BIDDING AND CONTRACT DOCUMENTS
FOR THE
BRUNSWICK COUNTY PUBLIC UTILITIES
NORTHWEST WATER TREATMENT PLANT – EXPANSION AND UPGRADES

DOCUMENT 009105

ADDENDA

ADDENDUM NUMBER 5

DATE: **February 19, 2020**

PROJECT: **NORTHWEST WATER TREATMENT PLANT – EXPANSION AND UPGRADES**

OWNER: BRUNSWICK COUNTY PUBLIC UTILTIES

ENGINEER: CDM SMITH

TO: Project Planholders

This Addendum forms a part of the Contract Documents and modifies the Bidding Documents dated October 2019, with amendments and additions noted herein below.

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

This Addendum consists of 29 pages.

NORTH CAROLINA PROFESSIONAL SEAL 028357 ENGINEER JONATHAN B. TREADWAY

2/19/2020

GENERAL

1. Pre-Bid Meeting Sign-In Sheet, Presentation, and Questions/Answers are incorporated into this Addendum as attachments.
2. As-built drawings for the Chemical Storage Building 2 are incorporated into this Addendum as an attachment.
3. Figures 1 & 2 provide layout and details for the proposed concentrate mag meter and vault. These Figures are incorporated into this Addendum as attachments.

IN THE SPECIFICATIONS

DOCUMENT 007300

1. Page 007300-2
    a. Add the following on page 2, before ARTICLE 2 – TERMONOLOGY AND INTENT OF DOCUMENTS:

    "ARTICLE 1 – DEFINITIONS

    Delete 'Partial Utilization is use by Owner of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.' and insert the following therefor 'Partial Utilization is use by Owner of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work. The term Beneficial Use is also used within these documents and has the same meaning as Partial Utilization.'"

    b. Add the follow on page 2 of this section:
    "SGC-10D

    Delete paragraph D and insert the following therefor:

    D. The Designer shall review required submittals promptly, noting desired corrections if any, and returning a copy of the annotated Shop Drawings to the Contractor per the requirements of Section 013300. When resubmittals are required, the submittal procedure shall be the same as for the original submittals. The Contractor shall not be entitled to any Time of Completion extension for review and approval of Shop Drawings by the Designer."

DOCUMENT 011000

1. Delete the following in paragraph 1.9 A: "Unrestricted Use of Site: Contractor shall have full use of Project site for construction operations during construction period."
2. Delete paragraph 1.11 C and insert the following therefor:
   "C. On-Site Work Day restrictions: Do not perform work resulting in utility shutdowns or resulting in noisy activity on-site during restrict work hours and restricted work days, as defined in Article 33 of the General and Supplemental Conditions."

DOCUMENT 012500

1. Delete the words "Substitutions for Cause" in paragraph 1.7A.
2. Delete paragraph 1.7B in its entirety.

DOCUMENT 012600

1. Delete the entire section and insert the enclosed therefor.

DOCUMENT 012900

1. Delete paragraph 1.5 in its entirety, and insert the following:
   "1.5 All payment requirements are defined in Article 53 through Article 55 of the General Conditions"

DOCUMENT 013100

1. Delete paragraph 1.8 B and insert the following therefor:
   "B. Web-Based Project Management Software Packaging:
   1. The Contractor shall use eBuilder for the purposes of managing communication and documentation until Final Completion.
   2. Engineer will provide the Contractor with two (2) e-Builder license seats for their use throughout the project. If contractor requires additional license seats Contractor may purchase additional seats at a cost of $1,500/per seat per year if available.
   3. Within 10 days of NTP, the Contractor shall schedule a meeting with the Engineer to review the use of the project management information software. This will include:
      a. Which processes will be managed within the PMIS
      b. Explanation of the processes and how to use the PMIS
2. Delete the following in paragraph 1.9:
   "F. Coordination Meetings: Engineer will conduct Project coordination meetings at regular intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences."
   And insert the following therefor:
   "F. Coordination Meetings: Engineer will conduct Project coordination meetings at intervals defined by the Engineer. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences."

DOCUMENT 013513.54

1. Delete all of paragraph 1.2 B and insert the following therefor:
   "B. Detailed plans for maintenance of plant operations (MOPO) for affected equipment and facilities will be submitted for review and approval. These temporary systems shall be designed to meet current code and industry standards. They shall also include the seal and signature of a licensed professional engineer. Where shutdowns are required, they shall be performed between 7 pm and 5 am on weekends and in the months of November through March or otherwise approved by the Owner."
2. Delete all of paragraph 1.3 and insert the following therefor:
   "A. In order to maintain continuous plant operations during construction, a phased construction sequence shall be required. Specific constraints and steps are outlined and are intended to suggest a sequence for specific activities. The sequencing suggested herein is meant to help facilitate the Contractor's planning and coordination of the Work. The Engineer makes no guarantee or representations that the sequencing presented herein are appropriate to execute the Work. The Contractor is solely responsible for establishing the sequencing of Work, schedule of sequencing, the means and methods of sequencing and impacts of their sequencing. This sequence shall be coordinated with the Owner and the Engineer and submitted for acceptance (Receipt Acknowledged) in accordance with the requirements of Paragraph 1.3. Work will not commence unless the sequence obtains Receipt Acknowledged from the Engineer.
   B. The detailed sequence of construction shall be based upon the schedule submitted by the Contractor and received by the Engineer as specified above. The Contractor may alter the sequence as noted by the Engineer, providing plant operations are maintained.
   C. The order of construction shall be subject to the acceptance of the Engineer; such direction, however, shall in no way relieve the Contractor's responsibility to perform the work in strict accordance with the Contract Documents. The construction plans and specifications have been developed to minimize the construction impacts on the operation of the Northwest Water Treatment Plant. Contractors shall note the requirements of this Section with regard to the operation of the facility and the phasing of construction when developing his work sequence. The Contractor's work sequence must be specifically detailed in the required schedule.
   D. The following work sequence provides for completing the construction of the project within the requirements of the Owner's plant operation and schedule limitations. It does not purport to cover any sequences necessitated by the actual construction methods. This is a partial outline only. Portions of the work not specifically itemized must be scheduled by the Contractor in accordance with the requirements of the received construction sequence. The Contractor is required to account for all details in formulating his own complete plan for implementation of the project.
   E. Some of the tasks below may overlap one another in performance of the work. Numerical and alphabetical identification of the tasks does not necessarily conform with actual order of construction."

DOCUMENT 015000

1. Delete paragraphs 2.2 A, B and C, and insert the following therefor:

   A. *Field Offices: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading. Field office trailer shall be Mobile Mini, ModSpace, Williams Scotsman, or equal. Converted storage or box containers will not be acceptable.*

   B. *Temporary sanitation: Provide temporary toilets with washing stations as necessary during construction. Facilities shall be kept clean and pumped out on a regular basis. No connection to the existing septic system is allowed.*

   C. *Engineer's Field Office: Provide a modular office trailer for the Engineer's use of sufficient size, but not less than 64' x 24' with the following requirements:*

      1. *Complete and fully functional electrical, plumbing, and HVAC systems.*
      2. *At least two private offices with doors*
      3. *Four individual workspaces*
      4. *One conference room*
      5. *One bathroom (toilet, sink and faucet, medicine cabinet, and exhaust fan)*
      6. *One closet*
      7. *Two exterior doors (lockable with 4 sets of keys for each door)*
      8. *Weather-tight construction with floor, walls, and ceiling completely insulated.*
      9. *Each room shall have at least one operating window with operable blinds and full insect screen.*
      10. *Provide fully insulated skirting on all sides of the field office trailer.*
      11. *Provide steps, platforms, handrails, and boot scrapers for each exterior door.*
      12. *Provide the following furnishings for the Engineer's Field Office for the duration of the project. All furnishings shall be new – or in very good condition – subject to approval of the Engineer.*
         a. *Each office shall have a 60-in by 30-in desks with lockable file drawers with upholstered swivel type chair with arms*
         b. *Each individual workstation shall have a desk with 60" of desk length, 30" deep with lockable file drawers and upholstered swivel type chair with arms*
         c. *One 12' x 4' conference table.*
         d. *Ten conference room chairs.*
         e. *Two 54-in by 30-in folding tables.*
         f. *Six file cabinets, 4 drawer, legal size, Hon No. HN-315C, or equal.*
         g. *Eight wastebaskets.*
         h. *One plan storage rack, 10-stick capacity.*
         i. *One lockable storage cabinet, 72-in high, 36-in wide, and 18-in deep.*
         j. *Three bookcase units, 4 shelves high, Hon No. HN-S48 ABC, or equal.*
         k. *24 painted steel coat hangers.*
         l. *One electric bottled water dispenser with hot and cold outlets and refrigerator unit. Adequate water bottles shall be provided (and paid for by the Contractor) until Final Completion.*
         m. *One wall-mounted first aid kit, McMaster-Carr 9501T1 or equal.*
         n. *Smoke detectors, with batteries.*

1) *Two dry erase boards, aluminum frame, 36-in by 60-in, markers and eraser, Quartet Model No. TS-S 535 or equal.*
2) *One 1000-watt minimum 1.4-cuft microwave oven.*
3) *One 6-cf refrigerator.*
4) *Commercial duty cross-cut shredder with basket, designed for 3 to 5 users, Fellowes Powershred SB-125i, or equal.*

13. *Contractor shall provide the following equipment for the Engineer's temporary field office for the duration of the project. All equipment shall be new.*
    a. *A multifunction Photocopier, printer, facsimile and scanner with 50-sheet auto-feeder, capable of copying and printing letter-sized, legal-sized, and 11x17-inch documents. Contractor to provide maintenance (as required), paper and ink cartridges (as required) for the duration of the project.*
    b. *Four 8-outlet surge protectors with six-foot cord and minimum 1800-joule energy rating or greater; as manufactured by Belkin, or equal.*
    c. *One 12-cup coffeemaker with timer, by Krups, or equal.*
14. *Contractor shall provide the following services for the duration of the project. Services shall include all costs for installation, use, maintenance, and removal of all products, services and equipment billed by each provider for each service specified herein.*
    a. *Perform all scheduled and unscheduled maintenance for all systems as required or requested by the Engineer.*
    b. *Provide connection to electric service. Comply with the electrical requirements of the furnished office trailer. Provide main circuit panel, sufficient GFCI outlets and lighting in each room, exterior lights at each exterior door, and proper grounding of entire electrical system. Contractor shall pay for all electrical costs.*
    c. *Connect to existing potable water supply. Provide hot water heater and hot and cold water to each fixture. Connect waste pipes to a waste holding tank and provide waste pump out services as required to maintain tanks from overflowing. Heat trace and insulate exterior piping to prevent freezing.*
    d. *HVAC System: Provide central heating and air conditioning system with programmable thermostat. System shall be capable of maintaining an interior temperature of 70°F when the exterior temperature is 0°F and an interior temperature of 75°F when the exterior temperature is 100°F.*
    e. *Bottled water service: Provide bottled water service complete with dispenser with hot and cold water taps and regular bottle and cup replenishment as directed by the Engineer.*
    f. *Janitorial service: Provide janitorial services (at least weekly) that include dusting, sweeping, vacuuming, mopping, disinfection, and trash removal.*
    g. *Provide high-speed business grade cable or fiber optic connection with internet access for the duration of the project. Pay all costs for installation, service, maintenance, and removal of the internet service and equipment.*
15. *The Contractor shall provide the following supplies for the duration of the project:*
    a. *Copy paper*
    b. *Toner/Ink and all other printer supplies*
    c. *Toilet paper*
    d. *Paper towels*
    e. *Soap*
    f. *Light bulbs*
    g. *Other consumables related to the trailer as required by the Engineer.*

SECTION 081500

1. DELETE Paragraph 1.5 E and REPLACE with "E. Regulatory Approvals: Although this project is located in North Carolina, Contractor shall provide copy of current, valid Florida statewide product approval for product, material or system as shown on the drawings and as specified in this Section, in accordance with Rule 9N-3 of Florida Administrative Code. Product approval shall be for the specific manufacturer, product type, model or style, and the State Approval Number."
2. DELETE Paragraph 1.8 A and REPLACE with "A. Provide products, materials and assemblies, including anchorage, proposed for the work of this Section that comply with project specific calculated design pressures. Provide products designed by the Manufacturer and installed by the Contractor to meet these requirements."
3. DELETE Paragraph 1.8 A.1 in its entirety.
4. DELETE Paragraph 1.8 B and REPLACE with "Provide documentation that compliance for the products, materials and assemblies, including anchorage specified in this Section have been incorporated into the Work. Demonstrate code compliance as outlined in Chapter 9N-3 Florida Administrative Code Product Approval documentation."

SECTION 083323

1. DELETE Paragraph 1.3 E and REPLACE with "E. Regulatory Approvals: Although this project is located in North Carolina, Contractor shall provide copy of current, valid Florida statewide product approval for product, material or system as shown on the drawings and as specified in this Section, in accordance with Rule 9N-3 of Florida Administrative Code. Product approval shall be for the specific manufacturer, product type, model or style, and the State Approval Number."
2. ADD Paragraph 1.8 as follows:
   "1.8 REGULATORY REQUIREMENTS
   A. Provide products, materials and assemblies, including anchorage, proposed for the work of this Section that comply with project specific calculated design pressures. Provide products designed by the Manufacturer and installed by the Contractor to meet these requirements.
   B. Provide documentation that compliance for the products, materials and assemblies, including anchorage specified in this Section have been incorporated into the Work. Demonstrate code compliance as outlined in Chapter 9N-3 Florida Administrative Code Product Approval documentation."
3. Paragraph 2.3 I.2 DELETE "Between Jambs" and REPLACE with "Face of Wall"
4. DELETE Paragraph 2.10 C.1 and REPLACE with "1. Door Operator Location: Top-of-Hood or Front-of-Hood"
5. Paragraph 2.3 H, DELETE "Stainless Steel" and REPLACE with "Aluminum"
6. Paragraph 2.3 L.4, ADD "(NEMA 3R)" at the end of the sentence.

SECTION 083613

1. DELETE Paragraph 1.3 D and REPLACE with "D. Regulatory Approvals: Although this project is located in North Carolina, Contractor shall provide copy of current, valid Florida statewide product approval for product, material or system as shown on the drawings and as specified in this Section, in accordance with Rule 9N-3 of Florida Administrative Code. Product approval shall be for the specific manufacturer, product type, model or style, and the State Approval Number."
2. DELETE Paragraph 1.8 A and REPLACE with "A. Provide products, materials and assemblies, including anchorage, proposed for the work of this Section that comply with project specific calculated design pressures. Provide products designed by the Manufacturer and installed by the Contractor to meet these requirements."
3. DELETE Paragraph 1.8 A.1 in its entirety.
4. DELETE Paragraph 1.8 B and REPLACE with "Provide documentation that compliance for the products, materials and assemblies, including anchorage specified in this Section have been incorporated into the Work. Demonstrate code compliance as outlined in Chapter 9N-3 Florida Administrative Code Product Approval documentation."
5. Paragraph 2.3 M.4, ADD "(NEMA 3R)" at the end of the sentence.

SECTION 084113

1. DELETE Paragraph 1.4 G and REPLACE with "G. Regulatory Approvals: Although this project is located in North Carolina, Contractor shall provide copy of current, valid Florida statewide product approval for product, material or system as shown on the drawings and as specified in this Section, in accordance with Rule 9N-3 of Florida Administrative Code. Product approval shall be for the specific manufacturer, product type, model or style, and the State Approval Number."
2. DELETE Paragraph 1.9 A and REPLACE with "A. Provide products, materials and assemblies, including anchorage, proposed for the work of this Section that comply with project specific calculated design pressures. Provide products designed by the Manufacturer and installed by the Contractor to meet these requirements."
3. DELETE Paragraph 1.9 A.1 in its entirety.
4. DELETE Paragraph 1.9 B and REPLACE with "Provide documentation that compliance for the products, materials and assemblies, including anchorage specified in this Section have been incorporated into the Work. Demonstrate code compliance as outlined in Chapter 9N-3 Florida Administrative Code Product Approval documentation."

SECTION 084523

1. DELETE Paragraph 1.4 E and REPLACE with "E. Regulatory Approvals: Although this project is located in North Carolina, Contractor shall provide copy of current, valid Florida statewide product approval for product, material or system as shown on the drawings and as specified in this Section, in accordance with Rule 9N-3 of Florida Administrative Code. Product approval shall be for the specific manufacturer, product type, model or style, and the State Approval Number."
2. DELETE Paragraph 1.9 A and REPLACE with "A. Provide products, materials and assemblies, including anchorage, proposed for the work of this Section that comply with project specific calculated design pressures. Provide products designed by the Manufacturer and installed by the Contractor to meet these requirements."
3. DELETE Paragraph 1.9 A.1 in its entirety.
4. DELETE Paragraph 1.9 B and REPLACE with "Provide documentation that compliance for the products, materials and assemblies, including anchorage specified in this Section have been incorporated into the Work. Demonstrate code compliance as outlined in Chapter 9N-3 Florida Administrative Code Product Approval documentation."

SECTION 085113

1. DELETE Paragraph 1.4 E and REPLACE with "E. Regulatory Approvals: Although this project is located in North Carolina, Contractor shall provide copy of current, valid Florida statewide product approval for product, material or system as shown on the drawings and as specified in this Section, in accordance with Rule 9N-3 of Florida Administrative Code. Product approval shall be for the specific manufacturer, product type, model or style, and the State Approval Number."
2. DELETE Paragraph 1.8 A and REPLACE with "A. Provide products, materials and assemblies, including anchorage, proposed for the work of this Section that comply with project specific calculated design pressures. Provide products designed by the Manufacturer and installed by the Contractor to meet these requirements."
3. DELETE Paragraph 1.8 A.1 in its entirety.
4. DELETE Paragraph 1.8 B and REPLACE with "Provide documentation that compliance for the products, materials and assemblies, including anchorage specified in this Section have been incorporated into the Work. Demonstrate code compliance as outlined in Chapter 9N-3 Florida Administrative Code Product Approval documentation."

SECTION 086300

1. DELETE Paragraph 1.4 F and REPLACE with "F. Regulatory Approvals: Although this project is located in North Carolina, Contractor shall provide copy of current, valid Florida statewide product approval for product, material or system as shown on the drawings and as specified in this Section, in accordance with Rule 9N-3 of Florida Administrative Code. Product approval shall be for the specific manufacturer, product type, model or style, and the State Approval Number."
2. DELETE Paragraph 1.8 A and REPLACE with "A. Provide products, materials and assemblies, including anchorage, proposed for the work of this Section that comply with project specific calculated design pressures. Provide products designed by the Manufacturer and installed by the Contractor to meet these requirements."
3. DELETE Paragraph 1.8 A.1 in its entirety.

4. DELETE Paragraph 1.8 B and REPLACE with "Provide documentation that compliance for the products, materials and assemblies, including anchorage specified in this Section have been incorporated into the Work. Demonstrate code compliance as outlined in Chapter 9N-3 Florida Administrative Code Product Approval documentation."

SECTION 089119

1. DELETE Paragraph 1.5 B and REPLACE with "E. Regulatory Approvals: Although this project is located in North Carolina, Contractor shall provide copy of current, valid Florida statewide product approval for product, material or system as shown on the drawings and as specified in this Section, in accordance with Rule 9N-3 of Florida Administrative Code. Product approval shall be for the specific manufacturer, product type, model or style, and the State Approval Number."
2. DELETE Paragraph 1.7 A and REPLACE with "A. Provide products, materials and assemblies, including anchorage, proposed for the work of this Section that comply with project specific calculated design pressures. Provide products designed by the Manufacturer and installed by the Contractor to meet these requirements."
3. DELETE Paragraph 1.7 A.1 in its entirety.
4. DELETE Paragraph 1.7 B and REPLACE with "Provide documentation that compliance for the products, materials and assemblies, including anchorage specified in this Section have been incorporated into the Work. Demonstrate code compliance as outlined in Chapter 9N-3 Florida Administrative Code Product Approval documentation."

SECTION 096723

1. Add the attached Section 096723 "Resinous Flooring" to the Bid Document set.

SECTION 210529

1. Page 210529-7
    a. In paragraph 3.7E, insert "(Chlorine Building)" after "for hostile environment applications".

SECTION 221116

1. Page 221116-13
    a. In paragraphs 3.12H and 3.12I, replace "Type M" with "Type K".

SECTION 211119

1. Page 211200-12
    a. Remove paragraph 3.2.C in its entirety.

SECTION 220529

1. Page 220529-8
    a. In paragraph 3.7E, replace "general service applications" with:
    "wet and corrosive environments (Chlorine Building, RO Building (including Membrane Room, Cleaning & Antiscalant Area, Pump Room, Spare Parts Room), Filter Gallery, Filters, and Emulsified Lime."

SECTION 220533

1. Page 220533-1
    a. In paragraph 1.2, remove: "and snow and ice melting on roofs and in gutters and downspouts".
2. Page 220533-3
    a. Remove paragraph 2.3.B in its entirety.
3. Page 220533-4
    a. Remove paragraph 3.3.B in its entirety.

SECTION 221316

1. Page 221316-9
    a. For paragraph 3.6B after "corrosive environments" insert:
    "(Chlorine Building, RO Building (including Membrane Room, Cleaning & Antiscalant Area, Pump Room, Spare Parts Room), Filter Gallery, Filters, and Emulsified Lime)."

SECTION 221429

1. Replace Paragraph 2.2 in its entirety with the following:

2.2 SUMP PUMPS – HEAVY DUTY – DUPLEX

A. Submersible type, heavy duty, duplex sump pumps, in the quantity shown at each location. Each sump pump shall be a Stancor Model SS200 or equal. Refer to the Schedule on the Drawings for each application.

B. Furnish and install for each sump pump or pumps, provide a duplex sump pump control panel. Control panel shall operate on a 480 volt, 3 phase, 60 Hz incoming power supply. Mount panel on wall adjacent to sump pump or as shown on the Drawings.

C. Construction Features:

1. *Pumps to have 2-in flanged discharge, connections, all stainless-steel housing, stainless steel shafts, stainless steel impellers, double mechanical seals and capable of passing 2-in solids.*

2. *Pumps shall have stainless steel check valves.*

D. Controls:

1. *Four Series 10-0225 non-mercury float switches suspended from stainless steel clips, each with 20-ft cord.*

2. *One NEMA 4X stainless steel control cabinet containing:*
   a. *Two magnetic trip circuit breakers with thru door disconnects and magnetic starters with 3 coil overload protection for each sump pump.*
   b. *Two HOA selector switches.*
   c. *Two running lights.*
   d. *Two control circuit transformers.*
   e. *One 4-in alarm horn with silencer.*
   f. *One flashing amber light.*
   g. *Two isolated contacts for remote alarm.*

3. *The Sequence of Operation shall be as follows:*
   a. *All actions shall be reversible.*
   b. *The low-level pump shutoff float shall stop the operation of the lead pump.*
   c. *The high-level lead pump start float switch shall start the operation of the lead pump.*
   d. *The high-level alarm/lag pump start float shall start the operation of the lag pump and shall send a signal to the plant SCADA system, to indicate an alarm condition. The lag pump shall run until the low-level pump shutoff float switch is satisfied.*
   e. *The automatic alternator shall switch the lead pump and the lag pump after every run cycle."*

SECTION 230529

1. Page 230529-9
   a. In paragraph 3.7F, after "hostile environment applications" insert:
      "(Chlorine Building, RO Building (including Membrane Room, Cleaning & Antiscalant Area, Pump Room, Spare Parts Room), Filter Gallery, Filters, and Emulsified Lime)".

SECTION 230719

1. Page 230719-21
    a. In subparagraph 3.15C.1, replace “Aluminum, Smooth: 0.016 inch thick.” With “none”.
    b. In paragraph 3.15D insert “(within 7 feet of finished floor)” after “Piping, Exposed”.
    c. In paragraph 3.16C removed the word “concealed”.

SECTION 231113

1. Page 231113-4
    a. In Paragraph 2.3B, replace “Schedule 40” with “Schedule 80”.

SECTION 233113

1. Page 233113-6
    a. Remove paragraph 2.5E in its entirety. Renumber subsequent paragraphs accordingly.

SECTION 233116

1. Page 233116-4
    a. Remove paragraph 2.1.A.6 in its entirety
    b. After paragraph 2.1, add the following, renumbering subsequent paragraphs as necessary:

2.2 Material

A. Design Conditions

1. Temperature: minus 10 to 125 degrees F

2. Pressure: 10-in H2O w.g. positive; 12-in H2O w.g. negative (min) or as required by the associated fan downstream.

3. Flow medium and velocity: air at 2500 fpm

4. Wall thickness (minimum): Sec 2.03.K

B. The following materials are expected to be in the air stream or surrounding area. The resins used shall be suitable for all of the following:

1. Chlorine Gas

2.3 CLASSES OF CONSTRUCTION

A. Ductwork shall be designed and constructed for the following services and in accordance with ANSI RTP-1.

System	Location	Static Pressure	Material Conveyed	Construction Material
Chlorine Scrubber	Various	10” w.c.	See 2.01 B	Vinyl Ester FRP

B. Design of ductwork shall include all loads applied to the ductwork, in addition to the load of the duct. These loads include but are not limited to wind, snow and internal dirt or liquid buildup.

2.4 FIBERGLASS REINFORCED PLASTIC (FRP) DUCTWORK

A. FRP ductwork shall be filament wound construction to meet design criteria.

B. Exterior FRP ductwork shall have a flame spread rating of 25 or less inside and outside. Interior FRP shall have a flame spread rating of 25 or less inside and outside and a smoke developed rating of not more than 50 on the outside in accordance with NFPA 91. Intumescent paint shall be applied to interior duct work to achieve the smoke development requirement.

1. Products: Provide one of the following:

a. Albi Manufacturing, a division of StanChem, Inc; Albi-Cote FRL; flat finish.

b. Benjamin Moore & Co; M59 220.

c. Fire Research Laboratories/Ocean Fire Retardants Inc; FireCoat 320; flat finish.

d. Flame Control Coatings, LLC; [No. 20-20 (flat finish)] [No. 320A.].

e. International Fire Resistant Systems, Inc; Firefree88; flat finish.

f. Magna Coatings Technology Inc; SafeCoat 451.

g. Muralo Company (The); 1500; flat finish.

h. NoFire Technologies, Inc; A-18; flat finish.
I PPG Industries, Inc; Speed Hide 42-7; flat finish.
j. Or equal as approved by the Engineer.

C. Laminates shall consist of a 20 mil (finished thickness) minimum chemical resistant interior liner with an apertured synthetic surface veil embedded in a resin rich surface. The corrosion barrier shall be a minimum of 100 mils thick and include not less than two layers of 1-1/2 oz mat with 25 percent glass and 75 percent resin content. The structural layer shall be of sufficient thickness to meet the minimum thickness requirements specified. The exterior surface layer shall be resin rich "C" – glass or apertured nexus veil not less than 20 mils thick. Outside finish shall be a pigmented, parrafinated gel coat with an ultra violet inhibitor. The inner surface shall be free of cracks and crazing with a smooth finish and with an average of not over two pits per square foot, providing the pits are less than 1/8-in in diameter and not over 1/32-in deep and are covered with sufficient resin to avoid exposure of inner surface fabric. Some waviness is permissible as long as the surface is smooth and free of pits.

D. Resins used in the laminate shall be premium corrosion resistant and fire-retardant vinyl ester resin without the use of Antimony Trioxide additive. Resin shall be:
1. Derakane 510-B-400
2. Cor VE 8401
3. AOC Vipel K022
4. Reichold's Dion Impact 9303-54

E. Fittings and Joints: All fittings such as elbows, laterals, tees and reducers shall be of the same resin as an equal or superior in strength to the adjacent duct section and shall have the same internal dimensions as the adjacent duct. Non-flanged duct joints shall be butt wrapped or bell and spigot joints. All field joints shall be flanged, no wrapped field joints are allowed. Field cut duct ends and exposed glass fibers shall be resin coated prior to joint assembly to maintain a continuous interior corrosion barrier. Coat all exterior surfaces of joints with a paraffinated resin-rich gel coat with UV inhibitors.

F. Total width of overlay for butt-wrap joints shall be not less than 6-in for diameters from 6-in up to and including 30-in, 36-in and larger shall be not less than 10-in. Butt wrapped field joints are not allowed.

G. Round Standard Elbows
1. Standard elbow centerline radius shall be equal to 1-1/2 times the diameter.
2. Standard elbows up to 24-in diameter shall be smooth radius molded elbows. Standard elbows 30-in diameter and greater may be mitered sections as specified below.
3. 0 to 44-degree elbows shall contain one mitered joint and two sections. 45 to 80-degree elbows shall have a minimum of two mitered joints and three sections. Elbows greater than 80 degrees shall have a minimum of four mitered joints and five sections.

H. Rectangular Fittings
1. Fittings shall be factory manufactured to meet the specified design criteria and in accordance with approved submittals. Factory install reinforcing ribs as required to meet the specified deflection requirements and to provide a system free from pulsing, warpage, sagging and undue vibration.
2. Provide forming vanes in all mitered rectangular elbows. Rectangular elbow turning vanes shall be of FRP construction, solid or double wall construction with an airfoil shaped profile.

I. Reinforcing
1. Round duct reinforcing shall be factory installed with spacing between reinforcing located to avoid all hangers and support saddles.
2. Rectangular duct and fitting reinforcing shall be factory located and installed to avoid duct hangers, support saddles, bracing, branch take-offs and entries, and plenum connections. Routine field cutting and field relocation of factory installed reinforcing is not acceptable.

J. Tolerances
1. Out-of-roundness of duct shall be limited to plus or minus 1/8-in or plus or minus 1 percent of duct inside diameter, whichever is greater for duct sizes 6-in diameter and greater.
2. Rectangular duct tolerances shall be 3/16-in for duct diameter up to 18-in and plus or minus 1 percent for dimensions of over 18-in.
3. Fittings

a. The tolerance on angles of all fittings shall be plus or minus 1 degree, up to and including 24-in diameter and plus or minus ½ degree for 30-in diameter and above.

4. Flanges

a. Flange faces shall be perpendicular to the axis of the duct within ½ degree.

b. Flange faces shall be flat to within plus or minus 1/32-in, up to and including 18-in diameter and flat within plus or minus 1/16-in for 20-in diameter and larger.

c. Provide custom filler pieces as required to mate flanges squarely.

K. Calculations for wall thickness determination shall be based on the structural fiberglass reinforced wall only. Long term deflection shall not exceed 1 percent of duct diameter or duct width for rectangular ducts. Round and rectangular FRP ductwork shall be designed using a safety factor of 10 to 1 for pressure and 5 to 1 for vacuum service. Round duct shall be designed by manufacturer to resist specified loadings but in no case shall FRP duct be less than the following thicknesses:

*Diameter (-in)**	*Filament Wound Thickness (-in)*
Less than 24	*.225*
24 to 30	*.275*
*36 to 42***	*.375*
*48 to 60***	*.525*
*66 to 72***	*.625*

** Where rectangular duct is used the longest dimension shall be considered equivalent to diameter.*

*** Rectangular duct may be reinforced with angles or tees as required to meet the required pressure/vacuum service.*

L. All connections to expansion joints, butterfly dampers, fire dampers, tanks, or other equipment shall be flanged. Gaskets shall be Viton. Flanges shall be hand laid up to thickness specified ASTM 3982 except that minimum thickness shall be ¾-in. Flange connections to the tanks shall be designed to withstand three-foot flood waters. Each flange face shall be ground flat, and a new 100 mil corrosion barrier shall be applied. The flange shall be anchored to a waxed table to ensure the flatness tolerance outlined above. The face shall be textured for use with full face Viton gaskets, 1/8-in minimum thickness. Flange drilling shall be as per ASTM D3982. All bolt holes shall be back spot faced for a washer seat. All flange bolts shall be torqued to values as recommended by manufacturer.

M. Fasteners: Furnish all bolts, nuts, washers and other fasteners required. Material of metallic fasteners shall be Type 316 stainless steel.

N. There shall be not less than a ¼-in buildup of FRP over the duct at each support and as shown on the Drawings.

O. Provide trapped PVC duct drains in the bottom of all main, branch and riser ducts to allow removal of condensate.

P. All hangers and supports shall be designed according to the structural drawings. All duct hangers shall be provided per SMACNA recommendations and manufacturers requirements. Minimum spacing of duct supports is shown on the drawings. The Contractor shall supply design calculations for duct supports, signed and sealed by an engineer licensed in the State of North Ca.

2.5 FLEXIBLE CONNECTORS

A. Furnish flexible connectors at each inlet and outlet of fan and in the duct runs where required for expansion, contraction and movement as indicated on the drawings. Flexible connections shall be integral flange molded arch type units constructed of EPDM rubber ¼-in thick, reinforced with a strong synthetic asbestos-free fabric suitable for corrosive service. The flexible connections shall be designed to minimize the transmission of vibration from the fans to the ductwork at the suction and discharge connections. Expansion or contraction flexible connections shall be designed to allow 1-in movement. Working length or "live" length shall be as designed by the manufacturer to allow up to 1-in of movement. Ends shall be flanged, with flanges matching duct connection flanges. Corners on rectangular expansion joints shall be molded and free of patches or splices. The flexible connections

shall be suitable for outdoor service and temperature ranges from minus 10 up to 125 degrees F, and pressure to 5 psig.

B. Where the construction of the flexible connections or vibration isolator results in a cross-sectional area of the connection which is less than 90 percent of the adjacent ductwork, the size of the connection shall be increased to provide a cross sectional area equal to or greater than 90 percent of the adjacent duct.

C. Ductwork spacing and alignment for flexible connections shall be aligned to the tolerances of the flexible connection manufacturer, or plus/minus ¼-in whichever is less. Bolts shall be torqued to the manufacturer's recommendations. Do not over tighten.

D. Where flexible connections are used as expansion joints, the manufacturer's pre-compression recommendations must be followed. When the temperature at installation differs from the temperature in the pre-compression recommendation, a correction shall be made.

G. Manufacturer:

1. Hold Rubber Company.
2. Mercer Rubber Company.
3. Daniel Company
4. Belco
5. Or equal as approved by the Engineer.

2.6 TOOLS, SPARE PARTS AND MAINTENANCE MATERIALS

A. The duct system shall be furnished with the following:

1. One set of special tools required to maintain and repair the system.
2. All materials in kit form to make or repair joints. Additional kits shall be supplied sufficient to repair 10 percent of the joints. Materials shall be packaged for long term storage.
3. Names and addresses of all manufacturers of fiberglass reinforcements, resins, hardeners and components used to repair and maintain the FRP duct system.

B. Spare parts shall be packed in sturdy containers with clear indelible identification markings and shall be stored in a dry, warm location, and provide in accordance with Section 01600

C. Material safety data sheets for all components must be furnished.

2.7 FIBERGLASS REINFORCED PLASTIC CONTROL DAMPERS

E. Provide factory fabricated dampers conforming to AMCA 500D requirements and as specified.

F. Provide FRP dampers manufactured from the same materials and resin as specified for duct.

G. Provide the following type of dampers for the service specified:

1. *Balancing:*
   a. *Blades: Two (2) piece, molded including blade stiffeners. Provide damper blade offset 5 degrees in the closed position to form a normal stop.*
   b. *Axle: Solid 316 SS*
   c. *Control Shaft: Provide axle extending 6 inches beyond frame, full length solid 316SS with Type 316 stainless steel pins embedded transverse of axle.*
   d. *The handle shall be 316 SS drilled to allow the damper to set and bolted in place.*
   e. *Bearings: Molded PTFE with 10 percent carbon and graphite fill.*
   f. *O-Rings: Viton.*

Metallic parts in contact with the air stream are not acceptable.

2. *Isolation:*
   a. *Blades: Two (2) piece, molded including blade stiffeners. Provide damper blade offset 5 degrees in the closed position to form a normal stop.*
   b. *Axle: Solid 316 SS*
   c. *Control Shaft: Provide axle extending 6 inches beyond frame, full length solid 316SS with Type 316 stainless steel pins embedded transverse of axle*
   d. *.Bearings: Molded PTFE with 10 percent carbon and graphite fill.*
   e. *O-Rings: Viton*
   f. *Provide dampers equipped with full circumference elastomer embedded in the damper body. Extruded double tadpole blade seals or "windshield type damper seals shall not be accepted.*
   g. *Isolation Damper leakage: Not to exceed 0 cfm/sq. ft. against 30 inches W.C.*

h. *The dampers shall bear an AMCA label.*

3. *Approved Manufacturers*

a. *Daniel Company*

b. *Swartout*

H. Where indicated, provide electric motor operators as specified herein.

I. Dampers shall be of self-supporting construction and shall not deflect or deform while free standing.

J. Dampers shall have flanged ends for connection to ductwork and equipment.

K. Manual Operators:

1. *Dampers 16-inch and larger: Provided gear operators with an epoxy coating.*
2. *Dampers 14-inch and smaller: Provide hand quadrant actuators fabricated of Type 316 stainless steel with a 5-stage locking quadrant indicator.*

L. Balancing Dampers:

1. *Manual: Provide a fully adjustable slot with an extra hole drilled in the handle for contractor to "drill and pin-in place" once system is balanced so handle cannot vibrate loose.*

M. Chain wheel operators: Provide stainless steel chain wheels with stainless steel chain and chain guides for all dampers with operator or gear operators higher than 6.5 feet above operating floor level.

1. *Provide chain that reaches to within 3 feet of the operating floor level with safety fall devices.*
2. *For dampers with gear operator mount with chain wheel in the vertical position.*

N. Actuators

1. *Manufacturers*

a. *The following manufacturers and model numbers have been prequalified. No substitutions are allowed. The electric motor actuators shall be:*

1) *Limitorque MX Series*

2) *Rotork IQ Series*

2. *Components:*

a. *Enclosure:*

1) *Watertight to IP68. Enclosure must be certified NEMA 6 by FM (Factory Mutual).*

2.8 FRP TRANSITION PIECES

A. Provide transition pieces as shown on Drawings and specified herein.

B. Construction:

1. Thickness of transition pieces shall be designed using a safety factory of 10 to 1 for pressure and 5 to 1 for vacuum service with the pressure classification listed below.

2. Custom flanges shall be designed as required to connect to fans, coils, dampers and duct work. Coordinate flange sizes to match approved equipment dimensions.

C. Pressure Classification: Manufacturer shall design transition pieces so that they shall be free from buckling, pulsing, warpage and sagging at design pressures.

2.9 LABELS

A. The service of each duct along with and arrow indicating direction of flow shall be provided on each duct system. Labels shall be located not more than 26 linear feet apart and shall also be provided at both sides of wall penetrations, at each damper, and each equipment connection.

B. Numbers and letters shall be die-cut from 3.5 mil vinyl film and pre-spaced on carrier film. Adhesive and finish shall be protected with one piece removable liners. Colors shall be white letters on black backgrounds.

C. The system for preparation and application of letters shall be Type B a.s.i./2 by ASI Sign Systems; Architectural Graphics Inc., or Engineer-approved equal. Letters shall be 3-in high Optima Bold, upper case using Grid 2 spacing. Direction arrows are to match. The instructions of the manufacturer shall be followed in respect to storage, surface preparation and application of letters.

D. Each piece of equipment is to be provided with an identification label"

SECTION 233423

1. Page 233423-1
    a. Under paragraph 1.2.A, add:
        "5. Distribution Fans"
2. Page 233423-6
    a. After paragraph 2.4, add the following, renumbering subsequent paragraphs as necessary:

2.5 "DISTRIBUTION FANS

A. *The entire fan assembly shall be ETL certified and built pursuant to the construction guidelines set forth by UL standard 507 and CSA standard 22.2. The fan shall be designed to move an effective amount of air for cooling and destratification in large industrial applications over an extended life. The fan and components shall be designed specifically for high volume, low speed fans to ensure lower operational noise. The sound levels from the fan operating at maximum speed shall not exceed 55 dBA measured 20' below the blades and 20' horizontally from the center of the fan.*

B. *The fan shall be equipped with ten (10) powerfoil airfoils of precision extruded aluminum alloy. The airfoils shall be connected by means of two (2) high strength locking bolts per airfoil. The airfoils shall be connected to the hub and interlocked with zinc plated steel retainers. Airfoils shall be powder coated. The fan shall be equipped with ten (10) powerfoil winglets on the end of the airfoils and ten (10) AirFences positioned on the airfoils at the optimum location for performance. AirFences are fixed aerodynamic devices applied along the airfoil to break up the air and redirect the fan's air velocity profile, contributing to a 28% improvement in coverage area. The winglets and AirFences shall be molded of ABS plastic. The standard color of the winglets and AirFences shall be "Safety Yellow".*

C. *The fan motor shall be an AC induction type inverter rated at 1725 RPM, 460 VAC/60 Hz/3 Phase and 1725 RPM. The motor shall be totally enclosed, fan cooled (TEFC) with an IP 42 NEMA classification. NEMA standard frames 56C shall be provided for ease of service. The motor shall be manufactured with a double baked Class F insulation and be capable of continuous operation in 30 F to 122 F ambient conditions.*

D. *The fan gearbox shall be a NitroSeal Drive designed specifically for the Powerfoil X 2.0. The gearbox shall include a high efficiency, hermetically sealed, nitrogen filled, offset helical gear reducer with two stage gearing, a 2-1/2" hollow output shaft, cast iron housing, double lip seals, high quality SKF Explorer Series bearings with crowned cages for optimal lubrication flow, and precision machined gearing to maintain backlash less than 11 arc – minutes over the life of the unit. Lubrication shall be high – grade, low foaming synthetic oil with extreme pressure additives and a wide temperature range. The fan gearbox shall be equipped with a hollow shaft in which wiring, piping, etc. can be routed below the fan. A non – rotating, junction box shall be provided at the base of the fan for installing optional features such as lights or cameras. The inclusion of the hollow shaft and non-rotating junction box shall be specified at the time of order.*

E. *The fan shall be equipped with a no critical weld design, mounting post that provides a structural connection between the fan assembly and extension tube. The mounting post shall be 3" x 3" and powder coated for corrosion resistance and appearance.*

F. *The fan hub shall be made of laser cut aluminum for high strength and light weight. The hub shall consist of two (2) aluminum plates, ten (10) aluminum spars and one (1) aluminum spacer fastened with a pin and collar rivet system. The hub shall be secured to the output shaft of the gearbox by means of a steel flange interface. The hub shall incorporate five (5) safety retaining clips made of ¼" thick steel that shall restrain the hub/airfoil assembly.*

G. *The fan mounting system shall be designed for quick and secure installation from a structural support beam. The mounting bracket shall be of welded construction using low carbon steel no less than 3/16" thick and be powder coated for appearance and resistance to corrosion. All mounting bolts shall be SAE Grade 8 or equivalent*

H. *The fan shall be equipped with a safety cable that provides an additional means of securing the fan assembly to the building structure. The safety cable shall be 3/8" to ¼" diameter and fabricated out of 7 x 19 stranded galvanized steel. The loops shall be secured with swaged Nicopress sleeves, pre-loaded and tested to 3,200 lb·f. Field construction of safety cables is not permitted.*

I. *The onboard fan controller shall be constructed using a Variable Speed Drive (VSD) that is pre-wired to the motor and factory programmed to minimize the starting and braking torques, for smooth and efficient operation. The controller shall be prewired to the motor using a short run of flexible conduit with a dedicated ground conductor to minimize electromagnetic interference (EMI) and radio frequency*

interference (RFI). An incoming power cord shall also be pre-wired to the controller with an NEMA L5-20P twist-lock plug and 15-ft cord for ease of installation.

J. *The fan shall be equipped with a wall mounted keypad or wall control providing 100% control of all fan functions. The wall control shall be a digital keypad device mounted within a cast zinc cover. The cover shall be capable of mounting to a standard wall box utilizing a supplied adapter plate. The wall control shall be equipped with touchpad controls and an LED display for controlling the fan's direction, operation, speed, and programming. Communication with the fan VSD and wall control shall be by a standard CAT-5 (or higher) ethernet cable. The wall control comes standard with 150-ft of factory-assembled CAT5 ethernet cable. The wall control shall be equipped with a simple diagnostic program to identify faults in the system. Provisions shall be made for retrieving fan operation and diagnostic data (fault messages) through the remote wall device*

K. *Provide the Big Ass Fans SmartSense365 Control system or equal. The control housing, measuring 7.25" x 3.825", shall be made of aluminum.*

1. *The control interface shall include push buttons and color-coded LED lights to indicate winter mode, summer mode, manual mode, fan speed percentage, and threshold temperature. A 25V AC adapter shall be included to power the unit.*
2. *In winter mode, an external temperature sensor placed near the ceiling and connected with 18-22 AWG stranded, shielded conductor cables, and an internal temperature sensor placed in the control shall measure the temperature differential between the ceiling and wall control to maintain a 1-3 °F temperature differential between the two. In summer mode, the internal temperature sensor shall measure the temperature at wall control level and adjust fan speed according to set point. In manual mode, the user shall have full control of SmartSense365's settings.*

L. *Manufacturer shall be Big Ass Fans or Equal."*

SECTION 238129

1. Page 238129-24
   a. For subparagraph 2.16B.2.b, insert "(except within 7 feet of finished floor)" after "None required".

SECTION 238239

2. Replace Paragraphs 2.2, 2.3, 2.4, 2.5, and 2.6 with the following:

"2.2 DESCRIPTION

A. Assembly including chassis, electric heating coil, fan, motor, and controls. UL listed for corrosive areas and NEMA 4X hose down requirements.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 CABINET

A. Housing: 16 Gauge Stainless steel.

B. Finish: Stainless Steel

C. Surface-Mounted Cabinet Enclosure: Stainless Steel.

2.4 COIL

A. Electric-Resistance Heating Coil: Industrial grade, type 316 stainless steel, monel sheath with mechanically wound monel fins and stainless steel mounting fittings. Provide integral circuit breaker for overcurrent protection.

2.5 FAN AND MOTOR

A. Fan: Power Coated Aluminum propeller directly connected to motor.

B. Motor: Totally Enclosed, epoxy coated, with permanently lubricated ball bearings. Comply with requirements in Section 230513 "Common Motor Requirements for HVAC Equipment."

2.6 CONTROLS

A. Non-metallic enclosure, which houses the element terminals and built-in controls, will not rust and meets NEMA 4X hose-down requirements.

B. Include automatic reset overtemperature cutout, fan delay relay, controlling contactor, transformer for 24-volt control circuit, terminal block for field wiring and a separate motor contactor (when required)."

SECTION 262923

3. Page 262923-7, Paragraph 2.4B
    a. In paragraph 262923-2.4.B.1, add the following after 'Matric AP Passive Harmonic Filter by MTE': "or equal by TCI"
    b. Add the following paragraph to 262923-2.4.B (this will become Paragraph 2 under 2.4.B): "2. Provide a capacitor cutout contactor within the passive harmonic filter to disconnect the capacitor banks from the assembly when operating at low loads. The capacitor cutout setpoint shall be a pre-determined load by the manufacturer and coordinated so that the filter does not cause a leading power factor in order to avoid VFC and generator failures and malfunctions."
4. Page 262923-9, Paragraph 2.6
    a. In paragraph 262923-2.6.A.1, add the following sentence to the end of the paragraph: "A separate line reactor is not required where incorporated into the passive harmonic filter."
    b. In paragraph 262923-2.6.B.1, add the following at the end of the paragraph after 'or equal': "by TCI"

SECTION 312000

1. Page 312000-3, Paragraph 1.5
    a. Replace Paragraph 1.5M ("Unsuitable Soil") with the following: "M. Unsuitable Soil: Includes organic soils (i.e., organic content greater than 5 percent per ASTM D2974), weak native soils, or clays with a plasticity index of greater than 30, and any materials that cannot be properly placed and compacted as specified."

SECTION 330519

1. Page 330519-6, Paragraph 1.11B
    a. Replace the word "two" with "a".
2. Page 330519-8, Paragraph 2.3.11
    a. Replace "Buried Sleeve-Type Couplings:" with "Buried Sleeve-Type Couplings, including solid sleeves, flexible couplings, and dresser couplings:"
3. Page 330519-11, Paragraph 3.3A
    a. For subparagraph 3.3A.5, replace "manufacturer's recommendation" with "75% of manufacturer's recommendation."

SECTION 330531.16

1. Page 330531.16-5, Paragraph 3.3C
    a. For subparagraph 3.3C.5, replace "manufacturer recommendations" with "75% of manufacturer recommendations."

SECTION 400523

1. Page 400523-20
    a. Add the following as Paragraph 2.5, renumbering subsequent paragraphs accordingly:

"2.5 Mechanical Couplings for Joining Stainless Steel Pipe:

A. Stainless Steel Mechanical Couplings: Manufactured in two or more segments of cast stainless steel, conforming to ASTM A-351, A-743, and A-744. Gaskets shall be pressure-responsive synthetic rubber, grade to suit the intended service, conforming to ASTM D-2000. (Gaskets used on potable water systems shall be UL classified in accordance with ANSI/NSF-61 for potable water service.) Mechanical coupling bolts shall be stainless steel, type 316, meeting the physical properties of ASTM A-193, grade B8M, Class2.

1. Rigid Type: Cast with key designed to clamp the bottom of the groove to provide an essentially rigid joint. Victaulic Series 489 or equal.
2. Flexible Type: Use in locations where vibration attenuation and stress relief are required. Victaulic Series 77S or equal."

SECTION 400531

1. Page 400531-7, Paragraph 2.5
    a. Added the following to 400531.00, subsection 2.5.A:
    "5. Stainless Steel Mechanical Couplings:
        a. Manufactured in two or more segments of cast stainless steel, conforming to ASTM A-351, A-743, and A-744.
        b. Gaskets: pressure-responsive synthetic rubber, grade to suit the intended service, conforming to ASTM D-2000. (Gaskets used on potable water systems shall be UL classified in accordance with ANSI/NSF-61 for potable water service.)
        c. Bolts: stainless steel, type 316, meeting the physical properties of ASTM A-193, grade B8M, Class 2.
        d. Rigid Type: Cast with key designed to clamp the bottom of the groove to provide an essentially rigid joint. Victaulic Series 489 or equal.
        e. Flexible Type: Use in locations where vibration attenuation and stress relief are required. Victaulic Series 77S or equal."
    b. Added the following to 400531.00, subsection 2.5.A:
    "4. Stainless Steel Mechanical Couplings:
        a. Manufactured in two or more segments of cast stainless steel, conforming to ASTM A-351, A-743, and A-744.
        b. Gaskets: pressure-responsive synthetic rubber, grade to suit the intended service, conforming to ASTM D-2000. (Gaskets used on potable water systems shall be UL classified in accordance with ANSI/NSF-61 for potable water service.)
        c. Bolts: stainless steel, type 316, meeting the physical properties of ASTM A-193, grade B8M, Class 2.
        d. Rigid Type: Cast with key designed to clamp the bottom of the groove to provide an essentially rigid joint. Victaulic Series 489 or equal.
        e. Flexible Type: Use in locations where vibration attenuation and stress relief are required. Victaulic Series 77S or equal."

SECTION 400559.21

1. Page 400559.21-5, Paragraph 2.2F
    a. Replace subparagraph 2.2F.5 ("Mounting: As indicated on Drawings and in the Gate Schedule.") with the following:
    "Mounting: face mounted."
2. Page 400559.21-10, Aluminum Slide Gate Schedule
    a. Replace the slide gate schedule with the following, keeping the title asterisk and footnote described in Addendum 3:

Gate Tag	**Process**	**Type**	**Opening W x H)**	**Frame/ Mounting**	**TOW EL.**	**Top of Gate Opening EL.**	**Bottom of Gate Opening EL.**	**Lift Type**
SG-3510	Backwash Equalization Tank	Slide Gate	48"x48"	Non-Self-contained Wall mounted	60.0	44.0	40.0	Manual
SG-3520	Backwash Equalization Tank	Slide Gate	48"x48"	Non-Self-contained Wall Mounted	60.0	44.0	40.0	Manual
SG-3500	Backwash Equalization Tank	Slide Gate	72"x72"	Non- Self-Contained Wall mounted	60.0	46.0	40.0	Manual

SECTION 400561

1. On page 400561-1, delete Paragraph 1.2.A in its entirety and insert the following:
   "1. Solid wedge, metal-seated gate valves
   2. Solid wedge, resilient-seated gate valves
   3. General duty gate valves smaller than 3 inches
   4. Tapping valves and sleeves"

2. On page 400561-1, delete Paragraph 1.2.B in its entirety and insert the following:
   "1. Section 220523.15 – Gate Valves for Plumbing Piping.
   2. Section 400551 – Common Requirements for Process Valves: Basic materials and methods related to valves commonly used for process systems.
   3. Section 400557 – Actuators for Process Valves and Gates.
   4. Section 432620 – Permeate Water Pumping System."

3. On page 400561-2, renumber Paragraphs 2.1 and 2.2 as paragraphs 2.2 and 2.4, respectively.

4. On page 400561-2, Insert the following as new Paragraph 2.1:

"2.1 SOLID WEDGE, METAL-SEATED GATE VALVES – TAG TYPE GV3

A. Manufacturers:
   1. Velan API 630
   2. Smith-Cooper Sharpe Series 35116
   3. FNW Model 451
   4. Substitutions: As specified in Section 016000 – Product Requirements.

B. Description:
   1. RO Permeate Water service.
   2. As specified in Section 400551 – Common Requirements for Process Valves.
   3. Comply with AWWA C500.
   4. Minimum Working Pressure: 200 psi.
   5. Maximum Process Fluid Temperature: 300 deg. F.
   6. Wedge: One piece, solid.
   7. End Connections: ASME B16.34 and B16.5, flanged.

C. Body: tongue and grooved guides for wedges

D. Operation:
   1. As specified in Section 400551 – Common Requirements for Process Valves.
   2. Interior and Exposed Service:
      a. Outside screw and yoke (OS&Y).
      b. Provide NRS (non-rising stem) valves with position indicators.
   3. Gear Actuators for Manual Valves: Comply with AWWA C500.

E. Materials:
   1. Comply with AWWA C500.
   2. Body, Bonnet, Wedge, and Gland: ASTM A351 Grade CF8M stainless steel.
   3. Handwheel: Ductile iron.
   4. Stem: Rolled, Type 316 stainless steel.
   5. Trim: Type 316 stainless steel.
   6. Packing: PTFE.
   7. Wedge Seating Surfaces and Body Seat Rings: Type 316 stainless steel.
   8. Rubber Components: PTFE.
   9. Connecting Hardware: Type 304 stainless steel.

F. Finishes:
   1. As specified in Section 400551 – Common Requirements for Process Valves.
   2. No coatings for stainless steel body valves.

G. NSF 61 compliant for potable water service valves."

5. Page 400561-3, Article 2.2
    a. Add the following to paragraph 2.2C:
    "3. Corporation Stops shall be furnished in accordance with AWWA C800. Stops shall have Mueller inlet threads except that corporation stops for use with service clamps shall have IPS threads."
    b. Following Paragraph 2.2D, add the following:
    "E. Materials and Requirements for Tapping Sleeves (services larger than 2 inch)
        1) Tapping sleeves shall have outlet flange counter bored to accept a mating tapping valve for true alignment of the tapping sleeve, tapping valve, and tapping machine.
        2) Sleeves shall be stainless steel, split type, with gasket and flanged outlet.
        3) Sleeve fasteners shall be minimum high strength alloy steel.
        4) Provide for a minimum working pressure of one hundred fifty (150) psi.
        5) Provide (¾) inch NPT test plug on the tapping sleeve.
        6) Air test of tapping sleeve – minimum fifty (50) psig for five (5) minutes – shall be witnessed by county staff prior to the contractor performing tapping operations on county water mains. No taps are allowed without county staff present.
        7) Acceptable tapping sleeves are:
            a) Romac, Ford, and Mueller for mains four (4) inches through twenty-four (24) inches diameter.
            b) Dresser, Cascade, and JCM for mains thirty (30) inches and larger."

6. On page 400561-3, Insert the following as new Paragraph 2.3:
"2.3 GENERAL-DUTY GATE VALVES – SMALLER THAN 3 INCHES – TAG TYPE GV5
    A. Manufacturers:
        1. Apollo Flow Controls; Conbraco Industries, Inc.
        2. Hammond Valve
        3. Nibco Inc.
        4. Watts
        5. Substitutions: As specified in Section 016000 "Product Requirements."
    B. 2 Inches and Smaller:
        1. Water service
        2. NRS
        3. Comply with MSS SP-80, Class 150.
        4. Maximum Process Fluid Temperature: 300 deg. F.
        5. Body and Trim: Bronze, ASTM B62.
        6. Gates: Bronze
        7. Bonnet: Threaded.
        8. Operation: Handwheel.
        9. Inside screw.
        10. Wedge Disc:
            a. Type: Solid.
            b. Bronze, ASTM B62.
        11. End Connections: threaded."

7. On page 400561-3, insert subparagraph 2.5.C.1 as follows:
"1. Submit an affidavit of compliance stating that the valves have been manufactured and tested in accordance with AWWA C509 and specifically list all exceptions."

8. On page 400561-3, Paragraphs 3.1.A add the following after "…C509": "and Manufacturer's Instructions".

9. On page 400561-3, renumber Paragraphs 3.1 as paragraphs 3.2.

10. On page 400561-3, insert new Paragraph 3.1 as follows:

"3.1 EXAMINATION

(1) As specified in Section 400551 – Common Requirements for Process Valves: Submittal requirements for compliance with this Section."

11. On page 400561-3, after "END OF SECTION 400561" insert the following gate schedule:

Tag Label	Tag Type	Size (inches)	Operator Type	Actuator Type	Location	Supplier[1]
GV-4801B	GV5	2	open/close	manual	Lime Slurry Dilution Water	--
GV-4802B	GV5	2	open/close	manual	Lime Slurry Dilution Water	--
GV-4940K	GV3	4	open/close	manual	CO2 Injection Manhole	--
GV-4950A	GV3	6	open/close	manual	RO Permeate Booster Feed	--
GV-4950B	GV3	4	open/close	manual	RO Permeate Booster Discharge	PBPSS
GV-4950C	GV3	4	open/close	manual	RO Permeate Booster Discharge	PBPSS
GV-4950D	GV3	4	open/close	manual	RO Permeate Booster Discharge	--
GV-4960A	GV3	4	open/close	manual	RO Permeate Booster Discharge	--
GV-4960B	GV3	4	open/close	manual	RO Permeate Booster Discharge	--
GV-4960C	GV3	4	open/close	manual	RO Permeate Booster Discharge	--
347	GV4	6	open/close	manual	Yard Piping – Watermain	--
359	GV4	4	open/close	manual	Yard Piping – Watermain	--
413	GV4	16	open/close	manual	Yard Piping – Recycle	--
418	GV4	16	open/close	manual	Yard Piping – Recycle	--
425	TPGV	6	open/close	manual	Yard Piping – Watermain	--
428	GV4	6	open/close	manual	Yard Piping – Watermain	--
432	GV4	6	open/close	manual	Yard Piping – Watermain	--
435	GV4	6	open/close	manual	Yard Piping – Watermain	--
456	GV4	6	open/close	manual	Yard Piping – Watermain	--
536	GV4	6	open/close	manual	Yard Piping – Watermain	--
554	GV4	6	open/close	manual	Yard Piping – Watermain	--
557	GV4	6	open/close	manual	Yard Piping – Watermain	--
558	GV4	6	open/close	manual	Yard Piping – Watermain	--
560	GV4	6	open/close	manual	Yard Piping – Watermain	--
[1]PBPSS: Permeate Booster Pump System Supplier						

SECTION 400563

1. Ball Valve Schedule (as previously amended in Addenda #3 and #4)
    a. Remove rows associated with “BV-4504,” “BV-4505,” “BV-4510,” “BV-4511,” and “BV-4512” from this table.

SECTION 400564

1. Page 400564-13, Butterfly Valve Schedule (as previously amended in Addenda #3 and #4)
    a. Make the following changes to the Butterfly Valve Schedule (*added rows in italics*):

Tag Label	Tag Type	Size (inches)	Operator Type	Actuator Type	Location	Supplier
BFV-3500A	*BFV1*	*48*	*open/close*	*manual*	*Backwash EQ Tank*	-
BFV-3500B	*BFV1*	*48*	*open/close*	*manual*	*Backwash EQ Tank*	-
BFV-3500C	*BFV1*	*48*	*open/close*	*manual*	*Backwash EQ Tank*	-
BFV-3500D	*BFV1*	*60*	*open/close*	*manual*	*Backwash EQ Tank*	-
BFV-3500F	*BFV1*	*60*	*open/close*	*manual*	*Backwash EQ Tank*	-
BFV-4504	*BFV3*	*6*	*open/close*	*manual*	*RO Cleaning System Drain*	*MSS*
BFV-4505	*BFV3*	*6*	*open/close*	*manual*	*RO Cleaning System Drain*	*MSS*
BFV-4216B	BFV3	~~10~~ *8*	open/close	manual	RO Unit 1 Stage 3 Inlet	MSS
BFV-4216D	BFV3	~~10~~ *8*	open/close	manual	RO Unit 1 Stage 3 Cleaning Inlet	MSS
BFV-4226D	BFV3	~~10~~ *8*	open/close	manual	RO Unit 2 Stage 3 Cleaning Inlet	MSS
BFV-4236D	BFV3	~~10~~ *8*	open/close	manual	RO Unit 3 Stage 3 Cleaning Inlet	MSS
BFV-4246D	BFV3	~~10~~ *8*	open/close	manual	RO Unit 4 Stage 3 Cleaning Inlet	MSS
BFV-4256D	BFV3	~~10~~ *8*	open/close	manual	RO Unit 5 Stage 3 Cleaning Inlet	MSS
BFV-4266D	BFV3	~~10~~ *8*	open/close	manual	RO Unit 6 Stage 3 Cleaning Inlet	MSS
BFV-4276D	BFV3	~~10~~ *8*	open/close	manual	RO Unit 7 Stage 3 Cleaning Inlet	MSS
BFV-4286D	BFV3	~~10~~ *8*	open/close	manual	RO Unit 8 Stage 3 Cleaning Inlet	MSS
BFV-4501C	BFV3	~~10~~ *4*	open/close	manual	RO Tank 1 CIPS Return	--

SECTION 400565.23

1. Page 400565.23-3, Article 2.2
    a. Remove Article 2.2 in its entirety. Renumber following articles accordingly.
2. Page 400565.23-7, Swing Check Valve Schedule (as previously amended in Addenda #3 and #4)
    b. Change all valves currently tagged “SCV-2” to “SCV-5”.
    c. Change CV-7010 from tag type “SCV-3” to “SCV-4”.

SECTION 400565.33

1. Remove this Section in its entirety without replacement.

SECTION 400578.10

1. Page 400578.10-5, Paragraph 2.2B
    a. Remove subparagraph 2.2B.7.f in its entirety, without replacement.
2. Air Release Valve Schedule (as amended in Addendum #3)
    a. For the ARV and CAV on page 400578.10-11 with sheet references to "I-RO-10/M-RO-30", change both their Nominal Sizes to 1".
    b. At the end of the Air Release Valve Schedule add the following rows:

Tag Label	Nominal Size (in)	Body and Cover Material	Pressure Rating (psi)	Location	Sheet Reference	Function	Working Pressure (psig)	Working Volume
ARV	½"	Thermoplastic	150	Raw water sample pump suction	C-RW-5	Air release	0-15 psi	9 SCFM
ARV	1"	Thermoplastic	100	Permeate Flushing Tank fill line	I-RO-6 M-RO-20	Air release	30 psi	600 gpm
AVRV	½"	Thermoplastic	100	Carrier water line high point	I-RO-1 M-RO-23	Large air release	32 psi	165 gpm
AVRV	½"	Thermoplastic	100	Carrier water line high point	I-RO-1 M-RO-23	Large air release	32 psi	165 gpm
AVRV	½"	Thermoplastic	100	Carrier water line high point	I-RO-1 M-RO-23	Large air release	32 psi	165 gpm

SECTION 404213

1. Page 404213-1, Paragraph 1.2B
    a. Add the following paragraph after 1.2B:
    "3. Section 404113.13 "Process Piping Electrical Resistance Heat Tracing" for requirements of heat tracing process pipes."
2. Page 404213-9, Paragraph 3.2
    a. Add the following paragraph after 3.2N:
    "Process Piping Insulation: Provide at all locations where heat trace is noted in the Electrical Yard Piping Drawings."
3. Page 404213-9, Paragraph 3.3
    a. Replace paragraph 3.3 in its entirety with the following:
    "3.3 ATTACHMENTS
        A. Process Piping Insulation Schedule
            1. Chemical Piping:
                a. Type: P-5
                b. Thickness: 1 inch
            2. Sample Piping
                a. Type: P-5
                b. Thickness: 1 inch
            3. Sludge Blowdown
                a. Type: P-5
                b. Thickness: 1 inch
            4. Sludge Manifold
                a. Type: P-5
                b. Thickness: 1 inch"

SECTION 463633

1. Replace SECTION 463633in its entirety with the attached SECTION 463633.

SECTION 466323

1. Replace SECTION 466323 in its entirety with the attached SECTION 466323.

SECTION 466323.13

1. Replace SECTION 466323.13 in its entirety with the attached SECTION 466323.13.

APPENDIX D

1. Insert the attached conditions and general certifications for the Army Corps of Engineers Nationwide Permits No. 7 and 12, as "Appendix D" in the Specifications Package.

APPENDIX E

1. Insert the attached Duke Energy Transmission Line Right-of-Way Plan Review Conditional Approval as "Appendix E" in the Specifications Package.

APPENDIX F

1. Insert the attached National Pollutant Discharge Elimination System Permit #NC0057533 as "Appendix F" in the Specifications Package.

APPENDIX G

1. Insert the following attached documents from NCDEQ Public Water Supply Section as "Appendix G" in the Specifications Package:
    a. Engineering Plans and Specifications Approval
    b. Authorization to Construct

APPENDIX H

1. Insert the attached Brunswick County Health Department Improvement Permit for Wastewater Collection, Treatment, And Disposal System, as "Appendix H" in the Specifications Package.

<u>IN THE DRAWINGS</u>

Replace the following sheets with the corresponding attached sheets:

1. S-RM-1
2. S-RM-2
3. S-FL-1
4. S-FL-2
5. S-FL-3
6. S-FL-4
7. S-FL-5
8. S-FL-6
9. S-FL-7
10. S-FL-8
11. S-FL-9
12. S-FL-10

Sheet C-SP-3

1. Change Site Feature Note 4 to read: "Original record drawings called for 2" AC over 6" AB; the Contractor shall remove AC and AB as necessary to install 2" Surface Course (S9.5B or C) over 6" Base Course (B25.0B or C)."

Sheet C-SP-4

1. Change Site Feature Note 6 to read: "Original record drawings called for 2" AC over 6" AB; the Contractor shall remove AC and AB as necessary to install 2" Surface Course (S9.5B or C) over 6" Base Course (B25.0B or C)."

Sheet C-SP-5

1. Change Site Feature Note 10 to read: "Original record drawings called for 2" AC over 6" AB; the Contractor shall remove AC and AB as necessary to install 2" Surface Course (S9.5B or C) over 6" Base Course (B25.0B or C)."

Sheet C-SP-6

1. Change Site Feature Note 10 to read: "Original record drawings called for 2" AC over 6" AB; the Contractor shall remove AC and AB as necessary to install 2" Surface Course (S9.5B or C) over 6" Base Course (B25.0B or C)."

Sheet C-RW-4

1. Replace text '(1) 1.5", DR15 HDPE SAMPLE' with '(1) 1", SCH 80 PVC SAMPLE'.

Sheet C-SP-13

1. Directly west of the Backwash EQ Tank, remove the hatches, labels, and associated concrete footprints from the "Future Fuel Tank" and "Future Generator" areas. Replace these footprints with a stone hatch. These changes are "typical" in other civil sheets.

Sheet C-GD-5

1. Add the following callout to the sidewalk between the Rapid Mix and roadway:
   "8-FT SIDEWALK WIDTH".

Sheet C-YP-1

1. On Note 6, change "80%" to "75%".

Sheet C-YP-2

1. For the two callouts "Connect to Existing Basin" and "Connect to Existing Recycle Pump Station", replace the detail references from "A/C-D-5" to "A/M-D-3".
2. Add two (2) 1" Polymer lines (SCH 40) inside of 4" PVC (SCH 80) Casing pipe running from Polymer Building to Thickener Feed Pump Station (Ref. M-GT-5).
3. Add Note 3 to read
   "3. Connect polymer piping to existing piping inside Polymer Building and cap existing sludge contractor feed piping."

Sheet C-YP-3

1. For the callout currently reading "SEE NOTE 2", change it to read "SEE NOTES 2 & 6".
2. Add the following Note:
   "6. Disconnect existing CL2S pipe outside Chlorine Feed Vaults and connect the new CL2S pipe."

Sheet C-YP-4

1. For the three handholes located on the Lime Slurry and Drain lines coming from the Lime Storage area, change the callouts to read "PRECAST CONCRETE HANDHOLE (SEE NOTE 2)".
2. Add the following note:
   "2. PRECAST HANDHOLES ARE TO BE SIZED TO PROVIDE A MINIMUM OF 12" CLEARANCE AROUND, AND BENEATH PIPING AND VALVES. HANDHOLES SHOULD HAVE A TOP ELEVATION 6" ABOVE FINISHED GRADE. REFER TO DETAIL U/E-D-3 FOR DETAILS OF CONSTRUCTION FOR HANDHOLES. COVERS SHALL BE MARKED WITH "CHEMICAL" OR "DRAIN" ACCORDINGLY."
3. Modify the yard piping per attached Figure 1. All changes noted in Addendum #3 affecting this area are to remain.

4. For the piping running from the antiscalant storage to the RO building, replace the leader reading ‘6” CASING-PVC(SCH 80), 3” AS-PVC(SCH 80)’, with the following:
   ‘3”x6” AS-Double-Walled PVC(SCH 80)’

Sheet C-YP-5

1. In the Fitting Table, change the Description of Fitting No. 450 to ‘60” x 48” DI REDUCING TEE’.
2. Add a callout on the sample line between JB 109 and JB 110, reading as follows:
   “(2) 8” CASING – PVC (SCH 80)
   (2) 2.5” CLO2 – HDPE
   (2) 2.5” CL2S – HDPE
   (1) 1” CAUSTIC – HDPE
   (1) 1” SPARE – HDPE
   (6) 0.75” Sample – PVC (SCH 80)”
3. Add a callout on the sample line between JB 113 and JB 114, reading as follows:
   “(2) 8” CASING – PVC (SCH 80)
   (2) 2.5” CLO2 – HDPE
   (2) 2.5” CL2S – HDPE
   (1) 1” CAUSTIC – HDPE
   (1) 1” SPARE – HDPE”
4. For the line between the chemical injection vault and JB 113, change the callout from ‘6” CASING’ to ‘8” CASING’.
5. For the line between the chemical injection vault and JB 115, change the callout from ‘4” CASING’ to ‘8” CASING’.
6. To the callout with text above West Filters 1-4, currently beginning “(1) 6” CASING…”, add to the end of the callout text “(SEE NOTE #5).
7. To the callout with text above West Filters 1-4, currently reading “1.25” CA-HDPE”, add to the end of the callout text “(SEE NOTE #6).
8. To the callout with text above West Filters 1-4, currently beginning “(3) 6” CASING…”, add to the end of the callout text “(SEE NOTE #7).
9. Add the following Notes:
   “4. AT JB 116, PROVIDE CLEANOUTS ON EACH OF (2)-1” POLYMER LINES”
   5. Provide piping and supports to route (6)-0.75” sample discharge lines to the existing laboratory sink. Install ARV’s at high points. Contractor to verify pipe routing to not conflict with existing piping and appurtenances. See M- AB-4 for details on modifications to the existing laboratory.
   6. Provide a tee and connect the 1.25” CA piping to the existing compressed air piping.
   7. Route (2)-1.5” CL2S and (2)-1” CLO2 piping to existing filter influent channels as shown on M-CL-6.”

Sheet C-D-5

1. On both details A and E, remove the text “5’-0” WITH”.

Sheet C-D-14

2. Replace Detail C with the attached Figure 2.

Sheet A-RO-21

1. RO Building Finish Schedule
   a. DELETE note no.2 in its entirety and REPLACE with “2. Epoxy flooring and cove base to be chemical-resident resinous flooring system. See Specification Section 096723 Resinous Flooring for product information.”
   b. For RO Process Room Number A-114, under column Wall Base Material, ADD “Epoxy”
   c. For Cleaning & Antiscalant Room Number A-116, under column Wall Base Material, ADD “Epoxy”

Sheet A-CB-9

1. Chlorine Building Finish Schedule
    a. DELETE note no.2 in its entirety and REPLACE with "2. Epoxy flooring and cove base to be chemical-resident resinous flooring system. See Specification Section 096723 Resinous Flooring for product information"
    b. For Chlorine Storage Room Number B-100, under column Floor Finish, DELETE "Spec" and REPLACE with "Epoxy"
    c. For Chlorine Storage Room Number B-100, under column Wall Base Material, DELETE "Concrete" and REPLACE with "Epoxy"
    d. For Chlorine Feed Room Number B-101, under column Wall Base Material, DELETE "Concrete" and REPLACE with "Epoxy"
    e. For Electrical Room Number B-102, under column Wall Base Material, DELETE "Concrete" and REPLACE with "Epoxy"

Sheet S-RO-7

1. Beginning at Column Line 1 and continuing toward Column Line 2, DELETE "28LH10SP, do, do, do, do, do, do, do, 28LH10SP" and REPLACE with "28LH10SP, 28LH10SP, W24x76, 28LH10SP, do, do, 28LH10SP, W24x76, 28LH10SP."

Sheet M-RM-1:

1. Delete label "CLEANOUT (TYP)" on the 1" polymer line.
2. Add the following note:
   "4. OUTDOOR NON-POTABLE WATER LINES AND WASH HOSE STATIONS SHALL BE HEAT TRACED AND INSULATED. SEE P-FL-1 FOR ADDITIONAL DETAILS."

Sheet M-CL-6:

1. Add the following note:
   "12. OUTDOOR NON-POTABLE WATER LINES AND WASH HOSE STATIONS SHALL BE HEAT TRACED AND INSULATED. SEE P-FL-1 FOR ADDITIONAL DETAILS."

Sheet M-CL-7:

1. REPLACE '30" RW-DI FROM EAST RAPID MIX INV. EL. 56.14-ft' WITH '30" RW-DI FROM WEST RAPID MIX INV. EL. 54.89-ft'
2. REPLACE '30" RW-DI FROM EAST RAPID MIX INV. EL. 54.14-ft' WITH '30" RW-DI FROM WEST RAPID MIX INV. EL. 54.89-ft'

Sheet M-CL-8:

1. REPLACE "(2) 30" RW-DI FROM EAST RAPID MIX INV. EL. 56.14-ft" WITH "(2) 30" RW-DI FROM WEST RAPID MIX INV. EL. 54.89-ft"

Sheet M-CL-9:

1. Add the following note:
   "12. OUTDOOR NON-POTABLE WATER LINES AND WASH HOSE STATIONS SHALL BE HEAT TRACED AND INSULATED. SEE P-FL-1 FOR ADDITIONAL DETAILS."

Sheet M-CL-10:

1. REPLACE "(2) 30" RW-DI FROM WEST RAPID MIX INV. EL. 56.14-ft" WITH "(2) 30" RW-DI FROM WEST RAPID MIX INV. EL. 54.89-ft"

Sheet M-CL-11:

1. REPLACE "(2) 30" RW-DI FROM WEST RAPID MIX INV. EL. 56.14-ft" WITH "(2) 30" RW-DI FROM WEST RAPID MIX INV. EL. 54.89-ft"

Sheet M-FL-2:

1. Add the following note:
   "5. OUTDOOR NON-POTABLE WATER LINES AND WASH HOSE STATIONS SHALL BE HEAT TRACED AND INSULATED. SEE P-FL-1 FOR ADDITIONAL DETAILS."

Sheet M-FL-2:

1. Change all instances of "Sluice Gate" to "Slide Gate".

Sheet M-RO-2

1. Add the following note:
   "4. Floor sleeves are required for all slab penetrations."

Sheet M-RO-9

1. Replace '1/2" Air Release Valve (Typ)' with '1" Air Release Valve (Typ)'.
2. Replace '1/2" Air/Vacuum Valve (Typ)' with '1" Air/Vacuum Valve (Typ)'.

Sheet M-RO-19

1. For the note starting '3"-AS-PVC WITHIN 6" CONTAIMENT PIPE', delete "(ALL PIPING WITHIN RO BUILDING AND ANTISCALANT TANK CONTAINMENT AREA)" and replace with "(SEE NOTE #7)".
2. Add the following note to this sheet:
   "7. All antiscalant piping systems external to antiscalant tank containment areas shall be double walled containment pipe, type Pro-Lock by Asahi America, or equal."

Sheet M-RO-23

1. For Section 1, add this leader to the highest elevation pipe above the garage door: 3"x4" Double Containment PVC (SCH 80)
2. For Section 1, add a multileader to the two smaller pipes above the garage door: 2"x3" Double Containment PVC (SCH 80)
3. For Section 1, add 1-1/4" AVRVs to each discharge for pumps P-4001 and P-4002.

Sheet M-RO-26

1. For the note starting '3"-AS-PVC WITHIN 6" CONTAIMENT PIPE', delete "(ALL PIPING WITHIN RO BUILDING AND ANTISCALANT TANK CONTAINMENT AREA)" and replace with "(SEE NOTE #1)".
2. Add the following note to this sheet:
   "1. All antiscalant piping systems external to antiscalant tank containment areas shall be double walled containment pipe, type Pro-Lock by Asahi America, or equal."

Sheet M-GT-6

1. At Section 1, modify the callout for the "Duckbill CV" to read:
   "Duckbill CV, Tideflex Series TF-2 duckbill check valve (by Red Valve) with 316 SS compression clamp, or equal"

Sheet M-REC-1

1. Delete Note #1 and replace with the following:
   "Demolish the existing 12"x8" reducing 90 deg bend and existing 12"-REC-DI (MJ) pipe as required to construct new piping arrangement. Abandon in place remaining 12"REC-DI (MJ) pipe."

Sheet M-AB-1

1. Please reference Figures 3 through 11 for clearer images on this sheet.

Sheet M-AB-3

1. Please reference Figures 12 through 19 for clearer images on this sheet.

Sheet M-D-4

1. For Detail B, replace the chemical injector schedule with the attached.

Sheet M-D-5

1. On Detail H, change ‘48” I.D.’ to ‘84” I.D.’.

Sheet I-RO-1

1. Remove BV-4010, BV-4011, and BV-4012. Replace all three with ½” AVRVs.

Sheet I-RO-2

1. On Membrane Feed Pump 6 (P-4106), change the ARV on the side of the can to “AVRV”.

Sheet I-RO-3 (as amended in Addendum #4)

1. Delete lines ‘6”-ROC-DI-L42W29’ and ‘6”-ROC-DI-L42W30’. Delete associated flanges and text for these lines (“From Unit 9 (Future),” “From Unit 10 (Future)”).
2. Add a 20”x12” Tee and 12” Cap on line ‘20”-ROC-DI-L42W53’, immediately downstream of the tee between lines ‘16”-ROC-DI-L42W51’ and ‘16”-ROC-DI-L42W52’ Add text to this tee as follows:
   “From RO Units 9 and 10 (Future)”

Sheet I-RO-5

1. Add an ARV on the line upstream of BFV-4501A. Label it as ‘1” ARV’.
2. Add an ARV onto line ‘4”-ROP-CPVC-L421W10’, upstream of BFV-4501A. Label it as ‘1” ARV’.
3. Add flexible coupling symbols (~~~) immediately downstream of both BFV-4501E and BFV-4502E. Label them both as “Flexible Connector”.
4. Change “BV-4504” and “BV-4505” to“BFV-4504” and “BFV-4505”, respectively.

Sheet I-RO-6

1. Add an ARV onto line ‘4”-ROP-CPVC-L421W10’, upstream of BFV-4500. Label it as ‘1” ARV’.
2. Add a flexible coupling symbol (~~~) immediately downstream of BFV-4535A. Label it as “Flexible Connector”.

Sheet I-AB-1

1. Change the text “Bulk Bag Unloader” to read “Bulk Bag (By Others)”.

<u>ATTACHMENTS</u>

1. DOCUMENT 012600 “Contract Modification Procedures”
2. SECTION 096723 “Resinous Flooring”
3. SECTION 463633 “Volumetric Feed Equipment”
4. SECTION 466323 “Reverse Osmosis Membrane Equipment”
5. SECTION 466323.13 “Reverse Osmosis Membrane Elements”
6. Pre-Bid Meeting Sign-In Sheet
7. Pre-Bid Meeting Presentation
8. Pre-Bid Meeting Questions/Answers
9. Additional Questions/Answers
10. Nationwide Permits 7 & 12
11. Duke Energy Transmission Line Right-of-Way Plan Review Conditional Approval
12. NPDES Permit #NC0057533
13. Public Water Supply Section “Engineering Plans and Specifications Approval” and “Authorization to Construct”.
14. Brunswick County Health Department Improvement Permit for Wastewater Collection, Treatment, And Disposal System.
15. Revised Chemical Injector Schedule
16. Figures 1 through 19
17. Chemical Storage Building 2 As Built Drawings

18. The following revised sheets
    1. S-RM-1
    2. S-RM-2
    3. S-FL-1
    4. S-FL-2
    5. S-FL-3
    6. S-FL-4
    7. S-FL-5
    8. S-FL-6
    9. S-FL-7
    10. S-FL-8
    11. S-FL-9
    12. S-FL-10

END OF ADDENDUM 5

Section 012600 – Contract Modification Procedures

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SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

B. Related Requirements:

1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
2. Section 013100 “Project Management and Coordination” for requirements for forms for contract modifications provided as part of web-based Project management software.
3. Section 007200 “General Conditions”
4. Section 012901 “Measurement and Payment”

1.3 MINOR CHANGES IN THE WORK

A. During the course of Work, the Engineer may issue Field Orders in accordance with Article 43 of the General Conditions, authorizing minor changes in the Work, not involving adjustment to the Contract Price or the Contract Time.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: In accordance with Article 38 of the General Conditions, Engineer will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Price or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Requests For Proposal (RFP) issued by Engineer are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request after receipt of RFP, submit a quotation estimating adjustments to the Contract Price and the Contract Time necessary to execute the change in accordance with Article 38 of the General Conditions ad all information included below.
   a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. Include costs of labor and supervision directly attributable to the change.
d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
e. Quotation Form: Use forms provided by Owner.

B. Contractor-Initiated Proposals: The Contractor may solicit a change using a Request for Change Proposal in accordance with the General Conditions Article 38. The Request for Change proposal shall be in accordance with the requirements in General Conditions Article 38 and all information included below:

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Price and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
7. Proposal Request Form: Use form provided by Owner.

1.5 ADMINISTRATIVE CHANGE ORDERS

A. Allowance Adjustment: See Section 012901 "Measurement and Payment" and “General Conditions” for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Price to reflect actual costs of allowances.

B. Unit-Price Adjustment: See Section 012901 "Measurement and Payment" and “General Conditions” for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

A. Change Order procedures shall be administered in accordance with the General Conditions and as specified herein.

1.7 WORK CHANGE DIRECTIVE

A. Work Change Directive: Engineer may issue a Work Change Directive, as necessary, in accordance with the General Conditions Article 38.

PART 2 - EXECUTION (NOT USED)

END OF SECTION 012600

Section 096723 – Resinous Flooring

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SECTION 096723 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Resinous flooring systems.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.

B. Samples for Initial Selection: For each type of exposed finish required.

1.5 INFORMATIONAL SUBMITTALS

A. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

B. Material Certificates: For each resinous flooring component, from manufacturer.

C. Material Test Reports: For each resinous flooring system, by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Apply full-thickness mockups on 96-inch- square floor area selected by Engineer.

a. Include 96-inch length of integral cove base with inside corner.

2. Simulate finished lighting conditions for Engineer's review of mockups.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Engineer specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.

B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.

C. Close spaces to traffic during resinous flooring application and for 24 hours after application unless manufacturer recommends a longer period.

PART 2 - PRODUCTS

2.1 PERORMANCE REQUIREMENTS

A. Flammability: Self-extinguishing according to ASTM D635.

2.2 MANUFACTURERS

A. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single manufacturer. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.

2.3 RESINOUS FLOORING

A. Resinous Flooring System: Abrasion-, impact-, and chemical-resistant, aggregate-filled, and resin-based monolithic floor surfacing designed to produce a seamless floor and integral cove base.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. Dudick, Inc.
   b. Stonhard, Inc.

B. System Characteristics:

1. Color and Pattern: As selected by Engineer from manufacturer's full range.
2. Wearing Surface: Textured for slip resistance.
3. Overall System Thickness: 1/4 inch.

C. Primer: Type recommended by resinous flooring manufacturer for substrate and resinous flooring system indicated.

1. Formulation Description: 100 percent solids.
2. Material design basis:
   a. Dudick Primer 67
   b. Stonhard HT Primer

D. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

E. Grout/Body Coat:

1. Resin: Epoxy or Epoxy novolac.
2. Formulation Description: 100 percent solids.
3. Type: Pigmented blended aggregates.
4. Thickness of Coat: 1/4 inch.
5. Material design basis:
   a. Dudick Steri-Flor T
   b. Stonhard HT

F. Topcoats: Sealing or finish coats.

1. Resin: Epoxy or Epoxy novolac.
2. Formulation Description: 100 percent solids.
3. Type: Pigmented.
4. Number of Coats: One.
5. Thickness of Coats: 8 mils.
6. Finish: Gloss.
7. Material design basis:
   a. Dudick Steri-Flor T
   b. Stonchem 501

G. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:

1. Compressive Strength: 9,000 psi minimum according to ASTM C579.
2. Tensile Strength: 2,000 psi minimum according to ASTM C307.
3. Flexural Modulus of Elasticity: 2,700 psi minimum according to ASTM C580.
4. Water Absorption: < 1 percent maximum according to ASTM C413.
5. Impact Resistance: No chipping, cracking, or delamination and not more than 1/16-inch permanent indentation according to MIL-D-3134J.
6. Abrasion Resistance: 0.08gm maximum weight loss according to ASTM D4060.
7. Hardness: 87 to 90, Shore D according to ASTM D2240.

H. System Chemical Resistance: Test specimens of cured resinous flooring system are unaffected when tested according to ASTM D1308 for 50 percent immersion in the following reagents for no fewer than seven days:

1. Area No. 1 - Reverse Osmosis (RO) Process
   a. Antiscalant
   b. Sodium Bisulfite (44% Aqueous Solution)
   c. Citric Acid (100% Anhydrous)
   d. Caustic Soda (50% Sodium Hydroxide Solution)

2. Area No. 2 – Chlorine Storage and Feed Area
   a. Chlorine
   b. Sodium Chlorite (25-29% Aqueous Solution)

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.

1. Roughen concrete substrates as follows:

   a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
   b. Comply with NACE No. 6/SSPC-SP13, with a Concrete Surface Profile (CSP) of 3 or greater in accordance with the International Concrete Repair Institute (ICRI) Technical Guideline No. 310.2R, unless manufacturer's written instructions are more stringent.

2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.

3. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.

    a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with application of resinous flooring only after substrates have maximum moisture-vapor-emission rate of 6 lb of water/1000 sq. ft. of slab area in 24 hours.
    b. Relative Humidity Test: Use in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 85 percent relative humidity level measurement.

4. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.

C. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

1. Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.

D. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

3.2 INSTALLATION

A. Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.

1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
3. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.

B. Primer: Apply primer over prepared substrate at manufacturer's recommended spreading rate.

C. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details, including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.

1. Integral Cove Base: 4 inches high.

D. Grout/Body Coat: Apply grout coat, of type recommended by resinous flooring manufacturer, to fill voids in surface of final body coat.

E. Topcoats: Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer and to produce wearing surface indicated.

3.3 FIELD QUALITY CONTROL

A. Material Sampling: Owner's representative (CDM-Smith) may, at any time and any number of times during resinous flooring application, require material samples for testing for compliance with requirements.

1. Owner's representative (CDM-Smith) will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.
2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring materials to comply with requirements.

B. Core Sampling: At the direction of the Owner's representative (CDM-Smith) and at locations designated by the Owner's representative (CDM-Smith), take one core sample per 1000 sq. ft. of resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two additional samples. Repair damage caused by coring. Correct deficiencies in installed flooring as indicated by testing.

3.4 PROTECTION

A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION 096723

Section 463633 – Volumetric Feed Equipment

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SECTION 463633 - VOLUMETRIC FEED EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes: Volumetric dry chemical feeders.

B. Related Requirements:

1. Section 055000 “Metal Fabrications” for fasteners, brackets, and other miscellaneous metal fabrications as required by this Section.
2. Section 099100 “Painting” for finishes as required by this Section.
3. Section 262923 “Low Voltage Variable-Frequency Motor Controllers” for execution and product requirements for variable-speed equipment specified by this Section.
4. Section 463683 “Dry Chemical Feed Accessories and Safety Equipment.”

1.3 COORDINATION

A. See Section 013100 “Project Management and Coordination” for coordination requirements.

1.4 PREINSTALLATION MEETINGS

A. See Section 013100 “Project Management and Coordination” for preinstallation meeting requirements.

1.5 ACTION SUBMITTALS

A. See Section 013300 “Submittal Procedures” for submittal requirements.

B. Product Data: Manufacturer information for system materials and component equipment, including electrical characteristics and connection requirements.

C. Shop Drawings:

1. Size and configuration of assembly, mountings, weights, and accessory connections.
2. System materials, component equipment, wiring diagrams, and schematics.

1.6 INFORMATIONAL SUBMITTALS

A. Manufacturer's Certificate: Products meet or exceed specified requirements.

B. Source Quality-Control Submittals: Results of shop tests and inspections.

C. Field Quality-Control Submittals: Results of Contractor-furnished tests and inspections.

D. Qualifications Statements:

1. Submit qualifications for manufacturer.
2. Manufacturer's approval of installer.

1.7 CLOSEOUT SUBMITTALS

A. See Section 017700 “Closeout Procedures” for submittal requirements.

B. Project Record Documents: Record actual locations of volumetric feed equipment.

C. Operation and Maintenance Data: Maintenance instructions for equipment and accessories.

1.8 QUALITY ASSURANCE

A. Materials in Contact with Potable Water: Certified to NSF Standards 61 and 372.

B. Maintain one copy of each standard affecting Work of this Section on Site.

1.9 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum five years' documented experience.

B. Installer: Company specializing in performing Work of this Section with minimum five years' documented experience.

1.10 DELIVERY, STORAGE, AND HANDLING

A. See Section 016000 “Product Requirements” for transporting, handling, storing, and protecting products requirements.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Protection:

1. Protect openings with temporary caps to prevent entry of foreign material.
2. Provide additional protection according to manufacturer instructions.

1.11 WARRANTY

A. See Section 017700 “Closeout Procedures” for warranties requirements.

B. Furnish five-year manufacturer's warranty for volumetric feed equipment and accessories.

PART 2 - PRODUCTS

2.1 VOLUMETRIC FEEDERS

A. Manufacturers:

1. Flexicon Corporation, Bethlehem, PA
2. ProMinent Fluid Controls, Inc., Pittsburg, PA
3. Acrison, Inc., Moonachie, NJ.
4. Substitutions: Not permitted.

B. Description:

1. Material: Type 304 stainless steel.
2. Internal Components: Type 304 stainless steel.
3. Hopper Capacity 4 cubic feet.
4. Discharge Device:
   a. Progressive-pitch auger.
   b. Configuration: Helix.
5. Drive: Direct-coupled gear reducer.

C. Performance and Design Criteria:

1. Feed Rate: 0.2 to 49 lbs/hr
2. Accuracy:
   a. By Weight: Plus or minus 3.0 percent.

2.2 DRY CHEMICAL DILUTION SYSTEM

A. Bulk Bag:

1. 1-ton capacity bulk bag to be placed via a fork truck
   a. 304ss receiving hopper
   b. Bulk bag lifting adapter, painted carbon steel.
   c. Total system height, including bulk bag frame, shall not exceed 12 feet due to height restriction.
2. Bulk Bag Frame shall have a tank weighing system consisting of nickel-plated load cells of shear beam strain gauge type. Flexible cable shall connect the load cell to indication for easy remote installation of the readout. Cable length shall be shown on the drawings.
3. Tank weighing assemblies shall be self-checking and have provisions for thermal expansion and contraction. Tank weighing assembly load plate shall be able to compensate for mounting surfaces up to 4 degrees off- level. Remote indication shall monitor bulk bag weight and be integrated into the feeder control panel.
4. Indicator shall output new weight via 4-20 ma signal and full-scale output shall be user adjustable via the keypad. Indicator shall have four (4) adjustable set points to display low or high level condition on the indicator.

5. Overall room height clearance is 12'Overall equipment height cannot exceed 12'.

B. Dry Chemical Feeder:

1. Solid Screw Feeder Shaft direct coupled to Drive Motor/Gear Box (No Pigtails allowed). The 90VDC 1/4hp motor drives the screw feeder. The screw feeder then rotates an arch breaker to prevent bridging of the dry chemical inside the hopper assembly. Dry chemical output is discharged through a feeder discharge pipe into a clear housing mounted on the solution tank.
2. Dry Chemical Level Sensor mounted inside the feeder hopper assembly. The level sensor provides an early alarm for a low level of dry chemical within the hopper assembly. The level sensor shall provide a signal indication to refill the dry feed hopper.
3. Metering Output: 0.2-49 lbs/hr
4. Feeder must have arch breaker assembly to prevent chemical bridging.
5. Materials of Construction:
   a. Screw Feeder & Arch Break Assembly: 304 Stainless Steel
   b. Feeder Housing: Polypropylene

C. Extension Hopper:

1. 4 cubic feet of dry chemical
2. Extension hopper shall transfer chemical from the bulk bag frame to the feed hopper
3. Material of Construction shall be 304ss.
4. Hopper shall include integral vibrator to prevent chemical bridging.

D. Solution Tank:

1. The feeder shall be mounted over and supported by a 200-gallon solution tank. Tank shall be constructed of FRP and shall support the feeder and extension hopper. The tank shall be provided with a clear housing to enclose the feeder discharge to contain dust. The tank shall include a dilution water inlet float valve to control inlet water flow rate. The tank shall be supplied with a mechanical mixer and inspection cover. Tank connections shall include:
   a. 1-inch FNPT Water Inlet Connection
   b. 2-inch FNPT Solution Discharge Connection.
   c. 1.5-inch FNPT Overflow Connection.
   d. 1.5-inch FNPT Drain Connection
   e. Feeder Downspout Connection
2. The tank shall have mechanical mixer(s) with stainless steel impellers and propellers and 3/4 HP, 115 VAC, 1 Phase, 60 Hz TENV motor.
3. Tank Level Controls: float type switches
4. Material of Construction shall be HDPE

E. System Control Panel: A vendor supplied control panel shall be provided for the fluoride system. Electrical components, shop wiring and design shall be system supplier's standard with the following minimum requirement for control panels: Power supply to be 240 VAC/1 phase/60Hz. Control panel shall be mounted in a non-classified area and as shown on the drawings.

1. Main System Control Panel
   a. NEMA 4X Polycarbonate Enclosure
   b. Main Disconnect Switch

c. Circuit breakers as required
d. System L/O/R Operation
e. H/O/A switches and status indication lights for the following:
   1) screw feeder
   2) Dilution water solenoid
f. Motor starters as required for equipment supplied.
g. Potentiometer for Calibration and local control
h. Load cell indicators shall have 6-digit display for chemical weight with TARE mode.
i. Alarm Reset
j. VFD or SCR drive for local or remote variable speed control of the feeder.
k. Alarm lights and Pilot Lights

F. Finishes:

1. As specified in Section 099100 “Painting.”

G. Accessories:

1. Removable hopper cover.
2. Vibration isolation pads.
3. Hopper Agitator: Separate drive.

2.3 SOURCE QUALITY CONTROL

A. See Section 014000 “Quality Requirements” for testing, inspection, and analysis requirements.

B. Provide shop inspection and testing of component parts.

C. Certificate of Compliance:

1. If fabricator is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
2. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 - EXECUTION

3.1 EXAMINATION

A. See Section 017300 “Execution” for installation examination requirements.

B. Verify that facility, piping, and electrical work are ready to receive volumetric feed equipment.

3.2 INSTALLATION

A. Install equipment and accessories and perform the Work as recommended by manufacturer and as indicated on the Drawings, shop drawings and manufacturer’s written instructions.

3.3 FIELD QUALITY CONTROL

A. See Section 014000 “Quality Requirements”, for inspecting and testing requirements.

B. After installation, inspect and test for proper operation.

C. Equipment Acceptance: Adjust, repair, modify, or replace components failing to perform as specified and rerun tests.

3.4 DEMONSTRATION

A. See Section 017900 “Demonstration and Training” for demonstration and training requirements.

B. Demonstrate equipment routine maintenance and emergency repair procedures to Owner's personnel.

END OF SECTION 463633

Section 466323 – Reverse Osmosis Membrane Equipment

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SECTION 466323.00 - REVERSE-OSMOSIS MEMBRANE EQUIPMENT

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. The Membrane System Supplier (MSS) for the reverse osmosis (RO) equipment shall furnish all designs, materials, labor, equipment and incidentals required to fabricate, coordinate and supervise installation, test, and make ready for operation, up to eight (8) 5.14-mgd (3,571-gpm) permeate capacity RO units as indicated on the Drawings and specified herein. The Membrane Element Manufacturer (MEM) will furnish to the MSS the new membrane elements, connectors, appurtenances and other services as specified in Section 466323.13. The Contractor shall be responsible for installation of the membrane elements under the supervision of the MSS and MEM.

B. The MSS shall be responsible for all coordination of the project work and for furnishing all items and information necessary for a complete Reverse Osmosis Membrane system. The MSS shall provide all the information and other assistance needed by the Owner's operation staff for the operation of a complete RO System as specified herein. The furnishing, installation supervision, coordination, and all other aspects of constructing a complete and fully operational RO system shall be included in the MSS's scope of work. The equipment required to be provided and installed, in general, is as shown on sheets M-RO-2 through M-RO-20 and I-RO-3 through I-RO-6.

C. The MSS shall prepare testing and start-up plans as specified herein and coordinate testing and start-up, including performance testing, of the RO Units with all components of the RO system.

D. The MSS shall review Section 406196, "Process Control Narratives" and provide notes and review comments to adapt the control narratives to the specific systems the MSS is to provide. All control and software submittals shall be reviewed and coordinated by the Contractor, MEM, Process Control System Supplier (PCSS), and MSS. The MSS shall coordinate programming of the membrane system with the PCSS. Refer to Section 406100 for division of Hardware, PLC Programming, and HMI Development.

E. Work shall include all the design, materials, equipment, labor, incidentals and a complete control systems, including network communications, control panels, and all hardware, development software and license, and programming necessary to provide control logic to operate the RO membrane systems and all ancillary equipment and sub-systems as specified herein. The MSS equipment and services shall generally consist of the following:

1. All requirements of Section 466323.13

2. Special engineering services.

3. Supply and installation supervision of RO units with pressure vessels, piping, instrumentation, controls, panels, and other associated appurtenances.

4. Fabricated skid and framework made of aluminum, stainless steel or epoxy-coated steel for supporting the pressure vessels, piping, and instrumentation and controls.

5. Multi-port side outlet pressure vessels for eight standard 8-in diameter by 40-in long membranes elements. Ports shall be large enough to allow up to four vessels to be connected to each other using port to port connections.

6. Supply and installation supervision of spiral-wound low-pressure reverse osmosis membranes to completely fill all the pressure vessels on all the RO units.

7. Interstage booster pump units to boost the feedwater pressure to Stage 3 on each RO unit.

8. All interconnecting piping, fittings, valves, and valve operators necessary for a complete and functional system. This includes but is not limited to interconnecting piping, fittings, valves, and valve operators on the RO Units for the following process streams: feedwater, interstage (stage 1 and stage 2), concentrate, permeate, cleaning solutions, flushing solutions, chemical feeds, and drains.

9. All instrumentation, local transmitters, SCADA interface, wiring, power distribution and panels, as shown on the membrane skid and as shown on M-RO-2 to M-RO-20 and I-RO-3 to I-RO-6.

10. All necessary interconnecting piping and connections on each RO Unit for connection of an external rinse, flush, and clean-in-place (CIP) system, which shall be supplied by the MSS and installed by the Contractor. Underground piping shall be provided by the Contractor.

11. Detailed shop drawings and membrane unit detailed design for all the equipment specified herein and other related specification sections.

12. Supply and installation of valves on each three-stage RO unit for feedwater, interstage feed, concentrate, permeate, permeate flush, and cleaning solutions. Manifold piping and valves on skid for feedwater, permeate, concentrate, and interstage shall be 316 stainless steel (valves) and schedule 10 316L stainless steel (piping). Cleaning solution and permeate flush piping and valves shall be Sch. 80 CPVC or stainless steel as shown on the Drawings. Isolation valves connecting the cleaning and permeate flush systems piping to the feedwater, permeate, interstage and concentrate piping shall be 316 stainless steel rated for the corresponding operating pressure.

13. Pipe taps, fittings and tubing for mounting and installation of instrumentation and controls, along with construction and supply of instrument panels, as identified in Division 40. Instrumentation shall be provided by the MSS as identified in Division 40. The MSS shall be responsible for mounting and installation of all instrumentation.

14. Supply and installation of all sample tubing, sample valves and isolation valves.

15. Direct and supervise the membrane system installation by Contractor. Conduct membrane elements performance tests and membrane system performance test. Coordinate with the Contractor for all preoperational bacteriological and pressure testing required.

16. Perform startup services and coordination with MEM, Contractor, Owner, and Engineer, including technical support and data compilation, during RO Units startup and performance testing. Supervision to Contractor and Owner/Engineer shall also be provided during the overall water treatment facility startup.

17. Warranty Engineering Services for RO units, the membranes elements, except for the items noted in Section 466323.13 that are required by the MEM, and ancillary equipment.

18. Project-specific Operation and Maintenance Training and Manuals with standard operating procedures and performance guidelines for RO Units and all ancillary equipment.

19. Design and supply of orifice plates for RO units preoperational and functional testing, as required.

F. The MSS shall provide:

1. Pre-operational, functional and performance testing for membrane elements and membrane system.

2. Coordination and timely delivery of all instruments and valves that are not skid mounted but are part of the MSS scope of supply.

1.03 DEFINITIONS

A. ASME: American Society of Mechanical Engineers.

B. ASTM: American Society for Testing and Materials.

C. CIP: Clean-in-place.

D. db: decibels.

E. GA: General arrangement.

F. gpm: Gallons per minute.

G. I/O: Input / Output.

H. L/s: Liters per second.

I. RO: Reverse osmosis.

J. Membrane Element Manufacturer (MEM). The MEM shall be defined as the corporation with whom the MSS has executed an agreement to supply the membrane elements. The MSS shall select the MEM and coordinate services. The various responsibilities and services of the MEM which impact the performance of the MSS are defined herein and in Section 466323.13.

K. NPSH: Net positive suction head.

L. NTU: Nephelometric turbidity unit.

M. O&M: Operations and maintenance.

N. OIT: Operator interface terminal.

O. P&ID: Process and instrumentation drawing.

P. psi: Pounds per square inch.

Q. Membrane System Supplier (MSS). The MSS is a subcontractor specializing in the fabrication and installation of RO membrane equipment who has the unit responsibility for membrane train (RO Units) fabrication, installation assistance, and performing startup and performance testing.

R. RPM: Rotations per minute.

S. SCADA: Supervisory control and data acquisition.

T. SDI: Silt density index.

U. TDS: Total dissolved solids.

V. Related Requirements:

1. Section 013100 "Project Management and Coordination" for project management and co-ordination of construction operations and activities.

2. Section 013300 "Submittal Procedures" for submittals requirements.

3. Section 016000 "Product Requirements" for transporting, handling, storing, and protecting products requirements.

4. Section 017700 "Closeout Procedures" for submitting warranties.

5. Section 017900 "Demonstration and Training" for training requirements for Owner staff.

6. Section 262923 "Variable-Frequency Motor Controllers" for variable-speed drives for feedwater pumps, CIP pump and Permeate Flushing Pump.

7. Section 262419 "Motor Control Centers" for variable-speed drives for interstage booster pumps.

8. Section 400519 "Ductile Iron Process Pipe."

9. Section 400523 "Stainless Steel Process Pipe and Tubing."

10. Section 400563 "Ball Valves.

11. Section 400562 "Plug Valves."

12. Section 400564 "Butterfly Valves."

13. Section 400565.23 “Swing Check Valves.”

14. Section 400565.35 “Globe Body Silent Check Valves.”

15. Section 400567.39 “Pressure-Relief Valves.”

16. Section 400593.23 “Low-Voltage Motor Requirements for Process Equipment.”

17. Section 406100 “Process Control and Enterprise Management Systems General Provisions.”

18. Section 406196 “Process Control Descriptions.”

19. Section 407113 “Magnetic Flow Meters” and Section 407123.13 “Venturi Flow Meters” for flow meters requirements

20. Section 434145.00 “Fiberglass Reinforced Plastic Tanks ”

21. Section 460553, “Identification for Water and Wastewater Equipment” for nameplates for equipment specified in this Section.

22. Section 466153 “Cartridge Filters.”

23. Section 466323.13 “Reverse Osmosis Membrane Elements.”

24. Contract Drawings including reverse osmosis piping and instrumentation diagram, process flow sheet, and mechanical Drawings.

1.04 DESCRIPTION OF THE RO SYSTEM

A. The OWNER intends to build a new Reverse Osmosis facility with a total permeate production capacity of 36 mgd (25,000 gpm) with one RO unit not in operation (redundant unit in standby). This equipment scope consists of up to eight (8) RO units with each RO Unit having a permeate production capacity of 5.14 mgd (3,571 gpm). The RO units shall be capable of operating from a minimum of 85 percent permeate recovery rate up to 92 percent permeate recovery rate.

B. The proposed system will treat surface water from the Cape Fear River, pre-treated by a conventional treatment plant that uses pre-oxidation, coagulation, flocculation, clarification, and granular media filtration. Additional pretreatment shall consist of 5-micron cartridge filtration (Section 466153) plus the addition of sodium bisulfite and of a scale inhibitor. The chemicals will be injected on the feedwater header to the RO pumps.

C. Filtered water from the granular media filters will flow from the equalization tank to the RO feed pumps by gravity. The feedwater will then be pumped by the RO feed pumps through the cartridge filters to the RO units. The total feed pressure required for the RO system from the feed pumps is projected to be between 70 psi and 150 psi, as determined by the permeate production rate, membrane element model characteristics, recovery ratio, and degree of fouling. Additional membrane system design criteria, train configuration and additional details are specified in Paragraphs 466323.00-2.2 and 466323.00-2.3.

D. Each RO unit shall demonstrate the ability to produce 5.14-mgd (3,571-gpm) of permeate during the 7-day membrane elements performance tests and the 30-Day Membrane System Per-

formance Test at a feed pressure of less than or equal to the clean membrane feed pressure specified in Paragraph 466323.00-2.3.

E. Permeate water from the RO units shall enter the header collecting permeate from all RO units, then balanced and conditioned using carbon dioxide and emulsified lime before being sent to the existing clearwells.

F. The required permeate water quality is specified in Table 466323.13-2. The specified permeate quality shall be obtained while the RO units are operating at the design recovery and feed pressure, as specified in Paragraph 466323.00-2.3.

G. The RO system shall operate at an average flux rate of less than or equal to 14.1-gal/sq-ft/day. The average flux rate shall be calculated based on the total permeate production divided by the total square footage of membrane surface area in stages 1, 2, and 3. The maximum flux in any element shall be limited to 25-gal/sq-ft/day or the maximum recommended value for the specific membrane element model provided by the MEM, whichever is the lowest.

H. The concentrate (or brine) from the RO units shall be collected in a common header that will be connected to the concentrate pipeline to the concentrate outfall (by others)

I. Each RO unit shall be capable of being isolated from other RO units using automated valves for maintenance without affecting the other RO units.

J. The RO units shall be permanently connected to a CIP system using manual isolation valves. The RO units shall be designed with valving as required to allow independent cleaning of up to 33 pressure vessels. The chemical cleaning solution shall be pumped under pressure to the RO unit to be cleaned by opening the isolation valves when cleaning is necessary. The operation of the cleaning system shall be completed in manual mode under the observation of the OWNER's operations personnel.

K. The RO units shall be permanently connected to a Permeate Flush system using actuated isolation valves at each RO unit. The Permeate Flush system shall be designed to use permeate to flush an RO unit by opening the main actuated isolation valve on the RO unit when it is taken out of service or whenever a flush is deemed necessary by the OWNER’s operations personnel. The operation of the permeate flush system shall be completed in automatic mode under the observation of the OWNER's operations personnel.

1.05 PREINSTALLATION MEETINGS

A. Section 013100 “Project Management and Coordination” for preinstallation meeting requirements.

B. Convene minimum one week prior to commencing Work of this Section.

1.06 ACTION SUBMITTALS

A. Section 013300 “Submittal Procedures” for submittals requirements.

B. Membrane specification sheets, specifying membrane element productivity, salt rejection, flux rates at standard conditions and the active surface area of the membrane elements, minimum concentrate velocity, and maximum feed flow.

C. Membrane element warranty specified in 466323.13.

D. Membrane system warranty specified in paragraph 1.16.

E. Membrane projections (produced using the proposed membrane manufacturer's software). Include with projections reference feed water quality data and system design assumptions, if any.

F. Recommended antiscalant for the membrane element to be provided. Antiscalant projections at chemical dose rates expected for feed water quality profile provided.

G. A hydraulic design of the RO unit piping which matches feedwater pump pressures, membrane pressures, interstage booster pump pressure, concentrate back pressure, and permeate back pressures.

H. Chemical Cleaning flowrate and inlet pressure requirements and allowances.

I. Data reduction and normalization software capable of running on an PC or compatible computer with the latest version of Windows operating system..

J. Product Data: Submit manufacturer product data for system materials and component equipment, including:

   1. Specials tools.

   2. Spare parts.

K. P&IDs, GAs for each system and sub-system.

L. Bill of materials of all equipment.

M. Shop Drawings and detailed specifications:

   1. Indicate system materials and component equipment.

   2. Submit installation and anchoring requirements, fasteners, and other details.

N. Scaled engineering fabrication drawings.

   1. Include physical dimensions of pressure vessels, piping arrangements, hydraulic and pneumatic termination points, support structure, pumping units, instrumentation, valves, tanks, cartridge filters, heaters, and other appurtenances.

O. Fabrication drawings and structural calculations, sealed by a Professional Engineer registered in the State of North Carolina, shall be submitted to the ENGINEER for approval prior to fabrication of the equipment

P. Electrical and control wiring diagram and terminations for systems identified in this Section. Indicate the number and size of conduits required to bring power to each system.

Q. Electrical panelboard drawings and details.

R. Nameplate motor data.

S. Instrumentation schematic for each of the systems identified in this Section. Equipment tag numbers will be provided by the Engineer.

1.07 INFORMATIONAL SUBMITTALS

A. Manufacturer's Certificate: Products meet or exceed specified requirements.

B. A description of equipment and methods proposed to pickle and passivate stainless steel piping after fabrication.

C. Manufacturer Instructions: Detailed instructions on installation requirements, including storage and handling procedures.

D. Qualifications Statements:

1. Qualifications for manufacturer and installer.

2. Manufacturer's approval of installer.

E. Source Quality-Control Submittals: Results of factory tests and inspections.

F. Field Quality-Control Submittals: Results of Manufacturer-furnished tests and inspections.

G. Manufacturer Installation Reports: Certify that equipment has been installed according to manufacturer instructions.

H. Operations and Maintenance (O&M) Data including:

1. O&M Manuals

2. Electronic CMMS compatible maintenance data

1.08 DELEGATED DESIGN SUBMITTALS

A. Delegated Design Submittals: Signed and sealed detailed dimensional Shop Drawings with design calculations and assumptions confirming required suction and discharge pressures and flows are acceptable for these pumps.

1. Included with Shop Drawings will be data for materials and equipment, including wiring and control diagrams, performance charts and curves, installation and anchoring requirements, fasteners, and other details as specified.

2. Complete description of surface preparation and shop prime painting.

B. Fabrication drawings and structural calculations, sealed by a Professional Engineer registered in the State of North Carolina, shall be submitted for approval, prior to fabrication of the equipment.

1.09 CLOSEOUT SUBMITTALS

A. Section 017700 “Closeout Procedures” for submittals requirements.

B. Project Record Documents: Record actual locations of installed RO equipment.

1.10 OPERATION AND MAINTENANCE MANUALS AND TRAINING

A. Complete operation and maintenance (O&M) manuals for the RO equipment shall be furnished by the MSS in accordance with the requirements of Section 017823. Three preliminary copies of the O&M Manual shall be submitted to the ENGINEER at least 30 days before commencing demonstration and training.

B. A representative for the MSS who has complete knowledge of the proper operation and maintenance of the system shall be provided to instruct the OWNER's representatives in the proper operation and maintenance of the equipment in accordance with the provisions of Section 017900.

C. A representative of the MEM shall be made available onsite for training in accordance with the provisions of Section 017900 and Section 466323.13.

1.11 QUALITY ASSURANCE

A. Perform Work according to State of North Carolina standards set by authorities having jurisdiction.

B. Pressure vessels will be certified to have been designed and fabricated in per the ASME Boiler and Pressure Vessels Code.

C. Welding in accordance with the latest applicable codes of the American Welding Society and/or ASME Boiler Code.

1.12 QUALIFICATIONS

A. The MSS shall have a minimum of five (5) years of experience designing, supervising installation, and commissioning RO equipment (membranes, pressure vessels, piping, valves, controls, permeate flush, and cleaning systems) for municipal water supply in the United States.

1. The MSS shall provide a minimum of five satisfactory references for completed RO/NF (nanofiltration) facilities with a total production capacity equal or greater than 5 mgd (3,472 gpm), completed during the last 15 years. The facilities must be in operation for a minimum of twelve (12) months at the time of submittal. Each reference provided shall be for a municipal facility containing multiple, independently operated, multi-stage RO units.

2. The MSS shall have fabricated a minimum of three multistage RO units with a minimum permeate capacity greater than 2.5 mgd.

B. The approved MSSs are:

1. Biwater Inc, San Dimas, California.

2. H2O Innovation, Quebec City, QC.

3. SafBon Water Technologies/Doosan Hydro Technology, Tampa, Florida.

4. Suez Water Technologies & Solutions, Oakville, Ontario.

5. Aerex Industries Inc, Ft. Pierce, Florida.

1.13 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 “Product Requirements” for transporting, handling, storing, and protecting products requirements.

B. Inspection: Accept materials on site in manufacturer's original packaging and inspect for damage.

C. Storage: Store materials, including RO membranes, per manufacturer instructions.

D. Protection: Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.

1. Provide additional protection according to manufacturer instructions.

1.14 TOOLS AND SPARE PARTS

A. All special tools required for normal operation and maintenance of the equipment shall furnished by the MSS.

1. Specifically, tools required to remove the restraining rings for the pressure vessel end caps, and piping and compression fitting for profiling conductivity along the length of the pressure vessel shall be furnished.

B. The MSS shall identify and provide recommended spare parts for components of the provided equipment.

1. Spare parts to be provided by the MEM with the membrane elements shall be secured by the MSS and delivered to the OWNER.

1.15 EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.

2. Document field measurements on Shop Drawings.

1.16 WARRANTY

A. Section 017700 “Closeout Procedures” for warranties requirements.

B. Furnish 3-year pro-rated MEM warranty direct to the Owner, as specified in 466323.13.

1.17 PAYMENT TERMS

A. The procedures for payment from OWNER to CONTRACTOR as defined in Specification Section 012900 are supplemented and superseded by the following conditions for the work required of this specification section. The OWNER will release progress payments to the CONTRACTOR per Section 012900 for up to 75 percent of the total scheduled value to furnish

and install membrane system equipment, per this section. Payment for the remaining balance (25 percent) will be provided following the Engineer's written acknowledgement of successful performance demonstration testing.

PART 2 PRODUCTS

2.01 SYSTEM DESCRIPTION

A. Components:

1. Pressure vessels support structure.

2. Process piping.

3. Membrane elements.

4. Pressure vessels.

5. Interstage Booster pumps.

6. CIP system.

7. Permeate Flushing system.

8. Instrumentation.

B. The RO membrane system equipment covered by this specification is intended to incorporate standard RO membrane elements and standard RO equipment designs. Equipment is for both continuous and intermittent service at the maximum operating pressure.

2.02 MEMBRANE SYSTEM CONFIGURATION

A. Each of the RO units shall be fitted with 912 eight-inch spiral-wound thin-film composite RO membranes. All RO units shall have membrane elements supplied from a single RO membrane manufacturer as specified in Section 466323.13.

B. The RO units shall be designed to allow single-pass operation with three (3) stages. Each RO unit shall have permeate backpressure valve (stage 1), interstage booster pump (between stage 2 and 3), pressure-indicating transmitters, and flow meters to allow for adjustments to membrane flux. Piping shall be designed to accommodate straight runs of pipe as required for each flow meter. The permeate flow meters shall be venturi meters and the concentrate flow meter shall be a magnetic flow meter. Refer to Section 407113 "Magnetic Flow Meters" and Section 407123.13 "Venturi Flow Meters" for flow meters requirements. A minimum of five pipe diameters of straight pipe upstream and three pipe diameters downstream of magnetic flow meters is required. A minimum of five pipe diameters of straight pipe upstream of the venturi meters is required. Flow meters shall be included to monitor the permeate and concentrate (brine) flows from each skid. Flow meters for stage 2 permeate, stage 3 permeate and combined permeate shall be provided.

C. Feed water, interstage, and concentrate piping shall be Schedule 10 Type 316L stainless steel. The inlet and outlet piping connections to the unit shall be a minimum of Class 150 flanges. The piping for manifolds with multiple outlet extensions with cut groove ends shall be at least

Schedule 40 stainless steel seamless or welded pipe with 316L stainless steel Victaulic joints connecting the pressure vessel and manifold. All Victaulic grooved ends shall be suitable for the applicable design pressure. Schedule 40 Victaulic cut groove nipples, 3-inches long, may be welded to Schedule 10S pipe to provide cut groove ends. Rolled grooves shall not be allowed.

D. Threaded fittings are not allowed, except for 1/2-in instrumentation and sample fittings. CIP and permeate flushing piping shall be Schedule 80 CPVC pipe. Provisions shall be made for hydro testing in accordance with Section 3.04 to avoid testing with entrained air pockets.

E. The RO units shall be arranged in two separate banks of 4 RO units, with connections for the 3future installation of an additional RO unit per bank. Each bank of RO units will be supplied with feedwater by a set of 4 variable speed vertical turbine pumps connected to a common feedwater suction manifold. Each feedwater pump will have a dedicated cartridge filter to protect the RO units from damage from suspended materials. After the cartridge filters, the feedwater from each set of pumps will be collected in a common manifold and conveyed to the corresponding bank of RO units. The RO unit piping shall begin at the ANSI B16.5 Class 150 flange on the 16-inch supply pipe to the corresponding RO unit.

F. The feedwater and concentrate control valves on the RO units shall be 316 stainless steel rotary V-port ball valve with motorized operator. Limiting of permeate flow from the first stage of each RO unit (if needed) shall be accomplished by inducing a backpressure on the permeate piping from the first stage with a 316 stainless steel rotary V-port ball valve with motorized operator.

G. Each RO unit shall be fitted with a fiberglass sample board which is mounted directly to the unit. The panel shall have all fiberglass construction with a minimum 8-in wide trough under the sample cocks with a 1-in PVC drain pipe routed to a floor drain. Sample tubing shall be black Eastman nylon or blue polyethylene opaque tubing.

H. The sample board shall use 1/4-in stainless steel sample cocks to sample the following:

1. Feedwater (single sample from inlet piping).
2. Concentrate (locate on common manifold to obtain single composite sample).
3. Permeate (locate on common manifold or pipe to obtain single composite sample).
4. Permeate from each pressure vessel.
5. Composite permeate, Stage 1.
6. Composite permeate, Stage 2.
7. Composite permeate, Stage 3.
8. Interstage 1-2 (locate on pipe between Stage 1 and Stage 2).
9. Interstage 2-3 (locate on pipe between Stage 2 and Stage 3).

I. The sample lines for the feedwater, interstage 1-2, interstage 2-3, and concentrate shall be provided with pressure regulating valves.

J. The MSS shall provide a 1/2-in ball valve on the permeate outlet on the end opposite the permeate discharge connection. This ball valve shall be used for inserting the sample tube for profiling the conductivity along the length of the pressure vessel.

K. Each RO unit shall have a control panel. The control panel shall include a programmable logic controller (PLC). The control panel will allow for each skid to be operated independently. The PLC shall be networked to the plant control system for remote control and monitoring.

L. All RO units shall share a permeate flush system. The system shall include a dedicated permeate flush tank and pump. The permeate flush system shall be sized to flush the complete RO unit. Permeate flush connections to the RO units shall allow automatic flushing of the RO units in the event of a power outage and Automatic (operator-initiated) flushing of the RO units.

M. All RO units shall share a chemical CIP system, independent of the permeate flush system. The CIP operation shall be initiated manually by the operators. The CIP system shall be sized to clean up to 33 pressure vessels at a time. CIP connections on the RO units shall allow the chemical cleaning of each stage or section of a stage on each RO unit separately.

N. Each RO unit shall be equipped with pH monitoring systems to protect the membranes and to enable pH verification of the process or cleaning fluid.

O. The different components of each RO unit shall be securely fastened to a skid fabricated from metallic framing members of epoxy-coated carbon steel, stainless steel or aluminum. Carbon steel members shall be protective-coated using the MSS's recommended two-part powder coated epoxy paint coating system for the specified service. Skid design shall allow for free access under the skid for cleaning and drainage. The support frame shall limit deflection in all axes to 0.25-in during the seismic design loads specified in the structural drawings.

P. MSS shall locate all panels so that unobstructed access is available to valves and mechanical equipment and so that instruments can be easily removed and installed.

Q. The eight 5.14-mgd (3,571-gpm) membrane units shall be capable of operating at 85.0 to 92.0 percent recovery with a feedwater pressure less than 150 psi using three stages, with an interstage booster pump between stage 2 and stage 3. Each RO membrane unit shall be designed to accommodate a feed water flow rate between 3,887 gpm (92 percent recovery) and 4,207 gpm (85 percent recovery).

R. Each unit shall have a three-stage array incorporating 114 pressure vessels, each fully loaded with eight (8), standard 40-in long, 8-in diameter elements as required. Sixty-six (66) vessels shall be in the first stage, thirty-two (32) vessels shall be in the second stage, and sixteen (16) vessels shall be in the third stage.

S. Each unit shall incorporate an interstage booster pump unit to boost the feedwater pressure to Stage 3. The pressure boost shall be as recommended by the MEM to balance the flux of the different stages. The materials of construction for the RO interstage booster pump shall be Type 316 stainless steel. Auxiliary piping and valving shall be Type 316L stainless steel.

T. The RO units shall be designed and configured according to the Mechanical Drawings and the Process and Instrumentation Drawings. The RO units design shown on the drawings are "horizontal" configuration. "Vertical" configurations meeting the requirements of this specification are also considered acceptable.

U. Feed, interstage, permeate and concentrate piping shall be provided with air release valves at the highest points for clearing air at startup.

V. Units will be completely independent from one another in every respect except the connection to common feed, permeate, concentrate, permeate flushing, and CIP manifolds.

W. Interlock controls will prevent the simultaneous starting and stopping of individual RO units during normal operation.

2.03 OPERATING CONDITIONS AND REQUIREMENTS

A. The RO system shall be designed to operate under the following conditions:

1.	Duty -	Continuous
2.	Ambient conditions -	Indoors
3.	Ambient temperature -	10 to 90 ºF
4.	Ambient relative humidity -	10 to 80 percent
5.	Fluid service -	Filtered surface water
6.	Fluid temperature-	10 to 31ºC
7.	Fluid viscosity -	1.13 (centipoises @ 60ºF)

B. The RO skids shall be designed to meet the following performance requirements:

1.	Number of RO Membrane Units -	up to 8
2.	Permeate design capacity, each skid -	5.14-mgd (3,571-gpm)
3.	Minimum permeate production, each skid -	4.0 mgd (2,778 gpm)
4.	Average flux, design -	14.1 gfd
5.	Stage 1 average flux (maximum allowed) -	Maximum recommended by MEM
6.	Stage 2 average flux (maximum allowed) -	Maximum recommended by MEM
7.	Stage 3 average flux (maximum allowed) -	Maximum recommended by MEM
8.	Maximum allowed flux (any element) -	Maximum recommended by MEM
9.	Max Feed Pressures Stage 1 -	150-psi
10.	Number of Stages -	3
11.	Vessel array staging -	66:32:16
12.	Vessel quantity, each skid Stage 1 -	66

13. Vessel quantity, each skid Stage 2 - 32

14. Vessel quantity, each skid Stage 3 - 16

15. Element quantity, each skid (all Stages) - 912

16. System recovery range - 85-92 percent

2.04 RO FEED PUMPS

A. See Section 432416.16 "Vertical Turbine Short Set Can Pumps"

2.05 CARTRIDGE FILTERS

A. See Section 466153 "Cartridge Filters"

2.06 RO MEMBRANE ELEMENTS

A. Refer to specification Section 466323.13 "Reverse Osmosis Membrane Elements" for requirements.

2.07 PRESSURE VESSELS

A. Pressure vessels shall be horizontal orientation, fiberglass reinforced plastic (FRP) and shall have a diameter and length sufficient for eight (8) standard 8-in diameter, 40-in standard length spiral-wound elements. Vessels shall be complete with end closures, mounting hardware, thrust cone, and membrane element end connectors and o-rings appropriate for the membrane element being supplied. Vessel shall be designed to allow the use of other makes of membranes by changing end connectors. Pressure vessels and component parts shall be NSF listed. Pressure vessels shall be PRO 8-300 SP-8W Protec Arisawa, Vista, CA; equal by Codeline or approved equivalent.

B. Vessels shall have a maximum working pressure of no less than 300-psi at a temperature of no less than 120°F, with a minimum operating temperature of no greater than 20°F.

C. Vessels shall be designed, constructed, inspected, and stamped in accordance with the latest edition of the ASME Boiler and Pressure Vessel Code Section X, Fiberglass Reinforced Plastic Pressure Vessels.

D. Vessels shall be designed to allow membrane elements to be connected to the permeate port at both ends of the vessel so that permeate can be taken from either end. The end cap permeate connections shall be grooved.

E. End closures shall incorporate a safety interlock which secures the primary locking components and provides a measure of tamper resistance. Retaining hardware shall not utilize a compression ring.

F. The side entry shall be included as part of the pressure vessel and shall be constructed of 316L stainless steel Schedule 40 wrought pipe with a grooved end. The port shall be flush with the inside diameter of the vessel to not interfere with the membrane brine seals.

G. Materials of construction shall be approved for use in pressure vessel construction by the code. Materials shall be code certified and lot traceable.

H. The vessel shall be fabricated from filament-wound fiberglass using continuous glass roving impregnated with an elevated cure epoxy resin. Materials shall be lot traceable to vessel serial numbers.

I. All vessels shall be painted in the factory with high gloss urethane coating or approved equal. Paint coatings must be opaque to light.

J. All vessels shall be made of non-corroding materials. Metal parts in contact with the process stream, including the port connections, shall be stainless steel type 316L except as noted above or equal approved by the ENGINEER. Split-ring couplings for connecting stainless steel pipe shall be 316 stainless steel.

2.08 PRESSURE VESSELS SUPPORT STRUCTURE

A. RO membrane unit support structures: Components shall be designed to pass through a twelve foot wide, twelve foot tall over-head roll-up doors. Components unable to pass through the roll-up doors should be assembled in place using only bolted connections.

1. Support pressure vessels on the support structure using contoured thermoplastic rubber saddles with 316L stainless steel retaining clamps.

2. Utilize three saddles and retaining clamps for each pressure vessel.

3. Maximum length and width of each RO membrane unit: As shown on the MSS's submitted drawings.

B. Frames: Pressure vessels, interconnecting piping, manifolds, flowmeters, instruments, valves, valve operators, and other related appurtenances shall be assembled on powder coated two-part epoxy-coated carbon steel, stainless steel or aluminum frames as designed by the MSS. The RO units design shown on the drawings are "horizontal" configuration. "Vertical" configurations meeting the requirements of this specification are also considered acceptable.

1. Corrosion Protection: The MSS shall define in detail the method proposed to protect the frames from corrosion.

2. Supports will be anchored on suitable concrete "housekeeping" pads to prevent the supports from contacting the floor.

3. Membrane unit support structures will allow for mounting on concrete "housekeeping" pads to allow free access under each unit for cleaning and drainage as needed.

4. The supporting framework shall be designed to withstand shipping and handling forces as well as operating loads and seismic forces. The unit structure may be designed as subassemblies to facilitate shipping and installation or to be completely field-assembled.

5. Mounting hardware, nuts, and bolts, for the membrane units will be 316L stainless steel.

C. The supporting framework shall be designed to be able to support the RO skid PLC, the instrument panel, and the water quality panel.

D. Anchor Bolts and bolts used for assembling structural steel shall be in accordance with the corresponding specification sections of Division 5.

2.09 INTERSTAGE BOOSTER PUMPS

A. The interstage booster pumping units shall all be supplied by one manufacturer and shall be complete including pumps, motors, and appurtenances such as, but not limited to, couplings, guards and gauges. The materials shall be NSF 61 approved.

B. The pumps and motors shall be designed and built for 24-hour continuous service at any and all points within the required range of operation, without overheating, excessive vibration or strain.

C. The interstage booster pumps shall be of the centrifugal single-stage type (horizontal or vertical) designed to pump RO membrane units interstage water of up to 200 ppm chloride concentration and up to 1,000 ppm TDS concentration.

D. No carbon steel or cast-iron parts or fasteners shall be used on the pumps except at the motor coupling.

E. The Interstage Booster Pumps will pump concentrate from the second stage of the RO Membrane Units to the third stage of the Units via the interstage piping, boosting the pressure of the flow to allow balanced operation of first, second and third stages of the Units. Each pump shall be designed to operate within the flow and head parameters specified herein. The pumps shall be installed between the second and third stages of each RO unit. The pumps shall be driven by variable frequency drives to maintain concentrate and third-stage permeate flows under varying second stage membrane unit pressure conditions. The interstage pump design shown on the drawings are horizontal configuration. Vertical pumps meeting the requirements of this specification are also considered acceptable.

F. The pump speed shall be controlled by a flow meter located on the third stage permeate header. The pumps shall operate to maintain a permeate flow set point, controlled through the SCADA system as shown on Instrumentation Drawings and as specified in Division 40.

G. Manufacturers:

1. Flowserve
2. Goulds
3. Fairbanks
4. Hydromatic, Pentair,
5. Sulzer,
6. Grundfoss,
7. Substitutions: As specified in Section 016000 “Product Requirements”.

H. Pump Designation:

1. P-4216 to P-4316

I. Performance and Design Criteria:

1. Design Flow Rate: 1,050 gpm or as recommended by MEM.
2. Design Flow Total Dynamic Head: 70 feet or as recommended by MEM.
3. Minimum Efficiency at Design Flow Rate: 77.5 percent.
4. Secondary Flow Rate: 755 gpm
5. Secondary Flow Total Dynamic Head: 70 feet
6. Minimum Efficiency at Secondary Flow Rate: 74.0 percent
7. Minimum Continuous Stable Flow Rate: 201 gpm.
8. Minimum Flow Total Dynamic Head: 84 feet.
9. Maximum Flow Rate: 1,375 gpm.
10. Maximum Flow Total Dynamic Head: 48 feet.
11. NPSH Available: 200 feet.
12. Liquid Temperature: 20-90 F.
13. Maximum Pump Speed: 1,780 rpm.
14. Maximum Motor Speed: 1,800 rpm.
15. Maximum Motor Size: 30 hp

J. Casing:

1. Design:
   a. One piece.
   b. End suction.
   c. Register fit mating surfaces.
2. Material: 316 Stainless Steel.
3. End Connections:
   a. Flanged.
   b. Comply with ASME B16.5, Class 150.
   c. Configuration: Tangential side or centerline top discharge.
4. Connections: Gage, cleanout port, prime, air vent, and drain/flush.

K. Impeller:

1. Design:
   a. Enclosed, reverse vanes.
   b. Radial flow.

2. Material: 316 Stainless Steel.

3. Keyed to shaft with 316 stainless-steel locknut.

4. Statically and dynamically balanced after assembly.

5. Rotation of the impeller shall correspond to the pump discharge orientation as indicated on the Drawings

6. Backhead: Separate one-piece casting, register fit to pump casing and bearing housing; cast stuffing box.

L. Pump Shaft:

1. Type 316 stainless steel

2. Tapered and keyed at both ends.

M. Bearings:

1. Inboard radial-load bearing and outboard radial-thrust bearing of the anti-friction ball or tapered-spherical roller type, of ample size to carry all loads imposed under continuous operation without overheating.

2. Comply with ABMA 9.

3. Bearings shall exceed B10 life of 17,500 hours.

4. Lubrication: Grease.

5. Furnish inboard and outboard bearing retainers, water deflectors, and fittings.

6. Bearing frame shall be designed so that the complete rotating element can be removed from casing without disconnecting piping.

7. The bearing frame shall be of cast iron construction, shall be rigidly fixed to the casing and back-head, shall be shoulder fitted and accurately centered.

N. Seals: Mechanical.

O. Motors:

1. Motors shall be 460V, 3 phase, TEFC and shall meet the requirements in Section 400593.23 “Low-Voltage Motor Requirements for Process Equipment.”

2. Motors shall be compatible and coordinated with variable frequency drives as specified in Section 262419 “Motor Control Centers”.

3. Motors shall be furnished with winding temperature detectors for each phase. The detectors shall be embedded bi-metallic temperature thermostat switches with normally closed contacts and leads terminating in the main conduit box.

P. Motors shall be inverter-duty and severe-duty rated.

2.10 PROCESS PIPING

A. All stainless steel piping on skids shall be type 316L and shall be pickled and passivated at the time of fabrication to remove surface discoloration from tool marks, welding, and surface abrasions. After installation, any surface irregularities which could result in discoloration shall be field passivated.

B. Piping shall conform to the stainless steel piping and fittings specifications, Section 400523 or thermoplastic process piping specifications, Section 400531, in addition to the requirements listed in this section. Pipe material use limitations are listed in the respective piping material specification sections.

C. Piping manifolds for feedwater, concentrate, permeate, and cleaning solutions, including interstage piping, shall be properly designed to distribute and collect flow while inducing a minimal head loss on the process fluid. The design of the manifolds shall be such that the flow is evenly distributed to and from all pressure vessels to avoid flow imbalances through the pressure vessels.

D. Feedwater, permeate, interstage, and concentrate manifolds for the membrane units shall be made of 316L stainless steel, and utilize a pulled stub for tee connections for manifolds with multiple extensions. Saddle or mating cut type fabrication with pipe stub sections welded to the tee on the manifold are not acceptable. The piping for manifolds with multiple outlet extensions with cut groove ends shall be at least Schedule 10S stainless steel seamless pipe and shall use split ring coupling joints to connect the manifold extension directly to the pressure vessel or a section of pipe with a J-bend.

E. Fluid velocities in all stainless steel piping shall be maintained within the range of 5- to 11-ft/sec at design conditions, but not to preclude the use of straight manifold sections where applicable. Stainless steel piping connections shall be welded except as required for connection to valves and equipment or to avoid pipe spools longer than 20-ft long, in which case the joints shall have flanged, or Victaulic type couplings as specified in Section 400523. Threaded fittings are not allowed, except for 1/2-in instrumentation and sample fittings.

F. The permeate manifolds for the membrane units shall be Schedule 10S 316L stainless steel with schedule 80 PVC "J" bends with Vitaulic "R" grooved joints connecting the bend to both the pressure vessel and the manifold. Bending shall be in accordance with Section 400531. A 1/2 in by 1/4-in NPT reducing bushing will be tapped and solvent welded into the PVC "U" bend for the permeate sample point. A hydrostatic test at 150-psi will be conducted on permeate piping and hoses.

G. CIP piping shall be Schedule 80 CPVC pipe. Fluid velocities in plastic pipe (PVC or CPVC) shall not exceed 6-ft/sec.

H. Provisions shall be made for hydro testing in accordance with Part 3 in the design of the unit and in the test procedure to avoid hydrostatic testing with air pockets in the pressure vessels or for testing piping sections independently of the pressure vessels.

I. All piping on all membrane units shall be completely assembled and connected to empty pressure vessels fitted for functional testing, disinfection, and flushing prior to loading the membranes.

J. Piping shall be designed to accommodate straight runs of pipe as required for each flow meter. Refer to Section 407113 "Magnetic Flow Meters" and Section 407123.13 "Venturi Flow Meters" for flow meters requirements. A minimum of five pipe diameters of straight pipe upstream and three pipe diameters downstream of magnetic flow meters is required. A minimum of five pipe diameters of straight pipe upstream of the venturi meters is required.

2.11 VALVES

A. All valves on the RO units shall be mounted in such a position that valve position indicators are plainly visible when standing on the floor. All manually operated valves mounted 7 feet or greater above operating floor level shall be provided with chain operators to allow operation of the valve from floor level. Each membrane train shall be provided with a check valve on the feed, concentrate, and permeate piping.

B. The following automatic process valves shall be included on each of the RO units:

1. RO Feed Control Valve – V-port control valve – motor operated, Type 316 stainless steel, fail to close

2. Permeate Throttling Valves (Stage 1) – V-port control valve – motor operated, Type 316 stainless steel, fail to open

3. Concentrate Flush Valve – Actuated ball valve, Type 316 stainless steel, fail-to-open

4. Concentrate Control Valve – V-port control valve – motor operated, Type 316 stainless steel, fail to open

5. Permeate Flush Supply Valve – Type 316 stainless steel butterfly valve, fail-to-close

C. The following manual process valves shall be included on each of the RO units:

1. RO Unit Feed Isolation Valve –butterfly valve, Type 316 stainless steel

2. Sample Valves (high-pressure) – Plug valves, Type 316 stainless steel

3. Sample Valves (low-pressure) – Ball valves, PVC

4. Stage 1, 2 and 3 isolation and CIP supply and return connection valves – manual-operated butterfly valve, Type 316 stainless steel.

5. Permeate and Concentrate Isolation Valves –butterfly valve, Type 316 stainless steel

6. Product Sample Valves – Ball valves, PVC (one for each RO vessel plus one common)

D. Check Valves. Each RO unit shall be provided with a check valve on the feed, low pressure concentrate, and permeate piping as shown on the Drawings. See specification Section 400565.23 "Swing Check Valves".

E. Concentrate Flush Valve. Automatically controlled flushing valves on the stage 3 concentrate pipeline that will allow for independent train flushing while the other RO trains remain in operation. Actuated ball valve, Type 316 SS, fail-to-open.

F. High Pressure Manually Operated Ball Valves. Ball valves for stainless pipe shall be as specified in Section 400563.

G. Butterfly valves shall be used as isolation valves on piping 4-in or more in diameter. Valves shall be as specified in Section 400564.

H. Pressure Release Valve. Pressure relief valves shall be installed on each permeate header upstream of isolation valves sized to relieve permeate flow at a rate of 350-gpm and adjustable setting in the range of 5 psi to 50 psi. Valve material shall be stainless 316 with a pressure rating of 150-psi.

I. Sizing and cavitation evaluations for the specific RO Feed. permeate and concentrate control valves supplied by the MSS shall be submitted. The evaluations shall indicate the valve is operating within the range rated for continuous operation for cavitation and repeatability. Refer to Section 400563 "Ball Valves" for valve specifications and 400557 for electric operator specifications.

J. All valves of the same type shall be from one manufacturer. MSS shall select and install properly sized RO Feed, permeate throttling and concentrate control valves to ensure proper operation. Excessive noise (greater than 70-db at 3 feet) and vibration in valve will not be accepted. The name of the manufacturer, flow direction arrows, and working pressure for which they are designed shall be cast in raised letters upon the body of the valve.

K. Feed Isolation/Control Valves. The feed control valve shall be a stainless steel control valve capable of flowing 6.05-mgd (4,202-gpm) with a pressure drop of less than 3.0 psi with the valve wide open. A V-port anti-cavitation ball valve as specified in Section 400563 shall be used to eliminate cavitation, vibration, and noise. The valve shall be automatically operated.

L. Concentrate Flow Control Valve. By adjusting RO Feedwater pump discharge pressure and concentrate control valve position, it shall be possible to adequately control the product recovery rate. A V-port anti-cavitation ball valve shall be used to eliminate cavitation, vibration, and noise. The concentrate control valve shall be a Type 316 stainless steel control valve as specified in Section 400563. The valve shall be automatically operated. The concentrate pressure downstream of the valve will be in the range of 40- to 50-psig.

M. The membrane feed and concentrate control valve sizes shown on the Drawing shall be confirmed by the MSS to be properly sized and located for accessibility for maintenance as per the MSS's specific design. As necessary, MSS shall select and install different sized feed and concentrate control valves to ensure proper operation and minimum nuisance noise at no additional cost to Owner. MSS shall select the operating speed of the valve to be compatible with the membrane unit design.

2.12 INSTRUMENTATION AND CONTROLS

A. MSS shall provide all instruments, instrument panels, PLC, PLC panels, and communication equipment per applicable specification sections and equipment list in Division 40. Refer to Section 406717, "Industrial Enclosures" for control panel enclosures requirements. All local instrumentation shall be mounted on either aluminum, type 316 stainless steel pipe or UniStrut on the side of each RO unit. Local pressure gauges shall be provided where pressure transmitters are mounted to piping.

B. Calibrated 4-in pressure gauges shall be provided at the same height as the pressure transmitters mounted at instrument mounting panel. Refer to Section 407313, "Pressure and Differential Pressure Gauges" for requirements.

C. Section 407000 "Instrumentation for Process Systems" and Section 407001 "Instrument List" for a complete list of instruments to be provided and requirements. Process instrumentation on each of the RO skids includes, but is not limited to the following:

1. Stage 1 Permeate High Pressure Switch. See Section 407336 "Pressure and Differential Pressure Switches" for requirements.

2. Pressure Transmitters and Gauges (Stage 1 feed, Stage 2 feed, Stage 3 feed, Concentrate, Stage 1 permeate, Stage 2 permeate, combined permeate). See Section 407313 "Pressure and Differential Pressure Gauges", Section 407323 "Gauge Pressure Transmitters", and Section 407329 "Differential Pressure Transmitter" for requirements.

3. Combined Permeate Conductivity Monitor. See Section 407516 "Conductivity Analyzers" for requirements.

4. Stage 2 and Stage 3 Permeate Flow Meters. See Section 407123.13 "Venturi Flow Meters" for requirements.

5. Combined Permeate Flow Meter. See Section 407123.13 "Venturi Flow Meters" for requirements.

6. Concentrate Conductivity Monitor. See Section 407516 "Conductivity Analyzers" for requirements.

7. Concentrate Flow Meter. See Section 407113 "Magnetic Flow Meters" for requirements.

D. CONTROLS

1. Each RO unit shall be furnished with a single process control system to monitor and control the different RO unit components. The MSS is responsible for providing instrumentation, control panel and other hardware. Refer to section 406100 for delineation of responsibilities between MSS and PCSS.

2. The final control system shall allow each of the RO units to operate automatically and continuously without plant operator intervention, except to initiate chemical CIP operations

3. All control and instrumentation equipment shall meet the Division 40 contract specifications.

4. All control system components, including the completed control panels, shall comply with Underwriters' Laboratory (UL) and the National Electrical Code (NEC). Panels shall be constructed and labeled by a UL508 listed facility.

5. Each RO unit will have a control panel. The control panel shall have a PLC that is fully programmed and tested prior to delivering the RO units to the Project Site. The front of the control panel shall include a color touch screen HMI. The control panel shall have Ethernet connectivity for remote monitoring and controlling purposes. The control panel shall be housed inside a NEMA 4X rated enclosure fabricated from Type 316 stainless steel and shall be equipped with a cooling fan.

6. The PLCs shall all be Modicon M340 PLC systems.

7. The PLC shall contain discrete input (DI), discrete output (DO), analog input (AI) and analog output (AO) cards needed to monitor and control all equipment listed in section 2.11 with 10% spare points for each input/output (I/O) type (DI, DO, AI and AO). The PLC shall be expandable to accommodate additional I/O cards if needed.

8. The control system shall be programmed with the following shutdown alarms:
   a. Low Feed Pressure
   b. Low Reject Flow
   c. High Permeate Flow

9. The control system shall be programmed to transmit the following parameters to the plant Supervisory Control and Data Acquisition (SCADA) system:
   a. All Shutdown Alarms
   b. Feed Flow
   c. Concentrate Flow
   d. Permeate Flow
   e. Percent Recovery
   f. Total Run Time
   g. RO Operating Mode
   h. Inlet Valve Status
   i. Concentrate Valve Status
   j. Permeate Valve Status
   k. All analog instrument values

10. The remote network connection for each RO skid shall have the following control inputs:
    a. RO Mode (Manual/Automatic)
    b. RO Start/Stop
    c. Auto Flush Selector On/Off
    d. Alarm Silence
    e. Alarm Reset

11. Each control system shall have the following additional controls/outputs:
    a. Alarm Horn
    b. Alarm Pilot Light

E. The MSS shall equip all RO Membrane Units with pre-wired junction boxes for all instruments and devices. Refer to Division 40 for additional requirements.

F. At a minimum, the following information shall be collected for each RO membrane unit by the MSS-provided instruments and devices:

1. Stage 1:
   a. Feed Pressure
   b. Permeate Pressure
   c. Concentrate Pressure
   d. Stage 1 differential pressure

2. Stage 2:
   a. Feed Pressure
   b. Permeate Flow
   c. Concentrate Pressure (Interstage)
   d. Stage 2 differential pressure

3. Stage 3:
   a. Feed Pressure (after booster pump)
   b. Permeate Flow
   c. Concentrate Pressure (Interstage)
   d. Stage 3 differential pressure

4. Total Permeate:
   a. Pressure
   b. Flow
   c. Conductivity

5. Final Concentrate:
   a. Pressure
   b. Flow
   c. Conductivity

6. The MSS-provided Control System shall perform the following functions:
   a. Monitor, display, and record operational data for all instrumentation detailed in specification.
   b. Monitor and record membrane process data including the following:
      1) Differential pressure across each stage.
      2) Normalized permeate flow across each stage.
      3) Normalized salt rejection across each stage.
      4) Monitor and record hours of operation including the following:
         a) Hours of operation for each membrane unit.
         b) Hours of operation for all component equipment.

7. Shutdown train and alarm upon failure of any defined critical parameter or component as specified herein.

8. Store one year of historical data (historical trends, alarm logs, operating data, cleaning and flushing information, water quality data) on the HMI.
   a. Provide other features as required by the system for unattended operation or to meet specified performance requirements.

2.13 ELECTRICAL

A. The RO units and associated equipment shall be provided with a 480V, 3 phase, 3 wire, panelboard with main breaker (100 Amp maximum), 65 kAIC short circuit rating; a stepdown 480V:208Y/120V, 3 phase transformer (sized as required); and a 208Y/120V, 3 phase, 4 wire panelboard with main breaker (sized as required), 10 kAIC short circuit rating. The panel shall be used to distribute power to the different RO system components with the exception of the Interstage Booster Pump.

B. Panelboards shall meet the requirements of Section 262416 and the transformer shall meet the requirements of Section 262200. The panelboards and transformers shall be 316 stainless steel. Panelboards and transformer shall be mounted per Division 26 Panel Mounting Details on the side of each RO unit, adjacent to the instrumentation and PLC panels.

C. Wiring and conduit between the 480V panelboard, transformer, and 208Y/120V panelboard shall be provided by the MSS, in accordance with Sections 260519 and 260533.

D. The RO units and associated equipment shall be wired and functionally tested by the MSS prior to turning over the equipment to the Owner.

E. All electrical system components shall comply with Underwriters' Laboratory (UL) and the National Electrical Code (NEC).

2.14 CIP SYSTEM

A. The MSS shall supply a Clean-in-Place (CIP) System to chemically clean the membrane elements without removing them from the pressure vessels. The CIP System shall generally consist of two (2) CIP Tanks, one CIP pump, a cartridge filter vessel with 5-micron filters, an inline immersion CIP solution heater with thermostat, Venturi-type chemical eductors, and piping and accessories to connect the CIP system to the RO units. MSS shall provide the CIP System components and supervise installation by the Contractor.

B. Cleaning connections shall be made between the CIP System and the RO membrane units for all stages. Piping manifolds shall be provided on each membrane train for cleaning solution with appropriate valving to divert the cleaning solution into and out of the pressure vessels.

C. Complete CIP system for periodic chemical cleaning of RO membrane units.

1. Components of CIP system to be suitable for use with full range of expected cleaning solutions, including chemicals, pH range, and temperature range.

2. Capable of cleaning up to 33 pressure vessels (half of stage 1) at once.

3. Design of system to be in accordance with the membrane manufacturer's published technical service bulletins.

4. Operation of the CIP system will be manually initiated.

D. Manual isolation valves on the RO system shall be designed so that each Stage on the RO unit can be cleaned separately.

E. Prior to the loading of the membranes, the CIP system may be used for disinfection of the RO unit. During startup and testing, the CIP system shall be connected and operated to simulate membrane cleaning using permeate instead of a cleaning solution.

F. CIP Tanks

1. As specified in Section 434145 "Fiberglass Reinforced Plastic Tanks"

G. CIP Pump

1. The CIP Pump unit shall include the pump, motor, variable frequency drive, and appurtenances such as, but not limited to, couplings, guards and gauges. The materials shall be NSF 61 approved.

2. The pump, motor, and variable frequency drive shall be designed and built for 24-hour continuous service at any and all points within the required range of operation, without overheating, excessive vibration or strain.

3. The CIP pump shall be of the centrifugal, ANSI-style, single-stage horizontal type designed to pump RO cleaning solutions with pH between 2 and 10 pH units.

4. No carbon steel or cast-iron parts or fasteners shall be used on the pumps except at the motor coupling.

5. The CIP Pump will pump the CIP Solution from either CIP Tank to the RO Units or back to a CIP Tank as selected by the operator. The pump shall be designed to operate within the flow and head parameters specified herein. The pump shall be driven by a variable frequency drive to achieve the CIP Solution flow required for the corresponding stage of the CIP cycle.

6. The pump speed shall be controlled by the flow meter located on the CIP piping downstream of the CIP cartridge filter housing. The pump shall operate to maintain a CIP solution flow set point as shown on Instrumentation Drawings and as specified in Division 40.

7. Manufacturers:
   a. Flowserve
   b. Goulds
   c. Fairbanks
   d. Hydromatic
   e. Pentair
   f. Sulzer
   g. Grundfos
   h. Substitutions: As specified in Section 016000 "Product Requirements".

8. Pump Designation:
   a. P-4510

9. Performance and Design Criteria:
   a. Pump internal components compatible with full pH range which may be produced when performing CIPs according to the membrane manufacturer's recommendations, at least pH 2 to 12.

b. Design Flow Rate: 1,320 gpm.
c. Design Flow Total Dynamic Head: 150 feet.
d. Minimum Efficiency at Design Flow Rate: 75 percent.
e. Minimum Flow Rate: 620 gpm.
f. Minimum Flow Total Dynamic Head: 185 feet.
g. Minimum Efficiency at Minimum Flow Rate: 63 percent.
h. Maximum Flow Rate: 1,650 gpm.
i. Maximum Flow Total Dynamic Head: 114 feet.
j. Minimum Efficiency at Maximum Flow Rate: 65 percent.
k. NPSH Available: 50feet.
l. Service Liquid: Water.
m. Specific Gravity: 1.0.
n. Temperature: 10 to 31 C.
o. Temperature limit should take into account maximum temperature of CIP solution (Max = 113 degrees F/ 45 degrees C)
p. Maximum Pump Speed: 1,780 rpm.
q. Maximum Motor Speed: 1,800 rpm.
r. Motor Size: 75 hp

10. Casing:
    a. Design:
        1) One piece.
        2) End suction.
    b. Material: 316 Stainless Steel.
    c. End Connections:
        1) Flanged.
        2) Comply with ASME B16.5, Class 150.
        3) Configuration: Centerline top discharge or tangential side discharge.
    d. Connections: Gage, prime, air vent, and drain/flush.

11. Impeller:
    a. Design:
        1) Enclosed, reverse vane.
        2) Radial flow.
    b. Material: 316 Stainless Steel.
    c. Keyed to shaft with 316 stainless-steel locknut.
    d. Statically and dynamically balanced after assembly.
    e. Rotation of the impeller shall correspond to the pump discharge orientation as indicated on the Drawings

12. Pump Shaft:
    a. Type 316 stainless steel
    b. Tapered and keyed at both ends.

13. Bearings:
    a. Inboard radial-load bearing and outboard radial-thrust bearing of the anti-friction ball or tapered-spherical roller type, of ample size to carry all loads imposed under continuous operation without overheating.
    b. Comply with ABMA 9.
    c. Bearings shall exceed B10 life of 17,500 hours.
    d. Lubrication: Grease.

e. Furnish inboard and outboard bearing retainers, water deflectors, and fittings.
f. Bearing frame shall be designed so that the complete rotating element can be removed from casing without disconnecting piping.
g. The bearing frame shall be of cast iron construction, shall be rigidly fixed to the casing and back-head, shall be shoulder fitted and accurately centered.

14. Seals: Mechanical.

15. Motors:
    a. Motor shall be 75hp, 460V, 3 phase, TEFC and shall meet the requirements in Section 400593.23 "Low-Voltage Motor Requirements for Process Equipment."
    b. Variable frequency drive shall be provided with motor and shall be fully coordinated and compatible with the motor. VFD shall be provided in accordance with Section 262923 "Variable Frequency Motor Controllers."
    c. Motor shall be furnished with winding temperature detectors for each phase. The detectors shall be embedded bi-metallic temperature thermostat switches with normally closed contacts and leads terminating in the main conduit box.
    d. Motor shall be inverter-duty and severe-duty rated.

H. CIP CARTRIDGE FILTERS

1. Per Section 466153 "Cartridge Filters."

2. Installed downstream of CIP feed pumps to protect RO membranes from damage due to debris, particles, and/or silt that may be in the cleaning solution.

I. INLINE IMMERSION CIP SOLUTION HEATER

1. The CIP pump discharge piping shall be designed to accommodate a 200 kW, 480 volts, 3 phase, 150 lb flanged inline immersion heater. The flanged immersion heater shall have a built-in thermostat well and adjustable thermostat and shall be capable of heating 8,000 gallons of CIP solution (the contents of one CIP tank) from a minimum of 40 degrees F to a maximum of 104 degrees F within 8 hours. The MSS shall provide the immersion heater, the adjustable thermostat, and all associated controls.

2. Immersion heater shall be a 10-inch, Type 316 stainless steel flange immersion heater with a NEMA 4X terminal enclosure. Sheath material of the heating elements shall be chemically passivated Incoloy and have a maximum immersion length of 52 inches. Immersion heater shall be Model FLI27160X1452-T as manufactured by Wattco, Model NWHIS-24-200P-E4XX as manufactured by Chromalox, or ENGINEER approved equal.

J. VENTURI INJECTOR (CHEMICAL EDUCTOR)

1. The MSS shall provide two (2) 2-in PVDF venture type injector (chemical eductor) for the introduction of undiluted cleaning chemicals into the system. The MSS shall install the venturi injector per manufacturer's recommendations and as shown in the Drawings. Venturi injector shall be Penberthy LM-2, Mazzei 2081-PVDF or ENGINEER approved equal.

K. The following information shall be collected for the CIP system by the MSS provided instruments and devices:

1. Tank high-high level.

2. Tank high level.

3. Tank low level.

4. Tank low-low level.

5. Pump high temperature.

6. Pump discharge pressure (local gauge and high-pressure switch).

7. Solution pH.

8. Pump flow.

9. Solution temperature.

10. Cartridge filter differential pressure (local indicator).

11. CIP solution heater status

2.15 PERMEATE FLUSHING SYSTEM

A. The MSS shall supply a Permeate Flushing System to displace all the feed water and concentrate in all pressure vessels of the RO unit with permeate upon shutdown of the RO unit. The system shall meet the following requirements:

1. System shall flush the RO membrane unit with a volume of not less than 16,000 gallons of permeate (two to three times the empty pressure vessel volume) within not more than fifteen minutes.

2. Design to overcome any pressure drop imposed by the RO membrane unit and associated piping systems while flushing.

B. The Permeate Flushing System shall generally consist of one Permeate Flushing Tank; one Permeate Flushing Pump; and piping, valving, and accessories to connect the Permeate Flushing System to the RO units.

C. The MSS shall supply permeate flushing connections to the RO units to allow automatic flushing of the RO units in the event of a power outage and to enable automatic operator-initiated flushing of the RO units with permeate.

D. Permeate Flush Tank

1. As specified in Section 434145 “Fiberglass Reinforced Plastic Tanks”

E. Permeate Flushing Pump

1. The Permeate Flushing Pump unit shall include the pump, motor, variable frequency drive, and appurtenances such as, but not limited to, couplings, guards and gauges. The materials shall be NSF 61 approved.

2. The pump, motor, and variable frequency drive shall be designed and built for 24-hour continuous service at any and all points within the required range of operation, without overheating, excessive vibration or strain.

3. The Permeate Flushing Pump shall be of the centrifugal, ANSI-style, single-stage horizontal type designed to pump RO permeate.

4. No carbon steel or cast-iron parts or fasteners shall be used on the pumps except at the motor coupling.

5. The pump speed shall be controlled by the flow meter located on the permeate flush piping downstream of the Permeate Flushing Pump. The pump shall operate as described on Section 406196 "Process Control Descriptions".

6. Manufacturers:
   a. Flowserve
   b. Goulds
   c. Fairbanks
   d. Hydromatic
   e. Pentair
   f. Sulzer
   g. Grundfos
   h. Substitutions: As specified in Section 016000 "Product Requirements".

7. Pump Designation:
   a. P-4535

8. Performance and Design Criteria:
   a. Design Flow Rate: 1,320 gpm.
   b. Design Flow Total Dynamic Head: 150 feet.
   c. Minimum Efficiency at Design Flow Rate: 75 percent.
   d. Minimum Flow Rate: 620 gpm.
   e. Minimum Flow Total Dynamic Head: 185 feet.
   f. Minimum Efficiency at Minimum Flow Rate: 63 percent.
   g. Maximum Flow Rate: 1,650 gpm.
   h. Maximum Flow Total Dynamic Head: 114 feet.
   i. Minimum Efficiency at Maximum Flow Rate: 65 percent.
   j. NPSH Available: 50 feet.
   k. Service Liquid: Water.
   l. Specific Gravity: 1.0.
   m. Temperature: 10 to 31 C.
   n. Maximum Pump Speed: 1,780 rpm.
   o. Maximum Motor Speed: 1,800 rpm.
   p. Motor Size: 75 hp

9. Casing:
   a. Design:
      1) One piece.
      2) End suction.
   b. Material: 316 Stainless Steel.
   c. End Connections:

1) Flanged.
2) Comply with ASME B16.5, Class 150.
3) Configuration: Centerline top discharge or tangential side discharge.

d. Connections: Gage, prime, air vent, and drain/flush.

10. Impeller:
    a. Design:
        1) Enclosed, reverse vane.
        2) Radial flow.
    b. Material: 316 Stainless Steel.
    c. Keyed to shaft with 316 stainless-steel locknut.
    d. Statically and dynamically balanced after assembly.
    e. Rotation of the impeller shall correspond to the pump discharge orientation as indicated on the Drawings

11. Pump Shaft:
    a. Type 316 stainless steel
    b. Tapered and keyed at both ends.

12. Bearings:
    a. Inboard radial-load bearing and outboard radial-thrust bearing of the anti-friction ball or tapered-spherical roller type, of ample size to carry all loads imposed under continuous operation without overheating.
    b. Comply with ABMA 9.
    c. Bearings shall exceed B10 life of 17,500 hours.
    d. Lubrication: Grease.
    e. Furnish inboard and outboard bearing retainers, water deflectors, and fittings.
    f. Bearing frame shall be designed so that the complete rotating element can be removed from casing without disconnecting piping.
    g. The bearing frame shall be of cast iron construction, shall be rigidly fixed to the casing and back-head, shall be shoulder fitted and accurately centered.

13. Seals: Mechanical.

14. Motors:
    a. Motor shall be 75hp, 460V, 3 phase, TEFC and shall meet the requirements in Section 400593.23 “Low-Voltage Motor Requirements for Process Equipment.”
    b. Variable frequency drive shall be provided with motor and shall be fully coordinated and compatible with the motor. VFD shall be provided in accordance with Section 262923 “Variable Frequency Motor Controllers.”
    c. Motor shall be furnished with winding temperature detectors for each phase. The detectors shall be embedded bi-metallic temperature thermostat switches with normally closed contacts and leads terminating in the main conduit box.
    d. Motor shall be inverter-duty and severe-duty rated.

F. The following information will be collected for the RO permeate flush system by the Manufacturer provided instruments and devices:

1. Permeate flush tank level.

2. Permeate flush pump high temperature.

3. Permeate flush pump high discharge pressure.

4. Permeate flush pump flow.

5. Permeate Flush pressure

G. Controls for the Permeate Flushing System shall activate and partially close the Stage 1 Backpressure valve on the RO Unit being flushed to prevent excessive production of permeate during the flush thus reducing the amount of permeate available to flush Stage 2 and Stage 3 of the RO Unit.

H. Prior to the loading of the membranes, the permeate flush system shall be operated to simulate membrane rinsing using non-chlorinated water instead of permeate.

2.16 SOURCE QUALITY CONTROL

A. Section 014000 “Quality Requirements” for testing, inspection, and analysis requirements.

B. Provide certified standard factory inspection and wet testing of RO membrane elements using the ASTM standard test solution.

C. OWNER Witnessing:

1. The Engineer and Owner may elect to visit the MSS’s facility to witness fabrication, assembly, shop testing of equipment and systems, or QA/QC procedures.

2. Notify Owner at least 14 days before inspections and tests are scheduled.

3. Visits will be at Owner's expense, unless otherwise noted.

D. Certificate of Compliance: If fabricator is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.

1. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 EXECUTION

3.01 SHIPPING AND INSTALLATION

A. The membrane systems, associated equipment, instrumentation, and appurtenances shall be installed in strict accordance with manufacturers’ written instructions and recommendations and with the Contract Documents referenced herein.

B. All equipment, valves, piping, instrumentation, and wiring shall be labeled in accordance with the Contract Documents referenced herein.

C. The membranes shall not be installed until after a successful hydrostatic test and system flush has been completed.

D. The MSS shall provide the services of an experienced RO system installer to observe and supervise the installation of equipment and interconnecting piping.

E. The duties of the MSS representative will include the following for each item of equipment furnished. These are subject to all limitations and requirements directed by the ENGINEER or specified elsewhere.

1. Give all necessary instructions for proper unloading and installation and testing of the equipment.

2. Be present at the work at all times necessary for proper supervision.

F. The MSS shall provide the services of a factory representative to instruct and supervise the loading of membranes.

G. The grades of oil and grease for all pumps shall be in accordance with the recommendations of the manufacturer. Anchor bolts shall be set in accordance with the manufacturer's approved shop drawings.

3.02 SURFACE PROTECTION

A. All iron and steel surfaces shall be blast cleaned and painted in accordance with Section 099100 and 090690 before installation of the pressure vessels or membranes unless specified otherwise herein.

B. All prepainted purchased equipment shall be coated with an intermediate and final gloss coat of epoxy paint to match the remainder of the unit. An appropriate seal coat cover over the factory finish shall be applied first if recommended by the paint Manufacturer.

C. The complete painting system for sand blasted areas shall be submitted to the ENGINEER for review along with a letter confirming that the individual coats of paint are compatible with each other. A similar letter shall be submitted concerning the painting of prepainted equipment.

D. Samples of colors available for painted and plastic surfaces shall be submitted to the ENGINEER for approval. The unit shall then be furnished in the approved colors.

E. Machined or polished ferrous surfaces such as pipe flanges shall be provided with a temporary protective coating of a nondrying oil-type rust preventative compound.

F. Stainless steel shall not be painted.

3.03 FACTORY TESTING AND INSPECTION

A. The MSS shall notify the OWNER a week prior to shipment of the piping manifolds and support frames to allow OWNER to schedule a factory inspection, if desired.

B. Pressure vessels shall be hydrostatically tested at the factory at the full name plate working pressure.

3.04 FIELD TESTING AND INSPECTION

A. GENERAL

1. The Contractor shall facilitate testing, start-up and performance testing of the RO units. The MSS will lead the testing and is responsible for coordination with the MEM and PCSS to complete startup and testing.

B. FLUSHING

1. The Contractor shall be responsible for flushing all piping and process equipment prior to start up. Feed piping and pressure vessels shall be swabbed out with clean rags soaked in chlorine solution. Flushing shall be accomplished by flowing feedwater through the pumps and feed piping through empty pressure vessels, exiting through the concentrate line. Flushing shall continue until all air pockets have been removed from piping and pressure vessels and no chlorine can be detected.

2. The Contractor shall provide temporary piping to flush each unit as recommended by the MEM and as required to pass bacteriological tests.

C. HYDROSTATIC TESTING

1. All feed water piping up to the outlets for the pressure vessel feedwater connections shall be hydrostatically tested at 225-psi (150 percent of the design operating pressure) by installing plugs on the manifold outlets before connecting the pressure vessels. After the pressure vessels are connected, the interstage piping, concentrate piping and pressure vessels shall be tested at 225-psi and the permeate piping shall be tested at 150 psi. The tests shall be conducted by the MSS and witnessed by the Engineer prior to operational testing any of the new piping and equipment. Hydrostatic testing shall not commence until all trapped air has been removed from piping and pressure vessels. Pressure vessels, piping, and fittings that leak or show structural damage during or after the test shall be rejected.

D. PREOPERATIONAL AND START-UP TESTING.

1. The Contractor and the MSS shall develop and submit a plan to operate the ancillary facilities such as chemical feed systems, cleaning systems, instrumentation, controls, and electric power to functionally test the RO components. The tests, conducted by the MSS, shall be conducted without membranes installed and shall demonstrate the following:
   a. Check equipment and piping alignment and ensure there are no internal stresses.
   b. Calibrate all instrumentation and controls and set alarm limits and ranges. All field instruments must be re-calibrated in the field after installation by a factory representative of equipment.
   c. Check hydraulic systems and control to ensure proper operation.
   d. Check all electrical systems and control to ensure proper operation.
   e. The RO units and piping shall be disinfected, and the bacteriological tests shall be completed. After passing the bacteriological tests, the units shall be flushed. The MSS and Contractor shall provide all piping and connections for flushing.

2. After successfully demonstrating that the membrane treatment system and controls operate as a complete and functional system to the satisfaction of the Engineer, then and only with the approval of the Engineer will the MSS be allowed to load membranes and proceed with the startup test.
3. The startup test for each RO unit will include operational control of unit in combination with the other units.

E. 7-DAY MEMBRANE ELEMENT PERFORMANCE TESTS

1. The MSS shall be responsible for all costs associated with sample collection and analysis for the performance test.

2. Once the preoperational and startup tests have been successfully completed, the membrane treatment equipment and controls shall be operated, and adjustments shall be made to demonstrate that equipment operates as a complete and functional system. Each membrane treatment unit shall be operated for 7 days without interruption under the MSS's and MEM's supervision to verify that the required permeate water quality is being produced.

3. The 7-day membrane element performance test for the installed RO units may be performed concurrently and as part of the 30-day Membrane System Performance Test specified in 3.04.G.

4. The following data shall be manually collected and recorded every four hours by MSS operations personnel in addition to the data collected hourly by the HMI computer during the performance test. All of this data shall be available for trend analysis on the HMI computer.
   a. Overall Membrane System:
      1) Feed water temperature
      2) Feed water conductivity
      3) Feed water pH
      4) Feed water ORP
      5) Feed water Turbidity
      6) Permeate Conductivity
      7) Concentrate Conductivity
   b. Each Membrane Train:
      1) Feed water pressure
      2) Feed pump VFD speed
      3) Interstage pressure 1 (Stage 1 and 2)
      4) Interstage pressure 2 (Stage 2 and 3)
      5) Stage 3 feed pressure
      6) Concentrate pressure
      7) Concentrate valve position
      8) First stage permeate flow
      9) Second stage permeate flow
      10) Third stage permeate flow
      11) Concentrate flow
      12) First stage permeate pressure
      13) Second stage permeate pressure
      14) Total permeate pressure
      15) Permeate Conductivity
      16) Permeate pH
      17) Concentrate Conductivity

5. The following data shall be manually collected and recorded every shift (every 12 hours):
   a. Feed water SDI
   b. Antiscalant consumption
   c. Stage 1 permeate conductivity
   d. Stage 2 permeate conductivity

e. Stage 3 permeate conductivity
f. Total permeate conductivity
g. Stage 1-2 feed (interstage) conductivity
h. Stage 2-3 feed (interstage) conductivity
i. Concentrate conductivity
j. Stage 1 permeate pressure
k. Stage 2 permeate pressure
l. Total permeate pressure
m. Feed temperature
n. Permeate pH
o. Concentrate pH

6. The following membrane performance parameters will be plotted against total time of operation in hours and provided to the OWNER/ENGINEER daily:
   a. Total Skid – flux, water mass transfer coefficient, feedwater pressure, net driving pressure, pressure differential (i.e. difference between feedwater pressure and the concentrate pressure, salt passage based on conductivity
   b. First Stage – normalized flux, normalized water mass transfer coefficient, feedwater pressure, net driving pressure, pressure differential, normalized salt passage based on conductivity
   c. Second Stage – normalized flux, normalized water mass transfer coefficient, net driving pressure, pressure differential, concentrate pressure, normalized salt passage based on conductivity
   d. Third Stage – normalized flux, normalized water mass transfer coefficient, feed pressure, net driving pressure, pressure differential, concentrate pressure, normalized salt passage based on conductivity

7. Maintain an operations log of events, recording all unit outages and the reason for outage.

8. Refer to Section 466323.13 for additional water quality sampling requirements for the 7-Day membrane element performance test.

9. TDS must be analyzed by an approved method and cannot be calculated by the sum of ions. Prior to the start of performance testing, the MSS will take samples from the feed, permeate, and concentrate streams and have the samples analyzed for conductivity, TDS, and pH in order to develop correlations between these parameters.

10. The MSS shall provide a Test Report on an individual RO unit basis that provides a summary of the collected data and charts of water mass transfer coefficient, pressure differential, and salt passage by stage and in total. Required charts shall use MEM's normalization software as applicable. Report shall also include required water quality data. Report shall be submitted within 14 days of completion of the testing.

11. The ENGINEER will use the results of the laboratory water analyses to determine whether the membrane unit passes the performance testing requirements. If one of the unit's discrete water samples for the membrane product water fails to meet the required value listed in the column titled "Required Permeate Quality" of Table 466323.13-2 and the operational criteria specified in this Section, the performance test shall be extended and will be repeated until two (2) consecutive analyses are successfully completed. If the failed analysis is deemed to be an error, it will be ignored. After the second failed performance test, the OWNER has the right to deem the membranes being tested as not meeting the require-

ments of the Contract Documents. In the event the membrane elements cannot meet the performance test requirements, the OWNER may, at its sole discretion, take the following actions:

a. Terminate the performance test and exercise its options under the terms of the Agreement.
b. Allow the MSS to repeat the performance test with revised operating conditions or new membrane elements or models at no additional cost to the OWNER
c. Accept the original performance test results
d. Take other actions as negotiated with the MSS and/or MEM and allowed under the Contract Documents

F. 30-DAY MEMBRANE SYSTEM PERFORMANCE TEST.

1. After all equipment is operational and startup testing is completed, a 30-Day Membrane System Performance Test shall be conducted. A qualified representative of the MSS shall monitor and demonstrate the performance of all membrane units, make minor adjustments to the equipment, and to provide O&M training to the OWNER's operating staff.

2. The 7-day membrane element performance tests for the installed RO units (3.04.F above) and the 30-day Membrane System Performance Test may be performed concurrently.

3. If the RO System is completely shut down for any reason other than the following, the down time shall be added to the duration of the test. If the test is interrupted for the following reasons, the period elapsed while the plant is not operating shall be credited toward the contract period, but the 30-Day Test must be completed.
   a. Loss of feedwater delivered to the RO plant for reasons beyond the control of the Contractor.
   b. Loss of power to the RO System for reasons beyond the control of the Contractor.
   c. Inability of the Owner to accept the water produced by the RO System, for reasons beyond the control of the Contractor.

4. At the end of the 30-Day Test, the MSS's representative shall prepare a test report which shall include daily operating and normalized performance data for each day of the test. Submittal of the report and subsequent approval by the ENGINEER shall be required for substantial completion. Test reports shall be submitted in booklet form showing all field tests performed to adjust each component and all field tests performed to prove compliance with specified RO performance criteria. Each test report shall indicate final positions of controls. The test report shall include, as a minimum, the following for each unit of the RO system:
   a. Daily Performance Data:
      1) Date
      2) feed pH
      3) Antiscalant consumption
      4) Feed flow, pressure, conductivity, chloride, temperature
      5) Stage 1 Permeate Flow, pressure, conductivity and chloride
      6) Stage 2 Permeate Flow, pressure, conductivity and chloride
      7) Stage 3 Permeate Flow, pressure, conductivity and chloride
      8) Stage 2 Concentrate Flow, pressure, conductivity and chloride
      9) Stage 3 Concentrate Flow, pressure, conductivity and chloride
      10) Interstage booster pump differential pressure
      11) Recovery Rate

12) Skid Flow Balance
13) Skid Chloride Balance

b. Plot of the following normalized performance parameters daily. If not provided every day to the ENGINEER, the performance test shall be suspended. The salt passage can be based on chloride.
   1) Stage 1 Flux, Water Mass Transfer Coefficient, diff. P (DP), Salt Passage
   2) Stage 2 Flux, Water Mass Transfer Coefficient, diff. P (DP), Salt Passage
   3) Stage 3 Flux, Water Mass Transfer Coefficient, diff. P (DP), Salt Passage

c. Complete inorganic water analyses shall be performed during the 1st and 4th week of the performance test and will include all major ions as shown below. The tests shall be conducted on the feed, composite permeate and concentrate.

GenX	1,4-Dioxane	PFMOAA
PFCs(Note 1)	Calcium	Bicarbonate
Magnesium	Chloride	Copper
Sodium	Sulfate	Chromium
Potassium	Fluoride	Selenium
Barium	Iron	Silica
Cadmium	TDS	Strontium

Note 1: Perfluorinated compounds are defined as per- and polyfluorinated alkyl substances (PFAS) as determined by the solid phase extraction (SPE) liquid chromatography/tandem mass spectrometry (LC/MS/MS) method (EPA Method 537.1)

5. Acceptance of the test shall be based on the demonstrated ability of the plant and each RO Unit installed to meet all the following criteria consistently throughout the 30-Day Test.
   a. Finished water production of 5.14-mgd (3,571-gpm) made from each RO Unit in operation.
   b. Water quality parameters stated in specification Section 466323.13.
   c. All functional operating parameters stated in this specification.
   d. Demonstration of satisfactory Permeate Flush and CIP system operation using permeate in lieu of cleaning solutions.

6. If the membrane system does not meet the requirements of the performance demonstration testing, then the CONTRACTOR and manufacture shall make reasonable adjustments necessary to meet the performance requirements in accordance with the Specifications. After the completion of any changes, the 30-Day Test shall be restarted.

G. MEMBRANE ELEMENT PRE-INSTALLATION MEETING

1. Prior to the installation of the new membrane elements, the MSS shall conduct a membrane element pre-installation meeting with the CONTRACTOR and MEM representative to review the procedures for handling, installation, and flushing of the membrane elements within the membrane units. Representatives from the ENGINEER and the OWNER may also participate in the meeting. The MEM will provide the MSS with a membrane loading schedule for each unit based upon wet bench testing and other MEM guidelines.

H. MEMBRANE ELEMENT PRE-STARTUP MEETING

1. Prior to the initiation of the startup and testing activities, the MSS shall hold a coordination meeting with the MEM, CONTRACTOR, OWNER, and ENGINEER. This meeting shall

be held not less than 30 days prior to the anticipated start of the membrane installation process. It is the intent of this specification that the MEM assists the MSS with the development of the detailed startup and testing plan. This detailed plan shall include all anticipated flow rates; test durations; characteristics of the produced streams; methods of handling, managing, and disposing of the produced streams; sequence for flushing the preservative from the membrane elements, startup, and performance testing; as well as the schedule, procedures, and durations of each activity.

3.05 MSS'S FIELD SERVICES

A. The MSS shall be responsible for complete and fully functional installation of the equipment and other items specified under this section. See section 466323.13 for MEM field services requirements, as pertaining to membrane elements, installation, system start-up and operation.

B. The MSS shall provide a minimum of five days of on-site services during the startup (commissioning) of the system equipment and system. A day of on-site service shall be defined as an 8-hour period of time.

C. The MSS shall provide a minimum of five days of on-site services during performance testing of the system. A day of on-site service shall be defined as an 8-hour period of time.

D. On-site supervision shall, at a minimum, include the following:

1. Confirmation field piping to and from the RO membrane system equipment is visually correct.

2. Supervision of the loading of the RO membrane elements.

3. Confirmation that all instruments, devices, remote I/O panels, etc. are communicating properly with the RO system control panel prior to startup.

4. Cross-check analog and digital instruments (where applicable) to confirm the instruments are reading properly.

5. Coordinate with the overall systems integrator to ensure proper communications between the RO membrane system and the facility-wide SCADA system.

6. Provide training for the operations staff.

E. The duties of the MSS on-site supervisor shall, for each subsystem provided by the MSS, include at a minimum:

1. Provide necessary instructions for proper unloading, installation, and testing of RO membrane system equipment.

2. Be present during all phases of work to ensure proper supervision is provided.

3. Coordinate with membrane manufacturer to ensure proper supervision of the membrane element loading process is provided.

F. Upon successful completion of system installation, a Notice of Completed Installation will be issued by the Contractor.

3.06 CONTROL SYSTEM PROGRAMMER'S FIELD SERVICES

A. The MSS shall provide for the field services of the control system PLC and HMI programmer during installation, startup, and testing of the RO systems and associated equipment. These services shall include the on-site presence of a qualified PLC and HMI programmer to assist in any required changes in the controls programming and integration of the membrane systems with the Plant Control System. The PCSS will be available during these performance tests to assist with any required changes to the controls programming and integration under his responsibility, that may affect the operations of the membrane system.

3.07 TRAINING

A. The MSS shall provide training of the OWNER's operations and maintenance staff. Training shall consist of a minimum of forty (40) hours of training on the operation and maintenance of the membrane system and ancillary components, including the control systems.

B. The manufacturers of the other equipment provided under this specification shall provide training of the OWNER's operations and maintenance staff.

3.08 OPERATIONAL SUPPORT SERVICES

A. Operational Support Services shall include a minimum of four quarterly visits per year to the RO System by a qualified reverse osmosis serviceman from the MSS or membrane supplier. The warranty engineering services shall begin after the successful completion of the 30-Day Membrane System Performance Test and end one year (365 calendar days) after the successful completion of the 30-Day Test. The RO System equipment shall be inspected with the OWNER and his designated ENGINEER to review the performance of the plant and equipment, the O&M procedures and records, and the status of all outstanding warranty items.

B. Operating and performance parameters shall be verified, and potential problems shall be discussed with the OWNER and his designated ENGINEER. During the warranty service period, observation of maintenance operations by the OWNER designated personnel, and the instruction of said personnel in the details of maintenance shall be provided. The cost of the one-year warranty engineering service shall be included in the contract price.

END OF SECTION 466323

Section 466323.13 - Reverse Osmosis Membrane Elements

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SECTION 466323.13 - REVERSE OSMOSIS MEMBRANE ELEMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. The Membrane Element Manufacturer (hereinafter referred to as "MEM") shall furnish to the Membrane System Supplier (MSS) new membrane elements, inter-element connectors, related appurtenances, and other services described herein to produce the required quantity and quality of permeate from the specified feed water quality in accordance with the requirements of the Contract Documents. Each of the eight membrane train consists of 114, 8-inch diameter, 8-element long pressure vessels arranged in a 66:32:16 array and has a permeate production capacity of 5.14 million gallons per day (mgd).

B. The MEM shall supply the required number of membrane elements of one of the models of membrane elements identified in Table 466323.13-1. The MEM may also propose an alternate RO membrane element model, or a hybrid of different elements, provided that all membranes meet the Required Membrane Product Water Characteristics identified in Table 466323.13-2 at the time of Bid submittal, as well as all other requirements defined herein. Refer to Section 466323.00 for a description of MSS-provided equipment and services under this contract.

C. The MEM shall provide the values for all items requested in Attachment A to this Specification Section and submit these during the shop drawing review submittal process.

D. Under no circumstances shall the total dissolved solids (TDS) concentration of the total permeate stream exceed 10 mg/L for any of the operating conditions identified in Attachment A for membranes operating less than 365 days.

E. Under no circumstances shall the rejection of per-fluorinated compounds or 1,4-Dioxane be less than the rejection percentages listed in Table 466323.13-2 for any of the operating conditions identified in Attachment A, unless the concentrations of these contaminants in the permeate are below detectable levels. The list of per-fluorinated compounds required to be tested and the acceptable analytical methods is provided in Table 466323.13-2.Related Requirements

1. Section 013300 "Submittal Procedures" for submittals requirements.
2. Section 017700 "Closeout Procedures" for submitting warranties.
3. Section 017900 "Demonstration and Training" for training requirements for OWNER staff.
4. Section 466323 "Reverse Osmosis Membrane Equipment" for Membrane System Supplier (MSS) scope of work.

1.03 QUALIFICATIONS

A. The MEM shall provide documentation of installations in the United States using the offered membrane element model(s), or elements of similar membrane materials of construction which

may be considered predecessor membrane element models to those being offered. Documentation shall note time in service since beneficial use and aggregate permeate production capacity for each installation.

B. The MEM shall provide suitable documentation that the MEM has a minimum of five (5) years of experience in the manufacture and supply of membrane elements for the treatment of feed waters having water quality characteristics similar to those identified in Table 466323.13-2.

1.04 PROPOSED SYSTEM CONFIGURATION

A. The proposed final system configuration will consists of up to eight (8) RO trains treating surface water from a conventional treatment plant using pre-oxidation, coagulation, flocculation, clarification, granular media filtration, scale inhibitor and 5-micron cartridge filtration. Scale inhibitor compound is subject to change.

B. The RO trains are to be three-stage systems with a 66:32:16 pressure vessel array and a maximum permeate production rate of 5.14 mgd per train. The 8-inch diameter pressure vessels have a maximum working pressure rating of 300 psi at a temperature of 120 F. Each pressure vessel will be designed to receive eight (8) membrane elements in series, each element shall have a nominal diameter of 8-inches and a nominal length of 40-inches. Each pressure vessel will equipped with a permeate sample tap.

C. The RO trains will have an interstage booster pump between stage 2 and 3 and can impose a backpressure on the Stage 1 permeate to balance the flux rates between Stage 1, Stage 2, and Stage 3.

D. Chemicals to be used for cleaning may include low pH, high pH and proprietary cleaners, biocides, reducing agents and/or disinfectants as offered by American Water Chemicals, Avista, or PWT, and are subject to change. The MEM shall consult with Engineer for alternate chemicals to be used for cleaning.

1.05 SUBMITTALS

A. For the membrane element model to be furnished, the following information shall be submitted during the shop drawing review submittal process.

1. Model, material of construction, and number of membrane elements.
2. Effective membrane area per membrane element.
3. Maximum and average product water flux rate in total and by stage.
4. Design feed pressure for all potential operating conditions identified in Attachment A of this specification. The MEM shall take into account the hydraulic losses through the membrane system piping, manifolds, and feed/interstage/concentrate ports.
5. Recommended first stage permeate backpressure and third stage interstage boost pressure and flow, such that the lead element flux rate for each stage is within the manufacturer's published limits and the tail element cross-flow and beta factor for each stage are within the manufacturer's published limits.
6. Evidence of membrane performance based on specific performance predictions using Membrane Element Manufacturer-specific computer software and the projected raw water specified herein. A clear indication of all given and assumed design considerations shall be provided. Multiple sets of projections shall be prepared as delineated in Attachment A. Projections shall be prepared for the projected feed water quality conditions and for

membrane element ages of 0, 1, and 3 years (or appropriate flow factors to simulate membrane element ages of 0, 1, and 3years). Submission of individual membrane performance projections for all potential operating condition delineated in Attachment A is required during shop drawing review.

7. The design interstage, concentrate, and product water quality parameter concentrations including, but not limited to alkalinity, calcium hardness, total dissolved solids, sulfate, and chloride shall be based on the projected feed water characteristics.
8. Complete physical characteristics of all components to be furnished including, but not limited to, membrane elements, net effective membrane area, external wrap, brine seals, o-rings, inter-element connectors, permeate adapters, storage solution, etc. Materials of construction and dimensional information shall also be provided for each component.
9. Recommended guidelines, if any, on antiscalants or dispersants to use with the membranes. Guidelines shall include a list of all known antiscalant products that are compatible with the MEM's specific membrane elements to be used in this project or that are compatible with the described raw water supplies. During the shop drawing review, the MSS/MEM shall also provide the Engineer with a list of all known antiscalant products that are incompatible with the MEM's specific membrane elements to be used in this project or that are incompatible with the described raw water supplies.
10. Membrane characteristics for the furnished membrane model including product water flux rate, life expectancy, maximum allowable feed pressures, feed channel pressure loss, and other appropriate information including all assumptions and standard conditions.
11. Submit the complete operating manual for the proposed membrane element model as specified further in Part 3.
12. MEM's printed instructions for the handling, storage, installation, maintenance, pickling, and cleaning of the membrane elements.
13. A list of recommended cleaning procedures and cleaning solutions for inorganic fouling, organic fouling, and bacterial fouling conditions, with detailed instructions for preparing the cleaning solutions and including a list of specific cleaning, biocides, and disinfection compounds that should not be used. Provide storage and preservation procedures for short term and long-term storage periods.
14. One (1) digital copy of the MEM's standard computer software package that was used to generate the membrane performance projections.
15. One (1) digital copy of the MEM's standard computer software for calculating and generating reports of normalized operating data for each membrane train.
16. A complete listing of all parameters required for normalization of system performance.
17. A complete listing of all parameters required for warranty purposes.
18. The MEM's standard wet bench test procedures for the selected membrane element model. The test procedures shall clearly indicate the temperature, feed pressure, feedwater composition, recovery, etc. for each test.
19. Provide storage and preservations procedures for the selected membrane element model including specific preservation solution chemical composition and expected effective service life prior to degradation. In the event storage and preservation procedures vary with storage duration, provide appropriate guidance.
20. A list of recommended spare parts and tools for the membrane elements. Include the manufacturer's part number and current pricing for each item.
21. Chlorate, chlorite, chlorine dioxide, free chlorine and combined chlorine tolerance for the selected membrane element. Tolerance shall be presented in terms of maximum ppm-hours aggregate exposure and in terms of a maximum instantaneous concentration for each chemical.
22. Other relevant information to the application of the membranes.

1.06 QUALITY ASSURANCE

A. To the greatest extent possible for each unit of work, the MEM shall provide products or materials of a singular generic kind from a single source. The word "Products," as used herein, is defined to include purchased items for incorporation into the work, regardless of whether specifically purchased for this project or taken from the MEM's stock of previously purchased products. The word "Materials," as used herein, is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined, or otherwise fabricated, processed, installed, or applied to form units of work. Where more than one choice is available as options for the MEM's selection of a product, material, or equipment, the MEM shall select an option which is compatible with other products or materials already selected. Compatibility is a basic general requirement of product/material selections.

1.07 MEMBRANE ELEMENT GENERAL WARRANTY

A. The MEM shall warrant the materials and workmanship for the membrane elements as well as the membrane element performance, as described herein.

B. Refer to General Conditions and the Supplementary General Conditions of the Contract Documents for additional warranty requirements.

1.08 MEMBRANE ELEMENT PERFORMANCE WARRANTY

A. The MEM shall warrant the performance of the membrane elements provided in accordance with the requirements described herein and per the General Conditions and the Supplementary General Conditions of the Contract Documents, for a period of three (3) years, commencing upon the successful completion of the 7-day Membrane Element Performance Test for the corresponding RO unit. This shall include meeting the minimum removal rates for all target constituents identified in Table 466323.13-2.

1. The MEM agrees to the complete membrane element replacement described herein if the membrane elements fail to meet the performance requirements during the first year of operation after the completion of the 7-day Membrane Element Performance Test. The MEM shall remove the failed membrane elements and replace them with new elements, meeting all requirements specified herein, at no cost to the OWNER.

2. If it is necessary to replace membrane elements during the second and third year of the warranty period, the MEM must supply and install new membrane elements at a prorated price according to the following calculation:
   a. The prorated membrane element replacement price is equal to the membrane element replacement price provided with the shop drawings multiplied by a prorated factor.
   b. The prorated factor is calculated: (36 - length of service, in months) / 36
   c. The membrane element replacement price shall be valid for the term of the Warranty.

B. The membrane elements provided under this contract shall be warranted to produce the specified quantity (Table 466323.13-3) and quality (Table 466323.13-2) of permeate from the specified feed water quality (Table 466323.13-2) at the specified permeate water recovery rate (Table 466323.13-3), at the specified transmembrane pressure (Table 466323.13-3), and at the specified temperature (Table 466323.13-2) for the term of the warranty.

C. In the event that actual feedwater conditions differ from the values presented in Table 466323.13-2, the permeate quality and feed pressure requirements for membrane element performance warranty purposes shall be correspondingly determined using the MEM's standard computer software package submitted for this project when generating membrane performance projections. Actual membrane element age shall be taken into account as appropriate. Refer to Table 466323.12-2 for additional clarifications.

1.09 ADMINISTRATION OF WARRANTY

A. The Owner agrees to notify the MEM, the MSS and Contractor, in writing of any warranty claim (i.e. material and workmanship or element performance). The claim shall be described in detail and be supported by operational and water quality data as appropriate.

B. The MEM agrees to acknowledge receipt of the warranty claim within seven (7) business days of receiving the claim and describe the MEM's proposed corrective action(s).

C. The MEM agrees to repair or replace membrane elements to restore performance within thirty (30) calendar days of receipt of a valid warranty claim.

D. The MEM shall have the right to request the Owner to have the flow meters and pressure gauges associated with each membrane skid calibrated on an agreed upon, reasonable frequency.

E. In the event the MEM fails to make corrective action(s) promptly, the Owner reserves the right to perform the corrective actions and the MEM, the MSS and the Contractor shall be liable to the Owner for the cost of these corrective actions. The extent of the MEM's liability shall not exceed the prorated membrane replacement cost.

1.10 PAYMENT TERMS

A. The procedures for payment from Owner to Contractor as defined in Specification Section 012900 are supplemented and superseded by the following conditions for the work required of this specification section. The Owner will release progress payments to the Contractor per Section 012900 for up to 75 percent of the total scheduled value to furnish and install membrane system equipment, per this section. Payment for the remaining balance (25 percent) will be provided following the Engineer's written acknowledgement of successful completion of the 7 day Membrane Element performance testing.

PART 2 PRODUCTS

2.01 MEMBRANE ELEMENTS

A. The furnished membrane elements shall be non-cellulosic, polyamide derivative, spiral-wound, thin film, composite membranes with a nominal diameter of 8-inches and a nominal length of 40-inches. The membrane elements shall be complete and suitable for installation in a standard 8-inch diameter x eight (8) element pressure vessels. The furnished membrane elements shall have filament wound fiberglass shells and shall be supplied with all necessary brine seals, inter-element connectors, o-rings, and permeate adapters suitable for use in the corresponding pressure vessels. The furnished membrane elements shall be NSF/ANSI Standard 61 certified.

B. Each membrane element furnished shall have a nominal membrane surface area of 400 square feet (ft^2), a feed channel spacer thickness of 31 mils or greater, and a maximum operating pressure of not less than 600 psi. Membrane elements furnished shall be as listed in Table 466323.13-1 below or the latest generation at the time of the bid:

TABLE 466323.13-1
RO MEMBRANE ELEMENTS

Membrane Element Manufacturer	Element Model
Toray	TMG20D-400
LG Chem Nano/H2O	LG BW 400 ES
Suez	AK -400 34 H
Lanxess	Lewabrane RO B400 ULP ASD

TABLE 466323.13-2
RO MEMBRANE SYSTEM PERFORMANCE TESTING
PROJECTED AND REQUIRED WATER CHARACTERISTICS

Parameter	Units	Projected Feed Water Quality	Required Permeate Quality[1]
Calcium	mg/L	7	< 5
Magnesium	mg/L	3	< 1
Sodium	mg/L	28	
Potassium	mg/L	4	
Ammonium	mg/L	0.3	
Barium	mg/L	0.03	
Strontium	mg/L	0.01	
Bicarbonate	mg/L	12	< 5
Sulfate	mg/L	9	
Chloride	mg/L	55	<10
Fluoride	mg/L	0.2	
Nitrate	mg/L	0.1	
Silica	mg/L	5	
pH	Units	6.4	
Temperature Range	°C	10-30	
Total Dissolved Solids (sum of ions)	mg/L	125	< 10
Silt Density Index (15 minutes @ 30 psi)	-----	5	
Turbidity	NTU	0.30	
Total Organic Carbon	mg/L	3.4	
Color	CU	5	
Chlorine Dioxide	mg/L	0.5	
GenX	ng/L	10 - 50	Note 2, 6
PFMOAA	ng/L	100-1,000	Note 3, 6
Per-fluorinated Compounds (PFCs)	ng/L	100-1,000	Note 4. 6
1,4-Dioxane	µg/L	1.5 - 3	Note 5, 6

Notes:
1. Water quality parameters listed above for which no value is entered in the required permeate quality columns shall meet federal and state regulations for drinking water, with the exception of pH.
2. Minimum rejection rate of 95 percent or concentration below analytical method detection limit (DL). The DL for the analytical method used to measure Gen-X shall be not greater than 5 ng/L.
3. Minimum rejection rate of 90 percent or concentration below analytical method DL. The DL for the analytical method used to measure PFMOAA shall be not greater than 5 ng/L.
4. Minimum rejection rate of 90 percent or permeate concentration below analytical method DL. Per-fluorinated compounds are defined as per- and polyfluorinated alkyl substances (PFAS) as determined by the solid phase extraction (SPE) liquid chromatography/tandem mass spectrometry (LC/MS/MS) method (EPA Method 537.1) and Isotope Dilution Anion Exchange Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (EPA Method 533).
5. Minimum rejection rate of 75 percent for water temperatures above 25-deg C, minimum rejection rate of 80 percent for water temperatures below 25-deg C; or concentration below analytical method DL. The DL for the analytical method used to measure 1,4-Dioxane shall be not greater than 0.07 µg/L.
6. If feedwater quality falls outside of the projected range, required permeate quality shall meet minimum rejection rates or be below analytical detection.

TABLE 466323.13-3
SYSTEM DESIGN CRITERIA FOR RO TRAINS

Parameter	Units	Value
Reverse Osmosis Train	Name	Train 1 - 8
Permeate Production Capacity	mgd	5.14
Permeate Water Recovery Rate	Percent	85-92
Number of Stages in RO Train	Number	3
Number of Pressure Vessels (Stage 1)	Number	66
Number of Pressure Vessels (Stage 2)	Number	32
Number of Pressure Vessels (Stage 3n)	Number	16
Nominal Membrane Element Diameter	Inches	8
Nominal Membrane Element Length	Inches	40
Number of Membrane Elements per Pressure Vessel	Number	8
Number of Membrane Elements (Stage 1)	Number	528
Number of Membrane Elements (Stage 2)	Number	256
Number of Membrane Elements (Stage 3)	Number	128
Number of Membrane Elements (Total to be provided for 8 RO Trains)[1]	Number	7296
Average Permeate Flux Rate	gfd	14.1
Maximum Permeate Flux Rate (Maximum Allowable for Individual Membrane Element)	gfd	Manufacturer's Maximum Recommended Value
Feed Pressure	psi	Maximum of 150 psi
Total Permeate Backpressure	Psi	10
Stage 1 Permeate Backpressure	Psi	As Required to Ensure the Flux of an Individual Membrane Element does not Exceed the Manufacturer's Maximum Recommended Value.
Interstage Boost Pressure	Psi	As recommended by MEM
Interstage Flow	Gpm	Maximum meeting all Manufacturers Maximum Recommended Flux Rates
Active Membrane Surface Area per Membrane Element	ft^2	400

[1] Refer to Section 004213 – Form of Proposal, Bid Bond, MMBE Affidavits for final number of RO Trains to be provided.

2.02 MEMBRANE ELEMENT BENCH TESTING PROTOCOL AND TEST REPORT

A. For each individual membrane element to be supplied, the MEM shall perform the MEM's specific conformance test. For a portion of the elements as specified below, MEM shall use their standard wet bench testing protocol including testing conditions and feedwater solute concentration. The MEM shall test at least ten (10) percent of all membrane elements to be provided. Subsequent to the testing and prior to membrane element delivery to the job site (the WTP), the MEM shall submit a Certificate of Analysis for the wet tests and a Certificate of Conformance for the dry elements.

B. Quality Control Testing Protocol shall be submitted sixty (60) days prior to the Testing. The protocol shall clearly indicate the proposed testing conditions including feed water composition, recovery rate, and pressure. The proposed testing conditions shall meet the requirements of this Section.

C. The Membrane Wet Test Data Report shall be submitted prior to membrane element loading. The test report shall provide the following information for each membrane element tested:

1. Membrane element serial number.
2. Date of test.
3. Test conditions: temperature, pressure, feed water, composition, recovery.
4. Test results: salt rejection, membrane productivity in gpd.
5. Square feet of active membrane area per membrane element.

D. Based upon the information provided in the MEM test report, the MEM shall provide the recommended load schedule. The recommended load schedule shall indicate the recommended position of each individual membrane element, identified by serial number, within each pressure vessel of each skid. In the event the MEM recommends a random load, the MEM shall clearly indicate as such in the test report.

PART 3 EXECUTION

3.01 MEMBRANE ELEMENT MANUFACTURER'S PROVIDED SERVICES

A. MEM shall be responsible for the performance of the membrane elements and their ability to meet the specified productivity and water quality goals.

B. The MEM shall coordinate with and assist the MSS with process and design criteria relating to the membrane process.

C. MEM shall be responsible for services associated with the membrane element pre-installation meeting, startup, element performance testing, and training. The MSS shall be responsible to coordinate and attend this meeting onsite.

D. Review and provide comments on all related O&M manual submittals, provided for the MSS, to verify conformance with the MEM's operating requirements.

E. Provide the Owner with a complete operating manual including: element data sheets; field data collection worksheets; performance projections; proper instructions for installing the membranes; proper instructions for cleaning the membrane elements; proper instructions for handling, storing, preserving and flushing preservatives from the membranes; taking and recording data, and calculating normalized system performance. Instructions shall be specific to the Owner's Facility and equipment. Generic instructions shall not be acceptable.

F. Normalize Owner provided operating data and prepare and submit a monthly report on system performance for a period of one (1) year after the successful completion of the membrane element performance test for the first RO unit and each RO unit afterwards. In each monthly report, the MEM shall alert the Owner to any operational problems that may impact the system warranty. The Owner will provide the data directly to the MEM in the form of an electronic spreadsheet file or an electronic file created with the MEM's data normalization software.

G. Keep the Owner informed of any changes in the operation and maintenance manual that may develop during the term of the warranty.

3.02 COORDINATION OF THE MEMBRANE SYSTEM SUPPLIER (MSS) WITH THE MEMBRANE ELEMENT MANUFACTURER (MEM)

A. MSS will procure all required membrane elements from MEM and will provide required coordination. The selection of the specific membrane element shall be by the MSS and agreed to by the Contractor. The MSS and MEM shall coordinate delivery of the membranes. To that end, the Contractor and MSS shall provide an authorized representative as a contact for the MEM. This representative shall receive correspondence relating to the progress of the membrane element supply contract.

B. The MEM shall coordinate its services with the MSS, Contractor and any designated sub-contractors.

C. The required on-site services of the MEM shall include the following:

1. Inspection of the membrane elements at the delivery site prior to unloading;

2. Inspection of the MSS/Contractor's membrane element storage area and practices.

3. Inspection and certification of the membrane element installation into the membrane trains prior to membrane system performance testing;

4. Witnessing the membrane element 7 day performance test; and,

5. Providing operator training.

D. The MSS shall provide the MEM with a twenty-one (21) calendar days advanced notice, via certified mail, prior to the need for on-site services. A copy of the request for on-site services letter shall be provided to the Engineer.

3.03 TRANSPORT AND DELIVERY OF THE MEMBRANE ELEMENTS

A. The delivery of the new membrane elements to the project site by the MEM includes providing transport, insurance, and delivery.

B. The MEM shall provide written instructions to the MSS and Contractor, for the storage of the membrane elements.

3.04 INSPECTION OF MEMBRANE ELEMENTS PRIOR TO UNLOADING

A. Prior to unloading of the membrane elements by the MSS, the MEM and the MSS shall jointly inspect the condition of each product.

1. The MSS shall record in writing the products transferred to the MSS's or Contractor's care.

2. The MSS will not unload membrane elements to be returned to the MEM for replacement unless necessary to expedite return shipping.

3.05 MEMBRANE ELEMENT PRE-INSTALLATION MEETING

A. Prior to the installation of new membrane elements, the MEM will attend a membrane element pre-installation meeting with the Contractor and MSS to review the procedures for handling, installation, and flushing of the membrane elements within the membrane units. Representatives from the Engineer and the Owner may also participate in the meeting. The MEM shall provide the MSS with a membrane loading schedule for each unit based upon wet bench testing and other MEM guidelines.

3.06 MEMBRANE ELEMENT PRE-STARTUP MEETING

A. Prior to the initiation of the startup and testing activities, the MSS will hold a coordination meeting with the Contractor, Owner, and Engineer. This meeting shall be held not less than 30 days prior to the anticipated start of the membrane installation process. It is the intent of this specification that the MEM assists the MSS with the development of the detailed startup and testing plan. This detailed plan shall include all anticipated flow rates; test durations; characteristics of the produced streams; methods of handling, managing, and disposing of the produced streams; sequence for flushing the preservative from the membrane elements, startup, and performance testing; as well as the schedule, procedures, and durations of each activity.

3.07 MEMBRANE ELEMENT PERFORMANCE TEST

A. Following the installation of the new membrane elements in each RO train by the MSS, the MSS with the assistance from the MEM and collaboration of the Owner and the Contractor shall conduct a 7-day Membrane Element Performance Test for each RO unit to confirm the membrane elements perform as required. Operating conditions for the Membrane Element Performance Test shall be as follows:

1. Permeate production rate per RO Unit = 5.14 mgd or 3,571 gallons per minute (gpm)
2. Permeate water recovery rate = 92%
3. Feed water quality as identified in the "Projected Feed Water Quality" column of Table 466323.13-2 during the performance test of the corresponding RO train.
4. Permeate quality shall be as listed in the column titled "Required Permeate Quality" of Table 466323.13-2.
5. Producing the required permeate water production at a feed pressure at or below the maximum transmembrane pressure stated in Table 466323.13-3
6. Meeting all testing condition functional operating parameters specified in this Section

B. Acceptance of the Membrane Element Performance Test for each RO train shall be based on the membrane system's flow, pressure and water quality performance during the corresponding testing period meeting the operating criteria provided by the MEM.

C. In the event that actual feedwater conditions differ from the values presented in the "Projected Feed Water Quality" listed on Table 466323.13-2, the performance criteria (i.e. required permeate quality and feedwater pressure) shall be correspondingly determined using the MEM's standard computer software package submitted for this project when generating membrane performance projections .

D. In the event that actual operating conditions (i.e. permeate production or recovery) differ from the values presented above due to equipment limitations not related to the new membrane

elements, the performance criteria (i.e. required permeate quality and feedwater pressure) shall be correspondingly determined using the MEM's standard computer software package submitted for this project when generating membrane performance projections .

E. The 7-day Membrane Element Performance Test for the installed RO units may be run concurrently for more than one RO unit and as part of the 30-day Membrane System Performance Test described in Section 466323.00.

F. Performance testing of the membrane system will be responsibility of the MSS; however, the MEM shall provide guidance and assistance throughout the testing period. The MSS shall schedule the performance testing with the MEM, Contractor, Owner, and Engineer. Final acceptance of the membrane elements will be contingent upon successful completion of the performance testing.

G. Each membrane unit will be tested for 7 consecutive days, 24 hours per day as specified in Section 466323.00, subsection 3.04.F. Up to two units may be tested on a concurrent basis. During this 7-day test, the membrane unit may be stopped and restarted two times as required to meet operational constraints at the water treatment plant. The system cannot be shutdown at any point during the performance test to complete a membrane cleaning. The MSS will be fully responsible for every aspect of the performance test. Representatives of the MSS shall be on-site for the entire duration of each membrane element performance test. The MEM shall have a representative on site for a minimum of 2 working days at the beginning of the 7-day membrane element performance testing period.

H. The MSS and MEM representative will perform the following during the performance test:

1. Be present on-site for the startup and initial operation of each membrane unit.
2. Be present on-site whenever membrane elements are installed in the system. Supervisory representatives from the MSS shall be onsite during the installation of the new membrane elements to direct and supervise Contractor's staff.
3. Perform the two (2) separate sampling episodes for each membrane unit to confirm samples are collected from the proper locations and were not contaminated during collection. One sampling episode shall be conducted after 48 hours of operation and one at the end of the 7-day membrane element performance test. Sampling episodes shall not be conducted until the membrane train has reached stable operating conditions. Samples shall be analyzed by an Owner/Engineer approved analytical laboratory. The MSS shall be responsible for all costs associated with sample collection and analysis.
4. The MEM and the MSS shall review and provide comments on procedures for correlating conductivity and TDS data for normalization of membrane system performance data.
5. The MSS, with input from the MEM, shall monitor the performance of the membrane units, independently normalize system performance data, and advise the Owner and Engineer of any potential membrane performance issues and/or membrane system operational issues which may impact membrane performance.
6. The MEM shall be available by telephone 24 hours/day during the performance test to respond in person to operational emergencies associated with the membranes.
7. Take corrective action as required.
8. The MSS will prepare the membrane performance test report to be submitted to the Owner and Engineer for review and approval.

I. Acceptance of the performance test for an individual membrane unit shall be based on the demonstrated ability of that membrane unit to meet all of the criteria listed in Section 466323.13, 3.07, consistently throughout the 7-day test.

J. If the membrane unit does not meet the requirements of the membrane element performance test, then the Contractor, MSS and MEM shall make reasonable adjustments necessary to meet the performance requirements in accordance with the Specifications. After the completion of any adjustments, the 7-Day Test shall be restarted.

3.08 MEMBRANE SYSTEM OPERATIONS SOFTWARE

A. The MEM shall supply the Owner with its standard computer software for calculating and generating reports of normalized operating data for each membrane unit. Final payment will not be made prior to submittal of the software.

B. Software, installed and tested a minimum 14 days prior to the first membrane element performance test, shall be capable of running on a PC or compatible computer with the latest version of Windows operating system.

C. The MEM shall provide the services of a qualified technical representative to be present on-site for a minimum of one (1) eight-hour day to instruct the Owner's personnel in the proper operation and use of the membrane system operations software. MEM shall provide the Owner PowerPoint slides, training guide books, and related videos. Onsite training will be videotaped by Owner for future reference.

D. The normalization software shall be installed onto the HMI computer(s) and set up for use during the 7-day membrane element performance tests and the 30-day membrane system performance test. The normalization software shall be used to process all data during the tests on a daily basis and generate normalized performance curves for the test report(s).

E. Software shall be capable of outputting data in a *.csv format or other format that allows the Owner to export data into an Excel or similar spreadsheet.

3.09 MEMBRANE SYSTEM TRAINING

A. The MEM shall provide a qualified technical representative for no less than four (4) hours per day, on two separate days to instruct the Owner's personnel on RO membrane theory and the proper operation, installation, sampling, cleaning, and maintenance for the membrane system for a minimum of eight (8) hours of training. The MSS or Contractor shall coordinate the dates of the training with the Owner and the MEM per the approved plant construction schedule.

B. The MEM shall provide the services of a qualified technical representative to be present on-site for a minimum of two (2) days to assist with the first membrane train cleaning procedure.

3.10 PROJECT CLOSEOUT

A. The MEM, prior to requesting final payment, shall obtain and submit the following items to the MSS for transmittal to the Owner:

1. Written guarantees and warranty, where required.

2. Releases from all parties who are entitled to claims against the subject project pursuant to the provisions of law.

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ATTACHMENT A
REQUIRED MEMBRANE PERFORMANCE PROJECTION INFORMATION

Parameter	**Units**	**Membrane Performance Projection Information**									
Feed Water Temperature	(°C)	10	10	10	10	10	30	30	30	30	30
Membrane Element Age (continuous operation)	(years)	0	0	1	1	3	0	0	1	1	3
Flux Decline Factor	(%/year)	5	5	5	5	5	5	5	5	5	5
Salt Passage Increase	(%/year)	7	7	7	7	7	7	7	7	7	7
Fouling Factor	(-----)										
Permeate Flow Rate	(gpm)	3571	3571	3571	3571	3571	3571	3571	3571	3571	3571
Permeate Water Recovery Rate	(%)	85	92	85	92	85	85	92	85	92	85
Stage 1 Membrane Element	(model)										
Stage 2 Membrane Element	(model)										
Stage 3 Membrane Element	(model)										
Feed Pressure	(psi)										
Stage 1 Permeate Backpressure	(psi)										
Stage 2-3 Interstage Boost Pressure	(psi)										
Total Permeate Pressure	(psi)	5	5	5	5	5	5	5	5	5	5
Total Permeate Total Dissolved Solids	(mg/L)										
Total Permeate Chloride	(mg/L)										
Average System Flux	(gfd)										
Average Stage 1 Flux	(gfd)										
Average Stage 2 Flux	(gfd)										
Average Stage 3 Flux	(gfd)										
Stage 1 Lead Element Flux	(gfd)										
Stage 2 Lead Element Flux	(gfd)										
Stage 3 Lead Element Flux	(gfd)										

Note: For operating conditions where the required feedwater pressure exceeds 150 psi, provide additional projections indicating the maximum permeate production capacity at a maximum feedwater pressure of 150 psi.

END OF SECTION 466323.13

2nd Pre-Bid Meeting Sign-In

BRUNSWICK COUNTY
NORTHWEST WTP EXPANSION AND UPGRADES

Pre-Bid Meeting
January 23, 2020

Name	Organization	E-mail	Phone
JONATHAN TREADWAY	CDM SMITH	treadwayjb@cdmsmith.com	919-325-3507
Greg Roy	CDM Smith	roygg@cdmsmith.com	978-409-5505
WAYDE CLARK	IDI-ERCO	WAYDE.CLARK@ERCOWORLDWIDE.com	704-604-5615
Brennen Weatherall	Garney Const	gweatherall@garney.com	662-902-5252
RYAN BUCCERI	CDMSMITH	BUCCERIRN@CDMSMITH.com	571-699-6513
Bob Tweedy	BCPU	bob.tweedy@brunswickcountyncgov	910.880.5827

January 2nd Pre-Bid Presentation

Northwest Water Treatment Plant Expansion and Upgrades

-

Pre-Bid Meeting

Brunswick County, NC

January 23, 2020

CDM Smith

Meeting Agenda

- Introductions
- General Overview of Projects
  - Meeting Logistics
  - Project Description
  - Bidding Details
- NWTP Upgrade and Expansions – Project Details
- Questions and Answers

Introductions

- John Nichols, Utilities Director
- Bob Tweedy, Project Manager
- Glenn Walker, Water Resources Manager

- Greg Roy, Project Manager
- Jonathan Treadway, Design Manager
- Ryan Bucceri, Construction Manager

Two County Projects – Pre Bid for NWTP only

NWTP Expansion and Upgrades

- Work 'inside the fence' at NWTP
- Includes pipeline portions on the WTP property
- Only Prequalified General Contractors may submit
- Bid Opening: March 5, 2020
- Estimated Value: $110 million

Concentrate Discharge Pipeline

- 4-mile PVC pipeline
  - Open cut and HDD
- Outfall into Cape Fear River
- Bid Opening: March 5, 2020
- Estimated Value: $7 million

General Overview of Project

Meeting Logistics

- Sign-in sheet
- Questions and answers during presentation
- Meeting correspondence provided by addendum
  - Sign-in, presentation, Q&A
- Site visits
  - Not mandatory
  - Today @ 2:00 at NWTP, 3954 Clearwell Dr, Leland, NC
  - Other times – refer to contract documents for scheduling

General Project Description

- General Project Description
  - NWTP, Clearwell Drive

    Leland, NC
- CDM Smith Role
- Permitting Status
- Project Funding
- Subcontractor Requirements
  - MBE goal 5%

Bidding Details

- Bidding details (common to both projects)
  - Sealed bids with public opening
  - Bid opening March 5, 2020
  - Last addendum before February 27, 2020
- Basis of Award: *Contract award will be based on the responsible Bidder with the lowest Base Bid identified in the Form of Proposal.*
- What constitutes a complete bid (refer to Instructions to Bidders)?
  - Form of Proposal (all entries completed)
  - Identification of Minority Business Participation Form
  - MBE Affidavit A (Listing of Good Faith Efforts)
  - Form of Bid Bond (5%) or cash deposit
  - Sealed inside envelope "SEALED BID, DO NOT OPEN"

Procedures During Bidding

- Process to submit questions
  - Only written questions will receive responses
  - E-mail: Jonathan Treadway, CDM Smith: treadwayjb@cdmsmith.com
  - Cut-off date for questions is February 25, 2020
    - 10 days prior to bid opening
- Addendum
  - Official changes to the contract documents
  - Addendums No. 1 through 3 already issued
  - Addendum last week January and possible 2 more in February

NWTP Expansion and Upgrades

NWTP Upgrade and Expansions

- Project Description
- MOPO
- Construction Constraints
- Dependent Construction Contracts
- Form of Proposal with Bid Alternates
- Construction Schedule

Clearwell Dr NE
Brunswick County
Northwest Water Plant

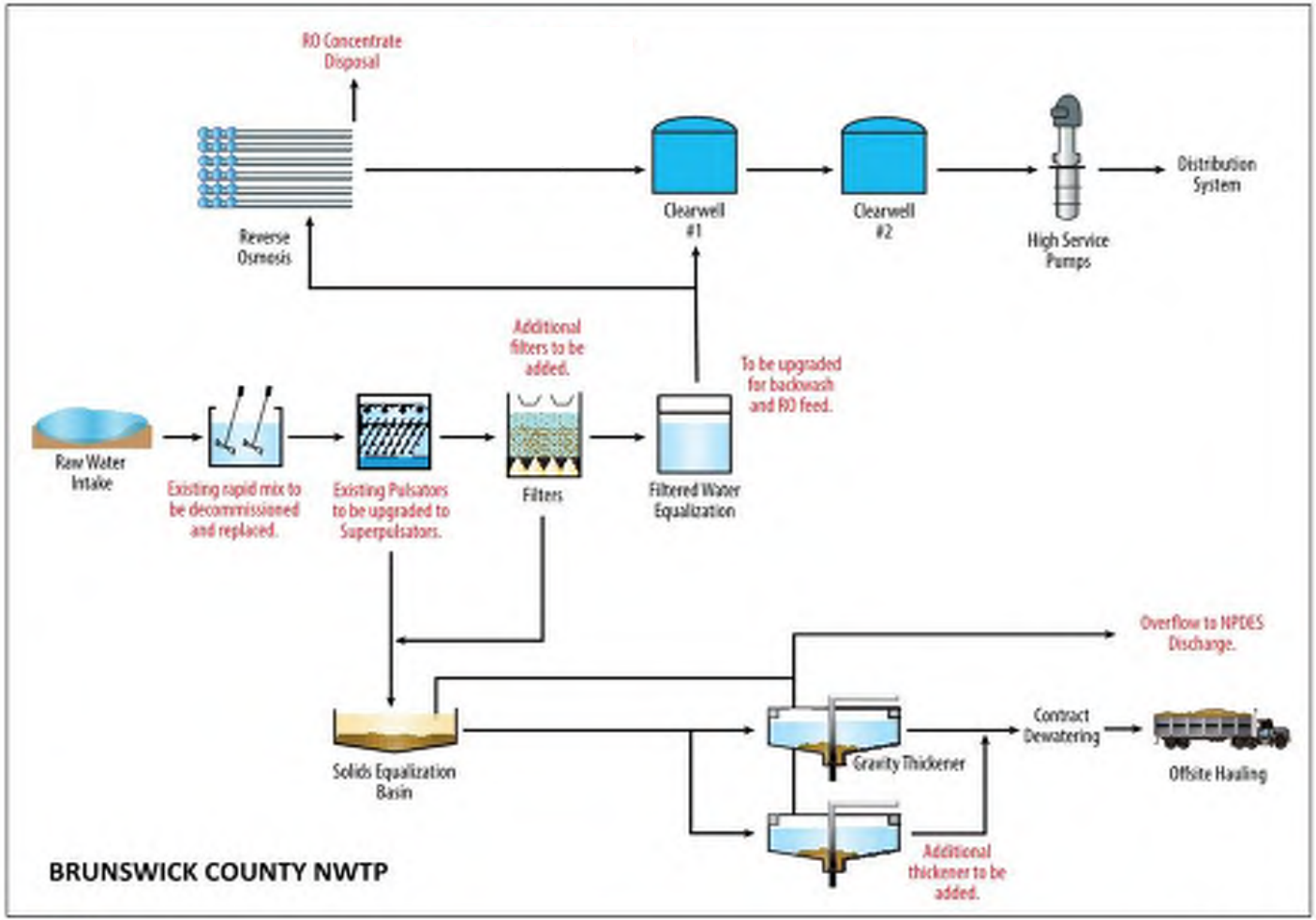
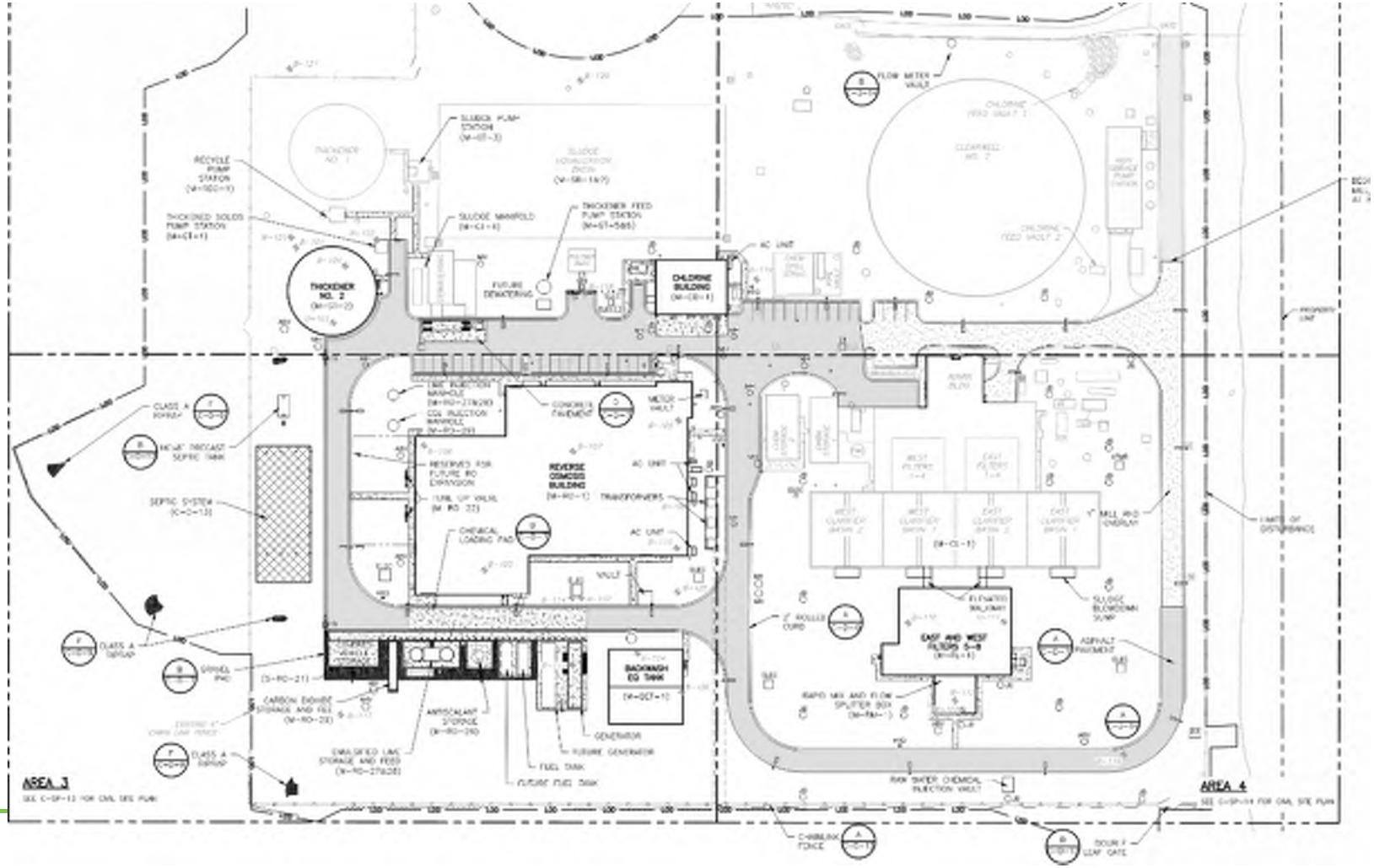


Figure ES-1
Proposed Improvements Process Schematic

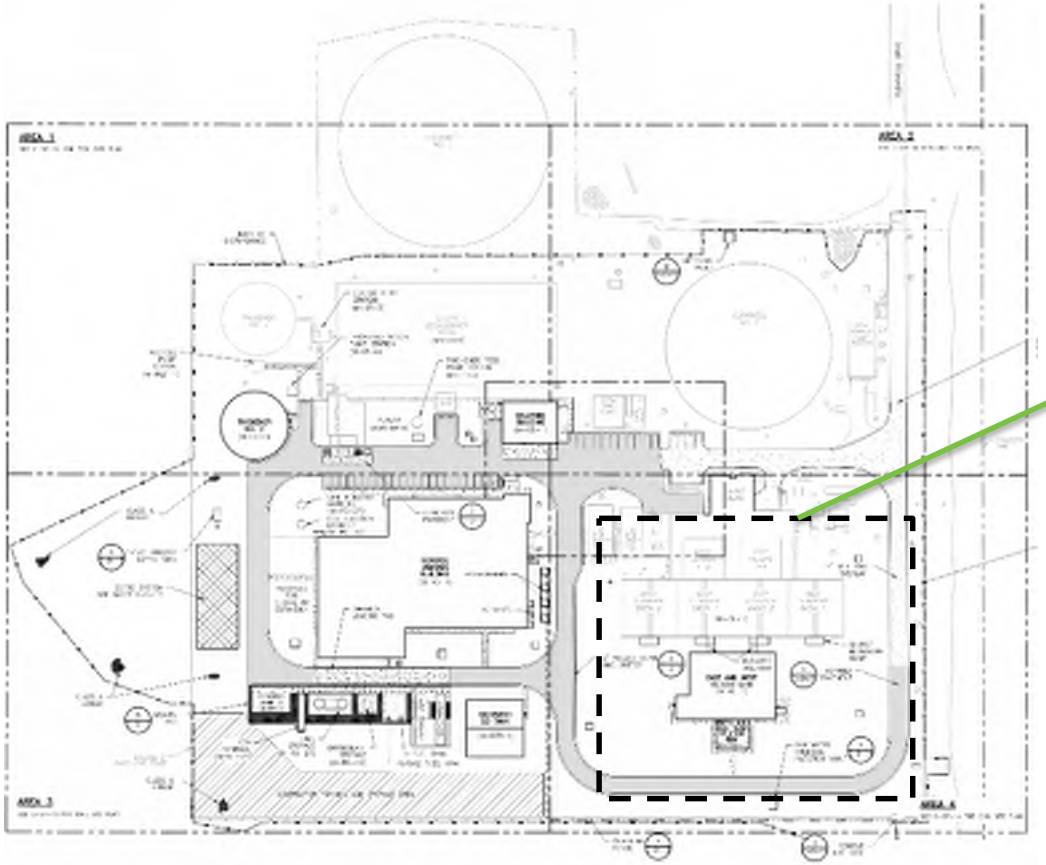
Scope of Work

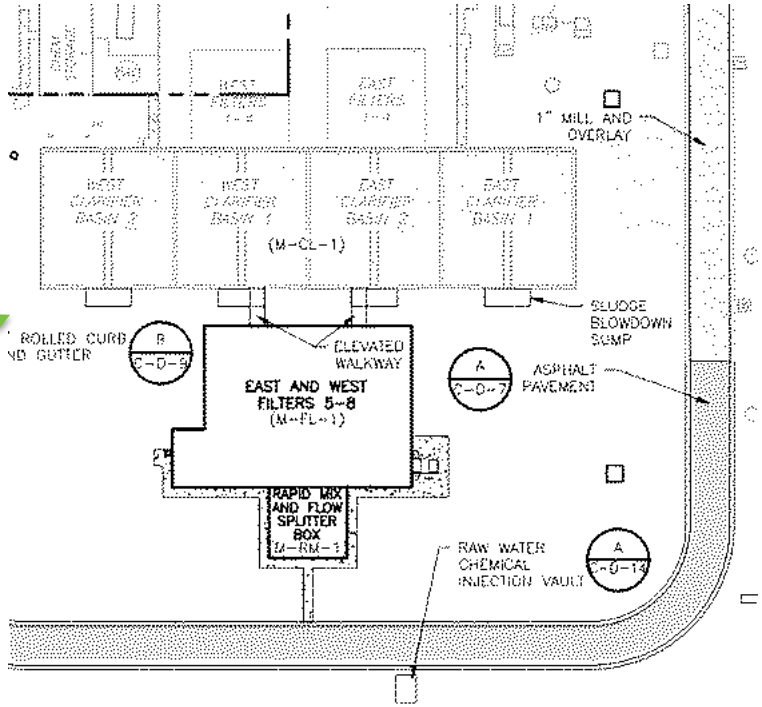
- New Raw Water Pipe
- New Rapid Mix
- Upgrade Clarifiers
- New Filters
- New EQ Tank
- New RO Building
- New Gravity Thickener
- New Chlorine Building
- New and Upgrades to Chemical Systems
- Yard Piping
- Electrical Upgrades
- I&C Upgrades with SCADA


AREA 3
AREA 4
THICKENER NO. 2
CHLORINE BUILDING
REVERSE OSMOSIS BUILDING
BACKWASH EQ TANK
EAST AND WEST FILTERS 5-8
FLOW METER VAULT
FUTURE DEWATERING
AC UNIT
TRANSFORMERS
VAULT
CHEMICAL LOADING PAD
CONCRETE PAVEMENT
METER VAULT
SEPTIC SYSTEM
CLASS A SPRAY
ASPHALT PAVEMENT
GENERATOR
FUTURE GENERATOR
FUEL TANK
FUTURE FUEL TANK
ANTISCALANT STORAGE
CARBON DIOXIDE STORAGE AND FEED
EMULSIFIED LIME STORAGE AND FEED
RAPID MIX AND FLOW SPLITTER BOX
RAW WATER CHEMICAL INJECTION VAULT
CHAINLINK FENCE
SOUTH LOAF GATE
LIMITS OF DISTURBANCE
PROPERTY LINE
SEE C-SP-13 FOR CIVIL SITE PLAN
SEE C-SP-14 FOR CIVIL SITE PLAN

Project Scope of Work Details

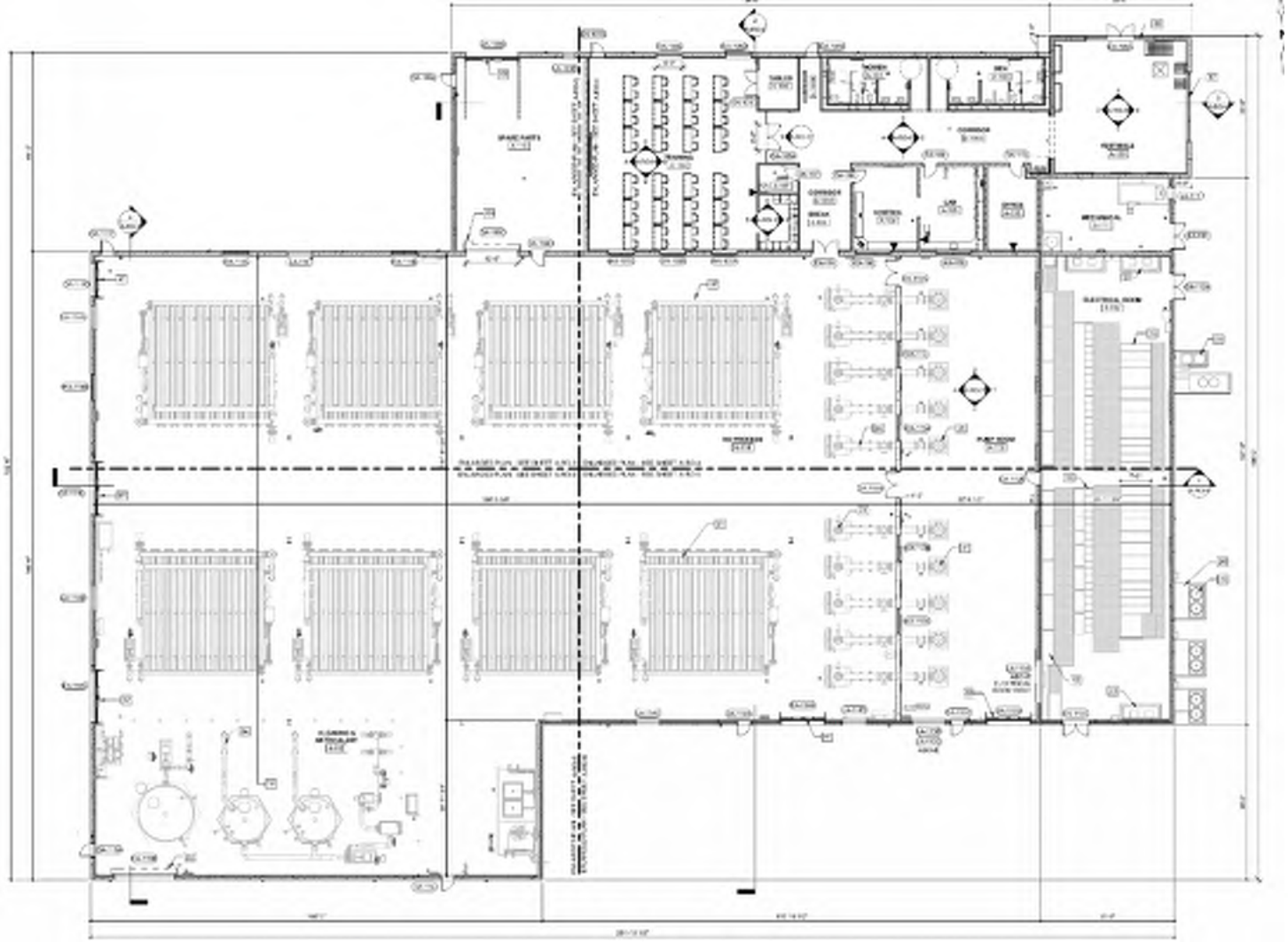
- Clarifiers
  - Upgrade existing basins (total of 4)
  - Sole source equipment to Suez for SuperPulsator® clarifiers
  - Seasonal work constraint for basin shutdowns
- Filters
  - New filter basins – Two ‘modules’ with 8 total filters
  - Sole source equipment to Suez for Greenleaf® filters
  - Deep pile foundations

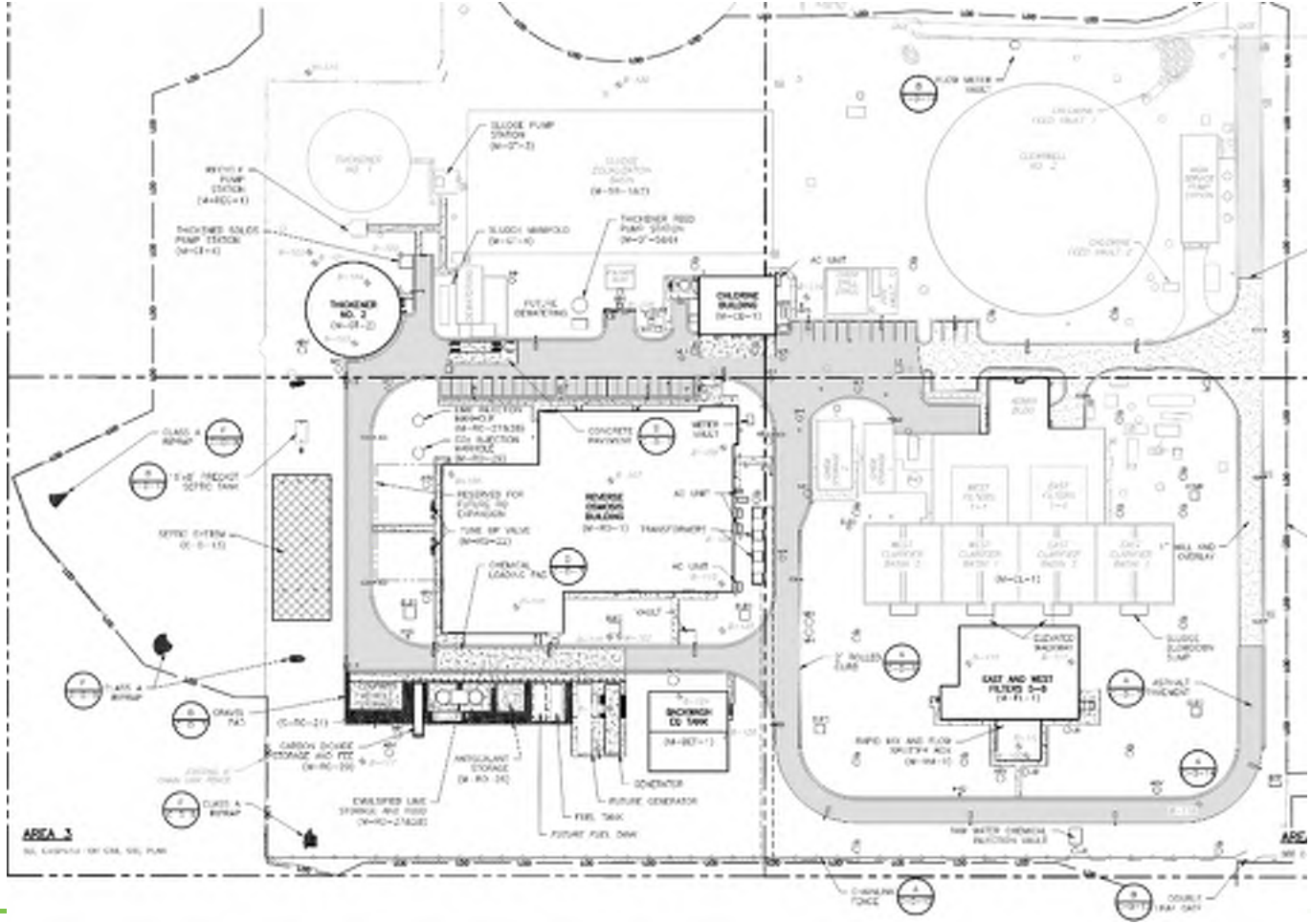



1" MILL AND OVERLAY
WEST CLARIFIER BASIN 2
WEST CLARIFIER BASIN 1
EAST CLARIFIER BASIN 2
EAST CLARIFIER BASIN 1
(M-CL-1)
SLUDGE BLOWDOWN SUMP
ROLLED CURB AND GUTTER
ELEVATED WALKWAY
EAST AND WEST FILTERS 5-8
(M-FL-1)
ASPHALT PAVEMENT
RAPID MIX AND FLOW SPLITTER BOX
M-RM-1
RAW WATER CHEMICAL INJECTION VAULT

Project Scope of Work Details

- Reverse Osmosis Building
  - Tilt Up Construction
  - Large Underslab Piping
  - Skid Area, Pump Room, Electrical Room, Training Room, Control Room
  - ‘Pre-load’, allows for shallow foundation design
- Reverse Osmosis Equipment
  - 8 skids, 5.15 mgd permeate each
    - Membrane System Suppliers listed in spec have been prequalified





Additional Scope of Work

- Backwash EQ Tank
- Gravity Thickener
- Chlorine Building
- Chemical Systems
- Electrical
- I&C

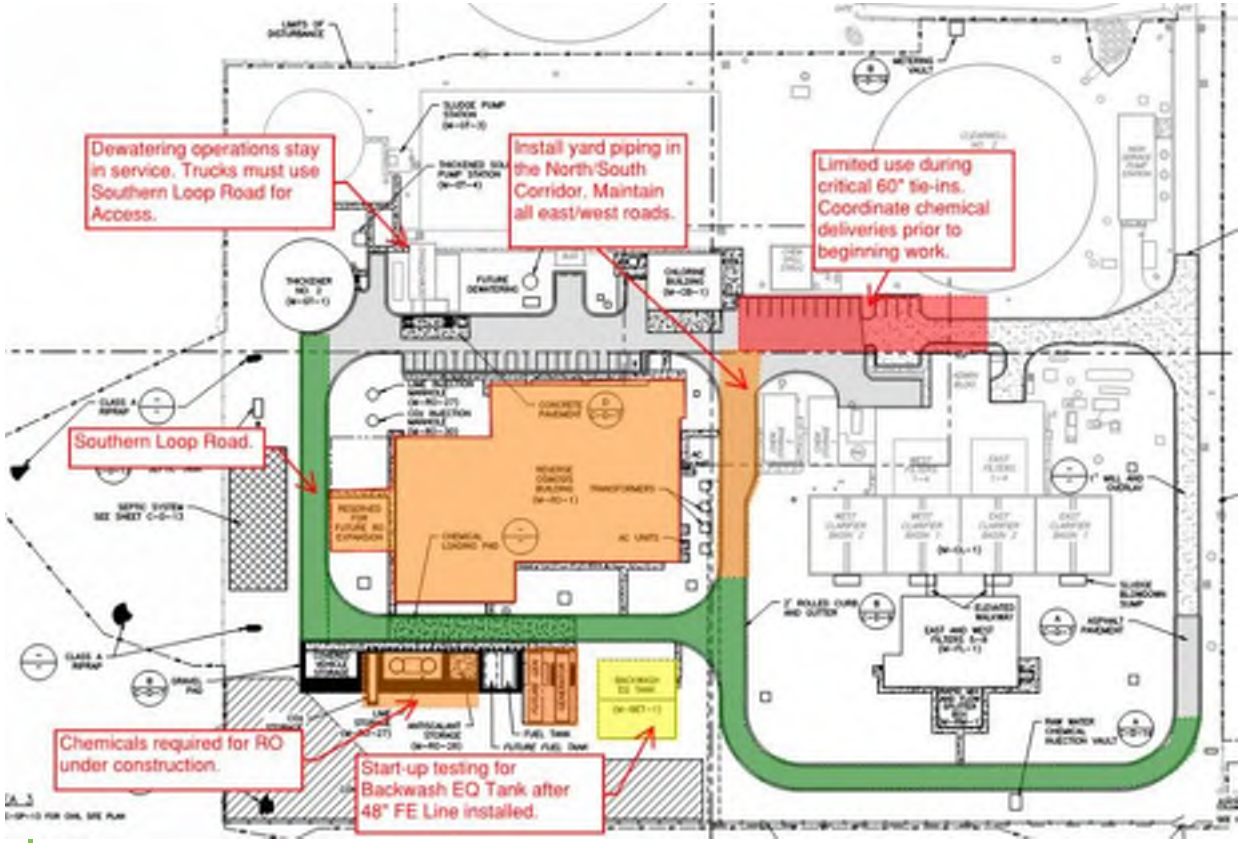
Work By Others

- Concentrate Discharge Pipeline
  - 4.5 mile pipeline
  - Begins at NWTP gate
  - Discharges to Cape Fear River
- Raw Water Pipeline
  - Large Transmission Line By LCFWASA
  - Tie-in with on-site RW pipelines (1 new, 1 existing) required
- Residuals Dewatering Contractor
  - On-site contractor
  - Covered belt filter press
  - Infrequent chemical deliveries
  - Frequent hauling of dewatered cake

Construction Constraints – Section 013513.54

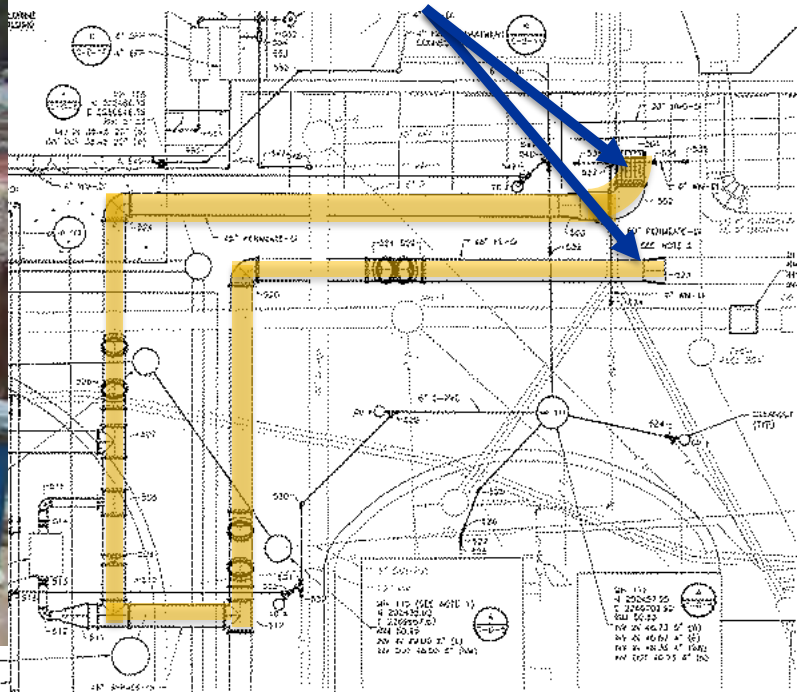
- MOPO/ Capacity
  - 12 mgd capacity at all times
  - 24 mgd (full) capacity in warm months
  - Shutdown constraints
- Traffic
  - Chemical deliveries
  - Residuals contractor hauling
  - Plant O&M staff
  - ‘Contractor’ entrance planned
- Work sequence
  - New electrical service (RO)
  - Raw water pipeline
  - Rapid Mix construction
    - Temporary piping required
  - Early completion milestone for conventional treatment

Critical Work Sequences – Road Closures

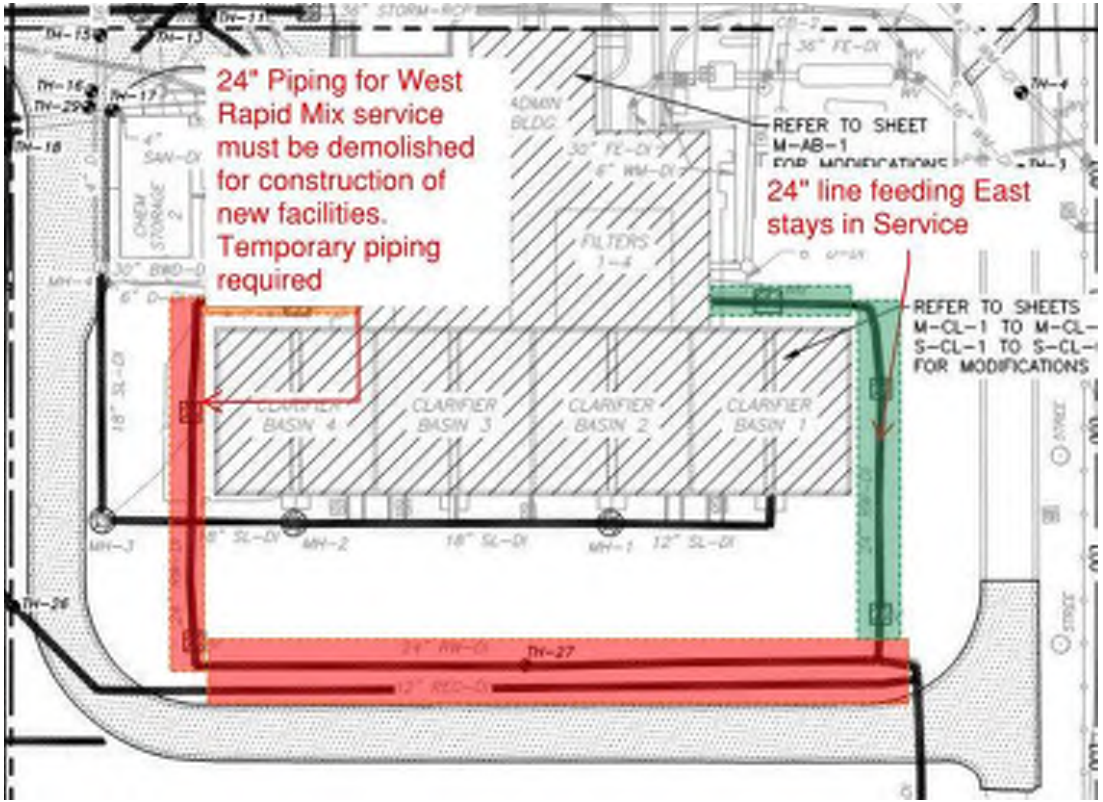


Critical Work Sequence – Yard Piping Tie-In

Critical yard piping tie-ins



Critical Work Sequences – Temporary Raw Water Piping



Form of Proposal

- Base Bid
  - Lump Sum (RO skids No. 1-5)
  - Unit Price Work
- Bid Alternates
  - Alt 1, add RO skids 6-8
  - Alt 2, delete RO skid 5
  - Alt 3, early beneficial use for RO (Nov 15, 2022)
  - Alt 4, remove all RO from the scope of work
- Measurement and Payment – Section 01 29 01

Pay Item	Pay Item Description	Unit	Est. Quantity	Unit Price	Extended Price
1	Change Order Allowance	LS	1	$ 300,000	$300,000
2	Materials Testing Allowance	LS	1	$250,000	$250,000
	Removal and replacement of Unsuitable Material	CY	200	$	$
4	Clarifier Concrete Tank Repair - Prepare and Repair equal to or greater than 3/8-inch in depth	SF	6,800	$	$
5	Clarifier Concrete Tank Repair - Prepare and Repair less than 3/8-inch and greater than 1/8-inch in depth	SF	10,300	$	$
6	Clarifier Concrete Tank Repair – Flexible Polyurethane Coating	SF	56,300	$	$
7	Clarifier Concrete Tank Repair – Prepare and Repair less than 1/8-inch in depth	SF	20,400	$	$
8	Clarifier Concrete Tank Repair – Crack Repair	LF	400	$	$

Construction Schedule

Bid Alternate	Beneficial Use RO Skids	Beneficial Use 36 mgd Conventional Treatment Capacity	Final Completion all work
Base Bid (skids 1-5)	May 15, 2023	May 15, 2022	Aug 15, 2023
Alternate 1 (add skids 6-8)	Skids 1-5: May 15, 2023 Skids 6-8: Aug 15, 2023	May 15, 2022	Nov 15, 2023
Alternate 2 (remove skid 5)	May 15, 2023	May 15, 2022	Aug 15, 2023
Alternate 3 (skids 1-5)	Nov 15, 2022	May 15, 2022	Feb 15, 2023
Alternative 4 (no skids)	NA	May 15, 2022	Aug 15, 2022

Questions?

2nd Pre-Bid Meeting Notes with Q and A

CLIENT: Brunswick County Public Utilities

PROJECT: Northwest Water Treatment Plant

DESCRIPTION: 2nd Pre-bid meeting

LOCATION: Training Room, Utility Operations Center, Supply, NC

DATE AND TIME: Wednesday, January 23, 2020, 10:00 AM

NOTES FOR NWTP EXPANSION AND UPGRADES:

1. See sign-in sheet for list of attendees.
2. Presenters include: Greg Roy and Jonathan Treadway.
3. The owner has two projects out for bidding. The first project is for the Northwest Water Treatment Plant (WTP) Expansion and Upgrades and has a planned contract value of approximately $110 million. The second contract is for the Northwest Water Treatment Plant Concentrate Discharge Pipeline and has a planned contract value of approximately $7 million.
4. During project introduction, it was noted this was the second pre-bid meeting for the project. The first pre-bid presented on both projects. This second pre-bid is specifically focused on the Northwest WTP Expansion and Upgrades project. The purpose of the pre-bid is to allow general contractors that have been recently pre-qualified to attend.
5. The Northwest WTP Expansion and Upgrades project is open for bidding by seven (7) prequalified general contractors listed in bid advertisement.
6. Project is funded by Brunswick County. Other funding sources such as SRF and WIFIA have been considered but are no longer being pursued for the project. Conditions of these funding sources – such as Davis-Bacon Act wage rates, federal minority business participation, and American Iron and Steel Act requirements – are not required.
7. County has an MBE participation goal of 5%.
8. Bid opening 3/5/20 at 3:00 P.M.
9. Cut-off date for questions is 2/24/19 and last addendum is planned for 2/27/19.

QUESTIONS AND ANSWERS:

1. QUESTION: Are there any other construction constraints in addition to those identified in the contract specifications.
   RESPONSE: *Specification Section 013513.54 provides definition of the primary construction constraints and a suggestion sequence of construction. These are highlighted in this section because they represent to most risk to the construction schedule. In addition, there do exist constraints for execution of individual items of work as defined in the technical specifications.*

2. QUESTION: Do the borrow areas identified on the construction plans indicate how much material is available in each area?
   REPSONSE: *Yes. The grading plan for pre-loading indicates approximate volumes of soil available in identified borrow areas.*

3. QUESTION: The intent is to remove and concentrate contaminants of emerging concern, and then discharge them back to the Cape Fear River. This concept appears to conflict with environmental protection.
   RESPONSE: *Brunswick County is not the generator of the contaminants of emerging concern in the Cape Fear River. These contaminants are simply passing through the County's treatment facility and being returned to the river without increasing the volume of contaminants that already exist.*

Response to Questions Received During Bidding Phase

RESPONSE TO QUESTIONS RECEIVED DURING BIDDING PHASE

1. QUESTION: When is start-up of the RO facility planned?
   RESPONSE: *Brunswick County has reviewed the schedule for award and construction milestones for the WTP Expansion and Upgrades and issued addenda to clarify these dates. The general contractor for the WTP project will develop the full schedule; however, startup and commissioning of RO is expected to begin as soon as June 2022.*

2. QUESTION: We understand the wetted materials for the cartridge filter housings need to have NSF61 certification. Do the completed fabricated vessels (after welding and passivation) need to have NSF61 certification as well? If so, the welded vessels would have to be sent out for testing following fabrication prior to shipment.
   RESPONSE: *Wetted materials for cartridge filters shall be NSF61 certified. The cartridge filter vessel does not need to be NSF61-certfied after construction.*

3. QUESTION: To find a manufacturer with NSF certification on the vessel is very difficult. We request that the NSF requirement on the vessels be removed.
   RESPONSE: *See response to previous question.*

4. QUESTION: The Process Piping Insulation Schedule provided in Specification Section 404213-3.3 does not provide what insulation is to be utilized on process piping (e.g., sludge blowdown piping at clarifiers). It is our interpretation that all piping indicated on the drawings to receive insulation but not included in Schedule is to be ½" thick Type P-1. If this is not correct, please notify us via addendum and provide a revised Insulation Schedule.
   RESPONSE: *All process piping external to buildings and not buried (sludge blowdowns, chemical conveyance lines, sludge manifolds, and water sample lines) will receive Type P-5 insulation 1" thick with aluminum jacketing. Section 404213 has been revised accordingly.*

5. QUESTION: The Process Piping Insulation Schedule provided in Specification Section 40 42 13-3.3 does not provide guidance regarding what areas (e.g., interior, exterior, buried, etc.) of these piping systems are to receive insulation. It is our interpretation that these listed systems are to only receive insulation where specifically indicated on the Drawings, and that if not stated on the Drawings that it is required no insulation is to be provided. If this is not correct, please notify us via addendum and provide a revised Insulation Schedule.
   RESPONSE: *All process piping external to buildings and not buried (sludge blowdowns, chemical conveyance lines, and water sample lines) will require insulation. All locations marked "HT" on the E-YP series of plans will receive heat tracing. Section 404213 has been revised accordingly.*

6. QUESTION: Is there a duckbill check valve spec?
   RESPONSE: *There is a sole duckbill check valve for this project, depicted on sheet M-GT-6. This shall be a 2" Tideflex Series TF-2 duckbill check valve (by Red Valve) with 316 SS compression clamp, or equal. This Sheet has been modified to reflect this clarification.*

7. QUESTION: Please refer to sheet I-FL-2. Where is the filter-to-waste line during the backwash sequence? Are the backwash and filter-to-waste sharing the same line? If so, the arrows on P&ID should represent this (only shows water running into the isolation line).

RESPONSE: *The FTW line is shown on the bottom right corner of I-FL-2. It is connected to the backwash header. The FTW line has a BFV that is closed during filter backwash and forward flow operations. See M-FL-3 and M-FL-4 for location of the FTW line within the filter pipe gallery.*

8. QUESTION: Please refer to Section 466123.11. Under Article 2.1, please correct "4.0gpm/sf" to "4.1 gpm/sf," to match table in Section 2.3 SYSTEM DESIGN.
   RESPONSE: *North Carolina DEQ Public Water Supply Section has approved filter operation for 4.0 gpm/sf. The design of the filters should accommodate operation up to 4.1 gpm/sf to facilitate future uprating study.*

9. QUESTION: Please refer to Section 466113. Please acknowledge if these are acceptable for sand filter materials:
   Gravel: 3/16" x #10 (4.75 mm - 2.00 mm)
   Sand: we need an effective size spread of 0.10 mm, and would like to propose 0.45 - 0.55 mm with UC of less than 1.4.
   Anthracite: we need an effective size spread of 0.10 mm, and would like to propose 0.85 - 0.95 mm with UC of less than 1.4.
   RESPONSE: *The proposed effective sizes for gravel, sand, and anthracite are acceptable. Filter underdrain manufacturer shall certify that the proposed gradations are appropriate, per the requirements of Section 466113, Paragraph 2.1.A.3.*

10. QUESTION: Section 466323.13 Part 3.08 and 3.09 discuss a 30-day consecutive performance test of each individual R/O train. It is our understanding that the individual test of each R/O train can be conducted concurrently with the individual tests of the other R/O trains. Please notify us by addendum if this is not correct and provide additional clarification.
    RESPONSE: *The RO units can be tested concurrently. Please see revised Section 466323.13.*

11. QUESTION: Please refer to Section 466323.13 Part 3.08.G.1. Please clarify who is responsible for obtaining the appropriate approval from NC DEQ Public Water Supply Section for sending permeate to the distribution system. How long should the CONTRACTOR expect for NC DEQ Public Water Supply Section approval? Is NC DEQ Public Water Supply Section approval required before the 30 -day consecutive test(s) commence?
    RESPONSE: *This language has been removed from Section 466323.13.*

12. QUESTION: Drawing M-RO-13 shows a typical piping setup for the Membrane Booster Pumps. The butterfly valve BFV-42x6B is shown on this drawing as being 8". The Butterfly valve schedule in section 400564 shows valve BFV-4216B as being 10", all other "B" valves for the membrane booster pump are shown as being 8" in the schedule. It is our interpretation that valve BFV-4216B is 8". If this is not correct, please advise via addendum.
    RESPONSE: *BFV-42x8B valves are 8"; however, MSS has some flexibility to size valve(s) based on the design of the RO unit. Section 400564 has been revised accordingly.*

13. QUESTION: Drawing M-RO-13 shows a typical piping setup for the Membrane Booster Pumps. The Butterfly Valve BFV-42x6D is shown as being 8". All other mechanical drawings show these valves as being 8" also. The Butterfly valve schedule in section 400564 shows the "D" valves for

membranes 1 thru 8 as being 10". It is our interpretation that the valves BFV-42x6D are to be 8". If this is not correct, please advise via addendum.
RESPONSE: *BFV-42x8D valves are 8"; however, MSS has some flexibility to size valve(s) based on the design of the RO unit. Section 400564 has been revised accordingly.*

14. QUESTION: I-RO-5 shows valve BFV-4501C as being 10". The Butterfly valve schedule in section 400564 shows this valve as being 4". Please confirm the correct size for this valve and provide a revised schedule in the next addendum if necessary
RESPONSE: *BFV-4501C valve is 10". Section 400564 has been revised accordingly.*

15. QUESTION: There do not appear to be any circuits shown for the heat tracing specified at Section 404113.13 - Process Piping Electrical Resistance Heat Tracing. Please clarify the requirement.
RESPONSE: *Please refer to electrical drawings as revised per Addendum No.3 for heat tracing circuits.*

16. QUESTION: Refer to Section 262923, Paragraph 2.3.A. In order to meet the seismic requirements, the VFDs shall need to be properly anchored by the installing contractor. To assist and ensure this, Seismic Calculations (stamped and certified by a NC structural engineer) would be provided within 6 weeks after "release to manufacturing" that indicates the proper anchoring materials and methods to use.
RESPONSE: *Noted.*

17. QUESTION: Refer to Section 262923, Paragraph 2.6.A. Earlier in the Spec (2.4.B.1), the requirement is to use an integral Passive Harmonic Filter (PHF) within each VFD System, on the line side of the VFD Unit. The PHF includes a Line Reactor. Thus, adding a separate Input Line Reactor (5% impedance) can often apply too much impedance on the System, causing voltage drop to the terminals of the VFD due to "overlap of diode conduction". Our design would not include a separate Input Line Reactor, but rather the Reactor that is already included in the design of the PHF. This Reactor is certainly sufficient to smooth current flow and absorb voltage transients – which are the two primary purposes of the Input Line Reactor. Please confirm these proposed changes meet the requirements of Section 262923, Paragraph 2.6.A.
RESPONSE: *A separate line reactor is not required where incorporated into the passive harmonic filter. Section 262923 has been revised to reflect this requirement.*

18. QUESTION: Please confirm whether TCI is an acceptable manufacturer for the Passive Harmonic Filter.
RESPONSE: *Confirmed and added to Specification*.

19. QUESTION: Refer to Section 262923, Paragraph 2.4.B.1. The Spec here does not appear to require the use of a capacitor cutout contactor for the Passive Harmonic Filter. In our opinion, this can be very concerning. The PHF uses capacitors. Under lightly loaded and no-load conditions (powered but not running), the PHF without a capacitor cutout contactor can cause a Leading Power Factor. If operated at lightly loaded conditions for extended periods of time, the VFD Unit can be susceptible to premature catastrophic failures. Also, Generators do not operate well with Leading Power Factors. To resolve these concerns, we suggest requiring the use of a Capacitor Cutout Contactor within the PHF assembly to disconnect the capacitor banks when

operating under a pre-determined load. If CDM Smith agrees with this observation, then we recommend that it be required by an addendum.
RESPONSE: *A capacitor cutout contactor will be required. Section 262923 has been revised to reflect this requirement.*

20. QUESTION: Please confirm whether TCI is an acceptable manufacturer for the DV/DT Filter.
RESPONSE: *Confirmed and added to Specification*.

21. QUESTION: In order to achieve optimal cost / schedule benefit, we recommend allowing 900 calendar days after NTP till beneficial occupancy of four R/O skids, 1080 calendar days after NTP to Substantial Completion and 1,170 calendar days after NTP to Final Acceptance.
RESPONSE: *Contract milestone dates were revised under Addendum #3. Assuming a NTP on May 11, 2020, the Contract allows:*
    - *734 calendar days after NTP until Beneficial Use is achieved (5/15/2022);*
    - *1,099 days to Substantial Completion (5/15/2023); and*
    - *1,191 days to Final Acceptance (8/15/2023).*

22. QUESTION: Please reference Section 466323 of the specifications. In the event a membrane system does not perform according to the specifications, Section 466323.3.4.5 requires the Contractor to make all necessary adjustments, design changes and modifications required to meet the performance requirements in accordance with the Specifications at his expense. This specification requirement places unquantifiable risk on the Contractor and is thus unbiddable. We recommend that this language be revised to place a cap on the liability of the Contractor with regards to the performance of the membrane system. We feel an appropriate amount would be $500,000.
RESPONSE: *Refer to revised Section 466323 for modifications to liability requirements and payment terms.*

23. QUESTION: Swing Check Valve 400565.23 Types SCV-2 and SCV-3 are rubber flapper checks. Type SCV-2 seems to be a conglobulated lever & weight swing check and rubber flapper check hybrid spec that describes a valve no one makes. We know of no brand that offers a rubber flapper check with extended shaft, outside lever & weight, stuffing box, packing gland and grease fittings.
RESPONSE: *All valves currently listed as SCV-2 have been reassigned as SCV-5 in this Addendum. The Valve Schedule in Section 400565.23 has been revised accordingly, and Article 2.2 describing Type SCV-2 has been removed altogether.*

24. QUESTION: Rubber Flapper Check 400565.33 describes essentially the same valve as 400565.23 Type SCV-3.
RESPONSE: *Section 400565.33 has been removed in this Addendum. The valves listed under Section 400565.33 were relegated to Section 400565.23 as Type SCV-3 valves per Addendum #3.*

25. QUESTION: Specifications 400565.23-2.2 and 400565.33 both contain specifications for Rubber Flapper Scheck Valves, but the specifications provided in 400565.23-2.2 (Type SCV-2) are for a

swing type check valve. It is our interpretation that all valves stated to be Type SCV-2 in the Check Valve Schedule in Section 400565.23 are to be provided per the Specifications provided in 40 05 65.33. If this is not correct, lease provide revised Specifications and Check Valve Schedule indicating correct check valve type and specifications.
RESPONSE: *Please see responses to previous questions.*

26. QUESTION: The Check Valve Schedule in Specification Section 40 05 65.23 indicates for the 2" CV-7010 to be a type SCV-3, but paragraph 2.3.B.2 states that type SCV-3 valves are to be for 3" and larger. It is our interpretation that CV-7010 is to be a type SCV-4. If this is not correct, please notify us via addendum and provide a revised Check Valve Schedule.
RESPONSE: *This interpretation is correct. The Check Valve Schedule has been revised accordingly.*

27. QUESTION: Will you allow the use of geogrids as an alternate method for soil stabilization.
RESPONSE: *Geogrids are not an alternative considered feasible at this time.*

28. QUESTION: What type of restraint is to be used on the 60" BFVs at the Backwash Eq. Tank?
RESPONSE: *Use a flanged restrained adapter coupling for both BFV-3500D and BFV-3500F.*

29. QUESTION: What type of restraint is required on the 60" BFV at the Backwash Eq. Tank?
RESPONSE: *See answer to previous question.*

30. QUESTION: Section 400578.10 lists air release, air & vacuum, combination and vacuum breaking air valves. Please clarify what is required by subparagraph 2.2.B.7.f, regarding "an over pressure safety feature".
RESPONSE: *As part of this addendum, subparagraph 2.2.B.7.f of Section 400578.10 has been removed.*

31. QUESTION: Specifications 400578.10-2.3 and 400578.19 both contain specifications for Combination Air Valves for Water Service, but these specifications differ. It is our interpretation that 400578.19 was included in error and all water service CAVs are to be provided per 400578.10-2.3. If this is not correct, please notify us via addendum.
RESPONSE: *This interpretation is correct. Section 400578.19 has been removed in Addendum #3.*

32. QUESTION: Our general observation is that the RO trains detailed in the plan drawings are for reference purposes only. The detailed trains cannot be manufactured in such a way as to meet the specification, that is; skid mounted and sized to be passed through a 12' x 12' roll up door. As such, it is incumbent upon the MSS to design the trains so that they are composed of shop-built skids, meeting all the requirements of the specification. Please confirm that this assessment is the proper way we should approach the project.
RESPONSE: *The skids can be shop-built or put together at the site. The reference to the door size is for informational purposes only. Section 466323 has been revised to clarify.*

33. QUESTION: The mechanical drawings provided with the RFP documents are showing site build RO design. However, Section 466323 suggests that MSS is providing RO drawings for pre-

assembled skids to fit through the 12 ft x 12 ft rolled-up doors. Please confirm what RO design is required.
RESPONSE: *Please see response to the previous question.*

34. QUESTION: Please refer to the Bid Form (Form of Proposal). One of the alternates suggests the Owner can remove all RO Process Improvements from the project Base Bid. Please confirm the Owner could select any of the Bid Alternates.
RESPONSE: *This interpretation is correct. The Bid Form has been revised in Addendum #3 to reduce the total number of alternates; however, the Owner still has the option to delete all RO Process Improvements through selection of Bid Alternate #4.*

35. QUESTION: What is the required performance warranty duration for membrane elements, 3, 5 or 7 years?
RESPONSE: *3 years. Section 466323.13 has been revised to clarify.*

36. QUESTION: The instrumentation schedule and drawings are not matching up. Instrumentation schedule notes "Turbidity" for tag # AIT-3624, AIT-3625; however the drawing I-FL-5 indicates that "pH" is required for these instruments. Please verify which is actually required.
RESPONSE: *These instruments are to be pH analyzers. The Instrument List (Section 407001) has been updated in Addendum #3 accordingly.*

37. QUESTION: There is a discrepancy in the number of turbidimeters noted on the drawings and in the instrumentation schedule. Please clarify.
RESPONSE: *The Instrument List (Section 407001) has been updated in Addendum #3, such that the number of turbidimeters should now be consistent between the schedule and drawings.*

38. QUESTION: There is a discrepancy on the listed range for turbidimeter AIT-3636. The Instrument List (Section 407001) requires a range of 0-5,000 NTU, while Section 407553 2.2C.4 lists the range for this instrument as "0-4,000 NTU, minimum." Please clarify which range is required. Hach advises that the Solitax would be a better fit for this application; this instrument would have a range of 0-4,000 NTU.
RESPONSE: *0-4,000 NTU is an acceptable range for this instrument. The Instrument List has been updated in Addendum #3 accordingly.*

39. QUESTION: For turbidimeters in the range of 0-100, Hach assumes to offer the TU5300, unless there is a need for ultra-high precision. Written specifications do not note the requirement for ultra high precision, but with all the varied specifications, we kindly ask for clarification.
RESPONSE: *Ultra high precision is not required.*

40. QUESTION: The specifications note a chlorine analyzer range of 0-0.5 ppm. Written specifications include language for both CL17 and CL10. There is no indication which is required, colorimetric or amperometric. Can you please verify which is required?
RESPONSE: *AIT-3621 shall be colorimetric.*

41. QUESTION: Detail E on Drawing C-D-15 references Detail B/M-D-4 for chemical injectors at the 48" FE line in the Pre-RO Manhole, but the Injector Schedule on C-D-15 does not include any injectors at this location. It is our interpretation that no chemical injectors will be required. If this is not correct, please notify us via addendum and provide a revised Injector Schedule.
RESPONSE: *Provide a 2" injector for each chemical pipe as shown by Detail E on Drawing C-D-15. Sheet M-D-4 has been updated accordingly.*

42. QUESTION: After a quick review of the specifications, we are still not sure how Brunswick County plans to execute engineering tasks related to the changes required by system engineers related to PLC and HMI systems. Maybe we are missing something, or you have other plans for this scope of work. I am reaching out for assistance. If you can point me in the right direction, I would appreciate the help.
RESPONSE: *PCSS candidates are listed in Specification Section 406100, paragraph 1.09.E. No other candidates will be accepted.*

43. QUESTION: For the Venturi Flow Meters, Section 407123.13, please provide the following information so we can provide a quote for these meters: beta ratio, min/max flow and min/max pressure; desired dP if that is available.
RESPONSE: *Minimum and maximum flows and pressures for these devices have been addressed in previous Addenda. The Engineer typically provides line size, pipe materials of construction, min/max flow rates and min/max pressures to the venturi tube manufacturer for their use in sizing the instrument. The beta ratio and the dP that corresponds to the desired flow rate have typically been values provided to the Engineer as a result of the manufacturer's calculations during the sizing of the flow tube.*

44. QUESTION: Reverse Osmosis and Chlorine Building Finish Schedule Note 2 on Sheets 101 and 114 calls for chemical-resistant polyamine epoxy with product information to be provided in Specification Section 033500. However, the Specification Section 033500 Concrete Finishing does not list any polyamine epoxy-based floor application product. Please provide product information via addendum for the epoxy floor application.
RESPONSE: *Product information is provided via this addendum.*

45. QUESTION: Drawings M-AB-2 and I-AB-2 indicate for a new 2" SOFL pipe to be run to the 60" filtered water pipe and the Chemical Injector Schedule on Drawing M-D-4 indicates for a new chemical injector at the existing Pre-Clearwell Vault, but this pipe is not shown on the Yard Piping drawings nor M-RO-29. It is our interpretation that the new SOFL pipe is to connect to the existing inside of the Administration Building and no new piping to Vault or new Injector will be required. If this is not correct, please provide revised drawings indicating extent of new SOFL piping.
RESPONSE: *This interpretation is correct.*

46. QUESTION: Drawing C-YP-5 indicates for two (2) 1" spare chemical lines coming into JB-114 from the south, but no spare lines are shown leaving this junction box. It is our interpretation that these two spare lines are to be capped inside JB-114. If this is not correct, please notify us via addendum and provide revised drawings indicating desired routing of spare chemical lines.
RESPONSE: *This interpretation is correct.*

47. QUESTION: The Air Release Valve on the sample pump discharge line shown on Drawing C-RW-5 is not included in the Air Release Valve Schedule in Specification Section 40 05 78.10. Please provide revised ARV Schedule indicating valve specifics.
RESPONSE: *The ARV Schedule has been revised in this Addendum to include this ARV.*

48. QUESTION: Drawing C-YP-4 indicates for "handholes" to be provided on the LS and D lines coming from the Lime Storage area, but no details were provided on the drawings on in specifications regarding "handholes." Please provide applicable details and/or specifications via addendum.
RESPONSE: *Notes have been added to Drawing C-YP-4 in this Addendum to clarify.*

49. QUESTION: Many of the soil borings (including B-111 in the on-site borrow pit area) contain a note in the "Remarks" column which states "Trace Decayed Wood". It is our interpretation that these trace amounts are acceptable for use as "Common Fill" provided the soil meets the other criteria specified in Specification 310515 paragraph 2.1A. If this is incorrect, and the intent is to haul off the majority of soils from the site and bring in borrow material, please clarify by addendum.
RESPONSE: *The Contractor is permitted to re-use the existing site soils for common fill material provided the organic material is less than 5% organics by weight. The Contractor shall be prepared to screen soils found to be greater than 5% organic matter, and those soils are not suitable for re-use as backfill materials.*

50. QUESTION: Specification 310515 paragraph 2.1A requires that "Common Fill" shall have a "maximum dry density of at least 90 pounds per cubic foot". The soil borings do not provide the maximum dry density of the existing soils. Therefore, it is our interpretation that on-site excavated soils are acceptable for use as "Common Fill" provided they meet the other criteria specified in Specification 310515 paragraph 2.1A. If this is incorrect, and the intent is to haul off the majority of soils from the site and bring in borrow material, please clarify by addendum.
RESPONSE: *This understanding is correct. The Contractor shall conduct all Quality Control Testing specified in Section 310515 and all Field Quality Control Testing (i.e., compaction testing) specified in Section 312000.*

51. QUESTION: No soil borings were provided along the Raw Water Pipeline. It is our interpretation that soil taken from the borrow pits along the Raw Water Pipeline (Drawing C-GD-7) are acceptable for use as "Common Fill". If this is incorrect, please clarify by addendum.
RESPONSE: *This understanding is correct. However, the soils re-used as common fill shall not contain objectionable materials as defined in Section 312000 Paragraph 1.5.G. The Contractor shall be prepared to screen soils found to be greater than 5% organic matter, and those soils are not suitable for re-use as backfill materials.*

52. QUESTION: Specification 312323.37 paragraph 2.1B.1 requires that "Pre-load Fill" shall have a "In-place density of at least 115 pounds per cubic foot". The soil borings do not provide information regarding the density of the existing soils. Therefore, it is our interpretation that all on-site excavated soils are acceptable for use as "Pre-load Fill" provided they meet the other criteria in Specification 312323.37 paragraph 2.1B and the "Common Fill" specification. If this is

incorrect, and the intent is to bring in special borrow material for pre-loading, please clarify by addendum.
RESPONSE: *This understanding is correct. The Contractor shall conduct all Quality Control Testing specified in Section 310515 and all Field Quality Control Testing (i.e., compaction testing) specified in Section 312000.*

53. QUESTION: The Filters and the Rapid Mix structures do not show "structural fill" below them. It is our understanding that all fill below these structures can be "common fill" since these structures are pile supported. If this is incorrect, please clarify by addendum.
RESPONSE: *This understanding is correct.*

54. QUESTION: There do not appear to be any circuits shown for the heat tracing specified at Section 404113.13 - Process Piping Electrical Resistance Heat Tracing. Please clarify the requirement.
RESPONSE: *Please refer to previous Addendum drawings and revisions for additional heat trace circuits.*

55. QUESTION: Why does print #S-RO-15 require a 7' 6"step height? We did not see where the specifications require any additional fuel tank under the genset to require such a high platform.
RESPONSE: *This is to ensure that a platform is provided if the generator frame is high enough off the ground to warrant a platform (i.e. more than a standard step up). Where applicable, the actual height of the platform is subject to the height of the generator frame.*

56. QUESTION: On the fuel system there is not a return pump called out. We recommend one in the case that the supply pump should remain running.
RESPONSE: *A return pump and day tank will not be proposed under this project.*

57. QUESTION: We also recommend a Day tank / belly tank at the generator set to be fed by the main 20,000 gallon tank. A 500 gallon day tank would fit in the base of the unit and would not take up any additional room in the enclosure.
RESPONSE: *A return pump and day tank will not be proposed under this project.*

58. QUESTION: The drawings contain references that all underslab process piping shown on the M drawings is to receive concrete encasement, but no mention is made regarding underslab plumbing piping shown on the P drawings. It is our interpretation that underslab piping shown on the P drawings will not requirement concrete encasement. If this is not correct, please notify us via addendum and provide revised drawings indicating encasement requirements.
RESPONSE: *This interpretation is correct. All below-ground plumbing piping is gravity waste, and concrete encasement is not required.*

59. QUESTION: Refer to Section 011000 Part 1.11.B. In the event the contract times are not extended as previously requested, please consider eliminating the specified restrictions on work hours and work days to accommodate the longer work weeks and multi-shift operations that maybe necessary to achieve the currently specified milestone dates. Please confirm by addendum that the Owner will be responsible for the cost of project inspection for such additional shifts and extended workweeks necessary to meet the schedule.

RESPONSE: *As stated in Section 011000, Part 1.11 B, "Work hours may be modified to meet the Project requirements if approved by Owner and authorities having jurisdiction." Therefore, longer work weeks and multi-shift operations are possible. In addition, the Contractor is not responsible for additional project inspection required for extended work hours granted by the Owner.*

60. QUESTION: For coordination purposes, please advise by way of an addendum to the NWWTP Contract, any changes that may have been made to the dates for Substantial and Final Completion of the Concentrate Discharge Pipeline Contract since the 10/30/2019 Pre-bid Meeting.
    RESPONSE: *Substantial and Final Completion dates for the Concentrate Pipeline were modified by details provided in Addendum No.2.*

61. QUESTION: Reference Drawing C-SP-6: Existing manhole MH-4 (located just a few feet away from the SW corner of Chemical Storage #2) has a depth of 15' and is shown to be removed. Please provide as-built drawings/foundation information for the Chemical Storage #2 structure.
    RESPONSE: *As-built drawings for this structure have been added in this Addendum.*

62. QUESTION: Reference Drawings C-SP-3, -4, -5, & -6: The existing asphalt shown to be removed is called out as 2" asphalt over 6" stone. This depth of asphalt differs from what is noted on some Geotechnical Boring logs. Should the 6" stone actually be 6" base asphalt? We will proceed with using a total asphalt depth of 2" per the drawings, but please confirm in a future addendum that a total depth of asphalt to be removed is 2".
    RESPONSE: *Original record drawings called for 2" AC over 6" AB; however, the Contractor shall remove AC and AB as necessary to install 2" Surface Course (S9.5B or C) over 6" Base Course (B25.0B or C). Drawing C-SP-3 has been revised to clarify.*

63. QUESTION: The location of where to apply the crystalline waterproofing is not specified per drawings or specification Section 071616 – Crystalline Waterproofing. It is our interpretation that crystalline waterproofing is not required on this project and this section can be deleted. If this is incorrect, please respond with an addendum specifying the locations requiring crystalline waterproofing.
    RESPONSE: *Crystalline Waterproofing is required to be installed on all wall of the Filter Pipe Gallery. Refer to structural drawings reissued by addendum.*

64. QUESTION: In Section 466323.13, subsection 1.04.A.6.a), projections are requested at 85% and 92% recovery, but the 30 day initial performance test is going to be performed at 90% recovery (subsection 1.06.A.2) or 92% recovery (subsection 3.09.D.3), and table 466323.13-3 states a recovery range of 80 to 92%. The wider the range of recoveries is, the harder it is to ensure that all of the flow, pressure, and water quality requirements are met through the entire range. Please clarify what recoveries the RO trains will be expected to operate at and what projections are required.

RESPONSE: *Section 466323.13 has been modified in this addendum. The initial performance test recovery rate will be 92%. Range of recovery rates for the RO units will be 85% to 92%. Required projections have been modified as well and are detailed in Section 466323.13.*

65. QUESTION: In section 466323.13, subsection 1.04.A.6.b), the specification asks for 5 psi, but table 466323.13-3 asks for 6 psi. Please confirm what permeate backpressure should be used for design.
RESPONSE: *Permeate backpressure for design will be 10 psi. Section 466323.13 has been modified accordingly.*

66. QUESTION: The generator pad shown on S-RO-15 does not match the plan view shown on C-GD-1. It is our understanding that only one generator pad is required and no pad is required for the future Generator. If this is incorrect, please clarify by addendum.
RESPONSE: *This is correct. The civil drawings have been modified accordingly.*

67. QUESTION: The fuel tank pad shown on S-RO-15 does not match the plan view shown on C-GD-1. It is our understanding that only one fuel tank pad is required, and no pad is required for the future fuel tank. If this is incorrect, please clarify by addendum.
RESPONSE: *This is correct. The civil drawings have been modified accordingly.*

68. QUESTION: Please reference sheet S-RO-7. Please confirm that no W24x76 beams are required to run between Column Lines D and E from the corners of the first skylight opening (between Column Lines 1 and 2), as is currently shown. Similarly, please confirm that W24x76 beams are not required to run from Column Lines A to B from the second skylight opening (at Column Line 3). If these beams are required, please revise this drawing accordingly
RESPONSE: *W24x76 beams are required similar to other skylights. S-RO-7 is revised by the addendum.*

69. QUESTION: Specification Section 400561-2.2 is labeled "Tapping Valves and Sleeves" but the information given in this paragraph is only regarding tapping valves. Please provide via addendum applicable tapping sleeve information.
RESPONSE: *Information is provided in this Addendum.*

70. QUESTION: Reference Drawing C-SP-5 (Sheet 29): Just to the right of the center of this page is a note to remove 360 LF of buried pipe of unknown size and material. For estimating purposes, it is our understanding that this pipe will be no larger than 8" diameter, contain no hazardous materials, and have minimal bury (less than 3 feet bury). If this is incorrect, please address via addendum.
RESPONSE: *This is an acceptable assumption.*

71. QUESTION: Specification Section 330519-2.3.8 states that mechanical joint restraint systems using wedge style gripping system will be considered acceptable on a case by case basis as determined by engineer. The M drawings indicate for the buried ductile lines shown at the Structures to be MJ, but no restraint specifics are provided, and the fittings shown on the Yard

Pipe Drawings are not labeled. It is our interpretation that all buried ductile iron fittings, within the plant and as part of the incoming Raw Water line, are to be Mechanical Joint fittings with wedge style gripping restraints. If this is not correct, please notify us via addendum.
RESPONSE: *All new buried site piping shall have restrained joints. Per section 330519-2.3.2, "push-on rubber gasket, locking ring type joints" are to be used. However, mechanical joint restraint systems are an acceptable alternative.*

72. QUESTION: Butterfly Valves BFV-3500A/B/C/D/E/F, 3530A, 3540, and 3550 are not included in the Butterfly Valve Schedule provided in Specification Section 400564. Please provide revised Schedule via addendum. Additionally, it is our interpretation that the 60" BFV-3500D and 3500F are to be provided as direct buried valves and that no vaults will be required around these flanged valves. If this is not correct, please notify us via addendum and provide vault details.
RESPONSE: *BFV-3500E has been deleted in a previous addendum. The other valves have been added to the Butterfly Valve Schedule in this addendum. BFV-3500D is direct bury.*

73. QUESTION: Drawing I-RO-3 indicates for mag meter FE-4410 to be installed on the ROC line downstream of the Chemical Injection Manhole, but there is no mag meter vault indicted on the yard piping drawings. It is our interpretation that this mag meter is part of the Concentrate Outfall Contract and not part of the Plant Expansion contract. If this is not correct, please notify us via addendum and provide revised drawings indicting mag meter location.
RESPONSE: *The mag meter will be installed under the WTP Contract. Please see Figures 1 & 2 provided in this Addendum for clarification.*

74. QUESTION: Drawing C-YP-3 states to provide a new motor operator on the existing 48" BFV-6900, but no information is provided in Specification Section 40 05 64 or on the Drawings regarding actuator specifics or installation details. Please provide via addendum valve manufacturer, orientation, depth, and current means of actuation of the existing valve as well as details regarding the new actuator installation.
RESPONSE: *Refer to Section 400557 for electric motor actuator specifications. The existing 48" BFV is manually operated and has approximately 8 FT of cover. The manufacturer and orientation are unknown. The new electric actuator shall be mounted approximately 18"-24" above ground with a valve stem extension down to the operator nut.*

75. QUESTION: Drawing C-RW-4 states for the sample line from the RW chemical feed vaults to be 1-1/2" but Drawing C-YP-5 indicates for this sample line to be 1". It is our interpretation that this sample line is to be 1". If this is not correct, please notify us via addendum and provide revised drawings.
RESPONSE: *The suction line to the sample pump shall be 1.5". The discharge line to the WTP filter gallery shall be 1". The drawings have been modified accordingly in this addendum.*

76. QUESTION: Drawing I-RO-7 indicates for the buried Antiscalant pipe to be double walled pipe with a leak detector, but no specifications were provided for double walled pipe. It is our interpretation that this pipe is to be 3" Sch. 80 PVC field installed in a 6" Sch. 80 PVC pipe as indicated on Drawing C-YP-4 without spacers or utilization of a prefabricated double

containment system. Additionally, Drawing I-RO-7 only indicates for this double containment to be for the buried piping system, but Drawings M-RO-19 and 26 appear to state all AS pipe is to be double contained. It is our interpretation that only the buried AS pipe is to receive double containment and that all interior or exposed piping is to be single wall. If either of these are incorrect, please notify us via addendum and provide revised specifications for double contained pipe, fittings, valves, leak detection, termination and accessories.
RESPONSE: *The antiscalant pipe system shall be a 3"x6" Pro-Lock® pipe system by Asahi America, or equal. Double walled piping is required for all locations exterior to a chemical containment area, whether internal to a building, exposed, or buried. The bid documents have been revised to reflect this change in this addendum.*

77. QUESTION: The Chemical Injector Schedule on Drawing M-D-4 indicates for a new Zinc Orthophosphate injector to be installed at the Pre-Clearwell Vault, but there is no Zinc Orthophosphate work shown on Drawing M-RO-29 nor any new pipe running to this structure. It is our interpretation that this Chemical Injector was included in error and can be deleted. If this is not correct, please notify us via addendum and provide revised drawings indicating extent of Zinc Orthophosphate work.
RESPONSE: *This interpretation is correct. Drawing M-D-4 has been revised accordingly.*

78. QUESTION: Please refer to Sheet C-YP-5. Should fitting #450 be a 60" X 48" tee?
RESPONSE: *Yes, this sheet has been revised accordingly.*

79. QUESTION: Fitting number 450 on sheet C-YP-5 calls out a 60" tee. The drawing (left side) depicts a 60" x 48" reducing tee. Please clarify what type of tee fitting number 450 shall be.
RESPONSE: *See above answer.*

80. QUESTION: Please refer to Sheet C-YP-5. Is there a detail for the flushing connection MH @ area E3?
RESPONSE: *This flushing connection manhole was included by mistake and deleted in a previous addendum.*

81. QUESTION: Is there a detail for flushing connections in general?
RESPONSE: *No, such a detail is not required.*

82. QUESTION: Please refer to Sheet C-YP-2. Detail A/C-D-5 is shown in location C3 & D3. Is this detail reference correct?
RESPONSE: *This reference should be A/M-D-3. This sheet has been revised accordingly.*

83. QUESTION: Detail A on Drawing C-D-14 indicates for the Chlorine Injections at the Raw Water Chemical Injection Vault to be 1", but the Chemical Injection Nozzle Schedule on Drawing M-D-4 states for these injections to be 2-1/2". It is our interpretation that the Chlorine injectors at the Raw Water Chemical Injection Vault are to be 1". If this is not correct, please notify us via addendum and provide revised drawings.
RESPONSE: *This interpretation is correct. The Chemical Injection Nozzle Schedule has been revised accordingly.*

84. QUESTION: Detail A on Drawing C-D-14 indicates for the Chlorine Injections at the Raw Water Chemical Injection Vault to be 1", but the Chemical Injection Nozzle Schedule on Drawing M-D-4 states for these injections to be 2-1/2". It is our interpretation that the Chlorine injectors at the Raw Water Chemical Injection Vault are to be 1". If this is not correct, please notify us via addendum and provide revised drawings.
RESPONSE: *This interpretation is correct. The Chemical Injection Nozzle Schedule has been revised accordingly.*

85. QUESTION: No specifications were provided for the Tank Scales shown on Drawing I-RO-8. It is our interpretation that these scales are to be provided By Others similar to as noted for the chemical totes. If this is not correct, please notify us via addendum and provide applicable specifications.
RESPONSE: *This interpretation is incorrect. These scales are covered under Section 407346, "Load Cells".*

86. QUESTION: Specification Section 466323-3.4C states "all feed water piping up to the outlets of the pressure vessel feedwater connections shall be hydrostatically tested at 300 PSI (150 percent of the design operating pressure)", but this 300 PSI is higher than the specified pressure rating of various components in the feed water piping system. Additionally, the operating pressure is specified in Paragraph 2.3B.9 which would provide a test pressure of 225 psi at 150% of operating pressure. It is our interpretation feed piping is to be pressure tested to 225 psi. If this is not correct, please notify us via addendum.
RESPONSE: *Hydrostatic test pressure for the feed piping has been changed to 225 psi in Section 466323, subsection 3.4.C.*

87. QUESTION: Specification Section 466323.13 appears to contain information from the pre-selection process for the Membrane Elements. It is our interpretation that any and all references to any proposals, product data, cost, etc. information to be submitted with the Bid are not applicable to the Contractor's Bid and can be deleted. If this is not correct, please notify us via addendum.
RESPONSE: *Membrane elements to be supplied by MSS as part of the Contractor's bid. Updated Section 466323.13 is attached to this addendum.*

88. QUESTION: Drawing M-RO-9 indicates for the ARVs at the RO Feed pump can and on top of the 16" tee above the cartridge filter to be ½", but the ARV Schedule in Specification Section 400578.10 state for them to be 1". It is our interpretation that these valves are to be ½" per M-RO-9. If this is not correct, please notify us via addendum and provide revised drawings.
RESPONSE: *Provide 1-inch Air/Vacuum Relief Valves (AVRV) for the RO Feed Pump can and 1" Air Release Valves (ARV) for the 16" tee above the cartridge filters as specified in Section 400578.10. Drawing M-RO-9 has been modified in this addendum.*

89. QUESTION: Drawing I-RO-3 shows a 16" a blind flanged ROF and a 6" blind flanged ROC connection for "Future Unit 9&10" but the only apparent future connection is the 16" blind flange on the 16" ROF to the west of the building and a 12" south of where the ROs 2/4/6/8 ROC line connects to the 20" ROC line. It is our interpretation that no additional future connections

will be required other than those shown on M-RO-2. If this is not correct, please notify us via addendum and provide revised drawings.
RESPONSE: *Drawing M-RO-2 is correct. However, M-RO-2 and I-RO-3 show two (2) 16-inch blind flanges on the ROF pipes (one on each ROF pipe) for connection for future RO units 9 and 10. M-RO-2 shows one (1) 12-inch MJ cap on the 20-inch ROC pipe. I-RO-3 has been modified to remove the two (2) 6-inch blind flanges and show the 12-inch MJ cap. Please note that a 48-inch blind flange is to be provided on the ROP pipe for future connection to RO units 9 and 10.*

90. QUESTION: Specification Section 432620-2.4B.3.a states that the discharge manifold gate valves for the Permeate Water Pumping System are to be "Type GV3" per Section 400561, but this section does not include any information for a Type GV3 gate valve. Please provide applicable specifications via addendum.
RESPONSE: *Specification Section 400561 has been modified by addendum. Type GV3 gate valves are included in the revised specification.*

91. QUESTION: Drawing M-RO-30 indicates for CAV-4950 and ARV-4950A to both be 1", but the Air Release Valve Schedule in Specification Section 400578.10 (page 11) states for these valves to be 4" and 1.25" respectively. It is our interpretation that these valves are to be 1" per the drawings. If this is not correct, please notify us via addendum and provide revised drawings.
RESPONSE: *Provide 1" combination air valve for CAV-4950 and a 1" air release valve for ARV-4950A as shown on M-RO-30. The Air Valve schedule has been modified accordingly.*

92. QUESTION: Section 1 on Drawing M-RO-20 and the Permeate Flushing Tank detail on Drawing M-RO-21 appear to indicate for an air release valve to be installed on top of the 4" ROP fill line, but it is not labeled as such and no ARV is shown on I-RO-6 or listed in the ARV Schedule in Specification Section 400578.10 for the ROP tank fill line. It is our interpretation that no ARV will be required for this line. If this is not correct, please notify us via addendum and provide revised drawings and specifications.
RESPONSE: *Provide 1" air release valve for Permeate Flushing Tank fill line (ROP). P&IDs and Air Valve schedule will be modified accordingly.*

93. QUESTION: Specification Section 400506-3.3F states to "install flexible couplings and expansion joints at connections to equipment and where indicated on the Drawings," but no flexible connections are indicated for the chemical and Flush storage tanks, nor are they mentioned in Specification Section 434145. It is our interpretation that these tanks will not require flexible couplings or expansion joints. If this is not correct, please notify us via addendum and provide revised drawings indicating flexible connection requirements.
RESPONSE: *Provide flexible couplings on the outlet to pump piping for the CIP tanks and the permeate flush tank. The drawings have been modified accordingly.*

94. QUESTION: Specification Section 400506-3.3F states to "install flexible couplings and expansion joints at connections to equipment and where indicated on the Drawings," but the definition as to what constitutes "equipment" is unclear and there are many connections, such as those to the Cartridge Filters and all the connections to the RO Skids, for which no flexible coupling is shown. It is our interpretation that flexible couplings and expansion joints will only be required where indicated on the drawings. If this is not correct, please notify us via addendum and provide revised drawings indicting all required flexible couplings and expansion joints

RESPONSE: *See response to the previous question.*

95. QUESTION: In the response to Question #52 from Addendum #3, Drawing M-RO-16 was modified to state that the ROPR pipe after the valve is to be CPVC, but multiple other drawings that indicate for this pipe to be 316 SST were not modified. It is our interpretation that all pipe after the isolation valve from the ROP is to be CPVC and any references to "LR" 90's are to be standard CPVC 90s. If this is not correct, please notify us via addendum and provide revised drawings.
RESPONSE: *Correct. ROPR piping after the isolation valve is schedule 80 CPVC.*

96. QUESTION: Drawing I-RO-5 states that the CIPS piping is to transition from CPVC to SST after BFVs-4525A/C, but Drawing M-RO-19 appears to indicate for the piping to transition to SST after the Cartridge filter. It is our interpretation that the CIPS pipe is to transition to SST after the butterfly valves as shown on I-RO-5. If this is not correct, please notify us via addendum and provide revised drawings.
RESPONSE: *Correct. The CIPS piping is to transition to 316L SST after the isolation valves BFVs-4525A/C to protect the piping from the heat from the heater.*

97. QUESTION: Drawing M-RO-19 indicates for Victaulic couplings to be installed on the CPVC pipe between the Cleaning Pump and Cartridge filter, but neither Specification Section 40 05 06 or 40 05 31 provides any information regarding Victaulic couplings to be utilized on PVC pipe. Please provide via addendum applicable coupling specifications.
RESPONSE: *Provide stainless steel grooved coupling Victaulic Series 77S or equal. The callouts in M-RO-19 have been updated accordingly.*

98. QUESTION: Drawings M-RO-9 and 10 indicate for Detail 1/M-D-1 to be utilized for the 16" ROF penetrations through the slab, but no details are provided for all the other slab penetrations at the RO Building. It is our interpretation that no sleeve or "wall pipe" will be required for any slab penetrations except this 16" ROF shown on M-RO-9. If this is not correct, please notify us via addendum and provide revised drawings indicating applicable slab penetration details
RESPONSE: *Floor sleeves are required for any and all slab penetrations; a note has been added to Drawing M-RO-2 indicating the same. See Detail H on Drawing MD-1. In addition, per the drawing notes, pipes shall have a flanged, grooved coupling or HFAC above the slab within 2' of the slab.*

99. QUESTION: Drawing M-RO-10 indicates for the tank drain from TK-4501 to be butterfly valve BFV-4504, but Drawing I-RO-5 and the Ball Valve Schedule in Specification Section 400563 state for this to be a ball valve BV-4504 as well as BV-4505 for TK-4502. It is our interpretation that these drain valves are to be ball valves per 400563. If this is not correct, please notify us via addendum and provide revised Drawings and Specifications indicating correct valve type
RESPONSE: *Drain valves for CIP Tanks TK-4501 and TK-4502 are 6" butterfly valves type BFV3. BV-4504 and BV-4505 have been deleted from the ball valve schedule, and BFV-4504 and BFV-4505 have been added to the butterfly valve schedule.*

100. QUESTION: Section 1 on Drawing M-RO-23 appears to show a containment pipe on the 2" and 3" FE lines near the ceiling, but there are no notes describing any specific work required for this

run of pipe. It is our interpretation that this apparent containment pipe around the FE was drawn in error and can be deleted. If this is not correct, please let us know and provide revised detail for work required in this area.
RESPONSE: *Provide 2"x3" double containment and 3"x4" double containment pipes as shown on M-RO-23 for the pipes above the roll-up door opening. Callouts have been added to Drawing M-RO-23 to clarify.*

101. QUESTION: Drawing I-RO-1 indicates for AVRVs to be installed directly after the FE carrier water pumps, and the Air Release Valve Schedule in Specification Section 400578.10 indicates for there to be two (2) 1-1/4" AVRVs installed on the Carrier Water Pumps. However, Drawing M-RO-23 does not indicate for these AVRVs at the pumps, but rather indicates for three (3) ½" AVRVs to be installed at the high spot shown in Section 1. It is our interpretation that only the two (2) AVRVs at the pump will be required. If this is not correct, please notify us via addendum and provide revised drawings and Air Release Valve Schedule.
RESPONSE: *Provide the two (2) 1-1/4" AVRV between the carrier water pump discharge flange and the check valve and also provide the three (3) ½" at the high spots of the piping. The drawings and tables have been revised accordingly.*

102. QUESTION: Please refer to Section 013100 – Project Management and Coordination, Paragraphs 1.9.E.3.b.3 and 1.9.F.2.c.3 which reference BIM conflict resolution as an action item in various required Project meetings. It is our understanding that Building Information Modeling (BIM) is not an explicit contractual requirement and will be performed only at the option of the Contractor. If this is incorrect, please notify us via addendum and provide the Project's required BIM execution plan.
RESPONSE: *BIM conflict resolution is an available tool for either the Contractor or Engineer to use to avoid construction complications. It is not intended for the Contractor to utilize BIM but to be responsive to resolving BIM conflicts that are revealed by the Contractor, Owner, Subcontractors or Engineer.*

103. QUESTION: It is our understanding that all work required by Section 099724 – High Performance Concrete Coatings shall be completed under Unit Price Pay Item No. 6 – Clarifier Concrete Tank Repair – Flexible Polyurethane Coating. If this is incorrect, please notify us via addendum.
RESPONSE: *The work required of Unit Price Pay Item No.6 is defined in Section 030100.61.*

104. QUESTION: Specification Section 211119-3.2C states to install two protective bollards at each fire department connection, but no bollards are shown on the Site Plans or in Detail B/C-D-11 for the fire department connection near the Chemical Building. It is our interpretation that bollards will not be required. If this is not correct, please notify us via addendum and provide revised drawings.
RESPONSE: *Correct. Section 211119 has been modified accordingly.*

105. QUESTION: Specification Section 210529-3.7E states that stainless steel supports are to be used "for hostile environment applications," but there is no definition of what constitutes a hostile environment. It is our interpretation that stainless steel supports for the fire suppression

system will not be required. If this is not correct, please notify us via addendum and provide revised specifications indicating applicable support material requirements.
RESPONSE: *Section 210529 has been revised to clarify that "hostile environment applications" refers to applications in the Chlorine Building.*

106. QUESTION: Specification Section 220529-3.7E states to use "Type 316 stainless steel pipe hangers and supports and attachments for general service applications," but this conflicts with other portions of this Specification indicating steel material as well as the individual Sections as referred to in 3.7A. It is our interpretation that stainless steel supports for plumbing piping will not be required unless specifically indicated for on the drawings on individual piping Sections. If this is not correct, please notify us via addendum and provide detailed plumbing pipe support material schedule by area.
RESPONSE: *Stainless steel piping will be required in wet and corrosive environments (Chlorine Building, RO Building (including Membrane Room, Cleaning & Antiscalant Area, Pump Room, Spare Parts Room), Filter Gallery, Filters, and Emulsified Lime). Section 210529 has been revised to clarify these requirements.*

107. QUESTION: Specification Section 220533 contains references for electric heat tracing to be utilized for snow and ice melting on roofs, gutters, and downspouts, but no information is shown on the drawings indicating any snow and ice melt heat tracing. It is our interpretation that all references to snow and ice melting heat tracing in this Section was included in error and can be deleted. If this is not correct, please notify us via addendum and provide revised drawings.
RESPONSE: *This interpretation is correct. Section 220533 has been revised accordingly.*

108. QUESTION: Specification Section 221119-3.12H&I state that Type M copper is to be used for aboveground domestic water piping, but the Pipe Schedule on Drawing P-D-1 indicates for Type K. It is our interpretation that where copper pipe is indicated to be installed on the Pipe Schedule it is to be Type K. If this is not correct, please notify us via addendum
RESPONSE: *We assume this question is in reference to Section 221116, not 221119. This interpretation is correct, and Section 221119 has been revised accordingly.*

109. QUESTION: Specification Section 221316-3.6B states to provide stainless steel supports when in "corrosive environments" but no definition of what constitutes a corrosive environment is included. It is our interpretation that stainless steel supports will not be required for sanitary waste and vent piping. If this is not correct, please notify us via addendum and provide schedule of support material to be utilized in specific locations.
RESPONSE: Stainless steel piping will be required in corrosive environments (Chlorine Building, RO Building (including Membrane Room, Cleaning & Antiscalant Area, Pump Room, Spare Parts Room), Filter Gallery, Filters, and Emulsified Lime). Section 221316 has been revised to clarify these requirements.

110. QUESTION: Specification Section 221429-2.2 states for submersible sump pumps to be cast iron body, but the Basis of Design listed in the Sump Pump Schedule on Drawing P-D-1 is for an all

stainless-steel constructed unit. It is our interpretation that this sump pump is to be provided per Section 221429-2.2. If this is not correct, please notify us via addendum and provide revised specifications.
RESPONSE: *Pumps shall be stainless steel construction. Section 221429-2.2 has been replaced in this addendum.*

111. QUESTION: Specification Section 230529-3.7F states to provide stainless steel supports when in "corrosive environments" but no definition of what constitutes a corrosive environment is included. It is our interpretation that stainless steel supports will not be required for HVAC piping and equipment. If this is not correct, please notify us via addendum and provide schedule of support material to be utilized in specific locations.
RESPONSE: *Stainless steel piping will be required in hostile environmental applications (Chlorine Building, RO Building (including Membrane Room, Cleaning & Antiscalant Area, Pump Room, Spare Parts Room), Filter Gallery, Filters, and Emulsified Lime). Section 230529 has been revised to clarify these requirements.*

112. QUESTION: Specification Section 231113-2.3B states for fuel oil piping to be Sch. 40, but the Pipe Schedule on Drawing P-D-1 indicates for it to be Sch. 80. It is our interpretation that fuel oil piping is to be Sch. 40. If this is not correct, please notify us via addendum and provide revised specifications.
RESPONSE: *This piping shall be Sch. 80. Section 231113 has been revised accordingly.*

113. QUESTION: Specification Section 233113-2.5E provides information regarding antimicrobial coating for ductwork, but it is unclear if this paragraph is to be applicable to ductwork installed as part of this project. It is our interpretation that antimicrobial coating will not be required. If this is not correct, please notify us via addendum and provide a revised Duct Schedule indicating which ductwork is to receive this coating.
RESPONSE: *This interpretation is correct. Paragraph 2.5E has been removed in this addendum.*

114. QUESTION: Specification Section 230719-3.5 requires aluminum jacketing to be installed on all interior refrigerant and condensate piping insulation, but Specification Section 238129-2.16 indicates that no field installed jacketing is required as part of condensate and refrigerant piping installed as part of the VRF system. It is our interpretation that condensate and refrigerant piping insulation is to be installed per 238129 and will not require jacketing for interior installations. If this is not correct, please notify us via addendum and provide revised specifications.
RESPONSE: *Exposed interior installations will require jacketing within 7 feet of finished floor. Sections 230719 and 238129 have been revised accordingly.*

115. QUESTION: Specification Section 233116-2.1A.6 contains references to double wall insulated duct, but none of the FRP duct is indicated to be double walled. It is our interpretation that this paragraph was included in error and that all FRP duct is to be single walled. If this is not correct, please notify us via addendum and provide revised drawings and specifications indicating double wall requirements.

RESPONSE: *Paragraph 2.1.A.6 has been removed, and Section 233116 has been revised in this Addendum.*

116. QUESTION: No specifications in Division 23 were provided for the Big Ass Fans included in the Fan Schedule on Drawing H-D-1. Please provide applicable specifications via addendum.
RESPONSE: *Language has been added to Section 233423 for these fans.*

117. QUESTION: The Electric Unit Heater Schedule on drawing H-D-2 indicates for all the 480-volt unit heaters to be epoxy coated stainless steel, but specifications provided in Section 238239.19 state for unit heaters to be steel construction. Additionally, no specifications were provided for the 120 and 208 voltage wall heaters. Please provide applicable specifications via addendum.
RESPONSE: *Section 238239 has been revised to address the material construction of 480-volt unit heaters. 120- and 208-volt heaters shall be specified manufacturer or equal.*

118. QUESTION: If on-site excavated soil is allowable as common backfill for structures, large quantities of soil will need to be stockpiled on-site for later re-use. The project site has very little space available for temporary stockpiling of soil. Please advise of any nearby stockpile locations available through Brunswick County.
RESPONSE: *The County is amenable to opening up portions of the raw water pipeline alignment to temporary stockpiling of soils. However, if the Contractor wishes to use areas outside the proposed limits of disturbance and erosion control measures, they will have to provide additional erosion control, re-seeding and other measures accordingly. They must also limit activities to outside any wetland areas along this route.*

119. QUESTION: No Specifications were provided for the bag unloader shown on Drawing M-AB-2 and I-AB-1. It is our interpretation that this bag unloader is to be provided By Others. If this is not correct, please notify us via addendum and provide applicable specifications
RESPONSE: *No bag unloader is pictured on Drawing M-AB-2. The "Bulk Bag Unloader" on I-AB-1 was mislabeled and depicts a dry volume bag, to be supplied by others. Bags will be loaded on the bulk bag frame by a forklift. The bid documents have been revised to clarify.*

120. QUESTION: Do any of the pre-engineered metal canopies require insulation in the roof to prevent condensation? If so, what R value is required?
RESPONSE: *Pre-engineered canopies do not require insulation in the roof.*

121. QUESTION: Spec 13319-6 H.1. calls for Liner Panels: Tapered rib. Are these liner panels required on the underside of the purlins for the pre-engineered metal canopies on the clarifiers and filters, or is the underside of the purlins to be left open?
RESPONSE: *The liner panels are intended to cover the purlins on the bottom side of the canopies and shall be installed to fully cover the purlins with no exposed cavities in which wildlife could perch above the filter.*

122. QUESTION: Note 7 on sheet G-GN-7 states that all piping connections not specifically detailed in these drawings shall be submitted by the contractor to engineer as shop drawings for review

and approval. These submittals shall be prepared by a professionally licensed engineer registered in the state of North Carolina. The two major pipe manufacturers can perform these calculations, but their Professional Engineers are registered in the state of Alabama. Please confirm these calculations can be signed and sealed by a PE in the state of Alabama in lieu of North Carolina
RESPONSE: *Pipe calculations will only be approved for those prepared by a professionally licensed engineer in the State of North Carolina.*

123. QUESTION: Please confirm that all exposed sample and plant water lines are to be heat traced and insulated.
RESPONSE: *Confirmed. The drawings have been revised to include notes indicating the same.*

124. QUESTION: Please confirm that exposed Compressed Air piping at the Clarifier Basins does not require heat tracing or insulation.
RESPONSE: *Correct, no heat tracing or insulation is required for exposed compressed air piping near the clarifier basins.*

125. QUESTION: Please confirm the symbol/abbreviation "P" represents existing duct banks/electrical, see sheet C-YP-5.
RESPONSE: *Confirmed*.

126. QUESTION: Please confirm it is acceptable to move JB 123 to the west in order to avoid conflicts with the existing 30" BWD, see sheet C-YP-5.
RESPONSE: *Exact locations of Junction Boxes are subject to change to accommodate installation.*

127. QUESTION: Section 312333 part 3.8 I. states to use granular fill material around structures. Spread and compact specified backfill under and over pipes connected to structures. How far away from the structures shall granular fill be provided? How far up from the pipe invert is this required? How far is this required from the edge of the pipe to side of trench?
RESPONSE: *Refer to Section 312000 and civil pipe details.*

128. QUESTION: Detail A on sheet C-D-3 has a callout for filter fabric. Section 310519.13 defines what type of filter fabric to use. Please confirm all pipe bedding in all pipe trenches shall be fully wrapped with filter fabric.
RESPONSE: *Confirmed.*

129. QUESTION: The addendum response to a previous question states that buried flexible couplings on restrained lines are to be fitted with a restraint coupling. Please provide a detail and/or specification for an acceptable buried flexible coupling to include manufacturer, model, pressure rating, etc. Some options available may not provide the engineer's intent for flexibility and being fully restrained. Would a solid sleeve with megalugs be acceptable where ductile iron pipe is required?
RESPONSE: *Solid sleeve with megalugs would be acceptable.*

130. QUESTION: Sheet C-YP-1 note 7 requires (2) restrained flexible joints and/or couplings wherever a 3" diameter and larger pipe passes from concrete to earth. Are the flexible couplings depicted on sheet C-YP-7 (and various other locations) in addition to the (2) restrained joints requirement, or do the depicted flexible couplings satisfy this requirement?
RESPONSE: *As long as joints shown on the drawings allow for deflection due to settlement, additional couplings will not be required.*

131. QUESTION: Sheet C-YP-10 shows the invert of the 30" RW at the clarifiers to be roughly 55' (in the profile view). Sheet M-CL-7 shows the invert elevation of the 30" RW at the clarifiers to be 56.14'. Using 75% of the manufacturer's recommended deflection, additional fittings will be required. Please advise if the maximum manufacturer's recommended deflection can be used on this run to avoid adding extra fittings.
RESPONSE: *Deflection is not to exceed 75% of manufacturer's recommended maximum. Contractor can rotate fittings as needed to meet elevations shown on drawings.*

132. QUESTION: Please advise how the 1.25" sample line depicted on sheet C-YP-5 shall connect to the 60" DIP line (ie tapping saddle, boss on pipe, direct tap, etc).
RESPONSE: *Sample line can be connected via tapping saddle or boss on pipe. Contractor is responsible for meeting pipe pressure/leakage requirements following connection.*

133. QUESTION: Please provide the invert elevation for fitting 454 (16" buried 90 bend) on sheet C-YP-5.
RESPONSE: *The invert elevation for fitting 454 is 47.9.*

134. QUESTION: Note 6 on sheet C-YP-1 states to not exceed 80% of the manufacturer's recommended deflection for any joint. Note 7 on sheet C-RW-2 states that for curved pipe alignments, offset joints a maximum 75% of manufacturer's recommended joint deflection. Profile sheets C-YP-8 through C-YP-10 state that the maximum deflection for 48" diameter ductile iron pipe shall be 2 degrees and for 20" and 30" diameter ductile iron pipes the maximum deflection shall be 2.25 degrees. Specification section 330519 (DIP) part 3.3 A. 5. states that the joint deflection shall not exceed the manufacturer's recommendation. Specification section 330531.16 (PVC) part 3.3 C. 5. states that the joint deflection shall not exceed the manufacturer's recommendation Please clarify what the maximum deflection shall be for both ductile iron pipe and C900 for all required diameters
RESPONSE: *Deflection of ductile iron pipe shall not exceed 75% of manufacturer's recommended maximum. The bid documents have been changed accordingly.*

135. QUESTION: Please provide a manhole, vault and chemical junction box schedule.
RESPONSE: *A manhole schedule will not be provided. Information is available on the drawings and in the specifications.*

136. QUESTION: Detail H on sheet M-D-5 shows MH 115 to be 4'-0" inside diameter. On sheets C-YP-9 and C-YP-5 the manholes scale to roughly 7'-0" diameter. Please confirm the diameter of all manholes shall be 4'-0" unless noted otherwise
RESPONSE: *MH 115 should be 7FT diameter. Detail H on M-D-5 has been changed accordingly.*

137. QUESTION: Details A and E on sheet C-D-5 have (2) callouts showing the inside diameter. (1) says '4'-0" min' and (1) says '5'-0" with'. Please clarify what the 5'-0" with comment is referencing
RESPONSE: *Manhole widths are to be 4'-0" minimum but may need to be larger as needed. The text '5'-0" with' has been removed from these two details.*

138. QUESTION: Please provide a pipe schedule
RESPONSE: *A piping schedule will not be provided. Information is available on the drawings and in the specifications.*

139. QUESTION: Please confirm that ARV manholes and chemical vaults, manholes and junction boxes are not required to receive plastic/stainless steel sewer linings.
RESPONSE: *Confirmed.*

140. QUESTION: The response to question #44 in addendum #3 clarified the interior linings and exterior coatings for sanitary manholes, storm drainage structures and vaults. Please clarify what coatings and linings are required for precast structures that have not been addressed. For example, what type of coatings and linings are required for the manholes on the sludge lines (i.e. MH 112 - MH 115).
RESPONSE: *No interior coatings are required on these structures; exterior damp proofing will be required.*

141. QUESTION: Please advise if precast structures for chemical pipe shall receive any linings/coatings.
RESPONSE: *No interior coatings are required on these structures; exterior damp proofing will be required.*

142. QUESTION: Please provide a callout for the chemical lines between the following junction boxes: 109-110; 113-114.
RESPONSE: *Callouts for these lines have been added to the drawings*.

143. QUESTION: Please confirm MH 115 and MH 112 shall be per detail A on sheet C-D-5, not detail E on sheet C-D-5.
RESPONSE: *Confirmed*.

144. QUESTION: There is a callout on sheet C-SP-1 that states there is existing wetlands and to protect them in place. The new 18" concentrate runs very close to the wetlands, see C-YP-3. The 18" concentrate is within the existing fence, and the wetlands are just outside the fence. Please advise exactly what provisions need to be included to protect the wetlands. For

example, is additional silt fence in this area enough to satisfy the requirements or are there any other specific requirements (ie permits, mitigation, etc.)?
RESPONSE: *Refer to permit requirements for wetland protection.*

145. QUESTION: Sheet C-D-14 calls out the pipe on the south side of the raw water chemical injection vault to be 8", while C-YP-5 calls this out as 6". Please clarify the size of this line.
RESPONSE: *This line should be 8" diameter. Drawing C-YP-5 has been revised accordingly.*

146. QUESTION: The response to question # 41 in addendum #3 states that buried PVC requires DIP fittings w/megalugs and thrust blocks at each fitting and individual restraints at the piping joints will not be required. Please confirm this applies to the 18" concentrate line and that no bell restraints are required for the pipe joints.
RESPONSE: *Confirmed.*

147. QUESTION: Specification section 400551 part 2.2 B. states to provide mechanical position indicators for power actuated and gearbox actuated valves. Please confirm that position indicators are required for all buried valves
RESPONSE: *Confirmed.*

148. QUESTION: Specification section 330531 Part 2.2 B. 3. states to use C110 DIP mechanical joint fittings for water mains. Please confirm C153 DIP mechanical joint fittings are acceptable.
RESPONSE: *The fittings need to be C110 MJ.*

149. QUESTION: Specification Section 330531-2.2B.3 states that C110 MJ fittings are to be utilized for PVC water mains, but C153 fittings are allowed in Specification Section 33 05 19-2.4. It is our interpretation that C153 fittings will also be allowed for PVC pressure piping. If this is not correct, please notify us via addendum.
RESPONSE: *See above response.*

150. QUESTION: The 18" concentrate line drops roughly 9'-0" between fittings 424 and 423 as depicted on sheet C-YP-5. The maximum manufacturer's recommended deflection for 18" C900 is 4" per 20'-0" stick of pipe. There are roughly (15) sticks of pipe between these fittings. At the maximum allowed deflection per the manufacturer's recommendations the max elevation change that can be achieved in this run is roughly 5'-0". Please confirm that additional fittings will be required for this change in elevation
RESPONSE: *Change in elevation can be made either through the use of additional fittings or by rotating fittings 423 and/or 424.*

151. QUESTION: Spec section 330531.16 calls out PVC fittings and DIP fittings for water mains. Please advise if the 18" concentrate line requires DIP fittings or PVC fittings.
RESPONSE: *The 18" concentrate line requires DIP fittings.*

152. QUESTION: Specification section 330519 part 2.3 11. states that buried sleeve-type couplings are required to be wrapped with a material by DENSO. Please clearly define what is considered a buried sleeve-type coupling (ie solid sleeve, flexible coupling, dresser coupling, etc.).
RESPONSE: *Section 330519 has been revised accordingly.*

153. QUESTION: Specification section 330519 part 3.3 B. states to encapsulate all bolts and nuts using wax sealing tape. Please confirm all buried hardware (including hardware for megalugs) shall be encapsulated in wax sealing tape in addition to the pipe being fully wrapped in polywrap.
RESPONSE: *Confirmed.*

154. QUESTION: Specification section 330519 part 2.5 a. 2. requires double cement lining. No other interior linings are called out in this section. Please confirm all ductile iron pipe and fittings shall receive double cement interior lining. Exhibit A is included in this section but is to be used as reference only. Exhibit A references other interior linings but it is not specific to the pipe services for this project. Some of the common uses for the linings apply to multiple different types of interior linings.
RESPONSE: *Double cement interior lining is required unless otherwise called for.*

155. QUESTION: Please confirm the basis of the cost for the buried DIP wall thickness shall be per specification section 330519 part 2.2 D. and that all buried DIP shall be fully restrained. If the thickness is required to change after design calculations are performed, a change order shall be issued.
RESPONSE: *Basis of cost shall encompass the whole of the project drawings and specifications. Refer to previous response confirming restrained requirements for all buried DIP.*

156. QUESTION: Spec section 330519 part 2.3 8. states that the pipe manufacturer's proprietary mechanical joint restraint systems that utilize a wedge-style gripping system or a gland/ring positive restraint system will be considered acceptable on a case by case basis as determined by the engineer. Please confirm: (1) Are megalugs acceptable at all buried valves as per industry standards? If this is not acceptable, please confirm that MJ coupled joints are required at all buried valves or change these valves to flanged. (2) (MJ) is called out in several locations on the drawings (see M-FL-1). Are mechanical joint fittings with megalugs or gland/ring positive restraint systems acceptable for all buried fittings as per industry standards?
RESPONSE: *Both (1) and (2) are confirmed.*

157. QUESTION: Spec section 330519 part 1.11 states to “furnish two 1 year manufacturer's warranty for ductile iron pipe and fittings.” Please confirm this is intended to read "furnish a 1 year manufacturer's warranty for ductile iron pipe and fittings".
RESPONSE: *Confirmed. This typographical error has been fixed in this addendum.*

158. QUESTION: Section 2 on sheet M-CL-12 appears to show new fittings between the existing pipe and the 90 bend for the riser. Please provide a plan view of the 8" drain line under the blowdown sumps.

RESPONSE: *See East Sludge Blowdown Sumps 1 and 2 on M-CL-8 and West Sludge Blowdown Sumps 1 and 2 on M-CL-11.*

159. QUESTION: The layout of the 6" DR does not match on sheets C-YP-5 and M-RM-1, please clarify which sheet shall override.
RESPONSE: *Provide 6" DR layout per C-YP-5 and cleanouts per M-RM-1.*

160. QUESTION: Sheet M-CL-7 shows the 30" RW invert to be 56.14' and section 3 on sheet M-CL-12 shows the centerline to be 56.14', please clarify.
RESPONSE: *Per Section 3 on M-CL-12, CL EL. of the 30" RW will be 56.14'. The drawings have been revised to clarify.*

161. QUESTION: *Sheet M-CL-7 shows the inverts of the (2) 30" RW lines to be at two different elevations (56.14' and 54.14'). Please confirm that these two lines shall be at the same invert elevation and clarify which invert the lines shall be at.*
RESPONSE: *Confirmed, both lines will be at the same elevation. Inv. El. of both lines will be 54.89'. The drawings have been revised accordingly.*

162. QUESTION: Sheet M-RM-1 has a callout for a cleanout on the 4" containment pipe with (1) 1" polymer line. Please confirm this is a typo, or provide a detail depicting how to install the cleanout on the containment pipe.
RESPONSE: *Provide cleanouts on each of the (2)-1" polymer lines in JB 116. The drawings have been revised to clarify.*

163. QUESTION: As they are not mentioned in Section 013513.54 – Special Procedures for the Maintenance of Plant Operations and Sequence of Construction, it is our interpretation that the sludge drying beds are not in service and can be demolished at any time. If this is incorrect, please provide the MOPO parameters necessary to estimate any temporary operations that may be required.
RESPONSE: *The sludge drying beds are not a critical component for plant operations and therefore can be demolished at any time.*

164. QUESTION: The existing masonry pipe supports shown to be removed on Drawings S-CL-2 & S-CL-3 are called out as "not anchored". It is our understanding that these 12" x 12" x 18"h block supports can simply be pushed over, thus patching of the slab underneath will not be necessary. Please address in a future addendum if this is incorrect.
RESPONSE: *For bidding purposes, the Contractor should assume that patching of the existing concrete will not be required beneath the masonry block pipe supports.*

165. QUESTION: Detail D/C-D-3 indicates for SST corporation stops to be installed on the tapping saddles, but no specifications were provided for corporation stops. Please provide applicable specifications via addendum.
RESPONSE: *Section 400561 has been revised to include corporation stops.*

166. QUESTION: The Aluminum Slide Gate Schedule in Specification Section 40 05 59.21 states that all gates are to be self-contained but Drawing M-BET-2 indicates these gates are to be non-self-contained. Additionally, the M-BET drawings refer to these gates as "Sluice Gates." It is our interpretation that the Backwash Tank gates are to be non-self-contained, surface mounted slide gates. If this is not correct, please notify us via addendum and provide revised drawings.
RESPONSE: *These gates are to be non-self-contained slide gates. The relevant documents have been changed accordingly.*

167. QUESTION: Please Reference Specification Section 083323 – Overhead Coiling Doors:
    a. Paragraph 2.3E calls for Aluminum curtain but the door schedule on drawings A-RO-22 says steel. It is our interpretation Aluminum is required. Please respond with addendum if this is incorrect.
    RESPONSE: *Aluminum is required, drawing revised per this addendum.*
    b. Paragraph 2.3I2 calls for between jamb mounted doors but drawings show face of wall mount doors. It is our interpretation between jamb mounted doors are not required and face of wall mounted doors are applicable. Please respond with an addendum if this is incorrect.
    RESPONSE: *Face of wall is correct, specification revised per this addendum.*
    c. Paragraph 2.3L4 calls for exterior, dusty, wet, or humid motor exposure. It is our interpretation this will require a Nema 3 rating. If this is incorrect, please respond with addendum.
    RESPONSE: *NEMA 3R is the correct duty rating, specification revised per this addendum.*
    d. Paragraph 2.4B calls for jamb guides to be same material and finish as doors but paragraph 2.3H calls for stainless steel guides. It is our interpretation the jamb guides are to be the same material and finish as doors. If this is incorrect, please respond with addendum.
    RESPONSE: *Jamb guides to be the same material and finish as doors, specification revised per this addendum.*
    e. Paragraph 2.10C1 calls for a jackshaft, Center Mounted motor, but drawings call for front of hood motor mount location. It is our interpretation to use a Jackshaft, center mounted motor. If this is incorrect, please respond with an addendum.
    RESPONSE: *Door Operator shall be top of hood or front of hood mounted as shown on the drawings, specification revised per this addendum.*

168. QUESTION: Please Reference Specification Section 083613 – Sectional Doors
    f. Paragraph 1.3D & 1.8 calls for products to comply with Florida Building Code and wind-borne debris region requirements. It is our interpretation Florida Building Code and wind-borne debris region requirements are NOT required and that Local wind load requirements are acceptable. If this is incorrect, please respond with addendum.
    RESPONSE: *Florida state product approval is required per 1.3D. Florida Building Code wind-borne debris region requirements not required, specification revised per this addendum.*
    g. Paragraph 2.34 calls for exterior, dusty, wet, or humid motor exposure. It is our interpretation this will require a Nema 3 rating. If this is incorrect, please respond with addendum.
    RESPONSE: *NEMA 3R is the correct duty rating, specification revised per this addendum.*

169. QUESTION: Please Reference Drawing A-FL-4 (Sheet 78). Keynote 245 (Two Hundred Forty-Five) per drawing A-FL-4 calls for "protection board" on concrete foundation walls. It is our interpretation ONLY protection board is required at the concrete foundation walls. If this is not correct, please notify us via addendum and provide revised drawings
RESPONSE: *Protection board is part of the bituminous dampproofing system and shall be located/installed as specified in Specification Section 071113 Bituminous Dampproofing.*

170. QUESTION: Please Reference Specification Section 081500 – Fiberglass Reinforced Plastic Doors and Frames. Paragraph 1.5E & 1.8 calls for products to comply with Florida Building Code and wind-borne debris region requirements. It is our interpretation Florida Building Code and wind-borne debris region requirements are NOT required and that Local wind load requirements are acceptable. If this is incorrect, please respond with addendum.
RESPONSE: *Florida state product approval is required per 1.5E. Florida Building Code wind-borne debris region requirements not required, specification revised per this addendum.*

171. QUESTION: Please Reference Specification Section 084113 – Aluminum-Framed Entrances and storefronts. Paragraph 1.4G & 1.9 calls for products to comply with Florida Building Code and wind-borne debris region requirements. It is our interpretation Florida Building Code and wind-borne debris region requirements are NOT required and that Local wind load requirements are acceptable. If this is incorrect, please respond with addendum.
RESPONSE: *Florida state product approval is required per 1.4G. Florida Building Code wind-borne debris region requirements not required, specification revised per this addendum.*

172. QUESTION: Please Reference Specification Section 084523 – Fiberglass-Sandwich-Panel Assemblies. Paragraph 1.4E & 1.9 calls for products to comply with Florida Building Code and wind-borne debris region requirements. It is our interpretation Florida Building Code and wind-borne debris region requirements are NOT required and that Local wind load requirements are acceptable. If this is incorrect, please respond with addendum.
RESPONSE: *Florida state product approval is required per 1.4E. Florida Building Code wind-borne debris region requirements not required, specification revised per this addendum.*

173. QUESTION: Please Reference Specification Section 085113 – Aluminum Windows. Paragraph 1.4E & 1.8 calls for products to comply with Florida Building Code and wind-borne debris region requirements. It is our interpretation Florida Building Code and wind-borne debris region requirements are NOT required and that Local wind load requirements are acceptable. If this is incorrect, please respond with addendum.
RESPONSE: *Florida state product approval is required per 1.4E. Florida Building Code wind-borne debris region requirements not required, specification revised per this addendum.*

174. QUESTION: Please Reference Specification Section 086300 – Metal-Framed Skylights. Paragraph 1.4F & 1.8 calls for products to comply with Florida Building Code and wind-borne debris region requirements. It is our interpretation Florida Building Code and wind-borne debris region requirements are NOT required and that Local wind load requirements are acceptable. If this is incorrect, please respond with addendum.

RESPONSE: *Florida state product approval is required per 1.4F. Florida Building Code wind-borne debris region requirements not required, specification revised per this addendum.*

175. QUESTION: Please Reference Specification Section 089119 – Fixed Louvers. Paragraph 1.5B & 1.7 calls for products to comply with Florida Building Code and wind-borne debris region requirements. It is our interpretation Florida Building Code and wind-borne debris region requirements are NOT required and that Local wind load requirements are acceptable. If this is incorrect, please respond with addendum.
RESPONSE: *Florida state product approval is required per 1.5B. Florida Building Code wind-borne debris region requirements not required, specification revised per this addendum.*

176. QUESTION: Contact drawing M-RO-17 shows Butterfly Valve BFV-4211 installed on a 10" CIPS-316SST line that ties into a 12" ROF line. Drawing I-RO-4 shows the same valve being installed on a 10" CIPR-CPVC line that ties into the 12" ROF line. Also, on drawing M-RO-17, along the left-hand side of the membrane unit, the section view shows a 10"-CIPR line run at elevation at 44.25 tee up through the slab. Above the slab the designation of the line changes to CIPS. This same line feeds three butterfly valves that are labeled as BFV-4213A, - 4213B, -4213C. These same valves on drawing I-RO-4 are located on a 10"-CIPS line. It appears the CIPS and CIPR lines at the membranes are either mislabeled or misdrawn. Please provide revised drawings showing the correct designation or routing of these lines.
RESPONSE: *The CIPS and CIPR piping designate clean-in-place "supply" and "return" lines, respectively. The same lines will switch designation depending on the RO stage being cleaned. For example, the return line for Stage #1 cleaning becomes the supply line for Stage #2 cleaning, thus changing the designation. Further, the piping designation between CIPR and CIPS will depend on the specific design of the RO Units provided by the MSS*

177. QUESTION: Drawings C-YP-3 and I-PS-1 indicate for new CL2S pipe to be run to the existing Chlorine Feed Vaults #1 and 2, but there are no chemical injectors listed in the schedule on Drawing M-D-4 for chlorine at these locations. It is our interpretation that the new CL2S pipe is to connect to existing chemical piping at these feed vaults. If this is not correct, please notify us via addendum and provide a revised Chemical Injector Schedule.
RESPONSE: *This interpretation is correct. Contractor shall disconnect the existing pipe outside the vault and connect the new pipe. Drawing C-YP-3 has been annotated for clarity.*

178. QUESTION: Drawing C-YP-3 indicates for a new 1-1/2" CL2S and 1" CLO2 pipe to be run to the existing pipe vault east of the Chemical Spill Structure, but Drawing M-RO-29 does not show any new piping inside this vault and no new Chemical Injectors for this location are included in the Schedule on drawing M-D-4. It is our interpretation that the new CL2S and CL02 pipes are to connect to existing directly on the inside of the existing pipe vault. If this is not correct, please notify us via addendum and provide revised drawings.
RESPONSE: *This interpretation is correct.*

179. QUESTION: Drawings M-GT-5 and I-GT-2 indicate for two (2) new 1" Polymer Lines to be ran to the Thickener Feed Pump Station, but the Yard Pipe drawings and Drawing I-AB-3 do not show

any polymer being run to this Pump Station. Please provide revised drawings indicating new polymer line requirements.
RESPONSE: *Drawing C-YP-2 has been revised to show these polymer lines.*

180. QUESTION: The Plan view of the Recycle Pump Station on Drawing M-REC-1 references Note 1 which states to demolish existing 16"x8" reducing 90 bend and 16" REC as required. Drawing C-SP-1 appears to show the existing line as being 12". In addition, the plan view calls for the 6" pipe to be capped and abandoned in place. Drawing C-SP-1 shows this line as 4". It is our interpretation that Drawing C-SP-1 is correct for both items. Please address in a future addendum if this is incorrect.
RESPONSE: *M-REC-1 has been revised to clarify the existing line and fitting are 12" and 12"x8", respectively. Mechanical as-builts show a 6" DI pipe connecting to the recycle pump station structure. Contractor should assume existing pipe is 6" diam. at this location for costing purposes.*

181. QUESTION: Please note the following exceptions to 466323.2.9 Interstage Booster Pumps:
    a. 2.9.A Internal coating not applicable.
    b. 2.9.C Pump material shall be as specified below. Flowserve is not responsible for chemical application.
    c. 2.9.J.1.c Pump casing shall have integrally cast feet that do not allow for rotation to accommodate different piping arrangements.
    d. 2.9.J.3.b Flange finishes shall comply with ANSI B16.5, Class 150.
    e. 2.9.J.3.c Pump configuration shall be centerline top discharge.
    f. 2.9.J.4 No casing wear rings are available for this model pump.
    g. 2.9.J.7 Handholes are not applicable for this model pump.
    h. 2.9.J.8 Suction head not applicable. Rear cover shall be provided as backhead.
    i. 2.9.K.1 The impeller shall not contain ports.
    j. 2.9.K.3 No impeller wear rings are available for this model pump.
    k. 2.9.M.3 Bearings shall exceed B10 life of 17,500 hours.

RESPONSE: *Please see attached Section 466323.00 as revised.*

182. QUESTION: Please note the following exceptions to 466323.2.14.G CIP Pump:
    a. 2.14.G.1. Internal coating not applicable. VFD and gauges to be provided by others.
    b. 2.14.G.9.a Pump material shall be as specified below. Flowserve is not responsible for chemical application.
    c. 2.14.G.10.a Pump casing shall have integrally cast feet that do not allow for rotation to accommodate different piping arrangements.
    d. 2.14.G.10.c.2 Flange finishes shall comply with ANSI B16.5, Class 150.
    e. 2.14.G.10.c.3 Pump configuration shall be centerline top discharge.
    f. 2.14.G.10.d No casing wear rings are available for this model pump.
    g. 2.14.G.10.e Cleanout ports are not applicable for this model pump.
    h. 2.14.G.11.c No impeller wear rings are available for this model pump.
    i. 2.14.G.13.c Bearings shall exceed B10 life of 17,500 hours.
    j. 2.14.G.13.g Suction cover wearing rings not applicable.

RESPONSE: *Please see attached Section 466323.00 as revised.*

183. QUESTION: Please note the following exceptions to 466323.2.15.E Permeate Flush Pump
    a. 2.15.E.1. Internal coating not applicable. VFD and gauges to be provided by others.
    b. 2.15.E.9.a Pump casing shall have integrally cast feet that do not allow for rotation to accommodate different piping arrangements.
    c. 2.15.E.9.c.2 Flange finishes shall comply with ANSI B16.5, Class 150.
    d. 2.15.E.9.c.3 Pump configuration shall be centerline top discharge.
    e. 2.15.E.9.d No casing wear rings are available for this model pump.
    f. 2.15.E.9.e Cleanout ports are not applicable for this model pump.
    g. 2.15.E.10.c No impeller wear rings are available for this model pump.
    h. 2.15.E.12.c Bearings shall exceed B10 life of 17,500 hours.
    i. 2.15.E.12.g Suction cover wearing rings not applicable.

    RESPONSE: *Please see attached Section 466323.00 as revised.*

184. QUESTION: The project appears to use the Flowserve Mark 3 as the design basis but the plans show tangential discharge. Can the piping connections be arranged in order to use the non-tangential discharge?
    RESPONSE: *Piping connections are responsibility of MSS. Alternate configurations will be acceptable.*

185. QUESTION: Section 466323 states "The RO membrane system equipment covered by this specification is intended to incorporate standard RO membrane elements and standard RO equipment designs." Whose standard design is this based on? This is a large system that would not be a standard design for most system suppliers.
    RESPONSE: *8-inch elements should be used as described in Section 466323.00 and Section 466323.13. While design is custom to this application, standard materials and equipment should be used to the extent feasible.*

186. QUESTION: Section 466323 states "Pressure vessels to be manufactured by same manufacturer. Equipment is for both continuous and intermittent service at the maximum operating pressure." Pressure vessels to be manufactured by same manufacturer as what? We are not understanding this requirement.
    RESPONSE: *Refer to addendum for clarification.*

187. QUESTION: Section 466323.3.2, G states that fiberglass pressure vessels shall not be painted. This conflicts with 2.7, J - All vessels shall be painted in the factory with high gloss urethane coating or approved equal. Paint coatings must be opaque to light.
    RESPONSE: *Refer to addendum for clarification. Vessels will require high gloss urethane coating or approved equal.*

188. QUESTION: As per the provided P&ID I-RO-5, CIP tank drain valves (Tag BV-4504 and BV-4506) are 6" ball valve type. Please clarify if these valves are to be butterfly type.
    RESPONSE: *This has been clarified in an earlier response, they are to be butterfly-type.*

189. QUESTION: The interstage booster pumps, CIP pumps and permeate flushing pumps shall be NSF 61 approved. However, Sulzer informed us that the RO pumps they normally quote (CPE, MBN, etc) are not NSF61 approved. Will you accept NON-approved/certified NSF61 pumps?
RESPONSE: *Wetted materials for these pumps shall be NSF61 certified.*

190. QUESTION: Please confirm the suction pressure for the interstage booster pump. The NPSH on the spec seems low.
RESPONSE: *Refer to addendum for clarification.*

191. QUESTION: The interstage booster pump has 3 flow conditions specified. The specs require the pump to operate continuously at any point. However, it is difficult to find a selection complying with this requirement because the flow range is too wide (6:7:1). The best pump that can be found is a pump that can meet the rated and max flow continuously, but the min flow can only be operating for a short time.
RESPONSE: *Refer to addendum for revised flow requirements.*

192. QUESTION: Is it intentional for permeate flushing pump to have the same performance as the CIP service?
RESPONSE: *Correct, this is intended.*

193. QUESTION: Can the RO trains sit on pads or are they to be directly on the floor?
RESPONSE: *Either is acceptable. MSS supplier is cautioned on maximum height restrictions and trench drain locations.*

194. QUESTION: Is it the intent of the owner/engineer to have the RO trains shop assembled to the greatest extent possible and shipped to site with vessels and piping mounted? If that is the intent it should be stated in Part 3 – Execution. A tree type design is shown in the drawings, but this would greatly increase the time required for onsite assembly and installation.
RESPONSE: *Please see answer to an earlier question. The RO trains may be shop or field assembled.*

195. QUESTION: The membrane Warranty was revised to 3 years per Add #3, but please clarify if these references to Year 5 should be revised to Year 3:
    a. Spec 466323.13, 2.2 MEMBRANE SYSTEM CONFIGURATION, Q. : "*The eight 5.14mgd… with a feedwater pressure less than… 150-psi (fouled membranes, <u>Year 5</u>)*" We assume Year 3.
    b. Spec 466323.13, 1.04 SUBMITTALS, A.6.a. 3) and 4). : "*one set which utilizes the projected feedwater quality, <u>five (5)</u> year old membranes…*"
    c. Spec 466323.13, ATTACHMENT A, column 7 and column 12 where Membrane Element Age (continuous operation) = <u>5 years</u>. We assume these columns can be deleted.

RESPONSE: *Section 466323.13 has been modified to consistently refer to a three year warranty period.*

196. QUESTION: Spec 466323-14, 2.3 OPERATING CONDITIONS AND REQUIREMENTS, B.17.: "*Amount of spare space to be provided with each unit to accommodate the installation of additional*

membrane modules in the future – 10". This does not match the requirements of the Membrane Module Specification. Please clarify 10% extra space is not required.
RESPONSE: *The 10% requirement has been removed.*

197. QUESTION: Please clarify this reference to Maximum Flux in Spec 466323, 1.4.G. should be deleted and design per the pilot at 14.1gfd. "*The maximum flux in any element shall be limited to 25-gal/sq-ft/day or the maximum recommended value for the specific membrane element model provided by the MEM, whichever is the lowest."*
RESPONSE: *The 25 gfd is in reference to any individual element, not the average system flux.*

198. QUESTION: Can PVC or CPVC be used instead of SST for permeate manifold?
RESPONSE: *Basis for Contractor bid shall be stainless steel.*

199. QUESTION: Design flow rate for RO Permeate Flushing pump is between 620 gpm and 1,650 gpm. This flow rate is too high for permeate flush purpose. Permeate flush is done on all stages at the same time. The max flow rate recommended per pressure vessel on stage 3 is 20 gpm during permeate flush. For 16 PVs, this gives 320 gpm max flow rate for the permeate flush pump.
RESPONSE: *Permeate flushing will also generate permeate to be returned through the flushing system. The flow by Stage 3 will be less than the pump flow. MSS may submit alternate configuration for flushing system, provided design intent is achieved.*

200. QUESTION: Section 466323 states CIP Pump materials, including the coating in the pump shall be NSF 61 approved. NSF 61 certification is only valid for fluid temperature up to 90°F and maximum temperature for CIP solution is 113°F. Please clarify this requirement.
RESPONSE: *Wetted materials for these pumps shall be NSF61 certified.*

201. QUESTION: Minimum Flow rate required for the interstage booster pump is 192 gpm. The flow rate of 192 gpm is the minimum flow rate required for the final concentrate of Stage 3 (12 gpm *16 PVs = 192 gpm). This cannot be the minimum feed flow rate for Stage 3. Please review this requirement.
RESPONSE: *Minimum flow point on the pump curve is not intended primary operating point.*

202. QUESTION: MSS will provide CIP components and instrumentation as per PID I-RO-5. The valves and interconnecting piping will be provided by CONTRACTOR. Please confirm.
RESPONSE: *Refer to "M-RO" sheets and Section 466323.00 for responsibility definitions between MSS and GC.*

203. QUESTION: MSS will provide Permeate Flushing components and instrumentation. The valves and interconnecting piping will be provided by CONTRACTOR. Please confirm.
RESPONSE: *Refer to "M-RO" sheets and Section 466323.00 for responsibility definitions between MSS and GC.*

204. QUESTION: For Table 466323.13-3: 150 psi max. feed pressure - Line 3.09.L.3 says transmembrane pressure, but the table says feed pressure.
    - Does 150 psi feed pressure include permeate back pressure?
    - Does this requirement apply to entire warranty period or the startup performance test only?
    - We expect warranty value for feed pressure performance warranty would be higher than 150 psi and expected to be around 190 psi. Would this deviation be acceptable?

    RESPONSE: *Refer to clarification in updated specifications. 150 psi feed pressure includes permeate backpressure, and this requirement applies to the startup performance test. Projection should be provided by MEM indicating feed pressure requirements at Year 1 and 3 conditions.*

205. QUESTION: 1.06.A.2 & 3.09.D.3: Recovery for performance test is listed at both 90 and 92%. Which value should be design basis?
    RESPONSE: *The initial performance test recovery rate will be 92%.*

206. QUESTION: Please refer to Specification Section 01 35 13.54. Paragraph 1.2.C.8 indicates the period of Clarifier Work to be From November 1 through February 28, a duration of approximately seventeen (17) weeks. Paragraphs 1.4.I and 1.4.3, however, state a twelve (12) week shutdown for Clarifier Work. It is our understanding that the period of Clarifier Work is approximately seventeen (17) weeks from November 1 through February 28. If this is incorrect, please notify us via addendum.
    RESPONSE: *The period for clarifier work is November 1 through February 28.*

207. QUESTION: Please refer to Paragraph 1.2.C.8 of Section 01 35 13.54 which states that Clarifier Repair Work can only be completed between November 1 and February 28 of each calendar year. The scope of work for each set of Clarifier Repairs includes, but is not limited to, isolation and shutdown of clarifiers; structural, mechanical, and electrical demolition; new structural concrete; concrete repairs; the coating of all new and repaired concrete surfaces (which cannot be applied to concrete surfaces until they have cured for 30 days per 099724.3.4.C.D); installation of new clarifier equipment and associated process mechanical piping; installation of electrical and control provisions; and start-up and testing. It is not feasible to complete this scope of work within the current allowable work period even if multiple shifts/extended resources are committed to this Work. It is therefore respectfully requested that allowable work period for Clarifier Repairs be extended by a minimum of twelve (12) weeks beyond the approximately 17 weeks contemplated in paragraph 1.2.C.8. Please address this matter via future addendum.
    RESPONSE: *Existing demands on the WTP do not facilitate extending the shutdown period beyond 17 weeks.*

208. QUESTION: Drawing M-AB-1 includes a slew of demolition notes and a handful of pixelated black & white photographs. Please provide existing as-built drawings (mechanical, structural, architectural, etc) for the Chlorine Room, Fluoride Feed Room, Fluoride Storage Room and the High Service Pump Room that identify pipe diameters, equipment location, pump base sizes, pipe supports, platforms, etc.

RESPONSE: *See Figures 3 through 11 for clearer photographs.*

209. QUESTION: Drawing M-AB-3 includes black & white photographs, some of which are too dark to be of use. Please provide existing as-built drawings (mechanical, structural, architectural, etc) for the East & West Chemical Feed Rooms that more clearly show the existing conditions and layout of pumps.
RESPONSE: *See Figures 12 through 19 for clearer photographs.*

Nationwide Permits 7 & 12

NATIONWIDE PERMIT 7
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
FINAL NOTICE OF ISSUANCE AND MODIFICATION OF NATIONWIDE PERMITS
FEDERAL REGISTER
AUTHORIZED MARCH 19, 2017

Outfall Structures and Associated Intake Structures. Activities related to the construction or modification of outfall structures and associated intake structures, where the effluent from the outfall is authorized, conditionally authorized, or specifically exempted by, or otherwise in compliance with regulations issued under the National Pollutant Discharge Elimination System Program (section 402 of the Clean Water Act). The construction of intake structures is not authorized by this NWP, unless they are directly associated with an authorized outfall structure.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity. (See general condition 32.) (Authorities: Sections 10 and 404)

NATIONWIDE PERMIT GENERAL CONDITIONS

The following General Conditions must be followed in order for any authorization by a NWP to be valid:

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

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

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

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

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status,

unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.

(b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. The permittee shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status.

(c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: http://www.rivers.gov/.

17. Tribal Rights. No NWP activity may cause more than minimal adverse effects on tribal rights (including treaty rights), protected tribal resources, or tribal lands.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless ESA section 7 consultation addressing the effects of the proposed activity has been completed. Direct effects are the immediate effects on listed species and critical habitat caused by the NWP activity. Indirect effects are those effects on listed species and critical habitat that are caused by the NWP activity and are later in time, but still are reasonably certain to occur.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. If pre-construction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that

might be affected by the proposed activity or that utilize the designated critical habitat that might be affected by the proposed activity. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non- Federal applicant of the Corps' determination within 45 days of receipt of a complete pre- construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have "no effect" on listed species or critical habitat, or until ESA section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs.

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

(f) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required.

(g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.nmfs.noaa.gov/pr/species/esa/ respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring their action complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting appropriate local office of the U.S. Fish and Wildlife Service to determine applicable measures to reduce impacts to migratory

birds or eagles, including whether "incidental take" permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

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

(b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act. If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect. Where the non-Federal applicant has identified historic properties on which the activity might have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed.

(d) For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation to ensure that the activity results in no more than minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult-to-replace resources (see 33 CFR 332.3(e)(3)).

(e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. Restored riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-

lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation.

(2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f)).

(3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation.

(4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)).

(5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided.

(6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs.

(h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill

material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:
"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To

validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

_____
(Transferee)

_____
(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation.

The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. Activities Affecting Structures or Works Built by the United States. If an NWP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a "USACE project"), the prospective permittee must submit a pre-construction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission is not authorized by NWP until the appropriate Corps office issues the section 408 permission to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. Pre-Construction Notification. (a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the

prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed activity;

(3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity;

(4) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures. For single and complete linear projects, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters.

Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(7) For non-Federal permittees, if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed activity or utilize the designated critical habitat that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act;

(8) For non-Federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act;

(9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the "study river" (see general condition 16); and

(10) For an activity that requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from the Corps office having jurisdiction over that USACE project.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is an NWP PCN and must include all of the applicable information required in paragraphs (b)(1) through (10) of this general condition. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and

supporting materials if the district engineer has established tools and procedures for electronic submittals.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity's adverse environmental effects so that they are no more than minimal.

(2) Agency coordination is required for: (i) all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of stream bed; (iii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iv) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes.

(3) When agency coordination is required, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or e-mail that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

DISTRICT ENGINEER'S DECISION

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal

individual or cumulative adverse environmental effects or may be contrary to the public interest. If a project proponent requests authorization by a specific NWP, the district engineer should issue the NWP verification for that activity if it meets the terms and conditions of that NWP, unless he or she determines, after considering mitigation, that the proposed activity will result in more than minimal individual and cumulative adverse effects on the aquatic environment and other aspects of the public interest and exercises discretionary authority to require an individual permit for the proposed activity. For a linear project, this determination will include an evaluation of the individual crossings of waters of the United States to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51, 52, or 54, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in only minimal individual and cumulative adverse environmental effects. For those NWPs that have a waivable 300 linear foot limit for losses of intermittent and ephemeral stream bed and a 1/2-acre limit (i.e., NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52), the loss of intermittent and ephemeral stream bed, plus any other losses of jurisdictional waters and wetlands, cannot exceed 1/2-acre.

2. When making minimal adverse environmental effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by NWP and whether those cumulative adverse environmental effects are no more than minimal. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional or condition assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse environmental effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site- specific environmental concerns.

3. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for NWP activities with smaller impacts, or for impacts to other types of waters (e.g., streams). The district engineer will consider any proposed compensatory mitigation or other mitigation measures the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed activity are no more than minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are no more than minimal, after considering mitigation, the district engineer will notify the permittee and

include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure the NWP activity results in no more than minimal adverse environmental effects. If the net adverse environmental effects of the NWP activity (after consideration of the mitigation proposal) are determined by the district engineer to be no more than minimal, the district engineer will provide a timely written response to the applicant. The response will state that the NWP activity can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

4. If the district engineer determines that the adverse environmental effects of the proposed activity are more than minimal, then the district engineer will notify the applicant either: (a) that the activity does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the activity is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal; or (c) that the activity is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse environmental effects, the activity will be authorized within the 45-day PCN period (unless additional time is required to comply with general conditions 18, 20, and/or 31, or to evaluate PCNs for activities authorized by NWPs 21, 49, and 50), with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation plan or a requirement that the applicant submit a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal. When compensatory mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

FURTHER INFORMATION

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project (see general condition 31).

DEFINITIONS

Best management practices (BMPs): Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

Compensatory mitigation: The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Currently serviceable: Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

Direct effects: Effects that are caused by the activity and occur at the same time and place.

Discharge: The term "discharge" means any discharge of dredged or fill material into waters of the United States.

Ecological reference: A model used to plan and design an aquatic habitat and riparian area restoration, enhancement, or establishment activity under NWP 27. An ecological reference may be based on the structure, functions, and dynamics of an aquatic habitat type or a riparian area type that currently exists in the region where the proposed NWP 27 activity is located. Alternatively, an ecological reference may be based on a conceptual model for the aquatic habitat type or riparian area type to be restored, enhanced, or established as a result of the proposed NWP 27 activity. An ecological reference takes into account the range of variation of the aquatic habitat type or riparian area type in the region.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Ephemeral stream: An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Establishment (creation): The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

High Tide Line: The line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

Historic Property: Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National

Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

Independent utility: A test to determine what constitutes a single and complete non-linear project in the Corps Regulatory Program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Indirect effects: Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

Intermittent stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Loss of waters of the United States: Waters of the United States that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the United States is a threshold measurement of the impact to jurisdictional waters for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. The loss of stream bed includes the acres or linear feet of stream bed that are filled or excavated as a result of the regulated activity. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities that do not require Department of the Army authorization, such as activities eligible for exemptions under section 404(f) of the Clean Water Act, are not considered when calculating the loss of waters of the United States.

Navigable waters: Waters subject to section 10 of the Rivers and Harbors Act of 1899. These waters are defined at 33 CFR part 329.

Non-tidal wetland: A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

Open water: For purposes of the NWPs, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of flowing or standing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of “open waters” include rivers, streams, lakes, and ponds.

Ordinary High Water Mark: An ordinary high water mark is a line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas.

Perennial stream: A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the

primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Pre-construction notification: A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Pre-construction notification may be required by the terms and conditions of a nationwide permit, or by regional conditions. A pre-construction notification may be voluntarily submitted in cases where pre-construction notification is not required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Protected tribal resources: Those natural resources and properties of traditional or customary religious or cultural importance, either on or off Indian lands, retained by, or reserved by or for, Indian tribes through treaties, statutes, judicial decisions, or executive orders, including tribal trust resources.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

Riffle and pool complex: Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

Riparian areas: Riparian areas are lands next to streams, lakes, and estuarine- marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through which surface and subsurface hydrology connects riverine, lacustrine, estuarine, and marine waters with their adjacent wetlands, non-wetland waters, or uplands. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality. (See general condition 23.)

Shellfish seeding: The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable substrate may consist of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.

Single and complete linear project: A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term "single and complete project" is defined as that portion of the total linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

Single and complete non-linear project: For non-linear projects, the term "single and complete project" is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete non-linear project must have independent utility (see definition of "independent utility"). Single and complete non-linear projects may not be "piecemealed" to avoid the limits in an NWP authorization.

Stormwater management: Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

Stormwater management facilities: Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

Stream bed: The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized stream remains a water of the United States.

Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

Tidal wetland: A tidal wetland is a jurisdictional wetland that is inundated by tidal waters. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water

surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line.

Tribal lands: Any lands title to which is either: 1) held in trust by the United States for the benefit of any Indian tribe or individual; or 2) held by any Indian tribe or individual subject to restrictions by the United States against alienation.

Tribal rights: Those rights legally accruing to a tribe or tribes by virtue of inherent sovereign authority, unextinguished aboriginal title, treaty, statute, judicial decisions, executive order or agreement, and that give rise to legally enforceable remedies.

Vegetated shallows: Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Waterbody: For purposes of the NWPs, a waterbody is a jurisdictional water of the United States. If a wetland is adjacent to a waterbody determined to be a water of the United States, that waterbody and any adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)). Examples of "waterbodies" include streams, rivers, lakes, ponds, and wetlands.

FINAL 2017 REGIONAL CONDITIONS

NOTICE ABOUT WEB LINKS IN THIS DOCUMENT:
The web links (both internal to our Wilmington District and any external links to collaborating agencies) in this document are valid at the time of publication. However, the Wilmington District Regulatory Program web page addresses, as with other agency web sites, may change over the timeframe of the five-year Nationwide Permit renewal cycle, in response to policy mandates or technology advances. While we will make every effort to check on the integrity of our web links and provide re-direct pages whenever possible, we ask that you report any broken links to us so we can keep the page information current and usable. We apologize in advanced for any broken links that you may encounter, and we ask that you navigate from the Regulatory home page (Regulatory Permit Program Wetlands and Streams) of the Wilmington District Corps of Engineers, to the "Permits" section of our web site to find links for pages that cannot be found by clicking directly on the listed web link in this document.

Final 2017 Regional Conditions for Nationwide Permits (NWP) in the Wilmington District

1.0 Excluded Waters

The Corps has identified waters that will be excluded from the use of all NWP's during certain timeframes. These waters are:

1.1 Anadromous Fish Spawning Areas

Waters of the United States identified by either the North Carolina Division of Marine Fisheries (NCDMF) or the North Carolina Wildlife Resources Commission (NCWRC) as anadromous fish spawning areas are excluded during the period between February 15 and June 30, without prior written approval from the Corps and either NCDMF or NCWRC.

1.2 Trout Waters Moratorium

Waters of the United States in the designated trout watersheds of North Carolina are excluded during the period between October 15 and April 15 without prior written approval from the NCWRC, or from the Eastern Band of Cherokee Indians (EBCI) Fisheries and Wildlife Management (FWM) office if the project is located on EBCI trust land. (See Section 2.7 for information on the designated trout watersheds).

1.3 Sturgeon Spawning Areas as Designated by the National Marine Fisheries Service (NMFS)

Waters of the United States designated as sturgeon spawning areas are excluded during the period between February 1 and June 30, without prior written approval from the NMFS.

2.0 Waters Requiring Additional Notification

The Corps has identified waters that will be subject to additional notification requirements for activities authorized by all NWPs. These waters are:

2.1 Western NC Counties that Drain to Designated Critical Habitat

For proposed activities within waters of the United States that require a Pre-Construction Notification (PCN) and are located in the sixteen counties listed below, permittees must provide a copy of the PCN to the U.S. Fish and Wildlife Service (USFWS), 160 Zillicoa Street, Asheville, North Carolina 28801. This PCN must be sent concurrently to the U.S. Fish and Wildlife Service and the Corps Asheville Regulatory Field Office. Please see General Condition 18 for specific notification requirements related to the Endangered Species Act and the below website for information on the location of designated critical habitat.

Counties with tributaries that drain to designated critical habitat that require notification to the Asheville U.S. Fish and Wildlife Service: Avery, Cherokee, Forsyth, Graham, Haywood, Henderson, Jackson, Macon, Mecklenburg, Mitchell, Stokes, Surry, Swain, Transylvania, Union and Yancey.

Website and office addresses for Endangered Species Act Information:

The Wilmington District has developed the following website for permittees which provides guidelines on how to review linked websites and maps in order to fulfill NWP General Condition 18 requirements:
http://www.saw.usace.army.mil/Missions/RegulatoryPermitProgram/AgencyCoordination/ESA.aspx

Permittees who do not have internet access may contact the appropriate U.S. Fish and Wildlife Service offices listed below or Corps at (910) 251-4633:

Asheville U.S. Fish and Wildlife Service Office counties: All counties west of and including Anson, Stanly, Davidson, Forsythe and Stokes Counties.

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

Raleigh U.S. Fish and Wildlife Service Office counties: all counties east of and including Richmond, Montgomery, Randolph, Guilford, and Rockingham Counties.

U.S. Fish and Wildlife Service
Raleigh Field Office
Post Office Box 33726

Raleigh, NC 27636-3726
Telephone: (919) 856-4520

2.2 Special Designation Waters

Prior to the use of any NWP, except NWP 3, that involves a discharge of dredged or fill material in any of the following identified waters and/or adjacent wetlands in North Carolina, permittees shall submit a PCN to the District Engineer prior to commencing the activity (see General Condition 32). The North Carolina waters and wetlands that require additional notification requirements are:

"Outstanding Resource Waters" (ORW) or "High Quality Waters" (HQW) as designated by the North Carolina Environmental Management Commission; "Primary Nursery Areas" (PNA), including inland PNA, as designated by the North Carolina Marine Fisheries Commission and the NCWRC; or wetlands adjacent to these waters. Definitions of ORW, HQW and PNA waters can be found in the North Carolina State Administrative Code, Title 15A, Subchapters 2B and 10C (15A NCAC 02B, 15A NCAC 10C) and at the following World Wide Web page: http://reports.oah.state.nc.us/ncac.asp?folderName=\Title%2015A%20-%20Environmental%20Quality&lookUpError=15A%20NCAC%20000%20. Surface water classifications for waters in North Carolina can be viewed at the North Carolina Division of Water Resources website or at the following World Wide Web Page: https://deq.nc.gov/about/divisions/water-resources/planning/classification-standards/classifications

Permittees who do not have internet access may contact the Corps at (910) 251- 4633.

2.3 Coastal Area Management Act (CAMA) Areas of Environmental Concern

Non-federal permittees for any NWP in a designated "Area of Environmental Concern" (AEC) in the twenty (20) counties of Eastern North Carolina covered by the North Carolina Coastal Area Management Act (CAMA) must also obtain the required CAMA permit. Development activities for non-federal projects may not commence until a copy of the approved CAMA permit is furnished to the appropriate Wilmington District Regulatory Field Office (Wilmington Field Office – 69 Darlington Avenue, Wilmington, NC 28403, (910) 251-4802 or Washington Field Office – 2407 West 5th Street, Washington, NC 27889, (910) 251-4610).

2.4 Barrier Islands

Prior to the use of any NWP on a barrier island of North Carolina, permittees must submit a PCN to the District Engineer prior to commencing the activity (see General Condition 32).

2.5 Mountain or Piedmont Bogs

Prior to the use of any NWP in a Bog, as classified by the North Carolina Wetland Assessment Methodology (NCWAM), permittees shall submit a PCN to the District Engineer prior to commencing the activity (see General Condition 32). The latest version of NCWAM can be

viewed on the Corps RIBITS (Regulatory In-lieu Fee and Bank Information Tracking System) website or at the following World Wide Web Page:
https://ribits.usace.army.mil/ribits_apex/f?p=107:27:0::NO:::

2.6 Animal Waste Facilities

Prior to use of any NWP for construction of animal waste facilities in waters of the United States, including wetlands, permittees shall submit a PCN to the District Engineer prior to commencing the activity (see General Condition 32).

2.7 Trout Waters

Prior to any discharge of dredge or fill material into streams, waterbodies or wetlands within the 294 designated trout watersheds of North Carolina, the permittee shall submit a PCN (see General Condition 32) to the District Engineer prior to commencing the activity, unless other thresholds are established in the Regional Conditions in Section 4 (Additional Regional Conditions for Specific Nationwide Permits). The permittee shall also provide a copy of the notification to the appropriate NCWRC office, or to the EBCI FWM Office (if the project is located on EBCI trust land), to facilitate the determination of any potential impacts to designated Trout Waters.

Notification to the Corps will include a statement with the name of the NCWRC or EBCI FWM biologist contacted, the date of the notification, the location of work, a delineation of wetlands and waters, a discussion of alternatives to working in the mountain trout waters, why alternatives were not selected, and, if applicable, a plan to provide compensatory mitigation for all unavoidable adverse impacts to mountain trout waters.

NCWRC and NC Trout Watersheds:

NCWRC Contact**	**Counties that are entirely within Trout Watersheds***		**Counties that are partially within Trout Watersheds***	
Mountain Coordinator Balsam Depot 20830 Great Smoky Mountain Expressway Waynesville, NC 28786 Telephone: (828) 558-6011 For NCDOT Projects: NCDOT Coordinator 206 Charter. Street Albemarle, NC 28001 Telephone: (704) 982-9181	Alleghany Ashe Avery Graham Haywood	Jackson Macon Swain Transylvania Watauga	Burke Buncombe Caldwell Cherokee Clay Henderson Madison	McDowell Mitchell Polk Rutherford Surry Wilkes Yancey

*NOTE: To determine notification requirements, contact the Corps Asheville Regulatory Field Office at (828) 271-7980 or view maps for each County at the following World Wide Web page: http://www.saw.usace.army.mil/Missions/Regulatory-Permit-Program/Agency-Coordination/Trout/.

**If a project is located on EBCI trust land, submit the PCN in accordance with Section 3.14. Contact the Corps Asheville Regulatory Field Office at (828) 271-7980 with questions.

2.8 Western NC Waters and Corridors

The permittee shall submit a PCN (see General Condition 32) to the District Engineer prior to commencing the activity in waters of the United States if the activity will occur within any of the following identified waters in western North Carolina, within 0.5 mile on either side of these waters, or within 0.75 mile of the Little Tennessee River, as measured from the top of the bank of the respective water (i.e., river, stream, or creek):

Brasstown Creek
Burningtown Creek
Cane River
Caney Fork
Cartoogechaye Creek
Chattooga River
Cheoah River
Cowee Creek
Cullasaja River
Deep Creek
Ellijay Creek
French Broad River
Garden Creek
Hiwassee River
Hominy Creek
Iotla Creek
Little Tennessee River (within the river or within 0.75 mile on either side of this river)
Nantahala River
Nolichucky River
North Fork French Broad River
North Toe River
Nottley River
Oconaluftee River (portion not located on trust/EBCI land)
Peachtree Creek
Shooting Creek
Snowbird Creek
South Toe River
Stecoah Creek
Swannanoa River
Sweetwater Creek

Tuckasegee River (also spelled Tuckaseegee or Tuckaseigee)
Valley River
Watauga Creek
Watauga River
Wayah Creek
West Fork French Broad River

To determine notification requirements, contact the Corps Asheville Regulatory Field Office at (828) 271-7980 or view maps for all corridors at the following World Wide Web page: http://www.saw.usace.army.mil/Missions/Regulatory-Permit-Program/Agency-Coordination/Designated-Special-Waters.aspx

3.0 List of Corps Regional Conditions for All Nationwide Permits

The following conditions apply to all Nationwide Permits in the Wilmington District:

3.1 Limitation of Loss of Stream Bed

NWPs may not be used for activities that may result in the loss or degradation of more than 300 total linear feet of stream bed, unless the District Engineer has waived the 300 linear foot limit for ephemeral and intermittent streams on a case-by-case basis and has determined that the proposed activity will result in minimal individual and cumulative adverse impacts to the aquatic environment. Waivers for the loss of ephemeral and intermittent streams must be in writing and documented by appropriate/accepted stream quality assessments*. This waiver only applies to the 300 linear feet threshold for NWPs.

This Regional Condition does not apply to NWP 23 (Approved Categorical Exclusions).

*NOTE: Permittees should utilize the most current methodology prescribed by Wilmington District to assess stream function and quality. Information can be found at: https://ribits.usace.army.mil/ribits_apex/f?p=107:27:0::NO:::

3.2 Mitigation for Loss of Stream Bed

For any NWP that results in a loss of more than 150 linear feet of stream, the permittee shall provide a mitigation proposal to compensate for more than minimal individual and cumulative adverse impacts to the aquatic environment. For stream losses of 150 linear feet or less that require a PCN, the District Engineer may determine, on a case-by-case basis, that compensatory mitigation is required to ensure that the activity results in minimal adverse effect on the aquatic environment.

3.3 Pre-construction Notification for Loss of Streambed Exceeding 150 Feet

Prior to use of any NWP for any activity which impacts more than 150 total linear feet of perennial stream, intermittent or ephemeral stream, the permittee shall submit a PCN to the District Engineer prior to commencing the activity (see General Condition 32). This applies to

NWPs that do not have specific notification requirements. If a NWP has specific notification requirements, the requirements of the NWP should be followed.

3.4 Restriction on Use of Live Concrete

For all NWPs which allow the use of concrete as a building material, live or fresh concrete, including bags of uncured concrete, may not come into contact with the water in or entering into waters of the United States. Water inside coffer dams or casings that has been in contact with wet concrete shall only be returned to waters of the United States after the concrete is set and cured and when it no longer poses a threat to aquatic organisms.

3.5 Requirements for Using Riprap for Bank Stabilization

For all NWPs that allow for the use of riprap material for bank stabilization, the following measures shall be applied:

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

3.5.2. Filter cloth must be placed underneath the riprap as an additional requirement of its use in North Carolina waters. The placement of filter fabric is not required if the riprap will be pushed or "keyed" into the bank of the waterbody. A waiver from the specifications in this Regional Condition may be requested in writing. The waiver will only be issued if it can be demonstrated that the impacts of complying with this Regional Condition would result in greater adverse impacts to the aquatic environment.

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

3.5.4. The riprap material shall be clean and free from loose dirt or any pollutant except in trace quantities that would not have an adverse environmental effect.

3.5.5. It shall be of a size sufficient to prevent its movement from the authorized alignment by natural forces under normal conditions.

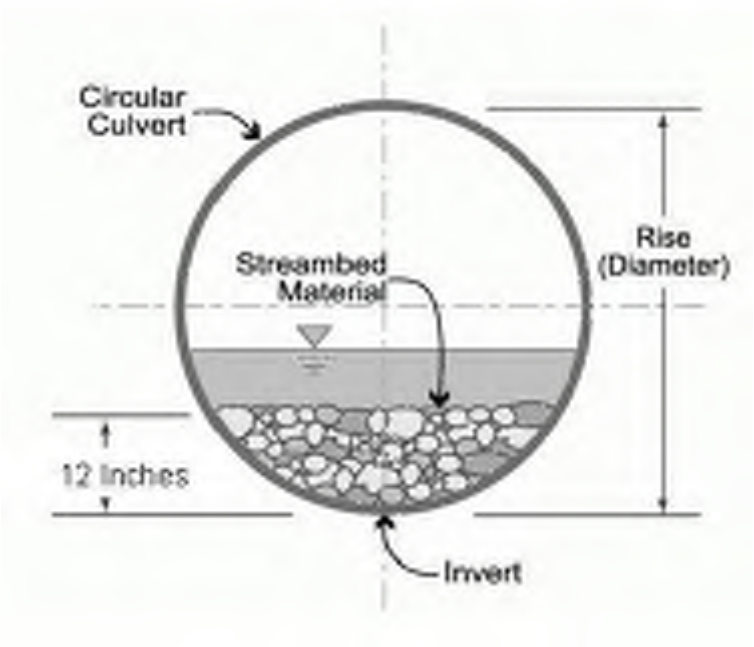
3.5.6. The riprap material shall consist of clean rock or masonry material such as, but not limited to, granite, marl, or broken concrete.

3.6 Requirements for Culvert Placement

3.6.1 For all NWPs that involve the construction/installation of culverts, measures will be included in the construction/installation that will promote the safe passage of fish and other aquatic organisms. The dimension, pattern, and profile of the stream above and below a pipe or culvert should not be modified by altering the width or depth of the stream profile in connection with the construction activity. The width, height, and gradient of a proposed culvert should be

sufficient to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow is the seasonal sustained high flow that typically occurs in the spring. Spring flows should be determined from gage data, if available. In the absence of such data, bank-full flow can be used as a comparable indicator.

In Public Trust Areas of Environmental Concern (AEC) and/or the Estuarine Waters AEC as designated by the Coastal Area Management Act (CAMA): All pipes/culverts must be sufficiently sized to allow for the burial of the bottom of the culvert at least one foot below normal bed elevation.



In all other areas: Culverts greater than 48 inches in diameter will be buried at least one foot below the bed of the stream. Culverts 48 inches in diameter or less shall be buried to maintain aquatic passage and to maintain passage during drought or low flow conditions, and every effort shall be made to maintain the existing channel slope.

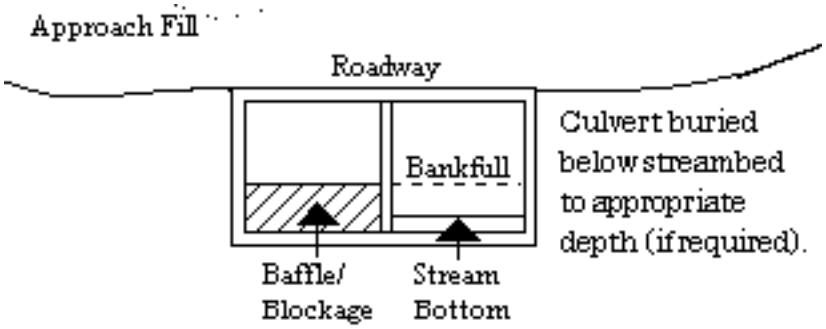
Culverts must be designed and constructed in a manner that minimizes destabilization and head cutting. Destabilizing the channel and head cutting upstream should be considered and appropriate actions incorporated in the design and placement of the culvert.

A waiver from the depth specifications in this condition may be requested, in writing, by the permittee and issued by the Corp; this request must be specific as to the reasons(s) for the request. The waiver will be issued if it can be demonstrated that the proposed design would result in less impacts to the aquatic environment.

All counties: Culverts placed within riparian and/or riverine wetlands must be installed in a manner that does not restrict the flow and circulation patterns of waters of the United States.

Culverts placed across wetland fills purely for the purposes of equalizing surface water do not have to be buried, but the culverts must be of adequate size and/or number to ensure unrestricted transmission of water.

3.6.2 Bank-full flows (or less) shall be accommodated through maintenance of the existing bank-full channel cross sectional area. Additional culverts or culvert barrels at such crossings shall be allowed only to receive bank-full flows.



3.6.3 Where adjacent floodplain is available, flows exceeding bank-full should be accommodated by installing culverts at the floodplain elevation. Additional culverts or culvert barrels at such crossings should not be buried, or if buried, must have sills at the inlets to ensure that they only receive flows exceeding bank-full.

3.6.4 Excavation of existing stream channels shall be limited to the minimum necessary to construct or install the proposed culvert. The final width of the impacted stream at the culvert inlet and outlet should be no greater than the original stream width. A waiver from this condition may be requested in writing; this request must be specific as to the reason(s) for the request. The waiver will be issued if the proposed design would result in less impacts to the aquatic environment and/or if it can be demonstrated that it is not practicable to restore the final width of the impacted stream at the culvert inlet and outlet to the width of the original stream channel.

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

3.7 Notification to NCDEQ Shellfish Sanitation Section

Permittees shall notify the NCDEQ Shellfish Sanitation Section prior to dredging in or removing sediment from an area closed to shell fishing where the effluent may be released to an area open for shell fishing or swimming in order to avoid contamination from the disposal area and cause a temporary shellfish closure to be made. Such notification shall also be provided to the appropriate Corps Regulatory Field Office. Any disposal of sand to the ocean beach should occur between November 1 and April 30 when recreational usage is low. Only clean sand

should be used and no dredged sand from closed shell fishing areas may be used. If beach disposal were to occur at times other than stated above or if sand from a closed shell fishing area is to be used, a swimming advisory shall be posted, and a press release shall be issued by the permittee.

3.8 Submerged Aquatic Vegetation

Impacts to Submerged Aquatic Vegetation (SAV) are not authorized by any NWP, except NWP 48, unless EFH Consultation has been completed pursuant to the Magnuson-Stevens Fisheries Conservation and Management Act (Magnuson-Stevens Act). Permittees shall submit a PCN (See NWP General Condition 32) to the District Engineer prior to commencing the activity if the project would affect SAV. The permittee may not begin work until notified by the Corps that the requirements of the Magnuson-Stevens Act have been satisfied and that the activity is authorized.

3.9 Sedimentation and Erosion Control Structures and Measures

All PCNs will identify and describe sedimentation and erosion control structures and measures proposed for placement in waters of the United States. The structures and measures should be depicted on maps, surveys or drawings showing location and impacts to jurisdictional wetlands and streams.

3.10 Restoration of Temporary Impacts to Stream Beds

Upon completion of work that involves temporary stream impacts, streambeds are to be restored to pre-project elevations and widths using natural streambed material such that the impacted stream reach mimics the adjacent upstream and downstream reach. The impacted area shall be backfilled with natural streambed material to a depth of at least 12 inches or to the bottom depth of the impacted area if shallower than 12 inches. An engineered in-stream structure or material can be used to provide protection of a buried structure if it provides benefits to the aquatic environment and can be accomplished by a natural streambed design. A permittee may request a waiver of this condition if it is determined a buried structure needs significant physical protection beyond those provided in this condition. This condition does not apply to NWP 27 – Aquatic Habitat Restoration, Enhancement, and Establishment Activities.

3.11 Restoration of Temporary Impacts to Stream Banks

Upon completion of work involving temporary stream bank impacts, stream banks are to be restored to pre-project grade and contours or beneficial grade and contours if the original bank slope is steep and unstable. Natural durable materials, native seed mixes, and native plants and shrubs are to be utilized in the restoration. Natural designs which use bioengineered and/or geo-engineered methods are to be applied. An engineered structure or material can be used to provide protection of a buried structure if it provides benefits to the stream bank environment, provided it is not in excess of the minimum amount needed for protection and does not exceed an average of one cubic yard per running foot placed along the bank below the plane of the ordinary high water mark. A permittee may request a waiver of this condition if it is determined a buried structure

needs significant physical protection beyond those provided in this condition. This condition does not apply to NWP 27 – Aquatic Habitat Restoration, Enhancement, and Establishment Activities.

3.12 Federal Navigation Channel Setbacks and Corps Easements

3.12.1 Authorized structures and fills located in or adjacent to Federally authorized waterways will be constructed in accordance with the latest setback criteria established by the Wilmington District Engineer. You may review the setback policy at http://www.saw.usace.army.mil/Missions/Navigation/Setbacks.aspx. This general permit does not authorize the construction of hardened or permanently fixed structures within the Federally Authorized Channel Setback, unless the activity is approved by the Corps. The permittee shall submit a PCN (see General Condition 32) to the District Engineer prior to the construction of any structures or fills within the Federally Authorized Channel Setback.

3.12.2 The permittee shall obtain a Consent to Cross Government Easement from the Wilmington District's Land Use Coordinator prior to any crossing of the Corps easement and/or prior to commencing construction of any structures, authorized dredging or other work within the right-of-way of, or in proximity to, a federally designated disposal area. The Land Use Coordinator may be contacted at: CESAW-OP-N, 69 Darlington Avenue, Wilmington, North Carolina 28403-1343, email: SAWWeb-NAV@usace.army.mil

3.13 Northern Long-eared Bat – Endangered Species Act Compliance

The Wilmington District, U.S. Army Corps of Engineers has consulted with the United States Fish and Wildlife Service (USFWS) in regards to the threatened Northern long-eared bat (NLEB) (*Myotis septentrionalis*) and Standard Local Operating Procedures for Endangered Species (SLOPES) have been approved by the Corps and the USFWS. This condition concerns effects to the NLEB only and does not address effects to other federally listed species and/or federally designated critical habitat.

A. Procedures when the Corps is the lead federal* agency for a project:

The permittee must comply with (1) and (2) below when:

- the project is located in the western 41 counties of North Carolina, to include non-federal aid North Carolina Department of Transportation (NCDOT) projects, OR;

- the project is located in the 59 eastern counties of North Carolina, and is a non-NCDOT project.

*Generally, if a project is located on private property or on non-federal land, and the project is not being funded by a federal entity, the Corps will be the lead federal agency due to the requirement to obtain Department of the Army authorization to impact waters of the United States. If the project is located on federal land, contact the Corps to determine the lead federal agency.

(1) A permittee using a NWP must check to see if their project is located in the range of the NLEB by using the following website: http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf. If the project is within the range of the NLEB, or if the project includes percussive activities (e.g., blasting, pile driving, etc.), the permittee is then required to check the appropriate website in the paragraph below to discover if their project:

- is located in a 12-digit Hydrologic Unit Code area ("red HUC" - shown as red areas on the map), AND/OR;

- involves percussive activities within 0.25 mile of a red HUC.

Red HUC maps - for the western 41 counties in NC (covered by the Asheville Ecological Services Field Office), check the project location against the electronic maps found at: http://www.fws.gov/asheville/htmls/project_review/NLEB_in_WNC.html. For the eastern 59 counties in NC (covered by the Raleigh Ecological Services Field Office), check the project location against the electronic maps found at: https://www.fws.gov/raleigh/NLEB_RFO.html.

(2) A permittee must submit a PCN to the District Engineer, and receive written authorization from the District Engineer, prior to commencing the activity, if the activity will involve any of the following:

- tree clearing/removal, construction/installation of wind turbines in a red HUC, AND/OR;

- bridge removal or maintenance, unless the bridge has been inspected and there is no evidence of bat use, (applies anywhere in the range of the NLEB), AND/OR:

- percussive activities in a red HUC, or within 0.25 mile of a red HUC.

The permittee may proceed with the activity without submitting a PCN to either the Corps or the USFWS, provided the activity complies with all applicable NWP terms and general and regional conditions, if the permittee's review under A.(1) and A.(2) above shows that the project is:

- located outside of a red HUC (and there are no percussive activities), and the activity will NOT include bridge removal or maintenance, unless the bridge has been inspected and there is no evidence of bat use, OR;

- located outside of a red HUC and there are percussive activities, but the percussive activities will not occur within 0.25-mile of a red HUC boundary, and the activity will NOT include bridge removal or maintenance, unless the bridge has been inspected and there is no evidence of bat use, OR;

- located in a red HUC, but the activity will NOT include: tree clearing/removal; construction/installation of wind turbines; bridge removal or maintenance, unless the bridge has been inspected and there is no evidence of bat use, and/or; any percussive activities.

B. Procedures when the USACE is not the lead federal agency:

For projects where another federal agency is the lead federal agency - if that other federal agency has completed project-specific ESA Section 7(a)(2) consultation for the NLEB, and has (1) determined that the project would not cause prohibited incidental take of the NLEB, and (2) completed coordination/consultation that is required by the USFWS (per the directions on the respective USFWS office's website), that project may proceed without notification to either the USACE or the USFWS, provided all General and Regional Permit Conditions are met.

The NLEB SLOPES can be viewed on the USACE website at the following World Wide Web Page: http://www.saw.usace.army.mil/Missions/Regulatory-Permit-Program/Agency-Coordination/ESA/. Permittees who do not have internet access may contact the USACE at (910) 251- 4633.

3.14 Work on Eastern Band of Cherokee Indians Land

All PCNs submitted for activities in waters of the United States on Eastern Band of Cherokee Indians (EBCI) trust land (i.e., Qualla Boundary and non-contiguous tracts of trust land), must comply with the requirements of the latest MOU between the Wilmington District and the Eastern Band of Cherokee Indians.

4.0 Additional Regional Conditions for Specific Nationwide Permits

4.1 NWP #7 - Outfall Structures and Maintenance

4.1.1 The permittee must employ the best available means when using any associated intake structure, including determining its site, design, and technology (e.g., screening), in order to minimize entrainment or impingement of fish and other aquatic life.

4.1.2 This NWP cannot be used to authorize any ocean outfall structures unless the Corps receives written verification that the proposed project is consistent with the North Carolina Coastal Management Program or has received a CAMA permit.

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER RESOURCES

WATER QUALITY GENERAL CERTIFICATION NO. 4132

GENERAL CERTIFICATION FOR PROJECTS ELIGIBLE FOR US ARMY CORPS OF ENGINEERS

- **NATIONWIDE PERMIT 3 (MAINTENANCE),**
- **NATIONWIDE PERMIT 4 (FISH AND WILDLIFE HARVESTING, ENHANCEMENT, AND ATTRACTION DEVICES AND ACTIVITIES),**
- **NATIONWIDE PERMIT 5 (SCIENTIFIC MEASUREMENT DEVICES),**
- **NATIONWIDE PERMIT 6 (SURVEY ACTIVITIES),**
- **NATIONWIDE PERMIT 7 (OUTFALL STRUCTURES AND ASSOCIATED INTAKE STRUCTURES),**
- **NATIONWIDE PERMIT 19 (MINOR DREDGING),**
- **NATIONWIDE PERMIT 20 (RESPONSE OPERATIONS FOR OIL OR HAZARDOUS SUBSTANCES),**
- **NATIONWIDE PERMIT 22 (REMOVAL OF VESSELS),**
- **NATIONWIDE PERMIT 25 (STRUCTURAL DISCHARGES),**
- **NATIONWIDE PERMIT 30 (MOIST SOIL MANAGEMENT FOR WILDLIFE),**
- **NATIONWIDE PERMIT 32 (COMPLETED ENFORCEMENT ACTIONS),**
- **NATIONWIDE PERMIT 36 (BOAT RAMPS),**
- **REGIONAL GENERAL PERMIT 197B00056 (PIERS, DOCKS AND BOATHOUSES), AND**
- **REGIONAL GENERAL PERMIT 197800125 (BOAT RAMPS)**

Water Quality Certification Number 4132 is issued in conformity with the requirements of Section 401, Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Regulations in 15A NCAC 02H .0500 and 15A NCAC 02B .0200 for the discharge of fill material to surface waters and wetland areas as described in 33 CFR 330 Appendix A (B) (3, 4, 5, 6, 7, 19, 20, 22, 25, 30, 32, and 36) of the US Army Corps of Engineers regulations and Regional General Permits 197B00056 and 197B00125.

The State of North Carolina certifies that the specified category of activity will not violate applicable portions of Sections 301, 302, 303, 306 and 307 of the Public Laws 92-500 and 95-217 if conducted in accordance with the conditions hereinafter set forth.

Effective date: December 1, 2017
Signed this day: December 1, 2017

By

for Linda Culpepper
Interim Director

Activities meeting any one (1) of the following thresholds or circumstances require *written approval* for a 401 Water Quality Certification from the Division of Water Resources (DWR):

a) If any of the conditions of this Certification (listed below) cannot be met; or
b) Total additional permanent impacts to streams (including stream relocations or restorations) greater than 40 linear feet at an existing stream impact location; or
c) Total temporary and permanent impacts to wetlands or open waters equal to or greater than one-tenth (1/10) of an acre; or
d) Complete dewatering and drawdowns to a sediment layer related to pond/dam maintenance or removal; or
e) Any impacts to streams from excavation or dredging other than excavation that is conducted as preparation for installing permanent fill or structures or projects qualifying for a Nationwide Permit 19; or
f) Except for projects qualifying for a Nationwide permit 3, any permanent impacts to waters, or to wetlands adjacent to waters, designated as: ORW (including SAV), HQW (including PNA), SA, WS-I, WS-II, Trout, or North Carolina or National Wild and Scenic River; or
g) Any high-density project, as defined in 15A NCAC 02H .1003(2)(a) and by the density thresholds specified in 15A NCAC 02H .1017, which:
    i. Disturbs one acre or more of land (including a project that disturbs less than one acre of land that is part of a larger common plan of development or sale); and
    ii. Has permanent wetland, stream or open water impacts; and
    iii. Is proposing new built-upon area; and
    iv. Does not have a stormwater management plan reviewed and approved under a state stormwater program[1] or a state-approved local government stormwater program[2].

    Projects that have vested rights, exemptions, or grandfathering from state or locally-implemented stormwater programs and projects that satisfy state or locally-implemented stormwater programs through use of community in-lieu programs **require written approval**; or
h) Any permanent impacts to coastal wetlands [15A NCAC 07H .0205], or Unique Wetlands (UWL); or
i) Any impact associated with a Notice of Violation or an enforcement action for violation(s) of NC Wetland Rules (15A NCAC 02H .0500), NC Isolated Wetland Rules (15A NCAC 02H .1300), NC Surface Water or Wetland Standards (15A NCAC 02B .0200), or State Regulated Riparian Buffer Rules (15A NCAC 02B .0200); or
j) Any impacts to subject water bodies and/or state regulated riparian buffers along subject water bodies in the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman Lake, Jordan Lake or Goose Creek Watersheds (or any other basin or watershed with State Regulated Riparian Area Protection Rules [Buffer Rules] in effect at the time of application) *unless*:

[1] e.g. Coastal Counties, HQW, ORW, or state-implemented Phase II NPDES
[2] e.g. Delegated Phase II NPDES, Water Supply Watershed, Nutrient-Sensitive Waters, or Universal Stormwater Management Program

i. The activities are listed as "EXEMPT" from these rules; or
ii. A Buffer Authorization Certificate is issued by the NC Division of Coastal Management (DCM); or
iii. A Buffer Authorization Certificate or a Minor Variance is issued by a delegated or designated local government implementing a state riparian buffer program pursuant to 143-215.23.

Activities included in this General Certification that do not meet one of the thresholds listed above do not require written approval.

I. ACTIVITY SPECIFIC CONDITIONS:

1. For all dam removal projects meeting the definition under G.S. 143-215.25 and requirements under G.S. 143-215.27 of a professionally supervised dam removal, the applicant shall provide documentation that any sediment that may be released has similar or lower level of contamination than sediment sampled from downstream of the dam in accordance with Session Law 2017-145.

2. For the North Carolina Department of Transportation, compliance with the NCDOT's individual NPDES permit NCS000250 shall serve to satisfy this condition. All other high-density projects that trigger threshold item (g) above shall comply with one of the following requirements: [15A NCAC 02H .0506(b)(5) and (c)(5)]

   a. Provide a completed Stormwater Management Plan (SMP) for review and approval, including all appropriate stormwater control measure (SCM) supplemental forms and associated items, that complies with the high-density development requirements of 15A NCAC 02H .1003. Stormwater management shall be provided throughout the entire project area in accordance with 15A NCAC 02H .1003. For the purposes of 15A NCAC 02H .1003(2)(a), density thresholds shall be determined in accordance with 15A NCAC 02H .1017.

   b. Provide documentation (including calculations, photos, etc.) that the project will not cause degradation of downstream surface waters. Documentation shall include a detailed analysis of the hydrological impacts from stormwater runoff when considering the volume and velocity of stormwater runoff from the project built upon area and the size and existing condition of the receiving stream(s).

   Exceptions to this condition require application to and written approval from DWR.

II. GENERAL CONDITIONS:

1. When written authorization is required, the plans and specifications for the project are incorporated into the authorization by reference and are an enforceable part of the Certification. Any modifications to the project require notification to DWR and may require an application submittal to DWR with the appropriate fee. [15A NCAC 02H .0501 and .0502]

2. No waste, spoil, solids, or fill of any kind shall occur in wetlands or waters beyond the footprint of the impacts (including temporary impacts) as authorized in the written approval from DWR; or beyond the thresholds established for use of this Certification without written authorization. [15A NCAC 02H .0501 and .0502]

   No removal of vegetation or other impacts of any kind shall occur to state regulated riparian buffers beyond the footprint of impacts approved in a Buffer Authorization or Variance or as listed as an exempt activity in the applicable riparian buffer rules. [15A NCAC 02B .0200]

3. In accordance with 15A NCAC 02H .0506(h) and Session Law 2017-10, compensatory mitigation may be required for losses of greater than 300 linear feet of perennial streams and/or greater than one (1) acre of wetlands. Impacts associated with the removal of a dam shall not require mitigation when the removal complies with the requirements of Part 3 of Article 21 in Chapter 143 of the North Carolina General Statutes. Impacts to isolated and other non-404 jurisdictional wetlands shall not be combined with 404 jurisdictional wetlands for the purpose of determining when impact thresholds trigger a mitigation requirement. For linear publicly owned and maintained transportation projects that are not determined to be part of a larger common plan of development by the US Army Corps of Engineers, compensatory mitigation may be required for losses of greater than 300 linear feet per perennial stream.

   Compensatory stream and/or wetland mitigation shall be proposed and completed in compliance with G.S. 143-214.11. For applicants proposing to conduct mitigation within a project site, a complete mitigation proposal developed in accordance with the most recent guidance issued by the US Army Corps of Engineers Wilmington District shall be submitted for review and approval with the application for impacts.

4. All activities shall be in compliance with any applicable State Regulated Riparian Buffer Rules in Chapter 2 of Title 15A.

5. When applicable, all construction activities shall be performed and maintained in full compliance with G.S. Chapter 113A Article 4 (Sediment and Pollution Control Act of 1973). Regardless of applicability of the Sediment and Pollution Control Act, all projects shall incorporate appropriate Best Management Practices for the control of sediment and erosion so that no violations of state water quality standards, statutes, or rules occur. [15A NCAC 02H .0506 (b)(3) and (c)(3) and 15A NCAC 02B .0200]

   Design, installation, operation, and maintenance of all sediment and erosion control measures shall be equal to or exceed the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*, or for linear transportation projects, the *NCDOT Sediment and Erosion Control Manual*.

   All devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) sites, including contractor-owned or leased borrow pits associated with the project. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.

For borrow pit sites, the erosion and sediment control measures shall be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*. Reclamation measures and implementation shall comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.

If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, WS-I, WS-II, High Quality Waters (HQW), or Outstanding Resource Waters (ORW), then the sedimentation and erosion control designs shall comply with the requirements set forth in 15A NCAC 04B .0124, *Design Standards in Sensitive Watersheds*.

6. Sediment and erosion control measures shall not be placed in wetlands or waters except within the footprint of temporary or permanent impacts authorized under this Certification. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0501 and .0502]

7. Erosion control matting that incorporates plastic mesh and/or plastic twine shall not be used along streambanks or within wetlands. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02B .0201]

8. An NPDES Construction Stormwater Permit (NCG010000) is required for construction projects that disturb one (1) or more acres of land. The NCG010000 Permit allows stormwater to be discharged during land disturbing construction activities as stipulated in the conditions of the permit. If the project is covered by this permit, full compliance with permit conditions including the erosion & sedimentation control plan, inspections and maintenance, self-monitoring, record keeping and reporting requirements is required. [15A NCAC 02H .0506(b)(5) and (c)(5)]

   The North Carolina Department of Transportation (NCDOT) shall be required to be in full compliance with the conditions related to construction activities within the most recent version of their individual NPDES (NCS000250) stormwater permit. [15A NCAC 02H .0506(b)(5) and (c)(5)]

9. All work in or adjacent to streams shall be conducted so that the flowing stream does not come in contact with the disturbed area. Approved best management practices from the most current version of the *NC Sediment and Erosion Control Manual*, or the *NC DOT Construction and Maintenance Activities Manual*, such as sandbags, rock berms, cofferdams, and other diversion structures shall be used to minimize excavation in flowing water. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0506(b)(3) and (c)(3)]

10. If activities must occur during periods of high biological activity (e.g. sea turtle nesting, fish spawning, or bird nesting), then biological monitoring may be required at the request of other state or federal agencies and coordinated with these activities. [15A NCAC 02H .0506 (b)(2) and 15A NCAC 04B .0125]

All moratoriums on construction activities established by the NC Wildlife Resources Commission (WRC), US Fish and Wildlife Service (USFWS), NC Division of Marine Fisheries (DMF), or National Marine Fisheries Service (NMFS) shall be implemented. Exceptions to this condition require written approval by the resource agency responsible for the given moratorium. A copy of the approval from the resource agency shall be forwarded to DWR.

Work within a designated trout watershed of North Carolina (as identified by the Wilmington District of the US Army Corps of Engineers), or identified state or federal endangered or threatened species habitat, shall be coordinated with the appropriate WRC, USFWS, NMFS, and/or DMF personnel.

11. Culverts shall be designed and installed in such a manner that the original stream profiles are not altered and allow for aquatic life movement during low flows. The dimension, pattern, and profile of the stream above and below a pipe or culvert shall not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed culvert shall be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. [15A NCAC 02H .0506(b)(2) and (c)(2)]

    Placement of culverts and other structures in streams shall be below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20% of the culvert diameter for culverts having a diameter less than or equal to 48 inches, to allow low flow passage of water and aquatic life.

    If multiple pipes or barrels are required, they shall be designed to mimic the existing stream cross section as closely as possible, including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel shall be avoided.

    When topographic constraints indicate culvert slopes of greater than 5%, culvert burial is not required, provided that all alternative options for flattening the slope have been investigated and aquatic life movement/connectivity has been provided when possible (e.g. rock ladders, cross vanes, etc.). Notification, including supporting documentation to include a location map of the culvert, culvert profile drawings, and slope calculations, shall be provided to DWR 60 calendar days prior to the installation of the culvert.

    When bedrock is present in culvert locations, culvert burial is not required provided that there is sufficient documentation of the presence of bedrock. Notification, including supporting documentation such as a location map of the culvert, geotechnical reports, photographs, etc. shall be provided to DWR a minimum of 60 calendar days prior to the installation of the culvert. If bedrock is discovered during construction, then DWR shall be notified by phone or email within 24 hours of discovery.

    If other site-specific topographic constraints preclude the ability to bury the culverts as described above and/or it can be demonstrated that burying the culvert would result in destabilization of the channel, then exceptions to this condition require application to and written approval from DWR.

Installation of culverts in wetlands shall ensure continuity of water movement and be designed to adequately accommodate high water or flood conditions. When roadways, causeways, or other fill projects are constructed across FEMA-designated floodways or wetlands, openings such as culverts or bridges shall be provided to maintain the natural hydrology of the system as well as prevent constriction of the floodway that may result in destabilization of streams or wetlands.

The establishment of native woody vegetation and other soft stream bank stabilization techniques shall be used where practicable instead of rip-rap or other bank hardening methods.

12. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means to the maximum extent practicable (e.g. grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0506(b)(5)]

13. Application of fertilizer to establish planted/seeded vegetation within disturbed riparian areas and/or wetlands shall be conducted at agronomic rates and shall comply with all other Federal, State and Local regulations. Fertilizer application shall be accomplished in a manner that minimizes the risk of contact between the fertilizer and surface waters. [15A NCAC 02B .0200 and 15A NCAC 02B .0231]

14. If concrete is used during construction, then all necessary measures shall be taken to prevent direct contact between uncured or curing concrete and waters of the state. Water that inadvertently contacts uncured concrete shall not be discharged to waters of the state. [15A NCAC 02B .0200]

15. All proposed and approved temporary fill and culverts shall be removed and the impacted area shall be returned to natural conditions within 60 calendar days after the temporary impact is no longer necessary. The impacted areas shall be restored to original grade, including each stream's original cross sectional dimensions, planform pattern, and longitudinal bed profile. For projects that receive written approval, no temporary impacts are allowed beyond those included in the application and authorization. All temporarily impacted sites shall be restored and stabilized with native vegetation. [15A NCAC 02H .0506(b)(2) and (c)(2)]

16. All proposed and approved temporary pipes/culverts/rip-rap pads etc. in streams shall be installed as outlined in the most recent edition of the *North Carolina Sediment and Erosion Control Planning and Design Manual* or the *North Carolina Surface Mining Manual* or the *North Carolina Department of Transportation Best Management Practices for Construction and Maintenance Activities* so as not to restrict stream flow or cause dis-equilibrium during use of this Certification. [15A NCAC 02H .0506(b)(2) and (c)(2)]

17. Any rip-rap required for proper culvert placement, stream stabilization, or restoration of temporarily disturbed areas shall be restricted to the area directly impacted by the approved construction activity. All rip-rap shall be placed such that the original stream elevation and streambank contours are restored and maintained. Placement of rip-rap or other approved materials shall not result in de-stabilization of the stream bed or banks upstream or downstream of the area or in a manner that precludes aquatic life passage. [15A NCAC 02H .0506(b)(2)]

18. Any rip-rap used for stream or shoreline stabilization shall be of a size and density to prevent movement by wave, current action, or stream flows and shall consist of clean rock or masonry material free of debris or toxic pollutants. Rip-rap shall not be installed in the streambed except in specific areas required for velocity control and to ensure structural integrity of bank stabilization measures. [15A NCAC 02H .0506(b)(2)]

19. Applications for rip-rap groins proposed in accordance with 15A NCAC 07H .1401 (NC Division of Coastal Management General Permit for construction of Wooden and Rip-rap Groins in Estuarine and Public Trust Waters) shall meet all the specific conditions for design and construction specified in 15A NCAC 07H .1405.

20. All mechanized equipment operated near surface waters should be inspected and maintained regularly to prevent contamination of surface waters from fuels, lubricants, hydraulic fluids, or other toxic materials. Construction shall be staged in order to minimize the exposure of equipment to surface waters to the maximum extent practicable. Fueling, lubrication and general equipment maintenance shall be performed in a manner to prevent, to the maximum extent practicable, contamination of surface waters by fuels and oils. [15A NCAC 02H .0506 (b)(3) and (c)(3) and 15A NCAC 02B .0211 (12)]

21. Heavy equipment working in wetlands shall be placed on mats or other measures shall be taken to minimize soil disturbance. [15A NCAC 02H .0506 (b)(3) and (c)(3)]

22. In accordance with 143-215.85(b), the applicant shall report any petroleum spill of 25 gallons or more; any spill regardless of amount that causes a sheen on surface waters; any petroleum spill regardless of amount occurring within 100 feet of surface waters; and any petroleum spill less than 25 gallons that cannot be cleaned up within 24 hours.

23. If an environmental document is required under the State Environmental Policy Act (SEPA), then this General Certification is not valid until a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) is issued by the State Clearinghouse. If an environmental document is required under the National Environmental Policy Act (NEPA), then this General Certification is not valid until a Categorical Exclusion, the Final Environmental Assessment, or Final Environmental Impact Statement is published by the lead agency. [15A NCAC 01C .0107(a)]

24. This General Certification does not relieve the applicant of the responsibility to obtain all other required Federal, State, or Local approvals before proceeding with the project, including those required by, but not limited to, Sediment and Erosion Control, Non-Discharge, Water Supply Watershed, and Trout Buffer regulations.

25. The applicant and their authorized agents shall conduct all activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act), and any other appropriate requirements of State and Federal Law. If DWR determines that such standards or laws are not being met, including failure to sustain a designated or achieved use, or that State or Federal law is being violated, or that further conditions are necessary to assure compliance, then DWR may revoke or modify a written authorization associated with this General Water Quality Certification. [15A NCAC 02H .0507(d)]

26. The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this Certification. A copy of this Certification, including all conditions shall be available at the project site during the construction and maintenance of this project. [15A NCAC 02H .0507 (c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

27. When written authorization is required for use of this Certification, upon completion of all permitted impacts included within the approval and any subsequent modifications, the applicant shall be required to return a certificate of completion (available on the DWR website https://edocs.deq.nc.gov/Forms/Certificate-of-Completion). [15A NCAC 02H .0502(f)]

28. Additional site-specific conditions, including monitoring and/or modeling requirements, may be added to the written approval letter for projects proposed under this Water Quality Certification in order to ensure compliance with all applicable water quality and effluent standards. [15A NCAC 02H .0507(c)]

29. If the property or project is sold or transferred, the new permittee shall be given a copy of this Certification (and written authorization if applicable) and is responsible for complying with all conditions. [15A NCAC 02H .0501 and .0502]

III. GENERAL CERTIFICATION ADMINISTRATION:

1. In accordance with North Carolina General Statute 143-215.3D(e), written approval for a 401 Water Quality General Certification must include the appropriate fee. An applicant for a CAMA permit under Article 7 of Chapter 113A of the General Statutes for which a Water Quality Certification is required shall only make one payment to satisfy both agencies; the fee shall be as established by the Secretary in accordance with 143-215.3D(e)(7).

2. This Certification neither grants nor affirms any property right, license, or privilege in any waters, or any right of use in any waters. This Certification does not authorize any person to interfere with the riparian rights, littoral rights, or water use rights of any other person and this Certification does not create any prescriptive right or any right of priority regarding any usage of water. This Certification shall not be interposed as a defense in any action respecting the determination of riparian or littoral rights or other rights to water use. No consumptive user is deemed by virtue of this Certification to possess any prescriptive or

other right of priority with respect to any other consumptive user regardless of the quantity of the withdrawal or the date on which the withdrawal was initiated or expanded.

3. This Certification grants permission to the Director, an authorized representative of the Director, or DWR staff, upon the presentation of proper credentials, to enter the property during normal business hours. [15A NCAC 02H .0502(e)]

4. This General Certification shall expire on the same day as the expiration date of the corresponding Nationwide Permit and/or Regional General Permit. The conditions in effect on the date of issuance of Certification for a specific project shall remain in effect for the life of the project, regardless of the expiration date of this Certification. This General Certification is rescinded when the US Army Corps of Engineers reauthorizes any of the corresponding Nationwide Permits and/or Regional General Permits or when deemed appropriate by the Director of the Division of Water Resources.

5. Non-compliance with or violation of the conditions herein set forth by a specific project may result in revocation of this General Certification for the project and may also result in criminal and/or civil penalties.

6. The Director of the North Carolina Division of Water Resources may require submission of a formal application for Individual Certification for any project in this category of activity if it is deemed in the public's best interest or determined that the project is likely to have a significant adverse effect upon water quality, including state or federally listed endangered or threatened aquatic species, or degrade the waters so that existing uses of the waters or downstream waters are precluded.

History Note: Water Quality Certification (WQC) Number 4132 issued December 1, 2017 replaces WCQ 4085 issued March 3, 2017; WQC 3883 issued March 19, 2012; WQC Number 3687 issued November 1, 2007; WQC Number 3624 issued March 19, 2007; WQC Number 3494 issued December 31, 2004; and WQC Number 3376 issued March 18, 2002.

NATIONWIDE PERMIT 12
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS
FINAL NOTICE OF ISSUANCE AND MODIFICATION OF NATIONWIDE PERMITS
FEDERAL REGISTER
AUTHORIZED MARCH 19, 2017

Utility Line Activities. Activities required for the construction, maintenance, repair, and removal of utility lines and associated facilities in waters of the United States, provided the activity does not result in the loss of greater than 1/2-acre of waters of the United States for each single and complete project.

Utility lines: This NWP authorizes discharges of dredged or fill material into waters of the United States and structures or work in navigable waters for crossings of those waters associated with the construction, maintenance, or repair of utility lines, including outfall and intake structures. There must be no change in pre-construction contours of waters of the United States. A "utility line" is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, and telegraph messages, and internet, radio, and television communication. The term "utility line" does not include activities that drain a water of the United States, such as drainage tile or french drains, but it does apply to pipes conveying drainage from another area.

Material resulting from trench excavation may be temporarily sidecast into waters of the United States for no more than three months, provided the material is not placed in such a manner that it is dispersed by currents or other forces. The district engineer may extend the period of temporary side casting for no more than a total of 180 days, where appropriate. In wetlands, the top 6 to 12 inches of the trench should normally be backfilled with topsoil from the trench. The trench cannot be constructed or backfilled in such a manner as to drain waters of the United States (e.g., backfilling with extensive gravel layers, creating a french drain effect). Any exposed slopes and stream banks must be stabilized immediately upon completion of the utility line crossing of each waterbody.

Utility line substations: This NWP authorizes the construction, maintenance, or expansion of substation facilities associated with a power line or utility line in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not result in the loss of greater than 1/2-acre of waters of the United States. This NWP does not authorize discharges into non-tidal wetlands adjacent to tidal waters of the United States to construct, maintain, or expand substation facilities.

Foundations for overhead utility line towers, poles, and anchors: This NWP authorizes the construction or maintenance of foundations for overhead utility line towers, poles, and anchors in all waters of the United States, provided the foundations are the minimum size necessary and separate footings for each tower leg (rather than a larger single pad) are used where feasible.

Access roads: This NWP authorizes the construction of access roads for the construction and maintenance of utility lines, including overhead power lines and utility line substations, in non-tidal waters of the United States, provided the activity, in combination with all other activities included in one single and complete project, does not cause the loss of greater than 1/2-acre of non-tidal waters of the United States. This NWP does not authorize discharges into non-tidal wetlands adjacent to tidal waters for access roads. Access roads must be the minimum width necessary (see Note 2, below). Access roads must be constructed so that the length of the road minimizes any adverse effects on waters of the United States and must be as near as possible to pre-construction contours and elevations (e.g., at grade corduroy roads or geotextile/gravel roads). Access roads constructed above pre-construction contours and elevations in waters of the United States must be properly bridged or culverted to maintain surface flows.

This NWP may authorize utility lines in or affecting navigable waters of the United States even if there is no associated discharge of dredged or fill material (See 33 CFR part 322). Overhead utility lines constructed over section 10 waters and utility lines that are routed in or under section 10 waters without a discharge of dredged or fill material require a section 10 permit.

This NWP authorizes, to the extent that Department of the Army authorization is required, temporary structures, fills, and work necessary for the remediation of inadvertent returns of drilling fluids to waters of the United States through sub-soil fissures or fractures that might occur during horizontal directional drilling activities conducted for the purpose of installing or replacing utility lines. These remediation activities must be done as soon as practicable, to restore the affected waterbody. District engineers may add special conditions to this NWP to require a remediation plan for addressing inadvertent returns of drilling fluids to waters of the United States during horizontal directional drilling activities conducted for the purpose of installing or replacing utility lines.

This NWP also authorizes temporary structures, fills, and work, including the use of temporary mats, necessary to conduct the utility line activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. After construction, temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if any of the following criteria are met:
(1) the activity involves mechanized land clearing in a forested wetland for the utility line right-of-way; (2) a section 10 permit is required; (3) the utility line in waters of the United States, excluding overhead lines, exceeds 500 feet; (4) the utility line is placed within a jurisdictional area (i.e., water of the United States), and it runs parallel to or along a stream bed that is within that jurisdictional area; (5) discharges that result in the loss of greater than 1/10-acre of waters of the United States; (6) permanent access roads are constructed above

grade in waters of the United States for a distance of more than 500 feet; or (7) permanent access roads are constructed in waters of the United States with impervious materials. (See general condition 32.) (Authorities: Sections 10 and 404)

Note 1: Where the utility line is constructed or installed in navigable waters of the United States (i.e., section 10 waters) within the coastal United States, the Great Lakes, and United States territories, a copy of the NWP verification will be sent by the Corps to the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS), for charting the utility line to protect navigation.

Note 2: For utility line activities crossing a single waterbody more than one time at separate and distant locations, or multiple waterbodies at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. Utility line activities must comply with 33 CFR 330.6(d).

Note 3: Utility lines consisting of aerial electric power transmission lines crossing navigable waters of the United States (which are defined at 33 CFR part 329) must comply with the applicable minimum clearances specified in 33 CFR 322.5(i).

Note 4: Access roads used for both construction and maintenance may be authorized, provided they meet the terms and conditions of this NWP. Access roads used solely for construction of the utility line must be removed upon completion of the work, in accordance with the requirements for temporary fills.

Note 5: Pipes or pipelines used to transport gaseous, liquid, liquescent, or slurry substances over navigable waters of the United States are considered to be bridges, not utility lines, and may require a permit from the U.S. Coast Guard pursuant to section 9 of the Rivers and Harbors Act of 1899. However, any discharges of dredged or fill material into waters of the United States associated with such pipelines will require a section 404 permit (see NWP 15).

Note 6: This NWP authorizes utility line maintenance and repair activities that do not qualify for the Clean Water Act section 404(f) exemption for maintenance of currently serviceable fills or fill structures.

Note 7: For overhead utility lines authorized by this NWP, a copy of the PCN and NWP verification will be provided to the Department of Defense Siting Clearinghouse, which will evaluate potential effects on military activities.

Note 8: For NWP 12 activities that require pre-construction notification, the PCN must include any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings that require Department of the Army authorization but do not require pre-construction notification (see paragraph (b) of general condition 32). The district engineer will evaluate the PCN in accordance with Section D, "District Engineer's Decision." The district engineer may require mitigation to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see general condition 23).

NATIONWIDE PERMIT GENERAL CONDITIONS

The following General Conditions must be followed in order for any authorization by a NWP to be valid:

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

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

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species. If a bottomless culvert cannot be used, then the crossing should be designed and constructed to minimize adverse effects to aquatic life movements.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

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

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. (a) No NWP activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status,

unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status.

(b) If a proposed NWP activity will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the permittee must submit a pre-construction notification (see general condition 32). The district engineer will coordinate the PCN with the Federal agency with direct management responsibility for that river. The permittee shall not begin the NWP activity until notified by the district engineer that the Federal agency with direct management responsibility for that river has determined in writing that the proposed NWP activity will not adversely affect the Wild and Scenic River designation or study status.

(c) Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service). Information on these rivers is also available at: http://www.rivers.gov/.

17. Tribal Rights. No NWP activity may cause more than minimal adverse effects on tribal rights (including treaty rights), protected tribal resources, or tribal lands.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless ESA section 7 consultation addressing the effects of the proposed activity has been completed. Direct effects are the immediate effects on listed species and critical habitat caused by the NWP activity. Indirect effects are those effects on listed species and critical habitat that are caused by the NWP activity and are later in time, but still are reasonably certain to occur.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. If pre-construction notification is required for the proposed activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation has not been submitted, additional ESA section 7 consultation may be necessary for the activity and the respective federal agency would be responsible for fulfilling its obligation under section 7 of the ESA.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that

might be affected by the proposed activity or that utilize the designated critical habitat that might be affected by the proposed activity. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non- Federal applicant of the Corps' determination within 45 days of receipt of a complete pre- construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the activity, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activity will have "no effect" on listed species or critical habitat, or until ESA section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific permit conditions to the NWPs.

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

(f) If the non-federal permittee has a valid ESA section 10(a)(1)(B) incidental take permit with an approved Habitat Conservation Plan for a project or a group of projects that includes the proposed NWP activity, the non-federal applicant should provide a copy of that ESA section 10(a)(1)(B) permit with the PCN required by paragraph (c) of this general condition. The district engineer will coordinate with the agency that issued the ESA section 10(a)(1)(B) permit to determine whether the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation conducted for the ESA section 10(a)(1)(B) permit. If that coordination results in concurrence from the agency that the proposed NWP activity and the associated incidental take were considered in the internal ESA section 7 consultation for the ESA section 10(a)(1)(B) permit, the district engineer does not need to conduct a separate ESA section 7 consultation for the proposed NWP activity. The district engineer will notify the non-federal applicant within 45 days of receipt of a complete pre-construction notification whether the ESA section 10(a)(1)(B) permit covers the proposed NWP activity or whether additional ESA section 7 consultation is required.

(g) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the FWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.nmfs.noaa.gov/pr/species/esa/ respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring their action complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting appropriate local office of the U.S. Fish and Wildlife Service to determine applicable measures to reduce impacts to migratory

birds or eagles, including whether "incidental take" permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

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

(b) Federal permittees should follow their own procedures for complying with the requirements of section 106 of the National Historic Preservation Act. If pre-construction notification is required for the proposed NWP activity, the Federal permittee must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will verify that the appropriate documentation has been submitted. If the appropriate documentation is not submitted, then additional consultation under section 106 may be necessary. The respective federal agency is responsible for fulfilling its obligation to comply with section 106.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the NWP activity might have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties might have the potential to be affected by the proposed NWP activity or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of, or potential for, the presence of historic properties can be sought from the State Historic Preservation Officer, Tribal Historic Preservation Officer, or designated tribal representative, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted in the PCN and these identification efforts, the district engineer shall determine whether the proposed NWP activity has the potential to cause effects on the historic properties. Section 106 consultation is not required when the district engineer determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR 800.3(a)). Section 106 consultation is required when the district engineer determines that the activity has the potential to cause effects on historic properties. The district engineer will conduct consultation with consulting parties identified under 36 CFR 800.2(c) when he or she makes any of the following effect determinations for the purposes of section 106 of the NHPA: no historic properties affected, no adverse effect, or adverse effect. Where the non-Federal applicant has identified historic properties on which the activity might have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects to historic properties or that NHPA section 106 consultation has been completed.

(d) For non-federal permittees, the district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA section 106 consultation is required. If NHPA section 106 consultation is required, the district engineer will notify the non-Federal applicant that he or she cannot begin the activity until section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, 38, and 54, notification is required in accordance with general condition 32, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the individual and cumulative adverse environmental effects are no more than minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse environmental effects of the proposed activity are no more than minimal, and provides an activity-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in only minimal adverse environmental effects.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation to ensure that the activity results in no more than minimal adverse environmental effects. Compensatory mitigation for losses of streams should be provided, if practicable, through stream rehabilitation, enhancement, or preservation, since streams are difficult-to-replace resources (see 33 CFR 332.3(e)(3)).

(e) Compensatory mitigation plans for NWP activities in or near streams or other open waters will normally include a requirement for the restoration or enhancement, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, the restoration or maintenance/protection of riparian areas may be the only compensatory mitigation required. Restored riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to restore or maintain/protect a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or maintaining/protecting a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of minimization or compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(f) Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in no more than minimal adverse environmental effects. For the NWPs, the preferred mechanism for providing compensatory mitigation is mitigation bank credits or in-

lieu fee program credits (see 33 CFR 332.3(b)(2) and (3)). However, if an appropriate number and type of mitigation bank or in-lieu credits are not available at the time the PCN is submitted to the district engineer, the district engineer may approve the use of permittee-responsible mitigation.

(2) The amount of compensatory mitigation required by the district engineer must be sufficient to ensure that the authorized activity results in no more than minimal individual and cumulative adverse environmental effects (see 33 CFR 330.1(e)(3)). (See also 33 CFR 332.3(f)).

(3) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, aquatic resource restoration should be the first compensatory mitigation option considered for permittee-responsible mitigation.

(4) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) through (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)).

(5) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided.

(6) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan (see 33 CFR 332.4(c)(1)(ii)).

(g) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any NWP activity resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that an NWP activity already meeting the established acreage limits also satisfies the no more than minimal impact requirement for the NWPs.

(h) Permittees may propose the use of mitigation banks, in-lieu fee programs, or permittee-responsible mitigation. When developing a compensatory mitigation proposal, the permittee must consider appropriate and practicable options consistent with the framework at 33 CFR 332.3(b). For activities resulting in the loss of marine or estuarine resources, permittee-responsible mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(i) Where certain functions and services of waters of the United States are permanently adversely affected by a regulated activity, such as discharges of dredged or fill

material into waters of the United States that will convert a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse environmental effects of the activity to the no more than minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:
"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To

validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

_____
(Transferee)

_____
(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation.

The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

31. Activities Affecting Structures or Works Built by the United States. If an NWP activity also requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers (USACE) federally authorized Civil Works project (a "USACE project"), the prospective permittee must submit a pre-construction notification. See paragraph (b)(10) of general condition 32. An activity that requires section 408 permission is not authorized by NWP until the appropriate Corps office issues the section 408 permission to alter, occupy, or use the USACE project, and the district engineer issues a written NWP verification.

32. Pre-Construction Notification. (a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the

prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or are in the vicinity of the activity, or to notify the Corps pursuant to general condition 20 that the activity might have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed activity;

(3) Identify the specific NWP or NWP(s) the prospective permittee wants to use to authorize the proposed activity;

(4) A description of the proposed activity; the activity's purpose; direct and indirect adverse environmental effects the activity would cause, including the anticipated amount of loss of wetlands, other special aquatic sites, and other waters expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; a description of any proposed mitigation measures intended to reduce the adverse environmental effects caused by the proposed activity; and any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity, including other separate and distant crossings for linear projects that require Department of the Army authorization but do not require pre-construction notification. The description of the proposed activity and any proposed mitigation measures should be sufficiently detailed to allow the district engineer to determine that the adverse environmental effects of the activity will be no more than minimal and to determine the need for compensatory mitigation or other mitigation measures. For single and complete linear projects, the PCN must include the quantity of anticipated losses of wetlands, other special aquatic sites, and other waters for each single and complete crossing of those wetlands, other special aquatic sites, and other waters.

Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the activity and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(5) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many wetlands, other special aquatic sites, and other waters. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(6) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse environmental effects are no more than minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(7) For non-Federal permittees, if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed activity or utilize the designated critical habitat that might be affected by the proposed activity. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with the Endangered Species Act;

(8) For non-Federal permittees, if the NWP activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, the PCN must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. For NWP activities that require pre-construction notification, Federal permittees must provide documentation demonstrating compliance with section 106 of the National Historic Preservation Act;

(9) For an activity that will occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, the PCN must identify the Wild and Scenic River or the "study river" (see general condition 16); and

(10) For an activity that requires permission from the Corps pursuant to 33 U.S.C. 408 because it will alter or temporarily or permanently occupy or use a U.S. Army Corps of Engineers federally authorized civil works project, the pre-construction notification must include a statement confirming that the project proponent has submitted a written request for section 408 permission from the Corps office having jurisdiction over that USACE project.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is an NWP PCN and must include all of the applicable information required in paragraphs (b)(1) through (10) of this general condition. A letter containing the required information may also be used. Applicants may provide electronic files of PCNs and

supporting materials if the district engineer has established tools and procedures for electronic submittals.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the activity's adverse environmental effects so that they are no more than minimal.

(2) Agency coordination is required for: (i) all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States; (ii) NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of stream bed; (iii) NWP 13 activities in excess of 500 linear feet, fills greater than one cubic yard per running foot, or involve discharges of dredged or fill material into special aquatic sites; and (iv) NWP 54 activities in excess of 500 linear feet, or that extend into the waterbody more than 30 feet from the mean low water line in tidal waters or the ordinary high water mark in the Great Lakes.

(3) When agency coordination is required, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (FWS, state natural resource or water quality agency, EPA, and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to notify the district engineer via telephone, facsimile transmission, or e-mail that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse environmental effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects of the proposed activity are no more than minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(4) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(5) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

DISTRICT ENGINEER'S DECISION

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal

individual or cumulative adverse environmental effects or may be contrary to the public interest. If a project proponent requests authorization by a specific NWP, the district engineer should issue the NWP verification for that activity if it meets the terms and conditions of that NWP, unless he or she determines, after considering mitigation, that the proposed activity will result in more than minimal individual and cumulative adverse effects on the aquatic environment and other aspects of the public interest and exercises discretionary authority to require an individual permit for the proposed activity. For a linear project, this determination will include an evaluation of the individual crossings of waters of the United States to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51, 52, or 54, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in only minimal individual and cumulative adverse environmental effects. For those NWPs that have a waivable 300 linear foot limit for losses of intermittent and ephemeral stream bed and a 1/2-acre limit (i.e., NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52), the loss of intermittent and ephemeral stream bed, plus any other losses of jurisdictional waters and wetlands, cannot exceed 1/2-acre.

2. When making minimal adverse environmental effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. He or she will also consider the cumulative adverse environmental effects caused by activities authorized by NWP and whether those cumulative adverse environmental effects are no more than minimal. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional or condition assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse environmental effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site- specific environmental concerns.

3. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for NWP activities with smaller impacts, or for impacts to other types of waters (e.g., streams). The district engineer will consider any proposed compensatory mitigation or other mitigation measures the applicant has included in the proposal in determining whether the net adverse environmental effects of the proposed activity are no more than minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse environmental effects are no more than minimal, after considering mitigation, the district engineer will notify the permittee and

include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure the NWP activity results in no more than minimal adverse environmental effects. If the net adverse environmental effects of the NWP activity (after consideration of the mitigation proposal) are determined by the district engineer to be no more than minimal, the district engineer will provide a timely written response to the applicant. The response will state that the NWP activity can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

4. If the district engineer determines that the adverse environmental effects of the proposed activity are more than minimal, then the district engineer will notify the applicant either: (a) that the activity does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the activity is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal; or (c) that the activity is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse environmental effects, the activity will be authorized within the 45-day PCN period (unless additional time is required to comply with general conditions 18, 20, and/or 31, or to evaluate PCNs for activities authorized by NWPs 21, 49, and 50), with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation plan or a requirement that the applicant submit a mitigation plan that would reduce the adverse environmental effects so that they are no more than minimal. When compensatory mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

FURTHER INFORMATION

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project (see general condition 31).

DEFINITIONS

Best management practices (BMPs): Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

Compensatory mitigation: The restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Currently serviceable: Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

Direct effects: Effects that are caused by the activity and occur at the same time and place.

Discharge: The term "discharge" means any discharge of dredged or fill material into waters of the United States.

Ecological reference: A model used to plan and design an aquatic habitat and riparian area restoration, enhancement, or establishment activity under NWP 27. An ecological reference may be based on the structure, functions, and dynamics of an aquatic habitat type or a riparian area type that currently exists in the region where the proposed NWP 27 activity is located. Alternatively, an ecological reference may be based on a conceptual model for the aquatic habitat type or riparian area type to be restored, enhanced, or established as a result of the proposed NWP 27 activity. An ecological reference takes into account the range of variation of the aquatic habitat type or riparian area type in the region.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Ephemeral stream: An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Establishment (creation): The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

High Tide Line: The line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm.

Historic Property: Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National

Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

Independent utility: A test to determine what constitutes a single and complete non-linear project in the Corps Regulatory Program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Indirect effects: Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

Intermittent stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Loss of waters of the United States: Waters of the United States that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the United States is a threshold measurement of the impact to jurisdictional waters for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. The loss of stream bed includes the acres or linear feet of stream bed that are filled or excavated as a result of the regulated activity. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities that do not require Department of the Army authorization, such as activities eligible for exemptions under section 404(f) of the Clean Water Act, are not considered when calculating the loss of waters of the United States.

Navigable waters: Waters subject to section 10 of the Rivers and Harbors Act of 1899. These waters are defined at 33 CFR part 329.

Non-tidal wetland: A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

Open water: For purposes of the NWPs, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of flowing or standing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of “open waters” include rivers, streams, lakes, and ponds.

Ordinary High Water Mark: An ordinary high water mark is a line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas.

Perennial stream: A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the

primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Pre-construction notification: A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Pre-construction notification may be required by the terms and conditions of a nationwide permit, or by regional conditions. A pre-construction notification may be voluntarily submitted in cases where pre-construction notification is not required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Protected tribal resources: Those natural resources and properties of traditional or customary religious or cultural importance, either on or off Indian lands, retained by, or reserved by or for, Indian tribes through treaties, statutes, judicial decisions, or executive orders, including tribal trust resources.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

Riffle and pool complex: Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

Riparian areas: Riparian areas are lands next to streams, lakes, and estuarine- marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through which surface and subsurface hydrology connects riverine, lacustrine, estuarine, and marine waters with their adjacent wetlands, non-wetland waters, or uplands. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality. (See general condition 23.)

Shellfish seeding: The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable substrate may consist of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.

Single and complete linear project: A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term "single and complete project" is defined as that portion of the total linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of NWP authorization. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

Single and complete non-linear project: For non-linear projects, the term "single and complete project" is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete non-linear project must have independent utility (see definition of "independent utility"). Single and complete non-linear projects may not be "piecemealed" to avoid the limits in an NWP authorization.

Stormwater management: Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

Stormwater management facilities: Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

Stream bed: The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized stream remains a water of the United States.

Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

Tidal wetland: A tidal wetland is a jurisdictional wetland that is inundated by tidal waters. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water

surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line.

Tribal lands: Any lands title to which is either: 1) held in trust by the United States for the benefit of any Indian tribe or individual; or 2) held by any Indian tribe or individual subject to restrictions by the United States against alienation.

Tribal rights: Those rights legally accruing to a tribe or tribes by virtue of inherent sovereign authority, unextinguished aboriginal title, treaty, statute, judicial decisions, executive order or agreement, and that give rise to legally enforceable remedies.

Vegetated shallows: Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Waterbody: For purposes of the NWPs, a waterbody is a jurisdictional water of the United States. If a wetland is adjacent to a waterbody determined to be a water of the United States, that waterbody and any adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)). Examples of "waterbodies" include streams, rivers, lakes, ponds, and wetlands.

FINAL REGIONAL CONDITIONS 2017

NOTICE ABOUT WEB LINKS IN THIS DOCUMENT:
The web links (both internal to our Wilmington District and any external links to collaborating agencies) in this document are valid at the time of publication. However, the Wilmington District Regulatory Program web page addresses, as with other agency web sites, may change over the timeframe of the five-year Nationwide Permit renewal cycle, in response to policy mandates or technology advances. While we will make every effort to check on the integrity of our web links and provide re-direct pages whenever possible, we ask that you report any broken links to us so we can keep the page information current and usable. We apologize in advanced for any broken links that you may encounter, and we ask that you navigate from the Regulatory home page (Regulatory Permit Program Wetlands and Streams) of the Wilmington District Corps of Engineers, to the "Permits" section of our web site to find links for pages that cannot be found by clicking directly on the listed web link in this document.

Final 2017 Regional Conditions for Nationwide Permits (NWP) in the Wilmington District

1.0 Excluded Waters

The Corps has identified waters that will be excluded from the use of all NWP's during certain timeframes. These waters are:

1.1 Anadromous Fish Spawning Areas

Waters of the United States identified by either the North Carolina Division of Marine Fisheries (NCDMF) or the North Carolina Wildlife Resources Commission (NCWRC) as anadromous fish spawning areas are excluded during the period between February 15 and June 30, without prior written approval from the Corps and either NCDMF or NCWRC.

1.2 Trout Waters Moratorium

Waters of the United States in the designated trout watersheds of North Carolina are excluded during the period between October 15 and April 15 without prior written approval from the NCWRC, or from the Eastern Band of Cherokee Indians (EBCI) Fisheries and Wildlife Management (FWM) office if the project is located on EBCI trust land. (See Section 2.7 for information on the designated trout watersheds).

1.3 Sturgeon Spawning Areas as Designated by the National Marine Fisheries Service (NMFS)

Waters of the United States designated as sturgeon spawning areas are excluded during the period between February 1 and June 30, without prior written approval from the NMFS.

2.0 Waters Requiring Additional Notification

The Corps has identified waters that will be subject to additional notification requirements for activities authorized by all NWPs. These waters are:

2.1 Western NC Counties that Drain to Designated Critical Habitat

For proposed activities within waters of the United States that require a Pre-Construction Notification (PCN) and are located in the sixteen counties listed below, permittees must provide a copy of the PCN to the U.S. Fish and Wildlife Service (USFWS), 160 Zillicoa Street, Asheville, North Carolina 28801. This PCN must be sent concurrently to the U.S. Fish and Wildlife Service and the Corps Asheville Regulatory Field Office. Please see General Condition 18 for specific notification requirements related to the Endangered Species Act and the below website for information on the location of designated critical habitat.

Counties with tributaries that drain to designated critical habitat that require notification to the Asheville U.S. Fish and Wildlife Service: Avery, Cherokee, Forsyth, Graham, Haywood, Henderson, Jackson, Macon, Mecklenburg, Mitchell, Stokes, Surry, Swain, Transylvania, Union and Yancey.

Website and office addresses for Endangered Species Act Information:

The Wilmington District has developed the following website for permittees which provides guidelines on how to review linked websites and maps in order to fulfill NWP General Condition 18 requirements:
http://www.saw.usace.army.mil/Missions/RegulatoryPermitProgram/AgencyCoordination/ESA.aspx

Permittees who do not have internet access may contact the appropriate U.S. Fish and Wildlife Service offices listed below or Corps at (910) 251-4633:

Asheville U.S. Fish and Wildlife Service Office counties: All counties west of and including Anson, Stanly, Davidson, Forsythe and Stokes Counties.

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

Raleigh U.S. Fish and Wildlife Service Office counties: all counties east of and including Richmond, Montgomery, Randolph, Guilford, and Rockingham Counties.

U.S. Fish and Wildlife Service
Raleigh Field Office
Post Office Box 33726

Raleigh, NC 27636-3726
Telephone: (919) 856-4520

2.2 Special Designation Waters

Prior to the use of any NWP, except NWP 3, that involves a discharge of dredged or fill material in any of the following identified waters and/or adjacent wetlands in North Carolina, permittees shall submit a PCN to the District Engineer prior to commencing the activity (see General Condition 32). The North Carolina waters and wetlands that require additional notification requirements are:

"Outstanding Resource Waters" (ORW) or "High Quality Waters" (HQW) as designated by the North Carolina Environmental Management Commission; "Primary Nursery Areas" (PNA), including inland PNA, as designated by the North Carolina Marine Fisheries Commission and the NCWRC; or wetlands adjacent to these waters. Definitions of ORW, HQW and PNA waters can be found in the North Carolina State Administrative Code, Title 15A, Subchapters 2B and 10C (15A NCAC 02B, 15A NCAC 10C) and at the following World Wide Web page: http://reports.oah.state.nc.us/ncac.asp?folderName=\Title%2015A%20-%20Environmental%20Quality&lookUpError=15A%20NCAC%20000%20. Surface water classifications for waters in North Carolina can be viewed at the North Carolina Division of Water Resources website or at the following World Wide Web Page: https://deq.nc.gov/about/divisions/water-resources/planning/classification-standards/classifications

Permittees who do not have internet access may contact the Corps at (910) 251- 4633.

2.3 Coastal Area Management Act (CAMA) Areas of Environmental Concern

Non-federal permittees for any NWP in a designated "Area of Environmental Concern" (AEC) in the twenty (20) counties of Eastern North Carolina covered by the North Carolina Coastal Area Management Act (CAMA) must also obtain the required CAMA permit. Development activities for non-federal projects may not commence until a copy of the approved CAMA permit is furnished to the appropriate Wilmington District Regulatory Field Office (Wilmington Field Office – 69 Darlington Avenue, Wilmington, NC 28403, (910) 251-4802 or Washington Field Office – 2407 West 5th Street, Washington, NC 27889, (910) 251-4610).

2.4 Barrier Islands

Prior to the use of any NWP on a barrier island of North Carolina, permittees must submit a PCN to the District Engineer prior to commencing the activity (see General Condition 32).

2.5 Mountain or Piedmont Bogs

Prior to the use of any NWP in a Bog, as classified by the North Carolina Wetland Assessment Methodology (NCWAM), permittees shall submit a PCN to the District Engineer prior to commencing the activity (see General Condition 32). The latest version of NCWAM can be

viewed on the Corps RIBITS (Regulatory In-lieu Fee and Bank Information Tracking System) website or at the following World Wide Web Page:
https://ribits.usace.army.mil/ribits_apex/f?p=107:27:0::NO:::

2.6 Animal Waste Facilities

Prior to use of any NWP for construction of animal waste facilities in waters of the United States, including wetlands, permittees shall submit a PCN to the District Engineer prior to commencing the activity (see General Condition 32).

2.7 Trout Waters

Prior to any discharge of dredge or fill material into streams, waterbodies or wetlands within the 294 designated trout watersheds of North Carolina, the permittee shall submit a PCN (see General Condition 32) to the District Engineer prior to commencing the activity, unless other thresholds are established in the Regional Conditions in Section 4 (Additional Regional Conditions for Specific Nationwide Permits). The permittee shall also provide a copy of the notification to the appropriate NCWRC office, or to the EBCI FWM Office (if the project is located on EBCI trust land), to facilitate the determination of any potential impacts to designated Trout Waters.

Notification to the Corps will include a statement with the name of the NCWRC or EBCI FWM biologist contacted, the date of the notification, the location of work, a delineation of wetlands and waters, a discussion of alternatives to working in the mountain trout waters, why alternatives were not selected, and, if applicable, a plan to provide compensatory mitigation for all unavoidable adverse impacts to mountain trout waters.

NCWRC and NC Trout Watersheds:

NCWRC Contact**	**Counties that are entirely within Trout Watersheds***		**Counties that are partially within Trout Watersheds***	
Mountain Coordinator Balsam Depot 20830 Great Smoky Mountain Expressway Waynesville, NC 28786 Telephone: (828) 558-6011 For NCDOT Projects: NCDOT Coordinator 206 Charter. Street Albemarle, NC 28001 Telephone: (704) 982-9181	Alleghany Ashe Avery Graham Haywood	Jackson Macon Swain Transylvania Watauga	Burke Buncombe Caldwell Cherokee Clay Henderson Madison	McDowell Mitchell Polk Rutherford Surry Wilkes Yancey

*NOTE: To determine notification requirements, contact the Corps Asheville Regulatory Field Office at (828) 271-7980 or view maps for each County at the following World Wide Web page: http://www.saw.usace.army.mil/Missions/Regulatory-Permit-Program/Agency-Coordination/Trout/.

**If a project is located on EBCI trust land, submit the PCN in accordance with Section 3.14. Contact the Corps Asheville Regulatory Field Office at (828) 271-7980 with questions.

2.8 Western NC Waters and Corridors

The permittee shall submit a PCN (see General Condition 32) to the District Engineer prior to commencing the activity in waters of the United States if the activity will occur within any of the following identified waters in western North Carolina, within 0.5 mile on either side of these waters, or within 0.75 mile of the Little Tennessee River, as measured from the top of the bank of the respective water (i.e., river, stream, or creek):

Brasstown Creek
Burningtown Creek
Cane River
Caney Fork
Cartoogechaye Creek
Chattooga River
Cheoah River
Cowee Creek
Cullasaja River
Deep Creek
Ellijay Creek
French Broad River
Garden Creek
Hiwassee River
Hominy Creek
Iotla Creek
Little Tennessee River (within the river or within 0.75 mile on either side of this river)
Nantahala River
Nolichucky River
North Fork French Broad River
North Toe River
Nottley River
Oconaluftee River (portion not located on trust/EBCI land)
Peachtree Creek
Shooting Creek
Snowbird Creek
South Toe River
Stecoah Creek
Swannanoa River
Sweetwater Creek

Tuckasegee River (also spelled Tuckaseegee or Tuckaseigee)
Valley River
Watauga Creek
Watauga River
Wayah Creek
West Fork French Broad River

To determine notification requirements, contact the Corps Asheville Regulatory Field Office at (828) 271-7980 or view maps for all corridors at the following World Wide Web page: http://www.saw.usace.army.mil/Missions/Regulatory-Permit-Program/Agency-Coordination/Designated-Special-Waters.aspx

3.0 List of Corps Regional Conditions for All Nationwide Permits

The following conditions apply to all Nationwide Permits in the Wilmington District:

3.1 Limitation of Loss of Stream Bed

NWPs may not be used for activities that may result in the loss or degradation of more than 300 total linear feet of stream bed, unless the District Engineer has waived the 300 linear foot limit for ephemeral and intermittent streams on a case-by-case basis and has determined that the proposed activity will result in minimal individual and cumulative adverse impacts to the aquatic environment. Waivers for the loss of ephemeral and intermittent streams must be in writing and documented by appropriate/accepted stream quality assessments*. This waiver only applies to the 300 linear feet threshold for NWPs.

This Regional Condition does not apply to NWP 23 (Approved Categorical Exclusions).

*NOTE: Permittees should utilize the most current methodology prescribed by Wilmington District to assess stream function and quality. Information can be found at: https://ribits.usace.army.mil/ribits_apex/f?p=107:27:0::NO:::

3.2 Mitigation for Loss of Stream Bed

For any NWP that results in a loss of more than 150 linear feet of stream, the permittee shall provide a mitigation proposal to compensate for more than minimal individual and cumulative adverse impacts to the aquatic environment. For stream losses of 150 linear feet or less that require a PCN, the District Engineer may determine, on a case-by-case basis, that compensatory mitigation is required to ensure that the activity results in minimal adverse effect on the aquatic environment.

3.3 Pre-construction Notification for Loss of Streambed Exceeding 150 Feet

Prior to use of any NWP for any activity which impacts more than 150 total linear feet of perennial stream, intermittent or ephemeral stream, the permittee shall submit a PCN to the District Engineer prior to commencing the activity (see General Condition 32). This applies to

NWPs that do not have specific notification requirements. If a NWP has specific notification requirements, the requirements of the NWP should be followed.

3.4 Restriction on Use of Live Concrete

For all NWPs which allow the use of concrete as a building material, live or fresh concrete, including bags of uncured concrete, may not come into contact with the water in or entering into waters of the United States. Water inside coffer dams or casings that has been in contact with wet concrete shall only be returned to waters of the United States after the concrete is set and cured and when it no longer poses a threat to aquatic organisms.

3.5 Requirements for Using Riprap for Bank Stabilization

For all NWPs that allow for the use of riprap material for bank stabilization, the following measures shall be applied:

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

3.5.2. Filter cloth must be placed underneath the riprap as an additional requirement of its use in North Carolina waters. The placement of filter fabric is not required if the riprap will be pushed or "keyed" into the bank of the waterbody. A waiver from the specifications in this Regional Condition may be requested in writing. The waiver will only be issued if it can be demonstrated that the impacts of complying with this Regional Condition would result in greater adverse impacts to the aquatic environment.

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

3.5.4. The riprap material shall be clean and free from loose dirt or any pollutant except in trace quantities that would not have an adverse environmental effect.

3.5.5. It shall be of a size sufficient to prevent its movement from the authorized alignment by natural forces under normal conditions.

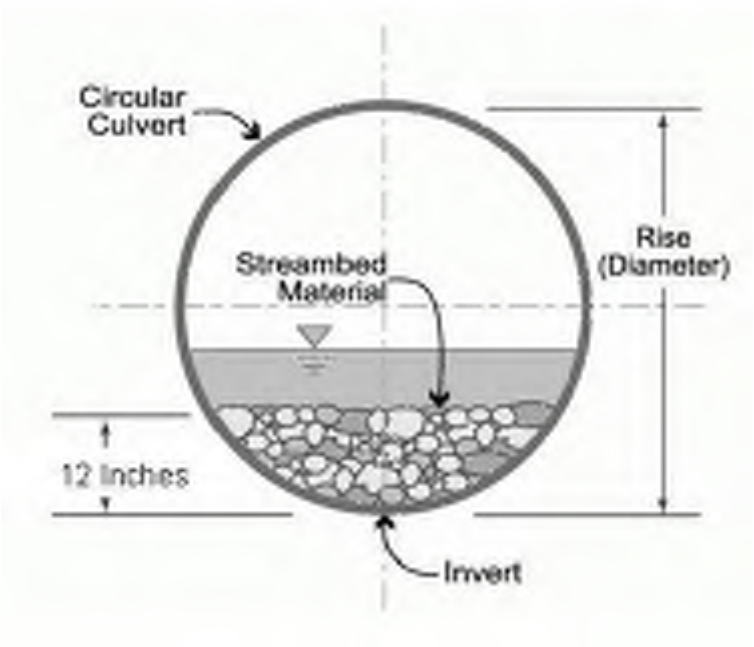
3.5.6. The riprap material shall consist of clean rock or masonry material such as, but not limited to, granite, marl, or broken concrete.

3.6 Requirements for Culvert Placement

3.6.1 For all NWPs that involve the construction/installation of culverts, measures will be included in the construction/installation that will promote the safe passage of fish and other aquatic organisms. The dimension, pattern, and profile of the stream above and below a pipe or culvert should not be modified by altering the width or depth of the stream profile in connection with the construction activity. The width, height, and gradient of a proposed culvert should be

sufficient to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow is the seasonal sustained high flow that typically occurs in the spring. Spring flows should be determined from gage data, if available. In the absence of such data, bank-full flow can be used as a comparable indicator.

In Public Trust Areas of Environmental Concern (AEC) and/or the Estuarine Waters AEC as designated by the Coastal Area Management Act (CAMA): All pipes/culverts must be sufficiently sized to allow for the burial of the bottom of the culvert at least one foot below normal bed elevation.



In all other areas: Culverts greater than 48 inches in diameter will be buried at least one foot below the bed of the stream. Culverts 48 inches in diameter or less shall be buried to maintain aquatic passage and to maintain passage during drought or low flow conditions, and every effort shall be made to maintain the existing channel slope.

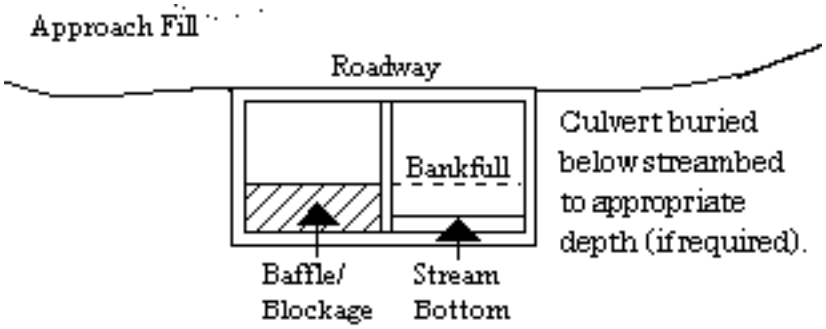
Culverts must be designed and constructed in a manner that minimizes destabilization and head cutting. Destabilizing the channel and head cutting upstream should be considered and appropriate actions incorporated in the design and placement of the culvert.

A waiver from the depth specifications in this condition may be requested, in writing, by the permittee and issued by the Corp; this request must be specific as to the reasons(s) for the request. The waiver will be issued if it can be demonstrated that the proposed design would result in less impacts to the aquatic environment.

All counties: Culverts placed within riparian and/or riverine wetlands must be installed in a manner that does not restrict the flow and circulation patterns of waters of the United States.

Culverts placed across wetland fills purely for the purposes of equalizing surface water do not have to be buried, but the culverts must be of adequate size and/or number to ensure unrestricted transmission of water.

3.6.2 Bank-full flows (or less) shall be accommodated through maintenance of the existing bank-full channel cross sectional area. Additional culverts or culvert barrels at such crossings shall be allowed only to receive bank-full flows.



3.6.3 Where adjacent floodplain is available, flows exceeding bank-full should be accommodated by installing culverts at the floodplain elevation. Additional culverts or culvert barrels at such crossings should not be buried, or if buried, must have sills at the inlets to ensure that they only receive flows exceeding bank-full.

3.6.4 Excavation of existing stream channels shall be limited to the minimum necessary to construct or install the proposed culvert. The final width of the impacted stream at the culvert inlet and outlet should be no greater than the original stream width. A waiver from this condition may be requested in writing; this request must be specific as to the reason(s) for the request. The waiver will be issued if the proposed design would result in less impacts to the aquatic environment and/or if it can be demonstrated that it is not practicable to restore the final width of the impacted stream at the culvert inlet and outlet to the width of the original stream channel.

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

3.7 Notification to NCDEQ Shellfish Sanitation Section

Permittees shall notify the NCDEQ Shellfish Sanitation Section prior to dredging in or removing sediment from an area closed to shell fishing where the effluent may be released to an area open for shell fishing or swimming in order to avoid contamination from the disposal area and cause a temporary shellfish closure to be made. Such notification shall also be provided to the appropriate Corps Regulatory Field Office. Any disposal of sand to the ocean beach should occur between November 1 and April 30 when recreational usage is low. Only clean sand

should be used and no dredged sand from closed shell fishing areas may be used. If beach disposal were to occur at times other than stated above or if sand from a closed shell fishing area is to be used, a swimming advisory shall be posted, and a press release shall be issued by the permittee.

3.8 Submerged Aquatic Vegetation

Impacts to Submerged Aquatic Vegetation (SAV) are not authorized by any NWP, except NWP 48, unless EFH Consultation has been completed pursuant to the Magnuson-Stevens Fisheries Conservation and Management Act (Magnuson-Stevens Act). Permittees shall submit a PCN (See NWP General Condition 32) to the District Engineer prior to commencing the activity if the project would affect SAV. The permittee may not begin work until notified by the Corps that the requirements of the Magnuson-Stevens Act have been satisfied and that the activity is authorized.

3.9 Sedimentation and Erosion Control Structures and Measures

All PCNs will identify and describe sedimentation and erosion control structures and measures proposed for placement in waters of the United States. The structures and measures should be depicted on maps, surveys or drawings showing location and impacts to jurisdictional wetlands and streams.

3.10 Restoration of Temporary Impacts to Stream Beds

Upon completion of work that involves temporary stream impacts, streambeds are to be restored to pre-project elevations and widths using natural streambed material such that the impacted stream reach mimics the adjacent upstream and downstream reach. The impacted area shall be backfilled with natural streambed material to a depth of at least 12 inches or to the bottom depth of the impacted area if shallower than 12 inches. An engineered in-stream structure or material can be used to provide protection of a buried structure if it provides benefits to the aquatic environment and can be accomplished by a natural streambed design. A permittee may request a waiver of this condition if it is determined a buried structure needs significant physical protection beyond those provided in this condition. This condition does not apply to NWP 27 – Aquatic Habitat Restoration, Enhancement, and Establishment Activities.

3.11 Restoration of Temporary Impacts to Stream Banks

Upon completion of work involving temporary stream bank impacts, stream banks are to be restored to pre-project grade and contours or beneficial grade and contours if the original bank slope is steep and unstable. Natural durable materials, native seed mixes, and native plants and shrubs are to be utilized in the restoration. Natural designs which use bioengineered and/or geo-engineered methods are to be applied. An engineered structure or material can be used to provide protection of a buried structure if it provides benefits to the stream bank environment, provided it is not in excess of the minimum amount needed for protection and does not exceed an average of one cubic yard per running foot placed along the bank below the plane of the ordinary high water mark. A permittee may request a waiver of this condition if it is determined a buried structure

needs significant physical protection beyond those provided in this condition. This condition does not apply to NWP 27 – Aquatic Habitat Restoration, Enhancement, and Establishment Activities.

3.12 Federal Navigation Channel Setbacks and Corps Easements

3.12.1 Authorized structures and fills located in or adjacent to Federally authorized waterways will be constructed in accordance with the latest setback criteria established by the Wilmington District Engineer. You may review the setback policy at http://www.saw.usace.army.mil/Missions/Navigation/Setbacks.aspx. This general permit does not authorize the construction of hardened or permanently fixed structures within the Federally Authorized Channel Setback, unless the activity is approved by the Corps. The permittee shall submit a PCN (see General Condition 32) to the District Engineer prior to the construction of any structures or fills within the Federally Authorized Channel Setback.

3.12.2 The permittee shall obtain a Consent to Cross Government Easement from the Wilmington District's Land Use Coordinator prior to any crossing of the Corps easement and/or prior to commencing construction of any structures, authorized dredging or other work within the right-of-way of, or in proximity to, a federally designated disposal area. The Land Use Coordinator may be contacted at: CESAW-OP-N, 69 Darlington Avenue, Wilmington, North Carolina 28403-1343, email: SAWWeb-NAV@usace.army.mil

3.13 Northern Long-eared Bat – Endangered Species Act Compliance

The Wilmington District, U.S. Army Corps of Engineers has consulted with the United States Fish and Wildlife Service (USFWS) in regards to the threatened Northern long-eared bat (NLEB) (*Myotis septentrionalis*) and Standard Local Operating Procedures for Endangered Species (SLOPES) have been approved by the Corps and the USFWS. This condition concerns effects to the NLEB only and does not address effects to other federally listed species and/or federally designated critical habitat.

A. Procedures when the Corps is the lead federal* agency for a project:

The permittee must comply with (1) and (2) below when:

- the project is located in the western 41 counties of North Carolina, to include non-federal aid North Carolina Department of Transportation (NCDOT) projects, OR;

- the project is located in the 59 eastern counties of North Carolina, and is a non-NCDOT project.

*Generally, if a project is located on private property or on non-federal land, and the project is not being funded by a federal entity, the Corps will be the lead federal agency due to the requirement to obtain Department of the Army authorization to impact waters of the United States. If the project is located on federal land, contact the Corps to determine the lead federal agency.

(1) A permittee using a NWP must check to see if their project is located in the range of the NLEB by using the following website: http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf. If the project is within the range of the NLEB, or if the project includes percussive activities (e.g., blasting, pile driving, etc.), the permittee is then required to check the appropriate website in the paragraph below to discover if their project:

- is located in a 12-digit Hydrologic Unit Code area ("red HUC" - shown as red areas on the map), AND/OR;

- involves percussive activities within 0.25 mile of a red HUC.

Red HUC maps - for the western 41 counties in NC (covered by the Asheville Ecological Services Field Office), check the project location against the electronic maps found at: http://www.fws.gov/asheville/htmls/project_review/NLEB_in_WNC.html. For the eastern 59 counties in NC (covered by the Raleigh Ecological Services Field Office), check the project location against the electronic maps found at: https://www.fws.gov/raleigh/NLEB_RFO.html.

(2) A permittee must submit a PCN to the District Engineer, and receive written authorization from the District Engineer, prior to commencing the activity, if the activity will involve any of the following:

- tree clearing/removal, construction/installation of wind turbines in a red HUC, AND/OR;

- bridge removal or maintenance, unless the bridge has been inspected and there is no evidence of bat use, (applies anywhere in the range of the NLEB), AND/OR:

- percussive activities in a red HUC, or within 0.25 mile of a red HUC.

The permittee may proceed with the activity without submitting a PCN to either the Corps or the USFWS, provided the activity complies with all applicable NWP terms and general and regional conditions, if the permittee's review under A.(1) and A.(2) above shows that the project is:

- located outside of a red HUC (and there are no percussive activities), and the activity will NOT include bridge removal or maintenance, unless the bridge has been inspected and there is no evidence of bat use, OR;

- located outside of a red HUC and there are percussive activities, but the percussive activities will not occur within 0.25-mile of a red HUC boundary, and the activity will NOT include bridge removal or maintenance, unless the bridge has been inspected and there is no evidence of bat use, OR;

- located in a red HUC, but the activity will NOT include: tree clearing/removal; construction/installation of wind turbines; bridge removal or maintenance, unless the bridge has been inspected and there is no evidence of bat use, and/or; any percussive activities.

B. Procedures when the USACE is not the lead federal agency:

For projects where another federal agency is the lead federal agency - if that other federal agency has completed project-specific ESA Section 7(a)(2) consultation for the NLEB, and has (1) determined that the project would not cause prohibited incidental take of the NLEB, and (2) completed coordination/consultation that is required by the USFWS (per the directions on the respective USFWS office's website), that project may proceed without notification to either the USACE or the USFWS, provided all General and Regional Permit Conditions are met.

The NLEB SLOPES can be viewed on the USACE website at the following World Wide Web Page: http://www.saw.usace.army.mil/Missions/Regulatory-Permit-Program/Agency-Coordination/ESA/. Permittees who do not have internet access may contact the USACE at (910) 251- 4633.

3.14 Work on Eastern Band of Cherokee Indians Land

All PCNs submitted for activities in waters of the United States on Eastern Band of Cherokee Indians (EBCI) trust land (i.e., Qualla Boundary and non-contiguous tracts of trust land), must comply with the requirements of the latest MOU between the Wilmington District and the Eastern Band of Cherokee Indians.

4.0 Additional Regional Conditions for Specific Nationwide Permits

4.1 NWP #12 - Utility Line Activities

4.1.1 Pipeline/utility line construction through jurisdictional waters and wetlands will be accomplished utilizing directional drilling/boring methods to the maximum extent practicable.

4.1.2 Temporary discharge of excavated or fill material into wetlands and waters of the United States will be for the absolute minimum period of time necessary to accomplish the work. Temporary discharges will be fully contained with appropriate erosion control or containment methods or otherwise such fills will consist of non-erodible materials.

4.1.3 The work area authorized by this permit, including temporary and/or permanent fills, will be minimized to the greatest extent practicable. Justification for work corridors exceeding forty (40) feet in width is required and will be based on pipeline diameter and length, size of equipment required to construct the utility line, and other construction information deemed necessary to support the request. The permittee is required to provide this information to the Corps with the initial notification package.

4.1.4 Excavated materials shall be returned to the excavated areas and any remaining materials shall be disposed of in uplands, unless the Corps authorizes disposal in waters of the United States**.**

4.1.5 In areas where a sub-aqueous utility line is to cross a federally-maintained channel, (i.e., the Atlantic Intracoastal Waterway [AIWW]), the line will be buried at least six (6) feet below the allowable overdepth of the authorized channel, including all side slopes. For areas outside federally-maintained channels, sub-aqueous lines must be installed at a minimum depth of two (2) feet below the substrate when such lines might interfere with navigation.

4.1.6 The minimum clearance*(see NOTE in 4.1.7) for aerial communication lines, or any lines not transmitting electrical power, will be ten (10) feet above the clearance required for nearby stationary bridges as established by the U.S. Coast Guard. In the event the U.S. Coast Guard has not established a bridge clearance, minimum vertical clearances for power and aerial lines will not be less than required by Section 23, Rule 232, of the latest revision of the National Electrical Safety Code (ANSI C2). Clearances will not be less than shown in Table 232-1, Item 7, ANSI C2.

4.1.7 The minimum clearance* for an aerial line, transmitting electrical power, is based on the low point of the line under conditions that produce the greatest sag, taking into consideration temperature, load, wind, length or span and the type of supports. The minimum clearance for an aerial electrical power transmission line crossing navigable waters of the United States, where there is an established bridge clearance established by the U.S. Coast Guard, shall be governed by the system voltage, as indicated below:

Nominal System Voltage, kilovolt	Minimum Clearance Above Bridge Clearance (As Established by the U.S. Coast Guard)
115 and below	20 feet
138	22
161	24
230	26
350	30
500	35
700	42
750 to 765	45

*NOTE: Minimum clearance is the distance measured between the lowest point of a stationary bridge, including *any* infrastructure attached to underside of the bridge, and the Mean High Water (MHW) of the navigable waters of the United States beneath the bridge.

4.1.8 On navigable waters of the United States, including all federal navigation projects, where there is no bridge for reference for minimum clearance, the proposed project will need to be reviewed by the Corps in order to determine the minimum clearance between the line and MHW necessary to protect navigational interests.

4.1.9 A plan to restore and re-vegetate wetland areas cleared for construction must be submitted with the required PCN. Cleared wetland areas shall be re-vegetated to the maximum extent practicable with native species of canopy, shrub, and herbaceous species. Fescue grass shall not be used.

4.1.10 Any permanently maintained corridor along the utility right of way within forested wetlands shall be considered a permanent impact. A compensatory mitigation plan will be required for all such impacts associated with the requested activity if the activity requires PCN and the cumulative total of permanent forested wetland impacts exceeds 1/10-acre, unless the District Engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse effects of the proposed activity are minimal.

For permanent forested wetland impacts of 1/10-acre or less, the District Engineer may determine, on a case-by-case basis, that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment.

4.1.11 Use of rip-rap or any other engineered structures to stabilize a stream bed should be avoided to the maximum extent practicable. If riprap stabilization is needed, it should be placed only on the stream banks, or, if it is necessary to be placed in the stream bed, the finished top elevation of the riprap should not exceed that of the original stream bed.

4.1.12 When directional boring or horizontal directional drilling (HDD) under waters of the United States, including wetlands, permittees shall closely monitor the project for hydraulic fracturing or "fracking." Any discharge from hydraulic fracturing or "fracking" into waters of the United States, including wetlands, shall be reported to the appropriate Corps Regulatory Field Office within 48 hours. Restoration and/or compensatory mitigation may be required as a result of any unintended discharges.

4.1.13 For purposes of this NWP, the term utility line does not include pipes or culverts associated with driveways, roadways, lots, etc.

4.1.14 The permittee shall submit a PCN to the District Engineer prior to commencing the activity if the activity will involve the discharge of dredged or fill material into more than 1/10-acre of wetlands or 150 linear feet of stream channel for the construction of temporary access fills and/or temporary road crossings. The PCN must include a restoration plan that thoroughly describes how all temporary fills will be removed, describes how pre-project conditions will be restored, and includes a timetable for all restoration activities.

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER RESOURCES

WATER QUALITY GENERAL CERTIFICATION NO. 4133

GENERAL CERTIFICATION FOR PROJECTS ELIGIBLE FOR US ARMY CORPS OF ENGINEERS

- **NATIONWIDE PERMIT 12 (UTILITY LINE ACTIVITIES)**

Water Quality Certification Number 4133 is issued in conformity with the requirements of Section 401, Public Laws 92-S00 and 95-217 of the United States and subject to the North Carolina Regulations in 1SA NCAC 02H .0500 and 1SA NCAC 02B .0200 for the discharge of fill material to surface waters and wetland areas as described in 33 CFR 330 Appendix A (B) (12) of the US Army Corps of Engineers regulations.

The State of North Carolina certifies that the specified category of activity will not violate applicable portions of Sections 301, 302, 303, 306 and 307 of the Public Laws 92-S00 and 9S-217 if conducted in accordance with the conditions hereinafter set forth.

Effective date: December 1, 2017

Signed this day: December 1, 2017

By

for Linda Culpepper
Interim Director

Activities meeting any one (1) of the following thresholds or circumstances require *written approval* for a 401 Water Quality Certification from the Division of Water Resources (DWR):

a) If any of the Conditions of this Certification (listed below) cannot be met; or
b) Total permanent impacts to wetlands or open waters equal to or greater than one-tenth (1/10) acre within the entire utility project; or
c) Any permanent impacts to streams; or
d) Total temporary impacts to streams greater than 500 feet within the entire utility project; or
e) Any stream relocation or stream restoration; or
f) Any high-density utility line and associated facilities project, as defined in 15A NCAC 02H .1003(2)(a) and by the density thresholds specified in 15A NCAC 02H .1017, which:
    i. Disturbs one acre or more of land (including a project that disturbs less than one acre of land that is part of a larger common plan of development or sale); and
    ii. Has permanent wetland, stream or open water impacts; and
    iii. Is proposing new built-upon area; and
    iv. Does not have a stormwater management plan reviewed and approved under a state stormwater program[1] or a state-approved local government stormwater program[2].

    Projects that have vested rights, exemptions, or grandfathering from state or locally-implemented stormwater programs and projects that satisfy state or locally-implemented stormwater programs through use of community in-lieu programs **require written approval**; or
g) Any permanent impacts to waters, or to wetlands adjacent to waters, designated as: ORW (including SAV), HQW (including PNA), SA, WS-I, WS-II, Trout, or North Carolina or National Wild and Scenic River; or
h) Any permanent impacts to coastal wetlands [15A NCAC 07H .0205], or Unique Wetlands (UWL); or
i) Any impact associated with a Notice of Violation or an enforcement action for violation(s) of NC Wetland Rules (15A NCAC 02H .0500), NC Isolated Wetland Rules (15A NCAC 02H .1300), NC Surface Water or Wetland Standards (15A NCAC 02B .0200), or State Regulated Riparian Buffer Rules (15A NCAC 02B .0200); or
j) Any impacts to subject water bodies and/or state regulated riparian buffers along subject water bodies in the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman Lake, Jordan Lake or Goose Creek Watersheds (or any other basin or watershed with State Regulated Riparian Area Protection Rules [Buffer Rules] in effect at the time of application) *unless:*
    i. The activities are listed as "EXEMPT" from these rules; or
    ii. A Buffer Authorization Certificate is issued by the NC Division of Coastal Management (DCM); or

[1] e.g. Coastal Counties, HQW, ORW, or state-implemented Phase II NPDES
[2] e.g. Delegated Phase II NPDES, Water Supply Watershed, Nutrient-Sensitive Waters, or Universal Stormwater Management Program

iii. A Buffer Authorization Certificate or a Minor Variance is issued by a delegated or designated local government implementing a state riparian buffer program pursuant to 143-215.23.

Activities included in this General Certification that do not meet one of the thresholds listed above do not require written approval.

I. ACTIVITY SPECIFIC CONDITIONS:

1. All sewer lines shall be designed, constructed and maintained in accordance with Title 15A NCAC Chapter 02T.

2. Any utility construction corridor that is parallel to a stream or open water shall not be closer than 10 feet to the top of bank or ordinary high-water mark. Exceptions to this condition require application to and written approval from 0WR. [15A NCAC 02H .0506 (b)(4) and (c)(4)]

3. Where there are temporary or permanent impacts from stream crossings, utility lines shall cross the stream channel at a near-perpendicular direction (i.e., between 75 degrees and 105 degrees to the stream bank). Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0506 (b)(2) and (c)(2)]

4. Construction corridors in wetlands and across stream channels shall be minimized to the maximum extent practicable and shall not exceed 50 feet wide for gas utility lines and 40 feet wide for all other utility lines. Exceptions to this condition require application to and written approval from 0WR. [15A NCAC 02H .0506 (b)(2) and (c)(2)]

   For construction corridors in wetlands and across stream channels, stumps shall be grubbed only as needed to install the utility and remaining stumps shall be cut off at grade level. The general stripping of topsoil within wetlands along the construction corridor is not permitted.

5. Permanent maintained access corridors in wetlands and across stream channels shall be restricted to the minimum width practicable and shall not exceed 30 feet wide for gas utility lines and 20 feet wide for all other utility lines except at manhole locations. 15-foot by 15-foot perpendicular vehicle turnarounds shall be allowed in access corridors but must be spaced at least 500 feet apart. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0506 (b)(2) and (c)(2)]

6. For all utility lines constructed within wetlands, an anti-seep collar shall be placed at the downstream (utility line gradient) wetland boundary and every 150 feet up the gradient until the utility exits the wetland. Anti-seep collars may be constructed with class B concrete, compacted clay, PVC pipe, or metal collars. Wetland crossings that are directionally drilled, and perpendicular wetland crossings that are open cut and less than 150 feet long do not require anti-seep collars. The compacted clay shall have a specific

infiltration of 1 X 10^{-5} cm/sec or less. A section and plan view diagram is attached for the anti-seep collars. [15A NCAC 02H .0506 (b)(4) and (c)(4)]

The following specifications shall apply to class B concrete:

a. Minimum cement content, sacks per cubic yard with rounded coarse aggregate 5.0
b. Minimum cement content, sacks per cubic yard with angular coarse aggregate 5.5
c. Maximum water-cement ratio gallons per sack 6.8
d. Slump range 2" to 4"
e. Minimum strength - 28-day psi 2,500

7. The applicant shall have a specific plan for restoring wetland contours. Any excess material will be removed to a high ground disposal area. [15A NCAC 02H .0506 (b)(2) and (c)(2)]

   The mixing of topsoil and subsoils within the wetlands along utility corridors shall be minimized to the greatest extent practical. During excavation, the soils shall be placed on fabric to minimize impacts whenever possible. Topsoil excavated from utility trenches will be piled separately from subsoils and will be backfilled into the trench only after the subsoils have been placed and compacted.

8. For the North Carolina Department of Transportation, compliance with the NCDOT's individual NPDES permit NCS000250 shall serve to satisfy this condition. All other high-density utility line and associated facilities projects that trigger threshold Item (f) above shall comply with one of the following requirements: [15A NCAC 02H .0506(b)(5) and (c)(5)]

   a. Provide a completed Stormwater Management Plan (SMP) for review and approval, including all appropriate stormwater control measure (SCM) supplemental forms and associated items, that complies with the high-density development requirements of 15A NCAC 02H .1003. Stormwater management shall be provided throughout the entire project area in accordance with 15A NCAC 02H .1003. For the purposes of 15A NCAC 02H .1003(2)(a), density thresholds shall be determined in accordance with 15A NCAC 02H .1017.

   b. Provide documentation (including calculations, photos, etc.) that the project will not cause degradation of downstream surface waters. Documentation shall include a detailed analysis of the hydrological impacts from stormwater runoff when considering the volume and velocity of stormwater runoff from the project built upon area and the size and existing condition of the receiving stream(s).

   Exceptions to this condition require application to and written approval from DWR.

II. GENERAL CONDITIONS:

1. When written authorization is required, the plans and specifications for the project are incorporated into the authorization by reference and are an enforceable part of the Certification. Any modifications to the project require notification to DWR and may require an application submittal to DWR with the appropriate fee. [15A NCAC 02H .0501 and .0502]

2. No waste, spoil, solids, or fill of any kind shall occur in wetlands or waters beyond the footprint of the impacts (including temporary impacts) as authorized in the written approval from DWR; or beyond the thresholds established for use of this Certification without written authorization. [15A NCAC 02H .0501 and .0502]

   No removal of vegetation or other impacts of any kind shall occur to state regulated riparian buffers beyond the footprint of impacts approved in a Buffer Authorization or Variance or as listed as an exempt activity in the applicable riparian buffer rules. [15A NCAC 02B .0200]

3. In accordance with 15A NCAC 02H .0506(h) and Session Law 2017-10, compensatory mitigation may be required for losses of greater than 300 linear feet of perennial streams and/or greater than one (1) acre of wetlands. Impacts associated with the removal of a dam shall not require mitigation when the removal complies with the requirements of Part 3 of Article 21 in Chapter 143 of the North Carolina General Statutes. Impacts to isolated and other non-404 jurisdictional wetlands shall not be combined with 404 jurisdictional wetlands for the purpose of determining when impact thresholds trigger a mitigation requirement. For linear publicly owned and maintained transportation projects that are not determined to be part of a larger common plan of development by the US Army Corps of Engineers, compensatory mitigation may be required for losses of greater than 300 linear feet per perennial stream.

   Compensatory stream and/or wetland mitigation shall be proposed and completed in compliance with G.S. 143-214.11. For applicants proposing to conduct mitigation within a project site, a complete mitigation proposal developed in accordance with the most recent guidance issued by the US Army Corps of Engineers Wilmington District shall be submitted for review and approval with the application for impacts.

4. All activities shall be in compliance with any applicable State Regulated Riparian Buffer Rules in Chapter 2 of Title 15A.

5. When applicable, all construction activities shall be performed and maintained in full compliance with G.S. Chapter 113A Article 4 (Sediment and Pollution Control Act of 1973). Regardless of applicability of the Sediment and Pollution Control Act, all projects shall incorporate appropriate Best Management Practices for the control of sediment and erosion so that no violations of state water quality standards, statutes, or rules occur. [15A NCAC 02H .0506 (b)(3) and (c)(3) and 15A NCAC 02B .0200]

   Design, installation, operation, and maintenance of all sediment and erosion control measures shall be equal to or exceed the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*, or for linear transportation projects, the *NCDOT Sediment and Erosion Control Manual*.

   All devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) sites, including contractor-owned or leased borrow pits associated with the project. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.

For borrow pit sites, the erosion and sediment control measures shall be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*. Reclamation measures and implementation shall comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.

If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, WS-I, WS-II, High Quality Waters (HQW), or Outstanding Resource Waters (ORW), then the sedimentation and erosion control designs shall comply with the requirements set forth in 15A NCAC 04B .0124, *Design Standards in Sensitive Watersheds*.

6. Sediment and erosion control measures shall not be placed in wetlands or waters except within the footprint of temporary or permanent impacts authorized under this Certification. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0501 and .0502]

7. Erosion control matting that incorporates plastic mesh and/or plastic twine shall not be used along streambanks or within wetlands. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02B .0201]

8. An NPDES Construction Stormwater Permit (NCG010000) is required for construction projects that disturb one (1) or more acres of land. The NCG010000 Permit allows stormwater to be discharged during land disturbing construction activities as stipulated in the conditions of the permit. If the project is covered by this permit, full compliance with permit conditions including the erosion & sedimentation control plan, inspections and maintenance, self-monitoring, record keeping and reporting requirements is required. [15A NCAC 02H .0506(b)(5) and (c)(5)]

   The North Carolina Department of Transportation (NCDOT) shall be required to be in full compliance with the conditions related to construction activities within the most recent version of their individual NPDES (NCS000250) stormwater permit. [15A NCAC 02H .0506(b)(5) and (c)(5)]

9. All work in or adjacent to streams shall be conducted so that the flowing stream does not come in contact with the disturbed area. Approved best management practices from the most current version of the *NC Sediment and Erosion Control Manual*, or the *NC DOT Construction and Maintenance Activities Manual*, such as sandbags, rock berms, cofferdams, and other diversion structures shall be used to minimize excavation in flowing water. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0506(b)(3) and (c)(3)]

10. If activities must occur during periods of high biological activity (e.g. sea turtle nesting, fish spawning, or bird nesting), then biological monitoring may be required at the request of other state or federal agencies and coordinated with these activities. [15A NCAC 02H .0506 (b)(2) and 15A NCAC 04B .0125]

All moratoriums on construction activities established by the NC Wildlife Resources Commission (WRC), US Fish and Wildlife Service (USFWS), NC Division of Marine Fisheries (DMF), or National Marine Fisheries Service (NMFS) shall be implemented. Exceptions to this condition require written approval by the resource agency responsible for the given moratorium. A copy of the approval from the resource agency shall be forwarded to DWR.

Work within a designated trout watershed of North Carolina (as identified by the Wilmington District of the US Army Corps of Engineers), or identified state or federal endangered or threatened species habitat, shall be coordinated with the appropriate WRC, USFWS, NMFS, and/or DMF personnel.

11. Culverts shall be designed and installed in such a manner that the original stream profiles are not altered and allow for aquatic life movement during low flows. The dimension, pattern, and profile of the stream above and below a pipe or culvert shall not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed culvert shall be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. [15A NCAC 02H .0506(b)(2) and (c)(2)]

    Placement of culverts and other structures in streams shall be below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20% of the culvert diameter for culverts having a diameter less than or equal to 48 inches, to allow low flow passage of water and aquatic life.

    If multiple pipes or barrels are required, they shall be designed to mimic the existing stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel shall be avoided.

    When topographic constraints indicate culvert slopes of greater than 5%, culvert burial is not required, provided that all alternative options for flattening the slope have been investigated and aquatic life movement/connectivity has been provided when possible (e.g. rock ladders, cross vanes, etc.). Notification, including supporting documentation to include a location map of the culvert, culvert profile drawings, and slope calculations, shall be provided to DWR 60 calendar days prior to the installation of the culvert.

    When bedrock is present in culvert locations, culvert burial is not required provided that there is sufficient documentation of the presence of bedrock. Notification, including supporting documentation such as a location map of the culvert, geotechnical reports, photographs, etc. shall be provided to DWR a minimum of 60 calendar days prior to the installation of the culvert. If bedrock is discovered during construction, then DWR shall be notified by phone or email within 24 hours of discovery.

    If other site-specific topographic constraints preclude the ability to bury the culverts as described above and/or it can be demonstrated that burying the culvert would result in destabilization of the channel, then exceptions to this condition require application to and written approval from DWR.

Installation of culverts in wetlands shall ensure continuity of water movement and be designed to adequately accommodate high water or flood conditions. When roadways, causeways, or other fill projects are constructed across FEMA-designated floodways or wetlands, openings such as culverts or bridges shall be provided to maintain the natural hydrology of the system as well as prevent constriction of the floodway that may result in destabilization of streams or wetlands.

The establishment of native woody vegetation and other soft stream bank stabilization techniques shall be used where practicable instead of rip-rap or other bank hardening methods.

12. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means to the maximum extent practicable (e.g. grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0506(b)(5)]

13. Application of fertilizer to establish planted/seeded vegetation within disturbed riparian areas and/or wetlands shall be conducted at agronomic rates and shall comply with all other Federal, State and Local regulations. Fertilizer application shall be accomplished in a manner that minimizes the risk of contact between the fertilizer and surface waters. [15A NCAC 02B .0200 and 15A NCAC 02B .0231]

14. If concrete is used during construction, then all necessary measures shall be taken to prevent direct contact between uncured or curing concrete and waters of the state. Water that inadvertently contacts uncured concrete shall not be discharged to waters of the state. [15A NCAC 02B .0200]

15. All proposed and approved temporary fill and culverts shall be removed and the impacted area shall be returned to natural conditions within 60 calendar days after the temporary impact is no longer necessary. The impacted areas shall be restored to original grade, including each stream's original cross sectional dimensions, planform pattern, and longitudinal bed profile. For projects that receive written approval, no temporary impacts are allowed beyond those included in the application and authorization. All temporarily impacted sites shall be restored and stabilized with native vegetation. [15A NCAC 02H .0506(b)(2) and (c)(2)]

16. All proposed and approved temporary pipes/culverts/rip-rap pads etc. in streams shall be installed as outlined in the most recent edition of the *North Corolino Sediment ond Erosion Control Plonning ond Design Monuol* or the *North Corolino Surfoce Mining Monuol* or the *North Corolino Deportment of Tronsportotion Best Monogement Practices for Construction ond Mointenonce Activities* so as not to restrict stream flow or cause dis-equilibrium during use of this Certification. [15A NCAC 02H .0506(b)(2) and (c)(2)]

17. Any rip-rap required for proper culvert placement, stream stabilization, or restoration of temporarily disturbed areas shall be restricted to the area directly impacted by the approved construction activity. All rip-rap shall be placed such that the original stream elevation and streambank contours are restored and maintained. Placement of rip-rap or other approved materials shall not result in de-stabilization of the stream bed or banks upstream or downstream of the area or in a manner that precludes aquatic life passage. [15A NCAC 02H .0506(b)(2)]

18. Any rip-rap used for stream or shoreline stabilization shall be of a size and density to prevent movement by wave, current action, or stream flows and shall consist of clean rock or masonry material free of debris or toxic pollutants. Rip-rap shall not be installed in the streambed except in specific areas required for velocity control and to ensure structural integrity of bank stabilization measures. [15A NCAC 02H .0506(b)(2)]

19. Applications for rip-rap groins proposed in accordance with 15A NCAC 07H .1401 (NC Division of Coastal Management General Permit for construction of Wooden and Rip-rap Groins in Estuarine and Public Trust Waters) shall meet all the specific conditions for design and construction specified in 15A NCAC 07H .1405.

20. All mechanized equipment operated near surface waters shall be inspected and maintained regularly to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials. Construction shall be staged in order to minimize the exposure of equipment to surface waters to the maximum extent practicable. Fueling, lubrication and general equipment maintenance shall be performed in a manner to prevent, to the maximum extent practicable, contamination of surface waters by fuels and oils. [15A NCAC 02H .0506(b)(3) and (c)(3) and 15A NCAC 02B .0211 (12)]

21. Heavy equipment working in wetlands shall be placed on mats or other measures shall be taken to minimize soil disturbance. [15A NCAC 02H .0506(b)(3) and (c)(3)]

22. In accordance with 143-215.85(b), the applicant shall report any petroleum spill of 25 gallons or more; any spill regardless of amount that causes a sheen on surface waters; any petroleum spill regardless of amount occurring within 100 feet of surface waters; and any petroleum spill less than 25 gallons that cannot be cleaned up within 24 hours.

23. If an environmental document is required under the State Environmental Policy Act (SEPA), then this General Certification is not valid until a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) is issued by the State Clearinghouse. If an environmental document is required under the National Environmental Policy Act (NEPA), then this General Certification is not valid until a Categorical Exclusion, the Final Environmental Assessment, or Final Environmental Impact Statement is published by the lead agency. [15A NCAC 01C .0107(a)]

24. This General Certification does not relieve the applicant of the responsibility to obtain all other required Federal, State, or Local approvals before proceeding with the project, including those required by, but not limited to, Sediment and Erosion Control, Non-Discharge, Water Supply Watershed, and Trout Buffer regulations.

25. The applicant and their authorized agents shall conduct all activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act), and any other appropriate requirements of State and Federal Law. If DWR determines that such standards or laws are not being met, including failure to sustain a designated or achieved use, or that State or Federal law is being violated, or that further conditions are necessary to assure compliance, then DWR may revoke or modify a written authorization associated with this General Water Quality Certification. [15A NCAC 02H .0507(d)]

26. The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this Certification. A copy of this Certification, including all conditions shall be available at the project site during the construction and maintenance of this project. [15A NCAC 02H .0507 (c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

27. When written authorization is required for use of this Certification, upon completion of all permitted impacts included within the approval and any subsequent modifications, the applicant shall be required to return a certificate of completion (available on the DWR website: https://edocs.deq.nc.gov/Forms/Certificate-of-Completion). [15A NCAC 02H .0502(f)]

28. Additional site-specific conditions, including monitoring and/or modeling requirements, may be added to the written approval letter for projects proposed under this Water Quality Certification in order to ensure compliance with all applicable water quality and effluent standards. [15A NCAC 02H .0507(c)]

29. If the property or project is sold or transferred, the new permittee shall be given a copy of this Certification (and written authorization if applicable) and is responsible for complying with all conditions. [15A NCAC 02H .0501 and .0502]

III. GENERAL CERTIFICATION ADMINISTRATION:

1. In accordance with North Carolina General Statute 143-215.3D(e), written approval for a 401 Water Quality General Certification must include the appropriate fee. An applicant for a CAMA permit under Article 7 of Chapter 113A of the General Statutes for which a Water Quality Certification is required shall only make one payment to satisfy both agencies; the fee shall be as established by the Secretary in accordance with 143-215.3D(e)(7).

2. This Certification neither grants nor affirms any property right, license, or privilege in any waters, or any right of use in any waters. This Certification does not authorize any person to interfere with the riparian rights, littoral rights, or water use rights of any other person and this Certification does not create any prescriptive right or any right of priority regarding any usage of water. This Certification shall not be interposed as a defense in any action respecting the determination of riparian or littoral rights or other rights to water use. No consumptive user is deemed by virtue of this Certification to possess any prescriptive or other right of priority with respect to any other consumptive user regardless of the quantity of the withdrawal or the date on which the withdrawal was initiated or expanded.

3. This Certification grants permission to the Director, an authorized representative of the Director, or DWR staff, upon the presentation of proper credentials, to enter the property during normal business hours. [15A NCAC 02H .0502(e)]

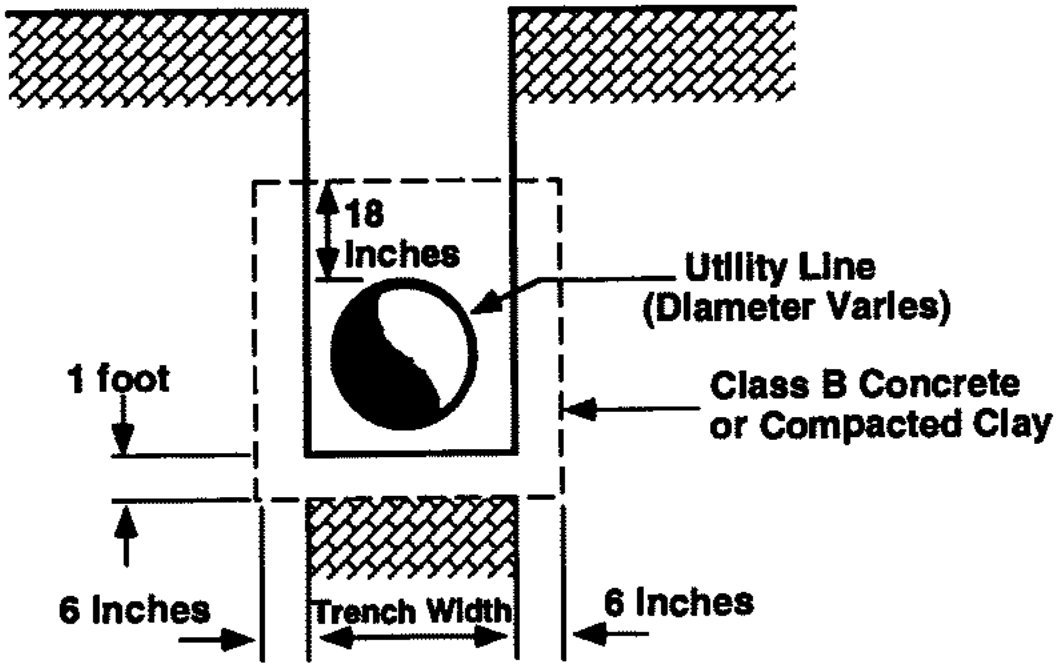
4. This General Certification shall expire on the same day as the expiration date of the corresponding Nationwide Permit and/or Regional General Permit. The conditions in effect on the date of issuance of Certification for a specific project shall remain in effect for the life of the project, regardless of the expiration date of this Certification. This General Certification is rescinded when the U5 Army Corps of Engineers reauthorizes any of the corresponding Nationwide Permits and/or Regional General Permits or when deemed appropriate by the Director of the Division of Water Resources.

5. Non-compliance with or violation of the conditions herein set forth by a specific project may result in revocation of this General Certification for the project and may also result in criminal and/or civil penalties.

6. The Director of the North Carolina Division of Water Resources may require submission of a formal application for Individual Certification for any project in this category of activity if it is deemed in the public's best interest or determined that the project is likely to have a significant adverse effect upon water quality, including state or federally listed endangered or threatened aquatic species, or degrade the waters so that existing uses of the water or downstream waters are precluded.

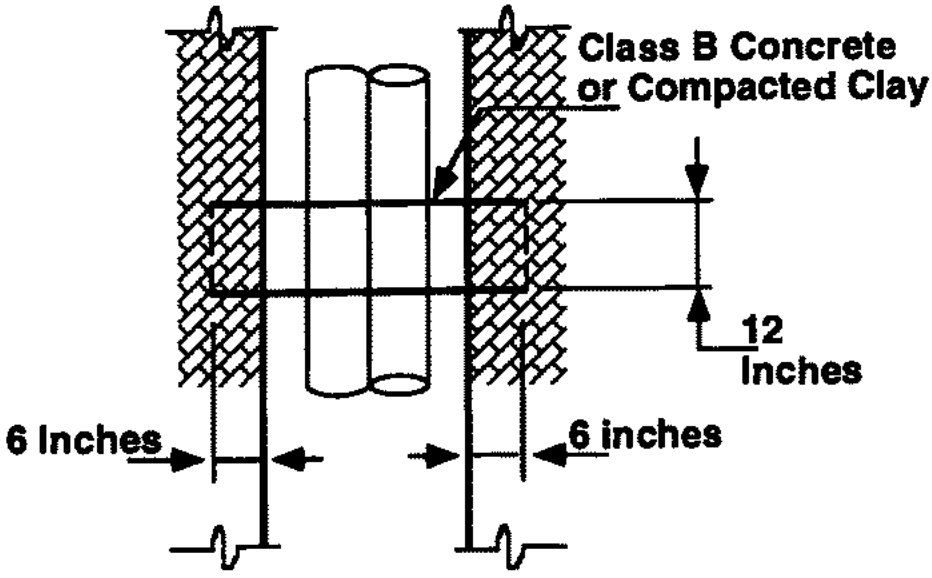
History Note: Water Quality Certification (WQC) Number 4133 issued December 1, 2017 replaces WQC 4086 issued March 3, 2017; WQC 3884 issued March 19, 2012; WQC Number 3819 issued March 19, 2010; WQC Number 3699 issued November 1, 2007; WQC Number 3625 issued March 19, 2007; WQC Number 3374 issued March 18, 2002; WQC Number 3288 issued June 1, 2000; WQC Number 3101 issued February 11, 1997; WQC Number 3022 issued September 6, 1995, WQC Number 2664 issued January 21, 1992.

ANTI -SEEP COLLAR



Not to exceed 40 feet

SECTION



PLAN

Duke Energy Approval Package

Duke Energy
8645 Trade Street
Leland, NC 28451
910-772-4903
Bill.wilder@duke-energy.com

February 10, 2020

CDM Smith
Attn: Kelly R. Boone, PE
5400 Glenwood Avenue, Suite 400
Raleigh, NC 27612
919-325-3500
boonekr@cdmsmith.com

Re: Duke Energy Transmission Line Right-of-Way Plan Review Conditional Approval
Project: Northwest Water Treatment Plant Concentrate Discharge Pipeline
Line: Sutton Plant – Delco 115kV North Line, OL099, Between Line Structure 83-84
Sutton Plant – Delco 115kV North Line, OL099, Between Line Structure 76-77
Sutton Plant – Delco 115kV North Line, OL099, Between Line Structure 74-75

Dear Kelly,

This office has reviewed the proposed "NORTHWEST WATER TREATMENT PLANT CONCENTRATE DISCHARGE PIPELINE" plans (attached separately via email) and referred to herein as Attachment "A". We find the plans as shown on the referenced drawings to be acceptable and in compliance with the attached transmission right-of-way guidelines and restrictions. Therefore Duke Energy Transmission ("DET") approves the referenced plans, insofar as its transmission easement rights are concerned, subject to the conditions detailed below. If this project construction has not commenced by a period of 12 months from the date of this letter, this approval by DET shall expire, and additional plan review will be required by DET at that time.

In summary, the following details DET's comments:

- **No stockpiling or storage of materials, dirt, or equipment of any kind is permitted within the DET easement area, nor may any combustible materials be placed within the easement area.**
- Contractors operating any and all equipment should be instructed not to operate within 25' of the poles, towers, or other electrical structures including guy anchors. All slopes shall be 4:1 or less. No spoil dirt is to be placed within the rights-of-way limits unless previously approved by DET.
- Any proposed easements must not cross closer than 25' to DET's electrical structures including, but not limited to poles, towers, and guy anchors.
- All underground facilities, such as, but not limited to, storm water pipes and domestic water line pipes, must be capable of a heavy equipment load bearing weight of 80,000 lbs. DET will not be responsible for damages to these installed facilities.
- Any damage to the transmission line or its associated structures, related to this project, and/or claims due to the damage, is the responsibility of the developer/owner.
- We have not reviewed, and therefore have not approved, any plans other than Attachment A. DET restrictions prohibit trees that exceed 12' at maturity or lights that exceed 12' within the rights-of-way

limits, and neither may be within the wire zone. Vegetation that exceeds 12' in height is subject to removal by DET. Additionally, irrigation systems and signs are not permitted.

- All plats, plans, renderings and representations of lots, parcels, designated spaces and/or designated areas having and including area within a Duke Energy easement cannot represent, with setbacks or other means, buildable areas(s) within a Duke Energy easement.
- This approval by DET is subject to the paramount right of DET at all times to make use of its entire easement area for the construction, maintenance, reconstruction, and operation of electric lines.
- This letter only addresses issues related to DET's transmission line easement. Additional easements, approvals, or permits from the underlying property owner(s) or other applicable agencies may be required in order for you to proceed with this project .

DET also offers these additional comments to ensure that other potential conflicts are not created during or after construction:

- If there are design changes to any drawings that involve the transmission right-of-way, DET requires a review of the changes for compliance with the rights-of-way guidelines.
- Proper clearances must be maintained at all times. If any transmission line modification by DET is required to maintain proper clearances, the cost will be the responsibility of the developer/owner. Any such line modifications must be approved and scheduled, through DET well in advance of the project start date.
- All current and future property owners are required to adhere to the most current version of the DET transmission right-of-way guidelines and restrictions. (attached separately via email)
- DET heavy equipment access must not be restricted during construction of this project due to grading or any other activity.
- Please contact me prior to the start of this project to attend any pre-construction meetings.
- Underground Utilities with cathodic protection will require a study of anodic interference on existing DET structures. The developer / owner is responsible for any required remediation as determined by DET. This study shall be provided at no cost to DET for their review and acceptance before a Final Approval shall be issued by DET**.** This study must be submitted to DET prior to the commissioning of the Underground Utilities.

In not objecting to the use of the rights-of-way for use as shown on the drawings, DET is not relinquishing the right to control and maintain the rights-of-way as specified in the recorded easement documents. Any damages to the transmission lines or its associated structures, and claims caused by the damage, is the responsibility of the developer/contractor/owner. It is the responsibility of the developer/contractor/owner to ensure that all work performed in the proximity of the transmission lines complies with all applicable laws and regulations, including but not limited to the National Electric Safety Code ("**NESC**"), the Overhead High-Voltage Line Safety Act ("**OHVLSA**"), and the Occupational Safety and Health Act ("**OSHA**"), and that all persons working near the electric power lines are made aware of the inherent safety hazards associated with these lines.

Please note that this approval is based in part on the accuracy of the information you have supplied on the site plans (Attachment A). You are responsible for indicating the correct location of the DET right of way and its associated electrical structures along with the correct width of the DET rights-of-way limits.

Thank you for the opportunity to work with you on this project. If you have any questions, please feel free to contact me at 910-772-4903.

Sincerely,

Bill Wilder

Bill Wilder
Asset Protection Specialist II
Transmission Right of Way

Attachments: Attachment "A" - Site Plans
Duke Energy Transmission Right-of-Way Guidelines & Restrictions
Duke Energy "Look Up & Live" Brochure

Cc: Curtis Garst Duke Energy

Robert "Bob" Tweedy, PE Brunswick County
Bob.tweedy@brunswickcountync.org

Jason Paradis Duke Energy

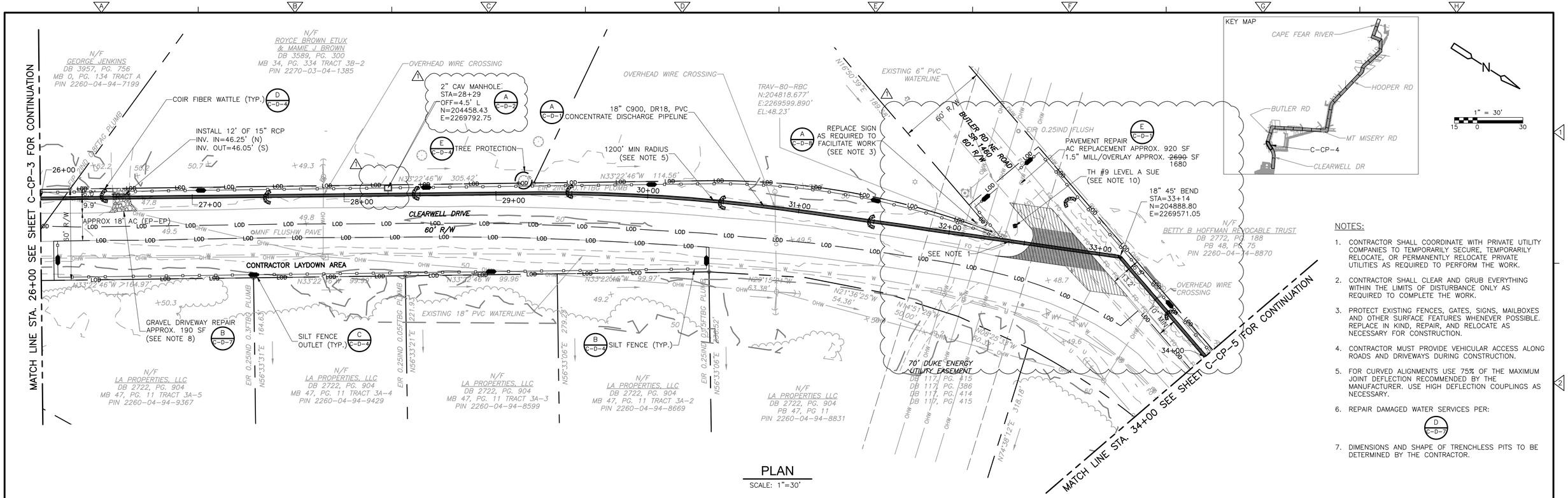
David Folk Duke Energy

Beau Mackie CDM Smith
mackiebm@cdmsmith.com

Attachment "A"

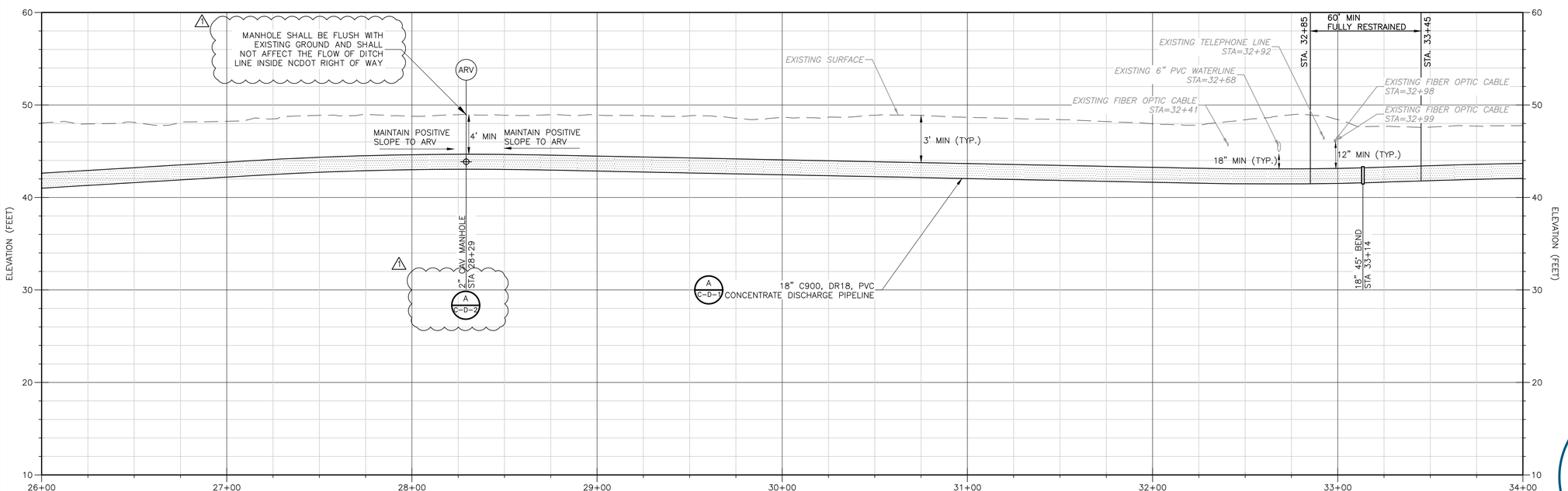
The following plan sheets were provided by CDM Smith and submitted to Duke Energy TRANSMISSION for this plan review and approval package. Plans provided under engineering seal of Michael A. Pollard, Jr. (PE License 045468)

Plan sheets: C-CP-4; and C-CP-13, dated 1/13/2020
Plan sheet: C-CP-11, dated 10/9/2019



PLAN

SCALE: 1"=30'



PROFILE

SCALE: 1"=30' HORIZ.
SCALE: 1"=6' VERT.

NOTES:

1. CONTRACTOR SHALL COORDINATE WITH PRIVATE UTILITY COMPANIES TO TEMPORARILY SECURE, TEMPORARILY RELOCATE, OR PERMANENTLY RELOCATE PRIVATE UTILITIES AS REQUIRED TO PERFORM THE WORK.
2. CONTRACTOR SHALL CLEAR AND GRUB EVERYTHING WITHIN THE LIMITS OF DISTURBANCE ONLY AS REQUIRED TO COMPLETE THE WORK.
3. PROTECT EXISTING FENCES, GATES, SIGNS, MAILBOXES AND OTHER SURFACE FEATURES WHENEVER POSSIBLE. REPLACE IN KIND, REPAIR, AND RELOCATE AS NECESSARY FOR CONSTRUCTION.
4. CONTRACTOR MUST PROVIDE VEHICULAR ACCESS ALONG ROADS AND DRIVEWAYS DURING CONSTRUCTION.
5. FOR CURVED ALIGNMENTS USE 75% OF THE MAXIMUM JOINT DEFLECTION RECOMMENDED BY THE MANUFACTURER. USE HIGH DEFLECTION COUPLINGS AS NECESSARY.
6. REPAIR DAMAGED WATER SERVICES PER: (D / C-D-7)
7. DIMENSIONS AND SHAPE OF TRENCHLESS PITS TO BE DETERMINED BY THE CONTRACTOR.

NOTES CONTINUED:

8. DRIVEWAY REPAIRS SHALL EXTEND FROM EDGE OF ROAD TO RIGHT OF WAY. FOR CONCRETE DRIVEWAYS, EXTEND FROM EDGE OF ROAD TO NEAREST JOINT OR PER FIELD ENGINEER'S DIRECTION.
9. DRIVEWAY CULVERTS IMPACTED BY CONSTRUCTION TO BE REPLACED WITH RCP AT THE SAME SLOPE UNLESS SHOWN OTHERWISE. 15" MIN. DIAMETER OR MATCH EXISTING, WHICHEVER IS GREATER.
10. LEVEL A SUE INDICATED 6" PVC WATERLINE CROWN 3.1' BELOW GRADE.
11. CONCENTRATE PIPELINE SHALL HAVE MINIMUM COMPACTION AND DEPTH REQUIREMENTS AS DETERMINED BY CONTRACTOR TO SATISFY 80,000 LB POINT LOAD BEARING FOR HEAVY EQUIPMENT WITHIN DUKE ENERGY EASEMENT RIGHT OF WAY.
12. ANGLE OF TANGENT CROSSING DUKE ENERGY TRANSMISSION POWERLINES SHALL BE MINIMUM 30 TO 90 DEGREES FROM CENTER LINE OF THE DUKE ENERGY EASEMENT RIGHT OF WAY.
13. CONCENTRATE DISCHARGE PIPELINE IS APPROXIMATELY 230 LF (W) FROM NEAREST DUKE ENERGY ABOVE GROUND STRUCTURE AS MEASURED ALONG THE CENTERLINE OF THE DUKE ENERGY EASEMENT RIGHT OF WAY.
14. CONTRACTOR SHALL REVIEW AND COMPLY WITH MOST UPDATED REVISION OF DUKE ENERGY ELECTRIC TRANSMISSION RIGHT OF WAY GUIDELINES & RESTRICTIONS VALID FOR NORTH CAROLINA.
15. NO PERMANENT CONCENTRATE DISCHARGE PIPELINE ABOVE GROUND OBSTRUCTIONS ARE LOCATED WITHIN DUKE ENERGY EASEMENT RIGHT OF WAY.

TRANSMISSION ASSET PROTECTION
DUKE ENERGY.
APPROVED
02/10/2020
10:22 am
BILL WILDER

NORTH CAROLINA PROFESSIONAL SEAL 045468 ENGINEER MICHAEL A. POLLARD, JR.
1-13-20

MICHAEL A. POLLARD, JR, P.E.
P.E NO. 045468

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	01/2020	D.B.	M.P.	ADDENDUM NO.2

DESIGNED BY: B. MACKIE
DRAWN BY: D. BORNMANN
SHEET CHK'D BY: B. WILLIAMS
CROSS CHK'D BY: M. POLLARD
APPROVED BY: M. POLLARD
DATE: OCTOBER 2019

CDM Smith
5400 Glenwood Avenue, Suite 400
Raleigh, NC 27612
Tel: (919) 325-3500

BRUNSWICK COUNTY NC

NORTHWEST WATER TREATMENT PLANT
CONCENTRATE DISCHARGE PIPELINE

CONCENTRATE FORCE MAIN - PLAN AND PROFILE
STA. 26+00 THRU STA. 34+00

PROJECT NO. 250459-232662
FILE NAME: C-CP-4.dwg
SHEET NO.
C-CP-4

ISSUED FOR BID

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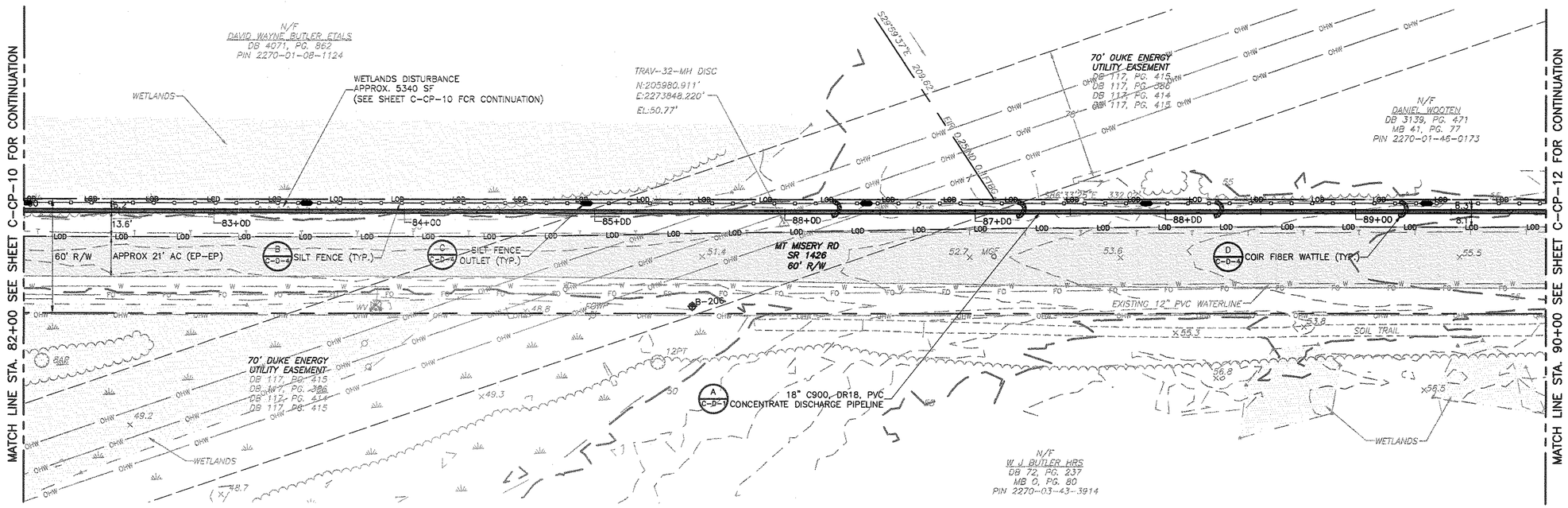
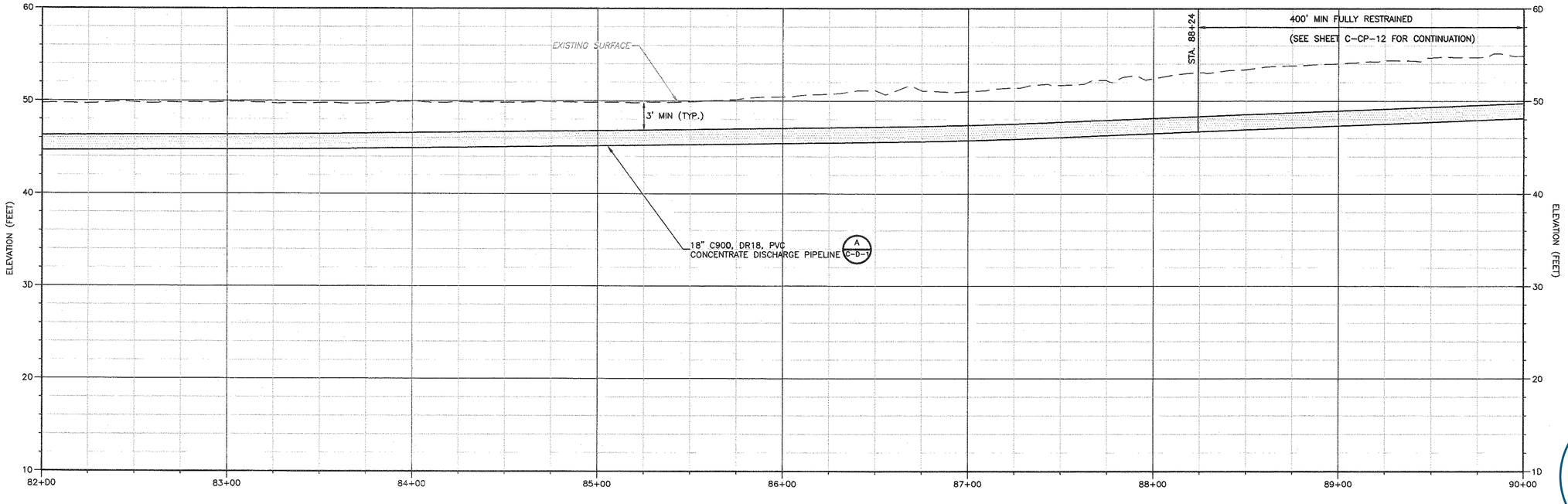


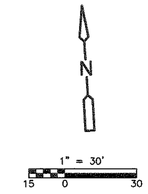
PLAN

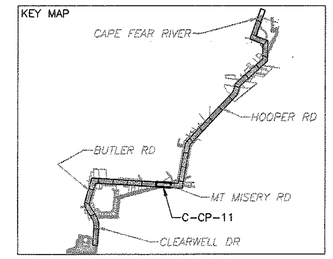
SCALE: 1"=30'



PROFILE

SCALE: 1"=30' HORIZ.
SCALE: 1"=6' VERT.





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6. REPAIR DAMAGED WATER SERVICES PER: D C-D-7
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12. CONCENTRATE DISCHARGE PIPELINE IS APPROXIMATELY 210 LF (N) FROM NEAREST DUKE ENERGY ABOVE GROUND STRUCTURE AS MEASURED ALONG THE CENTERLINE OF THE DUKE ENERGY EASEMENT RIGHT OF WAY.
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TRANSMISSION ASSET PROTECTION
DUKE ENERGY.
APPROVED
02/10/2020
10:22 am
BILL WILDER

NORTH CAROLINA PROFESSIONAL SEAL 045468 ENGINEER MICHAEL A. POLLARD, JR.
10-9-19

DATE: OCTOBER 2019
MICHAEL A. POLLARD, JR, P.E.
P.E NO. 045468

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: B. MACKIE
DRAWN BY: D. BORNMANN
SHEET CHK'D BY: B. WILLIAMS
CROSS CHK'D BY: M. POLLARD
APPROVED BY: M. POLLARD
DATE: OCTOBER 2019

CDM Smith
5400 Glenwood Avenue, Suite 400
Raleigh, NC 27612
Tel: (919) 325-3500

BRUNSWICK COUNTY NC

NORTHWEST WATER TREATMENT PLANT
CONCENTRATE DISCHARGE PIPELINE

CONCENTRATE FORCE MAIN - PLAN AND PROFILE
STA. 82+00 THRU STA. 90+00

PROJECT NO. 250459-232662
FILE NAME: C-CP-11.dwg
SHEET NO.
C-CP-11
SHEET 14 OF 44

ISSUED FOR BID

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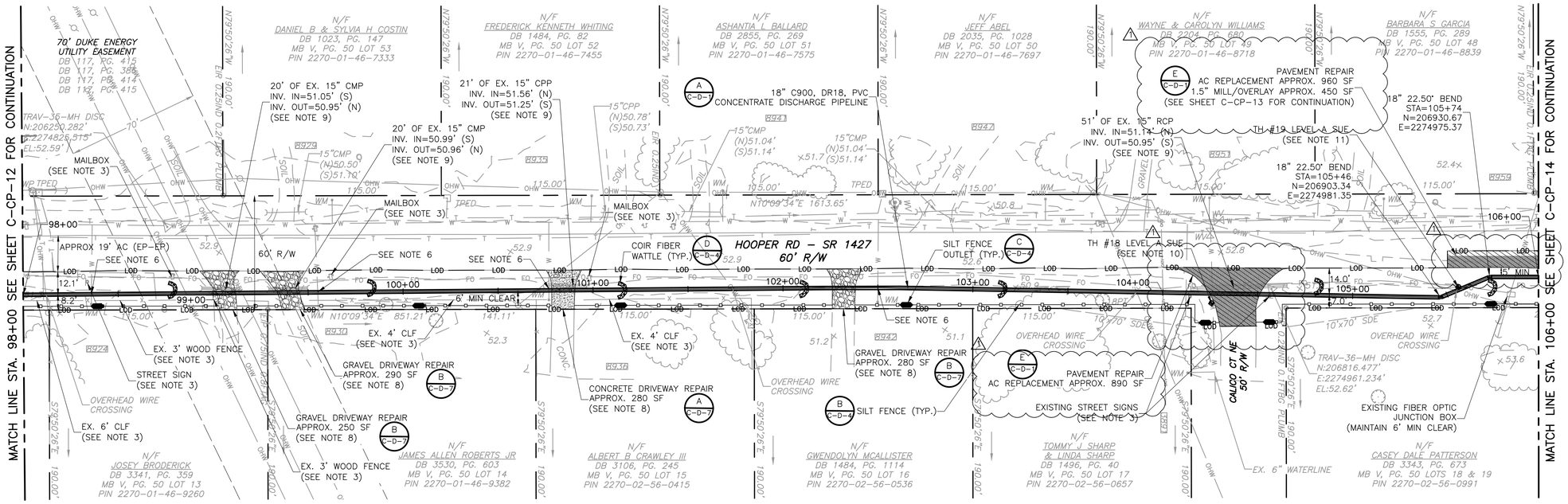
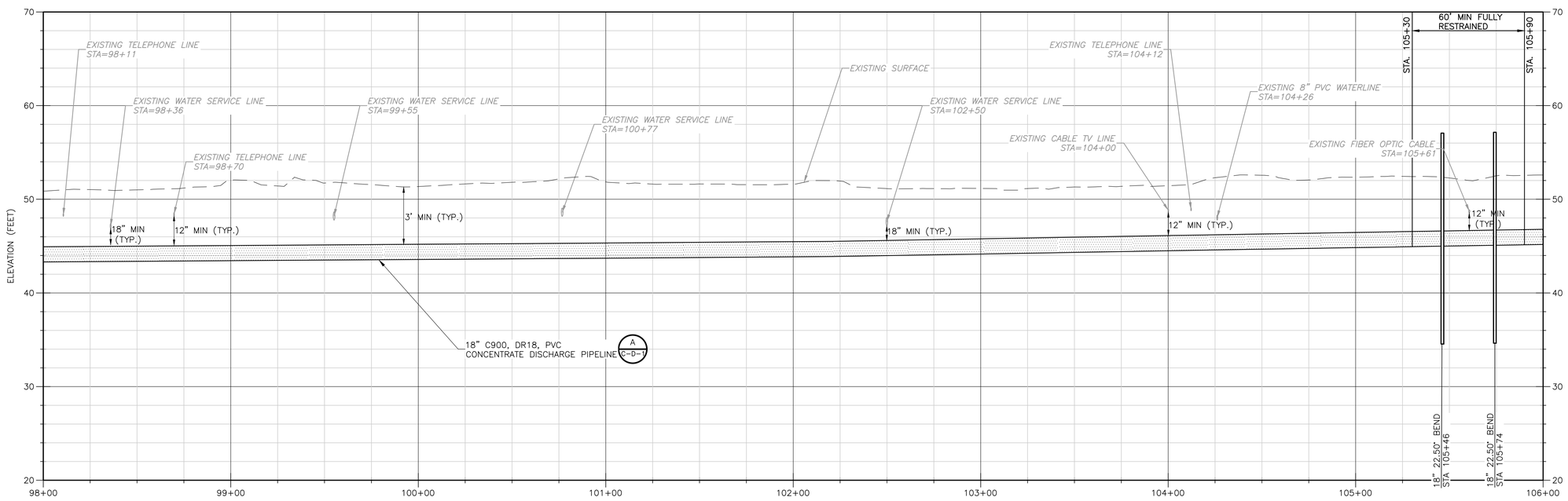


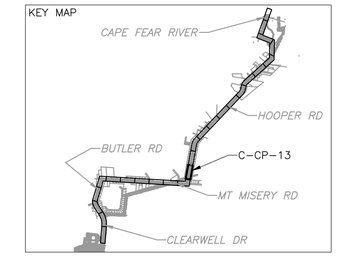
PLAN

SCALE: 1"=30'



PROFILE

SCALE: 1"=30' HORIZ.
SCALE: 1"=6' VERT.



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10. LEVEL A SUE INDICATED 8" PVC WATERLINE CROWN 4.15' BELOW GRADE AT THIS LOCATION.
11. LEVEL A SUE INDICATED 1" AT&T FIBER OPTIC CABLE CROWN 3.35' BELOW GRADE AT THIS LOCATION.
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TRANSMISSION ASSET PROTECTION DUKE ENERGY. APPROVED 02/10/2020 10:22 am BILL WILDER

NORTH CAROLINA PROFESSIONAL SEAL 045468 ENGINEER MICHAEL A. POLLARD, JR.
1-13-20

MICHAEL A. POLLARD, JR, P.E.
P.E NO. 045468

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	01/2020	D.B.	M.P.	ADDENDUM NO.2

DESIGNED BY: B. MACKIE
DRAWN BY: D. BORNMANN
SHEET CHK'D BY: B. WILLIAMS
CROSS CHK'D BY: M. POLLARD
APPROVED BY: M. POLLARD
DATE: OCTOBER 2019

CDM Smith
5400 Glenwood Avenue, Suite 400
Raleigh, NC 27612
Tel: (919) 325-3500

BRUNSWICK COUNTY NC

NORTHWEST WATER TREATMENT PLANT
CONCENTRATE DISCHARGE PIPELINE

CONCENTRATE FORCE MAIN - PLAN AND PROFILE
STA. 98+00 THRU STA. 106+00

PROJECT NO. 250459-232662
FILE NAME: C-CP-13.dwg
SHEET NO.
C-CP-13

ISSUED FOR BID

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DUKE ENERGY ELECTRIC TRANSMISSION RIGHT-OF-WAY GUIDELINES/RESTRICTIONS VALID FOR NORTH CAROLINA AND SOUTH CAROLINA (Revised 11/20/2014)

This list of right-of-way restrictions has been developed to answer the most frequently asked questions about property owner use of Duke Energy's electric transmission rights of way. This list does not cover all restrictions or all possible situations. You should contact the Asset Protection right-of-way specialist if you have additional concerns about the rights of way. This list of restrictions is subject to change at any time and without notice. Duke Energy reserves all rights conveyed to it by the right-of-way agreement applicable to the subject property. All activity within the rights of way shall be reviewed by an Asset Protection right-of-way specialist to obtain prior written approval. Engineering plans may be required. Compliance with the Duke Energy Right-of-Way Guidelines/Restrictions or approval of any plans by Duke Energy does not mean that the requirements of any local, county, state or federal government or other applicable agency with governing authority have been satisfied.

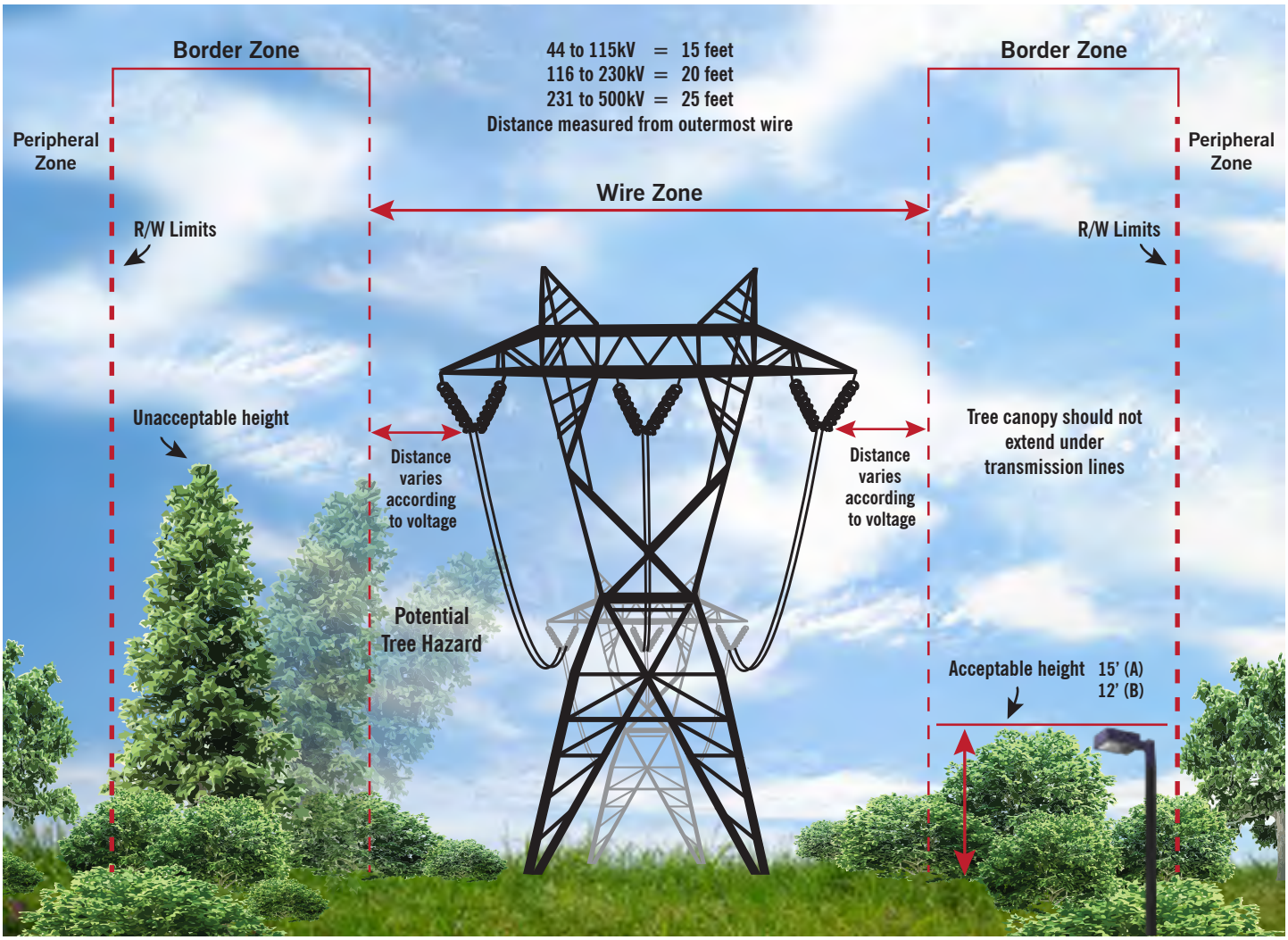
1. **Structures, buildings, manufactured/mobile homes, satellite systems, swimming pools (any associated equipment and decking), graves, billboards, dumpsters, signs, wells, deer stands, retaining walls, septic systems or tanks (whether above or below ground), debris of any type, flammable material, building material, wrecked or disabled vehicles and all other objects (whether above or below ground) which in Duke Energy's opinion interfere with the electric transmission right of way are not allowed within the right-of-way limits. Transformers, telephone/cable pedestals (and associated equipment) and fire hydrants are not allowed. Manholes, water valves, water meters, backflow preventers and irrigation heads are not permitted. Attachments to Duke Energy structures are prohibited.**
2. **Fences and gates shall not exceed 10 feet in height and shall be installed greater than 25 feet from poles, towers and guy anchors. Fences shall not parallel the centerline within the rights of way but may cross from one side to the other at any angle not less than 30 degrees with the centerline. If a fence crosses the right of way, a gate (16 feet wide at each crossing) shall be installed by the property owner, per Duke Energy's specifications. The property owner is required to install a Duke Energy lock on the gate to ensure access. Duke Energy will supply a lock.**
3. **Grading (cuts or fill) shall be no closer than 25 feet from poles, towers, guys and anchors (except for parking areas; see paragraph 7) and the slope shall not exceed 4:1. Grading or filling near Duke Energy facilities which will prevent free equipment access or create ground-to-conductor clearance violations will not be permitted. Storage or stockpiling of dirt or any other material is prohibited. Sedimentation control, including re-vegetation, is required per state regulations.**
4. **Streets, roads, driveways, sewer/water lines, other utility lines or any underground facilities shall not parallel the centerline within the right of way but may cross, from one side to the other, at any angle not less than 30 degrees with the centerline. No portion of such facility or corresponding easement shall be located within 25 feet of Duke Energy's facilities. Roundabouts, cul-de-sacs and intersections (such as roads, driveways and alleyways) are not permitted.**
5. **Any drainage feature that allows water to pond, causes erosion, directs stormwater toward the right of way or limits access to or around Duke Energy facilities is prohibited.**
6. **Contact Duke Energy prior to the construction of lakes, ponds, retention or detention facilities, etc.**
7. **Parking may be permitted within the right of way, provided that:**
   a. **Prior to grading, concrete barriers shall be installed at a minimum of 9 feet from the Duke Energy facilities. During construction, grading shall be no closer than 10 feet to any Duke Energy facility.**
   b. **After grading/paving activity is complete, a Duke Energy-approved barrier sufficient to withstand a 15mph vehicular impact shall be erected 9 feet from any Duke Energy facility.**
   c. **Any access areas, entrances or exits shall cross (from one side to the other) the right of way at any angle not less than 30 degrees with the centerline and shall not pass within 25 feet of any structure. Parking lot entrances/exits cannot create an intersection within the right of way.**
   d. **Lighting within the right-of-way limits must be approved by Duke Energy before installing. Due to engineering design standards, lighting <u>is not</u> allowed in the "Wire Zone." Where lighting is approved ("Border Zone"), the total height may not exceed 15 feet in Area A and 12 feet in Area B. See map on back of this page for Areas. Contact your Asset Protection right-of-way specialist as the "Wire Zone" varies for the different voltage lines.**
8. **Duke Energy will not object to certain vegetation plantings as long as:**
   a. **They do not interfere with the access to or the safe, reliable operation and maintenance of Duke Energy facilities.**
   b. **With prior written approval, Duke Energy does not object to low-growing shrubs and grasses within the "Wire Zone." Tree species <u>are not</u> allowed within the "Wire Zone." Trees that are approved in the "Border Zone" may not exceed, at maturity, 15 feet in Area A and 12 feet in Area B. See map on back of page for areas. Contact the Asset Protection right-of-way specialist for "Wire Zone"/"Border Zone" definitions.**
   c. **For compliant mature height species, refer to plants.ces.ncsu.edu/ for reference.**
   d. **Engineering drawings must indicate the <u>outermost</u> conductor.**
   e. **Vegetation that is not in compliance is subject to removal without notice.**
   f. **Duke Energy may exercise the right to cut "danger trees" outside the right-of-way limits as required to properly maintain and operate the transmission line.**

We hope this is useful information. If you have additional questions or plan any activity not mentioned above, please contact the Asset Protection right-of-way specialist for your area (see map).

AUTHORIZED COPY
Duke Energy Proprietary Business Information

BUILDING A **SMARTER** ENERGY FUTURE℠

Transmission Right-of-way Zones – Carolinas



Wire Zone: Extends beyond the outermost conductor on both sides. (See diagram above.)

Permitted within the Wire Zone: Low-growing plants, shrubs and grasses.
Not permitted within the Wire Zone: Tree species of any kind.

Border Zone: Extends from the edge of the Wire Zone to the outside edge of the Right of Way.

Permitted within the Border Zone: Lighting structures and plantings within the Right of Way that do not exceed a vertical height of 15 feet in Area A and 12 feet in Area B. (See Asset Protection Map for location of geographic areas.) For compliant mature height species, refer to **plants/ces.ncsu.edu/**.

Not permitted within the Border Zone: Any object that exceeds vertical height restrictions. These restrictions are based on flat ground elevations. If the ground elevations differ, no object at any time may exceed the outermost conductor's ground elevation.

Peripheral Zone: Outside the Right of Way and adjacent to Border Zones.

Permitted within the Peripheral Zone: Trees may be planted in the Peripheral Zone. Duke Energy recommends customers exercise caution selecting and planning trees in this zone.
Not permitted in the Peripheral Zone: Trees with canopies are subject to routine trimming and possible removal.

In all zones:

When an outage risk is identified, Duke Energy will attempt to notify the affected customer. However, the company may need to take immediate action if trees cannot be pruned to appropriate levels. This may include trees and shrubs that are within 20 feet of the power line at the maximum peak load or during weather conditions that create line sag and sway.

Written approvals by Duke Energy are required for all plans.

We hope this is useful information. If you have additional questions on line voltages or plan any activity not mentioned above, please contact the Asset Protection Specialist for your area. (See Map.)

*Right of Way is intended to reference the easement rights granted to Duke Energy. Actual zone size may vary based upon the particular Right of Way.

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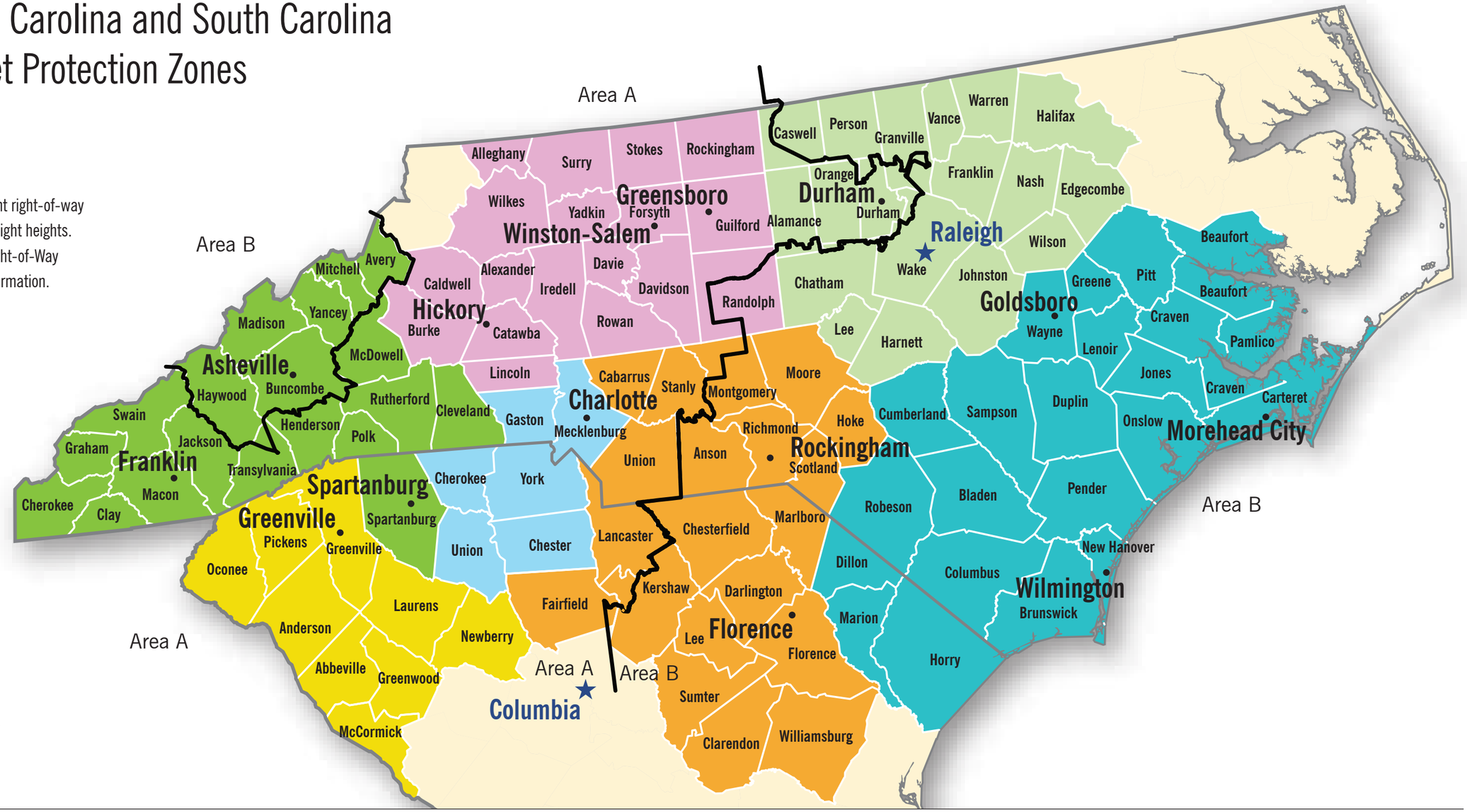
Duke Energy North Carolina and South Carolina Transmission Asset Protection Zones

Area A and Area B have different right-of-way restrictions related to tree and light heights. Please refer to the attached Right-of-Way Restrictions Guide for more information.



Asset Protection Right-of-Way Specialist Zones

- Zone 1 – Craig Garrett 828.258.5018 craig.garrett@duke-energy.com
- Zone 2 – Johnny Wagner 864.234.4382 jonathan.wagner@duke-energy.com
- Zone 3 – Stephen Lord 704.812.2316 stephen.lord@duke-energy.com
- Zone 4 – Ethan Pardue 336.526.2524 ethan.pardue@duke-energy.com
- Zone 5 – Lorick Fanning 910.944.5249 lorick.fanning@duke-energy.com
- Zone 6 – Bill Wilder 910.772.4903 bill.wilder@duke-energy.com
- Zone 7 – Bruce Pait 919.431.4831 bruce.pait@duke-energy.com

Legend – updated 12/17/19

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DUKE ENERGY®

BUILDING A SMARTER ENERGY FUTURE®

Your safety is our priority

We have a goal at Duke Energy – to eliminate injury and death from needless power line contacts. We want to provide you with the information you need to stay safe at work.

Important OSHA minimum approach regulation

The following table is from OSHA 1910.333 and applies to nonqualified persons working in proximity to energized power lines. The minimum approach distance is to be maintained for nonqualified workers. When using equipment classified as a crane or derrick, OSHA 29 CFR 1926.1407-1411 must be followed.

OSHA - 1910.333 Applies to NonQualified Persons Minimum Approach Distance	
Up to 50 kV	10 Feet
50 kV up to 200 kV	15 Feet
200 kV up to 350	20 Feet
350 to 500 kV	25 Feet
500 kV to 750 kV	35 Feet

Important OSHA crane regulation

Cranes and derricks near transmission power lines – OSHA 29 CFR 1926.1407-1411

This regulation applies to power-operated equipment used in construction that can hoist, lower and horizontally move a suspended load. Such equipment includes, but is not limited to:

If any part of equipment, load line or load could get closer than 20 feet to less than 350 kV power lines or 50 feet for greater than 350 kV power lines, you must speak with a Duke Energy representative before beginning work.

Such equipment includes, but is not limited to:

- Articulating cranes (such as knuckle boom cranes)
- Floating cranes
- Locomotive cranes
- Multipurpose machines when configured to hoist and lower (by means of a winch or hook) and horizontally move a suspended load
- Industrial cranes (such as carry deck cranes)
- Pedestal cranes
- Straddle cranes
- Derricks
- Overhead bridge and gantry cranes NOT permanently installed
- Crawler cranes
- Cranes on barges
- Side boom tractors
- Base-mounted drum hoists only when used with derricks
- Tower cranes
- Portal cranes
- Service/mechanic trucks with a hoisting device
- Dedicated pile drivers
- Mobile cranes (such as wheel-mounted, rough-terrain, all-terrain, commercial truck-mounted and boom truck cranes)
- Variations of these types of equipment

DUKE ENERGY®

Contact us

For more information, please visit duke-energy.com/safety or call:

Duke Energy Carolinas
800.777.9898 or 800.POWERON

Duke Energy Indiana
800.521.2232

Duke Energy Kentucky or Ohio
800.544.6900

Duke Energy Progress
800.452.2777

Duke Energy Florida
800.700.8744

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550 South Tryon Street
Charlotte, NC 28202

www.duke-energy.com

DUKE ENERGY®

Look up and live.

Working around high-voltage transmission lines

Know how to protect yourself, your crew and the public when working around transmission lines.

Duke Energy cares about your safety. This brochure contains important information for:

- Anyone working around power lines
- Grading contractors
- Forklift operators
- Crane operators
- Developers (residential, commercial, industrial)
- Architects and engineers
- Dump truck operators

Know your voltage, know your clearance

Federal law requires that all contractors maintain at least a 10-foot clearance from overhead power lines up to 50 kV. Greater clearance is required for higher-voltage power lines and cranes and derricks in construction.

Contact Duke Energy at least three working days before you start working near overhead power lines and equipment so that safety recommendations can be made.

Treat all transmission lines, regardless of their operating voltage, with caution:

- 44 kV and 100 kV lines look similar.
- Never assume a voltage based on the illustration.
- Minimum clearance includes maximum sag, which must be calculated for each instance.
- Injury or death can occur without touching power lines.
- Assume all overhead power lines are energized.
- Contact Duke Energy if you are in doubt about safe operating distances.

Fact 1.

Power lines that serve your homes and businesses are not insulated like home appliance cords.

Fact 2.

Power lines carry 4,000 to 500,000 volts of electricity that can seriously injure or kill on contact.

Fact 3.

The simplest way to stay safe is to know where your power lines are located and stay away.

A planned project is a safe project

Check the job site for hazards and know the location of all overhead power lines and electric equipment, including poles and guy wires.

Consider all overhead lines as energized. Mark the work site boundaries to keep workers, vehicles, tools and equipment a safe distance from electric lines and equipment.

Hold a pre-work safety meeting, pointing out areas where overhead lines and electric equipment are located.

We can help you:

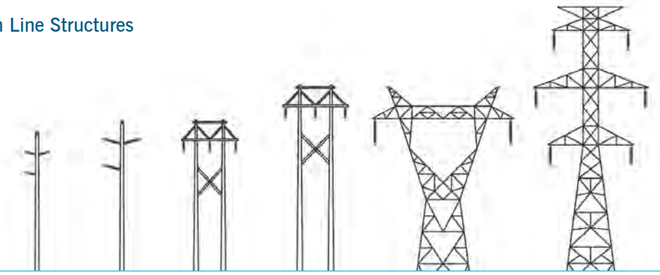
- Confirm voltage
- Confirm clearance
- Confirm wire height under peak conditions
- Provide safety guidance around power lines
- Review and approve drawings for:
  - Compliance with right-of-way restrictions
  - Compliance to National Electric Safety Code
- Identify the best, safe solution

Emergency situations

If your equipment makes contact with an overhead power line, notify Duke Energy immediately and take these precautions:

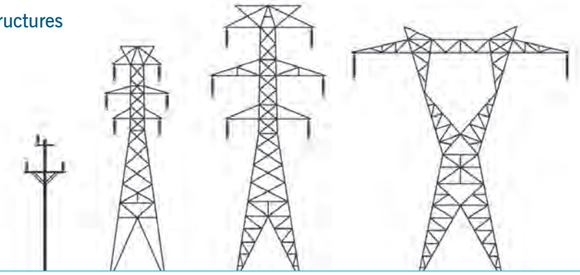
- Have someone call 911.
- Do not attempt to turn off engines or generators.
- Move equipment away from the line only if it is safe to do so.
- Remain on equipment until utility workers arrive and de-energize the line.
- Warn others to stay away. Those on the ground can be injured or killed if they make contact with the equipment.
- If you must leave the equipment because of fire or other dangers, jump off with your feet together. Never touch the ground and equipment at the same time. Keeping your feet together, shuffle or hop away until you are clear of the area.

Duke Energy Midwest Transmission Line Structures

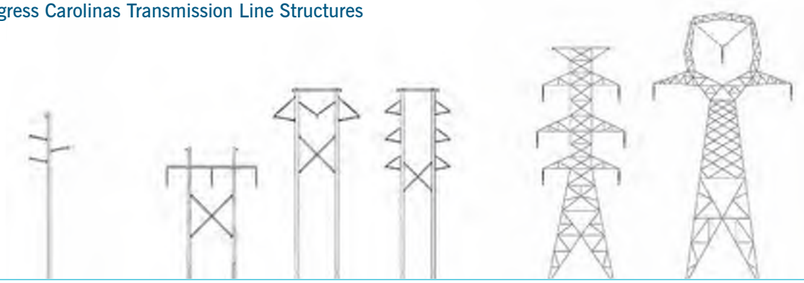


Duke Energy Florida Transmission Line Structures

Duke Energy Carolinas Transmission Line Structures



Duke Energy Progress Carolinas Transmission Line Structures



For more information, visit duke-energy.com/safety.

130695-look-up-and-live-brochure-v3.indd 5-6,8 8/6/14 9:26 AM

NPDES Permit

NORTH CAROLINA
Environmental Quality

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

S. DANIEL SMITH
Director

February 13, 2020

Mr. John Nichols
Brunswick County
PO Box 249
Bolivia, NC 28422-0249

Subject: **NPDES PERMIT ISSUANCE**
NPDES Permit NC0057533
Northwest WTP
Grade I Physical Chemical WPCS
Brunswick County

Dear Mr. Nichols:

Division personnel have reviewed and approved your application for renewal of the subject permit. Accordingly, we are forwarding the attached final NPDES discharge permit. This permit is issued pursuant to the requirements of North Carolina General Statute 143-215.1 and the Memorandum of Agreement between North Carolina and the U.S. Environmental Protection Agency dated October 15, 2007 (or as subsequently amended).

The final permit includes the following significant changes from the existing permit:

1. Outfall map has been updated.
2. Receiving stream for outfall 001 has been corrected to state it is an unnamed tributary to Hood Creek on the Permit Cover Sheet and Supplement to Permit Cover Sheet per information provided by the permittee's representative.
3. Language on the Supplement to Permit Cover Sheet has been updated for outfall 001 and new language has been added to reflect the proposed expansion and addition of the proposed outfall 002.
4. The facility grade has been added in Section A. (1).
5. Turbidity monitoring has been reduced to 2/Month for outfall 001 in Section A. (1) per the current water treatment plant guidance.
6. Limit for total residual chlorine has been updated for outfall 001 in Section A. (1) based on the waste load allocation at full expansion.
7. Limits for copper have been updated for outfall 001 in Section A. (1) per the reasonable potential analysis.
8. Limits have been removed for fluoride for outfall 001 in Section A. (1) as the reasonable potential analysis indicates here is no longer a potential to exceed water quality standards, and the compliance schedule in the renumbered Section A. (3) has been updated to remove fluoride.
9. Limits have been removed for aluminum and monitoring reduced to quarterly for outfall 001 in Section A. (1) per the current water treatment plant guidance.

10. Monitoring for zinc has been removed for outfall 001 in Section A. (1) per the reasonable potential analysis and as the permittee indicated in the last permit renewal application that zinc orthophosphate or sweetwater CP1236 does not have the potential to be discharged.
11. A limited toxicity test with a compliance schedule has been added in Section A. (1) and Section A. (11) for outfall 001 to address ongoing toxicity issues.
12. Sections A. (2) and A. (12) have been added to reflect monitoring requirements for the proposed outfall 002, consisting of a reverse osmosis concentrate waste stream into the Cape Fear River.
13. Compliance schedule in renumbered Section A. (3) has been updated to reflect the current items remaining until the compliance deadline for outfall 001.
14. Section A. (6) has been added to define instream monitoring requirements for the proposed outfall 002.
15. Section A. (7) has been added for monitoring that will be required for outfalls 001 and 002 after discharge commences from the proposed outfall 002.
16. Section A. (8) has been added for required monitoring for PFAS compounds at outfall 002.
17. Section A. (9) has been added to address the disposal of the spent membrane cleaning solution from the reverse osmosis treatment.
18. Language has been updated in renumbered Section A. (13) regarding electronic submission of effluent data. Federal regulations require electronic submittal of all discharge monitoring reports (DMRs).

The final permit includes the following significant changes from the draft permit:

1. Items 2, 4, and 5 on the Supplement to Permit Cover Sheet have been updated to clarify notification should be given 60 days prior to expanded discharge from outfall 001 based on the recommendation in hearing officer's report.
2. Descriptions of the wastewater discharges in Sections A. (1) and A. (2) have been updated to match that described on the Supplement to Permit Cover Sheet based on the recommendation in hearing officer's report.
3. Aluminum limits have been added back to the permit and updated from the previous permit in Section A. (1) per the reasonable potential analysis. These limits were mistakenly removed in the draft permit.
4. The toxicity footnotes have been updated in Sections A. (1) and A. (2) based on the recommendation in hearing officer's report.
5. Monitoring and limits for alkalinity have been added in Section A. (2) per the reasonable potential analysis. This monitoring was mistakenly left out of the draft permit.
6. Footnote #2 in Section A. (2) has been updated regarding instream monitoring frequencies based on the recommendation in hearing officer's report.
7. The conditions under the effluent tables in Sections A. (1) and A. (2) have been updated to match language in other permits based on the recommendation in hearing officer's report.
8. The Corrective Action Plan in Section A. (3) has been updated to remove the requirement for the third year based on the recommendation in hearing officer's report.
9. Section A. (7) has been updated to clarify that monitoring is required at outfall 001 and 002 after expansion has been completed based on the recommendation in hearing officer's report.
10. The missing parameter codes in Section A. (8) have been added.
11. The parameter name for HFPO-DA (GenX) has been updated in Section A. (8).
12. Monitoring frequency for PFAS compounds has been changed from semi-annual to quarterly in Sections A. (2) and A. (8) based on the recommendation in hearing officer's report.

Attachment A to this letter contains a list of labs that have been pre-approved as capable of analyzing PFAS by LCMSMS Compliant with Table B-15 of QSM 5.1 or Latest Version or with an acceptable

variation. Please be aware that criteria are being developed for PFAS compounds and are likely to be lower than the current drinking water health advisory level. The PFAS drinking water health advisory of 70 ng/L is the target concentration for the sum of sample results for PFOA and PFOS. Results for PFAS that do not currently require action may trigger reduction activities in the future.

The NC 2007-2014 Water Quality Standard (WQS) Triennial Review was approved by the NC Environmental Management Committee (EMC) on November 13, 2014. The US EPA subsequently approved the WQS revisions on April 6, 2016 with some exceptions. The NC Division of Water Resources NPDES Permitting Unit is required to implement the new dissolved metal standards in all permits public noticed after April 6, 2016.

The new standards for most metals include acute standards. Further, the freshwater standards for several metals are expressed as the dissolved form of the metals, and seven metals have hardness-dependent equations. As a result, the NPDES Permitting Unit will need site-specific effluent hardness data and instream hardness data, upstream of the discharge, for each facility monitoring these metals in order to calculate permit limitations. Effluent hardness and instream hardness sampling, upstream of the discharge, has been added to this permit at a monitoring frequency of quarterly. See Sections A. (1) and A. (2) Effluent Limitations and Monitoring Requirements.

If any parts, measurement frequencies or sampling requirements contained in this permit are unacceptable to you, you have the right to an adjudicatory hearing upon written request within thirty (30) days following receipt of this letter. This request must be in the form of a written petition, conforming to Chapter 150B of the North Carolina General Statutes, and filed with the Office of Administrative Hearings (6714 Mail Service Center, Raleigh, North Carolina 27699-6714). Unless such demand is made, this permit shall be final and binding.

Please note that this permit is not transferable except after notice to the Division. The Division may require modification or revocation and reissuance of the permit. This permit does not affect the legal requirements to obtain any other Federal, State, or Local governmental permit that may be required.

If you have any questions or need additional information, please do not hesitate to contact Brianna Young of my staff at (919) 707-3619.

Sincerely,

S. Daniel Smith

S. Daniel Smith
Director, Division of Water Resources

cc: NPDES Files
Central files
Wilmington Regional Office
WSS/Aquatic Toxicology Branch
WSS/Ecosystems Branch
WSS/Ecosystem Branch
Kelly Boone, CDM Smith
Jonathan Treadway, CDM Smith
Reed Barton, CDM Smith
Paul Calamita, AquaLaw

Bob Tweedy, Brunswick County
Glenn Walker, Brunswick County
Chris Harrelson, Brunswick County
Donald Dixon, Brunswick County
Frank Williams, Brunswick County Board of Commissioners
Beth Eckert, Lower Cape Fear River Research Program
Jean Zhuang, Southern Environmental Law Center
Geoffrey Gisler, Southern Environmental Law Center

Attachment A

Labs approved by NCDEQ-DWR for the PFAS Wastewater Influent Screening Sampling:

(Note: Most labs on this list are also listed on the Department of Defense accredited list approved for PFAS testing using LCMSMS with Isotope Dilution, found by visiting https://www.denix.osd.mil/edqw/accreditation/accreditedlabs/ and searching by method "PFAS by LCMSMS Compliant with Table B-15 of QSM 5.1 or Latest Version".)

ALS Environmental – Kelso 1317 S. 13th Avenue Kelso, Washington 98626 (360) 577-7222 http://www.alsglobal.com/	Maxxam Analytics International Corp 6740 Campobello Road Mississauga, Ontario L5N 2L8 (905) 817-5700 http://maxxam.ca
APPL, Inc. 908 N. Temperance Avenue Clovis, CA 93611 (559) 275-2175 http://www.applinc.com/	Microbac Laboratories, Inc. – Ohio Valley Division 158 Starlite Drive Marietta, OH 45750 (800) 373-4071 http://www.microbac.com/ourlaboratories/marietta-ohio/
Alpha Analytical 8 Walkup Drive Westborough, MA 01581 (508) 898-9220 http://www.anab.org/	SGS AXYS Analytical Services Ltd. 2045 Mills Road W. Sidney BC, Canada V8L 5X2 (250) 655-5800 http://www.axysanalytical.com/
Battelle 141 Longwater Drive, Suite 202 Norwell, MA 02061 (781) 681-5565 http://www.battelle.org/	*SGS North America, Inc. – Orlando 4405 Vineland Road, Suite C15 Orlando, FL 32811 (407) 425-6700 http://www.sgs.com/
*Enthalpy Analytical 2714 Exchange Drive Wilmington, NC 28405 (910) 212-5858 https://enthalpy.com/	Shealy Environmental Services 106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 http://www.shealylab.com
Eurofins Lancaster Laboratories Environmental 2425 New Holland Pike Lancaster, PA 17601 (717) 656-2300 http://www.lancasterlabs.com/	TestAmerica – Sacramento 880 Riverside Parkway West Sacramento, CA 95605 (916) 373-5600 http://www.testamericainc.com
GEL Laboratories, LLC 2040 Savage Road Charleston, SC 29407 (843) 556-8171 http://www.gel.com	Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 (916) 676-1520 http://www.vista-analytical.com
Gulf Coast Analytical Laboratories, Inc. 7979 Innovation Park Drive Baton Rouge, LA 70820 (225) 767-5717 http://www.gcal.com/	

* denotes labs approved by NCDEQ-DWR to run the DoD compliant method regardless of accreditation status and/or are approved to run a variation of the DoD method.

Laboratories that believe they run the DoD compliant method accurately and should be included on this list shall contact Christyn Fertenbaugh via phone at 919-707-3625 or by email at christyn.fertenbaugh@ncdenr.gov.

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER RESOURCES

PERMIT

TO DISCHARGE WASTEWATER UNDER THE

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

In compliance with the provisions of North Carolina General Statute 143-215.1, other lawful standards and regulations promulgated and adopted by the North Carolina Environmental Management Commission, and the Federal Water Pollution Control Act, as amended,

Brunswick County

is hereby authorized to discharge wastewater from a facility located at the

Northwest Water Treatment Plant (WTP) (Hood Creek WTP)
3954 Clearwell Dr. NE
Leland
Brunswick County

to receiving waters designated as an unnamed tributary to Hood Creek within the Cape Fear River Basin in accordance with effluent limitations, monitoring requirements, and other conditions set forth in Parts I, II, III, and IV hereof.

The permit shall become effective on **April 1, 2020**.

This permit and the authorization to discharge shall expire at midnight on **March 31, 2023**.

Signed this day **February 13, 2020**.

S. Daniel Smith
Director, Division of Water Resources
By Authority of the Environmental Management Commission

SUPPLEMENT TO PERMIT COVER SHEET

All previous NPDES Permits issued to this facility, whether for operation or discharge are hereby revoked, and as of this issuance, any previously issued permit bearing this number is no longer effective. Therefore, the exclusive authority to operate and discharge from this facility arises under the permit conditions, requirements, terms, and provisions described herein.

Brunswick County

is hereby authorized to:

1. Continue to operate a conventional water treatment plant with discharge of wastewaters at Outfall 001 from media filter backwash and sedimentation basins. No reverse osmosis concentrate may be discharged from Outfall 001. This water treatment plant currently has a design potable flowrate of 24 MGD and a maximum, monthly average wastewater discharge of approximately 1.49 MGD. This facility is located at the Northwest WTP (Hood Creek WTP), 3954 Clearwell Dr. NE in Leland in Brunswick County. Water and wastewater treatment consists of:

    - Influent disinfection [chlorination]
    - Two (2) 12 MGD up-flow clarifiers [disinfected raw water]
    - Two (2) banks of four (4) filters each [sand/anthracite/gravel filter]
    - One (1) 4 MGD clear well
    - One (1) 2 MGD surge lagoon
    - One (1) 0.180 MGD sludge thickener
    - Dechlorination
    - Chemical usage consists of:
        - Chlorine dioxide
        - 50% sodium hydroxide
        - Polyaluminum chloride
        - Sodium silica fluoride
        - Bleach-type solutions
        - Cationic polymer solutions
        - Calcium thiophosphate
        - Powered activated carbon
        - Orthophosphate

2. Upon completion of expansion of potable capacity up to 36 MGD, and 60 days prior to commencement of expanded discharge from Outfall 001 from media filter backwash and sedimentation basins, the Wilmington Regional Office staff and Central Office staff must be contacted. No reverse osmosis concentrate may be discharged from Outfall 001.

3. Upon completion of expansion of potable capacity up to 36 MGD, and 60 days prior to commencement of discharge from Outfall 002 of reject concentrate wastewater from reverse osmosis units, the Wilmington Regional Office staff and Central Office staff must be contacted.

4. Upon completion of expansion of potable capacity up to 45 MGD, and 60 days prior to commencement of expanded discharge from Outfall 001 from media filter backwash and sedimentation basins, the Wilmington Regional Office staff and Central Office staff must be contacted. No reverse osmosis concentrate may be discharged from Outfall 001.

5. Upon completion of expansion of potable capacity up to 45 MGD, and 60 days prior to commencement of expanded discharge from Outfall 002 of reject concentrate wastewater from reverse osmosis units, the Wilmington Regional Office staff and Central Office staff must be contacted.

6. This water treatment plant, upon expansion at full build-out, will have a design potable flowrate of 45 MGD and an estimated wastewater discharge of 3.9 MGD from Outfall 001 from media filter backwash and sedimentation basins and a maximum design wastewater discharge of 5 MGD from Outfall 002 of reject concentrate wastewater from reverse osmosis units. No reverse osmosis concentrate may be discharged from Outfall 001. This facility will be located at the Northwest WTP (Hood Creek WTP), 3954 Clearwell Dr. NE in Leland in Brunswick County. Water and wastewater treatment will consist of:

   - Two (2) 24 MGD rapid mix basins
   - Four (4) high rate clarifier basins
   - Sixteen (16) dual media (sand and anthracite) granular media filters
   - Two (2) clearwells
   - One (1) 4 MGD backwash equalization and decant basin
   - Two (2) 80-ft diameter sludge thickeners
   - Dechlorination
   - Eight (8) 5.15 MGD reverse osmosis skids
   - Surface water discharge (Outfall 001)
   - Submerged streambank discharge (Outfall 002)
   - Conventional treatment chemical usage consists of:
     - Chlorine dioxide
     - Chlorine
     - Powdered activated carbon (PAC)
     - Polyaluminum chloride (PAX)
     - Caustic soda
     - Coagulant aid polymer
     - Sodium fluorosilicate
     - Orthophosphate
     - Chloramines (chlorine plus ammonia)
     - Calcium thiosulfate
   - Reverse osmosis treatment chemical usage consists of:
     - Sodium bisulfite
     - Antiscalant
     - Carbon dioxide
     - Emulsified lime
     - Alkaline or acid solution (for membrane cleaning) - Spent membrane cleaning solutions shall be treated and mixed with the membrane reject concentrate for discharge from Outfall 002 or treated and disposed off-site.

7. Discharge from said treatment works at the location specified on the attached map to Outfall 001 into an unnamed tributary to Hood Creek [Stream Segment: 18-66], a waterbody currently classified C; Sw within subbasin 03-06-17 [HUC: 0303000504] of the Cape Fear River Basin.

8. Discharge from said treatment works at the location specified on the attached map to Outfall 002 in the Cape Fear River [Stream Segment: 18-(63)], a waterbody currently classified C; Sw, PNA within subbasin 03-06-17 [HUC: 0303000504] of the Cape Fear River Basin.

PART I.

A. (1) EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - OUTFALL 001

[15A NCAC 02B .0400 et seq., 02B .0500 et seq.]
Grade I Physical Chemical WPCS [15A NCAC 08G .0302]

During the period beginning on the effective date of this permit and lasting until expiration, the Permittee is authorized to discharge wastewaters from media filter backwash and sedimentation basins from Outfall 001. Such discharges shall be limited, monitored and reported[1] by the Permittee as specified below:

EFFLUENT CHARACTERISTICS	Parameter Code	LIMITS		MONITORING REQUIREMENTS		
		Monthly Average	Daily Maximum	Measurement Frequency	Sample Type	Sample Location
Flow (MGD)	*50050*			Continuous	Recording	Effluent
Total Suspended Solids	*C0530*	30 mg/l	45 mg/l	Weekly	Grab	Effluent
pH	*00400*	Not < 6.0 s.u. nor > 9.0 s.u.		Weekly	Grab	Effluent
Total Residual Chlorine [2]	*50060*		17 µg/l	Weekly	Grab	Effluent
Turbidity (NTU)	*00070*			2/Month	Grab	Effluent
Total Aluminum	*01105*	8,243 µg/l	8,243 µg/l	Quarterly	Grab	Effluent
Total Copper [3]	*01042*	8.12 µg/l	10.74 µg/l	Monthly	Grab	Effluent
Total Fluoride (µg/l)	*00951*			Monthly	Grab	Effluent
Total Nitrogen (TN) (mg/l)	*C0600*	Monitor & Report		Quarterly	Grab	Effluent
Total Phosphorus (TP) (mg/l)	*C0665*	Monitor & Report		Quarterly	Grab	Effluent
Hardness - Total as [$CaCO_3$ or (Ca + Mg)] (mg/L) [4]	*00900*	Monitor & Report		Quarterly	Grab	Effluent
Hardness - Total as [$CaCO_3$ or (Ca + Mg)] (mg/L) [5]	*00900*	Monitor & Report		Quarterly	Grab	Upstream
Chronic WET Testing [6]	*TGP3B*	See Footnote 6		Quarterly	Grab	Effluent

Footnotes:

1. The permittee shall submit discharge monitoring reports electronically using the NC DWR's eDMR application system [see Section A. (13)].
2. The Division shall consider all effluent TRC values reported below 50 µg/L to be in compliance with the permit. However, the Permittee shall continue to record and submit all values reported by a North Carolina certified test laboratory (including field certified), even if these values fall below 50 µg/L.
3. Compliance with this limit shall commence on April 1, 2022. See Compliance Schedule in Section A. (3).
4. Effluent hardness sampling should be performed in conjunction with sampling for hardness dependent metals (copper).
5. The Permittee shall sample instream hardness, upstream of the facility's discharge. The sample shall be representative of the hardness in the receiving stream.
6. Chronic WET testing (*Ceriodaphnia dubia*) monitoring only at **90%** in **February, May, August and November** [See Section A. (10)]. **One (1) year after the commencement of discharge from Outfall 002**, with notification to the Aquatic Toxicity Branch, Chronic WET testing (*Ceriodaphnia dubia*) Pass/Fail limit test at **90%** in **February, May, August and November** [See Section A. (11)].

All samples collected must be from a representative discharge event.
There shall be no discharge of floating solids or visible foam in other than trace amounts.

A. (2) EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS - OUTFALL 002

[15A NCAC 02B .0400 et seq., 02B .0500 et seq.]

Upon completion of reverse osmosis treatment units, and lasting until permit expiration, the Permittee is authorized to discharge reject concentrate wastewater from reverse osmosis units from Outfall 002. Such discharges shall be limited, monitored and reported[1] by the Permittee as specified below:

EFFLUENT CHARACTERISTICS	Parameter Code	LIMITS		MONITORING REQUIREMENTS		
		Monthly Average	Daily Maximum	Measurement Frequency	Sample Type	Sample Location [2]
Flow (MGD)	50050			Continuous	Recording	Effluent
Dissolved Oxygen (mg/L)	00300			2/Month	Grab	Effluent U & D
Salinity (ppth)	00480			2/Month	Grab	Effluent U & D
Conductivity (µmhos/cm)	00480			2/Month	Grab	Effluent U & D
pH	00400	Not < 6.0 s.u. nor > 9.0 s.u.		Weekly	Grab	Effluent
pH (s.u.)	00400			2/Month	Grab	U & D
Total Residual Chlorine [3]	50060		28 µg/l	Weekly	Grab	Effluent
Total Dissolved Solids (mg/L)	70295			2/Month	Grab	Effluent
Turbidity (NTU)	00070			2/Month	Grab	Effluent
Total Arsenic (µg/L)	01002			Monthly	Grab	Effluent
Total Chloride	00940	345 mg/L		Monthly	Grab	Effluent
Total Copper (µg/L)	01042			Monthly	Grab	Effluent
Total Fluoride	00951	2,700 µg/L		Monthly	Grab	Effluent
Total Zinc (µg/L)	01092			Monthly	Grab	Effluent
Ammonia Nitrogen (mg/L)	CO610			Monthly	Grab	Effluent
Perchlorate	61209	4.2 µg/L		Monthly	Grab	Effluent
Total Alkalinity	00410	100.0 mg/L		Monthly	Grab	Effluent
Total Lead	01051			Quarterly	Grab	Effluent
Dichloroacetic acid	51605			Quarterly	Grab	Effluent
Total Nitrogen (TN) (mg/L)	C0600			Quarterly	Grab	Effluent
Total Phosphorus (TP) (mg/L)	C0665			Quarterly	Grab	Effluent
Hardness - Total as [$CaCO_3$ or (Ca + Mg)] (mg/L) [4]	00900	Monitor & Report		Quarterly	Grab	Effluent
Hardness - Total as [$CaCO_3$ or (Ca + Mg)] (mg/L) [5]	00900	Monitor & Report		Quarterly	Grab	Upstream
Chronic WET Testing [6]	TGP3B	Pass / Fail		Quarterly	Grab	Effluent
PFAS Compounds		See Footnote 7		Quarterly	Grab	Effluent

Footnotes:

1. The permittee shall submit discharge monitoring reports electronically using the NC DWR's eDMR application system [see Section A. (13)].
2. U = Upstream; D = Downstream. See Section A. (6) for instream monitoring requirements. Two (2) years after commencement of discharge begins, permittee may request a reduction in instream monitoring frequency.
3. The Division shall consider all effluent TRC values reported below 50 µg/L to be in compliance with the permit. However, the Permittee shall continue to record and submit all values reported by a North Carolina certified test laboratory (including field certified), even if these values fall below 50 µg/L.
4. Effluent hardness sampling should be performed in conjunction with testing for hardness dependent metals (copper, zinc).
5. The Permittee shall sample instream hardness, upstream of the facility's discharge. The sample shall be representative of the hardness in the receiving stream. If the Permittee is a member of the Monitoring Coalition Program, sampling for instream hardness may be waived as long as the Monitoring coalition agrees to sample hardness at the nearest upstream location, at a minimum frequency of quarterly, and the Permittee has obtained approval from DWR-NPDES Permitting Unit that the upstream station being monitored by the Coalition is representative of the receiving stream for this discharge. The Permittee is responsible for submitting instream hardness test results with its permit renewal application package. If Coalition membership is cancelled or the Coalition terminates instream hardness sampling at the approved station, the Permittee will immediately notify the Division and resume sampling for instream hardness, upstream of its discharge.
6. Chronic WET testing (*Ceriodaphnia dubia*) Pass/Fail limit test at **33.3%** in **February, May, August and November** [See Section A. (12)].
7. See Section A. (8) for monitoring requirements.

All samples collected must be from a representative discharge event.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

A. (3) SCHEDULE OF COMPLIANCE - OUTFALL 001
[G.S. 143-215.1(b)]

1. Within one year from the effective day of the permit the Permittee shall submit to the Division of Water Resources a Corrective Action Plan summarizing the actions to be taken to achieve compliance with the Total Copper limits at Outfall 001 and a schedule of activities to implement the Plan.
2. Within two years from the effective date of the permit submit a report to the Division summarizing actions taken in accordance with the Corrective Action Plan.
3. Achieve compliance with Total Copper limits specified in Section A. (1) by April 1, 2022.

Upon approval of the Corrective Action Plan by the Division, the report and actions become an enforceable part of this permit. Any modifications to the schedule shall be requested to the Division at least ninety (90) days before the deadline. Modifications to the schedule in excess of four months will be subject to public notice.

The Corrective Action Plan and reports shall include the owner's name, NPDES permit number and Permittee contact person, and shall be submitted to:

(1) NCDEQ / Division of Water Resources
NPDES Compliance and Expedited Permitting
1617 Mail Service Center
Raleigh, NC 27699-1617

(2) NCDEQ / Division of Water Resources
Wilmington Regional Office
127 Cardinal Drive Ext.
Wilmington, NC 28405

A. (4) PERMIT RE-OPENER: WHOLE EFFLUENT TOXICITY
[G.S. 143-215.1(b)]

Whole Effluent Toxicity monitoring results indicating aquatic toxicity may result in the Division of Water Resources re-opening this permit, or requesting by letter that further action be taken. Additional metals testing, a toxicity identification evaluation, a toxicity reduction evaluation, and/or an assessment of discharge treatment alternatives may be requested.

A. (5) PERMIT RE-OPENER: TMDL IMPLEMENTATION
[G.S. 143-215.1(b)]

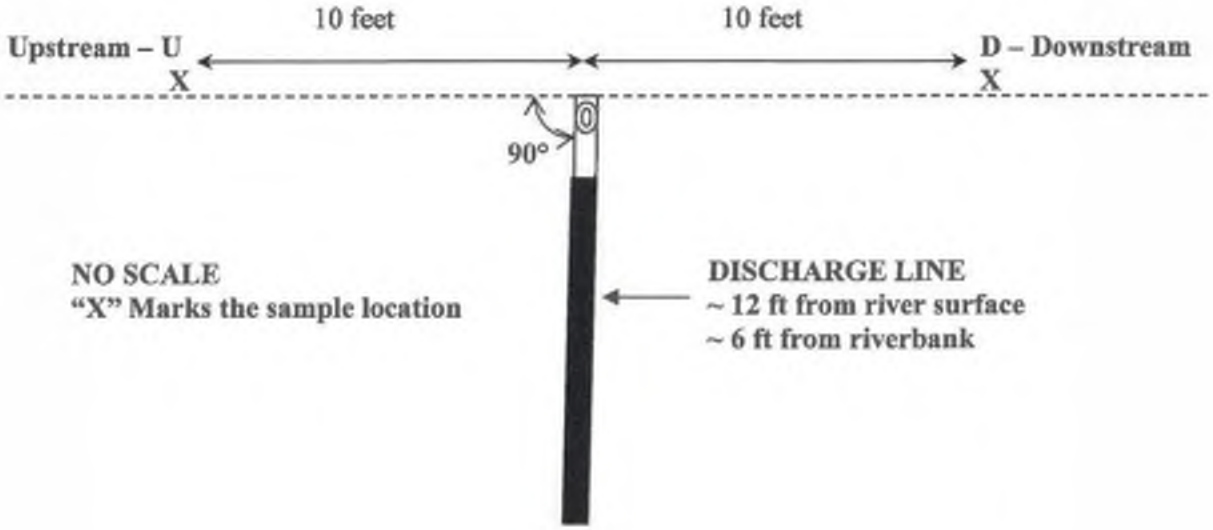
The Division may, upon written notification to the Permittee, re-open this permit in order to incorporate or modify effluent limits, monitoring and reporting requirements, and other permit conditions when it deems such action is necessary to implement TMDL(s) approved by the USEPA.

A. (6) INSTREAM SAMPLE LOCATIONS

The Permittee shall collect grab samples at the designated locations and frequency during a continuous discharge event after a minimum of 1 hour of continuous discharge has occurred. Effort should be made to collect the sample several feet below the surface water level or at the median water depth of the river at the point at which the sample is being taken. Every effort should be made to replicate the same sample

location and depth each time instream samples are taken. To provide a point of comparison the required effluent grab sample should be collected at the same time.

In accordance with 15A NCAC 2B .0505(c)(4), stream sampling may be discontinued when flow conditions or extreme weather conditions could result in injury or death of the person(s) collecting the samples. In such cases, on each day that sampling is discontinued, written justification for the discontinuance shall be specified in the monitoring report for the month in which the event occurred. This provision also applies to influent and effluent sampling.



Location Description:

U = upstream 10 feet, perpendicular to diffuser, approximately 12 feet from river surface and 6 feet from riverbank.
D = downstream 10 feet, perpendicular to diffuser, approximately 12 feet from river surface and 6 feet from riverbank.

A. (7) REPORTING REQUIREMENTS AFTER COMMENCEMENT OF DISCHARGE

In accordance with 40 CFR 122.21(k)(5)(vi), no later than 2 years after the commencement of discharge from the proposed expanded facility through outfall 001 and outfall 002, the applicant is required to complete and submit items V and VI of NPDES application Form 2C for outfall 001 and outfall 002. Please note that all data generated must be reported to the approved detection level or lower reporting level of the procedure. Practical Quantitation Limit levels can be found on the DWR website at: https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/microbiology-inorganics-branch/methods-pqls-qa. Two copies of items V and VI of NPDES application Form 2C shall be submitted to:

Attention: North Carolina Division of Water Resources
Wastewater Branch / NPDES

1617 Mail Service Center
Raleigh, North Carolina 27699-1621

In addition, no later than 2 years after the commencement of discharge from the proposed facility through outfall 002, monitoring shall be performed and reported for all parameters listed in Attachment I of this permit for outfall 002. See Attachment I for required monitoring.

A. (8) REPORTING REQUIREMENTS FOR EMERGING COMPOUNDS - OUTFALL 002

Monitoring for emerging compounds will be required for Outfall 002 at a quarterly frequency. Samples collected should be representative of the typical wastewater discharged from the facility. Sufficiently sensitive test methods shall be used. All data shall be reported in the units of ng/L. The PFAS by LCMSMS Compliant with Table B-15 of QSM 5.1 or Latest Version or with an acceptable variation method should be used. Grab samples are required to avoid cross-contamination and ensure consistency.

EFFLUENT CHARACTERISTICS		LIMITS	
	Parameter Code	**Monthly Average**	**Daily Maximum**
Perfluorotetradecanoic acid (PFTeA)	*51631*	Monitor & Report	
Perfluorotridecanoic acid (PFTriA)	*51630*	Monitor & Report	
Perfluorododecanoic acid (PFDoA)	*51629*	Monitor & Report	
Perfluoroundecanoic acid (PFUnA)	*51628*	Monitor & Report	
Perfluorodecanoic acid (PFDA)	*51627*	Monitor & Report	
Perfluorononanoic acid (PFNA)	*51626*	Monitor & Report	
Perfluorooctanoic acid (PFOA)	*51521*	Monitor & Report	
Perfluoroheptanoic acid (PFHpA)	*51625*	Monitor & Report	
Perfluorohexanoic acid (PFHxA)	*51624*	Monitor & Report	
Perfluoropentanoic acid (PFPeA)	*51623*	Monitor & Report	
Perfluorobutanoic acid (PFBA)	*51522*	Monitor & Report	
Perfluorodecanesulfonic acid (PFDS)	*52603*	Monitor & Report	
Perfluorononanesulfonic acid (PFNS)	*52611*	Monitor & Report	
Perfluorooctanesulfonic acid (PFOS)	*52606*	Monitor & Report	
Perfluoroheptanesulfonic acid (PFHpS)	*52604*	Monitor & Report	
Perfluorohexanesulfonic acid (PFHxS)	*52605*	Monitor & Report	
Perfluoropentanesulfonic acid (PFPeS)	*52610*	Monitor & Report	
Perfluorobutanesulfonic acid (PFBS)	*52602*	Monitor & Report	
Perfluorooctanesulfonamide (PFOSA)	*51525*	Monitor & Report	
2-(N-ethylperfluorooctanesulfonamido) acetic acid (N-EtFOSAA)	*51643*	Monitor & Report	
2-(N-methylperfluorooctanesulfonamido) acetic acid (N-MeFOSAA)	*51644*	Monitor & Report	
Hexafluoropropylene oxide dimer acid (HFPO-DA / PFPrOPrA / GenX)	*52612*	Monitor & Report	
Perfluoro-2-methoxyacetic acid (PFMOAA)	*52613*	Monitor & Report	
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	*52608*	Monitor & Report	

PFESA Byproduct 2 (Nafion Byproduct 2)	*52614*	Monitor & Report
Perfluoro(3,5,7,9-tetraoxadecanoic) acid	*52615*	Monitor & Report
Perfluoro(3,5,7-trioxaoctanoic) acid	*52616*	Monitor & Report
Perfluoro(3,5-dioxahexanoic) acid	*52617*	Monitor & Report

A. (9) DISPOSAL OF SPENT MEMBRANE CLEANING SOLUTIONS

Spent membrane cleaning solutions shall be treated and mixed with the membrane reject concentrate at a rate which will not affect the aquatic toxicity of the effluent in the receiving waters. When use of detergents is used with the membrane cleaning solutions, spent membrane cleaning solutions shall be treated and disposed off-site, and discharge of the solutions to surface waters is not authorized under this permit.

A. (10) CHRONIC TOXICITY PASS/FAIL MONITORING (QUARTERLY) OUTFALL 001

[15A NCAC 02B .0500 et seq.]

The permittee shall conduct **quarterly** chronic toxicity tests using test procedures outlined in the "North Carolina *Ceriodaphnia* Chronic Effluent Bioassay Procedure," (Revised December 2010, or subsequent versions).

The effluent concentration defined as treatment two in the procedure document is 90 %. The testing shall be performed as a *Ceriodaphnia dubia* 7-day pass/fail test. The tests will be performed **during the months of February, May, August and November**. These months signify the first month of each three-month toxicity testing quarter assigned to the facility. Effluent sampling for this testing must be obtained during representative effluent discharge and shall be performed at the NPDES permitted final effluent discharge below all treatment processes.

All toxicity testing results required as part of this permit condition will be entered on the Effluent Discharge Monitoring Form (**MR-1**) for the month in which it was performed, using the parameter code **TGP3B**. Additionally, DWR Form **AT-1** (original) is to be sent to the following address:

North Carolina Division of Water Resources
Water Sciences Section/Aquatic Toxicology Branch
1621 Mail Service Center
Raleigh, NC 27699-1621

Or, results can be sent to the email, ATForms.ATB@ncdenr.gov.

Completed Aquatic Toxicity Test Forms shall be filed with the Water Sciences Section no later than 30 days after the end of the reporting period for which the report is made.

Test data shall be complete and accurate and include all supporting chemical/physical measurements performed in association with the toxicity tests, as well as all dose/response data. Total residual chlorine

of the effluent toxicity sample must be measured and reported if chlorine is employed for disinfection of the waste stream.

Should there be no discharge of flow from the facility during a month in which toxicity monitoring is required, the permittee will complete the information located at the top of the aquatic toxicity (AT) test form indicating the facility name, permit number, pipe number, county, and the month/year of the report with the notation of "No Flow" in the comment area of the form. The report shall be submitted to the Water Sciences Section at the address cited above.

Should the permittee fail to monitor during a month in which toxicity monitoring is required, then monthly monitoring will begin immediately. Upon submission of a valid test, this monthly test requirement will revert to quarterly in the months specified above.

Should any test data from this monitoring requirement or tests performed by the North Carolina Division of Water Resources indicate potential impacts to the receiving stream, this permit may be re-opened and modified to include alternate monitoring requirements or limits.

NOTE: Failure to achieve test conditions as specified in the cited document, such as minimum control organism survival, minimum control organism reproduction, and appropriate environmental controls, shall constitute an **invalid test** and will require immediate follow-up testing to be completed no later than the last day of the month following the month of the initial monitoring.

A. (11) CHRONIC TOXICITY PERMIT LIMIT (QUARTERLY)
OUTFALL 001
[15A NCAC 02B .0200 et seq.]

The effluent discharge shall at no time exhibit observable inhibition of reproduction or significant mortality to ***Ceriodaphnia dubia*** at an effluent concentration of **90 %.**

The permit holder shall perform at a minimum, **quarterly** monitoring using test procedures outlined in the "North Carolina *Ceriodaphnia* Chronic Effluent Bioassay Procedure," (Revised December 2010, or subsequent versions) or "North Carolina Phase II Chronic Whole Effluent Toxicity Test Procedure" (Revised December 2010, or subsequent versions). The tests will be performed **during the months of February, May, August, and November**. These months signify the first month of each three-month toxicity testing quarter assigned to the facility. Effluent sampling for this testing must be obtained during representative effluent discharge and shall be performed at the NPDES permitted final effluent discharge below all treatment processes.

If the test procedure performed as the first test of any single quarter results in a failure or ChV below the permit limit, then multiple-concentration testing shall be performed at a minimum, in each of the two following months as described in "North Carolina Phase II Chronic Whole Effluent Toxicity Test Procedure" (Revised-December 2010, or subsequent versions).

All toxicity testing results required as part of this permit condition will be entered on the Effluent Discharge Monitoring Form (**MR-1**) for the months in which tests were performed, using the parameter code **TGP3B** for the pass/fail results and **THP3B** for the Chronic Value. Additionally, DWR Form **AT-3** (original) is to be sent to the following address:

North Carolina Division of Water Resources
Water Sciences Section/Aquatic Toxicology Branch
1621 Mail Service Center
Raleigh, NC 27699-1621

Or, results can be sent to the email, ATForms.ATB@ncdenr.gov.

Completed Aquatic Toxicity Test Forms shall be filed with the Water Sciences Section no later than 30 days after the end of the reporting period for which the report is made.

Test data shall be complete, accurate, include all supporting chemical/physical measurements and all concentration/response data, and be certified by laboratory supervisor and ORC or approved designate signature. Total residual chlorine of the effluent toxicity sample must be measured and reported if chlorine is employed for disinfection of the waste stream.

Should there be no discharge of flow from the facility during a month in which toxicity monitoring is required, the permittee will complete the information located at the top of the aquatic toxicity (AT) test form indicating the facility name, permit number, pipe number, county, and the month/year of the report with the notation of "No Flow" in the comment area of the form. The report shall be submitted to the Water Sciences Section at the address cited above.

Should the permittee fail to monitor during a month in which toxicity monitoring is required, monitoring will be required during the following month. Assessment of toxicity compliance is based on the toxicity testing quarter, which is the three-month time interval that begins on the first day of the month in which toxicity testing is required by this permit and continues until the final day of the third month.

Should any test data from this monitoring requirement or tests performed by the North Carolina Division of Water Resources indicate potential impacts to the receiving stream, this permit may be re-opened and modified to include alternate monitoring requirements or limits.

NOTE: Failure to achieve test conditions as specified in the cited document, such as minimum control organism survival, minimum control organism reproduction, and appropriate environmental controls, shall constitute an **invalid test** and will require immediate follow-up testing to be completed no later than the last day of the month following the month of the initial monitoring.

A. (12) CHRONIC TOXICITY PERMIT LIMIT (QUARTERLY)
OUTFALL 002
[15A NCAC 02B .0200 et seq.]

The effluent discharge shall at no time exhibit observable inhibition of reproduction or significant mortality to ***Ceriodaphnia dubia*** at an effluent concentration of **33.3 %**.

The permit holder shall perform at a minimum, **quarterly** monitoring using test procedures outlined in the "North Carolina *Ceriodaphnia* Chronic Effluent Bioassay Procedure," (Revised December 2010, or subsequent versions) or "North Carolina Phase II Chronic Whole Effluent Toxicity Test Procedure" (Revised December 2010, or subsequent versions). The tests will be performed **during the months of**

February, May, August, and November. These months signify the first month of each three-month toxicity testing quarter assigned to the facility. Effluent sampling for this testing must be obtained during representative effluent discharge and shall be performed at the NPDES permitted final effluent discharge below all treatment processes.

If the test procedure performed as the first test of any single quarter results in a failure or ChV below the permit limit, then multiple-concentration testing shall be performed at a minimum, in each of the two following months as described in "North Carolina Phase II Chronic Whole Effluent Toxicity Test Procedure" (Revised-December 2010, or subsequent versions).

All toxicity testing results required as part of this permit condition will be entered on the Effluent Discharge Monitoring Form (**MR-1**) for the months in which tests were performed, using the parameter code **TGP3B** for the pass/fail results and **THP3B** for the Chronic Value. Additionally, DWR Form **AT-3** (original) is to be sent to the following address:

North Carolina Division of Water Resources
Water Sciences Section/Aquatic Toxicology Branch
1621 Mail Service Center
Raleigh, NC 27699-1621

Or, results can be sent to the email, ATForms.ATB@ncdenr.gov.

Completed Aquatic Toxicity Test Forms shall be filed with the Water Sciences Section no later than 30 days after the end of the reporting period for which the report is made.

Test data shall be complete, accurate, include all supporting chemical/physical measurements and all concentration/response data, and be certified by laboratory supervisor and ORC or approved designate signature. Total residual chlorine of the effluent toxicity sample must be measured and reported if chlorine is employed for disinfection of the waste stream.

Should there be no discharge of flow from the facility during a month in which toxicity monitoring is required, the permittee will complete the information located at the top of the aquatic toxicity (AT) test form indicating the facility name, permit number, pipe number, county, and the month/year of the report with the notation of "No Flow" in the comment area of the form. The report shall be submitted to the Water Sciences Section at the address cited above.

Should the permittee fail to monitor during a month in which toxicity monitoring is required, monitoring will be required during the following month. Assessment of toxicity compliance is based on the toxicity testing quarter, which is the three-month time interval that begins on the first day of the month in which toxicity testing is required by this permit and continues until the final day of the third month.

Should any test data from this monitoring requirement or tests performed by the North Carolina Division of Water Resources indicate potential impacts to the receiving stream, this permit may be re-opened and modified to include alternate monitoring requirements or limits.

NOTE: Failure to achieve test conditions as specified in the cited document, such as minimum control organism survival, minimum control organism reproduction, and appropriate environmental controls,

shall constitute an **invalid test** and will require immediate follow-up testing to be completed no later than the last day of the month following the month of the initial monitoring.

A. (13) ELECTRONIC REPORTING - DISCHARGE MONITORING REPORTS
[G.S. 143-215.1 (b)]

Federal regulations require electronic submittal of all discharge monitoring reports (DMRs) and program reports. The final NPDES Electronic Reporting Rule was adopted and became effective on December 21, 2015.

NOTE: This special condition supplements or supersedes the following sections within Part II of this permit (*Standard Conditions for NPDES Permits*):

- Section B. (11.) Signatory Requirements
- Section D. (2.) Reporting
- Section D. (6.) Records Retention
- Section E. (5.) Monitoring Reports

1. Reporting Requirements [Supersedes Section D. (2.) and Section E. (5.) (a)]

The permittee shall report discharge monitoring data electronically using the NC DWR's Electronic Discharge Monitoring Report (eDMR) internet application.

Monitoring results obtained during the previous month(s) shall be summarized for each month and submitted electronically using eDMR. The eDMR system allows permitted facilities to enter monitoring data and submit DMRs electronically using the internet. The eDMR system may be accessed at: https://deq.nc.gov/about/divisions/water-resources/edmr.

If a permittee is unable to use the eDMR system due to a demonstrated hardship or due to the facility being physically located in an area where less than 10 percent of the households have broadband access, then a temporary waiver from the NPDES electronic reporting requirements may be granted and discharge monitoring data may be submitted on paper DMR forms (MR 1, 1.1, 2, 3) or alternative forms approved by the Director. Duplicate signed copies shall be submitted to the following address:

NC DEQ / Division of Water Resources / Water Quality Permitting Section
ATTENTION: Central Files
1617 Mail Service Center
Raleigh, North Carolina 27699-1617

See "How to Request a Waiver from Electronic Reporting" section below.

Regardless of the submission method, the first DMR is due on the last day of the month following the issuance of the permit or in the case of a new facility, on the last day of the month following the commencement of discharge.

Starting on **December 21, 2020**, the permittee must electronically report the following compliance monitoring data and reports, when applicable:

- Sewer Overflow/Bypass Event Reports;
- Pretreatment Program Annual Reports; and
- Clean Water Act (CWA) Section 316(b) Annual Reports.

The permittee may seek an electronic reporting waiver from the Division (see "How to Request a Waiver from Electronic Reporting" section below).

2. Electronic Submissions

In accordance with 40 CFR 122.41(l)(9), the permittee must identify the initial recipient at the time of each electronic submission. The permittee should use the EPA's website resources to identify the initial recipient for the electronic submission.

Initial recipient of electronic NPDES information from NPDES-regulated facilities means the entity (EPA or the state authorized by EPA to implement the NPDES program) that is the designated entity for receiving electronic NPDES data [see 40 CFR 127.2(b)].

EPA plans to establish a website that will also link to the appropriate electronic reporting tool for each type of electronic submission and for each state. Instructions on how to access and use the appropriate electronic reporting tool will be available as well. Information on EPA's NPDES Electronic Reporting Rule is found at: https://www.federalregister.gov/documents/2015/10/22/2015-24954/national-pollutant-discharge-elimination-system-npdes-electronic-reporting-rule

Electronic submissions must start by the dates listed in the "Reporting Requirements" section above.

3. How to Request a Waiver from Electronic Reporting

The permittee may seek a temporary electronic reporting waiver from the Division. To obtain an electronic reporting waiver, a permittee must first submit an electronic reporting waiver request to the Division. Requests for temporary electronic reporting waivers must be submitted in writing to the Division for written approval at least sixty (60) days prior to the date the facility would be required under this permit to begin submitting monitoring data and reports. The duration of a temporary waiver shall not exceed 5 years and shall thereupon expire. At such time, monitoring data and reports shall be submitted electronically to the Division unless the permittee re-applies for and is granted a new temporary electronic reporting waiver by the Division. Approved electronic reporting waivers are not transferrable. Only permittees with an approved reporting waiver request may submit monitoring data and reports on paper to the Division for the period that the approved reporting waiver request is effective.

Information on eDMR and the application for a temporary electronic reporting waiver are found on the following web page:

http://deq.nc.gov/about/divisions/water-resources/edmr

4. **Signatory Requirements [Supplements Section B. (11.) (b) and Supersedes Section B. (11.) (d)]**

All eDMRs submitted to the permit issuing authority shall be signed by a person described in Part II, Section B. (11.)(a) or by a duly authorized representative of that person as described in Part II, Section B. (11.)(b). A person, and not a position, must be delegated signatory authority for eDMR reporting purposes.

For eDMR submissions, the person signing and submitting the DMR must obtain an eDMR user account and login credentials to access the eDMR system. For more information on North Carolina's eDMR system, registering for eDMR and obtaining an eDMR user account, please visit the following web page:

http://deq.nc.gov/about/divisions/water-resources/edmr

Certification. Any person submitting an electronic DMR using the state's eDMR system shall make the following certification [40 CFR 122.22]. NO OTHER STATEMENTS OF CERTIFICATION WILL BE ACCEPTED:

"I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

5. **Records Retention [Supplements Section D. (6.)]**

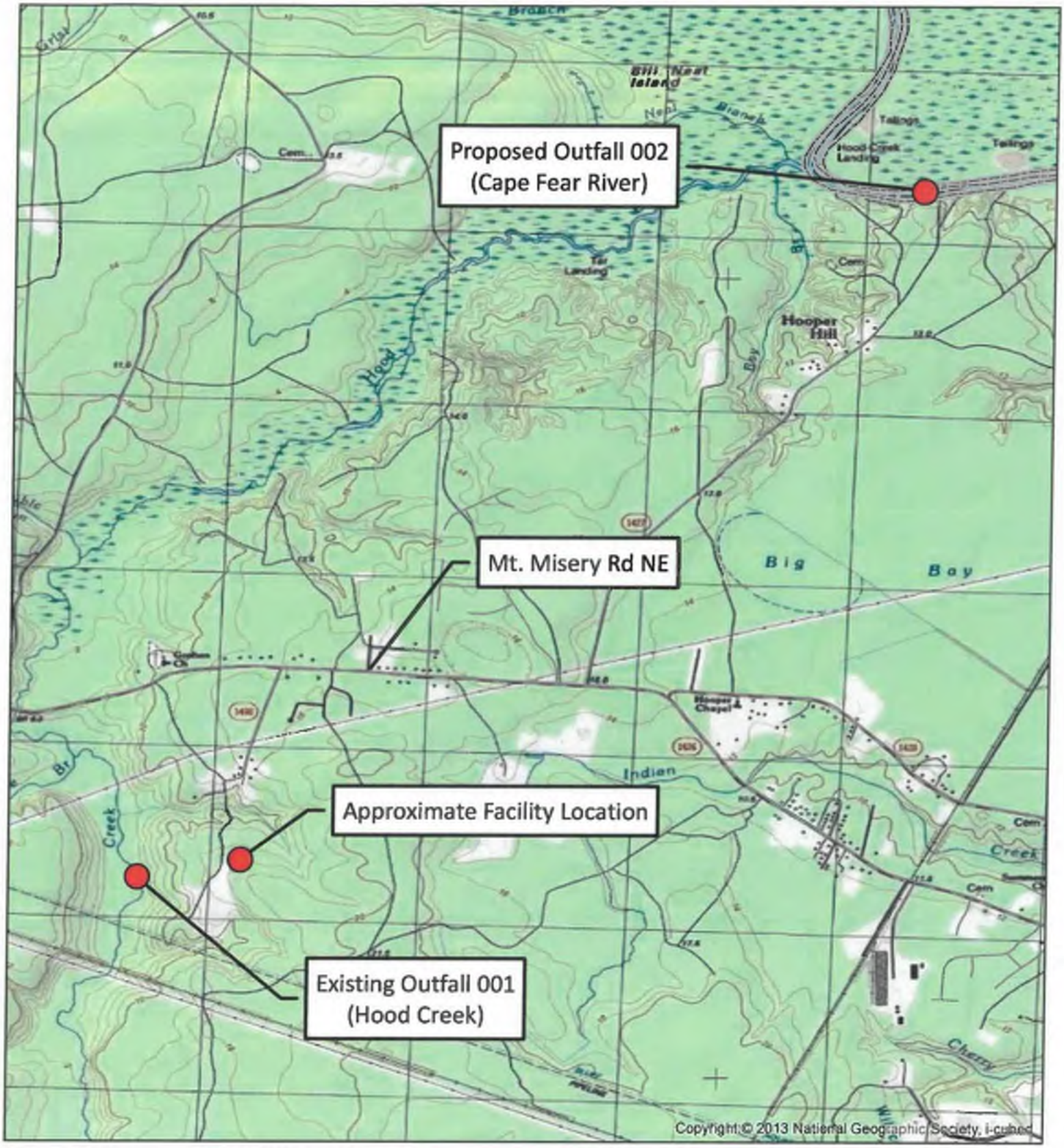
The permittee shall retain records of all Discharge Monitoring Reports, including eDMR submissions. These records or copies shall be maintained for a period of at least 3 years from the date of the report. This period may be extended by request of the Director at any time [40 CFR 122.41].

ATTACHMENT I – OUTFALL 002

No later than 2 years after the commencement of discharge from the proposed facility through outfall 002, monitoring for the following parameters shall be performed and reported. All laboratory data sheets will be submitted to the Division. Testing shall be performed at the same time as parameters required by NPDES application Form 2C. All samples shall be grab samples and must be collected from a typical discharge event.

EFFLUENT CHARACTERISTICS	LIMITS	
	Monthly Average	Daily Maximum
Gross Beta (pCi/L)	Monitor & Report	
Atrazine	Monitor & Report	
Total Molybdenum	Monitor & Report	
2,4-Dichlorophenoxyacetic acid (2,4-D)	Monitor & Report	
1,4-dioxane	Monitor & Report	
1,1,2-Trichloro-1,2,2-trifluoroethane	Monitor & Report	
1,2,3-Trichloropropane	Monitor & Report	
1,2,3-Trimethylbenzene	Monitor & Report	
1,2-Dibromo-3-chloropropane (DBCP)	Monitor & Report	
2-Butanone (MEK)	Monitor & Report	
Acetone	Monitor & Report	
Acrylonitrile	Monitor & Report	
Total Chromium	Monitor & Report	
Total Cobalt	Monitor & Report	
Ethyl ether (Diethyl ether)	Monitor & Report	
Ethyl methacrylate	Monitor & Report	
Ethylbenzene	Monitor & Report	
Hexachlorobutadiene	Monitor & Report	
Tetrahydrofuran	Monitor & Report	
trans-1,2-Dichloroethylene	Monitor & Report	
4-Nonylphenol	Monitor & Report	
Bromochloroacetic acid	Monitor & Report	
Bromodichloroacetic acid	Monitor & Report	
Bromodichloromethane	Monitor & Report	
Chlorate	Monitor & Report	
Clofibric acid	Monitor & Report	
Desethylatrazine	Monitor & Report	
Desisopropylatrazine	Monitor & Report	
Diaminochlorotriazine	Monitor & Report	
Dibromoacetic acid	Monitor & Report	
Dibromochloromethane	Monitor & Report	
Metazochlor	Monitor & Report	
Monobromoacetic acid	Monitor & Report	
Monochloroacetic acid	Monitor & Report	
N-Nitrosomorpholine (NMOR)	Monitor & Report	
N-Nitrosopyrrolidine (NPYR)	Monitor & Report	

Total HAAS	Monitor & Report
Total Organic Carbon (TOC)	Monitor & Report
Trichloroacetic acid	Monitor & Report
Tris(1,3-dichloro-2-propyl) phosphate	Monitor & Report
Tris(2-carboxyethyl)phosphine hydrochloride	Monitor & Report



Brunswick County
Northwest WTP
NPDES Permit NC0057533

Receiving Stream: 001: Hood Creek
002: Cape Fear River
Stream Segment: 001: 18-66
002: 18-(63)
River Basin: Cape Fear

County: Brunswick
Stream Class: 001: C; Sw
002: C; Sw, PNA
Sub-Basin #: 03-06-17
HUC: 0303000504

N

SCALE
1:30,000

Facility Location
scale not shown

USGS Quad: Leland
Existing Outfall 001: 34.30222°, -78.11333°
Proposed Outfall 002: 34.33805°, -78.07275°

PART II
STANDARD CONDITIONS FOR NPDES PERMITS

Section A. Definitions

2/Month
Samples are collected twice per month with at least ten calendar days between sampling events. These samples shall be representative of the wastewater discharged during the sample period.

3/Week
Samples are collected three times per week on three separate calendar days. These samples shall be representative of the wastewater discharged during the sample period.

Act or "the Act"
The Federal Water Pollution Control Act, also known as the Clean Water Act (CWA), as amended, 33 USC 1251, et. seq.

Annual Average
The arithmetic mean of all "daily discharges" of a pollutant measured during the calendar year. In the case of fecal coliform, the geometric mean of such discharges.

Arithmetic Mean
The summation of the individual values divided by the number of individual values.

Bypass
The known diversion of waste streams from any portion of a treatment facility including the collection system, which is not a designed or established or operating mode for the facility.

Calendar Day
The period from midnight of one day until midnight of the next day. However, for purposes of this permit, any consecutive 24-hour period that reasonably represents the calendar day may be used for sampling.

Calendar Week
The period from Sunday through the following Saturday.

Calendar Quarter
One of the following distinct periods: January through March, April through June, July through September, and October through December.

Composite Sample
A sample collected over a 24-hour period by continuous sampling or combining grab samples of at least 100 mL in such a manner as to result in a total sample representative of the wastewater discharge during the sample period. The Director may designate the most appropriate method (specific number and size of aliquots necessary, the time interval between grab samples, etc.) on a case-by-case basis. Samples may be collected manually or automatically. Composite samples may be obtained by the following methods:

(1) Continuous: a single, continuous sample collected over a 24-hour period proportional to the rate of flow.
(2) Constant time/variable volume: a series of grab samples collected at equal time intervals over a 24 hour period of discharge and combined proportional to the rate of flow measured at the time of individual sample collection, or
(3) Variable time/constant volume: a series of grab samples of equal volume collected over a 24 hour period with the time intervals between samples determined by a preset number of gallons passing the sampling point. Flow measurement between sample intervals shall be determined by use of a flow recorder and totalizer, and the preset gallon interval between sample collection fixed at no greater than 1/24 of the expected total daily flow at the treatment system, or

(4) Constant time/constant volume: a series of grab samples of equal volume collected over a 24-hour period at a constant time interval. Use of this method requires prior approval by the Director. This method may only be used in situations where effluent flow rates vary less than 15 percent. The following restrictions also apply:

- Influent and effluent grab samples shall be of equal size and of no less than 100 milliliters
- Influent samples shall not be collected more than once per hour.
- Permittees with wastewater treatment systems whose detention time < 24 hours shall collect effluent grab samples at intervals of no greater than 20 minutes apart during any 24-hour period.
- Permittees with wastewater treatment systems whose detention time exceeds 24 hours shall collect effluent grab samples at least every six hours; there must be a minimum of four samples during a 24-hour sampling period.

Continuous flow measurement
Flow monitoring that occurs without interruption throughout the operating hours of the facility. Flow shall be monitored continually except for the infrequent times when there may be no flow or for infrequent maintenance activities on the flow device.

Daily Discharge
The discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants measured in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the day. (40 CFR 122.2; see also "Composite Sample," above.)

Daily Maximum
The highest "daily discharge" during the calendar month.

Daily Sampling
Parameters requiring daily sampling shall be sampled 5 out of every 7 days per week unless otherwise specified in the permit. Sampling shall be conducted on weekdays except where holidays or other disruptions of normal operations prevent weekday sampling. If sampling is required for all seven days of the week for any permit parameter(s), that requirement will be so noted on the Effluent Limitations and Monitoring Page(s).

DWR or "the Division"
The Division of Water Resources, Department of Environmental Quality.

Effluent
Wastewater discharged following all treatment processes from a water pollution control facility or other point source whether treated or untreated.

EMC
The North Carolina Environmental Management Commission

EPA
The United States Environmental Protection Agency

Facility Closure
Cessation of all activities that require coverage under this NPDES permit. Completion of facility closure will allow this permit to be rescinded.

Geometric Mean
The Nth root of the product of the individual values where N = the number of individual values. For purposes of calculating the geometric mean, values of "0" (or "< [detection level]") shall be considered = 1.

Grab Sample
Individual samples of at least 100 mL collected over a period of time not exceeding 15 minutes. Grab samples can be collected manually. Grab samples must be representative of the discharge (or the receiving stream, for instream samples).

Hazardous Substance
Any substance designated under 40 CFR Part 116 pursuant to Section 311 of the CWA.

Instantaneous flow measurement
The flow measured during the minimum time required for the flow measuring device or method to produce a result in that instance. To the extent practical, instantaneous flow measurements coincide with the collection of any grab samples required for the same sampling period so that together the samples and flow are representative of the discharge during that sampling period.

Monthly Average (concentration limit)
The arithmetic mean of all "daily discharges" of a pollutant measured during the calendar month. In the case of fecal coliform or other bacterial parameters or indicators, the geometric mean of such discharges.

Permit Issuing Authority
The Director of the Division of Water Resources.

Quarterly Average (concentration limit)
The arithmetic mean of all samples taken over a calendar quarter.

Severe property damage
Substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage excludes economic loss caused by delays in production.

Toxic Pollutant:
Any pollutant listed as toxic under Section 307(a)(1) of the CWA.

Upset
An incident beyond the reasonable control of the Permittee causing unintentional and temporary noncompliance with permit effluent limitations and/or monitoring requirements. An upset does not include noncompliance caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

Weekly Average (concentration limit)
The arithmetic mean of all "daily discharges" of a pollutant measured during the calendar week. In the case of fecal coliform or other bacterial parameters or indicators, the geometric mean of such discharges.

Section B. General Conditions

1. Duty to Comply
   The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the CWA and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application [40 CFR 122.41].

   a. The Permittee shall comply with effluent standards or prohibitions established under section 307(a) of the CWA for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.

   b. The CWA provides that any person who violates section[s] 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed $37,500 per day for each violation. [33 USC 1319(d) and 40 CFR 122.41(a)(2)]

   c. The CWA provides that any person who negligently violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or

imprisonment of not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than 2 years, or both. [33 USC 1319(c)(1) and 40 CFR 122.41(a)(2)]

d. Any person who knowingly violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than $100,000 per day of violation, or imprisonment of not more than 6 years, or both. [33 USC 1319(c)(2) and 40 CFR 122.41(a)(2)]

e. Any person who *knowingly* violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions. [40 CFR 122.41(a)(2)]

f. Under state law, a civil penalty of not more than $25,000 per violation may be assessed against any person who violates or fails to act in accordance with the terms, conditions, or requirements of a permit. [North Carolina General Statutes § 143-215.6A]

g. Any person may be assessed an administrative penalty by the Administrator for violating section 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Administrative penalties for Class I violations are not to exceed $16,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $37,500. Penalties for Class II violations are not to exceed $16,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $177,500. [33 USC 1319(g)(2) and 40 CFR 122.41(a)(3)]

2. Duty to Mitigate
The Permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit with a reasonable likelihood of adversely affecting human health or the environment [40 CFR 122.41(d)].

3. Civil and Criminal Liability
Except as provided in permit conditions on "Bypassing" (Part II.C.4), "Upsets" (Part II.C.5) and "Power Failures" (Part II.C.7), nothing in this permit shall be construed to relieve the Permittee from any responsibilities, liabilities, or penalties for noncompliance pursuant to NCGS 143-215.3, 143-215.6 or Section 309 of the Federal Act, 33 USC 1319. Furthermore, the Permittee is responsible for consequential damages, such as fish kills, even though the responsibility for effective compliance may be temporarily suspended.

4. Oil and Hazardous Substance Liability
Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the Permittee from any responsibilities, liabilities, or penalties to which the Permittee is or may be subject to under NCGS 143-215.75 et seq. or Section 311 of the Federal Act, 33 USC 1321. Furthermore, the Permittee is responsible for consequential damages, such as fish kills, even though the responsibility for effective compliance may be temporarily suspended.

5. Property Rights
The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations [40 CFR 122.41(g)].

6. Onshore or Offshore Construction
This permit does not authorize or approve the construction of any onshore or offshore physical structures or facilities or the undertaking of any work in any navigable waters.

7. Severability
The provisions of this permit are severable. If any provision of this permit, or the application of any provision of this permit to any circumstances, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby [NCGS 150B-23].

8. Duty to Provide Information
The Permittee shall furnish to the Permit Issuing Authority, within a reasonable time, any information which the Permit Issuing Authority may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee shall also furnish to the Permit Issuing Authority upon request, copies of records required by this permit [40 CFR 122.41(h)].

9. Duty to Reapply
If the Permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Permittee must apply for and obtain a new permit [40 CFR 122.41(b)].

10. Expiration of Permit
The Permittee is not authorized to discharge after the expiration date. In order to receive automatic authorization to discharge beyond the expiration date, the Permittee shall submit such information, forms, and fees as are required by the agency authorized to issue permits no later than 180 days prior to the expiration date unless permission for a later date has been granted by the Director. (The Director shall not grant permission for applications to be submitted later than the expiration date of the existing permit.) [40 CFR 122.21(d)] Any Permittee that has not requested renewal at least 180 days prior to expiration, or any Permittee that does not have a permit after the expiration and has not requested renewal at least 180 days prior to expiration, will subject the Permittee to enforcement procedures as provided in NCGS 143-215.6 and 33 USC 1251 et. seq.

11. Signatory Requirements
All applications, reports, or information submitted to the Permit Issuing Authority shall be signed and certified [40 CFR 122.41(k)].

a. All permit applications shall be signed as follows:
   (1) For a corporation: by a responsible corporate officer. For the purpose of this Section, a responsible corporate officer means: (a) a president, secretary, treasurer or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions for the corporation, or (b) the manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures .
   (2) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or
   (3) For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official [40 CFR 122.22].

b. All reports required by the permit and other information requested by the Permit Issuing Authority shall be signed by a person described in paragraph a. above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
   (1) The authorization is made in writing by a person described above;
   (2) The authorization specified either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or well field, superintendent, a position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and
   (3) The written authorization is submitted to the Permit Issuing Authority [40 CFR 122.22]

e. Changes to authorization: If an authorization under paragraph (b) of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph (b) of this section must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative [40 CFR 122.22]

d. Certification. Any person signing a document under paragraphs a. or b. of this section shall make the following certification [40 CFR 122.22]. NO OTHER STATEMENTS OF CERTIFICATION WILL BE ACCEPTED:

"I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations."

12. Permit Actions
This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the Permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition [40 CFR 122.41(f)].

13. Permit Modification, Revocation and Reissuance, or Termination
The issuance of this permit does not prohibit the permit issuing authority from reopening and modifying the permit, revoking and reissuing the permit, or terminating the permit as allowed by the laws, rules, and regulations contained in Title 40, Code of Federal Regulations, Parts 122 and 123; Title 15A of the North Carolina Administrative Code, Subchapter 02H .0100; and North Carolina General Statute 143.215.1 et. al.

14. Annual Administering and Compliance Monitoring Fee Requirements
The Permittee must pay the annual administering and compliance monitoring fee within thirty days after being billed by the Division. Failure to pay the fee in a timely manner in accordance with 15A NCAC 02H .0105(b)(2) may cause this Division to initiate action to revoke the permit.

Section C. Operation and Maintenance of Pollution Controls

1. Certified Operator
Owners of classified water pollution control systems must designate operators, certified by the Water Pollution Control System Operators Certification Commission (WPCSOCC), of the appropriate type and grade for the system, and, for each classification must [T15A NCAC 08G .0201]:

a. designate one Operator In Responsible Charge (ORC) who possesses a valid certificate of the type and grade at least equivalent to the type and grade of the system;

b. designate one or more Back-up Operator(s) in Responsible Charge (Back-up ORCs) who possesses a valid certificate of the type of the system and no more than one grade less than the grade of the system, with the exception of no backup operator in responsible charge is required for systems whose minimum visitation requirements are twice per year; and

c. submit a signed completed "Water Pollution Control System Operator Designation Form" to the Commission (or to the local health department for owners of subsurface systems) countersigned by the designated certified operators, designating the Operator in Responsible Charge (ORC) and the Back-up Operator in Responsible Charge (Back-up ORC):

(1) 60 calendar days prior to wastewater or residuals being introduced into a new system; or

(2) within 120 calendar days following:

- receiving notification of a change in the classification of the system requiring the designation of a new Operator in Responsible Charge (ORC) and Back-up Operator in Responsible Charge (Back-up ORC) of the proper type and grade; or
- a vacancy in the position of Operator in Responsible Charge (ORC) or Back-up Operator in Responsible Charge (Back-up ORC).

(3) within seven calendar days of vacancies in both ORC and Back-up ORC positions replacing or designating at least one of the responsibilities.

The ORC of each Class I facility (or the Back-up ORC, when acting as surrogate for the ORC) must:

- Visit the facility as often as is necessary to insure proper operation of the treatment system; the treatment facility must be visited at least weekly
- Comply with all other conditions of 15A NCAC 08G .0204.

The ORC of each Class II, III and IV facility (or the Back-up ORC, when acting as surrogate for the ORC) must:

- Visit the facility as often as is necessary to insure proper operation of the treatment system; the treatment facility must be visited at least five days per week, excluding holidays
- Properly manage and document daily operation and maintenance of the facility
- Comply with all other conditions of 15A NCAC 08G .0204.

2. Proper Operation and Maintenance

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the Permittee to install and operate backup or auxiliary facilities only when necessary to achieve compliance with the conditions of the permit [40 CFR 122.41(e)].

NOTE: Properly and officially designated operators are fully responsible for all proper operation and maintenance of the facility, and all documentation required thereof, whether acting as a contract operator [subcontractor] or a member of the Permittee's staff.

3. Need to Halt or Reduce not a Defense

It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the condition of this permit [40 CFR 122.41(c)].

4. Bypassing of Treatment Facilities

a. Bypass not exceeding limitations [40 CFR 122.41(m)(2)]

The Permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Paragraphs b. and c. of this section.

b. Notice [40 CFR 122.41(m)(3)]

(1) Anticipated bypass. If the Permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass; including an evaluation of the anticipated quality and effect of the bypass.

(2) Unanticipated bypass. The Permittee shall submit notice of an unanticipated bypass as required in Part II.E.6. (24-hour notice).

c. Prohibition of Bypass

(1) Bypass from the treatment facility is prohibited and the Permit Issuing Authority may take enforcement action against a Permittee for bypass, unless:

(A) Bypass was unavoidable to prevent loss of life, personal injury or severe property damage;

(B) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate backup equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

(C) The Permittee submitted notices as required under Paragraph b. of this section.

(2) Bypass from the collection system is prohibited and the Permit Issuing Authority may take enforcement action against a Permittee for a bypass as provided in any current or future system-wide collection system permit associated with the treatment facility.

(3) The Permit Issuing Authority may approve an anticipated bypass, after considering its adverse effects, if the Permit Issuing Authority determines that it will meet the three conditions listed above in Paragraph c. (1) of this section.

5. Upsets
   a. Effect of an upset [40 CFR 122.41(n)(2)]: An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph b. of this condition are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.
   b. Conditions necessary for a demonstration of upset: Any Permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
      (1) An upset occurred and that the Permittee can identify the cause(s) of the upset;
      (2) The Permittee facility was at the time being properly operated; and
      (3) The Permittee submitted notice of the upset as required in Part II.E.6.(b) of this permit.
      (4) The Permittee complied with any remedial measures required under Part II.B.2. of this permit.
   c. Burden of proof [40 CFR 122.41(n)(4)]: The Permittee seeking to establish the occurrence of an upset has the burden of proof in any enforcement proceeding.

6. Removed Substances
   Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be utilized/disposed of in accordance with NCGS 143-215.1 and in a manner such as to prevent any pollutant from such materials from entering waters of the State or navigable waters of the United States except as permitted by the Commission. The Permittee shall comply with all applicable state and Federal regulations governing the disposal of sewage sludge, including 40 CFR 503, Standards for the Use and Disposal of Sewage Sludge; 40 CFR Part 258, Criteria For Municipal Solid Waste Landfills; and 15A NCAC Subchapter 2T, Waste Not Discharged To Surface Waters. The Permittee shall notify the Permit Issuing Authority of any significant change in its sludge use or disposal practices.

7. Power Failures
   The Permittee is responsible for maintaining adequate safeguards (as required by 15A NCAC 02H .0124) to prevent the discharge of untreated or inadequately treated wastes during electrical power failures either by means of alternate power sources, standby generators or retention of inadequately treated effluent.

Section D. Monitoring and Records

1. Representative Sampling
   Samples collected and measurements taken, as required herein, shall be representative of the permitted discharge. Samples collected at a frequency less than daily shall be taken on a day and time that is representative of the discharge for the period the sample represents. All samples shall be taken at the monitoring points specified in this permit and, unless otherwise specified, before the effluent joins or is diluted by any other wastestream, body of water, or substance. Monitoring points shall not be changed without notification to and the approval of the Permit Issuing Authority [40 CFR 122.41(j)].

2. Reporting
   Monitoring results obtained during the previous month(s) shall be summarized for each month and reported on a monthly Discharge Monitoring Report (DMR) Form (MR 1, 1.1, 2, 3) or alternative forms approved by the Director, postmarked no later than the last calendar day of the month following the completed reporting period.

   The first DMR is due on the last day of the month following the issuance of the permit or in the case of a new facility, on the last day of the month following the commencement of discharge. Duplicate signed copies of these, and all other reports required herein, shall be submitted to the following address:

NC DEQ / Division of Water Resources / Water Quality Permitting Section
ATTENTION: Central Files
1617 Mail Service Center
Raleigh, North Carolina 27699-1617

3. Flow Measurements
Appropriate flow measurement devices and methods consistent with accepted scientific practices shall be selected and used to ensure the accuracy and reliability of measurements of the volume of monitored discharges. The devices shall be installed, calibrated and maintained to ensure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected shall be capable of measuring flows with a maximum deviation of less than 10% from the true discharge rates throughout the range of expected discharge volumes. Flow measurement devices shall be accurately calibrated at a minimum of once per year and maintained to ensure that the accuracy of the measurements is consistent with the accepted capability of that type of device. The Director shall approve the flow measurement device and monitoring location prior to installation.

Once-through condenser cooling water flow monitored by pump logs, or pump hour meters as specified in Part I of this permit and based on the manufacturer's pump curves shall not be subject to this requirement.

4. Test Procedures
Laboratories used for sample analysis must be certified by the Division. Permittees should contact the Division's Laboratory Certification Section (919 733-3908) or visit https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch for information regarding laboratory certifications.

Facilities whose personnel are conducting testing of field-certified parameters only must hold the appropriate field parameter laboratory certifications.

Test procedures for the analysis of pollutants shall conform to the EMC regulations (published pursuant to NCGS 143-215.63 et. seq.), the Water and Air Quality Reporting Acts, and to regulations published pursuant to Section 304(g), 33 USC 1314, of the CWA (as amended), and 40 CFR 136; or in the case of sludge use or disposal, approved under 40 CFR 136, unless otherwise specified in 40 CFR 503, unless other test procedures have been specified in this permit [40 CFR 122.41].

To meet the intent of the monitoring required by this permit, all test procedures must produce minimum detection and reporting levels that are below the permit discharge requirements and all data generated must be reported down to the minimum detection or lower reporting level of the procedure. If no approved methods are determined capable of achieving minimum detection and reporting levels below permit discharge requirements, then the most sensitive (method with the lowest possible detection and reporting level) approved method must be used.

5. Penalties for Tampering
The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than two years per violation, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both [40 CFR 122.41].

6. Records Retention
Except for records of monitoring information required by this permit related to the Permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR 503), the Permittee shall retain records of all monitoring information, including:

- all calibration and maintenance records
- all original strip chart recordings for continuous monitoring instrumentation
- copies of all reports required by this permit
- copies of all data used to complete the application for this permit

These records or copies shall be maintained for a period of at least 3 years from the date of the sample, measurement, report or application. This period may be extended by request of the Director at any time [40 CFR 122.41].

7. Recording Results
For each measurement or sample taken pursuant to the requirements of this permit, the Permittee shall record the following information [40 CFR 122.41]:

   a. The date, exact place, and time of sampling or measurements;
   b. The individual(s) who performed the sampling or measurements;
   c. The date(s) analyses were performed;
   d. The individual(s) who performed the analyses;
   e. The analytical techniques or methods used; and
   f. The results of such analyses.

8. Inspection and Entry
The Permittee shall allow the Director, or an authorized representative (including an authorized contractor acting as a representative of the Director), upon the presentation of credentials and other documents as may be required by law, to;

   a. Enter, at reasonable times, upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
   b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
   c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
   d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location [40 CFR 122.41(i)].

Section E Reporting Requirements

1. Change in Discharge
All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit.

2. Planned Changes
The Permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility [40 CFR 122.41(l)]. Notice is required only when:

   a. The alteration or addition to a permitted facility may meet one of the criteria for new sources at 40 CFR 122.29(b); or
   b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42(a)(1); or
   c. The alteration or addition results in a significant change in the Permittee's sludge use or disposal practices, and such alteration, addition or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

3. Anticipated Noncompliance
The Permittee shall give advance notice to the Director of any planned changes to the permitted facility or other activities that might result in noncompliance with the permit [40 CFR 122.41(l)(2)].

4. Transfers
This permit is not transferable to any person without prior written notice to and approval from the Director in accordance with 40 CFR 122.61. The Director may condition approval in accordance with NCGS 143-215.1, in

particular NCGS 143-215.1(b)(4)h.2., and may require modification or revocation and reissuance of the permit, or a minor modification, to identify the new permittee and incorporate such other requirements as may be necessary under the CWA [40 CFR 122.41(l)(3), 122.61] or state statute.

5. Monitoring Reports
Monitoring results shall be reported at the intervals specified elsewhere in this permit [40 CFR 122.41(l)(4)].

   a. Monitoring results must be reported on a Discharge Monitoring Report (DMR) (See Part II.D.2) or forms provided by the Director for reporting results of monitoring of sludge use or disposal practices.

   b. If the Permittee monitors any pollutant more frequently than required by this permit using test procedures approved under 40 CFR Part 136 and at a sampling location specified in this permit or other appropriate instrument governing the discharge, the results of such monitoring shall be included in the calculation and reporting of the data submitted on the DMR.

6. Twenty-four Hour Reporting

   a. The Permittee shall report to the Director or the appropriate Regional Office any noncompliance that potentially threatens public health or the environment. Any information shall be provided orally within 24 hours from the time the Permittee became aware of the circumstances. A written submission shall also be provided within 5 days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance, and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance [40 CFR 122.41(l)(6)].

   b. The Director may waive the written report on a case-by-case basis for reports under this section if the oral report has been received within 24 hours.

   c. Occurrences outside normal business hours may also be reported to the Division's Emergency Response personnel at (800) 858-0368 or (919) 733-3300.

7. Other Noncompliance
The Permittee shall report all instances of noncompliance not reported under Part II.E.5 and 6. of this permit at the time monitoring reports are submitted. The reports shall contain the information listed in Part II.E.6. of this permit [40 CFR 122.41(l)(7)].

8. Other Information
Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Director, it shall promptly submit such facts or information [40 CFR 122.41(l)(8)].

9. Noncompliance Notification
The Permittee shall report by telephone to either the central office or the appropriate regional office of the Division as soon as possible, but in no case more than 24 hours or on the next working day following the occurrence or first knowledge of the occurrence of any of the following:

   a. Any occurrence at the water pollution control facility which results in the discharge of significant amounts of wastes which are abnormal in quantity or characteristic, such as the dumping of the contents of a sludge digester; the known passage of a slug of hazardous substance through the facility; or any other unusual circumstances.

   b. Any process unit failure, due to known or unknown reasons, that render the facility incapable of adequate wastewater treatment such as mechanical or electrical failures of pumps, aerators, compressors, etc.

   c. Any failure of a pumping station, sewer line, or treatment facility resulting in a by-pass without treatment of all or any portion of the influent to such station or facility.

   Persons reporting such occurrences by telephone shall also file a written report within 5 days following first knowledge of the occurrence. Also see reporting requirements for municipalities in Part IV.C.2.c. of this permit.

10. Availability of Reports
Except for data determined to be confidential under NCGS 143-215.3 (a)(2) or Section 308 of the Federal Act, 33 USC 1318, all reports prepared in accordance with the terms shall be available for public inspection at the offices

of the Division. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in NCGS 143-215.1(b)(2) or in Section 309 of the Federal Act.

11. Penalties for Falsification of Reports
The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $25,000 per violation, or by imprisonment for not more than two years per violation, or by both [40 CFR 122.41].

12. Annual Performance Reports
Permittees who own or operate facilities that primarily collect or treat municipal or domestic wastewater and have an average annual flow greater than 200,000 gallons per day shall provide an annual report to the Permit Issuing Authority and to the users/customers served by the Permittee (NCGS 143-215.1C). The report shall summarize the performance of the collection or treatment system, as well as the extent to which the facility was compliant with applicable Federal or State laws, regulations and rules pertaining to water quality. The report shall be provided no later than sixty days after the end of the calendar or fiscal year, depending upon which annual period is used for evaluation.

The report shall be sent to:

NC DEQ / Division of Water Resources / Water Quality Permitting Section
ATTENTION: Central Files
1617 Mail Service Center
Raleigh, North Carolina 27699-1617

PART III
OTHER REQUIREMENTS

Section A. Construction

a. The Permittee shall not commence construction of wastewater treatment facilities, nor add to the plant's treatment capacity, nor change the treatment process(es) utilized at the treatment plant unless (1) the Division has issued an Authorization to Construct (AtC) permit or (2) the Permittee is exempted from such AtC permit requirements under Item b. of this Section.

b. In accordance with NCGS 143-215.1(a5) [SL 2011-394], no permit shall be required to enter into a contract for the construction, installation, or alteration of any treatment work or disposal system or to construct, install, or alter any treatment works or disposal system within the State when the system's or work's principle function is to conduct, treat, equalize, neutralize, stabilize, recycle, or dispose of industrial waste or sewage from an industrial facility and the discharge of the industrial waste or sewage is authorized under a permit issued for the discharge of the industrial waste or sewage into the waters of the State. Notwithstanding the above, the permit issued for the discharge may be modified if required by federal regulation.

c. Issuance of an AtC will not occur until Final Plans and Specifications for the proposed construction have been submitted by the Permittee and approved by the Division.

Section B. Groundwater Monitoring

The Permittee shall, upon written notice from the Director, conduct groundwater monitoring as may be required to determine the compliance of this NPDES permitted facility with the current groundwater standards.

Section C. Changes in Discharges of Toxic Substances

The Permittee shall notify the Permit Issuing Authority as soon as it knows or has reason to believe (40 CFR 122.42):

a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels";

   (1) One hundred micrograms per liter (100 µg/L);

   (2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;

   (3) Five times the maximum concentration value reported for that pollutant in the permit application.

b. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels";

   (1) Five hundred micrograms per liter (500 µg/L);

   (2) One milligram per liter (1 mg/L) for antimony;

   (3) Ten times the maximum concentration value reported for that pollutant in the permit application.

Section D. Facility Closure Requirements

The Permittee must notify the Division at least 90 days prior to the closure of any wastewater treatment system covered by this permit. The Division may require specific measures during deactivation of the system to prevent adverse impacts to waters of the State. This permit cannot be rescinded while any activities requiring this permit continue at the permitted facility.

PART IV
SPECIAL CONDITIONS FOR MUNICIPAL FACILITIES

Section A. Definitions

In addition to the definitions in Part II of this permit, the following definitions apply to municipal facilities:

Indirect Discharge or Industrial User
Any non-domestic source that discharges wastewater containing pollutants into a POTW regulated under section 307(b), (c) or (d) of the CWA. [40 CFR 403.3 (i) and (j) and 15A NCAC 02H .0903(b)(11)]

Interference
Inhibition or disruption of the POTW treatment processes; operations; or its sludge process, use, or disposal which causes or contributes to a violation of any requirement of the Permittee's (or any satellite POTW's if different from the Permittee) NPDES, collection system, or non-discharge permit or prevents sewage sludge use or disposal in compliance with specified applicable State and Federal statutes, regulations, or permits. [15A NCAC 02H .0903(b)(14)]

Pass Through
A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or with discharges from other sources, causes a violation, including an increase in the magnitude or duration of a violation, of the Permittee's (or any satellite POTW's, if different from the Permittee) NPDES, collection system, or non-discharge permit. [15A NCAC 02H .0903(b)(23)]

Publicly Owned Treatment Works (POTW)
A treatment works as defined by Section 212 of the CWA, which is owned by a State or local government organization. This definition includes any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes the collection system, as defined in 15A NCAC 2T .0402, only if it conveys wastewater to a POTW treatment plant. The term also means the local government organization, or municipality, as defined in section 502(4) of the CWA, which has jurisdiction over indirect discharges to and the discharges from such a treatment works. In this context, the organization may be the owner of the POTW treatment plant or the owner of the collection system into which an indirect discharger discharges. This second type of POTW may be referred to as a "satellite POTW organization." [15A NCAC 02H .0903(b)(26)]

"Significant Industrial User" or "SIU"
An Industrial User that discharges wastewater into a publicly owned treatment works and that [15A NCAC 02H .0903(b)(33)]:

1. Discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling and boiler blowdown wastewaters); or
2. Contributes process wastewater which makes up five percent or more of the NPDES or non-discharge permitted flow limit or organic capacity of the POTW treatment plant. In this context, organic capacity refers to BOD, TSS and ammonia; or
3. Is subject to categorical standards under 40 CFR Part 403.6 and 40 CFR Parts 405-471; or
4. Is designated as such by the Permittee on the basis that the Industrial User has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, or the POTW's effluent limitations and conditions in its NPDES or non-discharge permit, or to limit the POTW's sludge disposal options;
5. Subject to approval under 15A NCAC 02H .0907(b), the Permittee may determine that an Industrial User meeting the criteria in paragraphs 1 or 2 of this definition above has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the POTW's effluent limitations and conditions in its NPDES or non-discharge permit, or to limit the POTW's sludge disposal options, and thus is not a Significant Industrial User (SIU); or
6. Subject to approval under 15A NCAC 02H .0907(b), the Permittee may determine that an Industrial User meeting the criteria in paragraph 3 of this definition above meets the requirements of 40 CFR Part 403.3(v)(2) and thus is a non-significant categorical Industrial User.

Section B. Publicly Owned Treatment Works (POTWs)

All POTWs must provide adequate notice to the Director of the following [40 CFR 122.42(b)]:

1. Any new introduction of pollutants into the POTW from an indirect discharger, regardless of the means of transport, which would be subject to section 301 or 306 of CWA if it were directly discharging those pollutants; and
2. Any substantial change in the volume or character of pollutants being introduced by an indirect discharger as influent to that POTW at the time of issuance of the permit.
3. For purposes of this paragraph, adequate notice shall include information on (1) the quality and quantity of effluent introduced into the POTW, and (2) any anticipated impact that may result from the change of the quantity or quality of effluent to be discharged from the POTW.

Section C. Municipal Control of Pollutants from Industrial Users.

1. Effluent limitations are listed in Part I of this permit. Other pollutants attributable to inputs from Industrial Users discharging to the POTW may be present in the Permittee's discharge. At such time as sufficient information becomes available to establish limitations for such pollutants, this permit may be revised to specify effluent limitations for any or all of such other pollutants in accordance with best practicable technology or water quality standards.
2. Prohibited Discharges
   a. The Permittee shall develop and enforce their Pretreatment Program to implement the prohibition against the introduction of pollutants or discharges into the waste treatment system or waste collection system which cause or contribute to Pass Through or Interference as defined in 15A NCAC 02H .0900 and 40 CFR 403. [40 CFR 403.5(a)(1)]
   b. The Permittee shall develop and enforce their Pretreatment Program to implement the prohibitions against the introduction of the following wastes in the waste treatment or waste collection system [40 CFR 403.5(b)]:
      (1) Pollutants which create a fire or explosion hazard in the POTW, including, but not limited to, wastestreams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21;
      (2) Pollutants which cause corrosive structural damage to the POTW, but in no case discharges with pH lower than 5.0, unless the works is specifically designed to accommodate such discharges;
      (3) Solid or viscous pollutants in amounts which cause obstruction to the flow in the POTW resulting in Interference;
      (4) Any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a Discharge at a flow rate and/or pollutant concentration which will cause Interference with the POTW;
      (5) Heat in amounts which will inhibit biological activity in the POTW resulting in Interference, but in no case heat in such quantities that the temperature at the POTW Treatment Plant exceeds 40°C (104°F) unless the Division, upon request of the POTW, approves alternate temperature limits;
      (6) Petroleum oil, non-biodegradable cutting oil, or products of mineral oil origin in amounts that will cause Interference or Pass Through;
      (7) Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems; or
      (8) Any trucked or hauled pollutants, except at discharge points designated by the POTW.
   c. The Permittee shall investigate the source of all discharges into the POTW, including slug loads and other unusual discharges, which have the potential to adversely impact the Permittee's Pretreatment Program and/or the operation of the POTW.

      The Permittee shall report such discharges into the POTW to the Director or the appropriate Regional Office. Any information shall be provided orally within 24 hours from the time the Permittee became aware of the circumstances. A written submission shall also be provided within 5 days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the discharge; the investigation into possible sources; the period of the discharge, including exact dates and times; if the discharge has not ceased, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance,

3. With regard to the effluent requirements listed in Part I of this permit, it may be necessary for the Permittee to supplement the requirements of the Federal Pretreatment Standards (40 CFR, Part 403) to ensure compliance by the Permittee with all applicable effluent limitations. Such actions by the Permittee may be necessary regarding some or all of the industries discharging to the municipal system.
4. The Permittee shall require any Industrial User (IU) discharging to the POTW to meet Federal Pretreatment Standards developed under Section 307(b) of the Act as amended (which includes categorical standards and specific local limits, best management practices and narrative requirements). Prior to accepting wastewater from any Significant Industrial User (SIU), the Permittee shall either develop and submit to the Division a new Pretreatment Program or, as necessary, a modification of an existing Pretreatment Program, for approval as required under section D below as well as 15A NCAC 02H .0907(a) and (b). [40 CFR 122.44(j)(2)]
5. This permit shall be modified, or alternatively, revoked and reissued, to incorporate or modify an approved POTW Pretreatment Program or to include a compliance schedule for the development of a POTW Pretreatment Program as required under Section 402 (b)(8) of the CWA and implementing regulations or by the requirements of the approved State pretreatment program, as appropriate.

Section D. Pretreatment Programs

Under authority of sections 307 (b) and (c) and 402(b)(8) of the CWA and implementing regulations 40 CFR 403, North Carolina General Statute 143-215.3(14) and implementing regulations 15A NCAC 02H .0900, and in accordance with the approved pretreatment program, all provisions and regulations contained and referenced in the pretreatment program submittal are an enforceable part of this permit. [40 CFR 122.44(j)(2)]

The Permittee shall operate its approved pretreatment program in accordance with Section 402(b)(8) of the CWA, 40 CFR 403, 15A NCAC 02H .0900, and the legal authorities, policies, procedures, and financial provisions contained in its pretreatment program submission and Division approved modifications thereof. Such operation shall include but is not limited to the implementation of the following conditions and requirements. Terms not defined in Part II or Part IV of this permit are as defined in 15A NCAC 02H .0903 and 40 CFR 403.3.

1. Sewer Use Ordinance (SUO)
   The Permittee shall maintain adequate legal authority to implement its approved pretreatment program. [15A NCAC 02H .0903(b)(32), .0905 and .0906(b)(1); 40 CFR 403.8(f)(1) and 403.9(b)(1) and (2)]

2. Industrial Waste Survey (IWS)
   The Permittee shall implement an IWS consisting of the survey of users of the POTW collection system or treatment plant, as required by 40 CFR 403.8(f)(2)(i-iii) and 15A NCAC 02H .0905 [also 40 CFR 122.44(j)(1)], including identification of all Industrial Users that may have an impact on the POTW and the character and amount of pollutants contributed to the POTW by these Industrial Users and identification of those Industrial Users meeting the definition of SIU. Where the Permittee accepts wastewater from one or more satellite POTWs, the IWS for the Permittee shall address all satellite POTW services areas, unless the pretreatment program in those satellite service areas is administered by a separate Permittee with an approved Pretreatment Program. The Permittee shall submit a summary of its IWS activities to the Division at least once every five years, and as required by the Division. The IWS submission shall include a summary of any investigations conducted under paragraph C.2.c. of this Part. [15A NCAC 02H .0903(b)(13), .0905 and .0906(b)(2); 40 CFR 403.8(f)(2) and 403.9]

3. Monitoring Plan
   The Permittee shall implement a Division-approved Monitoring Plan for the collection of facility specific data to be used in a wastewater treatment plant Headworks Analysis (HWA) for the development of specific pretreatment local limits. Effluent data from the Plan shall be reported on the DMRs (as required by Parts II.D and II.E.5.). [15A NCAC 02H .0903(b)(16), .0906(b)(3) and .0905]

4. Headworks Analysis (HWA) and Local Limits
   The Permittee shall obtain Division approval of a HWA at least once every five years, and as required by the Division. Within 180 days of the effective date of this permit (or any subsequent permit modification) the Permittee shall submit to the Division a written technical evaluation of the need to revise local limits (i.e., an updated HWA or documentation of why one is not needed) [40 CFR 122.44]. The Permittee shall develop, in accordance with 40 CFR 403.5(c) and 15A NCAC 02H .0909, specific Local Limits to implement the prohibitions listed in 40 CFR 403.5(a) and (b) and 15A NCAC 02H .0909. Pursuant to 40 CFR 403.5, local limits are

enforceable Pretreatment Standards as defined by 40 CFR 403.3(1). [15A NCAC 02H .0903(b)(10), .0905, and .0906(b)(4)]

5. Industrial User Pretreatment Permits (IUP) & Allocation Tables
In accordance with NCGS 143-215.1, the Permittee shall issue to all Significant Industrial Users, permits for operation of pretreatment equipment and discharge to the Permittee's collection system or treatment works. These permits shall contain limitations, sampling protocols, reporting requirements, appropriate standard and special conditions, and compliance schedules as necessary for the installation of treatment and control technologies to assure that their wastewater discharge will meet all applicable pretreatment standards and requirements. The Permittee shall maintain a current Allocation Table (AT) which summarizes the results of the HWA and the limits from all IUPs. Permitted IUP loadings for each parameter cannot exceed the treatment capacity of the POTW as determined by the HWA. [15A NCAC 02H .0906(b)(6), .0909, .0916, and .0917; 40 CFR 403.5, 403.8(f)(1)(iii); NCGS 143-215.67(a)]

6. Authorization to Construct (AtC)
The Permittee shall ensure that an Authorization to Construct permit (AtC) is issued to all applicable Industrial Users for the construction or modification of any pretreatment facility. Prior to the issuance of an AtC, the proposed pretreatment facility and treatment process must be evaluated for its capacity to comply with all Industrial User Pretreatment Permit (IUP) limitations. [15A NCAC 02H .0906(b)(7) and .0905; NCGS 143-215.1(a)(8)]

7. POTW Inspection & Monitoring of their IUs
The Permittee shall conduct inspection, surveillance, and monitoring activities as described in its Division approved pretreatment program in order to determine, independent of information supplied by Industrial Users, compliance with applicable pretreatment standards. [15A NCAC 02H .0908(e); 40 CFR 403.8(f)(2)(v)] The Permittee must:

   a. Inspect all Significant Industrial Users (SIUs) at least once per calendar year;
   b. Sample all Significant Industrial Users (SIUs) at least once per calendar year for all SIU permit-limited parameters including flow except as allowed under 15A NCAC .0908(e); and
   c. At least once per year, document an evaluation of any non-significant categorical Industrial User for compliance with the requirements in 40 CFR 403.3(v)(2), and either continue or revoke the designation as non-significant.

8. IU Self Monitoring and Reporting
The Permittee shall require all Industrial Users to comply with the applicable monitoring and reporting requirements outlined in the Division-approved pretreatment program, the industry's pretreatment permit, or in 15A NCAC 02H .0908. [15A NCAC 02H .0906(b)(5) and .0905; 40 CFR 403.8(f)(1)(v) and (2)(iii); 40 CFR 122.44(j)(2) and 40 CFR 403.12]

9. Enforcement Response Plan (ERP)
The Permittee shall enforce and obtain appropriate remedies for violations of all pretreatment standards promulgated pursuant to section 307(b) and (e) of the CWA (40 CFR 405 et. seq.), prohibitive discharge standards as set forth in 40 CFR 403.5 and 15A NCAC 02H .0909, specific local limitations, and other pretreatment requirements. All remedies, enforcement actions and other, shall be consistent with the Enforcement Response Plan (ERP) approved by the Division. [15A NCAC 02H .0903(b)(7), .0906(b)(8) and .0905; 40 CFR 403.8(f)(5)]

10. Pretreatment Annual Reports (PAR)
The Permittee shall report to the Division in accordance with 15A NCAC 02H .0908. In lieu of submitting annual reports, Modified Pretreatment Programs developed under 15A NCAC 02H .0904 (b) may be required to submit a partial annual report or to meet with Division personnel periodically to discuss enforcement of pretreatment requirements and other pretreatment implementation issues.

For all other active pretreatment programs, the Permittee shall submit two copies of a Pretreatment Annual Report (PAR) describing its pretreatment activities over the previous calendar year to the Division at the following address:

NC DEQ / Division of Water Resources / Water Quality Permitting Section
Pretreatment, Emergency Response, and Collection Systems (PERCS) Unit
1617 Mail Service Center
Raleigh, North Carolina 27699-1617

These reports shall be submitted by March 1 of each year and shall contain the following:

a. Narrative
A narrative summary detailing actions taken, or proposed, by the Permittee to correct significant non-compliance and to ensure compliance with pretreatment requirements;

b. Pretreatment Program Summary (PPS)
A pretreatment program summary (PPS) on forms or in a format provided by the Division;

c. Significant Non-Compliance Report (SNCR)
A list of Industrial Users (IUs) in significant noncompliance (SNC) with pretreatment requirements, and the nature of the violations on forms or in a format provided by the Division;

d. Industrial Data Summary Forms (IDSF)
Monitoring data from samples collected by both the POTW and the Significant Industrial Users (SIUs). These analytical results must be reported on Industrial Data Summary Forms (IDSF) or on other forms or in a format provided by the Division;

e. Other Information
Copies of the POTW's allocation table, new or modified enforcement compliance schedules, public notice of IUs in SNC, a summary of data or other information related to significant noncompliance determinations for IUs that are not considered SIUs, and any other information, upon request, which in the opinion of the Director is needed to determine compliance with the pretreatment implementation requirements of this permit;

11. Public Notice
The Permittee shall publish annually a list of Industrial Users (IUs) that were in significant noncompliance (SNC) as defined in the Permittee's Division-approved Sewer Use Ordinance with applicable pretreatment requirements and standards during the previous twelve month period. This list shall be published within four months of the applicable twelve-month period. [15A NCAC 02H .0903(b)(34), .0908(b)(5) and .0905 and 40 CFR 403.8(f)(2)(viii)]

12. Record Keeping
The Permittee shall retain for a minimum of three years records of monitoring activities and results, along with support information including general records, water quality records, and records of industrial impact on the POTW and shall retain all other Pretreatment Program records as required by 15A NCAC 02H .0908(f). [15A NCAC 02H .0908(f); 40 CFR 403.12(o)]

13. Pretreatment Program Resources
The Permittee shall maintain adequate funding and qualified personnel to accomplish the objectives of its approved pretreatment program. and retain a written description of those current levels of inspection. [15A NCAC 02H .0906(b)(9) and (10) and .0905; 40 CFR 403.8(f)(3), 403.9(b)(3)]

14. Modification to Pretreatment Programs
Modifications to the approved pretreatment program including but not limited to local limits modifications, POTW monitoring of their Significant Industrial Users (SIUs), and Monitoring Plan modifications, shall be considered a permit modification and shall be governed by 40 CFR 403.18, 15 NCAC 02H .0114 and 15A NCAC 02H .0907.

Public Water Supply Approval & ATC

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
S. DANIEL SMITH
Director

NORTH CAROLINA
Environmental Quality

February 6, 2020

Brunswick County
Attention: John Nichols, Public Utilities Director
Post Office Box 249
Bolivia, North Carolina 28422

Re: Engineering Plans and Specifications Approval
Surface Water System
Northwest WTP Expansion and RO System
Brunswick County Water System
Water System No.: NC0410045, Brunswick County
Serial No.: 19-00770

Dear Applicant:

Enclosed please find one copy of the "Application for Approval..." together with one copy of the referenced engineering plans and specifications bearing the Division of Water Resources stamp of approval for the referenced project. These engineering plans and specifications are approved under Division of Water Resources Serial Number 19-00770, dated February 6, 2020. **This approval has the following conditions:**

1. **401/404/CAMA Permits and approvals must be in place before constructing concentrate discharge line from the water treatment plant to the Cape Fear River, especially in jurisdictional waters.**
2. **NPDES Permit for the Reverse Osmosis (RO) concentrate discharge and the additional process waste from the water treatment plant must be in place before the project is placed into service.**
3. **The water system's Operation and Maintenance Plan and Emergency Management Plan must be updated prior to placing the new water treatment units in operation per Rule .0307(d) and (e) of the Rules Governing Public Water Systems.**

Engineering plans and specifications prepared by Jonathan Treadway, P.E. and other Professional Engineers with CDM Smith, call for the expansion of the Northwest Water Treatment Plant (WTP) (located at 3954 Clearwell Drive, NE in Leland) from 24 million gallons per day (MGD) treatment capacity to 48 MGD with conventional treatment (operating the SuperPulsators at a maximum loading rate of 2.7 gpm/SF and the dual media filters at a maximum filtration rate of 4.0 gpm/SF), 45 MGD treatment capacity when one filter is out of service (one cell of a Greenleaf filter) and a RO treatment system with a design flux of 14.1 gallons per day per square foot (gfd) and a design permeate recovery rate of 85%-92%. Brunswick County has a raw water purchase agreement with Lower Cape Fear Water and Sewer Authority (LCFWASA) to purchase 50 MGD of raw water. The proposed modifications include the following:

1. Installation of approximately 20,000 feet of 18-inch PVC/24-inch HDPE concentrate discharge line and related appurtenances from the WTP to Clearwell Drive to Butler Road to Mt. Misery Road to Hooper Road to north along a private land with a permanent utility easement to the Caper Fear River discharge location to discharge the RO concentrate (NPDES Permit), with a concentrate diffuser.
2. Installation of approximately 1,800 feet of 36-inch raw water main and other related appurtenances from the existing LCFWASA's 48-inch and new 54-inch raw water mains near the meter vault to the WTP at raw water chemical injection vault near the rapid mix basins.
3. Decommission of the existing rapid mix basin and a construction of two (2) new rapid mix basins with length of 17 feet and width of 17 feet with vertical shaft mixer in each unit.
4. Upgrade of the existing two (2) pulsators with an installation of fiberglass reinforced plastic plates to operate them as SuperPulsators at the maximum loading rate of 2.7 gpm/SF with new sludge concentrators and water collection troughs. Each pulsator clarifier has two basins each, with a total of 4 basins, each basin with a length of 65 feet and a width of 48 feet.
5. Installation of two (2) new Greenleaf filters with four filter cells in each filter, with a filter cell dimensions of length of 24 feet and width of 24 feet, each filter cell aera of 527 SF. Filters will have dual media (sand and anthracite), with a total of 27-inches of media, with 3-inches of gravel base, 9-inches of sand and 18-inches of anthracite, with maximum filtration rate of 4.0 gpm/SF, 48 MGD treatment capacity WTP when all the filters are operating at 4.0 gpm/SF, 45 MGD treatment capacity WTP when one filter is out of service (one filter cell within one Greenleaf filter), all filters equipped with filter underdrain system with air and water backwash system.
6. Construction of an equalization basin to equalize flow from the gravity filters entering the RO treatment system.
7. RO treatment system (a packaged unit) to remove unregulated contaminants consisting of the following:
    - Eight (8) 4,500 gpm, 370 feet TDH, 500 HP vertical turbine RO feed pumps to feed water from the equalization basin to the eight (8) RO treatment trains, each RO treatment train consisting of three (3) stages (66 vessels in Stage 1, 32 vessels in Stage 2 and 16 vessels in Stage 3); each vessel with eight (8) elements (vessels array of 66:32:16) Low Pressure Reverse Osmosis (LPRO) with eight (8) LPRO units treatment system set up where the permeate from all three stages of membranes enter the clearwell, concentrate from each stage is further treated with the stage following it, and the RO concentrate from the third stage is treated with sodium bisulfite before it enters the concentrate discharge line for a disposal at the Cape Fear River. RO treatment system is equipped with a treatment bypass to allow water to bypass the RO treatment unit on an as needed basis, a Clean in Place (CIP) system with cleaning tanks, antiscalant tank, permeate flush tanks, pumps and other related appurtenances.
    - RO treatment system with a design permeate recovery rate between 85%-92% and a design flux of 14.1 gfd.
    - Permeate stabilization storage and feeding systems including carbon dioxide to increase alkalinity and hydrated lime to increase hardness.
8. Installation of additional chlorine gas storage and feeding system and an emergency chlorine gas scrubber.

9. Installation of two (2) additional chlorine dioxide generation system which include raw materials storage and feeding system, chlorine dioxide analyzers, chlorine dioxide feeding pumps and related appurtenances.
10. Installation of diaphragm type metering pumps for antiscalant, sodium bisulfite and fluoride.
11. Installation of liquid chemical transfer pumps for antiscalant.
12. Installation of three (3) submersible solids handling pumps to transfer liquid from clarifier to gravity thickener, one solids handling pump to transfer liquid from clarifier to equalization basin (for process waste collection), two thickened solids pump to transfer liquid from gravity thickener to sludge dewatering holding tank
13. Construction of one additional circular 80 feet diameter gravity solids thickener.
14. Installation of miscellaneous piping, electrical, SCADA system improvements other related appurtenances.
15. Installation of piping and valves to allow for recycling of water treatment process wastewater (except the RO concentrate) back to the head of the water treatment plant (recycle flow entering the WTP just prior to the rapid mix basins). Pumps and other associated appurtenances necessary for recycling are existing. Recycling of process waste approval has the following conditions in accordance with Rule .0404 (i) and Rule .2003:
    A. Total water recycled back to the head of the plant from the filter backwash and sludge thickening processes must not exceed 10% by volume to the daily flow into the water treatment plant.
    B. Backwash water must not be recycled when raw water contains excessive algae, when finished water taste and odor problems occur or when trihalomethane levels in the distribution system exceed the allowable levels (maximum contaminant level, MCL).
    C. Water treatment plant **must collect and retain** the following information for review and evaluation by the State (a copy of the suggested record keeping form is attached):
    i. A copy of the recycling approval.
    ii. A list of all recycle flows and the frequency at which they are returned.
    iii. Average and maximum backwash flow rates through the filters and the average and maximum duration of the filter backwash process, in minutes.
    iv. Typical filter run length and a written summary of how filter run lengths determined (e.g., headloss, turbidity, time etc.).
    v. Type of treatment provided for the recycle stream before it reenters the conventional filtration process; and
    vi. Types of treatment (for filter backwash waste) chemicals used, average doses of chemicals, frequency of chemical addition, and frequency of solids removal.

Raw water will continue to be treated with chlorine dioxide, chlorine, powdered activated carbon (PAC), polyaluminum chloride (PAX), caustic and polymer before or at rapid mix basins; treated with chlorine and chlorine dioxide after SuperPulsators; treated with sodium bisulfite and antiscalant before entering the RO treatment system; treated with carbon dioxide and lime (calcium hydroxide) after the RO treatment system; treated with fluoride, orthophosphate, chlorine dioxide and chlorine after the filters; and treated with chlorine and ammonia after the clearwells. Chlorine dioxide is used as a primary disinfectant and chlorine is added to maintain residual in the distribution system.

In addition to the aforementioned modifications at the Northwest WTP, existing two (2) Greenleaf filters, Clearwell No. 1 and Clearwell No. 2 and six (6) high service pumps will continue to be a part of the overall water treatment plant.

Please note that in accordance with 15A NCAC 18C .0309(a), no construction, alteration, or expansion of a water system shall be placed into service or made available for human consumption until the Public Water Supply Section has issued Final Approval. Final Approval will be issued and mailed to the applicant upon receipt of both an Engineer's Certification and an Applicant's Certification submitted in accordance with 15A NCAC 18C .0303 (a) and (c).

These plans and specifications in the foregoing application are approved insofar as the protection of public health is concerned as provided in the rules, standards and criteria adopted under the authority of Chapter 130A-317 of the General Statutes. This approval does not constitute a warranty of the design, construction or future operation of the water system.

One copy of the "Application for Approval..." and a copy of the plans and specifications with a seal of approval from the department are enclosed. One copy of the documents in digital format (CD) is being forwarded to our Wilmington Regional Office. The second copy of the CD is being retained in our office.

If Public Water Supply Section can be of further service, please call (919) 707-9100.

Sincerely,

SMBhatta /for

Robert W. Midgette, P.E.
Chief, Public Water Supply Section

RWM/SMB

Enclosures: Approval Documents

cc: Heidi Cox, Wilmington Regional Office
Brunswick County Health Department
CDM Smith
Linda Raynor, Compliance Services Branch

FILTER BACKWASH RECYCLING RULE RECORDKEEPING FORM

SYSTEM NAME Example 3.0 MGD Plant
PWSID _____ **Operating Period**[1] Jun 2003-Jun 2004

Check with your State or Primacy Agency to make sure this form is acceptable.

Type of Recycle Stream	Frequency at which flow is returned[2]
Spent Filter Backwash	4 times/day returned to main treatment train
Thickener Supernatant	
Liquids from Dewatering Process	
Other	
Other	

Filter Information	Filter Number[3]			
	1-8, all filters the same			
Average Duration of Backwash (in minutes)	15 minutes			
Maximum Duration of Backwash (in minutes)	15 minutes			
Average Backwash Flow[4] (in gpm)	1,500 gpm			
Maximum Backwash Flow[4] (in gpm)	1,500 gpm			
Run Length Time of Filter[5] (include units)	48 hrs			
Criteria for Terminating Filter Run[6]	Time, unless individual filter turbidity exceeds 0.2 NTU.			

Is treatment or equalization provided for recycle flows? _____ Yes ___X___ No
If yes, complete the following table.

Type of Treatment Provided		
Physical Dimensions of Unit		
Typical Hydraulic Loading Rate		
Maximum Hydraulic Loading Rate		
Type of Chemical Used		
Average Dose of Chemical (mg/L)		
Frequency of Chemical Addition		
Frequency of Solids Removal		

See instructions on back.

Instructions

1. Note the operating period for the information provided. Check with your State or Primacy Agency for required operating period.

2. The frequency at which the recycle stream is returned can be described as continuous, once a day, or as another frequency.

3. Fill out all information for each of your filters. If some or all filters are operated the same, note the appropriate filter numbers.

4. The backwash flow is obtained by multiplying filter surface area (in ft^2) by backwash rate (gpm/ft^2). Use the average backwash rate to get the average flow and the maximum backwash rate to get the maximum flow. If the flow is varied throughout the backwash process, then the average can be computed on a time-weighted basis as follows:

$$\frac{(\text{Backwash Rate 1 X Duration 1}) + (\text{Backwash Rate 2 X Duration 2}) + \ldots}{\text{Duration 1} + \text{Duration 2} + \ldots}$$

5. The filter run length time is the sum of the time that the filter is producing water between backwashes.

6. Describe how run length time is determined. For example, is the run length based on head loss across the filter, turbidity levels of filter effluent, a predetermined amount of time, or another method?

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
S. DANIEL SMITH
Director

NORTH CAROLINA
Environmental Quality

February 6, 2020

Brunswick County
Attention: John Nichols, Public Utilities Director
Post Office Box 249
Bolivia, North Carolina 28422

Re: **Authorization to Construct (This is not a Final Approval)**
Issue Date: February 6, 2020
Northwest WTP Expansion and RO System
Serial No.: 19-00770 Brunswick County
Water System No.: NC0410045
Water System Name: Brunswick County Water System

Dear Applicant:

This letter is to confirm that a complete Engineer's Report and a Water System Management Plan have been received, and that engineering plans and specifications have been approved by the Department for **Northwest WTP Expansion and RO System, Serial No.: 19-00770. This authorization to construct is granted with the following conditions: Prior to issuance of Final Approval for the project, provide a copy of the NPDES Permit modification that includes the RO concentrate discharge, and obtain 401/404/CAMA Permits before commencement of RO discharge line construction within the wetland area.**

The "Authorization to Construct" is valid for 36 months from the issue date**.** Authorization to construct may be extended if the Rules Governing Public Water Supplies and site conditions have not changed (see Rule .0305). The "Authorization to Construct" and the engineering plans and specifications approval letter shall be posted at the primary entrance of the job site before and during construction.

Upon completion of the construction or modification, **and prior to placing the new construction or modification into service**, the applicant must submit an Engineer's Certification and Applicant's Certification to the Public Water Supply Section.

- **Engineer's Certification**: in accordance with Rule .0303 (a), the applicant shall submit a certification statement signed and sealed by a registered professional engineer stating that construction was completed in accordance with approved engineering plans and specifications, including any provisions stipulated in the Department's engineering plan and specification approval letter.
- **Applicant's Certification:** in accordance with Rule .0303 (c), the applicant shall submit a signed certification statement indicating that the requirements for an Operation and Maintenance Plan and Emergency Management Plan have been satisfied in accordance with Rule .0307 (d) and (e) and that the system has a certified operator in accordance with Rule .1300. The "Applicant's Certification" form is available at http://www.ncwater.org/ (click on Public Water Supply Section, Plan Review, Plan Review Forms).

Certifications can be sent by mail, fax (919-715-4374) or attachment to an e-mail message to P**WSSection.PlanReview@ncdenr.gov**.

Once the certifications are received and determined adequate, the Department will issue a Final Approval letter to the applicant. In accordance with Rule .0309 (a), no portion of this project shall be placed into service until the Department has issued Final Approval. Please contact us at (919) 707-9100 if you have any questions or need additional information.

Sincerely,

RW Midgette

Robert W. Midgette, P.E.
Chief, Public Water Supply Section

cc: Heidi Cox, Regional Engineer
CDM Smith

North Carolina Department of Environmental Quality
Division of Water Resources

Authorization to Construct

Project Applicant:	**Brunswick County**
Public Water System Name And Water System No.:	**Brunswick County Water System NC0410045**
Project Name:	**Northwest WTP Expansion and RO System**
Serial No.:	**19-00770**
Issue Date:	**FEBRUARY 6, 2020**
Expiration Date:	36 Months after Issue Date

In accordance with NCAC 18C .0305, this Authorization to Construct must be posted at the primary entrance to the job site during construction.

Jonathan Treadway, P.E.
CDM Smith
5400 Glenwood Avenue, Suite 400
Raleigh, NC 27612

Septic Permit

Brunswick County Health Services

25 Courthouse Drive N.E.: Post Office Box 9
Bolivia, North Carolina 28422-0009
910-253-2250 1-888-428-4429

David M. Stanley III, Executive Director
Health and Human Services Agency

North Carolina Public Health

Cris Hamelson, Director
Department of Health Services

Date: 2/6/2020

-MAILED

FEB 10 2020

Applicant: Kelly Boone, CDM Smith
5400 Glenwood Avenue, Suite 400
Raleigh, NC 27612

RE: Brunswick County Public Utilities, Northwest Water Treatment plant
GIS Address: 3954 Clearwell Dr, NE, Leland, NC 28451
Tax Parcel #: 01500080
BCHS #: 2019074095

Kelly Boone:
As requested, an Improvement Permit for a wastewater collection, treatment, and disposal system has been issued and may be obtained onee all applicable fees have been paid. Please submit pump plans to this office for the site listed above using the design criteria below. These plans must be reviewed and approved prior to the issuance of the Construction Authorization Permit.

Design Criteria:
Brunswick County Public Utilities water treatment
10 staff per shift @ 25gal/ employee = 250 gal x 2 shifts = 500 gal
2 night employees @ 35 gal/ea = 70 gal
15 conference room attendees @ 15 gal/ea = 225 gal
Total = 795 gal/day

Type of system: IIIB
Septic tank: 1500 gal
Pump tank: 1500 gal
LTAR: 0.45gpd/ft2
Number of lines: 6 (Rock aggregate must be used to expand existing system)
Length of lines: 100' (Add 25' to each of the 5 existing lines and add 1, 100' line)
Trench depth: 30"

Repair Area: 6, 100' drain lines

Pump plans must be submitted to this office for approval, prior to the issuance of the Authorization to Construct permit. The Authorization the Construct permit is required prior to any eonstruction being started or receiving a building permit. If you have any questions, please contact the BCHS at 910-253-2150.

Sincerely,

Jason Gore, REHS

Brunswick County Health Department
Environmental Health Section
Wastewater Collection, Treatment
and Subsurface Disposal System

Application # 2019074095
Tax Parcel # 01500080
Type: 3 B

IMPROVEMENT PERMIT
FOR WASTEWATER COLLECTION, TREATMENT, AND DISPOSAL SYSTEM

In accordance with the provisions of Article 11 of Chapter 130A, General Statutes of North Carolina, 15A NCAC 18A . 1900 et seq., and other applicable Laws and Rules

PERMISSION IS HEREBY GRANTED TO:

Applicant: Kelly Boone
5400 Glenwood Avenue, Suite 400
Raleigh, NC 27612

Owner: Brunswick County Public Utilities
PO Box 249
Bolivia, N C 28422

FOR THE
Installation of a wastewater collection, treatment, and disposal system to serve:

Residential NA Bedroom NA Commercial Water treatment plant
Comments/Use : Pump to Pressure Manifold and 6. 100'drain lines; LTAR 0..45 gpd/sqft pursuant to 15A NCAC 18A.1900 as amended and in conformity with the application and other supporting data subsequently filed and approved by the DEHNR/or the Brunswick County Health Department and considered a part of this permit.

Facility to be served: Name Brunswick County Public Utilities
Address/Location: 3954 Clearwell Drive NE, Leland, NC 28451

Description 10 staff per shift @ 25gal/ employee = 250 gal x 2 shifts = 500 gal
2 night employees @ 35 gal/ea = 70 gal
15 conference room attendees @ 15 gal/ea = 225 gal
Total = 795 gal/day

The owner shall be subject to the following conditions, limitations, and construction requirements for the installation and operation of this system:

1. This permit is effective only with respect to the specific design flow facilities, and the nature and volume of waste described in the Permit Application, and other supporting data. Changes in the proposed use, waste flow, nature or volume of waste render this Permit void.
2. All documents, including but not limited to site evaluation, design review plans and specifications, Triparty Agreements, Easements, and other legal agreements will become a part of the Permit. This includes operation and maintenance procedures and other pertinent documents relating to system operation and maintenance.
All legal documents must be recorded with the Brunswick County Register of Deeds, and proof of filing submitted before the Operations Permit or Authorization to Construct is issued, conditional on recordation and enforcement of easement.
3. The designated repair area is to have no parking, driveways, or other impervious material located on it.
4. The issuance of this permit does not preclude the permittee from complying with any and all statues, regulations, or ordinances which may be imposed by other government agencies which have jurisdiction, or any other permits issued by this department.
5. The permit shall become invalid if the information submitted in the application was falsified or changed, if the permit was based on inaccurate or incomplete information, or if the designated site is altered.
6. Before Authorization to Construct a Wastewater Treatment and Disposal System is issued pump plans must be submitted to be approved by the Health Department.
7. Repair area is 6, 100' drain lines (see attached site plan)

PERMIT ISSUED THIS 6th DAY OF February, 2020.

DATE OF PERMIT EXPIRATION February 6, 2025

BRUNSWICK COUNTY HEALTH DEPARTMENT ENVIRONMENTAL HEALTH DIVISION

_____ Environmental Health Specialist

N

Brunswick County Health Services

25 Courthouse Drive N.E., Post Office Box 9
Bolivia, North Carolina 28422-0009
910-253-2250 1-888-428-4129

Daniel M. Stanley III, Executive Director
Health and Human Services Agency

North Carolina Public Health

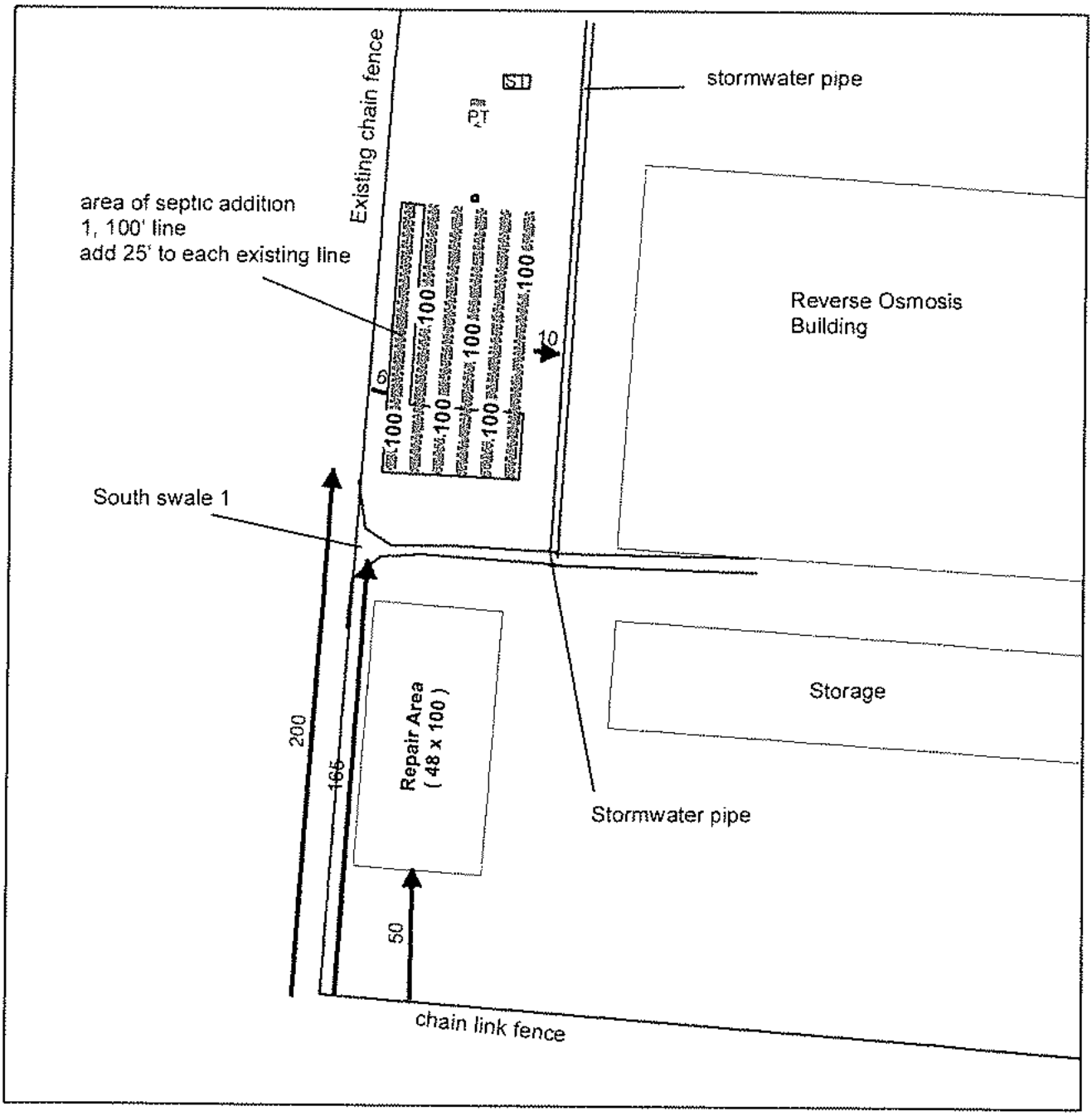
Cris Harrison, Director
Environmental Health Services

Site Plan For (Check One): ☑ **Improvement Permit** ☐ **Fill Plan** ☐ **Authorization to Construct Permit**
☐ **Well Permit** ☐ **Proposal**

Date: 2/6/20
BCHS #: 2019074095
Tax Parcel #: 01500080

REHS Signature

SITE PLAN ONLY. THIS IS NOT A PERMIT



70 35 0 70 Feet

1 inch = 60 feet

N

Brunswick County Health Services

25 Courthouse Drive N.E., Post Office Box 9
Bolivia, North Carolina 28422-0009
910-253-2250 1-888-428-4429

David M. Stanley III, Executive Director
Health and Human Services Agency

North Carolina Public Health

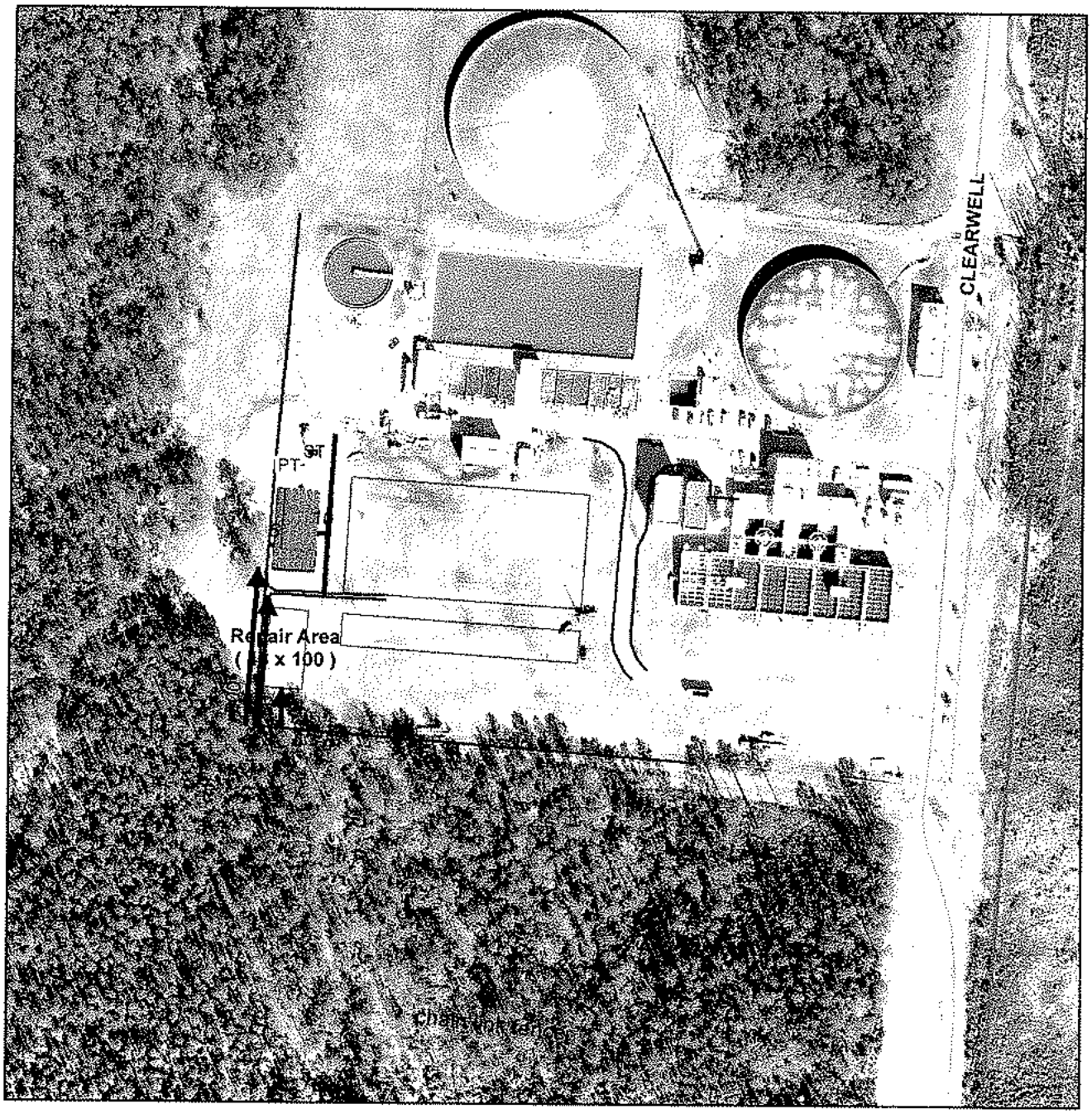
Cleo Hawkins, Director
Department of Health Services

Site Plan For (Check One): ☑ Improvement Permit ☐ Fill Plan ☐ Authorization to Construct Permit
☐ Well Permit ☐ Proposal

Date: 2/6/70
BCHS #: 2019074095
Tax Parcel #: 01500080

REHS Signature

SITE PLAN ONLY. THIS IS NOT A PERMIT



240 120 0 240 Feet

1 inch = 200 feet

Effective Date:	3-3-2008
Revision Date:	4-2011
Approved By:	
Date Approved:	Feb 6, 2013

Brunswick County Health Department
Policies and Procedures
Environmental Health Section
Plan Submittal Procedures and Requirements

Policy:

The Environmental Health Division shall accept plans and proposals for subsurface wastewater system installations to serve properties / sites proposed for development. Said plans will be reviewed and evaluated for practicality and application based on the North Carolina Laws and Rules For Sewage Treatment and Disposal Systems (Article 11, Chapter 130A of NCGS 15A NCAC 18A .1900 et. seq.) and from guidance received from the NCDENR-Onsite Water Protection, Engineering Section. Systems proposed should protect the public health and environmental protection.

Purpose:

The purpose of this policy is to provide for uniform procedures and guidance for submittal of plans and specifications for proposed subsurface wastewater systems.

Procedure:

I. All plans and specifications for a proposed wastewater system submitted to the BCHD for local review shall:
   1. Be designed to handle less than 3,000 gallons per day, as determined by the Rules For Sewage Treatment and Disposal Systems 15A NCAC 18A .1949(a) or (b).
   3. Comply with all applicable NC Laws, Rules & Regulations and specified conditions.
   4. Comply with all applicable local Brunswick County Health Department policies and procedures.
   5. Be complete and include the following information:
      a. Design calculations.
      b. Detailed, scaled site plan (1 "=20' recommended) showing the house / building footprint (decks, porches, steps, related structures) accessory buildings, driveways, parking, wells (within 100'), water lines, setbacks, CAMA, Corp of Engineers, zoning limitations, etc. When the property size or multiple properties are involved, an overall layout / plat (1" = 60ft) may be submitted for the overall project with smaller inserts or pages scaled at 1" = 20ft showing the areas specific to the system installation components.
      c. Supporting documentation, illustrations, etc. Example: diagrams, pump specifications, control panel, special equipment types and details.
      d. Recommended/specialized operation and maintenance requirements sball be addressed.

II. Multi-unit facilities (residences or businesses) shall provide a separate, independent electric meter/service for the wastewater system.

III. For systems utilizing offsite locations of system components, plats, easements, and legal documents sucb as, encroachment agreements, right-of-ways, etc., shall be provided to the local Health Department for review. Said documentation shall be approved by the Brunswick County Attorney's Office, and recorded with the Brunswick County Register of Deeds Office before any Permit(s) may be issued.

IV. For wastewater installations serving multifamily facilities (duplexes, condominiums, multiple home developments, etc.), draft tri-party agreements, Articles of Incorporation, Bylaws of Homeowners Association, etc., shall be submitted to the Brunswick County Attorney's Office and approved by the Brunswick County Health Department and the Brunswick County Attorney's Office before the Construction Authorization may be issued. Legal documents shall be signed by the parties described in the legal document and recorded with the Brunswick County Register of Deeds Office before the Operations Permit is issued.

V. The Brunswick County Health Department may forward or require engineering review from the NCDENR-Onsite Water Protection-Engineering Section for any Wastewater System Plans with complex design, questionable design or components, which include design concepts not in general practice, etc...

Reference:

Brunswick County Health Department Environmental Health Policy Manual

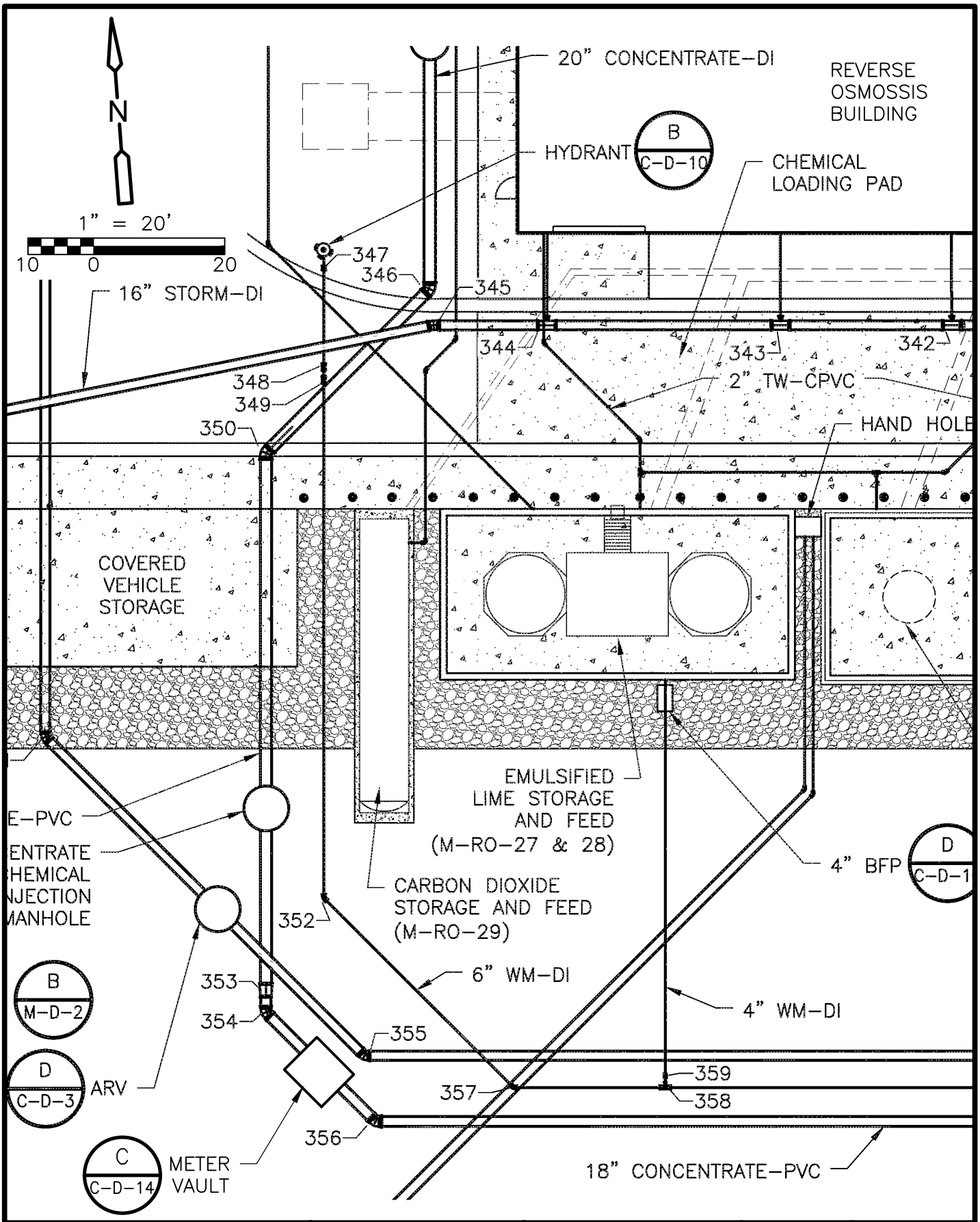
North Carolina Laws and Rules For Sewage Treatment and Disposal Systems (Article 11, Chapter 130A of NCGS 15A NCAC 18A .1900 et. seq.)

Policy originally approved, November 13, 2006
Updated 8-31-2011

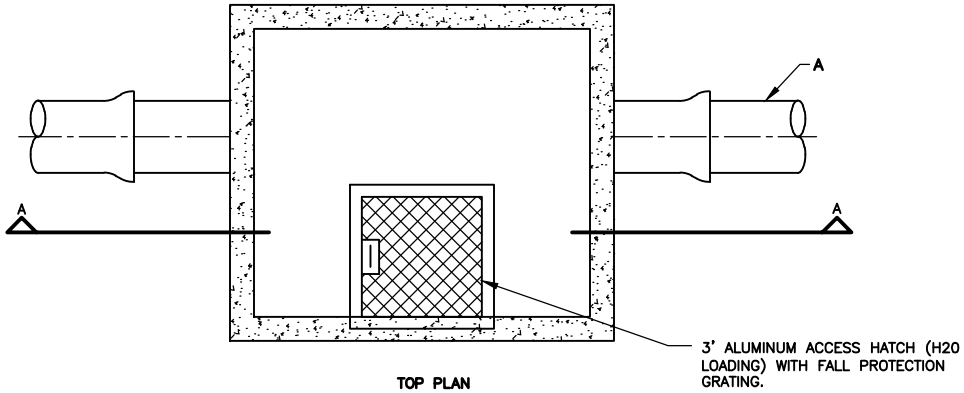
Chemical Injector Schedule

CHEMICAL	DOSING	CHEMICAL INJECTION DIAMETER	RECEIVING PIPE DIAMETER	PIPE MATERIAL	INJECTION FLOW RATE (MAX)
PAX	RAW WATER PIPE TO WEST RAPID MIX	1"	24"	CPVC SCH 80	110 GPH
PAX	RAW WATER PIPE TO EAST RAPID MIX	1"	24"	CPVC SCH 80	110 GPH
PAC	RAW WATER PIPE TO WEST RAPID MIX	1"	24"	CPVC SCH 80	4.2 GPH
PAC	RAW WATER PIPE TO EAST RAPID MIX	1"	24"	CPVC SCH 80	4.2 GPH
CAUSTIC	RAW WATER CHEMICAL INJECTION VAULT	1"	36"	CPVC SCH 80	44 GPH
CAUSTIC	RAW WATER CHEMICAL INJECTION VAULT	1"	36"	CPVC SCH 80	44 GPH
CAUSTIC	RAW WATER PIPE TO WEST RAPID MIX	1"	24"	CPVC SCH 80	44 GPH
CAUSTIC	RAW WATER PIPE TO EAST RAPID MIX	1"	24"	CPVC SCH 80	44 GPH
CAUSTIC	POST-CLEARWELL NO. 1 (FINISHED WATER VAULT)	1"	36"	CPVC SCH 80	39 GPH
CAUSTIC	POST-CLEARWELL NO. 2 (FINISHED WATER)	1"	48"	CPVC SCH 80	81 GPH
LIME SLURRY	LIME INJECTION MANHOLE (THREE UNITS)	1"	48"	CPVC SCH 80	194 GPH
CHLORINE	RAW WATER CHEMICAL INJECTION MANHOLE #1	2 1/2"	36"	CPVC SCH 80	35 GPM (NOTE 5)
CHLORINE DIOXIDE	RAW WATER CHEMICAL INJECTION MANHOLE #1	2 1/2"	36"	CPVC SCH 80	14 GPM
CHLORINE	RAW WATER CHEMICAL INJECTION MANHOLE #2	2 1/2"	36"	CPVC SCH 80	35 GPM (NOTE 5)
CHLORINE DIOXIDE	RAW WATER CHEMICAL INJECTION MANHOLE #2	2 1/2"	36"	CPVC SCH 80	14 GPM
CHLORINE	RAW WATER CHEMICAL INJECTION VAULT	1"	36"	CPVC SCH 80	35 GPM (NOTE 5)
CHLORINE	RAW WATER CHEMICAL INJECTION VAULT	1"	36"	CPVC SCH 80	35 GPM (NOTE 5)
ANTISCALANT	FILTERED WATER PRE-RO	2"	48"	CPVC SCH 80	40 GPM (CARRIER WATER FLOW)
SODIUM BISULFITE	FILTERED WATER PRE-RO	2"	48"	CPVC SCH 80	40 GPM (CARRIER WATER FLOW)

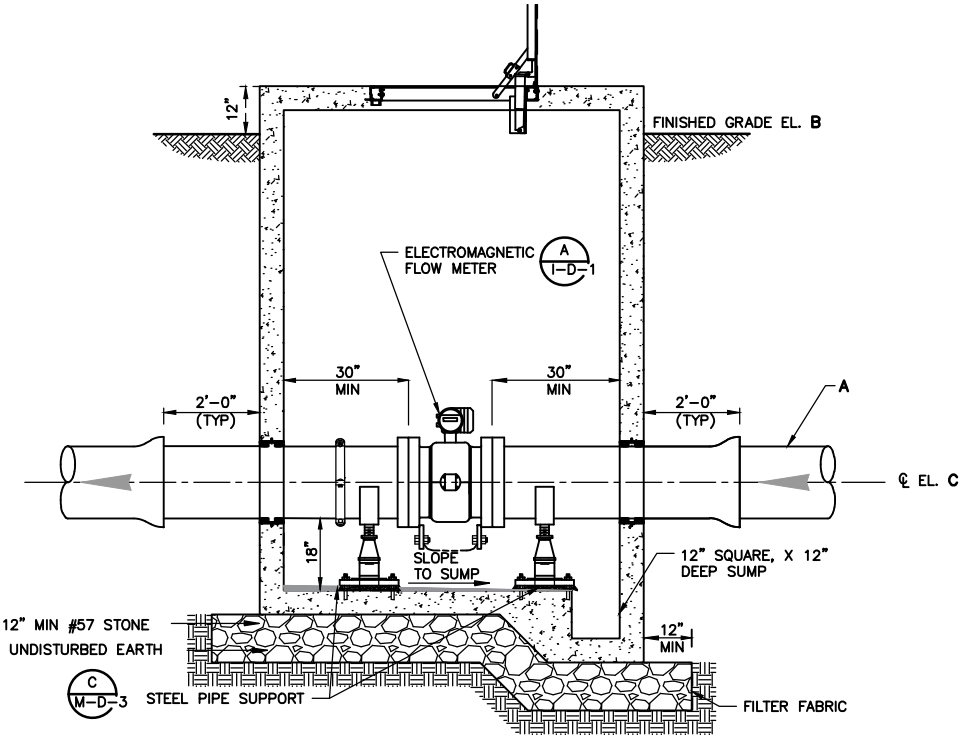
Figures 1-19



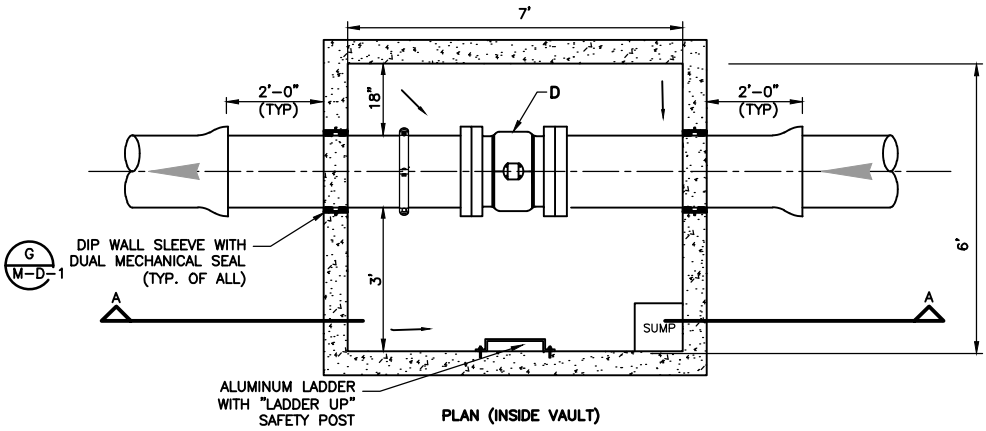
CDM Smith	DATE FEB 2020	250459-232662		ADDENDUM NO.	FIGURE NO.
		SHEET NO.	LOCATION		
		C-YP-4	C-4	5	1



TOP PLAN



SECTION 'A-A'



PLAN (INSIDE VAULT)

METER VAULT

DETAIL C

NTS

NOTES:

1. REFER TO INSTRUMENTATION AND ELECTRICAL DETAILS AND SPECIFICATIONS FOR MOUNTING AND WIRING REQUIREMENTS.

SHEET	PIPE	A	B	C	D
C-YP-6	18" BYPASS	18" DIP (RESTRAINED)	52.0 ±	44.75 ±	FE-3350
C-YP-4	18" CONCENTRATE	18" PVC (RESTRAINED)	51.0 ±	43.80 ±	

CDM Smith

DATE FEB 2020

250459-232662

SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
C-D-14	DETAIL C	5	2

C:\Users\wassjr\Desktop\232662_FIGURE_2A.dwg
XREFs: [CDMS_2436_WTP] Images: []
Last saved by: WASSJR Time: 2/4/2020 2:59:35 PM

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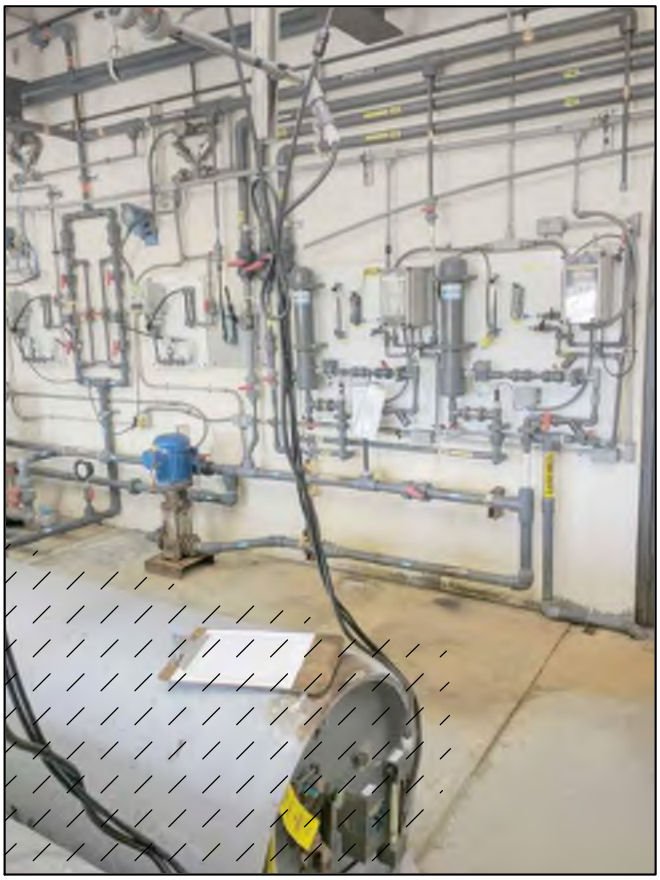
PHOTOGRAPH 1 NOTES:

1. REMOVE EXISTING CHLORINE FEED PIPING AND EXISTING SODIUM CHLORITE PIPING.
2. CYLINDERS SHALL BE MOVED BY THE COUNTY. ALL SADDLES AND CYLINDER SUPPORTS DEMOLISHED BY CONTRACTOR.
3. CONTRACTOR SHALL REMOVE GAS FLOWMETERS, YOKE WITH CYLINDER SCALE AND MONORAIL TROLLEY AND TURN IT OVER TO OWNER.



CHLORINE ROOM

PHOTOGRAPH 1

NTS –

FOR INFORMATION ONLY

CDM Smith

DATE FEB 2020	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
	M–AB–1	A2	5	3

PHOTOGRAPH 2 NOTES:

1. REMOVE OVERHEAD PIPE SUPPORTS, HANGERS AND MONORAIL.

CHLORINE ROOM

PHOTOGRAPH 2

NTS

FOR INFORMATION ONLY

CDM Smith

DATE FEB 2020	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
	M-AB-1	A4	5	4

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PHOTOGRAPH 3 NOTES:

1. REMOVE EXISTING BOOSTER PUMPS, CONNECTING PIPING, WIRING AND CONCRETE BASES. EXISTING PUMPS AND MOTORS SHALL BE SALVAGED.

CHLORINE ROOM

PHOTOGRAPH 3

NTS –

FOR INFORMATION ONLY

CDM Smith

DATE FEB 2020	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
	M–AB–1	B4	5	5

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PHOTOGRAPH 4 NOTES:

1. REMOVE EXISTING PUMPS, PUMP CONCRETE BASES AND MOTORS ASSOCIATED WITH THE EXISTING PUMPS.

HIGH SERVICE PUMP ROOM

PHOTOGRAPH 4 / –

NTS

FOR INFORMATION ONLY

CDM Smith

DATE FEB 2020	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
	M–AB–1	D4	5	6

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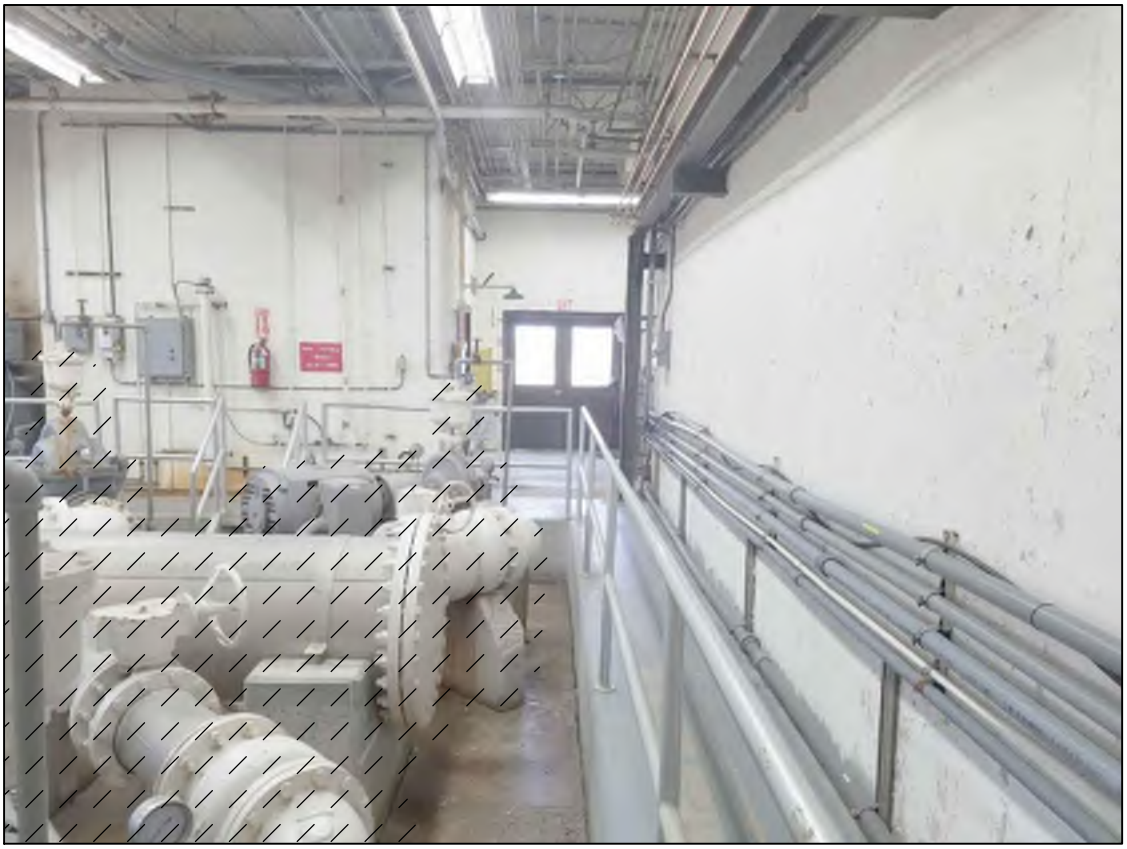
PHOTOGRAPH 5 NOTES:

1. REMOVE ALL PUMP, PIPING, PIPE SUPPORTS AND CONCRETE BASES.

2. COAT FLOOR IN HIGH SERVICE PUMP ROOM IN ACCORDANCE WITH 099100 PAINTING.



HIGH SERVICE PUMP ROOM

PHOTOGRAPH 5

NTS –

FOR INFORMATION ONLY

CDM Smith

DATE FEB 2020	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
	M–AB–1	F4	5	7

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PHOTOGRAPH 6 NOTES:

1. EXISTING FLUORIDE SHALL BE RELOCATED TO THE NEW FLUORIDE ROOM AFTER CONSTRUCTION AND STARTUP TESTING. NO DEMOLITION OF THE EXISTING FLUORIDE SYSTEM SHALL TAKE PLACE UNTIL AFTER STARTUP.

FLUORIDE STORAGE ROOM

PHOTOGRAPH 6 / –

NTS

FOR INFORMATION ONLY

CDM Smith

DATE FEB 2020	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
	M–AB–1	F1	5	8

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PHOTOGRAPH 7 NOTES:

1. REMOVE AND DEMOLISH ALL PUMPS, PUMP MOTORS, PUMP CONCRETE BASES AND SUPPORTS. THE EXISTING AIR COMPRESSOR SHALL BE LEFT IN SERVICE.

HIGH SERVICE PUMP ROOM

PHOTOGRAPH 7 / –

NTS

FOR INFORMATION ONLY

CDM Smith

DATE FEB 2020	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
	M–AB–1	G1	5	9

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FLUORIDE FEED ROOM

PHOTOGRAPH 8

NTS –

FOR INFORMATION ONLY

CDM Smith

DATE FEB 2020	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
	M–AB–1	H2	5	10

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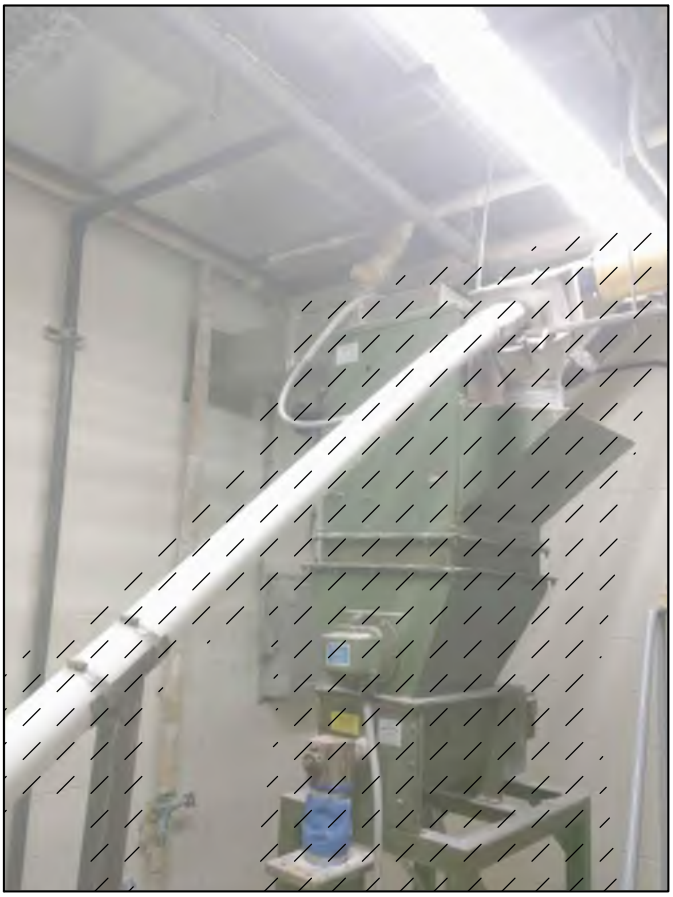
PHOTOGRAPH 9 NOTES:

1. DEMOLISH AND DISPOSE OF ALL EXISTING FLUORIDE FEED EQUIPMENT AFTER CONSTRUCTION AND STARTUP OF NEW SYSTEM.



FLUORIDE FEED ROOM

PHOTOGRAPH 9

NTS –

FOR INFORMATION ONLY

CDM Smith

DATE FEB 2020	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
	M–AB–1	H3	5	11

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WEST PAX

PHOTOGRAPH 1

NTS –

FOR INFORMATION ONLY

CDM Smith

DATE FEB 2020	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
	M–AB–3	A1	5	12

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WEST PAX

PHOTOGRAPH 2

NTS –

FOR INFORMATION ONLY

CDM Smith

DATE FEB 2020	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
	M–AB–3	A2	5	13

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WEST PAX

PHOTOGRAPH 3

NTS –

FOR INFORMATION ONLY

CDM Smith	DATE FEB 2020	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
		M–AB–3	A3	5	14

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WEST PAX

PHOTOGRAPH 4

NTS –

FOR INFORMATION ONLY

CDM Smith

DATE FEB 2020	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
	M–AB–3	A4	5	15

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EAST PAX

PHOTOGRAPH 5

NTS –

FOR INFORMATION ONLY

CDM Smith

DATE FEB 2020	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
	M–AB–3	G1	5	16

EAST PAX

PHOTOGRAPH 6

NTS –

FOR INFORMATION ONLY

CDM Smith

DATE FEB 2020	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
	M–AB–3	H1	5	17

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EAST PAX

PHOTOGRAPH 7

NTS –

FOR INFORMATION ONLY

CDM Smith

DATE FEB 2020	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
	M–AB–3	G2	5	18

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EAST PAX

PHOTOGRAPH 8

NTS –

FOR INFORMATION ONLY

CDM Smith

DATE FEB 2020	SHEET NO.	LOCATION	ADDENDUM NO.	FIGURE NO.
	M–AB–3	H2	5	19

Chemical Storage 2 Foundation

NOTES:

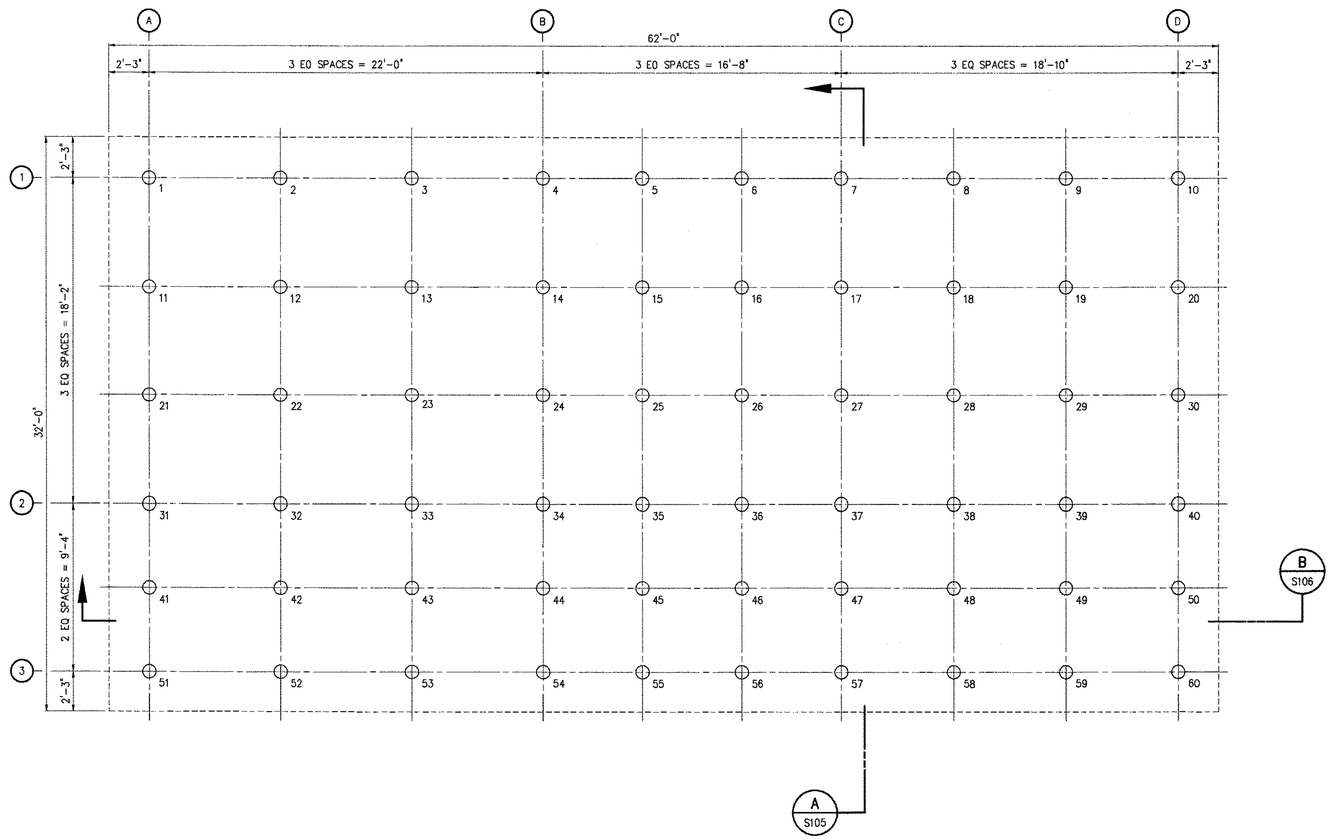
1 PRIOR TO STARTING PILE DRIVING OPERATIONS, THE CONTRACTOR SHALL ACQUIRE THE SERVICES OF AN INDEPENDENT TESTING AGENCY PER SPECIFICATION 02457.

2 PILES SHALL HAVE A WORKING COMPRESSIVE CAPACITY OF 25 TONS AND A LATERAL CAPACITY OF 2 TONS. THE LOCATION AND NUMBER OF TEST PILES SHALL BE AS RECOMMENDED BY THE INDEPENDENT TESTING AGENCY ACQUIRED BY THE CONTRACTOR. A MINIMUM OF 3 PILES SHALL BE TESTED.

2 TOP OF PILE ELEVATION SHALL BE 50.50 FOR ALL PILES WITH THE EXCEPTION OF PILES 31–40, 44–45 AND 54–55 WHICH SHALL HAVE AN ELEVATION OF 48.83.

3 ALL PILES SHALL HAVE 6" EMBEDMENT INTO CONCRETE SLAB.

4 ALL PILES SHALL BE DRIVEN 20'–0" MINIMUM.



PILE PLAN

1/4" = 1'–0"

NO.	ISSUED FOR	DATE	BY
6	RECORD DRAWING	12/2011	JCJ
5	PILE REVISION	09/2010	JCJ
4	ISSUED FOR CONSTRUCTION	07/2010	JCJ
3	ISSUED FOR BIDDING	03/2010	JCJ
2	BRUNSWICK COUNTY BUILDING PERMIT	02/2010	JCJ
1	NC PWS REGULATORY APPROVAL	01/2010	JCJ

DESIGNED CSW
DRAWN CSW
CHECKED
PROJ. ENGR. JCJ
APPROVED

THIS DOCUMENT ORIGINALLY ISSUED FOR CONSTRUCTION AND SEALED BY Z M MICHAEL WANG, SEAL NUMBER 16425

THIS DOCUMENT ORIGINALLY ISSUED FOR CONSTRUCTION AND SEALED BY ADAM D OVERBAY, SEAL NUMBER 26530

RECORD DRAWING

THIS DRAWING HAS BEEN MODIFIED TO REFLECT FIELD CHANGES REPORTED BY THE CONTRACTOR OR ANOTHER PARTY, BUT NOT VERIFIED BY THE CERTIFYING ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 18797 ENGINEER JAY C. JACKSON 1-25-12

HAZEN AND SAWYER
Environmental Engineers & Scientists
4944 Parkway Plaza Blvd, Suite 375, Charlotte, North Carolina 28217
License Number: C-0381

BRUNSWICK COUNTY
NORTH CAROLINA

NORTHWEST WATER TREATMENT PLANT IMPROVEMENTS

CHEMICAL STORAGE BUILDING - 2
STRUCTURAL
PILE PLAN

THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.

DATE JANUARY 2012
H&S JOB NUMBER 30994-005
CONTRACT NUMBER
DRAWING NUMBER S100

RECORD DRAWING

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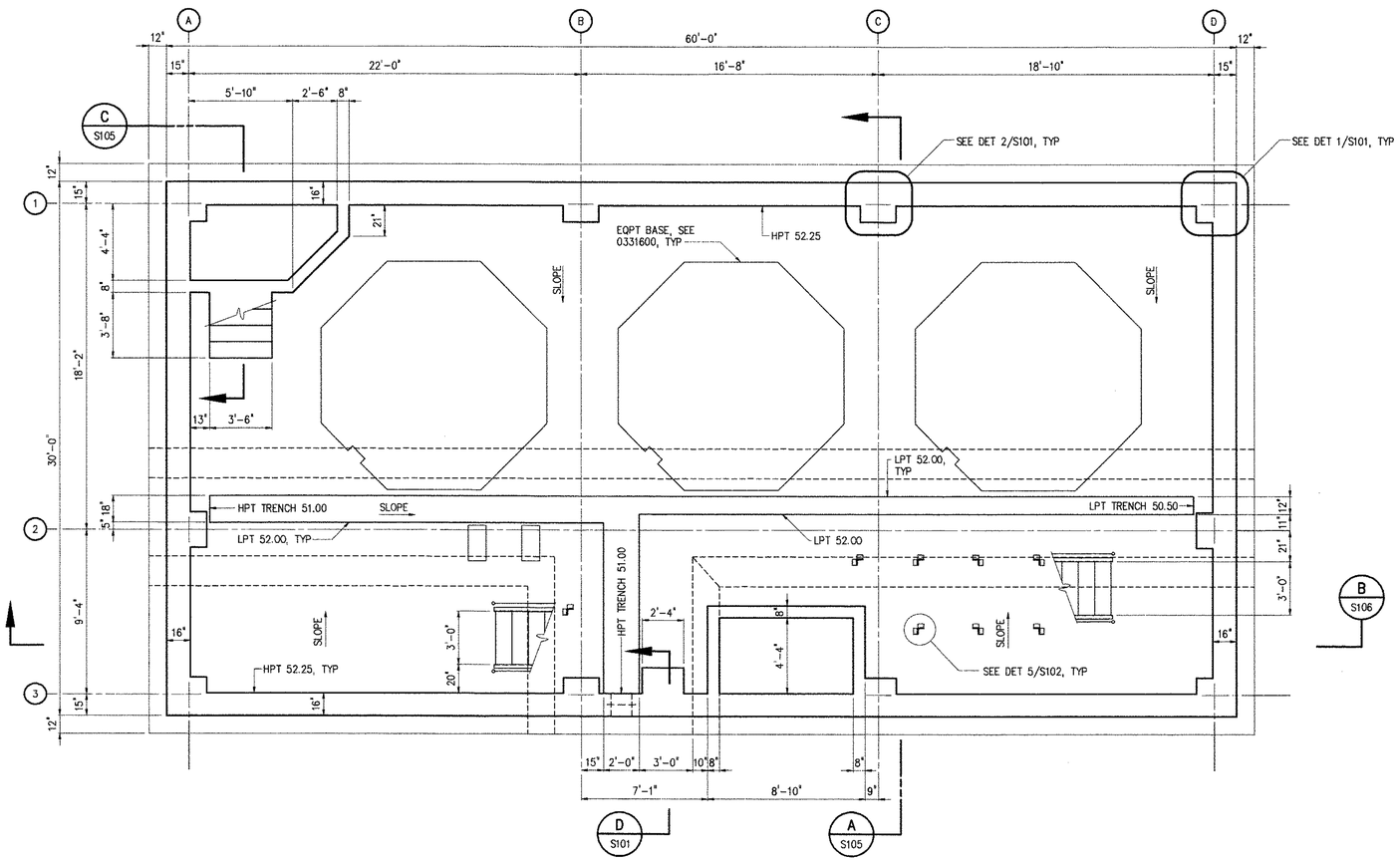
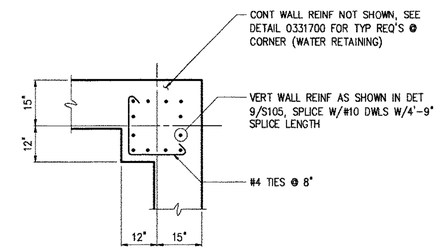
NOTE:

1 PROVIDE CONCRETE COATING, SEE ARCH.



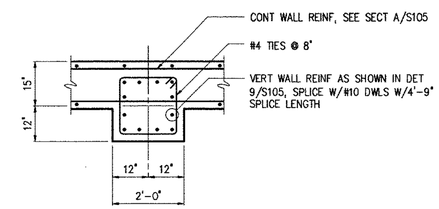
BOTTOM PLAN

1/4" = 1'-0"



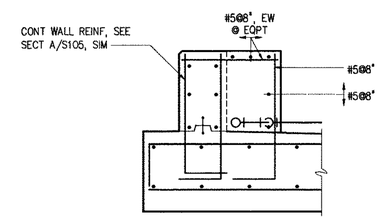
DETAIL 1

1/2" = 1'-0" S101



DETAIL 2

1/2" = 1'-0" S101



NOTES: 1 CONTRACTOR SHALL COORD EQPT BASE PLAN DIMS W/ EQPT MFR.

2 GRATING AND MASONRY NOT SHOWN.

SECTION D

1/2" = 1'-0" S101

NO.	ISSUED FOR	DATE	BY
6	RECORD DRAWING	12/2011	JCJ
5	PILE REVISION	09/2010	JCJ
4	ISSUED FOR CONSTRUCTION	07/2010	JCJ
3	ISSUED FOR BIDDING	03/2010	JCJ
2	BRUNSWICK COUNTY BUILDING PERMIT	02/2010	JCJ
1	NC PWS REGULATORY APPROVAL	01/2010	JCJ

DESIGNED CSW
DRAWN CSW
CHECKED
PROJ. ENGR. JCJ
APPROVED

THIS DOCUMENT ORIGINALLY ISSUED FOR CONSTRUCTION AND SEALED BY Z M MICHAEL WANG, SEAL NUMBER 16425

THIS DOCUMENT ORIGINALLY ISSUED FOR CONSTRUCTION AND SEALED BY ADAM D OVERBAY, SEAL NUMBER 26530

RECORD DRAWING

THIS DRAWING HAS BEEN MODIFIED TO REFLECT FIELD CHANGES REPORTED BY THE CONTRACTOR OR ANOTHER PARTY, BUT NOT VERIFIED BY THE CERTIFYING ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 10797 ENGINEER JAY C. JACKSON 12/5/12

HAZEN AND SAWYER
Environmental Engineers & Scientists
4944 Parkway Plaza Blvd, Suite 375, Charlotte, North Carolina 28217
License Number: C-0381

BRUNSWICK COUNTY
NORTH CAROLINA

NORTHWEST WATER TREATMENT PLANT IMPROVEMENTS

CHEMICAL STORAGE BUILDING - 2
STRUCTURAL
BOTTOM PLAN AND DETAILS

THE SCALE BAR SHOWN BELOW MEASURES ONE INCH LONG ON THE ORIGINAL DRAWING.

DATE JANUARY 2012
H&S JOB NUMBER 30994-005
CONTRACT NUMBER
DRAWING NUMBER S101

RECORD DRAWING

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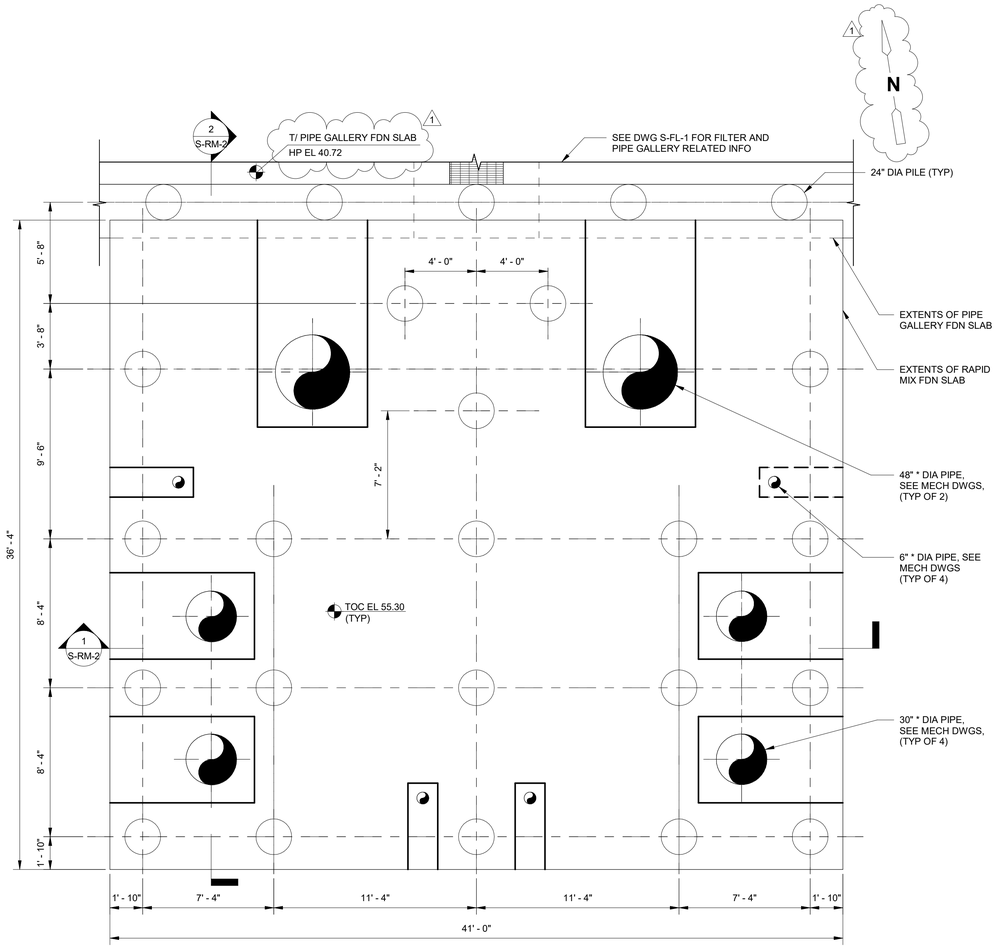
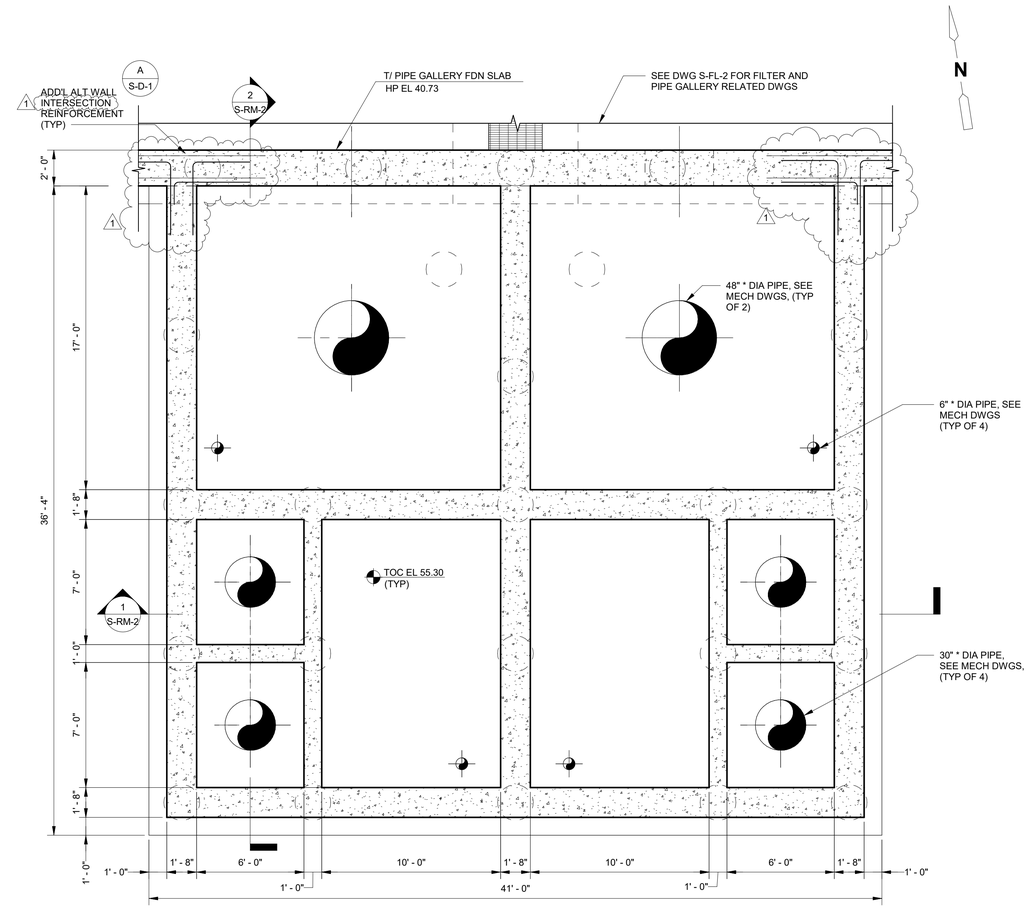
Structural Drawings



PILE LAYOUT

1/4" = 1'-0"



LOWER PLAN (EL 55.30)

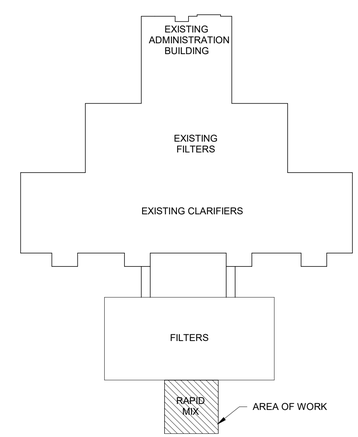
1/4" = 1'-0"

NOTES:

1. SEE S-GN-1 FOR STRUCTURAL GENERAL NOTES.
2. * INDICATES DIMENSION AND/OR INFORMATION TO BE COORDINATED BY THE CONTRACTOR WITH THE MANUFACTURER OF THE APPROVED EQUIPMENT PRIOR TO FABRICATION AND CONSTRUCTION
3. ——— INDICATES THE PIPE ENCASEMENT BELOW. CONTRACTOR SHALL COORDINATE FINAL PIPE AND ENCASEMENT CONFIGURATION AND LENGTH, BASED UPON FINAL PILE AS-BUILT LOCATION AND APPROVED EQUIPMENT SHOP DRAWINGS.
4. ALL PILES SHALL CONFORM TO SECTION 316316. REFER TO S-GN-2 FOR PILE DETAILS..

CONSTRUCTION SEQUENCE:

1. RAPID MIX AND FILTER STRUCTURE SHALL BE FILLED COMPLETELY WITH WATER AND ALLOWED TO SETTLE FOR A MINIMUM OF 30-DAYS CONGRUENT WITH WATER-TIGHTNESS TESTING.
2. IT IS ANTICIPATED THAT ONE OF MORE INCHES OF TOTAL ESTIMATED SETTLEMENT WILL OCCUR DURING THIS TIME. THE CONTRACTOR SHALL MONITOR SETTLEMENT OF THE STRUCTURE AT FOUR LOCATIONS TWICE A WEEK FOR NO LESS THAN A 30 DAY PERIOD. UPON COMPLETION OF THE 30 DAY MONITORING PERIOD, THE CONTRACTOR SHALL CONFIRM WITH THE ENGINEER THAT PIPE CONNECTIONS AND FILTER INFLUENT TROUGH CONSTRUCTION MAY BE COMPLETED.



KEY PLAN

NTS

NORTH CAROLINA PROFESSIONAL SEAL 038223 ENGINEER JUSTIN S. BOGGS 02/14/20

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	02/20	PCS	JSB	ADDENDUM NO. 5

DESIGNED BY: E. RIVERA
DRAWN BY: S. DINESH
SHEET CHK'D BY: J. BOGGS
CROSS CHK'D BY: N. RASTOGI
APPROVED BY: J. BOGGS
DATE: OCTOBER 2019

CDM Smith
5400 Glenwood Avenue, Suite 400
Raleigh, NC 27612
Tel: (919) 325-3500

BRUNSWICK COUNTY, NC

NORTHWEST WATER TREATMENT PLANT EXPANSION AND UPGRADES

RAPID MIX AND SPLITTER BOX PILE LAYOUT AND LOWER PLANS

PROJECT NO. 250459-232662
FILE NAME: SWZ000FL.rvt

SHEET NO.
S-RM-1

ISSUED FOR BID

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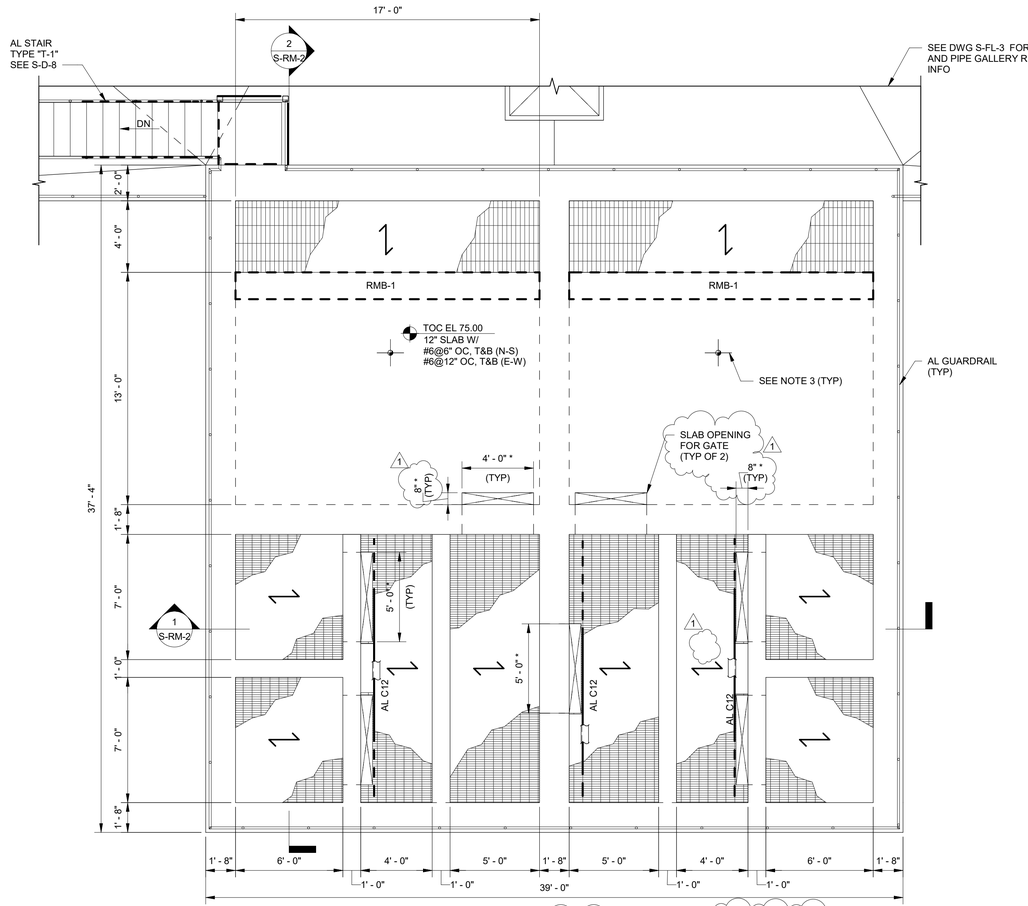
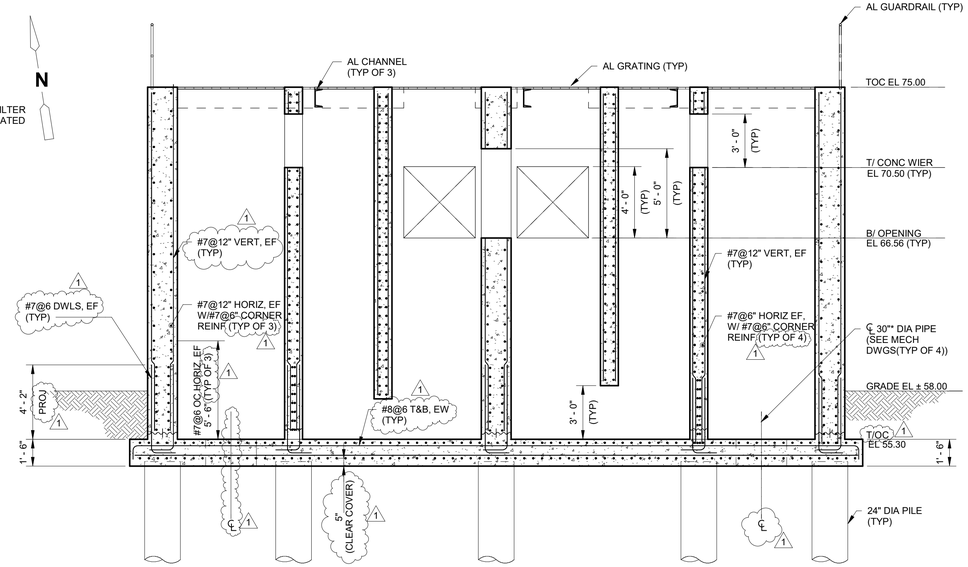
NOTES:

1. SEE S-GN-1 FOR STRUCTURAL GENERAL NOTES.
2. * INDICATES DIMENSION AND/OR INFORMATION TO BE COORDINATED BY THE CONTRACTOR WITH THE MANUFACTURER OF THE APPROVED EQUIPMENT PRIOR TO FABRICATION AND CONSTRUCTION.
3. COORDINATE WITH RAPID MIXER MANUFACTURER. SEE SECTION 464111.
4. SEE SHEET S-FL-4 FOR BEAM SCHEDULE.



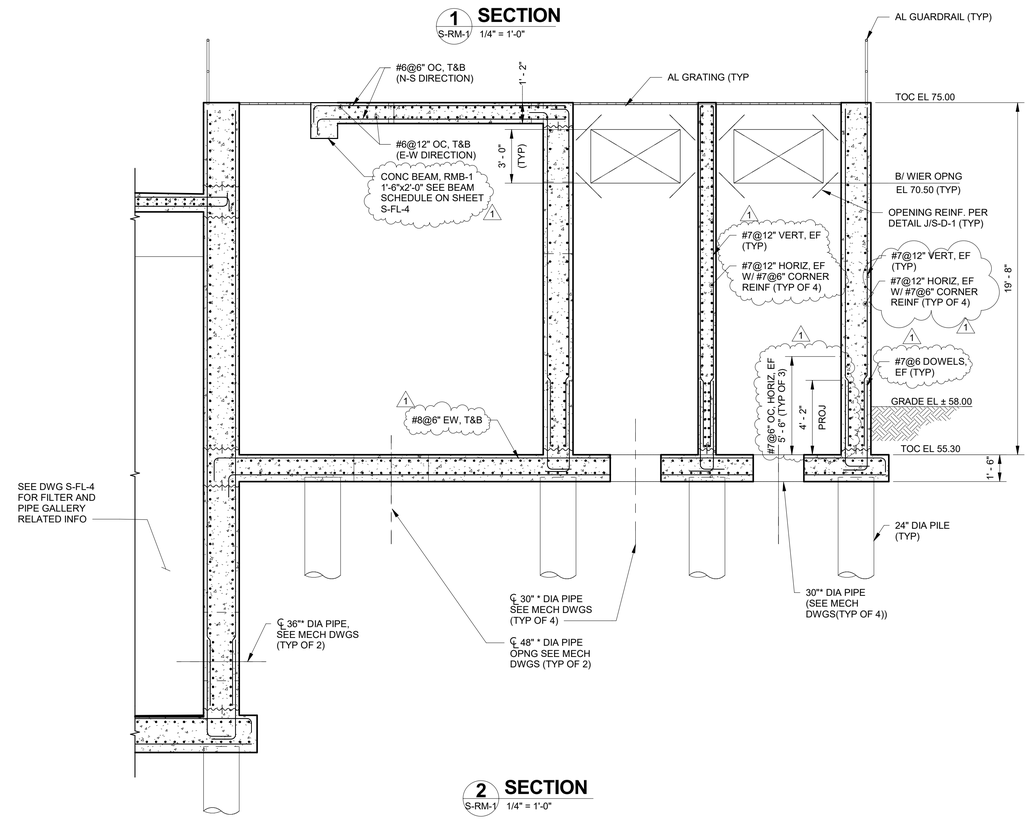
TOP PLAN AT EL 75.00

1/4" = 1'-0"



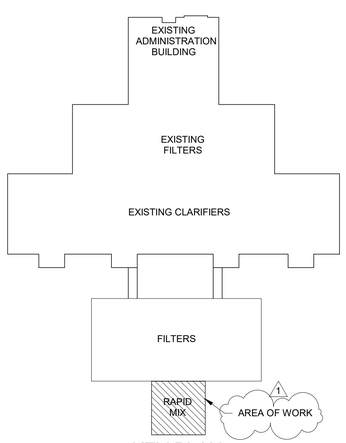
1 S-RM-1 **SECTION**

1/4" = 1'-0"



2 S-RM-1 **SECTION**

1/4" = 1'-0"



KEY PLAN

NTS

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	02/20	PCS	JSB	ADDENDUM NO. 5

DESIGNED BY: E. RIVERA
DRAWN BY: S. DINESH
SHEET CHK'D BY: J. BOGGS
CROSS CHK'D BY: J. RASTOGI
APPROVED BY: J. BOGGS
DATE: OCTOBER 2019

CDM Smith
5400 Glenwood Avenue, Suite 400
Raleigh, NC 27612
Tel: (919) 325-3500

BRUNSWICK COUNTY, NC

NORTHWEST WATER TREATMENT PLANT EXPANSION AND UPGRADES

RAPID MIX AND SPLITTER BOX TOP PLAN AND SECTIONS

PROJECT NO. 250459-232662
FILE NAME: SWZ000FL.rvt

SHEET NO.
S-RM-2

ISSUED FOR BID

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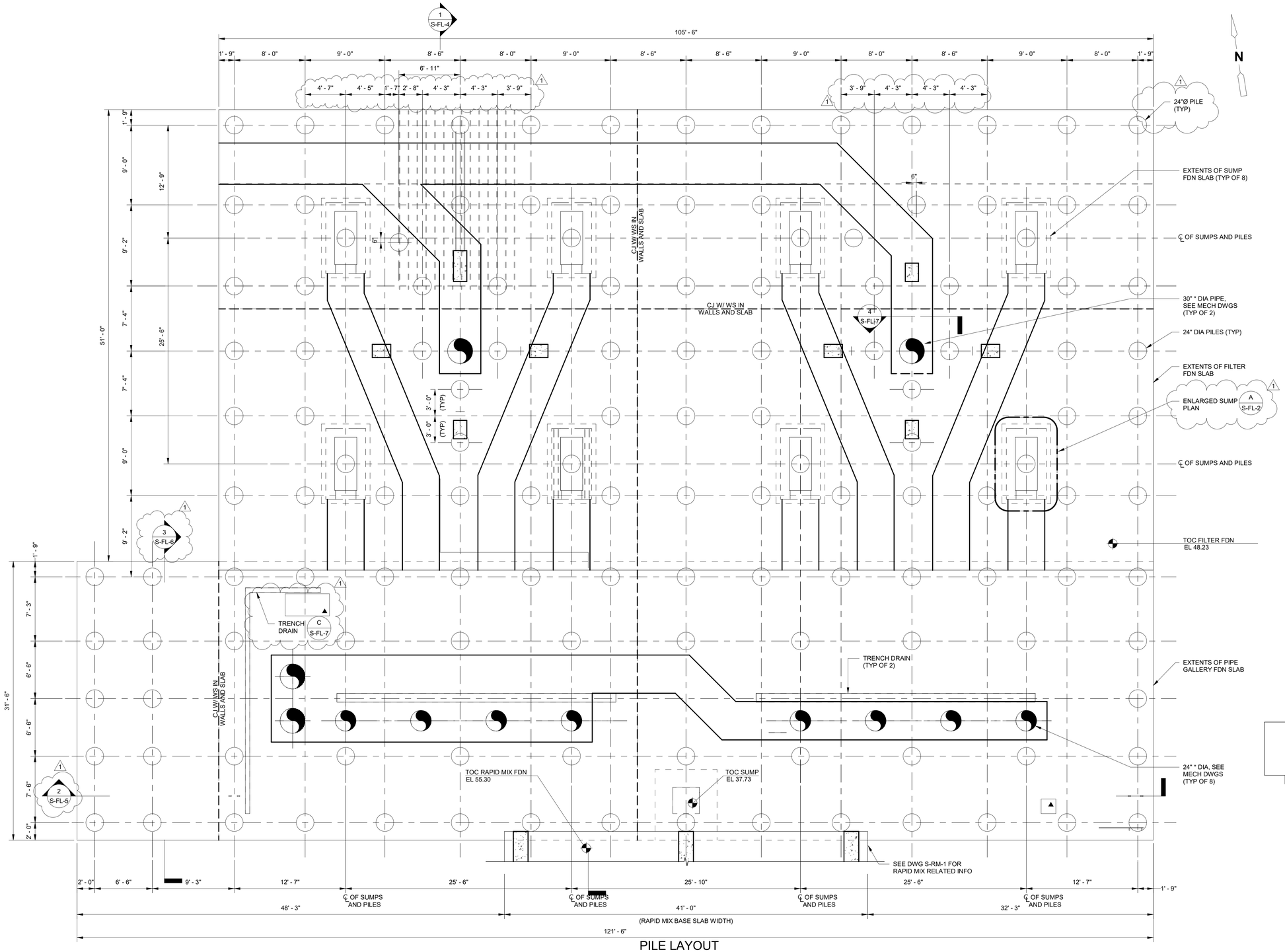


PILE LAYOUT

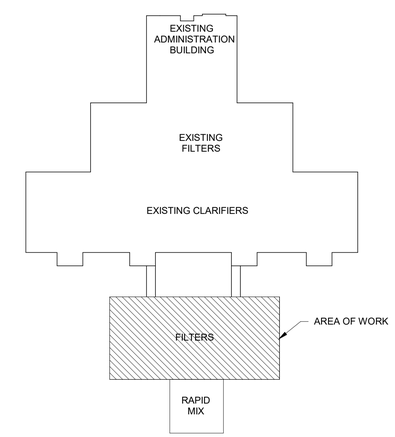
3/16" = 1'-0"

NOTES:

1. SEE S-GN-1 FOR STRUCTURAL GENERAL NOTES.
2. * INDICATES DIMENSION AND/OR INFORMATION TO BE COORDINATED BY THE CONTRACTOR WITH THE MANUFACTURER OF THE APPROVED EQUIPMENT PRIOR TO FABRICATION AND CONSTRUCTION
3. ——— INDICATES THE PIPE ENCASEMENT BELOW. CONTRACTOR SHALL COORDINATE FINAL PIPE AND ENCASEMENT CONFIGURATION AND LENGTH, BASED UPON FINAL PILE AS-BUILT LOCATION AND APPROVED EQUIPMENT SHOP DRAWINGS.
4. ALL PILES SHALL CONFORM TO SECTION 316316. REFER TO S-GN-2 FOR PILE DETAILS.
5. ▲ INDICATES EQUIPMENT PAD.

CONSTRUCTION SEQUENCE:

1. RAPID MIX AND FILTER STRUCTURE SHALL BE FILLED COMPLETELY WITH WATER AND ALLOWED TO SETTLE FOR A MINIMUM OF 30-DAYS CONGRUENT WITH WATER-TIGHTNESS TESTING.
2. IT IS ANTICIPATED THAT ONE OF MORE INCHES OF TOTAL ESTIMATED SETTLEMENT WILL OCCUR DURING THIS TIME. THE CONTRACTOR SHALL MONITOR SETTLEMENT OF THE STRUCTURE AT FOUR LOCATIONS TWICE A WEEK FOR NO LESS THAN A 30 DAY PERIOD. UPON COMPLETION OF THE 30 DAY MONITORING PERIOD, THE CONTRACTOR SHALL CONFIRM WITH THE ENGINEER THAT PIPE CONNECTIONS AND FILTER INFLUENT TROUGH CONSTRUCTION MAY BE COMPLETED.



KEY PLAN

1/16" = 1'-0"

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 036223 JUSTIN S. BOGGS 02/19/20

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	02/20	PCS	JSB	ADDENDUM NO. 5

DESIGNED BY: S. GIL
DRAWN BY: DINESH S.
SHEET CHK'D BY: J. BOGGS
CROSS CHK'D BY: N. RASTOGI
APPROVED BY: J. BOGGS
DATE: OCTOBER 2019

CDM Smith
5400 Glenwood Avenue, Suite 400
Raleigh, NC 27612
Tel: (919) 325-3500

BRUNSWICK COUNTY, NC

NORTHWEST WATER TREATMENT PLANT EXPANSION AND UPGRADES

FILTERS
PILE LAYOUT PLAN

PROJECT NO. 250459-232662
FILE NAME: SWZ000FL.rvt
SHEET NO. S-FL-1

ISSUED FOR BID

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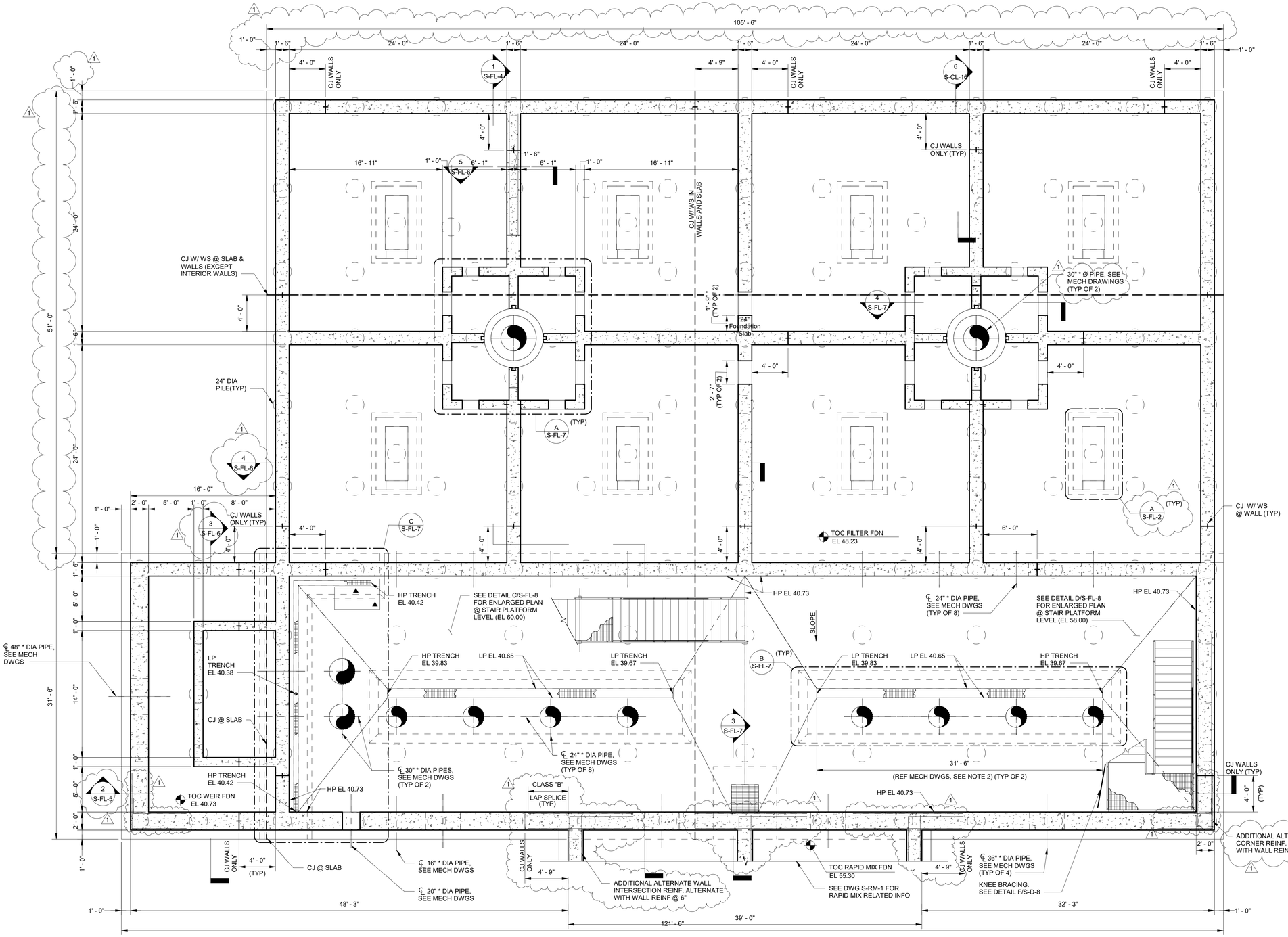
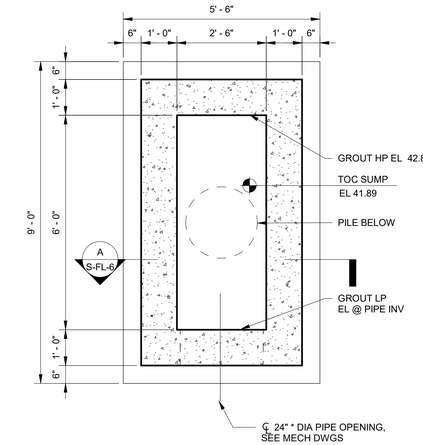
NOTES:

1. SEE S-GN-1 FOR STRUCTURAL GENERAL NOTES.
2. * INDICATES DIMENSION AND/OR INFORMATION TO BE COORDINATED BY THE CONTRACTOR WITH THE MANUFACTURER OF THE APPROVED EQUIPMENT PRIOR TO FABRICATION AND CONSTRUCTION.
3. ▲ INDICATES EQUIPMENT PAD.



LOWER PLAN

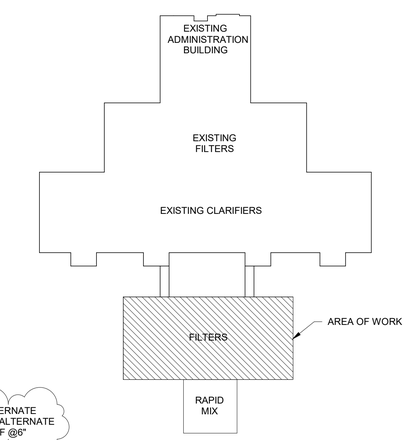
3/16" = 1'-0"



ENLARGED SUMP PLAN

A DETAIL

1/2" = 1'-0"



KEY PLAN

NTS

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	02/20	PCS	JSB	ADDENDUM NO. 5

DESIGNED BY: S. GIL
DRAWN BY: S. DINESH
SHEET CHK'D BY: J. BOGGS
CROSS CHK'D BY: N. RASTOGI
APPROVED BY: J. BOGGS
DATE: OCTOBER 2019

CDM Smith
5400 Glenwood Avenue, Suite 400
Raleigh, NC 27612
Tel: (919) 325-3500

BRUNSWICK COUNTY, NC

NORTHWEST WATER TREATMENT PLANT EXPANSION AND UPGRADES

FILTERS
LOWER PLAN

PROJECT NO. 250459-232662
FILE NAME: SWZ000FL.rvt

SHEET NO.
S-FL-2

ISSUED FOR BID

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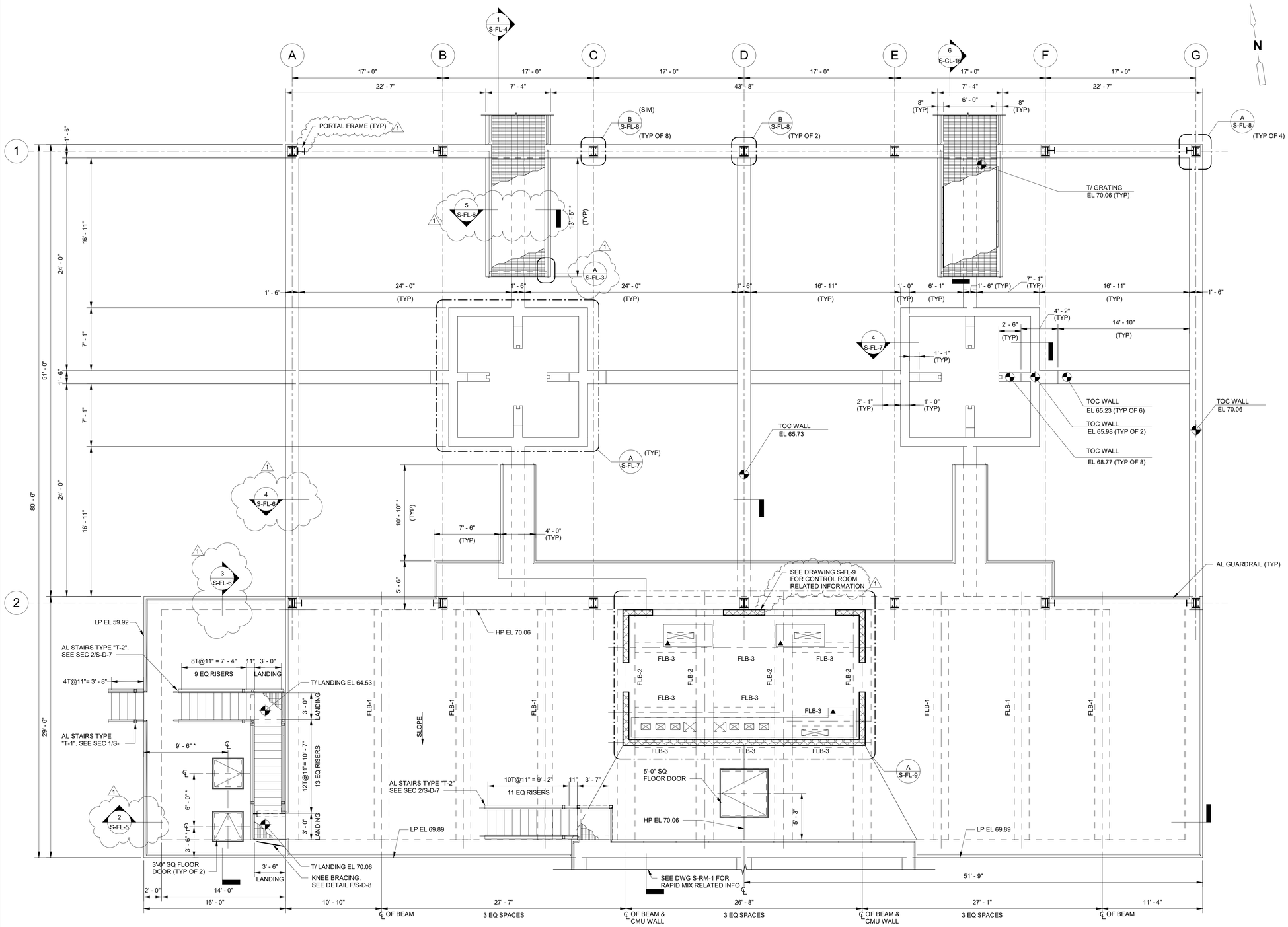
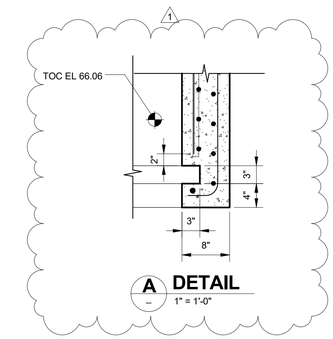
NOTES:

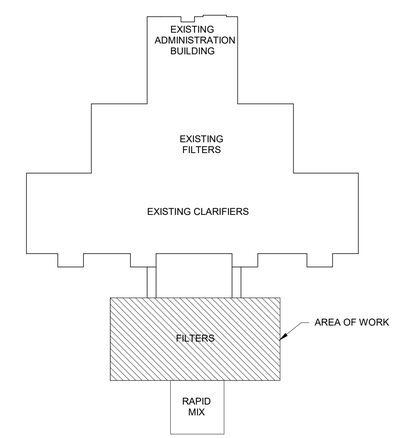
1. SEE S-GN-1 FOR STRUCTURAL GENERAL NOTES.
2. SEE- S-FL-6 FOR ADDITIONAL INFORMATION ON PRE- ENGINEERING METAL CANOPY.
3. * INDICATES DIMENSION AND/OR INFORMATION TO BE COORDINATED BY THE CONTRACTOR WITH THE MANUFACTURER OF THE APPROVED EQUIPMENT PRIOR TO FABRICATION AND CONSTRUCTION.
4. SEE SHEET S-FL-4 FOR BEAM SCHEDULE.
5. ▲ INDICATES EQUIPMENT PAD.



TOP PLAN

3/16" = 1'-0"





KEY PLAN

NTS

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REV. NO.	DATE	DRWN	CHKD	REMARKS
1	02/20	PCS	JSB	ADDENDUM NO. 5

DESIGNED BY: S. GIL
DRAWN BY: DINESH S.
SHEET CHK'D BY: J. BOGGS
CROSS CHK'D BY: N. RASTOGI
APPROVED BY: J. BOGGS
DATE: OCTOBER 2019

CDM Smith
5400 Glenwood Avenue, Suite 400
Raleigh, NC 27612
Tel: (919) 325-3500

BRUNSWICK COUNTY, NC

NORTHWEST WATER TREATMENT PLANT
EXPANSION AND UPGRADES

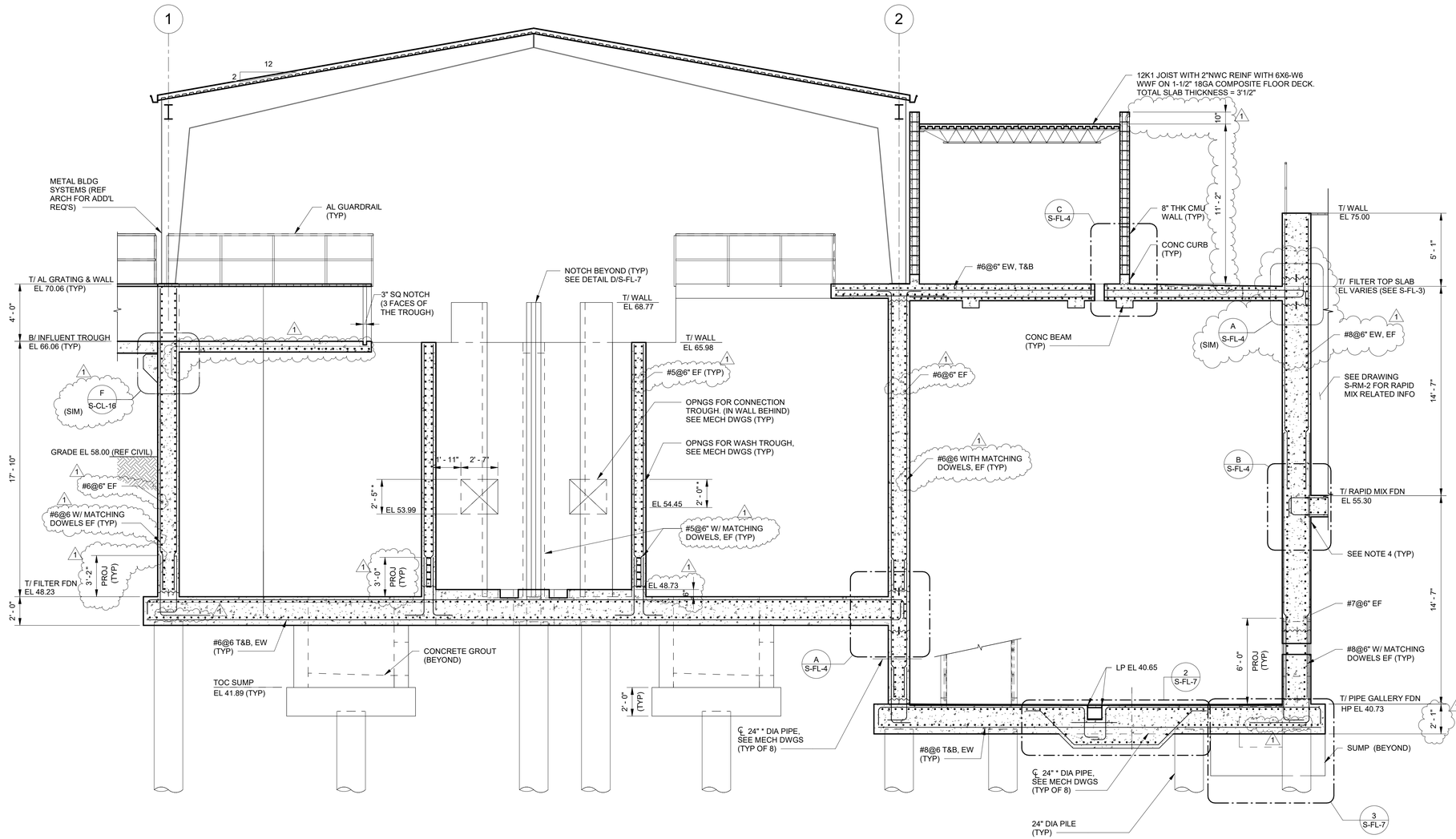
FILTERS
TOP PLAN

PROJECT NO. 250459-232662
FILE NAME: SWX000FL.rvt
SHEET NO.
S-FL-3

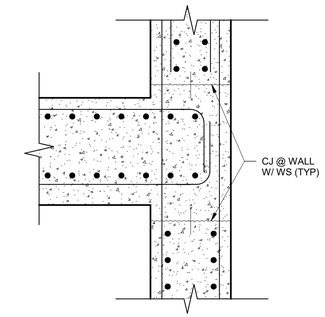
ISSUED FOR BID

NOTES:

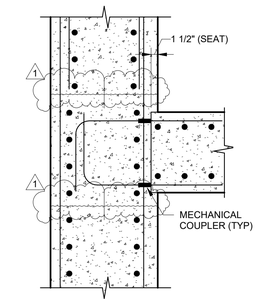
1. SEE S-GN-1 FOR STRUCTURAL GENERAL NOTES.
2. * INDICATES DIMENSION AND/OR INFORMATION TO BE COORDINATED BY THE CONTRACTOR WITH THE MANUFACTURER OF THE APPROVED EQUIPMENT PRIOR TO FABRICATION AND CONSTRUCTION.
3. IT SHALL BE AT THE CONTRACTOR'S OPTION TO CONTINUE THE HORIZONTAL JOINTS IN THE PIPE GALLERY WALLS AT THE FILTER FOUNDATION, RAPID MIX FOUNDATION, AND WEIR STRUCTURE TOP SLAB AROUND THE PERIMETER OF THE PIPE GALLERY. IN EITHER CASE THE PVC WATERSTOPS SHALL BE CONTINUOUS WITH THE SPLICES PER DETAIL K/S-D-1.
4. PIPE ENCASEMENT NOT SHOWN FOR CLARITY.
5. WHERE HORIZONTAL REINFORCING IS SPACED @ 6" LAP SPLICE FOR SEPARATE CORNER AND INTERSECTION REINFORCEMENT PER DETAIL A/S-D-1 MAY BE OMITTED. HOOKED REINFORCEMENT SHALL STILL BE PROVIDED.



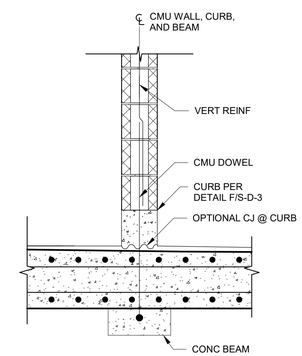
1 S-FL-1 **SECTION** 1/4" = 1'-0"



A S-FL-4 **DETAIL** 3/4" = 1'-0"



B S-FL-4 **DETAIL** 3/4" = 1'-0"



C S-FL-4 **DETAIL** 3/4" = 1'-0"

CONCRETE BEAM SCHEDULE

Mark	TYPE	T/ BEAM ELEV	SIZE BxH	BOTTOM REINF CONT REINF (B)	BOTTOM REINF ADD REINF (B)	END TOP REINF CONT REINF (E)	END TOP REINF ADD REINF (E)	SIDE FACE (EF)	STIRRUPS SIZE	STIRRUPS S TYPE	STIRRUPS SPACING S1	STIRRUPS SPACING S2	REMARKS
FLB-1	TYPE E	69.89'	20"Wx36"D	5-#8	-	4-#7		2-#5	#4	CLOSED	4"	12"	
FLB-2	TYPE E	69.89'	24"Wx42"D	6-#8	-	4-#7		3-#5	#4	CLOSED	4"	12"	
FLB-3	TYPE S	69.89'	14"Wx18"D	3-#6	-	3-#6		1-#5	#4	CLOSED	4"	6"	
RMB-1	TYPE E	75.00'	18"Wx24"D	4-#8	-	4-#8		2-#5	#4	CLOSED	8"	8"	

BEAM SCHEDULE NOTES:

1. SEE SHEET S-D-4 FOR BEAM TYPES AND SECTIONS.
2. BEAM DEPTHS ARE MEASURED FROM THE CONCRETE SLAB LP ELEVATION.

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	02/20	PCS	JSB	ADDENDUM NO. 5

DESIGNED BY: S. GIL
DRAWN BY: DINESH S.
SHEET CHK'D BY: J. BOGGS
CROSS CHK'D BY: N. RASTOGI
APPROVED BY: J. BOGGS
DATE: OCTOBER 2019

CDM Smith
5400 Glenwood Avenue, Suite 400
Raleigh, NC 27612
Tel: (919) 325-3500

BRUNSWICK COUNTY, NC

NORTHWEST WATER TREATMENT PLANT EXPANSION AND UPGRADES

FILTERS SECTIONS I

PROJECT NO. 250459-232662
FILE NAME:
SHEET NO. S-FL-4

ISSUED FOR BID

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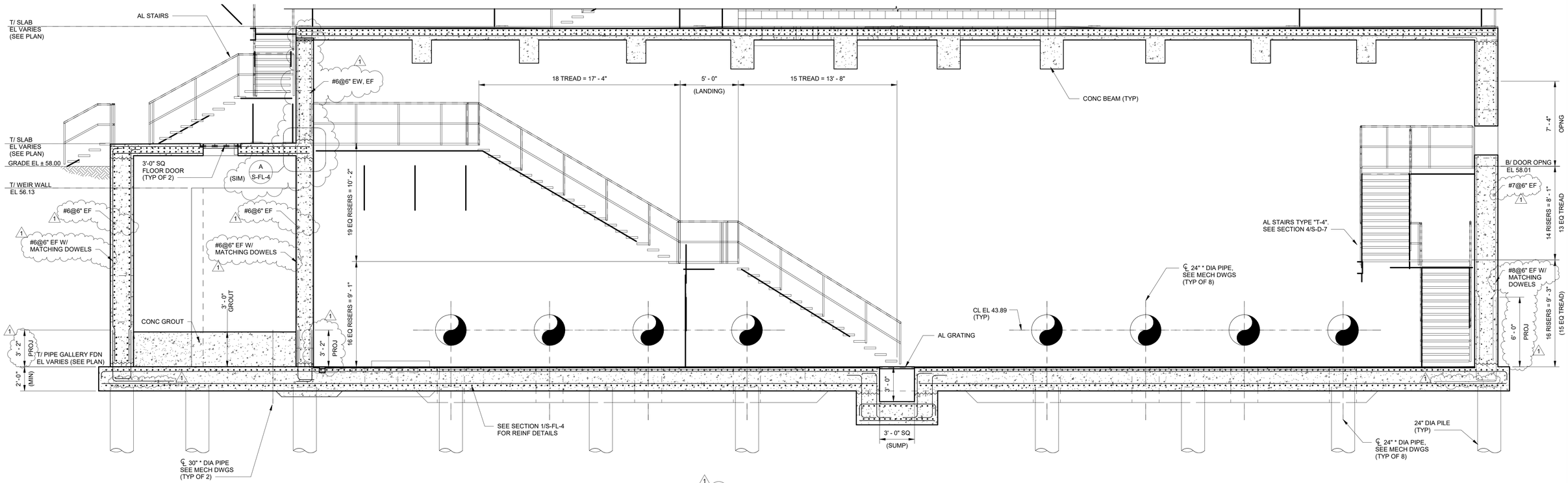
NOTES:

1. SEE S- GN-1 FOR STRUCTURAL GENERAL NOTES.
2. * INDICATES DIMENSION AND/OR INFORMATION TO BE COORDINATED BY THE CONTRACTOR WITH THE MANUFACTURER OF THE APPROVED EQUIPMENT PRIOR TO FABRICATION AND CONSTRUCTION.
3. FILTER UNDERDRAIN SYSTEM NOT SHOWN FOR CLARITY. REFER TO SECTION 466123 FOR REINFORCEMENT AND ANCHORAGE REQUIREMENTS FOR MONOLITHIC FALSE CONCRETE FLOOR.
4. IT SHALL BE AT THE CONTRACTOR'S OPTION TO CONTINUE THE HORIZONTAL JOINTS IN THE PIPE GALLERY WALLS AT THE FILTER FOUNDATION, RAPID MIX FOUNDATION, AND WEIR STRUCTURE TOP SLAB AROUND THE PERIMETER OF THE PIPE GALLERY. IN EITHER CASE THE PVC WATERSTOPS SHALL BE CONTINUOUS WITH THE SPLICES PER DETAIL K/S-D-1.



2 SECTION
S-FL-1 1/4" = 1'-0"

NORTH CAROLINA PROFESSIONAL SEAL 038223 ENGINEER JUSTIN S. BOGGS 02/19/20

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	02/20	PCS	JSB	ADDENDUM NO. 5

DESIGNED BY: S. GIL
DRAWN BY: DINESH S.
SHEET CHK'D BY: J. BOGGS
CROSS CHK'D BY: N. RASTOGI
APPROVED BY: J. BOGGS
DATE: OCTOBER 2019

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BRUNSWICK COUNTY, NC

NORTHWEST WATER TREATMENT PLANT
EXPANSION AND UPGRADES

FILTERS
SECTIONS II

PROJECT NO. 250459-232662
FILE NAME: SWZ00FL.rvt

SHEET NO.
S-FL-5

ISSUED FOR BID

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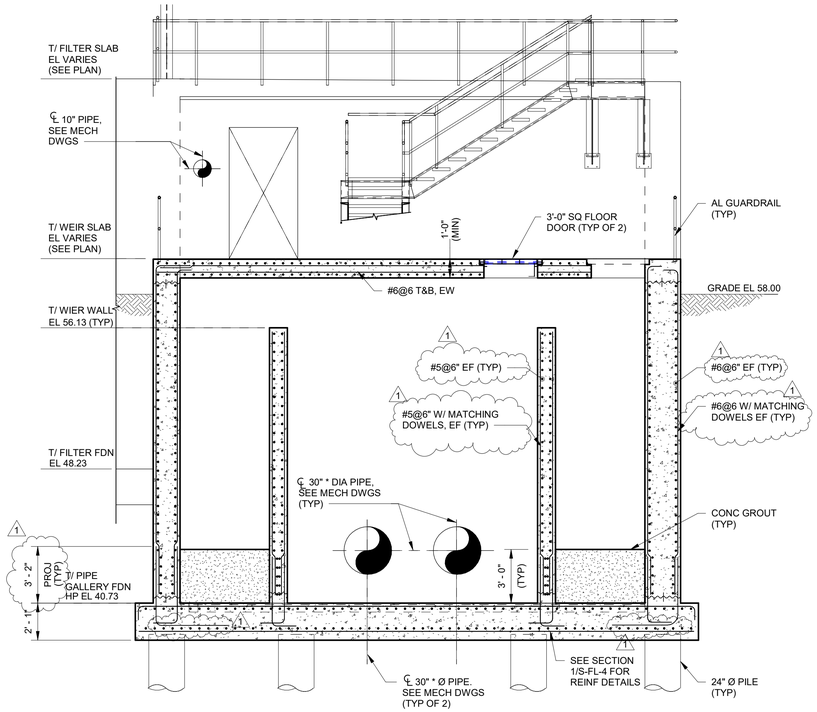
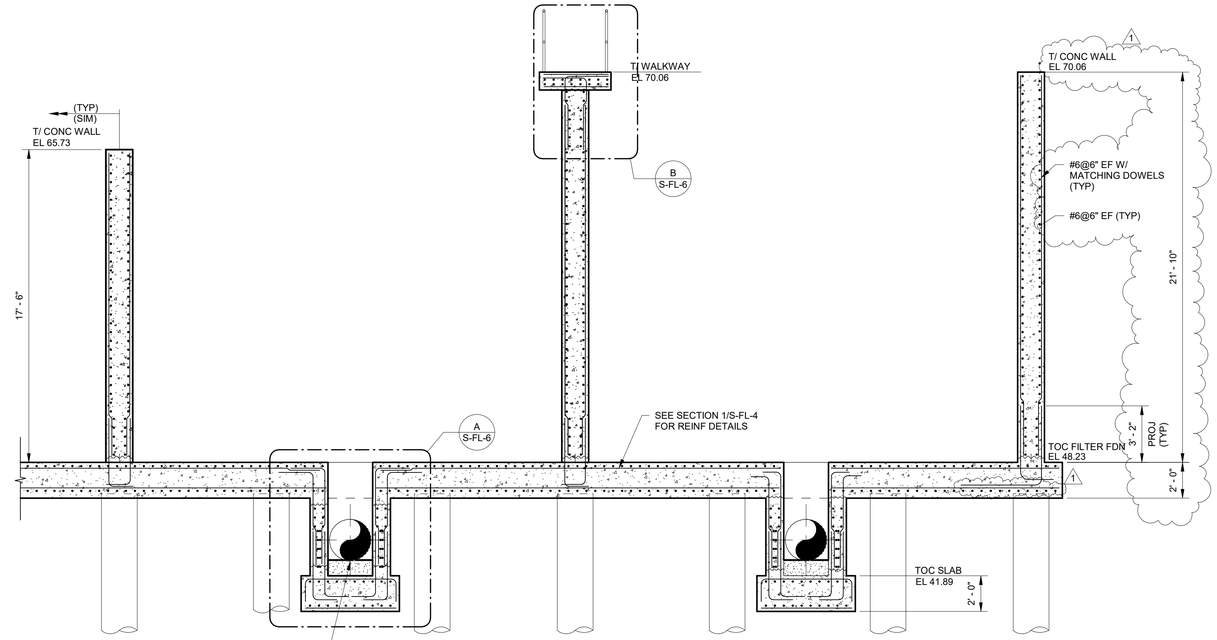
NOTE:

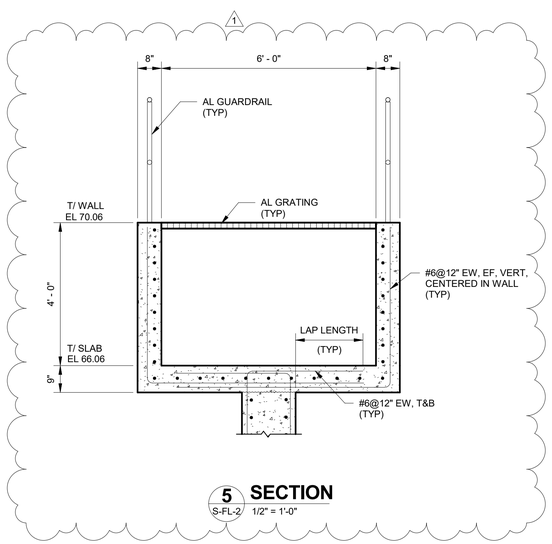
1. FILTER UNDERDRAIN SYSTEM NOT SHOWN FOR CLARITY. REFER TO SECTION 466123 FOR REINFORCEMENT AND ANCHORAGE REQUIREMENTS FOR MONOLITHIC FALSE CONCRETE FLOOR.



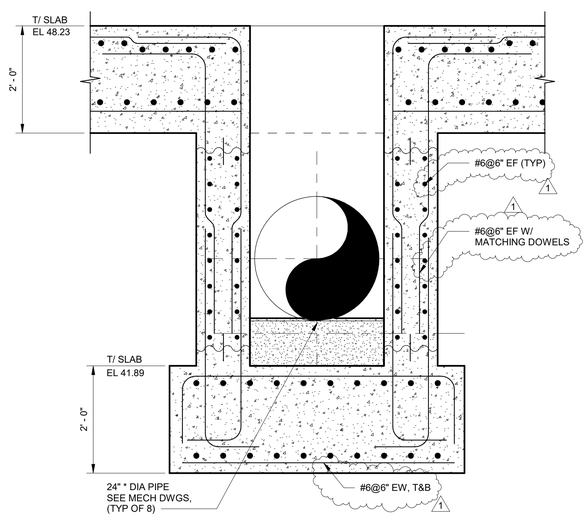
3 SECTION
S-FL-1 1/4" = 1'-0"



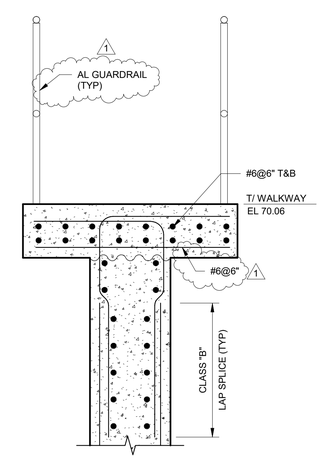
4 SECTION
S-FL-2 1/4" = 1'-0"



5 SECTION
S-FL-2 1/2" = 1'-0"



A DETAIL
S-FL-2 3/4" = 1'-0"



B DETAIL
S-FL-6 3/4" = 1'-0"

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	02/20	PCS	JSB	ADDENDUM NO. 5

DESIGNED BY: A. VOIGT
DRAWN BY: DINESH S.
SHEET CHK'D BY: J. BOGGS
CROSS CHK'D BY: N. RASTOGI
APPROVED BY: J. BOGGS
DATE: OCTOBER 2019

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BRUNSWICK COUNTY, NC

NORTHWEST WATER TREATMENT PLANT
EXPANSION AND UPGRADES

FILTERS
SECTIONS III

PROJECT NO. 250459-232662
FILE NAME:

SHEET NO.
S-FL-6

ISSUED FOR BID

NORTH CAROLINA PROFESSIONAL SEAL 036223 ENGINEER JUSTIN S. BOGGS 02/20/20

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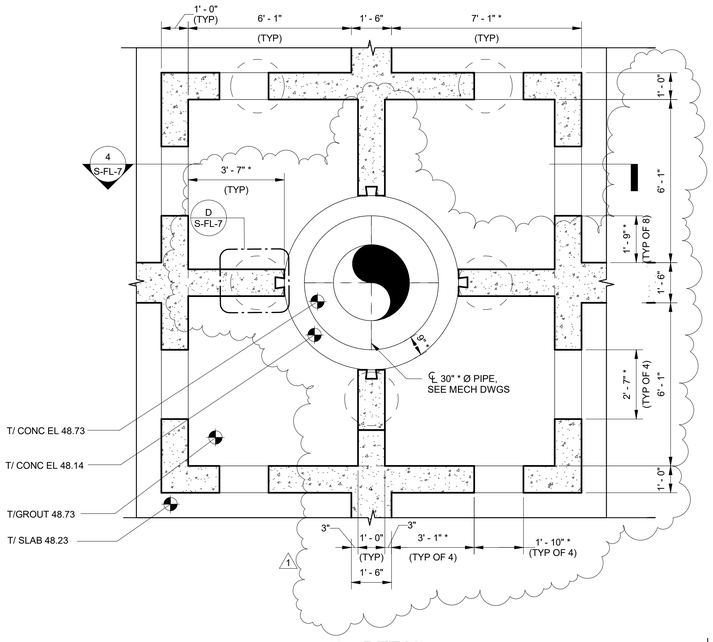
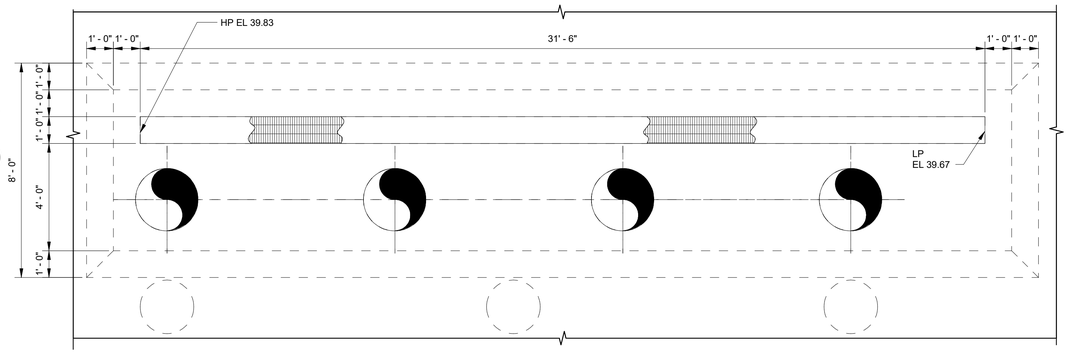
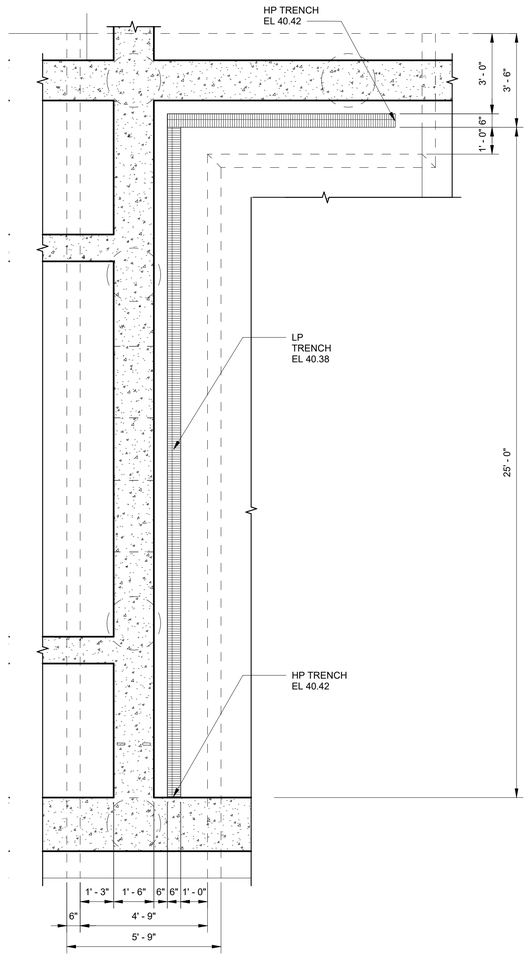


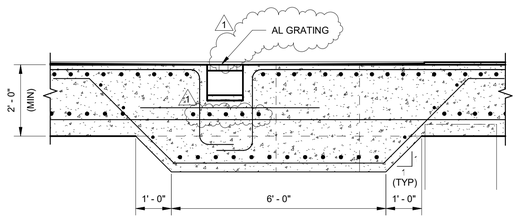
A DETAIL S-FL-2 3/8" = 1'-0"



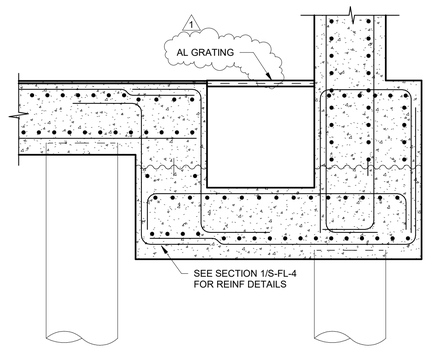
B DETAIL S-FL-2 3/8" = 1'-0"



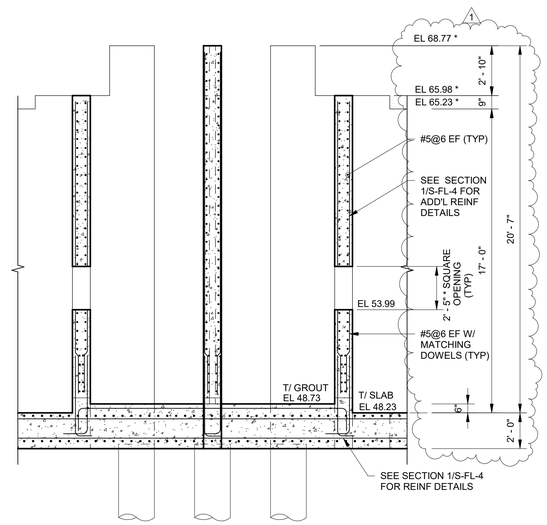
C DETAIL S-FL-2 3/8" = 1'-0"



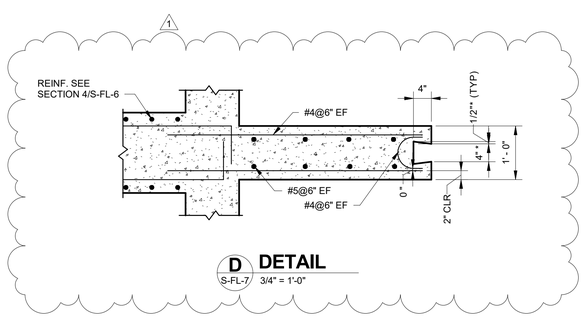
2 SECTION S-FL-4 1/2" = 1'-0"



3 SECTION S-FL-2 1/2" = 1'-0"



4 SECTION S-FL-1 1/4" = 1'-0"



D DETAIL S-FL-7 3/4" = 1'-0"

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	02/20	PCS	JSB	ADDENDUM NO. 5

DESIGNED BY: S. GIL
DRAWN BY: DINESH S.
SHEET CHK'D BY: J. BOGGS
CROSS CHK'D BY: N. RASTOGI
APPROVED BY: J. BOGGS
DATE: OCTOBER 2019

CDM Smith
5400 Glenwood Avenue, Suite 400
Raleigh, NC 27612
Tel: (919) 325-3500

BRUNSWICK COUNTY, NC

NORTHWEST WATER TREATMENT PLANT EXPANSION AND UPGRADES

FILTERS
ENLARGED PLANS AND SECTIONS

PROJECT NO. 250459-232662
FILE NAME: SWZ000FL.rvt
SHEET NO. S-FL-7

NORTH CAROLINA PROFESSIONAL SEAL 036223 ENGINEER JUSTIN S. BOGGS 02/14/20

ISSUED FOR BID

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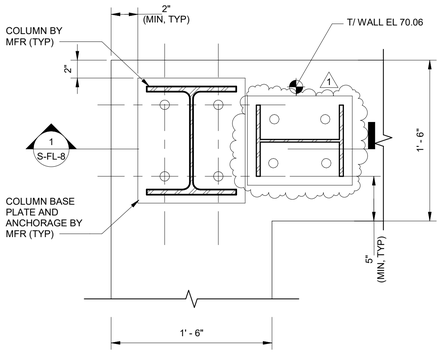
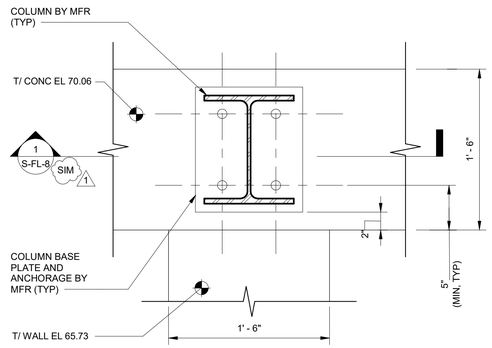
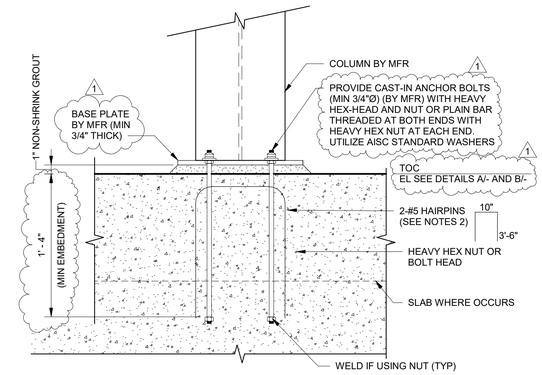


A DETAIL
S-FL-3 1 1/2" = 1'-0"



B DETAIL
S-FL-3 1 1/2" = 1'-0"



1 SECTION
S-FL-8 1 1/2" = 1'-0"

NOTES:

1. SEE S-GN-1 FOR STRUCTURAL GENERAL NOTES.
2. SUPPLEMENTAL REINFORCEMENT FOR THE CAST-IN-PLACE ANCHOR BOLTS MAY NEED TO BE MODIFIED. TYPE, EXTENT AND NUMBER OF SUPPLEMENTAL REINFORCEMENT WILL BE PROVIDED BY THE ENGINEER, DURING CONSTRUCTION, UPON REVIEW AND APPROVAL OF THE METAL BUILDING SUBMITTAL AND COLUMN REACTIONS.

DESIGN LOAD DATA - PRE-ENGINEERED METAL CANOPY

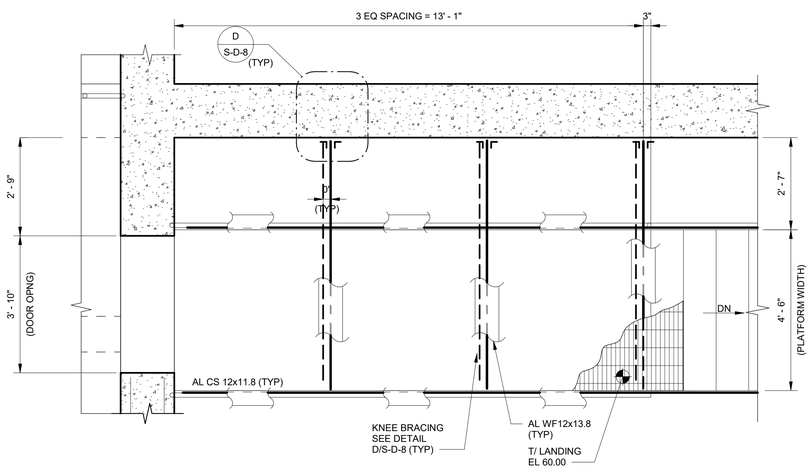
SEISMIC:

BASIC SEISMIC-FORCE-RESISTING SYSTEM:	ORDINARY STEEL MOMENT FRAME
DESIGN BASE SHEAR:	Cs*W
SEISMIC RESPONSE COEFFICIENT:	Cs: 0.14 FOR MOMENT FRAME
RESPONSE MODIFICATION FACTOR:	R: 3.5 FOR MOMENT FRAME
ANALYSIS PROCEDURE USED:	EQUIVALENT LATERAL FORCE PROCEDURE

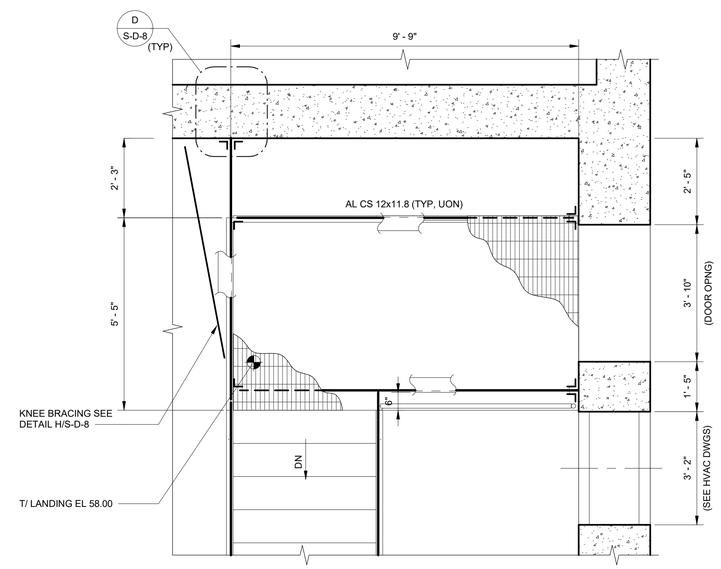
WIND DESIGN DATA:

ENCLOSURE CLASSIFICATION:	OPEN
INTERNAL PRESSURE COEFFICIENT:	0.00

REFER TO SHEET S-GN-1 FOR DESIGN LOAD DATA THAT IS THE SAME FOR ALL STRUCTURES.



C DETAIL
– 1/2" = 1'-0"



D DETAIL
– 1/2" = 1'-0"

WIND PRESSURE (PSF) FOR COMPONENT AND CLADDING- CLEAR WIND FLOW (STRENGTH) 1						
PRESSURE (+) / SUCTION (-)						
EFFECTIVE WIND AREA (SQ.FT)	ROOF (PSF)					
	ZONE 1		ZONE 2		ZONE 3	
< 26 FT²	45.2	-49.3	69.8	-73.9	90.3	-132.2
26 FT² TO 104 FT²	45.2	-49.3	69.8	-73.9	69.8	-73.9
> 104 FT²	45.2	-49.3	45.2	-49.3	45.2	45.2

1

WIND PRESSURE (PSF) FOR COMPONENT AND CLADDING- OBSTRUCTED WIND FLOW (STRENGTH)						
PRESSURE (+) / SUCTION (-)						
EFFECTIVE WIND AREA (SQ.FT)	ROOF (PSF)					
	ZONE 1		ZONE 2		ZONE 3	
< 26 FT²	20.6	-69.8	32.9	-106.8	41.1	-188.9
26 FT² TO 104 FT²	20.6	-69.8	32.9	-106.8	32.9	-106.8
> 104 FT²	20.6	-69.8	32.9	-106.8	20.6	-69.8

1

PRELIMINARY COLUMN LOAD TABLE (ASD/SERVICE) 1				
COLUMN TYPE	VERTICAL LOAD		HORIZONTAL LOAD	
	DOWNWARD	UPWARD	PARALLEL TO FRAME	PERPENDICULAR TO FRAME
CORNER	8.5	8.1	3.1	-
INTERIOR	17.0	16.2	6.2	-

1

PRELIMINARY COLUMN LOAD TABLE NOTES:

1. STRUCTURE SHOWN HAS BEEN FOR ESTIMATED PRE-ENGINEERED BUILDING LOADS (ASD) AS SHOWN IN THE COLUMN LOAD TABLE. STRUCTURE SHALL NOT BE FABRICATED OR CONSTRUCTED UNTIL THE SUBMITTAL OF THE PRE-ENGINEERED BUILDING ANCHOR BOLT LOCATIONS AND FOUNDATION REACTIONS HAVE BEEN REVIEWED AND ADJUSTMENTS TO THE STRUCTURE HAVE BEEN COMPLETED, IF REQUIRED, BY THE ENGINEER. 1

NORTH CAROLINA PROFESSIONAL SEAL 036922 ENGINEER JUSTIN S. BOGGS 10/4/20

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	02/20	PCS	JSB	ADDENDUM NO. 5

DESIGNED BY: DINESH S.
DRAWN BY: DINESH S.
SHEET CHK'D BY: J. BOGGS
CROSS CHK'D BY: N. RASTOGI
APPROVED BY: J. BOGGS
DATE: OCTOBER 2019

CDM Smith
5400 Glenwood Avenue, Suite 400
Raleigh, NC 27612
Tel: (919) 325-3500

BRUNSWICK COUNTY, NC

NORTHWEST WATER TREATMENT PLANT
EXPANSION AND UPGRADES

FILTERS-PRE ENGINEERED METAL CANOPY
SECTIONS AND DETAILS

PROJECT NO. 250459-232662
FILE NAME: SWZ000FL.rvt
SHEET NO.
S-FL-8

ISSUED FOR BID

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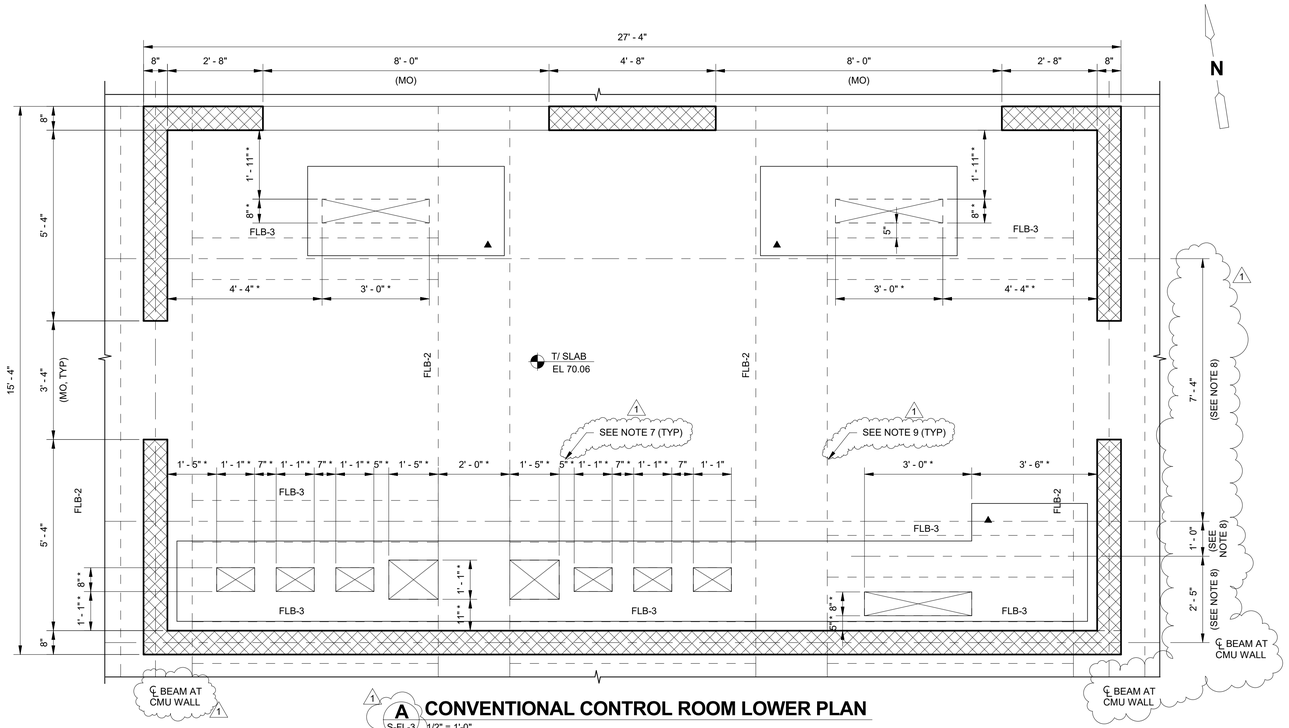
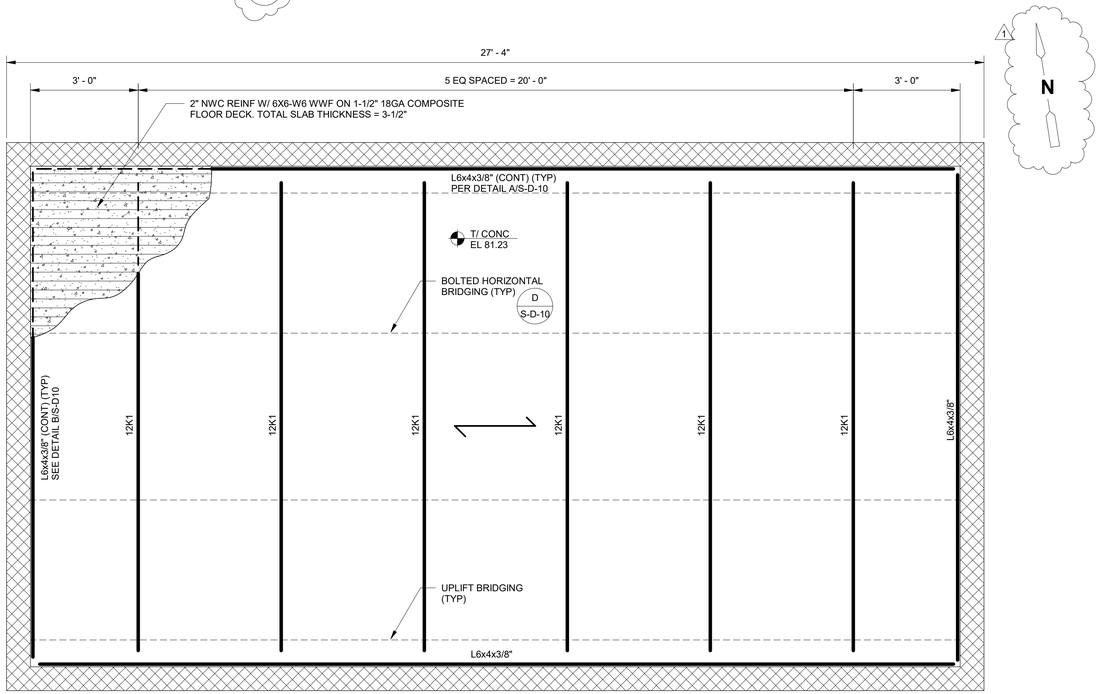


A CONVENTIONAL CONTROL ROOM LOWER PLAN

S-FL-3 1/2" = 1'-0"



B CONVENTIONAL CONTROL ROOM TOP PLAN

1/2" = 1'-0"

DESIGN LOAD DATA - CONTROL ROOM BUILDING

SEISMIC:	
BASIC SEISMIC-FORCE-RESISTING SYSTEM:	SPECIAL REINFORCED MASONRY SHEAR WALLS
DESIGN BASE SHEAR:	Cs*W
SEISMIC RESPONSE COEFFICIENT:	Cs: 0.097
RESPONSE MODIFICATION FACTOR:	R: 5.0
ANALYSIS PROCEDURE USED:	EQUIVALENT LATERAL FORCE PROCEDURE
WIND DESIGN DATA:	
ENCLOSURE CLASSIFICATION:	PARTIALLY ENCLOSED
INTERNAL PRESSURE COEFFICIENT:	+/- 0.55
REFER TO SHEET S-GN-1 FOR DESIGN LOAD DATA THAT IS THE SAME FOR ALL STRUCTURES.	

NOTES:

1. SEE S-GN-1 FOR STRUCTURAL NOTES.
2. SEE S-D-5 FOR STANDARD MASONRY DETAILS.
3. SEE S-FL-10 FOR CONTROL ROOM ELEVATIONS.
4. SEE S-D-10 FOR STANDARD ROOF JOIST AND DECK DETAILS.
5. * INDICATES DIMENSION AND/OR INFORMATION TO BE COORDINATED BY THE CONTRACTOR WITH THE MANUFACTURER OF THE APPROVED EQUIPMENT PRIOR TO FABRICATION AND CONSTRUCTION.
6. ⟶ DENOTES STEEL DECK SPAN DIRECTION.
7. PROVIDE MINIMUM 1-1/2" CLEARANCE BETWEEN REINFORCEMENT BARS WHICH ARE PLACED BETWEEN OPENINGS. ADDITIONAL REINFORCEMENT IS NOT REQUIRED WHEN LATERAL SPACING BETWEEN OPENINGS IS LESS THAN 1'-0".
8. LOCATION OF BEAMS FLB-3 SHALL BE COORDINATED WITH APPROVED EQUIPMENT SUBMITTALS AND ENGINEER SHALL HAVE FINAL APPROVAL OF LOCATION. EDGE OF BEAMS SHALL BE WITHIN 1'-0" OF OPENING IN SLAB.
9. COORDINATE SLAB OPENINGS SUCH THAT NO OPENINGS ARE PLACED IN BEAMS.

JOIST AND DECK NOTES:

1 - ROOF JOIST SUPERIMPOSED LOADS:

ROOF LIVE LOAD	=	20 PSF
DEAD LOAD	=	52 PSF
SELF-WEIGHT	=	PER MFR
COLLATERAL LOAD	=	10 PSF
EQUIPMENT	=	PER EQUIPMENT MFR. SEE PLANS FOR EQUIPMENT LOCATIONS
RAIN PONDING	=	SEE FIGURE BELOW
SNOW	=	SEE FIGURE BELOW
NET WIND UPLIFT	=	SEE WIND PRESSURE TABLE

JOIST BRIDING NOT SHOWN FOR CLARITY, PROVIDE JOIST BRIDGING PER STEEL JOIST INSTITUTE SPECIFICATION BY MANUFACTURER..

2 - ROOF DECK DIAPHRAGM:

A. DECK: 3-1/2" COMPOSITE DECKING 1.5VLI18 WITH 2" NOMINAL CONCRETE THICKNESS WITH WWF 6x6-W2.1xW2.1 BY VULCRAFT OR APPROVED EQUAL.

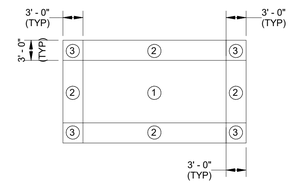
B. PERPENDICULAR SUPPORT FASTENERS: POWDER-ACTUATED FASTENERS AT 36/4 PATTERN.

C. PARALLEL SUPPORTS: POWDER-ACTUATED FASTENERS AT 24" O.C.

D. SIDELAP FASTENERS: HILTI S-SLC01M HWH SIDELAP CONNECTORS AT 24" O.C. OR APPROVED EQUAL.

E. POWDER-ACTUATED FASTENERS SHALL BE HILTI X-EDN19 FOR BASE THICKNESS 1/4" TO 5/8" THICK AND HILTI X-EDNK22 FOR BASE THICKNESS 1/8" TO 1/4" OR APPROVED EQUAL.

3. STEEL JOISTS SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH SJI "STANDARD SPECIFICATIONS LOAD TABLES AND LOAD TABLES AND WEIGHT TABLES FOR STEEL JOISTS AND JOISTS GIRDER.
4. ADDITIONAL WEB MEMBERS SHALL BE PROVIDED IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS AT CONCENTRATED LOADS APPLIED TO STEEL JOISTS.



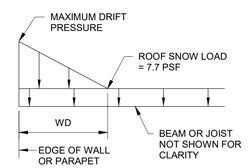
FLAT ROOF (θ < 10DEG)

2018 NORTH CAROLINA STATE BUILDING CODE SECTION 1603.1.4-5		
COMPONENTS & CLADDING - JOIST WIND PRESSURE (PSF) (ASD)		
ZONE	MAXIMUM POSITIVE PRESSURE	MAXIMUM SUCTION PRESSURE
1 (INTERIOR)	40.4	-73
2 & 2' (EDGE STRIP)	40.4	-110.7
3 & 3' (CORNER)	40.4	-157.8

NOTE:
ALL TABULATED VALUES ARE STRENGTH LEVEL FORCES.

1 DIAGRAM

NTS



ROOF SNOW LOAD

2 DIAGRAM

NORTH CAROLINA PROFESSIONAL SEAL 036223 ENGINEER JUSTIN S. BOGGS 02/19/20

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	02/20	PCS	JSB	ADDENDUM NO. 5

DESIGNED BY: DINESH S.
DRAWN BY: DINESH S.
SHEET CHK'D BY: J. BOGGS
CROSS CHK'D BY: N. RASTOGI
APPROVED BY: J. BOGGS
DATE: OCTOBER 2019

CDM Smith
5400 Glenwood Avenue, Suite 400
Raleigh, NC 27612
Tel: (919) 325-3500

BRUNSWICK COUNTY, NC

NORTHWEST WATER TREATMENT PLANT
EXPANSION AND UPGRADES

FILTERS - CONVENTIONAL CONTROL ROOM
ROOF PLAN

PROJECT NO. 250459-232662
FILE NAME: SWZ000FL.rvt
SHEET NO.
S-FL-9

ISSUED FOR BID

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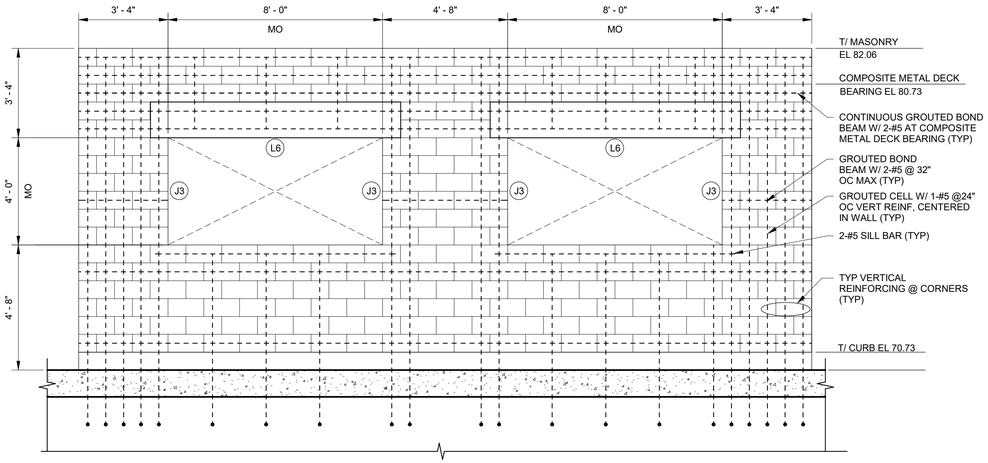
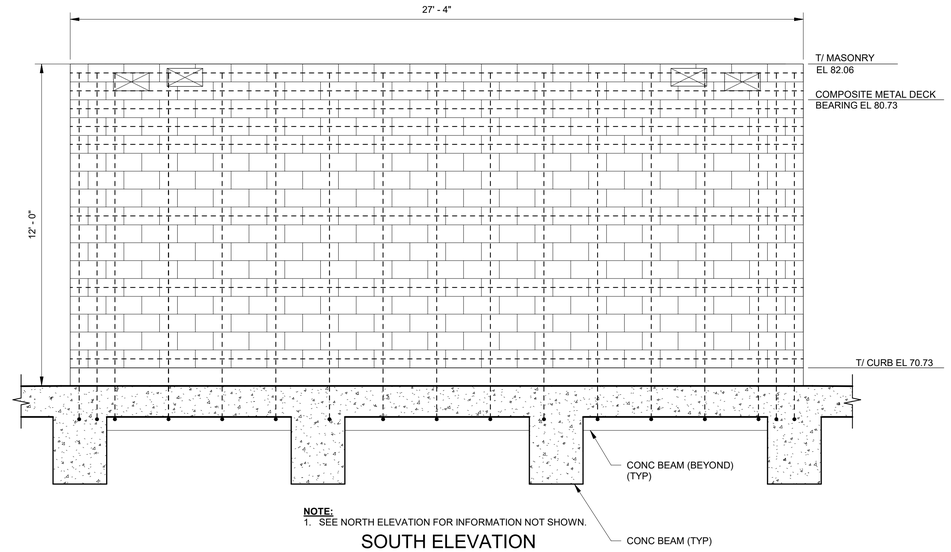


NORTH ELEVATION

3/8" = 1'-0"



NOTE:
1. SEE NORTH ELEVATION FOR INFORMATION NOT SHOWN.

SOUTH ELEVATION

3/8" = 1'-0"

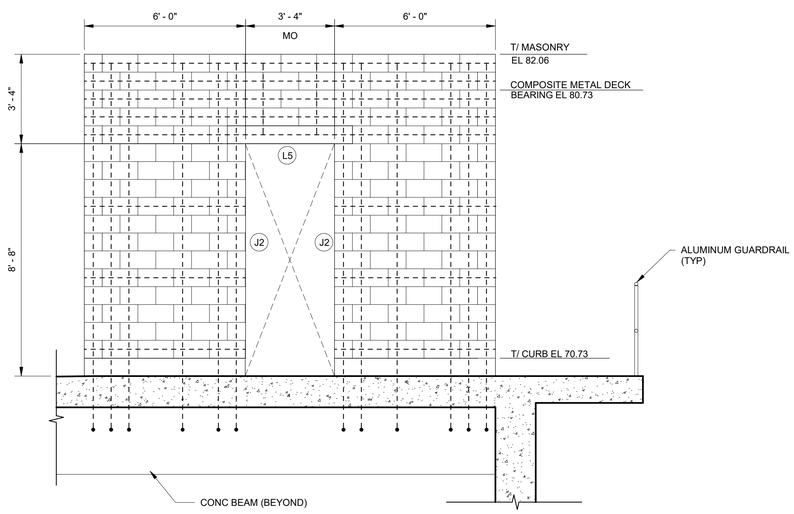
NOTES:

1. SEE S-GN-1 FOR STRUCTURAL GENERAL NOTES.
2. SEE S-D-10 FOR STANDARD MASONRY DETAILS.
3. SEE S-FL-4 FOR ADDITIONAL INFORMATION ON CONTROL ROOM.
4. REINFORCING DEPICTED IN ELEVATIONS IS FOR ILLUSTRATIVE PURPOSES ONLY. PROVIDE REINFORCING FOR CORNERS, INTERSECTIONS, LINTELS, SILLS, AND JAMBS PER DETAILS SHOWN ON S-D-5.

LEGENDS:

- (L#) LINTEL TYPE, DETAIL G/S-D-5
- (J#) JAMB TYPE, DETAIL K/S-D-5
- (X) OPENING LABEL

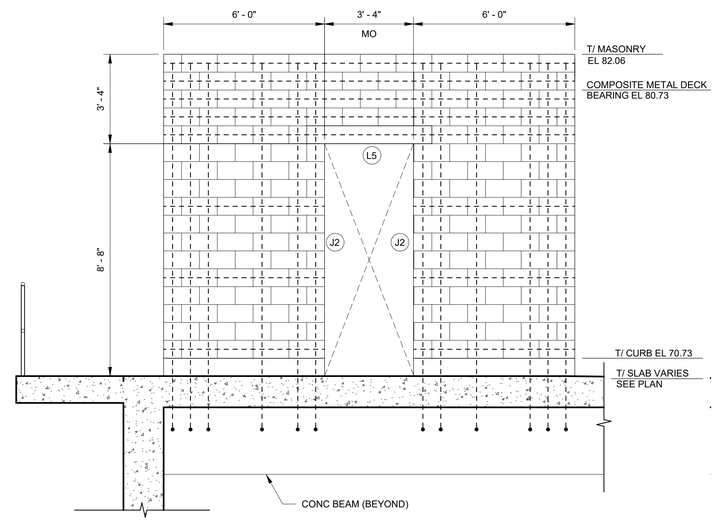
COMPONENTS & CLADDING - WALL WIND PRESSURE (PSF)				
EFFECTIVE WIND AREA (SQ.FT)	PRESSURE (+) / SUCTION (-)			
	WALL (PSF)			
	ZONE 4		ZONE 5	
< 10.00	68.3	-72.5	68.3	-85.3
>=100	60.8	-65.0	60.8	-70.2



NOTE:
1. SEE NORTH ELEVATION FOR INFORMATION NOT SHOWN.

EAST ELEVATION

3/8" = 1'-0"



NOTE:
1. SEE NORTH ELEVATION FOR INFORMATION NOT SHOWN.

WEST ELEVATION

3/8" = 1'-0"

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REV. NO.	DATE	DRWN	CHKD	REMARKS
1	02/20	PCS	JSB	ADDENDUM NO. 5

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PROJECT NO. 250459-232662
FILE NAME: SWZ00FL.rvt

SHEET NO.
S-FL-10

ISSUED FOR BID