June 5, 2019 Reference No. 080987

Mr. Steven Scharf
Project Engineer, Division of Environmental Remediation
New York State Department of Environmental Conservation
Remedial Bureau A
625 Broadway 12th Floor
Albany, NY 12233-7015

Dear Mr. Scharf:

Re: Friedrichsohn Remediation – Technical Components of Bid Package
Friedrichsohn Cooperage Site
Waterford, NY

Please find attached the technical components of the Bid Package for the Friedrichsohn Cooperage remedial action (Attachment A). The complete bid package was distributed on May 17, 2019 to the following contractors: Sevenson, Entact, Abscope, Land Remediation, DA Collins and Maxymilian. The representatives from these six contracting companies attended the mandatory bid meeting on May 23, 2019.

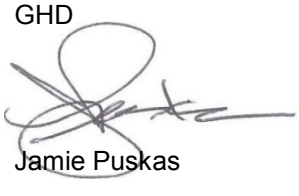
The project specifications and drawing set included in the attached technical components of the bid package include minor changes related to input received from the New York State Canal Corporation (NYSCC) as a result of our meeting with the NYSCC on April 9, 2019. The modifications to the specifications and drawings are related to the following NYSCC requirements:

1. Tree removal along the canal berms and associated restoration of the berms
2. A bridge crossing of the spillway with an alignment and capacity for use of a transport truck with a lowboy trailer loaded with equipment

Should you have any questions regarding this information please do not hesitate to contact us.

Sincerely,

GHD



Jamie Puskas

JP/kf/7

cc: John Swartwout (NYSDEC)
Patrick Rabideau – CHA
Scott Smith – CHA
Bob Gibson – GE
Charles Gardner – SI Group
Brandon Hurl - GHD

GHD
455 Phillip Street Unit #100A Waterloo Ontario N2L 3X2 Canada
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Attachment A
Technical Component of Bid Package (Specifications and Design Drawings) Remedial Action Friedrichsohn Cooperage Site

Project Specifications

DOCUMENT 00 01 10 - TABLE OF CONTENTS

END OF TABLE OF CONTENTS

SECTION 01 10 00

SUMMARY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Description of the Project Site.
2. Location.
3. Access to the Site.
4. Scope of work.
5. Description of work.
6. Sequence of work.
7. Contract Times.
8. Drawings.
9. CONTRACTOR use of the Site.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. No separate payment will be made for work of this Section.

1.3 DESCRIPTION OF PROJECT SITE

A. The Site is approximately 0.45 acres in size and has approximately 315 feet of frontage on Saratoga Avenue (Route 32). The Old Champlain Canal borders the Site on the side opposite the road. Residential properties are located adjacent to the Site on Saratoga Avenue; residential and commercial properties are also located across from the Site on Saratoga Avenue.

B. The contaminants of concern (COCs) at the Site include polychlorinated biphenyls (PCBs), chlorinated volatile organic compounds (VOCs) (tetrachloroethane, trichloroethane, dichloroethene, vinyl chloride, and chlorobenzene), benzene, toluene, ethylbenzene, xylenes (BTEX), phenolic compounds (phenol and dimethylphenol), hexachlorobenzene, and metals (arsenic, barium, chrome, and lead).

C. The Site is comprised of three Operable Units (OUs). OU-1 is comprised of the on-Site and off-Site contaminated soils associated with the former cooperage operation. OU-2 is comprised of the on-Site and off-Site groundwater, but is not addressed under this Contract. OU-3 is comprised primarily of the sediments in the Old Champlain Canal between O'Connor Drive and Burton Avenue (approximately 1,750 feet), and also includes on-Site source area soils.

D. NYSDEC issued a Record of Decision (ROD) for OU-3 in March 2011 and a ROD for OU-1 in December 2012. In the OU-1 ROD, NYSDEC selected a Site Cover remedy to achieve restricted residential soil cleanup objective (SCOs). In addition to the Site cover component, the remedy also included Institutional Controls. In the OU-3 ROD, the remedy pertinent to the on-Site source area included excavating the source soil down to

bedrock and excavating contaminated sediments from the Old Champlain Canal and transporting the material off-Site for disposal.

1.4 LOCATION

A. The Site is located at 153-155 Saratoga Avenue in the Town of Waterford, New York ("the Town").

1.5 ACCESS TO THE SITE

A. Access to the Site is available from Saratoga Avenue.

B. CONTRACTOR may construct temporary access to Old Champlain Canal through the Site.

C. OWNER is attempting to secure additional access to the Old Champlain Canal. Negotiations with adjacent property owners for access are ongoing.

D. Make all necessary arrangements with the authorities having jurisdiction for the movement of CONTRACTOR material and equipment to and from the Site over public roadways.

E. Access to the Site: In accordance with Paragraph 1.10 A.

1.6 SCOPE OF WORK

A. The Works to be performed under the Contract consists of Remedial Action and associated work for Friedrichsohn Cooperage Site, Waterford, New York.

1.7 DESCRIPTION OF WORK

A. The Works includes but is not limited to the following:
   1. Project startup including mobilization to the Site.
   2. Development, implementation, and maintenance of a Site-specific Health and Safety Plan.
   3. Provision and maintenance of temporary facilities and controls, including but not limited to emergency first aid facility, fire suppression equipment, construction of decontamination facilities, temporary utilities, work zone identification, and sediment/soil staging facilities, fugitive particulate control, odor control, soil erosion and sediment migration control.
   4. Site preparation, including clearing and grubbing, removal of debris from the Canal, decommissioning of designated monitoring wells, and off-Site disposal of removed materials.
   5. Development, implementation, and maintenance of a Stormwater Pollution Prevention Plan.
   6. Construction of a storm water diversion channel and spillway across Mohawk Paper Company property north of Fulton Street Bridge.
   7. Design, installation and operation of a wastewater treatment facility
   8. Construction of three cofferdams within the Old Champlain Canal.
   9. Excavation of PCB impacted Canal sediment.

10. Sediment dewatering, and stabilization (if required).
11. Sediment characterization, transportation, and off-Site disposal.
12. Canal and bank restoration.
13. Design and installation of shoring and dewatering system.
14. Excavation of PCB impacted soils.
15. Soil characterization, transportation, and off-Site disposal.
16. Backfilling and construction of a Site cap comprising the following layers:
    a. Demarcation layer 2 feet below the proposed surface elevation.
    b. 1.5 feet of imported clean fill.
    c. 0.5 feet of imported topsoil.
17. Closeout activities, including final decontamination, cleanup/restoration of support areas, and demobilization of temporary facilities and equipment.
18. Demobilization.

1.8 SEQUENCE OF WORK

A. CONTRACTOR is responsible for sequencing activities to complete the work in an orderly and timely manner and prevent spreading of contamination or re-contaminating completed works.

B. Perform tasks in an orderly and safe manner such that the movement and double handling of materials is minimized.

1.9 CONTRACT TIMES

A. Perform the Works according to the following Contract Times:
    1. The Works at the Site shall be commenced within 14 days after the date of the Notice to Proceed.
    2. The Works shall be substantially completed by November 30, 2020.
    3. The Works shall be fully completed and ready for final payment within 30 days of issuance of the Certificate of Substantial Completion.

1.10 DRAWINGS

A. Drawings issued with and forming part of the Contract Documents are listed below:

Drawing No.	Revision No.	Date of Drawing or Latest Revision	Title
C-01	0	May 2019	Existing Condition Overall Site Plan
C-02	0	May 2019	Existing Condition Site Plan
C-03	0	May 2019	Site Works - OU3 Sediments/Source Soils
C-04	0	May 2019	Site Preparation Plan - OU3 Sediment/Source Soils
C-05	0	May 2019	Sediment/ Soil Removal Sequence
C-06	0	May 2019	Canal Sediment Excavation Overall Plan Layout
C-07	0	May 2019	Canal Sediment Excavation Plan 1 of 6 - <50 PPM

Drawing No.	Revision No.	Date of Drawing or Latest Revision	Title
C-08A	0	May 2019	Canal Sediment Excavation Plan 2 of 6 - ≥50 PPM
C-08B	0	May 2019	Canal Sediment Excavation Plan 3 of 6 - <50 PPM
C-09A	0	May 2019	Canal Sediment Excavation Plan 4 of 6 - ≥50 PPM
C-09B	0	May 2019	Canal Sediment Excavation Plan 5 of 6 - <50 PPM
C-10	0	May 2019	Canal Sediment Excavation Plan 6 of 6 - <50 PPM
C-11	0	May 2019	Canal Sediment Excavation Cross Sections Page 1 of 3
C-12	0	May 2019	Canal Sediment Excavation Cross Sections Page 2 of 3
C-13	0	May 2019	Canal Sediment Excavation Cross Sections Page 3 of 3
C-14	0	May 2019	Canal Sediment Excavation Cross Sections Sanitary Sewers
C-15	0	May 2019	Erosion And Sediment Control Site Plan
C-16	0	May 2019	Erosion And Sediment Control Measures Details
C-17	0	May 2019	Source Area OU1 Impacted Soil Excavation (0-2 Ft. Bgs)
C-18	0	May 2019	Source Area OU3 Impacted Soil Excavation (0-1 Ft. Bgs)
C-19	0	May 2019	Source Area OU3 Impacted Soil Excavation (1-2 Ft. Bgs)
C-20	0	May 2019	Source Area OU3 Impacted Soil Excavation (2-4 Ft. Bgs)
C-21	0	May 2019	Source Area OU3 Impacted Soil Excavation (4-6 Ft. Bgs)
C-22	0	May 2019	Source Area OU3 Impacted Soil Excavation (6-8 Ft. Bgs)
C-23	0	May 2019	Source Area OU3 Impacted Soil Excavation (8 Ft. Bgs - Bedrock)
C-24	0	May 2019	Final Grading Site Plan
C-25A	0	May 2019	Canal Restoration Cross Sections Page 1 of 3
C-25B	0	May 2019	Canal Restoration Cross Sections Page 2 of 3
C-25C	0	May 2019	Canal Restoration Cross Sections Page 3 of 3
C-26	0	May 2019	Temporary Overflow Spillway
C-27	0	May 2019	Details – 1 of 3
C-228	0	May 2019	Details – 2 of 3

Drawing No.	Revision No.	Date of Drawing or Latest Revision	Title
C-29	0	May 2019	Details – 3 of 3
M-01	0	May 2019	Water Treatment System Process Flow Schematic
M-02	0	May 2019	Water Treatment System

B. Perform the Works according to the Drawings issued "Approved for Construction" by ENGINEER. Such Drawings will be issued to CONTRACTOR with the Notice to Proceed and will consist of bid Drawings revised as required by ENGINEER and additional Drawings if required by ENGINEER.

C. Revised "Approved for Construction" Drawings may be issued from time to time by ENGINEER and such Drawings will supersede previous revisions.

D. If revised "Approved for Construction" Drawings are issued, which necessitate changes to CONTRACTOR's drawings not yet reviewed, no separate payment will be made for CONTRACTOR's expenses involved in revising such drawings.

1.11 CONTRACTOR USE OF THE SITE

A. Access to the Site: To be determined by coordination with the Town, NYSCC, and Property owners on either side of the Site, as required. Coordination requirements include:
   1. Review of work activities to be completed including identification of anticipated work area, transportation routes, and scope and timing of activities; review;
   2. Review of vegetation which requires clearing and restoration plans;
   3. Periodic updates of work progress and anticipated completion;
   4. Notification of additional truck traffic; and
   5. Permit requirements.

B. Construction Operations: Limited to areas noted on the Drawings and access to be determined.
   1. Hours of Operation: Limit on-Site hours of operation to the hours of 7 a.m. to 5 p.m. Monday through Friday and 8 a.m. to 4 p.m. on Saturday. No work other than equipment and general Site maintenance shall be conducted on Sundays without prior approval by ENGINEER.
   2. When unfavorable weather, soil, drainage, or other unsuitable construction conditions exist, continue operations which will not be adversely affected by such conditions. Do not construct or cause to be constructed any portion of the Works under conditions which would adversely affect the quality of the Works, unless special means or precautions are taken to perform the Works in a proper and satisfactory manner.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Price and payment procedures.
2. Applications for Payment.
3. Contract modification procedures.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Payment for the Works will be made in lump sums and unit prices according to the General Conditions, PROGRESS PAYMENT.
2. Measurement and payment requirements applicable to the Works are delineated in the individual Sections and complement the criteria of this article.
3. CONTRACTOR shall be responsible for providing survey and measurement data throughout the duration of the Works, and for measurement and calculation of quantities for payment. ENGINEER will review and verify the data, measurements, calculations, and approve quantities for payment. Notify ENGINEER sufficiently in advance of operations to permit verification of measurements for payment, and provide necessary equipment, workers, facilities, and survey personnel for making measurements as required.
4. Measurement for Unit Price Work: As specified in individual Sections. Quantities indicated in the Schedule of Prices are for bidding and contract purposes only and are approximate. Quantities of material furnished and/or work performed as provided by CONTRACTOR, accurately substantiated by CONTRACTOR's approved survey and measurement methods, and as verified and approved by ENGINEER, will be used to determine payment(s).Measurement for Lump Sum Work: ENGINEER will review and verify the amount of work eligible for progress payment purposes. Items will be measured in units such as time, weight, volume, area, or linear means, or combination as appropriate as a completed item or unit of the Works. Such measurements will serve as a basis for estimating percentage payments for partially completed work.
5. Measurement Devices:
   a. Weigh Scales: Inspected, tested, and certified by the applicable state Weights and Measures department within the past year.
   b. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.
   c. Metering Devices: Inspected, tested, and certified by the applicable state Weights and Measures department within the past year.
6. Payment for Each Item Includes: Full compensation for furnishing labor, supervision, material, tools, equipment, plant, transportation, services, and incidentals for performance and completion of the Works in complete accordance with the Contract Documents; erection, application, installation, completion, or construction of an item of the Works; overhead and profit; and all other miscellaneous items for which separate payment is not provided under other Items of the Schedule of Prices. All work not specifically set forth as a separate pay Item in the Schedule of Prices shall be considered as a subsidiary obligation of CONTRACTOR and all costs in connection therewith shall

be included in the amounts and prices stipulated in the Schedule of Prices. CONTRACTOR shall properly and fairly distribute indirect costs to each pay Item. Final payment for work governed by unit prices will be made on the basis of the actual measurements and quantities approved by ENGINEER multiplied by the unit price stipulated in the Schedule of Prices. Final payment for work governed by lump sum prices will be made on the basis of the applicable lump sum prices stipulated in the Schedule of Prices.

7. Non-payment for Rejected Products: Payment will not be made for any of the following:
   a. Products wasted or disposed of in a manner that is not acceptable.
   b. Products determined as unacceptable before or after placement.
   c. Products not completely unloaded from the transporting vehicle.
   d. Products placed beyond the lines and levels of the required Works.
   e. Products remaining on hand after completion of the Works.
   f. Loading, hauling, and disposing of rejected products.
8. Quantity overruns and underruns : The estimated quantities of work to be done and materials to be furnished are approximate. The quantities have been estimated for the purpose of comparison of the bids and are not to be assumed to be the actual final quantities which will be necessary to complete the work. The OWNER reserves the right to increase or diminish any or all the quantities of work as OWNER sees appropriate. Increases or decreases in quantities from those estimated in the bid will not be considered sufficient grounds for granting an increase in the unit price bid. No additional payment will be made to the CONTRACTOR for items where the actual quantity of an item is less than that shown on the Form of Bid, regardless to what extent the quantity is reduced.

1.3 APPLICATIONS FOR PAYMENT

A. Submit each Application for Payment on the form furnished in the Contract Documents (Exhibit E). Obtain electronic version from ENGINEER.

B. Submit one signed original of each Application for Payment. Include electronic version with each application.

C. Execute certification by signature of authorized officer.

D. List each authorized Change Order on the Application for Payment, listing Change Order number and dollar amount as for an original item of the Works.

E. Prepare Application for Final Payment as specified in Section 01 70 00.

F. Submit an updated progress schedule with each Application for Payment.

G. Payment Period: Submit at intervals stipulated in the General Conditions, PROGRESS PAYMENT.

H. Submit releases and waivers as stipulated in the General Conditions, WORK TO BE FREE FROM ALL ENCUMBRANCES.

I. When ENGINEER requires substantiating information, submit data justifying dollar amounts in question.

1.4 CONTRACT MODIFICATION PROCEDURES

A. Changes in the Works or the requirement for extra work will be made by ENGINEER in accordance with the General Conditions, ALTERATIONS, ADDITIONS, AND OMISSIONS and EXTRA WORK and with the change procedures as specified herein.

B. Field Order: ENGINEER will advise of minor changes in the Works not involving an adjustment to the Contract Price or the Contract Times as authorized by the General Conditions, ALTERATIONS, ADDITIONS, AND OMISSIONS by issuing supplemental instructions in the form of a Field Order. Promptly execute such minor changes and supplemental instructions.

C. Request for Quotation: ENGINEER may issue a Request for Quotation, which includes a detailed description of a proposed change with supplementary or revised information, Drawings, and Specifications, and schedule for executing the change in the Works. Prepare and submit a written itemized cost estimate of changes in the Contract Price and/or the Contract Times that would result from the proposed change in the Works by the due date stipulated in the Request for Quotation. CONTRACTOR shall abide by the following limitations for Change Order work.
   1. CONTRACTOR's combined overhead and profit on labor costs : 15 percent maximum
   2. CONTRACTOR's combined overhead and profit on materials and equipment : 10 percent maximum
   3. If the work is performed by a SUBCONTRACTOR:
      a. SUBCONTRACTOR'S overhead and profit percentage : 10 percent maximum.
      b. CONTRACTOR'S combined overhead and profit : 5 percent maximum.

D. Documentation of Change in Contract Price and Contract Times:
   1. Maintain detailed records of work done on a time and material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs of changes in the Works.
   2. Document each quotation for a change in Contract Price and/or Contract Times with sufficient data to allow evaluation of the quotation by ENGINEER. Each quotation for a change must be approved by ENGINEER prior to CONTRACTOR proceeding with Works associated with the quotation. Allow sufficient time for ENGINEER to review the quotation, without adversely affecting efficiency or production of Works in progress.
   3. On request, provide additional data to support computations including:
      a. Quantities of products, labor, and equipment.
      b. Taxes, insurance, and bonds.
      c. Overhead and profit.
      d. Justification for any change in the Contract Times.
      e. Credit for deletions from the Contract, similarly documented.

E. Support each claim for additional costs, and for work done on a time and material basis, with additional information including:
   1. Origin and date of claim.
   2. Dates and times work was performed, and by whom.
   3. Time records and wage rates paid.
   4. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

F. CONTRACTOR may propose a change by submitting a request for change to ENGINEER, describing the proposed change and its full effect on the Works, with a statement describing the reason for the change, and the effect on the Contract Price and Contract Times with full documentation (including itemization of costs for labor, material, taxes, subcontracts, bonds,

insurance, and overhead and profit) and a statement describing the effect on the Works by Other Contractors, if any.

G. Work Change Directive: ENGINEER may issue a document, signed by OWNER, instructing CONTRACTOR to proceed with a change in the Works, for subsequent inclusion in a Change Order. The document will describe changes in the Works, and will designate method of determining any change in the Contract Price or the Contract Times. Promptly execute the change in the Works.

H. Lump Sum Price Change Order: Based on Request for Quotation and CONTRACTOR's fixed lump sum price quotation or CONTRACTOR's request for a Change Order as approved by ENGINEER.

I. Unit Price Change Order: Based on Request for Quotation and CONTRACTOR's fixed unit price quotation and estimated quantities or CONTRACTOR's request for a Change Order as approved by ENGINEER.

J. Time and Material: Submit itemized account and supporting data after completion of change, within time limits indicated in the Contract Documents. ENGINEER will determine the change allowable in the Contract Price and the Contract Times as provided in the Contract Documents. Maintain detailed records of work done on a time and material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Works.

K. ENGINEER will issue Change Orders for signatures of parties as provided in the Contract Documents.

L. Promptly revise progress schedules to reflect any approved change in the Contract Times (or Milestones), revise sub-schedules to adjust times for other items of work affected by the change, and promptly resubmit to ENGINEER.

M. Promptly enter changes in the Project record documents.

N. Promptly revise Applications for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Price.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Specification language.
2. Mobilization and startup.
3. Coordination.
4. Pre-construction meeting.
5. Progress meetings.
6. Pre-installation meetings.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
2. Bonds:
a. Schedule of Prices Item No. 01 30 00/1.
b. Payment Basis: Lump sum price. Includes furnishing and maintaining bonds required by the Contract Documents.
3. Insurance:
a. Schedule of Prices Item No. 01 30 00/2.
b. Payment Basis: Lump sum price. Includes furnishing and maintaining insurance required by the Contract Documents including Worker's Compensation insurance, Employer's Liability, Vehicle insurance, Commercial General Liability, Builder's Risk insurance, Environmental Impairment and/or Pollution Liability, Umbrella/Excess Liability, and all other insurance.
4. Mobilization and Startup:
a. Schedule of Prices Item No. 01 30 00/3.
b. Payment Basis: Lump sum price. Includes resource and material procurement activities; procure permits; meetings to coordinate key interface points and to establish communication channels between OWNER, ENGINEER, and CONTRACTOR; pre-construction sampling of any off site properties used by CONTRACTOR; mobilizing plant and equipment to the Site; utility connections; initiation of security measures; access road improvements; Site survey/work zone delineations; work area preparations; support area preparations; and all other administrative items required in order to comply with the Contract.

1.3 SPECIFICATION LANGUAGE

A. These Project Specifications are written in imperative mood and are in abbreviated or streamlined form and include incomplete sentences. This imperative language is directed

to CONTRACTOR, unless specifically noted otherwise. Omission of words or phrases such as "CONTRACTOR shall", "shall be", "a", "the", and "all" are intentional. Omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the Drawings.

1.4 MOBILIZATION AND STARTUP

A. Do not mobilize to the Site without ENGINEER's prior written authorization. Ensure insurance as required by the Contract Documents are in full force.

B. Perform planning and scheduling activities as necessary for the performance of the Works.

C. Purchase materials and mobilize equipment, supplies, and incidentals to the Site.

D. Use the existing Site access roads to the designated work areas during mobilization. Construct additional access roads and complete improvements to roads as necessary for the performance of the Works.

E. Site temporary utilities and facilities in areas designated by ENGINEER. Obtain ENGINEER's approval prior to changing locations of temporary construction facilities. Do not use other areas without ENGINEER's prior approval. Provide additional land and access thereto not shown or described that may be required by CONTRACTOR for temporary construction facilities or storage of materials with no liability to OWNER or ENGINEER. Relocate construction equipment or other materials or equipment as required for the performance of the Works.

F. Perform pre and post surface soil sampling at any off site properties that the CONTRACTOR may use for staging, storage, truck parking etc. Samples to be collected in presence of ENGINEER and at locations agreed to by ENGINEER. Samples to be analyzed for TCL VOC, TCL, SVOC, PCBs, and metals. Sample frequency of one sample per 30 ft by 30 ft area.

1.5 COORDINATION

A. Coordinate scheduling, submittals, and work of the various Sections of the Project Specifications and other requirements of the Contract Documents to assure efficient and orderly sequence of the Works.

B. Coordinate completion and cleanup of work of separate Sections in preparation for Substantial Completion.

1.6 PRE-CONSTRUCTION MEETING

A. ENGINEER will schedule and administer a pre-construction meeting at the Site after the date of the Notice to Proceed and prior to start of construction at the Site.

B. ENGINEER will make arrangements for meeting, prepare agenda with copies for participants, and preside at meeting. Provide data required to ENGINEER and be prepared to discuss all items on the agenda.

C. Minimum Attendance Required: CONTRACTOR, CONTRACTOR's Health and Safety Officer, and major Subcontractors.

D. Agenda will include, but not necessarily be limited to, the following:
1. Designation of responsible personnel.
2. Lines of authority and communication.
3. Health and safety.
4. Use of the Site for storage, vehicle parking, access routes, and other Site requirements.
5. OWNER's requirements.
6. Coordination with Other Contractors and OWNER.
7. Temporary facilities and controls provided by CONTRACTOR.
8. Temporary utilities and services provided by OWNER.
9. Field offices.
10. Survey and Site layout.
11. Security and housekeeping procedures.
12. Procedures for processing field decisions, submittals, substitutions, applications for payments, proposal requests, Field Orders, Work Change Directives, Change Orders, and closeout procedures.
13. Progress schedules.
14. Procedures for testing and inspection.
15. Procedures for maintaining Project record documents.

E. ENGINEER will record minutes and distribute copies to participants and those affected by decisions made. Identify errors in the minutes, if any, to ENGINEER in writing within 3 days of receipt.

1.7 PROGRESS MEETINGS

A. ENGINEER will schedule and administer progress meetings at the Site throughout the progress of the Works at minimum weekly intervals or more frequently as required.

B. ENGINEER will make arrangements for meetings, prepare agenda with copies for participants, and preside at meetings. Provide data required to ENGINEER and be prepared to discuss all items on the agenda.

C. Attendance Required: CONTRACTOR's Health and Safety Officer, CONTRACTOR's superintendent and/or project manager, major Subcontractors and Suppliers, as appropriate to agenda topics for each meeting.

D. Agenda will include, but not necessarily be limited to, the following:
1. Review of minutes of previous meetings.
2. Review of work progress since last meeting.
3. Field observations, problems, and decisions.
4. Identification of problems which impede planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-Site material fabrication/processing and delivery schedules.
7. Review of health and safety concerns and issues including air monitoring results.
8. Maintenance of progress schedule.
9. Corrective measures to regain projected schedules.
10. Planned progress during succeeding work period.
11. Coordination of projected progress.
12. Maintenance of quality and work standards.

13. Effect of proposed changes on progress schedule and coordination.
14. Change Orders.
15. Applications for Payment.
16. Other business relating to the Works.

E. Progress meetings attended by parties other than OWNER, ENGINEER, CONTRACTOR, and CONTRACTOR's major Subcontractors and Suppliers will be split into two meetings. Part A will include all parties at the meeting including NYSDEC. Part B will include only OWNER, ENGINEER, CONTRACTOR, and CONTRACTOR's major Subcontractors and Suppliers, and will include discussions related to the Contract.

F. ENGINEER will record minutes and distribute copies to participants and those affected by decisions made within one week following the meeting. All communication to Subcontractors, Suppliers, or others that CONTRACTOR is responsible for will be made through CONTRACTOR. Identify errors in the minutes, if any, to ENGINEER in writing within 3 days of receipt.

1.8 PRE-INSTALLATION MEETINGS

A. When required in individual Sections, convene a pre-installation meeting at the Site prior to commencing work of the Section.

B. Require attendance of parties directly affecting, or affected by, work of the specific Section.

C. Notify ENGINEER, in writing, a minimum of 5 days in advance of meeting date.

D. Prepare agenda and preside at meeting:
1. Review conditions of installation, preparation, and installation procedures.
2. Review coordination with related work.

E. ENGINEER will record minutes and distribute copies to participants and those affected by decisions made.

F. Identify errors in the minutes, if any, to ENGINEER in writing within 3 days of receipt.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Price and payment procedures.
2. References.
3. Submittal procedures.
4. Progress schedules.
5. Monthly progress reports.
6. Construction quality control reports.
7. Proposed products list.
8. Shop Drawings.
9. Product data.
10. Samples.
11. Manufacturer installation instructions.
12. Manufacturer certificates.
13. Construction photographs.
14. Project organization.
15. Submittals for progress meetings.
16. Site layout.
17. Summary of major Project submittals.
18. Submittals schedule.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. No separate payment will be made for work of this Section.

1.3 SUBMITTAL PROCEDURES

A. Submittal procedures shall conform to the requirements of the General Conditions, SHOP DRAWINGS AND SAMPLES, and procedures described in this article.

B. Unless directed otherwise, transmit submittals to ENGINEER at the address set forth in the Special Conditions.

C. Transmit each submittal with a letter of transmittal and the correct number of copies.

D. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

E. Identify the Project, CONTRACTOR, Subcontractor, or Supplier; pertinent Drawing and detail number and Section number, as appropriate.

F. Apply CONTRACTOR's approval stamp prior to initial submission to ENGINEER, signed and dated, certifying that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents including but not limited to review and approval, verification of products required, field dimensions, adjacent construction work, and coordination of information with respect to CONTRACTOR's review and approval of that submittal. Unstamped or unsigned submittals will be returned by ENGINEER without action.

G. Except as specified otherwise, for each submittal for review by ENGINEER allow 15 days excluding delivery time to and from CONTRACTOR. Schedule submittals to expedite the Contract and according to specified scheduling. Coordinate submission of related items.

H. Identify product or system limitations which may be detrimental to successful performance of the completed Works.

I. Provide space for ENGINEER review stamp and comments on submittals.

J. Make corrections to each submittal required by ENGINEER. Promptly revise and resubmit corrected submittal and submit new submittals required by such correction; identify changes made since previous submission and changes other than those requested by ENGINEER.

K. Promptly distribute reviewed submittals to Subcontractors, Suppliers, and other concerned parties as appropriate. Instruct parties to promptly report any inability to comply with provisions.

L. Submittals not requested will not be recognized or processed. Submittals received directly from Subcontractors, Suppliers, vendors, or other Representatives or without CONTRACTOR stamp will be returned by ENGINEER without action.

M. Adjustments made on CONTRACTOR's drawings by ENGINEER are not intended to change the Contract Price. If adjustments affect the Contract Price, state such in writing, as specified elsewhere in the Contract, to ENGINEER for approval prior to proceeding with the Works.

N. It is the responsibility of CONTRACTOR to review submittals made by Suppliers and Subcontractors before transmitting them to ENGINEER to assure proper coordination of the Works and to determine that each submittal is according to CONTRACTOR's desires and that there is sufficient information about materials and equipment for ENGINEER to determine compliance with the Drawings and Specifications. Incomplete or inadequate submittals will be returned for revision without review.

O. Unless specified otherwise submit electronic copy of submittals.

P. Requirements of this article shall apply to all required submittals.

1.4 PROGRESS SCHEDULES

A. Pursuant to the General Conditions, PROSECUTION OF THE WORKS, within 7 days after the date of the Notice to Proceed and prior to commencing work at the Site, submit initial detailed progress schedule in pdf format , and one electronic copy in Microsoft Project Gantt Chart format. Submit updated progress schedules at each progress meeting, identifying changes since previous version and estimated percentage of

completion for each item of the Works. If a schedule remains unchanged from one period to the next, submit a written notice to that effect.

B. Submit a computer generated horizontal bar chart with separate line for each item of work identified in the individual Sections, identifying first work day of each week.

C. Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities, and include the Contract Times identified in Section 01 10 00. Show coordination of interrelated work activities and items. Indicate the early and late start, early and late finish, float dates, and duration.

D. OWNER controls the float time in the progress schedule, and therefore, without obligation to extend either the overall completion date or any intermediate completion dates set out in the progress schedule, OWNER may initiate changes to the Works that absorb float time only. OWNER-initiated changes that affect the critical path on a critical path methods schedule shall be the sole grounds for extending said completion dates. CONTRACTOR initiated changes that encroach on the float time identified in the progress schedule may be accomplished with OWNER's concurrence. Such changes, however, shall give way to OWNER initiated changes competing for the same float time.

E. Portions of the Works that are listed in the progress schedule with a float time may, at the option of OWNER, be performed using any or no amount of the float time, but in no event shall performance of the Works during the float times entitle CONTRACTOR to an increase in the Contract Price as to such portions of the Works or as to other portions of the Works.

F. Provide sub-schedules to define critical activities which dictate the rate of progress.

G. Show accumulated percentage of completion of each item, and total percentage of the Works completed, as of the first day of each month.

H. Provide separate schedule of submittal dates for Shop Drawings, product data, Samples, factory and field testing dates, and product delivery dates, including those furnished by OWNER, and dates reviewed submittals will be required from ENGINEER. Indicate decision dates for selection of finishes.

I. If during performance of the Works CONTRACTOR believes it necessary or advantageous to change sequence of activities shown on CONTRACTOR's progress schedule, submit proposed revisions to ENGINEER for approval prior to changing the sequence of work. No change shall be made in the order in which work activities are being performed until ENGINEER's written approval for the revised schedule has been obtained. The schedule will be acceptable to ENGINEER as providing an orderly progression of the Works to completion within any specified dates identified in Section 01 10 00, but such acceptance will neither impose on ENGINEER responsibility for the sequencing, scheduling, or progress of the Works nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility therefor.

J. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes. Provide narrative report to define problem areas causing delay, anticipated delays and length, and impact on schedule. Report corrective action taken, or proposed, and its effect including the effect of changes on schedules of Other Contractors.

K. Distribute copies of reviewed schedules to Subcontractors, Suppliers, and other concerned parties. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

1.5 MONTHLY PROGRESS REPORTS

A. Submit monthly progress report in a form acceptable to ENGINEER indicating work accomplished, problems encountered, problems resolved, requests for changes to the Works, a comparison of the schedule submitted as part of the Contract Documents versus the current status, and work scheduled for the next month.

B. The following documentation shall be part of the monthly progress report:
   1. Tabulated budget status listing the Contract tasks identified in the progress schedule, and consisting of the following column headings:
      a. Original Budget: Original estimated cost, including direct proportional amount of CONTRACTOR's overhead and profit, to accomplish the tasks. Total cost to complete the tasks shall equal the Contract Price.
      b. Approved Changes: Changes approved by Change Order to the original budget.
      c. Current Budget: Sum of original budget and approved changes.
      d. Percent Complete: Estimated fraction of the work that has been completed.
      e. Achieved Value: Dollar value of the work that has been completed, i.e., current budget multiplied by percent complete.
      f. Amount Spent: Dollar amount that has been spent on the task.
      g. Achieved/Spent Ratio: Comparison of achieved value to amount spent.
   2. Graph that has the Contract months as X-axis and dollars as Y-axis. Each month the graph shall be updated with plots of the achieved value and the amount spent.
   3. Progress Schedule in the form of a Gantt chart with highlighted critical path tasks. The schedule shall show the original schedule and the actual schedule.

1.6 CONSTRUCTION QUALITY CONTROL REPORTS

A. Record daily Construction Quality Control activities in CONTRACTOR's Site log book.

B. Each work day submit a Construction Quality Control report for the previous work day.

1.7 PROPOSED PRODUCTS LIST

A. Within 15 days after the date of the Notice to Proceed and prior to products arrival on the Site, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards or description, give name of manufacturer, trade name, model or catalog designation, and reference standards.

C. For products requiring special handling procedures, submit a Safety Data Sheet (SDS) prior to product's arrival on the Site.

1.8 SHOP DRAWINGS

A. When specified in individual Sections, prepare detailed drawings of material and structures to be supplied by CONTRACTOR from typical details shown on "Approved for Construction" Drawings and/or from specified requirements.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Indicate materials, methods of construction, attachment or anchorage, erection diagrams, connections, explanatory notes, and other information necessary for completion of the Works.

D. Where articles or equipment attach or connect to other articles or equipment, indicate that such work has been coordinated, regardless of the Section under which the adjacent items will be supplied and installed.

E. Confirm dimensions shown on CONTRACTOR’s drawings with actual measurements of existing and/or completed associated structures and affected adjacent work at the Site.

F. Submit one digital copy of CONTRACTOR’s drawings on USB memory stick or electronic file transfer or Compact Disc (CD) compatible for use with Windows 7 and AutoCAD 2012.

G. After ENGINEER completes its review, Shop Drawings will be stamped with one of the following notations:
1. Reviewed.
2. Reviewed as Noted.
3. Not Subject to Review.
4. Revise and Resubmit.

H. If a Shop Drawing is acceptable, it will be marked “Reviewed" or "Reviewed as Noted". Two hard copies of the Shop Drawing will be returned to CONTRACTOR.

I. Upon return of a Shop Drawing marked "Reviewed" or "Reviewed as Noted", CONTRACTOR may order, ship, or fabricate the materials included on the Shop Drawing, provided it is according to the corrections indicated. Upon receipt of Shop Drawings stamped "Reviewed" or “Reviewed as Noted", produce copies and distribute according to PART 1, SUBMITTAL PROCEDURES and for Project record document purposes as described in Section 01 70 00.

J. If a Shop Drawing marked "Reviewed as Noted" has extensive corrections or corrections affecting other drawings or Works, ENGINEER may require that CONTRACTOR make the corrections indicated thereon and resubmit the Shop Drawings for Project record document purposes.

K. Shop Drawings that are for information only will be marked "Not Subject to Review" and one copy will be returned to CONTRACTOR.

L. If a Shop Drawing is unacceptable, it will be will be returned to CONTRACTOR marked "Revise and Resubmit".

M. Upon return of a Shop Drawing marked "Revise and Resubmit", CONTRACTOR shall make the corrections indicated and repeat the initial approval procedure.

N. Shop Drawings lacking adequate details or information to allow ENGINEER to determine whether or not the Shop Drawing meets the requirements of the Contract Documents will also be marked "Revise and Resubmit" and returned without further comment.

O. Shop Drawings not bearing ENGINEER's "Approved" or "Approved as Noted" notation shall not be issued to Subcontractors nor utilized for construction purposes. No work requiring submission and approval of Shop Drawings shall be performed or equipment requiring submission and approval of Shop Drawings installed without Shop Drawings bearing one of these notations.

P. Submit Shop Drawings well in advance of the need for the material or equipment for construction and with ample allowance for time required to make delivery of material or equipment after data covering such is approved. CONTRACTOR shall assume the risk for all materials or equipment which are fabricated or delivered prior to the approval of Shop Drawings. No materials or equipment shall be incorporated into the Works nor included in progress payments until approval thereof has been obtained in the specified manner.

Q. ENGINEER will review and process all Shop Drawings promptly, but a reasonable time should be allowed for this, for Shop Drawings being revised and resubmitted, and for time required to return the approved Shop Drawings to CONTRACTOR. ENGINEER shall endeavor to review Shop Drawings and provide response to CONTRACTOR within 7 working days.

R. Approval of Shop Drawings shall not relieve CONTRACTOR from the responsibility of furnishing materials and equipment of proper dimension, size, quality, quantity, and all performance characteristics to efficiently perform the requirements and intent of the Contract Documents. Approval shall not relieve CONTRACTOR from responsibility for errors of any sort on Shop Drawings. Approval is intended only to assure conformance with the design concept of the Project and compliance with the information given in the Contract Documents. CONTRACTOR is responsible for information that pertains solely to the fabrication processes, to the technique of construction, and for the coordination of the work of all trades.

S. CONTRACTOR shall not be relieved of any part of its responsibilities for correctness of its drawings or adequacy of its design bearing ENGINEER's "Approved" or "Approved as Noted" notation. ENGINEER's approval is for the sole purpose of ascertaining conformance with general design concepts, and in no way constitutes approval of the detail design inherent in CONTRACTOR's drawings, responsibility for which remains solely with CONTRACTOR. Drawings prepared by CONTRACTOR's representatives including Subcontractors, Suppliers, vendors, or other Representatives shall be considered CONTRACTOR's drawings.

1.9 PRODUCT DATA

A. Submit electronic copy of project data to ENGINEER.

B. Mark copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to the Project.

C. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. After review, distribute according to PART 1, SUBMITTAL PROCEDURES and provide copy for Project record documents as described in Section 01 70 00.

1.10 SAMPLES

A. The submittal of Samples shall conform to the requirements of the General Conditions, SHOP DRAWINGS AND SAMPLES and to procedures described in this article.

B. When specified in individual Sections, submit Samples to illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate Sample submittals for interfacing work.

C. Samples and Shop Drawings which are related to the same unit of Works or specification Section shall be submitted at the same time. If related Shop Drawings and Samples are submitted at different times, they cannot be reviewed until both are furnished to ENGINEER.

D. CONTRACTOR shall review, approve, and submit all Samples promptly. Samples shall be identified with correct reference to individual Section, page, article, and paragraph number, and Drawing number when applicable.

E. CONTRACTOR shall submit at least three Samples of each item required for ENGINEER's approval. Submission of Samples shall conform to all applicable provisions under PART 1, SUBMITTAL PROCEDURES. Two of the Samples shall be delivered to ENGINEER's office identified in PART 1, SUBMITTAL PROCEDURES unless otherwise authorized by ENGINEER. One Sample shall be delivered to ENGINEER's field office. Submit the number of Samples specified in individual Sections; one of which will be retained by ENGINEER.

F. ENGINEER will review and take action on Samples with reasonable promptness so as to cause no delay, but only for conformance with the design concept of the Works and with the information given in the Contract Documents.

G. CONTRACTOR shall make all corrections required and shall resubmit the required number of new Samples until approved.

H. ENGINEER's approval of Samples shall not relieve CONTRACTOR of responsibility for any deviation from the requirements of the Contract Documents. ENGINEER's approval shall not relieve CONTRACTOR from responsibility for errors or omissions in the Samples.

I. No portion of the Works requiring a Sample submission shall be commenced until the submission has been approved by ENGINEER. All such portions of the Works shall be according to approved Samples.

J. Reviewed Samples which may be used in the Works are indicated in individual Sections.

1.11 MANUFACTURER INSTALLATION INSTRUCTIONS

A. When specified in individual Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing, to ENGINEER in quantities specified for product data in PART 1, PROPOSED PRODUCTS LIST.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

C. Whenever the Specifications refer to manufacturer's instructions, such reference shall mean written instructions of the manufacturer.

1.12 MANUFACTURER CERTIFICATES

A. When specified in individual Sections, or when required by reference standards, submit certification and/or test results by manufacturer, in quantities specified for product data in PART 1, PROPOSED PRODUCTS LIST.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications, as appropriate.

C. Certificates may be recent or previous test results on material or product, but must be acceptable to ENGINEER.

1.13 CONSTRUCTION PHOTOGRAPHS

A. Provide extensive photo documentation of each work area including Canal diversion, excavation areas, stockpiles locations, staging operations, stabilization, decontamination, to ENGINEER for approval prior to mobilization to each work area, when work is performed and after restoration. Submit electronic progress photographs at least weekly, or as requested by ENGINEER.

B. Take Site photographs from differing directions indicating the relative progress of the Works.

C. ENGINEER will advise CONTRACTOR in writing, describing Project locations and subjects to be photographed, which will not be limited to work performed under the Contract.

D. Each photograph shall contain at least one person or other easily identifiable object properly located to effectively illustrate dimensional scale of work being photographed.

E. Identify photographs with date, time, orientation, Project identification, and description provided by ENGINEER.
   1. Minimum Resolution for Digital Photographs: 5 megapixels.

F. Permission for CONTRACTOR to use progress photographs will be subject to approval of ENGINEER.

G. Deliver photographs to ENGINEER with Project record documents. Catalog and index photographs in chronological sequence; provide table of contents.

1.14 PROJECT ORGANIZATION

A. Within 7 days after the date of the Notice to Proceed and prior to mobilization to the Site submit a Project organization chart identifying major positions and names of persons

assigned to these positions, including off-Site project manager, superintendent, certified industrial hygienist, health and safety officer, testing labs, and Subcontractors.

1.15 SUBMITTALS FOR PROGRESS MEETINGS

A. At least 24 hours prior to scheduled progress meetings submit the following:
   1. Updated progress schedule detailing all activities. Include review of progress with respect to previously established dates for starting and stopping the various stages of the Works, major problems and action taken, injury reports, equipment breakdown, and material removal.
   2. Copies of air sampling and analytical results conducted by CONTRACTOR.
   3. Copies of transport manifests, trip tickets, and disposal receipts for waste materials removed from the work area.
   4. Weekly copies of the Site entry and work area logbooks with information on worker and visitor access.
   5. Any other information required by ENGINEER or relevant to the agenda for the upcoming progress meeting.

1.16 SITE LAYOUT

A. Within 7 days after the date of the Notice to Proceed and prior to mobilization to the Site, submit Site layout drawings showing existing conditions, facilities, proposed construction facilities, and temporary controls to be provided by CONTRACTOR including, but not limited to, the following:
   1. Existing property lines, structures, roads, utilities, and other existing Site feature or facility.
   2. Temporary access roads and utilities to be constructed.
   3. Field offices and sheds.
   4. Equipment and personnel decontamination areas.
   5. The means of ingress and egress and temporary traffic control facilities.
   6. Proposed location of Site access.
   7. Equipment and material staging areas.
   8. Soil stockpile areas.
   9. Exclusion Zones, Contaminant Reduction Zones, and other zones specified in CONTRACTOR's Site-specific Health and Safety Plan.
   10. Grading, including contours, required to construct temporary construction facilities.
   11. Location of wastewater treatment facility.
   12. Any other data deemed pertinent by CONTRACTOR or required by ENGINEER.

1.17 SUMMARY OF MAJOR PROJECT SUBMITTALS

A. In addition to the submittals specified in this Section, submit the following submittals for review:

Name of Submittal	**Specification Cross-Reference**
Contractor Health and Safety Plan	01 35 29 – 1.6
Emergency Response Plan	01 35 29 – 1.10
Odor Control Plan	01 57 16 – 1.2
Dewatering Plan	01 57 19 – 1.5

Name of Submittal	Specification Cross-Reference
Waste Water Treatment Plan	01 57 20 – 1.5
Waste Water Treatment Plant – Waste Management Plan	01 57 20 – 1.5 D
Stabilization Plan	02 55 00 – 1.5
Excavation Plan	02 61 13 – 1.5
Sediment Removal Plan	02 61 16 – 1.4
Transportation and Disposal Proposal	02 61 16 – 1.3
Transportation Emergency Response Plan	02 61 16 – 1.3
Coffer Dam Design	31 23 19 – 1.5
Shoring Design	02 61 13 – 3.3

1.18 SUBMITTALS SCHEDULES

A. Submit a submittals schedule within 7 days after the date of the Notice to Proceed.

B. The submittals schedule shall be in tabular form listing all submittals required by the Contract Documents and the date on which CONTRACTOR will make each submittal. As a minimum, the submittals schedule shall consist of the following columns:
   1. Submittal Number: Number consecutively.
   2. Section Number: Section number or description of location in the Contract Documents where submittal is requested.
   3. Page Number: Page number of the Section in the Contract Documents where submittals is requested.
   4. Item: Description of item or items to which submittals pertain.
   5. Submittal Type: A letter code indicating what type of submittal was requested. The type key shall be as follows:
      a. Test Results and/or Certificates
      b. Manufacturers' Literature or Data (Informative only)
      c. Shop Drawings
      d. Operation and Maintenance Instructions
      e. Samples
      f. Alternative Product Supporting Data
      g. Administrative such as schedules, etc.
   6. Deficiencies: Manner in which submittal or proposed alternative product does not meet the requirements of the Contract Documents.
   7. Anticipated Submittal Date: Date on which CONTRACTOR anticipates submittal to be delivered to ENGINEER.
   8. Response Required: Indicate "yes" if CONTRACTOR anticipates response from ENGINEER and "no" if no response is anticipated.

C. The submittals schedule will be reviewed by ENGINEER and ENGINEER will respond in writing listing deficiencies. Do not list submittals not called for in the Contract Documents. The schedule shall include all items for which CONTRACTOR proposes to use substitute or "or-equal" products. Correct deficiencies and resubmit the submittals schedule prior to beginning any work.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 35 29

HEALTH AND SAFETY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. General requirements.
2. Basis of program.
3. Site characterization.
4. Submittals.
5. Health and Safety Officer and Certified Industrial Hygienist.
6. Personnel health, safety, and hygiene.
7. Air monitoring.
8. Contingency and Emergency Response Plans.
9. Site control.

B. Related Requirements:
1. Section 01 57 16 – Odor Control.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
2. Development, Implementation, and Maintenance of the HASP and Level D/Modified PPE:
a. Schedule of Prices Item No. 01 35 29/1.
b. Payment Basis: Lump sum price. Includes development, implementation, and maintenance of the HASP; provision of all required training; designation and maintenance of work areas; air monitoring for volatile organics, explosive gases, and respirable dust; provision of Emergency First-aid Facility; services of Health and Safety Officer including salary, wages, taxes, and benefits; services of Custodian including salary, wages, taxes, and benefits; and furnishing and maintaining PPE for Level D and Modified Level D.
3. Health and Safety and PPE - Level B:
a. Schedule of Additional Unit Prices Item No. 1.
b. Measurement Basis: By man-hour for the actual number of hours worked per person wearing the specified protective equipment as determined from daily timesheets provided by CONTRACTOR and submitted to ENGINEER on a daily basis for approval.
c. Payment Basis: Unit price. Includes furnishing and maintaining PPE for Level B for all CONTRACTOR personnel required to work in the potentially contaminated work areas.
4. Health and Safety and PPE - Level C:
a. Schedule of Additional Unit Prices Item No. 2.
b. Measurement Basis: By man-hour for the actual number of hours worked per person wearing the specified protective equipment as determined from

daily timesheets provided by CONTRACTOR and submitted to ENGINEER on a daily basis for approval.

c. Payment Basis: Unit price. Includes furnishing and maintaining PPE for Level C (respirator donned) for all CONTRACTOR personnel required to work in the potentially contaminated work areas.

5. Health and Safety and PPE - Modified Level D:
   a. No separate payment will be made for Health and Safety and PPE - Modified Level D. Included under payment Item No. 01 35 29/1.

1.3 REFERENCES

A. Abbreviations and Acronyms:
1. AIHA: American Industrial Hygiene Association.
2. CPR: Cardiopulmonary resuscitation.
3. HASP: Site-specific Health and Safety Plan.
4. JSA: Job Safety Analysis form.
5. SDS: Safety Data Sheet.
6. NIOSH: National Institute for Occupational Safety and Health.
7. NRC: National Response Center.
8. OSHA: Occupational Safety and Health Administration.
9. PCB: Polychlorinated biphenyl.
10. PID: Photoionization detector.
11. PPE: Personal protective equipment.
12. USEPA: United States Environmental Protection Agency.
13. VOC: Volatile Organic Compound.

B. Reference Standards:
1. Section 01 40 00 - Quality Requirements: Requirements for references.
2. Occupational Safety and Health Administration, an agency of the United States Department of Labor, Occupational Safety and Health Standards and Safety and Health Regulations - Code of Federal Regulations:
   a. 29 CFR 1910 - Subpart I - Personal Protective Equipment.
   b. 29 CFR 1910.134 – Subpart I – Personal Protective Equipment - Respiratory Protection.
   c. 29 CFR 1910 - Subpart Z - Toxic and Hazardous Substances.
   d. 29 CFR 1910.120 – Subpart H Hazardous Materials - Hazardous Waste Operations and Emergency Response.
   e. 29 CFR 1910.146 – Subpart J – General Environmental Controls - Permit-required Confined Spaces.
   f. 29 CFR 1910.1200 - Subpart Z - Toxic and Hazardous Substances - Hazard Communication.
   g. 29 CFR 1926 - Subpart P - Excavations.
   h. 29 CFR 1926.65 - Subpart D – Occupational Health and Environmental Controls - Hazardous Waste Operations and Emergency Response.
   i. 29 CFR 1926.502 - Subpart M - Fall Protection - Fall Protection Systems Criteria and Practices.
   j. 49 CFR 171, Subpart B—Incident Reporting, Notification, BOE Approvals and Authorization.
   k. 49 CFR 172, Subpart G—Emergency Response Information.
   l. 49 CFR 390.15, Subpart E - Hazardous Materials Safety Permits.

1.4 GENERAL REQUIREMENTS

A. Develop a written HASP which complies with 29 CFR 1910.120 and 29 CFR 1926.65 prior to commencing mobilization to the Site and continue to implement, maintain, and enforce the HASP until final demobilization from the Site. The development, implementation, and maintenance of the HASP are CONTRACTOR's sole responsibility. As a minimum, CONTRACTOR shall start with the HASP and Emergency Response and Contingency Plans that are provided with these specifications and add any additional requirements to it that may be necessary and/or are specified in this Section.

B. The health and safety guidelines contained herein are minimal requirements intended to provide for a safe and minimal risk working environment for on-Site personnel and to minimize the impact of activities involving contact with hazardous materials or hazardous wastes on the general public and the surrounding environment.

C. Should CONTRACTOR seek relief from, or substitution for, any portion or provision of the health and safety requirements specified herein, or the HASP reviewed by ENGINEER, such relief or substitution shall be requested from ENGINEER in writing, and if accepted by ENGINEER, will be authorized in writing.

D. Responsibility: Be responsible for the safety of persons and property on Site and for the protection of persons off Site and the environment to the extent that they may be affected by the performance of the Works. Comply with, and enforce compliance by employees of CONTRACTOR and Representatives, safety requirements of the Contract Documents, Laws and Regulations, and the HASP. CONTRACTOR acknowledges that safety and environment protection obligations are of paramount importance regarding all of the work to be performed under the Contract Documents.

E. Hazard Communication Requirements:
   1. Comply with the requirements of 29 CFR 1910.1200. Obtain information on any hazardous chemical or harmful physical agent to which personnel of CONTRACTOR and Representatives and visitors have potential exposure while on Site.
   2. Provide ENGINEER with SDS documentation on "hazardous" chemicals that CONTRACTOR or Representatives plan to bring onto the Site. In addition, CONTRACTOR shall be responsible for meeting container warning label requirements of 29 CFR 1910.1200.

F. Work Stoppage: Give precedence to the safety and health of the public and on-Site personnel and the protection of the environment over cost and schedule considerations for all of the work to be performed under the Contract Documents. The Health and Safety Officer shall be responsible for decisions regarding when the Works shall be stopped or started for health or safety considerations and shall have the authority, in the Health and Safety Officer's discretion, to stop or start the Works for health or safety considerations. ENGINEER will also have the right to stop the Works for health and safety considerations.

G. Unforeseen Hazards: Should any unforeseen or Site-peculiar safety-related factor, hazard, or condition become evident during performance of the Works, bring such to the attention of ENGINEER verbally and in writing as quickly as possible, for resolution. In the interim, take prudent action to establish and maintain safe working conditions and to safeguard employees of CONTRACTOR and Representatives, the public, PERFORMING PARTIES, ENGINEER, and the environment.

H. Work Zone Restrictions: Do not work in the Exclusion Zone or Contaminant Reduction Zone, including any areas expected to become an Exclusion Zone or Contaminant Reduction Zone, including work relating to the designation or establishment of an Exclusion Zone or Contaminant Reduction Zone, until the HASP is reviewed by ENGINEER. Other on-Site

work outside the restricted work zones may be conducted after the submittal of the HASP to, and prior to, its review by ENGINEER, but conduct any such work only with the prior approval of ENGINEER. Implement the proposed HASP, as submitted to ENGINEER, during the conduct of any such work prior to the review of the HASP. Ensure all personnel and visitors receive awareness training to ensure they remain outside the restricted work zones.

1.5 BASIS OF PROGRAM

A. OSHA standards and regulations contained in 29 CFR 1910 and 1926 provide the basis for the Site health and safety program. The program also reflects the position of the USEPA and NIOSH regarding procedures recommended or required to ensure safe operations at sites containing hazardous or toxic materials.

1.6 SITE CHARACTERIZATION

A. Work at the Site will involve contact with materials containing elevated concentrations of Contaminants of Concern (COCs) listed below. Known concentration ranges for the COCs are also identified below.

Contaminants of Concern	Concentration at Site
1,2-Dichloroethylene CAS-540-59-0	0-250 ppb
Arsenic CAS-7440-38-2	0-168 ppb
Barium CAS-7440-39-3	6.08-1,860 ppb
Benzene CAS-71-43-2	0-190 ppb
Cadmium (dust/metal) CAS-7440-43-9	
Chlorobenzene CAS-108-90-7	0-30 ppb
Chromium (metal) CAS-7440-47-3	0-197 ppb
DDT CAS-50-29-3	-
Ethyl Benzene CAS-100-42-5	0-650 ppb
Hexachlorobenzene CAS-118-74-1	0-9.3 ppb
Lead (metal) CAS-7439-92-1	0-321 ppb
Mercury - Elemental and inorganic forms CAS-7439-97-6	0-1.03 ppb
PCB (54%) CAS-11097-69-1	0 - 50000 ppm
PCE CAS-127-18-4	0-86 ppb
Phenol	0-80000 ppb

Contaminants of Concern	Concentration at Site
CAS-108-95-2	
Toluene CAS-108-88-3	0-25000 ppb
Vinyl Chloride CAS-75-01-4	0-31 ppb
Xylene (o;m;p isomers) CAS-106-42-3	0-550 ppb

1.7 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. HASP:

1. Within 7 days after the date of the Notice to Proceed and prior to mobilization to the Site, submit a HASP which complies with 29 CFR 1910.120, 29 CFR 1926.65 and the HASP, which was submitted by ENGINEER and accepted by the NYSDEC. As a minimum, the HASP shall include the following:
   a. A safety and health risk or hazard analysis for each work task and operation.
   b. Personnel training assignments in accordance with 29 CFR 1910.120 (e) and 29 CFR 1926.65 (e).
   c. PPE to be used by personnel on Site for each work task and operation being conducted in accordance with 29 CFR 1910.120 (g) (5) and 29 CFR 1926.65 (g) (5).
   d. Medical surveillance requirements in accordance with 29 CFR 1910.120 (f) and 29 CFR 1926.65 (f).
   e. Air monitoring program in accordance with 29 CFR 1920 (h) and 29 CFR 1926.65 (h), including frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment to be used.
   f. Site control measures in accordance with 29 CFR 1910.120 (d) and 29 CFR 1926.65 (d).
   g. Decontamination procedures in accordance with 29 CFR 1910.120 (k) and 29 CFR 1926.65 (k).
   h. Contingency and Emergency Response Plans meeting the requirements of 29 CFR 1910.120 (l) and 29 CFR 1926.65 (l) for safe and effective responses to emergencies, including necessary PPE and other equipment. CONTRACTOR shall start with the Emergency Response and Contingency Plan that has been provided with these specifications and add any additional requirements that may be necessary as determined by CONTRACTOR.
   i. Provisions for first aid and bloodborne pathogens.
   j. Communication systems.
   k. A detailed description of the planned movement of labor, equipment, and materials from and between work areas as work progresses, including measures to be employed to prevent recontamination of previously cleaned areas and contamination of areas that do not now contain hazardous materials.
   l. A written respiratory protection program for work activities.

m. Dust Suppression Program.
n. Odor Control Plan in accordance with Section 01 57 16.
o. Procedures dealing with heat and/or cold stress.
p. Confined space entry procedures.
q. A spill containment program meeting the requirements of 29 CFR 1910.120 (j) and 29 CFR 1926.65 (j) if drummed waste material is generated, excavated, stored, or managed at the Site.
r. A detailed description of the personnel decontamination facilities to be employed including the planned phasing of decontamination facilities between work areas as work progresses and the methods to be used to collect, store, treat, and ultimately dispose of personnel decontamination waters and wastes.
s. A detailed description of the wash down area for decontamination of vehicles and equipment and the methods to be used to collect, store, treat, and ultimately dispose of wash down decontamination waters and sediments.
t. Physical, chemical, biological and other applicable Site hazards.
u. Hauling operations, traffic control and road maintenance.
v. Accident/Incident Report form(s).

2. ENGINEER will review the HASP and provide comments to CONTRACTOR within 7 days after receipt of the HASP. Revise the HASP as appropriate and resubmit the HASP to ENGINEER within 7 days after receipt of comments from ENGINEER.

C. Proof of OSHA Training: Within 7 days after the date of the Notice to Proceed and prior to mobilization to the Site, submit a list of all personnel who will be employed at the Site. For each of the listed personnel, provide proof of training as required under 29 CFR 1910.120 and 29 CFR 1926.65. Submit proof of training for any additional personnel as they are sent to the Site.

D. Medical Surveillance:
1. Within 7 days after the date of the Notice to Proceed and prior to mobilization to the Site, submit certification of medical surveillance for all Site personnel.
2. Submit additional certification of medical surveillance as personnel are sent to the Site.

E. Respirator Fit Test: Within 7 days after the date of the Notice to Proceed and prior to mobilization to the Site, submit proof of respirator fit testing for on-Site personnel.

F. FPAP Plan:
1. A qualified person for fall protection shall prepare and sign the FPAP Plan which complies with 29 CFR 1926.502. The FPAP Plan shall be Site-specific and address all fall hazards on-Site and during different phases of the Works. The FPAP Plan shall address:
   a. How to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above 6 feet.
   b. Fall protection and prevention systems, equipment and methods employed for every phase of the Works, responsibilities, assisted rescue, self rescue, and evacuation procedures, training requirements, and monitoring methods.
2. Revise the FPAP Plan as necessary, reflecting any changes during the performance of the Works due to changes in personnel, equipment, systems, or work habits. The accepted FPAP Plan shall be kept and maintained at the Site for the duration of the Works.

G. Air Monitoring Reporting: Submit real-time air monitoring results daily on a separate CONTRACTOR designated form.

H. Physical Hazard Control Records: Maintain records of the activities undertaken to control physical hazards on Site. As a minimum, include the following:
   1. Heart rate measurements and/or oral temperatures for heat stress monitoring.
   2. Results of heavy equipment inspections
   3. Training and experience records of heavy equipment operators.
   4. Lockout/tagout records, as required by the HASP.
   5. Results of documented work area inspections.
   6. Results of documented excavation inspections.
   7. Activities on the soil stabilization and staging pad.

1.8 HEALTH AND SAFETY OFFICER AND CERTIFIED SAFETY PROFESSIONAL

A. Employ and assign to the Works a competent and authorized representative, herein referred to as "Health and Safety Officer".

B. Health and Safety Officer Qualifications:
   1. Minimum of 2 years Site related working experience as a Health and Safety Officer specific to remedial construction activities at hazardous waste sites.
   2. Basic working knowledge of state and federal occupational safety and health regulations.
   3. Formal education and/or training in occupational safety and health.

C. Health and Safety Officer Responsibilities:
   1. Obligated to stop or start the work when it is necessary or advisable for reasons of health or safety.
   2. Conduct health and safety training sessions and ensuring that personnel not successfully completing the required training are not permitted to enter the Site to perform work in the Exclusion Zone or Contaminant Reduction Zone.
   3. Implementation and daily enforcement and monitoring of the HASP.
   4. Be on the Site during the execution of work at the Site and report directly to and be under the direction of a Certified Safety Professional.
   5. Verify that all on-Site personnel are made aware of the provisions of the HASP and have been informed of the nature of physical and/or chemical hazards associated with Site activities.
   6. Ensure that JSA forms have been developed for all Project tasks and that Project personnel have been trained in all JSAs.
   7. Maintain a daily log of all significant health and safety activities and incidents.
   8. Verify that on-Site personnel and visitors have received the required training, including instructions for safety equipment and PPE use.
   9. Suspend work if health and/or safety-related concerns arise.
   10. Provide on-Site technical assistance.
   11. Conduct the Site and personal air monitoring program, including all required real-time air monitoring and equipment maintenance and calibration. Submit collected samples to an AIHA accredited laboratory.
   12. Issue/obtain required work permits.
   13. Conduct Site safety orientation training and daily safety meetings.
   14. Maintain the Exclusion Zones, Contaminant Reduction Zone, and Support Zones.
   15. Coordinate emergency procedures.
   16. Conduct on-Site personnel safety indoctrination sessions for potential hazards, personal hygiene principles, confined space entry procedures, all other standard

operating procedures, safety equipment usage, emergency procedures, and location of first aid kits and identification of personnel trained in first aid and CPR.
17. Supervise and inspect equipment cleaning.
18. Maintain the on-Site Hazard Communication Program including copies of all SDSs.
19. Verify that on-Site personnel have received the required physical examinations and medical certifications.
20. Review Site activities with respect to the adequacy of the HASP.
21. Maintain required health and safety documents and records on Site.

D. Employ and assign to the Work a competent and authorized representative, herein referred to as "Certified Safety Professional". Certified Safety Professional Responsibilities:
1. Oversee operations as necessary to ensure the Work is performed in accordance with the Site specific Health and Safety Plan.
2. Oversee and be present during Health and Safety Training Sessions and, as a minimum, complete qualitative respirator fit testing.
3. Oversee the Health and Safety Officer's activities on a part time basis.
4. Be available on an as needed basis for emergency situations.

1.9 PERSONNEL HEALTH, SAFETY, AND HYGIENE

A. Medical Surveillance: Conduct medical surveillance of personnel as required by 29 CFR 1910.120, 29 CFR 1926.65, and 29 CFR 1910.134.

B. Training: Furnish personnel assigned to or entering the Site who have successfully completed training required by the applicable OSHA Standards in 29 CFR 1910 and 29 CFR 1926 and specifically with 29 CFR 1910.120 and 1926.65.

C. Levels of Protection: Establish actual levels of protection for each work area based on planned activity and location of activity. The anticipated levels of personal protection based on work activity are as follows:

Work Activity	**Anticipated Level of Personal Protection**
Mobilization and demobilization of labor, materials, and equipment to and from the Site, reconnaissance activities, preparation/setup and restoration activities	Level D, Modified Level D
Surveying Activities	Level D, Modified Level D
Clearing and Grubbing	Level D, Modified Level D
Installation of erosion control measures	Level D, Modified Level D
Excavation, stockpiling, and loading of impacted soils	Level B, Level C and Modified Level D
Construction of a soil management area	Level D. Modified Level D
Sediment and soil stabilization activities	Level C, Level D and Modified Level D

Work Activity	Anticipated Level of Personal Protection
Collection, storage, and disposal of accumulated water from excavations and the decontamination area	Level C, Modified Level D
Backfilling	Level C, Modified Level D
Soil/sediment sampling activities	Level C, Modified Level D
Oversight of construction activities	Level C, Modified Level D
Equipment and personnel decontamination activities	Level C, Modified Level D

D. PPE:
   1. Furnish on-Site CONTRACTOR personnel with appropriate PPE. Clean and maintain safety equipment and protective clothing. As a minimum, each worker on Site shall wear a hard hat, safety glasses with side shields, safety boots with steel toes and shank, full-length pants, and long- sleeved shirt.
   2. Develop PPE usage procedures and enforce strict compliance with such procedures by on-Site personnel. Include the following procedures as a minimum:
      a. Do not permit prescription eyeglasses to be worn that are not safety glasses.
      b. Change respirator cartridges/filters daily during periods of respirator usage or prior to breakthrough, whichever occurs first.
   3. Do not permit footwear to be worn that is not steel-toed safety shoes or boots. Require footwear to be covered by rubber overshoes when entering or working in the Exclusion Zone or Contaminant Reduction Zone.
   4. Dispose of or decontaminate PPE worn on Site at break time and at the end of the work day.
   5. Decontaminate reusable PPE before reissuing.
   6. Do not permit on-Site personnel who have not passed a respirator fit test to enter the Exclusion Zone or Contaminant Reduction Zone. Do not permit personnel to have facial hair that interferes with a proper fit of the respirator.

E. Respiratory Protection:
   1. Furnish on-Site personnel with extensive training in the usage and limitations of, and qualitative fit testing for, air purifying and supplied-air respirators in accordance with 29 CFR 1910.134 for confined space entry, or any work requiring Level C or higher protection.
   2. Develop, implement, and maintain a written respiratory program in accordance with 29 CFR 1910.134.
   3. Monitor, evaluate, and provide respiratory protection for on-Site personnel.
   4. Immediately notify ENGINEER when level of respiratory protection required increases from Level D to Level C or from Level C to Level B.
   5. Be responsible for appropriate respiratory protection during work activities. Do not allow persons to enter the Exclusion Zone or Contaminant Reduction Zone without appropriate respiratory protection.
   6. Be responsible for assessing the ability for on-Site personnel to wear respiratory protection. Cardiopulmonary system examination and pulmonary function testing are minimum requirements for personnel wearing respiratory protection.

7. Do not permit on-Site personnel unable to pass a respirator fit test to wear respiratory protection and to enter the Exclusion Zone or Contaminant Reduction Zone.

F. Heat Stress/Cold Stress: Implement a heat stress and/or cold stress monitoring program as applicable and include the CONTRACTOR's Site-specific program in the HASP.

G. Personnel Hygiene and Personnel Decontamination Procedures:
1. Provide, as a minimum, the following:
   a. Suitable disposable and reusable PPE on a daily basis for the use of CONTRACTOR's on-Site personnel.
   b. Suitable containers for storage and disposal of used disposable PPE.
   c. Potable water and a suitable sanitation facility.

H. Emergency and First aid Equipment:
1. Locate and maintain emergency and first aid equipment in appropriate on-Site location, including:
   a. First aid kit containing medications appropriate for the initial treatment of burns, abrasions, fractures, and ingestion or dermal contact with on-Site hazardous waste. Size first aid kit in accordance with the potential maximum number of on-Site personnel.
   b. Portable emergency eye wash and shower capable of providing adequate irrigation for 15 uninterrupted minutes.
   c. Two 20-pound ABC type dry chemical fire extinguishers.
   d. Blankets and towels.
   e. Stretcher.
   f. One hand-held emergency siren (air horn) for each work area.
   g. A windsock(s) visible from all work areas.
   h. Two complete sets of Level B equipment or self-contained breathing apparatus (SCBA) for each work area.
2. As a minimum, provide one certified first aid and CPR technician on Site at all times that on-Site work activities are in progress. This technician may perform other duties but shall be immediately available to render first aid when needed.

I. Site Communications:
1. Post emergency numbers near Site telephones.
2. Ensure that personnel work under the use of a "buddy" system and develop a hand signal system appropriate for Site activities.
3. Provide an employee alarm system to notify employees of on-Site emergency situations or to stop work activities if necessary.
4. Furnish selected personnel with two-way radios.

J. Safety Meetings: Conduct mandatory daily safety meetings for on-Site personnel in the morning to discuss safety issues recapped from the day before, review of JSAs for the work activities for the current day as well as health and safety issues for the current day, to address questions that may have arisen in the workforce, and additionally as required by special or work-related conditions. Include refresher training for existing equipment and protocols, review ongoing safety issues and protocols, and examine new Site conditions as they are encountered. Hold additional safety meetings on an as needed basis.

K. Custodian: Employ and assign to the Works a person who shall report directly to the Health and Safety Officer and who shall be responsible for keeping safety equipment and facilities clean, properly equipped, and maintained, herein referred to as "Custodian". The Custodian

may perform other duties for CONTRACTOR but the Custodian's first priority shall be maintenance of PPE and the personnel decontamination area.

1.10 AIR MONITORING

A. Develop an air monitoring program meeting the requirements of 29 CFR 1910.120 (h) and 29 CFR 1926.65 (h). Implement all aspects of the air monitoring program that is presented in the ENGINEER's HASP that has been provided.

B. Provide the required instruments for air monitoring including, as a minimum:
   1. PID equipped with an 10.6 eV lamp.
   2. MIE PDM DataRam, or equivalent.
   3. MultiRae capable of monitoring oxygen, combustible gas, and carbon monoxide.

C. Calibrate air monitoring equipment on a daily basis in accordance with manufacturer's guidelines. Record calibrations in the Site daily logbook.

D. Furnish a wind speed and direction indicator capable of providing a permanent record, placed at an unobstructed on-Site location above the elevation of the work area, clearly visible to affected workers.

E. Community Air Monitoring Plan (CAMP): ENGINEER will perform during the progress of work activities to ensure that the community will not be adversely impacted during Site activities and in accordance with the Community Air Monitoring Plan that is presented in Attachment C of the ENGINEER's HASP.

F. Fugitive Dust Suppression and Particulate Monitoring Program: Implement the following fugitive dust suppression program at the Site during ground invasive activities or during other activities which may potentially create an airborne hazard:
   1. Implement reasonable fugitive dust suppression techniques during Site activities which may generate fugitive dust. ENGINEER may direct CONTRACTOR to take additional steps if controls are not effective.
   2. As required in the CAMP, ENGINEER will perform particulate monitoring using a real-time particulate monitor that is capable of monitoring particulate matter less than 10 microns in size. ENGINEER will monitor particulate levels at the downwind Site perimeter. Readings will be based on 15-minute average concentrations.
   3. ENGINEER will set action level at 150 µg/m^3 based on a 15-minute average. If particulate levels are detected in excess of 150 µg/m^3, ENGINEER will immediately measure the upwind background level. If the particulate measurement is greater than 100 µg/m^3 above the background level, CONTRACTOR will be directed to implement additional dust suppression techniques to reduce generation of fugitive dust and take corrective action to protect Site personnel and reduce the potential for off-Site contaminant migration. Corrective measures may include increasing the level of personal protection and implementing additional dust suppression techniques. Dust suppression techniques may include:
      a. Applying water on haul roads.
      b. Wetting equipment, waste piles, and excavation faces.
      c. Spraying potable water on excavation buckets during excavation and grading.
      d. Hauling materials in tarped containers.
      e. Restricting vehicle speed.
      f. Immediately covering excavation areas or materials upon completion.
      g. Reducing the size and/or number of excavations.

4. If excessive dust is observed leaving the work area, as determined by ENGINEER, implement additional dust suppression techniques.
5. If the dust suppression techniques being utilized at the Site do not lower particulates to an acceptable level, i.e., below 150 µg/m^3, suspend work and implement appropriate corrective measures to lower dust levels to an acceptable level.

G. Odor Control Plan: In accordance with Section 01 57 16.

H. Reporting:
1. Report the results of air monitoring programs to ENGINEER daily. Include the following information as applicable:
   a. Site location and date.
   b. Work process and operation name.
   c. Temperature, wind speed, and wind direction.
   d. Area sampling location diagram.
   e. Field notes, including the following:
      1) Description of operations and complaints and symptoms.
      2) Chemicals, materials, and equipment in use.
      3) Engineering and administration controls in effect.
      4) PPE in use.
      5) Sampling observations and comments.
2. Record all daily air monitoring activities in a hard cover log book which shall be maintained on Site at all times by the Health and Safety Officer.

1.11 CONTINGENCY AND EMERGENCY RESPONSE PLANS

A. Comply with 29 CFR 1910.120 (l) and 20 CFR 1926.65 (l) and the requirements presented in the Emergency Response Plan section of the ENGINEER's HASP and the requirements in the Remedial Design Report. CONTRACTOR shall start with the Emergency Response Plan that has been provided with these specifications and add any additional requirements that may be necessary as determined by CONTRACTOR.

B. Include and address the following emergency situations and responses, as a minimum:
1. In the event of injury to on-Site personnel or contact with hazardous materials requiring immediate medical attention, implement the following protocol:
   a. Notify ENGINEER and the Health and Safety Officer.
   b. Phone 911 (Community Responders) and describe the injury.
   c. Decontaminate personnel and administer appropriate first aid.
   d. Transport personnel to the specified hospital along the most direct route which shall be predefined prior to commencing work on the Site.
2. In the event that a release of a hazardous waste occurs on Site beyond the limit of working areas, implement the protocols presented in the HASP. As a minimum, the response action shall consist of:
   a. Notifying the NYSDEC representative or his or her designee and, if the release qualifies under 40 CFR Part 302 (Designation, Reportable Quantities and Notification), the NRC.
   b. Performing material containment actions.
   c. Performing air monitoring to determine if the released material migrated off Site.
   d. Performing required decontamination and/or disposal activities.
   e. Creating an Incident Report, which will, as a minimum, discuss the incident and the response actions taken, present the findings from the investigation

of the incident, and present protocols to prevent a reoccurrence of the situation.

3. In the event that excessive gases or vapors are detected at a work area, take the following actions:
   a. Evacuate workers to an area upwind of the affected area.
   b. Identify the contaminant and monitor contaminant concentrations to determine the type of respiratory protection and/or engineering controls required before workers re-enter the area.
4. In the event of a fire at a work area, quickly use fire extinguishers and/or earth moving equipment to smother the fire if possible and, if the presence of noxious gases or degree of hazard prohibits this, employ proper evacuation procedures. Notify the Police and Fire Department. Police and Fire Department Officials will assume responsibility for coordinating with the Health and Safety Officer for the proper emergency response strategy upon arrival.
5. In the highly unlikely event of a major leak of toxic gas, such as might occur if a compressed gas cylinder were encountered and ruptured, evacuate on-Site personnel to a safe distance, and notify the Police and Fire Department and local hospital if deemed necessary by the Health and Safety Officer. Police and Fire Department officials will assume responsibility for coordinating with the Health and Safety Officer for the proper emergency response strategy upon arrival.

C. Off-Site Contingency and Emergency Response Plan:
1. Attend a coordination meeting to be held with appropriate authorities including the Town, Fire Department, Hospital, State and City Police, State Department of Transportation, County Health Department, and Community Emergency Coordinator. The meeting will identify the off-Site Emergency Response Coordinator through whom all information and coordination will occur in the event of an incident.
2. Prior to commencing work involving the off-Site transportation of soils and waste materials, CONTRACTOR shall develop a written emergency response plan that identifies the emergency response actions that will be implemented involving a spill or release of waste material (i.e., vehicle rollover, equipment failure or leakage) from a truck that is in transit to a disposal facility. The Emergency Response Plan will identify the designated truck routes that will be used for driving to the disposal facility, a requirement to communicate these designated truck routes to all drivers to ensure that they stay on the designated routes and will also identify the name of the firm(s) and phone number(s) who have been contracted with to provide emergency response services. CONTRACTOR shall have agreements in place with these firms that will require them to respond to the scene of any emergency within a 4-hour time frame.
3. Only authorized transporters will be used for the transportation of hazardous materials. If a release of material from a transport vehicle occurs while in transit, the following actions will be taken to reduce potential migration of the waste material:
   a. Immediately notify CONTRACTOR, who will in turn notify ENGINEER and ENGINEER will notify the NYSDEC.
   b. Take immediate measures within the capabilities of the transport driver to control the release, if necessary.
   c. Contain and eliminate the release, if possible.
   d. The driver must remain within a safe distance of the vehicle, and will keep unnecessary people away, isolate the area of the release, and deny entry to unauthorized personnel.
   e. Stay upwind, keeping out of low areas, and do not allow contact with the related material.
   f. Contact the appropriate local authorities (police, fire department, traffic control) and local hazardous materials response units.
   g. Other actions, as advised by the spill response team.

4. In the event of an accident involving transport vehicles, follow the procedures outlined in CONTRACTOR's Emergency Response Plan and comply with the requirements of 49 CFR 171 Subpart B, 49 CFR 172, Subpart G, and 49 CFR 390.15 Subpart E.

1.12 SITE CONTROL

A. Comply with 29 CFR 1910.120 (d) and 20 CFR 1926.65 (d). Refer to the HASP that has been provided for information on the Site Characterization.

B. Slip, Trip, and Fall Hazards: Maintain good housekeeping at the Site for the duration of the Works. Remove, mark, or guard trip hazards. Use extreme caution when working on or around slippery surfaces. Take necessary precautions to protect personnel from injuries caused by slick surfaces.

C. Fall Protection: Using guard rail systems or personal fall arrest systems to protect walking or working horizontal and vertical surfaces at the Site with an unprotected side or edge that is 6 feet or more above a lower level such as found at the edge of excavations. Comply with 29 CFR 1926.502.

D. Confined Space Entry Program: Comply with 29 CFR 1926.1200 through 1213 and 29 CFR 1910.146. Confined space workers and attendants shall wear and use fall arrest equipment according to manufacturer's instructions when there is a risk of falling:
   1. Six feet.
   2. Into operating machinery.
   3. Into water or another liquid.
   4. Onto a hazardous substance or object.
   5. Through an opening on a work surface.

E. Work Areas: Clearly layout and identify work areas in the field and limit equipment, operations, and personnel in the areas as defined below. Establish work areas as temporary or permanent, depending on the work activity and the sequence in which it is performed. These areas are:
   1. Exclusion Zone: Includes areas where hazardous or potentially contaminated soils, debris, and other materials are being excavated contacted, disturbed, or handled (e.g., soil stabilization) and areas where contaminated equipment or personnel travel. Establish temporary Exclusion Zones around remote work areas beyond the limits of the Exclusion Zone; clearly delineate temporary Exclusion Zones with temporary fencing and warning signs.
   2. Contaminant Reduction Zone: Occurs at the interface of the Exclusion Zone and Support Zone and provides for the prevailing upwind transfer of construction materials from clean to Site-dedicated equipment, the decontamination of equipment and vehicles prior to entering the Support Zone from the Exclusion Zone, the decontamination of personnel and clothing prior to entering the Support Zone from the Exclusion Zone, and the physical segregation of Support and Exclusion Zones. An additional Contaminant Reduction Zone will be located on the decontamination wash pad.
   3. Support Zone: Defined as a clearly delineated predominantly upwind area outside the Exclusion Zone(s) and Contaminant Reduction Zone(s), which functions include:
      a. An entry area for personnel, material, and equipment to the Contaminant Reduction Zone.
      b. An exit area for decontaminated personnel, material, and equipment from the Contaminant Reduction Zone.

c. A storage area for clean safety and work equipment.

F. Particulate Emission Control Program: Prior to commencing the Works, submit a Particulate Emission Control Program for approval. During work activities, implement and enforce this program to minimize the generation and migration of dust, cement kiln dust and/or lime on and off Site. The Particulate Emission Control Program is in addition to the Fugitive Dust Suppression Program.

G. Contaminant Migration Control: Take appropriate measures to prevent contaminant tracking on and off the Site. Decontaminate all vehicles including transport vehicles, equipment, and workers leaving areas of potential contamination prior to entry into Support Zones. Locate decontamination facilities and sequence work activities to prevent contaminant tracking.

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. References.
2. Quality control.
3. Tolerances.
4. Requirements for references.
5. Mockup.
6. Inspecting company and testing laboratory services.
7. Manufacturers' field services and reports.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. No separate payment will be made for work of this Section.

1.3 REFERENCES

A. Reference Standards:
1. ASTM International:
a. ASTM D3740- Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
b. ASTM E329- Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.
c. ASTM E543- Standard Specification for Agencies Performing Nondestructive Testing.

1.4 QUALITY CONTROL

A. CONTRACTOR is solely responsible for establishing and implementing a quality control program to ensure that the Works is in accordance with the Contract Documents.

B. Monitor quality control over Suppliers, products, services, Site conditions, and workmanship, to produce Works of specified quality.

C. Comply with manufacturers' instructions, including each step in sequence.

D. Should manufacturers' instructions conflict with the Contract Documents, request clarification from ENGINEER before proceeding.

E. Comply with specified standards as minimum quality for the Works except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

F. Perform work by persons qualified to produce workmanship of specified quality. Use persons licensed to perform the Works where required by these Specifications or Laws and Regulations.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

H. Materials furnished and finished or intermediate stages of the Works shall be sampled, tested, and inspected as specified in individual Sections and as required by reference standards.

1.5 TOLERANCES

A. Monitor tolerance control of installed products to produce acceptable Works. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with the Contract Documents, request clarification from ENGINEER before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.6 REQUIREMENTS FOR REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable Laws and Regulations.

B. Conform to reference standard by date of issue current as of bid closing date, except where a specific date is established by Laws or Regulations or by an individual Section.

C. Specific provisions of Laws or Regulations may be referenced in the Project Specifications to assist CONTRACTOR and identify options selected by ENGINEER. Such references do not relieve CONTRACTOR from compliance with other applicable provisions of Laws or Regulations not specifically referenced.

D. No inference or provision of any reference document including, but not limited to any standard specification, manual, or code shall be effective to change the relationships, duties, and responsibilities of OWNER, CONTRACTOR, or ENGINEER from those set forth in the Contract Documents, nor shall it be effective to assign to OWNER or ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Works or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract.

E. Reference standards referred to in these Specifications form part of the Specifications to the extent specified in individual Sections.

F. In case of conflict or discrepancy between a reference standard and the Project Specifications or with another reference standard, the more stringent requirements shall apply.

G. Should specified reference standards conflict with the Contract Documents, request clarification from ENGINEER before proceeding.

1.7 INSPECTING AND TESTING SERVICES

A. CONTRACTOR shall employ and pay for services of an independent testing laboratory to perform inspecting and testing services as specified in individual Sections.

B. Employment of testing laboratory and services performed by such testing laboratory in no way relieves CONTRACTOR of obligation to perform the Works according to requirements of the Contract Documents.

C. Quality Assurance:
1. Comply with requirements of the reference standards listed in PART 1, REFERENCES.
2. Comply with agencies listed in individual Sections.
3. Inspecting Company and Testing Laboratory: Authorized to operate in the state in which the Site is located.
4. Inspecting Company and Testing Laboratory Staff: Maintain a full-time registered professional engineer on staff to review services.
5. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either the National Institute of Standards and Technology (NIST) or accepted values of natural physical constants.

D. CONTRACTOR Submittals:
1. Prior to start of the Works, submit independent testing laboratory name(s), address, and telephone number, and names of full-time specialist and responsible officer.
2. Submit copy of report of testing laboratory facilities inspection made by the Materials Reference Laboratory of NIST during most recent inspection, with memorandum of remedies of deficiencies reported by the inspection.

E. Testing Laboratory Responsibilities:
1. Test samples of mixes and materials submitted by CONTRACTOR.
2. Provide qualified personnel at the Site. Cooperate with ENGINEER and CONTRACTOR in performance of services.
3. Perform specified inspecting, sampling, and testing of products and methods of construction according to specified standards.
4. Ascertain compliance of materials and mixes with requirements of the Contract Documents.
5. Promptly notify ENGINEER and CONTRACTOR of observed irregularities, deficiencies, or non-conformance of products.
6. Perform additional inspection and tests required by ENGINEER.
7. Attend pre-construction meetings and progress meetings, as required.

F. Testing Laboratory Reports:
1. After each inspection and test promptly submit two copies of reports to ENGINEER and CONTRACTOR. Submit draft on-Site inspection report prior to leaving the Site.

2. As a minimum, reports shall include:
   a. Date issued.
   b. Project title and number.
   c. Name and address of testing laboratory.
   d. Name of inspector.
   e. Date and time of sampling or inspection.
   f. Identification of product and related specification Section.
   g. Location in the Project.
   h. Record of temperature and weather.
   i. Type of inspection or test.
   j. Date of test.
   k. Results of tests and observations.
   l. Conformance with the Contract Documents.
3. When requested by ENGINEER, provide interpretation of test results.

G. Limits on Testing Laboratory Authority:
1. Testing laboratory may not release, revoke, alter, or enlarge upon requirements of the Contract Documents.
2. Testing laboratory may not approve or accept any portion of the Works.
3. Testing laboratory may not assume or perform any duties of CONTRACTOR.
4. Testing laboratory has no authority to stop the Works.

H. CONTRACTOR Responsibilities:
1. Deliver to testing laboratory at designated location, adequate samples of materials proposed to be used which require testing.
2. Cooperate with personnel of independent testing laboratory, and provide safe access to the Works and to manufacturer's operations.
3. Provide incidental labor and facilities:
   a. To provide access to the Works to be tested.
   b. To obtain and handle samples at the Site or at source of products to be tested.
   c. To facilitate tests and inspections.
   d. For testing laboratory's exclusive use for storage and curing of test samples.
   e. Forms for preparing concrete test beams and cylinders.
4. Notify ENGINEER and testing laboratory 24 hours prior to expected time for operations requiring inspecting and testing services to allow for assignment of personnel and scheduling of tests.
5. Furnish copies of product test reports.
6. Promptly notify ENGINEER of all observed irregularities or non-conformance of the Works.
7. Retesting required because of CONTRACTOR negligence or non-conformance to specified requirements shall be performed by the same testing laboratory on instructions by ENGINEER at CONTRACTOR's expense and at no additional cost to OWNER.
8. If defects or deficiencies are revealed during testing or inspecting, correct such defects and deficiencies and retest affected portions of the Works.

1.8 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual Sections, require Suppliers to provide qualified personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, and to initiate instructions when necessary.

B. Submit qualifications of observer to ENGINEER 30 days in advance of required observations. Observer subject to approval of ENGINEER.

C. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

D. Submit report on same day as the Site visit to ENGINEER for information.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Temporary Utilities:
a. Electricity.
b. Water service.
c. Telephone service.
d. Facsimile service.
e. Portable radios.
f. Construction lighting.
g. Heat.
h. Temporary cooling.
i. Fire protection.
2. Construction Facilities:
a. ENGINEER's field office.
b. CONTRACTOR's field office and sheds.
c. Equipment Decontamination Pads.
d. Personnel Hygiene/Decontamination Facility.
e. Emergency First-aid Facility.
f. Sanitary facilities.
g. Storage/stockpiling facilities.
h. Staging and Dewatering Pad.
i. Wastewater storage tanks.
j. Drums.
3. Vehicular Access and Parking:
a. Access roads.
b. Parking.
c. Traffic regulation.
4. Temporary Barriers and Enclosures:
a. Barriers.
b. Fencing.
c. Exterior enclosures.
d. Security.
5. Temporary Controls:
a. Water control.
b. Dewatering.
c. Erosion and sediment control.
d. Noise control.
e. Dust and particulate control.
f. Pollution control.
g. Equipment decontamination.
6. Project identification.
7. Removal of temporary facilities and controls.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
2. ENGINEER's Field Office:
a. Schedule of Prices Item No. 01 50 00/1.
b. Payment Basis: Lump sum price. Includes supplying, installing, and maintaining ENGINEER's field office; office furnishings; telephone, answering machine, printer/scanner, high speed internet, photocopy, and water service.
3. Personnel Hygiene/Decontamination Facility:
a. Schedule of Prices Item No. 01 50 00/2.
b. Payment Basis: Lump sum price. Includes supplying, installing, maintaining, operating, cleaning, and stocking the Personnel Hygiene/Decontamination Facility, Emergency First-aid Facility, and toilet facilities; personnel hygiene and decontamination materials; toilets; wastewater and potable water holding tanks.
4. Equipment Decontamination Pads:
a. Schedule of Prices Item No. 01 50 00/3.
b. Payment Basis: Lump sum price. Includes constructing the Equipment Decontamination Pads, operating and maintaining pads for the duration of the Works.
5. Staging and Dewatering Pads:
a. Schedule of Prices Item No. 01 50 00/4.
b. Payment Basis: Lump sum price. Includes constructing the Staging and Dewatering Pads and maintaining pads for the duration of the Works.
6. Temporary Access Roads and Traffic Control:
a. Schedule of Prices Item No. 01 50 00/5.
b. Payment Basis: Lump sum price. Includes maintaining temporary access roads including traffic controls required for the duration of the Works.
7. CONTRACTOR Support Facilities:
a. Schedule of Prices Item No. 01 50 00/6.
b. Payment Basis: Lump sum price. Includes provision and maintenance of CONTRACTOR Support Facilities for the duration of the Works.
8. Protection of Existing Structures and Site Security:
a. Schedule of Prices Item No. 01 50 00/7.
b. Payment Basis: Lump Sum price. Includes provision of temporary barriers and enclosures including fencing, protection of existing structures, and Site security.

1.3 REFERENCES

A. Abbreviations and Acronyms:
1. DOT: Department of Transportation.

B. Reference Standards:
1. Section 01 40 00 - Quality Requirements: Requirements for references.
2. National Fire Protection Association:
a. NFPA 10 - Standard for Portable Fire Extinguishers.
b. NFPA 70 - National Electrical Code.

3. Occupational Safety and Health Administration (OSHA), an agency of the United States Department of Labor, Occupational Safety and Health Standards and Safety and Health Regulations - Code of Federal Regulations:
   a. 29 CFR 1910.141 - Sanitation.
   b. 29 CFR 1910.151 - Medical Services and First Aid.
   c. 29 CFR 1910.157 - Portable Fire Extinguishers.

1.4 TEMPORARY UTILITIES

A. Electricity:
1. Provide, maintain, and pay for power service required for performance of the Works.
2. Provide power outlets for construction operations, with branch wiring and distribution boxes located as necessary. Provide flexible power cords as necessary.
3. Provide main service disconnect and overcurrent protection at convenient locations.
4. Route temporary utility lines along alignments approved by ENGINEER. Take necessary precautions to prevent service interruptions due to accidental breakage of utility lines. Coordinate installation with local utility company and comply with Laws and Regulations and NFPA 70.

B. Water Service:
1. Provide, maintain, and pay for suitable quality water service required for performance of the Works.
2. Extend branch piping with outlets located so that water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.
3. Provide and maintain on Site a potable water storage tank(s) with a minimum live capacity of 5,000 gallons and all pipes, hoses, and fittings to adapt to the water supply and to transfer water to work locations. Protect equipment from freezing.
4. Provide an operating flow control valve in-line near work locations to reduce waste of potable water.
5. Do not use wastewater storage tanks to store or haul potable water.
6. Potable water tanks shall be clean and contaminant free inside and outside.

C. Telephone Service:
1. Provide, maintain, and pay for telephone service and equipment including a minimum of one dedicated telephone unit with voice mail at CONTRACTOR’s field office at time of mobilization to the Site.
2. Post emergency numbers including police, fire, ambulance, hospital, poison control center, and appropriate regulatory agencies in prominent locations in CONTRACTOR’s and ENGINEER’s field offices.

D. High Speed Internet Service:
1. Provide, maintain, and pay for high speed Internet service for ENGINEER’s field office.
2. Provide, maintain, and pay for high speed Internet service for CONTRACTOR’s field office.

E. Portable Radios:
1. Provide and maintain for ENGINEER’s exclusive use, 3 two-way portable radios for Site communications, capable of clearly transmitting and receiving communications over a 1-mile radius at time of mobilization to the Site.

2. Radio Frequencies: Same as those set for radios used by CONTRACTOR.
3. Equip at least the following key CONTRACTOR personnel with two-way portable radios:
   a. Superintendent.
   b. Health and Safety Officer.
   c. Security personnel.
   d. Each crew foreman.

F. Construction Lighting:
1. Provide and maintain lighting for construction operations.
2. Provide and maintain a minimum of 1 watt/sq ft lighting to exterior staging and storage areas exterior office area exterior decontamination areas after dark for security purposes.
3. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as necessary.
4. Maintain lighting and make routine repairs.

G. Heat:
1. Provide heating devices, fuel, and attendance as needed to maintain specified conditions for construction operations, to protect the Works and material against damage by dampness, cold, and freezing, and to facilitate completion of the Works.

H. Temporary Cooling:
1. Provide and pay for cooling devices and cooling as needed to maintain specified conditions for construction operations.

I. Fire Protection:
1. Take precautions to prevent fires. Provide and maintain temporary fire protection equipment of a type appropriate to the hazard anticipated in accordance with Laws and Regulations and to the satisfaction of ENGINEER and insurance authorities.
2. Bulk storage of flammable liquids and other hazardous materials is not allowed on Site. Handle flammable liquids in approved containers.
3. Open burning of rubbish is not permitted on Site.
4. Deliver, use, and dispose of flammable materials as required by authorities having jurisdiction.
5. Prohibit smoking with buildings under construction. Designate an area on Site where smoking is permitted. Provide approved ashtrays in designated smoking areas.
6. Establish a fire watch for cutting and welding and other hazardous operations capable of starting fires. Maintain the fire watch before, during, and after hazardous operations until threat of fire does not exist.
7. Portable Fire Extinguishers: NFPA 10; 10-pound capacity, 4A-60B; C UL rating.
8. Provide a minimum of one fire extinguisher in every construction trailer and storage shed.
9. Use fireproofed tarpaulins.
10. Include on-Site fire protection specified in CONTRACTOR’s Site-specific Health and Safety Plan.

1.5 CONSTRUCTION FACILITIES

A. ENGINEER's Field Office:

1. Within 2 weeks after the date of the Notice to Proceed, furnish a structurally sound, completely weathertight and insulated office trailer, specifically designed for the purpose required.
2. Minimum Floor Area: 150 sq ft; minimum 10 feet wide.
3. Windows: Four, 50 percent opening, with a minimum total area of 10 percent floor area per room; with operable sash and screen.
4. Lighting: 50 ft-candles at desktop height; exterior light at entrances.
5. Electrical Wall Outlets: Accessible from 6 feet .along any point.
6. Doors: Two, with new locks, two keys, and screens.
7. Temperature Control: Heating and Cooling equipment to maintain an ambient temperature of 68 to 72 degrees F.
8. Finish: New interior finish, resilient floor covering in first class condition, and exterior finish, all acceptable to ENGINEER.
9. Access: Minimum 4-foot wide concrete or boardwalk landings and sidewalks for complete access to the field office.
10. Minimum Furnishings:
    a. Five-drawer desk.
    b. Shelf.
    c. Three-drawer lockable filing cabinet.
    d. Coat rack.
    e. Swivel armchair and three side chairs.
    f. Two waste baskets.
    g. Two tack boards.
    h. Two-door storage cabinet.
    i. Bookcase with minimum 48- by 48-inch shelving.
    j. Drawing rack to hold eight racks of drawings mounted on wheels with lateral file compartments on top.
    k. Minimum of two 20-pound ABC type dry chemical fire extinguishers.
    l. Ten-person first-aid kit.
    m. Outdoor thermometer.
    n. Wall mounted electric clock.
    o. Six protective helmets.
    p. A 6-foot plug mold strip with outlets at 12-inch spacing, prewired with 6-foot extension cords.
11. Provide and maintain suitable bottled chilled drinking water service.
12. Provide and maintain a photocopier/scanner. ENGINEER will supply own paper.
13. Provide and maintain Internet service as specified in PART 1, TEMPORARY UTILITIES.
14. Provide and maintain private washroom facilities adjacent to the field office complete with flush or chemical type toilet, lavatory, and mirror.
15. Locate the field office where shown on the Drawings or as directed by ENGINEER.
16. Remove the field office upon final acceptance or when directed by ENGINEER. ENGINEER's field office and furnishings will become property of CONTRACTOR upon completion of the Works.
17. Maintain the office and services continuously. Clean not less than once per week. Provide soap, paper towels, cleansers, and janitorial service and implements.
18. Repair immediately any damage, leaks, or defective service.
19. Exchange walk-off mats weekly at all entrances.

B. CONTRACTOR's Field Office and Sheds:
   1. Provide CONTRACTOR's field office with the minimum facilities specified. Provide all required storage and work sheds.
   2. Field Office and Furnishings:
      a. As required by CONTRACTOR and with sufficient room for Project meetings.
      b. Include conference table and chairs sufficient for 12 persons.
      c. Telephone service.
      d. Light and temperature as specified under ENGINEER's field office.
      e. Six protective helmets for visitors' use.
      f. Exterior identifying sign.
      g. Other furnishings at CONTRACTOR's option.
   3. Remove field office and sheds upon completion unless otherwise approved by ENGINEER.

C. Equipment Decontamination Pads:
   1. Prior to commencing work involving equipment contact with potentially contaminated materials, construct equipment decontamination pads in accordance with the details shown on the Drawings.
   2. Provide, operate, and maintain suitable portable, high-pressure, low-volume decontamination wash unit(s) equipped with self-contained water storage tank and pressurizing system and capable of heating and maintaining wash waters to 180 degrees F and providing a nozzle pressure of 150 psi.
   3. Provide, operate, and maintain necessary equipment, pumps, and piping required to collect and contain equipment decontamination wastewater and sediment and transfer same to approved storage facilities.

D. Personnel Hygiene/Decontamination Facility:
   1. Provide, operate, and maintain a Personnel Hygiene/Decontamination Facility which complies with the requirements of 29 CFR 1910.141 and contains, as a minimum, the following:
      a. Shower facilities with at least one shower for every six on-Site CONTRACTOR personnel.
      b. Locker room with one locker for each on-Site CONTRACTOR personnel plus **three** additional lockers for use by ENGINEER and regulatory agencies.
      c. A room where personal safety equipment and protective clothing can be stored.
      d. A room where personnel can eat or drink.
      e. Boot washing facility and boot rack for washed boots to drain.
      f. Toilet facilities with at least one toilet and one hand basin for every six on-Site CONTRACTOR personnel.
      g. Tank(s) for sanitary waste and wastewater and necessary pumping and piping from the Personnel Hygiene/Decontamination Facility to the designated wastewater storage tanks.
      h. Potable water and wastewater pumping and piping.
      i. Containers for storage of spent disposable personal safety and protective equipment.
   2. Connect necessary pumping and piping to convey:
      a. Wastewaters from hand basins, toilet facilities, and shower facilities to designated wastewater storage tanks.
      b. Potable water from the potable water tank to facilities requiring running water.

3. Provide a boot wash, glove wash, refuse containers, and other items required for initial personnel decontamination at the decontamination corridor established at each work area for initial personnel decontamination prior to entering the Personnel Hygiene/Decontamination Facility.
4. Provide separate storage for wastewaters generated from toilet facilities, handbasins, and shower facilities from wastewater generated from initial decontamination of personnel.
5. Sample and analyze containerized wastewater for disposal purposes; submit analytical results to ENGINEER prior to off-Site disposal.
6. Post notices and take such precautions as required by local health authorities. Maintain the Personnel Hygiene/Decontamination Facility and premises in a clean and sanitary condition.

E. Emergency First-aid Facility:
1. Comply with Section 01 35 10.

F. Sanitary Facilities:
1. Provide and maintain required temporary sanitary facilities and enclosures in accordance with OSHA 29 CFR 1910.141.
2. Remove and dispose of sanitary wastes off Site on a periodic basis as required and in accordance with applicable Laws and Regulations.
3. In lieu of portable sanitary toilets, provide toilets housed within the Personnel Hygiene/Decontamination Facility which are connected to separate collection tanks or to the existing Site sanitary sewer system.

G. Storage/Stockpiling Facilities:
1. Provide, maintain, and operate storage/stockpiling facilities to details shown on the Drawings.
2. Install liner below all proposed stockpile locations to prevent contact between the stockpile material and the ground. Equip the facility with tarps capable of covering the stockpiled material until the material is incorporated into the Works or ENGINEER advises CONTRACTOR to dispose of the material off Site.

H. Staging and Dewatering Pads:
1. Provide, maintain, and operate Staging and Dewatering Pads to details shown on the Drawings.
2. Provide and maintain pads to store and protect stabilization additives.
3. Equip pads with tarps capable of covering the stockpiled material before and after stabilization until ENGINEER advises CONTRACTOR to load into transport vehicles for off-site disposal.

I. Wastewater Storage Tanks:
1. Provide, operate, and maintain wastewater storage tanks to store wastewater.
2. Wastewater includes:
   a. Handbasin and shower wastewaters from the Personnel Hygiene/Decontamination Facility.
   b. Water collected from dewatering operations.
   c. Water collected from the Equipment Decontamination Facility.
3. Store wastewaters from dewatering operations and the Equipment Decontamination Facility in a separate tank from the wastewater from the Personnel Hygiene/Decontamination Facility.
4. If toilet facilities are provided in the Personnel Hygiene/Decontamination Facility, store wastewater from these toilets with the wastewater from the handbasins, and showers for ultimate disposal off Site.

5. Discharges: Comply with applicable discharge limitations and requirements; do not discharge any wastewaters to on-Site sewer systems that do not conform to or are in violation of such limitations or requirements. Obtain ENGINEER's approval prior to discharge of wastewater.
6. Provide pumps and piping to convey collected wastewaters to designated wastewater storage tanks; provide wastewater storage tanks with a minimum total live capacity of 40,000 gallons for dewatering.
7. Install wastewater storage tanks in locations acceptable to ENGINEER.
8. Support tank(s) on temporary aboveground foundation(s) provided by CONTRACTOR.
9. Connect pumps, piping, valves, miscellaneous items, and necessary utilities as required for operation of the facilities. Protect tanks, valves, pumps, piping, and miscellaneous items from freezing.
10. Do not operate wastewater storage tanks until inspected by ENGINEER.
11. Notify ENGINEER 72 hours in advance of when a wastewater storage tank is anticipated to be full. Do not discharge additional liquids to a filled tank following sampling by ENGINEER. ENGINEER will determine the appropriate disposition of the wastewaters based on sample analysis.
12. Transport and dispose of wastewaters in accordance with Section 02 61 19.
13. Payment for transporting and disposing of wastewater to an off-Site disposal facility will be determined in accordance with Section 02 61 19.

J. Drums:
1. Storage of Liquid Waste: DOT-approved 55-gallon steel drums, closable lids, complete with labels for marking contents and date filled.
2. Storage of Solid Waste: DOT-approved 55-gallon steel drums, closable lids, complete with labels for marking contents and date filled.

1.6 VEHICULAR ACCESS AND PARKING

A. Access Roads:
1. Existing Roads: Reasonable use of existing on-Site roads for construction traffic is permitted subject to the following conditions:
   a. Do not interrupt or interfere with traffic on roads at any time except where open-trench crossings are specified on the Drawings and proper notice regarding open-trench crossings has been given to ENGINEER.
   b. Improve existing roads as CONTRACTOR may require to perform the Works.
   c. Comply with weight and load size restrictions where applicable.
   d. Tracked vehicles are not allowed on paved areas.
2. Temporary Roads:
   a. Locate roads as approved by ENGINEER. Obtain ENGINEER's prior approval for location and extent of temporary roads.
   b. Construct temporary all-weather access roads from public thoroughfares and Site roadways to serve construction area of a width and load bearing capacity to provide unimpeded traffic for construction purposes as CONTRACTOR requires for performance of the Works.
   c. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.
3. Materials:
   a. Temporary Construction: CONTRACTOR's option.
   b. Preparation: Clear areas, provide surface and storm drainage of road and adjacent areas.

c. Extend and relocate temporary roads as work progress requires. Provide detours as necessary for unimpeded traffic flow.

a. Provide unimpeded access for emergency vehicles. Maintain sufficient width and turning space.

b. Provide and maintain access to fire hydrants and control valves, free of obstructions.

4. Maintenance and Use:

a. Maintain temporary access roads in a sound condition, properly graded, and free of ruts, washboard, potholes, ponding, ice, snow, mud, soft material, excavated material, construction equipment, and products. Maintain access roads throughout the Contract period to ensure unimpeded access for passenger automobiles as well as construction vehicles.

b. Maintain existing and permanent paved areas used for construction; promptly remove standing water and repair breaks, potholes, low areas, and other deficiencies, to maintain paving and drainage in original or specified condition.

c. Remove mud from vehicle wheels before entering public roads.

d. Prevent contamination of access roads. Immediately scrape up debris or material on access roads which is suspected to be contaminated as determined by ENGINEER; transport and dispose of in appropriate off-Site disposal facility. Clean access roads at least once per shift.

e. ENGINEER may collect soil samples for chemical analyses from the traveling surfaces of constructed and existing access routes prior to, during, and upon completion of the Works. Excavate and dispose of clean soil contaminated by CONTRACTOR's activities, and supply and place clean replacement soil materials, all at no additional cost to OWNER.

5. Removal and Repair:

a. Remove temporary materials and construction at Substantial Completion.

b. Remove underground work and compacted materials to full depth and grade the Site as specified.

c. Repair existing facilities damaged by use to original condition.

B. Parking:

1. Arrange for or construct temporary gravel surface parking areas to accommodate use of construction personnel.
2. When Site space is not adequate, provide additional off-Site parking.
3. Locate parking areas as shown on the Drawings or directed by ENGINEER.
4. Do not allow tracked vehicles on pavement.
5. Designate three parking spaces for ENGINEER.
6. Maintain separate parking area for construction equipment.
7. Existing Parking Areas:

a. Use of designated areas of existing parking facilities by construction personnel is not permitted.

b. Do not allow heavy vehicles or construction equipment in parking areas.

8. Permanent Parking Facilities:

a. Use of permanent parking structures is not permitted.

C. Traffic Regulation:

1. Signs, Signals, and Devices:

a. Post-mounted and Wall-mounted Traffic Control and Informational Signs: Specified in PART 1, PROJECT IDENTIFICATION.

2. Access to the Site is from N.Y. Route 32 – Saratoga Avenue. CONTRACTOR responsible for securing any necessary NYSDOT permits required for performing Works.
3. Traffic Control Signals: As approved by local jurisdictions.
4. Traffic Cones and Drums, Flares, and Lights: As approved by local jurisdictions.
5. Flagpersons Equipment: As required by local jurisdictions.
    a. Control construction vehicular parking to prevent interference with public traffic and parking, and access by emergency vehicles.
    b. Monitor parking of construction personnel's vehicles. Maintain vehicular access to and through parking areas.
    c. Prevent construction parking on or adjacent to access roads or in non-designated areas.
    d. Provide trained and equipped flagpersons to regulate traffic when construction operations or traffic encroach on public traffic lanes.
    e. Provide signs, barricades, gatepersons, and other measures required to control traffic on the Site.
    f. Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.
    g. Consult with authority having jurisdiction; establish thoroughfares to be used for haul routes and Site access.
6. Confine construction traffic to designated haul routes.
7. Provide traffic control at critical areas of haul routes to regulate traffic and to minimize interference with public traffic.
8. At approaches to the Site and on the Site, install traffic signs and signals at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
9. Install and operate traffic control signals to direct and maintain orderly flow of traffic in areas under CONTRACTOR's control, and areas affected by CONTRACTOR's operations.
10. Relocate signs, signals, and devices as work progresses, to maintain effective traffic control.
11. Remove equipment and devices when no longer required.
12. Repair damage caused by installation and removal.
13. Remove post settings to full depth.

1.7 TEMPORARY BARRIERS AND ENCLOSURES

A. Barriers:
1. Provide barriers to prevent unauthorized entry to construction, Site office, and on-Site parking areas, and to protect existing facilities and adjacent properties from damage from CONTRACTOR's operations.
2. Provide barricades and covered walkways required by governing authorities for public rights-of-way.
3. Provide protection for plant life designated to remain. Replace damaged plant life.
4. Protect vehicular traffic, stored materials, the Site, and structures from damage as shown on the Drawings.

B. Fencing:
1. Construction: Temporary fencing shall be suitable for the installation and shall be installed in accordance with all codes and ordinances. Temporary fencing, maintenance and protection of excavations shall be the responsibility of CONTRACTOR.

2. At a minimum, temporary fencing shall be lightweight, reusable, bright orange fence made of high density polyethylene, 1.2 m high, mesh opening of 37.5 mm, and breakload of 95,760 Pa. Provide suitable fence posts and supports for the installation.
3. Provide fence to delineate work areas and at locations shown on drawings.
4. Enforce and require that workers and visitors observe and respect the limits marked with temporary fencing.

C. Exterior Enclosures:
1. Provide temporary weathertight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating, cooling, and maintenance of required ambient temperatures identified in individual Sections or otherwise required to produce Works of specified quality, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

D. Security:
1. Initiate security program at time of mobilization to the Site.
2. Maintain security program throughout the construction period until demobilization from the Site.
3. Provide security and facilities to protect the Works and the Site from unauthorized entry, vandalism, and theft.
4. Restrict entrance of persons and vehicles into the Site.
5. Allow entrance only to authorized persons with proper identification.
6. Maintain log of workers and visitors and make available to ENGINEER on request. Include date, name, address, company employed by, company/person visited, time in and time out for each person, and record of deliveries and security incidents.
7. Do not allow cameras on the Site or photographs to be taken except by prior written approval of OWNER or ENGINEER.
8. If unauthorized personnel are observed on the Site, notify ENGINEER and, if so directed by ENGINEER, call upon the appropriate law enforcement officials for proper legal actions.
9. Do not permit visitors to enter the area secured by Site security fence without the express permission of the Health and Safety Officer and ENGINEER; require visitors to complete training in accordance with the Site-specific Health and Safety Plan prior to gaining access to the secured areas.
10. Check that the perimeter fencing and warning signs are secure and intact on a daily basis; if deterioration of Site security fence is observed, or if warning signs are found to be removed, bring the situation to the attention of ENGINEER and immediately rectify.
11. Keep access gate to the Site closed except for passage of authorized personnel and vehicles.

1.8 TEMPORARY CONTROLS

A. Water Control:
1. Maintain excavations free of water.
2. Protect the Site from puddling or running water. Grade the Site to drain. Provide water barriers as necessary to protect the Site from soil erosion.
3. Prevent surface water runoff from leaving work areas.

4. Do not discharge decontamination water, or surface water runoff, or groundwater which may have come in contact with potentially contaminated material, off Site or to municipal sewers.
5. Prevent precipitation from infiltrating or from directly running off stockpiled waste materials. Cover stockpiled waste materials with an impermeable liner during periods of work stoppage including at the end of each working day and as directed by ENGINEER.
6. Direct surface waters that have not contacted potentially contaminated materials to existing surface drainage systems.
7. Control surface drainage including ensuring that gutters are kept open, water is not directed across or over pavements or sidewalks except through approved pipes or properly constructed troughs, and runoff from unstabilized areas is intercepted and diverted to a suitable outlet.
8. Dispose of water in a manner not injurious to public health or safety, to property, or to any part of the Works completed or under construction.
9. Provide, operate, and maintain necessary equipment appropriately sized to keep excavations, staging pads, and other work areas free from water.
10. Contain water from stockpiled waste materials. Transfer potentially contaminated surface waters to wastewater storage tanks separate from the wastewater from the Personnel Hygiene/Decontamination Facility.
11. Have on hand sufficient pumping equipment, machinery, and tankage in good working condition for ordinary emergencies, including power outage, and competent workers for the operation of the pumping equipment.
12. Contain and collect wastewaters and transfer such collected wastewaters to CONTRACTOR-supplied wastewater storage tanks.

B. Dewatering:
1. Dewater the various parts of the Works including, without limitation, excavations, structures, foundations, and work areas.
2. Employ construction methods, plant, procedures, and precautions that will ensure the Works, including excavations, are stable, free from disturbance, and dry.
3. Dewatering Methods: Includes sheeting and shoring; groundwater control systems; surface or free water control systems employing ditches, diversions, drains, pipes and/or pumps; and any other measures necessary to enable the whole of the Works to be carried out in the dry.
4. Provide sufficient and appropriate labor, plant, and equipment necessary to keep the Works free of water including standby equipment necessary to ensure continuous operation of dewatering system.
5. Take precautions necessary to prevent uplift of any structure or pipeline and protect excavations from flooding and damage due to surface runoff.
1. For temporary dewatering system comply with Section 01 57 19.

C. Erosion and Sediment Control:
1. Comply with Section 01 57 13.

D. Noise Control:
1. Provide methods, means, and facilities to minimize noise produced by construction operations.
2. If machinery, motors, pumps, and other similar equipment must be operated beyond normal working hours, keep the noise below a level acceptable to ENGINEER by housing the equipment as necessary.
3. Provide and use sufficient muffling devices that will minimize vehicle and equipment noise levels in the construction area.

E. Dust and Particulate Control:
   1. Execute the Works by methods to minimize raising dust from construction operations.
   2. Implement and maintain dust and particulate control measures immediately during construction and in accordance with action levels specified in Section 01 35 29.13.
   3. Provide positive means to prevent airborne dust from dispersing into atmosphere. Use potable water for dust and particulate control.
   4. Do not use chemical means for a water misting system for dust and particulate control without ENGINEER's prior written approval.
   5. As a minimum, use appropriate covers on trucks hauling fine or dusty material and use watertight vehicles to haul wet materials.
   6. Prevent dust from becoming a nuisance to adjacent property owners or occupants.
   7. ENGINEER may stop work at any time when CONTRACTOR's control of dusts and particulates is inadequate for the wind conditions present at the Site, or when air quality monitoring indicates that the release of fugitive dusts and particulates into the atmosphere equals or exceeds the specified levels.
   8. In the event that CONTRACTOR's dust and particulate control is not sufficient for controlling dusts and particulates into the atmosphere, work shall be discontinued and a meeting held between ENGINEER and CONTRACTOR to discuss the procedures that CONTRACTOR proposes to resolve the problem. Make all necessary changes to operations prior to resuming any excavation, handling, processing, or any other work that may cause a release of dusts or particulates.

F. Pollution Control:
   1. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious toxic substances and pollutants produced by construction operations.
   2. Be prepared to intercept, clean up, and dispose of spills or releases that may occur, whether on land or water. Maintain materials and equipment required for cleanup of spills or releases readily accessible on Site.
   3. Promptly report spills and releases potentially causing damage to the environment to:
      a. Authority having jurisdiction or an interest in the spill or release including any conservation authority, water supply authorities, drainage authority, road authority, and fire department.
      b. The owner of the pollutant, if known.
      c. The person having control over the pollutant, if known.
      d. ENGINEER.
   4. Contact the manufacturer of the pollutant, if known, and ascertain the hazards involved, precautions required, and best measures to be used in any cleanup or mitigating action.
   5. Take immediate action using available resources to contain and mitigate the effects on the environment and persons from any spill or release.
   6. Vapor and Dust Control:
      a. In addition to the requirements of Section 01 35 29.13, monitor air quality for volatile organics and particulates at the Exclusion Zone perimeter at minimum once per hour during contaminated materials excavation and management activities, and maintain a log of the air quality readings. If air quality monitoring indicates that the levels are above background air, quality readings will be taken at the site perimeter. If actions are not sufficient to control the release of volatile organics and particulates within an hour of identification of the air quality problem, the work resulting in

the excessive emissions shall be suspended and a meeting held between ENGINEER and CONTRACTOR to discuss the additional methods that CONTRACTOR proposes to control the release of volatile organics and particulates. Make all necessary changes at no additional cost to OWNER prior to resuming the Works.

b. In addition, if ENGINEER's CAMP monitoring detects VOCs or particulate levels exceeding the CAMP actions levels, implement corrective actions in accordance with the CAMP presented in Attachment C of the ENGINEER's HASP.

G. Equipment Decontamination:

1. Do not commence work involving equipment contact with potentially contaminated material until the Equipment Decontamination Facility is operational.
2. Decontaminate equipment after working in potentially contaminated work areas and prior to subsequent work or travel on clean areas.
3. Perform equipment decontamination on CONTRACTOR-constructed equipment decontamination pad.
4. As a minimum, perform the following steps during equipment decontamination:
   a. Mechanically remove packed dirt, grit, and debris by scraping and brushing without the use of steam or high-pressure water to reduce the amount of water needed and to reduce the amount of contaminated rinsate generated.
   b. Use high-pressure, low-volume, hot water or steam supplemented by detergents or solvents as appropriate and as approved by ENGINEER.
   c. Pay particular attention to tire treads, equipment tracks, springs, joints, sprockets, and undercarriages.
   d. Scrub surfaces with long handle scrub brushes and a cleaning agent.
   e. Rinse off and collect cleaning agent.
   f. Air dry equipment in the Clean Zone before removing from the Site or travel on clean areas.
   g. Perform an assessment as directed by ENGINEER to determine the effectiveness of the decontamination.
5. Maintain an inspection record on the Site which includes:
   a. Equipment descriptions with identification numbers or license plates.
   b. Time and date entering the decontamination facility.
   c. Time and date exiting the decontamination facility.
   d. Name of the inspector with comment stating that decontamination was performed and completed.
6. Each piece of equipment will be inspected by ENGINEER after decontamination and prior to removal from the Site and/or travel on clean areas. ENGINEER will have right to require additional decontamination to be completed if deemed necessary.
7. Take appropriate measures necessary to minimize the drift of mist and spray during decontamination including the provision of wind screens.
8. Collect decontamination wastewaters and sediments which accumulate on the equipment decontamination pad. Transfer wastewaters to designated wastewater storage tank.
9. Transfer sediments to soil staging area.
10. Furnish and equip personnel engaged in equipment decontamination with protective equipment including suitable disposable clothing, respiratory protection, and face shields.
11. Have on hand sufficient pumping equipment, of adequate pumping capacity and associated machinery and piping in good working condition for ordinary

emergencies, including power outage, and competent workers for the operation of the pumping equipment. Maintain piping and connections in good condition and leak-free.

1.9 REMOVAL OF TEMPORARY FACILITIES AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Remove underground installations to full depth. Grade the Site as shown on the Drawings.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original and functional condition.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 57 13

TEMPORARY SOIL EROSION AND SEDIMENT CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. References.
2. Definitions.
3. Submittals.
4. Quality assurance.
5. Qualifications.
6. Pre-installation meeting.
7. Delivery, storage, and handling.
8. Scheduling.
9. Products.
10. Source quality control.
11. Examination.
12. Preparation.
13. Installation.
14. Field quality control.
15. Cleaning.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
2. Erosion Control Measures:
a. Schedule of Prices Item No. 01 57 13/1.
b. Payment Basis: Lump sum price. Includes supply, installing and maintaining erosion control measures including straw bales and silt fencing.
3. Stabilized Construction Entrance:
a. Schedule of Prices Item No. 01 57 13/2.
b. Payment Basis: Lump sum price. Includes supplying, installing and maintaining geotextile and riprap.
4. Rock Check Dam:
a. Schedule of Prices Item No. 01 57 13/3.
b. Measurement Basis: By the number (each).
c. Payment Basis: Unit price. Includes supplying, installing and maintaining each rock check dam.

1.3 REFERENCES

A. Definitions:

1. SMDD: Standard Maximum Dry Density and in the context of this Contract means the maximum dry unit weight determined according to ASTM D698.

B. Reference Standards:
   1. Section 01 40 00 - Quality Requirements: Requirements for references.
   2. ASTM International:
      a. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft^3 (600 kN-m/m^3)).
      b. ASTM D6461/D6461M - Standard Specification for Silt Fence Materials.

1.4 PRE-INSTALLATION MEETING

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene 1 week prior to commencing work of this Section.

1.5 SCHEDULING

A. Section 01 30 00 - Administrative Requirements**:** Requirements for scheduling.

B. Verify temporary erosion control measures as identified in the approved Soil Erosion and Sediment Control Plan are in place and functional prior to initiation of earth work activities.

1.6 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: No later than 14 days following the date of the Notice to Proceed, submit product data for all manufactured products and materials.

C. Soil Erosion and Sediment Control Plan: No later than 14 days following the date of the Notice to Proceed, submit Soil Erosion and Sediment Control Plan indicating locations, design, and product names of design features.

1.7 QUALITY ASSURANCE

A. Perform work of this Section in accordance with New York Standards and Specifications for Erosion and Sediment Controls and Stormwater Pollution Prevention Plan.

B. Certifications: Provide certificate of compliance from authority having jurisdiction indicating approval of Soil Erosion and Sediment Control Plan.

C. CONTRACTOR is responsible for the design of any temporary measures required to by-pass the water flow around the work area. Assess the risks of any high water flow events (storms, floods) that may affect the Works and assume the appropriate level of risk. CONTRACTOR is responsible to prepare and implement a contingency plan should any surface water or groundwater enter and overwhelm the work area. At a minimum, remove all equipment from the work area and temporarily protect all exposed soil areas.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum 3 years documented experience.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Protect materials from chemicals, physical damage, direct sunlight, or other conditions or substances which may degrade the product.

PART 2 PRODUCTS

2.1 MATERIALS

A. Straw Bale:
   1. Wire bound or string tied.
   2. Securely anchored by at least two stakes or rebars driven through the bale 18 to 24 inches into the ground.
   3. Chinked (filled by wedging) with hay to prevent water from escaping between the bales.
   4. Entrenched a minimum of 4 inches into the ground.

B. Silt Fence:
   1. An assembled, ready to install unit consisting of geotextile attached to drivable posts.
   2. Geotextile: Uniform in texture and appearance with no defects, flaws, or tears that would affect its physical properties. Contain sufficient ultraviolet ray inhibitor and stabilizers to provide a minimum 2-year service life from outdoor exposure.
   3. Net Backing: An industrial polypropylene mesh which is joined to the geotextile at both top and bottom with double stitching of heavy duty cord.
      a. Width of Netting: Minimum of 2 1/2 feet.
   4. Posts:
      a. Sharpened hard wood 2 inches square and protrude below the bottom of geotextile to allow a minimum of 1 1/2 feet embedment.
      b. Post Spacing: Not to exceed 10 feet.
      c. Securely fasten each post to the geotextile and net backing by staples suitable for such purpose.
   5. ASTM D6461/D6461M.

C. Heavy Duty Silt Fence:
   1. Geotextile: Uniform in texture and appearance with no defects, flaws, or tears that would affect its physical properties. Containing sufficient ultraviolet ray inhibitor and stabilizers to provide a minimum 2-year service life from outdoor exposure. Attached to chain link with hog rings.
   2. Chain Link Backing:
      a. Galvanized Chain Link: 6 inch spacing, 14 gauge.
      b. Width of Netting: Minimum 3 1/2 feet.
      c. Attached to pipe with pipe ties.

3. Posts:
   a. 2 1/2-inch heavy duty galvanized pipe.
   b. Post Spacing: Not to exceed 10 feet.

D. Earth Berm:
1. Temporary berm or ridge of compacted clean soil materials to channel runoff water to a desired location.
2. Stabilize slopes with seed and mulch as required.
3. Physical Properties:
   a. Height: 18 inches minimum.
   b. Width: 24 inches minimum.
   c. Side Slopes: 2:1 or flatter.

E. Temporary Drainage Swale:
1. Temporary drainage channel to direct runoff water to a desired location.
2. Physical Properties:
   a. Depth: 12 inches minimum.
   b. Width: 24 inches minimum.
   c. Side Slopes: 2:1 or flatter.
   d. Channel Slope: 0.5 percent minimum.]
3. Stabilize channel with seed and mulch.

F. Check Dams:
1. Clear Crushed Stone, 4 and 10 inches:
   a. Clean, crushed, uniformly graded stone with nominal size 4 inch and 10-inch sieve.
   b. Free of dust and other deleterious materials which may damage underlying synthetic geotextile.
2. Geotextile: Section 31 05 19.

G. Pea Bag Coffer Dam:
1. Geotextile: Section 31 05 19.
2. Stone: pea gravel – particle size 0.5 inch (12.5 mm) to #8 mesh (2.36 mm).
3. Peabags:
   a. Clean pea gravel placed in an inner heavy duty sealed plastic liner and an outer burlap bag. Fill bags to no more than 2/3 volume.
   b. Extend peabags along outside of barrier base and fixed or weighted on the inside (working area).

H. Stabilized Construction Entrance:
1. Gravel/stone between 1 to 4 inches in size.
2. Geotextile: Section 31 05 19.
3. Physical Properties:
   a. Length: Not less than 50 feet.
   b. Width: 12 feet minimum.

I. Filter Sock
1. Polyester sock material, 12-inch diameter, fabricated as a knitted mesh.
2. Siltsoxx™, as manufactured by Filtrexx International, LLC or approved equal.
3. Composted Product: An approved Growing Media, as determined by testing procedures outlined by Filtrexx International.

4. Aggregate:
   a. Imported from an approved source and composed of clean, graded, hard, durable, uncoated particles obtained from deposits of gravel or sand, talus rock, quarried rock, or other suitable granular materials.
   b. Free of unsuitable materials including:
      1) Frozen material or material containing snow or ice.
      2) Trees, stumps, branches, or other wood or lumber, or other organic matter.
      3) Wire, steel, cast iron, cans, drums, or other foreign material.
      4) Materials containing hazardous or toxic constituents at hazardous or toxic concentrations.
   c. Natural rounded stone or gravel, washed; free of clay, shale; graded in accordance with ASTM C136 and ASTM C117 to the following limits:
      1) Minimum Size: 1/4 inch.
      2) Maximum Size: 3/4 inch.
5. Seed Mix for Polyester Filtration Sock, as follows:

Scientific Name	***Common Name***
Acorus calamus	Sweet Flag
Carex lacustris	Lake Bank Sedge
Carex vulpinoidea	Fox Sedge
Hibiscus palustris SC	Swamp Rose Mallow
Iris versicolor	Blue Flag Iris
Scirpus atrovirens	Dark Green Bulrush
Scirpus fluviatilis	River Bulrush Maximum Poa Trivialis

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution Requirements: Verification of existing conditions before starting work.

B. Verify surface water drainage pattern to ensure proper locating of soil erosion and sediment control features.

C. Verify that surfaces and Site conditions are ready to receive work.

3.2 PREPARATION

A. Preserve salient natural features, keep cut-fill operations to a minimum, and ensure conformity with topography to minimize erosion and adequately handle the volume and velocity of surface water runoff.

B. Whenever feasible, retain, protect, and supplement natural vegetation.

C. Do not damage, degrade, or in any way cause harm to existing above-ground structure or appurtenance, below-ground utility, pipe, conduit, cable, conductor, or structure.

D. Performance of temporary erosion control work does not relieve CONTRACTOR of responsibility for preventing or minimizing the potential for erosion or siltation.

E. Clear and grub areas where soil erosion and sediment control features to be placed.

3.3 INSTALLATION

A. Install erosion and sediment control items according to the Soil Erosion and Sediment Control Plan.

B. Construct temporary erosion control items at locations shown on the Drawings. Actual alignment and/or location of the various items as directed by ENGINEER.

C. Construct stabilized construction entrance to details shown on the Drawings.

D. Do not construct straw bale barriers and silt fence in flowing streams or in swales where there is the possibility of a washout.

E. Entrench bales a minimum of 4 inches into ground. Chink spaces between bales with straw or hay. Securely anchor each bale with two stakes or rebars driven at least 18 inches into the ground.

F. Check erosion and sediment control measures weekly and immediately after each rainfall greater than 1/2 inch.

G. Repair damaged or degraded bales, end runs, and undercutting beneath bales.

H. If fence fabric tears, starts to decompose, or in any way becomes ineffective, replace the affected portion immediately.

I. Whenever sedimentation is caused by stripping vegetation, regrading, or other development, remove it from all adjoining surfaces, drainage systems, and watercourses, and repair damage as quickly as possible.

J. Compact soil in diversion berms to 95 percent SMDD.

K. Prior to or during construction, ENGINEER may require the installation or construction of improvements to prevent or correct temporary conditions on Site. Improvements may include berms, mulching, sediment traps, detention and retention basins, grading, planting, retaining walls, culverts, pipes guardrails, temporary roads, and other measures appropriate to the specific condition. All temporary improvements shall remain in place and in operation until otherwise directed by ENGINEER.

L. Repair damaged bales, end runs, and undercutting beneath bales.

M. Filter Socks:
1. Fill low areas if approved by ENGINEER to provide base for polyester filtration sock system.
2. Polyester filtration sock shall be filled with a compost, aggregate, and seed mix that passes the criteria listed in PART 2.
3. Pre-assemble polyester filtration sock in 3 m segments, fill with compost, aggregate, and seed mix transport to the application point, and lower in place.
4. Installation of polyester filtration sock shall ensure a continuous stock. When completing one section of sock filling, the next section shall be sleeved over the first full section by a minimum of at least 1-foot overlap. Place a stake in this

overlap section, securing 2 sections together with 38 mm x 38 mm x 762 mm wooden stakes placed 250 mm O.C.

5. Maintain by repairing damaged filtration sock and seeded areas, replacing dead vegetation, and any other activity necessary to establish health growth

N. Unless otherwise shown on the Drawings, or directed by ENGINEER, remove all items upon completion of the Works. Spread accumulated sediments to form a suitable surface for seeding or dispose of sediments and shape the area to permit natural drainage, all to the satisfaction of ENGINEER. All materials once removed become the property of CONTRACTOR.

3.4 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting and testing.

B. ENGINEER will inspect all temporary erosion control items for proper placement and maintenance. All erosion control items shall be maintained in good working order. If any maintenance or repairs are to be made to any erosion control item, the work shall be initiated within 24 hours of inspection.

C. Inspect and maintain erosion control items in accordance with SWPP and CONTRACTOR's Sediment and Erosion Control Plan.

3.5 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.

B. Clean silt fences, bales, and check dams of excessive sediment accumulation if and when necessary.

C. Remove sediment deposits when the level of deposition reaches approximately half the height of the barrier.

END OF SECTION

SECTION 01 57 16

ODOR CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Preparation and application of temporary and stabilized foam to areas and equipment to control odor while working with contaminated materials.

B. Related Requirements:
   1. Section 01 35 29 - Health and Safety.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
   2. Development, Implementation, and Maintenance of Odor Controls:
      a. Schedule of Prices Item No. 01 57 16/1.
      b. Payment Basis: Lump sum price. Includes development, implementation, and maintenance of the Odor Controls including the Odor Control Plan; and provision of all required training, materials, and equipment required to install and operate odor controlling mechanisms.
   3. Operation of Odor Controls:
      a. Schedule of Prices Item No. 01 57 16/2.
      b. Payment Basis: Lump sum price. Includes operation of the Odor Controls based on the Odor Control Plan.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Odor Control Plan:
   1. Prior to excavation of contaminated materials, submit an Odor Control Plan describing the procedures that will be used to control odors and air emissions during the Works to ENGINEER for review.
   2. The Odor Control Plan shall identify equipment, materials, standard operating procedures, and contingency procedures for control of odor and air emissions.
   3. Include manufacturer's information (e.g., material safety data sheet) on products to be used for odor control.

C. Records of Air and Meteorological Monitoring: Submit the results from any air or meteorological monitoring conducted by CONTRACTOR that will be used for odor control decisions.

PART 2 PRODUCTS

2.1 ODOR SUPPRESSION FOAM SYSTEM

A. System Description:
   1. Products used for Odor Controls must be compatible with requirements of the Temporary Wastewater Treatment Facility Section 01 57 20.
   2. Construct a temporary and stabilized foam application system to provide odor suppression during performance of the Works.
   3. System Components:
      a. An adequate supply of water to prepare temporary and stabilized foam.
      b. Two trailer mounted systems to provide application of temporary and stabilized foam.
      c. A mobile raised platform, located beside the haulage truck loading area at the excavation, to provide a station for application of foam on contaminated materials in haulage trucks.
      d. Flexible hoses, hose connections, air aspirating nozzles, and miscellaneous appurtenances as necessary to apply foam on the haulage trucks and excavation areas.
      e. Minimum one fully trained and experienced technician to operate the foam systems.

B. Pressure: Construct foam application components to withstand the design pressure specified by equipment manufacturer.

C. Foam/Air Mixing Ratio: Size the foam application system components to provide a foam/air ratio that meets equipment manufacturer's specifications. This ratio is controlled by the air aspirating nozzle at the outlet of the flexible application hose.

2.2 MANUFACTURERS

A. Rusmar Foam Technologies or approved equal.

PART 3 EXECUTION

3.1 PREPARATION

A. Implement health and safety procedures for excavation of contaminated materials, including air monitoring.

3.2 CONTROLLING ODOR SOURCES

A. Control air emissions from open excavations, sediment stabilization, transportation, and staging at all times during the Works to protect on-Site and facility workers in accordance with the Site-specific Health and Safety Plan and to maintain acceptable on Site air quality.

B. Apply foam to the exposed surfaces of contaminated materials at the excavation face, the excavator bucket, haulage vehicles, and other areas and/or equipment as directed by ENGINEER.

C. Cover soil stockpiles that will be inactive for longer than 24 hours. Cover material used for such temporary, daily or overnight cover shall be considered to be waste material and shall be disposed off-Site at a licensed landfill site.

D. Minimize the area of open excavation to the extent practicable.

E. CONTRACTOR's odor source control measures shall not adversely impact other aspects of the Works, including the performance of earthwork activities.

F. In the event a complaint is received about nuisance odors due to CONTRACTOR's work at the Site, CONTRACTOR shall be responsive and address the source of nuisance odors in accordance with the Odor Control Plan.

3.3 INSTALLATION AND OPERATION OF ODOR SUPPRESSION FOAM SYSTEM

A. Conduct odor control efforts in accordance with the Odor Control Plan.

B. Install the foam system in accordance with supplier's and equipment manufacturer's instructions.

C. Do not operate the foam system until foam supplier, equipment manufacturer, and ENGINEER have inspected the system.

D. Operate the foam system and do all work necessary to provide temporary and stabilized foam. Operation shall include:
1. Preparation of the foam pre mix.
2. Maintaining adequate engine fuel quantities, foam concentrate, and stabilizer quantities.
3. Relocation of the foam applicator(s).
4. Application of temporary and stabilized foam to equipment and areas as required by ENGINEER.

E. Minimum one full time operator required for the operation of the foam application system.

F. Immediately after the application of stabilized foam is completed flush the equipment with water to prevent foam setup and blockage of equipment. Maintain unblocked lines.

G. Adjust the foam/air ratio, operating pressures, or flows with approval of foam supplier and equipment manufacturer.

H. Provide sufficient temporary and/or stabilized foam.

I. Provide necessary health and safety precautions related to foam usage in accordance with the Site-specific Health and Safety Plan.

J. Relocate the haulage truck application platform and the foam applicator as necessary to provide adequate foam application.

K. Adjust odor and emissions source control efforts as necessary due to changing weather conditions.

L. Foam System Closeout: Disassemble and package for shipping the foam system in accordance with manufacturer's specifications.

3.4 AIR MONITORING

A. Conduct air quality monitoring in accordance with the Odor Control Plan and Site-specific Health and Safety Plan. At a minimum, monitor for organic vapors and particulates in the work zone on a continuous basis, or as otherwise approved by ENGINEER. Monitor for organic vapors and particulates at the work zone perimeter in accordance with the Site-specific Health and Safety Plan.

B. Report to ENGINEER air monitoring results on daily basis. In the event the air monitoring results indicate that CONTRACTOR's activities are causing unfavorable air quality conditions, CONTRACTOR shall implement additional measures to control odors in accordance with the Odor Control Plan.

END OF SECTION

SECTION 01 57 19

TEMPORARY DEWATERING SYSTEM

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Design, installation, operation, and maintenance of a temporary Dewatering System.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
2. Cofferdams:
a. Schedule of Prices Item Nos. 01 57 19/1(i), 01 57 19/1(ii), 01 57 19/1(iii).
b. Payment Basis: Lump sum price. Includes supply, installation, and maintenance of Cofferdam 1 for Item No. 01 57 19/1(i); supply, installation, and maintenance of Cofferdam 2 for Item No. 01 57 19/1(ii); supply, installation, and maintenance of Cofferdam 3 for Item No. 01 57 19/1(iii).
3. Temporary Dewatering System Between Cofferdams C1 and C2:
a. Schedule of Prices Item No. 01 57 19/2.
b. Payment Basis: Lump sum price. Includes design, supply, installation, operation, and maintenance of the temporary Dewatering System.
4. Temporary Dewatering System Between Cofferdams C2 and C3:
a. Schedule of Prices Item No. 01 57 19/3.
b. Payment Basis: Lump sum price. Includes design, supply, installation, operation, and maintenance of the temporary Dewatering System.

1.3 REFERENCES

A. Definitions:
1. Dewatering System: A system to allow construction activities to be carried on in areas free of water, including but not limited to: surface water control, storm water, precipitation, and seepage control.

B. Reference Standards:
1. Section 01 40 00 - Quality Requirements: Requirements for references.
2. Section 01 57 20 – Temporary Wastewater Treatment Facility
3. New York State Department of Environmental Conservation (NYSDEC) SPDES General Permit for Stormwater Discharges From Construction Activity, Permit No. GP-0-15-002.

1.2 SYSTEM DESCRIPTION

A. The Dewatering System shall consist of sumps, sump pumps, ditches, trenches, dikes, berms, cofferdams and combinations thereof and all necessary appurtenances. The system may also include construction methods that divert the flow of water away from the construction area. The system shall be designed, installed and operated as necessary to accomplish specified requirements.

B. System capacity shall be continuously reviewed during operation and, if necessary, increased or otherwise modified to insure that the installed capacity is adequate to provide the required level of control. Any required increases in system capacity shall be added at no additional cost to OWNER.

1.3 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate work to permit construction to be completed on dry stable substrate.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Dewatering Plan: Within 14 days after the date of the Notice to Proceed, submit the proposed Dewatering Plan. The plan shall contain all supporting calculations and the following details:

C. The planned location and layout, sizes, and capacities of the Dewatering System components.

D. Provisions for disposal of water from the system and proposed facilities to prevent scour from system discharge.

E. Plan of normal operation.

F. Capacities of power-supply facilities, backup power, and description of standby components and spare parts.

G. Contingency plan to deal with instances where surface water or groundwater enter and overwhelm the work area.

H. Cofferdam Design: Within 14 days after the date of the Notice to Proceed, submit plans and computations verifying the adequacy of the cofferdam design together with bill of materials and method of cofferdam construction.

1.5 QUALITY ASSURANCE

A. Perform work of this Section in compliance with NYSDEC Permit No. GP-0-15-002.

B. CONTRACTOR shall be responsible for meeting all local, state and federal regulations regarding erosion control including the applicable provisions of the National Pollution Discharge Elimination System (NPDES).

C. CONTRACTOR shall be responsible for the design of any temporary measures required to by-pass the water flow around the work area. CONTRACTOR shall assess the risks of any high water flow events (storms, floods) that may affect the Works and provide an appropriate level of response. CONTRACTOR is responsible to prepare and implement a contingency plan should any surface water or ground water enter and overwhelm the work area.

PART 2 PRODUCTS

2.1 DEWATERING EQUIPMENT

A. Pumps:

B. Suited for this application and actual field conditions.

C. Pipes:

D. Leak free with fittings of compatible materials and of corresponding weight and quality.

E. Size, length, and type as required to accommodate flow from the pumps.

F. Standpipe: Sufficient size to accommodate the flow.

G. Keep available sufficient standby equipment to ensure continuous operation of the Dewatering System. The number of standby components and spare parts shall be determined by CONTRACTOR in consideration of known reliability and availability.

2.2 COFFERDAMS

A. Cofferdams C2 and C3
   Terrafix Geosynthetics Inc.- Meter Bags or equivalent.
   Portadam, Inc. - Portadam or equivalent.
   East Coast AquaDams, LLC - AquaDam or equivalent

B. Cofferdam C1
   1. Steel plates to seal existing openings in tumbler gate structure
   2. Terrafix Geosynthetics Inc.- Meter Bags or equivalent to raise crest of tumbler gate structure

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Verification of existing conditions before starting work.

B. Examine Site to establish locations for dewatering equipment and related piping.

3.2 PREPARATION

A. Protect existing adjacent structures and improvements from damage caused by dewatering operations.

3.3 INSTALLATION OF DEWATERING SYSTEM

A. Construct and maintain cofferdams, including the necessary dewatering equipment as required in order that the Works in a cofferdammed area will be completed in the dry.

B. Operate dewatering equipment between cofferdams C1 and C2 in accordance with Lock Operations Plan.

C. Connect pumps to discharge header. Install valves to permit pump isolation if multiple pumps tie in to a single discharge line.

D. Operate pumps in accordance with manufacturer’s instructions.

E. Provide supervision of Dewatering System by personnel skilled in operation, maintenance, and replacement of system components.

F. Conduct periodic observation of Dewatering System. Make required repairs and perform scheduled maintenance.

G. Modify Dewatering System when operation causes or threatens existing facilities or stability of excavation or fill.

H. Do not discontinue dewatering operations without ENGINEER’s approval.

I. Route discharge lines and provide vehicle crossing over pipes or hoses without damage.

J. Flows from the Dewatering System shall be discharged outside of the work areas and on the downstream side of each work area, unless otherwise authorized by ENGINEER. Discharge from the Dewatering System shall not erode, scour or otherwise damage the excavation or embankment slopes, completed works, existing ditches, or adjacent soil.

K. Water that has come into contact with potentially contaminated sediment or soil shall be pumped to the CONTRACTOR supplied Waste Water Treatment Facility for treatment prior to discharge.

L. Carefully control excavation operations in the vicinity of the cofferdam to ensure that the limiting lines and grades are not violated. Should CONTRACTOR over-excavate and undercut these limiting lines and grades, CONTRACTOR shall take immediate action as directed by ENGINEER to ensure the integrity of the cofferdam at no additional cost to OWNER.

3.4 REMOVAL OF DEWATERING SYSTEM

A. After completion of the Works within the cofferdammed area, remove cofferdams and dispose of cofferdam materials with contaminated sediments/soils.

B. Remove Dewatering System after dewatering operations are discontinued.

C. Decontaminate any reusable dewatering equipment or materials in accordance with Section 01 70 00.

D. Dispose any non-reusable dewatering equipment or materials in accordance with Section 01 70 00.

E. Repair damage caused by Dewatering System or resulting from failure of Dewatering System.

END OF SECTION

SECTION 01 57 20

TEMPORARY WASTEWATER TREATMENT FACILITY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Design, construction, operation, and maintenance of temporary on-Site Wastewater Treatment Facility (WWTF) capable of treating wastewaters generated during performance of Works. Sources include:
a. Dewatering wastewater.
b. Equipment Decontamination Facility.
c. Potentially contaminated storm water.
d. Staging and Dewatering Pad wastewater.
e. Impacted Canal water.
2. OWNER Permit conditions/treated water discharge criteria.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
2. Temporary Wastewater Treatment Facility:
a. Schedule of Prices Item No. 01 57 20/1.
b. Payment Basis: Lump sum price. Includes designing, supplying, constructing, cleaning, and demobilizing Temporary Wastewater Treatment Facility including all labor, materials, utilities, equipment, media, and chemicals; and installing of discharge piping, flow meter and freeze protection measures; initial testing of system to demonstrate permit compliance, and preparation of CONTRACTOR's Wastewater Treatment Plan.
3. Temporary Wastewater Treatment Facility Operation:
a. Schedule of Prices Item No. 01 57 20/2.
b. Measurement Basis: By the gallon as determined from flow meters provided by CONTRACTOR and approved by ENGINEER measuring the volume of wastewater treated.
c. Payment Basis: Unit price. Includes operating and maintaining Wastewater Treatment Facility including all labor, materials, equipment media; maintaining freeze protection; wastewater treatment chemicals; treating wastewater; testing in accordance with discharge permit, and discharge of treated water to the treated water discharge area.

1.3 REFERENCES

A. Definitions:
1. Wastewater is liquid that is:
a. Water collected from construction dewatering activities.
b. Wastewater generated from cleaning and decontamination.

c. Other liquids as may be generated or accumulated in active work area during performance of the Works including precipitation, groundwater, and infiltration.
d. Wastewater shall include all water generated during Works impacted with Site contamination. Impacted waters (wastewater) are expected to contain elevated levels of PCBs, suspended solids, oil/grease, heavy metals, and soluble toxic organics.
e. Temporary WWTF is not intended for management of domestic sanitary wastewater that will be generated on Site. This liquid waste stream is to be managed by other means.

B. Reference Standards:
1. Section 01 40 00 - Quality Requirements: Requirements for references.
2. American National Standards Institute (ANSI).
3. ASTM International (ASTM).
4. American Water Works Association (AWWA).
5. Institute of Electrical and Electronics Engineers (IEEE).
6. Insulated Power Cable Engineers Association (IPCEA).
7. New York State Building Code.
8. National Electrical Manufacturer's Association (NEMA).
9. National Electrical Safety Code (NESC).
10. National Fire Protection Association, Inc.:
a. NFPA 70 - National Electrical Code.
11. National Pollution Discharge Elimination System (NPDES).

1.4 SYSTEM DESCRIPTION

A. Treatment system will be required to manage wastewater for entire Contract period. Design, obtain ENGINEER's approval, and implement water management program compatible with construction schedule and methodologies selected as outlined in this Section to undertake the Contract. Temporary wastewater treatment facility shall be purchased or rented by CONTRACTOR and maintained throughout Contract duration. The WWTF shall consist of wastewater storage/equalization equipment, conveyance systems (pumps/hoses/piping), and wastewater treatment equipment. The WWTF shall consist of a single wastewater treatment train rated for a minimum design flow of 100 US gallons per minute (USGPM). The wastewater treatment systems shall be furnished in several modified 40 ft ISO containers or other approved weather enclosure, not including large equipment such as frac tanks or clarification tanks. The WWTF shall be controlled by automated process logic controller(s) (PLC). Operation and maintenance required of the WWTF shall be the responsibility of CONTRACTOR.

B. The WWTF equipment is to be pre-plumbed/pre-wired prior to shipment to Site to minimize on Site installation requirements. CONTRACTOR shall be responsible for any interconnecting piping/hoses between treatment containers. Multiple sample ports shall be provided through the treatment system to allow for performance tracking and to satisfy regulatory requirements.

C. Collected wastewater is expected to contain elevated levels of suspended solids (sediment), oil/grease, heavy metals, and soluble toxic organic compounds. Preliminary pilot remediation work allowed for the collection of wastewater samples that are representative of the wastewater to be encountered during execution of the Contract.

D. The attached Table 1 outlines the anticipated quality of wastewater entering the temporary wastewater treatment facility:

Table 1 Estimated Influent Chemistry

		Estimated Parameter Concentration
Volatile Organic Compounds		
1,1-Dichloroethane	µg/L	3.1
1,2,4-Trichlorobenzene	µg/L	1.7
1,2-Dichlorobenzene	µg/L	8.5
1,2-Dichloroethane	µg/L	2.9
1,3-Dichlorobenzene	µg/L	1.1
1,4-Dichlorobenzene	µg/L	4.4
4-Methyl-2-pentanone (Methyl isobutyl ketone) (MIBK)	µg/L	19.4
Acetone	µg/L	344
Benzene	µg/L	76 J
Chlorobenzene	µg/L	85 J
cis-1,2-Dichloroethene	µg/L	96.6
Cyclohexane	µg/L	3.8
Ethylbenzene	µg/L	1016
Isopropyl benzene	µg/L	11.1
m&p-Xylenes	µg/L	2815
Methyl cyclohexane	µg/L	1.6
Methylene chloride	µg/L	4.9
o-Xylene	µg/L	873
Styrene	µg/L	106
Tetrachloroethene	µg/L	43 J
Toluene	µg/L	4565
trans-1,2-Dichloroethene	µg/L	9.2
Trichloroethene	µg/L	110 J
Vinyl chloride	µg/L	35.3
Xylenes (total)	µg/L	3164
Semi-volatile Organic Compounds		
2,4,5-Trichlorophenol	µg/L	15.5
2,4,6-Trichlorophenol	µg/L	63.5
2,4-Dimethylphenol	µg/L	2438
2-Methylnaphthalene	µg/L	11.0
2-Methylphenol	µg/L	1255
3&4-Methylphenol	µg/L	7181.5
4-Methylphenol	µg/L	12567
Acetophenone	µg/L	5.6

Table 1 Estimated Influent Chemistry

		Estimated Parameter Concentration
Anthracene	µg/L	25.0
Biphenyl (1,1-Biphenyl)	µg/L	13.0
bis(2-Ethylhexyl)phthalate (DEHP)	µg/L	110
Di-n-butylphthalate (DBP)	µg/L	2.8
Fluorene	µg/L	2.5
Hexachlorobenzene	µg/L	6.0 J
Naphthalene	µg/L	54.5
Pentachlorophenol	µg/L	46.0
Phenanthrene	µg/L	56.6
Phenol	µg/L	7448
Pyrene	µg/L	21.0
Metals		
Aluminum	µg/L	9558
Antimony	µg/L	4.8
Arsenic	µg/L	57.7
Barium	µg/L	963
Beryllium	µg/L	3.9
Cadmium	µg/L	3.3
Calcium	µg/L	30698
Chromium	µg/L	43.7
Cobalt	µg/L	19.1
Copper	µg/L	121.0
Cyanide (total)	µg/L	0.2
Iron	µg/L	60518
Lead	µg/L	85.8
Magnesium	µg/L	8924
Manganese	µg/L	2962
Mercury	µg/L	0.3
Nickel	µg/L	84.0
Potassium	µg/L	11488
Selenium	µg/L	31.2
Silver	µg/L	1.5
Sodium	µg/L	630600
Vanadium	µg/L	154.9
Zinc	µg/L	98.2
PCBs		
Aroclor-1016 (PCB-1016)	µg/L	39.0

Table 1 Estimated Influent Chemistry

		Estimated Parameter Concentration
Aroclor-1242 (PCB-1242)	µg/L	5234
Total PCBs (calculated)	µg/L	4124

Notes:
D - Compounds at secondary dilution factor.
J - Estimated concentration.
ND/U - Not detected at the associated reporting limit.
NA - Not applicable.

E. Treat wastewater to the requirements of OWNER's permit criteria. Permit attached to contract documents.

F. System shall be designed to treat wastewater which will vary in quality/quantity. Permit effluent and monitoring requirements are attached. The overall treatment strategy shall conform to the details of this Section. Wastewater characteristics outlined in Table 1 are estimates based on best available information prior to commencement of remediation activities. CONTRACTOR shall make modifications to wastewater collection and treatment systems as necessary (at additional cost) based on actual conditions observed during execution of Works. The WWTF shall be designed to be operated up to 10 hours per day, 5 days per week.

G. Provide emergency secondary containment for all wastewater treatment and storage facilities. Earthen berms may be constructed to contain the temporary WWTF and wastewater storage/staging facilities. Secondary containment plans are to be reviewed and approved by ENGINEER prior to construction.

H. Provide sufficient storage for wastewater collected in active work areas to prevent delay of work. It is recommended that a minimum 40,000 US gallon (USG) of wastewater equalization capacity be provided upstream of the WWTF. Upstream equalization capacity shall be provided by means of an array of frac tanks or other water storage systems. The WWTF shall be fed by influent feed pumps installed on the frac tank discharge header. Additional post treatment equalization capacity must also be provided. Post treatment storage capacity must be provided to allow for testing of effluent in accordance with permit requirements prior to discharge. Sequence the Works, including temporary storage in active areas, to provide adequate water treatment to meet Project schedule.

I. Discharge to CONTRACTOR supplied permitted outfall in Old Champlain Canal south of cofferdam C-3.

1.5 SEQUENCING

A. Section 01 10 00 - Summary: Requirements for sequencing.

B. CONTRACTOR shall be responsible for managing and coordinating related work that affects the quality and quantity of the wastewater that is routed to the treatment system for treatment and discharge.

C. Coordinate wastewater treatment and discharge rates to maintain treatment system capacity.

D. Minimize the total suspended solids transferred to the treatment system. Active sediment controls must be implemented throughout implementation of Works. Minimize open pit excavation areas. Cover stockpiled excavated material whenever possible.

E. Sequence and coordinate work so that the treatment system is operational prior to beginning operations that will generate contaminated run-off or decontamination water.

F. Continuously maintain the treatment system and continue all wastewater treatment efforts until all of the following conditions have been met:
1. All of the on-Site operations that could potentially generate contaminated wastewater have been completed.
2. All of the contaminated materials have been transported off Site.
3. The potential for contaminated runoff has been eliminated at the Site.

G. Sequence work to have WWTF installed, tested, and inspected by ENGINEER prior to commencing work which may generate wastewater.

H. Work included:
1. Supply of specified treatment system equipment to meet the specified system requirements.
2. Delivery of equipment to Site and field installation.
3. Provision/construction of necessary foundations for WWTF equipment.
4. Calibration, certification, and commissioning of the supplied equipment.
5. Provision of complete O&M manual for ENGINEER and OWNER reference.
6. Tagging and identification of WWTF equipment.
7. Pressure testing, flushing, and cleaning of all system to satisfactory levels. Pressure testing reports to be provided to ENGINEER.
8. Supply of all process instrumentation associated with treatment equipment within WWTF.
9. Power and control wiring of process equipment and instrumentation.
10. WWTF electrical panel and process logic controller (PLC) and human-machine interface (HMI) for automated operation of the WWTF.
11. Onsite start-up assistance and operator training. Treatment equipment supplier shall provide a minimum 5 days of system start-up assistance and operator training. CONTRACTOR shall provide ENGINEER a minimum of 2 weeks' notice prior to WWTF start-up.
12. Provision of all manufacturer recommended spare parts so as to minimize system downtime during maintenance.
13. Provide access hatches for system enclosures to allow for expendable media replacement and equipment clean-out/maintenance.
14. Treatment equipment enclosures shall include ventilation systems to prevent internal temperatures in excess of 105 degrees F.

1.6 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Wastewater Treatment Plan: 21 days after Notice to Proceed, submit a Wastewater Treatment Plan, including process and instrumentation diagrams, equipment selected, storage and pumping capacities, effluent monitoring program, operating plan compatible

with and demonstrating compliance with specified requirements. Design of WWTF shall be approved by ENGINEER prior to construction.

C. Shop Drawings shall indicate:
   1. Product Data:
      a. Performance criteria, compliance with appropriate reference standard, characteristics, limitations, and trouble-shooting protocol.
      b. Product transportation, storage, handling, and installation requirements.
      c. Equipment information including: inlet pressure requirements, inlet/outlet diameters, included controls, included options, brochure cuts indicating dimensions and weights, surface loading rates, number of installations in North America, and location from where system services and technical support would be provided.
      d. A list of all supplied equipment including the length of supplied piping/tubing as part of the hookup requirements.
      e. A system schematic and process control narrative.
   2. Overall dimensions of equipment.
   3. Fixing support dimensions.
   4. Equipment Layout.
   5. Arrangement and dimensions of accessories.
   6. Process and Instrumentation.
   7. Dimension Drawing and Foundation Loading Data.
   8. Arrangement and dimensions of accessories.
   9. Diagram of connections.
   10. Electrical Sequence Diagram.
   11. Schedule of Electrical Components.
   12. Control Panel Electrical Schematic.
   13. Cable Schedule.
   14. Installation data.
   15. In addition to the Installation, Operation and Maintenance Manuals required by the Contract, a spare manual shall be shipped (marked preliminary if that is the case) to allow installing contractor the opportunity to review equipment supply and to allow for planning of proper installation of equipment, prior to release of all final Installation, Operation and Maintenance Manuals to the end user.
   16. Provide required Drawings and calculations sealed by a professional engineer registered in the State of New York for non-standardized components.

D. Solids/Sediment Waste Data: Indicate how solids/soil wastes to be managed and submit disposal plan for approval. Plans shall include plans for management of sludge resulting from wastewater treatment activities as well as the management of expendables such as granular activated carbon. There may be opportunity for solid waste from the WWTF to be disposed of with other solid residuals generated during the remediation effort (i.e., impacted soils to be removed from Site).

E. Testing Results: Submit the results from any analytical tests or field tests from samples collected before and after wastewater treatment. Submit results to ENGINEER for review in a timely manner.

F. Discharge Data: Include records of the instantaneous discharge flow rate each hour of treatment, total volume and duration of each wastewater discharge.

G. Test Reports/Commissioning Reports:

1. Provide records of commissioning performance and final set points, indicate on shop drawings all adjustments made during commissioning.
2. Submit commissioning procedure for ENGINEER review a minimum 4 weeks prior to planned WWTF commissioning. Commissioning report documentation (e.g., checklists) shall be provided for review. If intended commissioning documentation is deemed unsatisfactory by ENGINEER, ENGINEER provided commissioning documentation will be utilized by CONTRACTOR.
3. Final effluent testing will be completed by an independent laboratory approved by ENGINEER. CONTRACTOR shall carry all costs for wastewater sampling to satisfy regulatory requirements.

1.7 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for closeout submittals.

B. Operation and maintenance data: Indicate and submit maintenance data for incorporation into Operation and Maintenance Manuals.
1. Identification: Manufacturing name, type, year, serial number, number of units, capacity, and identification of related systems.
2. Data necessary for maintenance of equipment.
3. Manufacturer’s recommended list of spare parts and associated costs.

1.8 QUALITY ASSURANCE

A. Perform work of this Section in accordance with approved Wastewater Treatment Plan and OWNER’s wastewater discharge permit.

B. Include prerequisites, standards, limitations, and criteria which established an overall level of quality for products and workmanship under this Section.

C. If required, make reference to national standards. State class and revision.

D. Perform work of this Section in accordance with the State of New York standards.

E. Comply with references listed in Paragraph 1.2 B.

1.9 QUALIFICATIONS

A. Manufacturer/Supplier of WWTF equipment: Company specializing in manufacture/supply of containerized continuous operation wastewater treatment equipment for substantially similar applications, with minimum 3 years documented product development, testing, and manufacturing experience. Project references over the past five years shall be provided outlining application, treatment flow, and treatment technologies. Reference project contact information may be required upon request of ENGINEER.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Protect equipment from precipitation by suitable covers or structures.

C. Protect supplies (e.g., sand, activated carbon) from precipitation by suitable covers or structures.

D. Maintain adequate supplies to maintain operations including all expendable materials and treatment chemicals. Store products in an appropriate manner with all health and safety/environmental requirements satisfied.

E. Maintain and service equipment to ensure they are in working order.

PART 2 PRODUCTS

2.1 DESIGN CRITERIA

A. Design WWTF for the duration of the Works. The minimum design flow rate shall be 300 USGPM as provided by two parallel and identical treatment trains. Each treatment train shall contain the same treatment equipment and will include at a minimum the following treatment steps:
1. Chemical Addition and Mixing.
2. Clarification by compact footprint clarifier.
3. Bag filtration
4. Granular activated carbon treatment.
5. Air stripper.
6. Liquid sludge disposal.

B. Design load requirements including applicable combinations.

C. The system shall be designed to treat up to 150,000 USG per day.

D. The WWTF shall be designed based on the influent and effluent parameters outlined in Tables 1 and the OWNERS permit, respectively. Influent water quality is based on best available information. CONTRACTOR is responsible to make any necessary modifications to the WWTF due to changing influent concentrations to continually satisfy discharge permit requirements. Any required changes shall be made in a timely manner so as to not hinder Works.

E. The supply, testing, and performance of all supplied equipment shall conform to all standards referred to herein. All equipment furnished under this Section shall be new (if treatment equipment purchased).

F. Power Supply: 480V/3 Phase/60 Hz power shall be available to the WWTF. Step-down transformers shall be provided by CONTRACTOR as required for 120V service (or other). CONTRACTOR shall provide full load list for the proposed WWTF.

G. Space Limitations: All wastewater treatment equipment is to be installed in several 40 ft ISO shipping containers or other approved weather enclosure. CONTRACTOR to provide

general arrangement of equipment within containers and overall intended layout of containers with interconnection details shown. Total area available for WWTF installation is shown on Drawings.

H. Based on the information available, the WWTF and associated wastewater storage systems will most likely be considered unclassified, however, CONTRACTOR is to determine if Class1, Division 2 is required. WWTF FEED PUMPS

I. Operating Conditions:
1. Fluid: Impacted surface water/groundwater as described above.
2. Service: Equalization Tank 21,000 USG) to WWTF.
3. Location: Outdoors – ambient conditions
4. Fluid Temperature: 34 to 110 degrees F.

J. Type and Materials: High efficiency, non-clog, ANSI - horizontal centrifugal pump.
1. Pump casing, seal chamber and frame adapter to all be ductile iron.
2. Impeller to be 304 stainless steel.
3. Bolting, nuts, hardware and plugs shall be 304 stainless steel.

K. Performance Requirements:
1. Capacity: 100 USGPM.
2. Speed: 1800 rpm maximum.
3. Pump Head: Shall be sized by equipment CONTRACTOR to pump from excavation pit to Equalization Tank. Shut off head shall be a minimum 15 percent above operating point for the pump. CONTRACTOR shall make allowance for losses of piping/hoses between any containers and equipment.

L. Motor: Provide TEFC motor rated at 1.15 service factor 480 VAC, 3 phase, 60 Hz, premium efficiency.

M. Make and Model: TBD by CONTRACTOR.

N. Other Requirement: Abrasion resistant impeller and pump casing. Provide pumps skid mounted and configured as required for outdoor service. Pumps shall be installed with high pressure discharge switch that shall terminate pump operation in unusual circumstances.

2.2 EQUALIZATION STORAGE TANK

A. Description: Frac Tank or equivalent from acceptable manufacturers (E-Tank, Rain for Rent, etc.).

B. Operating Conditions:
1. Fluid: Impacted surface water/groundwater as described above.
2. Location: Outdoors. Ambient Conditions.
3. Fluid Temperature: 34 to 110 degrees F.

C. Capacity: 21,000 Gal (Minimum). Volume capacity may change depending on CONTRACTOR decision on how to operate the treatment system.

D. Performance:
1. Provide suitable foundation as required to prevent shifting/settling of tanks. Tank shall be leak-proof and hydrostatically tested. Repair or replace at no additional

cost to OWNER any tanks that leak. Supply pipes, flanges, connections, and any other appurtenances required to place wastewater in or remove wastewater from storage tanks. Tanks shall include access manholes/portholes for decontamination of tanks and for sampling. Containment shall be designed/provided to prevent accidental release to adjacent areas (see Article 1.3).

E. Make and Model: TBD by CONTRACTOR.

2.3 WWTF INFLUENT FLOW METER

A. Type: Magnetic Type Flow Meter.

B. Description: Instrument to continuously measure the volume flow rate of the electrically conductive fluid based on Faraday's law of induction, where the voltage induced by flowing fluid is proportional to flow rate.

C. Operating Conditions:
1. Fluid: Impacted groundwater/surface water.
2. Location: Indoors in feed line between flocculator and clarifier (60 degrees F to 110 degrees F, 0 – 95 percent RH).
3. Fluid Temperature: 34 to 110 degrees F.
4. Quantity: 2 (1 per treatment train).

D. Performance:
1. Measured fluid conductivity (limits): not less than 0.5 μS/mm.
2. Accuracy: +/ -0.5 percent of calibrated span (assuming 5 pipe diameters upstream and 3 pipe diameters downstream of straight run).
3. Velocity Range: 1 feet/s to 10 feet/s.

E. Transmitter: Microprocessor based with backlit LCD integral display of measure flow and flow totalizer values in engineering units (US: gal/min, gallons), sensor and electronics failure mode and annunciation, field programmable, menu driven type software limit and control settings (units, range, zero and span adjustment, pulse volume, etc.), non-volatile memory, local or remote mounted.
1. Enclosure: Minimum types 4X or as indicated, suitable for the transmitter mounting location, corrosive resistant enclosure, and horizontal or vertical surface mount.
2. Power Requirements: 4 – wire type, less than 0.5 A @ 120 VAC +/ -10 percent, 60 Hz.
3. Analog Output Signals: 1 - 4 -20 mA.
4. Discrete Status Output Signals: Minimum 1 programmable, SPDT type dry contact, rated 1 A at 120 VAC. Programmed to indicate sensor problem.
5. Instrument shall be rated for Class 1, DIV 2 service.

F. Sensor, Non-Wetted Materials: Epoxy coated steel flowtube sensor, flanged to ASME B16.5 class 150, silicone rubber housing sealant. Process wetted materials: lined with mechanically resistant material and chemically compatible with process fluid, fluid isolated electromagnetic pulsed DC coils, and corrosion resistant electrodes.

1. Enclosure: Corrosion resistant, minimum types 4X.
2. Mounting: Horizontal or vertical position with full tube.
3. Maximum Fluid Pressure: Entire flow tube must meet ratings of flanges.
4. Liner and electrode type shall be determined by supplier.

G. Make and Model (Standard of Construction): Endress + Hauser Promag 10P, or approved equal.

H. Other Requirements: Mounting material; grounding rings as required.

2.4 REACTION TANK

A. Operating Conditions:
1. Fluid: Impacted surface water/groundwater dosed with treatment chemicals including sulfur containing reducing compound, polymer based flocculating aid, and acid and/or sodium hydroxide (caustic) for pH adjustment.
2. Location: Indoors – within ISO container: 40 degrees F to 110 degrees F, 0 – 95 percent R.H.
3. Fluid Temperature: 34 to 110 degrees F.

B. Type and Materials:
1. Frame: CONTRACTOR to determine appropriate material.
2. Flanges and Connections: CONTRACTOR to determine appropriate material. ANSI 150 Flanges.
3. Chemical Injectors: CPVC.

C. Performance Requirements:
1. Flow Capacity: 100 USGPM (Design Flow).
2. Retention time of 20 minutes (minimum).
3. Storage Capacity: 2,000 USG (minimum)
4. Tank shall be above ground inside an ISO Container if CONTRACTOR determines it is appropriate. Provide suitable foundation as required to prevent shifting/settling of tanks. Tanks shall be leak-proof and hydrostatically tested. Repair or replace at no additional cost to OWNER any tanks that leak. Supply pipes, flanges, connections, and any other appurtenances required to place wastewater in or remove wastewater from storage tanks. Tanks shall include access manholes/portholes for decontamination of tanks and for sampling. Containment shall be designed/provided to prevent accidental release to adjacent areas.
5. Mixing Requirement: Shall be sized/selected by CONTRACTOR to completely mix treatment chemicals with influent wastewater utilizing mixing elements. The Reaction Tank must allow for addition for coagulant, pH adjustment agent, and flocculating aid. Mixer shall be included with the tank. CONTRACTOR to determine mixer and motor sizing.

D. Make and Model: TBD by CONTRACTOR.

E. Other Requirement: Reaction Tank shall either include upstream and downstream sample ports, or CONTRACTOR shall include sample ports in the associated piping.

2.5 REACTION TANK pH SENSOR

A. On-line pH analyzer shall continuously monitor pH in the range 0.0 to 14.0 pH in aqueous solutions with automatic temperature compensation.

B. Transmitter/Controller: Multi-parameter type (pH, ORP, conductivity, suspended solids, turbidity, DO) with "plug and play" sensor recognition, two channels (any instrument combination), microprocessor based with backlit LCD display of measured and correcting values, minimum 12 mm high characters, additional indicators for alarms and status conditions, keypad, menu driven type software, control settings, range and span adjustment, status, and error annunciation; menu driven automatic calibration with sensor diagnostics; user programmable control/alarm relays; non-volatile memory.

C. Environmental Requirements:
1. Fluid: Impacted surface water/groundwater as described above dosed with treatment chemicals including sulfur containing reducing compound, polymer based flocculating aid, and acid/sodium hydroxide (caustic) for pH adjustment.
2. Location: Indoors, inside the Reaction Tank (40 degrees F to 110 degrees F, 0 – 95 percent RH).
3. Fluid Temperature: 34 to 110 degrees F.

D. Control Interface:
1. Analog output signals: two, 4-20 mA, linear and proportional to range analog current signals, isolated with superimposed HART protocol signal into load between 0 and 750 ohm (minimum) HART. First output signal shall be configured for pH measurement and second for temperature measurement.
2. Discrete output signals: 3, programmable, dry contacts (SPDT type), rated 5A at 120 VAC and 2A at 24 VDC. Independently programmable functions: high and low alarm in response to the measured parameter (adjustable setpoint and deadband), event/timer to control an external device on a timed basis (adjustable interval and duration), warning to indicate sensor problem.
3. HART digital communication protocol. Data read/write with instrument configuration capabilities. As minimum data shall include both channels (process parameters, or process parameter and compensation parameter) and instrument fault/status signals.

E. Connections:
1. Power Requirements: less than 0.5A at 120 VAC, 60 Hz.
2. Power Cord: 15A, 120 VAC, 1.5 m length with encapsulated 5-15R plug.
3. Receptacles for plug-in sensor cables connection.

F. Differential electrode design, 2 glass process electrodes and titanium reference ground electrodes measure the pH differentially; digital type, built-in integrated preamp, and temperature element for automatic temperature compensation and analyzer temperature readout; replaceable salt bridge protecting the reference electrode from process condition; encapsulated construction, chemical resistance body materials compatible with process media; round, "pen" shape body to facilitate different mounting arrangements (convertible, insertion, submersion).

G. Encapsulated construction, round, "pen" shape body to facilitate different mounting arrangements (sanitary, immersion, 1-inch NPT threaded, convertible, submersible, etc.). Arrangement shall match specified installation method and mounting hardware.

1. Materials: chemical resistance body (PEEK, Ryton, PVDF or Type 316 stainless-steel body for immersion) and sensor “head” materials (glass) compatible with process media.
2. Cable: Integral, factory sealed to probe, flexible, submersible, multi-conductor cable assembly with shield and polyurethane jacket; rated to 90 degrees C; minimum 10 m length with plug-in signal connector.

H. Process measurement performance requirements:
1. Measuring Range: 0 to 14 pH.
2. Sensitivity: plus/minus 0.01 pH.
3. Stability: 0.03 pH per 24 hours, non-cumulative.
4. Response Time: 90 percent of measurement value within 1 minute.
5. Operating Temperature: 0 to 110 degrees F.
6. Flow Rate: 3 m/s, maximum.

I. Other Requirements: Provide necessary mounting hardware for installation in pressurized piping.

2.6 FLASH MIX AND FLOCCULATION TANK

A. Operating Conditions:
1. Fluid: Impacted surface water/groundwater dosed with treatment chemicals including sulfur containing reducing compound, polymer based flocculating aid, and acid and/or sodium hydroxide (caustic) for pH adjustment.
2. Location: Indoors – within ISO container: 40 degrees F to 110 degrees F, 0 – 95 percent R.H.
3. Fluid Temperature: 34 to 110 degrees F.

B. Type and Materials:
1. Frame: CONTRACTOR to determine appropriate material.
2. Flanges: CONTRACTOR to determine appropriate material. ANSI 150 Flanges.
3. Chemical Injectors: CPVC.

C. Performance Requirements:
1. Flow Capacity: 100 USGPM (Design Flow).
2. Retention time of 20 minutes (minimum).
3. Storage Capacity: 2,000 USG (minimum)
4. Tank shall be above ground inside an ISO Container. Provide suitable foundation as required to prevent shifting/settling of tanks. Tanks shall be leak-proof and hydrostatically tested. Repair or replace at no additional cost to OWNER any tanks that leak. Supply pipes, flanges, connections, and any other appurtenances required to place wastewater in or remove wastewater from storage tanks. Tanks shall include access manholes/portholes for decontamination of tanks and for sampling. Containment shall be designed/provided to prevent accidental release to adjacent areas.
5. Mixing Requirement: Shall be sized/selected by CONTRACTOR to completely mix treatment chemicals with influent wastewater utilizing mixing elements. The Reaction Tank must allow for addition for coagulant, pH adjustment agent, and flocculating aid. Mixer shall be included with the tank. Motor for the mixer shall have a variable speed drive to adjustment to maximize floc size and formation. CONTRACTOR to determine mixer and motor sizing.

D. Make and Model: TBD by CONTRACTOR.

E. Other Requirement: Flash Mix and Flocculation Tank shall either include upstream and downstream sample ports, or CONTRACTOR shall include sample ports in the associated piping.

2.7 EQUALIZATION CLARIFIER TANK

A. Operating Conditions:
   1. Fluid: Flocculated Reaction Tank effluent.
   2. Location: Outdoors. Ambient Conditions.

B. Unit Type: Inclined plate or tube clarifier. The unit shall consist of the lamella tank and support legs. Clarification equipment may be placed inside of a frac tank or equivalent holding tank. CONTRACTOR to determine setup of this clarification tank to allow for sludge settlement and clarification of effluent.

C. Performance Requirements:
   1. Hydraulic Capacity: 100 USGPM (Design).
   2. The clarifier shall provide a minimum of 100-400 feet^2 of settling area and allow for a hydraulic loading rate (surface overflow rate) of 0.25 -1.0 USGPM/ft^2 at the design flow of 100 USGPM. Settling media shall be installed at a 45-60 deg. angle (above horizontal). Nominal media spacing shall be 2 inches (50 mm).

D. Clarifier Process Components:
   1. The sludge hopper shall be outfitted with a minimum of 2 manual sludge blanket sample ports.

E. Plates shall be a minimum of 2 mm thick FRP, PVC, or PP. Submerged effluent throttling devices shall be provided to ensure a minimum pressure drop of 0.5 kPa across each plate at the design flow. Individual throttling devices shall be centered over each individual plate spacing to provide maximum plate utilization.

F. The ability to access and clean the clarifier media must be available.

G. Fabrication:
   1. The clarifier tank and sludge hopper shall be fabricated from ASTM A36 Carbon Steel with a chemical resistant epoxy coating.
   2. Minimum tank wall thickness shall be 6 mm.
   3. Coatings: All carbon steel surfaces shall be sandblasted in accordance with the steel structures painting council (SSPC) SP6, latest edition, on all non-wetted surfaces and ANSI SSPC -SP 10 for all wetted parts.
   4. All carbon steel surfaces shall be painted as follows:
      a. Interior surfaces of the tank shall be near white blast metal (SSPC – SP10) and finished with a coating of 0.13 to 0.15 mm high solids epoxy mastic primer and finished with 0.13 to 0.15 epoxy mastic, applied in accordance with the coating manufacturer's recommendations. Average MDFT shall be a minimum of 0.25 mm.
      b. Exterior surfaces of the tank shall be a commercial blast condition (SSPC – SP 06) and finished with a coating of 0.13 to 0.15 mm high solids epoxy mastic primer as finished with 0.04 to 0.06 mm enamel, applied in accordance with the coating manufacturer's recommendations. Average MDFT shall be a minimum of 0.17 mm.

5. Stainless steel, nickel, Monel, lead, Hastelloy, galvanized steel, rubber, plastic or fiberglass surfaces, drives, motors, etc. and fasteners shall not be painted unless they have been factory coated.

2.8 BAG FILTRATION FEED PUMP

A. Operating Conditions:
   1. Fluid: Equalization Clarifier Tank effluent.
   2. Service: Equalization Clarifier Tank to Bag Filters.
   3. Location: Indoors – within ISO container: 40 degrees F to 110 degrees F, 0 – 100 percent R.H.
   4. Fluid Temperature: 34 to 110 degrees F.

B. Type and Materials: High efficiency, non-clog, ANSI - horizontal centrifugal pump.
   1. Pump casing, seal chamber and frame adapter to all be ductile iron.
   2. Impeller to be 304 stainless steel.
   3. Bolting, nuts, hardware and plugs shall be 304 stainless steel.

C. Performance Requirements:
   1. Capacity: 100 USGPM.
   2. Speed: 1800 rpm maximum.
   3. Pump Head: Shall be sized by equipment CONTRACTOR to pump from Equalization Clarifier Tank effluent to Air Stripper discharge. Shut off head shall be a minimum 15 percent above operating point for the pump. CONTRACTOR shall make allowance for losses of piping/hoses between any containers and equipment.

D. Motor: Provide TEFC motor rated at 1.15 service factor 480 VAC, 3 phase, 60 Hz, premium efficiency.

E. Make and Model: TBD by CONTRACTOR.

F. Other Requirement: Abrasion resistant impeller and pump casing. Pumps shall be installed with high pressure discharge switch that shall terminate pump operation in unusual circumstances.

2.9 BAG FILTRATION

A. Operating Conditions:
   1. Fluid: Equalization Clarifier Tank effluent.
   2. Location: Indoors – ISO container. Anticipated room temperature is 40 degrees F to 110 degrees F, 0 to 95 percent relative humidity.

B. Unit Type: Single bag filter pressure filter housings; 6 filter housings (minimum); #2 size bag filters. CONTRACTOR to determine final sizing of bags.

C. Performance Requirements:
   1. Hydraulic Capacity: 100 USGPM (Design) split over two parallel trains of three pressure vessels in series. Two parallel trains will provide capability for

continuous operation during bag filter change out and other maintenance requirements.

2. Solid Separation: Nominal particulate removal range 10 micron followed by 5 micron and then by 1 micron filter bags.
3. Quantity: 6 (2 trains of 3 in series).
4. Bag Filter Process Components:
   a. Each bag filter housing shall include inlet/outlet manual pressure gauges.
   b. A high differential pressure switch shall be provided to indicate bag filter replacement requirement.
   c. Bag filter housings shall be constructed of 304 SS.

2.10 GRANUAL ACTIVATED CARBON CONTACTORS

A. Operating Conditions:
   1. Fluid: Bag Filtration effluent.
   2. Location: Indoors – ISO container. Anticipated room temperature is 40 degrees F to 110 degrees F, 0 to 95 percent relative humidity.

B. Unit Type: Pressurized granular activated carbon contactor for complete removal of soluble organic compounds.

C. Performance Requirements:
   1. Hydraulic Capacity: 100 USGPM (Design).
   2. Organics removal: Granular activated carbon (GAC) treatment shall remove all residual soluble organic compounds of concern as identified in Table 2. Activated carbon treatment shall allow for consistent removal of organic compounds to discharge limits stipulated in OWNER discharge permit.
   3. Quantity: 4 (2 trains of 2 in series). A series configuration of the GAC treatment vessels is recommended to allow for identification of contaminant breakthrough of the lead treatment vessel.
   4. The GAC contactor should be sized/selected to allow for a maximum hydraulic loading rate of 5 USGPM/ft^2. The granular activated carbon contactors should provide an effective media contact time of 10 minutes (minimum).
   5. GAC Contactor Process Components:
      a. The GAC contactor should be configured to allow for easy replacement of GAC media. All GAC media used shall be virgin media.
      b. The contact vessel should include an inlet distributor for equal flow distribution across vessel cross-section.
      c. Media contactor shall be constructed to ASME code requirements for pressure vessels. Vessels shall be constructed for a maximum operating pressure of 75 PSIG. Vessels shall be constructed of carbon steel with PVC internal components.
      d. Media contactor shall include inlet and discharge manual pressure gauges and sample ports.
      e. GAC contactors shall be configured to allow either vessel to be operated as lead or lag vessel. The vessels must be configured to allow for continued treatment while one vessel is undergoing maintenance (i.e., media replacement).

2.11 BAG FILTRATION (POLISHER)

A. Operating Conditions:

1. Fluid: Granular Activated Carbon effluent.
2. Location: Indoors – ISO container. Anticipated room temperature is 40 degrees F to 110 degrees F, 0 to 95 percent relative humidity.

B. Unit Type: Single-round bag filter pressure filter housings; 2 filter housings (minimum); #2 size bag filters. CONTRACTOR to determine final sizing of bags.

C. Performance Requirements:
1. Hydraulic Capacity: 100 USGPM (Design) split over two parallel pressure vessels.
2. Solid Separation: Nominal particulate removal range 0.5 micron filter bags.
3. Quantity: 2 (in parallel).
4. Bag Filter Process Components:
   a. Each bag filter housing shall include inlet/outlet manual pressure gauges.
   b. A high differential pressure switch shall be provided to indicate bag filter replacement requirement.
   c. Bag filter housings shall be constructed of 304 SS.

2.12 AIR STRIPPER

A. Operating Conditions:
1. Fluid: Secondary (polishing) Bag Filtration effluent.
2. Location: Outdoors – Ambient conditions.

B. Design Requirements:
1. Low profile air stripper system.
2. Design the equipment for continuous operation at peak hydraulic capacity.
3. Design all parts with adequate factors of safety to withstand the maximum mechanical stresses to which they might be subjected during the course of plant operation.
4. The arrangement of parts must be such as to allow ready accessibility for erection, inspection, maintenance, and repair.
5. The stripper system will be skid mounted outdoors on a concrete slab.
6. Include all other equipment required to provide a complete and functional system meeting all performance requirements specified herein.
7. Stripper to have induced draft design.

C. Performance Requirements:
1. Under all operating conditions the low profile air stripper system is required to reduce contaminants from the peak influent concentrations to below to the treated water concentrations requirements as listed below. CONTRACTOR shall be responsible for ensuring and guaranteeing that the design of the equipment and system will meet the effluent requirements as stated above.
2. Design parameters for low profile air stripper:
   a. Number of Units: One.
   b. Process Design Flow: Water - 100 gpm. Air – TBD by CONTRACTOR.
   c. Model: TBD by CONTRACTOR.
3. Equip stripper with manways for inspection and repair service.
4. Equip system with lifting lugs for installation and maintenance service.
5. CONTRACTOR to determine the following connections for the stripper:
   a. Influent
   b. Effluent (two connections - siphon drain on lower)
   c. Air Inlet

d. Air Outlet
e. High-level switch
f. Drain (siphon drain)
g. Sight glass (two connections)
h. Differential pressure switch

6. Air Stripper Air Blower:
   a. Performance
   b. Blower Motor
   c. Blower accessories: Discharge silencer, inlet filter, manually adjustable inlet guide vanes, and casing drain.
   d. Belt drive.

D. Materials:
1. Materials used shall be selected for their suitability for each particular duty and will comply with ASTM standards unless otherwise provided.
2. Materials shall be new and of the best quality; all workmanship shall be first class.
3. The mechanical aspects of all equipment shall comply with ASME standards unless otherwise provided.
4. Stripper steel shall be fabricated from 304L stainless steel.
5. Anchor bolts, nuts, drill in adhesive anchors, hangers for insertions in concrete shall be of Type 304 or 316 stainless steel.
6. Piping:
   a. Arrange piping so that valves, pressure switches, gages, and other items which may require regular inspection or maintenance are conveniently accessible. Provide piping with drains at all low points, and air release valves at all high points.
   b. The design of the piping shall allow for proper restraint under all anticipated conditions, particularly where surges may occur and high transient pressures could result, or where different temperatures occur seasonally.
   c. Where piping connections are made between adjacent structures, provide at least 1 flexible coupling if any possibility of settlement or movement exits.

E. Piping, Valves, and Appurtenances:
1. Air stripper system vendor shall supply face piping described below, at a minimum. The air stripper shall be supplied with pipes and valves for operation.
   a. Water Line: CPVC.
   b. Air Line: FRP.
2. Butterfly Valves: AWWA C504; as manufactured by Pratt, DeZurik, Keystone or equal. Valves 8 inches and larger shall have gear operators with hand wheel. Butterfly valves shall be cast or ductile iron body, ductile iron with Ni-chrome edge disc, stainless steel shaft, and Buna N seat.
3. Pressure Gauges: 4 ½-inch nominal diameter, installed with isolation valves. Manufactured by Trerice, Ashcroft or equal.
4. Pipe Hangers and Supports: Provide for all face piping. All pipe supports shall have liberal strength and stiffness to support pipes under the maximum combination of peak loading conditions to include pipe weight, liquid weight, liquid movement and pressure forces, thermal expansion and contraction, vibrations, and all probable externally applied forces. Support spacing shall be a

maximum of 10 feet with additional support provided at fittings, valves, and changes in direction.

5. Air/Vacuum Valves: Combination air/vacuum valve; APCO Series 14 C as manufactured by Valve and Primer Corporation or equal.

2.13 WWTF EFFLUENT FLOW METER

A. Type: Magnetic Type Flow Meter.

B. Description: Instrument to continuously measure the volume flow rate of the electrically conductive fluid based on Faraday's law of induction, where the voltage induced by flowing fluid is proportional to flow rate.

C. Operating Conditions:
1. Fluid: WWTF treated effluent (Air Stripper effluent).
2. Location: Indoors in discharge line of GAC vessels (40 degrees F to 110 degrees F, 0 – 95 percent RH).
3. Fluid Temperature: 34 to 110 degrees F.

D. Performance:
1. Measured fluid conductivity (limits): not less than 0.5 μS/mm.
2. Accuracy: +/ -0.5 percent of calibrated span (assuming 5 pipe diameters upstream and 3 pipe diameters downstream of straight run).
3. Velocity Range: 1 feet/s to 10 feet/s.

E. Transmitter: Microprocessor based with backlit LCD integral display of measure flow and flow totalizer values in engineering units (imperial: gal/min, gallons), sensor and electronics failure mode and annunciation, field programmable, menu driven type software limit and control settings (units, range, zero and span adjustment, pulse volume, etc.), non-volatile memory, local or remote mounted.
1. Enclosure: Minimum types 4X or as indicated, suitable for the transmitter mounting location, corrosive resistant enclosure, and horizontal or vertical surface mount.
2. Power Requirements: 4 – wire type, less than 0.5 A @ 120 VAC +/ -10 percent, 60 Hz.
3. Analog Output Signals: 1 - 4 -20 mA.
4. Discrete Status Output Signals: Minimum 1 programmable, SPDT type dry contact, rated 1 A at 120 VAC. Programmed to indicate sensor problem.

F. Sensor, Non-Wetted Materials: Epoxy coated steel flowtube sensor, flanged to ASME B16.5 class 150, silicone rubber housing sealant. Process wetted materials: lined with mechanically resistant material and chemically compatible with process fluid, fluid isolated electromagnetic pulsed DC coils, and corrosion resistant electrodes.
1. Enclosure: Corrosion resistant, minimum types 4X.
2. Mounting: Horizontal or vertical position with full tube.
3. Maximum fluid pressure: Entire flow tube must meet ratings of flanges.
4. Liner and electrode type shall be determined by supplier.

G. Make and Model (Standard of Construction): Endress + Hauser Promag 10P, or approved equal.

H. Other Requirements: Mounting material; grounding rings as required.

2.14 CHEMICAL DOSING EQUIPMENT

A. Unit Description:
1. Chemical metering pumps dose treatment chemicals from the chemical storage area into the Reaction Tank. All chemicals are to be delivered to Site in totes or drums.
2. The metering pumps are controlled by the plant PLC in auto mode or locally in manual mode. Metering pumps shall modulate dosing flow to an adjustable dose setpoint.

B. Operating Conditions:

Pump #	Capacity	Liquid Pumped
1	TBD	Sulfur Containing Reducing Compound
2	TBD	Polymer (1)
3	TBD	Sodium Hydroxide
4	TBD	Sulfuric Acid

(1) Maximum neat polymer dose.

C. Design Requirements:
1. Type: Diaphragm operated metering pump, sized by SUPPLIER, materials of construction to be suitable for fluid mentioned above. Metering pump/accessories to be mounted on independent chemical pump panel.
2. Provide polymer mixing, activation, and dilution equipment as required.

D. Performance and Connection Requirements:
1. Minimum Capacity: See table above.
2. Minimum Turn Down Ratio: 100:1.
3. Quantity: Single pump system.

E. Make and Model: TBD by SUPPLIER.

F. Other Requirements:
1. The chemical feed system shall be supplied by a single system Supplier.
2. Backpressure valve, internal pressure relief valve, isolation valves, calibration column, Pump to come with all accessories mounted on a board with a single inlet/outlet connection.

2.15 LIQUID SLUDGE DISPOSAL

A. Any sludge that accumulates within the WWTF as a result of chemical treatment and sedimentation shall be disposed offsite by CONTRACTOR as necessary. The primary location for this accumulation would most likely be settling at the bottom of the Equalization Clarifier Tank, which follows the flocculation tank.

B. CONTRACTOR to determine if dewatering will be utilized or not. If dewatering is utilized, then the conditions listed in subsections C through M shall be met.

C. Settled sludge collecting at the base of the clarifier unit will be conveyed by a single duty air operated diaphragm (AOD) pump to sludge holding tanks. Sludge will be transferred to the holding tanks based on adjustable timer controls (i.e., frequency and duration of sludge transfer events).

D. Sludge management systems shall include a minimum capacity of sludge storage. CONTRACTOR to determine sludge storage capacity. The cone bottom tanks shall include level switch (high/low) level indicators. The cone bottom tanks shall include the ability to manually decant liquid from the storage tanks and return the liquid to the equalization tanks upstream of the WWTF.

E. Dewatering of collected sludge shall be achieved through the use of a pressurized filter press system. The filter press shall achieve a dewatered sludge cake that does not possess excessive free water (i.e., shall pass paint filter test as per USEPA Method 9095B).

F. It is recommended that the filter press be sized for a minimum 25 cubic feet (ft^3) per dewatering cycle. Depending on solids load to the WWTF, dewatering events may need to occur as frequently as twice per operating day.

G. Sludge shall be conveyed to the filter press by 2 (duty, standby) air operated diaphragm pumps. The AOD pumps shall be sized to accommodate the recommended feed rate for the filter press.

H. The filter press will be supplied with any necessary walkways, platforms, and structural supports to allow for discharge of filter cake to a collection bin below. Any structural elements shall be designed to withstand all loads, including dynamic loads.

I. The filter press shall include a dedicated PLC with operator interface.

J. The dewatering cycle shall be fully automatic.

K. The dewatering system shall include all necessary accessories for the collection and return of filter press filtrate to the equalization tanks upstream of the WWTF.

L. Dewatering system shall provide for manual plate scraping as well as high pressure wash of filter fabric covers.

M. A compressed air system shall be installed to provide compressed air necessary for AOD pump operation.

2.16 TREATMENT EQUIPMENT ENCLOSURES

A. All proposed WWTF equipment is to be installed in several 8’W x 40’L x 9’6” H modified ISO shipping containers or other approved weather enclosure, unless otherwise specified.

B. General arrangement of equipment within containers shall be provided by SUPPLIER as well as arrangement of shipping containers on Site plan.

C. The enclosures shall include at a minimum:

1. Lifting eyes on upper corners.
2. Plywood floor.
3. Barn-style rear double doors.
4. One man door.
5. Ventilation fan with thermostat and hood. Ventilation system shall be sized to prevent enclosure temperature from exceeding 105 deg. F.
6. Access hatches as required from removal of spent treatment media.

D. CONTRACTOR shall provide appropriate foundations for treatment equipment enclosures so as to prevent shifting or settling.

2.17 ELECTRICAL CONTROL PANEL AND PLC SYSTEM

A. Operating Conditions: Indoors; install in separate un-classified area.

B. Control Panel:
1. Enclosure: A new PLC (Programmable Logic Controller) Panel must be provided based on treatment equipment SUPPLIER PLC IO list, which calls out specific PLC hardware.
2. The electrical instrument design, specification portion of this project shall conform to the latest editions of the NEMA, ANSI, IEEE, the National Electrical Code, the Occupational Safety and Health Act, and any regulations or codes of any governmental jurisdictions, that may be more exacting than these references and related codes and standards as designated herein.
3. All specifications, standards, codes, etc. referenced are to be the latest edition, and together with all addenda, revisions, and supplements shall be considered part of this project.
   a. NEC -2011 National Electrical Code.
   b. SUPPLIER will prepare new and modify existing drawings to provide a complete Electrical Control Panel package.
   c. SUPPLIER will prepare new and modify existing drawings displaying connections of the new field devices to the new PLC Panel.
   d. SUPPLIER will be expected to work with outside suppliers, as appropriate, to prepare a successful installation.
4. Hardware:
   a. Allen -Bradley ControlLogix; Ethernet Module 1756 -ENBT; 1756 I/O Modules, as required; HMI Display, 2711P PanelView Plus 1500; Ethernet Switch, Stratix 6000 Fixed Managed.
5. Communications: SUPPLIER will use Ethernet or Fiber cables, as they deem necessary, for the main PLC/HMI communications network.
6. Other Requirements: All automatic equipment and process set points shall be controlled through an HMI touch screen. All alarms generated by the process will activate a written description of the alarm on the HMI touch screen.
7. Electrical enclosure shall include all motor starters. All system motors shall be provided with HOA switches at electrical enclosure.

C. Programming: The software for the controls system will be developed using the state -of -the -art hardware and software development tools. The design of the automation system is based upon the criteria listed below:

1. The PLC will be programmed with the latest available version of Rockwell Software RSLogix5000.
2. The HMI graphics and database package will be developed with the latest available version of Rockwell Software FTView Machine Edition.
3. The communication software will be the latest available version of Rockwell Software RSLinx Enterprise percent RSLinx Classic.
4. All systems are operated at all times to meet required quality metric, and process data storage requirements along with client requirements, standards and objectives.
5. All systems are designed for automatic, unattended operation. The status of operating equipment is continuously monitored to detect operational excursions, equipment failures, and automatic shutdowns.
6. Manual control is provided for maintenance, startup and emergency shutdown where appropriate.
7. PLC ladder logic programming is subject to 30 percent, 60 percent, and final review and comment by ENGINEER. Tag names and tag descriptions will be fully utilized in the development of the software, where appropriate, the PLC tag name will be the same as the PID tag name. Rung comments and titles are expected and will be included in the software as it is developed. The use of function blocks will be accepted. Password protection for the PLC program will not be required. At the completion of the system installation and commissioning, one final DVD of the PLC program will be submitted to ENGINEER. This will also include a tag database listing and a tag cross reference listing to the ladder logic usage.
8. The HMI programming is subject to 30 percent, 60 percent, and final review and comment by ENGINEER. Detailed review and comment by ENGINEER of screen graphics, system operability, and system navigation architecture will be an integral part of the development of this system. The HMI, when booted, will automatically startup a runtime version of the graphics package. If the HMI fails, the PLC program will continue operation of the system based upon pre-programmed values and last setpoints entered. Navigation buttons will be provided along the bottom of each screen to logically progress and maneuver through the system. HMI screens will allow process and alarm setpoints to be modified by the Operator, within an acceptable range. HMI screens will be designed to pictorially represent the real -time operation and control of the system using ISA graphic symbols, simple schematics or representations of actual devices. The HMI will be controlled by both touch and PanelView keys for the same objective. The top of the HMI screen will have a stationary Alarm Summary. Trend data points will be determined by ENGINEER. Provide ENGINEER with an HMI system manual and operator training, outlining the specifics on how to operate the system using the HMI screens. A DVD will be submitted that will have the entire HMI system backup.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer’s instructions and State of New York standards.

B. Maintain working area free of standing water.

3.2 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting and testing.

B. Field test all equipment in the presence of ENGINEER. Provide ENGINEER with minimum 10 days working notice prior to the field tests.

C. Functional Test: Prior to facility startup, all equipment shall be inspected and verified for installation of equipment by others is satisfactory.

D. Testing Equipment: Furnish all instruments and labor as required for this procedure.

3.3 MANUFACTURER'S FIELD SERVICES

A. Section 01 40 00 - Quality Requirements: Requirements for manufacturer's field services.

B. Assist CONTRACTOR with installation and start-up of equipment.

3.4 START UP AND PERFORMANCE VERIFICATION

A. Site Acceptance Testing:
   1. SUPPLIER shall test the system as a whole to bring the system online to treat the influent to the required effluent criteria.
   2. Chemicals and consumables required for the startup and performance verification will be provided by CONTRACTOR.
   3. In general, equipment start -up and performance verification shall include:
      a. Bring packaged system into operating condition.
      b. Ensure operation of equipment, devices, instrumentation and alarms required for the proper operation of the packaged system.
      c. Operate packaged system in different modes, perform multiple start and stop sequences and adjust settings as required.
      d. Simulate failures for packaged system and shut-down sequence. Adjust as required.
      e. Operation of the associated equipment.

B. Performance Verification:
   1. Performance verification shall happen after all equipment has completed start -up testing and has been signed off by equipment SUPPLIER.
   2. Operate the system as a whole, bringing each system online as required by plant operation to treat water.
   3. Fine tune dosing points of chemical coagulant and flocculant at clarifier to meet the performance requirements of the system. Record all adjustments made and record final set points.
   4. Once all final adjustments are made and set points are finalized, operate the plant for 5 consecutive 8-hour days with minimum two batch runs of the filter press.
   5. After 5 consecutive days of continuous - trouble free run (malfunction free) the plant shall be deemed ready for operation.
      a. If a system must be removed from service in order to perform a cleaning cycle or other regular maintenance, the cleaning or maintenance activities shall be considered part of the continuous operation of the

process provided that the activities are not required to address failure of mechanical components or failure to meet operational standards.

b. Malfunctions shall be defined as an event of 1) mechanical failure of a system or component, or 2) failure to meet the operational standards required for the system. If in the event of a malfunction, the system will be required to be re -tested to ensure system performance is met.

3.5 DEMONSTRATION

A. Equipment manufacturer shall furnish the services of a factory trained representative for a maximum of 3 trips and 3 eight-hour days to instruct representatives of CONTRACTOR and ENGINEER on proper operation and maintenance. If there are difficulties in operation of the equipment due to the manufacturer's design or fabrication, additional services shall be provided at no cost to OWNER.

B. A qualified representative of the equipment shall instruct ENGINEER on general preparation for installation and startup.

C. SUPPLIER shall supervise CONTRACTOR's operating personnel during the startup period. Startup operations shall be continuous until it is satisfactorily demonstrated that the equipment is suitable for continuous online services.

3.6 TRAINING

A. Forward training materials for ENGINEER review minimum 4 weeks prior to date of training for system.

B. Training shall cover off, at a minimum:
1. Typical operating scenarios.
2. Common malfunctions/troubleshooting procedures for the system.

3.7 OPERATION

A. Do not operate WWTF until ENGINEER has inspected WWTF and authorization for discharge has been received from ENGINEER.

B. Operate WWTF and do work necessary to treat collected wastewater. Operation shall include treatment of feed tank wastewaters and discharge of treated water for duration of the Works.

C. Operate and maintain treatment units as required to meet OWNER's permit and flow rate requirements. Provide for removal of solids as necessary.

D. If resin or carbon media is utilized, provide for removal and disposal of media. Dispose solid waste by commingling with stabilized sediments and shipped off-Site.

E. Treatment system shall be operated in compliance with OWNER's permit (attached).

F. Provide daily flow rate data to ENGINEER on a daily basis in a Log Sheet format acceptable to ENGINEER.

3.8 MONITORING OF WASTEWATER TREATMENT AND DISCHARGE

A. Monitor wastewater that is treated and discharged from the Wastewater Treatment Facility. Monitoring shall include periodic field and laboratory testing of water samples. Analysis of influent and effluent samples from the WWTF shall coincide with parameters identified in OWNER's permit. Samples shall be collected on a daily basis during system start-up/demonstration and once per week thereafter. Sampling requirements may change due to request of Regulator.

B. CONTRACTOR may conduct additional testing of the water in support of operational or discharge decisions. Prior to discharging treated wastewater, submit all available testing results to ENGINEER. ENGINEER may require CONTRACTOR to conduct further wastewater treatment prior to discharging.

C. Notify ENGINEER when treated wastewater is ready for testing.

D. Do not add treated wastewater to a previously sampled treated wastewater batch, unless all batches have been approved for discharge.

3.9 DISCHARGE LIMITS

A. Ensure discharges from WWTF are in compliance with OWNER's permit requirements (attached) and limitations. If influent exceeds design criteria, cease discharge and consult with ENGINEER before modifying the WWTF at an additional cost.

3.10 FAILURE TO MEET CRITERIA

A. Should analyses indicate that effluent has not met treatment criteria or flow rates or other criteria do not comply with OWNER's permit discharge must be ceased immediately. Store any additional water on Site until an additional sample yielding satisfactory result has been collected and analyzed. Collect and analyze second sample of treated water. If second sample also fails to meet criteria, perform full check on the treatment system, including replacement of granular activated carbon (GAC) and/or filter media, if necessary. Do not release treated water until testing has verified that system is capable of treating water to OWNER's permit and to satisfaction of ENGINEER. Retesting and retreating water to meet criteria shall be at no additional cost to OWNER only following approval by ENGINEER, except if additional treatment is required for pH adjustment resulting from the stabilization process or for the treatment of dissolved metals.

B. Provide sufficient water storage until treatment criteria can be met. Store wastewater, carry out the treatment system checks, and repair the treatment system.

3.11 DECOMMISSIONING

A. Drain all pipes/tanks/pumps.

B. Lock out power to WWTF.

C. Decontaminate WWTF prior to removal from the Site.

3.12 REMOVALS

A. Remove all components of WWTF including tanks, berms, piping, tanks etc. after decontaminating.

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Basic product requirements.
2. Product options.
3. Product substitutions.
4. Product delivery and handling requirements.
5. Product storage and handling requirements.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
2. No separate payment will be made for work of this Section.

1.3 BASIC PRODUCT REQUIREMENTS

A. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

B. Provide interchangeable components of the same manufacturer for components being replaced.

1.4 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any approved product meeting those standards or descriptions.

B. Products Specified by Naming One or More Manufacturers with a Provision Not Prohibiting Substitutions: Products of manufacturers named and meeting specifications; options or substitutions allowed in accordance with the General Conditions, SUBSTITUTES AND OR-EQUALS. Submit a request for substitution for any manufacturer not named in accordance with the following article.

C. Products Specified by Naming One or More Manufacturers with a Provision Prohibiting Substitutions: Products of manufacturers named and meeting specifications, no options or substitutions allowed.

1.5 PRODUCT SUBSTITUTIONS

A. The General Conditions, SUBSTITUTES AND OR-EQUALS, specifies requirements and procedures for submitting requests for substitutions after the Notice of Award.

B. Document each request with complete data substantiating compliance of proposed substitution with the Contract Documents.

C. A request for substitution constitutes a representation that CONTRACTOR:
1. Has investigated the proposed product and determined that it meets or exceeds the quality level of the specified product.
2. Will provide the same warranty for the substitution as for the specified product.
3. Will coordinate installation and make changes to other Works which may be required for the Works to be complete at CONTRACTOR's expense and at no additional cost to OWNER.
4. Waives claims for additional costs or time extension which may subsequently become apparent.
5. Will reimburse OWNER and ENGINEER for review or redesign services associated with re-approval by authorities.

D. Substitutions will not be considered when they are shown or implied on Shop Drawings or product data submittals without separate written request.

E. Substitution Submittal Procedure after the Notice of Award:
1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
2. Submit Shop Drawings, product data, and certified test results and other data as required by the General Conditions, SUBSTITUTES AND OR-EQUALS, attesting to the proposed product equivalence. Burden of proof is on CONTRACTOR.
3. ENGINEER will notify CONTRACTOR in writing of decision to accept or reject request.
4. ENGINEER will be sole judge as to the acceptance or rejection of CONTRACTOR's request.
5. In the event CONTRACTOR obtains ENGINEER's approval for the use of products other than that shown or specified, CONTRACTOR shall, at CONTRACTOR's own expense and using methods approved by ENGINEER, make all changes to the Works, including structures, piping, electrical, equipment, and controls, that may be necessary to accommodate this product.

1.6 PRODUCT DELIVERY AND HANDLING REQUIREMENTS

A. Make all arrangements for transportation, delivery, and handling of products required for prosecution and completion of the Works.

B. Shipments of products to CONTRACTOR or Subcontractors shall be delivered to the Site only during regular working hours. Shipments shall be addressed and consigned to the proper party giving name of Project, street number, and city. Do not deliver shipments to OWNER except where otherwise directed in writing.

C. Provide advance notice of delivery of products to the Site as required in other Sections. Do not deliver products of any kind to the Site until approval in writing has been applied for and obtained by CONTRACTOR from ENGINEER.

D. Arrange delivery of products to the Site in accordance with work sequence and in ample time to facilitate inspection prior to installation. Schedule deliveries to limit requirement for storage at the Site to the practical minimum.

E. Coordinate deliveries to avoid conflict with the Works and conditions at the Site and to accommodate the following:
   1. Work of Other Contractors, or OWNER.
   2. Limitations of storage space.
   3. Availability of equipment and personnel for handling products.
   4. OWNER's use of the Site.

F. Do not have products delivered to the Site until related Shop Drawings or Samples have been approved by ENGINEER.

G. Do not have products delivered to the Site until required storage facilities have been provided.

H. Transport and handle products in accordance with manufacturers' instructions.

I. Immediately on delivery, inspect shipments to ensure that products comply with requirements of the Contract Documents and reviewed submittals, quantities are correct, and products are undamaged.

J. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.7 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Limit on-Site storage of products to areas shown on the Drawings or otherwise approved by ENGINEER.

B. Make all arrangements and provisions necessary for storage of materials and equipment.

C. Place all excavated materials, construction equipment, and materials and equipment to be incorporated into the Works so as not to injure any part of the Works or existing facilities and so that free access can be had at all times to all parts of the Works and to all utility service company installations in the vicinity of the Works.

D. Store and protect products in accordance with manufacturers' recommendations and instructions and requirements of Specifications, with seals and labels intact and legible.

E. Store sensitive products in weathertight, climate-controlled enclosures. Protect products subject to ultraviolet degradation from direct exposure to sunlight.

F. For exterior storage of fabricated products, place on sloped supports, above ground.

G. Provide off-Site storage and protection when the Site does not permit on-Site storage or protection.

H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of product.

I. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

J. Furnish equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

K. Arrange storage of products to permit easy access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

L. Store materials and equipment neatly and compactly, and in locations that will cause a minimum of inconvenience to Other Contractors, public travel, adjoining owners, tenants, and occupants.

M. Protect delivered products from contamination or damage.

N. Do not use lawns, grass plots, or other private property for storage purposes without written permission of OWNER or other person in possession or control of such premises.

O. CONTRACTOR shall be fully responsible for loss or damage to stored products, materials, and equipment.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Examination.
2. Preparation.
3. Field surveying.
4. Restoration.
5. Progress cleaning.
6. Final cleaning.
7. Final decontamination.
8. Removal and disposal.
9. Starting and adjusting.
10. Protection of installed work.
11. Closeout procedures.
12. Project record documents.
13. Warranties.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
2. Demobilization and Closeout:
a. Schedule of Prices Item No. 01 70 00/1.
b. Payment Basis: Lump sum price. Includes final decontamination of equipment, construction facilities, and materials to be removed from the Site; final removal of temporary construction and support facilities provided by CONTRACTOR; final Site cleanup; final non-contaminated waste removal and disposal; final grading; adjusting; field surveying; restoration; protection of installed work; Project record documents; pre and post-construction sampling of any off site properties used by CONTRACTOR; and warranties.

1.3 REFERENCES

A. Abbreviations and Acronyms:
1. OSHA: Occupational Safety and Health Administration.

1.4 EXAMINATION

A. Prior to commencement of work at the Site, inspect the Site with ENGINEER to review and establish the condition of surface features including existing roads, parking areas,

buildings, wells, trees and other plants, grassed areas, fencing, service poles, wires, paving, and survey bench marks or monuments on or adjacent to the Site which may be affected by the Works. This inventory shall be mutually agreed between ENGINEER and CONTRACTOR and shall not thereafter be subject to dispute. Such inventory, as may be amended from time to time, will be used by ENGINEER to check compliance by CONTRACTOR with the requirements of the Contract Documents.

B. Provide ongoing review, inspection, and attendance during performance of the Works to properly document conditions. Promptly inform ENGINEER of any existing condition at the Site affected by the Works which may require restoration, repair, or replacement. Do not cover up any of the Works without prior approval from ENGINEER.

C. Maintain and protect existing Site structures and facilities from damage which may be affected by the Works while work is in progress. Repair or replace damage resulting from the Works to ENGINEER's approval.

D. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent work. Beginning new work means acceptance by CONTRACTOR of existing conditions.

E. Verify that existing substrate is capable of structural attachment of new work being applied or attached or that existing or previously constructed surfaces are ready to receive subsequent work.

F. Examine and verify specific conditions described in individual Sections.

G. Verify that utility services are available, of the correct characteristics, and in the correct location.

H. CONTRACTOR shall perform pre and post surface soil sampling at any off site properties that CONTRACTOR uses for staging, storage, truck parking etc. Samples to be collected in presence of ENGINEER and at locations agreed to by ENGINEER. Samples to be analyzed for TCL VOC, TCL SVOC, PCBs, and metals. Sample frequency of one sample per 30 foot by 30 foot area.

1.5 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

1.6 FIELD SURVEYING

A. Quality Assurance:
   1. Employ a land surveyor registered in the State of New York and acceptable to ENGINEER to perform survey work of this article.
   2. ENGINEER may, at any time, check CONTRACTOR's survey and layout work but this shall not relieve CONTRACTOR of any of its responsibilities to carry out the Works to the lines and grades set out according to the Drawings and the

Project Specifications or as otherwise necessary for performance of the Works according to the Contract Documents.

3. Notify ENGINEER in writing at least 5 working days in advance of commencing work on any part of the construction to enable ENGINEER to establish bench marks and base lines.
4. Unless otherwise specified, ENGINEER will establish reference bench marks adjacent to the Works. CONTRACTOR shall be responsible for laying out the Works from established reference points.

B. Submittals:
1. Submit paper and digital copies of Site drawing and certificate signed by the land surveyor engaged by CONTRACTOR that the elevations and locations of the Works are in conformance with the Contract Documents.
2. On request, submit documentation verifying accuracy of survey work.

C. Record Documents:
1. Maintain a complete and accurate log of control and survey work as it progresses.
2. Prepare a certified survey illustrating dimensions, locations, angles, and elevations of construction**,** and Site work.
3. Submit record documents under the provisions of PART 1, PROJECT RECORD DOCUMENTS.

D. Survey Reference Points:
1. Locate, preserve, and protect survey control and reference points.
2. Control datum for survey is that shown on the Drawings. Promptly report to ENGINEER the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
3. Make good any errors entering into the Works through CONTRACTOR failure to notify ENGINEER concerning lack of preservation of such survey reference points.
4. Accurately replace or relocate disturbed reference or survey control points based on original survey control. Make no changes without prior written notice to and approval from ENGINEER.

E. Survey Requirements:
1. Utilize recognized engineering survey practices. Locate and lay out the Works using properly calibrated instrumentation.
2. Establish elevations, lines, and levels.
3. Periodically verify layouts by same means and methods.
4. Establish a minimum of two temporary bench marks on Site, referenced to established control points. Record locations, with horizontal and vertical data, on Project record documents.
5. Provide reasonable and necessary opportunities and facilities for setting points and making measurements during construction.
6. Confirm and document locations of all utilities.
7. Develop and make such additional detailed surveys as are needed for construction, such as bench marks, slope stakes, batterboards, stakes for establishing the design elevations of excavations and final grades, as-builts, and other working points, lines, and elevations. Maintain bench marks established by ENGINEER, existing property boundaries, lines and grade hubs, and other references and construction or survey points.
8. Post-processing software must be capable of producing relative position coordinates and corresponding statistics which can be used in a three

dimensional least squares network adjustment. This software should also allow analysis of loop closures and repeat baseline observations.

F. Examination:
1. Verify locations of survey control points prior to starting work.
2. Verify set-backs, easements, and clearances, confirm Drawing dimensions and elevations.
3. Promptly notify ENGINEER of any discrepancies discovered.

1.7 RESTORATION

A. As a minimum, restoration shall mean replacement, repairs, or reconstruction to a condition at least as good as or better than the condition prior to commencement of the Works.

B. Except where specifically required otherwise by other Sections, restore areas of the Works and areas affected by the performance of the Works to conditions that existed prior to commencement of the Works and to match condition of similar adjacent, undisturbed areas.

C. Ensure that restored areas match existing grade and surface drainage characteristics, except as otherwise specified, and ensure a smooth transition from restored surfaces to existing surfaces.

D. Do not alter original conditions without prior written approval from ENGINEER.

E. Without limiting the generality of the foregoing or other requirements of the Contract Documents, preserve and protect existing features encountered at the Site during performance of the Works including, but not limited to buildings, wells, structures, curbs and gutters, fences, pavement, manholes and catch basins, utilities, railroad sidings, roads, streets, walks, grassed areas, and other graded or improved areas.

F. Utilize construction methods and procedures during performance of the Works which keeps disturbance and damage of whatever nature to existing conditions to the practical minimum. Where work necessitates root or branch cutting, do not proceed without ENGINEER's prior approval.

G. Ensure that quality, grades, elevations, and the extent of bedding, cover, and other backfill materials including subgrades, finish grades, and thickness of pavements for roadways and parking areas are properly documented during their removal to ensure reconstruction to at least their original and functional condition.

H. Restoration Material: New, except as otherwise specified, not damaged or defective, and of the best quality for the purpose intended. Furnish evidence as to type, source, and quality of materials or products furnished when requested by ENGINEER or specified in other Sections.

I. Should any dispute arise as to the quality or fitness of materials, whether obtained on or off Site, whether previously inspected by ENGINEER prior to use or not, the decision to use any material or product in the finished Works will rest solely with ENGINEER.

J. Remove from the Site clean material not approved for reuse.

K. Handle and store products and materials in a manner to prevent damage, adulteration, deterioration, and soiling and according to manufacturers' instructions when applicable.

L. Prior to commencement of restoration work, inform ENGINEER of proposed material, methods, and procedures to repair, replace, or reconstruct disturbed, damaged, or suspected damage to the Works.

M. Perform cutting, fitting, remedial, and coordination work to make the several parts of the Works fit together.

N. Except as specified otherwise, dismantle and salvage materials for reuse where practicable. Exercise due care when removing material for salvage. Repair or replace materials damaged through improper handling or through loss after removal.

O. Store and protect removed material approved for reuse in approved locations. Beginning of restoration work means acceptance of existing conditions.

P. Unless otherwise specified, restore pavement by:
1. Removing and replacing the entire portions between joints or scores and not merely refinishing or patching localized areas.
2. Saw cutting surfaces, curbs and gutters, and similar structures or surfaces.
3. Protecting adjacent joints and load transfer devices and underlying granular materials.

1.8 PROGRESS CLEANING

A. Execute cleaning during progress of the Works and as required by the General Conditions.

B. Requirements of Regulatory Agencies:
1. In addition to the requirements herein, maintain the cleanliness of the Works and surrounding premises within the Works limits to comply with federal, state, and local fire and safety laws, ordinances, codes, and regulations.
2. Comply with all federal, state, and local anti-pollution laws, ordinances, codes, and regulations when disposing of waste materials, debris, and rubbish.

C. Coordinate cleaning operations with disposal operations to prevent accumulation of dust, dirt, debris, rubbish, and waste materials on or within the Works or on the premises surrounding the Works.

1.9 FINAL CLEANING

A. Execute final cleaning prior to Substantial Completion of the Works.

B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains, and foreign substances; polish transparent and glossy surfaces.

C. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

D. Clean filters of operating equipment.

E. Clean debris from roofs, gutters, downspouts, and drainage systems.

F. Clean the Site; sweep paved areas and rake clean landscaped surfaces.

G. Repair pavement, roads, sod, and all other areas affected by construction operations and restore them to original condition or to minimum condition specified.

H. Maintain cleaning until acceptance and occupation by OWNER.

1.10 FINAL DECONTAMINATION

A. Perform final decontamination of construction facilities, equipment, and materials which may have come in contact with potentially contaminated materials prior to removal from the Site.

B. For construction facilities, equipment, and materials which may have come in contact with TSCA regulated materials, decontaminate in accordance with 40 CFR Part 761 prior to removal from the Site.

C. Perform decontamination as specified in Section 01 50 00 to the satisfaction of ENGINEER. ENGINEER will have the right to direct CONTRACTOR to perform additional decontamination if required.

1.11 REMOVAL AND DISPOSAL

A. Remove surplus materials and temporary facilities and controls from the Site.

B. Dispose of all non-contaminated waste materials, litter, debris, and rubbish off Site.

C. Do not burn or bury rubbish and waste materials on Site.

D. Do not dispose of volatile or hazardous wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

E. Do not discharge wastes into streams or waterways.

F. Dispose of the following materials at an appropriate off-Site facility identified by CONTRACTOR and approved by OWNER:
   1. Debris including excess construction material, non-contaminated litter, and rubbish.
   2. Spent Tyvek and other disposable personal protective equipment worn during final cleaning.
   3. Wastewater removed from wastewater storage tank, wastewater generated from final decontamination operations including wastewater storage tank cleaning.
   4. Lumber from the decontamination pads.
   5. Volatile or hazardous wastes such as mineral spirits, oil, or paint thinner.

G. Dispose of materials according to Section 02 61 16.

H. Wastewater sampling: Perform sampling and analysis of stored wastewater for disposal purposes prior to removal from the Site. The results of the analyses will determine the appropriate methods of disposal. Upon receipt of the analytical results, ENGINEER will

instruct CONTRACTOR to transfer tank contents without spills or release to liquid waste tankers for off-Site disposal. Following completion of tank emptying, decontaminate the tank interior with a steam or high-pressure water wash supplemented by detergent (Alconox). For tanks containing TSCA regulated waste, decontaminate in accordance with 40 CFR 761. Dispose of tank decontamination water with tank contents.

1.12 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

1.13 PROTECTION

A. Protect installed work and provide special protection where specified in individual Sections.

B. Provide temporary and removable protection for installed products. Control activity in the immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic on landscaped areas.

G. Maintenance of Flow: Maintain the flow of water in the water distribution system and in existing sewers, drains, and watercourses. In the event that any emergency or situation should arise which requires interruption of normal operation of any existing systems, restore normal operation as soon as possible even though permission for such planned shutdown was obtained.

H. Flotation: Take necessary precautions against the flotation of any structures during construction. Make good any damage caused by flotation.

1.14 CLOSEOUT PROCEDURES

A. Submit written certification that the Contract Documents have been reviewed, the Works has been inspected, and that the Works is complete according to the Contract Documents and in compliance with Laws and Regulations including, but not limited to, the provision of all applicable federal, state, and local health, safety, and environmental laws and regulations, including OSHA, and ready for ENGINEER's review.

B. Submit final Application for Payment identifying previous payments and amounts remaining due.

C. Complete and furnish submittals to ENGINEER that are required by governing or other authorities and by the Contract Documents. Payment shall not become due and payable until all submittals have been made acceptable to ENGINEER.

1.15 PROJECT RECORD DOCUMENTS

A. Maintain one set of the following Project record documents on Site; record actual revisions to the Works:
   1. Drawings.
   2. Specifications.
   3. Change Orders and other modifications to the Contract.
   4. Reviewed Shop Drawings, product data, and Samples.
   5. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by OWNER.

C. Store Project record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Specifications: Legibly mark and record, at each Section of the Specifications, a description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by modifications.

F. Project Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   2. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Works.
   3. Field changes of dimension and detail.
   4. Details not on original Drawings.

G. Remove ENGINEER title block and seal from all documents generated by CONTRACTOR.

H. Submit documents to ENGINEER with claim for final Application for Payment.

1.16 WARRANTIES

A. Obtain warranties, executed in duplicate by responsible Subcontractors and Suppliers, within 14 days after completion of the applicable item of work. Except for items put into use with OWNER's permission, leave date of beginning of time of warranty open until the date of Substantial Completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties until time specified for submittal.

E. Bind in commercial quality 8 1/2- by 11-inch 3-D side ring binders with durable plastic covers. Identify each binder with typed title WARRANTIES, with title of Project; name, address, and telephone number of CONTRACTOR; and name of responsible company principal. Neatly type Table of Contents, in the sequence of the Table of Contents of the Contract Documents, with each item identified with the number and title of the Section in which specified, and the name of the project or work item. Separate each warranty with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor and Supplier, with name, address, and telephone number of responsible principal.

F. For equipment or component parts of equipment put into service during construction with OWNER's permission, submit documents within 10 days after acceptance. Make other submittals within 10 days after the date of Substantial Completion.

G. For items of the Works for which acceptance is delayed beyond the date of Substantial Completion, furnish updated submittal within 10 days after acceptance of the affected item. The date of acceptance of such item shall be the start of the warranty period for that item.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 83 13

TEMPORARY BRIDGE

PART 1 GENERAL

1.1 SUMMARY

A. Design and supply the temporary bridge structure including all structural components such as bearings, abutments, foundations necessary to complete the bridge structure, as detailed on the Contract Drawings,

B. Section Includes:
   1. Acceptance requirements to ensure that the temporary bridge meets design and installation requirements and contain no identifiable defects.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
   2. Temporary Bridge:
      a. Schedule of Prices Item No. 01 83 131.
      b. Payment Basis: Lump sum price. Includes supply, installation of temporary bridge and accessories, removal upon completion of the Work, restoration of disturbed surfaces to original condition, and road re-routing.

1.3 REFERENCES

A. Reference Standards:
   1. Section 01 40 00 - Quality Requirements: Requirements for references.
   2. AASHTO Standard Specifications for Highway Bridges.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Furnish manufacturer’s specifications, literature, installation instructions, and Shop Drawings for the fabrication of the bridge, and any recommendations, if applicable, that are specifically related to the Project, 14 days prior to installation of the bridge.

C. Layout Drawings: Include layout, layout sequence, and installation details. Provide no later than 14 days prior to installation.

D. Test Reports: Submit manufacturer’s performance research results and calculations in support of the cellular concrete mat system proposed for use. Calculations must be made in accordance with PART 2 – DESIGN REQUIREMENTS. Submit reports for alignment (laser preferred). Include ENGINEER performance of visual inspection.

E. Daily Field Installation Report. Submit no later than 1 day following date covered by report.

F. Manufacturer's Certificates:
   1. Provide manufacturer's certificate upon installation.

G. Manufacturer's Instructions: Submit at least 14 days prior to installation. Include installation, maintenance, and repair instructions.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for closeout submittals.

B. Acceptance Documentation:
   1. Upon completion of the project and acceptance testing, ENGINEER will provide acceptance documentation to CONTRACTOR. Complete, sign, and date this documentation and submit the documentation to ENGINEER for processing and approval.

1.6 QUALITY ASSURANCE

A. Submit a quality control plan outlining the intended methods of receiving, testing, and installing structural components. Ensure that the plan meets the minimum testing requirements. Submit the following as part of the quality control plan for required acceptance testing:
   1. List of test equipment used, including the manufacturer, model number, calibration date, certificate of calibration, and serial number.
   2. Certificates showing the qualifications and certifications of test personnel.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Design Loads: The temporary bridge shall be designed to support an HS 25 live load, including impact, for the applicable AASHTO Load Combination Groups.

B. Allowable Stresses and Loads: Appropriate reductions in allowable stresses and loads shall be used in design when other than new or undamaged materials are used in the construction of the temporary bridge.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Verification of existing conditions before starting work.

B. Perform visual inspection on the structural components. Correct abnormalities or defects.

3.2 INSTALLATION

A. Submit layout drawings for installed structural components, including assembly drawings, manufacturer's instructions, installation details, and connection diagrams.

3.3 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting and testing.

B. ENGINEER will observe and monitor the acceptance testing, analysis, and documentation. Satisfactory completion of acceptance requirements is required to obtain approval and acceptance of the Work.

C. Predictive Testing and Inspection Tests:
   1. Perform alignment (laser preferred) for structural components.
      a. Perform an alignment survey/test of the structural components as part of the preoperational check for desired levelness, voids in components, or the presence of contact gaps.

END OF SECTION

SECTION 02 55 00

SEDIMENT STABILIZATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Stabilization of sediment on the Staging and Dewatering Pads by adding stabilization additives and blending them into sediment.
2. Sampling and analysis of stabilized sediment to demonstrate performance criteria.

B. Related Requirements:
1. Section 02 61 19 - Transportation and Disposal.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
2. Sediment Stabilization:
a. Schedule of Additional Unit Prices Item Nos. 3a) to 3d).
b. Measurement Basis: Per ton based on TSDFs.
c. Payment Basis: Unit price. Includes supply of stabilization additives, blending of sediment with stabilization additives, loading of stabilized soil into transport vehicles, coordination with ENGINEER to facilitate sampling for waste profiling, management of soils in the Staging and Dewatering Pad, handling waste water. Construction of Staging and Dewatering Pad included in Section 01 50 00.

1.3 REFERENCES

A. Abbreviations and Acronyms:
1. PCBs: Polychlorinated biphenyls.

B. Definitions:
1. Sediment: Contaminated organic matter, sludge, sediment, oil, grease, vegetation, and debris and associated chemical constituents.

C. Reference Standards:
1. Section 01 40 00 - Quality Requirements: Requirements for references.
2. ASTM International.
a. ASTM C911 - Standard Specification for Quicklime, Hydrated Lime, and Limestone for Selected Chemical and Industrial Uses.
b. ASTM D5050 - Standard Guide for Commercial Use of Lime Kiln Dusts and Portland Cement Kiln Dusts.

1.4 PRE-INSTALLATION MEETING

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Convene 1 week prior to commencing work of this Section.

C. Purpose of the meeting is to:
1. Define responsibilities of parties and individuals.
2. Establish lines of authority and communication.
3. Review schedules.
4. Review sequence of operations.
5. Review methods of measurement.
6. Review Stabilization Plan.
7. Review Quality Assurance/Quality Control Plan.

1.5 SEQUENCING

A. Section 01 10 00 - Summary: Requirements for sequencing.

B. Do not commence excavation and stabilization activities prior to ENGINEER's review of submittals specified in PART 1, SUBMITTALS.

1.6 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Stabilization Plan: Submit within 7 days after the date of the Notice to Proceed and prior to mobilization to the Site. Include mixing methods, description of additives, access, lay-down area requirements, and equipment to be used.

C. Daily Field Installation Report:
1. Submit no later than 3 days following date covered by report. Include:
a. Types and amounts of additives used.
b. Estimated quantity of additive used per cubic yard of soil.

D. Quality Assurance/Quality Control Plan:
1. Submit with the Stabilization Plan. Include sampling and testing protocol to confirm compliance with specification. Include:
a. Manufacturer's quality control for stabilization additives.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Protect stabilization additive materials from wind, rain, and humidity and store and handle in such manner as to minimize generation of dust and airborne particulates and to control particle agglomeration.

1.8 AMBIENT CONDITIONS

A. Suspend operations whenever climatic conditions, as determined by ENGINEER, are unsatisfactory for meeting requirements of this Section.

B. Dust Control: Transport, store, and mix specified stabilization additives in such manner as to minimize generation of dust. Include in the Stabilization Plan material handling procedures and dust control measures sufficient to minimize or eliminate dust generation.

C. Do not stabilize soil with additives when winds would cause excessive dust.

D. Stabilization shall not take place in an ambient temperature below 40 degrees F without ENGINEER's approval.

E. Contaminated material shall not be treated if it contains any frozen material.

F. Stabilization shall not be performed during periods of heavy rainfall if this will result in the addition of excess water to the mixture.

G. Do not stabilize with additives when soils are excessively wet.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. The treated sediment shall meet the criteria listed in Table 1 based on samples collected and analyzed by CONTRACTOR:

Table 1: Post Treatment Test Criteria	
Test	Test Value
Free Liquid, USEPA SW-846	0
RCRA Characteristics (reactivity, corrosivity, ignitability), USEPA SW-846	Disposal criteria – non-hazardous
TCLP metals, TCL VOCs, TCL SVOCs, and if required TCLP VOCs or SVOCs, USEPA SW-846	Disposal criteria – non-hazardous
Maximum Volume Increase, ASTM D1556	percent*

* Sediment Stabilization Plan to include volume increase due to addition of stabilization agents as it pertains to future disposal volume and cost.

B. Emission Controls: Include control apparatus necessary to meet local, state, and/or federal regulations for air emissions and dust.

C. Noise Control: System shall meet state and local noise pollution control regulations at any Site boundary.

D. Mixing Equipment: Minimum capacity adequate to meet performance and schedule requirements and shall be equipped with positive means for controlling the mix proportions, maintaining the time of mixing constant, and maintaining the appropriate speed of rotation of the mixer.

E. Reagent Feed Units: Provide satisfactory means, incorporating weighing, metering, or volumetric measurement to separately batch the required amount of each reagent. Provision shall be made so that each reagent can be easily sampled.

F. Accuracy of Measurement Equipment: Scales, meters, and volumetric measuring devices used for measuring sediment, reagents, and water for sediment processing shall be accurate to plus or minus 0.1 percent of the quantity being measured. Perform a check of calibration of measuring equipment once every 5 working days.

G. Mix Design: Select a mix design which meets the performance criteria listed in Table 1.

2.2 STABILIZATION ADDITIVES

A. Cement Kiln Dust: ASTM D5050.

B. Lime: ASTM C911.

C. Fly ash

2.3 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing, inspection, and analysis requirements.

B. Lime, Fly Ash and Cement kiln dust suppliers data sheets and MSDSs.

C. Trace metal analysis for cement kiln dusts and fly ash.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Verification of existing conditions before starting work.

B. Verify that the Staging and Dewatering Pad is ready to receive work.

3.2 EQUIPMENT

A. Capable of mixing and stabilizing sediment in an efficient manner.

3.3 SEDIMENT STABILIZATION

A. Following dewatering of sediment on the Staging and Dewatering Pad, prepare and mix stabilization additives with dewatered sediment to ensure uniform physical properties.

B. Collect and analyze samples of stabilized sediment to confirm adequate stabilization. Collect and analyze samples in accordance with Article 2.1. If mixed sediment does not meet performance criteria as specified in Article 2.1, modify mix design and remix sediment until performance criteria are met or dispose stabilized sediment in an alternate facility as approved by OWNER. Supply of additional stabilization additives and all costs associated with additional stabilization required to meet performance criteria or additional disposal costs will be at OWNER's expense.

3.4 TRANSPORTATION OF STABILIZED SEDIMENT

A. Load and transport stabilized sediment into transport vehicles for off-Site disposal in accordance with Section 02 61 19.

3.5 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspection and testing.

B. CONTRACTOR will sample stabilized sediment for waste characterization analysis at a frequency of one analysis for every 300 cu yd of stabilized sediment or as required by the disposal facility.

3.6 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.

B. Remove equipment and surplus raw materials.

END OF SECTION

SECTION 02 61 13

EXCAVATION AND HANDLING OF CONTAMINATED MATERIALS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Excavating clean soil.
2. Excavating contaminated soil.
3. Segregating soil depending upon its waste characterization
4. Handling and on-Site transportation of contaminated and clean soil.
5. Preparing transport vehicles/containers for off-Site transportation.
6. Loading and securing materials in transport vehicles/containers.
7. Decontaminating vehicles/containers prior to leaving the Site.

B. Related Requirements:
1. Section 01 57 13 - Temporary Soil Erosion and Sediment Controls.
2. Section 31 23 23 - Fill.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
2. Shoring:
a. Schedule of Prices Item No. 02 61 13/1.
b. Payment Basis: Lump sum price. Includes design, supply, placement, maintenance, and removal of shoring for excavations.
3. Excavating and Stockpiling of Contaminated Soil in OU-1:
a. Schedule of Prices Item No. 02 61 13/2.
b. Measurement Basis: Per cubic yard based on field survey.
c. Payment Basis: Unit price. Includes excavating, dewatering, transporting excavated materials to staging areas on Site, segregating, temporary stockpiling, and equipment decontamination in OU-1.
4. Excavating and Stockpiling of Contaminated Soil in OU-3:
a. Schedule of Prices Item No. 02 61 13/3.
b. Measurement Basis: Per cubic yard based on field survey.
c. Payment Basis: Unit price. Includes excavating, dewatering, transporting excavated materials to staging areas on Site, segregating, temporary stockpiling, and equipment decontamination in OU-3.

1.3 REFERENCES

A. Definitions:
1. Excavation: Removal of materials of whatever nature encountered, whether wet, frozen, or otherwise, including dense tills, hardpan, frozen materials, cemented materials, concrete fragments, asphalt pavement, concrete slabs, boulders or rock fragments, and weathered rock which can be removed by ripping or

excavating with heavy duty mechanical construction equipment without drilling and blasting.

2. Excavation Limits: Cut lines shown on the Drawings to specified depth or as directed by ENGINEER.
3. Additional Excavation: Excavation beyond cut lines either aerially or in depth, as directed by ENGINEER.
4. Rock: Material from solid masses of igneous, sedimentary, or metamorphic rock which, prior to its removal, was integral with its parent mass, and boulders or rock fragments having individual volume in excess of 1 cu yd.

B. Reference Standards:
1. Section 01 40 00 - Quality Requirements: Requirements for references.
2. ASTM International:
   a. ASTM D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
3. Code of Federal Regulations:
   a. 29 CFR 761 - Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions.

1.4 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate work of this Section with dewatering and backfilling operations.

1.5 SCHEDULING

A. Section 01 33 00 – Submittal Procedures: Requirements for scheduling.

B. Keep the time during which excavations remain open to the practicable minimum.

C. Do not allow or cause any of work performed to be covered up or enclosed prior to required inspections, tests, or approvals.

D. Unless otherwise specified, advise ENGINEER a minimum of 48 hours in advance of excavation operations to enable ENGINEER to review pre-excavation surveying.

1.6 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Excavation Plan: Within 7 days after the date of the Notice to Proceed and prior to mobilization to the Site, submit a detailed Work Plan demonstrating compliance with specified requirements and to permit ENGINEER to review and schedule measurement activities. Include written procedures, schedules, and drawings as applicable and, at a minimum, address each of the following items:
1. Methods and procedures which will be used to perform root grubbing in the Canal embankment and the upland excavation areas.
2. Methods and procedures which will be used to perform excavation.

3. Sequencing and scheduling of excavation and backfilling in excavation areas, including allowances for time required for sampling and analysis of stockpiled soil by ENGINEER and availability of space on staging pads.
4. Locations and sequencing of constructed and relocated temporary decontamination facilities.
5. Sequencing and layout of access routes to and from excavation areas.
6. Methods and procedures which will be used to perform additional excavation in open excavations.
7. Sequencing and scheduling of stockpiling operations.
8. Sloping of excavation faces and slope stability issues. Sloping and benching for excavations greater than 20 feet shall be designed by an engineer registered in the State of New York.
9. Methods of monitoring movement of adjacent structures.
10. Anticipated crew sizes, man-hours, and types of equipment.

C. Material Handling and On-Site Transportation Plan: Before beginning any excavation, prepare a detailed Material Handling and On-Site Transportation Plan that describes how contaminated and non-contaminated materials will be handled, staged, loaded, transported on Site, and how equipment will be decontaminated, including list of type and size of transport vehicles. The Plan shall be designed so that handling and transportation measures prevent the spread of contamination.

1.7 QUALITY ASSURANCE

A. Ensure that work operations involving PCB-contaminated materials are conducted in accordance with 40 CFR 761 and the requirements of this Section.

1.8 AMBIENT CONDITIONS

A. Protect open excavations against damage due to surface run-off and run-on. Take necessary precautions to prevent erosion of excavated or disturbed surfaces.

B. Suspend operations whenever climatic conditions, as determined by ENGINEER, may detrimentally affect the quality of excavated material and prevent their use as backfill.

C. After occurrence of heavy rains, do not operate equipment on approved excavations until the material has dried sufficiently to prevent occurrence of excessive rutting.

D. In the event that a storm event occurs, cover the open work area with polyethylene sheeting. Once the storm event passes, clean water from the top of the sheeting shall be pumped off the sheeting and transferred to the storage tanks. Where the sheets overlap, the sheets shall overlap in the same manner as roof shingles with the upstream sheet overlapping on top of the next sheet. Sheets shall be anchored in place.

PART 2 PRODUCTS

2.1 PLASTIC SHEETING

A. ASTM D4397.

2.2 VEHICLES AND CONTAINERS

A. Excavators, vehicles, and containers used for contaminated materials shall be labeled to indicate that they are dedicated solely for use with contaminated materials.

B. Excavators shall be equipped with GPS capable of excavating to within ± 1/10 ft vertical and horizontal of grades specified on drawings.

C. Excavator Buckets, Containers, Truck Beds and Roll-on/Roll-off Boxes:
1. Free from drain holes, cracks, or other conditions that might allow leakage of liquids or solids.
2. Free from conditions that might allow waste to accumulate.
3. Sealed and/or fully lined to prevent leakage.
4. Covers to prevent accumulation of rain water or release of dust.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Verification of existing conditions before starting work.

B. Verify that survey bench marks and existing and intended elevations for the Works are as shown on the Drawings.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Stake limits of excavation areas.

C. Protect plant life, lawns, and other features remaining as a portion of final landscaping.

D. Maintain and protect from damage bench marks and survey control points, wells, utilities, and surface features, encountered, and not designated for demolition or removal. In the event of disturbance of or damage to any such well, utility, or surface features, immediately notify ENGINEER. Repair or replace, as directed by ENGINEER, any well, utility, or surface feature, damaged by CONTRACTOR operations unless specified for demolition or removal.

E. Protect existing wells and other structures where temporary unbalanced earth pressures or uplift are liable to develop utilizing bracing, shoring, or other approved methods to counteract unbalance.

F. Monitoring Wells Requiring Protection: ENGINEER will locate and mark locations prior to commencement of excavation. Well protection shall consist of enclosing each monitoring well or well nest with highly visible temporary construction fencing which will be maintained throughout completion of the Works.

G. Employ procedures for excavation such that disturbance of wells and other structures is avoided.

H. Protect excavations from contamination.

I. Obtain direction from ENGINEER before moving or otherwise disturbing wells, and other structures.

J. Safeguards and Protective Barriers:
1. Provide protective barriers to minimize the spread of contamination during handling. Items may include tarpaulin on a wooden frame to protect the side of the truck during loading, plastic sheeting on the ground during loading and unloading, and dump ramps during unloading to protect the undercarriage.
2. Provide appropriate safeguards (e.g., bump guards, signs) as necessary.

3.3 SHORING AND BRACING

A. Do not allow the sides of the excavation to become unsafe and provide, place, and maintain such sheet piling, sheathing, shoring, and bracing as are necessary for safety. Maintain sides and slopes of excavations in safe condition by appropriate methods as verified by CONTRACTOR's registered engineer.

B. CONTRACTOR to retain professional engineer licensed in the State of New York to prepare design and Shoring Plan for excavation of OU-3 source area soils to bedrock.
1. Structures including roadways within 150 ft of shoring installations shall be subject to a pre-construction survey to identify and record existing structural conditions. In the instance of private residences, the property owners shall be contacted directly. These inspections shall be carried out by a pre-inspection firm hired by the CONTRACTOR experienced in this line of Work.
2. During the actual construction process, CONTRACTOR shall provide for monitoring and recording of the actual vibrations generated. A baseline of ambient vibration levels shall be established prior to driving sheet pilling.
3. The particle acceleration during the driving of the sheet pilling shall not exceed 0.6 m/s.
4. CONTRACTOR will be required to change the construction methods if the work is resulting in unacceptable vibration levels.

C. All local, state, and federal ordinances, codes, regulations, and laws shall be observed. CONTRACTOR shall provide all sheeting, shoring and bracing which conform to all applicable Sections of Occupational Health and Safety Act (OHSA) and any other requirements as necessary.

D. Used material shall be in good condition, not damaged or excessively pitted. All steel sheeting designated to remain in place shall be new. New or used sheeting may be used for temporary work.

E. Steel sheet piling shall be manufactured from steel conforming to ASTM A328. Steel for soldier piles, wales and braces shall be new or used and shall conform to ASTM A36.

F. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.

G. Unless otherwise shown, specified, or ordered, all materials used for temporary construction shall be removed when Work is completed. Such removal shall be made in a manner not injurious to the structure or its appearance or to adjacent Work or property.
   1. Geotechnical boreholes and geotechnical data collected by ENGINEER are provided for information purposes in Attachment A.

3.4 EXCAVATING CONTAMINATED SOIL

A. Excavate contaminated soil to the horizontal and vertical limits shown on the Drawings and as directed by ENGINEER.

B. Excavate contaminated soil in layers as specified on drawings and segregate soils during excavation based on PCB concentrations (i.e., PCBs ≥ 50 and PCBs < 50 mg/kg). Remove PCBs ≥ 50 mg/kg for each layer prior to removing PCBs < 50 mg/kg.

C. Use methods and equipment that result in minimal disturbance to remaining soil beyond the excavation limits. Remove and dispose of any material that becomes contaminated as a result of CONTRACTOR's operation at no additional cost to OWNER.

D. Stage operations to minimize the time the contaminated soil is exposed to the weather.

E. Provide protection measures around the area of contaminated soils to divert runoff of water from within the excavation boundaries.

F. Remove water from open excavations as necessary to keep excavation dry to prevent softening of surfaces exposed by excavation.

G. Maintain strict dust control at all times to prevent dust particles from becoming airborne. Sprinkle soil at the Site and other areas disturbed by operations with water or other dust suppressants as approved by ENGINEER and NYSDEC.

H. Place plastic sheeting or a suitable equivalent on the ground between the excavator and on-Site haulage units to prevent soils from spilling out of the excavator bucket onto unexcavated soils during remedial excavation activities.

I. Load contaminated excavated materials directly from excavation equipment into haulage units licensed to carry contaminated soils and transport non-stop between the excavations and designated staging pads identified on the Drawings on a single designated route, to minimize the potential spread of contamination. Transport vehicles shall have the means to prevent spillage of loads.

J. Keep limits of excavation undisturbed and free of loose, soft, or organic matter.

K. Maintain excavation depth tolerances. Unless directed by ENGINEER, excavation in excess of specified limits shall be considered unauthorized over excavation.

L. Should unauthorized excavation be carried below the lines and cuts shown on the Drawings and in excess of specified limits and tolerance because of CONTRACTOR's operations including errors, methods of construction, or to suit his convenience, correct unauthorized excavation as described in PART 3, OVER-EXCAVATING.

M. CONTRACTOR to retain surveyor licensed in the State of New York to survey excavations upon completion.

N. Keep excavations open until directed to be backfilled by ENGINEER pending receipt of verification survey results. Following receipt of survey results, ENGINEER may direct CONTRACTOR to horizontally extend the limits of the excavation, excavate an additional depth of soil, or commence backfilling, if necessary. . For the duration of an open excavation, maintain the excavation free from water and adequately mark the open excavation with temporary fencing to restrict access until the excavation is properly backfilled.

O. Schedule excavation activities in such a manner that access is available to any excavation area for additional excavation as directed by ENGINEER. In returning to an area for additional excavation, comply with previously specified access route restrictions.

P. Decontaminate excavation equipment periodically and as directed by ENGINEER. Decontaminate equipment prior to performing additional excavation in an excavation previously left open pending survey analysis by ENGINEER. ENGINEER will direct additional decontamination when required in the opinion of ENGINEER.

Q. Control odor in accordance with Section 01 57 16.

3.5 OVER-EXCAVATING

A. Should unauthorized excavation be carried below the cut lines shown on the Drawings and in excess of specified limits and tolerance because of CONTRACTOR's operations including errors, methods of construction, or to suit his convenience, correct unauthorized excavation as directed by ENGINEER.

3.6 PROTECTING CLEAN SOIL FROM CONTAMINATION

A. Prevent contamination of adjacent clean soil.

B. Place plastic sheeting and plywood under excavation equipment and alongside the excavation to prevent contaminated soil from being mixed with surrounding clean soil. Use other means of preventing contamination subject to approval by ENGINEER. Do not mix excavated soil with imported materials.

C. Excavate contaminated soil in accordance with Section 3.4, EXCAVATING CONTAMINATED SOIL.

D. Load contaminated soil and materials directly into transport vehicles/containers and stage on Site until ready for off-site disposal. ENGINEER may direct clean or non-characterized excavated soil to be handled as contaminated material.

E. Decontaminate excavation equipment after handling contaminated materials and prior to handling clean imported fill. Decontaminate shoring, temporary dams and/or falsework prior to reuse. ENGINEER will direct additional decontamination as necessary in the opinion of ENGINEER.

3.7 TEMPORARY STOCKPILING

A. Obtain ENGINEER's approval for locations of temporary stockpiles in addition to those shown on the Drawings. Obtain ENGINEER's approval prior to placing material in such stockpiles.

B. Construct stockpile sites so that they are well drained, free of foreign materials, and of adequate bearing capacity to support the weight of soil to be placed thereon. Direct surface water away from stockpile areas.

C. Place geotextile on the base of stockpiles prior to stockpiling in accordance with manufacturer's instructions and as shown on the Drawings.

D. Install soil berm around the stockpile and cover stockpiled soil with polyethylene sheets. Secure edges of sheets to keep the polyethylene sheeting in place.

E. Provide and maintain access to stockpiles.

F. Maintain stockpile slopes not steeper than 2 horizontal to 1 vertical. In no instance shall stockpiles be greater than 15 feet in height above original surrounding grade. Maintain area surrounding stockpiles in neat and tidy condition.

3.8 MATERIAL HANDLING AND ON SITE TRANSPORTATION

A. General:
   1. Take necessary precautions for safe operation of the equipment and protection of the public, workers, and the environment from injury and damage from equipment. Operators shall be properly licensed. Use designated equipment operators to work in restricted work areas.
   2. Equipment and tools associated with contaminated materials shall be used exclusively for that purpose until released. Items shall be decontaminated in accordance with Paragraph 3.8 E prior to release off the Site or for use with non-contaminated materials.
   3. Keep a log in each truck recording the following information for each trip:
      a. Date and time of loading.
      b. Area from which the contaminated material was obtained.
      c. Staging destination.
      d. Quantity (e.g., approximate cubic yards, approximate weight, or specific number of containers).
      e. Date and time of unloading.
   4. When not in use, secure vehicles in the secured excavation support areas, with keys removed and doors locked. Security shall be solely the responsibility of CONTRACTOR.

B. Loading:
   1. Inspect containers and haulage trucks before loading to verify that no water or liquid has been introduced and the vehicle/container has not been damaged.
   2. Use protective barriers and take care to prevent spreading contamination.
   3. Inspect vehicles and if necessary, decontaminate vehicles before leaving the work area. Collect and transport sediments removed from vehicles and equipment to staging location approved by ENGINEER.

C. Transportation:
   1. Control free water from the soils and sediments to prevent spreading contamination along the haul roads during transport. Do not track contaminated or non-contaminated material onto clean areas or transportation routes.
   2. Collect, pump, and transport potentially contaminated water to on-Site storage tanks provided by CONTRACTOR. This includes water from excavations, staging pads, and decontamination pad(s). Control water handling to prevent accidental spills in accordance with Section 01 50 00.
   3. Do not deviate from the on-Site transportation routes approved by ENGINEER without prior written approval ENGINEER.
   4. Cover on-Site routes between excavation areas and staging locations with geotextile and gravel.
   5. In the event of accidents, spills, or releases, comply with Paragraph 3.8 F.

D. Unloading/Testing:
   1. Unload contaminated soils at the staging area in a manner that will prevent spillage onto clean areas. Use appropriate safeguards (e.g., flagpersons, bump guards).
   2. Decontaminate vehicles prior to leaving contaminated work areas (i.e., excavation and staging locations).

E. Decontamination:
   1. Decontaminate equipment that has contacted impacted soils and leaves the Exclusion Zone.
   2. Complete gross decontamination by removing soil and debris from the exterior, underbody, and between tires before leaving a contaminated area. Remove soil and debris using scrapers, brushes, rags, or similar means.
   3. Collect and dispose of materials removed from vehicles/containers off Site with excavated soil.
   4. Perform gross decontamination as part of earthwork at the area where trucks are loaded or unloaded. Complete further cleaning at on-Site decontamination pad using a high-pressure, low-volume hot water and non-phosphate detergent (or equivalent), if necessary. Repeat decontamination as needed.
   5. Visually inspect decontaminated vehicles and maintain log of inspections at the Site. Provide decontamination inspection log to ENGINEER on a monthly basis.
   6. Any excavation and waste handling equipment that has contacted TSCA-impacted soils and leaves the Site shall initially be cleaned at on-Site decontamination pad by mechanical means (e.g., scraped, brushed, and/or wiped) to remove gross contamination (e.g., packed dirt, grit, and/or debris). Further decontamination and verification shall be performed in accordance with 40 CFR 761.79(c)(2).

F. Spills and Accidents: Notify ENGINEER and implement the appropriate response immediately upon learning of an accident, spill, or release of contaminated material in accordance with the Emergency Response and Contingency Plan.

3.9 LOADING AND UNLOADING OPERATIONS

A. The motor vehicle operators shall remain inside the tractor cab at all times during loading and unloading.

B. Provide motor vehicles that are non-contaminated and free of mud, dirt, grease, or other accumulations; motor vehicles shall arrive at the work area sufficiently clean to allow inspection.

C. Conduct loading and unloading operations in a highly controlled manner that prevents contamination of motor vehicles. Verify that CONTRACTOR motor vehicles are free of contamination before releasing them from the loading/unloading area. Do not overload. Ensure compliance with applicable load restrictions.

D. Decontaminate motor vehicles that become contaminated during loading or unloading operations. After decontamination, check the motor vehicle again to verify that it is free of contamination before releasing it for transport.

E. After loading and before leaving the Site or TSDF, the motor vehicle operator shall inspect and verify that the load is arranged and secured properly (based on experience and training, and in accordance with 49 CFR 393, Subpart I, and 392.9).

F. It is CONTRACTOR'S responsibility to ensure that vehicles are loaded properly and not overloaded.

G. Upon acceptance of the load for transport, maintain the integrity of the load, the load arrangement, and any security seals. The motor vehicle operator shall examine and periodically reexamine the load and its load-securing devices as necessary to maintain the integrity of the load and the load arrangement in accordance with 49 CFR 392.9. (Load inspections during transit do not apply to sealed trailers, only to the inspection of security seals.) Comply with the requirements of PART 3, ACCIDENT INVOLVING TRANSPORT VEHICLES upon discovery of any change in the load condition, load arrangement, or security seals (e.g., change caused by equipment/packaging failure, motor vehicle accident, adverse weather.

3.10 PREPARATION AND SECUREMENT OF TRANSPORT VEHICLES/CONTAINERS

A. Do not load materials for transport for disposal without ENGINEER's approval.

B. Comply with applicable federal, state, and local regulations concerning shipping vehicles, containers, and materials.

C. Visibly display number for each transport vehicle/container.

D. Secure materials in transport vehicles/containers in accordance with regulations governing transportation of materials.

E. Bulk Solid Shipments:
1. Clean the receiving box of the transport vehicle/container of loose debris or foreign material. Line the receiving box or container with a tub liner that is continuous along the bottom and sides. Place the tub liner on the floor, run up the sides, and drape over the sideboards. Neatly push the tub liner into corners to prevent tearing during loading and transport.
2. Load bulk materials into transport vehicles or containers in a manner which will not damage the placed tub liner. Limit the freefall of bulk materials being loaded.
3. Replace damaged tub liner which is incapable of providing containment.
4. Following loading, fold the tub liner over the loaded materials and place an overliner of polyethylene sheeting over the materials prior to securing with an

approved tarpaulin in a manner to prevent loss of materials or fugitive dust emissions.

5. ENGINEER will waive the lining requirements where CONTRACTOR can demonstrate, to the satisfaction of ENGINEER, that all of the following conditions are met:
   a. The receiving box or container is of leak-proof construction and capable of maintaining a leak-proof condition.
   b. The cover to be placed over the receiving box or container is watertight and will totally enclose the materials within.
   c. The cover to be placed over the receiving box or container will prevent fugitive dust emissions.
   d. The receiving box or container is constructed of materials which can be decontaminated and CONTRACTOR has supplied evidence to the satisfaction of ENGINEER that arrangements have been made with TSDF to decontaminate the box or container after disposal of materials at TSDF.

F. Bulk Liquid Shipments:
   1. Inspect bulk liquid tankers prior to use.
   2. Verify that all attached piping and valving is sound and in good working order.
   3. Verify that all necessary valves are closed prior to loading.
   4. Observe for leaks during loading. Correct all leaks that are observed. Cleanup of materials impacted by leaks during loading is the responsibility of CONTRACTOR. Replace bulk liquid containers that leak and are unsuitable for transport at CONTRACTOR's cost.

G. Drummed/Containerized Shipments:
   1. Load and segregate drummed/containerized shipments in accordance with DOT requirements.
   2. Place cushioning materials under and around each container for shipments of drummed/containerized materials.
   3. Verify that each drum/container is tightly closed.
   4. Secure the load to prevent shifting of the load during transport.

H. Perform packaging, labeling, marking, and placarding in compliance with 49 CFR 172, 49 CFR 173, 49 CFR 178, 40 CFR 262, 40 CFR 263, and 40 CFR 761. The motor vehicle operator(s) shall perform an inspection to verify (based on their training in accordance with 49 CFR 172, Subpart H, and experience) that packaging, labeling, marking, and placarding are in accordance with the requirements listed above and the accompanying shipping documents. Maintain the integrity of packaging, labeling, marking, placarding, and the accompanying shipping documents in compliance with 49 CFR 177.800, Subpart A.

3.11 DECONTAMINATION OF TRANSPORT VEHICLES

A. CONTRACTOR shall endeavor to keep transport vehicles designated for off-Site transport on clean roadways to minimize the need for decontamination. Prior to leaving the Site, each transport vehicle shall be inspected. If necessary based on inspection or if transport vehicle contacted contaminated materials on site, decontaminate transport vehicles and containers at on-Site equipment decontamination pad. Remove material on the tires and axles of trucks and material on the vehicle resulting from loading operations.

3.12 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Within 0.1 foot greater or less than specified grades but not uniformly greater or less.

3.13 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.

B. Clean and reinstate work areas and areas affected by equipment outside areas specified to be excavated, to pre-construction conditions.

END OF SECTION

SECTION 02 61 16

SEDIMENT REMOVAL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Section Includes:
   1. Removal of Canal sediment.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
   2. Excavation and Stockpiling Contaminated Sediments:
      a. Schedule of Prices Item No. 02 61 16/1.
      b. Measurement Basis: Per cubic yard measured in place.
      c. Payment Basis: Unit price. Includes excavating, dewatering, transporting excavated materials to staging areas on Site, segregating, temporary stockpiling, and equipment decontamination.

1.3 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate sediment removal activities with stabilization operations specified in Section 02 55 00, and transportation and disposal operations specified in Section 02 61 19.

1.4 SCHEDULING

A. Section 01 30 00 - Administrative Requirements: Requirements for scheduling

B. Do not allow or cause any of work performed to be covered up or enclosed prior to required inspections, tests, or approvals. Once sediment removal and verification survey by CONTRACTOR is complete, the active work segment shall be released for backfilling or restoration as shown on drawings. Maintain excavations dry and control dust and runoff pending completion of verification survey.

C. CONTRACTOR shall be responsible for collection and analyses of samples for waste characterization purposes (see Section 02 61 19). Schedule work activities accordingly.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Sediment Removal Plan: Prior to mobilization to the Site, submit a Sediment Removal Plan. Describe design and performance parameters related to the sediment removal operation, including but not limited to:
   1. Detailed plan for removal of sediment from the Canal and how the removal operations will interface with Canal diversion, dewatering, sediment stabilization, waste characterization, and off-Site transportation and disposal.
   2. Estimated minimum and maximum daily removal rates and factors which shall impact removal rates.
   3. Daily Removal: Submit prior to each work day, the previous day daily removal rate, average solids in removed sediment.

1.6 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for closeout submittals.

B. Record Documents: Include a hard copy and digital copy of detailed pre-construction and post construction survey, conducted by a surveyor licensed in the State of New York, of native soil elevations before and after sediment removal and after restoration.

1.7 QUALITY ASSURANCE

A. Perform work of this Section in accordance with the approved Sediment Removal Plan.

1.8 EXISTING CONDITIONS

A. The Drawings represent existing conditions based on current available information. Sediment removal conditions specified and indicated describe conditions which are known. CONTRACTOR is responsible for unknown conditions encountered which are not unusual when compared to conditions recognized in the sediment removal business as usual for the sediment removal activities such as those required under the Contract.

PART 2 PRODUCTS

2.1 Excavators shall be equipped with GPS capable of excavating to within ± 1/10 ft vertical and horizontal of grades specified on drawings.

2.2 PERFORMANCE REQUIREMENTS

A. Limits of Sediment Removal:
   1. Sediment shall be removed to the horizontal and vertical limits shown on the Drawings.

2. During removal of the sediment, portions of the boundary sediments may expected to slough into the limits of removal. The quantity of sloughed boundary sediments shall be minimized through operational controls.

B. CONTRACTOR shall construct and operate a system including all piping and pumps or excavator to remove impacted sediments and transfer them to the Staging and Dewatering Pad.

PART 3 EXECUTION

3.1 PREPARATION

A. Establish all reference points, benchmarks, and lines necessary to establish the limits of sediment removal.

B. Comply with federal, state, and local regulations pertaining to water, air, and noise pollution.

C. Prevent, to the greatest extent practicable, the displacement and/or resuspension of existing contaminated sediment.

D. Prevent surface discharge of potentially contaminated material including sediment or water.

E. After occurrence of heavy rains, do not operate construction equipment on approved sediment removal area until excess water has been removed and the material has dried sufficiently to prevent occurrence of excessive rutting.

F. Decontaminate equipment involved in sediment removal activities which may have come in contact with potentially contaminated material before being removed from the Site or being relocated to clean areas of the Site.

G. Divert flow of surface drainage and natural watercourses around work areas in accordance with Section 01 57 19 and as shown on the Drawings.

H. Do not perform work in a manner which causes releases of contaminated water or sediment to non-contaminated areas.

I. Do not perform any work of this Section until soil erosion and sediment controls are in place in accordance with Drawings and approved by ENGINEER.

3.2 REMOVAL OF CANAL SEDIMENT

A. Remove sediment in accordance with the approved Sediment Removal Plan or as further directed by ENGINEER.

B. Construct temporary access and haul roads to minimize potential for cross contamination during performance of works.

C. Excavate contaminated sediment as specified on drawings. In each work area, remove sediments with PCBs ≥ 50 mg/kg prior to removing PCBs < 50 mg/kg.

D. Place debris, encountered during removal, with excavated sediments and dispose with sediments.

E. Remove canal sediment including, but not limited to, loose rock and gravel within the canal bed as directed by ENGINEER.

F. Divert canal flow around work areas as shown on the Drawings and in accordance with Section 01 57 19.

G. Maintain the canal bed relatively dry. Pump impacted water to on-Site WWTF for treatment.

H. Load sediment removed from canal into haulage units for transport to the designated Staging and Dewatering Pad, keeping material with PCBs ≥ 50 mg/kg separate from material with PCBs < 50 mg/kg.

I. If necessary, mix sediment with stabilization additives in accordance with approved Sediment Stabilization Plan. CONTRACTOR to collect and analyze samples of stabilized sediment. Remove stabilized sediment in accordance with approved Sediment Removal Plan and dispose off-Site in accordance with Section 02 61 19.

J. In the event that a storm event occurs, cover the open work area with polyethylene sheeting. Once the storm event passes, clean water from the top of the sheeting shall be pumped off the sheeting and discharged downstream prior to removing the sheeting and recommencing work. Should any reason exist to believe the sheeting has failed and the water may be impacted, it shall be transferred to the WWTF storage tanks. Where the sheets overlap, the sheets shall overlap in the same manner as roof shingles with the upstream sheet overlapping on top of the next sheet. Sheets shall be anchored in place.

K. ENGINEER will verify completion of sediment removal.

L. Maintain diversion structures and equipment until removal is authorized by ENGINEER based upon verification survey documentation provided by CONTRACTOR.

M. Perform a detailed survey of canal soil elevations before and after sediment removal and after restoration. Prepare final contour plan of canal surface with 0.5-foot contour intervals.

N. Decontaminate excavation equipment periodically and as directed by ENGINEER in accordance with Section 01 50 00. Decontaminate equipment when visibly contaminated or when moving from a contaminated area to a clean area. ENGINEER will direct additional decontamination when required in the opinion of ENGINEER.

3.3 PROTECTING CLEAN AREAS FROM CONTAMINATION

A. Prevent contamination of adjacent clean area.

B. Place plastic sheeting and plywood under construction equipment and alongside the removal area to prevent contaminated sediment from being mixed with surrounding clean area. Use other means of preventing contamination subject to approval by ENGINEER.

3.4 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting and testing.

B. ENGINEER will inspect work areas to verify that sediments have been removed. When areas are found to be in a satisfactory condition as confirmed by CONTRACTOR's verification survey, the work therein will be accepted as complete. Final estimates will be subject to deductions or correction of deductions previously made because of excessive overdepth or removal outside of authorized areas.

C. Subject to results of the verification survey, CONTRACTOR may be directed by ENGINEER to return to one or more locations and remove additional sediment.

END OF SECTION

SECTION 02 61 19

TRANSPORTATION AND DISPOSAL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Supply, operation, and maintenance of transport vehicles/containers.
2. Transporting the following materials from the Site to approved TSDFs:
a. Hazardous and non-hazardous liquid waste.
b. Hazardous and non-hazardous solid waste materials.
c. PCB-contaminated materials.
3. Preparation of shipping documents including manifests and bills of lading.
4. Maintaining transportation records as required by regulatory agencies.
5. Obtaining documents from TSDFs to be provided for payment.

B. Related Requirements:
1. Section 02 61 13 – Excavating and Handling of Materials.
2. Section 02 55 00 – Sediment Stabilization.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
2. Loading, Transportation and Disposal of Contaminated Soil/Sediment:
a. Schedule of Prices Item No. 02 61 19/1.
b. Measurement Basis: Per ton based on TSDFs.
c. Payment Basis: Unit price. Includes supply of haulage units licensed to haul contaminated sediment; ensuring units are placarded during transport; transporting to the approved TSDF; fuel costs, licenses, tolls, and permitting fees; payment of penalties or fines charged as a result of vehicle overloadings or otherwise; cleaning up spilled solid waste along haul routes; acceptance and disposal of waste materials by TSDF; all taxes; full compliance with applicable federal, provincial, and local regulations; unloading and decontamination of unloaded transport haulage units; weighing each haulage unit at the approved TSDF; preparation and submittal of disposal report prepared by TSDF and all disposal costs charged by TSDF based on TSDF Weigh Scale Documents for PCBs <50 ppm for Item No. 02 61 19/1(i) for PCBs ≥50 ppm for Item No. 02 61 19/1(ii), and PCBs ≥50 ppm and exceed LDR for Item No. 02 61 19/1(iii).
3. Loading, Transportation and Offsite Disposal of Contaminated Water <50 ppm PCBs:
a. Schedule of Prices Item No. 02 61 19/2.
b. Measurement Basis: Per gallon based on TSDFs.
c. Payment Basis: Unit price. Includes loading at the Site decontaminating the haul units as required prior to being released from the Site; supply of

haul units licensed to haul hazardous liquid waste; ensuring units are placarded during transport; transporting to the approved TSDF; fuel costs, licenses, tolls, and permitting fees; payment of penalties or fines charged as a result of vehicle overloadings or otherwise; cleaning up spilled waste along haul routes; acceptance and disposal of liquid waste by TSDF; all taxes; full compliance with applicable federal, provincial, and local regulations; unloading and decontamination of unloaded transport haul units; measuring volume of liquid at the approved TSDF; preparation and submittal of disposal report prepared by TSDF and all disposal costs charged by TSDF based on TSDF Weigh Scale Documents.

4. Loading, Transportation and Offsite Disposal of Non-Contaminated Wood:
   a. Schedule of Prices Item No. 02 61 19/3.
   b. Measurement Basis: Per ton based on TSDFs.
   c. Payment Basis: Unit price. Includes loading at the Site decontaminating the haul units as required prior to being released from the Site; supply of haul units licensed to haul hazardous liquid waste; ensuring units are placarded during transport; transporting to the approved TSDF; fuel costs, licenses, tolls, and permitting fees; payment of penalties or fines charged as a result of vehicle overloadings or otherwise; cleaning up spilled waste along haul routes; acceptance and disposal of liquid waste by TSDF; all taxes; full compliance with applicable federal, provincial, and local regulations; unloading and decontamination of unloaded transport haul units; measuring volume of liquid at the approved TSDF; preparation and submittal of disposal report prepared by TSDF and all disposal costs charged by TSDF based on TSDF Weigh Scale Documents.
5. Loading, Transportation and Offsite Disposal of Non-Contaminated Refuse and Debris:
   a. Schedule of Prices Item No. 02 61 19/4.
   b. Measurement Basis: Per ton based on TSDFs.
   c. Payment Basis: Unit price. Includes loading at the Site decontaminating the haul units as required prior to being released from the Site; supply of haul units licensed to haul hazardous liquid waste; ensuring units are placarded during transport; transporting to the approved TSDF; fuel costs, licenses, tolls, and permitting fees; payment of penalties or fines charged as a result of vehicle overloadings or otherwise; cleaning up spilled waste along haul routes; acceptance and disposal of liquid waste by TSDF; all taxes; full compliance with applicable federal, provincial, and local regulations; unloading and decontamination of unloaded transport haul units; measuring volume of liquid at the approved TSDF; preparation and submittal of disposal report prepared by TSDF and all disposal costs charged by TSDF based on TSDF Weigh Scale Documents.

1.3 REFERENCES

A. Abbreviations and Acronyms:
   1. DOT: Department of Transportation.
   2. RCRA: Resources Conservation and Recovery Act.
   3. TSCA: Toxic Substances Control Act.
   4. TSDF: Treatment, storage, or disposal facility.

B. Definitions:
   1. Non-hazardous Materials: Materials not regulated by 40 CFR 261, 40 CFR 273, 40 CFR 279, and 40 CFR 761, or equivalent state regulation.
   2. PCB Wastes: Materials as defined in 40 CFR 761.
   3. RCRA Characteristic Wastes: Materials as defined in 40 CFR 261 Subpart C.
   4. RCRA Listed Wastes: Materials as defined in 40 CFR 261 Subpart D.
   5. Universal Waste: Materials as defined in 40 CFR 273.
   6. Used or Waste Oil: Materials as defined in 40 CFR 279.

C. Reference Standards:
   1. Section 01 40 00 - Quality Requirements: Requirements for references.
   2. United States Federal Government - Code of Federal Regulations:
      a. 40 CFR 261 - Identification and Listing of Hazardous Waste.
      b. 40 CFR 262 - Standards Applicable to Generators of Hazardous Waste.
      c. 40 CFR 263 - Standards Applicable to Transporters of Hazardous Waste.
      d. 40 CFR 264 - Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal.
      e. 40 CFR 265 - Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal.
      f. 40 CFR 273 - Standards for Universal Waste Management.
      g. 40 CFR 279 - Standards for the Management of Used Oil.
      h. 40 CFR 761 - Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions.
      i. 49 CFR 171 - General Information, Regulations, and Definitions.
      j. 49 CFR 171, Subpart B—Incident Reporting, Notification, BOE Approvals and Authorization.
      k. 49 CFR 172 - Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements.
      l. 49 CFR 172, Subpart G—Emergency Response Information.
      m. 49 CFR 173 - Shippers - General Requirements for Shipments and Packaging.
      n. 49 CFR 177 - Carriage by Highway.
      o. 49 CFR 178 - Specifications for Packaging.
      p. 49 CFR 383 - Commercial Driver's License Standards; Requirements and Penalties.
      q. 49 CFR 385 - Safety and Fitness.
      r. 49 CFR 387 - Minimum Levels of Financial Responsibility for Motor Carriers.
      s. 49 CFR 390 - Federal Motor Carrier Safety Regulations.
      t. 49 CFR 390.15, Subpart E - Hazardous Materials Safety Permits.
      u. 49 CFR 391 - Qualifications of Drivers.
      v. 49 CFR 392 - Driving of Motor Vehicles.
      w. 49 CFR 393 - Parts and Accessories Necessary for Safe Operation.
      x. 49 CFR 395 - Hours of Service of Drivers.
      y. 49 CFR 396 - Inspection, Repair, and Maintenance.
      z. 49 CFR 397 - Transportation of Hazardous Materials; Driving and Parking Rules.
      aa. 49 CFR 1300 - Passenger and Freight Tariffs and Schedules (of Subtitle B, Other Regulations Relating to Transportation; Subchapter D, Tariffs and Schedules).

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Transportation and Disposal Proposal: Submit for review and approval a proposal for transportation and disposal of materials 14 days prior to transportation and disposal of materials from the Site. Include relevant transporter and TSDF identification and regulatory classification and status, methods of transportation and disposal, contingency plans for spills during transportation, and schedule for transportation and disposal. Confirm TSDF-specific requirements for waste profiling sampling and analyses to determine acceptance.

C. Transportation Emergency Response Plan addressing:
1. Instructions for compliance with 49 CFR 171.15 and 49 CFR 172, Subpart G.
2. All aspects and considerations arising from transport incidents involving contaminated materials.
3. Procedures for incident response.
4. Methods to contain and clean up releases.
5. Details of manpower and equipment available.
6. The coordination necessary to mobilize in an emergency.
7. Traffic maintenance and warning procedures.
8. List of emergency numbers for information and notification for each applicable state.
9. List of name and telephone number of the contact at the pickup and destination facilities.
10. Name and phone number of CONTRACTOR’s Emergency Response Coordinator and the Transportation Representative.
11. Accident/incident reporting requirements.
12. A current copy of the Federal Motor Carrier Safety Rating assigned by the Federal Highway Administration (FHWA) as set forth in 49 CFR 385. A Contractor receiving notification by the FHWA of a "conditional" or "unsatisfactory" rating will be ineligible to transport contaminated materials.
13. A notarized copy of the RCRA-EPA waste transport identification number.
14. A copy of the TSDF permit, including both USEPA and state identification numbers.

D. TSDF Requirements:
1. For each TSDF accepted by OWNER, provide TSDF requirements to ENGINEER including:
    a. Any TSDF-specific packaging requirements for shipments.
    b. TSDF restrictions by wastestream which may cause rejection of transported materials.
    c. Any wastestream-specific pre-approvals required by federal or state agencies prior to acceptance of wastestream by TSDF.
    d. Restrictions on delivery schedules.
    e. Type and frequency of routine additional sampling and analysis of materials by wastestream which are required during transport and disposal activities prior to delivery to TSDF.
    f. Additional sampling and analysis of materials that will be conducted by TSDF during receipt of shipments to verify waste profiles.
2. Each TSDF shall disclose the name and telephone number of the contact at the lead agency responsible for TSDF primary permits who has knowledge of and can verify the existence of existing corrective action programs which may impact the ability of TSDF to accept materials from the Site.

E. Agency Approvals: For any wastestream requiring agency pre-approval, provide letters of approval from applicable federal and state agencies which approve the disposal of materials from the Site at each proposed TSDF 14 days prior to off-Site transportation of materials.

F. Operating Licenses and Permits:
1. Include letter from each proposed TSDF stating that it is in compliance with its federal, state, and local permits and that permits are current for the duration of the off-Site disposal activities from the Site. Provide letter seven days prior to commencing transportation of materials from the Site.
2. Include copies of valid operating licenses and permits (including permit under 6 NYCRR Part 364) from each transporter for each proposed transport vehicle/container 14 days prior to entry to the Site.

G. Transportation Routes: Submit plans showing transportation routes or alternate routes which will be used to transport materials to each TSDF 14 days prior to commencing transportation of materials from the Site. Comply with applicable federal, state, and local regulations.

H. Qualifications of Motor Vehicle Operators:
1. Signed affidavit stating that all vehicle operators handling hazardous waste are HAZMAT trained in accordance with 49 CFR Part 172, Subpart H.
2. Statement that motor vehicle operators meet the requirements of 49 CFR 383, 49 CFR 391, 49 CFR 392, 49 CFR 395, 49 CFR 397, 49 CFR 172 Subpart H, 49 CFR 177 and 6 NYCRR Part 364,

I. Shipping and Disposal Documents:
1. Include blank sample forms of proposed shipping and disposal documents at least 14 days prior to use.
2. Include complete copies of waste profiles.
3. Include completed copies of shipping and disposal documents including manifests and/or bills of lading on standard approved forms, including a copy of each form signed by the transporter prior to leaving the Site and a copy of each form signed by TSDF accepting the shipment.
4. Use shipping and disposal documents of consignment state where so required. Obtain shipping documents from consignment state 14 days prior to shipment from the Site.
5. Include completed certificates of disposal/destruction/treatment/recycle as applicable and issued by the TSDF following acceptance and final disposition of the shipment.

J. Supplemental Indemnifications: For each TSDF which provides a supplemental indemnification (e.g., Superfund Indemnification), obtain such indemnification for the benefit of OWNER.

K. TSDF Weigh Scale Documents:
1. Include copies of weigh scale tickets on approved forms signed by an authorized weigh scale operator including the following information:
   a. Location, date, and time of weighing.
   b. Measured weights.
   c. Vehicle and container identification.
   d. Shipment identification number.

1.5 QUALIFICATIONS

A. Motor Vehicle Operators:
   1. Before off-Site transportation services are rendered, motor vehicle operators (drivers) shall meet the requirements specified in Paragraph 1.5 A.2.
   2. Have available the following information before any off-Site transportation activity:
      a. A medical examiner's certificate, or a legible photographic copy of a certificate, or a statement attesting to a record on file with CONTRACTOR of a medical examiner's certificate on each motor vehicle operator's physical qualifications to operate a motor vehicle in accordance with 49 CFR 391.43 and 49 CFR 391.41.
      b. A statement certifying that CONTRACTOR, at least once every 12 months, reviews the driving record of each motor vehicle operator it employs, in accordance with 49 CFR 391.25. Include in this statement a list of any violations of motor vehicle traffic laws in accordance with 49 CFR 391.27.
      c. A valid commercial driver's license for each motor vehicle operator.
   3. Replace any motor vehicle operator deemed unacceptable for transporting contaminated materials.

1.6 QUALITY ASSURANCE

A. CONTRACTOR will perform waste profile analyses of materials scheduled for off-Site disposal as required by and to the satisfaction of the operators of TSDFs and federal, state, and local regulations, prior to transport from the Site.

B. CONTRACTOR will sample and analyze materials scheduled for transportation and off-Site disposal to verify that the type and concentration level of contaminants present lie within acceptable ranges established by the approved waste stream description for each of TSDFs.

C. Do not remove any waste materials from the Site without prior authorization by ENGINEER.

1.7 AMBIENT CONDITIONS

A. Do not spill, leak, or otherwise release materials from transport vehicles and containers during loading and unloading operations or while in transit from the Site to TSDF.

B. Do not generate dusting conditions when loading bulk solids.

C. Do not generate fume or misting conditions when loading bulk liquids.

D. Clean up spills or leaks in transit.

PART 2 PRODUCTS

2.1 SEDIMENT STABILIZATION

A. In accordance with Section 02 55 00.

2.2 POLYETHYLENE SHEETING

A. Continuous sheeting, minimum 6 mil thick, fabricated from a single ply of construction grade polyethylene plastic.

2.3 TUB LINER

A. Tub Liners for Bulk Solid Shipments: Pre-manufactured fitted polyethylene tub liner or continuous single sheet of polyethylene sheeting.

2.4 CONTAINERS, PACKING MATERIAL, AND LABELS

A. Comply with DOT, federal, state, and local regulations.

B. Transport vehicles (e.g., dry van, flatbed, lowboy, and ocean style trailers; truck tractors; and roll off and ocean style containers) that meet the requirements of 49 CFR.

C. Securement systems, especially tie down assemblies (e.g., chains, cables, steel straps, and fiber webbing); load binders and hardware (e.g., hooks, bolts, welds, or other connectors); and winches or other fastening devices that are without visual damage from wear or misuse and that meet the requirements of 49 CFR 393, Subpart I.

D. Weatherproof tarpaulins that are without visual damage from wear or misuse; are of a quality highly resistant to tears, rips, snags, punctures, abrasion, cracking, peeling, and weathering; and are suitable for use as an external cargo wrap.

E. Side boards that are suitable as a frame for use with tarpaulins to form a closed transport vehicle.

F. Motor vehicle operators who meet the requirements of 49 CFR 383, 49 CFR 391, 49 CFR 392, 49 CFR 395, 49 CFR 397, 49 CFR 172 Subpart H, and 49 CFR 177.

G. Motor vehicle operators for handling hazardous waste who are HAZMAT trained in accordance with 49 CFR Part 172, Subpart H.

2.5 MOTOR VEHICLES

A. Provide equipment that is appropriate for accomplishing successful transportation of contaminated materials either from the Site or to or from TSDF. Maintain and operate motor vehicles in accordance with the manufacturer's recommendations; Occupational Safety and Health Administration requirements; federal regulations specified in

49 CFR 393, 49 CFR 396, and 49 CFR 397; and applicable federal, state, and local regulations. Take all precautions necessary for safe operation of equipment and vehicles to safeguard the public and the environment from injury or accidental release of contaminated materials.

B. Inspect all vehicles in accordance with 49 CFR 393, and comply with all applicable local, state, and federal requirements for registration, insurance, inspection, certification, and performance.

C. Motor vehicle inspections shall be performed by qualified inspectors, as required by 49 CFR 396.19. Have available a copy of the current certificate of commercial motor vehicle inspection before any transportation activities (or a statement certifying that all motor vehicles have been inspected in accordance with the requirements of 49 CFR 396.17, 49 CFR 396.19, and 49 CFR 396.23). Brake inspections shall be performed by a certified brake inspector for commercial motor vehicles, as described in 49 CFR 396.25.

D. The motor vehicle operator shall perform a safety inspection of each motor vehicle before it is used and at least once each day, in accordance with the requirements of 49 CFR 396.11 and 49 CFR 396.13.

E. Remove from the Site any motor vehicles determined to be potentially unsafe and/or unsuitable for their intended use. Re-inspect repaired or replaced motor vehicles to determine whether they meet inspection standards.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Verification of existing conditions before starting work.

B. Notify ENGINEER sufficiently in advance of intention to commence activities at the Site that require attendance by ENGINEER as provided hereinafter.

C. Activities requiring attendance by ENGINEER include:
1. Placement of tub liner in bulk solid transport vehicles/containers.
2. Final securement of loaded materials prior to transport from the Site.
3. Decontamination of transport vehicles/containers prior to leaving the Site.

D. Do not cover up loaded material prior to ENGINEER’s inspection.

3.2 TSDF SELECTION

A. Provide submittals identifying proposed TSDFs to ENGINEER. OWNER may accept TSDFs proposed by CONTRACTOR or request alternate facilities.

B. OWNER tentatively acceptable TSDFs:
1. Non Hazardous Waste Landfills PCBs < 50 ppm
   a. Chaffee Landfill, Chaffee, NY
   b. Seneca Meadows Landfill, Waterloo, NY.

c. Ontario County Sanitary Landfill, Stanley, NY

2. TSCA Landfill PCBs ≥ 50 ppm
   a. U.S. Ecology Michigan, Belleville, MI
   b. Chemical Waste Management, Emelle, AL
3. TSCA PCBs ≥ 50 ppm and VOCs > LDR
   a. Veolia Port Arthur Treatment Complex, Port Arthur, TX.
   b. U.S. Ecology Michigan, Belleville, MI
   c. Chemical Waste Management, Emelle, AL

3.3 WASTE PROFILING

A. CONTRACTOR will conduct waste profile sampling and analysis. Do not remove materials from the Site which have been sampled by CONTRACTOR and are awaiting analytical results. CONTRACTOR will provide ENGINEER with analytical results within seven days of sample collection. CONTRACTOR will provide copies of analytical results to ENGINEER's upon request.

B. CONTRACTOR will classify materials for off Site disposal according to waste stream based on waste profile analytical results and other pertinent data/information.

C. Select and submit proposals to ENGINEER for the appropriate disposition of all determined waste streams to be removed from the Site in accordance with applicable regulations for each waste stream. CONTRACTOR shall be responsible for disposition of materials to OWNER-approved TSDFs.

D. CONTRACTOR will complete a waste profile for each waste stream. Waste profiles will be signed by OWNER or an authorized agent of OWNER except for materials brought on the Site by CONTRACTOR that are not incorporated in Works or materials contaminated by performance of Works.

E. Submit signed waste profiles to TSDFs accepted by OWNER.

3.4 SEGREGATION OF MATERIALS

A. Do not segregate materials for disposal until waste profiles are approved by each TSDF.

B. Segregate and prepare materials for transportation and disposal in accordance with the delivery acceptance requirements of the transporter and TSDF and governing regulations.

3.5 STABILIZATION OF SEDIMENT

A. In accordance with Section 02 55 00.

3.6 DOCUMENTATION FOR THE TRANSPORTATION OF MATERIALS

A. Document the transport and disposal of materials to TSDFs on appropriate state and/or federal manifests or bills of lading as applicable. Prepare, maintain, and provide ENGINEER with copies of manifests, bills of lading, and/or other records for each shipment of materials from the Site. Maintain shipping documents from the time the

materials leave the Site to the time of release to TSDFs. Shipping documents for the transportation and disposal of materials will be signed by OWNER or an authorized agent of OWNER, except for materials brought on the Site by CONTRACTOR that are not incorporated in the Works or contaminated by performance of the Works.

B. ENGINEER will inspect each truck before leaving the Site and maintain a log. Trucks shall not leave the Site until released by ENGINEER.

3.7 NOTIFICATION

A. Notify applicable federal, state, and local representatives, or authorities having jurisdiction over the route and mode of transport, in advance of commencing transportation.

3.8 TRANSPORTATION

A. Comply with applicable requirements of regulations including, but not limited to 49 CFR 171, 49 CFR 172, 49 CFR 173, 49 CFR 177, 40 CFR 262, 40 CFR 263, 40 CFR 273, 40 CFR 279, 40 CFR 76, 6 NYCRR Part 364.

B. Transport material removed from the Site directly to TSDF approved by OWNER. Do not change either the route or mode of transport after commencing off-Site operations without ENGINEER's prior written approval.

C. Mark and placard shipments in accordance with federal, state, and local regulations as applicable.

D. Employ transport vehicle operators trained in conformance with federal, state, and local regulations applicable to the waste streams to be transported.

E. Materials shall be transported using vehicles licensed for the waste stream being transported. Regardless of regulatory waste classification, materials shall be transported using vehicles licensed to transport hazardous wastes.

3.9 DISPOSAL

A. Make all arrangements with TSDFs for the receipt and acceptance of materials removed from the Site.

B. Ensure that materials removed from the Site are properly prepared and will be accepted by TSDF. Dispose of materials at TSDFs preapproved by OWNER and USEPA, which are in compliance with applicable regulations and permitted to receive materials from the Site.

C. Weigh transport vehicles/containers at receiving TSDF weigh scales both before and after discharging their contents.

D. Such measurements will be used by ENGINEER to verify proper delivery of materials which have been removed from the Site and for payment purposes. Transportation to a TSDF will be suspended in the event of discrepancy between the net weight as recorded by the on-Site vehicle built in weigh scale and TSDF scale.

E. Return to the Site any transported material delivered to a TSDF which is rejected by the TSDF.

3.10 RCRA SUBTITLE D LANDFILL

A. Dispose of non-hazardous solid waste other than recyclable waste at a RCRA Subtitle D landfill.

B. The facility shall be permitted to receive solid wastes, other than hazardous wastes, by USEPA and all other authorities having jurisdiction.

3.11 RCRA SUBTITLE C LANDFILL

A. Dispose of RCRA hazardous solid waste at a RCRA Subtitle C permitted landfill preapproved by OWNER and NYSDEC.

B. The facility shall be inspected by the appropriate federal and state officials responsible for the RCRA program within six months prior to receipt of materials under the Contract.

C. The facility shall not have any significant regulatory violations or other environmental conditions that could affect its satisfactory operation or its ability to accept materials from the Site during the performance of the Contract. Such regulatory violations shall include violations under RCRA, or other federal or state laws.

3.12 TSCA/RCRA SUBTITLE C LANDFILL

A. Dispose of TSCA/RCRA hazardous solid material with total PCBs greater than or equal to 50 ppm at a TSCA/RCRA permitted landfill preapproved by OWNER and NYSDEC.

B. The facility shall be USEPA permitted to receive TSCA wastes as applicable and shall be in compliance with the applicable requirements of 40 CFR 264, 40 CFR 265, and any other regulatory requirements.

C. The facility shall be inspected by the appropriate federal and state officials responsible for the TSCA program within six months prior to receipt of wastes under the Contract. ENGINEER will have the right to inspect/audit the facility.

D. The facility shall not have any significant regulatory violations or other environmental conditions that could affect its satisfactory operation or its ability to accept materials from the Site during the performance of the Contract. Such regulatory violations shall include violations under TSCA or other federal, state, and local regulations.

3.13 RCRA/TSCA INCINERATION FACILITY

A. Incinerate solid waste material with VOCs in excess of land ban restrictions at a RCRA/TSCA permitted incinerator preapproved by OWNER and NYSDEC.

B. The facility shall be USEPA permitted to receive TSCA wastes as applicable and shall be in compliance with the applicable requirements of 40 CFR 264, 40 CFR 265 and any other applicable regulatory requirements.

C. The facility shall be inspected by the appropriate federal and state officials responsible for the TSCA program within six months prior to receipt of wastes under the Contract. ENGINEER will have the right to inspect/audit the facility.

D. The facility shall not have any significant regulatory violations or other environmental conditions that could affect its satisfactory operation or its ability to accept materials from the Site during the performance of the Contract. Such regulatory violations shall include violations under TSCA or other federal, state, and local regulations.

3.14 INDUSTRIAL LIQUID TREATMENT FACILITY

A. Dispose of wastewaters at an industrial treatment facility preapproved by OWNER and NYSDEC.

B. The treatment facility shall have RCRA and/or TSCA permit or RCRA and/or TSCA interim status to treat RCRA and/or TSCA wastes.

C. The facility shall have been inspected by the appropriate federal, state, and local representatives responsible for RCRA and/or TSCA program within six months prior to receipt of wastewater under the Contract.

D. The facility shall not have any significant regulatory violations or other environmental conditions that could affect its satisfactory operation or its ability to accept wastes from the Site during the performance of the Contract. Such regulatory violations include violations under RCRA and/or TSCA or other federal, state, and local regulations.

3.15 ACCIDENT INVOLVING TRANSPORT VEHICLES

A. In the event of an accident, follow the procedures outlined in CONTRACTOR's Emergency Response Plan and comply with the requirements of 49 CFR 390.15 Subpart E, 49 CFR 172, Subpart G, and 49 CFR 171 Subpart B.

B. In the event of an accident involving a release of contaminated materials, promptly notify ENGINEER via telephone, and prepare a written report within five days. The report shall include but not be limited to:

1. Location, date, and time of the accident.
2. Resultant damage or injury.
3. Person(s) involved.
4. Probable cause.
5. Condition of the load.
6. Amount of contaminated materials released and amount recovered.
7. Any other pertinent information.
8. If applicable, weather conditions, distance to water sources, government agencies on the scene, and telephone number where communications can be maintained.
9. Copies of any accident/incident.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMARY

A. Section Includes:
   1. Cast-in-place concrete for bridge foundation.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
   2. No separate payment will be made for work of this Section.

1.3 REFERENCES

A. Reference Standards:
   1. Section 01 40 00 - Quality Requirements: Requirements for references.
   2. American Concrete Institute:
      a. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials.
      b. ACI 301 - Specifications for Structural Concrete.
      c. ACI 305R - Hot Weather Concreting.
      d. ACI 306.1 - Standard Specification for Cold Weather Concreting.
      e. ACI 308 - Standard Specification for Curing Concrete.
      f. ACI 315 - Details and Detailing of Concrete Reinforcement.
      g. ACI 318 - Building Code Requirements for Structural Concrete.
      h. ACI 350R - Environmental Engineering Concrete Structures.
      i. ACI SP 66 - ACI Detailing Manual.
   3. ASTM International:
      a. A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
      b. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
      c. ASTM C33/C33M - Standard Specification for Concrete Aggregates.
      d. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
      e. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
      f. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic Cement Concrete.
      g. ASTM C150/C150M - Standard Specification for Portland Cement.
      h. ASTM C172/C172M - Standard Practice for Sampling Freshly Mixed Concrete.
      i. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
      j. ASTM C231/C231M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.

k. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete.
l. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
m. ASTM C1064/C1064M - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.
n. ASTM D3963/D3963M - Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Reinforcing Steel.
o. ASTM E329 - Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.

4. Concrete Reinforcing Steel Institute:
   a. CRSI 63 - Recommended Practice for Placing Reinforcing Bars.
   b. CRSI 65 - Recommended Practice for Placing Bar Supports, Specifications, and Nomenclature.
   c. CRSI Manual of Practice.
5. New York State Department of Transportation Standard Specifications (NYSDOTSS).
6. National Fire Protection Association: NFPA 70 – National Electrical Code.
7. National Ready Mixed Concrete Association (NRMCA).

1.4 COORDINATION

A. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

1.5 SCHEDULING

A. Section 01 30 00 - Administrative Requirements: Requirements for scheduling.

B. Coordinate the placement of embedded components with erection of concrete formwork and placement of form accessories.

C. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement, before proceeding request instructions from ENGINEER.

1.6 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings:
   1. Where construction joints are proposed in addition to those specified, submit, minimum 21 days prior to planned construction, drawings showing locations and sequence of proposed joints.
   2. Submit formwork and falsework drawings indicating dimensions, materials, bracings, and ties.
   3. Submit reinforcement drawings:
      a. Indicate bar sizes, spacings, locations, and quantities of reinforcing steel and wire fabric, bending and cutting schedules, and supporting and spacing devices; with identifying code marks to permit correct placement without reference to the Drawings in accordance with ACI 315.
      b. Detail placement of reinforcing where special conditions occur.
      c. Design and detail lap lengths and bar development lengths in accordance with ACI 318 Class A for normal structural work and Class B for water containing structures.

C. Product Data: Include for joint devices, attachment accessories, and admixtures.

D. Concrete Mix Investigation Data: Submit mix data minimum 14 days prior to producing concrete.

E. Aggregate Source Data: Prior to aggregate production, submit details of source and methods proposed for producing aggregate.

F. Test Reports: Submit, minimum 14 days prior to intended use, test reports for current representative samples of the following materials: coarse aggregate, fine aggregate, water, cement, and reinforcement mill test certificates.

G. Certificates: Certify that products and mix proportions meet or exceed specified requirements, and will produce concrete of specified quality and yield and that strength will comply with specified requirements.

H. Concreting Methods and Procedures: Submit 7 days prior to placement of concrete, proposed methods of mixing, transporting, conveying, placing, spreading, consolidating, finishing, curing, and protection of concrete.

I. Inspections: Prepare, submit, and coordinate for special inspection requirements.

1.7 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for closeout submittals.

B. Record Documents: Indicate actual locations of embedded utilities and components which are concealed from view.

1.8 QUALITY ASSURANCE

A. Conform to applicable NYSDOTSS.

B. Perform concrete work in accordance with ACI 301 and ACI 350R.

C. Acquire cement and aggregate materials from same source for all work.

D. Conform to ACI 305R when concreting during hot weather.

E. Conform to ACI 306.1 when pouring concrete during cold weather.

F. Perform formwork in accordance with ACI 347. Immediately remove from the Site the forms that cannot be properly cleaned or repaired.

G. Perform reinforcement work in accordance with CRSI 63, CRSI 65, and CRSI Manual of Practice.

H. Remove immediately from the Site reinforcement without rolled in grade marks or certified mill test reports.

1.9 QUALIFICATIONS

A. Supplier:
   1. Certified ready mix supplier approved by ENGINEER.
   2. Plant certification complying with NRMCA.

B. Testing Agency: Independent testing laboratory complying with ASTM E329 and approved by ENGINEER, to carry out trial concrete mix investigations, and select materials and mix proportions in accordance with ACI 211.1.

C. Design formwork under direct supervision of a licensed professional engineer experienced in its design.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Store materials off ground in ventilated and protected manner to prevent deterioration from moisture.

C. Store reinforcement in bundles with identifying tags or markings on racks or sills that will permit easy access for identification and handling, and prevent it from becoming coated with any material that would adversely affect the bond.

D. Maintain individual bar identification after bundles are broken.

1.11 AMBIENT CONDITIONS

A. Hot Weather Requirements:
   1. Apply when the air temperature is above 78 degrees F.
   2. Submit to ENGINEER for review proposed equipment and methods before concreting in hot weather.

B. Concrete Temperature Upon Delivery to Site: Between 60 and 80 degrees F.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

A. Design, engineer, and construct formwork, shoring, and bracing to conform to design and code requirements; resultant concrete shall conform to required shape, line, and dimension.

2.2 FORM AND FORM ACCESSORIES

A. Form Materials: At the discretion of CONTRACTOR and conforming to APA PS9.

B. Form Ties: Snap off type, galvanized metal, adjustable length, 1/2 inch back break dimension, free of defects that could leave holes in concrete surface. Tapered and removable wall ties are not permitted.

C. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.

D. Corners: Chamfer, rigid plastic or wood strip type; 3/4 by 3/4 inch size; maximum possible lengths; provide on all exposed corners and edges.

E. Flashing Reglets: Galvanized steel or rigid polyvinyl chloride, 22 gage thick, longest possible lengths, with alignment splines for joints, release tape sealed slots, anchors for securing to concrete formwork.

F. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

2.3 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, 60 ksi yield grade; deformed billet steel bars; unfinished, galvanized in accordance with ASTM A767/A767M Class I/II, or epoxy coated in accordance with ASTM A775/A775M and ASTM D3963/D3963M.

B. Welded Steel Wire Fabric: ASTM A1064/A1064M and ASTM A1064/A1064M, plain type in flat sheets; unfinished, galvanized in accordance with ASTM A767/A767M Class I/II, or epoxy coated in accordance with ASTM A884/A884M.

2.4 REINFORCEMENT ACCESSORIES

A. Tie Wire: Minimum 16 gage annealed type or epoxy coated in accordance with ASTM A899.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions, including load bearing pad on bottom to prevent vapor barrier puncture. Do not use masonry block.

2.5 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M Type IIA, moderate sulfate resistance and heat of hydration and air entraining, gray color.

B. Fine and Coarse Aggregates: ASTM C33/C33M.

C. Water: Clean and not detrimental to concrete, free from injurious amounts of oil, acid, alkali, organic matter, sediment, or other deleterious substance.

2.6 CONCRETE ADMIXTURES

A. Air Entrainment: ASTM C260/C260M.

B. Chemical: ASTM C494/C494M, Type A water reducing, Type F water reducing and high range.

C. Provide admixtures from same source and manufacturer. Admixtures shall not contain calcium chloride based compounds.

D. Fly Ash/Calcinated Pozzolan: ASTM C618 Class C or F.

E. Cold Weather:
   1. Use accelerating admixtures in cold weather.
   2. Use of admixtures will not relax cold-weather placement requirements.

F. Hot Weather: Use set-retarding admixtures.

2.7 JOINT DEVICES AND FILLER MATERIALS

A. Joint Filler: Bakor Polybitume 570-05, expanded and extruded polystyrene, caulking, EVA foam, or similar as indicated on the Drawings, and as required to complete the structure.

B. Construction Joint Devices: Integral extruded plastic, formed to tongue and groove profile, with removable top strip exposing sealant trough, knockout holes spaced at 6 inches, ribbed steel spikes with tongue to fit top screed edge.

2.8 CONCRETE MIX

A. Mix and deliver concrete in accordance with ASTM C94/C94M Option C.

B. Select proportions for normal weight concrete in accordance with ACI 211.1.

C. Provide concrete to the following criteria:

Unit	*Measurement*
Compressive Strength (7-day)	3,750 psi
Compressive Strength (28-day)	5,000 psi
Water/Cement Ratio (maximum)	0.4 by weight (mass)
Aggregate Size (maximum)	3/4 inch
Air Entrained - Plus or minus 1 percent	5 percent
Admixture	water reducing type
Fly Ash and Pozzolan Content (maximum)	20 percent of cement content
Slump - Plus or minus 1 inch	3½ inches
Cement Content (minimum)	550 pounds per cubic yard

D. Use set retarding admixtures during hot weather only when approved by ENGINEER.

E. If required, add high range water reducing admixture (superplasticizer) to mix at the Site.

F. Do not use calcium chloride.

2.9 GROUT MIX

A. Concrete mix, less 50 percent of coarse aggregate.

2.10 CONCRETE ACCESSORIES

A. Vapor Retarder: 10-mil thick fabric reinforced polyethylene film, type recommended for below grade application.

2.11 FABRICATION - REINFORCEMENT

A. Fabricate concrete reinforcing in accordance with CRSI 63, CRSI 65, and CRSI Manual of Practice.

B. Epoxy Coated Reinforcement: Clean surfaces, weld, and re protect welded joint in accordance with manufacturer's instructions and/or CRSI Manual of Practice.

C. Locate reinforcing splices not shown on the Drawings, at point of minimum stress. Review location of splices with ENGINEER.

2.12 FILL

A. In accordance with Section 31 23 23.

2.13 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing, inspection, and analysis requirements.

B. ENGINEER may perform tests of cement, aggregates, water, and the mixture thereof at batch plant to ensure conformance with specified requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Verification of existing conditions before starting work.

B. Verify that compacted granular base is dry and ready to support imposed loads. Verify slopes and elevations of the base are correct.

C. Verify lines, levels, openings, and centers before proceeding with formwork. Ensure that dimensions agree with the Drawings.

D. Verify requirements for concrete cover over reinforcement.

E. Verify that anchors, seats, plates, reinforcement, and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

F. Verify that construction joints are located as shown on the Drawings.

3.2 PREPARATION

A. Earth forms are not permitted. If required, obtain approval from ENGINEER for use of earth forms. Hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete using compressed air prior.

B. Prepare previously placed concrete by cleaning with steel brush to remove laitance and mortar, and applying bonding agent in accordance with manufacturer's instructions.

C. Erect formwork, shoring, and bracing in accordance with requirements of ACI 301 and ACI 347. Align joints and make watertight. Construct forms tight fitting to prevent cement migrating out of plastic matrix. Keep form joints to a minimum. Arrange and assemble formwork to permit dismantling and stripping without damaging concrete.

D. Install inserts, formed openings, anchoring devices, embedded parts, void forms, chamfer strips, and accessories in accordance with manufacturer's recommendations, prior to placement of reinforcing steel.

E. Apply form release agent on formwork in accordance with manufacturer's recommendations. Soak inside surfaces of untreated forms with clean water. No standing water shall be permitted in the formwork.

3.3 PLACEMENT - REINFORCEMENT

A. Install reinforcement as shown on Drawings and in accordance with reviewed Shop Drawings.

B. Comply with ACI 315 for reinforcement installation not shown on the Drawings.

C. Comply with ACI 315 and CRSI 65 for bar support systems and patterns.

D. Place, support, and secure reinforcement against displacement. Do not deviate from required position. Maintain required concrete cover around reinforcing.

E. Do not displace or damage vapor barrier. Accommodate placement of formed openings.

F. In the event inserts, sleeves, or other items interfere with reinforcement placing, immediately notify ENGINEER and obtain approval from ENGINEER for adjustments. Do not cut bars to clear obstructions without consulting ENGINEER.

G. Do not field bend reinforcement. When field bending is authorized by ENGINEER, bend without heat, applying a slow and steady pressure.

H. Replace bars which develop cracks or splits.

I. Bond and ground reinforcement in accordance with NFPA 70.

J. Notify ENGINEER at least 24 hours in advance of completion of reinforcement placing to permit time for inspection, final adjustment, and review by ENGINEER prior to placing concrete.

3.4 PLACING CONCRETE

A. Place concrete in accordance with ACI 301, ACI 318 and ACI 350R.

B. Notify ENGINEER minimum 48 hours prior to commencement of concrete placing operations to allow ENGINEER opportunity to review methods of conveying, spreading, consolidating, finishing, curing, and protecting concrete.

C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.

D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

E. Place concrete continuously between predetermined control joints or without control and construction joints.

F. Do not interrupt successive placement; do not permit cold joints to occur.

G. Place smooth dowels with lubrication at saw cut joint locations. Saw cut joints within 24 hours after placing. Use 3/16 inch thick blade (sof cut type), cut into 1/4 depth of slab thickness.

H. Apply sealants in joint devices.

3.5 CONCRETE FINISHING

A. Provide formed concrete surfaces to be left exposed with smooth rubbed finish.

3.6 CURING AND PROTECTION

A. Cure and protect concrete in accordance with ACI 308.

B. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

C. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.7 PATCHING

A. Allow ENGINEER to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify ENGINEER upon discovery.

C. Patch imperfections as directed by ENGINEER in accordance with ACI 301.

3.8 DEFECTIVE CONCRETE

A. Concrete not conforming to required lines, details, dimensions, tolerances, or specified requirements.

B. Repair or replacement of defective concrete will be determined by ENGINEER.

C. Do not patch, fill, touch up, repair, or replace exposed concrete except upon express direction of ENGINEER for each individual area.

3.9 FORM REMOVAL

A. Give ENGINEER advance notice prior to form removal.

B. Do not remove forms or bracing until concrete has reached a strength of 3500 psi.

C. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

D. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

3.10 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting and testing.

B. Three concrete test cylinders will be taken by ENGINEER for every 75 cubic yard or less of concrete placed each day. Make one additional cylinder during cold weather concreting and field cure.

C. One slump test will be taken for each set of test cylinders taken. Slump test will be determined by ENGINEER at the beginning of each, the middle of, and the end of a particular mixer/agitator truck.

D. Testing by ENGINEER or failure to detect defective work will not prevent rejection when defect is discovered, nor will it obligate ENGINEER for final acceptance.

E. Methods of Testing by ENGINEER:
   1. Securing Composite Samples: ASTM C172/C172M.
   2. Molding and Securing Specimens from Each Sample: ASTM C31/C31M.
   3. Compressive Strength: ASTM C39/C39M except specimens will be tested at 7 and 28 days.
   4. Slump for Each Strength Test: ASTM C143/C143M.
   5. Total Air Content for Each Strength Test: ASTM C231/C231M or ASTM C173/C173M, as determined by ENGINEER.
   6. Temperature of concrete sample and mixing water for each strength test or as required.

F. Copies of test reports will be supplied to CONTRACTOR on request.

G. Water test areas where unusual conditions exist for required slope and drainage. Repair areas where ponding is greater than 1/4 inch depth.

3.11 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.

B. Clean forms as erection proceeds, to remove foreign matter within forms.

C. Clean formed cavities of debris prior to placing concrete.

D. Flush with water or use compressed air to remove remaining foreign matter.

E. Ensure that no material, equipment or debris is allowed to enter the watercourse.

END OF SECTION

SECTION 31 05 19

GEOTEXTILES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Geotextile for construction of temporary Canal berm, Staging and Dewatering Pad, Equipment Decontamination Pads, Stabilized Construction Entrance, and Soil Stockpile Area.

B. Geotextile for permanent demarcation layer.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
   2. No separate payment will be made for work of this Section.

1.3 REFERENCES

A. Abbreviations and Acronyms:
   1. AOS: Apparent Opening Size.
   2. CBR: California Bearing Ratio.
   3. CD: Cross Direction.
   4. MD: Machine Direction.
   5. UV: Ultra Violet.

B. Definitions:
   1. Geotextile: Synthetic fabric for use in geotechnical filter, separation, stabilization, or erosion control applications.
   2. Minimum Average Roll Value (MARV): Average value for a specified parameter less two standard deviations.

C. Reference Standards:
   1. Section 01 40 00 - Quality Requirements: Requirements for references.
   2. ASTM International:
      a. ASTM D4354 - Standard Practice for Sampling of Geosynthetics and Rolled Erosion Control Products (RECPs) for Testing.
      b. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
      c. ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
      d. ASTM D4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
      e. ASTM D4759 - Standard Practice for Determining the Specification Conformance of Geosynthetics.

f. ASTM D4873 – Standard Guide for Identification, Storage and Handling of Geosynthetic Rolls and Samples.
g. ASTM D5261 - Standard Test Method for Measuring Mass Per Unit Area of Geotextiles.
h. ASTM D6241 - Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe.
i. ASTM D7238 - Test Method for Effect of Exposure of Unreinforced Polyolefin Geomembrane Using Fluorescent UV Condensation Apparatus.

3. Geosynthetic Institute:
   a. GRI Test Method GT12(a), ASTM Version - Standard Specification for Test Methods and Properties for Nonwoven Geotextiles Used as Protection (or Cushioning) Materials.

1.4 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate installation of geotextile with surface preparation.

1.5 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Requirements for pre-installation meeting.

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

C. Purpose of Meeting:
   1. Define Site-specific quality control and monitoring procedures.
   2. Discuss pre-installation submittals.
   3. Identify daily schedule.

1.6 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit no later than 14 days prior to ordering.

C. Samples: Submit a representative sample at least 6 foot by roll width of geotextile no later than 14 days prior to ordering.

D. Manufacturer’s Instructions: Submit at least 14 days prior to installation. Include installation, handling, storage, and repair instructions.

E. Manufacturer’s Certificates:
   1. Deliver each roll to the Site accompanied by manufacturer’s certificate.
   2. Identify each roll by unique manufacturing number.
   3. Include results of tests specified in PART 2, and manufacturer’s records for storage, handling, and shipping of geotextile.
   4. Certificates shall be signed by the responsible person in charge of the laboratory and notarized.

1.7 QUALIFICATIONS

A. Installer: Company specializing in performing the work of this Section with minimum three years documented experience.

B. Manufacturer: Submit no later than 14 days prior to ordering, a list of previous projects totaling 3 million sq ft of installation, and five projects including name of project, description of project, area, client's name and address, contacts and telephone numbers; engineer's name, address, contact and telephone number; installer's name, address, contact and telephone number; and date installed.

C. Geosynthetic Testing Laboratory: Submit Geosynthetic Accreditation Institute-Laboratory Accreditation Program (GAI-LAP) certificate.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Deliver geotextile bearing manufacturer's seals and labels intact. Clearly label each roll to show geotextile identification, date of manufacture, lot number, analysis of contents, and special instructions.

C. Store and handle geotextile according to manufacturer's recommendations and ASTM D4873, indoors, in manufacturer's original covers. Protect from moisture, dust, light, and heat.

D. Notify ENGINEER three days in advance of delivery to the Site. Perform joint inspection with ENGINEER upon delivery. Defects or damage from shipping and handling will be grounds for rejection of a portion of geotextile or of the entire geotextile roll at ENGINEER's discretion. Remove rejected material from the Site and replace with new material.

1.9 AMBIENT CONDITIONS

A. Install geotextile in dry conditions and according to manufacturer's instructions.

B. Suspend installation operations whenever climatic conditions, as determined by ENGINEER, are unsatisfactory for placing geotextile to the requirements of this Section.

PART 2 PRODUCTS

2.1 GEOTEXTILE

A. General:
   1. Rot-proof, mildew-proof, and not subject to attack by insects or rodents.
   2. Capable of retaining its structure during handling, placement, and long-term service.

B. Description:

1. Non-woven, needle punched geotextile of 100 percent polypropylene, combining high modulus, permeability, and strength. Any roll in a lot shall meet or exceed the following values:

Test	Unit	Test Method	MARV
Unit Weight	ounce/yd^2	ASTM D5261	12
Thickness	mils	ASTM D5199	115
Tensile Strength	pound	ASTM D4632	320
Elongation at Break	percent	ASTM D4632	50
Static CBR Puncture	pound	ASTM D6241	925
Trapezoid Tear Strength	pound	ASTM D4533	125
AOS	US Sieve	ASTM D4751	100
Permittivity	sec^{-1}	ASTM D4491	0.8
Permeability	cm/s	ASTM D4491	0.29
Water Flow Rate	gpm/ft^2	ASTM D4491	60
Ultra Violet Resistance	percent retained/ 500 hours	ASTM D4355	70

2.2 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing, inspection, and analysis requirements.

B. Manufacturer Quality Control:

1. Sample and test geotextile material at a minimum once every 10,000 sq ft for unit weight, tensile strength, elongation, hydraulic burst strength, CBR puncture strength, and trapezoid tear strength to demonstrate that the material conforms to requirements specified in Article 2.1. Test for UV stability and AOS at a minimum once every month.
2. Perform samples on sacrificial portions of material so that repair of material is not required.
3. As a minimum, each type of geotextile to be shipped to the Site shall be randomly sampled for testing in accordance with ASTM D4354. Acceptance of geotextile shall be based on ASTM D4759.
4. If geotextile sample fails to meet the quality control requirements of this Section, sample and test each roll manufactured in the same lot, or at the same time, as the failing roll. Continue sampling and testing of rolls until a pattern of acceptable test results is established.
5. At geotextile manufacturer's discretion and expense, additional testing of individual rolls may be performed to more closely identify the non-complying rolls and/or to qualify individual rolls.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Verification of existing conditions before starting work.

B. Verify that surfaces and Site conditions are ready to receive work.

3.2 PREPARATION

A. Prior to geotextile placement, where possible roll the surface with a smooth drum steel or pneumatic roller to avoid irregularities, loose earth, and abrupt changes in grade. Provide necessary equipment and personnel to maintain an acceptable supporting surface during fabric installation.

B. Examine geotextile for defects including rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or handling.

C. Remove defective or damaged geotextile from the Site.

D. Prepare anchor trenches according to the Drawings.

3.3 INSTALLATION

A. Notify ENGINEER at least 24 hours in advance of intention to commence placement of geotextile.

B. Do not permit placement of overlay materials until ENGINEER has inspected and approved installation of geotextile.

C. Obtain approval of ENGINEER prior to installation of geotextile.

D. Place geotextile on a prepared base as shown on the Drawings.

E. Unfold or unroll geotextile according to manufacturer’s instructions, directly on prepared base, in conditions which will prevent damage to both geotextile and base grade. Unsuitable conditions include, but are not limited to moderate to high wind conditions.

F. Overlap dimensions and the method of joining adjacent sheets shall, as a minimum, be in strict conformance with manufacturer’s instructions. Secure geotextile to base grade according to manufacturer’s instructions and as shown on the Drawings.

G. Do not entrap stones in geotextile during placement.

H. Do not expose geotextiles to sunlight for more than 30 days, or less if recommended by manufacturer.

I. Position and deploy geotextile to minimize handling. Lay smooth and free of tension, stress, folds, or creases. Protect properly placed geotextile from displacement,

contamination by surface runoff, or damage, until and during placement of overlaid materials.

J. Place geotextile on sloping surfaces in one continuous length.

K. Do not permit passage of vehicular traffic directly on geotextile at any time.

L. Place geotextile by unrolling onto graded surface and retain in position as specified.

M. Remove and replace damaged or deteriorated geotextile as directed by ENGINEER.

N. Protect installed geotextile material from dust, fine particles, and debris prior to placing overlying materials.

3.4 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting and testing.

B. ENGINEER will inspect geotextile in place for tears, overlaps, and consistency before placing materials thereon. Damaged sections, as judged by ENGINEER, will be marked and their removal from the work area recorded. Repair minor damage and minor defects as specified in manufacturer's procedures when approved by ENGINEER to ENGINEER's satisfaction.

C. ENGINEER will verify that weather conditions (air temperature, non-excessive wind, and lack of precipitation) are acceptable for panel placement.

D. Conformance Testing:
   1. Samples of geotextiles may be collected by ENGINEER according to ASTM D4354 and sent to laboratory for testing to ensure conformance with the requirements of this Section. Geotextile acceptance will be based on ASTM D4759.
   2. This testing will be carried out prior to installation of geotextile.
   3. Geotextile material that does not comply with requirements specified in PART 2 will be rejected by ENGINEER. Replace rejected material with suitable material, at no additional cost to OWNER.

END OF SECTION

SECTION 31 05 20

GEOMEMBRANES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. High density polyethylene (HDPE) liner for construction of Equipment Decontamination Pads, Staging and Dewatering Pad, and Soil Stockpile Area.

B. Related Requirements:
1. Section 31 05 19 – Geotextiles.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
2. No separate payment will be made for work of this Section.

1.3 REFERENCES

A. Abbreviations and Acronyms:
1. IAGA: International Association of Geosynthetic Installers.
2. HDPE: High density polyethylene.
3. MARV: Minimum average roll values.
4. MaxARV: Maximum average roll values.

B. Definitions:
1. Conform to ASTM D4439 for interpretation of terms used in this Section.
2. SMDD: Standard Maximum Dry Density and in the context of this Contract means the maximum dry unit weight determined according to ASTM D698.
3. Wrinkles: Corrugations in HDPE liner that will fold over during placement of materials overlying HDPE.

C. Reference Standards:
1. Section 01 40 00 – Quality Requirements: Requirements for references.
2. ASTM International:
a. ASTM D698 – Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft lbf/ft^3 (600 kN m/m^3)).
b. ASTM D792 – Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
c. ASTM D1004 – Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
d. ASTM D1505 – Standard Test Method for Density of Plastics by the Density Gradient Technique.

e. ASTM D1603 – Standard Test Method for Carbon Black Content in Olefin Plastics.
f. ASTM D3895 – Standard Test Method for Oxidative Induction Time of Polyolefins by Differential Scanning Calorimetry.
g. ASTM D4218 – Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle Furnace Technique.
h. ASTM D4437/D4437M – Standard Practice For Non Destructive Testing (NDT) for Determining the Integrity of Seams Used in Joining Flexible Polymeric Sheet Geomembranes.
i. ASTM D4439 – Standard Terminology for Geosynthetics.
j. ASTM D4833/D4833M – Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
k. ASTM D5199 – Standard Test Method for Measuring Nominal Thickness of Geosynthetics.
l. ASTM D5321 – Standard Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method.
m. ASTM D5397 – Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test.
n. ASTM D5596 – Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics.
o. ASTM D5641/D5641M – Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber.
p. ASTM D5721 – Standard Practice for Air-Oven Aging of Polyolefin Geomembranes.
q. ASTM D5820 – Standard Practice for Pressurized Air Channel Evaluation of Dual Seamed Geomembranes.
r. ASTM D5885 – Standard Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High-Pressure Differential Scanning Calorimetry.
s. ASTM D6370 – Standard Test Method for Rubber-Compositional Analysis by Thermogravimetry (TGA).
t. ASTM D6497 – Standard Guide for Mechanical Attachment of Geomembrane to Penetrations or Structures.
u. ASTM D6693 – Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes.

3. Geosynthetic Research Institute:
   a. GRI Test Method GM6 – Pressurized Air Test for Dual Seamed Geomembranes.
   b. GRI Test Method GM9 – Cold Weather Seaming of Geomembranes.
   c. GRI Test Method GM13 – Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes.
   d. GRI GM14 – Standard Guide for Selecting Variable Intervals for Taking Geomembrane Destructive Seam Samples Using the Method of Attribute.
   e. GRI Test Method GM19 – Standard Specification for Seam Strength and Related Properties of Thermally Bonded Polyolefin Geomembranes.
   f. GRI Test Method GM29 – Standard Practice for Field Integrity Evaluation of Geomembrane Seams (and Sheet) Using Destructive and Nondestructive Testing.

1.4 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures: Requirements for submittals.

B. Product Data: Submit no later than 30 days prior to ordering.

C. Shop Drawings: Indicate installation layout, dimensions, and details including field seams, anchor trenches, and protrusion details.

D. Manufacturers' Instructions: Submit at least 14 days prior to installation. Include written installation, handling, storage, and repair instructions.

E. Manufacturer's Certificate: At least two weeks prior to delivery to the Site, certify that products meet or exceed specified requirements. Include test results.

F. Manufacturer's Quality Assurance Plan or Manual: Submit no later than 30 days prior to ordering.

G. Installer's Quality Assurance Plan or Manual: Submit no later than 30 days prior to ordering.

H. Manufacturer's Field Reports: Submit copies of manufacturer's test data at least four weeks prior to commencing the Works.

I. Daily Field Installation Report: submit no later than 1 day following date covered by report. Include:
   1. Subgrade surface acceptance form signed by manufacturer's representative and ENGINEER.
   2. Total quantity, type, and location of HDPE placed.
   3. Identifiers of rolls with manufacturer's number.
   4. Quality control tests of materials used during the day.
   5. Total quantity and location of seams completed, identification of seamer, and welding equipment used.
   6. Observations of test seams, including seaming unit number and identification of names of seamers, weather conditions, speed, temperature setting, and results.
   7. Location and results of non-destructive testing.
   8. Reasons for and observations of repairs and retesting, including locations, type of repair, name of repairer, and seaming equipment or product used.
   9. Observations of anchor trench excavation, backfilling, and compaction.
   10. Observations of field seaming operations, including weather conditions, cleaning, overlaps, rate of seaming, names of seamers, and units used.
   11. Observations of placement and seams around appurtenances, and connection to appurtenances.

J. Manufacturer Qualifications Statements:
   1. Submit qualifications for manufacturer, no later than 14 days prior to ordering including name of project, description of project, area, client's name and address, contacts, and telephone numbers; engineer's name, address, contact, and telephone number.
   2. Submit installer's name, address, contact, and telephone number; and date installed.
   3. Manufacturer shall be ISO 9001 certified.

K. Installer Qualification Statements:

1. Submit manufacturer's approval of installer no later than 14 days prior to installation.
2. Submit IAGI Certified Contractor Status.
3. Submit IAGI Certificates and Certified Welding Technician Certificates for each seamer.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 – Execution and Closeout Requirements: Requirements for closeout submittals.

B. Project Record Documents: Indicate panel layout, including panel identifiers, date placed, installer's name, location of seams, and location and details of repair.

1.6 QUALITY ASSURANCE

A. Provide manufacturer's quality assurance plan or manual to ensure that HDPE liner is manufactured in accordance with and will meet the requirements this Section.

B. Provide installer's quality assurance plan or manual to ensure that HDPE liner will be installed in accordance with this Section and the noted references.

C. Certifications: Submit certificates based on GRI GM13 test frequency as follows:
1. Certificates pertaining to rolls of geomembrane delivered to the Site shall accompany rolls. Each roll shall be identified by a unique manufacturing number. Quality control certificate shall include results of at least the following tests: density, carbon black content, thickness, tensile strength, puncture resistance, and tear resistance. Quality control certificates shall be signed by a responsible party employed by manufacturer.
2. Certificates pertaining to raw materials and manufactured rolls shall be provided by geomembrane manufacturer. ENGINEER will review test results for completeness and for compliance with minimum properties specified for both raw materials and manufactured rolls. Materials and rolls which are in non-compliance with minimum properties specified will be rejected.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 20 projects, 25 million sq ft, and five years documented experience.

B. Installer: Company specializing in installing products specified in this Section with minimum five projects, 10 million sq ft, three years documented experience, certified/licensed by manufacturer, and a holder of IAGI Certified Contractor Status.

C. Seamers: Certification by IAGI and certification as a Certified Welding Technician is required for all personnel performing seaming operations.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 – Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Package and label HDPE rolls prior to shipment to site. Label shall indicate HDPE liner manufacturer, type of HDPE liner, thickness, lot number, roll number, and roll dimensions. Manufacturer is responsible for initial loading and shipping of HDPE liner. Methods of unloading HDPE liner shall be approved by manufacturer prior to shipment.

C. When transported to the Site, handle HDPE rolls by appropriate means so that no damage is caused, as recommended by HDPE liner manufacturer.

D. During delivery and storage, protect HDPE rolls from direct sunlight, ultraviolet rays, excessive heat, mud, dirt, dust, debris, and rodents.

E. Take adequate measures to keep HDPE liner away from possible deteriorating sources (i.e., vandalism, theft).

F. Use handling equipment approved by manufacturer when moving HDPE rolls from one place to another. Lift rolls by inserting bar, sized to limit deflection detrimental to HDPE liner, through roll core. Attach slings or lifting chains at both ends of bar. Use a spreader bar to support and spread slings. Bar and support pipe shall be long enough to prevent damage to edges of liner during hoisting.

G. Notify ENGINEER three days in advance of HDPE liner delivery to the Site. Perform joint inspection with ENGINEER upon delivery. Defects or damage from shipping and handling will be grounds for rejection of a portion of HDPE liner or of entire HDPE roll at ENGINEER's discretion. Remove roll from the Site and replace with new material.

1.9 AMBIENT CONDITIONS

A. Suspend installation operations whenever climatic conditions, as determined by ENGINEER or manufacturer's representative, are unsatisfactory for placing HDPE liner to requirements of this Section.

B. Weather Conditions for HDPE Placement:
1. Comply with manufacturer's recommendation.
2. Do not unroll, unfold, or place HDPE at an ambient temperature below 32 degrees F or above 104 degrees F, unless CONTRACTOR obtains written approval from HDPE liner manufacturer and ENGINEER.
3. Install on dry ground.
4. HDPE liner placement shall take into account site drainage, wind direction, Site construction, access to the Site and production schedule of the Works.
5. HDPE liner placement shall not proceed if subgrade conditions have deteriorated due to moisture, or in the presence of high winds, as determined by ENGINEER, which might damage HDPE liner.
6. Adequately ballast deployed HDPE liner at all times to limit risk of wind damage.

C. Weather Conditions for HDPE Liner Seaming:
1. Comply with manufacturer's recommendations.
2. Make no weld below 34 degree F unless:

a. CONTRACTOR strictly follows guidelines for field seaming of HDPE liner in cold weather, as identified in GRI GM9.
b. CONTRACTOR obtains written approval from HDPE liner manufacturer to weld at temperature below 32 degrees F to GRI GM9.
c. Between 34 and 50 degrees F, seaming is possible if HDPE liner is preheated by either sun or hot air device, and if there is not excessive cooling resulting from wind.
d. Make no weld below 5 degrees F.
e. In all cases, HDPE liner must be dry while being welded.

PART 2 PRODUCTS

2.1 HDPE LINER

A. A smooth, geomembrane, designed and manufactured specifically for the purpose of fluid containment.

B. Free of holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter.

C. Shall have good appearance qualities, free of features that may affect the specified properties.

D. Manufactured from new, prime quality, compounded polyethylene resin meeting the following additional requirements:
1. Density: to ASTM D1505, greater than or equal to 0.932 g/cm^3.
2. Melt flow index: to ASTM D1238 (190/2.16), less than or equal to 1.0 g/10 min.
3. OIT: to ASTM D3895 (1 atm/200°C), greater than or equal to 160 minutes.

E. Conforming to the following specifications:

Property	Unit	Test Method	Test Value(1)	
Thickness (minimum average)) Lowest individual of 10 values	mil mil	ASTM D5199	40 36	60 54
Density (minimum)	g/ cm^3	ASTM D1505/ D792	0.940	0.940
Tensile Properties (minimum average)) Yield strength) Break strength) Yield elongation) Break elongation	 pound/ inch pound/ inch percent percent	ASTM D6693 Type IV	 84 152 12 700	 126 228 12 700
Tear Resistance (minimum average)	pound	ASTM D1004	28	42
Puncture Resistance (minimum average)	pound	ASTM D4833	72	108
Carbon Black Content (range)	percent	ASTM D4218(2)	2 to 3	2 to 3
Stress Crack Resistance	hour	ASTM D5397, Appendix	500	500

Property	Unit	Test Method	Test Value(1)	
Carbon Black Dispersion for 10 Different Views	--	ASTM D5596	9 in Cat.1 or 2 and 1 in Cat.3	9 in Cat.1 or 2 and 1 in Cat.3
Oxidative Induction Time (OIT) (minimum average)				
) Standard OIT or	minute	ASTM D3895	100	100
) High Pressure OIT	minute	ASTM D5885	400	400

Notes:
(1) The values shall be interpreted according to the designated test method. In this respect they are neither MARV nor MaxARV.
(2) ASTM D1603 or ASTM D6370 methods are acceptable if an appropriate correlation to ASTM D4218 method can be established.

2.2 SOURCE QUALITY CONTROL

A. Section 01 40 00 – Quality Requirements: Testing, inspection, and analysis requirements.

B. Manufacturer shall perform test for parameters specified in PART 2, at a minimum frequency specified in GRI GM13. If the specific manufacturer's quality control guide is more stringent and is certified accordingly, it must be followed in like manner.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 – Execution and Closeout Requirements: Verification of existing conditions before starting work.

B. Obtain ENGINEER's and manufacturer's approval in writing prior to installing HDPE liner and prior to placing subsequent materials on HDPE liner.

C. Coordinate activities so that ENGINEER can observe and inspect installation.

3.2 PREPARATION

A. Surface Preparation:
1. Do not begin installation of HDPE liner until a proper subbase has been prepared and approved by ENGINEER and HDPE liner manufacturer's representative. Prepared surface shall be free from abrupt changes in grade, water, loose earth, exposed rocks, rubble, protrusions, vegetation, and other foreign matter which may be damaging to HDPE liner. Compact subgrade uniformly to a minimum of 98 percent SMDD and smooth with a drum roller.
2. Do not place HDPE liner in an area which has become softened by precipitation and which will not support liner installation equipment without rutting.
3. Prepare excessively soft supporting material as directed by ENGINEER.

3.3 INSTALLATION

A. Maintain area of installation free of water and snow accumulations.

B. Place in accordance with manufacturer's recommendations on prepared surface. Minimize wrinkles, avoid scratches and crimps to geomembranes, and avoid damage to supporting material.

C. Minimize pulling of HDPE liner panels to reduce permanent tension.

D. Take the following precautions to minimize the risk of damage by wind during placement:
   1. Orientate work according to the direction of prevailing winds if possible, unless otherwise specified.
   2. Adequately secure the HDPE liner panels to prevent uplift by wind, by any means necessary that will not damage HDPE liner. Along the edges, ensure loading is continuous, to avoid possible wind flow under the panels.

E. Replace damaged, torn or permanently twisted panels to approval of ENGINEER. Remove rejected damaged panels from the Site.

F. Repair minor tears and pinholes by patching until non-destructive testing is successful. Patches to be round or oval in shape, made of same geomembrane material, and extend minimum of 3 inches beyond edge of defect.

3.4 INSTALLATION AROUND APPURTENANCES

A. Install HDPE liner around vents, chambers, sumps and other appurtenances protruding through HDPE liner as indicated.

B. Obtain ENGINEER's written approval for materials to be used to seal gaps between the liner skirt and appurtenances.

C. Perform installation on rough surfaces carefully to minimize HDPE liner damage. Additional loosely placed HDPE liner sections may be used by HDPE liner installer as protection for HDPE liner, if approved by ENGINEER.

D. Ensure clamps, clips, bolts, nuts, or other fasteners used to secure HDPE liner around each appurtenance have a lifespan equal to or exceeding HDPE liner.

E. Geomembrane penetration shall be in accordance with ASTM D6497 or as recommended by geomembrane manufacturer.

3.5 FIELD SEAMING

A. Keep field seaming to minimum. Locate field seams up and down slopes, with no horizontal field seam less than five feet beyond toe or crest of slope.

B. Keep seam area clean and free of moisture, dust, dirt, debris and foreign material.

C. Make field seam samples in accordance with requirements specified in PART 2, HDPE LINER on fragment pieces of geomembrane and test to verify that seaming conditions are adequate.

D. Overlap the panels a minimum of four inches for extrusion welds and a minimum of 4 inches for hot wedge welds.

E. Panel Preparation: Prior to seaming, clean the seam area and ensure it is free of moisture, dust, dirt, debris of any kind, and foreign material.

F. Seaming Equipment and Products: Seam HDPE liner using extrusion or hot wedge welding equipment and installation methods recommended by manufacturer. For extrusion welding, use an extrudate composition identical to that of the liner material, or weld all panels together using the hot wedge welding system. Include thermometers on the extrusion welding equipment to measure the temperature of the extrudate in the machine extruder and at the nozzle. Use wedge welding equipment capable of continuously monitoring and controlling the wedge temperature.

G. Orient seams downslope so that direction of seaming will not hinder flow of water over top of HDPE liner. Specifically for hot welded seams, overlap HDPE liner on downslope side of seam. Extend seaming to outside edge of panels to be placed in anchor trench.

H. If the supporting soil is yielding, provide a firm substrate by using a homogeneous board, a conveyor belt, or similar hard surface directly under seam overlap to effect proper rolling pressure.

I. Seaming Wrinkles: Cut fishmouths and corrugations so as to affect a flat overlap. Seam the cut fishmouths or wrinkles as well as possible, then install patch of the same generic HDPE liner extending a minimum of 6 inches beyond the cut in all directions.

J. Seaming Tie ins: Only proceed with seaming of HDPE liner tie ins once all panels to be seamed are at a uniform temperature (i.e., early in the morning or late in the day) to avoid excessive distortion in the liner due to HDPE liner contraction and expansion.

K. Test field seams as seaming work progresses by non-destructive methods over their full length, in accordance with ASTM D4437/D4437. Repair seams which do not pass non-destructive test. Reconstruct seam between failed location and any passed test location, until non-destructive testing is successful.

3.6 REPAIR PROCEDURES

A. Clean and dry surfaces at the time of repair.

B. Repair pinholes by applying a patch. Repair defective seams by re seaming, flap welding, or applying a patch, as approved by ENGINEER.

C. Repair tears, blisters, larger holes, undispersed raw materials, and contamination by foreign matter, or corrugations determined by ENGINEER to be excessive, by patches.

D. Patches:
1. Abrade surfaces as appropriate.
2. Label each patch date, number, seamer, and equipment.
3. Ensure patches are round or oval in shape.
4. Make of same generic HDPE liner.
5. Extend patch a minimum of 4 inches beyond edge of defects.

3.7 FIELD QUALITY CONTROL

A. Section 01 40 00 – Quality Requirements: Field inspecting and testing.

B. Test quality of resin and HDPE to ensure consistency of raw material and geomembrane quality in accordance with manufacturer's recommendations.

C. Inspect each panel after placement and prior to seaming for damage. Mark damaged panels or portions of damaged panels which have been rejected, as judged by ENGINEER, and record their removal.

D. Verify that weather conditions (air temperature, non-excessive wind, and lack of precipitation) are acceptable for panel placement.

E. Field Seaming Operations: Verify as follows:
1. Seaming personnel have the specified qualifications.
2. Overlaps meet specified requirements.
3. Seaming area is clean and dry, as specified.
4. A hard substrate such as a board or a piece of conveyor belt is used if the supporting soil is soft or uneven.
5. Seaming equipment is available and meets specified requirements.
6. Weather conditions for seaming are acceptable, as specified.
7. Seaming procedures as specified are followed.
8. Panels are properly positioned to prevent wrinkling.
9. Equipment for testing seams is available on site and operational.
10. Field tensiometer has been correctly calibrated.

F. Provide test results to ENGINEER, for each shift's production, including documentation of non-destructive testing and repairs at the end of each shift.

G. Non-destructive Seam Testing:
1. Non-destructively test field double fusion seams with an enclosed channel by air pressure testing according to ASTM D5820 or single-welded seams by vacuum testing according to ASTM D5641/D5641M. Pressure test results will be written on liner near seam. Number or otherwise designate each seam. Record location, date, test unit, name of tester, and outcome of all non-destructive testing.
2. Passing non-destructive test of field seams, meeting or exceeding requirements according to GRI Test Method GM19, indicates the adequacy of field seams.
3. Coordinate activities such that ENGINEER can observe all testing. ENGINEER will observe all testing. Non-destructive testing performed in absence of ENGINEER will be repeated. Conduct testing as seaming work progresses. Number and mark all defects found during testing immediately after detection. Repair, retest, and remark all defects found to indicate completion of repair and acceptability. If pressure testing is performed, following testing, repair hole resulting from pressure needle.

H. Verification of Seams in Special Locations:
1. Non-destructively test seams in special locations (i.e., appurtenances) if seam is accessible to testing equipment. ENGINEER will observe all seam testing operations. If seam cannot be tested in place, it will be observed by ENGINEER and CONTRACTOR for uniformity and completeness.
2. In the case of visual inspections, record the seam number, date of inspection, name of tester, and outcome of inspection.

3. Promptly repair, retest, and re-mark defective seams to indicate completion of repair.

I. Defects and Repairs:
1. Identification: inspect seams and non-seam areas of HDPE liner for identification of defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter.
2. Evaluation: non-destructively test each suspect location, both in seam and non-seam, using methods specified in PART 3, FIELD QUALITY CONTROL. Mark and repair each location which fails non-destructive testing.
3. Verification of Repairs: Non-destructively test each repair using the method specified in PART 3, FIELD QUALITY CONTROL. Tests which pass non-destructive test standards will serve as an indication of an adequate repair. Re repair and test failed test locations until a passing test results. Record the number of each repair, date, location, repair personnel initials, and test outcome. ENGINEER will observe non-destructive testing of repairs.

J. HDPE Liner Acceptance:
1. HDPE liner will be accepted by ENGINEER when:
2. Installation is finished.
3. Documentation of installation is completed and submitted to ENGINEER.
4. Verification of the adequacy of field seams and repairs, and associated testing, is complete.

3.8 MANUFACTURER'S FIELD SERVICES

A. Section 01 40 00 – Quality Requirements: Requirements for manufacturer's field services.

B. Furnish services of a qualified manufacturer's representative to observe placement of HDPE liner, subgrade preparation, HDPE liner installation, and backfilling operations. Manufacturer's representative will provide guidance to installer on proper installation techniques, but will not assume liability or responsibility in overall installation.

3.9 CLEANING

A. Section 01 70 00 – Execution and Closeout Requirements: Requirements for cleaning.

B. Remove construction debris from the Site and dispose in an environmentally responsible and legal manner.

3.10 PROTECTION

A. Section 01 70 00 – Execution and Closeout Requirements: Requirements for protection of installed work.

B. Protect installed liner from displacement, damage or deterioration before, during and after placement of material layers.

C. Do not permit vehicular traffic directly on HDPE liner.

D. Require workers to wear shoes which will not damage HDPE liner.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Removing surface debris.
2. Removing designated trees, shrubs, and other plant life.
3. Removal, salvage, and storage of existing fencing as required to access areas to be excavated.
4. Abandonment of monitoring wells.

B. Related Requirements:
1. Section 31 10 00A – Item 201.0600xx12 –Stump Removal And Brush Clearing Of Previously Cleared Canal Embankment Areas.
2. Section 31 10 00B – Typical Stump Removal and Animal Burrow Repair.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
2. Site Clearing:
a. Schedule of Prices Item No. 31 10 00/1.
b. Payment Basis: Lump sum price. Includes clearing the Site, loading and removing waste materials from the Site, removing and salvaging existing fencing for reinstallation at completion of the Works, restoration of canal berm as necessary.
3. Fence Removal:
a. Schedule of Prices Item No. 31 10 00/2.
b. Payment Basis: Lump sum price. Includes removal, salvage, and storage of existing fence.
4. Abandonment of Monitoring Wells:
a. Schedule of Prices Item No. 31 10 00/3.
b. Payment Basis: Lump sum price. Includes preparation and submission applications and reports; well abandonment.

1.3 REFERENCES

A. Definitions:
1. Clearing:
a. General Clearing: Cut off trees and brush vegetative growth to specified height above ground and dispose of felled trees, live or dead plant material, previously uprooted trees and stumps, visible boulders, and surface debris.

b. Clearing Isolated Trees: Cut off designated trees to specified height above ground and dispose of felled trees and debris.

2. Underbrush Clearing: Remove undergrowth, deadwood, and trees smaller than specified trunk diameter from treed areas and dispose of fallen timber and surface debris.

3. Grubbing: Excavation and disposal of stumps, roots, and visible boulders and rock fragments of specified size to specified depth below existing ground surface.

B. Reference Standards:

1. Section 01 40 00 - Quality Requirements: Requirements for references.

2. New York State Department of Environmental Conservation:

a. NYSDEC CP 43 - Groundwater Monitoring Well Decommissioning Policy.

3. New York State Canal Corporation:

a. Item 201.0600xx12 –Stump Removal And Brush Clearing Of Previously Cleared Canal Embankment Areas.

b. Typical Stump Removal and Animal Burrow Repair.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Tree Preservation Plan: Identify trees to be protected and method of protection.

1.5 QUALITY ASSURANCE

A. Conform to applicable code for environmental requirements and disposal of debris.

PART 2 PRODUCTS

2.1 GROUT

A. In accordance with Section 6 of NYSDEC Policy CP 43.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution Requirements: Verification of existing conditions before starting work.

B. Verify existing plant life designated to remain is tagged or otherwise identified.

C. Identify waste area for the temporary staging of removed materials.

3.2 PROTECTION

A. Locate, identify, and protect utilities designated to remain from damage.

B. Protect trees, plant growth, and features designated to remain as final landscaping as shown on the Drawings.

C. Protect bench marks, survey control points, and existing structures from damage or displacement.

D. Minimize impact to adjacent areas by conducting only clearing and grubbing necessary to perform work of this Section.

E. Control dust generation to avoid creating a nuisance in surrounding area.

3.3 CLEARING

A. Comply with NYSCC Item 201.0600XX12 attached to this Section.

B. Clear areas required for access to the Site and execution of the Works.

C. Below ground vegetation, including vegetation less than one foot above grade, cleared from contaminated areas will be managed consistent with contaminated soil located immediately adjacent to the vegetation. Above grade vegetation (i.e., greater than one foot above grade) will be compiled separately.

D. Trim trees, designated to be left standing within cleared areas, of dead branches 1 1/2 inches or more in diameter as directed by ENGINEER.

E. Neatly cut limbs and branches to be trimmed close to bole of tree or main branches.

F. Remove trees and shrubs within marked areas shown on the Drawings. Remove stump and main root ball.

G. When directed by ENGINEER, remove trees and stumps designated as trees from areas outside areas designated for clearing and grubbing; fell such trees, remove stumps and roots, and dispose of trees and debris.

H. Clear undergrowth and deadwood without disturbing subsoil.

I. Remove materials to be grubbed, together with logs and other organic or non-organic debris to minimum 18 inches below original ground surface in areas shown on the Drawings to be grubbed, and in areas shown on the Drawings as construction areas.

J. Grub roots from the Canal embankment and the upland excavation areas in accordance with the Excavation Plan and NYSCC specifications, where required.. Stockpile grubbed materials with excavated impacted soil as appropriate.

K. Fill depressions made by grubbing where construction of staging pads is required with suitable material and compact with Section 31 23 23 to make surface conform with original adjacent ground surface.

3.4 REMOVAL

A. Remove debris, rock, and extracted plant life.

B. Continuously clean up and remove waste materials from the Site; do not allow waste materials to accumulate.

C. Do not burn or bury waste materials on Site. Leave the Site in clean condition.

D. Chip trees from clearing operations; dispose of wood chips off Site.

E. Dispose of stumps and roots off Site in accordance with Section 02 61 19. Materials grubbed from impacted soil will be characterized prior to disposal.

F. Remove existing fencing as required to access excavation areas and dispose off-Site. Provide and install new fence in accordance with Section 32 31 13 at the completion of remediation.

3.5 ABANDONMENT OF MONITORING WELLS

A. Perform abandonment of existing monitoring wells in accordance with applicable regulations governing such activities. Complete and submit necessary applications and reports of abandonment activity to the appropriate authorities. Submit these applications and reports to ENGINEER for review prior to submittal to the authorities.

B. General:
1. Abandon monitoring wells in accordance with NYSDEC Policy CP 43.
2. Well abandonment shall be performed by a qualified drilling contractor licensed in the State of New York.
3. Prior to arrival on the Site, the drill rig and all associated drill equipment, including drill bits and drill steel, shall be decontaminated using a high pressure, low volume, hot water wash and rinse to remove all foreign particulate.
4. Soil cuttings and fluids generated during the monitoring well abandonment activities shall be contained in approved containers and staged at an appropriate location on the Site for future disposal.
5. Document abandonment of monitoring wells in accordance with NYSDEC Policy CP 43.

C. Monitoring Well Abandonment Activities:
1. Grout the riser in place with cement/bentonite grout, placed using a tremie line and positive displacement methods, to an elevation consistent with bottom of excavation in that Area.
2. As excavation progresses, cut off well risers to bottom of excavation, pressure wash, and dispose off Site.

END OF SECTION

ITEM 201.0600XX12 –STUMP REMOVAL AND BRUSH CLEARING OF PREVIOUSLY CLEARED CANAL EMBANKMENT AREAS

DESCRIPTION:

This work shall consist of the removal and disposal of all brush, stumps, animal burrows, root systems, surrounding disturbed soil (as per plan details), backfilling and proper compaction of all areas, of previously cut trees and brush. This work also includes the removal of all debris material within the project boundaries, i.e., trunks, woodchips, branches, asphalt, concrete, masonry, tires, trash, etc. Dewatering, if required, is included the unit price bid.

Stump/animal burrow excavation and backfilling can only be performed during the canal non-navigation season when the canal is drained. Approximate non-navigation season dates are provided within the contract plans.

MATERIALS:

Backfill material shall conform to the following gradation requirements;

SIEVE SIZE	PERCENT PASSING BY WEIGHT
¾ inch	80 – 100
#4	40 - 90
#40	30 - 85
#200	25 - 75

CONSTRUCTION DETAILS:

Work limits for each Area shall be established as per plans and as specified in §201-3.01. All removal within the specified work limits for each Area shall be performed under the direction of the Engineer.

All existing brush and grasses within the work area limits shall be cut to near ground level. Cut materials shall be removed and disposed of as specified in §201-3.03. Removal of remaining ground level brush, grass and topsoil shall not be included in this work.

All existing stumps, associated root systems, animal burrows and surrounding disturbed soils from areas of previously cut trees and brush shall be completely removed in accordance with the contract plans.

All material removed as part of the work for this item shall be disposed of, off NYSCC ROW, unless the material is tested and shown to meet the material requirements for other Items in the contract, as per §203-2. All costs associated with the re-use of stockpiled material shall be included within the unit bid price for the items of the contract.

Stumps shall be removed and disposed of as specified in §201-3.03, with the exception that no wood chips shall be used on site for any purpose. Trees and stumps designated as trees, with a

ITEM 201.0600XX12 –STUMP REMOVAL AND BRUSH CLEARING OF PREVIOUSLY CLEARED CANAL EMBANKMENT AREAS

diameter of 4 inches or less shall be cut level with ground and do not need to be removed. Stumps on the embankment shall be removed according to the following steps:

- Trees have already been cut to approximately 2 feet above ground level, leaving a well-defined stump that can be used in the rootball removal process.
- Remove the stump and rootball.
- Remove the remaining root system, i.e., 1-inch diameter roots or greater, and loose soil from the rootball cavity by excavating the sides of the cavity to slopes no steeper than 1:1 (horizontal to vertical) and the bottom of the cavity, 6" minimum below the rootball, approximately horizontal in accordance with §203-3.01 and contract plans. Upon completion of removal of stump and excavation of disturbed soil, the Engineer will inspect excavation to identify if "root chasing" (further removal of 1-inch diameter roots or greater) is necessary. If needed, roots are to be "chased" and removed. All material removed as part of the "root chasing" process shall be removed and disposed of under Item 203.02. All backfill material required to replace the material removed as part of the "root chasing" process shall be provided, compacted and paid for under Item 203.01990006.
- Backfill the excavation with soil meeting the material requirements included in this specification. The material shall be placed to the upper limits shown in the contract plans and compacted as specified in §203-3.03. For each stump removal location, the quantity of compacted material required to properly fill the excavation, prior to any possible "root chasing" shall be included in this item. For each stump removal location where "root chasing" is required, the estimate of quantity for the backfill material, Item 203.01990006 shall match the actual quantity of the amount of material that was excavated and disposed of under Item 203.02 necessary to complete the "root chasing" process.

Provisions of §203-1.01P regarding prohibition of winter placement of any backfill material is applicable to work under this item.

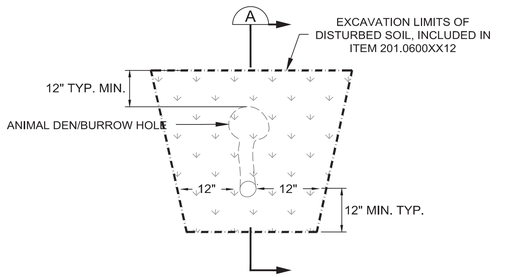
METHOD OF MEASUREMENT:

The work will be measured for payment on a lump sum basis for each defined embankment area. Monthly payments will be made in proportion to the amount of work done as determined by the Engineer.

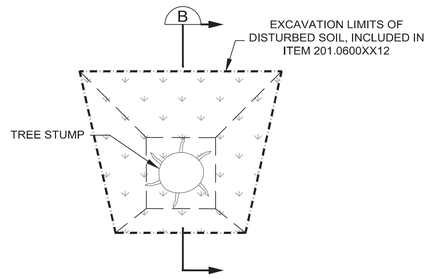
BASIS OF PAYMENT:

The lump sum price bid shall include the cost to furnish all materials, labor and equipment necessary to satisfactorily complete the work as specified. No separate payment will be made for any excavation, backfilling, handling, storing, re-handling, and hauling related to disposable of the material outside the NYSCC right-of-way.

Note: XX denotes serialized pay item for each Area.



TYPICAL ANIMAL DEN/BURROW PLAN OF DISTURBED SOIL
NOT TO SCALE



TYPICAL TREE STUMP PLAN OF DISTURBED SOIL
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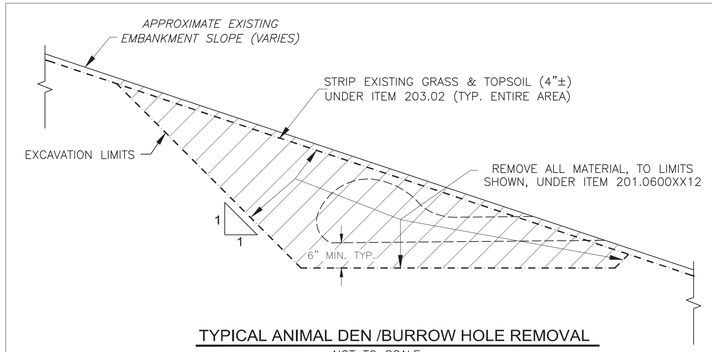

TYPICAL ANIMAL DEN /BURROW HOLE REMOVAL
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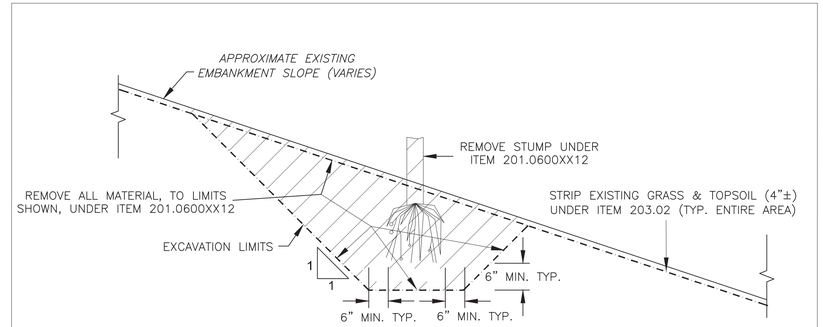

TYPICAL STUMP REMOVAL
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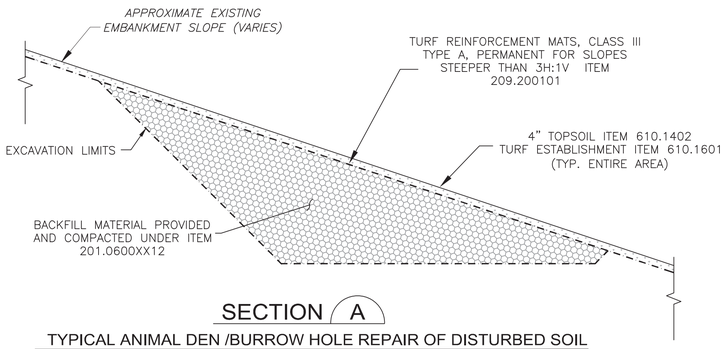
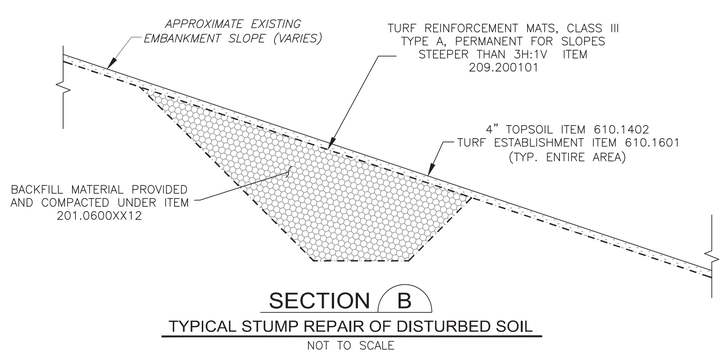


SECTION A
TYPICAL ANIMAL DEN /BURROW HOLE REPAIR OF DISTURBED SOIL
NOT TO SCALE



SECTION B
TYPICAL STUMP REPAIR OF DISTURBED SOIL
NOT TO SCALE

REMOVAL, EXCAVATION AND BACKFILL NOTES:

1. ALL TREE STUMPS AND ANIMAL BURROWS DESIGNATED FOR REMOVAL BY THIS CONTRACT AND INCLUDED WITHIN THE LIMITS OF THE AREAS A001 THRU A040, AS SPECIFICALLY LISTED HEREIN, SHALL BE REQUIRED TO BE REMOVED, BACKFILLED AND PROPERLY COMPACTED. TREE STUMP AND ANIMAL BURROW REMOVAL OPERATIONS FOR ANY GIVEN AREA SHALL BE PRE-APPROVED BY THE ENGINEER PRIOR TO START.
2. ALL EMBANKMENT WORK AREAS INCLUDED IN THIS CONTRACT ARE ACCESSIBLE BY WAY OF THE ADJACENT CANALWAY TRAIL. IF THE CONTRACTOR SECURES ALTERNATE LEGAL ACCESS TO AN EMBANKMENT THROUGH PRIVATE PROPERTY, PROOF OF SUCH ACCESS SHALL BE PRESENTED TO THE NYSCC PRIOR TO STARTING WORK AT THAT EMBANKMENT AREA.
3. TREE STUMP AND ANIMAL BURROW REMOVAL SHALL BEGIN WHEN THE CANAL IS FULLY DEWATERED TO THE GREATEST EXTENT POSSIBLE AND CEASE WHEN THE CANAL BEGINS FILLING FOR THE UPCOMING NAVIGATION SEASON AS PER THE CANAL OPERATION NOTES ON DRAWING WZTC-1.
4. ALL TREE STUMP AND ANIMAL BURROW EXCAVATIONS BELOW THE NORMAL NAVIGATION SEASON WATER SURFACE ELEVATION OF THE CANAL AT THAT LOCATION SHALL BE COMPLETELY BACKFILLED AND COMPACTED, AS PER CONTRACT REQUIREMENTS, PRIOR TO THE BEGIN FILLING CANAL DATE SO THAT THE CANAL CORPORATION MAY PREPARE FOR THE UPCOMING NAVIGATION SEASON.
5. UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE CONTRACTOR SHALL NOT BE ABLE TO PROCEED WITH TREE STUMP AND ANIMAL BURROW REMOVAL AND BACKFILL OPERATIONS AT MORE THAN 6 CONTRACT AREAS (A0001 THRU A040) AT ANY GIVEN TIME. THE CONTRACTOR SHALL PLAN ALL WORK OPERATIONS IN ACCORDANCE WITH THE APPROVED STORM WATER POLLUTION PREVENTION PLAN INCLUDED WITHIN THESE CONTRACT DOCUMENTS.
6. CLASS III TURF REINFORCEMENT MAT (TRM) TYPE A SHALL BE INSTALLED BELOW TOPSOIL WHEN EMBANKMENT SLOPES ARE STEPPER THAN 3H:1V SLOPES. INSTALLATION SHALL FOLLOW SUPPLIER INSTALLATION SPECIFICATIONS.
7. FOR CLASS 1 AND CLASS 2 AREAS, ALL TREES AND STUMPS (INCLUDING 4-INCH DIAMETER AND LESS) SHALL BE REMOVED (INCLUDING ROOTS).
8. FOR CLASS 3 AREAS, 4-INCH DIAMETER TREES AND STUMPS SHALL BE CUT OFF AT GROUND LEVEL (ROOTBALL AND ROOTS REMAIN).
9. FOR CLASS 3 AREAS, TOPSOIL AND TURF ESTABLISHMENT SHALL BE INSTALLED ONLY AT DISTURBED ZONES, NOT AT THE ENTIRE AREA.
10. ALL CLASS 1 AREAS SHALL RECEIVE TOPSOIL-LAWNS ITEM 610.1403 AND TURF ESTABLISHMENT-LAWNS ITEM 610.1602; ALL CLASS 2 AND CLASS 3 AREAS SHALL RECEIVE TOPSOIL-ROADSIDE ITEM 610.1402 AND TURF ESTABLISHMENT-ROADSIDE ITEM 610.1601.
11. PAYMENT FOR ALL DEWATERING IS INCLUDED IN THE UNIT PRICES BID FOR VARIOUS ITEMS IN THE CONTRACT.

ITEM 201.0600XX12	STUMP REMOVAL AND BRUSH CLEARING
ITEM 209.200101	TURF REINFORCEMENT MATS, CLASS iii TYPE A, PERMANENT
ITEM 203.02	UNCLASSIFIED EXCAVATION AND DISPOSAL
ITEM 610.1402	TOPSOIL - ROADSIDE
ITEM 610.1403	TOPSOIL - LAWNS
ITEM 610.1601	TURF ESTABLISHMENT - ROADSIDE
ITEM 610.1602	TURF ESTABLISHMENT - LAWNS

ALTERED ON:	AFFIXED ON: 11-19-2018
SIGNATURE: STAMP:	SIGNATURE: ATILLA H. HASNAY STAMP: NO. 60329-1

REVISIONS

DATE	DESCRIPTION	BY	SYM.
10/23/18	100% DESIGN DRAWINGS	GPB	0
11/19/18	GENERAL REVISION	CAM	1

NEW YORK STATE OF OPPORTUNITY. Canal Corporation

RIZZO

RIZZO CAD FILE NUMBER 16-5719R-E400(M)

TITLE OF PROJECT: EMBANKMENT RESTORATION PROJECT
LOCATION OF PROJECT: NEW YORK STATE CANAL
TITLE OF DRAWING: TYPICAL STUMP REMOVAL AND ANIMAL BURROW REPAIR

CONTRACT NUMBER:
DATE: 11/19/18
DRAWING NUMBER: TSR-1

DESIGN SUPERVISOR: XX
DESIGNED BY: XX
CHECKED BY: XX
DRAFTED BY: GB
2017//K17-########x/Design/Plans/fn.dgn

SECTION 31 23 23

FILL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Backfilling of excavations.
   2. Clay for canal liner.
   3. Aggregate.
   4. Topsoil.

B. Related Requirements:
   1. Section 31 23 23A – Item 203.01990006 – Impervious Embankment In Place.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Section 01 20 00 – Price and Payment Procedures: Requirements for measurement and payment.
   2. Imported Common Fill:
      a. Schedule of Prices Item No. 31 23 23/1.
      b. Measurement Basis: Per cubic yard measured in place.
      c. Payment Basis: Unit price. Includes supplying fill material, stockpiling, placing, and compacting.
   3. Imported Clay:
      a. Schedule of Prices Item No. 31 23 23/2.
      b. Measurement Basis: Per cubic yard measured in place.
      c. Payment Basis: Unit price. Includes supplying fill material, stockpiling, placing, and compacting.

1.3 REFERENCES

A. Abbreviations and Acronyms:
   1. TAL: Target Compound List.
   2. TCL: Target Analyte List.
   3. NYSDOT: New York State Department of Transportation.
   4. SMDD: Standard Maximum Dry Density and in the context of this Contract means the maximum dry unit weight determined in accordance with ASTM D698.

B. Reference Standards:
   1. Section 01 40 00 - Quality Requirements: Requirements for references.
   2. ASTM International:
      a. ASTM C136/136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
      b. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft^3 (600 kN-m/m^3)).

c. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
d. ASTM D2216 - Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.
e. ASTM D2321 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
f. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
g. ASTM D2974 - Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.
h. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
i. ASTM D4972 - Standard Test Method for pH of Soils.
j. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
k. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
l. ASTM D7928 - Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis.

3. United States Environmental Protection Agency: SW-846 - Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, as amended by Final Updates I-III.
4. New York State Department of Environmental Conservation (NYSDEC):
   a. DER-10 Appendix 5 Limits (Residential Use).
5. New York State Canal Corporation:
   a. Item 203.01990006 - Impervious Embankment In Place.
   b. Sampling for 1,4-Dioxane and Per- and Polyfluoroakyl Substances (PFAS) Under DEC's Part 375 Remedial Programs.

1.4 SCHEDULING

A. Section 01 30 00 - Administrative Requirements: Requirements for scheduling.

B. Do not allow or cause work performed to be covered up or enclosed prior to required inspections, tests, or approvals.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Materials Source: Submit name of proposed imported fill material source at least 14 days prior to commencing transport of materials to the Site.

C. Geotechnical Data:
1. Submit geotechnical data at least seven days prior to commencing transport to the Site. Submit grain size distribution curves, soil classification, density, and moisture content for each classification of imported soil material and each material source. Show average distribution and minimum and maximum variation in gradation for each grain size distribution curve.

2. Submit organic content, pH, bulk density, and porosity for topsoil at least seven days prior to commencing transport to Site.

D. Analytical Results: Submit chemical analytical results for each soil material at least seven days prior to commencing transport to the Site.

E. Test Reports: Submit test reports certifying compliance with specified requirements at least seven days prior to commencing transport to the Site.

F. Suppliers' Certificates: Submit certificate indicating that each type of imported fill material meets or exceeds specified requirements.

G. Weigh Tickets: At the end of each work day submit delivery weigh tickets of imported fill materials delivered to the Site.

H. Weigh Scale Calibration: No later than seven days prior to commencing transport of fill materials to the Site, submit a weigh scale calibration chart, certified in accordance with the State of registered agency, within the previous six months.

I. Field Quality Control: Submit field data on same day testing is performed. Submit laboratory data within 24 hours of completion of test.

J. Independent Geotechnical Testing Firm: At least 14 days prior to commencing transport of soil materials to the Site, submit name and qualifications of independent geotechnical testing firm to provide geotechnical testing services for work of this Section.

K. Independent Analytical Laboratory: At least 14 days prior to commencing transport of soil or aggregate materials to the Site, submit name and qualifications of independent testing laboratory to provide chemical analysis for work of this Section.

L. Certificates: Certify that products meet or exceed specified requirements.

M. Material Source Certification: If fill materials will be obtained from a state certified quarry, chemical characterization specified in PART 2, SOURCE QUALITY CONTROL may not be required. Submit documentation related to quarry operations, including, but not limited to the following:
1. State certification.
2. Quarry location and address.
3. Owner's name and state permit/licensing number.
4. Reports of testing in accordance with specified standards, evidencing compliance with specified requirements.
5. Historical report information pertaining to quarry certification.
6. Quarry Quality Assurance Plan identifying sampling procedures, sample network, analytical procedures, and analytical laboratory.
7. Statement from quarry declaring there is no contamination in the fill materials proposed for the Project, and providing evidence that source is clean. Fill materials will be considered uncontaminated if chemical analysis has been completed by a state-certified laboratory in accordance with USEPA Contract Laboratory Program protocol for parameters specified in PART 2, SOURCE QUALITY CONTROL and the most recent test results for every fill material proposed for the Project show that every fill material is at or below natural background levels for the region.

1.6 QUALITY ASSURANCE

A. Perform work of this Section in accordance with State of New York standards.

1.7 QUALIFICATIONS

A. Geotechnical Testing Firm: Company specializing in performing work of this Section and complying with ASTM D3740 to perform testing of fill materials including density, moisture content, permeability, and particle size analysis for both soil and aggregate samples.

B. Independent Testing Laboratory: Company specializing in performing work of this Section to perform chemical analysis of fill material samples for parameters specified in PART 2, SOURCE QUALITY CONTROL.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

A. Deliver, handle, and transport fill materials in a manner and with equipment that will prevent intermixing of soil, aggregate, segregation, or contamination.

B. Minimize stockpiling requirements. Transport material from source directly to final position where possible.

C. Stockpile fill materials in on-Site locations approved by ENGINEER.

1.9 AMBIENT CONDITIONS

D. Suspend operations whenever climatic conditions, as determined by ENGINEER, are unsatisfactory for placing fill to the requirements of this Section.

E. Do not operate equipment on approved excavations after heavy rain until material has dried sufficiently to prevent excessive rutting.

PART 2 PRODUCTS

2.1 GENERAL

A. Imported from an approved source.

B. Free of unsuitable materials including:
1. Frozen material or material containing snow or ice.
2. Trees, stumps, branches, roots, or other wood or lumber.
3. Wire, steel, cast iron, cans, drums, or other foreign material.
4. Materials containing hazardous or toxic constituents at hazardous or toxic concentrations.

C. Compactable to specified density at specified moisture content.

2.2 COMMON FILL

A. Graded.

B. Free of rocks larger than two inches, loam, organic matter, very soft clays, swelling clays, or fine uniform sands that may be difficult to compact.

C. A liquid limit of not more than 35 and plasticity index of not more than 12 in accordance with ASTM D4318.

D. ASTM D2487 Group Symbol: Any except those described as poorly graded and except CH, MH, OL, and OH.

2.3 CLAY

A. Minimum of 50 percent passing the No. 200 sieve and a minimum of 25 percent smaller than 0.002 mm diameter. Maximum of 10 percent having a dimension greater than 0.75 inches.

B. Free of rocks larger than two inches, organic matter, inorganic clays of high plasticity in accordance with ASTM D2487, swelling clays, or very soft clays.

C. ASTM D2487 Group Symbol CL or ML.

D. Compactible to a density necessary to achieve an in place maximum permeability of 1.0 x 10-7 cm/s.

2.4 AGGREGATE

A. ASTM D2321 Class III or better.

2.5 TOPSOIL

A. Friable loam neither of heavy clay nor of very light sandy nature.

B. Reasonably free of roots, rocks, or lumps larger than one inch, weeds, vegetation, and seeds of noxious weeds.

C. Acidity Range (pH): 5.5 to 7.5, determined in accordance with ASTM D4972.

D. Containing minimum two percent and maximum ten percent organic matter determined in accordance with ASTM D2974.

E. Capable of supporting growth of grass.

2.6 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing, inspection, and analysis requirements.

B. Testing as required by NYSCC's "Sampling for 1,4-Dioxane and Per- and Polyfluoroakyl Substances (PFAS) Under DEC's Part 375 Remedial Programs".

C. Testing of imported common fill, clay, and aggregate:

Property	Test Method	Frequency		
		Common Fill	Clay	Aggregate
Maximum Dry	ASTM D698	1 sample per 4,500 cu yd	1 sample per 1,500 cu yd	1 sample per 1,000 cu yd
Optimum Moisture Content	ASTM D698	1 sample per 4,500 cu yd	1 sample per 1,500 cu yd	
Grain Size	ASTM D7928 or ASTM C136/C136M	1 sample per 4,500 cu yd	1 sample per 1,500 cu yd	1 sample per 1,000 cu yd
Atterberg Limits	ASTM D4318	1 sample per 4,500 cu yd	1 sample per 1,500 cu yd	
Soil Classification	ASTM D2487	1 sample per 4,500 cu yd	1 sample per 1,500 cu yd	

D. Testing and analysis of imported topsoil:

Parameter	Test Method	Frequency
Organic Content	ASTM D2974	1 sample per 4,000 cu yd
Potassium, Phosphorus, Calcium, Magnesium	in accordance with state accredited method	1 sample per 4,000 cu yd
pH	ASTM D4972	1 sample per 4,000 cu yd

E. Chemical Characterization: Minimum one sample per source of each type of imported fill and additional sampling in accordance with NYSDEC DER 10 Table 5.4(e)10; in accordance with the following methods (collected by CONTRACTOR):

Parameter	Extraction/Preparation (EPA SW-846)	Analysis (EPA SW-846)
TCL Volatile Organic Compound	5035	8260B
TCL Semi-volatile Organic Compound	3540C/3550B	8270C
Pesticide	3540C/3550B	8081A
PCB	3540C/3550B	8082
Herbicides	3540C/3550B	8151A
TAL Metals	3050B or 3051	6010B/7000

Parameter	Extraction/Preparation (EPA SW-846)	Analysis (EPA SW-846)
		Series
Cyanide	9013	9010 or 9012A

F. If tests indicate imported fill materials do not meet DER-10 Appendix 5 Limits (Ecological Resources for placement in Canal and Residential or protection of groundwater, whichever is lower, for placement in upland areas), change material or material source and retest.

G. Provide materials of each type from the same source throughout the Works.

H. In the event of changes to approved sources of materials during performance of the Works, immediately advise ENGINEER of revised locations and obtain approval of such locations and materials prior to use in the Works.

I. Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution Requirements: Verification of existing conditions before starting work.

B. Verify that survey bench marks and intended elevations for the Works are as shown on the Drawings.

C. Do not allow or cause any of the work performed or installed to be covered up or enclosed by work of this Section prior to required inspections, measurements, tests, or approvals.

D. Obtain approval from ENGINEER for completed excavations and previously placed material prior to placement of successive lifts.

E. Obtain approval from ENGINEER prior to placing fill against structures or around exposed buried utilities.

F. Ensure areas to be backfilled are free from debris, snow, ice, water, soft soils, organic materials, or frozen ground.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Cut out soft areas of subgrade not capable of compaction in place.

C. Decontaminate equipment which has handled contaminated or potentially contaminated material at the decontamination area prior to being used for backfilling operations.

3.3 BACKFILLING

A. Obtain approval from ENGINEER for completed excavations and previously placed material prior to placement of successive lifts of fill materials.

B. Do not cause excavations to be backfilled until ENGINEER has approved excavation as complete and completed field measurements for excavation confirmation.

C. Obtain approval from ENGINEER prior to placing fill against structures or around exposed buried utilities.

D. Remove debris or water from areas to be backfilled.

E. Ensure areas to be backfilled are free from debris, snow, ice, water, soft soils, organic materials, or frozen ground.

F. Backfill to final grade using imported common fill.

G. Compact subgrade to density requirements for subsequent backfill materials.

H. Backfill areas to final contours and elevations.

I. Backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

J. Place material in continuous layers as follows:
   1. Soil Materials: Maximum 24 inches compacted depth.
   2. Aggregate: Maximum 6 inches compacted depth.

K. Employ placement method so not to disturb or damage other work.

L. Maintain optimum moisture content of backfill materials to attain required compaction density.

M. Compact each layer to the density specified before placing succeeding layers.

3.4 DEVELOPMENT OF ACCEPTABLE COMPACTION FOR CLAY

A. Comply with NYSCC Item 203.01990006 attached to this Section for canal berm restoration, where required.

B. For clay develop a zone plot of compacted density and moisture content on a dry density versus moisture content graph in which soils have a permeability of 1×10^{-7} cm/s or less.

C. Moisture Density Relationship: Develop moisture density relationship in accordance with ASTM D698.

D. Zone Plot:
   1. Determine hydraulic conductivity in accordance with ASTM D5084 on at least five samples. Choose the moisture and density of the samples for each compactive effort such that they will assist in developing the boundary of the zone of acceptable compaction.
   2. Plot all samples on a moisture density graph, tagging each point with the value of hydraulic conductivity determined in accordance with ASTM D5084.
   3. Draw the zone of acceptable compaction to encompass all points with permeabilities less than or equal to 1×10^{-7} cm/s
   4. Perform additional hydraulic conductivity tests as necessary to establish boundary of zone acceptable compaction.
   5. No part of the zone of acceptable compaction shall be at a density less than 95 percent SMNN

3.5 COMPACTION

A. Comply with NYSCC Item 203.01990006 attached to this Section.

B. Common Fill for Backfill in Excavation: Install in one-foot lifts and compact with minimum three passes of suitable equipment to the satisfaction of ENGINEER.

C. Compact aggregate to 95 percent SMDD

D. Compact common fill to 95 percent SMDD.

E. Clay – place and compact in equal continuous layers not exceeding six inches loose lift. Maintain moisture and density within zone of acceptable compaction defined in Article 3.4. Scarify each layer to a depth of two inches before placing the next lift to ensure proper bonding. Cover the completed work overnight and on the weekends to prevent loss of moisture to mitigate the potential for desiccation cracks.

F. Apply potable water as necessary during compaction to obtain specified density. If material to be compacted is excessively moist, aerate with suitable equipment and method until moisture content is corrected. In areas not accessible to rolling equipment, compact material to specified density using mechanical tamper. Supply and pay for water.

G. When granular material is wetted by sprinkling, do not direct jets of water at fill with such force that finer materials will be washed out.

H. Compaction Equipment: Use type, size, and efficiency of compaction equipment capable of achieving specified degree of compaction. When operating equipment adjacent to and immediately above structures, avoid causing damage or displacement of structure.

3.6 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Top Surface of Backfilling: Plus or minus two inches from required elevations.

3.7 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting and testing.

B. Testing as required by NYSDEC's "Sampling for 1,4-Dioxane and Per- and Polyfluoroakyl Substances (PFAS) Under DEC's Part 375 Remedial Programs".

C. Testing by CONTRACTOR:
1. Select samples of uncompacted fill intended for the Works and samples of compacted fill in the Works.
2. Perform tests in the field and in the laboratory on samples of imported fill to determine if materials meet specification.

D. Verification Testing by ENGINEER:
1. ENGINEER may select samples of uncompacted fill intended for the Works and samples of compacted fill in the Works.
2. ENGINEER may perform quality assurance tests in the field and in the laboratory on samples of backfill and imported fill to determine if materials meet specification.
3. Testing by ENGINEER will in no way relieve CONTRACTOR of responsibility to test all material prior to notifying ENGINEER of materials' suitability for the work involved.

E. Methods and Frequency of Testing:

Property	Test	Frequency (1)	
		Common Fill	Clay
Maximum Dry Density (Laboratory)	ASTM D698	1 sample per 1,000 cu yd placed for each 10,000 sq ft of area	1 sample per 300 cu yd placed for each 10,000 sq ft of area
Optimum Moisture Content (Laboratory)	ASTM D698	1 sample per 1,000 cu yd placed for each 10,000 sq ft of area	1 sample per 300 cu yd placed for each 10,000 sq ft of area
Bulk Wet Density (Field)	ASTM D6938	1 sample per 1,000 cu yd placed for each 10,000 sq ft of area	1 sample per 300 cu yd placed for each 10,000 sq ft of area
Moisture Content (Field)	ASTM D6938	1 sample per 1,000 cu yd placed for each 10,000 sq ft of area	1 sample per 300 cu yd placed for each 10,000 sq ft of area
Moisture Content (Laboratory)	ASTM D2216	1 sample per 10 moisture content	1 sample per 10 moisture content

		determinations	determinations
Particle Size Analysis	ASTM D7928	1 sample per 1,000 cu yd of material required	1 sample per 300 cu yd of material required

(1) The method used and the frequency of such tests may be modified by ENGINEER.

F. Failure to Meet Specified Requirements: If tests indicate that material specifications have not been achieved or cannot be obtained with equipment in use, procedure being followed, or material being incorporated, remove and replace work and modify operations so that equipment, procedures, and materials will produce required results. Additional testing required by ENGINEER will be at no additional cost to OWNER.

G. Proof roll compacted fill surfaces under slabs on grade and around structures.

3.8 ADJUSTING

A. Finish compacted soil surfaces to within 1 inch of grades shown on the Drawings but not uniformly high or low. Correct surface irregularities by loosening and adding or removing material until the surface is within specified grade.

B. Leave work areas in a properly graded condition sloped as required to permit proper drainage and free of depressions that will pond or collect water or debris that will restrict flow.

3.9 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.

B. Clean and reinstate work areas and areas affected by equipment outside areas specified to be excavated, to specified restoration condition.

C. Upon completion of backfilling, remove excess material and debris from work areas and travel routes.

3.10 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished work.

B. Reshape and re-compact fills subjected to vehicular traffic.

END OF SECTION

ITEM 203.01990006 – IMPERVIOUS EMBANKMENT IN PLACE

DESCRIPTION

This work shall consist of furnishing, placing and compacting impervious embankment material as shown in the contract documents and in accordance with §203 - Excavation and Embankment, except as herein modified.

MATERIALS

Impervious embankment material shall have the following gradation:

SIEVE SIZE	PERCENT PASSING BY WEIGHT
¾ inch	80 - 100
#4	40 – 90
#40	30 – 85
#200	25 – 75

CONSTRUCTION DETAILS

All depressions, holes or keyway trenches shall be backfilled with impervious embankment material and compacted to not less than 95 percent of Standard Protector Maximum Density.

Immediately prior to placement of the impervious embankment material, the entire earth surface on or against which fill is to be placed, shall be thoroughly scarified to a depth of 6 inches and compacted to not less than 95 percent of Standard Proctor Maximum Density. Impervious embankment material shall then be deposited in horizontal layers not exceeding 8 inches in thickness prior to compaction. Each layer shall be compacted to not less than 95 percent of Standard Proctor Maximum Density. The moisture content of all impervious embankment material shall not be greater than 2 percent above or below the Optimum Moisture Content as determined by A.A.S.H.T.O Designation: T-99, Method C at the time of compaction.

The entire embankment shall be brought to not less than the prescribed cross-section at all points.

METHOD OF MEASUREMENT

The quantity of impervious embankment in place shall be the number of cubic yards of material installed based on payment lines shown in the Contract Documents.

BASIS OF PAYMENT

The unit price bid per cubic meter shall include the cost of furnishing all labor, materials and equipment necessary to satisfactorily complete the work. The cost of adding water shall be included in the bid price. No direct payment will be made for any losses of material which may result from compaction, foundation settlement, erosion or any other causes.

SECTION 31 25 15

EROSION CONTROL MATS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Cellular concrete erosion control mats.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
   1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
   2. Erosion Control Mats:
      a. Schedule of Prices Item No. 31 25 15/1.
      b. Payment Basis: Lump sum price. Includes supply and installation of erosion control mats.

1.3 REFERENCES

A. Reference Standards:
   1. Section 01 40 00 - Quality Requirements: Requirements for references.
   2. ASTM International:
      a. ASTM C33 - Standard Specification for Concrete Aggregates.
      b. ASTM C150 - Standard Specification for Portland Cement.
      c. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.
      d. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
      e. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
      f. ASTM D6684 - Standard Specification for Materials and Manufacture of Articulating Concrete Block (ACB) Revetment Systems.

1.4 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate the installation of mats with surface preparation work.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Furnish manufacturer's specifications, literature, installation instructions, and Shop Drawings for the fabrication of the mats, and any recommendations, if applicable, that are specifically related to the Project, 14 days prior to assembly of the cellular mats.

C. Test Reports: Submit manufacturer's performance research results and calculations in support of the cellular concrete mat system proposed for use. Calculations must be made in accordance with PART 2 – DESIGN REQUIREMENTS.

D. Manufacturer's Certificates: Furnish manufacturer's certificates of compliance for cellular concrete blocks/mats, revetment cable, and any revetment cable fittings and connectors to ENGINEER prior to the start of mat fabrication.

E. Daily Field Installation Report. Submit no later than 1 day following date covered by report.

F. Layout Drawings: Include layout, layout sequence, anchor details, mat junction details, anchor to mat connection details, and details for grade change. Provide no later than 14 days prior to installation.

G. Installer Qualifications: Submit a copy of the manufacturer's approval letter or license to ENGINEER no later than 14 days prior to installation.

H. Manufacturer's Qualifications: Submit no later than 14 days prior to retaining, list of previous projects including name of project, description of project, area, client's name and address, contacts, and telephone numbers; engineer's name, address, contact, and telephone number; installer's name, address, contact, and telephone number; and date installed.

1.6 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for closeout submittals.

B. Warranties: Completed original warranty forms filled out in OWNER's name and registered with manufacturer.

1.7 QUALIFICATIONS

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

B. Installer: Company specializing in performing the work of this Section with minimum three years documented experience and approved by manufacturer.

C. Design under direct supervision of a professional engineer experienced in design of the work of this Section and licensed in the State of New York.

1.8 PRE INSTALLATION MEETING

A. Convene 1 week prior to commencing work of this Section.

B. Purpose of Meeting:
   1. Define the responsibilities of each party.
   2. Establish lines of authority and lines of communication.
   3. Review the Site specific quality assurance/quality control and monitoring procedures.
   4. Define the method of acceptance of the completed mats.
   5. Review time schedules.
   6. Review safety plan and procedures.
   7. Review critical design details.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Handle materials by appropriate means so that no damage is caused, as recommended by manufacturer.

C. Take adequate measures to keep materials away from possible deteriorating sources (i.e., vandalism, theft).

D. Do not store materials directly on the ground without a fabric or plastic liner beneath. Keep free of dirt and debris.

1.10 AMBIENT CONDITIONS

A. Suspend installation operations whenever climatic conditions, as determined by ENGINEER or manufacturer's representative, are unsatisfactory for placing mats to the requirements of this Section.

1.11 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for warranties.

B. Provide five-year manufacturer's warranty.

C. Fill out original warranty forms in OWNER's name and register with manufacturer.

PART 2 PRODUCTS

2.1 DESIGN REQUIREMENTS

A. Cellular concrete mats shall be pre-manufactured as an assembly of concrete blocks, with specific hydraulic capacities, bound into mats by the use of revetment cables. Cellular concrete mats may be assembled on the Site by hand placing individual blocks with or without subsequent insertion of cables.

B. Stagger and interlock individual blocks in the cellular mats for enhanced stability. The open cell version of the blocks have two vertical openings of rectangular cross section

with sufficient wall thickness to resist breakage during shipping and installation. The mats shall be constructed of open and/or closed cell blocks as shown on the Contract Drawings. Parallel strands of cable shall extend through two ducts in each block in a manner which provides for longitudinal binding of the blocks within the mats. Each row of blocks shall be laterally offset by 1/2 block width from the adjacent row so that any given block is cabled to four other blocks (two in the row above and two in the row below).

C. The gross area of each individual block in direct contact with the protected subgrade shall be no less than one sq ft. Each block shall incorporate interlocking surfaces that prevent lateral displacement of the blocks within the mats when they are lifted by the longitudinal revetment cables. The interlocking surfaces must not protrude beyond the perimeter of the blocks to such an extent that they reduce the flexibility or articulation capability of the cellular mats or become damaged or broken when the mats are lifted during shipment or placement. Once the mats are in place, the interlocking surfaces shall prevent the lateral displacement of the blocks even if the cables should become damaged or removed. The mats must be able to flex a minimum of 18 degrees between any given row or column of blocks in the uplift direction and a minimum of 45 degrees in the downward direction.

D. The cables shall be inserted into the mats in such a manner to form lifting loops at 1 end of the mat with the corresponding cable ends spliced together to form a lifting loop at the other end of the mat with sleeves approved by ENGINEER.

E. Certification (Open Channel Flow): Cellular concrete mats will only be accepted when accompanied by documented hydraulic performance characteristics, derived from tests under controlled flow conditions. Testing guidelines shall conform to U.S. Federal Highway Administration and U.S. Bureau of Reclamation Testing Protocol as documented in "Minimizing Embankment Damage During Overtopping Flow", Report No. FHWA RD 88 181. Test conditions shall conform to FHWA RD 89 199. In addition, system restraints, such as mechanical anchors, and ancillary components, such as a synthetic drainage medium, used in the full scale testing program shall be incorporated in field installations in an identical manner.

F. Performance (Open Channel Flow): The design of the cellular concrete mats shall be in accordance with the Factor of Safety design methodology as described in "Erosion and Sedimentation" by Pierre Julien, Cambridge University Press, 1995. The cellular concrete mats shall be designed to a minimum safety factor of 1.5. The analysis shall be performed based upon the stability of the mat due to gravity forces alone, neglecting forces which may be due to cabling, mechanical anchorage, contact with adjacent blocks, or other restraint not attributable to gravity based forces. The analysis must account for a 0.5-inch block projection. The individual blocks comprising the mat shall have an open area of not more than 20 percent. Extrapolation of tested shear stress values to the performance of thicker units may be considered only for units within the same "family" of blocks having the same geometric dimensions (length and width) and interlock of the tested units.

2.2 CELLULAR CONCRETE BLOCKS

A. Materials:
   1. Cementitious Materials:
      a. Portland Cement: ASTM C150.
      b. Blended Cements: ASTM C595.
      c. Hydrated Lime: ASTM C207.
      d. Pozzolans: ASTM C618

e. Aggregates: ASTM C33, Normal weight.

B. Physical Requirements:

1. At the time of delivery to the Site, the units shall conform to the following physical requirements:

Compressive Strength Net Area Minimum psi		Water Absorption Maximum Pounds per Cubic Foot	
Average of 3 Units	Individual Unit	Average of 3 Units	Individual Unit
4,000	3,500	10	12

2. Sample and test units in accordance with ASTM D6684.

C. Visual Inspection:

1. Units shall be sound and free of defects that would interfere with the proper placing of the unit or impair the strength or permanence of the construction. Surface cracks incidental to the usual methods of manufacture, or surface chipping resulting from customary methods of handling in shipment and delivery, shall not be deemed grounds for rejection.
2. Cracks exceeding 0.25 inches in width and/or 1.0 inch in depth shall be deemed grounds for rejection.
3. Chipping resulting in a weight loss exceeding 10 percent of the average weight of the blocks shall be deemed grounds for rejection.
4. Blocks rejected prior to delivery from the point of manufacture shall be replaced at the manufacturer's expense. Blocks rejected at the Site shall be repaired with structural grout at CONTRACTOR's expense.

D. Sampling and Testing: ENGINEER shall have access to facilities to inspect and sample the units at the place of manufacture from lots ready for delivery.

E. Manufacturer:

1. Cellular concrete blocks shall be ARMORFLEX® as manufactured by ARMORTEC, 4301 Industrial Drive, Bowling Green, Kentucky, 42102. Phone: (270) 843 4659, (800) 305 0523; Fax: (270) 783 8952.
2. The ARMORFLEX® cellular concrete blocks shall have the following nominal characteristics:

Class	Type	Pounds	Pounds per Square Foot	Length (inches)	Width (inches)	Height (inches)	Open Area (percent)
50-T	Open	81-94	46-53	17.4	15.5	6.0	20

2.3 REVETMENT CABLE AND FITTINGS

A. Galvanized Steel Revetment Cable and Fittings:

1. Revetment cable shall be constructed of preformed galvanized aircraft cable. The cables shall be made from individual wires and strands that have been formed during the manufacture into the shape they have in finished cable.
2. Cable shall consist of a core construction comprised of 6 or 7 wires wrapped within 7 or 19 wire strands. The revetment cable shall have the following physical properties:

Nominal Cable Diameter	Approximate Average Strength (Pounds)	Pounds per 100 Feet	
		Minimum Pounds	Maximum Pounds
1/8 inch	1,700	2.8	2.9
3/16 inch	3,700	6.2	6.5
1/4 inch	6,100	10.6	11.0
3/8 inch	13,300	23.6	24.3

3. The revetment cable shall exhibit good resistance to mild concentrations of acids, alkalis, and solvents. Fittings such as sleeves and stops shall be aluminum, washers shall be galvanized steel.
4. Selection of cable and fittings shall be made in a manner that insures a safe design factor for mats being lifted from both ends, thereby forming a catenary. Consideration shall be taken for the bending of the cables around hooks or pins during lifting. Revetment cable splicing fittings shall be selected so that the resultant splice shall provide a minimum of 75 percent of the minimum rated cable strength.

2.4 ANCHORS

A. Where permanent anchoring is required, e.g., hanging mats on steep slopes without toe construction, the cables shall be attached to the anchoring system as shown on the Contract Drawings.

2.5 GEOTEXTILE

A. Section 31 05 19.

2.6 CELLULAR CONCRETE MATS

A. Pre-manufactured as an assembly of concrete blocks when connected into mats by the revetment cables. The assembled mats shall have a range of 18 to 23 percent open area to be achieved by penetrations within the block.

B. Size: Cellular concrete blocks, cables, and fittings shall be fabricated at the manufacturer or another approved location into mats with a width of up to 8 feet, length as required and as approved by ENGINEER.

2.7 GROUT

A. Mixture of 6.5 US gallons of water per 94 pounds of Portland cement ASTM C150 Type I. Do not use quick setting cement containing additives.

B. Add approximately four pounds of bentonite powder per 94 pounds of Portland cement to the slurry.

C. Quantity of Bentonite: Not exceeding five percent by weight of the mixed slurry to avoid excessive shrinkage of grout.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Verification of existing conditions before starting work.

B. Obtain ENGINEER's approval of surfaces, in writing, prior to installation of mats.

3.2 PLACEMENT OF CELLULAR CONCRETE BLOCKS/MATS

A. Cellular concrete block/mats shall be constructed within the specified lines and grades shown on the Contract Drawings.

B. Placement: The cellular concrete blocks shall be placed on geogrid in such a manner as to produce a smooth plane surface in intimate contact with the geogrid. No individual block within the plane of placed cellular concrete blocks shall protrude more than 1/2 inch or as otherwise specified by ENGINEER. To ensure that the cellular concrete blocks are flush and develop intimate contact with the subgrade, the blocks shall be "seated" with a roller or other means as approved by ENGINEER.

C. If assembled and placed as large mattresses, the cellular concrete mats shall be attached to a spreader bar or other approved device to aid in the lifting and placing of the mats in their proper position by the use of a crane or other approved equipment. The equipment used should have adequate capacity to place the mats without bumping, dragging, tearing, or otherwise damaging the underlying fabric. The mats shall be placed side by side and/or end to end, so that the mats abut each other. Mat seams or openings between mats greater than two inches shall be filled with grout. Whether placed by hand or in large mattresses, distinct changes in grade that results in a discontinuous revetment surface in the direction of flow shall require a grout seam at the grade change location so as to produce a continuous surface. All cable ties and anchoring shall be completed prior to placing grout.

D. Anchor trenches and side trenches shall be backfilled and compacted flush with the top of the blocks. The integrity of a soil trench backfill must be maintained so as to ensure a surface that is flush with the top surface of the cellular concrete blocks for its entire service life. Backfilling and compaction of trenches shall be completed in a timely fashion. No more than 500 lineal feet of placed cellular concrete blocks with non-completed anchor and/or toe trenches shall be permitted at any time.

E. Finishing: The cells or openings in the cellular concrete blocks shall be backfilled and compacted immediately with ENGINEER-approved material to assure that there are not voids and so that compacted material extends from the filter fabric to one inch above the surface of the cellular concrete block. Backfilling and compaction shall be completed in a timely manner such that no more than 500 feet of exposed mats exist at any time.

F. Closeout: at completion of project, remove erosion control mats, dispose off Site and restore area to pre-existing conditions.

3.3 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting and testing.

B. Inspect for compliance with Specifications and record the inspection of all operations including but not limited to the following, as applicable:
   1. Preparation of surface to receive cellular concrete mats.
   2. Individual concrete blocks and geogrid soundness and free of defects.
   3. Cables and Fittings: Breaking strength.
   4. Assembly of cellular concrete blocks bound by cables to form cellular concrete mats.
   5. Placement of mats on the prepared surface.
   6. Embedment of cables in the anchor trenches and side trenches.

3.4 MANUFACTURER'S FIELD SERVICES

A. Section 01 40 00 - Quality Requirements: Requirements for manufacturer's field services.

B. Manufacturer shall provide a qualified representative to observe installation of cellular concrete blocks and mats.

C. Manufacturer's representative shall have extensive knowledge of installed product, specifically as it pertains to proper construction techniques specific for this Project.

D. Manufacturer's representative shall be on the Site for a minimum of first week of installation and shall remain on the Site until, in its opinion, CONTRACTOR and/or installer can adequately complete the installation in strict accordance with specifications and the installation procedure specified in this Section.

END OF SECTION

SECTION 32 31 13

CHAIN LINK FENCES AND GATES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Fence and gate requirements for permanent fencing to remain after construction.
2. Fence framework, fabric, and accessories
3. Excavation for post bases.
4. Concrete foundation for posts and center drop for gates.
5. Manual gates and related hardware.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
2. Fencing:
a. Schedule of Prices Item No. 32 31 13/1.
b. Payment Basis: Lump sum price. Includes posts, rails, tension wire, fabric, accessories, attachments, and grounding.
3. Post Footings:
a. Schedule of Prices Item No. 32 31 13/2.
b. Payment Basis: Lump sum price. Includes excavation, concrete placement, finishing.
4. Gates:
a. Schedule of Prices Item No. 32 31 13/3.
b. Payment Basis: Lump sum price. Includes frame posts, fabric, accessories, hardware.

1.3 REFERENCES

A. Reference Standards:
1. Section 01 40 00 - Quality Requirements: Requirements for references.
2. ASTM International:
a. ASTM A121 - Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.
b. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
c. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
d. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
e. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

f. A1011/A1011M Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
g. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
h. ASTM F567 - Standard Practice for Installation of Chain-Link Fence.
i. ASTM F900 - Standard Specification for Industrial and Commercial Swing Gates.
j. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.

3. Chain Link Fence Manufacturers Institute:
   a. CLFMI Product Manual.

1.4 SYSTEM DESCRIPTION

A. Fence Height: Eight feet nominal.

B. Line Post Spacing: At intervals not exceeding ten feet.

C. Fence Post and Rail Strength: Conform to ASTM F1043, Light Industrial Fence quality.

D. Gates: 16-foot double swing gate.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data on fabric, posts, accessories, fittings, and hardware.

C. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, gates, and schedule of components.

D. Manufacturer's Instructions: Submit installation requirements.

1.6 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for closeout submittals.

B. Project Record Documents: Accurately record actual locations of property perimeter posts relative to property lines.

1.7 QUALITY ASSURANCE

A. Supply material in accordance with CLFMI Product Manual.

B. Perform installation in accordance with ASTM F567.

C. Certifications: Provide certificate of compliance from authority having jurisdiction.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years' experience.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Deliver fence fabric and accessories in packed cartons or firmly tied rolls.

C. Identify each package with manufacturer's name.

D. Store fence fabric and accessories in secure and dry place.

PART 2 PRODUCTS

2.1 MATERIALS

A. Framing (Steel): ASTM F1083, Schedule 40; galvanized steel pipe, welded construction, minimum yield strength of 25 ksi; coating conforming to ASTM F1043, Type A on pipe exterior and interior.

B. Fabric Wire (Steel): ASTM A392, Class 1; zinc-coated steel wire.

C. Concrete: Normal Portland Cement, 3,000 psi strength at 28 days.

2.2 COMPONENTS

A. Line Posts: 2.38 inch diameter.

B. Corner and Terminal Posts: 2.88 inch.

C. Gate Posts: Four inch diameter.

D. Top and Brace Rail: 1.66 inch diameter, plain end, sleeve coupled.

E. Gate Frame: Two inch diameter for welded fabrication.

F. Fabric: Two-inch diamond mesh interwoven wire, nine gage, top salvage knuckle end closed, twisted tight, bottom selvage twisted tight, knuckle end closed.

G. Tension Wire: Seven gage steel, single strand.

H. Tension Band: 0.188 inch steel.

I. Tension Strap: 0.188 inch steel.

J. Tie Wire: Aluminum alloy steel wire.

2.3 ACCESSORIES

A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.

B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; galvanized steel.

C. Gate Hardware: Center gate stop and drop rod; two 180-degree gate hinges for each leaf and hardware for padlock.

2.4 GATES

A. General:
   1. Gate Types, Opening Widths and Directions of Operation: 16-foot width.
   2. Factory assemble gates.
   3. Design gates for operation by one person.

B. Swing Gates:
   1. Fabricate gates to permit 180-degree swing.
   2. Gates Construction: ASTM F900, with welded corners. Use of corner fittings is not permitted.

2.5 FINISHES

A. Components and Fabric: Galvanized to ASTM A123/A123M for components; ASTM A153/A153M for hardware; ASTM A392 for fabric; 1.8 ounces per sq ft coating.

B. Hardware: Galvanized to ASTM A153/A153M, 1.8 ounces per sq ft coating.

C. Accessories: Same finish as fabric.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install framework, fabric, accessories and gates in accordance with ASTM F567.

B. Set intermediate, terminal, gate, posts plumb, in concrete footings with top of footing two inches above finish grade. Slope top of concrete for water runoff.

C. Line Post Footing Depth Below Finish Grade: Three feet.

D. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: Three feet.

E. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods. Install brace rail one bay from end and gate posts.

F. Install top rail through line post tops and splice with six-inch long rail sleeves.

G. Install center and bottom brace rail on corner gate leaves.

H. Place fabric on outside of posts and rails.

I. Do not stretch fabric until concrete foundation has cured seven days.

J. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.

K. Position bottom of fabric two inches above finished grade.

L. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches oc.

M. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.

N. Install bottom tension wire stretched taut between terminal posts.

O. Support gates from gate posts.

P. Install gate with fabric to match fence. Install three hinges on each gate leaf, latch, catches, drop bolt.

Q. Connect to existing fence at existing terminal post or existing line post converted to terminal post by installation of brace rails and brace rods.

R. Install posts with six inches maximum clear opening from end posts to fences and other structures.

S. Excavate holes for posts to diameter and spacing shown on the Drawings without disturbing underlying materials.

T. Center and align posts. Place concrete around posts, and vibrate or tamp for consolidation. Verify vertical and top alignment of posts and make necessary corrections.

U. Extend concrete footings one inch above grade, and trowel, forming crown to shed water.

V. Allow footings to cure minimum seven days before installing fabric and other materials attached to posts.

3.2 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Variation From Plumb: 1/4 inch.

C. Maximum Offset From Indicated Position: One inch.

D. Minimum Distance From Property Line: Six inches.

3.3 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting and testing.

B. Repair damaged galvanized surfaces in accordance with ASTM A780/A780M.

C. Apply field repair coating to damaged galvanized surfaces at dry film thickness at least equal to specified galvanized coating thicknesses.

END OF SECTION

SECTION 32 92 19

SEEDING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Placing topsoil.
2. Hydroseeding.
3. Maintenance.
4. Erosion Control Blanket.
5. Turf Reinforcement Mat.

B. Related Requirements:
1. Section 31 23 22 - Fill.
2. Section 32 93 00 - Plants.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
2. Supplying and Placing Topsoil:
a. Schedule of Prices Item No. 32 92 19/1.
b. Measurement Basis: Per square yard measured in place.
c. Payment Basis: Unit price. Includes testing, supply, temporary stockpiling, transporting topsoil from temporary stockpiles, placing, preparing for seeding.
3. Hydroseeding:
a. Schedule of Prices Item No. 32 92 19/2.
b. Measurement Basis: Per square yard measured in place.
c. Payment Basis: Unit price. Includes supply and apply fertilizer, seed, water, mulch, and adhesive; maintenance to specified time limit.
4. Erosion Control Blanket:
a. Schedule of Prices Item No. 32 92 19/3.
b. Measurement Basis: By square yard measured in place by CONTRACTOR’s survey methods from the horizontal projection of the area covered with blanket.
c. Payment Basis: Unit price. Includes supply and installation of erosion control blanket, anchoring, overlaps, surveying.

1.3 REFERENCES

A. Definitions:
1. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass,

Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

2. Noxious Weeds:
   a. Harmful, undesirable, hard to control. Including, but not limited to:
      1) Johnson Grass or Johnson Grass Crosses, Canadian Thistle, Quackgrass, Wild Garlic and Wild Onion, Bermuda Grass, Annual Blue Grass, Corn Cockle, Dodder, and Blindweed.

B. Reference Standards:
   1. Section 01 40 00 - Quality Requirements: Requirements for references.
   2. ASTM International:
      a. ASTM C602 - Standard Specification for Agricultural Liming Materials.

C. Abbreviations and Acronyms:
   1. TRM- turf reinforcement mat.

1.4 SCHEDULING

A. Section 01 30 00 - Administrative Requirements: Requirements for scheduling.

B. Schedule topsoil placing to permit seeding operations under optimum conditions during normal planting seasons.

C. Coordinate planting with specified maintenance periods to provide maintenance until acceptance by ENGINEER.

D. Seed areas within ten days of completion of topsoiling.

E. Apply fertilizer at least one week after application of lime.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Seeding and Erosion Control Plan: At least 14 days prior to placing topsoil, submit to ENGINEER for approval CONTRACTOR's Seeding and Erosion Control Plan including, but not limited to the following:
   1. Seed mixture(s) and fertilizers and application rates.
   2. Time of year for planting such mixtures.
   3. Methods of preparing seedbed, seeding, sodding, rolling seeded areas, and irrigation.
   4. Methods to provide erosion control until seed is placed and grass is established (i.e., use of any or a combination of emulsifiers, tackifiers, mulches, adhesives, nurse crop seed).

C. Seed Certificates: At least 14 days prior to seeding submit certificates from seed vendors stating botanical and common name, percentage by weight and percentages of purity, germination, and weed seed for each species.

D. Fertilizer Certificate: At least 14 days prior to placing fertilizer, submit certificate confirming conformance with recommendations provided by laboratory based on topsoil analysis.

E. Samples of erosion control blanket and TRM materials - A representative sample at least 300 mm by roll width no later than ten0 days prior to ordering.

1.6 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for closeout submittals.

B. Operation and Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer.

C. Record Documents: Indicate layout, including panel identifiers.

1.7 QUALITY ASSURANCE

A. Perform work of this Section in accordance with NYSDEC standards.

B. Provide seed mixture in containers showing percentage of seed mix, germination percentage, inert matter percentage, weed percentage, year of production, net weight, date of packaging, and location of packaging.

C. Regulatory Requirements: Comply with regulatory agencies for fertilizer and herbicide composition.

D. Certifications: Provide certificate of compliance from authority having jurisdiction indicating approval of seed mixture.

1.8 QUALIFICATIONS

A. Seed Supplier: Established vendor capable of providing adequate seed quality and quantities.

B. Fertilizer Supplier: Established vendor capable of providing adequate fertilizer quality and quantities.

C. Installer: Company specializing in performing the work of this Section with minimum five years documented experience.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Deliver grass seed mixture in sealed containers bearing seed Supplier’s label and certificate indicating the content of species, grade, and mass. Seed in damaged packaging is not acceptable. Label containers showing:
   1. Analysis of seed mixture.
   2. Percentage of pure seed.

3. Percentage of weeds.
4. Year of production.
5. Net weight.
6. Date when tagged and location.
7. Percentage germination.
8. Name and address of distributor.

C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

D. Deliver mulch and erosion control agent in moisture-proof containers showing manufacturer, content, and net weight (air dry).

E. Store materials in accordance with manufacturer's instructions and in a manner to prevent damage or deterioration.

F. Remove from the Site seed which has become wet, moldy, or otherwise damaged in transit or storage.

G. Store seed in weatherproof enclosures.

H. Erosion control blanket and TRM.

1. Package and label matting rolls or blankets prior to shipment to the Site. Indicate manufacturer, type of matting, thickness, lot number, roll number, and roll dimensions.

2. When transported to the Site, handle rolls by appropriate means as recommended by manufacturer so that no damage is caused.

3. Take adequate measures to keep materials away from possible deteriorating sources (i.e., vandalism, theft).

4. Use appropriate handling equipment when moving rolled or folded matting from one place to another.

5. Notify ENGINEER 3 days in advance of matting delivery to the Site. Perform joint inspection with ENGINEER upon delivery. Defects or damage from shipping and handling will be grounds for rejection of a portion of matting or of the entire matting roll at the discretion of ENGINEER. Remove roll from the Site and replace with new material.

1.10 AMBIENT CONDITIONS

A. Do not apply seed slurry when wind conditions are such that material would be carried beyond designated area or that materials would not be uniformly applied or when wind velocity exceeds five miles per hour.

B. Do not apply materials over snow, ice, frozen ground, or standing water.

C. Weather conditions for Matting Placement – Comply with manufacturer's recommendations. Install on dry ground.

PART 2 PRODUCTS

2.1 SEED MIXTURE

A. Seed Mixture:
1. Festuca arundinacea: 30 percent by dry weight.
2. Lolium multiflorum: 16 percent by dry weight.
3. Phleum pratense: 16 percent by dry weight.
4. Lotus coniculatus: 23 percent by dry weight.
5. Trifolium hybridum: 10 percent by dry weight.
6. Agrostis alba: 5 percent by dry weight.

B. Grass Seed: Fresh, clean, new-crop seed harvested previous year complying with the tolerance for purity and germination established by Official Seed Analysis of North America; minimum germination of 75 percent and minimum purity of 97 percent; obtained from an approved seed house.

C. Weed Seed Content: Not over 0.25 percent and free of noxious weeds.

2.2 TOPSOIL

A. Section 31 23 23.

2.3 MULCHING MATERIAL

A. Free of weeds and other foreign materials, free of growth or germination inhibiting ingredients; manufactured in such a manner that after addition and agitation in slurry tanks with water, the fibers in the material will become uniformly suspended to form a homogeneous slurry; dyed a suitable color to facilitate inspection of the placement of the material. When applied, capable of forming an absorptive mat, which will allow moisture to percolate into the underlying soil.

B. Straw Mulch: Oat or wheat, free from weeds, foreign matter detrimental to plant life, and dry; seasoned for spreading with mulch blower equipment. Hay or chopped cornstalks are not acceptable.

C. Wood Mulch: Mulch from on-Site chipping of trees removed during Site clearing.

2.4 FERTILIZER

A. Granular form, dry, free flowing, and free from lumps.

B. Recommended for grass, with 50 percent of the elements derived from organic sources; of proportion necessary to eliminate deficiencies of topsoil.

2.5 EROSION CONTROL BLANKET

A. Manufacturer: North American Green S75

2.6 WATER

A. Clean, fresh, and free of any contaminants and substances or matter which could inhibit germination and vigorous growth of grass.

2.7 ACCESSORIES

A. Lime: ASTM C602, Class T agricultural limestone containing a minimum 80 percent calcium carbonate equivalent.

2.8 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing, inspection, and analysis requirements.

B. Analyze topsoil to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.

C. Provide recommendation for fertilizer and lime application rates for specified seed mix as result of testing.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Verification of existing conditions before starting work.

B. Verify prepared soil base is ready to receive the work of this Section.

3.2 PREPARATION - SUBGRADE

A. Prepare subgrade to eliminate uneven areas and low spots. Maintain lines, levels, profiles, and contours. Make changes in grade gradual. Blend slopes into level areas.

B. Remove foreign materials, weeds, and undesirable plants and their roots.

C. Scarify subgrade to a depth of three inches where topsoil is to be placed. Repeat cultivation in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

D. Remove surface debris, roots, vegetation, lumps, and stones in excess of one inch.

E. Obtain ENGINEER’s approval of subgrade before placing topsoil.

3.3 PLACING TOPSOIL

A. Spread topsoil to a minimum settled depth of six inches over area to be seeded. Rake until smooth.

B. Place topsoil during dry weather and on dry, unfrozen subgrade.

C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.

D. Grade topsoil to eliminate rough, low, or soft areas, and to ensure positive drainage.

E. Install edging at periphery of seeded areas in straight lines to consistent depth.

F. Mix lime into full depth of topsoil.

G. Obtain ENGINEER's approval of topsoil grade and depth before starting seeding.

3.4 HYDROSEEDING

A. Seeding and mulching shall be a one-step process in which seed, fertilizer, hydraulic mulch, and mulch adhesive are applied simultaneously in a water slurry via hydraulic seeder/mulcher.

B. Apply seed mixture at a rate of 150 pounds per acre.

C. Hydraulic Seeder/Mulcher: Apply seed, fertilizer, hydraulic mulch, and temporary cover adhesive using an acceptable hydraulic seeder/mulcher equipped with mechanical agitation equipment capable of mixing the materials into a homogeneous slurry and maintaining the slurry in a homogeneous state until it is applied. The discharge pumps and gun nozzles shall be capable of applying the materials uniformly.

D. Volume Certification: Hydraulic seeding/mulching equipment shall have the tank volume certified by a plate affixed by manufacturer and confirmed to ENGINEER by means of measurements or tests prior to the commencement work. This plate shall be affixed in plain view on the hydraulic seeder/mulcher and shall not be removed or altered. The plate shall certify tank volume only, and shall imply equipment conformance to other requirements of this Section.

E. Application of Materials: Measure the quantity of each material to be charged into the hydraulic seeder/mulcher tank either by mass or by a system of mass-calibrated volume measurements acceptable to ENGINEER. Add the materials to the tank while it is being loaded with water. Thoroughly mix the materials into a homogeneous water slurry and distribute uniformly over the designated surface area via the hydraulic seeder/mulcher. Apply seed, fertilizer, and where applicable, hydraulic mulch adhesive within two hours of being charged into the hydraulic seeder/mulcher tank. During loading of the hydraulic seeder/mulcher tank, add materials in the following sequence:
   1. Seed, then fertilizer, then, where applicable, hydraulic mulch and adhesive.

F. Blend into existing adjacent grass areas to bond new growth to existing adjacent areas or to previous applications to form uniform surfaces.

3.5 OVERLAP

A. Hydroseeding and temporary cover shall overlap adjoining vegetation by 12 inches.

3.6 MAINTENANCE FOR VEGETATION ESTABLISHMENT

A. Start maintenance immediately after area seeded hydroseeded.

B. Maintain seeded area for not less than the period stated below and longer, as required to establish an acceptable stand, as determined by ENGINEER:
   1. Not less than 60 days after last area hydroseeded.
   2. If planted in fall and not given full 60 days of maintenance, or if not considered acceptable by ENGINEER as specified in Paragraph 3.6 E, at completion of 60 days continue maintenance the following spring until acceptable vegetative cover is established.

C. Maintain vegetative cover by watering, fertilizing, weeding, mowing, trimming, overseeding, and other operations such as rolling, regrading, and replanting as required to establish a smooth, acceptable grassed surface, free of eroded or bare areas.

D. Cutting Height: Mow vegetative cover as soon as there is enough top growth to cut with mower set at the specified height for the principal species planted. Repeat mowing as required to maintain specified height. Do not remove more than a third of grass height. Do not mow when grass is wet. Time initial and subsequent mowings as required to maintain the following grass height:
   1. Mow grass at four- to five-inch height. Do not mow lower than four inches.

E. Vegetative cover will be accepted by ENGINEER provided all requirements have been complied with, including completion of 60-day maintenance period, and the following:
   1. Vegetative cover is properly established.
   2. Turf is free of eroded, bare, or dead spots and 98 percent free of weeds.
   3. No surface is visible when vegetative cover has been cut to a height of four to five inches.

3.7 EROSION CONTROL BLANKET AND TRM

A. Ensure surface is free from exposed rocks and protrusions.

B. Do not place matting on areas softened by rainfall and which will not support equipment.

C. Install erosion control blanket and TRM according to manufacturer’s instructions.

D. Lay smooth and free of tension, stress, folds, wrinkles, or creases

E. Inspect erosion control blanket and TRM in place for tears, overlaps, and consistency. Repair or replace improperly placed sections, as judged by ENGINEER, as directed by ENGINEER.

3.8 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.

B. Clean up immediately, soil, mulch, broken sod, or other debris spilled onto pavement and dispose of deleterious materials.

C. Take precautions and prevent contamination by seeding and mulching slurry of structures, signs, guardrails, fences, utilities, or other surfaces not specified to be landscaped.

D. Where contamination occurs, remove seeding slurry to satisfaction of, and by means approved by ENGINEER.

3.9 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished work.

B. Protect landscaped areas from damage.

END OF SECTION

SECTION 32 93 00

PLANTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Bioengineered brush layer for erosion protection on Canal bank.
2. Maintenance.

B. Related Requirements:
1. Section 32 92 19 - Seeding.

1.2 PRICE AND PAYMENT PROCEDURES

A. Measurement and Payment:
1. Section 01 20 00 - Price and Payment Procedures: Requirements for measurement and payment.
2. Live Stakes:
a. Schedule of Prices Item No. 32 93 00/1.
b. Measurement Basis: By the Number (each) counted in place.
c. Payment Basis: Unit price. Includes supplying live stakes, preparing stakes for installation, advancing pilot holes, installing stakes, maintenance until acceptance.
3. Live Fascine:
a. Schedule of Prices Item No. 32 93 00/2.
b. Payment Basis: Lump sum price. Includes supplying vegetative material, excavating trench, preparation, supplying and installing topsoil, installing live fascine, maintenance until acceptance.
4. Brush Layer:
a. Schedule of Prices Item No. 32 93 00/3.
b. Payment Basis: Lump sum price. Includes supplying vegetative material, preparation, installing brush layer, maintenance until acceptance.

1.3 REFERENCES

A. Definitions:
1. Branch: A single whip of a woody vegetative material with dormant leaf buds cut above the root network.
2. Brush Layer: Placed branches of recently cut living woody material with the cut ends buried in stepped trenches excavated along a designated contour in preparation for self rooting.
3. Live Fascine: Branch bundles of recently cut living woody material bound together and buried in shallow trenches excavated along a designated contour in preparation for self rooting.
4. Live Staking: Stakes of recently cut living woody vegetative material which is driven vertically into the ground in preparation for self rooting.

5. Plants: Living trees, plants, and ground cover specified in this Section, and described in ANSI Z60.1.
6. Weeds: Vegetative species other than specified species to be established in given area.

1.4 SYSTEM DESCRIPTION

A. Planted bioengineered vegetation which to takes root in and provides anchoring and surface erosion protection to a soil mass.

1.5 PRE-INSTALLATION MEETING

A. Section 01 30 00 - Administrative Requirements: Pre installation meeting.

B. Convene one week prior to commencing work of this Section.

C. Purpose of meeting is to establish:
1. Source of vegetative material and method of transport to Site.
2. Storage procedures.
3. Detailed sequencing and scheduling of harvesting, transportation, and scheduling.
4. Date of commencement of dormancy.
5. Installation procedures.
6. Maintenance procedures.

1.6 SEQUENCING AND SCHEDULING

A. Section 01 30 00 - Administrative Requirements: Requirements for scheduling.

B. Complete filling and grading of Site prior to installing vegetative material, except as otherwise specified in following paragraph.

C. Complete work of this Section prior to placement of topsoil, seed, sod, or erosion control blankets in adjacent areas which may be damaged during work of this Section.

D. Store no vegetative material more than 72 hours between harvesting and installation.

E. Complete work of this Section no later than 21 days following commencement of dormancy period for vegetative matter.

F. Install live stakes following installation of brush layer and fascine.

1.7 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit list of plant material sources and data for fertilizer and other accessories.

C. Source: No later than 14 days prior to harvesting plant material, submit source of plant

material including name, address, and telephone number of owner of property from which vegetative material is to be harvested.

D. Evidence of Qualifications: No later than 28 days prior to harvesting vegetative material, submit evidence of CONTRACTOR's qualifications for installing bioengineered vegetation. Include names, addresses, and telephone numbers of references.

E. Botanist/Arborist Qualifications: No later than seven days prior to harvesting plant material submit evidence of botanist's/arborist's qualifications.

F. Letter from Botanist/Arborist: Confirmation of onset of vegetative matter dormancy seven days prior to harvesting.

1.8 QUALIFICATIONS

A. Installer: Company specializing in installing bioengineered vegetative systems with at least three years of experience, and five projects of similar scope and definition as described herein.

B. Botanist/Arborist: Trained at an accredited university or college with at least three years of' experience.

C. Nursery: Company specializing in growing and cultivating plants with three years of experience.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

C. Protect and maintain plant life until planted.

D. Deliver plant life materials immediately prior to placement. Keep plants moist.

E. Plant material damaged as a result of delivery, storage, or handling will be rejected.

F. Transport as bundles to Site within 8 hours of harvesting. Stack in vehicle in orderly fashion in parallel rows to minimize damage. Cover with tarpaulin while transporting in a manner to prevent contact with wind and damage due to drying.

G. If not installed immediately upon arrival at Site, cover with tarpaulin. If transported and stored for more than 12 hours submerge cut ends in water. Store at temperature between 32 degrees F and 50 degrees F. Store in orderly fashion. Storage area must be out of direct sunlight.

H. Notify ENGINEER three days in advance of delivery of vegetative material. Perform joint inspection with ENGINEER upon delivery. Defects or damage from cutting, shipping, and handling will be grounds for rejection of a portion of or all vegetative material. Remove from Site and dispose of in accordance with Laws and Regulations at CONTRACTOR's

expense.

1.10 AMBIENT CONDITIONS

A. Install immediately upon arrival to Site if ambient air temperature exceeds 50 degrees F.

B. Do not install plant life when ambient temperatures may drop below 35 degrees F or rise above 90 degrees.

C. Do not install plant life when wind velocity exceeds 30 mph.

PART 2 PRODUCTS

2.1 TREES, PLANTS, AND GROUND COVER

A. Willow: Selection of sandbar willow (*salix exiua*), pussy willow (*salix discolor*), black willow (*salix nigra*), and laurel willow (*salix pentandra*), maximum five years old with healthy juvenile growth, minimum 18 inches from current growth year.

B. Dogwood: Selection of gray dogwood (*cornus racemosa*), red osier dogwood (*cornus sericea*), and flowering dogwood (*cornus flonda*), maximum five years old with healthy juvenile growth, minimum 12 inches from current growth year.

C. Mixtures:

	Diameter (inches) (feet)	by Branch Length Name	Branches	Percent of
1. Live Stakes:		Willow	Dogwood 50 to 60	40 to 50
2. Brush Layer:		3 to 4 3 to 4	Dogwood 50 to 60	40 to 50
3. Fascine:	1/2 to 1 1/23 to 4	Dogwood Willow	Dogwood 50 to 60	40 to 50

D. Cutting: Ends cut cleanly and at blunt angles with chain saws, bush axes, loppers, or pruners.

E. Free of disease or insect infestation.

2.2 PLANTING MEDIUM

A. Topsoil: Section 31 23 23.

2.3 HEMP ROPE

A. Twisted natural hemp fibers, minimum 1/10 inch thick, treated with rodent repellent.

2.4 DEAD BLOW HAMMER

A. Hammer with head filled with shot or sand.

2.5 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing, inspection, and analysis requirements.

B. Test and analyze imported topsoil.

C. Provide recommendation for fertilizer and soil amendment application rates for specified planting as result of testing.

D. Testing is not required when recent tests are available for imported topsoil. Submit these test results to testing laboratory. Indicate, by test results, information necessary to determine suitability.

E. Preharvest evaluation by CONTRACTOR's botanist/arborist with ENGINEER present shall be undertaken to confirm species composition.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Verification of existing conditions before starting work.

B. Verify that prepared subsoil is ready to receive work of this Section.

3.2 BRUSH LAYER INSTALLATION

A. Cut lengths such that vegetative material extends a minimum 12 inches beyond crest of bench while touching back of bench.

B. Mix plant types in appropriate proportions and arrange on benches such that branches slightly cross each other. Minimum of 25 branches per lineal foot of trench.

C. Minimum Thickness of Compressed Brush Layer Following Backfilling: Three inches.

D. Place live fascine on top of brush layer in accordance with Article 3.4.

3.3 LIVE FASCINE

A. Bundle using hemp rope at two-foot intervals, in lengths of ten feet, and six to eight inches diameter when compressed, such that growing tips face in one direction. Stagger budding tips such that they are uniformly distributed along length of fascine. Overlap consecutive bundles by 12 inches.

B. Place live fascine into trench as shown on Drawings.

C. Install live stake in accordance with Article 3.5 and as shown on Drawings.

D. Backfill trench with topsoil. Ensure top of fascine is slightly visible following placement of topsoil. Place and compact topsoil such that there are no air spaces around branches.

E. Backfill trenches same day as branches are placed.

3.4 LIVE STAKE INSTALLATION

A. Cut to lengths of 36 inches. Cut upper end (original plant position) square. Cut lower end at an angle for easy insertion. Remove side branches cleanly while keeping bark intact.

B. Install same day as stakes are prepared. Do not store overnight.

C. Using dead blowhammer, push or drive live stake into ground through live fascine at right angles (normal) to slope face. Drive an average of 2.5 feet apart until 4/5 of stake length is buried.

D. At locations where soil is too firm to permit driving of live stakes without splitting, advance pilot hole using metallic bar of diameter smaller than branch.

E. Remove split live stakes and replace or trim at discretion of ENGINEER.

3.5 TOLERANCES

A. Maximum Variation from True Specified Contour: Six inches, but not uniformly six inches higher or lower.

B. Maximum Variation from Live Stake Spacing: Six inches but not uniformly six inches greater or smaller.

C. Maximum Variation from Brush Layer Branches: Five branches per lineal foot but not uniformly less.

3.6 MAINTENANCE

A. Start maintenance immediately after area planted.

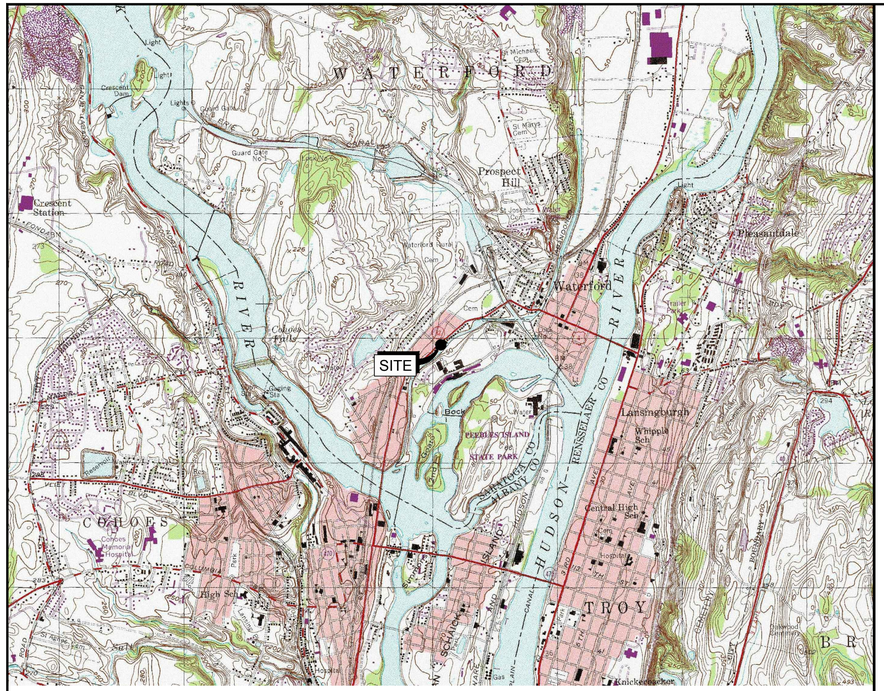
B. Maintain at least until the first June 30 following planting, and longer if required, as determined by ENGINEER, to establish successful growth.

C. Maintain by watering, fertilizing, trimming, repairing gullies, and any other activity necessary to establish health growth.

D. Planted areas will be accepted by ENGINEER provided all requirements stated above and the following requirements have been complied with for every ten-foot long trench section:
   1. Brush Layer: Minimum 60 percent of branches uniformly distributed, with minimum 10 percent in each family group, exhibiting healthy, vigorous growth.

2. Live Fascine: Minimum 40 percent branches uniformly distributed, with minimum 10 percent in each family group, exhibiting healthy growth.
3. Live Stake: Minimum 70 percent branches uniformly distributed, with minimum 10 percent in each family group, exhibiting healthy, vigorous growth.

END OF SECTION



SOURCE: U.S. DEPARTMENT OF THE INTERIOR, U.S. GEOLOGICAL SURVEY, 1997, STANDARDS FOR DIGITAL RASTER GRAPHS: RESTON, VA.

KEY MAP

DRAWING INDEX

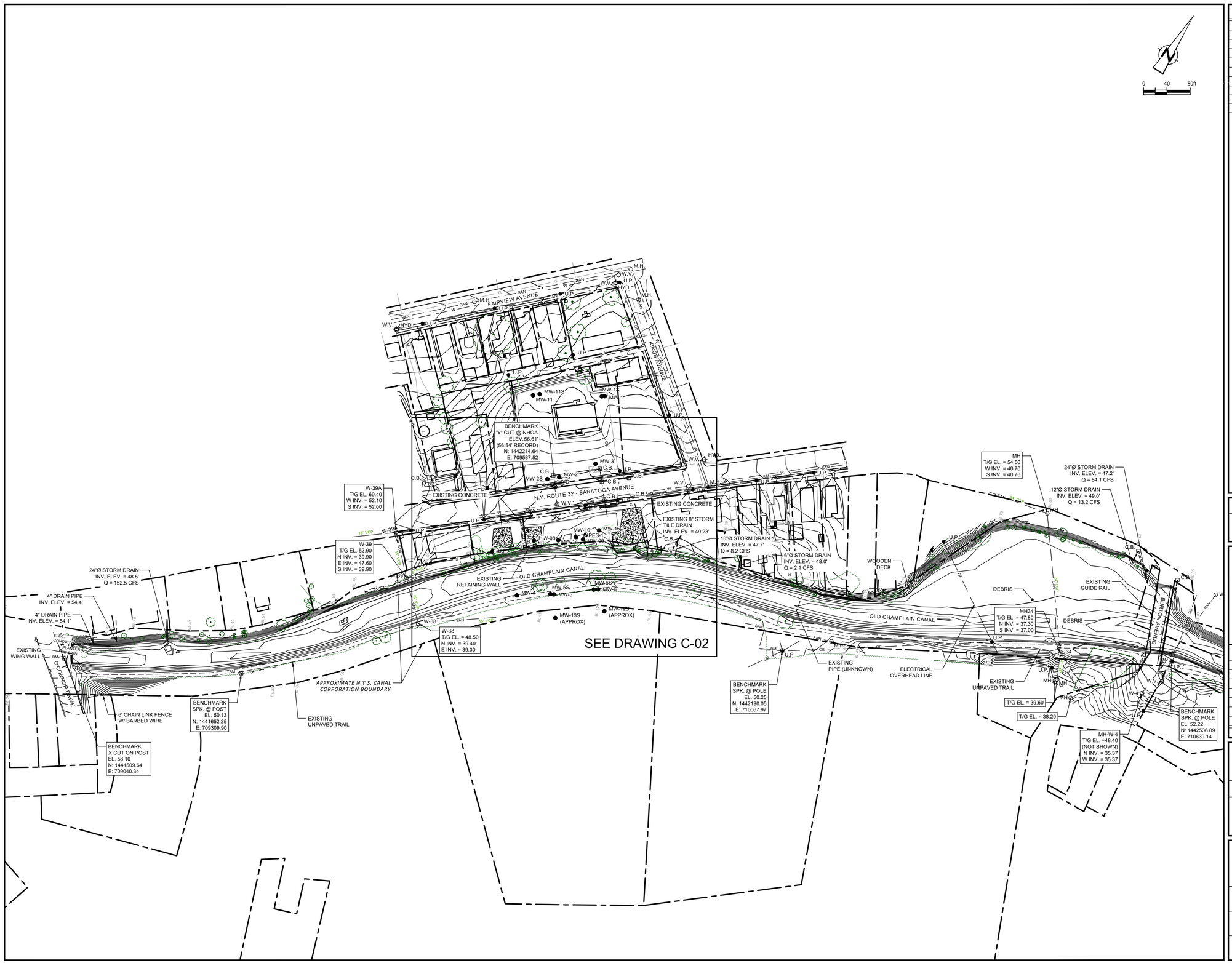
DRAWING NO.	TITLE
G-01	COVER SHEET
C-01	EXISTING CONDITION OVERALL SITE PLAN
C-02	EXISTING CONDITION SITE PLAN
C-03	SITE WORKS - OU3 SEDIMENTS/SOURCE SOILS
C-04	SITE PREPARATION PLAN - OU3 SEDIMENT/SOURCE SOILS
C-05	SEDIMENT/ SOIL REMOVAL SEQUENCE
C-06	CANAL SEDIMENT EXCAVATION OVERALL PLAN LAYOUT
C-07	CANAL SEDIMENT EXCAVATION PLAN 1 OF 6 - < 50ppm
C-08A	CANAL SEDIMENT EXCAVATION PLAN 2 OF 6 - ≥ 50ppm
C-08B	CANAL SEDIMENT EXCAVATION PLAN 3 OF 6 - < 50ppm
C-09A	CANAL SEDIMENT EXCAVATION PLAN 4 OF 6 - ≥ 50ppm
C-09B	CANAL SEDIMENT EXCAVATION PLAN 5 OF 6 - < 50ppm
C-10	CANAL SEDIMENT EXCAVATION PLAN 6 OF 6 - < 50ppm
C-11	CANAL SEDIMENT EXCAVATION CROSS SECTIONS PAGE 1 OF 3
C-12	CANAL SEDIMENT EXCAVATION CROSS SECTIONS PAGE 2 OF 3
C-13	CANAL SEDIMENT EXCAVATION CROSS SECTIONS PAGE 3 OF 3
C-14	CANAL SEDIMENT EXCAVATION CROSS SECTIONS SANITARY SEWERS
C-15	EROSION AND SEDIMENT CONTROL SITE PLAN
C-16	EROSION AND SEDIMENT CONTROL MEASURES DETAILS
C-17	SOURCE AREA OU1 IMPACTED SOIL EXCAVATION (0-2 ft. BGS)
C-18	SOURCE AREA OU3 IMPACTED SOIL EXCAVATION (0-1 ft. BGS)
C-19	SOURCE AREA OU3 IMPACTED SOIL EXCAVATION (1-2 ft. BGS)
C-20	SOURCE AREA OU3 IMPACTED SOIL EXCAVATION (2-4 ft. BGS)
C-21	SOURCE AREA OU3 IMPACTED SOIL EXCAVATION (4-6 ft. BGS)
C-22	SOURCE AREA OU3 IMPACTED SOIL EXCAVATION (6-8 ft. BGS)
C-23	SOURCE AREA OU3 IMPACTED SOIL EXCAVATION (8 ft. BGS - BEDROCK)
C-24	FINAL GRADING SITE PLAN
C-25A	CANAL RESTORATION CROSS SECTIONS PAGE 1 OF 3
C-25B	CANAL RESTORATION CROSS SECTIONS PAGE 2 OF 3
C-25C	CANAL RESTORATION CROSS SECTIONS PAGE 3 OF 3
C-26	TEMPORARY OVERFLOW SPILLWAY
C-27	DETAILS - PAGE 1 OF 3
C-28	DETAILS - PAGE 2 OF 3
C-29	DETAILS - PAGE 3 OF 3
M-01	WATER TREATMENT SYSTEM PROCESS FLOW SCHEMATIC
M-02	WATER TREATMENT SYSTEM
S-01	STRUCTURAL GENERAL NOTES
S-02	TEMPORARY BRIDGE - GENERAL ARRANGEMENT
S-03	TEMPORARY BRIDGE - FOUNDATION AND BEARING DETAILS

REMEDIAL DESIGN
ISSUED FOR BID

FRIEDRICHSOHN COOPERAGE SITE
153-155 SARATOGA AVE.,
WATERFORD, NEW YORK
SITE NO. 546045

MAY 14, 2019

GHD



No	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 CONTOUR (NAVD 88)
- VEGETATION
- SAN SANITARY SEWER
- STM STORM SEWER
- W WATER MAIN
- OE ELECTRICAL OVERHEAD LINE
- G GAS MAIN
- X FENCE LINE (APPROXIMATE)
- TREE
- C.B. CATCH BASIN
- M.H. MAN HOLE
- HYD. HYDRANT
- U.P. UTILITY POLE
- MW-5 MONITORING WELL
- W.V. WATER VALVE
- BM BENCHMARK (NAVD 88)

SURVEY NOTE:

EXISTING CONDITIONS AND SITE WORKS DRAWINGS ARE REFERENCED TO NAVD 88. WATER LEVELS, AND STRUCTURES WITHIN THE ERIE CANAL AND OLD CHAMPLAIN CANAL ARE NORMALLY REFERENCED TO BARGE CONTROL DATUM (BCC) UNLESS NOTED OTHERWISE. ALL ELEVATIONS ON THESE PLANS ARE REFERENCED TO NAVD 88 FOR CONSISTENCY.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

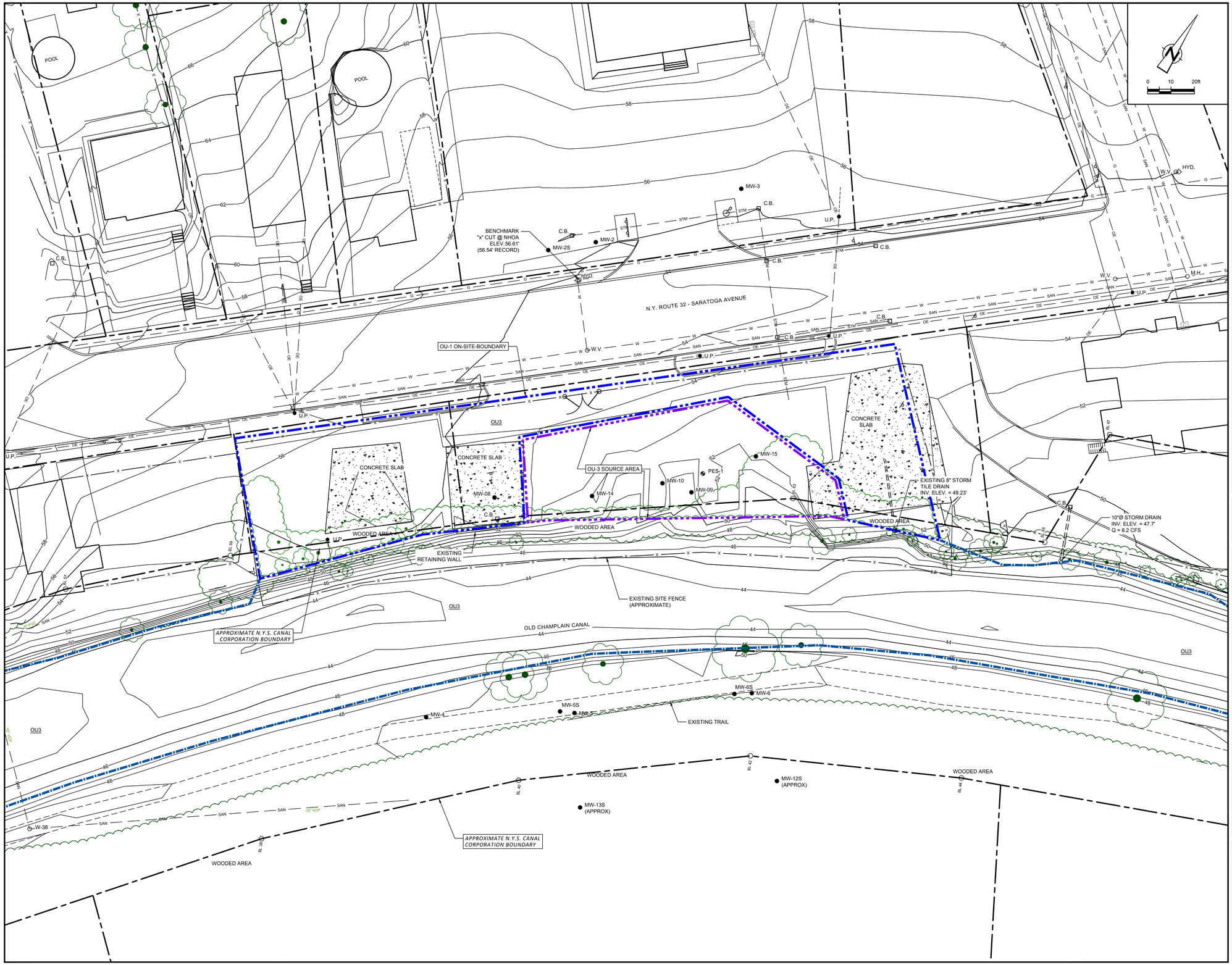
EXISTING CONDITION
OVERALL SITE PLAN

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 80'	Project No: 80987-20	Report No: 014	Drawing No: C-01

80987-20(014)CI-WA012 MAY 14, 2019



NΩ	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN EXISTING SANITARY SEWER
- STM EXISTING STORM SEWER
- W EXISTING WATER MAIN
- OE EXISTING ELECTRICAL OVERHEAD LINE
- G EXISTING GAS MAIN
- X EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. EXISTING CATCH BASIN
- M.H. EXISTING MAN HOLE
- HYD. EXISTING HYDRANT
- U.P. EXISTING UTILITY POLE
- W.V. EXISTING WATER VALVE
- MW-5 EXISTING MONITORING WELL
- BM EXISTING BENCHMARK (NAVD 88)
- OU1 - ON-SITE BOUNDARY
- OU3 - SEDIMENT BOUNDARY
- OU3 - SOURCE AREA BOUNDARY

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

EXISTING CONDITION SITE PLAN

GHD

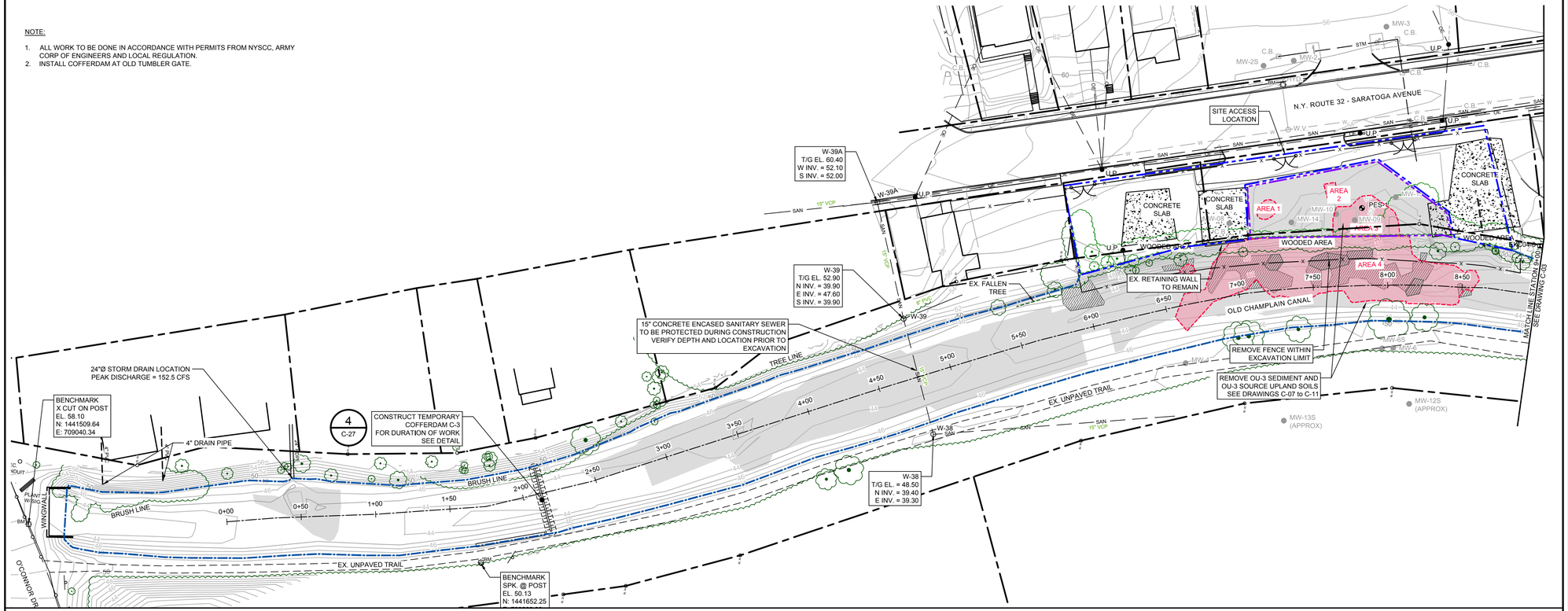
Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

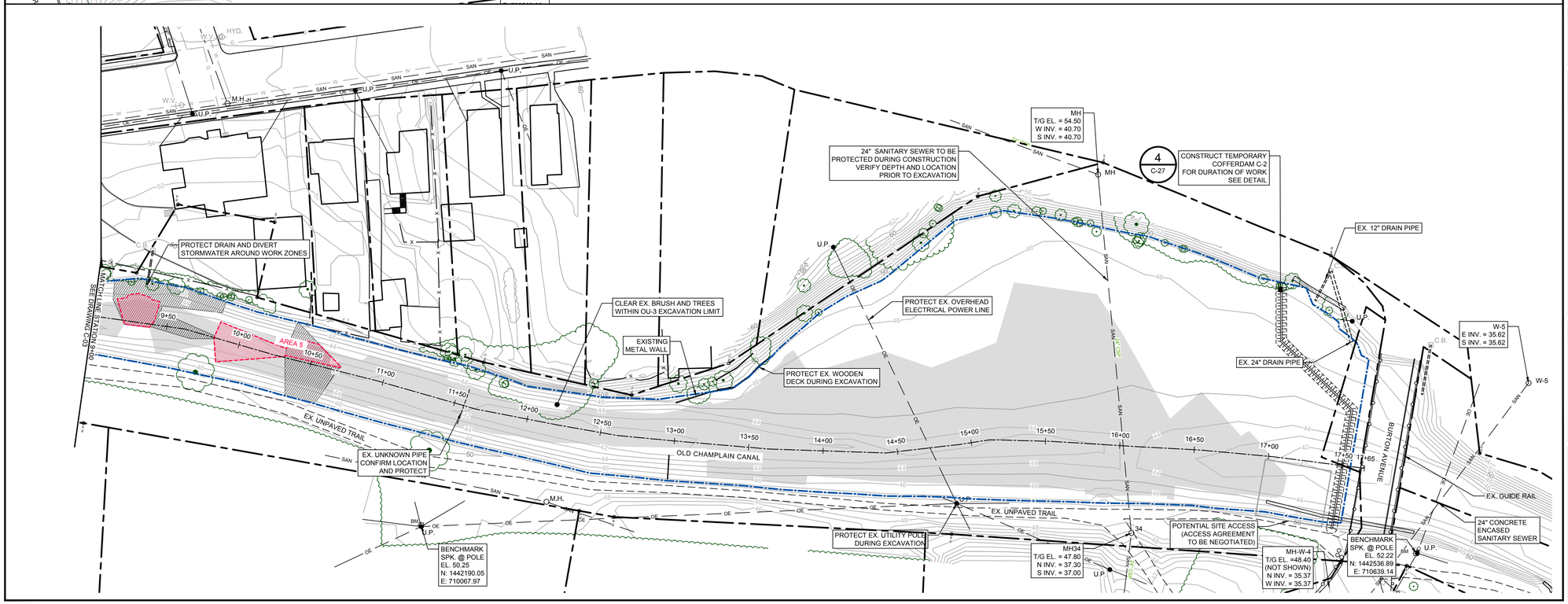
Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 20'	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: C-02

80987-20(014)CI-WA013 MAY 14, 2019

NOTE:

1. ALL WORK TO BE DONE IN ACCORDANCE WITH PERMITS FROM NYSCC, ARMY CORP OF ENGINEERS AND LOCAL REGULATION.
2. INSTALL COFFERDAM AT OLD TUMBLER GATE.





NO	Revision	Date	Initial

0 20 40ft

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN EXISTING SANITARY SEWER
- STM EXISTING STORM SEWER
- W EXISTING WATER MAIN
- OE EXISTING ELECTRICAL OVERHEAD LINE
- G EXISTING GAS MAIN
- X EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. EXISTING CATCH BASIN
- M.H. EXISTING MAN HOLE
- HYD. EXISTING HYDRANT
- U.P. EXISTING UTILITY POLE
- W.V. EXISTING WATER VALVE
- MW-5 EXISTING MONITORING WELL
- BM EXISTING BENCHMARK
- OU1 - ON-SITE BOUNDARY
- OU3 - SEDIMENT BOUNDARY
- OU3 - SOURCE AREA BOUNDARY
- EXTENT OF PCBs ≥ 50 ppm
- EXTENT OF PCBs < 50 ppm
- EXCAVATION TO BEDROCK

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial
ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

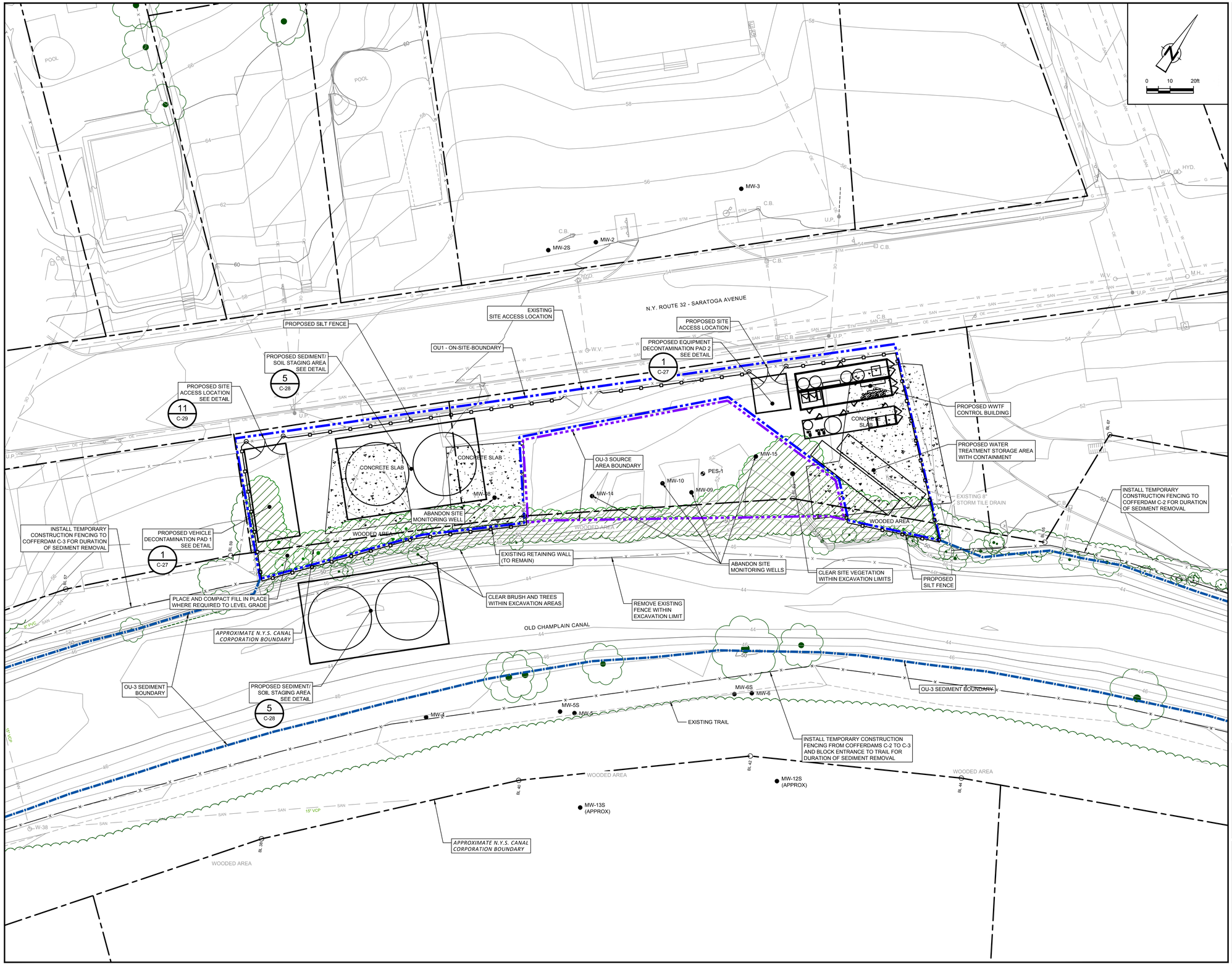
REMEDIAL DESIGN

SITE WORKS
OU3 SEDIMENTS/ SOURCE SOILS

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 40'	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: C-03



No	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN EXISTING SANITARY SEWER
- STM EXISTING STORM SEWER
- W EXISTING WATER MAIN
- OE EXISTING ELECTRICAL OVERHEAD LINE
- G EXISTING GAS MAIN
- x x EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. EXISTING CATCH BASIN
- M.H. EXISTING MAN HOLE
- HYD. EXISTING HYDRANT
- U.P. EXISTING UTILITY POLE
- W.V. EXISTING WATER VALVE
- MW-5 EXISTING MONITORING WELL
- BM EXISTING BENCHMARK
- OU1 - ON-SITE BOUNDARY
- OU3 - SEDIMENT BOUNDARY
- OU3 - SOURCE AREA BOUNDARY
- PROPOSED TREE REMOVAL AREA
- PROPOSED SILT FENCE

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

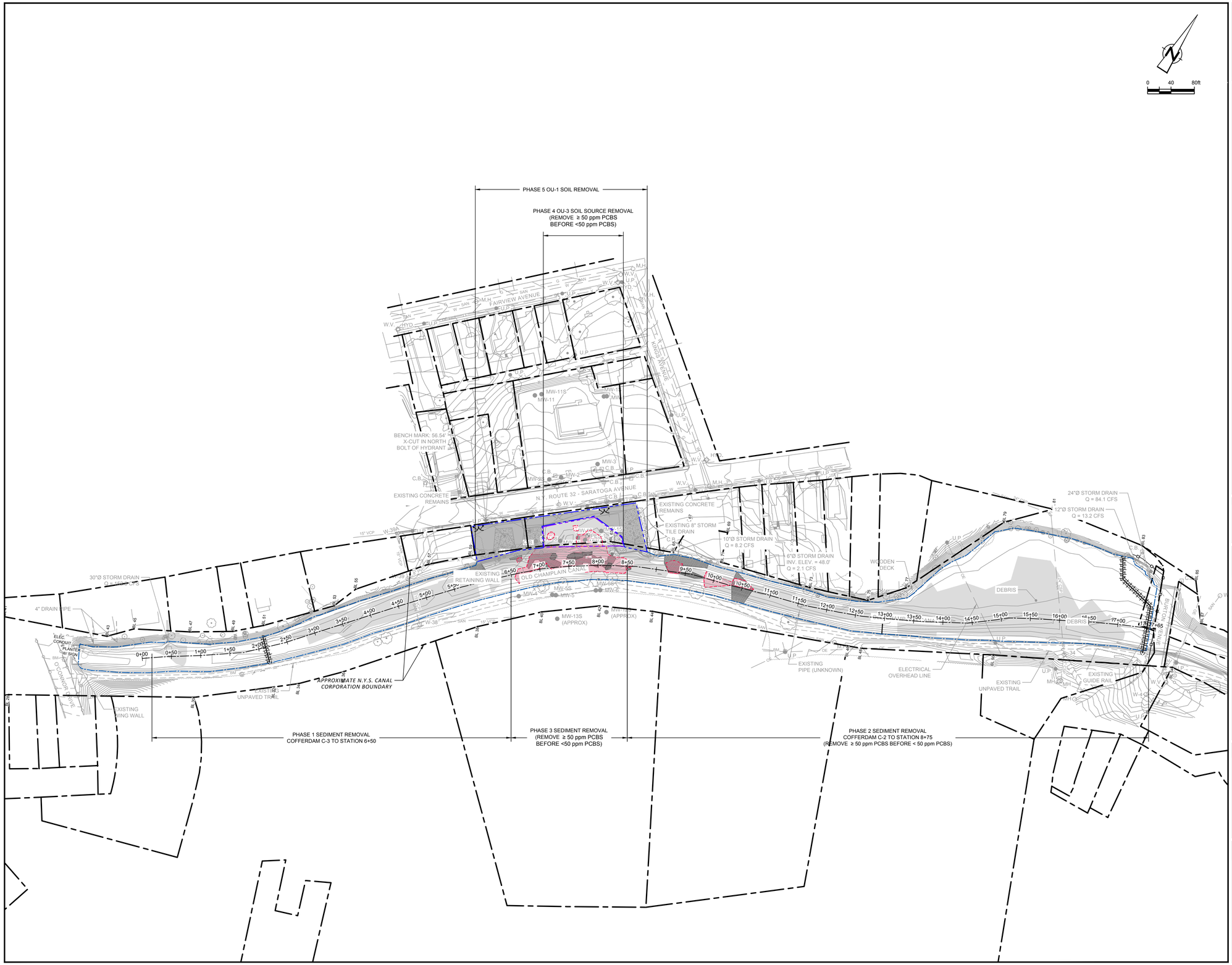
SITE PREPARATION PLAN
OU3 SEDIMENT/SOURCE SOILS

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J.PUSKAS	NOVEMBER 2018	
Scale: 1" = 20'	Project No: 80987-20	Report No: 014	Drawing No: C-04

80987-20(014)CI-WA014 MAY 14, 2019



0 40 80ft

NΩ	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 EXISTING CONDITIONS CONTOUR (NAVD88)
- VEGETATION
- SAN SANITARY SEWER
- STM STORM SEWER
- W WATER MAIN
- OE ELECTRICAL OVERHEAD LINE
- G GAS MAIN
- X FENCE LINE (APPROXIMATE)
- TREE
- C.B. CATCH BASIN
- M.H. MAN HOLE
- HYD. HYDRANT
- U.P. UTILITY POLE
- W.V. WATER VALVE
- MW-5 MONITORING WELL
- BM BENCHMARK (NAVD 88)
- OU1 - ON-SITE BOUNDARY
- OU3 - SEDIMENT BOUNDARY
- OU3 - SOURCE AREA BOUNDARY
- EXTENT OF PCBs ≥ 50 ppm
- EXTENT OF PCBs < 50 ppm
- EXCAVATION TO BEDROCK

SURVEY NOTE:

EXISTING CONDITIONS AND SITE WORKS DRAWINGS ARE REFERENCED TO NAVD 88. WATER LEVELS, AND STRUCTURES WITHIN THE ERIE CANAL AND OLD CHAMPLAIN CANAL ARE NORMALLY REFERENCED TO BARGE CONTROL DATUM (BCC) UNLESS NOTED OTHERWISE. ALL ELEVATIONS ON THESE PLANS ARE REFERENCED TO NAVD 88 FOR CONSISTENCY.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

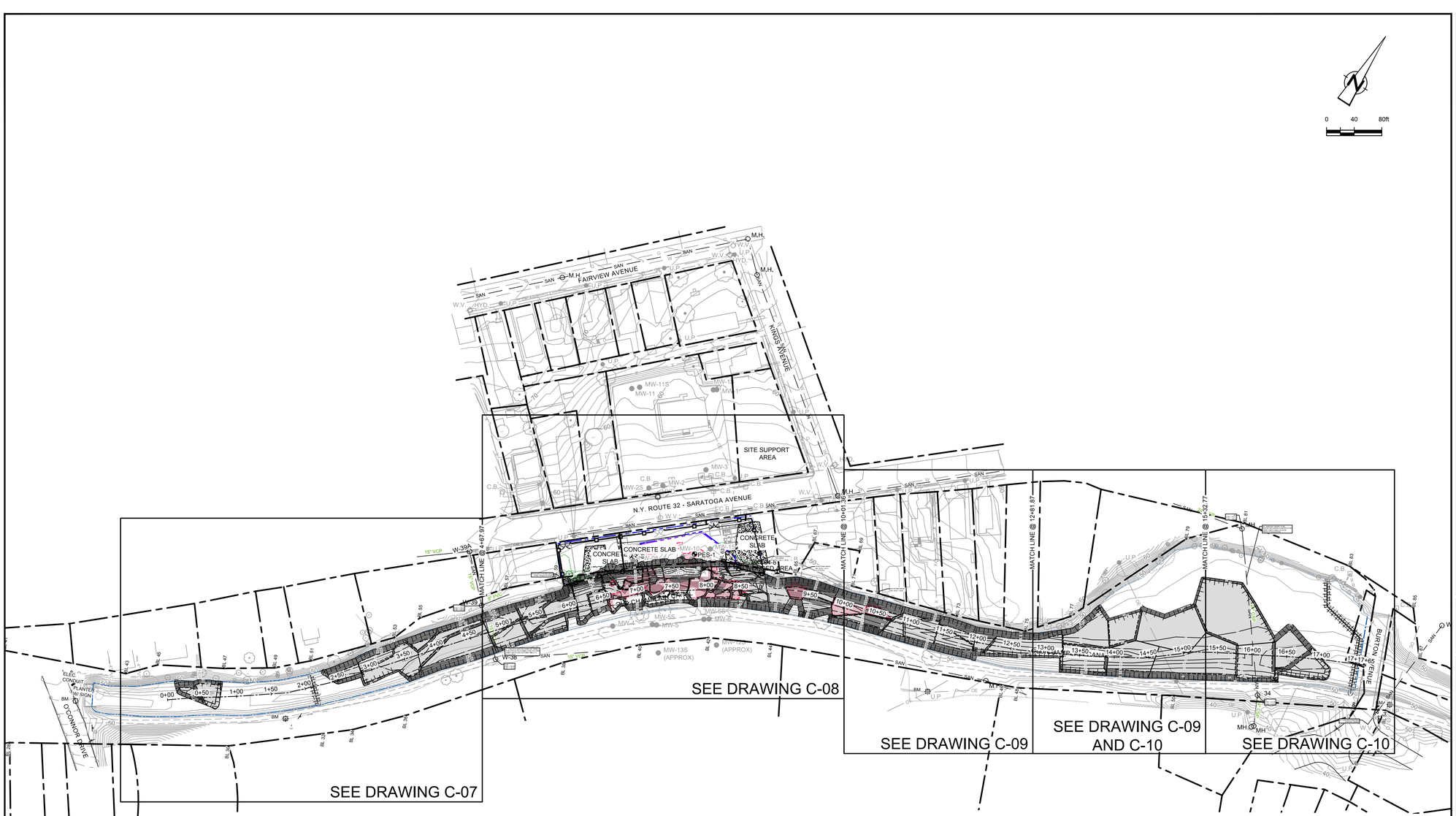
SEDIMENT/ SOIL REMOVAL SEQUENCE

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUASKAS	NOVEMBER 2018	
Scale: 1" = 80'	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: C-05

80987-20(014)CI-WA021 MAY 14, 2019



NO	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN EXISTING SANITARY SEWER
- STM EXISTING STORM SEWER
- W EXISTING WATER MAIN
- OE EXISTING ELECTRICAL OVERHEAD LINE
- G EXISTING GAS MAIN
- X EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. EXISTING CATCH BASIN
- M.H. EXISTING MAN HOLE
- HYD. EXISTING HYDRANT
- U.P. EXISTING UTILITY POLE
- W.V. EXISTING WATER VALVE
- MW-5 EXISTING MONITORING WELL
- BM EXISTING BENCHMARK
- OU1 - ON-SITE BOUNDARY
- OU3 - SEDIMENT BOUNDARY
- OU3 - SOURCE AREA BOUNDARY
- EXTENT OF PCBs ≥ 50 ppm
- EXTENT OF PCBs < 50 ppm
- PROPOSED SILT FENCE

NOTE:

EXCAVATE TO ELEVATIONS SHOWN UNLESS BEDROCK IS REACHED.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

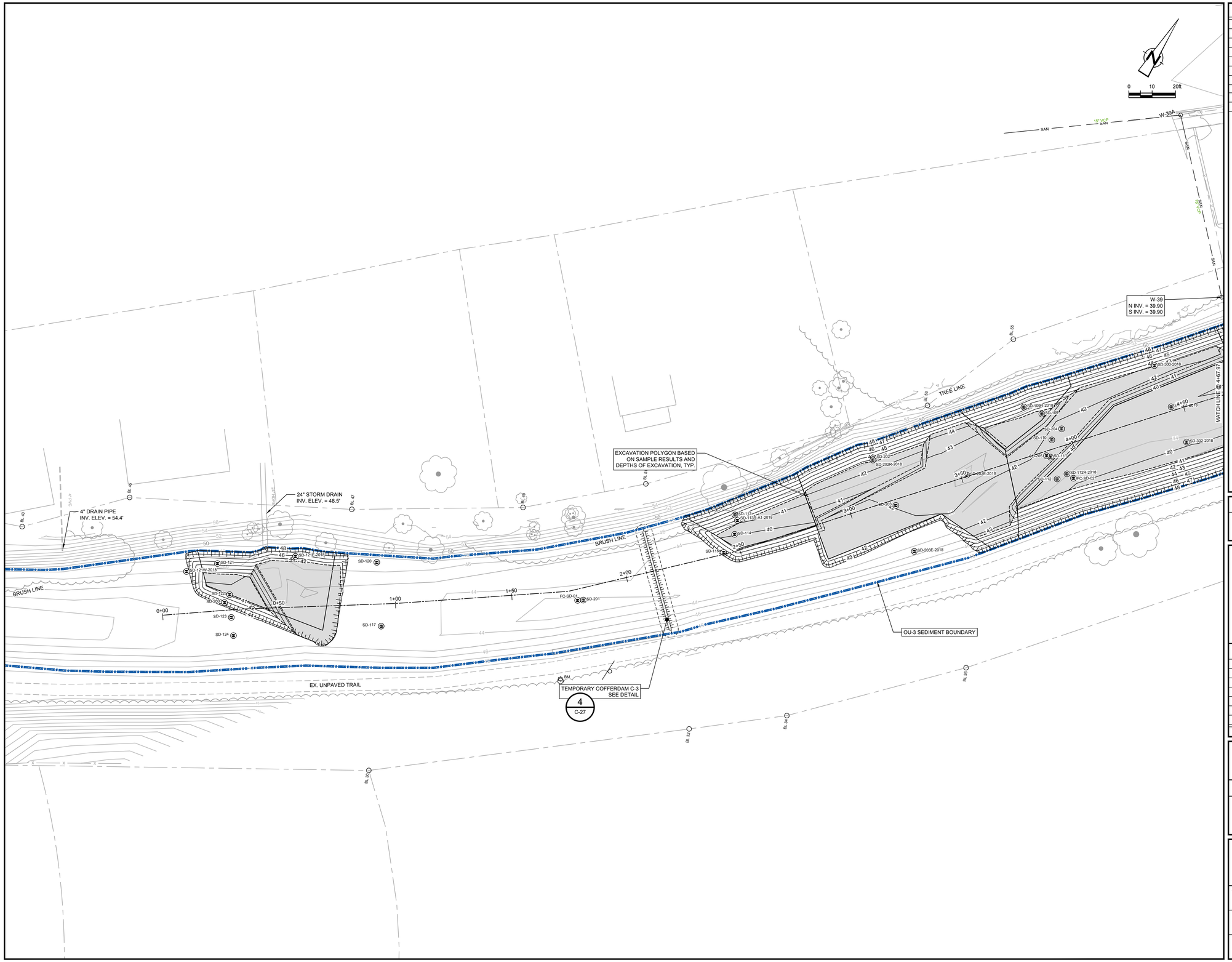
CANAL SEDIMENT EXCAVATION OVERALL PLAN LAYOUT

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 80'	Project NO.: 80987-20	Report NO.: 014	Drawing NO.: C-06

80987-20(014)CI-WA015 MAY 14, 2019



NO	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN EXISTING SANITARY SEWER
- STM EXISTING STORM SEWER
- W EXISTING WATER MAIN
- OE EXISTING ELECTRICAL OVERHEAD LINE
- G EXISTING GAS MAIN
- X EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. EXISTING CATCH BASIN
- M.H. EXISTING MAN HOLE
- HYD. EXISTING HYDRANT
- U.P. EXISTING UTILITY POLE
- W.V. EXISTING WATER VALVE
- MW-5 EXISTING MONITORING WELL
- BM EXISTING BENCHMARK
- OU1 - ON-SITE BOUNDARY
- OU3 - SEDIMENT BOUNDARY
- OU3 - SOURCE AREA BOUNDARY
- EXTENT OF PCBs < 50 ppm
- SD-78 SEDIMENT SAMPLE ID

NOTE:

EXCAVATE TO ELEVATIONS SHOWN UNLESS BEDROCK IS REACHED.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

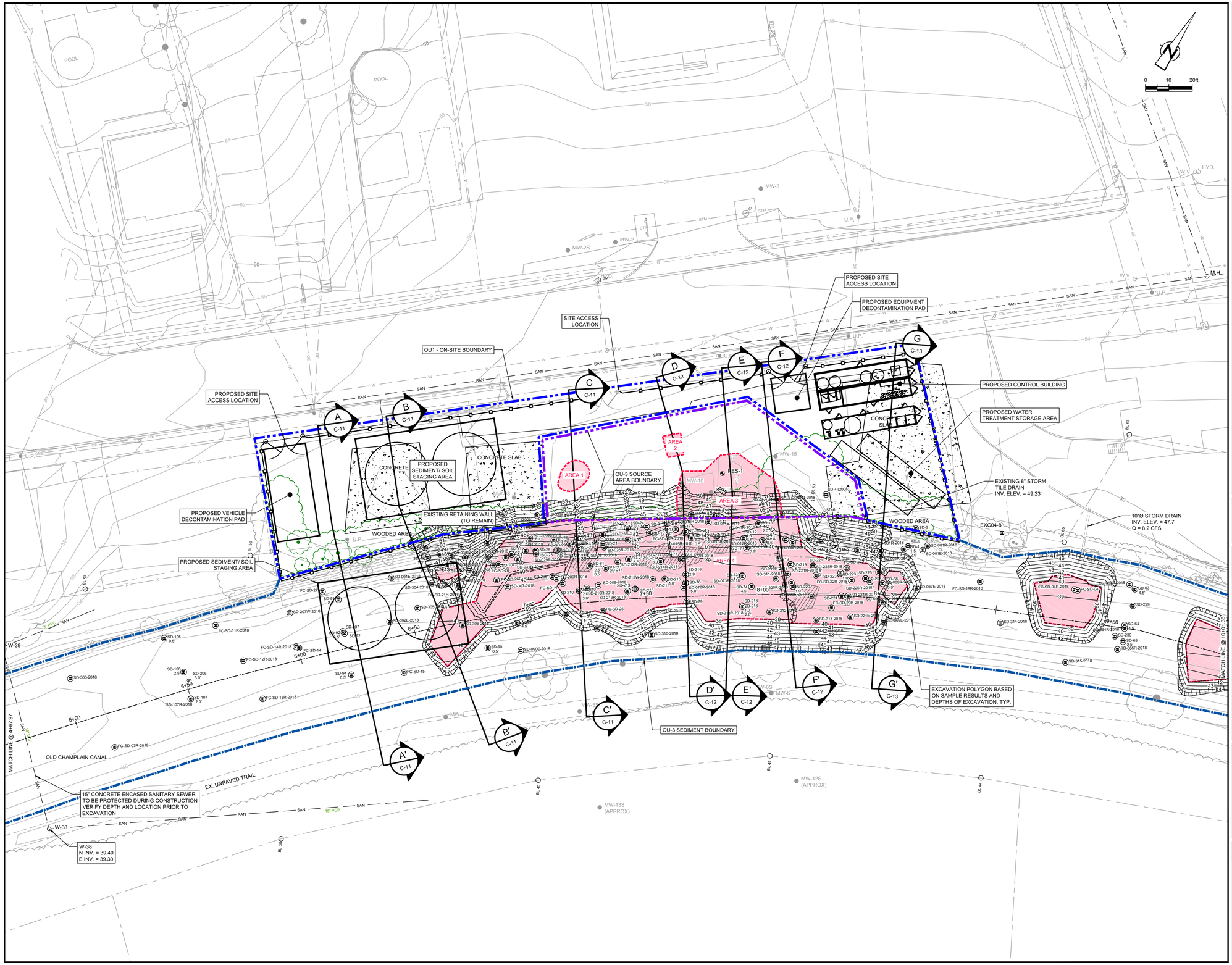
CANAL SEDIMENT EXCAVATION
PLAN 1 OF 6 - < 50ppm

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 20'	Project No: 80987-20	Report No: 014	Drawing No: C-07

80987-20(014)CI-WA015 MAY 14, 2019



No	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial
ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.

NOTE:

EXCAVATE TO ELEVATIONS SHOWN UNLESS BEDROCK IS REACHED.

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

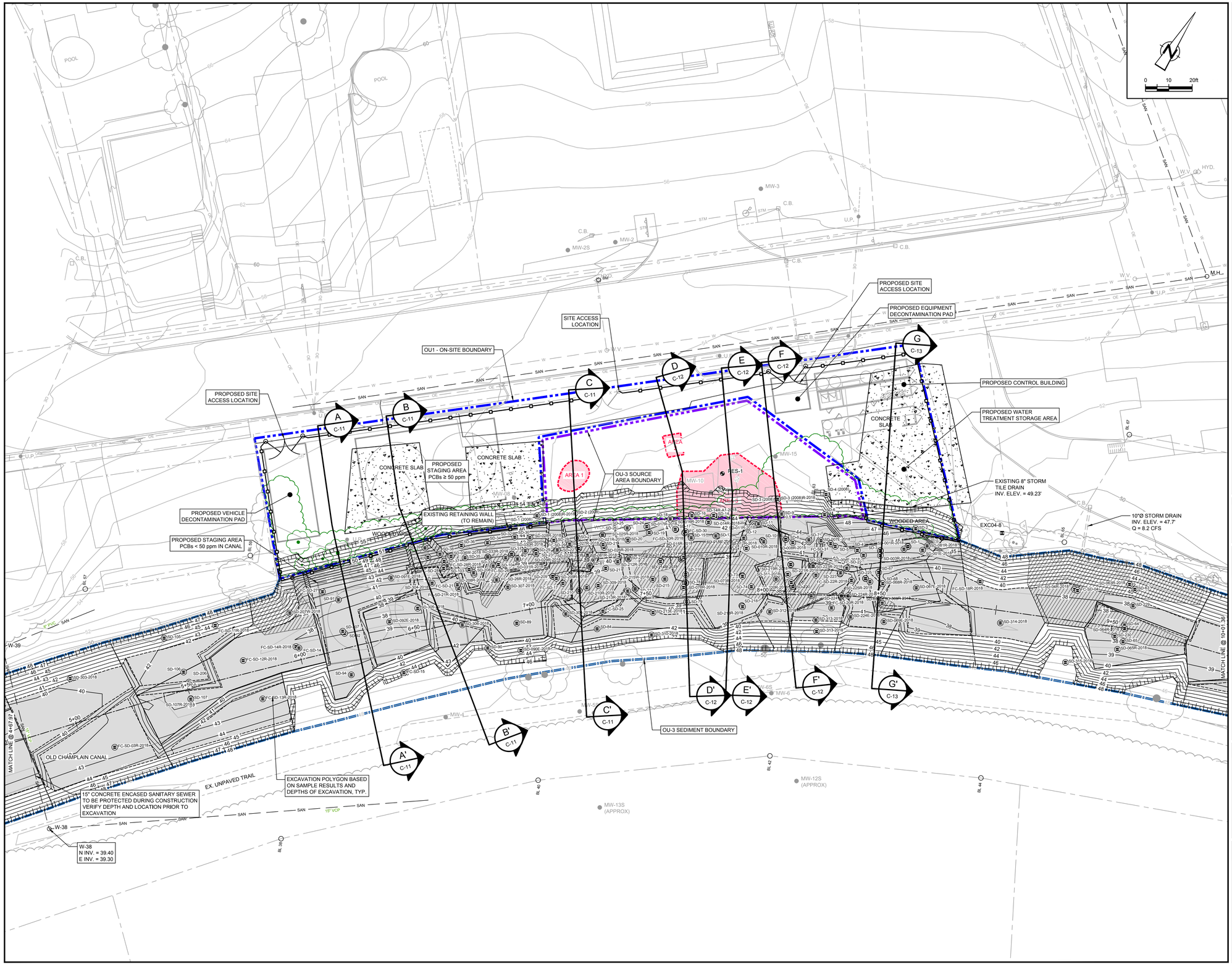
CANAL SEDIMENT EXCAVATION PLAN 2 OF 6 - ≥ 50ppm

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES 32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 20'	Project No: 80987-20	Report No: 014	Drawing No: C-08A

80987-20(014)CI-WA022 MAY 14, 2019



NOTE:

EXCAVATE TO ELEVATIONS SHOWN UNLESS BEDROCK IS REACHED.

No	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial
ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

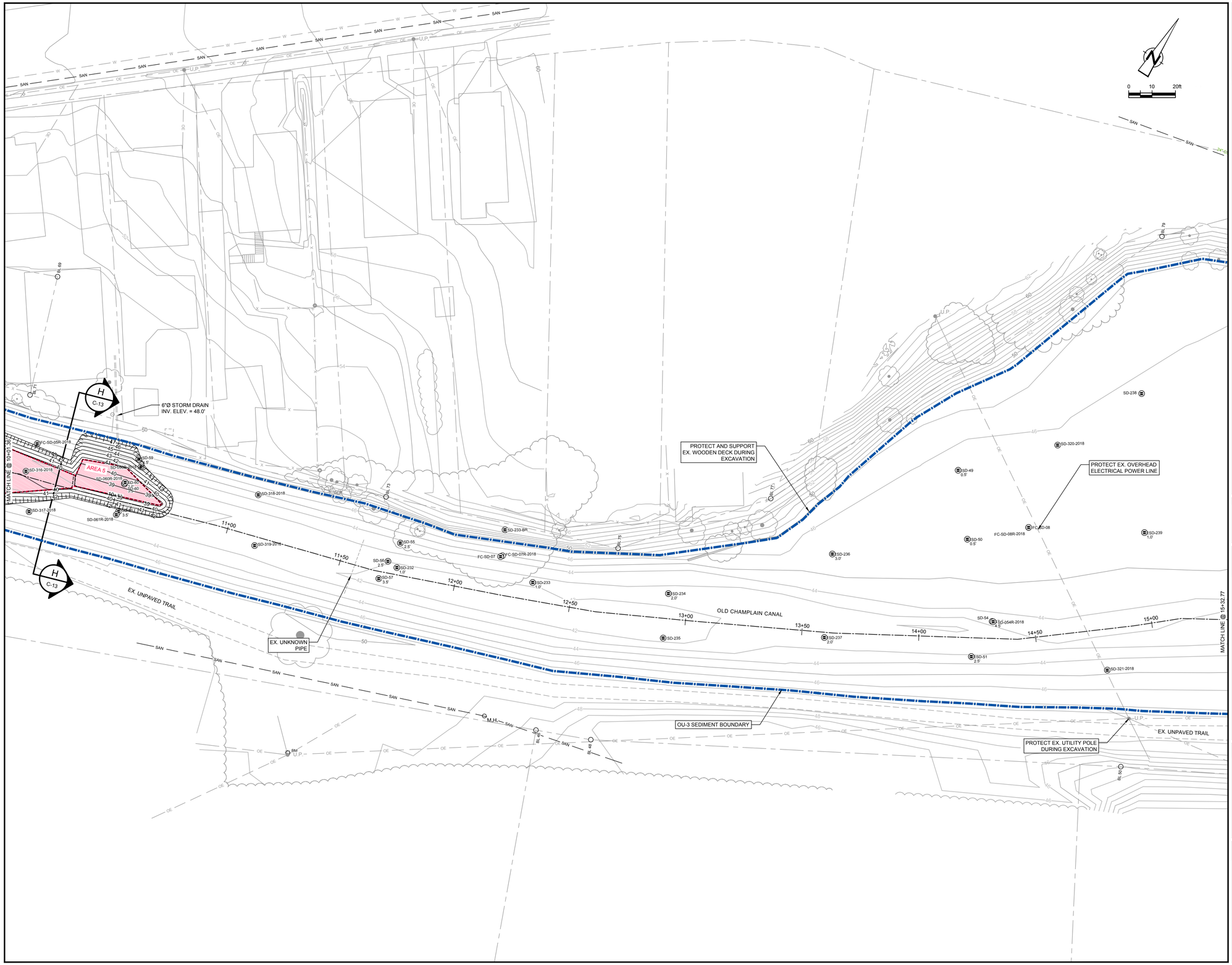
CANAL SEDIMENT EXCAVATION PLAN 3 OF 6 - < 50ppm

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES 32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 20'	Project No: 80987-20	Report No: 014	Drawing No: C-08B

80987-20(014)CI-WA015 MAY 14, 2019



NΩ	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN EXISTING SANITARY SEWER
- STM EXISTING STORM SEWER
- W EXISTING WATER MAIN
- OE EXISTING ELECTRICAL OVERHEAD LINE
- G EXISTING GAS MAIN
- X EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. EXISTING CATCH BASIN
- M.H. EXISTING MAN HOLE
- HYD. EXISTING HYDRANT
- U.P. EXISTING UTILITY POLE
- W.V. EXISTING WATER VALVE
- MW-5 EXISTING MONITORING WELL
- BM EXISTING BENCHMARK
- OU1 - ON-SITE BOUNDARY
- OU3 - SEDIMENT BOUNDARY
- OU3 - SOURCE AREA BOUNDARY
- EXTENT OF ≥ 50ppm PCB EXCAVATION AREA
- EXTENT OF PCBs ≥ 50 ppm
- PROPOSED SILT FENCE
- SD-78 SEDIMENT SAMPLE ID

NOTE:

EXCAVATE TO ELEVATIONS SHOWN UNLESS BEDROCK IS REACHED.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

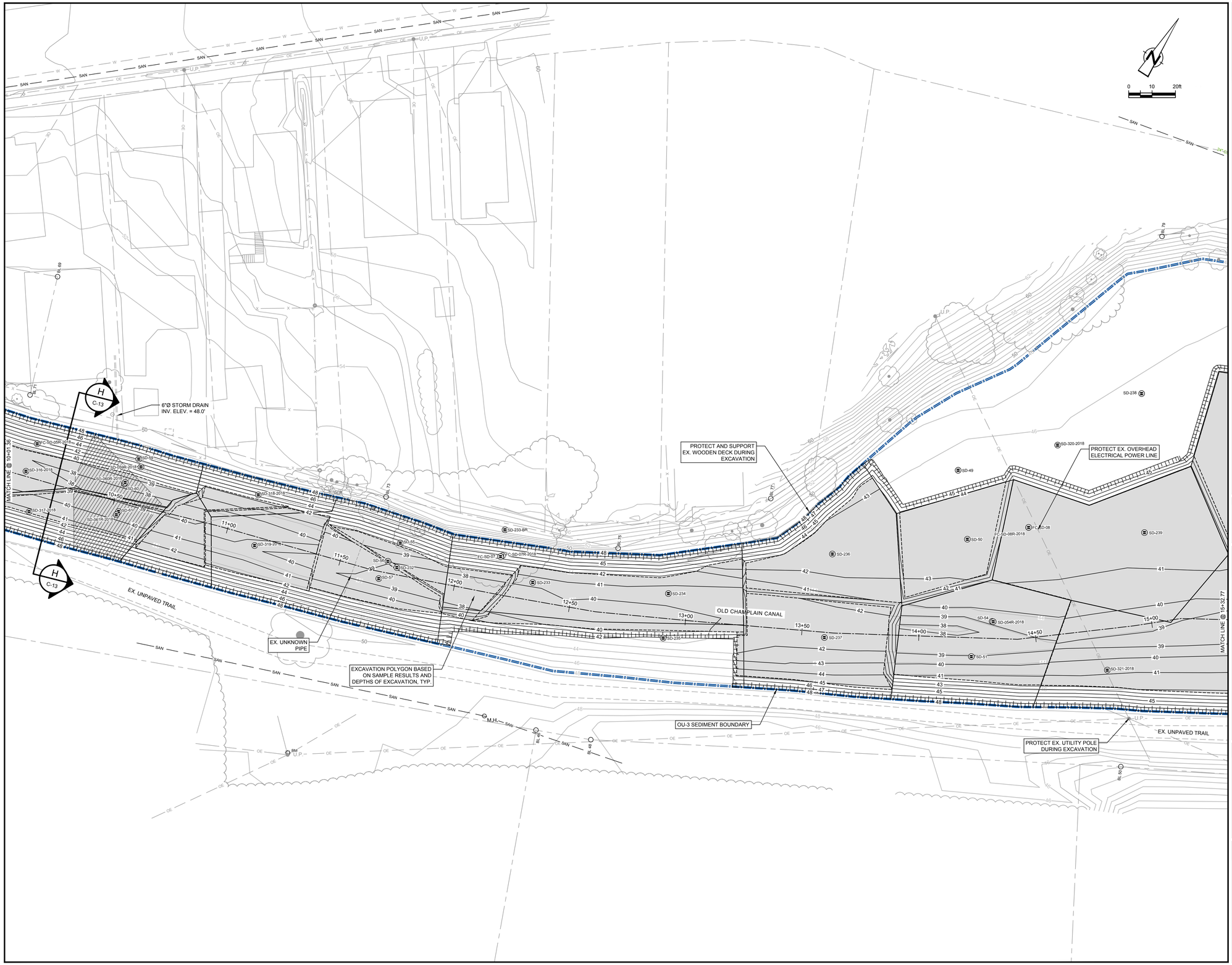
CANAL SEDIMENT EXCAVATION
PLAN 4 OF 6 - ≥ 50ppm

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 20'	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: C-09A

80987-20(014)CI-WA022 MAY 14, 2019



NΩ	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 — EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN — EXISTING SANITARY SEWER
- STM — EXISTING STORM SEWER
- W — EXISTING WATER MAIN
- OE — EXISTING ELECTRICAL OVERHEAD LINE
- G — EXISTING GAS MAIN
- X — EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. — EXISTING CATCH BASIN
- M.H. — EXISTING MAN HOLE
- HYD. — EXISTING HYDRANT
- U.P. — EXISTING UTILITY POLE
- W.V. — EXISTING WATER VALVE
- MW-5 — EXISTING MONITORING WELL
- BM — EXISTING BENCHMARK
- OU1 - ON-SITE BOUNDARY
- OU3 - SEDIMENT BOUNDARY
- OU3 - SOURCE AREA BOUNDARY
- EXTENT OF ≥ 50ppm PCB EXCAVATION AREA
- EXTENT OF PCBs < 50 ppm
- EXCAVATION TO BEDROCK
- SD-78 — SEDIMENT SAMPLE ID

NOTE:

EXCAVATE TO ELEVATIONS SHOWN UNLESS BEDROCK IS REACHED.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

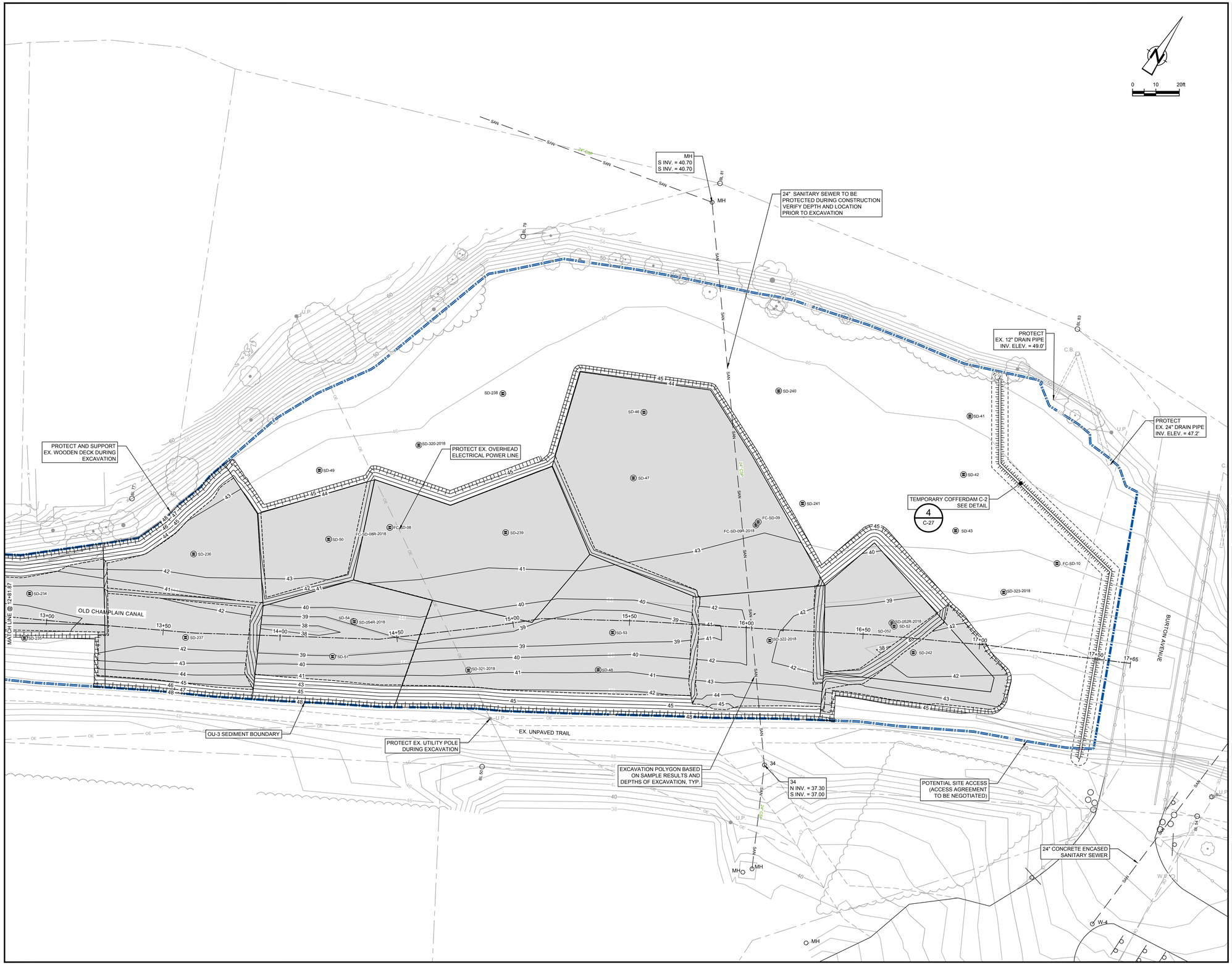
CANAL SEDIMENT EXCAVATION
PLAN 5 OF 6 - < 50ppm

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 20'	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: C-09B

80987-20(014)CI-WA015 MAY 14, 2019



NΩ	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN EXISTING SANITARY SEWER
- STM EXISTING STORM SEWER
- W EXISTING WATER MAIN
- OE EXISTING ELECTRICAL OVERHEAD LINE
- G EXISTING GAS MAIN
- X EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. EXISTING CATCH BASIN
- M.H. EXISTING MAN HOLE
- HYD. EXISTING HYDRANT
- U.P. EXISTING UTILITY POLE
- W.V. EXISTING WATER VALVE
- MW-5 EXISTING MONITORING WELL
- BM EXISTING BENCHMARK
- OU1 - ON-SITE BOUNDARY
- OU3 - SEDIMENT BOUNDARY
- OU3 - SOURCE AREA BOUNDARY
- EXTENT OF ≥ 50ppm PCB EXCAVATION AREA
- EXTENT OF PCBs < 50 ppm
- SD-78 SEDIMENT SAMPLE ID

NOTE:

EXCAVATE TO ELEVATIONS SHOWN UNLESS BEDROCK IS REACHED.

SCALE VERIFICATION

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Approved

DRAWING STATUS

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Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

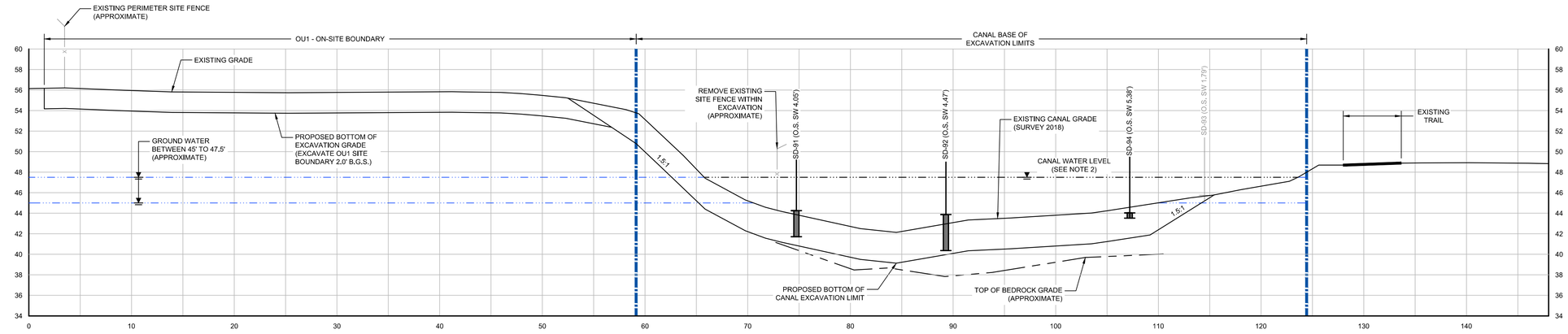
CANAL SEDIMENT EXCAVATION
PLAN 6 OF 6 - < 50ppm

GHD

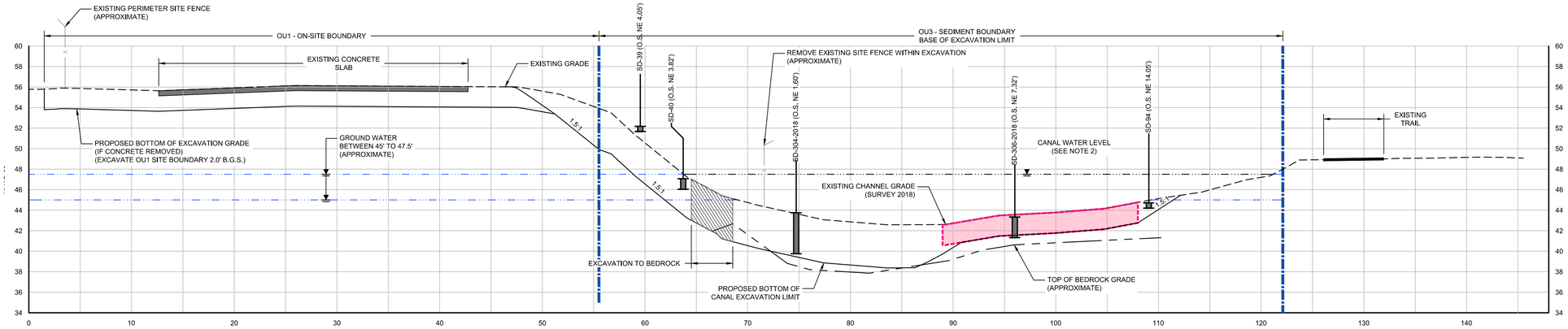
Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 20'	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: C-10

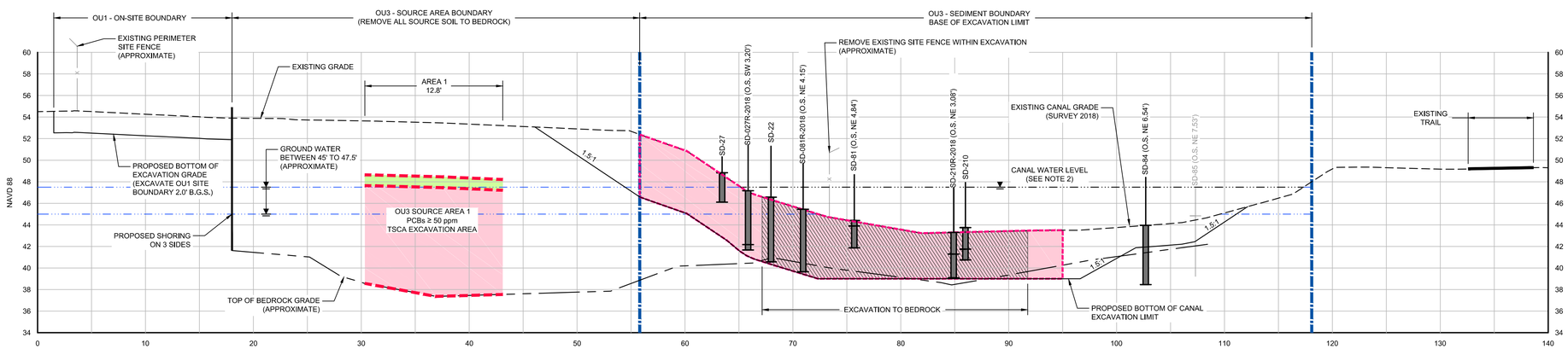
80987-20(014)CI-WA015 MAY 14, 2019



SECTION A-A' STA. 6+24.96
1" = 6'
C-09



SECTION B-B' STA. 6+62.81
1" = 6'
C-09



SECTION C-C' STA. 7+21.86
1" = 6'
C-09

NO	Revision	Date	Initial

LEGEND

EXTENT OF PCBs ≥ 50 ppm

PCB ≥ 50 ppm AND VOC > LDR
AREA 1 = 131 ft²

NOTES:

1. EXISTING CONCRETE SLABS CAN REMAIN AS A COMPONENT OF THE FINAL COVER IN OU1 UNLESS DAMAGED OR REMOVED TO ACCESS CANAL OU3 SEDIMENT AND/OR OU3 SOURCE SOILS. CONFIRM WITH ENGINEER.
2. CANAL WILL BE DRAINED FOR REMEDIAL ACTION IMPLEMENTATION. THE WATER LEVEL IN THE CANAL IS NORMALLY CONTOLLED BY A SPILLWAY WEIR (ELEV = 47.5' NAVD 88) AS SHOWN. WHERE SEDIMENT IS MORE THAN 6' BELOW THE NORMAL WATER ELEVATION, GRADE TO RESTORATION ELEVATIONS SHOWN. SEE NOTE 3
3. IF SEDIMENT EXCAVATION EXTENDS TO BEDROCK, BACKFILL WITH 1 FOOT OF CLAY.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

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ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

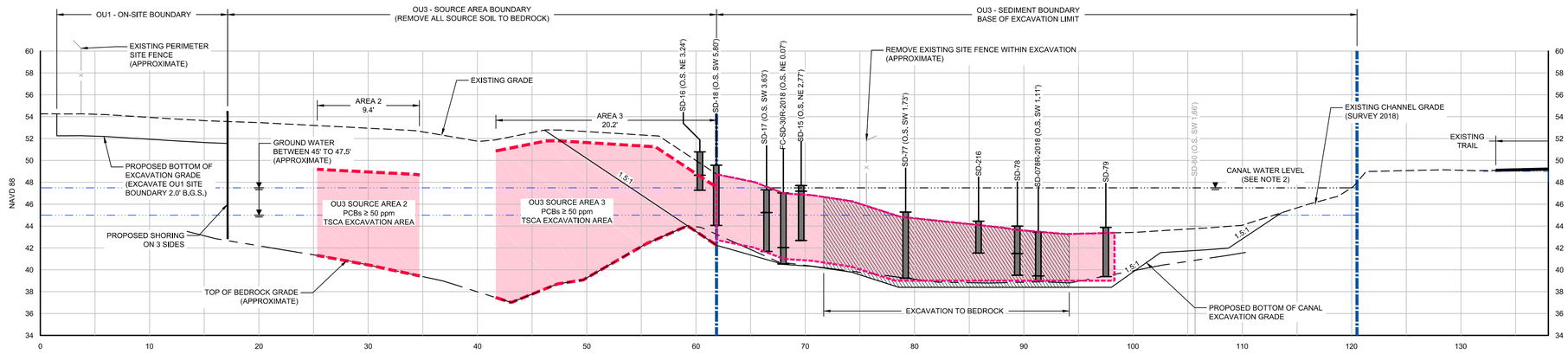
CANAL SEDIMENT EXCAVATION
CROSS SECTIONS PAGE 1 OF 3

GHD

Source Reference:

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: AS SHOWN	Project No: 80987-20	Report No: 014	Drawing No: C-11

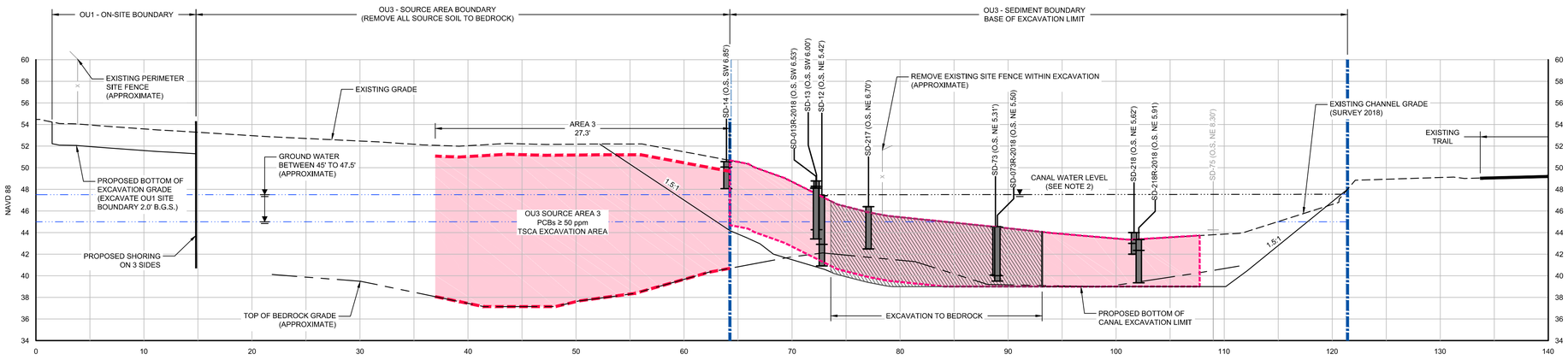
80987-20(014)CI-WA015 MAY 14, 2019



SECTION D-D' STA. 7+67.30

1" = 6'

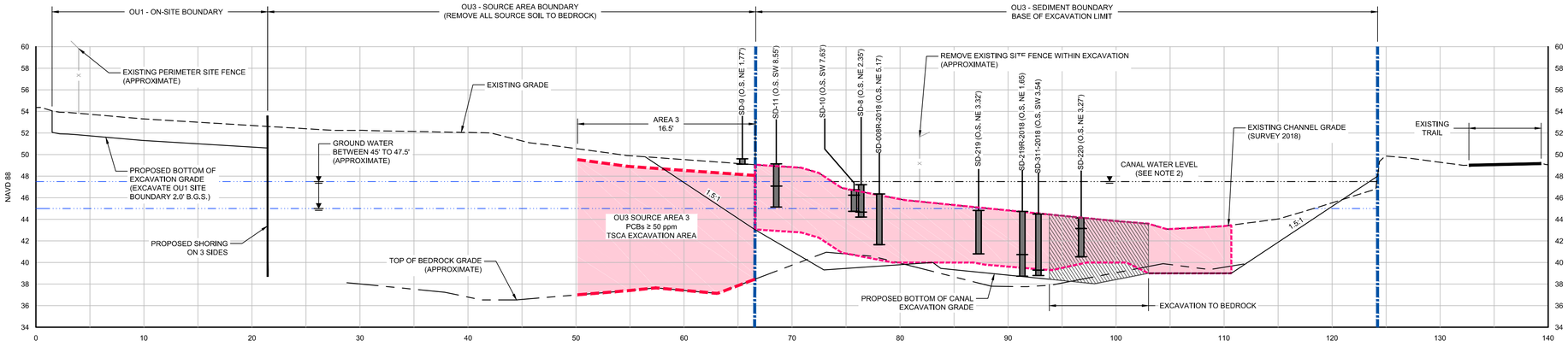
C-09



SECTION E-E' STA. 7+85.54

1" = 6'

C-09



SECTION F-F' STA. 8+09.89

1" = 6'

C-09

NO	Revision	Date	Initial

LEGEND

EXTENT OF PCBs ≥ 50 ppm

NOTES:

1. EXISTING CONCRETE SLABS CAN REMAIN AS A COMPONENT OF THE FINAL COVER IN OU1 UNLESS DAMAGED OR REMOVED TO ACCESS CANAL OU3 SEDIMENT AND/OR OU3 SOURCE SOILS. CONFIRM WITH ENGINEER.
2. CANAL WILL BE DRAINED FOR REMEDIAL ACTION IMPLEMENTATION. THE WATER LEVEL IN THE CANAL IS NORMALLY CONTOLLED BY A SPILLWAY WEIR (ELEV = 47.5' NAVD 88) AS SHOWN. WHERE SEDIMENT IS MORE THAN 6' BELOW THE NORMAL WATER ELEVATION, GRADE TO RESTORATION ELEVATIONS SHOWN. SEE NOTE 3
3. IF SEDIMENT EXCAVATION EXTENDS TO BEDROCK, BACKFILL WITH 1 FOOT OF CLAY.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

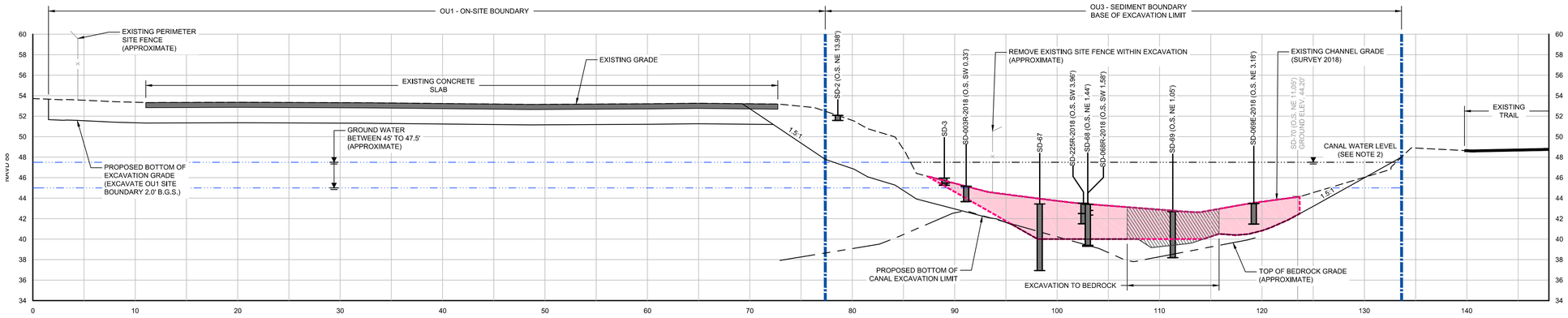
CANAL SEDIMENT EXCAVATION CROSS SECTIONS PAGE 2 OF 3

GHD

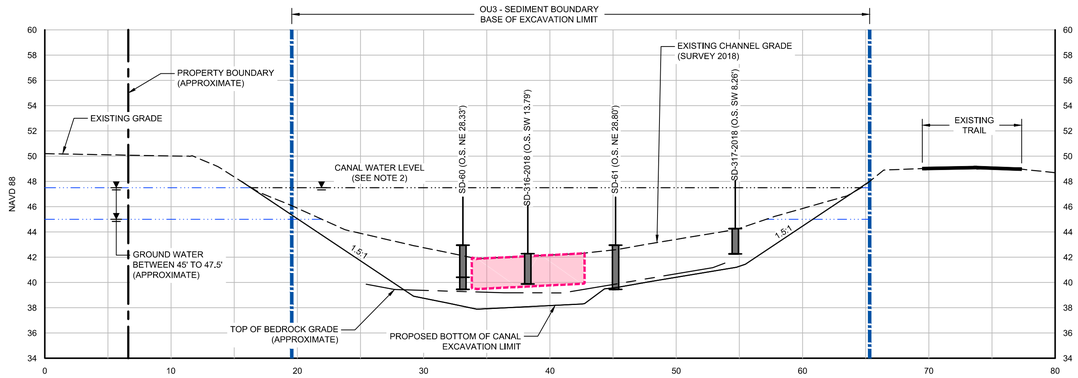
Source Reference:

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: AS SHOWN	Project No: 80987-20	Report No: 014	Drawing No: C-12

80987-20(014)CI-WA015 MAY 14, 2019



SECTION G-G' STA. 8+49.27
1" = 6'
C-09



SECTION H-H' STA. 10+24.17
1" = 6'
C-10

NO	Revision	Date	Initial

LEGEND

EXTENT OF PCBs ≥ 50 ppm

NOTES:

1. EXISTING CONCRETE SLABS CAN REMAIN AS A COMPONENT OF THE FINAL COVER IN OU1 UNLESS DAMAGED OR REMOVED TO ACCESS CANAL OU3 SEDIMENT AND/OR OU3 SOURCE SOILS. CONFIRM WITH ENGINEER.
2. CANAL WILL BE DRAINED FOR REMEDIAL ACTION IMPLEMENTATION. THE WATER LEVEL IN THE CANAL IS NORMALLY CONTOLLED BY A SPILLWAY WEIR (ELEV = 47.5' NAVD 88) AS SHOWN. WHERE SEDIMENT IS MORE THAN 6' BELOW THE NORMAL WATER ELEVATION, GRADE TO RESTORATION ELEVATIONS SHOWN. SEE NOTE 3
3. IF SEDIMENT EXCAVATION EXTENDS TO BEDROCK, BACKFILL WITH 1 FOOT OF CLAY.

SCALE VERIFICATION

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Approved

DRAWING STATUS

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ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
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Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

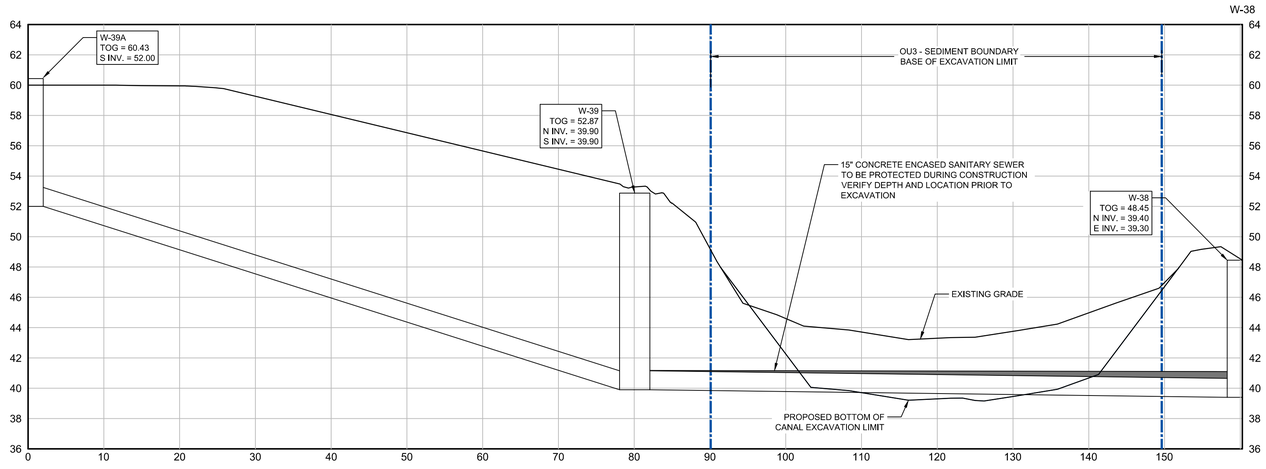
CANAL SEDIMENT EXCAVATION
CROSS SECTIONS PAGE 3 OF 3

GHD

Source Reference:

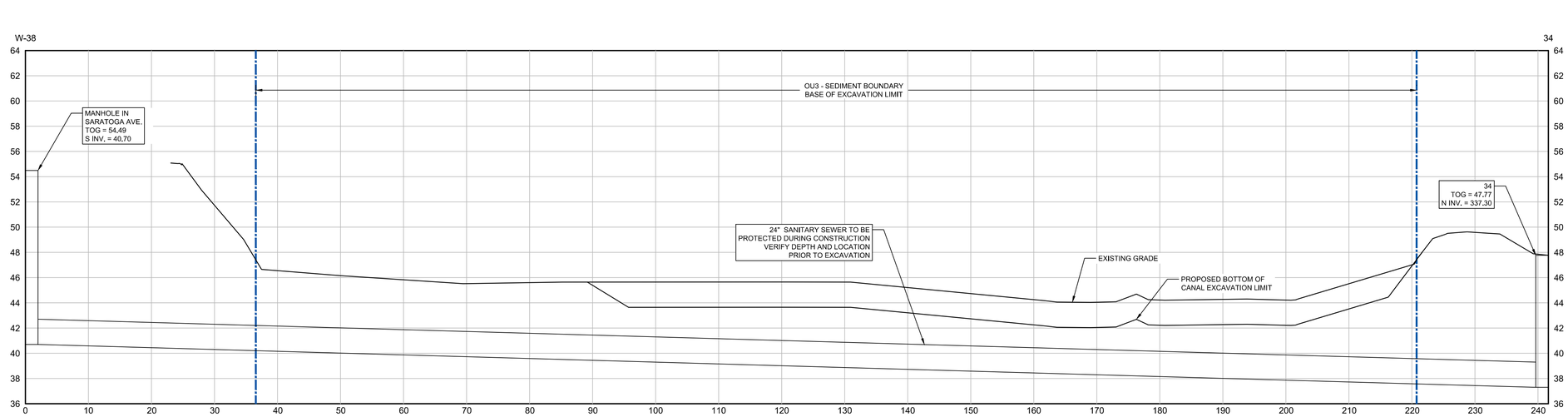
Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: AS SHOWN	Project No: 80987-20	Report No: 014	Drawing No: C-13

80987-20(014)CI-WA015 MAY 14, 2019



SOUTH SANITARY SEWER

HORIZ: 1" = 10'
VERT: 1"=5'



NORTH SANITARY SEWER

HORIZ: 1" = 10'
VERT: 1"=5'

NΩ	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

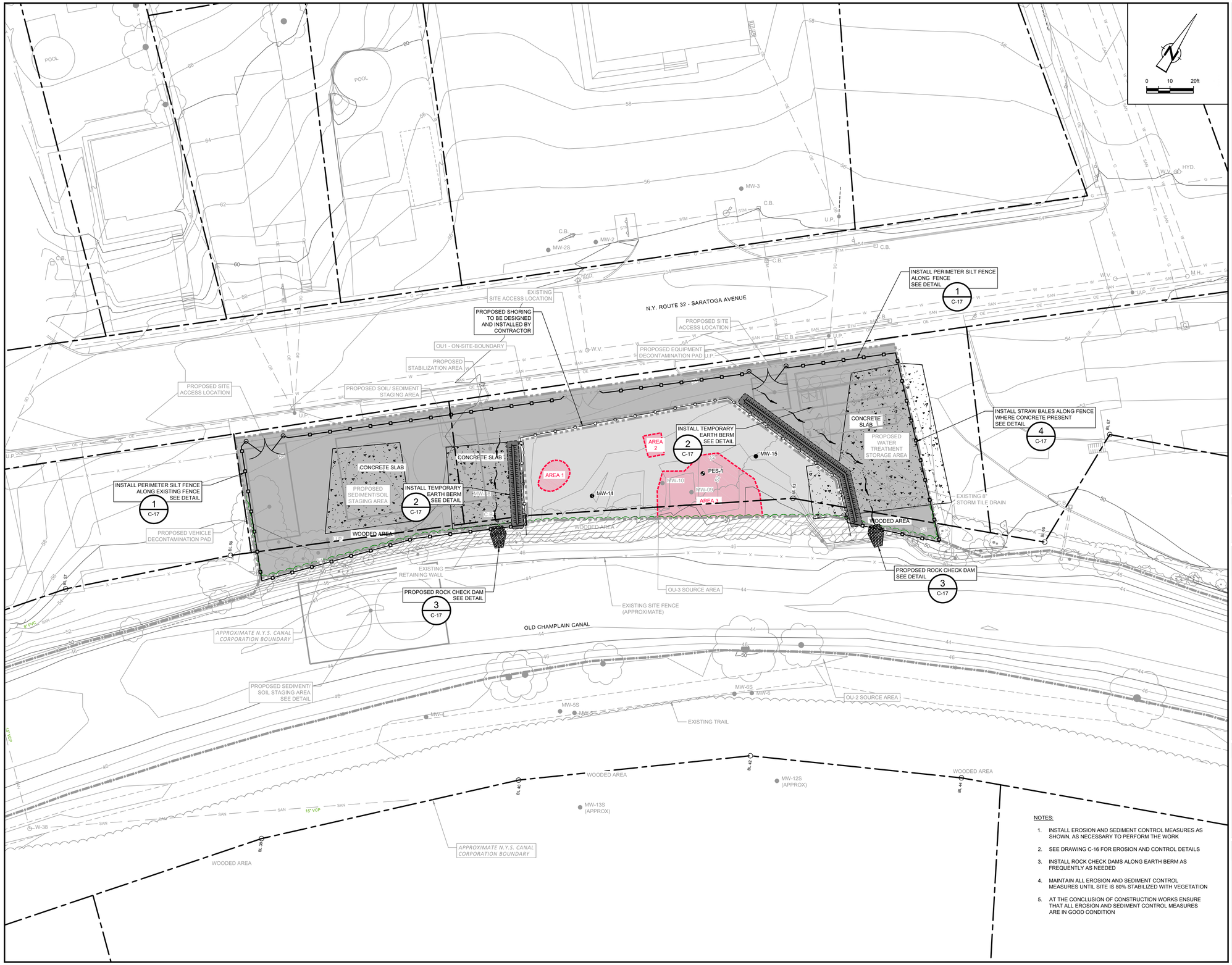
REMEDIAL DESIGN

CANAL SEDIMENT EXCAVATION
CROSS SECTIONS - SANITARY SEWERS

GHD

Source Reference:

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: AS SHOWN	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: C-14



N⁰	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 — EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN — EXISTING SANITARY SEWER
- STM — EXISTING STORM SEWER
- W — EXISTING WATER MAIN
- OE — EXISTING ELECTRICAL OVERHEAD LINE
- G — EXISTING GAS MAIN
- X — EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. — EXISTING CATCH BASIN
- M.H. — EXISTING MAN HOLE
- HYD. — EXISTING HYDRANT
- U.P. — EXISTING UTILITY POLE
- W.V. — EXISTING WATER VALVE
- MW-5 — EXISTING MONITORING WELL
- BM — EXISTING BENCHMARK
- OU1 - ON-SITE BOUNDARY
- OU3 - SEDIMENT BOUNDARY
- OU3 - SOURCE AREA BOUNDARY
- APPROXIMATE EXTENT OF > 50ppm PCB TSCA EXCAVATION AREA
- PROPOSED SILT FENCE
- PROPOSED SHORING
- PROPOSED BERM TOP OF BANK
- PROPOSED BERM TOE OF SLOPE
- PROPOSED ROCK CHECK DAM
- PROPOSED WATER FLOW DIRECTION

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

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NOTES:

1. INSTALL EROSION AND SEDIMENT CONTROL MEASURES AS SHOWN, AS NECESSARY TO PERFORM THE WORK
2. SEE DRAWING C-16 FOR EROSION AND CONTROL DETAILS
3. INSTALL ROCK CHECK DAMS ALONG EARTH BERM AS FREQUENTLY AS NEEDED
4. MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES UNTIL SITE IS 80% STABILIZED WITH VEGETATION
5. AT THE CONCLUSION OF CONSTRUCTION WORKS ENSURE THAT ALL EROSION AND SEDIMENT CONTROL MEASURES ARE IN GOOD CONDITION

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

EROSION AND SEDIMENT CONTROL SITE PLAN

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 20'	Project N⁰: 80987-20	Report N⁰: 014	Drawing N⁰: C-15

80987-20(014)CI-WA017 MAY 14, 2019

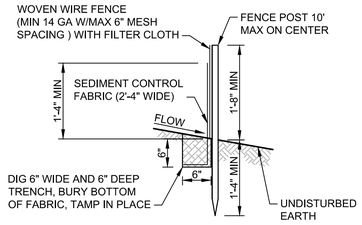


FIGURE 1

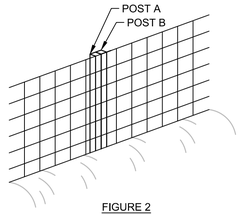


FIGURE 2

FIGURE 3

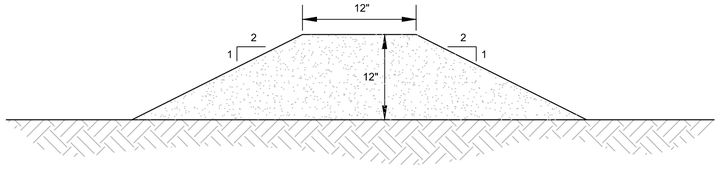
NOTES:

1. SILT FENCE HEIGHT TO BE 1'-8" MIN ABOVE GROUND, CONSTRUCTED OF FABRIC WITH MIN TENSILE STRENGTH OF 136LBS.
2. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES. POSTS SHALL BE STEEL "T" OR "U" TYPE OR HARDWOOD.
3. FILTER CLOTH TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION. FENCE SHALL BE WOVEN WIRE. SILT FENCE TO HAVE FACTORY ATTACHED FENCE POSTS.
4. REFER TO DRAWING FOR LOCATION OF SILT FENCE.
5. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE.

INSTALLATION SEQUENCE:

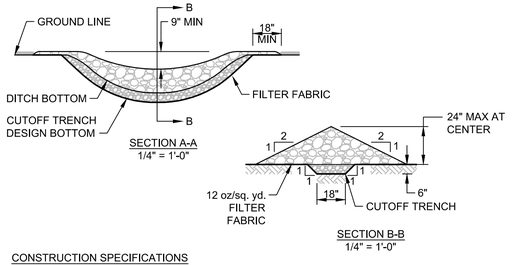
1. DIG A 6" X 6" TRENCH ALONG SILT FENCE LOCATIONS SHOWN.
2. UNROLL SILT FENCE POSITIONING THE POSTS ON THE DOWNSTREAM SIDE.
3. DRIVE POSTS INTO THE GROUND AS SHOWN ON FIGURE 1.
4. LAY THE BOTTOM 12" OF FABRIC FLAP IN THE BOTTOM OF THE TRENCH, BACKFILL AND COMPACT.
5. ADJACENT SECTIONS OF THE SILT FENCE ARE JOINED AS SHOWN IN FIGURE 3. A COUPLER CAN BE USED TO SECURE ADJACENT POSTS AS SHOWN IN FIGURE 2.

DETAIL 1 SILT FENCE (TYP)
NTS C-16



NOTES:
1. ALL BERMS SHALL BE COMPACTED BY EARTH MOVING EQUIPMENT.
2. ALL BERMS SHALL HAVE POSITIVE DRAINAGE TO AN OUTLET.
3. TOP WIDTH MAY BE WIDER AND SIDE SLOPES BE FLATTER IF DESIRED TO FACILITATE CROSSING CONSTRUCTION TRAFFIC.
4. STABILIZATION SHALL BE DONE BY USING SEED AND STRAW MULCH.

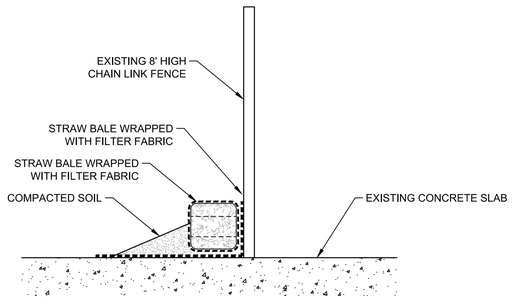
DETAIL 2 EARTH BERM (TYP)
NTS C-16



CONSTRUCTION SPECIFICATIONS

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION TO THE LINES, GRADES AND LOCATIONS SHOWN IN THE PLAN.
2. SET SPACING OF CHECK DAMS TO ASSUME THAT THE ELEVATIONS OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 18" BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.
5. ENSURE THAT CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.

DETAIL 3 CHECK DAM (TYP)
NTS C-16



CONSTRUCTION SEQUENCE

1. UNROLL FILTER FABRIC ALONG FENCE.
2. PLACE FILTER FABRIC WRAPPED STRAW BALE ON FILTER FABRIC SUCH THE FILTER FABRIC IS PINNED BETWEEN THE EXISTING CHAIN LINK FENCE AND THE STRAW BALE.
3. FILTER FABRIC TO EXTEND UP CHAIN LINK FENCE TO HEIGHT OF STRAW BALE. APPROXIMATE 1.O FEET.

DETAIL 4 STRAW BALE WALL
NTS C-16

NΩ	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

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ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

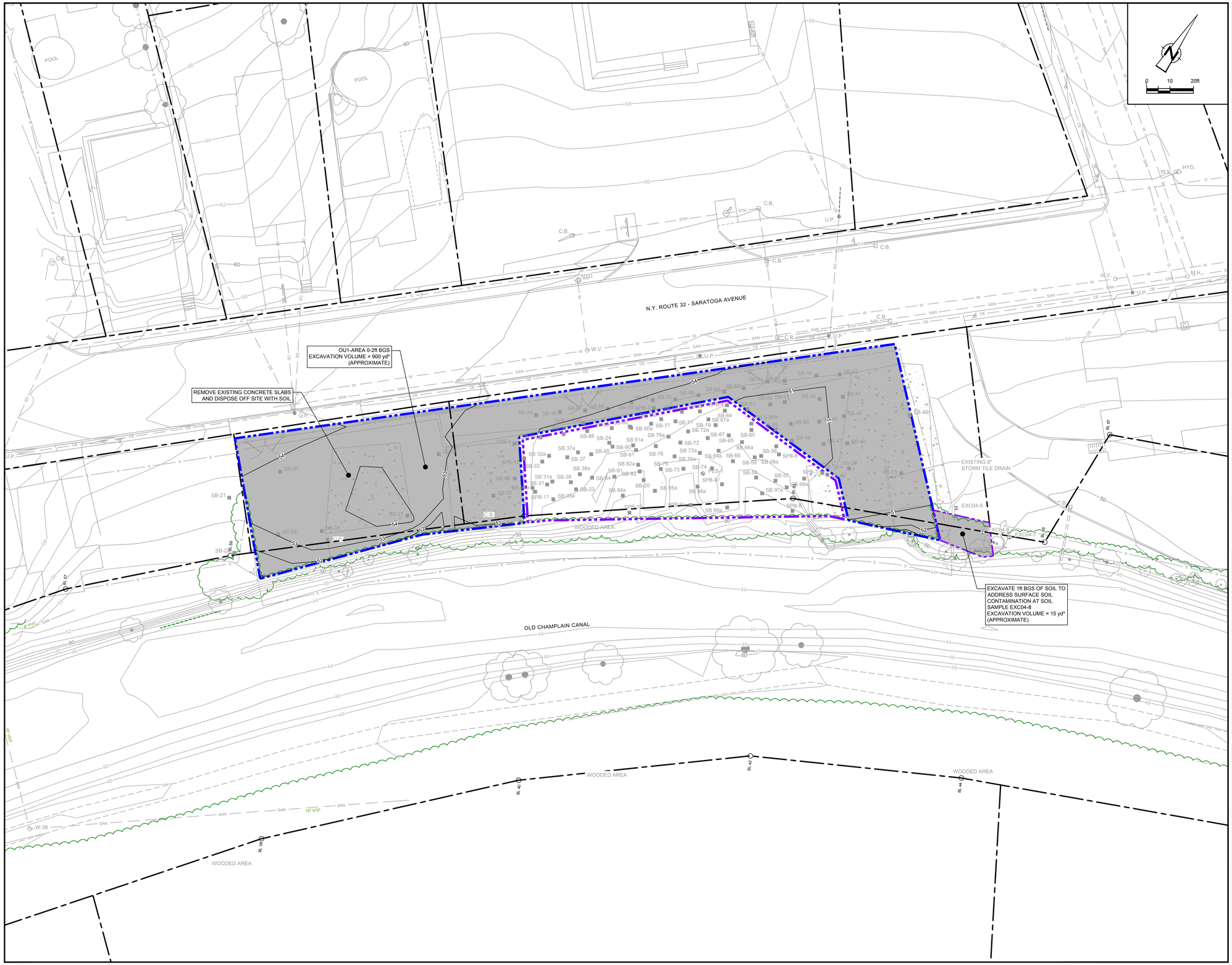
REMEDIAL DESIGN

EROSION AND SEDIMENT CONTROL MEASURES DETAILS

GHD

Source Reference:

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: AS SHOWN	Project NΩ: 80987-20	Report NΩ: 014	Drawing NΩ: C-16



Nº	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN EXISTING SANITARY SEWER
- STM EXISTING STORM SEWER
- W EXISTING WATER MAIN
- OE EXISTING ELECTRICAL OVERHEAD LINE
- G EXISTING GAS MAIN
- X EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. EXISTING CATCH BASIN
- M.H. EXISTING MAN HOLE
- HYD. EXISTING HYDRANT
- U.P. EXISTING UTILITY POLE
- W.V. EXISTING WATER VALVE
- MW-5 EXISTING MONITORING WELL
- OU1 - ON-SITE BOUNDARY
- OU3 - SOURCE AREA BOUNDARY
- OU-1 SOIL EXCAVATION AREA
  AREA = 12090 ft²
- EXCAVATION AREA (0-1 ft BGS)
  AREA = 324 ft²
- SB-72 SOIL BORING LOCATION
  (MALCOLM PIRNIE, 2009 TO 2011)
- SB 72a SOIL BORING LOCATION
  (GHD, 2014)
- EXC04-9 SOIL SAMPLE (SEPTEMBER/OCTOBER 2010)
  (MALCOLM PIRNIE, 2012)
- 52 EXCAVATION CONTOUR (NAVD 88)

NOTES

- BOGS - BELOW ORIGINAL GROUND SURFACE
- TSCA - TOXIC SUBSTANCE CONTROL ACT
- LDR - LAND DISPOSAL RESTRICTIONS

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

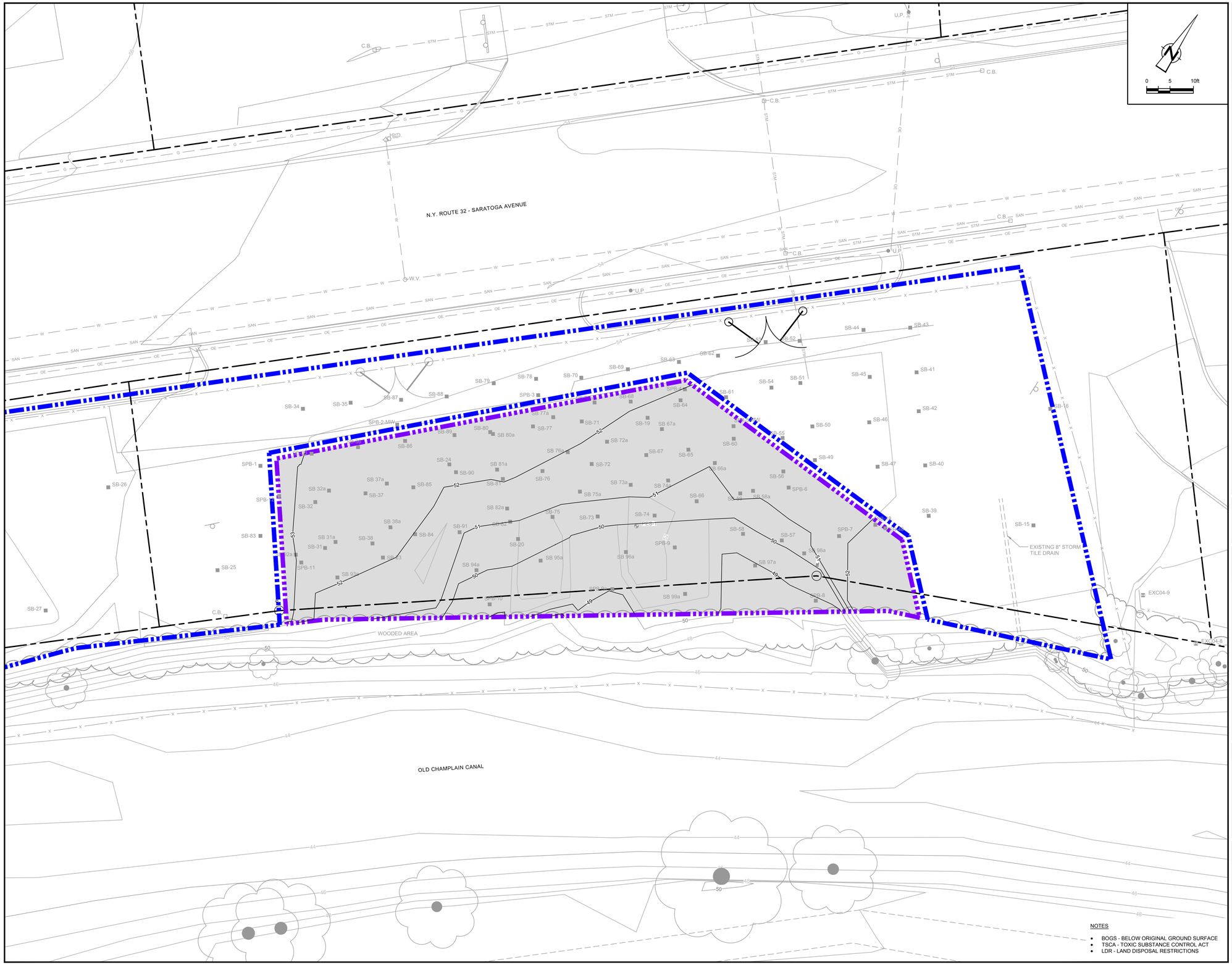
REMEDIAL DESIGN

SOURCE AREA OU-1
IMPACTED SOIL EXCAVATION (0-2 ft. BGS)

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 20'	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: C-17



0 5 10ft

No	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN EXISTING SANITARY SEWER
- STM EXISTING STORM SEWER
- W EXISTING WATER MAIN
- OE EXISTING ELECTRICAL OVERHEAD LINE
- G EXISTING GAS MAIN
- X X EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. EXISTING CATCH BASIN
- M.H. EXISTING MAN HOLE
- HYD. EXISTING HYDRANT
- U.P. EXISTING UTILITY POLE
- W.V. EXISTING WATER VALVE
- MW-5 EXISTING MONITORING WELL
- BM EXISTING BENCHMARK
- OU1 - ON-SITE BOUNDARY
- OU3 - SOURCE AREA BOUNDARY
- PCB < 50 ppm AND VOC < LDR AREA = 6277 ft
- SB-72 SOIL BORING LOCATION (MALCOLM PIRNIE, 2009 TO 2011)
- SB 72a SOIL BORING LOCATION (GHD, 2014)
- EXC04-9 SOIL SAMPLE (SEPTEMBER/OCTOBER 2010) (MALCOLM PIRNIE, 2012)
- 52 EXCAVATION CONTOUR (NAVD 88)

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

SOURCE AREA OU-3
IMPACTED SOIL EXCAVATION (0-1 ft. BGS)

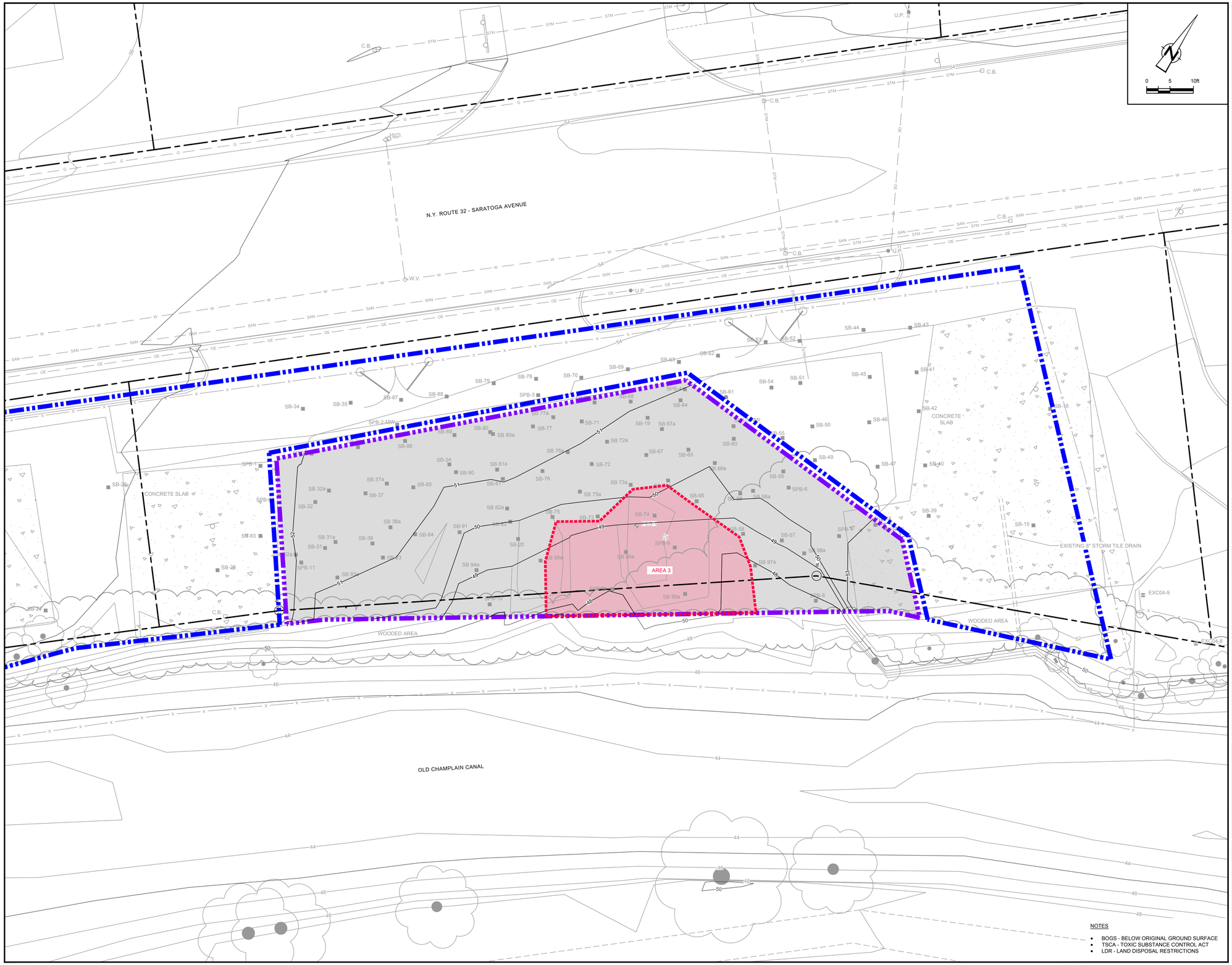
NOTES

- BOGS - BELOW ORIGINAL GROUND SURFACE
- TSCA - TOXIC SUBSTANCE CONTROL ACT
- LDR - LAND DISPOSAL RESTRICTIONS

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 10'	Project No.: 80987-20	Report No.: 014	Drawing No.: C-18

80987-20(014)CI-WA004 MAY 14, 2019



NOTES

- BOGS - BELOW ORIGINAL GROUND SURFACE
- TSCA - TOXIC SUBSTANCE CONTROL ACT
- LDR - LAND DISPOSAL RESTRICTIONS

Nº	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN EXISTING SANITARY SEWER
- STM EXISTING STORM SEWER
- W EXISTING WATER MAIN
- OE EXISTING ELECTRICAL OVERHEAD LINE
- G EXISTING GAS MAIN
- X X EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. EXISTING CATCH BASIN
- M.H. EXISTING MAN HOLE
- HYD. EXISTING HYDRANT
- U.P. EXISTING UTILITY POLE
- W.V. EXISTING WATER VALVE
- MW-5 EXISTING MONITORING WELL
- BM EXISTING BENCHMARK
- OU1 - ON-SITE BOUNDARY
- OU3 - SOURCE AREA BOUNDARY
- PCB < 50 ppm AND VOC < LDR AREA 3 = 5312 ft²
- PCB > 50 ppm AND VOC < LDR AREA 3 = 965 ft²
- SB-72 SOIL BORING LOCATION (MALCOLM PIRNIE, 2009 TO 2011)
- SB 72a SOIL BORING LOCATION (GHD, 2014)
- EXC04-9 SOIL SAMPLE (SEPTEMBER/OCTOBER 2010) (MALCOLM PIRNIE, 2012)
- 52 EXCAVATION CONTOUR (NAVD 88)

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial
ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

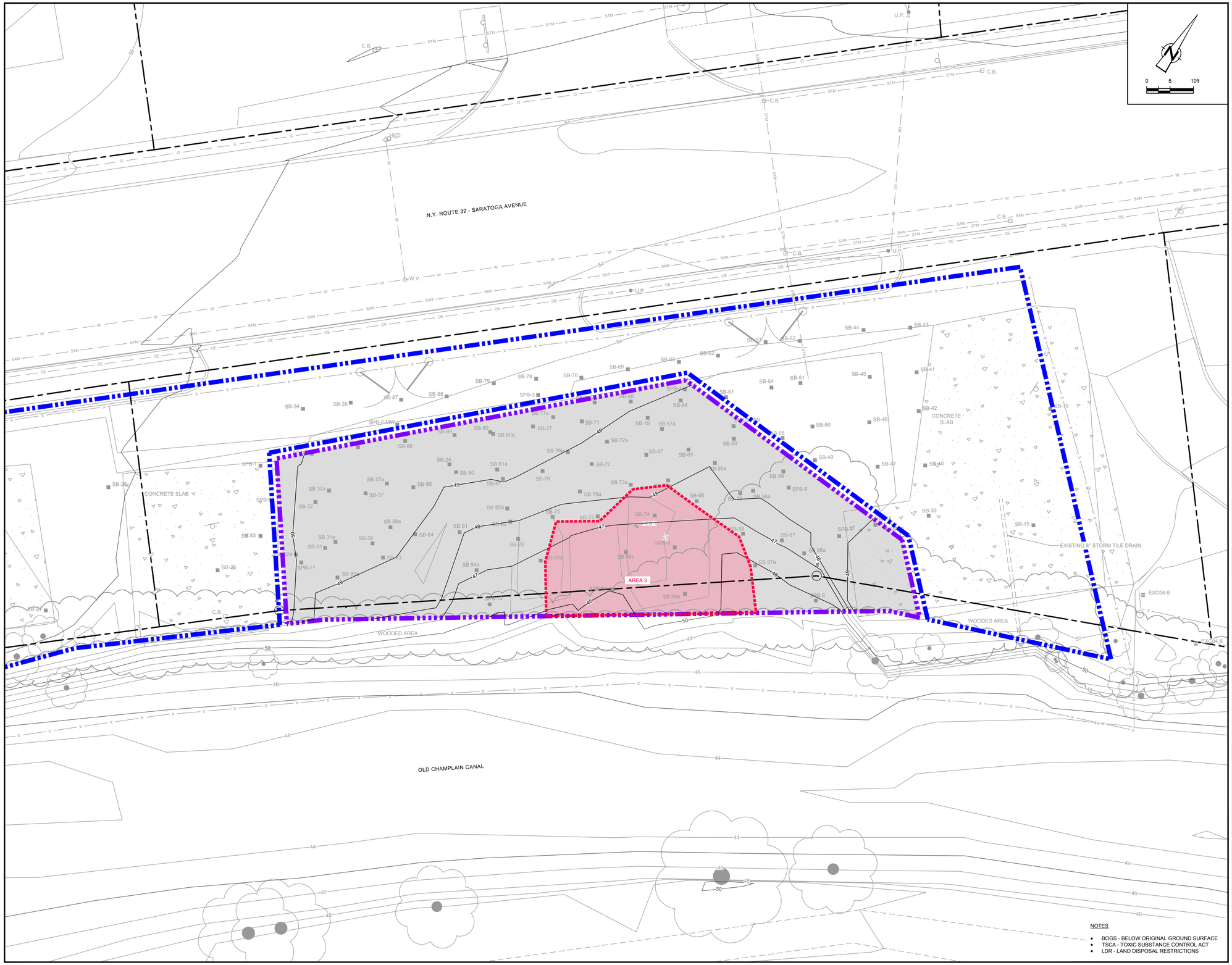
SOURCE AREA OU-3
IMPACTED SOIL EXCAVATION (1-2 ft. BGS)

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 10'	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: C-19

80987-20(014)CI-WA005 MAY 14, 2019



NOTES

- BOGS - BELOW ORIGINAL GROUND SURFACE
- TSCA - TOXIC SUBSTANCE CONTROL ACT
- LDR - LAND DISPOSAL RESTRICTIONS

NO	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN EXISTING SANITARY SEWER
- STM EXISTING STORM SEWER
- W EXISTING WATER MAIN
- OE EXISTING ELECTRICAL OVERHEAD LINE
- G EXISTING GAS MAIN
- X X EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. EXISTING CATCH BASIN
- M.H. EXISTING MAN HOLE
- HYD. EXISTING HYDRANT
- U.P. EXISTING UTILITY POLE
- W.V. EXISTING WATER VALVE
- MW-5 EXISTING MONITORING WELL
- BM EXISTING BENCHMARK
- OU1 - ON-SITE BOUNDARY
- OU3 - SOURCE AREA BOUNDARY
- PCB < 50 ppm AND VOC < LDR AREA 3 = 5312 ft²
- PCB ≥ 50 ppm AND VOC < LDR AREA 3 = 965 ft²
- SB-72 SOIL BORING LOCATION (MALCOLM PIRNIE, 2009 TO 2011)
- SB 72a SOIL BORING LOCATION (GHD, 2014)
- EXC04-9 SOIL SAMPLE (SEPTEMBER/OCTOBER 2010) (MALCOLM PIRNIE, 2012)
- 52 EXCAVATION CONTOUR (NAVD 88)

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

SOURCE AREA OU-3
IMPACTED SOIL EXCAVATION (2-4 ft. BGS)

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 10'	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: C-20

80987-20(014)CI-WA006 MAY 14, 2019

NOTES

- BOGS - BELOW ORIGINAL GROUND SURFACE
- TSCA - TOXIC SUBSTANCE CONTROL ACT
- LDR - LAND DISPOSAL RESTRICTIONS
- GRAB SAMPLES COLLECTED FROM GRID NODES WITH LIKE NUMBERS WILL BE COMBINED TO FORM ONE COMPOSITE SAMPLE
- GRID INTERVAL IS 5 FEET
- COMPOSITE SAMPLES SHOULD BE COMBINED FROM A MAXIMUM OF 9 GRAB SAMPLES WITH A MINIMUM OF 3 SAMPLES COLLECTED FROM EACH AREA

No	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN EXISTING SANITARY SEWER
- STM EXISTING STORM SEWER
- W EXISTING WATER MAIN
- OE EXISTING ELECTRICAL OVERHEAD LINE
- G EXISTING GAS MAIN
- X X EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. EXISTING CATCH BASIN
- M.H. EXISTING MAN HOLE
- HYD. EXISTING HYDRANT
- U.P. EXISTING UTILITY POLE
- W.V. EXISTING WATER VALVE
- MW-5 EXISTING MONITORING WELL
- BM EXISTING BENCHMARK
- OU1 - ON-SITE BOUNDARY
- OU3 - SOURCE AREA BOUNDARY
- PCB < 50 ppm AND VOC < LDR AREA 3 = 5112 ft²
- PCB ≥ 50 ppm AND VOC < LDR AREA 2 = 69 ft², AREA 3 = 965 ft²
- PCB ≥ 50 ppm AND VOC > LDR AREA 1 = 131 ft²
- SB-72 SOIL BORING LOCATION (MALCOLM PIRNIE, 2009 TO 2011)
- SB 72a SOIL BORING LOCATION (GHD, 2014)
- EXC04-9 SOIL SAMPLE (SEPTEMBER/OCTOBER 2010) (MALCOLM PIRNIE, 2012)
- 52 EXCAVATION CONTOUR (NAVD 88)

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

SOURCE AREA OU-3
IMPACTED SOIL EXCAVATION (4-6 ft. BGS)

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 10'	Project No: 80987-20	Report No: 014	Drawing No: C-21

80987-20(014)CI-WA007 MAY 14, 2019

NO	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN EXISTING SANITARY SEWER
- STM EXISTING STORM SEWER
- W EXISTING WATER MAIN
- OE EXISTING ELECTRICAL OVERHEAD LINE
- G EXISTING GAS MAIN
- X X EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. EXISTING CATCH BASIN
- M.H. EXISTING MAN HOLE
- HYD. EXISTING HYDRANT
- U.P. EXISTING UTILITY POLE
- W.V. EXISTING WATER VALVE
- MW-5 EXISTING MONITORING WELL
- BM EXISTING BENCHMARK
- OU1 - ON-SITE BOUNDARY
- OU3 - SOURCE AREA BOUNDARY
- PCB < 50 ppm AND VOC < LDR AREA 3 = 5112 ft²
- EXTENT OF PCBs ≥ 50ppm AREA 1 = 131 ft², AREA 2 = 69 ft², AREA 3 = 965 ft²
- SB-72 SOIL BORING LOCATION (MALCOLM PIRNIE, 2009 TO 2011)
- SB 72a SOIL BORING LOCATION (GHD, 2014)
- EXC04-9 SOIL SAMPLE (SEPTEMBER/OCTOBER 2010) (MALCOLM PIRNIE, 2012)
- 52 EXCAVATION CONTOUR (NAVD 88)

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

SOURCE AREA OU-3
IMPACTED SOIL EXCAVATION (6-8 ft. BGS)

NOTES

- BOGS - BELOW ORIGINAL GROUND SURFACE
- TSCA - TOXIC SUBSTANCE CONTROL ACT
- LDR - LAND DISPOSAL RESTRICTIONS
- GRAB SAMPLES COLLECTED FROM GRID NODES WITH LIKE NUMBERS WILL BE COMBINED TO FORM ONE COMPOSITE SAMPLE
- GRID INTERVAL IS 5 FEET
- COMPOSITE SAMPLES SHOULD BE COMBINED FROM A MAXIMUM OF 9 GRAB SAMPLES WITH A MINIMUM OF 3 SAMPLES COLLECTED FROM EACH AREA

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 10'	Project No: 80987-20	Report No: 014	Drawing No: C-22

Nº	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 — EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN — EXISTING SANITARY SEWER
- STM — EXISTING STORM SEWER
- W — EXISTING WATER MAIN
- OE — EXISTING ELECTRICAL OVERHEAD LINE
- G — EXISTING GAS MAIN
- X — X — EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. — EXISTING CATCH BASIN
- M.H. — EXISTING MAN HOLE
- HYD. — EXISTING HYDRANT
- U.P. — EXISTING UTILITY POLE
- W.V. — EXISTING WATER VALVE
- MW-5 — EXISTING MONITORING WELL
- BM — EXISTING BENCHMARK
- OU1 - ON-SITE BOUNDARY
- OU3 - SOURCE AREA BOUNDARY
- PCB < TSCA AND VOC < LDR AREA 3 = 5112 ft²
- EXTENT OF PCBs ≥ 50ppm AREA 1 = 131 ft², AREA 2 = 69 ft², AREA 3 = 965 ft²
- SB-72 — SOIL BORING LOCATION (MALCOLM PIRNIE, 2009 TO 2011)
- SB 72a — SOIL BORING LOCATION (GHD, 2014)
- EXC04-9 — SOIL SAMPLE (SEPTEMBER/OCTOBER 2010) (MALCOLM PIRNIE, 2012)
- 42 — TOP OF BEDROCK CONTOUR (APPROXIMATE)

NOTES

- BOGS - BELOW ORIGINAL GROUND SURFACE
- TSCA - TOXIC SUBSTANCE CONTROL ACT
- LDR - LAND DISPOSAL RESTRICTIONS
- ADDITIONAL EXCAVATION MAY BE REQUIRED BASED ON VERIFICATION SAMPLE RESULTS FROM 8 ft. BOGS (AREAS 1, 2 AND 3)

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

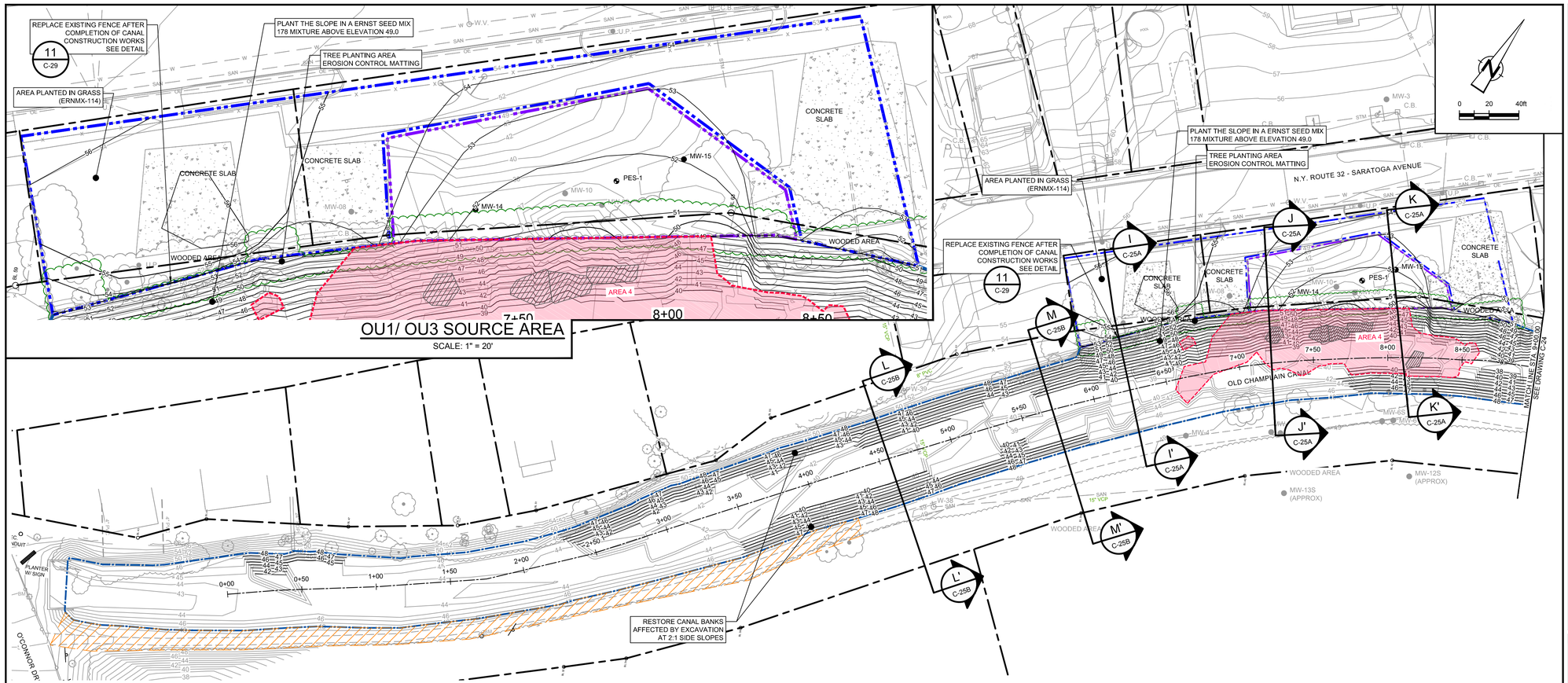
SOURCE AREA OU-3
IMPACTED SOIL EXCAVATION (8 ft. BGS - BEDROCK)

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 10'	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: C-23

80987-20(014)CI-WA009 MAY 14, 2019



OU1/ OU3 SOURCE AREA

SCALE: 1" = 20'

NΩ	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 EXISTING CONDITION CONTOUR
- EXISTING VEGETATION
- SAN EXISTING SANITARY SEWER
- STM EXISTING STORM SEWER
- W EXISTING WATER MAIN
- OE EXISTING ELECTRICAL OVERHEAD LINE
- G EXISTING GAS MAIN
- X EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. EXISTING CATCH BASIN
- M.H. EXISTING MAN HOLE
- HYD. EXISTING HYDRANT
- U.P. EXISTING UTILITY POLE
- W.V. EXISTING WATER VALVE
- MW-5 EXISTING MONITORING WELL
- BM EXISTING BENCHMARK
- 56 PROPOSED FINAL GRADE CONTOUR (NAVD 88)
- N.Y.S. CANAL CORPORATION SPECIFICATION FOR STUMP REMOVAL, BACKFILL AND IMPERVIOUS EMBANKMENT APPLY

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

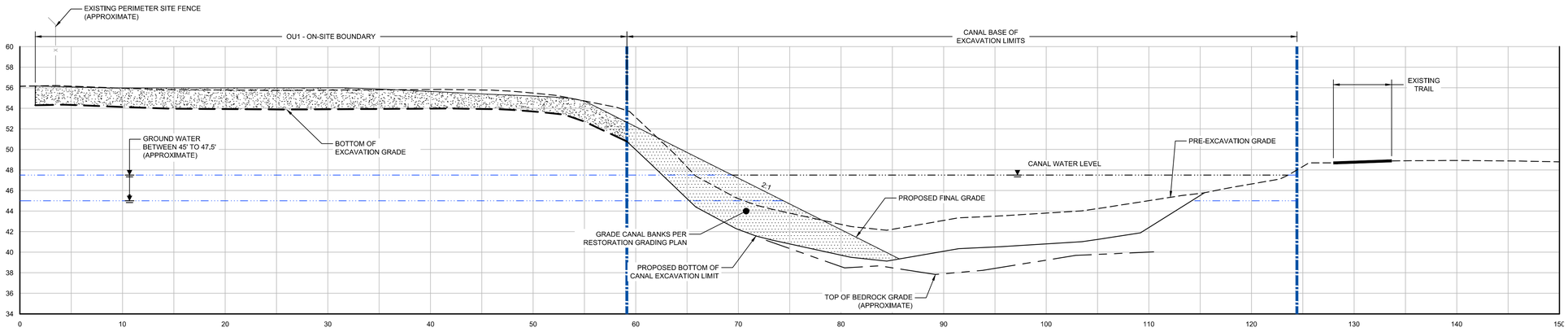
FINAL GRADING SITE PLAN

GHD

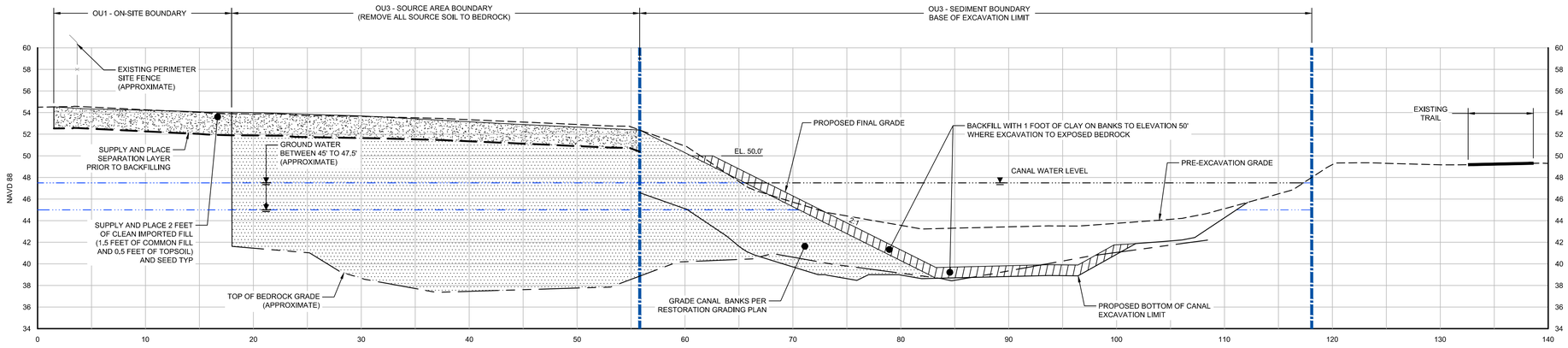
Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 40'	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: C-24

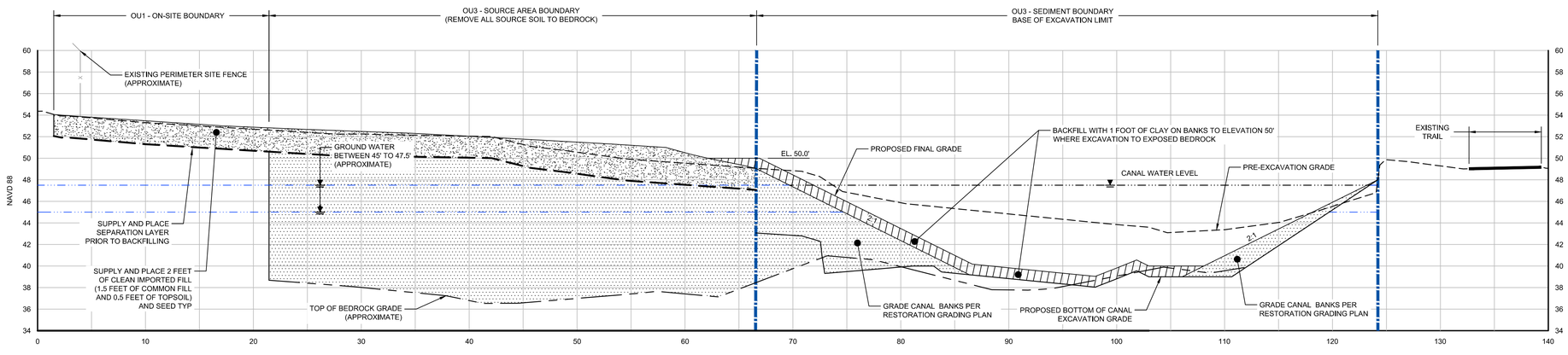
80987-20(014)CI-WA011 MAY 14, 2019



SECTION I-I' STA. 6+24.96
1" = 6'
C-24



SECTION J-J' STA. 7+21.86
1" = 6'
C-24



SECTION K-K' STA. 8+09.89
1" = 6'
C-24

NΩ	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

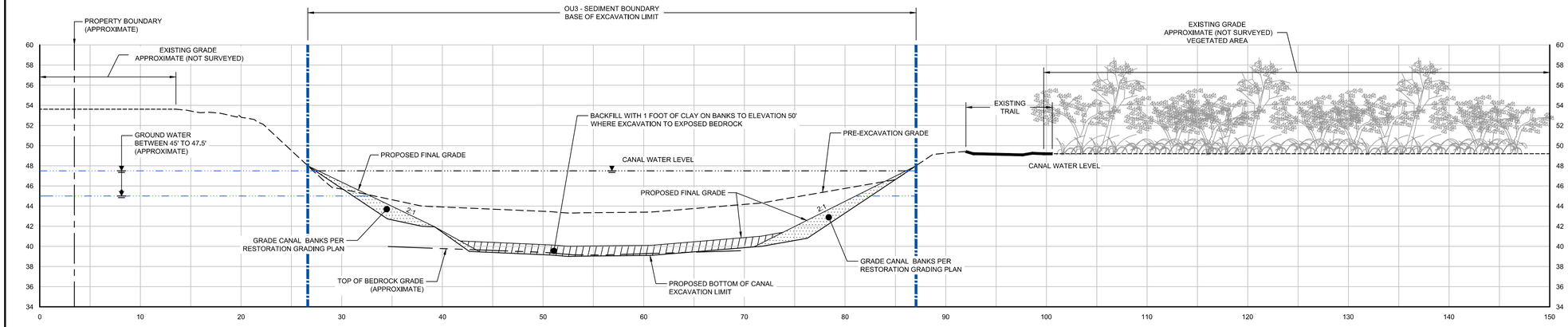
CANAL RESTORATION
CROSS SECTIONS PAGE 1 OF 3

GHD

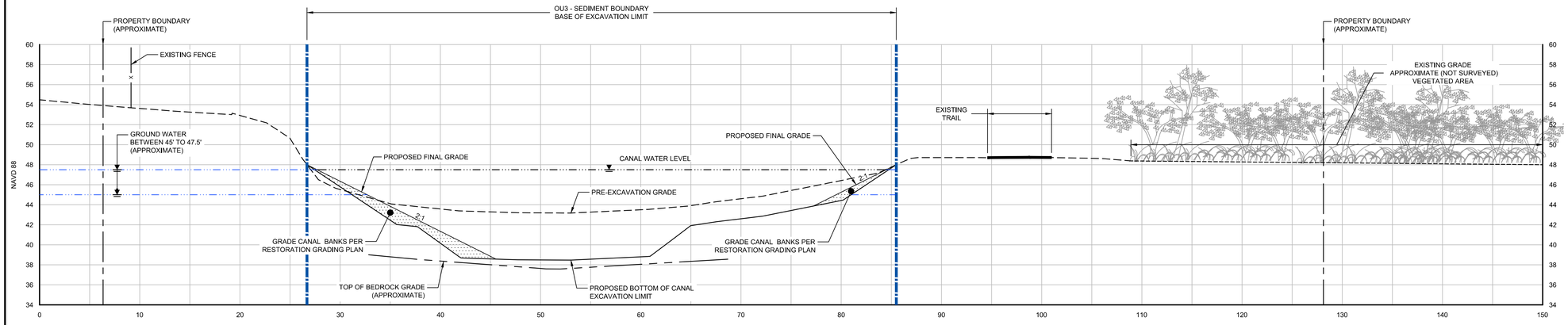
Source Reference:

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: AS SHOWN	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: C-25A

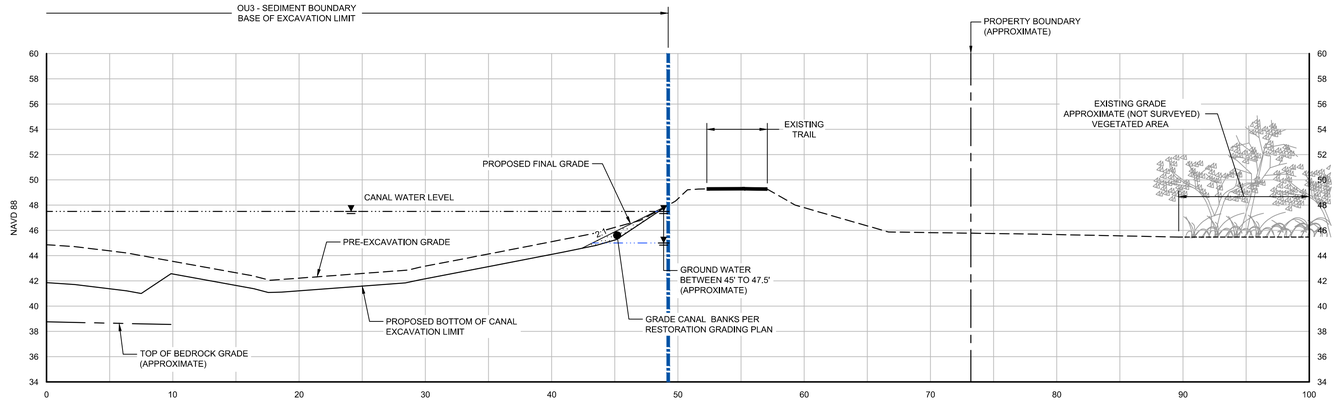
80987-20(014)CI-WA019 MAY 14, 2019



SECTION L-L' STA. 4+56.30
1" = 6'
C-24



SECTION M-M' STA. 5+71.05
1" = 6'
C-24



SECTION N-N' STA. 13+80.25
1" = 6'
C-24

NΩ	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

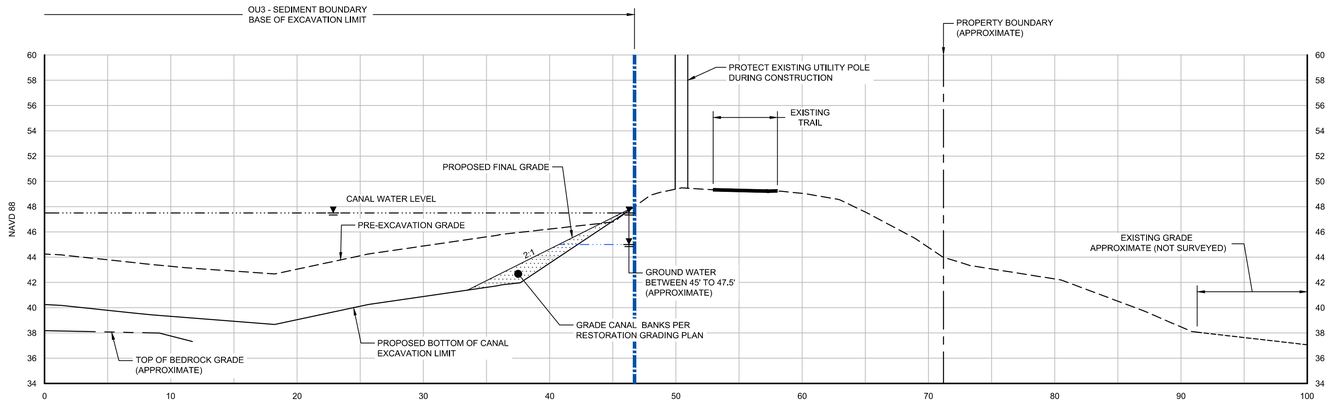
CANAL RESTORATION
CROSS SECTIONS PAGE 2 OF 3

GHD

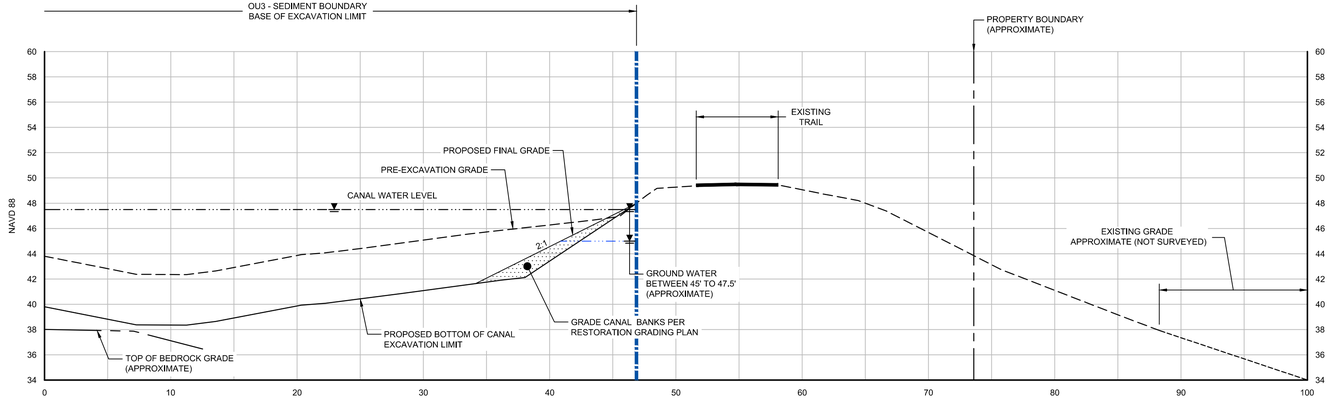
Source Reference:

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	MAY 2019	
Scale: AS SHOWN	Project NΩ: 80987-20	Report NΩ: 014	Drawing NΩ: C-25B

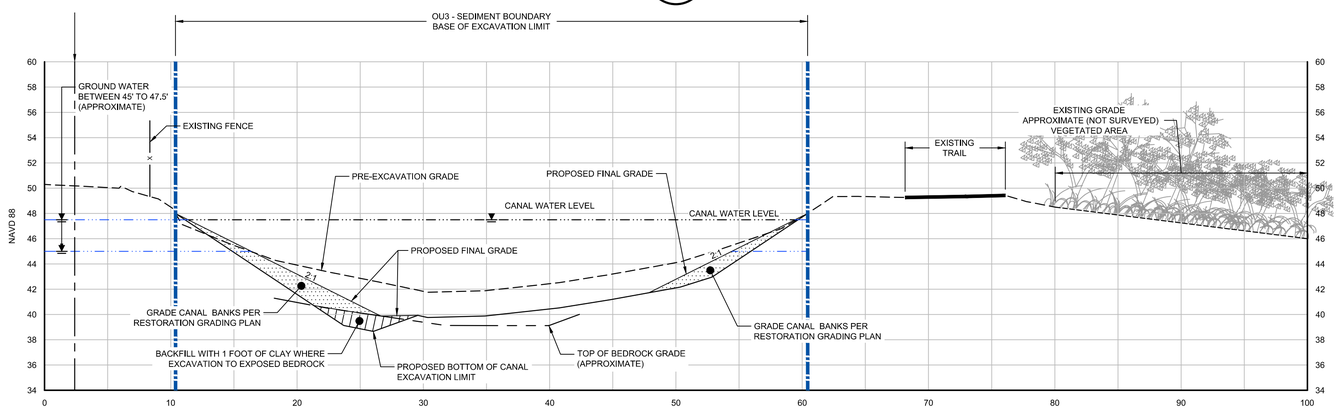
80987-20(014)CI-WA019 MAY 14, 2019



SECTION O-O' STA. 14+92.75
1" = 6'
C-24



SECTION P-P' STA. 15+59.39
1" = 6'
C-24



SECTION Q-Q' STA. 10+78.39
1" = 6'
C-24

NΩ	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

CANAL RESTORATION
CROSS SECTIONS PAGE 3 OF 3

GHD

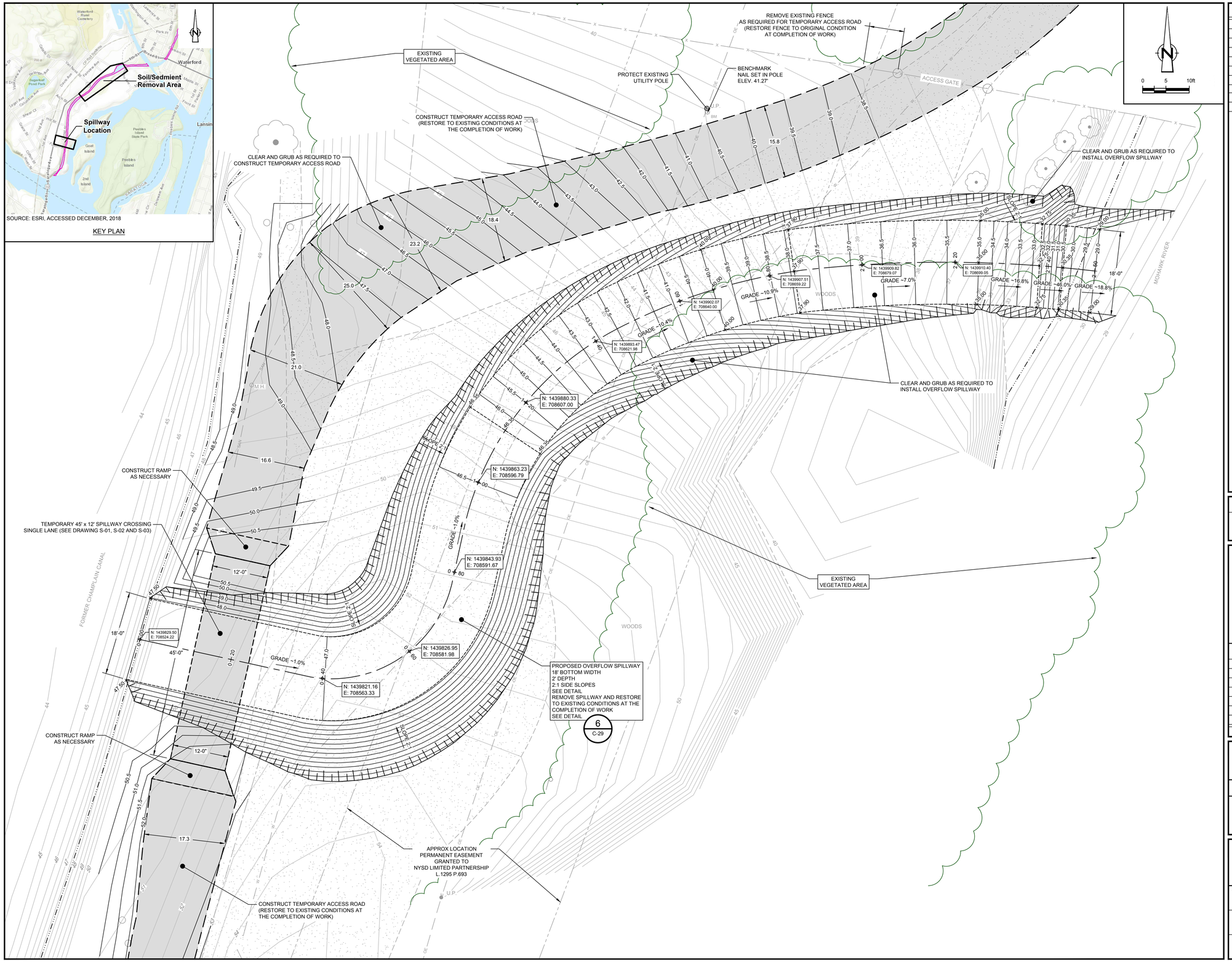
Source Reference:

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	MAY 2019	
Scale: AS SHOWN	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: C-25C

80987-20(014)CI-WA019 MAY 14, 2019

SOURCE: ESRI, ACCESSED DECEMBER, 2018

KEY PLAN



N⍰	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 — EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN — EXISTING SANITARY SEWER
- W — EXISTING WATER MAIN
- OE — EXISTING ELECTRICAL OVERHEAD LINE
- X — X — EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- M.H. — EXISTING MAN HOLE
- U.P. — EXISTING UTILITY POLE
- BM — EXISTING BENCHMARK
- EXISTING GRAVEL DRIVEWAY

NOTES

- N.Y.S. CANAL CORPORATION SPECIFICATION FOR STUMP REMOVAL, BACKFILLING AND IMPERVIOUS EMBANKMENT APPLY TO WORKS.
- RESTORE TO PRE-EXISTING CONDITIONS AT COMPLETION OF WORK.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial
ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

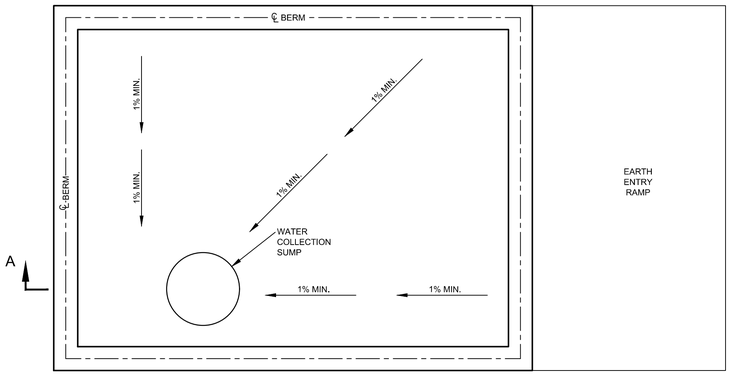
REMEDIAL DESIGN

TEMPORARY OVERFLOW SPILLWAY

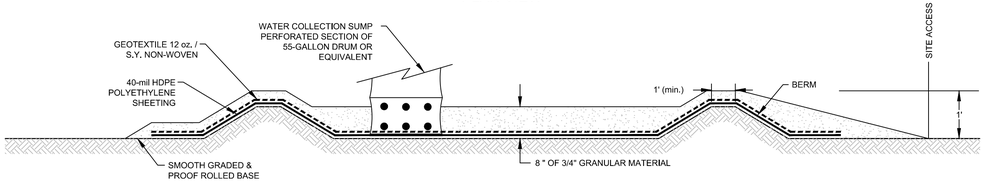
GHD

Source Reference:
TOPOGRAPHIC SURVEY - SI GROUP PROPOSED SPILLWAY AREA - CHA COMPANIES 32690-3002 - VBASE-326903002-SW - 10/16/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale:	Project N⍰:	Report N⍰:	Drawing N⍰:
1" = 10'	80987-20	014	C-26



PLAN VIEW



SECTION A-A'

NOTES:

1. TEMPORARY DECONTAMINATION PAD TO BE CONSTRUCTED IN SUITABLE LOCATION CLOSE TO WORK AREAS, AS REQUIRED.
2. TEMPORARY DECONTAMINATION PAD GRANULAR MATERIAL AND SEDIMENTS COLLECTED FROM DECONTAMINATING EXCAVATION EQUIPMENT TO BE CHARACTERIZED FOR OFF-SITE DISPOSAL.

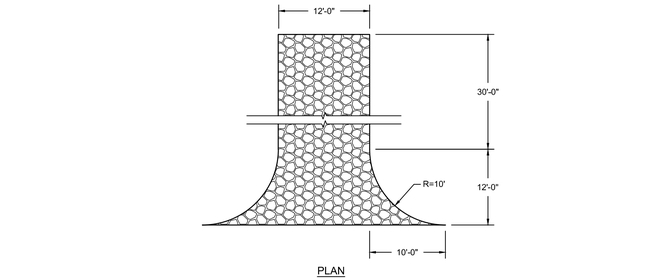
EQUIPMENT DECONTAMINATION PAD DIMENSIONS

PAD I : 45 ft. x 18 ft.

PAD II : 15 ft. x 15 ft.

DETAIL 1 TYPICAL EQUIPMENT DECONTAMINATION PAD

NTS



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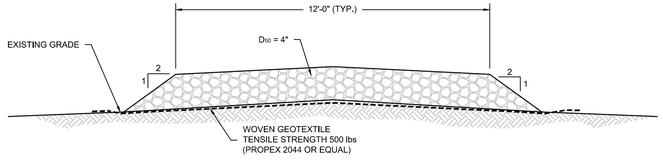
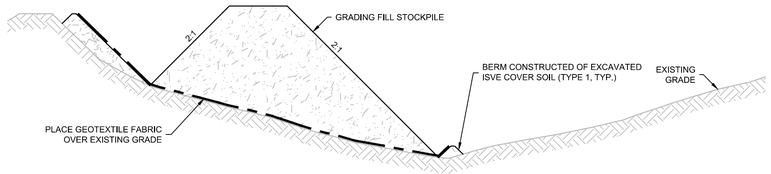


SECTION
N.T.S.

DETAIL 3 STABILIZED CONSTRUCTION ENTRANCE

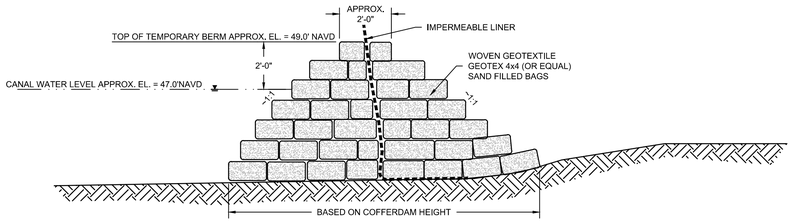
NTS

COFFERDAM	CREST ELEV. (FT, NAVD88)
C2	48.32
C3	48.82

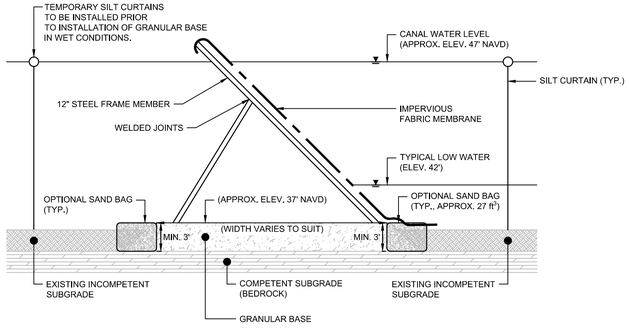


DETAIL 2 SOIL STOCKPILE AREA

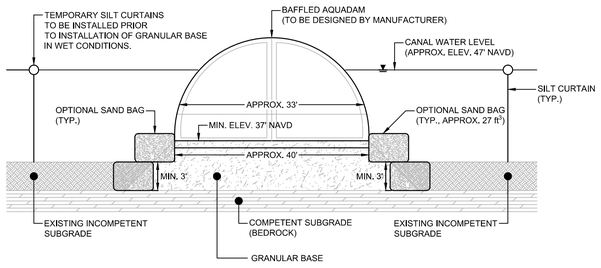
HOR. 1" = 40'
VER. 1" = 20



OPTION 1 - COFFERDAM C2 AND C3



OPTION 2 - COFFERDAM C2 AND C3



OPTION 3 - COFFERDAM C2 AND C3

DETAIL 4 TEMPORARY COFFERDAM

NTS

Nº	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave., Waterford, New York

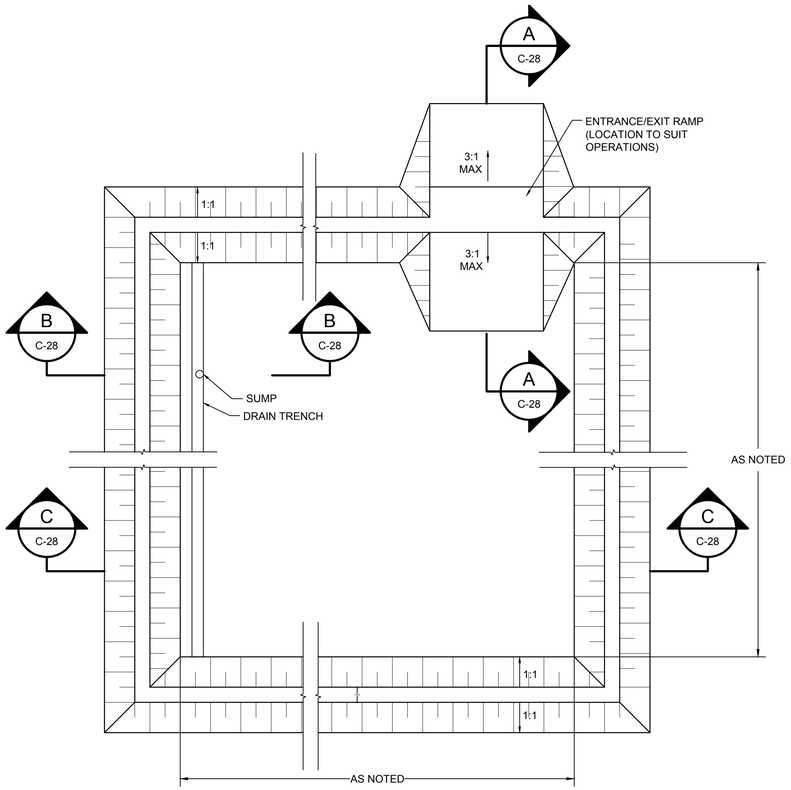
REMEDIAL DESIGN

DETAILS
PAGE 1 OF 3

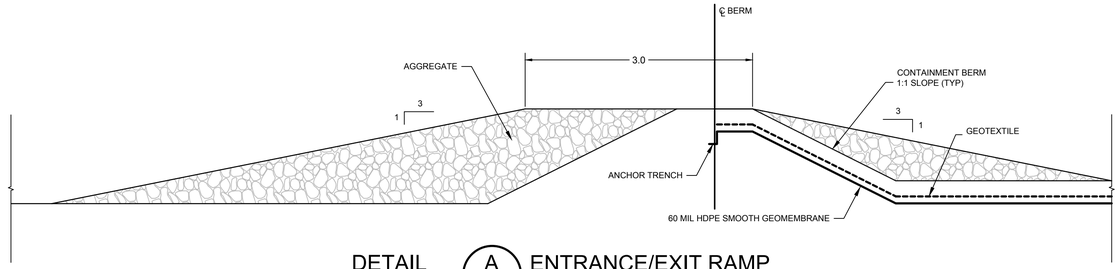
GHD

Source Reference:

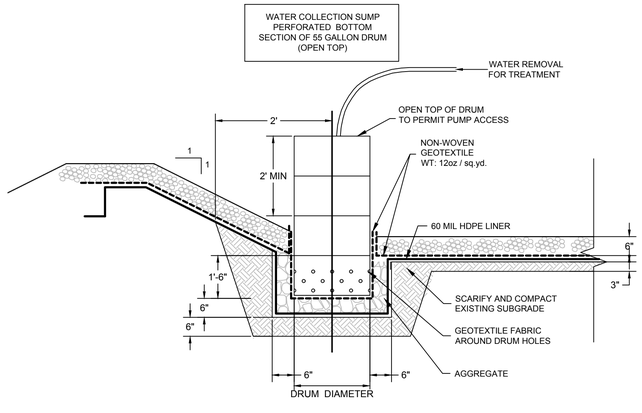
Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: AS SHOWN	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: C-27



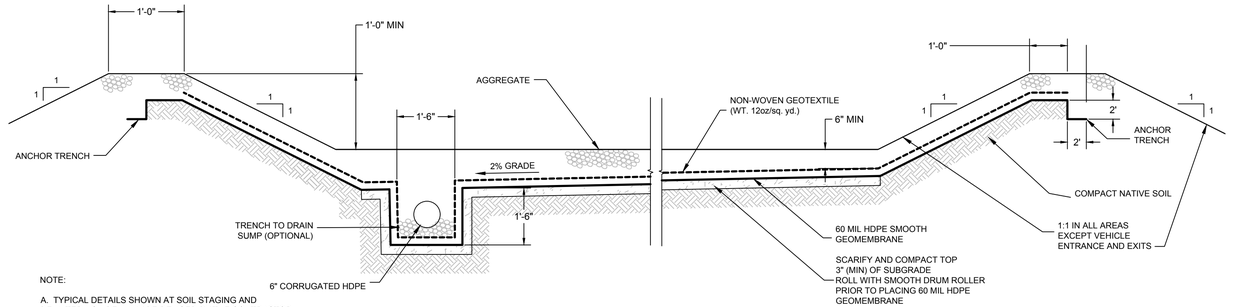
PLAN
N.T.S.



DETAIL A C-28 ENTRANCE/EXIT RAMP
N.T.S.



SECTION B C-28 SUMP PUMP
N.T.S.



NOTE:

A. TYPICAL DETAILS SHOWN AT SOIL STAGING AND DEWATERING AREA MAY BE REVISED BY THE CONTRACTOR. CONTRACTOR'S REVISED DETAILS SHALL BE SUBMITTED FOR REVIEW BY GHD PRIOR TO CONSTRUCTION.
B. DO NOT USE FOR SOILS WITH PCB'S ≥ 500ppm PLACE IN ROLL OFF

SECTION C SUMP PUMP
N.T.S.

DETAIL 5 - SITE STAGING AREA PCBs > 1ppm
NTS

No	Revision	Date	Initial

SCALE VERIFICATION

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Approved

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ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave., Waterford, New York

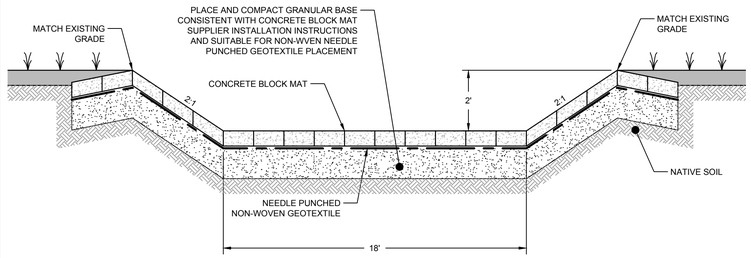
REMEDIAL DESIGN

DETAILS
PAGE 2 OF 3

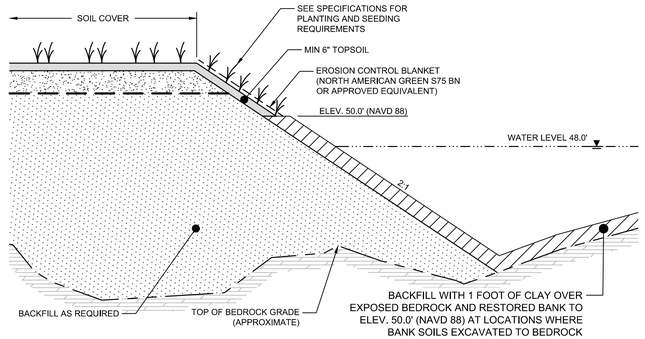
GHD

Source Reference:

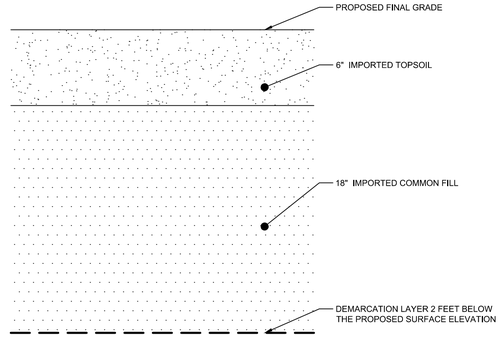
Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: AS SHOWN	Project No: 80987-20	Report No: 014	Drawing No: C-28



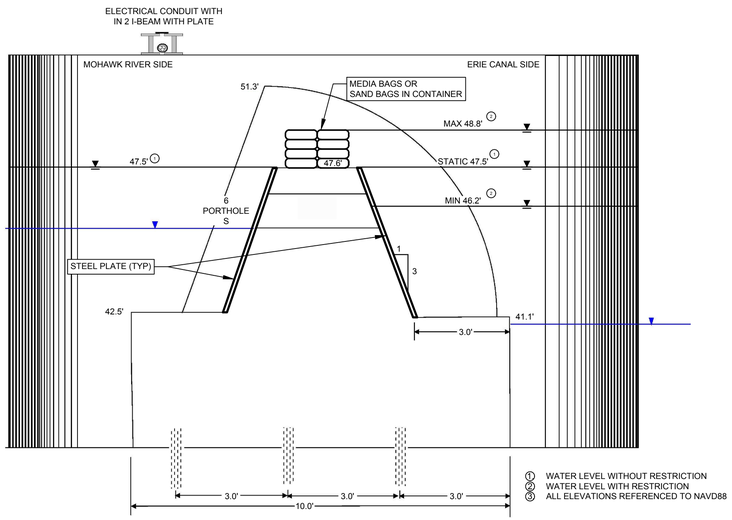
DETAIL 6 - OLD CHAMPLAIN CANAL TYPICAL SPILLWAY
N.T.S.



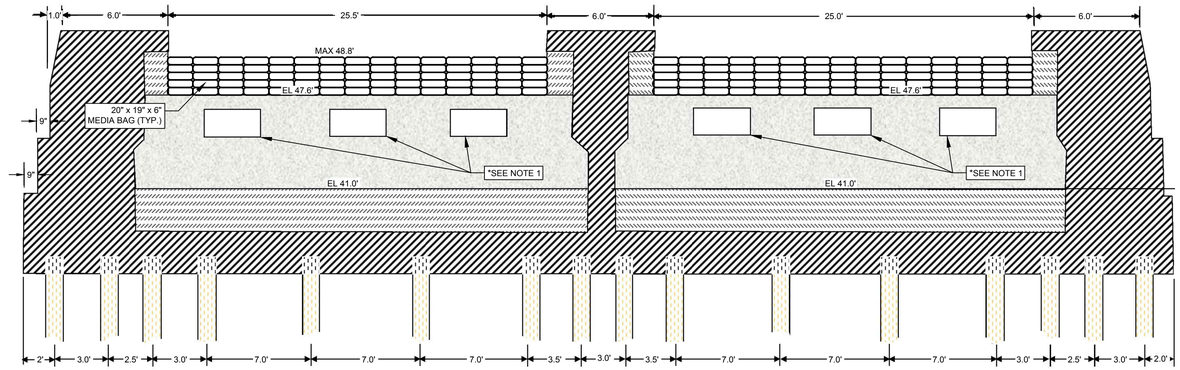
DETAIL 7 - CANAL BANK RESTORATION
NTS



DETAIL 8 - SOIL COVER
NTS



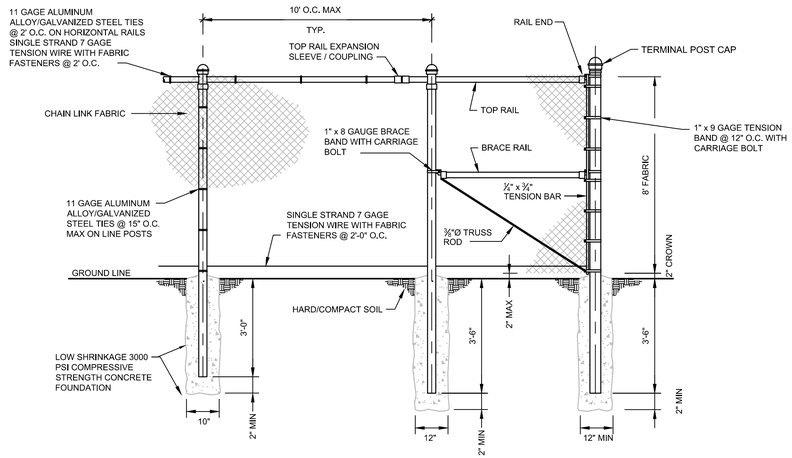
SECTION



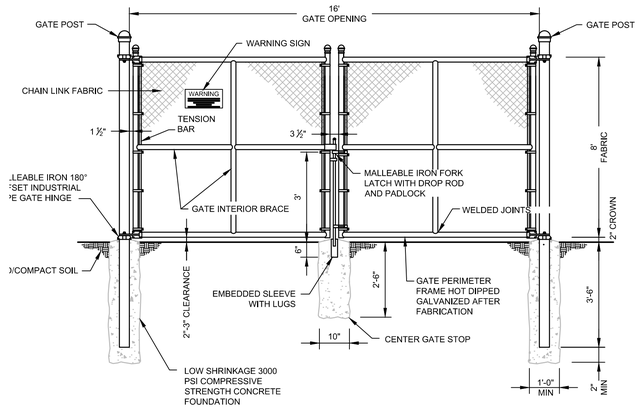
*NOTES:
1. COVER GATE OPENING WITH STEEL PLATES ON BOTH SIDES, AFFIX TO STRUCTURE USING EXISTING POINT OF ATTACHMENT (TYP)

ELEVATION VIEW

DETAIL 9 - TUMBLER GATE - COFFERDAM C-1
NTS



DETAIL 10 - CHAIN LINK FENCE
NTS



DETAIL 11 - DOUBLE SWING GATE
NTS

NΩ	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave., Waterford, New York

REMEDIAL DESIGN

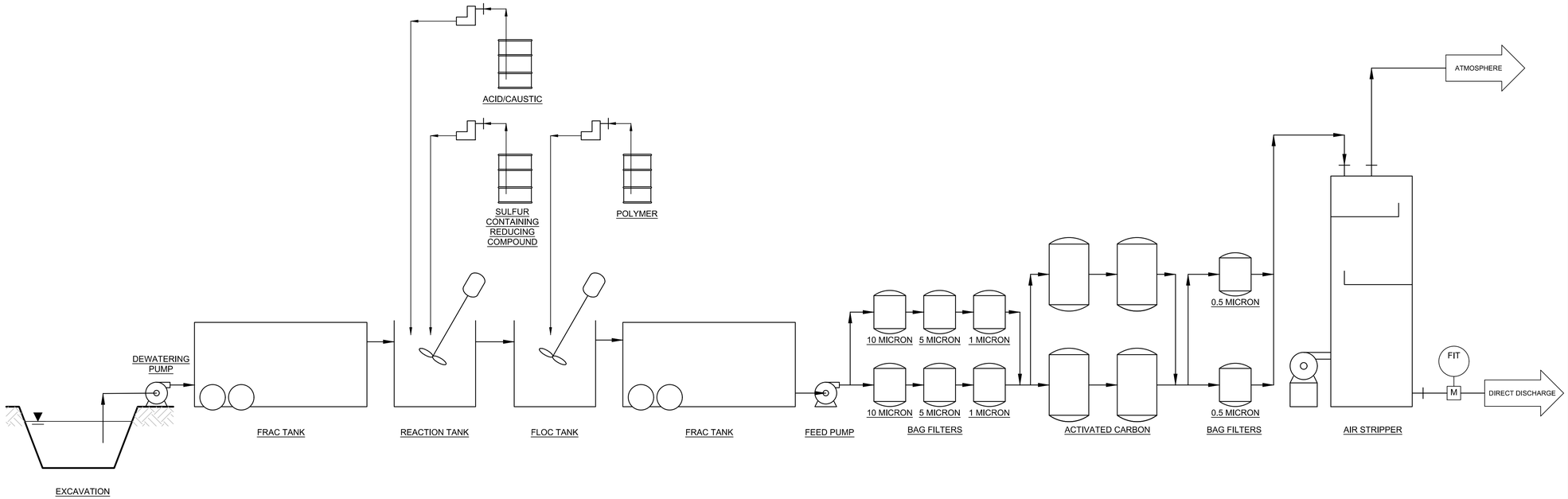
DETAILS
PAGE 3 OF 3

GHD

Source Reference:

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: AS SHOWN	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: C-29

80987-20(014)CI-WA024 MAY 14, 2019



NOTES:
1. PROCESS FLOW SIMPLIFIED FOR CLARITY
2. WASTEWATER QUALITY DATA BASED ON INFORMATION COLLECTED FROM ON SITE MONITORING WELLS. WORST CASE CONCENTRATIONS ASSUMED.
3. DISCHARGE REQUIREMENTS ARE THE RESOLVED WITH THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION.
4. SOLIDS REMOVAL FROM INLET EQ TANKS MAY BE REQUIRED PERIODICALLY.
5. OPTION TO BACKWASH GAC VESSELS SHOULD E PROVIDED.

Nº	Revision	Date	Initial

SCALE VERIFICATION

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Approved

DRAWING STATUS

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ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
ISSUED TO NYSDEC	MAR. 22, 2016	R.M.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave., Waterford, New York

REMEDIAL DESIGN

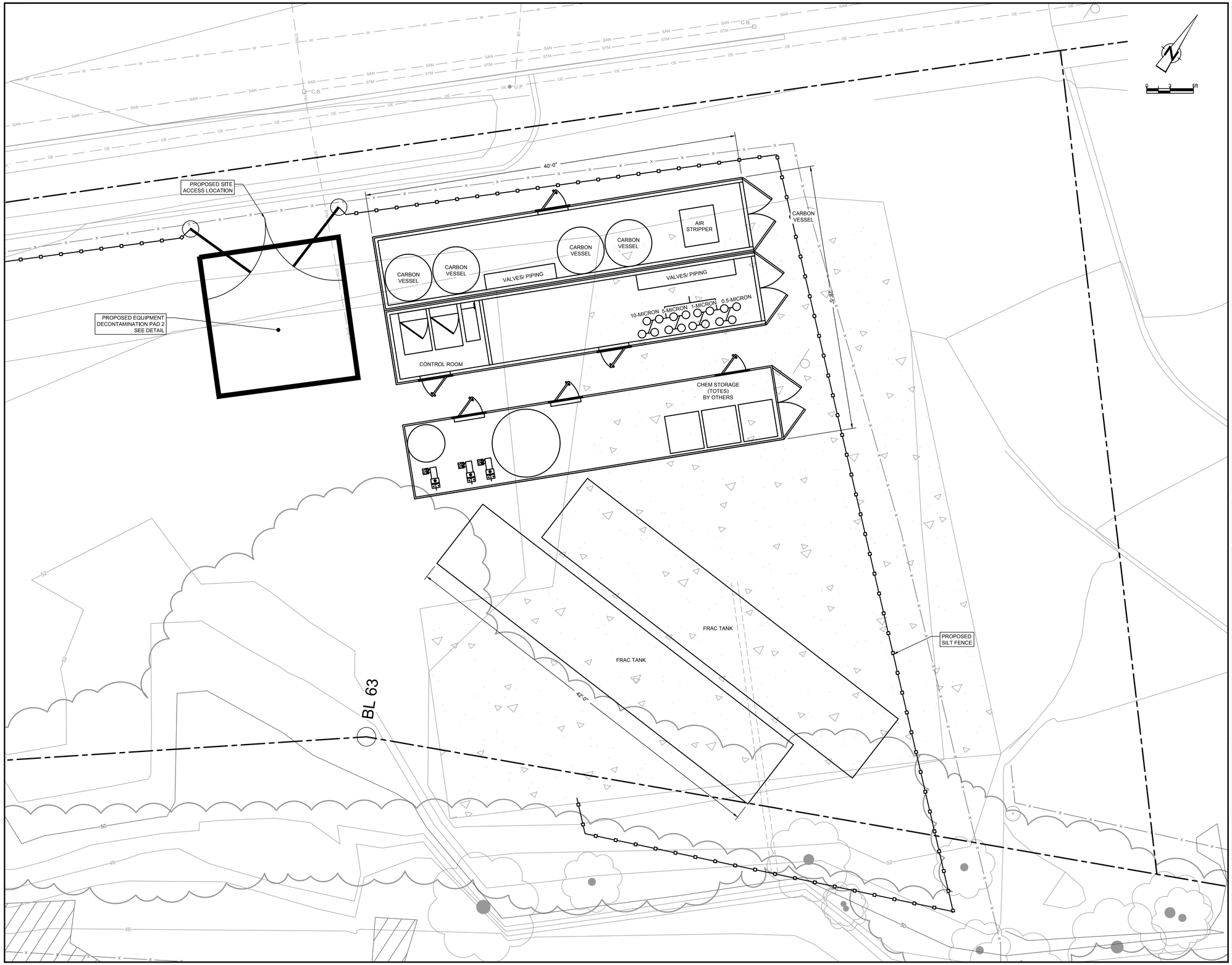
WATER TREATMENT SYSTEM PROCESS FLOW SCHEMATIC

GHD

Source Reference:

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: NTS	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: M-01

80987-20(014)IC-WA001 MAY 14, 2019



Nº	Revision	Date	Initial

LEGEND

- PROPERTY BOUNDARY (APPROXIMATE)
- 50.0 EXISTING CONDITION CONTOUR (NAVD 88)
- EXISTING VEGETATION
- SAN EXISTING SANITARY SEWER
- STM EXISTING STORM SEWER
- W EXISTING WATER MAIN
- OE EXISTING ELECTRICAL OVERHEAD LINE
- G EXISTING GAS MAIN
- X EXISTING FENCE LINE (APPROXIMATE)
- EXISTING TREE
- C.B. EXISTING CATCH BASIN
- M.H. EXISTING MAN HOLE
- HYD. EXISTING HYDRANT
- U.P. EXISTING UTILITY POLE
- W.V. EXISTING WATER VALVE
- EXISTING MONITORING WELL
- PROPOSED SILT FENCE

NOTE

CONTRACTOR TO PROVIDE SECONDARY CONTAINMENT FOR ENTIRE WATER TREATMENT

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
ISSUED FOR PRE-FINAL DESIGN	DEC. 3, 2018	J.P.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN

WATER TREATMENT SYSTEM

GHD

Source Reference:
TOPOGRAPHIC SURVEY - FRIEDRICHSOHN COOPERAGE SITE - CHA COMPANIES
32690.3002.34000 - VBASE_32690300 - 3/12/18

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	NOVEMBER 2018	
Scale: 1" = 5'	Project Nº: 80987-20	Report Nº: 014	Drawing Nº: M-02

GENERAL NOTES

1. GENERAL NOTES ARE NOT INTENDED TO REPLACE THE CONTRACT DOCUMENTS. SEE CONTRACT DOCUMENTS FOR REQUIREMENTS IN ADDITION TO THESE GENERAL NOTES. THE CONTRACT DOCUMENTS SHALL CONSIST OF THE COMPLETE PROJECT SPECIFICATIONS AND WORKING DRAWINGS INCLUDING, BUT NOT LIMITED TO, GENERAL PROVISIONS, SPECIAL PROVISIONS, TECHNICAL SPECIFICATIONS AND ANY RELEVANT ADDENDA ITEMS. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THESE DRAWINGS AND SPECIFICATIONS.

2. THE WORKING DRAWINGS ARE NOT NECESSARILY COMPLETE IN EVERY DETAIL. THE CONTRACTOR SHALL PROVIDE ALL EQUIPMENT, MATERIAL, SERVICES LABOR, ETC. FOR A COMPLETE INSTALLATION INCLUDING WORK REASONABLY INFERRED FROM THE CONTRACT DOCUMENTS AS BEING NECESSARY TO PRODUCE THE INTENDED RESULTS, WHETHER SHOWN OR NOT ON THE DRAWINGS.

3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND EXISTING CONDITIONS BEFORE STARTING WORK. DO NOT SCALE DRAWINGS. REPORT ANY DISCREPANCIES IN THE DRAWINGS AND/OR SPECIFICATIONS TO THE OWNER'S REPRESENTATIVE FOR CLARIFICATIONS OR ADJUSTMENTS PRIOR TO COMMENCING WORK. THE CONTRACTOR SHALL NOT BEGIN DEMOLITION/CONSTRUCTION IN ANY SUCH AFFECTED AREA UNTIL THE DISCREPANCY HAS BEEN RESOLVED.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING FROM THE OWNER'S REPRESENTATIVE ANY CLARIFICATION OR INTERPRETATION OF THE GENERAL NOTES, WORKING DRAWINGS, AND/OR SPECIFICATIONS IN WRITING IN ADVANCE OF THE BEGINNING OF DEMOLITION OR CONSTRUCTION. NUMERICAL DIMENSIONS AND ELEVATIONS SHOWN SHALL SUPERCEDE ANY DISCREPANCY IN THE SCALING ON THE DRAWINGS.

5. ALL FEDERAL, STATE AND LOCAL SAFETY REGULATIONS ARE TO BE STRICTLY FOLLOWED. METHODS OF DEMOLITION/CONSTRUCTION AND INSTALLATION OF MATERIAL IS THE CONTRACTORS RESPONSIBILITY.

6. THE CONTRACTOR SHALL ABIDE BY ALL APPLICABLE FEDERAL, STATE AND LOCAL ENVIRONMENTAL PROTECTION STANDARDS, LAWS AND REGULATIONS.

7. THE CONTRACTOR SHALL KEEP ACCURATE RECORDS OF ANY CHANGES MADE TO THE DRAWINGS ON A SEPARATE WHITE SET OF PLANS PROVIDED BY THE OWNER'S REPRESENTATIVE. THESE ANNOTATED DRAWINGS SHALL BE RETURNED TO THE OWNER'S REPRESENTATIVE PRIOR TO APPROVAL OF THE FINAL PAYMENT APPLICATION.

8. EXISTING CONSTRUCTION, INCLUDING UTILITIES AND OTHER MISCELLANEOUS ITEMS WHICH ARE TO REMAIN, SHALL REMAIN UNDISTURBED, AND BE PROTECTED, UNLESS OTHERWISE NOTED.

9. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING, AT HIS OWN EXPENSE, ANY AND ALL DAMAGES THAT MAY OCCUR OUTSIDE AND WITHIN THE LIMITS OF THIS PROJECT AS A RESULT OF CONSTRUCTION.

10. ALL AREAS DISTURBED DURING CONSTRUCTION SHALL BE REPAIRED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITIONS, AT NO EXPENSE TO THE OWNER, UNLESS OTHERWISE NOTED.

11. THE CONTRACTOR SHALL PROTECT ADJACENT STRUCTURES, FOUNDATIONS, DRAINAGE FEATURES, UTILITIES, VESSELS, PEDESTRIANS, AND VEHICULAR TRAFFIC FROM POTENTIAL DAMAGE DUE TO CONTRACTOR'S OPERATIONS.

12. THE CONTRACTOR SHALL PLACE CONSTRUCTION DEBRIS CONTROL DEVICES, TURBIDITY CURTAINS, BOOMS, TARPAULINS, FLOATS, STAGING, AND OTHER DEVICES AS NECESSARY TO PREVENT CONSTRUCTION DEBRIS FROM ENTERING THE WATER AND AIRBORNE MATERIALS FROM LEAVING THE IMMEDIATE VICINITY OF THE SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEANUP OF ANY MATERIALS DEPOSITED OUTSIDE THE WORK AREA.

13. ALL BUILDINGS, SURFACE, AND SUBSURFACE IMPROVEMENTS ON AND ADJACENT TO THE PROJECT SITE ARE NOT NECESSARILY SHOWN HEREON.

14. THE OWNER SHALL HAVE THE SOLE AUTHORITY TO DESIGNATE AND/OR LIMIT AREAS OF CONSTRUCTION.

15. THE OWNER MAKES NO REPRESENTATIONS ABOUT SUBSURFACE CONDITIONS THAT MAY BE ENCOUNTERED WITHIN THE LIMITS OF THE PROJECT.

STRUCTURAL NOTES

1. DESIGN SPECIFICATIONS:

   A. PRIMARY DESIGN CODES AND STANDARDS:

      i. AASHTO LRFD 2015 Bridge Design Specifications 7th Edition (US), with 2015 and 2016 Interim Revisions

      ii. NEW YORK STATE STANDARDS FOR ROAD AND PUBLIC WORKS INCLUDING NEW YORK STATE STANDARD SPECIFICATIONS

   B. CONCRETE DESIGN: ACI 318–11 Building Code Requirements for Structural Concrete

   C. STEEL DESIGN: ANSI/AISC 360–10 Specification for Structural Steel Buildings

2. DESIGN LOADS:

   A. VEHICLE LOAD:
      VEHICLE LIVE LOAD DESIGN TRUCK: AASHTO HS–25

   B. WIND ON STRUCTURE:

      CODE: AASHTO LRFD 2015 Bridge Design Specifications 7th Edition (US), with 2015 and 2016 Interim Revisions
      SITE LOCATION: SARATOGA, NEW YORK

   C. SEISMIC LOAD:

      CODE: AASHTO LRFD 2015 Bridge Design Specifications 7th Edition (US), with 2015 and 2016 Interim Revisions
      SITE LOCATION: SARATOGA, NEW YORK

3. CONCRETE AND REINFORCEMENT:

   A. PRECAST AND CAST–IN–PLACE CONCRETE SHALL BE CLASS C–1, IN ACCORDANCE WITH ACI 318, WITH MINIMUM COMPRESSIVE STRENGTH, fc', OF 5,000 PSI (35 MPa) AT 28 DAYS
      MAXIMUM WATER:CEMENT RATIO = 0.40

   B. CONCRETE SHALL BE AIR ENTRAINED, BASED ON NOMINAL MAXIMUM SIZE COARSE AGGREGATE (NMSA) AS FOLLOWS:
      5 TO 7 PERCENT AIR CONTENT FOR ½" TO ¾" NMSA
      6 TO 8 PERCENT AIR CONTENT FOR ⅜" NMSA

   C. CEMENT FOR CONCRETE SHALL BE IN ACCORDANCE WITH ACI 318.

   D. PROVIDE 1" x 1" CHAMFER ON ALL EXPOSED CORNERS OF CONCRETE UNLESS OTHERWISE INDICATED.

   E. PROVIDE CONCRETE COVER OVER REINFORCEMENT AS FOLLOWS, UNLESS OTHERWISE INDICATED ON THE DRAWINGS:

      CAST–IN–PLACE CONCRETE: 3 INCH ± 1 INCH

   F. PROVIDE UNCOATED REINFORCEMENT IN ACCORDANCE WITH ASTM A615, GRADE 60(420), UNLESS OTHERWISE INDICATED.

   G. REINFORCEMENT SHALL NOT BE WELDED, UNLESS OTHERWISE INDICATED ON THE DRAWINGS OR APPROVED IN WRITING BY THE OWNER'S REPRESENTATIVE. REINFORCEMENT FOR WELDING SHALL BE GRADE 60. WELDING SHALL COMPLY WITH AWS D1.4.

   H. PROVIDE REINFORCEMENT DEVELOPMENT AND CLASS B LAP SPLICE IN ACCORDANCE WITH ACI 318.

   I. REINFORCEMENT COUPLERS SHALL BE LENTON MECHANICAL COUPLERS. AS MANUFACTURED BY ERICO INTERNATIONAL CORPORATION, OR APPROVED EQUAL COUPLERS SHALL BE CAPABLE OF DEVELOPING AT LEAST 120 PERCENT OF THE SPECIFIED YIELD STRENGTH OF THE BARS, BUT NOT LESS THAN 110 PERCENT OF THE ACTUAL YIELD STRENGTH OF THE BARS.

   J. STRUCTURAL GROUT SHALL BE NON–SHRINK CEMENTITIOUS GROUT (MIN. STRENGTH 5000 PSI [35MPa] AT 28 DAYS).

4. STRUCTURAL STEEL:

   A. ALL STRUCTURAL STEEL INCLUDING HARDWARE ITEMS SHALL BE HOT–DIP GALVANIZED IN ACCORDANCE WITH ASTM A123 & A153.

   B. ALL STEEL SHAPES AND PLATES, EXCEPT AS OTHERWISE NOTED
      ASTM A572 GRADE 50 [GRADE 345] OR
      ASTM A992

   C. STEEL BOLTS ASTM F3125/ASTM A325 UNLESS OTHERWISE NOTED. BOLT THREADS SHALL BE EXCLUDED FROM SHEAR PLANES OF THE JOINTS.

   D. WELDING: AWS STANDARDS

   E. WELDING ELECTRODES: AWS, MATCHING FILLER METAL

   F. HEADED STUDS ASTM A108

N⍰	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

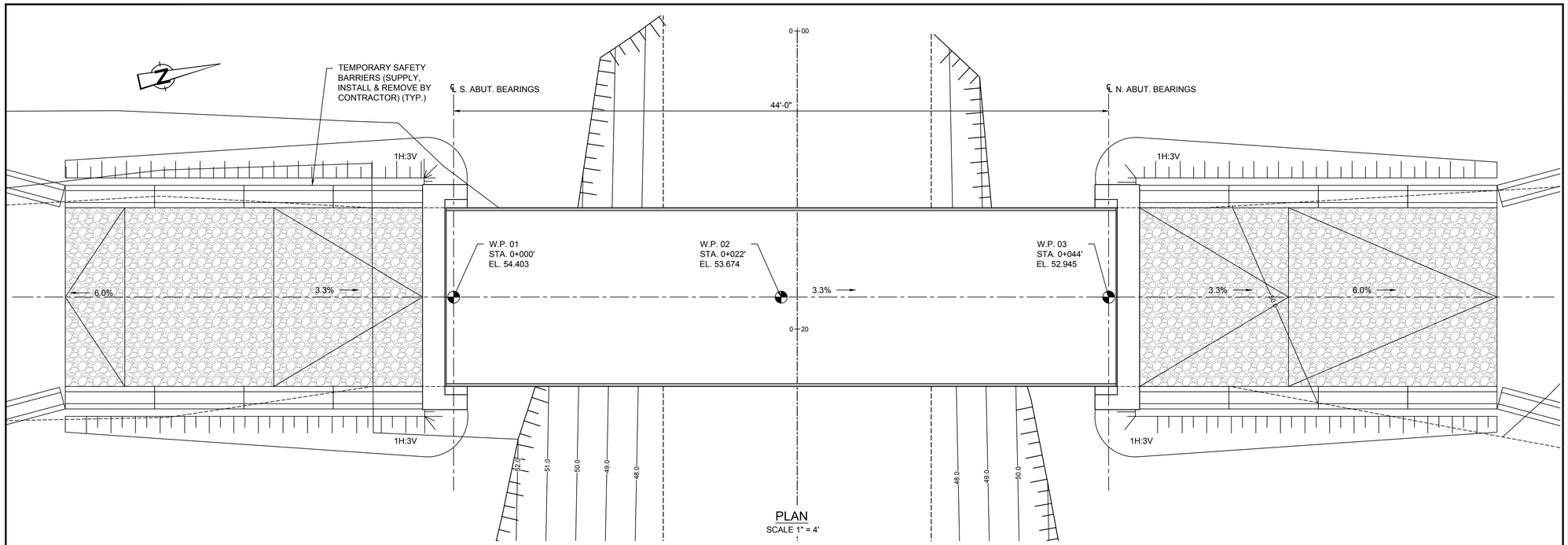
REMEDIAL DESIGN REPORT

STRUCTURAL GENERAL NOTES

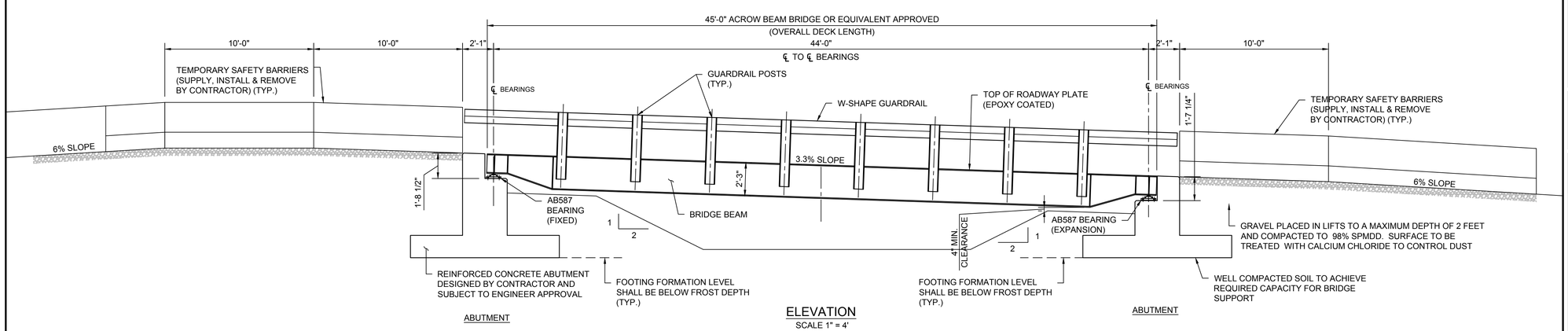
GHD

Source Reference:

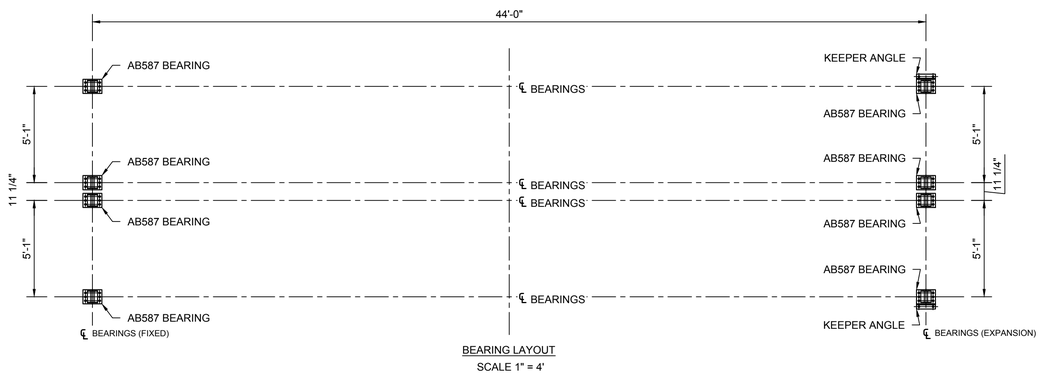
Project Manager:	Reviewed By:	Date:	
J. PUSKAS	J. PUSKAS	MAY 2019	
Scale: AS SHOWN	Project N⍰: 80987-62	Report N⍰: 014	Drawing N⍰: S-01



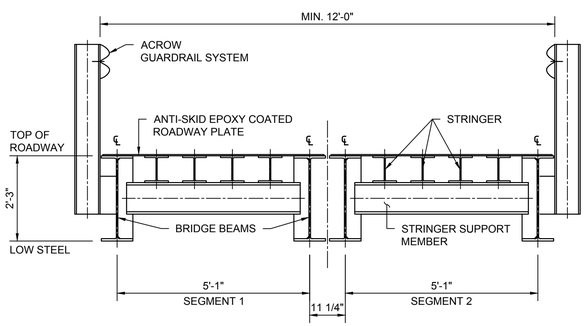
PLAN
SCALE 1" = 4'



ELEVATION
SCALE 1" = 4'



BEARING LAYOUT
SCALE 1" = 4'



12ft WIDE ACROW BEAM BRIDGE
SCALE 1" = 2'

N№	Revision	Date	Initial

NOTES

1. IT IS CONTRACTOR SCOPE TO PERFORM THE REQUIRED SOIL INVESTIGATION TO DESIGN THE TEMPORARY BRIDGE FOUNDATION.
2. IT IS CONTRACTOR RESPONSIBILITY TO CONFIRM THE EXISTING UNDERGROUND UTILITIES, AT CONSTRUCTION AREA, PRIOR TO START FOUNDATION WORKS. IF EXISTING UNDERGROUND UTILITIES CLASH WITH THE BRIDGE'S WORKS, ALTERNATIVE PROPOSAL TO BE SUBMITTED FOR ENGINEER REVIEW AND APPROVAL.
3. THE TEMPORARY STEEL BRIDGE TO BE 45' ARCOW BEAM BRIDGE OR EQUIVALENT APPROVED.
4. IT IS CONTRACTOR RESPONSIBILITY TO SUPPLY, INSTALL AND REMOVE THE TEMPORARY BRIDGE AND ASSOCIATED COMPONENTS. AND RETURN THE AREA TO ORIGINAL SITUATION.

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

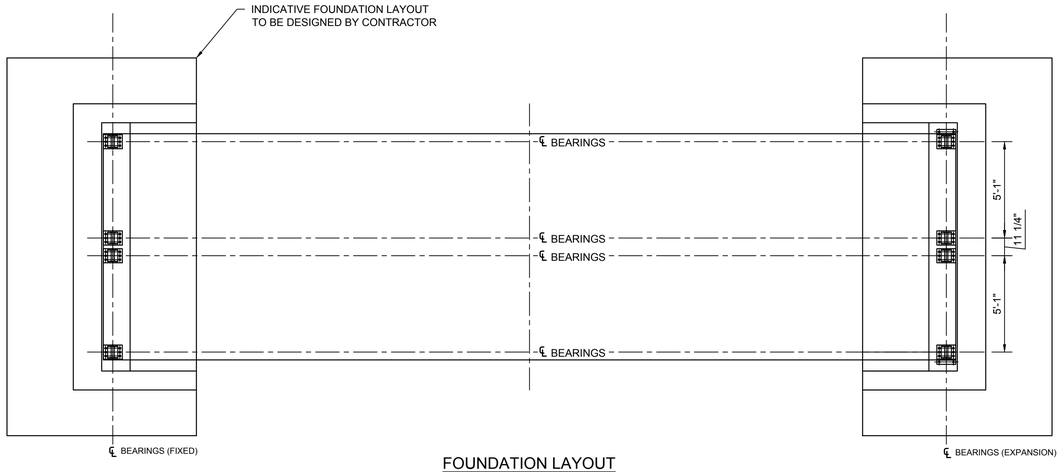
REMEDIAL DESIGN REPORT

TEMPORARY BRIDGE GENERAL ARRANGEMENT

GHD

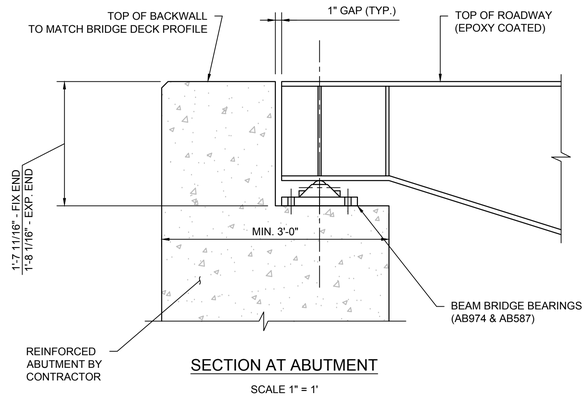
Source Reference:

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	Y. Al Saadi	MAY 2019	
Scale: AS SHOWN	Project №: 80987-62	Report №: 014	Drawing №: S-02



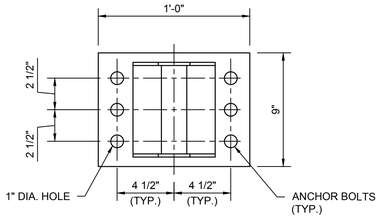
FOUNDATION LAYOUT

SCALE 1" = 4'



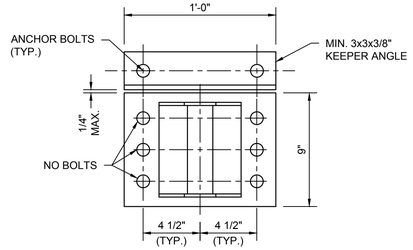
SECTION AT ABUTMENT

SCALE 1" = 1'



AB587
FIXED BEARING DETAIL

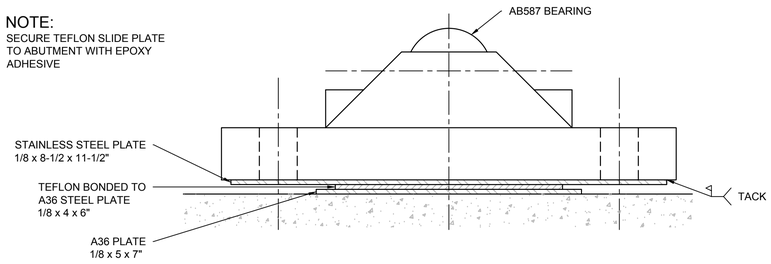
1-3/8" THICK PLATE
SCALE: 1" = 6"



AB587
EXPANSION BEARING DETAIL

1-3/8" THICK PLATE
SCALE: 1" = 6"

NOTE:
SECURE TEFLON SLIDE PLATE TO ABUTMENT WITH EPOXY ADHESIVE



EXPANSION BEARING
ELEVATION VIEW A-A

ANGLE NOT SHOWN FOR CLARITY
SCALE: 1" = 2"

No	Revision	Date	Initial

SCALE VERIFICATION

THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

ISSUED FOR BID	MAY 14, 2019	J.P.
Status	Date	Initial

FRIEDRICHSOHN COOPERAGE SITE
153-155 Saratoga Ave. Waterford, New York

REMEDIAL DESIGN REPORT

TEMPORARY BRIDGE
FOUNDATION AND BEARING DETAILS

GHD

Source Reference:

Project Manager:	Reviewed By:	Date:	
J. PUSKAS	Y. Al Saadi	MAY 2019	
Scale: AS SHOWN	Project No: 80987-62	Report No: 014	Drawing No: S-03