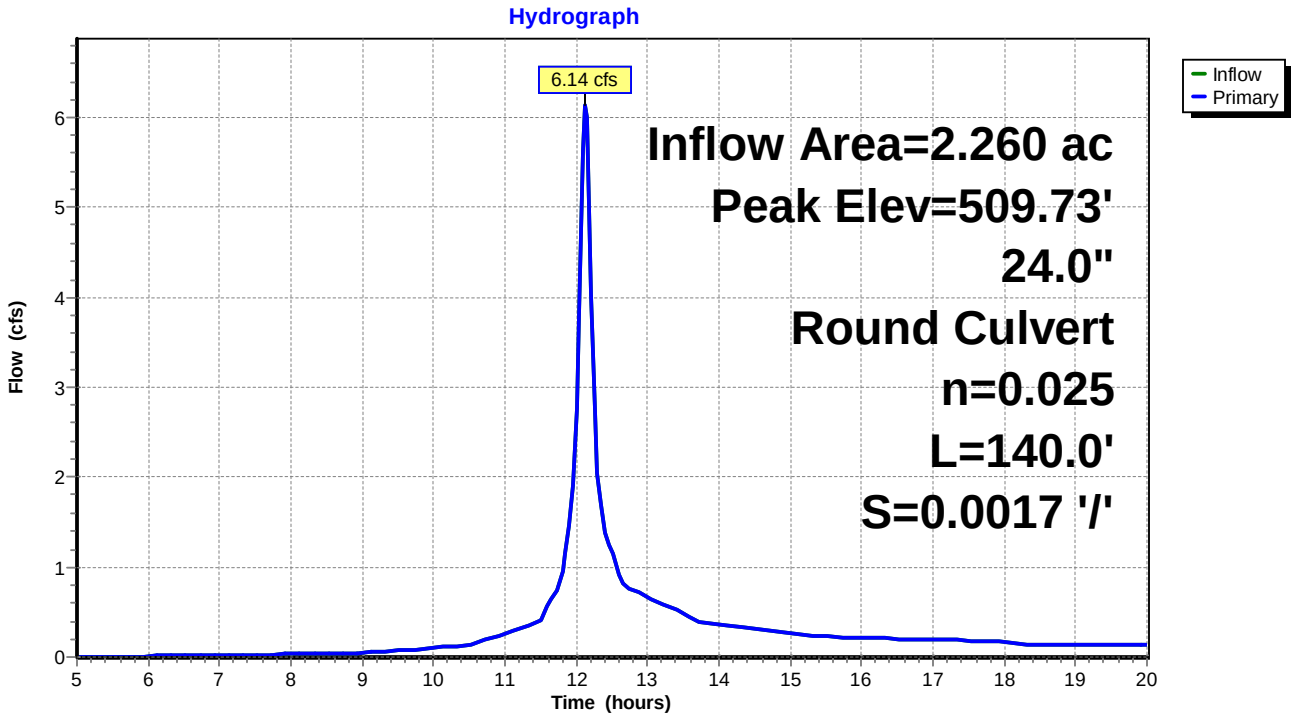
Inflow Area = 2.260 ac, 36.28% Impervious, Inflow Depth > 2.04" for 10-yr event
Inflow = 6.14 cfs @ 12.13 hrs, Volume= 0.383 af
Outflow = 6.14 cfs @ 12.13 hrs, Volume= 0.383 af, Atten= 0%, Lag= 0.0 min
Primary = 6.14 cfs @ 12.13 hrs, Volume= 0.383 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 509.73' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	507.83'	**24.0" Round Culvert** L= 140.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 507.83' / 507.59' S= 0.0017 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf

Primary OutFlow Max=5.88 cfs @ 12.13 hrs HW=509.68' (Free Discharge)
1=Culvert (Barrel Controls 5.88 cfs @ 2.53 fps)

Pond 13P: Study Point 2 (Existing)



Summary for Pond 21P: Study Point 2 (Proposed)

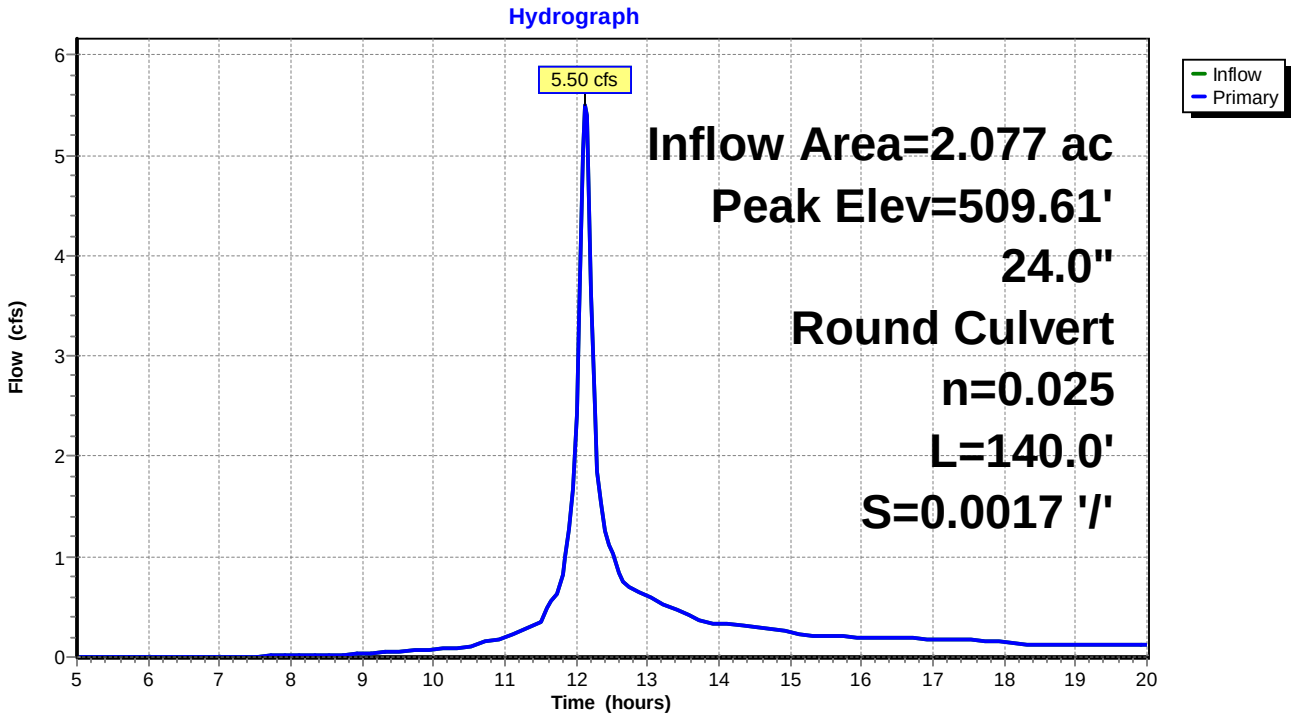
Inflow Area = 2.077 ac, 31.32% Impervious, Inflow Depth > 1.95" for 10-yr event
Inflow = 5.50 cfs @ 12.13 hrs, Volume= 0.338 af
Outflow = 5.50 cfs @ 12.13 hrs, Volume= 0.338 af, Atten= 0%, Lag= 0.0 min
Primary = 5.50 cfs @ 12.13 hrs, Volume= 0.338 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 509.61' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	507.83'	**24.0" Round Culvert** L= 140.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 507.83' / 507.59' S= 0.0017 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf

Primary OutFlow Max=5.27 cfs @ 12.13 hrs HW=509.56' (Free Discharge)
1=Culvert (Barrel Controls 5.27 cfs @ 2.44 fps)

Pond 21P: Study Point 2 (Proposed)



Summary for Pond 27P: Study Point 3 (Proposed)

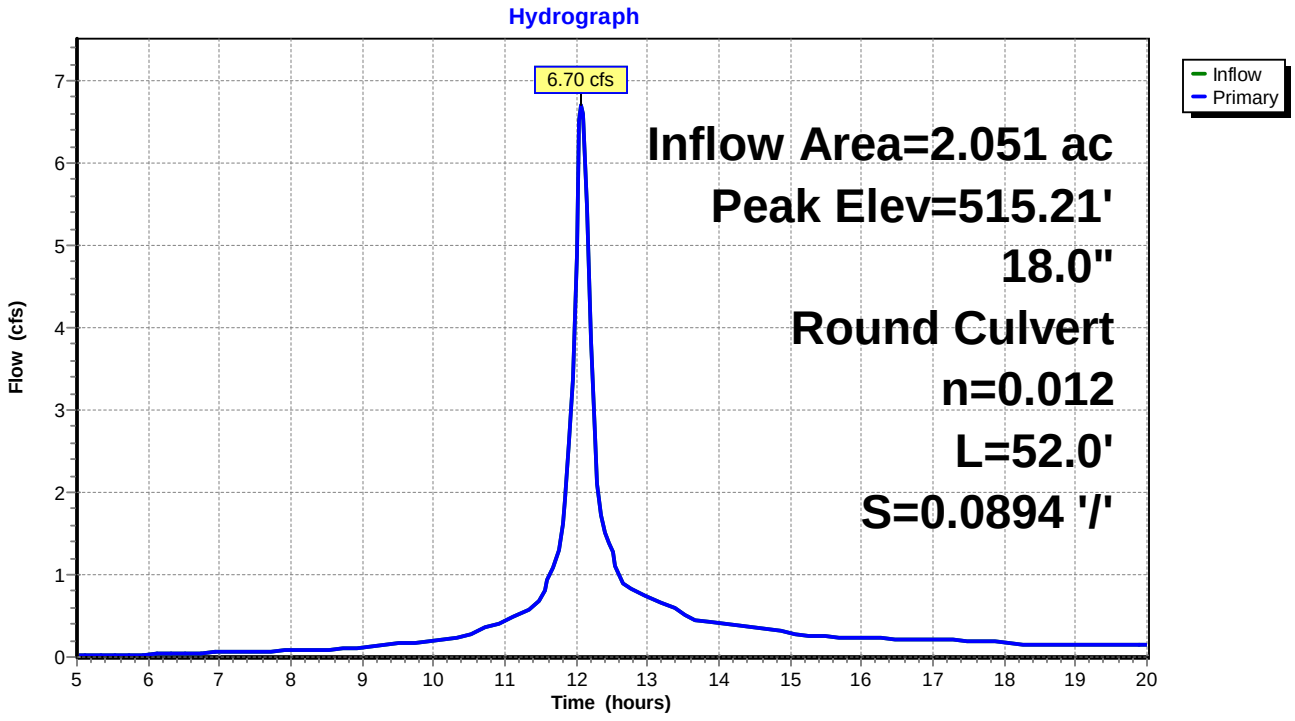
Inflow Area = 2.051 ac, 52.92% Impervious, Inflow Depth > 2.85" for 10-yr event
Inflow = 6.70 cfs @ 12.08 hrs, Volume= 0.487 af
Outflow = 6.70 cfs @ 12.08 hrs, Volume= 0.487 af, Atten= 0%, Lag= 0.0 min
Primary = 6.70 cfs @ 12.08 hrs, Volume= 0.487 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 515.21' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	513.85'	**18.0" Round Culvert** L= 52.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 513.85' / 509.20' S= 0.0894 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=6.55 cfs @ 12.08 hrs HW=515.19' (Free Discharge)
1=Culvert (Inlet Controls 6.55 cfs @ 3.94 fps)

Pond 27P: Study Point 3 (Proposed)



Summary for Pond 28P: Study Point 3 (Existing)

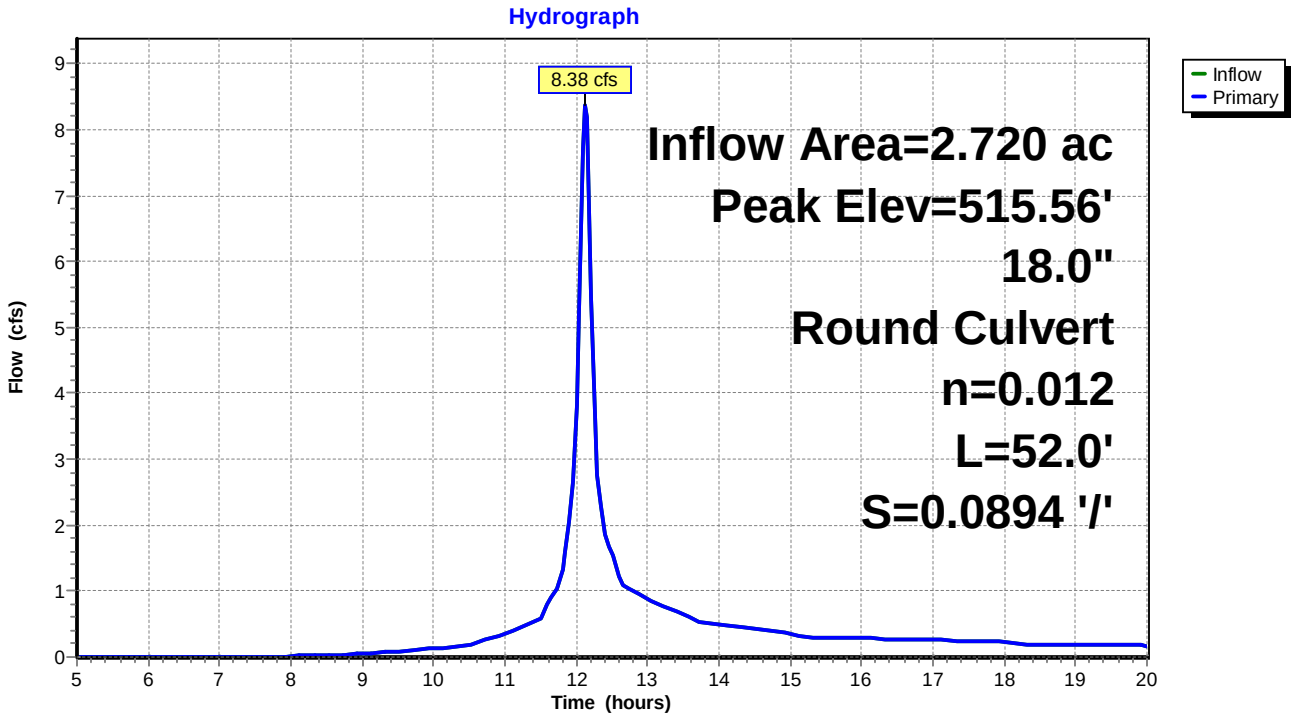
Inflow Area = 2.720 ac, 45.96% Impervious, Inflow Depth > 2.25" for 10-yr event
Inflow = 8.38 cfs @ 12.13 hrs, Volume= 0.510 af
Outflow = 8.38 cfs @ 12.13 hrs, Volume= 0.510 af, Atten= 0%, Lag= 0.0 min
Primary = 8.38 cfs @ 12.13 hrs, Volume= 0.510 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 515.56' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	513.85'	**18.0" Round Culvert** L= 52.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 513.85' / 509.20' S= 0.0894 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=8.02 cfs @ 12.13 hrs HW=515.49' (Free Discharge)
1=Culvert (Inlet Controls 8.02 cfs @ 4.54 fps)

Pond 28P: Study Point 3 (Existing)



Summary for Pond 35P: Study Point 4 (Existing)

Inflow Area = 5.540 ac, 10.83% Impervious, Inflow Depth > 2.05" for 10-yr event
Inflow = 15.46 cfs @ 12.13 hrs, Volume= 0.948 af
Outflow = 12.34 cfs @ 12.18 hrs, Volume= 0.948 af, Atten= 20%, Lag= 2.9 min
Primary = 12.34 cfs @ 12.18 hrs, Volume= 0.948 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 513.55' @ 12.18 hrs Surf.Area= 2,666 sf Storage= 2,159 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.9 min (801.4 - 800.6)

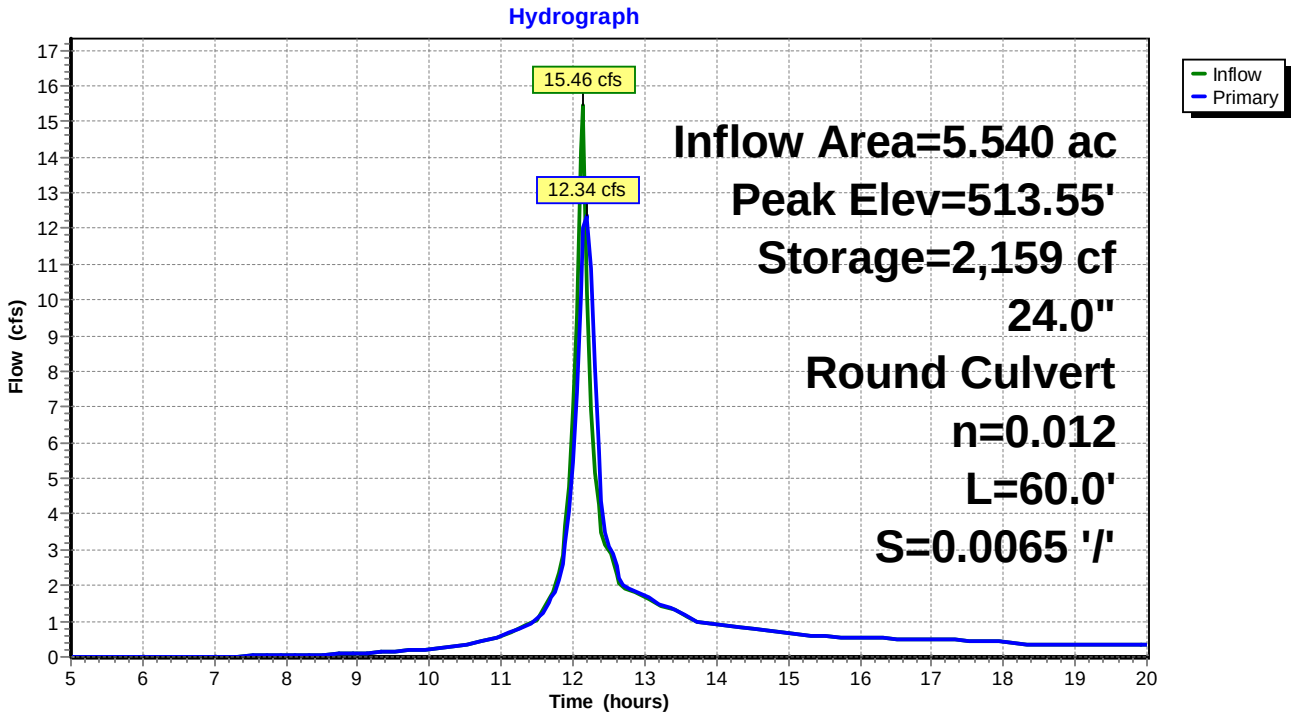
Volume	Invert	Avail.Storage	Storage Description
#1	512.00'	3,559 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
512.00	317	0	0
513.00	1,644	981	981
514.00	3,512	2,578	3,559

Device	Routing	Invert	Outlet Devices
#1	Primary	511.48'	**24.0" Round Culvert** L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 511.48' / 511.09' S= 0.0065 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=12.16 cfs @ 12.18 hrs HW=513.52' (Free Discharge)
1=Culvert (Inlet Controls 12.16 cfs @ 3.87 fps)

Pond 35P: Study Point 4 (Existing)



Summary for Pond 47P: Study Point 4 (Proposed)

Inflow Area = 6.183 ac, 32.64% Impervious, Inflow Depth > 2.83" for 10-yr event
Inflow = 23.07 cfs @ 12.13 hrs, Volume= 1.457 af
Outflow = 15.95 cfs @ 12.20 hrs, Volume= 1.457 af, Atten= 31%, Lag= 4.1 min
Primary = 15.95 cfs @ 12.20 hrs, Volume= 1.457 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 514.26' @ 12.20 hrs Surf.Area= 4,176 sf Storage= 4,550 cf

Plug-Flow detention time= 1.4 min calculated for 1.457 af (100% of inflow)
Center-of-Mass det. time= 1.4 min (779.9 - 778.5)

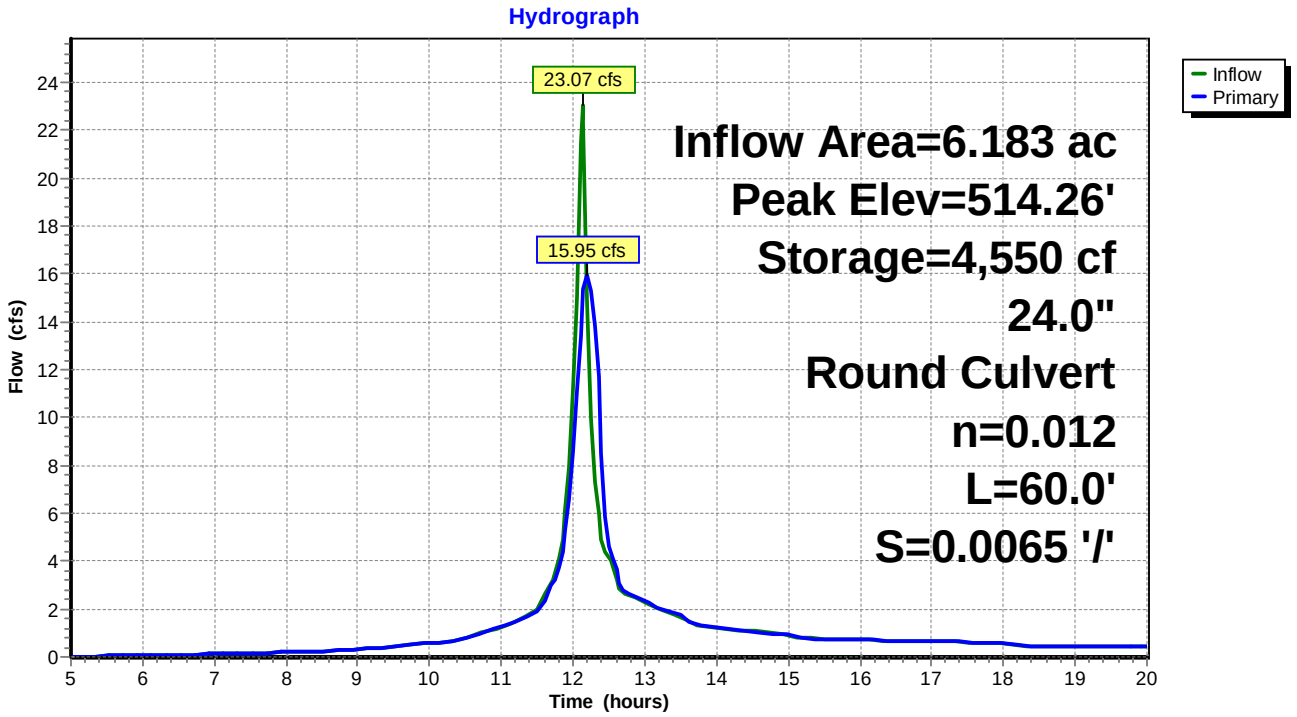
Volume	Invert	Avail.Storage	Storage Description
#1	512.00'	24,183 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
512.00	272	0	0
513.00	1,590	931	931
514.00	3,597	2,594	3,525
517.00	10,175	20,658	24,183

Device	Routing	Invert	Outlet Devices
#1	Primary	511.48'	**24.0" Round Culvert** L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 511.48' / 511.09' S= 0.0065 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=15.94 cfs @ 12.20 hrs HW=514.26' (Free Discharge)
1=Culvert (Inlet Controls 15.94 cfs @ 5.07 fps)

Pond 47P: Study Point 4 (Proposed)

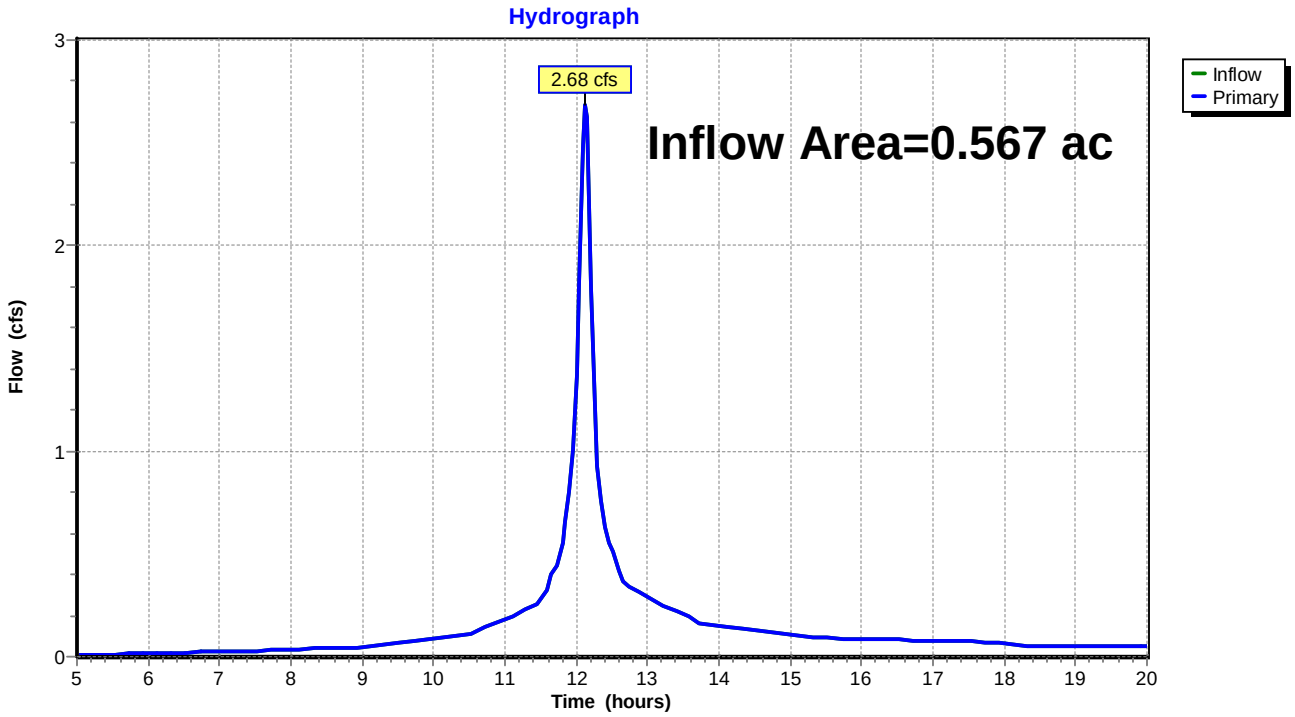


Summary for Pond 2P: Study Point 1 (Proposed)

Inflow Area = 0.567 ac, 61.61% Impervious, Inflow Depth > 3.94" for 25-yr event
Inflow = 2.68 cfs @ 12.13 hrs, Volume= 0.186 af
Primary = 2.68 cfs @ 12.13 hrs, Volume= 0.186 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 2P: Study Point 1 (Proposed)

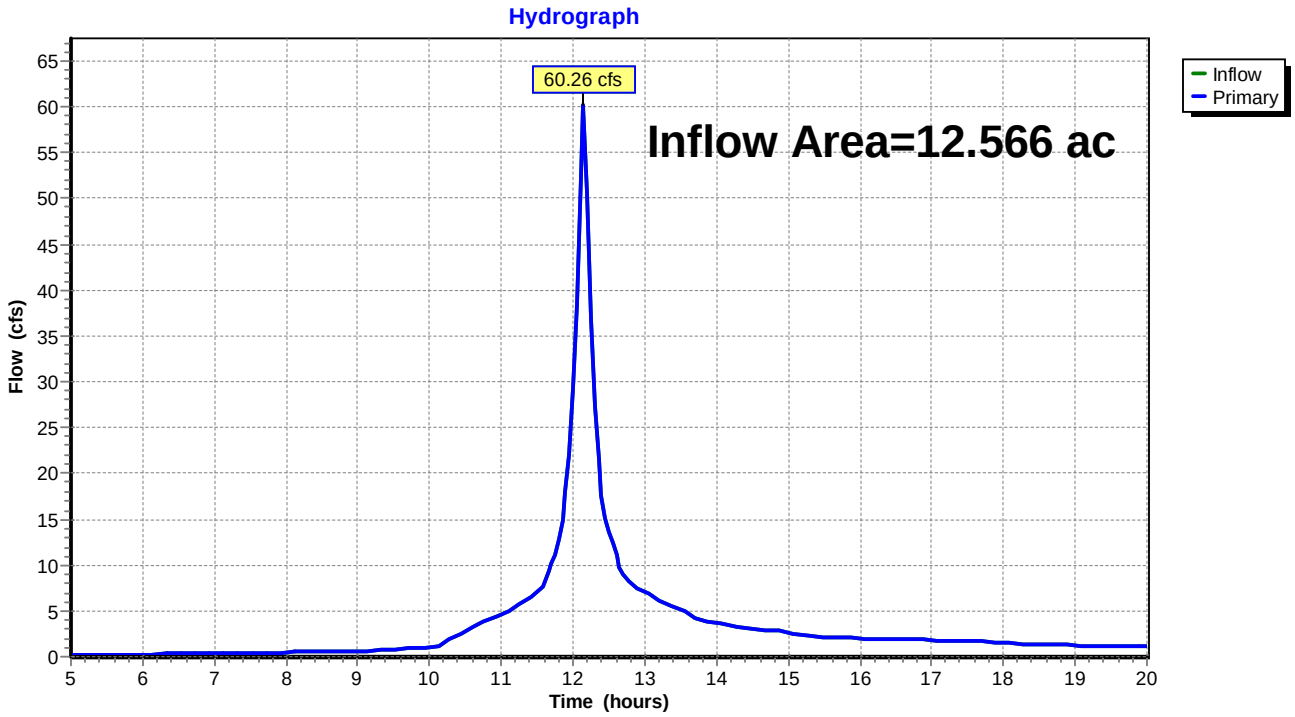


Summary for Pond 7P: Study Point 1 (Existing)

Inflow Area = 12.566 ac, 3.12% Impervious, Inflow Depth > 4.17" for 25-yr event
Inflow = 60.26 cfs @ 12.15 hrs, Volume= 4.363 af
Primary = 60.26 cfs @ 12.15 hrs, Volume= 4.363 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 7P: Study Point 1 (Existing)



Summary for Pond 13P: Study Point 2 (Existing)

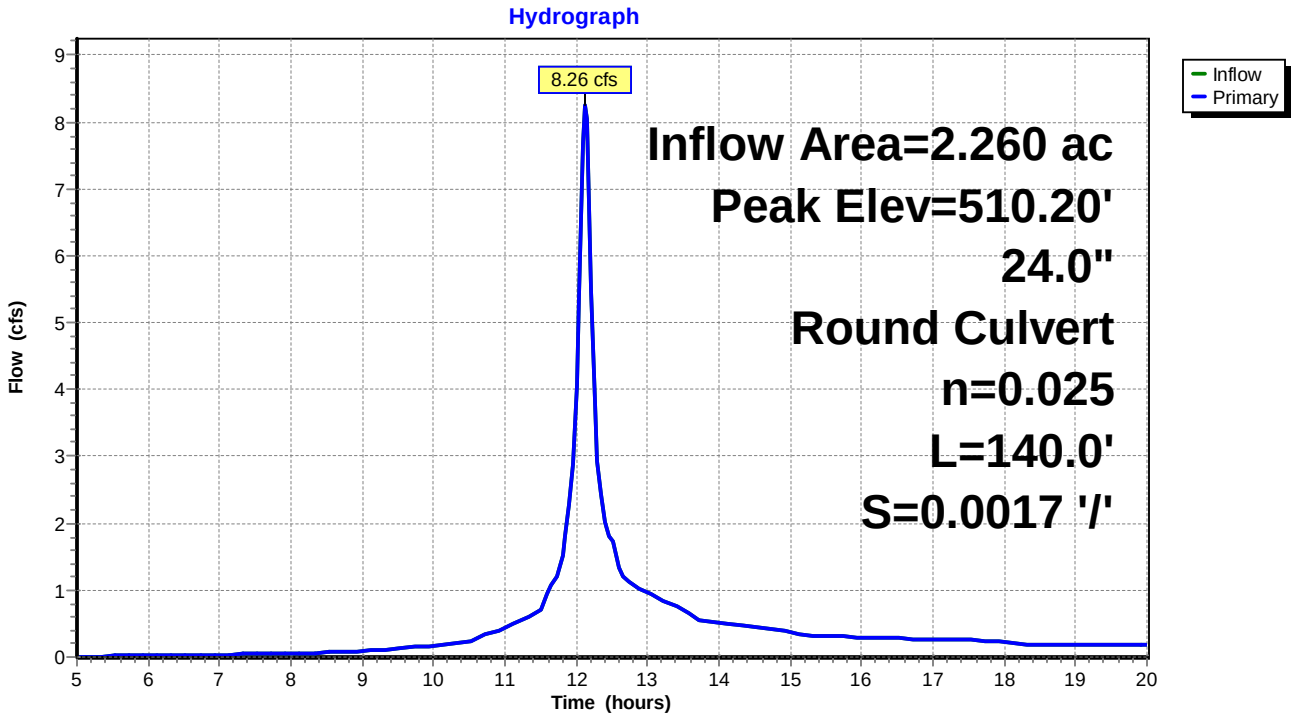
Inflow Area = 2.260 ac, 36.28% Impervious, Inflow Depth > 2.95" for 25-yr event
Inflow = 8.26 cfs @ 12.13 hrs, Volume= 0.556 af
Outflow = 8.26 cfs @ 12.13 hrs, Volume= 0.556 af, Atten= 0%, Lag= 0.0 min
Primary = 8.26 cfs @ 12.13 hrs, Volume= 0.556 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 510.20' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	507.83'	**24.0" Round Culvert** L= 140.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 507.83' / 507.59' S= 0.0017 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf

Primary OutFlow Max=7.92 cfs @ 12.13 hrs HW=510.12' (Free Discharge)
1=Culvert (Barrel Controls 7.92 cfs @ 2.76 fps)

Pond 13P: Study Point 2 (Existing)



Summary for Pond 21P: Study Point 2 (Proposed)

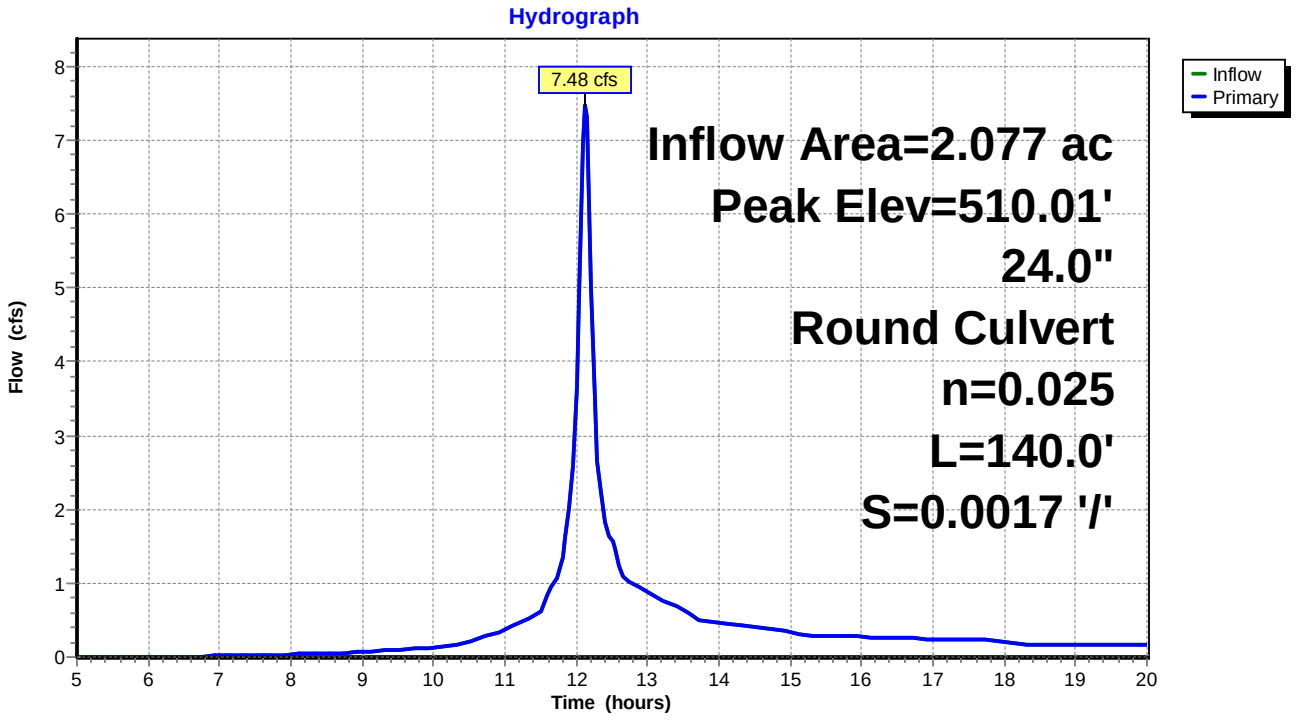
Inflow Area = 2.077 ac, 31.32% Impervious, Inflow Depth > 2.86" for 25-yr event
Inflow = 7.48 cfs @ 12.13 hrs, Volume= 0.496 af
Outflow = 7.48 cfs @ 12.13 hrs, Volume= 0.496 af, Atten= 0%, Lag= 0.0 min
Primary = 7.48 cfs @ 12.13 hrs, Volume= 0.496 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 510.01' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	507.83'	**24.0" Round Culvert** L= 140.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 507.83' / 507.59' S= 0.0017 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf

Primary OutFlow Max=7.17 cfs @ 12.13 hrs HW=509.94' (Free Discharge)
1=Culvert (Barrel Controls 7.17 cfs @ 2.68 fps)

Pond 21P: Study Point 2 (Proposed)



Summary for Pond 27P: Study Point 3 (Proposed)

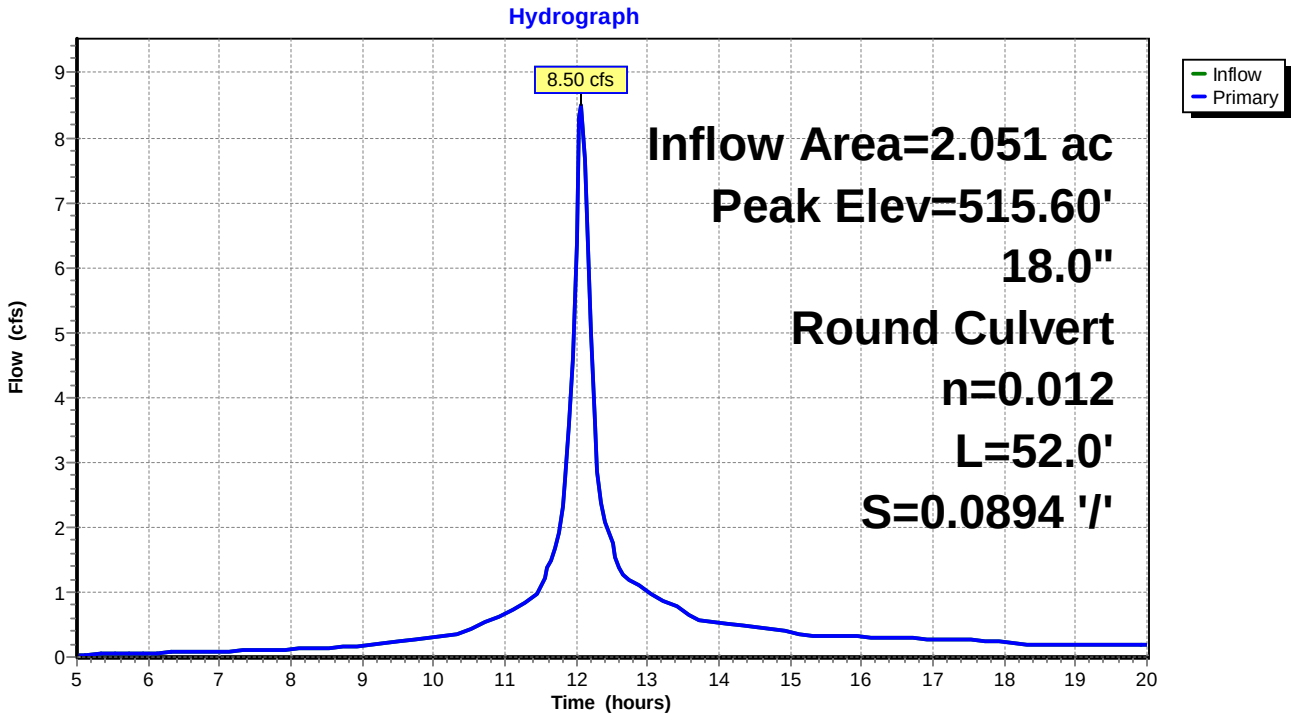
Inflow Area = 2.051 ac, 52.92% Impervious, Inflow Depth > 3.89" for 25-yr event
Inflow = 8.50 cfs @ 12.08 hrs, Volume= 0.665 af
Outflow = 8.50 cfs @ 12.08 hrs, Volume= 0.665 af, Atten= 0%, Lag= 0.0 min
Primary = 8.50 cfs @ 12.08 hrs, Volume= 0.665 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 515.60' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	513.85'	**18.0" Round Culvert** L= 52.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 513.85' / 509.20' S= 0.0894 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=8.33 cfs @ 12.08 hrs HW=515.56' (Free Discharge)
1=Culvert (Inlet Controls 8.33 cfs @ 4.71 fps)

Pond 27P: Study Point 3 (Proposed)



Summary for Pond 28P: Study Point 3 (Existing)

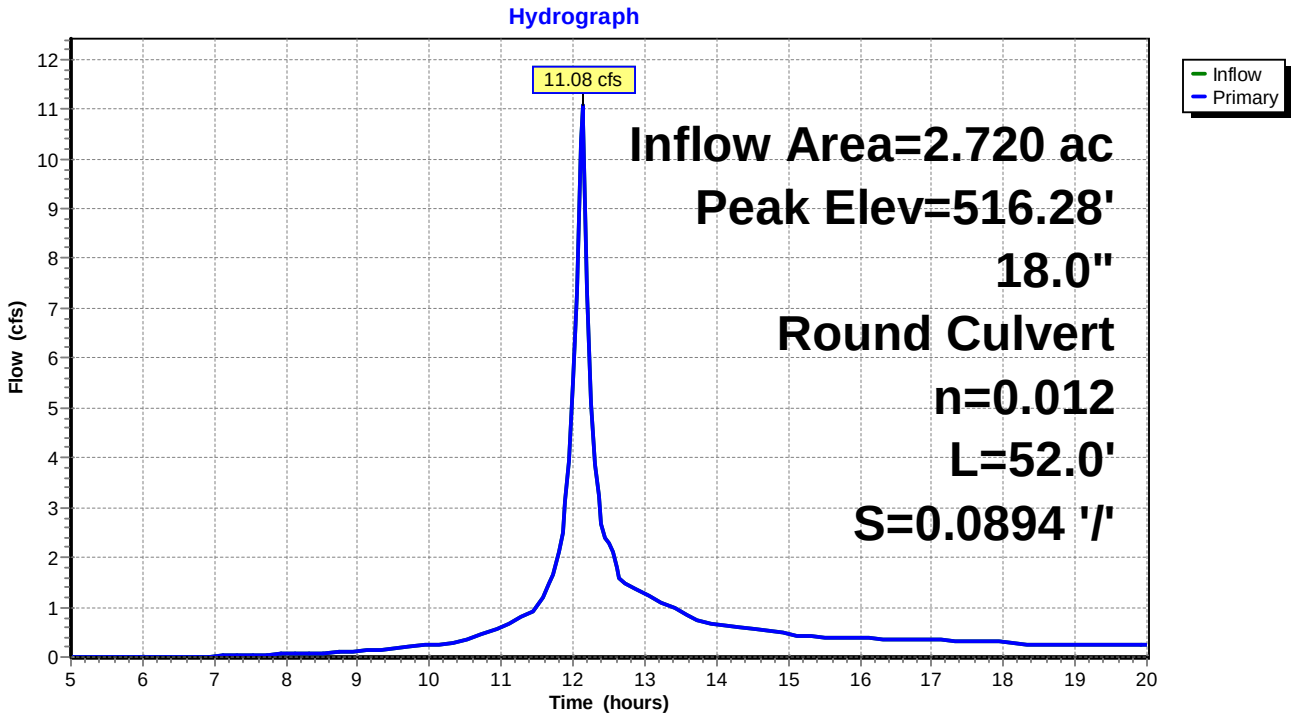
Inflow Area = 2.720 ac, 45.96% Impervious, Inflow Depth > 3.24" for 25-yr event
Inflow = 11.08 cfs @ 12.13 hrs, Volume= 0.734 af
Outflow = 11.08 cfs @ 12.13 hrs, Volume= 0.734 af, Atten= 0%, Lag= 0.0 min
Primary = 11.08 cfs @ 12.13 hrs, Volume= 0.734 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 516.28' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	513.85'	**18.0" Round Culvert** L= 52.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 513.85' / 509.20' S= 0.0894 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=10.62 cfs @ 12.13 hrs HW=516.16' (Free Discharge)
1=Culvert (Inlet Controls 10.62 cfs @ 6.01 fps)

Pond 28P: Study Point 3 (Existing)



Summary for Pond 35P: Study Point 4 (Existing)

Inflow Area = 5.540 ac, 10.83% Impervious, Inflow Depth > 2.99" for 25-yr event
Inflow = 20.79 cfs @ 12.13 hrs, Volume= 1.381 af
Outflow = 18.21 cfs @ 12.20 hrs, Volume= 1.381 af, Atten= 12%, Lag= 3.9 min
Primary = 18.21 cfs @ 12.20 hrs, Volume= 1.381 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 514.80' @ 12.20 hrs Surf.Area= 3,512 sf Storage= 3,559 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.2 min (792.5 - 791.3)

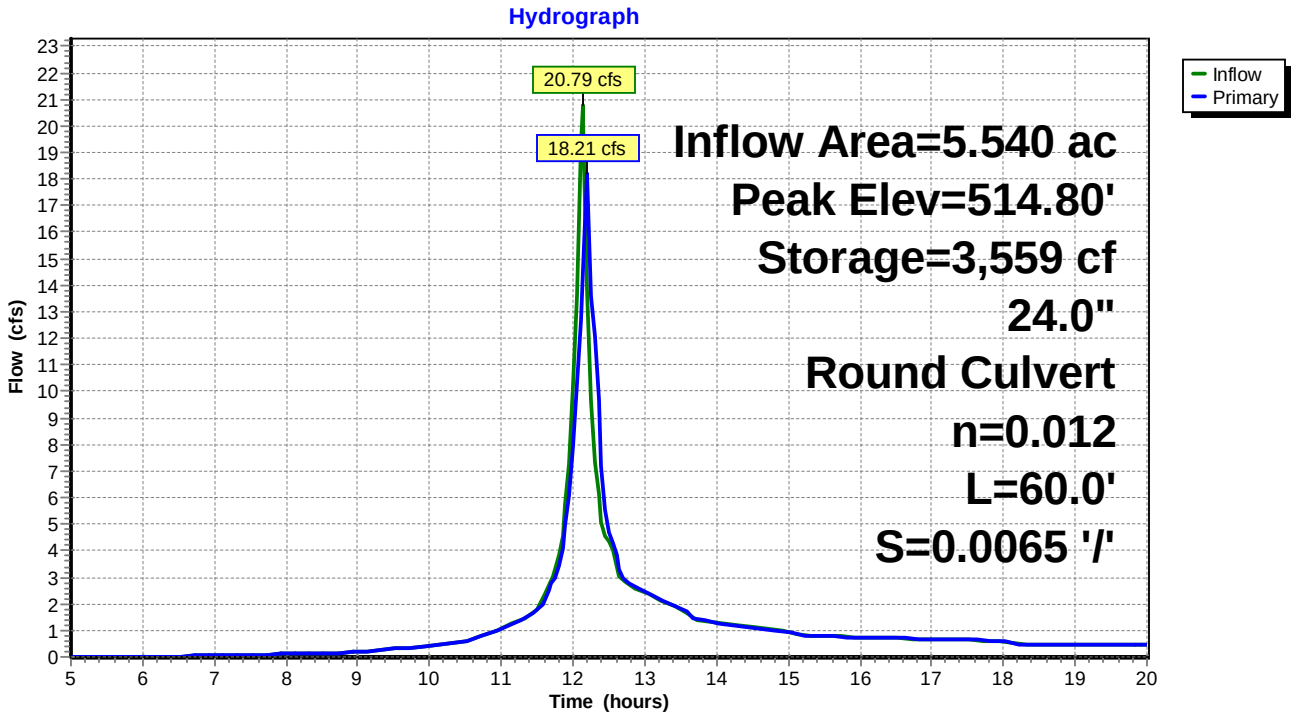
Volume	Invert	Avail.Storage	Storage Description
#1	512.00'	3,559 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
512.00	317	0	0
513.00	1,644	981	981
514.00	3,512	2,578	3,559

Device	Routing	Invert	Outlet Devices
#1	Primary	511.48'	**24.0" Round Culvert** L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 511.48' / 511.09' S= 0.0065 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=18.00 cfs @ 12.20 hrs HW=514.75' (Free Discharge)
1=Culvert (Inlet Controls 18.00 cfs @ 5.73 fps)

Pond 35P: Study Point 4 (Existing)



Summary for Pond 47P: Study Point 4 (Proposed)

Inflow Area = 6.183 ac, 32.64% Impervious, Inflow Depth > 3.89" for 25-yr event
Inflow = 29.08 cfs @ 12.13 hrs, Volume= 2.004 af
Outflow = 18.33 cfs @ 12.21 hrs, Volume= 2.004 af, Atten= 37%, Lag= 5.0 min
Primary = 18.33 cfs @ 12.21 hrs, Volume= 2.004 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 514.84' @ 12.21 hrs Surf.Area= 5,429 sf Storage= 7,295 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.9 min (772.8 - 770.9)

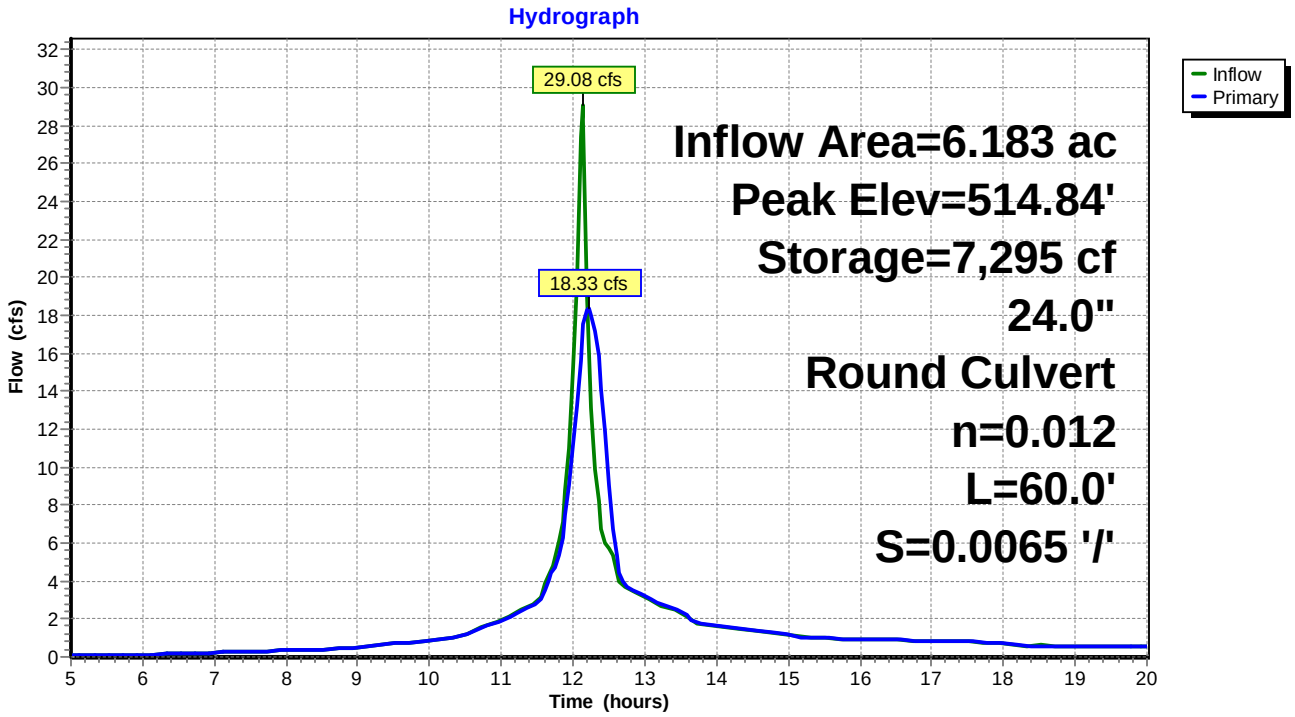
Volume	Invert	Avail.Storage	Storage Description
#1	512.00'	24,183 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
512.00	272	0	0
513.00	1,590	931	931
514.00	3,597	2,594	3,525
517.00	10,175	20,658	24,183

Device	Routing	Invert	Outlet Devices
#1	Primary	511.48'	**24.0" Round Culvert** L= 60.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 511.48' / 511.09' S= 0.0065 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=18.23 cfs @ 12.21 hrs HW=514.81' (Free Discharge)
1=Culvert (Inlet Controls 18.23 cfs @ 5.80 fps)

Pond 47P: Study Point 4 (Proposed)



WATERSHED BOUNDARY FOR STUDY AREA

STUDY POINT 1

3,000 GAL. FUEL TANK

PAD MOUNT TRANSFORMER

100-FOOT REGULATED UPLAND REVIEW LINE

ADMINISTRATION BUILDING

SEPTAGE RECEIVING TANK

SIPHON STRUCTURE

VACTOR DUMP STATION

PRELIMINARY TREATMENT BUILDING

ELECTRICAL ADDITION

ODOR CONTROL SYSTEM No.3

FILTRATE WETWELL

OPERATIONS BUILDING

MAINTENANCE GARAGE

ADMINISTRATION BUILDING

MOW STRIP BETWEEN BUILDING AND WALK

COLLECTION SYSTEM MAINTENANCE BUILDING

DROP SITE RECYCLING / STORAGE FACILITY

500 FLOOD LINE EL 525.00

BLENDED SLUDGE HOLDING TANK

THICKENED SLUDGE HOLDING TANK

PRIMARY SCUM BOX

WASTE SLUDGE HOLDING TANK No.2

GRAVITY THICKENER

CHEMICAL BUILDING

PRIMARY SETTLING TANK No.1

PRIMARY SETTLING TANK No.2

PRIMARY SETTLING TANK No.3

ELECTRICAL ROOM

DISTRIBUTION BOX No.1

FOG FRAC TANK No.1,2

FOG PUMP ROOM

WASTE SLUDGE HOLDING TANK No.1

DISTRIBUTION BOX No.2A

RETURN SLUDGE MIXING CHAMBER

DISTRIBUTION BOX No.3

AERATION TANK No.3

DISTRIBUTION BOX No.4

AERATION TANK No.4

PRIMARY PUMP GALLERY

AERATION TANK No.1

TERTIARY BUILDING

AERATION TANK No.2 (FUTURE)

FINAL SETTLING TANK No.1

FINAL SETTLING TANK No.2

FINAL SETTLING TANK No.3

STUDY POINT 4

100-FOOT REGULATED UPLAND REVIEW LINE

500 FLOOD LINE EL 525.00

SECONDARY SCUM BOX No.3

DISTRIBUTION BOX No.5A

SECONDARY SCUM BOX No.2

SECONDARY SCUM BOX No.3

EFFLUENT FLOW METER VAULT

100 FLOOD LINE EL 520.00

SECONDARY PUMP GALLERY No.2

STUDY POINT 2

EFFLUENT CHAMBER

CHLORINE CONTACT TANK

STUDY POINT 3

WATERSHED BOUNDARY FOR STUDY AREA

POST-DEVELOPED WATERSHED

SCALE: NTS

NO.	REVISIONS	DRAWN BY	APP'D
1	-	---	---
2			
3			

FIGURE NO. 11-2

REFERENCE: DWG C-10

FIGURE: FIG.11-2

CITY OF TORRINGTON, CONNECTICUT
WATER POLLUTION CONTROL FACILITY
COMPREHENSIVE UPGRADE
POST-DEVELOPED WATERSHED

PROJ NO: 13164D DATE: JUNE 2017

WRIGHT-PIERCE
Engineering a Better Environment

WATERSHED BOUNDARY FOR STUDY AREA

STUDY POINT 1

100-FOOT REGULATED UPLAND REVIEW LINE

ADMINISTRATION BUILDING

SIPHON STRUCTURE

VACTOR DUMP STATION

SEPTAGE RECEIVING STATION

MECHANICAL SCREEN BUILDING

PRIMARY SCUM BOX

PRIMARY PUMP GALLERY

PRIMARY SETTLING TANK No.1

PRIMARY SETTLING TANK No.2

PRIMARY SETTLING TANK No.3

DISTRIBUTION BOX No.1

DISTRIBUTION BOX No.2

THICKENER FILTRATE WETWELL

AUXILIARY SLUDGE HOLDING TANK No.2

FUEL OIL STORAGE TANK

OPERATIONS BUILDING

FOG PUMP ROOM

FOG FRAC TANKS No.1,2

THICKENED SLUDGE HOLDING TANKS No.1,2

COLLECTION SYSTEM MAINTENANCE BUILDING

GREENHOUSE

PRIMARY SLUDGE THICKENER

CHEMICAL BUILDING

WASTE SLUDGE HOLDING TANK No.1

WASTE SLUDGE HOLDING TANK No.2

SECONDARY PUMP GALLERY No.1

DISTRIBUTION BOX No.3

SECONDARY SCUM BOX No.1

AERATION TANK No.3

DISTRIBUTION BOX No.4

AERATION TANK No.4

AERATION TANK No.1

AERATION TANK No.2

CHLORINE CONTACT TANK No.2

FINAL SETTLING TANK No.1

FINAL SETTLING TANK No.2

FINAL SETTLING TANK No.3

DISTRIBUTION BOX No.5

FINAL SETTLING TANK No.4

FINAL SETTLING TANK No.5

DECHLORINATION TANK

POST AERATION TANK

OUTFALL PUMPS WETWELL

CHLORINE CONTACT TANK No.1

OUTFALL MANHOLE

SECONDARY SCUM BOX No.2

SECONDARY SCUM BOX No.3

SECONDARY PUMP GALLERY No.2

500 YEAR FLOOD LINE EL: 525.00

100-YEAR FLOOD LINE EL 520.00

STUDY POINT 2

STUDY POINT 3

STUDY POINT 4

NAUGATUCK RIVER

PRE-DEVELOPED WATERSHED

NOT TO SCALE

NO.	REVISIONS	DRAWN BY	APP'D
1	-	---	---
2			
3			

FIGURE: FIG.11-1

FIGURE NO. 11-1

REFERENCE: DWG C-2

CITY OF TORRINGTON, CONNECTICUT
WATER POLLUTION CONTROL FACILITY
COMPREHENSIVE UPGRADE
PRE-DEVELOPED WATERSHED

PROJ NO: 13164D DATE: JUNE 2017

WRIGHT-PIERCE
Engineering a Better Environment

BY JBR DATE 12/15/17

CHCKD. BY _____ DATE _____

WRIGHT-PIERCE
Engineering a Better Environment

SHEET NO. 1 OF 3

PROJECT NO. 13164D

PROJECT TORRINGTON WPCF RIPRAP APRONS

BOOK NO. _____

SIZE RIPRAP APRONS PER 11.13.2 OF CTDOT DRAINAGE MANUAL

STUDY POINT #1

Q 10YR EVENT - 2.14 CFS

TYPE A APRON

Q = VA 12" Ø PIPE A = 0.785 SF

V = 2.73 FPS (0.83 MPS)

Refer to Table 11-12 Min L = 3.0 FT

USING L = 10' MODIFIED RIPRAP

STUDY POINT #3

Q 10 YR EVENT - 6.70 CFS (TYPE B APRON)

Q = VA 18" Ø PIPE A = 1.76 SF

V = 3.79 FPS (1.15 MPS)

REFER TO TABLE 11-13 Min L = 3.9 FT

USING L = 17.5' MODIFIED RIPRAP

(TO match Bank conditions)

STUDY POINT 1 2 OF 3

OUTLET PROTECTION - OUTLET VELOCITY ≤ 4.27 meters/sec

DISCHARGE (cms)	OUTLET PIPE DIAMETER OR SPAN (mm)									
	300	375	450	600	750	900	1050	1200	1350	1500
0-0.142	***3.0***	***3.0***		***USE***						
0.170	3.6	3.4								
0.180		3.6	***3.5***							
0.190		3.7	3.6			***MINIMUM***				
0.210		4.0	3.8	***3.5***						
0.250		4.5	4.2	3.8						
0.275			4.5	4.0						
0.300			4.7	4.1				***LENGTH***		
0.325			5.0	4.3						
0.340				4.4	***4.0***					
0.350				4.5	4.1					
0.400		***USE***		4.8	4.3	***4.0***			***OUTLINED***	
0.450				5.2	4.6	4.2	***4.0***			
0.500				5.5	4.8	4.4	4.1			
0.550					5.0	4.6	4.3	***4.0***		
0.600					5.3	4.8	4.4	4.2		
0.650					5.5	4.9	4.6	4.3		
0.800			***PREFORMED***			5.5	5.0	4.6		
0.940						6.0	5.4	5.0		
1.000							5.6	5.1		
1.100							5.9	5.4	***5.0***	
1.250							6.3	5.7	5.3	***5.0***
1.300							6.5	5.9	5.4	5.1
1.500					***SCOUR***			6.3	5.8	5.4
1.700								6.8	6.2	5.7
1.900								7.3	6.6	6.1
2.200								8.0	7.2	6.6
2.500									7.8	7.1
2.850									8.5	7.7
3.250							***HOLE***			8.4
3.600										9.0

Table 11-12 - Length - L_a (meters)
Type A Riprap Apron

Notes: 1. Bold face outlined boxes indicate minimum L_a to be used for a given pipe diameter or span.
2. Rounding and interpolating are acceptable.

STUDY POINT 3 3 OF 3

OUTLET PROTECTION - OUTLET VELOCITY ≤ 4.27 meters/sec

DISCHARGE (cms)	OUTLET PIPE DIAMETER OR SPAN (mm)									
	300	375	450	600	750	900	1050	1200	1350	1500
0-0.142	***3.0***	***3.0***			***USE***					
0.170	4.0	3.7	***3.5***							
0.180		3.9	3.7	***3.5***		***MINIMUM***				
0.190		4.2	3.9	3.6						
0.200		4.4	4.1	3.7	**3.5**					
0.205		4.5	4.2	3.8	3.6					
0.227			4.5	4.0	3.7			***LENGTH***		
0.250			5.0	4.3	3.9					
0.275				4.6	4.1					
0.300				4.9	4.3	***4.0***				
0.320				5.1	4.5	4.2			***OUTLINED***	
0.340				5.3	4.7	4.3	***4.0***			
0.360		***USE***		5.5	4.8	4.4	4.1			
0.380					5.0	4.5	4.2	***4.0***		
0.410					5.2	4.7	4.4	4.1		
0.440					5.5	4.9	4.5	4.3		
0.500						5.3	4.8	4.5		
0.560						5.7	5.1	4.7		
0.620			***PREFORMED***			6.0	5.4	5.0		
0.660							5.6	5.1		
0.730							6.0	5.4	***5.0***	
0.800							6.3	5.7	5.3	***5.0***
0.850							6.5	5.9	5.4	5.1
1.000								6.5	6.0	5.5
1.120					***SCOUR***			7.0	6.4	5.9
1.250								7.5	6.8	6.3
1.370								8.0	7.2	6.6
1.500									7.6	7.0
1.630									8.1	7.4
1.750									8.5	7.7
1.975							***HOLE***			8.4
2.200										9.0

Table 11-13 - Length - L_a (meters)
Type B or C Riprap Apron

Notes: 1. Bold face outlined boxes indicate minimum L_a to be used for a given pipe diameter or span.
2. Rounding and interpolating are acceptable.

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD

Torrington WPCF
Torrington, CT

Area	0.33 ac	Unit Site Designation	WQU
Weighted C	0.6	Rainfall Station #	34
t_c	5 min		
CDS Model	2015-4	CDS Treatment Capacity	**1.4 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.02	9.7%	9.7%	0.00	0.00	9.4
0.04	9.7%	19.4%	0.01	0.01	9.4
0.06	9.8%	29.2%	0.01	0.01	9.5
0.08	7.7%	36.9%	0.02	0.02	7.4
0.10	8.0%	44.9%	0.02	0.02	7.7
0.12	5.4%	50.3%	0.02	0.02	5.2
0.14	4.7%	55.0%	0.03	0.03	4.5
0.16	5.5%	60.5%	0.03	0.03	5.3
0.18	3.5%	63.9%	0.04	0.04	3.3
0.20	4.1%	68.0%	0.04	0.04	3.9
0.25	6.5%	74.5%	0.05	0.05	6.2
0.30	5.5%	80.0%	0.06	0.06	5.2
0.35	4.0%	84.0%	0.07	0.07	3.8
0.40	2.0%	86.0%	0.08	0.08	1.9
0.45	2.1%	88.1%	0.09	0.09	2.0
0.50	2.0%	90.2%	0.10	0.10	1.9
0.75	5.1%	95.3%	0.15	0.15	4.7
1.00	2.5%	97.8%	0.20	0.20	2.3
1.50	1.8%	99.5%	0.30	0.30	1.6
2.00	0.5%	100.0%	0.40	0.40	0.4
					95.5
				Removal Efficiency Adjustment[2] =	6.5%
				Predicted % Annual Rainfall Treated =	93.5%
				Predicted Net Annual Load Removal Efficiency =	**89.0%**

1 - Based on 10 years of hourly precipitation data from NCDC station 806, Bridgeport WSO ARPT, Fairfield County, CT
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

INSTRUCTIONS:

Version 1, Automated: Mar. 4, 2008

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Location: Outfall #001 - NE Portion of site

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Street Sweeping - 10%	**0.10**	**1.00**	**0.10**	**0.90**
Deep Sump and Hooded Catch Basin	**0.25**	**0.90**	**0.23**	**0.68**
Wet Basin	**0.80**	**0.68**	**0.54**	**0.14**
	0.00	**0.14**	**0.00**	**0.14**
	0.00	**0.14**	**0.00**	**0.14**

Total TSS Removal = **87%**

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: **Torrington WPCF**

Prepared By: **JDP**

Date: **12/21/2017**

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed

1. From MassDEP Stormwater Handbook Vol. 1

TSS Removal Calculation Worksheet

Location: Outfall #002 - Parking/Primarys/Aeration

A BMP[1]	B TSS Removal Rate[1]	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Street Sweeping	**0.10**	**1.00**	**0.10**	**0.90**
	0.00	**0.90**	**0.00**	**0.90**
Dynamic Separator	**0.89**	**0.90**	**0.80**	**0.10**
	0.00	**0.10**	**0.00**	**0.10**
	0.00	**0.10**	**0.00**	**0.10**

Total TSS Removal = **90%**

to be Completed for Each Outlet or BMP Train

Project: **Torrington WPCF**

Prepared By: **JDP**

Date: **1/2/2018**

*Equals remaining load from previous BMP (E) which enters the BMP

INSTRUCTIONS:

Version 1, Automated: Mar. 4, 2008

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Location: Outfall #003 - Center Portion of Site

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Street Sweeping - 10%	**0.10**	**1.00**	**0.10**	**0.90**
Deep Sump and Hooded Catch Basin	**0.25**	**0.90**	**0.23**	**0.68**
Dry Well	**0.80**	**0.68**	**0.54**	**0.14**
	0.00	**0.14**	**0.00**	**0.14**
	0.00	**0.14**	**0.00**	**0.14**

Total TSS Removal = **87%**

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: **Torrington WPCF**

Prepared By: **JDP**

Date: **12/21/2017**

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed

1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:

Version 1, Automated: Mar. 4, 2008

1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Location: Outfall #004 - Southern Portion of Site

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Street Sweeping - 10%	**0.10**	**1.00**	**0.10**	**0.90**
Deep Sump and Hooded Catch Basin	**0.25**	**0.90**	**0.23**	**0.68**
Water Quality Swale - Wet	**0.70**	**0.68**	**0.47**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**
	0.00	**0.20**	**0.00**	**0.20**

Total TSS Removal = **80%**

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: **Torrington WPCF**

Prepared By: **JDP**

Date: **12/21/2017**

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed

1. From MassDEP Stormwater Handbook Vol. 1

APPENDIX F: INSPECTION FORMS

Torrington, CT
Water Pollution Control Facility Upgrade

Soil Erosion and Sedimentation Control Inspections

V. INSPECTION AND MAINTENANCE OF STORMWATER CONTROLS - TEMPORARY

Stormwater controls must be maintained in good operating condition until all disturbed soils are permanently stabilized. The following standard maintenance practices will apply to the erosion and sedimentation controls for the project:

- All erosion and sediment control measures will be properly maintained. If repairs or other maintenance is necessary, it will be initiated by the Contractor within 24 hours of report;
- Filter berms and/or silt fence will be inspected for proper installation and depth of accumulated sediment after each significant rainfall;
- Built up sediment will be removed from the filter berm or silt fence when it has reached one-third the height of the berm/fence and at end of the job;
- Erosion control measures will be maintained for areas of the site that have been disturbed but not stabilized;
- Erosion control measures will be installed and maintained for any construction staging area, fueling area, stockpiles, and material storage areas until those areas have been stabilized after construction; and,
- Temporary and permanent seeding and planting will be inspected for bare spots, washouts, and healthy growth.

If the inspections reveal the need for additional control devices to prevent erosion and sedimentation, the Contractor will promptly install additional protection devices as required. Control devices in need of repair will be repaired promptly after identification. A stockpile of 300 linear feet of silt fence will be maintained on the site and under cover for emergency repairs and routine maintenance.

VI. INSPECTION AND MAINTENANCE OF STORMWATER CONTROLS – PERMANENT

Water channels and culverts will be monitored for sediment buildup and cleaned as needed. Sediment shall be removed when it has reached a depth of one-third the height of the channel/culvert or has caused the channel/culvert to not function properly. Catch basins shall be maintained and have sumps monitored for excessive sediment deposits. The catch basins shall be cleaned annually or as needed based on monitoring.

The stormwater BMP will be inspected twice annually and following any rain event of 2.5-inches or more in a 24-hour period. Maintenance or rehabilitation of the system will be conducted as needed, and removal of trash and debris will be conducted during each inspection. Annually, the surface of the treatment swale shall be raked in the spring. Annually, the system will be inspected

for drawdown time and maintenance of the system will be conducted should the system not drain within 72 hours.

The operation and maintenance budget for this project will be determined by the City of Torrington. The City of Torrington Water Pollution Control Authority will be responsible for maintenance of the permanent stormwater controls on site.

VII. INSPECTION AND MAINTENANCE FORMS

The following forms address the controls required by the Contractor during the construction phase and the responsibilities of the owner upon completion of construction. All inspections shall follow criteria listed in the Maintenance Inspection Checklist section of the 2004 Connecticut Stormwater Quality Manual.

INSPECTION AND MAINTENANCE REPORT FORM

TO BE COMPLETED EVERY 14 DAYS AND/OR WITHIN 24 HOURS OF
A RAINFALL EVENT OF 0.5 INCHES OR MORE

SITE STABILIZATION

Inspector:_____ Date:_____

Days Since Last Rainfall:_____ Amount of Last Rainfall:____ Inches

Area	Date since last disturbed	Stabilized? (yes/no)	Stabilized with	Condition

Contractor's Superintendent: _____ Date:_____

Stabilization Action Required:

_____
_____
_____
_____
_____
_____

Performed by: _____ On or Before: _____

INSPECTION AND MAINTENANCE REPORT FORM

EROSION CONTROLS

Inspector: _____ Date: _____

Depth of material behind filter berm and/or silt fence	Condition of side slopes	Any evidence of overtopping of the filter berms/silt fence?	Condition of grassed channels and check dams

Contractor's Superintendent: _____ Date: _____

Maintenance action required for erosion controls:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Performed by: _____ On or Before: _____

INSPECTION AND MAINTENANCE REPORT FORM

CONSTRUCTION ACCESS

Inspector: _____ Date: _____

Is sediment being tracked onto road?	Is the gravel (stabilized entrance) clean or is it filled with sediment?	Does all traffic use the stabilized entrance to leave the site?

Contractor's Superintendent: _____ Date: _____

Maintenance action required to stabilize access road:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Performed by: _____ On or Before: _____

INSPECTION AND MAINTENANCE REPORT FORM

Inspector: _____ Date: _____

Contractor's Superintendent: _____

Changes required to the Construction Pollution Prevention Plan:

_____
_____
_____
_____

Reasons for changes:

_____
_____
_____
_____

I certify that the foregoing statements are, to the best of my knowledge, true and accurate.

Inspector
Signature: _____ Date: _____

Contractor's Superintendent
Signature: _____ Date: _____

APPENDIX G: PLAN CERTIFICATIONS

STORMWATER POLLUTION CONTROL PLAN
CERTIFICATION BY PERMITTEE (Town of Torrington)

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."

Permittee Signature

2/20/2018
Date

Permittee Name and Title: Ray Drew, Torrington WPCF Administrator

ATTACH REGISTRANT CERTIFICATIONS AND PROFESSIONAL ENGINEER DESIGN CERTIFICATION SUBMITTED WITH CTDEEP REGISTRATION

Note: If substantial engineered design changes are made, the Plan shall be updated and an updated P.E. design certification completed.

APPENDIX H: LIST OF CONTRACTORS AND SUBCONTRACTORS

- **Blank Form**
- **Completed Forms**

STORMWATER POLLUTION CONTROL PLAN
LIST OF CONTRACTORS AND SUBCONTRACTORS PERFORMING WORK AT THE SITE

Each contractor and subcontractor that will perform construction activities on the site that have the potential to cause pollution of the waters of the State will be identified in the SWPCP.

Site: Torrington Water Pollution Control Facility, Lower Bogue Road, Harwinton, CT
Project: Torrington WPCF Comprehensive Upgrade Project

Reproduce additional sheets as necessary.

Item		**CONTRACT NO.:**
Date of Notice to Proceed:		
1.	Company Name	
	Company Address	
	Company Phone Number	
	Contact Person Designated Responsible for SWPCP Compliance	
	Direct Phone Number of Contact Person	
	Is this Company the main Contractor or Subcontractor?	
	If Subcontractor, Name of main Contractor	
2.	Company Name	
	Company Address	
	Company Phone Number	
	Contact Person Designated Responsible for SWPCP Compliance	
	Direct Phone Number of Contact Person	
	Is this Company the main Contractor or Subcontractor?	
	If Subcontractor, Name of main Contractor	

STORMWATER POLLUTION CONTROL PLAN
LIST OF CONTRACTORS AND SUBCONTRACTORS PERFORMING WORK AT THE SITE

Item		**CONTRACT NO.:**
3.	Company Name	
	Company Address	
	Company Phone Number	
	Contact Person Designated Responsible for SWPCP Compliance	
	Direct Phone Number of Contact Person	
	Is this Company the main Contractor or Subcontractor?	
	If Subcontractor, Name of main Contractor	
4.	Company Name	
	Company Address	
	Company Phone Number	
	Contact Person Designated Responsible for SWPCP Compliance	
	Direct Phone Number of Contact Person	
	Is this Company the main Contractor or Subcontractor?	
	If Subcontractor, Name of main Contractor	
5.	Company Name	
	Company Address	
	Company Phone Number	
	Contact Person Designated Responsible for SWPCP Compliance	
	Direct Phone Number of Contact Person	
	Is this Company the main Contractor or Subcontractor?	
	If Subcontractor, Name of main Contractor	

APPENDIX I: CONTRACTOR AND SUBCONTRACTOR CERTIFICATIONS

- **Blank Form**
- **Completed Forms**

STORMWATER POLLUTION CONTROL PLAN
CONTRACTOR AND SUBCONTRACTOR CERTIFICATION FORM

The following certification form shall be signed by each contractor and subcontractor identified in the SWPCP that will perform construction activities on the site that have the potential to cause pollution of the waters of the State.

"I certify under penalty of the law that I have read and understand the terms and conditions of the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. I understand that as a contractor or subcontractor at the site, I am authorized by this general permit, and must comply with the terms and conditions of this general permit, including, but not limited to, the requirements of the Stormwater Pollution Control Plan prepared for the site."

_____ _____
Company Name: _____ Date
Company Address: _____
Company Phone Number: _____
Name of Signatory: _____
Title of Signatory: _____

If Subcontractor, Name of Contractor with whom subcontractor is directly contracted:
_____

Site: Torrington Water Pollution Control Facility, Lower Bogue Road, Harwinton, CT
Project: Torrington WPCF Comprehensive Upgrade Project
Contract: _____

APPENDIX J: STORMWATER MONITORING REPORT

Connecticut Department of
Energy & Environmental Protection
Bureau of Materials Management & Compliance Assurance
Water Permitting & Enforcement Division

General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities, issued 8/21/13, effective 10/1/13
Stormwater Monitoring Report

SITE INFORMATION

Permittee: _____

Mailing Address: _____

Business Phone: _____ ext.: _____ Fax: _____

Contact Person: _____ Title: _____

Site Name: _____

Site Address: _____

Receiving Water (name, basin): _____

Stormwater Permit No. GSN _____

SAMPLING INFORMATION (Submit a separate form for each outfall)

Outfall Designation: _____ Date/Time Collected: _____

Outfall Location(s) (lat/lon or map link): _____

Person Collecting Sample: _____

Storm Magnitude (inches): _____ Storm Duration (hours): _____

Size of Disturbed Area at any time: _____

MONITORING RESULTS

Sample #	Parameter	Method	Results (units)	Laboratory (if applicable)
1	Turbidity			
2	Turbidity			
3	Turbidity			
4	Turbidity			

(provide an attachment if more than 4 samples were taken for this outfall) Avg =

STATEMENT OF ACKNOWLEDGMENT

I certify that the data reported on this document were prepared under my direction or supervision in accordance with the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. The information submitted is, to the best of my knowledge and belief, true, accurate and complete.

Authorized Official: _____

Signature: _____ Date: _____

Please send completed form to:

DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION
BUREAU OF MATERIALS MANAGEMENT AND COMPLIANCE ASSURANCE
79 ELM STREET
HARTFORD, CT 06106-5127
ATTN: NEAL WILLIAMS

APPENDIX K: NOTICE OF TERMINATION FORM

General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities

Notice of Termination Form

Please complete and submit this form in accordance with the general permit (DEP-PED-GP-015) in order to ensure the proper handling of your termination. Print or type unless otherwise noted.

Note: Ensure that for commercial and industrial facilities, registrations under the *General Permit for the Discharge of Stormwater Associated with Industrial Activity* (DEP-PED-GP-014) or the *General Permit for the Discharge of Stormwater from Commercial Activities* (DEP-PED-GP-004) have been filed where applicable. For questions about the applicability of these general permits, please call the Department at 860-424-3018.

Part I: Registrant Information

1. Permit number: ***GSN***
2. Fill in the name of the registrant(s) as indicated on the registration certificate:

   Registrant:
3. Site Address:

   City/Town: State: Zip Code:
4. Date all storm drainage structures were cleaned of construction sediment:

   Date of Completion of Construction:

   Date of Last Inspection (must be at least three months after final stabilization pursuant to Section 6(b)(6)(D) of the general permit):
5. Check the post-construction activities at the site (check all that apply):

   ☐ Industrial ☐ Residential ☐ Commercial ☐ Capped Landfill

   ☐ Other (describe):

Part II: Certification

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."

Signature of Permittee	Date
Name of Permittee (print or type)	Title (if applicable)

Note: Please submit this Notice of Termination Form to:

STORMWATER PERMIT COORDINATOR
BUREAU OF WATER MANAGEMENT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

APPENDIX L: BLANK CERTIFICATION FOR SUBMITTAL OF DOCUMENTS OR REPORTS

STORMWATER POLLUTION CONTROL PLAN CERTIFICATION BY PERMITTEE (City of Torrington)

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."

Permittee Signature _____ Date 2/26/2018

Permittee Name and Title: Raymond E. Drew, WPCA Administrator

OR Duly Authorized Representative of the Permittee:

Name and Title: N/A

Company: _____

STORMWATER POLLUTION CONTROL PLAN CERTIFICATION BY PREPARER

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."

Individual Responsible for Preparing Document _____ Date 2-21-18

Name and Title: Jeffrey Pierce

Company: Wright-Pierce

WRIGHT-PIERCE
Engineering a Better Environment

Attachment E
Boring Logs

WRIGHT-PIERCE
Engineering a Better Environment

HALEY ALDRICH

TEST BORING REPORT

Boring No. B111

Project	Torrington WPCF, 252 Lower Bogue Rd, Harwinton, Connecticut
Client	Wright-Pierce
Contractor	General Borings, Inc.

File No. 42075-000
Sheet No. 1 of 3
Start May 4, 2015
Finish May 5, 2015
Driller J. Casson
H&A Rep. R. Genovesi
Elevation 514.0 (est.)
Datum Unknown
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	S	--	Rig Make & Model: ATV-mounted Diedrich Drill D-50
Inside Diameter (in.)	3.25"	1 3/8	--	Bit Type: Cutting Head
Hammer Weight (lb)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Casing: Spun
				Hoist/Hammer: Automatic Hammer
				PID Make & Model: None

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)
0	3 11 6 5	S1 18	0.0 2.0	513.8 0.3		-TOPSOIL- Medium dense light brown sandy GRAVEL, little silt, no odor, moist
5	5 7 13 26	S2 6	5.0 7.0			Medium dense brown SAND, some silt, no odor, moist -FILL-
	23 15 15 26	S3 16	7.0 9.0	507.0 7.0		Dense brown to orange-brown gravelly SAND, trace silt, no odor, moist
10	35 25 31 28	S4 12	10.0 12.0			Very dense tan to light brown gravelly SAND, trace silt, no odor, wet
15	8 8 9 10	S5 16	15.0 17.0			Medium dense tan to light brown fine to medium SAND, trace silt, no odor, wet -ALLUVIUM-
20						

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
05/05/15		DRILLING			9.5

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 55
Rock Cored (ft) -
Samples 10S
Boring No. B111

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None **Toughness**: L - Low M - Medium H - High **Plasticity**: N - Nonplastic L - Low M - Medium H - High **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

†**Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY ALDRICH

TEST BORING REPORT

Boring No. B111
File No. 42075-000
Sheet No. 2 of 3

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)
20	5 7 12 14	S6 14	20.0 22.0			Medium dense tan SAND, trace silt, no odor, wet
25	3 3 3 5	S7 12	25.0 27.0			Loose light brown SAND, trace silt, no odor, wet
30	3 4 5 6	S8 12	30.0 32.0			Loose brown fine to medium SAND, trace fine gravel, no odor, wet
35	5 7 6 6	S9 10	35.0 37.0			Similar to S8. Approximately 6 inches of running sands encountered prior to sampling. Added head of water, cleaned out running sands, then sampled.
45	50/1"	S10 0	45.0 45.1			No recovery. Drill action indicated probable cobble. -ALLUVIUM-

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. B111

HALEY ALDRICH

TEST BORING REPORT

Boring No. B111
File No. 42075-000
Sheet No. 3 of 3

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)
50						Boring advanced using HSA to 55 ft probing for bedrock. Bedrock not encountered.
						-ALLUVIUM-
55				459.0 55.0		BOTTOM OF EXPLORATION 55.0 FT

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. B111

HALEY ALDRICH

TEST BORING REPORT

Boring No. B112

Project	Torrington WPCF, 252 Lower Bogue Rd, Harwinton, Connecticut
Client	Wright-Pierce
Contractor	General Borings, Inc.

File No. 42075-000
Sheet No. 1 of 3
Start May 5, 2015
Finish May 5, 2015
Driller J. Casson
H&A Rep. R. Genovesi
Elevation 514.0 (est.)
Datum Unknown
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HW	S	NQ	Rig Make & Model: ATV-mounted Diedrich Drill D-50
Inside Diameter (in.)	4"	1 3/8	2	Bit Type: Roller Bit
Hammer Weight (lb)	300	140	-	Drill Mud: None
Hammer Fall (in.)	24	30	-	Casing: Driven
				Hoist/Hammer: Automatic Hammer
				PID Make & Model: None

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)
	4 8 12 10	S1 20	0.0 2.0	513.7 0.3		-TOPSOIL- Medium dense brown SAND, some gravel, little silt
	18 20 13 14	S2 4	2.0 4.0			Similar to S1, except little gravel and dense
	17 24 35 25	S3 10	5.0 7.0			Dense gray brown gravelly SAND, little silt, no odor, moist Environmental samples collected from 5.0 to 8.5 ft. VOCs collected at 6.0 ft
	13 8 10 25	S4 20	7.0 9.0	506.5 7.5		Similar to S3 Dense brown to orange-brown medium to fine SAND, little silt, no odor, moist.
				505.0 9.0		-FILL-
	14 29 45 46	S5 12	10.0 12.0			Very dense gray-brown gravelly SAND, little silt, no odor, wet
	4 4 6 7	S6 14	15.0 17.0			Medium dense light brown fine to medium SAND, trace silt, no odor, wet
	4 5 6 15	S7 12	20.0 22.0			Similar to S6
						-ALLUVIUM-

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
05/05/15		DRILLING			9

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 29
Rock Cored (ft) 10
Samples 9S, 2C

Boring No. B112

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None **Toughness**: L - Low M - Medium H - High **Plasticity**: N - Nonplastic L - Low M - Medium H - High **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

†Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY ALDRICH

TEST BORING REPORT

Boring No. B112
File No. 42075-000
Sheet No. 2 of 3

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)
	50/1"	S8 0	25.0 25.1			No recovery
						-ALLUVIUM
				485.0 29.0		Very dense gray-brown weathered rock
	50/4"	S9 2	30.0 30.3	483.0 31.0		-WEATHERED BEDROCK-
						SEE CORE BORING REPORT FOR ROCK DETAILS

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

Boring No. B112

CORE BORING REPORT

Boring No. B112

Project	Torrington WPCF, 252 Lower Bogue Rd, Harwinton, Connecticut
Client	Wright-Pierce
Contractor	General Borings, Inc.

File No. 42075-000
Sheet No. 1 of 3
Start May 5, 2015
Finish May 5, 2015
Driller J. Casson
H&A Rep. R. Genovesi
Elevation 514.0 (est.)
Datum Unknown
Location See Plan

	Casing	Sampler	Barrel
Type	HW	S	NQ
Inside Diameter (in.)	4"	1 3/8	2
Hammer Weight (lb)	300	140	-
Hammer Fall (in.)	24	30	-

Drilling Equipment and Procedures
Rig Make & Model: ATV-mounted Diedrich Drill D-50
Bit Type: Roller Bit
Drill Mud: None
Casing: Driven
Hoist/Hammer: , Automatic Hammer

Depth (ft)	Drilling Rate (min./ft)	Run No.	Run Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Elev./ Depth (ft)	Visual Description and Remarks
	2.1	C1	31.0 36.0	60 32	100 53		483.0 31.0	Hard, slightly weathered to fresh, gray to light grey medium to fine grained SCHIST. Primary joints parallel to foliation planes, tight to open, close, rough, undulating, slightly weathered. Secondary joints horizontal, tight to open, moderately spaced, slighily weathered.
	2							
	2.2							
	2.2							
35	2.3							
	2.1	C2	36.0 41.0	59 44	98 73			Similar to C1
	2							
	2.3							
	2.2							
40	2.3							
							473.0 41.0	-BEDROCK
45								
50								

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water
05/05/15		DRILLING			9

Sample Identification
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon
G - Geoprobe

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (lin. ft.) 29
Rock Cored (lin. ft.) 10
Samples 9S, 2C

Boring No. B112

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY ALDRICH

TEST BORING REPORT

Boring No. B113

Project	Torrington WPCF, 252 Lower Bogue Rd, Harwinton, Connecticut
Client	Wright-Pierce
Contractor	General Borings, Inc.

File No. 42075-000
Sheet No. 1 of 1
Start May 6, 2015
Finish May 6, 2015
Driller J. Casson
H&A Rep. R. Genovesi
Elevation 518.0 (est.)
Datum Unknown
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	S	--	Rig Make & Model: ATV-mounted Diedrich Drill D-50
Inside Diameter (in.)	3.25"	1 3/8	--	Bit Type: Cutting Head
Hammer Weight (lb)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Casing: Spun
				Hoist/Hammer: Automatic Hammer
				PID Make & Model: None

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)
0	4 7 9 10	S1 14	0.0 2.0	517.8 0.3		-FOREST MAT- Medium dense brown medium to fine SAND, some gravel, little silt, no odor, moist
	7 11 9 10	S2 12	2.0 4.0			Similar to S1
5	12 15 13 11	S3 6	5.0 7.0			Medium dense brown silty SAND, little gravel, no odor, moist
	10 6 8 10	S4 0	7.0 9.0			No recovery -FILL-
10	14 37 29 29	S5 3	10.0 12.0	508.0 10.0		Very dense light brown sandy GRAVEL, trace silt, no odor, moist. Gravel caught in sampler tip.
	39 75/3"	S6 6	12.0 12.7			Similar to S5 -ALLUVIUM-
15	15 19 31 47	S7 14	15.0 17.0			Dense brown gravelly SAND, trace silt, no odor, wet
				500.0 18.0		HSA refusal at 18 ft on probable bedrock BOTTOM OF EXPLORATION 18.0 FT

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
05/06/15		DRILLING			14

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (ft)	18
Rock Cored (ft)	-
Samples	7S

Boring No. B113

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None
Toughness: L - Low M - Medium H - High
Plasticity: N - Nonplastic L - Low M - Medium H - High
Dry Strength: N - None L - Low M - Medium H - High V - Very High

†**Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY ALDRICH

TEST BORING REPORT

Boring No. B114

Project	Torrington WPCF, 252 Lower Bogue Rd, Harwinton, Connecticut
Client	Wright-Pierce
Contractor	General Borings, Inc.

File No. 42075-000
Sheet No. 1 of 2
Start May 6, 2015
Finish May 6, 2015
Driller J. Wyatt
H&A Rep. R. Genovesi
Elevation 515.0 (est.)
Datum Unknown
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HW	S	NQ	Rig Make & Model: Truck-mounted Diedrich Drill D-50
Inside Diameter (in.)	4"	1 3/8	2	Bit Type: Roller Bit
Hammer Weight (lb)	300	140	-	Drill Mud: None
Hammer Fall (in.)	24	30	-	Casing: Driven
				Hoist/Hammer: Automatic Hammer
				PID Make & Model: None

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)
	2 3 6 5	S1 18	0.0 2.0	514.8 0.3		-TOPSOIL- Loose brown SAND, some silt no odor, moist
	5 3 2 3	S2 18	2.0 4.0	513.0 2.0		Loose black silty SAND, fibers and wood fragments, organic and petroleum odor mix, moist -BURIED SLUDGE-
	20 85 50/0"	S3 8	5.0 6.0	509.5 5.5		Medium dense gray silty SAND, no odor, moist Very dense gray fractured rock and gravel, slight petroleum odor, moist -FILL-
				508.0 7.0		Note: Began coring at 7 ft. See Core Report. SEE CORE BORING REPORT FOR ROCK DETAILS

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft)
Rock Cored (ft) 8.5
Samples 3S, 2C

Boring No. B114

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None **Toughness**: L - Low M - Medium H - High **Plasticity**: N - Nonplastic L - Low M - Medium H - High **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

†**Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

CORE BORING REPORT

Boring No. B114

Project	Torrington WPCF, 252 Lower Bogue Rd, Harwinton, Connecticut
Client	Wright-Pierce
Contractor	General Borings, Inc.

File No. 42075-000
Sheet No. 1 of 2
Start May 6, 2015
Finish May 6, 2015
Driller J. Wyatt
H&A Rep. R. Genovesi
Elevation 515.0 (est.)
Datum Unknown
Location See Plan

	Casing	Sampler	Barrel
Type	HW	S	NQ
Inside Diameter (in.)	4"	1 3/8	2
Hammer Weight (lb)	300	140	-
Hammer Fall (in.)	24	30	-

Drilling Equipment and Procedures
Rig Make & Model: Truck-mounted Diedrich Drill D-50
Bit Type: Roller Bit
Drill Mud: None
Casing: Driven
Hoist/Hammer: , Automatic Hammer

Depth (ft)	Drilling Rate (min./ft)	Run No.	Run Depth (ft)	Recovery/RQD in.	Recovery/RQD %	Weathering	Elev./ Depth (ft)	Visual Description and Remarks
	2	C1	7.0	30			508.0	Core indicated granite boulders and gravel.
	2			4			7.0	
	1.3							
10							505.0	
	2.5	C2	10.5	50			10.0	Medium to moderately hard, moderately weathered, highly fractured, light gray medium to fine-grained SCHIST. Primary joints parallel to foliation planes, very close, rough, undulation, open, slightly weathered.
	2.3			30				Hard, slightly weathered, gray to light gray medium to fine-grained SCHIST. Primary joints parallel to foliation planes, tight to open, close, rough, undulating, slightly weathered. Secondary joints horizontal, tight to open, moderately spaced, slightly weathered.
	2.5							
	2.4							
	2.5							
15							499.5	-BEDROCK-
							15.5	
20								
25								

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon
G - Geoprobe

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (lin. ft.)
Rock Cored (lin. ft.) 8.5
Samples 3S, 2C

Boring No. B114

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

HALEY ALDRICH

TEST BORING REPORT

Boring No. B115

Project	Torrington WPCF, 252 Lower Bogue Rd, Harwinton, Connecticut
Client	Wright-Pierce
Contractor	General Borings, Inc.

File No. 42075-000
Sheet No. 1 of 1
Start May 6, 2015
Finish May 6, 2015
Driller J. Wyatt
H&A Rep. R. Genovesi
Elevation 520.0 (est.)
Datum Unknown
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type	HSA	S	--	Rig Make & Model: Truck-mounted Diedrich Drill D-50
Inside Diameter (in.)	3.25"	1 3/8	--	Bit Type: Cutting Head
Hammer Weight (lb)	-	140	-	Drill Mud: None
Hammer Fall (in.)	-	30	-	Casing: Spun
				Hoist/Hammer: Winch Safety Hammer
				PID Make & Model: None

Depth (ft)	Sampler Blows per 6 in.	Sample No. & Rec. (in.)	Sample Depth (ft)	Stratum Change Elev/Depth (ft)	USCS Symbol	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION (Density/consistency, color, GROUP NAME, max. particle size†, structure, odor, moisture, optional descriptions GEOLOGIC INTERPRETATION)
0	5 10 21 25	S1 6	0.0 2.0	519.7 0.3		-TOPSOIL- Medium dense brown SAND, little silt, little gravel, no odor, moist
	20 32 20 14	S2 12	2.0 4.0			Very dense brown SAND, some gravel, little silt, no odor, moist
5	8 9 33 15	S3 12	5.0 7.0			Dense brown gravelly SAND, little silt, no odor, moist
	35 13 10 11	S4 12	7.0 9.0			Medium dense brown SAND, little fine gravel, little silt, no odor, moist -FILL-
	50/3" 0	S5	10.0 10.3	509.5 10.5		No recovery. HSA and sampler refusal at 10.5 ft likely on abandoned foundation. BOTTOM OF EXPLORATION 10.5 FT

Water Level Data					
Date	Time	Elapsed Time (hr.)	Depth (ft) to: Bottom of Casing	Bottom of Hole	Water
					NE

Sample ID
O - Open End Rod
T - Thin Wall Tube
U - Undisturbed Sample
S - Split Spoon Sample

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (ft) 6.5
Rock Cored (ft) -
Samples 5S
Boring No. B115

Field Tests: **Dilatancy**: R - Rapid S - Slow N - None **Toughness**: L - Low M - Medium H - High **Plasticity**: N - Nonplastic L - Low M - Medium H - High **Dry Strength**: N - None L - Low M - Medium H - High V - Very High

†**Note: Maximum particle size (mps) is determined by direct observation within the limitations of sampler size.**

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

APPENDIX B

PREVIOUS TEST BORING LOGS

W-21

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

HAMMER

CASING: WT. — FALL —

SAMPLER: WT 140 FALL 30

CLIENT: STEARNS & WHEELER

PROJECT: [illegible] CONN

SHEET 1 OF 1

LOCATION

HOLE NO. B-1

LINE & STA.

OFFSET

INSPECTOR:

DRILLER: R COOK JR

HELPER: D COOK

SAMPLER I.D. 1 3/8

CASING I.D. —

ALLSTATE NO. W-560

DATE, START 1-29-91

DATE, FINISH 1-30-91

GROUND ELEVATION

GROUND WATER DEPTH 6-0

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO. DEPTHS ELEV. FT.	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOILS, REMARKS (INCLUDE COLOR, GRADATION, TYPE OF SOIL, ETC. ROCK COLOR, TYPE, CONDITION, HARDNESS, DRILLING TIME, SEAMS, ETC.)
0	A	0-2-0	D-1	1-2-2-3		1-0	TOP SOIL
	U						
	G	2-4-0	D-2	2-31-46-51	VERY		F-M DK GR SAND LITTLE
	E				DENSE		C SAND SOME F-C GRAV.,
	R	4-5-2	D-3	59-100-120			LITTLE SILT
						5-2	
		6-0 TO	C-1	CORED 60"			ROLLER BIT FROM 5-2 TO 6-0
		11-0		REC. 56"			LT GREY-WHITE BEDROCK
10							WITH FRACTURES
		11-0 TO	C-2	CORED 60"			
		16-0		REC. 48"			
		16-0 TO	C-3	CORED 48"			
		20-0		REC. 39"			
20						20-0	
							E.O.B.
							RUN I CORED 6-0 TO 11-0
							CORED 60" REC. 56"
							CORE RECOVERY 93 %
							RQD 93 % - EXCELLENT
30							RUN 2 CORED 11-0 TO 16-0
							CORED 60" REC. 48"
							CORE RECOVERY 80 %
							RQD 73 % - FAIR
							RUN 3 CORED 16-0 TO 20-0
							CORED 48" REC. 39"
							CORE RECOVERY 81 %
							RQD 58 % - FAIR
40							

GROUND SURFACE TO 5-2 FT. USED AUGER CASING: THEN CORED FROM 6-0 TO 20-0 HOLE NO. B-1

Type of Sample: D = Dry, C = Cored, W = Washed, UP = Undisturbed Piston, TP = Test Pit, A = Auger, US = Undisturbed Shelby, V = Vane Test

Proportions Used: trace 0 to 10%, little 11 to 20%, some 21 to 35%, and 36 to 50%

Penetration Resistance 140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Med. Dense	5-8	M/Stiff
30-49	Dense	9-15	Stiff
50 +	Very Dense	16-30	V-Stiff
		31 +	Hard

Summary: Earth Boring 5-2; Rock Coring 14-0; Samples D-3 C-3

W-21

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

HAMMER

CASING: WT. — FALL —

SAMPLER: WT. 140 FALL 30

CLIENT: STEARNS & WHELEN

PROJECT: U.S. T.I. - CONN.

SHEET 1 OF 1

LOCATION

HOLE NO. B-2

LINE & STA.

OFFSET

INSPECTOR: M PRETNER

DRILLER: R COOK JR

HELPER: D COOK

SAMPLER I. D 3" / 18

CASING I. D —

ALLSTATE NO. W-560

DATE, START 1-29-91

DATE, FINISH 1-29-91

GROUND ELEVATION

GROUND WATER DEPTH 11'-0"

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO DEPTHS ELEV ft	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR GRADATION TYPE OF SOIL ETC ROCK COLOR TYPE CONDITION HARDNESS DRILLING TIME SEAMS ETC)	
	N U G E R S	0-2-0	D-1	13-15-21-14*		0-8	TOP SOIL F-C DK BR. SAND AND F-C GRAV. TR OF SILT AND COBBLES - FILL	
		2-4-0	D-2	32-18-18-21	DENSE			
		4-6-0	D-3	8-8-12-14				
		6-8-0	D-4	12-25-30-13				
		8-10-0	D-5	3-4-8-120	LOOSE			
0		10-11-5	—	120/3"-100*/3"	VERY DENSE	11-5		
		12-7 TO 17-8	C-1	CORED 62" REC. 62"			ROLLER BIT FROM 11'-5" TO 12'-7" LT GREY-WHITE - BEDROCK FRACTURED SOIL SEAM BETWEEN 17'-8" TO 18'-3" - UNABLE TO CONTROL SAND SEAM FROM RUNNING. ROLLER BIT FROM 18'-8 TO 20'-0" TO VERIFY BEDROCK.	5 5 6 6 6 3 2 1 3
20						20-0	E.O.B. * DENOTES 300 # HAM	
							RUN I CORED 12'-7" TO 17'-8" CORED 62" REC. 62" CORE RECOVERY 100% RQD 92% - EXCELLENT	
30								
40								

GROUND SURFACE TO 11'-5" FT. USED AUGER CASING: THEN CORED AND ROLLER BIT HOLE NO. B-2

Type of Sample: D = Dry C = Cored W = Washed; UP = Undisturbed Piston; TP = Test Pit A = Auger; US = Undisturbed Shelby; V = Vane Test

Proportions Used: trace 0 to 10%; little 11 to 20%; some 21 to 35%; and 36 to 50%

Penetration Resistance: 140 lb Wt falling 30" on 2" O.D. Sampler

Cohesionless Density			Cohesive Consistency	
	Very Loose	0-4	0-2	Very Soft
	Loose	5-9	3-4	Soft
Med	Dense	10-29	5-8	M/Stiff
	Dense	30-49	9-15	Stiff
Very	Dense	50 +	16-30	V Stiff
			31 +	Hard

Summary

Earth Boring 11'-5"

Rock Coring 8'-5"

Samples D-5, C-1

W-21

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

HAMMER

CASING: WT. — FALL —

SAMPLER: WT. 140 FALL 30

CLIENT: STEARNS & WHEELER

PROJECT: GUILFORD CONN.

SHEET 1 OF 1

LOCATION

HOLE NO. B-3

LINE & STA.

OFFSET

INSPECTOR:

DRILLER: R COOK JR

HELPER: D COOK

SAMPLER I. D. 1 3/8

CASING I. D. —

ALLSTATE NO.

DATE, START 1-30-91

DATE, FINISH 1-30-91

GROUND ELEVATION

GROUND WATER DEPTH 15.0

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO. DEPTHS ELEV. FT.	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR, GRADATION, TYPE OF SOIL, ETC. ROCK COLOR, TYPE, CONDITION, HARDNESS, DRILLING TIME, SEAMS, ETC.)
	A	0-2-0	D-1	14-20-12-30		1-0	TOP SOIL
	U				DENSE		F-M BR SAND TR OF
	G	2-2-8	D-2	43-120			C SAND LITTLE F-M GRAV.
	E						
	R	4-6-0	D-3	3-4-4-21	LOOSE		LITTLE SILT TR OF CONC.
	S						—FILL
		6-8-0	D-4	45-100-6-3			
		8-10-0	—	4-4-11-3	MED DENSE		
10							
		10-12-0	D-5	3-2-3-4	LOOSE		
		12-14-0	D-6	9-13-6-6	MED DENSE		
		14-16-0	D-7	3-4-4-3	LOOSE	15-0	
		16-17-0	—	4-10	MED DENSE		F-C DK GREY SAND AND F-C GRAV. SOME SILT
						17-7	
20							
							REFUSAL ON AUGER
30							
40							

GROUND SURFACE TO 17-7 FT. USED AUGER ~~CASING~~: THEN SAMPLE SPOON

HOLE NO. B-3

Type of Sample
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger
US = Undisturbed Shelby
V = Vane Test

Proportions Used	
trace	0 to 10%
little	11 to 20%
some	21 to 35%
and	36 to 50%

Penetration Resistance: 140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Med Dense	5-8	M/Stiff
30-49	Dense	9-15	Stiff
50 +	Very Dense	16-30	V Stiff
		31 +	Hard

Summary

Earth Boring 17-7

Rock Coring —

Samples D-7

W-21

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

HAMMER

CASING: WT. — FALL —

SAMPLER: WT. 140 FALL 30

CLIENT: STARA'S & WHEELER

PROJECT: G. W. T. P. CONN

SHEET 1 OF 1

LOCATION

HOLE NO B-4

LINE & STA.

OFFSET

INSPECTOR

DRILLER: A COOK JR

HELPER: D COOK

SAMPLER I. D. 1 3/8

CASING I. D. —

ALLSTATE NO. GW-560

DATE. START 1-28-91

DATE. FINISH: 1-28-91

GROUND ELEVATION

GROUND WATER DEPTH 15-0'

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO DEPTHS ELEV. FT	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS. REMARKS. REMARKS INCLUDE COLOR, GRADATION, TYPE OF SOIL, ETC. ROCK COLOR, TYPE, CONDITION, HARDNESS, DRILLING TIME, SEAMS, ETC.
0	A	0-2-0	D-1	6-8-12-14			TOP SOIL
	V					1-1	
	G	2-4-0	D-2	18-12-10-8	MED DENSE		F-M DK. BR SAND LITTLE F-M GRAV, LITTLE SILT - FILL
	E						
	R	4-6-0	D-3	8-8-3-3			
	S				LOOSE		F-M DK. BR SAND LITTLE SILT - FILL
		6-8-0	D-4	4-5-3-4			
		8-10-0	D-5	11-16-43-47			
						7-2	
10		10-12-0	D-6	43*-45*-46*	VERY DENSE		F-C DK. BR SAND AND F-C GRAV. LITTLE SILT
				-43*			
		12-14-0	D-7	32*-27*-34*			
				-25*			
		14-16-0	D-8	49-55-61-			
				59			
		16-17-0	D-9	63-67			
20		20-22-0	D-10	69-75-100			
				-81			
						23-0	
							REFUSAL ON AUGERS
							*DENOTES 300#/HAM
30							
40							

GROUND SURFACE TO 23-0 FT. USED AUGER CASING: THEN SAMPLE SPOON HOLE NO. B-4

Type of Sample: D = Dry, C = Cored, W = Washed, UP = Undisturbed Piston, TP = Test Pit, A = Auger, US = Undisturbed Shelby, V = Vane Test

Proportions Used: trace 0 to 10%; little 11 to 20%; some 21 to 35%; and 36 to 50%

Penetration Resistance, 140 lb Wt falling 30" on 2" O.D. Sampler

Cohesionless Density			Cohesive Consistency	
0-4	Very	Loose	0-2	Very Soft
5-9		Loose	3-4	Soft
10-29	Med	Dense	5-8	M/Stiff
30-49		Dense	9-15	Stiff
50 +	Very	Dense	16-30	V Stiff
			31 +	Hard

Summary: Earth Boring 23-0', Rock Coring —, Samples D-10

W-21

HAMMER

CASING: WT. — FALL —

SAMPLER: WT. 140 FALL 30

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

CLIENT: STEARNS & WHELER

PROJECT: WIL. TP. - CONN.

SHEET 1 OF 1

LOCATION

HOLE NO. B-5

LINE & STA.

OFFSET

INSPECTOR:

DRILLER: R COOK JR

HELPER: D COOK

SAMPLER I. D. 1 3/8"

CASING I. D. —

ALLSTATE NO. W-560

DATE, START 1-30-91

DATE, FINISH 1-31-91

GROUND ELEVATION

GROUND WATER DEPTH 1.5-0'

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO DEPTHS / ELEV FT	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST / MOISTURE	PROFILE CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR, GRADATION, TYPE OF SOIL ETC; ROCK COLOR, TYPE, CONDITION, HARDNESS, DRILLING TIME, SEAMS ETC)	
0	AUGER	0-2-0	D-1	3-6-8-7		1-0	TOP SOIL	
		2-4-0	D-2	6-6-4-5	MED DENSE		F-M DK BR SAND LITTLE F-C GRAV, LITTLE SILT SOME COBBLES -- ROCK	
		4-6-0	D-3	5-5-3-7				
		6-8-0	D-4	5-5-7-3				
		8-10-0	D-5	5-7-5-7				
10		10-12-0	D-6	2-4-6-4	LOOSE			
		12-13-0	D-7	80-120	MED DENSE	13-0		
		13-0 TO 14-8	C-1	CORED 20% REC. 10%		14-8	EXISTING CONC. TANK FLOOR	4 4
					MED DENSE		F-M DK BR SAND LITTLE SILT	
20							ROLLER BIT FROM 14-8 TO 25-2 REFUSAL ON ROLLER BIT.	
						25-2		
							REFUSAL ON ROLLER BIT	
30								

GROUND SURFACE TO 13-0 FT. USED AUGER CASING: THEN CORED AND ROLLER BIT HOLE NO. B-5

Type of Sample
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger
US = Undisturbed Shelby
V = Vane Test

Proportions Used
trace 0 to 10%
little 11 to 20%
some 21 to 35%
and 36 to 50%

Penetration Resistance
140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density			Cohesive Consistency	
		0-4	0-2	Very Soft
Very	Loose	5-9	3-4	Soft
	Loose	10-29	5-8	M/Stiff
Med	Dense	30-49	9-15	Stiff
	Dense	50 +	16-30	V Stiff
Very	Dense		31 +	Hard

Summary
Earth Boring 23-4'
Rock Coring 1-8'
Samples D-7, C-1

W-21

HAMMER

CASING: WT. — FALL —

SAMPLER: WT. 140 FALL 30"

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

CLIENT: STEARNS & WHEELER

PROJECT: NEW T.P. CONN.

SHEET 1 OF 1

LOCATION

HOLE NO. B-6

LINE & STA.

OFFSET

INSPECTOR:

DRILLER: R COOKE

HELPER: D COOKE

SAMPLER I D 1 3/8"

CASING I D —

ALLSTATE NO. W-560

DATE, START 1-31-91

DATE, FINISH 1-31-91

GROUND ELEVATION

GROUND WATER DEPTH 10-0"

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO DEPTHS ELEV FT	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR GRADATION TYPE OF SOIL ETC; ROCK COLOR TYPE CONDITION HARDNESS DRILLING TIME SEAMS ETC)
0	4	0-2-0	D-1	1-4-36-16		0-8	TOP SOIL
	6						F-M DK BR SAND LITTLE F-C
	6	2-4-0	D-2	8-6-6-7	MED		GRAV. LITTLE SILT AND
	E				DENSE		LOAM - FILL
	12	4-6-0	D-3	8-8-12-15			
	5					5-3	
		6-8-0	D-4	56-26-33-41	VERY		F-C DK BR SAND AND
							F-C GRAV. TR OF SILT
		8-10-0	D-5	56-64-67-79	DENSE		
10							
		10-12-0	D-6	21-23-25-21			
						11-5"	
		12-14-0	D-7	26-24-27-20	DENSE		F-M DK BR SAND SOME C
							SAND TR OF SILT
		14-16-0	D-8	19-20-18-15			
		16-17-0	D-9	14-14			
					MED		
					DENSE		
20							
		20-22-0	D-10	5-5-5-8			
							F-M DK BR SAND SOME C
							SAND TR OF F-M GRAV.
							TR OF SILT (RUNNING)
		25-27-0	D-11	8-10-12-12			
						27-0	
							E.O.B.
30							
40							

GROUND SURFACE TO 25-0 FT. USED AUGER CASING: THEN SAMPLE SPOON

HOLE NO. B-6

Type of Sample
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger
US = Und-sturbed Shelby
V = Vane Test

Proportions Used
trace 0 to 10%
little 11 to 20%
some 21 to 35%
and 36 to 50%

Penetration Resistance
140 lb Wt falling 30" on 2" O.D. Sampler

Cohesionless Density			Cohesive Consistency	
0-4	Very	Loose	0-2	Very Soft
5-9		Loose	3-4	Soft
10-29	Med	Dense	5-8	M. Stiff
30-49		Dense	9-15	Stiff
50 +	Very	Dense	16-30	V Stiff
			31 +	Hard

Summary
Earth Boring 27.0'
Rock Coring —
Samples D-11

W-21

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

HAMMER

CASING: WT. — FALL —

SAMPLER WT 140 FALL 30

CLIENT: STEVENS & WHEELER

PROJECT: [illegible] TP. - CONN.

SHEET 1 OF 2

LOCATION

HOLE NO B-1

LINE & STA.

OFFSET

INSPECTOR:

DRILLER: B COOK JR.

HELPER: D COOK

SAMPLER I D 1⅜ 3 O

CASING I D ----

ALLSTATE NO. W-566

DATE, START 2-1-91

DATE, FINISH: 2-1-91

GROUND ELEVATION

GROUND WATER DEPTH 7-0"

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO DEPTHS ELEV FT	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR GRADATION TYPE OF SOIL ETC FOR ROCK COLOR TYPE CONDITION HARDNESS DRILLING TIME SEAMS ETC)
-0	A	0-2-0	D-1	4-6-31-33		1-0	TOP SOIL
	U				VERY		F-M DK BR SAND LITTLE
	G	2-4-0	D-2	42-47-47	DENSE		FINE GRAV, LITTLE SILT -
	E					3-0	FILL
	R	4-6-0	D-3	2-2-2-3			F DK BR-BLACK SAND
	S				LOOSE		LITTLE SILT AND ORGANIC
		6-8-0	D-4	1-2-2-2		6-0	SILT - FILL
							F DK BR SAND LITTLE
-10		8-10-0	D-5	6-9-12-24	LOOSE		SILT TR. OF ROOT MATERIAL
						8-7	(SUBSOIL)
		10-12-0	D-6	34-26-34-38			
							F-C DK BR SAND AND
		12-14-0	D-7	74-100-5 4"			F-C GRAV. TR OF SILT
				- 46 ±	VERY		
		14-16-0	D-8	40 ± - 35 ± - 22	DENSE		
				- 21			
		16-17-0	D-9	27-25			
						18-0	
-20							F-C DK BR-GREY SAND
		20-22-0	D-10	3-10-12-14	MED		TR OF FINE GRAV. TR OF
					DENSE		SILT (RUNNING)
		25-27-0	D-11	2-2-2-3	LOOSE		
-30							
		30-32-0	D-12	12-10-14-30	DENSE		F-C DK BR SAND TR OF
							FINE GRAV. TR OF SILT
							(RUNNING)
		35-37-0	D-13	21-24-24-23			
						38-5	
-40							

GROUND SURFACE TO 40-0 FT. USED AUGER CASING: THEN SAMPLE SPOON

HOLE NO. B-1

Type of Sample
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger
US = Undisturbed Shelby
V = Vane Test

Proportions Used
trace 0 to 10%
little 11 to 20%
some 21 to 35%
and 36 to 50%

Penetration Resistance
140 lb Wt falling 30" on 2" O D Sampler

Cohesionless Density			Cohesive Consistency	
		0-4	0-2	Very Soft
Very	Loose	5-9	3-4	Soft
	Loose	10-29	5-8	M/Stiff
Med	Dense	30-49	9-15	Stiff
	Dense	50 +	16-30	V-Stiff
Very	Dense		31 +	Hard

Summary
Earth Boring 42-0'
Rock Coring —
Samples D-14

W-21

HAMMER

CASING: WT. — FALL —

SAMPLER: WT. 140 FALL 30

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

CLIENT: STRANS PLUMBER

PROJECT: W-WTP - CONN

SHEET 1 OF 2

LOCATION

HOLE NO. B-1

LINE & STA.

OFFSET

INSPECTOR

DRILLER: R COOK JR

HELPER: D COOK

SAMPLER I. D 3" O 1 3/8

CASING I. D. —

ALLSTATE NO W-560

DATE, START 2-1-91

DATE, FINISH 2-1-91

GROUND ELEVATION

GROUND WATER DEPTH -7-0-

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO DEPTHS / ELEV FT	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST / MOISTURE	PROFILE CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOILS, REMARKS. REMARKS INCLUDE COLOR GRADATION TYPE OF SOIL ETC. ROCK COLOR TYPE CONDITION HARDNESS DRILLING TIME SEAMS ETC
0		40-42-0	D-14	19-20-20-21	DENSE	42-0	F-C DK BR SAND LITTLE F-C GRAV. TR OF SILT
							E.O.B.
							*DENOTES 300# HAMM
10							
20							
30							
40							

GROUND SURFACE TO 40-0 FT. USED AUGER CASING THEN SPLIT SPOON HOLE NO. B-1

Type of Sample: D=Dry C=Cored W=Washed; UP=Undisturbed Piston; TP=Test Pit A=Auger; US=Undisturbed Shelby; V=Vane Test

Proportions Used: trace 0 to 10%; little 11 to 20%; some 21 to 35%; and 36 to 50%

Penetration Resistance, 140 lb. Wt falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Med Dense	5-8	M/Stiff
30-49	Dense	9-15	Stiff
50 +	Very Dense	16-30	V Stiff
		31 +	Hard

Summary: Earth Boring 42-0; Rock Coring —; Samples D-14

W-21

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

HAMMER

CASING: WT. — FALL —

SAMPLER WT 140 FALL 30

CLIENT: [illegible]

PROJECT: [illegible] — CONN.

SHEET 1 OF 1
LOCATION
HOLE NO. B-8
LINE & STA
OFFSET

INSPECTOR:
DRILLER: R COOK JR
HELPER: D COOK

SAMPLER I.D. 1 3/8
CASING I.D. —

ALLSTATE NO. W-560
DATE, START 1-31-91
DATE, FINISH 2-8-91

GROUND ELEVATION
GROUND WATER DEPTH 7-0

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO. DEPTHS ELEV. FT	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR, GRADATION, TYPE OF SOIL ETC. ROCK COLOR, TYPE, CONDITION, HARDNESS, DRILLING TIME, SEAMS ETC.)	
0	A	0-2-0	D-1	1-3-10-25		0-8	TOP SOIL	
	U				DENSE		F-C DK BR SAND AND F-C	
	G	2-4-0	D-2	10-6-4-4		2-0	GRAV. LITTLE SILT-FILL	
	E							
	R	4-6-0	D-3	2-2-4-7	LOOSE		F-M DK BR SAND LITTLE SILT	
	S							
		6-8-0	D-4	10-12-14-20				
						7-3		
		8-10-0	D-5	30-42-31-29	VERY		F-C DK BR-RUSTY SAND	
10					DENSE		AND F-C GRAV. LITTLE SILT	
		10-12-0	D-6	120-32*-45*-32*				
		12-14-0	D-7	48*-46*-42*-32*			F-C DK BR-GREY SAND AND F-C GRAV. LITTLE SILT	
		14-16-0	D-8	32*-35*-59-61				
		16-17-0	D-9	55-69			F-C DK BR SAND AND F-C GRAV. LITTLE SILT	
20						20-7		
		20-20-7	D-10	50*-100*	VERY BROKEN		DK GREY-PURPLE-BEDROCK	3
		20-7 TO 22-7	—	NO REC.			(FROM 20-7 TO 22-7, VERY	3
		22-7 TO 25-7	C-1	CORED 36" REC. 36"			BROKEN-UP BEDROCK AND	3
							SOIL - NO REC.) WITH	6
						25-7	FRACTURES	6
30							E.O.B.	
40								

*DENOTES 300# HAM

CORE FROM 20-7 TO 22-7
CORED 24" REC. 0"
CORE FROM 22-7 TO 25-7
CORED 36" REC. 36"
CORE RECOVERY 60%
RQD 57%-FAIR

GROUND SURFACE TO 20-7 FT. USED AUGERS CASING: THEN CORED TO 25-7

HOLE NO. B-8

Type of Sample: D = Dry, C = Cored, W = Washed, UP = Undisturbed Piston, TP = Test Pit, A = Auger, US = Undisturbed Shelby, V = Vane Test

Proportions Used: trace 0 to 10%, little 11 to 20%, some 21 to 35%, and 36 to 50%

Penetration Resistance — 140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density: 0-4 Very Loose, 5-9 Loose, 10-29 Med. Dense, 30-49 Dense, 50+ Very Dense

Cohesive Consistency: 0-2 Very Soft, 3-4 Soft, 5-8 M/Stiff, 9-15 Stiff, 16-30 V-Stiff, 31+ Hard

Summary: Earth Boring 20-7, Rock Coring 5-0, Samples D-10, C-1

W-21

HAMMER	Allstate Drilling Co. PROVIDENCE, R. I. 02915	
CASING WT. — FALL —	CLIENT: STEARNS & WHEELER	SHEET 1 OF 1
SAMPLER: WT. 140 FALL 30	PROJECT: W.W.T.P. CONN.	LOCATION
		HOLE NO. B-9
		LINE & STA.
		OFFSET

INSPECTOR:	SAMPLER I. D. 1 3/8"	ALLSTATE NO. W-560	GROUND ELEVATION
DRILLER: R COOK JR	CASING I. D. —	DATE, START 2-6-91	GROUND WATER DEPTH 4-0'
HELPER: D COOK		DATE, FINISH 2-6-91	

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO. DEPTHS ELEV. FT	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS. REMARKS (REMARKS INCLUDE COLOR GRADATION TYPE OF SOIL ETC. ROCK COLOR TYPE CONDITION HARDNESS DRILLING TIME SEAMS ETC.)
0	A	0-2-0	D-1	1-1-0-1	VERY		LOAM AND ROOT MATERIAL
	U				LOOSE		-FILL
	G	2-4-0	D-2	2-1-1-2			
	E						
	R	4-6-0	D-3	2-2-2-10		4-5	
	S				LOOSE		SUBSOIL
		6-8-0	D-4	12-14-37-40		7-0	
					VERY		F-C DK BR SAND AND F-C
		8-10-0	D-5	44-47-42-44	DENSE		GRAV. TR. OF SILT
10							
		10-12-0	D-6	50-54-61-72			
							F-C DK GREY-BR SAND
		12-14-0	D-7	100-46*-48*-43*			AND F-C GRAV. TR. OF SILT
		14-14.5	—	120/6"		14-5	
							REFUSAL ON AUGER.
20							*DENOTES 300# HAM
30							
40							

GROUND SURFACE TO 14-5 FT. USED AUGER ~~CASING~~: THEN SAMPLE SPOON

HOLE NO. B-9

Type of Sample
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger
US = Undisturbed Shelby
V = Vane Test

Proportions Used

trace	0 to 10%
little	11 to 20%
some	21 to 35%
and	36 to 50%

Penetration Resistance
140 lb Wt falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Med Dense	5-8	M/Stiff
30-49	Dense	9-15	Stiff
50 +	Very Dense	16-30	V-Stiff
		31 +	Hard

Summary
Earth Boring 14-5'
Rock Coring —
Samples D-7

W-21

HAMMER

CASING: WT. — FALL —

SAMPLER: WT. 140 FALL 30"

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

CLIENT: STANLEY WHITE

PROJECT: W. W. TP. - COVN.

SHEET 1 OF 1

LOCATION

HOLE NO. B-10

LINE & STA.

OFFSET

INSPECTOR:

DRILLER: R COOK JR

HELPER: D COOK

SAMPLER I. D. 3" / 1 3/8

CASING I. D. —

ALLSTATE NO. W-560

DATE. START 2-12-71

DATE. FINISH: 2-12-71

GROUND ELEVATION

GROUND WATER DEPTH 9-5"

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO DEPTHS ELEV FT	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS. REMARKS. REMARKS INCLUDE COLOR GRADATION TYPE OF SOIL ETC ROCK COLOR TYPE CONDITION HARDNESS DRILLING TIME SEAMS ETC
0							
	A	0-2-0	D-1	1-2-1-1	VERY		LOAM AND ROOT MATERIAL
	U						-FILL
	G	2-4-0	D-2	1-1-2-2	LOOSE		
	E						
	R	4-6-0	D-3	1-1-2-2			
	5						
		6-8-0	D-4	2-3-2-3			
					LOOSE		
		8-10-0	D-5	5-8-8-11			
10						9-5	
		10-12-0	D-6	17-19-48-36	VERY		F-C DK BR SAND AND F-C
					DENSE		GRAV. TR OF SILT
		12-14-0	D-7	120-43*-46*			
				-48*			F-C DK BR-GREY SAND
		14-16-0	D-8	50*-63*-69			AND F-C GRAV. TR OF SILT
				-79			
		16-17-0	D-9	84-91			
20							
		20-22-0	D-10	6-12-24-36			F-C DK BR SAND & F-C
							GRAV. TR OF SILT
							F-C DK BR-GREY SAND
		25-25-8	D-11	120-100*		25-8	AND F-C GRAV. TR OF SILT
							REFUSAL ON AUGERS
30							*DENOTES 300# HAMM
40							

GROUND SURFACE TO 25-8 FT. USED AUGER CASING: THEN SAMPLE SPOON HOLE NO. B-10

Type of Sample
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger
US = Undisturbed Shelby
V = Vane Test

Proportions Used
trace 0 to 10%
little 11 to 20%
some 21 to 35%
and 36 to 50%

Penetration Resistance
140 lb Wt falling 30" on 2" O D Sampler

Cohesionless Density			Cohesive Consistency	
0-4	Very	Loose	0-2	Very Soft
5-9		Loose	3-4	Soft
10-29	Med	Dense	5-8	M/Stiff
30-49		Dense	9-15	Stiff
50 +	Very	Dense	16-30	V Stiff
			31 +	Hard

Summary
Earth Boring 25-8'
Rock Coring —
Samples D-11

W-21

HAMMER

CASING: WT. — FALL —

SAMPLER: WT. 140 FALL 30

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

CLIENT: STEARNS & WHELER

PROJECT: W.W.T.F. - CONN.

SHEET 1 OF 1

LOCATION

HOLE NO B-11

LINE & STA.

OFFSET

INSPECTOR:

DRILLER: R COOK JR.

HELPER: D COOK

SAMPLER I. D. 1 3/8

CASING I. D. —

ALLSTATE NO. W-560

DATE, START 2-11-91

DATE, FINISH: 2-11-91

GROUND ELEVATION

GROUND WATER DEPTH 10-0"

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO DEPTHS ELEV FT	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS, REMARKS. REMARKS INCLUDE COLOR GRADATION TYPE OF SOIL ETC ROCK COLOR TYPE CONDITION HARDNESS DRILLING TIME SEAMS ETC
0							
	A' U G E R S	0-2-0	D-1	4-9-12-16			F-M DK BR SAND AND F-C GRAV. LITTLE SILT, BOULDERS, AND COBBLES - FILL
		2-4-0	D-2	19-21-17-24	DENSE		
		4-6-0	D-3	31-20-120-	VERY		
				49*	DENSE	6-0	
		6-8-0	D-4	58*-12-63			F-M DK GREY SAND AND F-C GRAV. LITTLE SILT AND COBBLES AND BOULDERS - FILL
				-75	VERY		
		8-10-0	D-5	71-100-21	DENSE		
10				-10			
		10-12-0	D-6	8-2-2-2		10-5	
		12-14-0	D-7	2-1-8-9			DK BR ORGANIC SILT AND LOAM SOME SAND
					LOOSE		
		14-16-0	D-8	12-16-19-5		14-0	
		16-17-0	—	21-22			F-C DK BR SAND AND F-C GRAV. TR OF SILT
					MED		
20					DENSE		
		20-22-0	D-9	5-11-13-19			F-C DK BR SAND LITTLE F-M GRAV. TR OF SILT
					VERY		
		25-27-0	D-10	23-27-31-34	DENSE		
30							
		30-32-0	D-11	33-41-90/3"		32-8	REFUSAL ON AUGER
							*DENOTES 300# HAM
40							

GROUND SURFACE TO 32-8 FT. USED AUGER ~~CASING~~ THEN SAMPLE SPOON

HOLE NO. B-11

Type of Sample: D = Dry, C = Cored, W = Washed; UP = Undisturbed Piston; TP = Test Pit, A = Auger; US = Undisturbed Shelby; V = Vane Test

Proportions Used: trace 0 to 10%; little 11 to 20%; some 21 to 35%; and 36 to 50%

Penetration Resistance, 140 lb Wt falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
		0-2	Very Soft
Very Loose	0-4	3-4	Soft
Loose	5-9	5-8	M/Stiff
Med Dense	10-29	9-15	Stiff
Dense	30-49	16-30	V Stiff
Very Dense	50 +	31 +	Hard

Summary

Earth Boring 32-8

Rock Coring —

Samples SD —

W-21

HAMMER

CASING: WT. — FALL —

SAMPLER: WT. 140 FALL 30

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

CLIENT: FRANKS ENGINEERS

PROJECT: W.W.T.F. - CONN

SHEET 1 OF 1

LOCATION

HOLE NO B-12

LINE & STA.

OFFSET

INSPECTOR:

DRILLER: R COOK JR

HELPER D COOK

SAMPLER I. D. 1 3/8

CASING I. D. — —

ALLSTATE NO. W-560

DATE, START 2-5-91

DATE, FINISH 2-5-91

GROUND ELEVATION

GROUND WATER DEPTH 10-0

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO DEPTHS / ELEV ft	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST / MOISTURE	PROFILE CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR, GRADATION, TYPE OF SOIL, ETC; ROCK: COLOR, TYPE, CONDITION, HARDNESS, DRILLING TIME, SEAMS, ETC)
	A U G E R S	0-2-0	D-1	1-6-4-2	MED DENSE		F-M DK BR SAND LITTLE SILT AND LOAM - FILL
		2-4-0	D-2	30-16-10-11			
		4-6-0	D-3	14-12-7-3			
		6-8-0	D-4	4-6-6-6			
						8-0	
0		8-10-0	D-5	14-25-45-61	DENSE		F-C DK BR SAND AND F-C GRAV. TR OF SILT
		10-12-0	D-6	19-26-29-27		10-2	F-C DK GREY SAND AND F-C GRAV. TR OF SILT
		12-14-0	D-7	29-33-35-39	VERY DENSE		
		14-16-0	D-8	20-12-12-10			F-C DK GREY-BR SAND AND F-C GRAV. TR OF SILT
		16-17-0	D-9	11-11	MED DENSE		
0							
		20-22-0	D-10	2-4-6-7			F-C LT BR-GREY SAND AND F-C GRAV. TR OF SILT
		25-27-0	D-11	6-5-10-10			
						28-8	
0		30-32-0	D-12	26-22-20-25	DENSE		F-M DK GREY SAND TR OF C SAND TR OF F-M GRAV. TR OF SILT
						32-0	
0							S.O.R.

GROUND SURFACE TO 30-0 FT. USED AUGERS CASING: THEN SAMPLE SPOON

HOLE NO. B-12

Type of Sample
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger
US = Undisturbed Shelby
V = Vane Test

Proportions Used
trace 0 to 10%
little 11 to 20%
some 21 to 35%
and 36 to 50%

Penetration Resistance
140 lb. Wt falling 30" on 2" O.D. Sampler

Cohesionless Density			Cohesive Consistency	
		0-4	0-2	Very Soft
Very	Loose	5-9	3-4	Soft
	Loose	10-29	5-8	M/Stiff
Med	Dense	30-49	9-15	Stiff
	Dense	50 +	16-30	V Stiff
Very	Dense		31 +	Hard

Summary
Earth Boring 32-0
Rock Coring —
Samples D-12

W-21

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

HAMMER			
CASING: WT. —	FALL —	SHEET 1 OF 1	LOCATION
SAMPLER: WT. 140	FALL 30	HOLE NO. B-13	LINE & STA.
			OFFSET

CLIENT: STEARNS & WHELER

PROJECT: WWTP - CONN.

INSPECTOR:

DRILLER: R COOK SR

HELPER: D COOK

SAMPLER I. D. 1 3/8

CASING I. D. —

ALLSTATE NO. U-560

DATE, START 2-6-91

DATE, FINISH 2-6-91

GROUND ELEVATION

GROUND WATER DEPTH 5-0

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO. DEPTHS ELEV. FT.	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOILS. REMARKS (REMARKS INCLUDE COLOR GRADATION TYPE OF SOIL ETC. ROCK COLOR TYPE CONDITION HARDNESS DRILLING TIME SEAMS ETC.)
0	A U	0-2-0	D-1	1-2-3-?		1-0	TOP SOIL
	G E	2-4-0	D-2	4-5-2-2	VERY LOOSE		F-M DK BR SAND TR OF FINE GRAV. TR OF SILT MIXED
	R S	4-6-0	D-3	2-2-1-1		4-0	WITH LOAM AND TR OF ASH-FILL.
		6-8-0	D-4	0-1-4-2?	V. LOOSE	5-3	TOP SOIL (LOAM)
		8-10-0	D-5	21-23-26-26	V. LOOSE	7-5	SUBSOIL - F-LT BR SAND SOME SILT
10		10-12-0	D-6	14-17-29-[illegible]	DENSE		F-C LT BR SAND AND F-C GRAV, TR OF SILT (RUNNING)
		12-14-0	D-7	31-18-24-23			
		14-16-0	D-8	10-6-6-3		14-3	
		16-17-0	D-9	6-6	MED DENSE		F-C LT BR SAND TR OF FINE GRAV. TR OF SILT (RUNNING)
20		20-22-0	D-10	2-3-4-6		22-0	F-C DK BR SAND AND F-C GRAV, TR. OF SILT
		25-27-0	D-11	21-23-25-26	VERY DENSE		
30		30-32-0	D-12	20-22-24-29	DENSE	32-0	E.O.B.
40							

GROUND SURFACE TO 30-0 FT. USED AUGER CASING: THEN SAMPLE SPOON

HOLE NO. B-13

Type of Sample

D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger
US = Undisturbed Shelby
V = Vane Test

Proportions Used

trace	0 to 10%	
little	11 to 20%	
some	21 to 35%	
and	36 to 50%	

Penetration Resistance
140 lb Wt falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Med. Dense	5-8	M/Stiff
30-49	Dense	9-15	Stiff
50 +	Very Dense	16-30	V-Stiff
		31 +	Hard

Summary

Earth Boring 32-0

Rock Coring —

Samples D-12

W-25

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

HAMMER

CASING: WT. — FALL —

SAMPLER WT. 140 FALL 30

CLIENT: [illegible] & WHEELER

PROJECT: [illegible] CONN.

SHEET 1 OF

LOCATION

HOLE NO. B-14

LINE & STA.

OFFSET

INSPECTOR M. PRETNER

DRILLER R COOK JR

HELPER D COOK

SAMPLER I. D. 1 3/8"

CASING I. D. —

ALLSTATE NO. W-5761

DATE, START 2-5-71

DATE, FINISH 2-5-71

GROUND ELEVATION

GROUND WATER DEPTH 10-0

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO. DEPTHS ELEV. FT.	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOILS, REMARKS (Remarks include color, gradation, type of soil, etc. Rock color, type, condition, hardness, drilling time, seams, etc.)
	A	0-2-0	D-1	1-2-4-6		0-3	TOP SOIL
	U						
	G	2-4-0	D-2	16-20-21-24	DENSE		F-C LT GREY SAND LITTLE F-C GRAV, TR OF SILT
	E						
	R	4-6-0	D-3	20-23-20-24			SOME LOAM - FILL
	S						
		6-8-0	D-4	12-10-2-2	LOOSE		LOAM AND ROOT MATERIAL - FILL
		8-10-0	D-5	3-3-14-16		9-5	
		10-12-0	D-6	30-38-29-53	VERY DENSE		F-C DK BR-GREY SAND AND F-C GRAV. LITTLE SILT
		12-14-0	D-7	49-46-51-29			
		14-16-0	D-8	36-33-44-61			
		16-17-0	D-9	65-9"			F-C DK BR SAND AND F-C GRAV. TR OF SILT (RUNNING)
		20-22-0	D-10	11-100-22*-20*		22-4	
							REFUSAL ON AUGER
							*DENOTES 300# HAM

GROUND SURFACE TO 22-4 FT. USED AUGER ~~CASING~~ THEN SAMPLE SPOON

HOLE NO. B-14

Type of Sample
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger
US = Undisturbed Snelby
V = Vane Test

Proportions Used	
trace	0 to 10%
little	11 to 20%
some	21 to 35%
and	36 to 50%

Penetration Resistance
140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
0-4	Very Loose	0-2	Very Soft
5-9	Loose	3-4	Soft
10-29	Med. Dense	5-8	M-Stiff
30-49	Dense	9-15	Stiff
50 +	Very Dense	16-30	V. Stiff
		31 +	Hard

Summary
Earth Boring 22-4
Rock Coring —
Samples D-10

W-21

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

HAMMER

CASING: WT. — FALL —

SAMPLER: WT. 140 FALL 30

CLIENT: S[illegible] [illegible]

PROJECT: [illegible] T.P. CONN.

SHEET ___ OF 1

LOCATION ___

HOLE NO. B-15

LINE & STA ___

OFFSET ___

INSPECTOR: M. PRETNER

DRILLER: R COOK JR

HELPER: D COOK

SAMPLER I D 1 3/8

CASING I D —

ALLSTATE NO. ___

DATE START 2-4-91

DATE FINISH 2-5-91

GROUND ELEVATION ___

GROUND WATER DEPTH 4'-5"

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO. DEPTHS ELEV. FT.	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR, GRADATION, TYPE OF SOIL, ETC. ROCK COLOR, TYPE, CONDITION, HARDNESS, DRILLING TIME, SEAMS, ETC.)
	A	0-2-0	D-1	12-2-3-15		0-8	TOP SOIL
	U				VERY		F-C DK BR SAND AND F-C
	G	2-4-0	D-2	52-45*-9*	DENSE		GRAV. LITTLE SILT AND
	E			-26			COBBLES - FILL
	R	4-6-0	D-3	20-21-2-3		5-0	
	S						F DK BR-BLACK SAND
		6-8-0	D-4	4-4-5-2	LOOSE		AND SILT AND ORGANIC
		8-10-0	D-5	2-3-4-4			SILT WITH LOAM - FILL
10						10-0	
		10-12-0	D-6	6-24-27-34			F-C DK GREY SAND AND
					VERY		F-C GRAV. TR OF SILT
		12-14-0	D-7	37-43-46-41	DENSE		
		14-16-0	D-8	47-49-53-51			
		16-17-0	D-9	57-53			
20							
		20-22-0	D-10	61-73-51*-			
				47*			F-C DK GREY-BR SAND AND
							F-C GRAV. TR OF SILT
		25-26-2	D-11	20-23-120/2"		26-2	
							REFUSAL ON AUGER
30							*DENOTES 300# HAM
40							

GROUND SURFACE TO 26-2 FT. USED AUGER ~~CASING~~; THEN SAMPLE SPOON

HOLE NO. B-15

Type of Sample		
D = Dry	C = Cored	W = Washed
UP = Undisturbed Piston		
TP = Test Pit	A = Auger	
US = Undisturbed Shelby		
V = Vane Test		

Proportions Used	
trace	0 to 10%
little	11 to 20%
some	21 to 35%
and	36 to 50%

Penetration Resistance: 140 lb Wt falling 30" on 2" O.D. Sampler

Cohesionless Density	
0-4	Very Loose
5-9	Loose
10-29	Med Dense
30-49	Dense
50 +	Very Dense

Cohesive Consistency	
0-2	Very Soft
3-4	Soft
5-8	M/Stiff
9-15	Stiff
16-30	V-Stiff
31 +	Hard

Summary

Earth Boring 26-2

Rock Coring —

Samples D-11

W-21

HAMMER

CASING: WT. — FALL —

SAMPLER: WT 140 FALL 30

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

CLIENT: STEARNS & WHEELER

PROJECT: U.W.W.T.P. - CONN.

SHEET 1 OF 1

LOCATION

HOLE NO. B-16

LINE & STA.

OFFSET

INSPECTOR: J. PIETNER

DRILLER: R COOK JR.

HELPER: D COOK

SAMPLER I. D. 1 3/8"

CASING I. D. —

ALLSTATE NO. 91-561

DATE, START 2-5-91

DATE, FINISH: 2-5-91

GROUND ELEVATION

GROUND WATER DEPTH 8'-0"

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO. DEPTHS ELEV FT	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR GRADATION TYPE OF SOIL ETC; ROCK-COLOR TYPE CONDITION HARDNESS DRILLING TIME SEAMS ETC)
	AV	0-2-0	D-1	2-2-3-2	LOOSE		LOAM AND ROOT MATERIAL - FILL
	GE	2-4-0	D-2	2-2-1-1	VERY LOOSE		
	RS	4-6-0	D-3	1-1-1-0			LOAM AND ROOT MATERIAL LITTLE C SAND - FILL (PETRO ODOR)
		6-8-0	D-4	0-2-1-2			
		8-10-0	D-5	2-2-2-2	LOOSE		
						10-0	
		10-11-0	D-6	12-12/6"	DENSE		F-C & GREY SAND AND F-C GRAV. LITTLE SILT
						11-0	

REFUSAL ON BEDROCK

GROUND SURFACE TO 11-0 FT. USED AUGER CASING: THEN SAMPLE SPOON

HOLE NO. B-16

Summary

Earth Boring 11-0'

Rock Coring —

Samples D-6

Type of Sample
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger
US = Undisturbed Shelby
V = Vane Test

Proportions Used
trace 0 to 10%
little 11 to 20%
some 21 to 35%
and 36 to 50%

Penetration Resistance
140 lb. Wt falling 30" on 2" O.D. Sampler

Cohesionless Density			Cohesive Consistency	
		0-4	0-2	Very Soft
	Very Loose	5-9	3-4	Soft
	Loose	10-29	5-8	M/Stiff
Med	Dense	30-49	9-15	Stiff
	Dense	50 +	16-30	V Stiff
Very	Dense		31 +	Hard

W-21

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

HAMMER

CASING: WT. — FALL —

SAMPLER: WT. 140 FALL 30

CLIENT: STEARNS & WHEELER

PROJECT: W.W. T.P. – CONN

SHEET 1 OF 1

LOCATION

HOLE NO. B-17

LINE & STA.

OFFSET

INSPECTOR

DRILLER: R COOK SR.

HELPER: D COOK

SAMPLER I. D 3" ⌀

CASING I. D —

ALLSTATE NO.

DATE, START 2-6-91

DATE, FINISH 2-6-91

GROUND ELEVATION

GROUND WATER DEPTH 5-0

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO DEPTHS ELEV FT	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR, GRADATION, TYPE OF SOIL, ETC. ROCK COLOR, TYPE, CONDITION, HARDNESS, DRILLING TIME, SEAMS, ETC.)
	AUGER	0-2-0	D-1	1-3-6-2		0-3	TOP SOIL
					VERY LOOSE		F-C DK BR-BLACK SAND AND F-C GRAV. LITTLE SILT - FILL
	2-4-0	D-2	1-0-1-1				
					VERY LOOSE	2-0	BLACK ORGANIC SILT AND LOAM
	4-6-0	D-3	1-1-1-1				
	6-8-0	D-4	2-5-20-21	LOOSE		3-0	SUBSOIL
	8-10-0	D-5	24-26-32-38	LOOSE		7-3	F-C DK BR SAND AND F-C GRAV. TR OF SILT
					VERY DENSE		
	10-12-0	D-6	34-39-41-43				
	12-14-0	D-7	47-50-52-57				
	14-16-0	D-8	57-60-65-69			14-7	
					VERY DENSE		F-C LT GR SAND AND F-C GRAV. TR OF SILT
	16-17-0	D-9	43-37				
	20-22-0	D-10	12-10-14-18		DENSE		
						24-0	
							REFUSAL ON AUGER

GROUND SURFACE TO 24-0 FT. USED AUGER CASING THEN SAMPLE SPOON

HOLE NO. B-17

Type of Sample
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger
US = Undisturbed Shelby
V = Vane Test

Proportions Used
trace 0 to 10% 0-4
little 11 to 20% 5-9
some 21 to 35% 10-29
and 36 to 50% 30-49
50 +

Penetration Resistance
140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density
Very Loose 0-2
Loose 3-4
Med Dense 5-8
Dense 9-15
Very Dense 16-30
31 +

Cohesive Consistency
0-2 Very Soft
3-4 Soft
5-8 M/Stiff
9-15 Stiff
16-30 V Stiff
31 + Hard

Summary
Earth Boring 24-0'
Rock Coring —
Samples D-10

W-21

HAMMER

CASING: WT. — FALL —

SAMPLER: WT. 140 FALL 30

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

CLIENT: STEARNS & WHEELER

PROJECT: WWTF - CONN.

SHEET 1 OF —

LOCATION

HOLE NO. B-18

LINE & STA.

OFFSET

INSPECTOR: M PRETNER

DRILLER: R COOK JR

HELPER: D COOK

SAMPLER I. D. 1⅜

CASING I. D. —

ALLSTATE NO. W-560

DATE, START 2-4-91

DATE, FINISH 2-4-91

GROUND ELEVATION

GROUND WATER DEPTH 6-5"

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO DEPTHS / ELEV FT	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OF CONSIST / MOISTURE	PROFILE CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR GRADATION TYPE OF SOIL ETC; ROCK COLOR TYPE CONDITION HARDNESS DRILLING TIME SEAMS ETC)
1	AUGER	0-2-0	D-1	5-22-31-26	—	1-0	TOP SOIL
					LOOSE		F-C DK BR SAND AND F-C
		2-4-0	D-2	34-43-45-33	DENSE		GRAV, TR OF SILT AND
							COBBLES - FILL
		4-6-0	D-3	16-19-1-2		4-1	
					LOOSE		LT-MED BROWN AND BLACK ORGANIC
		6-8-0	D-4	2-8-42-63		5-1	SILT
		8-10-0	D-5	93-120-36*	LOOSE		SUBROUNDED F-M SAND
10				-42*			SOME SILT
		10-12-0	D-6	15-12-31*		7-2	
				-24*			F-C DK BR SAND AND
		12-14-0	D-7	19*-17*-46	LOOSE		F-C GRAV, TR OF SILT
				-46			
		14-16-0	D-8	28-23-17*-14			
						15-5	
		16-17-0	D-9	13-15*	MED		F-C DK BR SAND TR OF
					DENSE		FINE GRAV, TR OF SILT
20							
		20-22-0	D-10	2-4-6-6			F-C DK BR SAND TR OF
							SILT (RUNNING)
		25-27-0	D-11	2-4-6-6		28-0	
							F-C DK GREY SAND AND
					VERY		F-C GRAV, TR OF SILT
-30					DENSE		(RUNNING)
		30-32-0	D-12	21-41-46-42		32-0	
							E.O.B.
							*DENOTES 300# HAM
-40							

GROUND SURFACE TO 30-0 FT. USED AUGER CASING: THEN SAMPLE SPOON

HOLE NO. B-18

Summary

Earth Boring 32-0'

Rock Coring —

Samples D-12

Type of Sample: D = Dry, C = Cored, W = Washed; UP = Undisturbed Piston; TP = Test Pit, A = Auger; US = Undisturbed Shelby; V = Vane Test

Proportions Used: trace 0 to 10%; little 11 to 20%; some 21 to 35%; and 36 to 50%

Penetration Resistance (140 lb Wt falling 30" on 2" O.D. Sampler)

Cohesionless Density			Cohesive Consistency	
		0-4	0-2	Very Soft
	Very Loose	5-9	3-4	Soft
	Loose	10-29	5-8	M/Stiff
Med	Dense	30-49	9-15	Stiff
	Dense	50 +	16-30	V Stiff
Very	Dense		31 +	Hard

W-21

HAMMER

CASING: WT. — FALL —

SAMPLER: WT. 140 FALL 30

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

CLIENT: STEARNS & WHEELER

PROJECT: [illegible] - CONN

SHEET 1 OF 1

LOCATION

HOLE NO. B-19

LINE & STA.

OFFSET

INSPECTOR:

DRILLER: A COOK SR

HELPER: D COOK

SAMPLER I. D. 1 3/8

CASING I. D. —

ALLSTATE NO. W-560

DATE, START 2-1-91

DATE, FINISH: 2-4-91

GROUND ELEVATION

GROUND WATER DEPTH 10.0'

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO DEPTHS ELEV FT	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR GRADATION TYPE OF SOIL ETC ROCK COLOR TYPE CONDITION HARDNESS DRILLING TIME SEAMS ETC)
0	A	0-2-0	D-1	2-3-21-4		1-2	TOP SOIL
	V						
	G	2-4-0	D-2	3-15-6-9	MED		F-M DK BR SAND TR OF
	E				DENSE		FINE GRAV. LITTLE SILT
	R	4-6-0	D-3	3-4-4-6		4-5	AND LOAM - FILL
	S				LOOSE		F DK GREY SAND SOME
		6-8-0	D-4	15-19-23-30		7-0	SILT
		8-10-0	D-5	32-37-49-53	VERY		F-C DK GREY-BR SAND
10					DENSE		AND F-C GRAV. TR OF SILT
		10-12-0	D-6	59-67-69-73			
							F-C DK GREY SAND AND
		12-14-0	D-7	63-70-58-55			F-C GRAV TR OF SILT
		14-16-0	D-8	23-24-21-21			
							F-C DK GREY-BR SAND
		16-17-0	D-9	19-21			AND F-C GRAV. TR OF SILT
						17-5	
20							F-C DK BR SAND TR OF
		20-22-0	D-10	2-3-8-11	MED		SILT (RUNNING)
					DENSE		
		25-27-0	D-11	3-4-8-15			F-C DK BR SAND TR OF
							F-M GRAV. TR OF SILT
30							(RUNNING)
		30-32-0	D-12	10-12-12-31	DENSE		
						35-6	
		35-35-6	D-13	21-12"/1"			REFUSAL ON AUGER
40							

GROUND SURFACE TO 35-6 FT. USED AUGER CASING: THEN SAMPLE SPOON HOLE NO. B-19

Penetration Resistance
140 lb. Wt. falling 30" on 2" O.D. Sampler

Type of Sample
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger
US = Undisturbed Shelby
V = Vane Test

Proportions Used

trace	0 to 10%
little	11 to 20%
some	21 to 35%
and	36 to 50%

Cohesionless Density

	0-4	
Very	5-9	Loose
	10-29	
Med	30-49	Dense
	50 +	
Very		Dense

Cohesive Consistency

0-2	Very Soft
3-4	Soft
5-8	M Stiff
9-15	Stiff
16-30	V Stiff
31 +	Hard

Summary
Earth Boring 35-6'
Rock Coring —
Samples D-13

W-21

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

HAMMER

CASING: WT. — FALL —

SAMPLER: WT. 140 FALL 30

CLIENT: SEASONS SUNBELTS

PROJECT: W.W.T.P. - OONN.

SHEET 1 OF 1

LOCATION

HOLE NO. B-20

LINE & STA.

OFFSET

INSPECTOR

DRILLER: R COOK SR.

HELPER: D COOK

SAMPLER I. D. 1 3/8

CASING I. D. —

ALLSTATE NO. W-560

DATE, START 1-28-91

DATE, FINISH 1-28-91

GROUND ELEVATION

GROUND WATER DEPTH 12.4

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO DEPTHS / ELEV FT	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST / MOISTURE	PROFILE CHANGE DEPTH / ELEV	FIELD IDENTIFICATION OF SOILS. REMARKS. REMARKS INCLUDE COLOR GRADATION TYPE OF SOIL ETC ROCK COLOR TYPE CONDITION HARDNESS DRILLING TIME SEAMS ETC
	B	0-2-0	D-1	5-12-31-42		0-4	TOP SOIL
	U						F-C DK GRAY-BR SAND
	G	2-4-0	D-2	42-44-35-4	LOOSE		AND F-C GRAVEL TR OF
	E				DENSE		SILT
	R	4-5-1	D-3	51-55-120/2"		5-1	
							REFUSAL ON AUGER.

GROUND SURFACE TO 5-1 FT. USED AUGER CASING: THEN SAMPLE SPOON HOLE NO. B-20

Type of Sample
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger
US = Undisturbed Shelby
V = Vane Test

Proportions Used
trace 0 to 10%
little 11 to 20%
some 21 to 35%
and 36 to 50%

Penetration Resistance
140 lb. Wt falling 30" on 2" O.D Sampler

Cohesionless Density			Cohesive Consistency	
		0-4	Very	Very Soft
Very	Loose	5-9		Soft
	Loose	10-29	Med	M/Stiff
Med	Dense	30-49		Stiff
	Dense	50 +	Very	V Stiff
Very	Dense			Hard

	0-2		Very Soft
	3-4		Soft
Med	5-8		M/Stiff
	9-15		Stiff
Very	16-30		V Stiff
	31 +		Hard

Summary
Earth Boring 5-1
Rock Coring —
Samples D-3

W-21

HAMMER

CASING: WT. — FALL —

SAMPLER: WT. 140 FALL 30

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

CLIENT: STEARNS & WHEELER

PROJECT: GLEN T. - CONN.

SHEET 1 OF 1

LOCATION

HOLE NO. B-20A

LINE & STA.

OFFSET 5-0

INSPECTOR:

DRILLER: R COOK JR

HELPER: D COOK

SAMPLER I. D. 2" / B

CASING I. D. —

ALLSTATE NO. W-560

DATE, START 2-1-91

DATE, FINISH: 2-1-91

GROUND ELEVATION

GROUND WATER DEPTH: DRY

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO DEPTHS ELEV.	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST MOISTURE	PROFILE CHANGE DEPTH ELEV	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR, GRADATION, TYPE OF SOIL, ETC. ROCK COLOR, TYPE, CONDITION, HARDNESS, DRILLING TIME, SEAMS, ETC.)
0	AU	0-2-0	D-1	3-14-27-30		0-4	TOP SOIL
	GE	2-4-0	D-2	45-51-60-50	VERY DENSE		F-C DK GREY-BR SAND AND F-C GRAV. TR OF SILT
	R	4-4-0	—	120		4-4	
							REFUSAL ON AUGER
							NOTE: OFFSET BORING 5-0 FROM ORIGINAL BORING B-20
10							
20							
30							
40							

GROUND SURFACE TO 4-4 FT. USED AUGER CASING: THEN SAMPLE SPOON HOLE NO. B-20A

Type of Sample
D = Dry C = Cored W = Washed
UP = Undisturbed Piston
TP = Test Pit A = Auger
US = Undisturbed Shelby
V = Vane Test

Proportions Used
trace 0 to 10%
little 11 to 20%
some 21 to 35%
and 36 to 50%

Penetration Resistance
140 lb Wt falling 30" on 2" O.D. Sampler

Cohesionless Density			Cohesive Consistency	
0-4	Very	Loose	0-2	Very Soft
5-9		Loose	3-4	Soft
10-29	Med	Dense	5-8	M/Stiff
30-49		Dense	9-15	Stiff
50 +	Very	Dense	16-30	V Stiff
			31 +	Hard

Summary
Earth Boring 4'-4"
Rock Coring —
Samples D-2