

SECTION 01 11 00

SUMMARY OF WORK

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 01 11 00 **TITLE:** SUMMARY OF WORK

SPECIFICATION PREPARED BY: _____ Signature
(Specification Preparer, SP)

Name Russell Hyatt Date

SCOPE AND FORMAT CHECKED BY: _____ Signature
(Scope and Format Checker, SFC)

Name Jessica Fears Date

DETAILED REQUIREMENTS CHECKED BY: _____ Signature
(Detailed Requirements Checker, DRC)

Name Darrell Nicholas Date

APPROVED BY: _____ Signature
(Specification Approver, SA)

Name J.F. Beech Date

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	JF	LW	GDN	JFB
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	JF	LW	GDN	JFB
C	RTA1 65% Remedial Design	11/20/17	JF	LW	GDN	JFB
A1	RTA1 100% Access Dredge Design	09/30/19	JC	RH	GDN	JFB
D	RTA1 90% Remedial Design	09/30/19	JC	RH	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	RH	JF	GDN	JFB

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SECTION 01 11 00

SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY

- A. This Section summarizes the sequence of work activities to be conducted during RTA1 Remedial Design construction.

1.02 RELATED SECTIONS

- A. All Specifications, Construction Drawings, and Contract Documents are related to this Section.

1.03 REFERENCES

- A. “Cultural Resources Monitoring Plan” – Most recent version prepared by AHRS.
- B. Gowanus Environmental Remediation Trust (Gowanus ERT), 2019. Management of Change Procedure.
- C. Geosyntec, 2019. “Stormwater Pollution Prevention Plan (SWPPP) for Construction Activities at Gowanus Canal Superfund Site.”

1.04 CONTRACTOR'S DUTIES

- A. The Contractor, shall become familiar with the Site and the Contract Documents.
- B. The Contractor shall prepare and obtain approval from the Owner’s Representative for Plans and Submittals required by these Specifications and as listed in Section 01 33 00.
- C. Remedial Design activities to be conducted in RTA1 fall within the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) permit equivalency. Prior to initiating construction, permit equivalency by USEPA will be required for the following regulated activities:
 - 1. Preparation of Staging Site for use as a support facility for dredging and capping operations and protection of utilities per 6 NYCRR Part 617.
 - 2. Stormwater management (NYSDEC).
 - 3. Discharge of Dredge Water Treatment System effluent (NYSDEC).
 - 4. The Owner’s Representative will work directly with the EPA to obtain permit equivalency for federal and state permits as indicated in Section 01 41 00. The Contractor shall be responsible for obtaining any additional local, state, and federal

- building, construction, and operating approvals, permits, and consents, excluding those obtained by the Owner in accordance with Section 01 41 00.
5. The Contractor shall be responsible for securing EPA approval for off-Site processing and end-placement of dredged material as indicated in Section 02 51 19.
- D. The Contractor shall start, construct, and complete the project in accordance with the approved Plans, Specifications, and Construction Drawings.
- E. The Contractor shall establish means of, and techniques and procedures for, constructing and otherwise executing the project.
- F. The Contractor shall comply with Section 01 41 00 and all applicable local rules, ordinances, regulations, and all authorities having jurisdiction over the Work.
- G. The Contractor shall maintain order, safe practices, and proper conduct at all times among Contractor's employees and shall comply with Section 01 35 29.
- H. The Contractor shall be responsible for securing all Site work areas, managing Staging Site security and maintaining Site gate access control throughout the Work as specified in Section 31 10 00.
- I. The Contractor shall coordinate activities of suppliers and subcontractors performing or supplying materials for the Work. Work performed by subcontractors for the Contractor shall be the responsibility of the Contractor. Products will be in accordance with Sections 01 60 00 and 01 55 29.
- J. The Contractor shall perform the Work as specified and in a timely manner and in accordance with Section 01 32 00.
- K. The Contractor shall coordinate with other parties according to Section 01 57 19 and this Section. Environmental controls and contingency plans shall be implemented according to results of monitoring performed by the Contractor and other parties as described in Section 01 57 19. Monitoring performed by others includes, but is not limited to, community air monitoring and water quality monitoring.
- L. The Contractor is responsible for repairing damages to any existing features in and around the Canal or on the Staging Site, caused by the Contractor at no additional cost to the Owner.

1.05 CONTRACTOR USE OF WORKSITE

- A. The Contractor shall confine operations at the Site to those areas permitted by laws, ordinances, permits, and the Contract Documents.

- B. When determining the amount, location, movement, and use of materials and equipment on the Canal or on the Staging Site, the Contractor shall consider the safety of performing the Work and the safety of people and property adjacent to the work activities.
- C. The Contractor shall conduct the Work in the Canal, on the Staging Site, and on surrounding streets and highways in a clean and orderly manner.
- D. Noise-producing work may occur between the hours of 7:00 AM and 6:00 PM local time on weekdays, unless otherwise authorized in accordance with Section 01 57 19.
- E. Work shall be coordinated with other activities on the Staging Site, and access agreements shall be obtained for adjacent properties in accordance with Contract Documents. Contractor shall minimize impact on vessel traffic, coordinating with other vessel operators, throughout the Canal in accordance with Sections 01 41 00 and 35 20 23.13.
- F. Parking and vehicular access shall be in accordance with Section 31 10 00.
- G. The Contractor shall coordinate the Work with the Owner's Representative and any other parties on the Site. The Owner's Representative shall provide points of contact for coordination with other parties to the Contractor.

1.06 DESIGN CLARIFICATIONS AND CHANGES

- A. During the course of the Work, clarifications and changes to the design may be necessary to advance the Work. Clarifications of the design will be resolved through the use of Requests for Information ("RFIs") submitted to the Owner's Representative. The Contractor shall follow the Management of Change (MOC) Procedure (Gowanus ERT, 2019). The MOC Procedure includes a Change Control Form which will be used to log changes. The Procedure also outlines process, tracking, routing, and approval requirements. All Contractors/Subcontractors are accountable for following the MOC Procedure.
- B. If conflicts within the Construction Drawings and/or Technical Specifications are discovered by the Contractor, the Contractor will submit an RFI to the Owner's Representative, who will be responsible for receiving, distributing, and tracking RFIs. The Owner's Representative may:
 - 1. Respond with clarification of the design intent (i.e., expounding upon an existing and approved design concept) and return the completed RFI to the Contractor for distribution; or
 - 2. Determine that an alteration to the design is warranted and issue a design change notice (DCN) for review and approval by the Owner. Approved DCNs will be forwarded to the Owner's Representative for distribution.

1.07 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.

1.08 CONTROL OF THE WORK

- A. The Owner's Representative will address all questions that may arise as to the quality and acceptability of the Work and as to the rate of progress of the Work, all questions that may arise as to the interpretation of the Contract Documents, all questions as to the acceptable fulfillment of the Contract on the part of the Contractor, and all questions as to compensation.
- B. All questions as to the interpretation of the Contract Documents shall be submitted to the Owner's Representative in writing. The Owner's Representative has the authority to suspend the Work wholly or in part due to the failure of the Contractor to correct conditions unsafe for the workers or the general public, failure to meet permit requirements, failure to comply with regulatory requirements, or for failure to carry out provisions of the Contract. The Owner may suspend partial payments for these reasons and shall not be responsible for stand-by costs to the extent work is suspended for these reasons.
- C. The Owner's Representative may also suspend the Work wholly or in part for such periods as deemed necessary due to unsuitable weather, for conditions considered unsuitable for the prosecution of the Work, or for any other condition or reason deemed to be in the public interest.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.01 GENERAL

- A. The Contractor shall provide facilities, plans, equipment, materials, labor, overhead, administration, and profit to satisfactorily construct and perform the Work. The following general summary of activities associated with the Work does not limit the Contractor's responsibility to provide a complete and usable installation in accordance with the Contract, Plans, Specifications, and Construction Drawings, hereinafter referred to as the Contract Documents. This summary provides the conceptual sequence of construction activities. The Contractor's schedule showing the proposed sequence of operations shall be provided and will be reviewed and approved by the Owner's Representative prior to the start of work.

1. Planning and Administration:
 - a. Attend the preconstruction site walk;
 - b. Conduct a Process Hazard Analysis and Risk Assessment in accordance with the Contract Documents;
 - c. Prepare the required project Plans and Submittals for review and acceptance in accordance with Section 01 33 00; and
 - d. Obtain all necessary local, state, and federal permits (excluding those obtained by the Owner's Representative), licenses, and approvals in accordance with Section 01 41 00.
2. Pre-Construction Activities:
 - a. Verify sediment and erosion controls measures installed by others are still functioning, or repair in accordance with Section 01 57 13 and the Construction Drawings;
 - b. Mobilize Contractor's construction equipment to the Site;
 - c. Conduct survey of underground utility locations and other features;
 - d. As necessary to facilitate work on the Staging Site, the Contractor shall relocate storage boxes servicing monitoring wells and convert any wells needed to flush-mount according to the Construction Drawings. Storage boxes shall be handled in accordance with the Construction Drawings;
 - e. Conduct photographic survey of bulkheads within RTA1 and along the Staging Site at low tide according to Section 31 41 16;
 - f. Conduct initial survey of the Staging Site according to Sections 31 10 00 and 01 71 23;
 - g. Install and perform maintenance of optical survey markers along the existing bulkheads in RTA1 and conduct a baseline survey prior to commencing dredging according to Section 02 22 00;
 - h. Protect Site features as shown on the Construction Drawings and according to Sections 31 10 00 and 35 20 23.13; and
 - i. Complete Baseline Building Conditions Assessments, according to Section 02 22 00.
3. Construction Activities:
 - a. Maintain and inspect sediment and erosion controls according to the Construction Drawings, the Stormwater Pollution Prevention Plan (SWPPP) and Section 01 57 13;
 - b. Cooperate with other parties and implement environmental controls in accordance with Section 01 57 19;
 - c. As necessary to facilitate work on the Staging Site, install water treatment facilities, close a portion of Huntington Street, and install temporary utilities in accordance with Sections 01 41 00, 01 51 00, 31 10 00, 44 08 40, and the Construction Drawings;

- d. Maintain Site order and cleanliness in accordance with Section 02 51 19;
 - e. Install sediment and floatables containment within the Canal in accordance with Section 02 60 16 and the Construction Drawings;
 - f. Perform Phase I Dredging as indicated in Section 35 20 23.13 and the Construction Drawings;
 - g. Install bulkhead support in accordance with the Section 31 41 00;
 - h. Perform Phase II Dredging in accordance with the Construction Drawings and Section 35 20 23.13;
 - i. Perform in situ stabilization/solidification (ISS) within RTA1 in accordance with the Construction Drawings and Section 03 11 00;
 - j. Perform Phase III Dredging in accordance with the Construction Drawings and Section 35 20 23.13;
 - k. Complete leveling layer placement in accordance with Section 35 20 23.13 and the Construction Drawings;
 - l. Conduct required progress surveys and accommodate hydrographic surveys conducted by others during dredging activities in accordance with Sections 35 20 23.13 and 01 71 23;
 - m. Manage, clean, transport, and dispose of debris collected during dredging in accordance with Sections 35 20 23.13 and 02 51 19;
 - n. Manage cultural resources in accordance with the most recent Cultural Resources Monitoring Plan prepared by Archaeology & Historic Resource Services (AHRS) and Sections 35 20 23.13 and 02 51 19;
 - o. Maintain, protect, and install temporary utilities in accordance with Section 01 51 00;
 - p. Transport water requiring treatment to the Dredge Water Treatment System for treatment and discharge in accordance with Sections 02 51 19, 35 20 23.13 and 44 08 40. Alternative water treatment approaches such as off-Site treatment at a licensed disposal facility are allowed during Phase I dredging if approved by the Owner's Representative and EPA;
 - q. Solidify/stabilize dredged sediment at an off-Site processing facility in accordance with Section 02 51 19. Thermally treat dredged sediment off-Site in accordance with Section 02 51 19. Transport processed dredged material to a beneficial use end-placement facility;
 - r. Cap dredged sections of the Canal in accordance with Sections 35 43 00 and 35 43 29 and the Construction Drawings; and
 - s. Conduct required progress surveys during capping activities in accordance with Sections 35 43 00, 35 43 29, and 01 71 23.
4. Post-Construction Activities:
- a. Conduct photographic survey at low tide of the bulkheads in accordance with Section 31 41 16;

- b. Conduct post-construction building condition assessments in accordance with Section 02 22 00;
 - c. Conduct after dredge (AD) hydrographic surveys within the Canal in accordance with Sections 01 71 23 and 35 20 23.13;
 - d. Conduct final cap survey in accordance with Sections 01 71 23 and 35 43 29;
 - e. Conduct final or as-built surveys of the Staging Site according to Sections 31 10 00 and 01 71 23;
 - f. Remove sediment and floatables containment from Canal in accordance with Section 02 60 16;
 - g. Conduct final Site inspection and project close-out activities in accordance with Section 01 78 00;
 - h. Remove from the Site all equipment, trailers and other appurtenances which may have been brought to the Site; and
 - i. Remove or dispose of unused materials from the Site in accordance with Section 02 51 19.
5. Maintain asphalt pad, drainage features, utilities, access roads, signs, and gates at the Staging Site until acceptance of construction by the Owner's Representative. Contractor is required to maintain Site gate access control (i.e., staff guard booths) for the duration of the Work.
 6. Remove, transport, and dispose of materials and debris associated with sediment and erosion controls in accordance with Section 02 51 19 and as directed by the Owner's Representative.
 7. Restore Staging Site to pre-construction conditions in accordance with Section 01 78 00.

[END OF SECTION]

SECTION 01 32 00

**CONSTRUCTION PROGRESS
DOCUMENTATION**

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 01 32 00 **TITLE:** CONSTRUCTION PROGRESS DOCUMENTATION

SPECIFICATION PREPARED BY: (Specification Preparer, SP) Signature
Name Julie Chambers Date

SCOPE AND FORMAT CHECKED BY: (Scope and Format Checker, SFC) Signature
Name Russell Hyatt Date

DETAILED REQUIREMENTS CHECKED BY: (Detailed Requirements Checker, DRC) Signature
Name Darrell Nicholas Date

APPROVED BY: (Specification Approver, SA) Signature
Name J.F. Beech Date

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
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SECTION 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.01 SUMMARY

- A. This Section summarizes reporting requirements to document construction progress, including schedules and daily/weekly progress reports.

1.02 RELATED SECTIONS

- A. Section 01 33 00 Submittals
- B. Section 01 57 13 Temporary Erosion and Sediment Control
- C. Section 01 57 19 Temporary Environmental Controls
- D. Section 01 71 23 Site Surveying and Grade Control
- E. Section 02 51 19 Dredged Material and Waste Management
- F. Section 03 11 00 In Situ Stabilization/Solidification
- G. Section 31 41 00 Bulkhead Support
- H. Section 35 20 23.13 Dredging, Dewatering, and Leveling Layer
- I. Section 35 43 00 Cap Construction - Treatment Layer
- J. Section 35 43 29 Cap Construction - Isolation and Armor Layer
- K. Section 44 08 40 Dredge Water Treatment System Requirements
- L. Contract Documents

1.03 REFERENCES

- A. EPA, August 2016. US EPA Region 2 Clean and Green Policy: Touchstone Practices and Metrics. <<https://www.epa.gov/greenercleanups/touchstone-practices-and-metrics-supporting-epa-region-2-clean-and-green-policy>>.

1.04 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00 and this Section:
1. Project Control Information as required by the Owner's Representative..
 2. Daily Progress Reports. The Contractor shall submit daily progress reports including the following information, at minimum, as it applies to that day's work:
 - a. General Information:
 - i. Date and report number;
 - ii. Weather Conditions;
 - iii. Contractor and Subcontractors (if applicable) on-Site and area of work completed;
 - iv. Hours of Work, including downtime and delays;
 - v. Brief description of the work performed;
 - vi. A summary of coordination activities conducted between the Contractor and other parties working in the Canal;
 - vii. Description of any damages to equipment or property;
 - viii. Description of any work stoppages;
 - ix. Summary of significant interactions with the public or regulatory authority;
 - x. Health and safety update, including the documentation of any near misses or incidents;
 - xi. Daily noise monitoring reports as indicated in Section 01 57 19;
 - xii. Notes regarding any construction discrepancies, field alterations, deficiencies, and any proposed remedial action; and
 - xiii. Reference and description of any circumstances that may lead to a contractual issue or question (i.e. differing site condition, etc.).
 - b. Progress documentation of bulkhead support construction activities .
 - c. Progress documentation of dredging activities in accordance with Section 35 20 23.13, including the following information:
 - i. Location of dredging;
 - ii. Daily dredging coverage figure from machine control software;
 - iii. Estimated daily dredge volume;
 - iv. Estimated cumulative dredge volume;
 - v. Variance from projected total volume at time of reporting;
 - vi. Brief description of products or materials inspected;
 - vii. Brief description of quality control activities or inspections of the work and the outcome of those activities/inspections;

- viii. Brief description of surveys performed;
 - ix. Brief description of communications received by the Owner's Representative;
 - x. A record of coordination activities related to bridge operations;
 - xi. A list of equipment on-Site, including equipment type, maintenance performed, hours of downtime due to equipment malfunction;
 - xii. For each dredge scow, a daily log of weights estimated using ullage tables, prior to and after loading and after dewatering;
 - xiii. Estimated cumulative total weight of dredged material based on the above weight log; and
 - xiv. Any other comments.
- d. Progress documentation of on-Site water treatment operations containing, at a minimum, the information required in Section 44 08 40.
- e. Progress documentation of off-Site S/S treatment containing, at a minimum, the information below in accordance with Section 02 51 19:
- i. Time and date of arrival of each scow-load to the off-Site sediment processing facility
 - ii. Approximate weight of scow-load in each scow transported to the off-Site sediment processing facility based on ullage tables;
 - iii. Approximate weight of dredged material in each scow transported to the off-Site processing facility after any decanting of excess dredge water based on ullage tables;
 - iv. Time and date of dewatering of each scow-load at the off-site sediment processing facility;
 - v. Volume of excess dredge water removed from each scow-load at the off-site sediment processing facility;
 - vi. Time and date of Debris screening and S/S of dredged material per scow-load;
 - vii. Approximate volume of Debris screened at the off-Site sediment processing facility per scow-load screened;
 - viii. Photos of Debris screened at the off-Site sediment processing facility at the end of each day of Debris screening operations;
 - ix. Approximate daily tonnage of Dredged Sediment processed via S/S and stockpiled at the off-Site sediment processing facility at the end of each day;
 - x. Current status of PDM stockpiles temporarily staged at the off-Site sediment processing facility including cure time duration for each stockpile, scow-load source of each stockpile, and anticipated date of transport to the end-placement facility;

- xi. Photos of PDM stockpiles temporarily stored at the off-Site processing facility prior to loadout to the end-placement facility;
 - xii. Daily tonnage and scow-load source of PDM transported to the end-placement facility; and
 - xiii. Daily tonnage of debris transported to the end-placement facility.
- f. Progress documentation of off-Site thermal treatment containing, at a minimum, the information below in accordance with Section 02 51 19:
 - i. Daily weight of S/S treated dredged sediment received at the thermal treatment facility;
 - ii. Scow-load source of S/S treated dredged sediment received at the thermal treatment facility;
 - iii. Daily weight of PDM that has undergone thermal treatment; and
 - iv. Daily tonnage and scow-load source of PDM transported to the end-placement facility.
- g. Progress documentation of capping containing, at a minimum, the information below in accordance with Section 35 43 00 and Section 35 43 29:
 - i. Location of capping;
 - ii. Description of layer(s) placed;
 - iii. Estimated area capped that day;
 - iv. Estimated volume placed and comparison to estimate;
 - v. Cap quality control measurements; and
 - vi. Weight tickets or equivalent from cement truck for structural concrete placement.
 - vii.
- h. Progress documentation of in situ stabilization/solidification (ISS) activities containing, at a minimum, the information below in accordance with Section 03 11 00:
 - i. ISS operations, as defined in Part 1.05 of Section 03 11 00, for each completed ISS Column;
 - ii. List of equipment deployed on-Site and hours used;
 - iii. Description of maintenance performed and hours of downtime due to equipment malfunction;
 - iv. Brief description of products or materials inspected;
 - v. Bill of lading for material delivered;
 - vi. Daily equipment operation and maintenance logs, quality control record logs, and inspection forms including daily hose inspection checklist;
 - vii. Quantities of Reagent/Additives received and stored;
 - viii. Any unforeseen Site conditions or equipment problems that may affect ISS activities; and

- ix. Any modifications or deviations from the Specifications, Construction Drawings, or Work Plans.
3. Draft Weekly Progress Reports. The Contractor shall submit weekly progress reports marked as “DRAFT” by noon on the first work day following the reporting week that shall include at a minimum, the following information as it applies to that week’s work:
- a. General Information:
 - i. Date and report number;
 - ii. Contractor and Subcontractors (if applicable), including a list of equipment and crewmembers on-Site, and area of Work completed;
 - iii. Description of Work performed with accompanying photographs;
 - iv. Health and safety update, including the documentation of any near misses or incidents; and
 - v. Weekly SWPPP inspection forms as indicated in Section 01 57 13.
 - b. Progress documentation of dredging activities in accordance with Section 35 20 23.13, including the following information:
 - i. Estimated volume removed during the week;
 - ii. Weekly production rate and comparison to estimate;
 - iii. Updated scow logs including number of scows loaded, loaded drafts, and estimated volume;
 - iv. Chart depicting cumulative volume or weight of material dredged and removed from Site relative to contract volumes; and
 - v. Export of XYZ files and a progress map showing areas dredged with bucket tracks.
 - c. Progress documentation of on-Site water treatment operations containing, at a minimum, the information required in Section 44 08 40.
 - d. Progress documentation of off-Site S/S treatment containing, at a minimum, the information below in accordance with Section 02 51 19:
 - i. Number of scows and approximate weight of dredged material transported to the off-Site sediment processing facility;
 - ii. Approximate volume of debris screened at the off-Site sediment processing facility;
 - iii. Current status of PDM stockpiles temporarily staged at the off-Site sediment processing facility including cure time duration for each stockpile, scow-load source of each stockpile, and anticipated date of transport to the end-placement facility;
 - iv. Weekly tonnage and scow-load source of PDM transported to the end-placement facility; and

- v. Weekly tonnage of debris transported to the end-placement facility.
- e. Progress documentation of off-Site thermal treatment containing, at a minimum, the information below in accordance with Section 02 51 19:
 - v. Weekly weight of S/S treated dredged sediment received at the thermal treatment facility;
 - vi. Scow-load source of S/S treated dredged sediment received at the thermal treatment facility;
 - vii. Weekly weight of PDM that has undergone thermal treatment; and
 - viii. Weekly tonnage and scow-load source of PDM transported to the end-placement facility.
- f. Progress documentation of capping activities in accordance with Section 35 43 00 and Section 35 43 29, including the following information:
 - i. Estimated area capped during the week (square footage) and locations over which capping materials were placed;
 - ii. Estimated volume placed and comparison to estimate;
 - iii. Quantities of each capping material received (e.g., sand, oleophilic clay, granular activated carbon, aggregate);
 - iv. Quantities of each capping material transported for mixing or placement;
 - v. Quantities of cap materials mixed and prepared;
 - vi. Quantities of each capping material placed (e.g., sand, oleophilic clay, granular activated carbon, aggregate, articulated concrete block (ACB) mats);
 - vii. Calculation of combined area of ACB mats placed; and
 - viii. Cap quality control measurements.
- g. Progress documentation of ISS activities containing, at a minimum, the information below in accordance with Section 03 11 00:
 - i. Operational logs including ISS column logs, ISS grout plant logs, surveyor/engineer notes, and ISS production logs according to the schedule in Section 01 33 00 to the Owner's Representative for review;
 - ii. Volume of ISS material treated during the week and comparison to estimate;
 - iii. Weekly production rate and comparison to estimate;
 - iv. Quantities of each ISS reagent received during the week;
 - v. Quantities of each ISS reagent used for mixing during the week;
 - vi. Quantity of grout prepared during the week and comparison to estimate;
 - vii. Summary of ISS quality control measurements and calibrations;

- viii. Location of ISS Columns completed with indication of top elevations, bottom elevations, thickness, mix design, effective area, quantity of grout used, weight of reagents used, and reagent dosage; and
 - ix. As-built update of completed ISS Columns for review in PDF and AutoCAD formats.
4. Final Weekly Progress Reports. The Contractor shall submit final weekly progress reports that incorporate any revisions based on Owner's Representatives review of Draft Weekly Reports.
5. Monthly Progress Reports. The Contractor shall submit monthly progress reports including, but not limited to, the following information as it applies to that month's work:
- a. A compiled list of all Property Access Agreements to date, including the property address, property owner, property owner contact information, and status of access agreement;
 - b. Electricity Usage (EPA, 2016):
 - i. Usage in kilowatt-hours;
 - ii. Sources of electricity used on Site; and
 - iii. Contractor will enter data into EPA's Power Profiler¹ and report the results.
 - c. Gowanus Project Fleet information as follows (EPA, 2016):
 - i. Number of vehicles in fleet;
 - ii. Vehicle/equipment type, sector, application, horsepower rating, model year, fuel type and monthly usage;
 - iii. Fleet usage rate (hours/vehicle/month);
 - iv. Number of vehicles that have been retrofitted and with what technology since originally manufactured; and
 - v. Contractor will enter data into EPA's Diesel Emissions Quantifier² and report the results.
 - d. Data regarding material reduction and material reuse/recycling, as follows (EPA, 2016):
 - i. Tons and type of materials reduced through purchase of products made from recycled materials;
 - ii. materials reused or recycled by tons and type of materials; and
 - iii. Contractor will enter data into EPA's Waste Reduction Model³ and ReCon Tool⁴ and report the results.

¹ <https://www.epa.gov/energy/power-profiler#/>

² <https://cfpub.epa.gov/quantifier/?action=user.account>

³ <https://www.epa.gov/warm>

⁴ <https://www.epa.gov/warm/recycled-content-recon-tool>

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

[END OF SECTION]

SECTION 01 33 00

SUBMITTALS

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 01 33 00 **TITLE:** SUBMITTALS

SPECIFICATION PREPARED BY: (Specification Preparer, SP) Signature _____

Name Russell Hyatt Date

SCOPE AND FORMAT CHECKED BY: (Scope and Format Checker, SFC) Signature _____

Name Jessica Fears Date

DETAILED REQUIREMENTS CHECKED BY: (Detailed Requirements Checker, DRC) Signature _____

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No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	LW	JF	GDN	JFB
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	LW	JF	GDN	JFB
C	RTA1 65% Remedial Design	11/20/17	LW	JF	GDN	JFB
A1	RTA1 100% Access Dredge Design	09/30/19	JC	RH	GDN	JFB
D	RTA190% Remedial Design	09/30/19	JC	RH	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	RH	JF	GDN	JFB

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SECTION 01 33 00

SUBMITTALS

PART 1 GENERAL

1.01 SUMMARY

- A. This Section covers the requirements for submittals made during construction activities.

1.02 RELATED SECTIONS

- A. This section relates to all other sections of the Contract Documents.

1.03 TYPES OF SUBMITTALS

- A. Submittals include, but are not limited to, the following general categories, with a full list provided as Table 01 33 00-01:
1. Administrative Submittals will be defined by the Owners Representative.
 2. Technical Submittals including, but not limited to:
 - a. Manufacturer's specifications;
 - b. Engineering certifications; and
 - c. Catalogs, or parts thereof, of manufactured equipment.
 3. Contractor Work Plan Submittals including, but not limited to:
 - a. Site Preparation Work Plan;
 - b. Upland Excavation and Fill Work Plan;
 - c. Dredged Material Management Work Plan;
 - d. Dredging Work Plan;
 - e. Treatment Layer Construction Plan;
 - f. Isolation and Armor Layers Construction Plan;
 - g. In Situ Stabilization/Solidification (ISS) Work Plan; and
 - h. Dredge Water Treatment and Management Plan.
 4. Transport and Waste Profile Submittals including, but not limited to:
 - a. Weight tickets;
 - b. Waste profile sampling results; and
 - c. Transportation manifests.

1.04 SUBMITTAL QUALITY

- A. Submittals shall be electronic. The Contractor shall maintain hard copies of submittals for 1 year following the completion of Work. Draft and final versions of reports and similar work products shall be provided in Microsoft Office® suite document format and in Portable Document Format (PDF). Engineering Drawings and surveys shall be provided in AutoCAD® drawing format (.dwg) and as a PDF.
- B. Submittals shall be reproducible with every line, character and letter clearly legible, and usable for further reproduction to yield legible hard copies.
- C. Documents submitted to the Owner's Representative that do not conform to these requirements will not be accepted. If conforming submittals cannot be obtained, such documents shall be retraced, redrawn, or photographically restored as may be necessary to meet such requirements. Contractor's failure to initially satisfy the legibility and quality requirements will not relieve Contractor from meeting the required schedule for submittals.
- D. Submittals shall be complete with respect to design criteria and other information specified to enable the Owner's Representative to review the information effectively.

1.05 LANGUAGE AND DIMENSIONS

- A. All words and dimensional units shall be in the English language and units.
- B. Metric dimensional unit equivalents may be stated in addition to the English units and the associated requirements.

1.06 SUMMARY OF PROJECT SUBMITTALS

- A. A summary of the major project submittals and the associated requirements will be provided in the 100% Design Package as Table 01 33 00-1. Additional submittals and requirements shall be provided as indicated by the Specifications or as requested by the Owner's Representative.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. The Contractor shall submit to the Owner's Representative submittals required by the Contract Documents, these Specifications, and any subsequent modifications.

- B. Items required to be submitted for review shall be furnished by and at the expense of the Contractor. Submittals and their contents shall be properly prepared, identified, and transmitted as provided herein or as otherwise directed.
- C. No construction materials or activities represented by required submittals shall be purchased or shall commence until the applicable submittal has been reviewed and approved, unless explicitly stated otherwise in writing by the Owner's Representative.
- D. Approval of submittals does not relieve the Contractor of their contractual obligations or responsibility for error and omissions within the submittal.

3.02 SUBMITTAL REVIEW TIME

- A. Unless stated otherwise for a specific submittal herein, not less than 7 calendar days shall be assumed for the review of draft submittals and not less than 5 calendar days shall be assumed for the review of final submittals.
- B. Submittals that are subject to regulatory review, as indicated in Table 01 33 00-1, not less than 10 calendar days shall be assumed for the review of draft submittals and not less than 5 calendar days shall be assumed for the review of final submittals. The Owner's Representative will coordinate the review of Contractor submittals with regulatory agencies.
- C. Review of submittals by the Owner's Representative should not cause a delay in the implementation of the Work. The Contractor shall provide review time within the project schedule that will allow for review of draft and final submittals.
- D. Extension of the time for performance of the Work will not be granted because of the Contractor's failure to make timely and correctly prepared and presented submittals with allowance for the checking and review periods.

3.03 DEVIATIONS

- A. At the time of the submission, the Contractor shall give notice in writing in the submittal of any deviation from the requirements of the Contract Documents. The deviations shall be clearly indicated or described including other changes required to correlate the Work.
- B. In accordance with the Contract Documents, the Contractor shall state in writing variations in costs occasioned by the deviations and the Contractor's assumption of the costs of related changes if the deviation is approved. Requirements set forth in Part 3.06 below also shall apply.

3.04 METHOD OF SUBMITTAL

- A. The Contractor shall deliver submittals by means of dated, signed, and sequentially numbered transmittals identified as to initial or resubmittal status, and fully describing the submittal contents.
- B. In each transmittal, the Contractor shall state the Owner's project number and name, name and address of the Contractor, name and address of the subcontractor, manufacturer, supplier or distributor as applicable, and the Construction Drawing, Work Plan, and/or Specification section reference to which the submittal pertains.
- C. Where several types or models are contained in the product literature incorporated into the submittal, the Contractor shall delete nonapplicable portions or specifically indicate which portions are intended and applicable.
- D. Submittals directly from subcontractors, suppliers, or manufacturers are not acceptable.
- E. Incomplete submittals, including those not correctly transmitted, not correctly titled and identified, or not bearing the Contractor's review and approval stamp, will be returned to the Contractor without review.
- F. Except where the preparation of a submittal is dependent upon the approval of a prior submittal, all submittals pertaining to the same class or portion of the Work shall be submitted simultaneously if possible.

3.05 CONTRACTOR'S REVIEW AND APPROVAL

- A. Every submittal shall bear the Contractor's review and approval stamp certifying that the Contractor has:
 - 1. Reviewed, checked, and approved the submittal;
 - 2. Coordinated the contents with the requirements of the Work, the Contract Documents, and this Section including related activities;
 - 3. Determined and verified all quantities, field measurements, field construction criteria, materials, equipment, catalog numbers, and similar data; and
 - 4. Confirmed the activities covered by the submittal are recommended by the Contractor and the Contractor's guarantee will fully apply thereto.
- B. The Contractor's stamp shall be dated and signed by the Contractor in every case.

3.06 REVIEW AND APPROVAL

- A. The approval of submittals shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract Documents or for any revision in resubmittals unless the Contractor has given notice in writing of the deviation or revision

at the time of submission (or resubmission) and written approval has been given of the specific deviation or revision.

Possible outcomes of the review of each submittal are as follows:

1. Approved – Submittal is approved as submitted. Contractor may proceed.
 2. Accept Without Objection – The Owner’s Representative will not approve the submittal, but will accept it if there are no objections upon review.
 3. Approved as noted – Submittal is conditionally accepted. Contractor may accept conditions and proceed, or resubmit alternatives for review.
 4. Revise and Resubmit – Significant changes are required in order for submittal to be accepted. Contractor may not proceed with activities regarding this submittal, but shall revise according to feedback and resubmit.
 5. Informational Submittal Only – The submittal will be reviewed but is for information only and not subject to approval.
- B. The approval of submittals shall not relieve the Contractor of responsibility for errors or omissions in the submittals or for the accuracy of dimensions and quantities, the adequacy of connections, and the proper and acceptable fitting, execution, and completion of the activities provided for by the submittals.

3.07 CORRECTIONS AND RESUBMITTALS

- A. Unless otherwise agreed upon with the Owner's Representative, the Contractor shall make required corrections to a submittal within 5 calendar days or as specified elsewhere in the Specifications and shall resubmit the submittal to the Owner’s Representative. This process will be repeated until the submittal is approved by the Owner’s Representative and other required parties. Should the Owner’s Representative determine that the Contractor’s resubmittals inadequately address comments, then the Owner’s Representative has the discretion to back charge the Contractor for unnecessary review time of submittals.
- B. The Contractor shall direct specific attention in writing to any revisions made to a document that do not specifically respond to the last set of comments received.
- C. The Contractor shall state, in writing, variations in costs and their assumption of the costs of related changes, as is required for deviations in Paragraph 3.03.
- D. Each resubmittal shall be identified with the number of the original submittal followed by “Rev. 1” for first resubmittal, “Rev. 2” for second resubmittal, and so forth until the submittal is ultimately approved.

3.08 CHECK OF RETURNED SUBMITTALS

- A. The Contractor shall check returned submittals for correction and ascertain if the corrections result in extra costs to the Contractor, above the costs included under the Contract Documents.
- B. If in the Contractor's opinion, extra costs result beyond the costs included under the Contract Documents, the Contractor shall give written notice to the Owner's Representative within 5 calendar days. By failing to so notify the Owner's Representative, the Contractor waives all claims for extra costs resulting from required corrections.

3.09 CONFORMANCE

- A. The Work shall conform to the approved submittals and other requirements of the Contract Documents unless subsequently revised by an appropriate modification, in which case the Contractor shall prepare and submit revised submittals as may be required.

**TABLE 01 33 00-1
 SUBMITTALS**

Section Number	Section Name	Submittal Title	Deadline	Review and Approval
DIVISION 01 - GENERAL REQUIREMENTS				
01 32 00	Construction Progress Documentation	Daily Progress Reports	Noon on the following work day	AWO
01 32 00	Construction Progress Documentation	Draft Weekly Progress Reports	Noon on the first work day following the reporting week	AWO
01 32 00	Construction Progress Documentation	Final Weekly Progress Reports	Weekly, upon incorporation of any revisions based on Owner's Representatives review of Draft Weekly Progress Report	AWO
01 32 00	Construction Progress Documentation	Monthly Progress Reports	Monthly	AWO
01 35 29	Health, Safety, and Emergency Response Requirements	Draft Site-specific Contractor Health and Safety Plan (HASP)	Within 7 days following NTP	Review and Comment
01 35 29	Health, Safety, and Emergency Response Requirements	Final Site-Specific Contractor HASP (including training records)	Within 5 days after receipt of Draft HASP comments	AWO
01 35 29	Health, Safety, and Emergency Response Requirements	New Contractor HASP or Addenda to Contractor HASP	5 days prior to implementation of Addenda task	AWO
01 40 00	Quality Requirements	Quality Assurance Project Plan	14 days prior to start of Work	AWO
01 41 00	Regulatory Requirements	Copies of local, county or municipal permits obtained (including, but not	7 days prior to start of Work	I

Section Number	Section Name	Submittal Title	Deadline	Review and Approval
		limited to, street closure permit and hydrant permit)		
01 41 00	Regulatory Requirements	Copies of Correspondence with US Coast Guard (including Local Notice to Mariners)	7 days prior to start of Work	I
01 51 00	Temporary Utilities	Temporary Utilities Work Plan	Within 14 days following NTP	A
01 55 29	Cap Material Staging and Transport	Material Staging and Transport Work Plan	Within 14 days following NTP	A
01 57 13	Temporary Erosion and Sediment Control	Manufacturer's Product Data for Erosion and Sediment Controls	7 days prior to installation	A
01 57 13	Temporary Erosion and Sediment Control	Signed Contractor Certification	7 days prior to installation	I
01 57 13	Temporary Erosion and Sediment Control	SWPPP Team Contact Information	7 days prior to installation	I
01 57 13	Temporary Erosion and Sediment Control	Weekly Inspection Forms	Weekly, with Draft Weekly Progress Reports	AWO
01 57 13	Temporary Erosion and Sediment Control	Copy of Compiled SWPPP Binder	Within 7 days after Contractor Demobilization	I
01 57 13	Temporary Erosion and Sediment Control	Certificates of erosion and sediment control training for Contractor personnel	7 days prior to installation	I
01 57 19	Temporary Environmental Controls	Noise Monitoring Work Plan	45 days prior to start of Work	A
01 57 19	Temporary Environmental Controls	Construction Noise Mitigation Plan	45 days prior to start of Work	A
01 57 19	Temporary Environmental Controls	Construction Air Emissions and Odor Control Plan	With Final Contractor HASP	A
01 57 19	Temporary Environmental Controls	Water Quality Control Plan	Within 30 days following NTP	A

Section Number	Section Name	Submittal Title	Deadline	Review and Approval
01 57 19	Temporary Environmental Controls	Dust Control Plan	With Final Contractor HASP	A
01 57 19	Temporary Environmental Controls	Spill Prevention and Control Plan	With Final Contractor HASP	A
01 57 19	Temporary Environmental Controls	Decontamination Plan	Within 14 days following NTP	A
01 57 19	Temporary Environmental Controls	Daily Noise Monitoring Reports	Include with daily reports listed in 01 32 00	AWO
01 60 00	Product Requirements	Requests for Product Substitution, if desired.	14 days prior to intended use	A
01 60 00	Product Requirements	Product Inventory Reporting	Include with weekly reports listed in 01 32 00	AWO
01 71 23	Site Surveying and Grade Control	Surveyor's Calibration Documentation and Surveyor Notes	Include with the daily and weekly reports listed in 01 32 00 as applicable	AWO
01 71 23	Site Surveying and Grade Control	Surveyor's license information	Submit with reports/ as built drawings / sketches / survey	I
01 71 23	Site Surveying and Grade Control	Initial Record Survey Drawings ⁺	Prior to beginning any earthmoving	A
01 71 23	Site Surveying and Grade Control	Intermediate Record Survey Drawings ⁺	Within 7 days after Survey is Performed	AWO
01 71 23	Site Surveying and Grade Control	Final Record Drawings ⁺	Prior to Final Acceptance of Project by Owner	A
01 78 00	Project Closure	Signed Warranties and Certifications	Prior to final payment request	I
01 78 00	Project Closure	Project Closeout Set of Drawings*	Prior to final payment request	A
01 78 00	Project Closure	Record Documents*	Prior to final payment request	A

Section Number	Section Name	Submittal Title	Deadline	Review and Approval
01 78 00	Project Closure	Documentation of Punchlist	Prior to final payment request	I
01 78 00	Project Closure	Post-Construction Staging Site Bulkhead Survey	Prior to final payment request	AWO
01 78 00	Project Closure	Maintenance/Operation Manuals	Prior to final payment request	I
01 78 00	Project Closure	Documentation of System Testing and Startups	Prior to final payment request	I
01 78 00	Project Closure	Final Payment Request	Submit final payment request following submittal of above referenced submittals	A
DIVISION 02 - EXISTING CONDITIONS				
02 22 00	Building Condition Assessments and Monitoring	Building Condition Assessment Work Plan	30 days prior to the start of Work	A
02 22 00	Building Condition Assessments and Monitoring	Baseline Building Condition Assessment Report	7 days prior to start of intrusive work	A
02 22 00	Building Condition Assessments and Monitoring	Interim Building Condition Assessment Report	Upon request of the Owner or Owner's Representative or if Contractor deems necessary	I
02 22 00	Building Condition Assessments and Monitoring	Post-Construction Building Condition Assessment Report	Following completion of the work scope, and prior to Contractor demobilization	A
02 22 00	Building Condition Assessments and Monitoring	Baseline Existing Bulkhead Condition Survey	25 days prior to start of intrusive work	A
02 22 00	Building Condition Assessments and Monitoring	Vibration Monitoring Work Plan	45 days prior to the start of Work	A
02 22 00	Building Condition Assessments and Monitoring	Monitoring Instrumentation Plan*	90 days prior to the start of Work	A
02 51 19	Dredged Material and Waste Management	Dredged Material Management Work Plan*	Within 30 days following NTP but not later than 14 days prior to start of Work	A

Section Number	Section Name	Submittal Title	Deadline	Review and Approval
02 51 19	Dredged Material and Waste Management	Waste Management Work Plan*	Within 14 days following NTP	A
02 51 19	Dredged Material and Waste Management	Transportation Plan	Within 30 days following NTP but not later than 14 days prior to start of Work	AWO
02 51 19	Dredged Material and Waste Management	Asphalt Pad Management Plan	14 days prior to start of Work	A
02 51 19	Dredged Material and Waste Management	Waste Profile and Transport Submittals ³	Within 24 hours of being acquired	I
02 60 16	Sediment and Floatables Containment	Plans and Specifications for Support Pilings	Within 14 days following NTP	A
02 60 16	Sediment and Floatables Containment	Plans and Specifications for Air Curtain	Within 14 days following NTP	A
02 60 16	Sediment and Floatables Containment	Plans and Specifications for Turbidity Curtain	Within 14 days following NTP	A
DIVISION 03 - CONCRETE				
03 11 00	In Situ Stabilization and Solidification	Draft In Situ Stabilization (ISS) Work Plan	N/A – Submitted prior to 100% Design	N/A
03 11 00	In Situ Stabilization and Solidification	Material Source Information and Certificates of Compliance	At least 30 days prior to mobilization	A
03 11 00	In Situ Stabilization and Solidification	Final ISS Work Plan*	At least 14 days prior to mobilization	A
03 11 00	In Situ Stabilization and Solidification	Final ISS Work Plan Addenda	At least 7 days prior to start of Work	A
03 11 00	In Situ Stabilization and Solidification	Operational Logs	No later than noon of the following work day	I
03 11 00	In Situ Stabilization and Solidification	ISS Final Record Documents	Prior to Final Acceptance of Project by Owner	A
DIVISION 31 - EARTH WORK				
31 10 00	Site Preparation	Site Preparation Work Plan	Within 7 days following NTP	A

Section Number	Section Name	Submittal Title	Deadline	Review and Approval
31 10 00	Site Preparation	Initial Site Survey	Prior to start of earthwork activities	AWO
31 10 00	Site Preparation	Final Site Survey	Prior to final payment request	AWO
31 10 00	Site Preparation	Pre-Construction Staging Site Bulkhead Survey	Prior to start of construction activities on Staging Site	AWO
31 10 00	Site Preparation	Post-Construction Staging Site Bulkhead Survey	See requirements under 01 78 00	
31 23 00	Upland Excavation and Fill	Proposed Sources of Offsite Fill	Prior to sampling	I
31 23 00	Upland Excavation and Fill	Name, Address and Qualifications of Independent Testing Lab	Prior to sampling	I
31 23 00	Upland Excavation and Fill	Virgin source certification and supporting documentation of PID screening results	Prior to unloading material at Site	A
32 23 00	Upland Excavation and Fill	Results of Compaction QC Testing	Within 24 hours of being acquired	A
31 23 00	Upland Excavation and Fill	Results of Material Property and Analytical Chemistry Testing for Proposed Fill Materials	10 days prior to Start of Work	AWO
31 23 00	Upland Excavation and Fill	Results of Material Testing or Supplier Certification for Graded Aggregate Base (GAB)	10 days prior to Start of Work	A
31 41 00	Bulkhead Support	Bulkhead Support Construction Records	Within 30 Days of Bulkhead Support Completion	A
DIVISION 35 - WATERWAY AND MARINE CONSTRUCTION				
35 20 23.13	Dredging and Dewatering	Dredging Work Plan*	Within 30 days following NTP but not later than 14 days prior to start of Work	A
35 20 23.13	Dredging and Dewatering	Surveys as required - weekly, after dredge, following backfill placement, leveling layer, etc.	Within 48 hours following each survey event	AWO

Section Number	Section Name	Submittal Title	Deadline	Review and Approval
35 43 00	Cap Construction-Treatment Layer	Treatment Layer Construction Plan*	Within 45 days following NTP but not later than 30 days prior to start of Work	A
35 43 00	Cap Construction-Treatment Layer	Reactive Material Certification*	30 days prior to placement of treatment layer	I
35 43 00	Cap Construction-Treatment Layer	Sand Material Characterization Reports*	30 days prior to placement of granular capping layer	I
35 43 00	Cap Construction-Treatment Layer	Grain Size Distribution Results Reports*	30 days prior to placement of granular capping layer	I
35 43 00	Cap Construction-Treatment Layer	QC Data Submittal	30 days prior to placement	AWO
35 43 00	Cap Construction – Treatment Layer	Surveys as required	Within 48 hours following each survey event	AWO
35 43 29	Cap Construction – Isolation and Armor Layer	Isolation and Armor Layers Construction Plan*	Within 45 days following NTP but not later than 30 days prior to start of Work	A
35 43 29	Cap Construction – Isolation and Armor Layer	Sand Material Characterization Reports	30 days prior to placement	I
35 43 29	Cap Construction – Isolation and Armor Layer	Grain Size Distribution Results Reports	30 days prior to placement	I
35 43 29	Cap Construction – Isolation and Armor Layer	Isolation Layer QC Data Submittal	Within 48 hours following placement	AWO
35 43 29	Cap Construction – Isolation and Armor Layer	ACB Mat QC Data Submittal	30 days prior to placement	I
35 43 29	Cap Construction – Isolation and Armor Layer	Report from Concrete Supplier	30 days prior to placement	AWO
35 43 29	Cap Construction – Isolation and Armor Layer	Surveys as required	Within 48 hours following placement	AWO
DIVISION 44 - POLLUTION CONTROL EQUIPMENT				
44 08 40	Dredge Water Treatment	Dredge Water Treatment and Management Plan*	Within 30 days following NTP but not later than 14 days prior to start of Work	A

Section Number	Section Name	Submittal Title	Deadline	Review and Approval
44 08 40	Dredge Water Treatment	Operator certifications and qualifications including years of experience	Within 30 days following NTP but no later than 14 days prior to start of Work	I
44 08 40	Dredge Water Treatment	Initial Calibration Records	Prior to water treatment startup	I
44 08 40	Dredge Water Treatment	Calibration Records of continuous discharge monitoring instrumentation	Include with daily reports listed in 01 32 00 as generated	I
44 08 40	Dredge Water Treatment	Results of bench-scale jar testing of polymer/chemical	Prior to water treatment startup	I
44 08 40	Dredge Water Treatment	Procedure for sampling and monitoring GAC tanks for contaminant breakthrough	Prior to water treatment startup	AWO
44 08 40	Dredge Water Treatment	Daily summary of continuous effluent monitoring results and system downtime	Include with daily reports listed in 01 32 00	I
44 08 40	Dredge Water Treatment	Weekly Inspection Reports	Include with weekly reports listed in 01 32 00 for duration of system operation	I
44 08 40	Dredge Water Treatment	Discharge Monitoring Laboratory Results*	Within permit equivalency reporting requirements	AWO
OTHER SUBMITTALS				
-	-	Access agreements	7 days prior to start of Work	I
-	-	Authorizations and certifications	As generated with daily reports	I

Notes:

1. All references to "days" are to be interpreted as "calendar days".
2. Abbreviations: A – Approval Required; AWO – Accept Without Objections (i.e. the Owner’s Representative will not approve the submittal, but will accept it if there are no objections upon review); I – Informational Submittal Only (e.g. the submittal will be reviewed but is for information only and not subject to approval); N/A – Not Applicable
3. Transport and Waste Profile Submittals include weight tickets (or equivalent records), waste profile sampling results, transportation manifests, and evidence of beneficial use end-placement as applicable.

*: Asterisks indicate submittals that are subject to regulatory review. The Owner’s Representative will coordinate the review of Contractor submittals with regulatory agencies.

- + At completion of a survey, provide a copy of the field notes, drawings, or sketches to the Owner's Representative for review. Allow the Owner's Representative three (3) working days for review of surveys. If necessary, provide corrections within three (3) working days.

[END OF SECTION]

SECTION 01 35 29

**HEALTH, SAFETY, AND EMERGENCY
RESPONSE REQUIREMENTS**

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% RTA1 Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 01 35 29 **TITLE:** HEALTH, SAFETY, AND EMERGENCY RESPONSE REQUIREMENTS

SPECIFICATION PREPARED BY: (Specification Preparer, SP) Signature
Name Mark Malchik Date

SCOPE AND FORMAT CHECKED BY: (Scope and Format Checker, SFC) Signature
Name Jessica Fears Date

DETAILED REQUIREMENTS CHECKED BY: (Detailed Requirements Checker, DRC) Signature
Name Russell Hyatt Date

APPROVED BY: (Specification Approver, SA) Signature
Name J.F. Beech Date

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	MM	RH	GDN	JFB
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	MM	RH	GDN	JFB
C	RTA1 65% Remedial Design	11/20/17	MM	RH	GDN	JFB
A1	RTA1 100% Access Dredge Design	09/30/19	MM	RH	GDN	JFB
D	RTA1 90% Remedial Design	9/30/19	MM	RH	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	MM	JF	RH	JFB

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SECTION 01 35 29

HEALTH, SAFETY, AND EMERGENCY RESPONSE REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. The project Site is a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)/Superfund site. This Section specifies the minimum health and safety submission and work requirements for the Site. The Contractor shall develop and implement an overall Site-specific Health and Safety Plan (HASP). The HASP shall address all activities performed within the Contract.
- B. The Contractor shall assume responsibility for the means and methods of job-site safety including general safety oversight authority for the health, safety, and protection of Contractor and Subcontractor on-site personnel, visitors and the general public during the performance of the Work. The Contractor is responsible for providing facilities, labor, materials, tools, equipment, appliances, transportation, and supervision necessary to complete the work specified in this Section and in the Contract Documents in a safe, diligent and compliant manner.
- C. Community air monitoring will be performed by others. The Contractor shall abide by the community air monitoring plan (CAMP).

1.02 RELATED SECTIONS, PLANS, AND DOCUMENTS

- A. All Sections of these specifications and the Contract Documents.

1.03 REFERENCES

- A. The site-specific HASP and all Work conducted on-Site shall be in accordance with, but not limited to, the requirements of the following references, as applicable to the Work:
 - 1. Gowanus Community Air Monitoring Plan – To be prepared by the Owner’s Representative prior to start of Phase I Dredging;
 - 2. Occupational Safety and Health Administration. General Duty Clause of the U.S. Occupational Safety and Health Act, 29 U.S.C., Section 654, Subsections 5 (a) 1, 5(a)2 and 5(b);
 - 3. Occupational Safety and Health Administration. Standards and Regulations contained in Title 29, Code of Federal Regulations, including, but not limited to:
 - a. Part 1910 “General Industry Regulations;”
 - b. Part 1926 “Construction Regulations;”

- c. 1910.120 “Hazardous Waste Operations and Emergency Response;”
 - d. 1910.1200 “Hazard Communication;” and
 - e. 1926.16 “Rules of Construction.”
- 4. National Institute of Occupational Safety and Health (NIOSH)/OSHA/United States Coast Guard (USCG)/EPA Occupational Safety and Health Guidance Manual for Hazardous Site Activities, October 1985, Department of Health and Human Services (DHHS) NIOSH Publication Number 85-115.
 - 5. New York City (NYC) codes, rules, regulations, permits and notifications as applicable to the work per NYC Department of Buildings, NYC Department of Environmental Protection and/or NYC Fire Department including, but not limited to, NYC Fire Code, FDNY Rules, NYC Construction Code, NYC Department of Buildings Rules, NYC Air Code, and DEP Asbestos Regulations.

1.04 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:
 - 1. The Contractor shall submit a Site-specific Health and Safety Plan as required in this Section.
 - 2. When addenda are added to the existing HASP or when a new HASP is developed by the Contractor, an electronic copy of the documents shall be submitted to the Owner’s Representative for review and comment.
 - 3. Once review is completed, an electronic copy of the finalized documents shall be provided to the Owner’s Representative.

PART 2 PRODUCTS

2.01 HEALTH AND SAFETY PLAN

- A. General:
 - 1. The Contractor shall be responsible for the development and implementation of a Site-specific HASP specifying the Contractor's policies and procedures to adequately protect Site workers, visitors and residents. The HASP shall comply with applicable sections of Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) 1926 and 1910, and all other applicable federal, state, and local laws, regulations and codes. The HASP must establish in detail the protocols necessary for protecting workers, on-Site personnel, visitors and the general public from potential physical and chemical hazards encountered during all Site activities.
 - 2. The Contractor shall examine all other Sections of the Specifications for requirements which affect work of this Section, whether or not such work is specifically mentioned in this Section.

3. The Contractor shall coordinate work, including safety aspects of that work, with all other trades or contracts affecting or affected by work of this Section and cooperate with such trades to assure the steady progress and safe execution of all work under the Contract.
4. Subcontractors shall provide their own amendments to the Contractor's HASP specifying the personnel and procedures applicable to their contracted scope of work. Subcontractors' amendments to the Contractor's HASP shall contain a statement indicating their intention to comply with Contractor's HASP and information regarding their specific tasks, including the identified tasks, potential hazards, and control procedures.
5. Minimum precautions noted in this Section (01 35 29) shall in no way relieve individual employers from their responsibility to implement stricter health and safety precautions as warranted by the Work.

B. Topics:

1. HASPs shall include, but not necessarily be limited to, the following sections: Signature Sheet (to include Title, Signature, and phone number of Plan Preparer & Contractor contact information), Project Overview, Project Personnel and Responsibilities, Site Description, Description of Work, Hazards and Controls, Site Control, Air Monitoring, Personal Protective Equipment, H&S Inspections, Incident Reporting and Investigation, Emergency Response, Health and Safety Training Information, Medical Surveillance, Subcontractors and Suppliers, and HASP amendment procedures. Specific Contractor policies or programs relating to any of the hazards associated with the proposed work shall be included as appendices to the HASP(s).

C. Review:

1. Review comments on the Contractor's HASP by project team members will be transmitted to the Contractor by the Owner's Representative. It will be the responsibility of the Contractor to incorporate appropriate provisions into its HASP, subject to the agreement between the Contractor and the Owner. The Contractor will not be permitted to initiate Work until the HASP has been finalized and accepted by the Owner. Acceptance of the HASP indicates only that the HASP complies with the requirements of this Section. Suitability of the HASP for the Work, and the means and methods therein, is the responsibility of the Contractor.

D. Modifications:

1. It shall be the Contractor's responsibility to notify the Owner's Representative verbally and in writing as quickly as possible should any unforeseen safety hazard or condition become evident during the performance of the Work. In the interim, the Contractor shall take prudent action to establish and maintain safe working conditions and to safeguard workers, on-Site personnel, visitors, potential off-site receptors, and the environment in accordance with the established emergency response procedures detailed in the Contractor's HASP.

2.02 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES:

- A. The Contractor shall utilize the services of a qualified “Project Safety Professional” to provide guidance and assistance in the development, implementation, administration and supervision of an overall site-specific HASP and associated project safety program in accordance with these specifications. The Project Safety Professional shall have adequate on-water experience and shall be a Certified Industrial Hygienist certified by the American Board of Industrial Hygiene, a Certified Safety Professional certified by the Board of Certified Safety Professionals, or an alternate qualified individual with equivalent knowledge, skills and experience.
- B. The Contractor’s Project Safety Professional shall review the available chemical data, the specified scope of work and Site conditions and develop the HASP. It shall be the responsibility of the Project Safety Professional to make interpretations and draw conclusions with respect to the conditions at the Site, the scope of work, and their impact on health and safety of project personnel.
- C. The Contractor shall designate an on-Site individual as the Site Safety and Health Officer (SSHO) who shall assist and represent the Project Safety Professional in the continuous daily implementation and enforcement of the HASP. The SSHO shall be assigned to the Site on a full-time basis when construction is occurring and shall report administratively to the Contractor's Site Manager and to the Project Safety Professional in matters pertaining to public health and on-Site safety and health. The SSHO shall be responsible for preparing and maintaining daily health and safety Site logs and reports. The SSHO shall not function in any other role besides that of the SSHO. The SSHO shall be sufficiently qualified through training and experience implementing HASPs for similar on-water work and COCs to function effectively in their role as SSHO for this project.
- D. The SSHO shall maintain a continuous health and safety monitoring/oversight program throughout the performance of the Work, including coordination/communication with the Owner’s Representative, who will occasionally observe/monitor safety performance of the Contractor and its subcontractors. It shall be the Contractor’s responsibility to notify the Owner’s Representative of any deviations from the health and safety monitoring program.
- E. The Contractor shall provide additional appropriately qualified personnel to support the SSHO, if needed.

2.03 PERSONAL PROTECTIVE EQUIPMENT

- A. Minimum personal protective equipment (PPE) to be worn during work in all worksite areas of the Site include hard hats, work boots, safety glasses and standard work clothes. Additional PPE shall be used as appropriate and as required for the work to be performed.

- B. USCG-approved Type III or Type V personal flotation devices (PFDs) shall be provided and properly worn in closed fashion (zipped, tied, latched, etc.) by all persons in the following circumstances:
 - 1. On floating pipelines, pontoons, rafts, or stages;
 - 2. On structures or equipment extending over or next to water except where guardrails, personal fall protection system, or safety nets are provided for employees;
 - 3. Working alone at night where there are drowning hazards, regardless of other safeguards provided;
 - 4. In skiffs, small boats, or launches, unless in an enclosed cabin or cockpit;
 - 5. On open decks of marine vessels except where guardrails, personal fall protection system, or safety nets are provided for employees; or
 - 6. Whenever there is a drowning hazard.
- C. Contractor shall oversee all use of personal protective equipment (PPE) necessary to be in compliance with the HASP for all Site personnel. Contractor shall make PPE available for use by Site visitors.

2.04 TRAINING, MEDICAL MONITORING, INFORMATION, COMMUNICATION

- A. Prior to the initiation of Work, the Contractor shall verify that personnel assigned to perform or supervise work within an exclusion zone (EZ) and/or contaminant reduction zone (CRZ) and/or will contact contaminated environmental media at the Site (primarily NAPL-impacted soils, sediments and water) have received appropriate training in compliance with 29 CFR 1910.120, (“HAZWOPER”), including initial 40 hour Training and annual 8 hour refreshers, as well as 8 hour Supervisor Training for designated individuals functioning in an on-Site HAZWOPER supervisory capacity.
- B. Active participation in a program of periodic medical monitoring in accordance with 29 CFR 1910.120 (f), at a frequency recommended by a physician, but no less frequent than biennial, is required for personnel working in exclusion zones and contamination reduction zones, and/or will contact contaminated environmental media at the Site.
- C. It will be the individual employer’s responsibility to provide requisite training and medical surveillance to its employees and to ensure subcontractors’ employees are qualified as such. The Contractor shall be responsible for ensuring that only personnel having successfully completed the required training and medical surveillance, commensurate with their work, are permitted to perform work at the Site, and records of such training and medical surveillance shall be maintained by the Contractor at the Site.
- D. At least one individual, designated by the Contractor and its subcontractors, who has current certification (Red Cross or equivalent) in basic first aid and cardiopulmonary resuscitation (CPR) must be present at each active work location on the Site at all times during work activities. First-aid-trained personnel must also have received training and

information regarding OSHA's Bloodborne Pathogen Standard including the required use of "universal precautions."

- E. The Contractor shall have available at least one AED on-Site. A minimum of 1 personnel trained in operation of the AED shall be present at each active work location at all times during work activities.
- F. The Contractor shall coordinate with local emergency responders prior to mobilization to develop procedures for emergency rescue from the Canal.
- G. The Contractor and subcontractors shall comply with additional training requirements as may be applicable to the Work, including, but not limited to: Hazard Communication, Respiratory Protection, Emergency Response Procedures, Construction Safety, and all other training as applicable to the work and required by other applicable regulations within 29 CFR 1926 and 1910.
- H. Prior to initiation of Work, the Project Safety Professional and SSHO shall attend a Process Safety Review meeting with the Owner's Representative to evaluate risks of hazards associated with the Work and mitigation measures.
- I. The Contractor shall implement a program of on-Site safety communication, information and oversight, consisting of such measures as Site safety orientations, daily toolbox meetings, and regular/periodic safety meetings. Workers shall be encouraged during the site safety orientation and periodically thereafter to report unsafe work practices or workplace conditions to their supervisor and/or project safety representatives (SSHO), and to discontinue or delay their work ("stop work") should it represent an imminent hazard or otherwise unacceptable safety risk.
- J. The Contractor shall be responsible for ensuring that all required postings are in place, including, but not limited to OSHA poster, applicable labor and wage posting, and emergency response contact information.
- K. The Contractor shall implement an accident/incident/near miss reporting program applicable to its own employees as well as its subcontractor employees, and shall provide information on reported incidents (Incident Reports) to the Owner's Representative within a timeframe agreed upon in the Contractor's HASP. Verbal communication of the incident to the Owner's Representative should occur immediately following stabilization of any emergency situation.
- L. Upon observing or becoming aware of any unsafe condition which poses an imminent danger to onsite workers, visitors, or the general public, the Contractor shall "stop work" and notify the individual(s) affected, their supervisor, and the Owner's Representative of the condition and of corrective actions to be taken.

2.05 HAZARD COMMUNICATION

- A. The Contractor and each subcontractor must have a written Hazard Communication Program. This Program must be available on Site for review by the Owner's Representative.
- B. The Contractor shall ensure that Safety Data Sheets (SDSs) for chemical products brought on-Site by the Contractor and all subcontractors are maintained at the Site and made available to the Owner's Representative and other affected personnel upon request.

2.06 LOGS, REPORTS, AND RECORDKEEPING

- A. The Contractor shall maintain logs and reports covering the implementation of the HASP and other requirements of this section. The formats shall be developed by the Contractor and submitted as part of the HASP.

PART 3 EXECUTION

3.01 IMPLEMENTATION OF THE HASP

- A. It shall be the sole responsibility of the Contractor to ensure that all health and safety requirements are implemented in accordance with the Contractor's HASP and applicable regulations.
- B. The Owner's Representative reserves the right to observe and monitor, from time to time, the health and safety performance of the Contractor and its subcontractors pertaining to their adherence to this Section, and to advise the Owner accordingly.

[END OF SECTION]

SECTION 01 40 00

QUALITY REQUIREMENTS

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 01 40 00 **TITLE:** QUALITY REQUIREMENTS

SPECIFICATION PREPARED BY: (Specification Preparer, SP) Signature _____
Name Russell Hyatt Date _____

SCOPE AND FORMAT CHECKED BY: (Scope and Format Checker, SFC) Signature _____
Name Jessica Fears Date _____

DETAILED REQUIREMENTS CHECKED BY: (Detailed Requirements Checker, DRC) Signature _____
Name Dave Himmelheber Date _____

APPROVED BY: (Specification Approver, SA) Signature _____
Name J.F. Beech Date _____

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
E	RTA1 100% Remedial Design	02/28/20	RH	JF	DH	JFB

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SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall be responsible for the implementation of Construction Quality Control (CQC) responsibilities outlined in the Specifications and Construction Drawings. The Contractor shall perform any CQC testing and inspection necessary to demonstrate that the work meets the requirements of the Contract Documents.

1.02 RELATED SECTIONS, PLANS, AND DOCUMENTS

- A. All Specifications, Construction Drawings, and Contract Documents are related to this Section.

1.03 REFERENCES

- A. EPA March 2005. "Uniform Federal Policy for Quality Assurance Project Plans. Evaluating, Assessing, and Documenting Environmental Data Collection and Use Programs; Part 1: UFP-QAPP Manual."

https://www.epa.gov/sites/production/files/documents/ufp_qapp_v1_0305.pdf

1.04 DEFINITIONS

- A. Construction Quality Control (CQC) – CQC is defined as the planned system of inspections and testing used by the Contractor to monitor and control the characteristics of an item, service, removal, or installation in relation to design requirements. CQC activities provide a collection of measurements of construction conditions.

1.05 SUBMITTALS

- A. The Contractor shall submit CQC documentation as required in individual Specifications.
- B. The Contractor shall provide a Quality Assurance Project Plan (QAPP):
 - 1. The QAPP shall provide detailed methods for collecting and analyzing samples, including sampling techniques, details regarding sample transportation to the laboratory, maintenance of chain-of-custody, and quality assurance/quality control measures as required by the EPA "Uniform Federal Policy for Quality Assurance Project Plans" (EPA, 2005).

2. The QAPP will include samples collected during the Work, including but not limited to, dredge water treatment samples as specified in Section 44 08 40, waste characterization samples as specified in Section 02 51 19, ISS performance samples as specified in 03 11 00, and LOI samples as specified in 35 43 00.

1.06 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.

PART 2 PRODUCTS

[NOT USED]

PART 3 EXECUTION

[NOT USED]

[END OF SECTION]

SECTION 01 41 00

REGULATORY REQUIREMENTS

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% RTA1 Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 01 41 00 **TITLE:** REGULATORY REQUIREMENTS

SPECIFICATION PREPARED BY: _____ Signature
(Specification Preparer, SP)

Name Russell Hyatt Date

SCOPE AND FORMAT CHECKED BY: _____ Signature
(Scope and Format Checker, SFC)

Name Jessica Fears Date

DETAILED REQUIREMENTS CHECKED BY: _____ Signature
(Detailed Requirements Checker, DRC)

Name Darrell Nicholas Date

APPROVED BY: _____ Signature
(Specification Approver, SA)

Name J.F. Beech Date

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	LW	JF	GDN	JFB
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	LW	JF	GDN	JFB
C	RTA1 65% Remedial Design	11/20/17	LW	JF	GDN	JFB
A1	RTA1 100% Access Dredge Design	09/30/19	RH	JF	GDN	JFB
D	RTA1 90% Remedial Design	9/30/19	RH	JF	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	RH	JF	GDN	JFB

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SECTION 01 41 00
REGULATORY REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. This Section details regulatory requirements for conducting the Work.

1.02 RELATED SECTIONS, PLANS, AND DOCUMENTS

- A. Section 01 33 00 Submittals
- B. Section 01 35 29 Health and Safety and Emergency Response Requirements
- C. Section 01 51 00 Temporary Utilities
- D. Section 01 55 29 Cap Material Staging and Transport
- E. Section 01 57 13 Temporary Erosion and Sediment Control
- F. Section 01 57 19 Temporary Environmental Controls
- G. Section 03 11 00 In Situ Stabilization and Solidification
- H. Section 02 51 19 Dredged Material and Waste Management
- I. Section 31 10 00 Site Preparation
- J. Section 31 23 00 Upland Excavation and Fill
- K. Section 35 43 00 Cap Construction Treatment Layer
- L. Section 35 43 29 Cap Construction – Isolation and Armor Layer
- M. Section 44 08 40 Dredge Water Treatment System Requirements
- N. Contract Documents

1.03 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:

1. Copies of local, county or municipal permits obtained including, but not limited to, street closure and hydrant permits.
2. Copies of all correspondence with the U.S. Coast Guard (USCG) and local marine interests relative to the project, including Local Notice to Mariners (LNM). The LNM must include, at a minimum, the information below and be e-mailed to LNM@uscg.mil or faxed to (617) 223-8291. It is the Contractor's responsibility to ensure the LNM is received by the United States Coast Guard.
 - a. Date of submission;
 - b. Name, phone number, and email address of project point of contact;
 - c. Company name;
 - d. Type of work;
 - e. Waterway and location where work will be done;
 - f. Latitude & Longitude of work area (Degrees, Minutes, Thousandths of seconds);
 - g. Work start and stop dates and hours of operation;
 - h. Equipment on scene; and
 - i. VHF radio channel monitored.

1.04 CONTRACTOR RESPONSIBILITIES

- A. A list of permits to be obtained by the Contractor is provided below. The Contractor is responsible for verifying that the permits are applicable to the Work. The Contractor may provide written justification to the Owner's Representative if a permit on the list is not necessary for completion of the Work, or if a permit or permits are required but not listed below. The Owner's Representative will coordinate with the Owner and appropriate Regulatory Agencies to verify the Contractor's request to amend the list below.
 1. Hydrant use permit (New York City Department of Environmental Protection [NYCDEP]);
 2. Protected street opening permit for purpose of maintaining construction fence across Huntington Street during the course of the Work (New York City Department of Transportation [NYCDOT]);
 3. Building operation permit(s) for purpose of occupying roadway, occupying sidewalk, and placing equipment on Huntington Street during the course of the Work (NYCDOT);
 4. EPA approval for the off-Site sediment processing facility, Thermal Treatment facility, and end-placement facility to receive dredged material in accordance with the Off-Site Rule for Superfund Sites as indicated in Section 02 51 19; and
 5. Any other permits that may be required by the means and methods employed by the Contractor.

- B. The Owner's Representative will be responsible for obtaining the following state and federal permits, or permit equivalencies, under the Joint Application form. Permit(s) shall be available for review in the job site trailer.
1. New York State Department of Environmental Conservation (NYSDEC):
 - a. Stream Disturbance
 - b. Excavation and Fill in Navigable Waters
 - c. Docks, Moorings and Platforms (the Contractor shall provide to the Owner's Representative the information necessary to acquire any relevant permits for the installation of a temporary dock, mooring, or platform required by the means and methods employed by the Contractor).
 - d. 401 Water Quality Certification
 2. United States Army Corps of Engineers (USACE):
 - a. Nationwide Permit 38
 3. New York State Office of General Services (NYS OGS):
 - a. State Owned Lands Under Water (including utility easements and docks, moorings or platforms)
 4. New York Department of State (NYDOS):
 - a. Coastal Consistency Concurrence

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.01 GENERAL

- A. The Contractor shall comply with all applicable local, county, and municipal rules, ordinances, codes, and regulations in order to successfully support the implementation of the Remedial Design under the Unilateral Administrative Order (UAO) effective March 24, 2014 and the technical activities required by the Record of Decision (ROD) dated September 27, 2013.
- B. All necessary local permits shall be obtained and paid for by the Contractor.
- C. The Contractor is not responsible for obtaining Federal and State permits. Due to the regulatory nature of the Site, the Owner's Representative will work directly with the U.S. Environmental Protection Agency (EPA) to obtain permit equivalency for federal and state permits including the State Pollution Discharge Elimination System (SPDES) General Permit or the General Permit for Stormwater Discharges from Construction Activity (GP-0-15-002). Therefore, the Contractor is not required to submit a Notice of Intent (NOI). However, the Contractor must implement and comply with the

requirements of the General Permit outlined in the Stormwater Pollution Prevention Plan (SWPPP) provided by the Owner's Representative, and in the Sediment and Erosion Control Plan provided in the Construction Drawings and Section 01 57 13. The Contractor must also comply with requirements of the SPDES General Permit and implement water treatment in accordance with the Construction Drawings and Section 44 08 40.

- D. The Contractor shall close Huntington Street in accordance with Section 31 10 00.

[END OF SECTION]

SECTION 01 51 00

TEMPORARY UTILITIES

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** 100% RTA1 Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 01 51 00 **TITLE:** TEMPORARY UTILITIES

SPECIFICATION PREPARED BY: _____ Signature
(Specification Preparer, SP)

Name Russell Hyatt Date

SCOPE AND FORMAT CHECKED BY: _____ Signature
(Scope and Format Checker, SFC)

Name Jessica Fears Date

DETAILED REQUIREMENTS CHECKED BY: _____ Signature
(Detailed Requirements Checker, DRC)

Name Darrell Nicholas Date

APPROVED BY: _____ Signature
(Specification Approver, SA)

Name J.F. Beech Date

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	LW	JF	GDN	JFB
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C	RTA1 65% Remedial Design	11/20/17	LW	JF	GDN	JFB
A1	RTA1 100% Access Dredge Design	09/30/19	RH	JF	GDN	JFB
D	RTA1 90% Remedial Design	09/30/19	RH	JF	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	RH	JF	JAS	JFB

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SECTION 01 51 00

TEMPORARY UTILITIES

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall be responsible for establishing connections and costs associated with temporary utilities as specified herein.

1.02 RELATED SECTIONS

- A. Section 01 33 00 Submittals
- B. Section 01 35 29 Health and Safety Requirements
- C. Section 01 41 00 Regulatory Requirements
- D. Section 01 57 13 Temporary Erosion and Sediment Control
- E. Section 01 57 19 Temporary Environmental Controls
- F. Section 01 78 00 Project Closure
- G. Section 31 10 00 Site Preparation
- H. Section 31 23 00 Upland Excavation and Fill
- I. Contract Documents

1.03 REFERENCES

- A. Rules of the City of New York (RCNY). Title 15: *Department of Environmental Protection*. <<http://rules.cityofnewyork.us/codified-rules?agency=DEP>>.
- B. New York Administrative Code (NYAC). Title 24: *Environmental Protection and Utilities*. <[http://library.amlegal.com/nxt/gateway.dll/New%20York/admin/newyorkcityadministrativecode?f=templates\\$fn=default.htm\\$3.0\\$vid=amlegal:newyork_ny](http://library.amlegal.com/nxt/gateway.dll/New%20York/admin/newyorkcityadministrativecode?f=templates$fn=default.htm$3.0$vid=amlegal:newyork_ny)>.

1.04 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:

1. Temporary Utilities Work Plan, including plans for:
 - a. Provision of toilet facilities for the duration of the Work;
 - b. Provision of a fire suppression plan and all necessary fire suppression equipment for the duration of the Work;
 - c. Provision of an installation and maintenance plan for temporary utilities for the duration of the Work; and
 - d. Provision of a temporary utilities project closeout plan.

1.05 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.

PART 2 PRODUCTS

2.01 GENERAL

- A. Furnish toilets and servicing for Contractor and for an additional 15 people working on the Staging Site.
- B. Furnish fire suppression equipment and appurtenances.
- C. Furnish electrical power necessary for the Work. All temporary wiring, feeders, appurtenances, and connections shall be furnished by the Contractor. The Contractor is encouraged to use renewable energy to the extent possible and to document any such use and provide to the Owner's Representative.
- D. Furnish all temporary piping, hoses, connections, and appurtenances necessary to perform the Work.

2.02 EQUIPMENT

- A. Furnish equipment to perform the Work in accordance with this Section and the Temporary Utility Work Plan.
- B. The Contractor is encouraged to use EnergyStar™ appliances if such appliances are available and needed for the Work. Documentation of such use is to be provided to the Owner's Representative.

PART 3 EXECUTION

3.01 GENERAL

- A. Verify existing conditions as shown on the Construction Drawings prior to beginning Work in this Section.
- B. Install, maintain, and inspect erosion and sediment controls and environmental controls prior to beginning Work in this Section in accordance with Section 01 57 13 and Section 01 57 19, respectively.
- C. Perform excavation and fill necessary for the Work described in this Section in accordance with Section 31 23 00.

3.02 TEMPORARY TOILET FACILITIES

- A. Install and maintain temporary toilet facilities, hand washing stations, and associated equipment in accordance with any local laws, regulations, or requirements and in accordance with Section 01 41 00.
- B. Install adequate number and size of temporary toilet facilities, hand washing stations, and associated equipment for the anticipated workforce (including for the Contractor and 15 additional people working on the Staging Site) that will be utilizing the facilities. The Contractor must account for designating separate female only toilet facilities when determining the adequate number of toilet facilities needed.
- C. Temporary toilet facilities, hand washing stations, and associated equipment shall be serviced and maintained on a weekly schedule or as recommended by the service providing the temporary toilet facilities. Temporary toilet facilities on barges may be serviced on an as needed basis or as recommended by the service provider.

3.03 FIRE SUPPRESSION

- A. Install and maintain fire suppression equipment and appurtenances in accordance with any local laws, regulations, or requirements and in accordance with Section 01 41 00.
- B. Install adequate number and size of fire suppression equipment for the Work under this Contract.
- C. Fire suppression equipment shall be serviced and maintained on a schedule as recommended by the Contractor providing the equipment.

3.04 TEMPORARY ELECTRICAL FACILITIES

- A. Electrical Services, except those provided in the guard booths and those supplied to existing security lights, shall be provided and maintained by the Contractor throughout the Work.
- B. All electrical Work shall be performed by personnel trained, licensed, and insured in New York.
- C. The use of generators or similar off-grid sources shall be approved by the Owner's Representative. Generators or similar off-grid sources shall comply with requirements set forth in RCNY Title 15, Chapter 28: "Citywide Construction Noise Mitigation," New York Administrative Code Title 24, Chapter 1: "Environmental Protection and Utilities – Air Pollution Control," and Section 01 57 19.
- D. Install and maintain all electrical power requirements needed to perform the Work described in the Contract Documents.
- E. Contractor is to identify electrical service and maintain power service to Contractor trailers.
- F. Contractor is responsible for protecting electrical equipment and repairing conduit which become damaged due to Contractor operations.
- G. The current electrical service will power the Administrative Area for Trailers and Parking (Reserved for Others), guard booths, and street lights. Electrical power obtained from the existing 200-amp service and power from upgrades of service at the Staging Site will be paid for by the Gowanus Canal Environmental Remediation Trust. The Contractor is responsible for providing electrical power for their operations.
- H. Install and maintain all temporary wiring, feeders, appurtenances, and connections necessary to perform the Work in accordance with any local laws, regulations, or requirements.

3.05 TEMPORARY WATER

- A. A nearby New York City fire hydrant is shown on the Construction Drawings. The Contractor may apply for a hydrant permit with the City. The connection shall be approved by authorities having jurisdiction before making any connections.
- B. Obtain construction water for moisture conditioning of fill and for dust control through a New York City hydrant permit or equivalent suitable source of potable water. Contractor shall obtain the necessary permits in accordance with Section 01 41 00.
- C. The Contractor shall install all temporary piping, hoses, connections, and appurtenances required to deliver water to every point where needed. If ambient temperatures are

expected to fall below freezing during the Work, pipes, hoses, connections and appurtenances shall be winterized to prevent leaking.

- D. All water used on-Site shall be potable water, unless otherwise approved by the jurisdictional authority for a specific purpose.
- E. The Contractor shall provide potable water for workers.
- F. Water from the Canal shall not be used on-Site for construction purposes (e.g., for moisture control).

3.06 CLEAN UP

- A. The Contractor shall remove all materials and equipment described in this Section as a part of final cleanup in accordance with Section 01 78 00, unless otherwise approved in writing by the Owner's Representative.

[END OF SECTION]

SECTION 01 55 29

**CAP MATERIAL STAGING AND
TRANSPORT**

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 01 55 29 **TITLE:** CAP MATERIAL STAGING AND TRANSPORT

SPECIFICATION PREPARED BY: (Specification Preparer, SP) Signature _____
Name Dogus Meric Date _____

SCOPE AND FORMAT CHECKED BY: (Scope and Format Checker, SFC) Signature _____
Name Russell Hyatt Date _____

DETAILED REQUIREMENTS CHECKED BY: (Detailed Requirements Checker, DRC) Signature _____
Name Jennifer Wilkie Date _____

APPROVED BY: (Specification Approver, SA) Signature _____
Name J.F. Beech Date _____

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	DM	JW	GDN	JFB
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	DM	JW	GDN	JFB
C	RTA1 65% Remedial Design	11/20/17	DM	JW	GDN	JFB
D	RTA1 90% Remedial Design	08/09/19	DM	JW	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	DM	RH	JW	JFB

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SECTION 01 55 29

CAP MATERIAL STAGING AND TRANSPORT

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

- A. This Section details the procurement, transportation within the Site, stockpiling, and safely grading/sloping of stockpiled cap and backfill material prior to placement.
- B. This Section also details best management practices to keep stockpile areas free of water, debris, and foreign material, and protective measures to keep cap and backfill materials safe from environmental stressors (e.g., weather, UV light, etc.) while storing cap and backfill materials prior to mixing and/or placement.

1.02 RELATED SECTIONS

- A. Section 01 32 00 Construction Progress Documentation
- B. Section 01 33 00 Submittals
- C. Section 01 35 29 Health, Safety, and Emergency Response Requirements
- D. Section 01 41 00 Regulatory Requirements
- E. Section 01 57 19 Temporary Environmental Controls
- F. Section 01 60 00 Product Requirements
- G. Section 02 51 19 Temporary Utilities
- H. Section 31 10 00 Site Preparation
- I. Section 35 20 23.13 Dredging and Dewatering
- J. Section 35 43 00 Cap Construction - Treatment Layer
- K. Section 35 43 29 Cap Construction - Isolation and Armoring Layer
- L. Contract Documents

1.03 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:

1. The Contractor shall provide a Material Staging and Transport Work Plan detailing the following:
 - a. Means, methods and equipment proposed for transporting and stockpiling or storing materials prior to placement;
 - b. Means and methods, and best management practices to be utilized for keeping material stockpile areas free of water, debris, and foreign material, and environmental stressors during handling of materials prior to use in construction; and
 - c. Means and methods of preventing cross-contamination of stockpiled materials in staging area during adjacent construction.

1.04 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.

PART 2 PRODUCTS

2.01 GENERAL

- A. The Contractor shall procure the capping and backfilling products as specified in Sections 35 43 00, 35 43 29, and 35 20 23.13.
- B. The Contractor shall protect the stockpiled materials according to manufacturer recommendations and Section 01 60 00. The Contractor shall supply materials required to provide this protection.
- C. The Contractor shall provide minimum protection of 6 mil plastic sheeting which is secure and free from holes or other damage any time stockpiles are not being accessed, or as directed by the Owner's Representative, to prevent precipitation from entering the stockpiles. The Contractor is responsible for any material damaged by precipitation due to inadequate protection.

PART 3 EXECUTION

3.01 GENERAL

- A. Prior to implementing any of the Work described in this Section, the Contractor shall become thoroughly familiar with the Site conditions, access, transport, staging and stockpile conditions, and all portions of the Work falling within this Section. If stored on the Staging Site, the Contractor shall show the material staging and storage areas on the Site Preparation Work Plan as described in Section 31 10 00. Contractor may propose alternate access transport, staging, and lay down areas for approval by the Owner's Representative.

- B. The Material Staging and Transport Work Plan shall be approved before material is transported to the site.
- C. When transporting the materials within the Site, the Contractor shall minimize spills and apply dust controls in accordance with Section 01 57 19. If spills occur, the Contractor shall manage them in accordance with Section 01 57 19.

3.02 STOCKPILING OF CAP AND BACKFILL MATERIALS

- A. Materials shall be stored and protected as described in Section 01 60 00.
- B. Stockpiled materials shall be labeled with signs.
- C. Stockpiles shall be located in areas approved by the Owner's Representative.
- D. Stockpiles shall be of neat configurations, graded to drain, have side slopes no steeper than 3H: 1V. Contractor shall protect the stockpiles sufficiently that they are ready to use without delays to the project.
- E. Container stockpiles of Granular Activated Carbon, oleophilic clay, bentonite for backfill, and other materials shall be stored and protected as recommended by the manufacturer, as described in Section 01 60 00, and as approved by the Owner's Representative.
- F. The Contractor shall secure material and equipment in accordance with Section 31 10 00.

[END OF SECTION]

SECTION 01 57 13

**TEMPORARY EROSION AND SEDIMENT
CONTROL**

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% RTA1 Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 01 57 13 **TITLE:** TEMPORARY EROSION AND SEDIMENT CONTROL

SPECIFICATION PREPARED BY: (Specification Preparer, SP) Signature
Name: Jessica Fears Date

SCOPE AND FORMAT CHECKED BY: (Scope and Format Checker, SFC) Signature
Name: Russell Hyatt Date

DETAILED REQUIREMENTS CHECKED BY: (Detailed Requirements Checker, DRC) Signature
Name: Darrell Nicholas Date

APPROVED BY: (Specification Approver, SA) Signature
Name: J.F. Beech Date

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	JF	LW	GDN	JFB
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	JF	LW	GDN	JFB
C	RTA1 65% Remedial Design	11/20/17	JF	LW	GDN	JFB
A1	RTA1 100% Access Dredge Design	09/30/19	JF	RH	GDN	JFB
D	RTA1 90% Remedial Design	09/30/19	JF	RH	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	RH	JF	GDN	JFB

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SECTION 01 57 13

TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SUMMARY

- A. Work in this Section includes installation and maintenance of temporary erosion and sediment control measures.

1.02 RELATED SECTIONS, PLANS, AND DOCUMENTS

- A. Section 01 33 00 Submittals
- B. Section 01 35 29 Health, Safety and Emergency Response Requirements
- C. Section 01 57 19 Temporary Environmental Controls
- D. Section 01 60 00 Product Requirements
- E. Contract Documents

1.03 REFERENCES

- A. New York State Department of Environmental Conservation (NYSDEC). November 2016, or most recent version. "New York State Standards and Specifications for Erosion and Sediment Control" ("NYS Standards and Specifications for E&SC").
- B. Geosyntec, 2019. "Stormwater Pollution Prevention Plan (SWPPP) for Construction Activities at Gowanus Canal Superfund Site."

1.04 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00 and the SWPPP:
 - 1. Manufacturer's product data to be used for sediment and erosion control measures;
 - 2. Signed Contractor Certification (provided as an attachment to the SWPPP);
 - 3. SWPPP Team Contact Information (provided as an attachment to the SWPPP);
 - 4. Weekly inspection forms (provided as an attachment to the SWPPP);
 - 5. Certificates of erosion and sediment control training for Contractor personnel (*qualified inspector* and *trained contractor*) who will conduct SWPPP inspections; and

6. A copy of the compiled SWPPP binder, to be submitted at the end of the project and maintained as follows:
 - a. The Contractor shall compile and maintain onsite a project SWPPP binder containing a copy of the SWPPP and all relevant documentation as required by the SWPPP.
 - b. The Contractor shall maintain the SWPPP binder throughout the project and shall make it available for inspection by the Owner's Representative or Conservation District.

1.05 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.

PART 2 PRODUCTS

2.01 GENERAL

- A. Materials for sediment and erosion control measures shall be in accordance with this Section, the New York State Standards and Specifications for Erosion and Sediment Control (November 2016, or latest version), and the Sediment and Erosion Control (S&EC) Plan shown on the Construction Drawings and associated notes.
- B. Materials used to cover stockpiles shall be, at a minimum, 6-mil plastic sheeting free from holes or other damage to prevent precipitation from entering stockpiles. Covers shall be secured suitably to protect stockpiles from wind.

2.02 SILT FENCE

- A. Furnish silt fence materials as needed in accordance with the criteria listed in Section 5 of the NYS Standards and Specifications for E&SC and as shown on the Construction Drawings.
 1. Silt Fence Fabric. The fabric shall meet the following specifications unless otherwise authorized by the Owner's Representative.

Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	110	ASTM D 4632
Elongation at Failure (%)	20	ASTM D 4632
Mullen Burst Strength (PSI)	300	ASTM D 3786
Puncture Strength (lbs)	60	ASTM D 4833
Minimum Trapezoidal Tear Strength (lbs)	50	ASTM D 4533
Flow Through Rate (gal/ min/sf)	25	ASTM D 4491
Equivalent Opening Size	40-80	US Std Sieve ASTM D 4751
Minimum UV Residual (%)	70	ASTM D 4355

2. Fence Posts (for fabricated units). Fence post length shall be a minimum of 36 inches. Wood posts shall be of sound quality hardwood with a minimum cross sectional area of 3.5 square inches. Steel posts shall be standard T and U section weighing not less than 1 pound per linear foot.
3. Wire Fence (for fabricated units). Wire fencing shall be a minimum 14 gage with a maximum 6-inch mesh opening, or as approved by the Owner's Representative.
4. Prefabricated Silt Fence. Prefabricated products are acceptable as long as substantive material specifications are met, as determined by the Owner's Representative.

2.03 FIBER ROLL

- A. Furnish fiber roll materials as needed in accordance with the criteria listed in Section 4 of the NYS Standards and Specifications for E&SC and as shown on the Construction Drawings.
 1. Fiber roll shall consist of coir (coconut fiber), straw, or excelsior encased in a netting of jute, nylon, or burlap.
 2. If located on asphalt, fiber rolls shall be anchored by tying them to cinder blocks placed on the downslope side of the fiber roll and spaced laterally on 2-ft to 4-ft centers. The anchor system shall limit movement of the fiber roll and trapped sediment. The Contractor may propose an alternate method for anchoring fiber rolls subject to approval by the Owner's Representative.

2.04 STABILIZED CONSTRUCTION ENTRANCE

- A. Inspect and maintain existing construction entrances to ensure compliance with criteria listed in Section 2 of the NYS Standards and Specifications for E&SC and details shown on the Construction Drawings.
 1. Aggregate. Aggregate layer shall not be less than 6 inches thick and shall consist of a matrix of 1 to 4 inch stone, or reclaimed or recycled concrete equivalent.

2. Width. Construction entrance shall be at least 12 feet wide but not less than the full width of points where ingress or egress occurs.
3. Length. Construction entrance shall be at least 50 feet in length.
4. Geotextile. The area to be covered with aggregate shall be underlain with geotextile. Fabric shall be woven or nonwoven, consist of continuous chain polymeric filaments or yarns of polyester, and inert to commonly encountered chemicals and hydrocarbons. The fabric shall be rot resistant and conform to the following properties:

Fabric Properties ³	Light Duty ¹ Roads Grade Subgrade	Heavy Duty ² Haul Roads Rough Graded	Test Method
Grab Tensile Strength (lbs)	200	220	ASTM D1682
Elongation at Failure (%)	50	60	ASTM D1682
Mullen Burst Strength (lbs)	190	430	ASTM D3786
Puncture Strength (lbs)	40	125	ASTM D751 Modified
Equivalent	40-80	40-80	US Std Sieve
Aggregate Depth	6	10	-
¹ Light Duty Road: Area sites that have been graded to subgrade and where most travel would be single axle vehicles and an occasional multi-axle truck. Acceptable materials are Trevira Spunbond 1115, Mirafi 100X, Typar 3401, or equivalent. ² Heavy Duty Road: Area sites with only rough grading, and where most travel would be multi-axle vehicles. Acceptable materials are Trevira Spunbond 1135, Mirafi 600X, or equivalent. ³ Fabrics not meeting these specifications may be used only when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.			

2.05 STRAW BALE DIKE

- A. Furnish straw bale dike materials as needed in accordance with the design criteria listed in Section 5 of the NYS Standards and Specifications for E&SC and as shown on the Construction Drawings.
 1. Bound straw bales. Straw bales shall be placed on the contour and secured with re-bar, steel pickets, or 2-inch by 2-inch stakes.

2.06 EQUIPMENT

- A. Furnish equipment to perform sediment and erosion control measure installation and maintenance in accordance with this Section and the NYS Standards and Specifications for E&SC.

PART 3 EXECUTION

3.01 PREPARATION AND INSTALLATION

- A. Review the Construction Drawings and SWPPP.
- B. Sign the Contractor Certification and provide contact information as required by the SWPPP.
- C. Verify existing conditions as shown on the Construction Drawings prior to beginning Work in this Section.
- D. Inspect the condition of existing erosion and sediment control devices for compliance with requirements listed in this Section and shown on the Construction Drawings.
- E. Install sediment and erosion control measures prior to commencement of any other work activities in locations shown on the Construction Drawings in accordance with this Section.
- F. Inspect and certify newly installed erosion control measures in coordination with the Owner's Representative.
- G. Implement dust control in accordance with Section 01 57 19.
- H. Do not rely on the construction entrance to remove mud from vehicles and prevent off-site tracking. Restrict vehicles that enter the construction site from muddy areas or wash mud from them in a designated location approved by the Owner's Representative before allowing the vehicles to leave the Site.
- I. Maintain the construction entrance in a condition that will prevent tracking or flow of mud onto public rights-of-way.
- J. Immediately and adequately remove materials spilled, dropped, washed, or tracked onto roadways or into storm.
- K. Under no circumstances shall water trucks be used to remove materials spilled, dropped, washed, or tracked onto roadways.
- L. Clean, maintain, repair, and replace sediment and erosion control measures for the duration of the Contract. Sediment that is removed from sediment and erosion control measures shall be disposed of in accordance with Section 02 51 19.
- M. At the end of the Contract, remove, transport and dispose of materials and debris associated with sediment and erosion controls in accordance with Section 02 51 19 and as directed by the Owner's Representative. Material shall be disposed or recycled in accordance with all local, state, and federal laws, codes, and ordinances.

3.02 INSPECTIONS

- A. The Contractor shall conduct a site inspection at least once every seven (7) calendar days following installation of all sediment and erosion controls. Inspection shall be performed by a *qualified inspector*, as defined in the Construction Drawings and documented in accordance with this Section and the SWPPP.

- B. The Contractor is responsible for conducting daily inspections of sediment and erosion control practices and pollution prevention measures being implemented within the active work area daily to ensure that they are being maintained in effective operating condition. Daily inspections shall be performed by a *trained contractor*, as defined in the Construction Drawings and documented in accordance with this Section and the SWPPP.

[END OF SECTION]

SECTION 01 57 19

**TEMPORARY ENVIRONMENTAL
CONTROLS**

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% RTA1 Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 01 57 19 **TITLE:** TEMPORARY ENVIRONMENTAL CONTROLS

SPECIFICATION PREPARED BY: _____ Signature
(Specification Preparer, SP)

Name Russell Hyatt Date

SCOPE AND FORMAT CHECKED BY: _____ Signature
(Scope and Format Checker, SFC)

Name Dillon O'Donnell Date

DETAILED REQUIREMENTS CHECKED BY: _____ Signature
(Detailed Requirements Checker, DRC)

Name Darrell Nicholas Date

APPROVED BY: _____ Signature
(Specification Approver, SA)

Name J.F. Beech Date

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	JF	LW	GDN	JFB
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C	RTA1 65% Remedial Design	11/20/17	JF	LW	GDN	JFB
A1	RTA1 100% Access Dredge Design	09/30/19	RH	JF	GDN	JFB
D	RTA1 90% Remedial Design	09/30/19	RH	JF	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	RH	DMO	GDN	JFB

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SECTION 01 57 19

TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 GENERAL

1.01 SUMMARY

- A. This Section establishes the requirements for temporary environmental controls to minimize emissions and discharges from the Site.

1.02 RELATED SECTIONS AND PLANS

- A. Section 01 33 00 Submittals
- B. Section 01 35 29 Health, Safety, and Emergency Response Requirements
- C. Section 01 51 00 Temporary Utilities
- D. Section 01 57 13 Temporary Erosion and Sediment Control
- E. Section 02 51 19 Dredged Material and Waste Management
- F. Section 02 60 16 Sediment and Floatables Containment
- G. Stormwater Pollution Prevention Plan (SWPPP)
- H. Contract Documents

1.03 REFERENCES

- A. Rules of the City of New York (RCNY). "Title 15: Department of Environmental Protection." <<http://rules.cityofnewyork.us/codified-rules?agency=DEP>>.
- B. New York City Administrative Code (NYCAC). "Title 24: Environmental Protection and Utilities." <<http://public.leginfo.state.ny.us/lawssrch.cgi?NVLWO:>>.
- C. Gowanus Community Air Monitoring Plan – To be prepared prior to the start of Phase I Dredging;
- D. Wilson Ihrig, October 2015. "Gowanus Canal Remedial Design Project Brooklyn, New York, RTA-1 and TB-4 Noise and Vibration Baseline Report."
- E. Wilson Ihrig, December 2016. "Noise Monitoring Report for Gowanus Canal Remedial Design Project TB-4 Debris Removal Pilot Study."

- F. Standards and regulations contained in Title 40, Code of Federal Regulations, including, but not limited to:
 - 1. Part 110 “Discharge of Oil”;
 - 2. Part 117 “Determination of Reportable Quantities for Hazardous Substances”; and
 - 3. Part 302 “Designation, Reportable Quantities, and Notification”.
- G. Geosyntec, 2019. “Stormwater Pollution Prevention Plan (SWPPP) for Construction Activities at Gowanus Canal Superfund Site.”
- H. Geosyntec, 2020. “Water Quality Monitoring Plan for In-Waterway Construction Activities.”

1.04 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:
 - 1. A Noise Monitoring Work Plan, including, but not limited:
 - a. The name and qualifications of the noise monitoring specialist to perform the monitoring;
 - b. A list of monitoring equipment to be used for the Work, including relevant certificates of calibration;
 - c. A description of the monitoring procedures and location of any necessary noise monitoring equipment;
 - d. Noise threshold limits that comply with local requirements for allowable noise limits and the threshold limits provided in this Section;
 - e. A template for daily monitoring reports to include at a minimum:
 - i. Date of monitoring;
 - ii. Name of the reporter/monitoring technicians;
 - iii. Identification of the equipment used for monitoring; and
 - iv. Summary of any exceedances to the noise monitoring criteria and noise mitigation measures implemented when necessary.
 - 2. Construction Noise Mitigation Plan that meets the requirements set forth in RCNY Title 15, Chapter 28: “Citywide Construction Noise Mitigation” including, but not limited to:
 - a. Construction devices to be used;
 - b. Noise mitigation barriers to be used; and
 - c. Means and methods for implementing operational controls and/or noise barriers to mitigate construction-related noise as required.
 - 3. Construction Air Emissions and Odor Control Plan including, but not limited to:
 - a. Types of foaming odor suppressants to be used;

- b. Types of air emissions controls to be used;
 - c. Means and methods for implementing operational and/or physical air emissions and odor controls as required; and
 - d. Contingency plan if odor thresholds are reached.
4. Water Quality Control Plan including, but not limited to:
- a. Types of water quality controls to apply to prevent and mitigate exceedances of water quality monitoring criteria as defined in this Section; and
 - b. Means and methods for implementing operational and/or physical water quality controls as required.
5. Dust Control Plan that meets the requirements set forth in RCNY Title 15, Chapter 13: “Rules Pertaining to the Prevention of the Emission of Dust from Construction Related Activities” including, but not limited to,
- a. Means and methods to control dust during construction activities and transport of materials.
6. Spill Prevention and Control Plan including, but not limited to:
- a. Procedures, instructions and reporting requirements in the event of any leak, spill, or other release containing a substance regulated under State or local laws and/or a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117, or 40 CFR Part 302;
 - b. Contact information for the person responsible for reporting spills or releases of hazardous materials and the chain of command for reporting this information to the Owner’s Representative and legally required emergency response authorities, regulatory agencies, and other reporting channels;
 - c. Contact information for the person responsible for implementing spill response measures;
 - d. Training requirements for personnel who will be responsible for implementing cleanup;
 - e. List of materials and equipment to be made available on-Site for containment and potential cleanup of spilled materials;
 - f. Means and methods to prevent, control and clean spills of materials stored on-Site or on barges;
 - g. Means and methods to prevent, control and clean spills from Dredge Water Treatment System (DWTS) secondary containment;
 - h. Means and methods to prevent, control, and clean spills associated with transloading in situ stabilization/solidification (ISS) reagents onto barges; and
 - i. Means and methods to clean up soils and/or water contaminated due to malfunction of the DWTS (e.g., overflow or spills).
7. Decontamination Plan including, but not limited to:

- a. Decontamination measures including description of facilities and procedures for decontamination of trucks, construction equipment (including barges and other equipment in contact with sediments, processed dredged material, decant water, leachates, and surface water runoff) and rented facilities (such as road mats and water treatment equipment) before they leave the Site. The discussion shall also include methods for containment and management of wastes resulting from these activities.
- b. The Contractor has the option to use the existing asphalt pad to perform decontamination activities as described in this Section; however, the Contractor may elect to submit an alternate design for an additional decontamination pad, if necessary, for Site operations. If the Contractor submits an alternate design for approval by the Owners Representative, the decontamination requirements in this Section shall apply to the new design.

1.05 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Materials covered under this Section shall include but not be limited to the following items:
 1. Water. The Contractor shall provide sufficient water for controlling dust emissions. Water may be obtained from an NYC fire hydrant adjacent to the Site following proper permitting according to Section 01 51 00.
 2. Sediment and erosion controls. The Contractor shall furnish materials for sediment and erosion control devices according to Section 01 57 13 and the Sediment and Erosion Control (S&EC) Plan shown on the Construction Drawings and associated notes.
 3. Noise barriers. The Contractor shall furnish appropriate materials as necessary to comply with this Section.
 4. Air emissions and odor control. The Contractor shall furnish odor suppressant foams described below and appropriate equipment for controlling air emissions and odors associated with debris and sediment removed from the Canal and ISS treatment operations performed in the Canal. The Contractor may propose an alternate foam product, subject to approval by the Owner's Representative. Contractor shall dispense foam according to the manufacturer's recommended instructions.

- a. The Contractor shall furnish a fast-acting odor suppressant foam for immediate short-term mitigation of odors such as RusFoam® OC (AC-645) (RusMar Foam Technologies, Incorporated).
 - b. The Contractor shall furnish a long-duration odor suppressant foam for long-term mitigation of odors such as RusFoam® LM (RusMar Foam Technologies, Incorporated).
5. Water quality control. The Contractor shall furnish appropriate materials for controlling turbidity in the Canal in accordance with this Section and Section 02 60 16.
 6. Spill Response Kit. The Contractor shall maintain a spill response kit on-Site at all times (including all vessels) of sufficient size to contain and absorb the capacity of the largest fuel or hydraulic fluid tank of Contractor-provided equipment.
 7. Spill control materials. The Contractor shall furnish appropriate materials for controlling and cleaning spills from material storage containers and/or the DWTS.

2.02 EQUIPMENT

- A. The Contractor shall provide all equipment to perform the activities associated with temporary environmental controls including, but not limited to:
 1. Pumps, hoses, and other water handling equipment used for dust control;
 2. Water truck(s) or other equipment needed to provide dust suppression independent of moisture conditioning activities; and
 3. Equipment for deploying odor and other environmental controls.

PART 3 EXECUTION

3.01 DUST CONTROL

- A. The Contractor shall perform dust control throughout the project duration to prevent the occurrence of dust. As necessary or otherwise directed by the Owner's Representative, clean water shall be applied to the surfaces of haul roads and work areas when equipment is moving about the Site in order to control dust monitored in accordance with the Community Air Monitoring Plan (CAMP, to be prepared). Particulate matter transported in trucks and other vehicles shall be covered when being transported and any particulate matter delivered to or kept on-Site shall be sufficiently managed to prevent particulate matter from becoming airborne.

3.02 NOISE CONTROL

- A. At a minimum, noise monitoring shall include the measurement of Equivalent Noise Levels (Leq) (e.g. an hourly "average" of sound level) and Maximum Sound Levels (Lmax) (e.g. the highest sound level that occurs during the time period of measurement).

Noise limits for Leq and Lmax for various times and receptors are provided in Table 1 below (full report provided upon request).

Table 1. Allowable Equivalent Noise Levels and Maximum Noise Levels

Land Uses	Equivalent Noise Level ^a - Leq dBA (whichever is greater)	Lmax Level - dBA, slow
Daytime (7AM to 6PM)		
Residences and buildings where people normally sleep	75 or Background + 5 ^a	85 ^e 90 (impact equipment)
Commercial Areas	80 or Background + 5 ^a	None
Industrial Areas	80 or Background + 5 ^a	None
Evening (6PM to 10PM)		
Residences and buildings where people normally sleep	65 or Background + 5	85
Commercial Areas	80 or Background + 5	None
Industrial Areas	80 or Background + 5	None
Nighttime (10PM to 7AM)		
No nighttime work planned		
Residences If background < 70 dBA If background ≥ 70 dBA	Background + 5 Background + 3	80 80
Commercial Areas	None	None
Industrial Areas	None	None
Weekend (Sat. 7AM to 6PM)		
No Weekend work planned		
Residences and buildings where people normally sleep	65 or Background + 5	85
Commercial Areas	80 or Background + 5	None
Industrial Areas	80 or Background + 5	None
Weekend (Sat. 6PM to Mon 7AM)		
No Weekend work planned		
Residences If background < 70 dBA If background ≥ 70 dBA	Background + 5 Background + 3	80 80
Commercial Areas	None	None
Industrial Areas	None	None
Notes:		
a) Noise level limits based on total noise level due to construction noise combined with typical ambient conditions b) All measurements taken at the affected lot-line and at least 50 feet from construction activity being measured c) Noise level limits based on hourly intervals d) Lmax noise level limits are the maximum noise level that occurs over hourly intervals e) Noise from impact equipment may be exempt from the Leq recommendation, however is subject to a lot line Lmax limit of 90 dBA		

- B. The Contractor shall perform baseline noise monitoring for a minimum duration of 10 days prior to the start of work.
- C. The Contractor shall be prepared to implement appropriate noise controls in response to monitoring data in accordance with the Noise Monitoring Work Plan, Construction Noise Mitigation Plan, and this Section.

- D. Perform noise-producing work in accordance with RCNY Title 15, Chapter 28: “Citywide Construction Noise Mitigation” and NYCAC Title 24, Chapter 2: “Noise Control.”
- E. Noise-producing work may occur between the hours of 7:00 AM and 6:00 PM local time on weekdays, unless authorized in accordance with procedures outlined in RCNY Title 15, Chapter 28.
- F. In the event of a noise complaint or specific exceedance, the Contractor shall respond in accordance with RCNY Title 15, Chapter 28 and NYCAC Title 24, Chapter 2.

3.03 AIR EMISSIONS AND ODOR CONTROL

- A. Air emissions and odor will be monitored by others in accordance with the CAMP (to be prepared) prior to and during dredging and capping operations. Exceedances of action levels will be communicated to the Contractor by the Owner’s Representative or their delegate. The Contractor is responsible for implementing air emissions and odor controls in response to specific exceedances. The nature and extent of corrective measures will be determined based on consultation with the Owner’s Representative. Corrective measures may include, but are not limited to:
 - 1. Modifying operating procedures;
 - 2. Installing additional engineering controls;
 - 3. Modifying equipment used for construction activities;
 - 4. Adjusting application rate of odor control materials; and
 - 5. Slowing or suspending construction activities until air quality is restored to below applicable threshold criteria.
- B. ISS Operations, Dredged Sediment, and Debris Air Emission and Odor Control
 - 1. Odor suppressant shall be available for use to control air emission and odor to maintain compliance with air emissions and odor thresholds defined in the CAMP (to be prepared). Odor suppressant shall be available on the ISS treatment barge for daily application for the duration of ISS Operations to the active ISS treatment area.
 - 2. At a minimum, odor suppressant foam shall be available for daily application for the duration of dredging activities to both areas where debris and sediment containers are stored, i.e. (1) on the barge and (2) on the asphalt pad.
 - 3. Additional odor suppressant foam shall be applied as needed to maintain compliance with air emissions and odor thresholds defined in the CAMP (to be prepared).
- C. Water Treatment System Air Emission and Odor Control

The Contractor shall use Best Management Practices (BMPs) to control odors, which include but are not limited to:

1. Reducing odor production via disinfection to control bacteria growth;
2. Reducing odor and air emission transmission by installing closed-top tanks or removable covers to cover tanks; and
3. Odor masking or counteraction only used as a stop-gap measure.

3.04 WATER QUALITY CONTROL

- A. Prior to and during dredging, ISS, and capping operations, water quality in the main portion of the Canal will be monitored by others in accordance with the “Water Quality Monitoring Plan for In-Waterway Construction Activities” (Geosyntec, 2020). Exceedances of threshold levels will be communicated to the Contractor by the Owner’s Representative or delegate. During in-waterway construction activities, one ambient turbidity monitoring buoy deployed in RTA2 to measure background turbidity conditions and sentinel turbidity monitoring buoys deployed just south of each of the Union Street, Carroll Street, and 3rd Street bridges will detect any increase in turbidity due to in-waterway construction activities. The Contractor shall not damage equipment or interfere with operation of equipment.
- B. The following threshold criteria will be applied to all in-waterway construction activities occurring in RTA1:
 1. The Trigger Criterion shall be reached if any of the following apply:
 - a. The rolling average of the relevant sentinel buoy turbidity measurements over a one-hour period exceeds the rolling average of the ambient buoy turbidity measurements by 20 Nephelometric Turbidity Unit (NTU) excluding any eliminated outlier measurements and in-waterway construction activities cannot be immediately excluded as the source; or
 - b. Either an oil sheen or turbidity plume is visually observed at the relevant sentinel buoy and in-waterway construction activities are readily identified as the source.
 2. The Action Criterion shall be reached if any of the following apply:
 - a. The rolling average of the turbidity measurements of the sentinel buoy outside of RTA1 over a one-hour period exceeds the rolling average of the ambient buoy turbidity measurements by 40 NTU excluding any eliminated outlier measurements; or
 - b. Either an oil sheen or turbidity plume is visually observed outside of RTA1 and any deployed engineering controls and in-waterway construction activities are readily identified as the source.
- C. The Contractor shall be prepared to implement appropriate operational and water quality control measures if an exceedance of the threshold criteria for turbidity or oil sheen is observed. Operations will not be stopped due to an exceedance of the Trigger Criterion. Should an exceedance of the Trigger Criterion be reached, the Contractor shall evaluate BMPs and begin implementing corrective actions as appropriate. Should an exceedance

of the Action Criterion be reached, the nature and extent of the corrective measures will be determined based on consultation with the Owner's Representative. The Contractor shall also be prepared to implement appropriate operational and water quality control measures for in-waterway construction activities occurring outside of RTA1 including, but not limited to, construction activities occurring along the Staging Site. Corrective measures are to be outlined in the Contractor Water Quality Control Plan and may include, but are not limited to:

1. Repairing, modifying, and/or installing additional engineering controls such as turbidity curtains or absorbent booms in accordance with Section 02 60 16;
2. Performing sweeps of the work zone using an absorbent boom to remove sheen;
3. Modifying equipment used for the in-waterway construction activities;
4. Adjusting BMPs; and
5. Slowing or suspending in-waterway construction activities until Canal water quality is restored to below applicable threshold criterion.

3.05 SPILL CONTROL

- A. The Contractor shall prevent and control spills in accordance with this Section and the SWPPP (Geosyntec, 2017).
- B. The Owner's Representative shall be notified immediately of any spills of hazardous materials. Once detected, spills should be cleaned immediately and waste materials properly disposed.

3.06 DECONTAMINATION OF EQUIPMENT AND VEHICLES

- A. The Contractor shall decontaminate all equipment in accordance with the Contractor's Decontamination Plan. Potable water shall be used for decontaminating equipment. The outsides of barges and other equipment shall be kept clean to prevent the release of sediment into the Canal.
- B. The Contractor shall use the asphalt pad for equipment and vehicle decontamination or build a separate decontamination pad.
- C. All vehicles hauling sediment, processed dredged material, or debris must be decontaminated before leaving the Staging Site.
- D. Decontamination fluids shall be captured and treated through the DWTS when the DWTS is present on-Site.
- E. Water used for decontamination of components of the DWTS and any other equipment after decommissioning of the DWTS shall be captured and properly discarded off-Site in accordance with local, state, and federal regulations.

3.07 SEDIMENT AND EROSION CONTROL

- A. The Contractor shall perform sediment and erosion control in accordance with Section 01 57 13, the SWPPP, and the Construction Drawings.

[END OF SECTION]

SECTION 01 60 00

PRODUCT REQUIREMENTS

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 01 60 00 **TITLE:** PRODUCT REQUIREMENTS

SPECIFICATION PREPARED BY: (Specification Preparer, SP) Signature _____

Name Julie Chambers Date

SCOPE AND FORMAT CHECKED BY: (Scope and Format Checker, SFC) Signature _____

Name Russell Hyatt Date

DETAILED REQUIREMENTS CHECKED BY: (Detailed Requirements Checker, DRC) Signature _____

Name Jessica Fears Date

APPROVED BY: (Specification Approver, SA) Signature _____

Name J.F. Beech Date

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	-	-	-	-
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	-	-	-	-
C	RTA1 65% Remedial Design	11/20/17	LW	JF	GDN	JFB
A1	RTA1 100% Access Dredge Design	09/30/19	RH	JF	GDN	JFB
D	RTA1 90% Remedial Design	09/30/19	RH	JF	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	JC	RH	JF	JFB

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SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. The Contractor shall be responsible for providing necessary products and implementing proper transport and handling of products as specified herein.

1.02 RELATED SECTIONS

- A. Section 01 32 00 Construction Progress Documentation
- B. Section 01 33 00 Submittals
- C. Section 01 35 29 Health, Safety, and Emergency Response Requirements
- D. Contract Documents

1.03 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:
 - 1. Product substitution requests:
 - a. Complete product data substantiating compliance of proposed substitutions with Contract Document requirements shall be included in request. Limit each request to one proposed substitution;
 - b. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence; and
 - c. The Owner's Representative will notify Contractor, in writing, of decision to accept or reject requests.

1.04 PRODUCT INVENTORY REPORTING REQUIREMENTS SHALL BE SUBMITTED IN ACCORDANCE WITH SECTION 01 32 00. DEFINITIONS

- A. Products. Products include materials, equipment, components, fixtures, systems, and assemblies forming the Work. Products may also include existing materials or components required for reuse. Products do not include machinery and equipment used for preparation, fabrication, conveying, and installation of the Work.

1.05 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.

PART 2 PRODUCTS

2.01 PRODUCT OPTIONS

- A. Where products are specified by reference standards or by description-only in Construction Documents, the Contractor may select any products meeting those standards or description.
- B. Where products are specified by naming one or more manufacturers with a provision for substitution (or equivalent) in Construction Documents, the Contractor may submit a written request for substitution for any manufacturer not named.

PART 3 EXECUTION

3.01 GENERAL

- A. Products may not be brought on Site without the approval of the Owner's Representative.
- B. The Contractor must remove non-approved or damaged products at the Contractor's sole expense.
- C. Excess products that have not been approved for payment shall remain the property of the Contractor and shall be removed from the Site at the Contractor's expense.

3.02 PRODUCT SUBSTITUTIONS

- A. Substitutions may be considered when a specified product becomes unavailable through no fault of the Contractor.
- B. A Product Substitution Request constitutes a representation that the Contractor:
 - 1. Has investigated the proposed product and determined that it meets or exceeds the quality level of the specified product and the performance criteria specified and intended for originally specified products;
 - 2. Will provide the same warranty or better for the substitution as for the specified product;
 - 3. Will coordinate installation and make changes to other work which may be required for the Work to be complete and operational with no additional cost to the Owner;

4. Will waive claims for additional costs and time extension which may subsequently become apparent; and
 5. Will reimburse the Owner's Representative for review or redesign associated with acceptance of the substitute product unless the specified product becomes unavailable through no fault of the Contractor.
- C. Substitutions will not be considered without a written request despite their indication or implication on shop drawings or product data submittals. Substitutions will not be considered when acceptance of the substitution will require revisions to the Construction Documents except as specified in Part 3.02(C)(5).
- D. The Contractor shall submit requests for substitution for consideration according to Section 01 33 00.

3.03 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure that products comply with requirements, that quantities are correct, and that delivered products are undamaged.
- C. Provide proper equipment and skilled personnel to handle products by methods to prevent product soiling, disfigurement, or damage.

3.04 STORAGE AND PROTECTION

- A. Store and protect products in accordance with manufacturer's instructions and maintain all seals and labels intact and legible.
- B. Store products in temperature-controlled environments when necessary to prevent freezing and heat damage. Comply with manufacturers' instructions regarding temperature at which products should be stored.
- C. Store products in moisture-tight enclosures when moisture can detrimentally affect the quality of the product.
- D. For exterior storage of fabricated products, place on sloped supports, above ground.
- E. Cover products subject to deterioration with impervious sheet covering. Provide proper ventilation to prevent condensation. Maintain coverage until product is used or removed from site.
- F. Arrange storage of products to permit access for inspection. Periodically inspect to ensure products are undamaged and maintained under specified conditions.
- G. Protect stored products from theft or vandalism.

- H. All material installed but not in operation shall be considered in storage and shall be protected accordingly.
- I. The Contractor shall replace all products which are damaged at no additional cost to the Owner.

[END OF SECTION]

SECTION 01 71 23

**SITE SURVEYING AND GRADE
CONTROL**

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 01 71 23 **TITLE:** SITE SURVEYING AND GRADE CONTROL

SPECIFICATION PREPARED BY: (Specification Preparer, SP) Signature _____
Name Dillon O'Donnell Date _____

SCOPE AND FORMAT CHECKED BY: (Scope and Format Checker, SFC) Signature _____
Name Russell Hyatt Date _____

DETAILED REQUIREMENTS CHECKED BY: (Detailed Requirements Checker, DRC) Signature _____
Name Darrell Nicholas Date _____

APPROVED BY: (Specification Approver, SA) Signature _____
Name J.F. Beech Date _____

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	MWS	LW	GDN	JFB
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	MWS	LW	GDN	JFB
C	RTA1 65% Remedial Design	11/20/17	MWS	LW	GDN	JFB
A1	RTA1 100% Access Dredge Design	09/30/19	RH	JF	GDN	JFB
D	RTA1 90% Remedial Design	09/30/19	RH	JF	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	DMO	RH	GDN	JFB

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SECTION 01 71 23

SITE SURVEYING AND GRADE CONTROL

PART 1 GENERAL

1.01 SUMMARY

- A. Work in this Section includes requirements for the following construction and record surveys. The detailed scope of the surveys is described within the individual sections:
 - 1. Weekly progress and After-Dredge surveys as outlined in Section 35 20 23.13;
 - 2. Required hydrographic capping surveys as outlined in Section 35 43 00;
 - 3. Initial surveys and final or as-built surveys of all upland earthwork, utilities, and other removed or constructed upland features as outlined in Section 31 10 00; and
 - 4. Daily optical monitoring and manual surveys as outlined in Section 02 22 00.

1.02 RELATED SECTIONS AND PLANS

- A. Section 01 33 00 Submittals
- B. Section 01 35 29 Health and Safety Requirements
- C. Section 01 78 00 Project Closure
- D. Section 02 22 00 Building Condition Assessment and Monitoring
- E. Section 31 10 00 Site Preparation
- F. Section 31 41 00 Bulkhead Support
- G. Section 35 20 23.13 Dredging, Dewatering, and Leveling Layer
- H. Section 35 43 00 Cap Construction
- I. Contract Documents

1.03 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:
 - 1. Copies of the surveyor's notes;

2. Calibration documentation for surveying equipment: (i) when drawings are provided for upland and capping surveys; (ii) on a weekly basis during dredging operations.
3. Surveyor's license information;
4. Initial record survey drawings;
5. Intermediate record (or progress) survey drawings; and
6. Final record (or as-built) survey drawings.

1.04 SURVEYOR QUALIFICATIONS

- A. The selected land surveyor will be a Professional Land Surveyor licensed in the State of New York. In accordance with New York State Education Law, the surveyor's firm shall possess a current Certificate of Authorization to provide professional services.
- B. The selected marine surveyor should have, at a minimum, an on-staff American Congress on Surveying and Mapping (ACSM) Certified Hydrographer working as the survey supervisor.
- C. The surveyors shall have experience working in the New York area in either land and/or marine environments depending on the scope of each specific survey.

1.05 HEALTH AND SAFETY REQUIREMENTS

- A. The Surveyor shall comply with environmental health and safety/training requirements in accordance with Section 01 35 29 Health and Safety Requirements.

1.06 REFERENCES

- A. National Geodetic Standards (NGS). Accessed 10 April 2017. <www.ngs.noaa.gov/heightmod/GuidelinesPublications.shtml#SSG>
- B. United States Army Corps of Engineers (USACE). 2013. Engineering Manual 1110-2-1003 (Engineering and Design – Hydrographic Surveying) for “Navigation & Dredging Support Surveys.”

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 GENERAL

- A. Maintain accurate and complete notes of surveys as follows:
 - 1. Document handwritten survey field notes and information. Survey notes shall be legibly recorded. Apply consistent notation to survey Work. The stake marking format and the document notations shall be compatible. Identify survey monuments and benchmarks on the field notes, sketches, and drawings.
 - 2. Submit electronically-collected field survey information within one week of performing the Work. The Electronic format shall be submitted as a “.dwg” file compatible with AutoCAD. An electronic PDF of the drawing compatible with Adobe Acrobat shall also be provided.
- B. During construction, survey notes shall be retained by the Surveyor.
- C. Maintain field documentation for surveys as follows:
 - 1. Record the following information in survey notes for each control point established:
 - a. Designation of control point;
 - b. Grid coordinate system corresponding to State Plane NAD (1983) New York East;
 - c. Elevations in feet recorded in NAVD88;
 - d. Date of establishment;
 - e. Description and sketch of the control point location; and
 - f. Control points referenced to a minimum of three features that can be observed from the control point.
 - 2. Document survey Work in the notes using the format and methods described below:
 - a. Title and consecutive field notes numbered on the front cover;
 - b. Consecutively numbered pages;
 - c. Table of contents, indicated by survey task, on the first numbered page;
 - d. Legend indicating symbols used in survey notes;
 - e. Names of survey team for each task;
 - f. Notes on weather, equipment, and other field conditions;
 - g. Date and time on each page to indicate when Work was recorded;
 - h. Notes in a uniform character such that they can be interpreted and used by anyone with knowledge of surveying; and
 - i. Description and/or sketches of the existing survey control used.

- D. Elevations shall be recorded in feet based on the North American Vertical Datum of 1988 (NAVD88). The Grid coordinate system shall correspond to New York State Plane, East Zone, US Foot (3101). Horizontal reference datum is North American Datum of 1983 (NAD 83).
- E. Provide appropriate equipment and software necessary to download data for use by Owner's Representative.
- F. As-built and record survey drawings shall bear the stamp and signature of the professional surveyor registered in the State of New York responsible for the survey work.
- G. Record surveys shall show grid lines at 100-foot intervals matching those of the Construction Drawings and shall generally conform to industry standards as to quality and information shown. Survey record drawings shall be labeled with the name of the project, the name of the surveyor, the date of the survey, and the survey location and purpose. Drawings for earthwork, grading, dredging, capping, or other excavation or placement activities shall compare as-built conditions with design conditions presented on the Construction Drawings or the Contractor's submitted design drawings. For structures or substructures (e.g., concrete pads) the Contractor installs, as-built conditions shall be compared to the design drawings prepared by the Contractor.
- H. The scopes of the survey requirements are provided within Section 02 22 00, Section 31 10 00, Section 35 20 23.13, and Section 35 43 00. The following surveys will be required:
 - 1. Initial record survey drawings. The drawing contour or bathymetric interval shall be 0.5 feet and the scale shall be 1-inch=40-feet or as appropriate for the drawing scale. Initial record survey drawings shall be compatible with existing Construction Drawings and shall be used to verify initial site conditions for the purpose of items such as calculating final cut and fill volumes and verifying the location of utilities or structures. The scopes for the initial record drawings associated with site preparation and dredging are provided in Sections 31 10 00 and 35 20 23.13, respectively.
 - 2. Intermediate record (or progress) survey drawings to document the progression of construction activities and specific components of the Project shall clearly show the area requiring documentation. The intermediate record survey drawings shall also show the horizontal and vertical limits of the area and provide sufficient information to clearly locate the area and perform calculations to record quantities, where applicable. The intermediate survey drawings shall be at the same drawing contour or bathymetric interval, scale, and of the same areas as the initial record survey drawings. Surveying and intermediate record drawing requirements for dredging and capping are provided in Section 35 20 23.13 and 35 43 00, respectively.
 - 3. Final record drawings and as-built survey drawings shall document the final condition of the Site after completion of the Work for the Project or completion of

a sub-component of the Work (e.g., completion of grading). The final record survey drawings shall be at the same drawing contour or bathymetric interval, at the same scale and of the same area as the initial record survey drawing, and shall be compatible with the initial drawing in the level of detail shown and in the manner of presentation, so that the drawings can be easily compared. Significant features requiring final or as-built surveys are described in Sections 31 10 00, 35 20 23.13, and 35 43 00. Final record and as-built drawings shall be provided as a compiled and complete drawing (e.g., the final Phase III dredge drawing and surface shall be provided as a compiled drawing and surface even if multiple surveys and phases were completed during dredging). Record surveys associated with Project Closure shall be submitted in accordance with Section 01 78 00.

3.02 CONTROL POINTS

- A. The Contractor shall establish temporary survey control points to support construction Work activities. Additional permanent survey monuments may also be established in lieu of temporary survey control points.
- B. Marine control points for dredging and cap placement shall be established by the Contractor.
- C. The precision of horizontal and vertical control points for:
 - 1. Upland areas: shall conform to or exceed Third-Order Class I and Third-Order accuracies, respectively, as defined by National Geodetic Survey (NGS) Standards.
 - 2. Marine work, as part of dredging and cap placement, shall have horizontal and vertical accuracies of +/- 0.10-ft and 0.10 ft, respectively.

3.03 UPLAND SURVEYS

- A. For upland surveys described in Section 31 10 00, the horizontal and vertical accuracy shall be ± 0.30 foot.
- B. The horizontal and vertical accuracy of the daily bulkhead optical monitoring and manual surveying as described in Section 02 22 00 shall each be $\pm 1/8$ -inch.
- C. Refer to Section 02 22 00 for additional survey requirements related to bulkhead monitoring.
- D. Report elevation and horizontal coordinates to the nearest 0.01 foot and to the nearest 20 seconds for angles.
- E. Perform construction layout surveys in advance of scheduled construction activities. The Surveyor shall be responsible for rework and/or construction delays caused by survey or staking errors.

- F. Set grade and slope stakes required for construction activities as the Work progresses. Staking shall be in accordance with accepted surveying practices and provisions herein, and subject to review by the Owner's Representative. When requested, the Surveyor shall set fine grade stakes on all surfaces for which the plans show a definite grade line.

3.04 HYDROGRAPHIC SURVEYS

- A. For marine surveys (e.g., dredging, cap placement), United States Army Corps of Engineers (USACE) hydrographic survey requirements per EM 1110-2-1003 (Engineering and Design – Hydrographic Surveying) for “Navigation & Dredging Support Surveys” shall be followed. Accuracies for marine surveys shall meet Table 3-1 for inland navigation projects (depth < 15 feet) (i.e., 0.3-ft for repeatability and +/- 0.5 ft for typical standard deviation).
- B. Quality Control and Quality Assurance Performance Criteria for survey operations including, but not limited to, bar checks, sound velocity calibration, horizontal and vertical position checks, system alignment, survey coverage, and quality performance tests shall follow the recommended frequency in Chapter 6, Section 7 of USACE manual EM 1110-2-1003.
- C. The Contractor shall verify positioning equipment is accurate on a weekly or more frequent basis by checking marine control points with permanent benchmarks and making modifications to equipment as necessary. Compliance with the requirements of 3.04 A and B shall be verified using the procedure in Attachment A of this Section. Survey repeatability will be determined at the 95% confidence level from survey reference area quality control checks and used to establish compliance with cap thickness requirements in accordance with Section 35 43 00.
- D. The following methodology shall be used for editing and sorting hydrographic surveys related to dredging operations:
 - 1. Unless specific field conditions or construction constraints dictate the use of other methods to be approved by the Owner's Representative, surveys shall be collected using a multibeam sonar system following recommended best-practices outlined in EM 1110-2-1003;
 - 2. A minimum of 100% survey coverage must be obtained for all record surveys for payment, volume calculation, and/or acceptance;
 - 3. Dredge surveys shall be binned to a 3-foot by 3-foot matrix;
 - 4. The Contractor shall provide soundings in average and minimum (shallowest) format;
 - 5. The origin coordinates and azimuth for the 3-foot by 3-foot matrix shall remain consistent for average and minimum soundings for record surveys;
 - 6. Soundings shall be recorded to the nearest tenth (0.1) of a foot;

7. All bathymetric maps for dredge surveys shall present minimum soundings binned to a 3-foot by 3-foot matrix using Actual X,Y positioning; and
8. All volumes for dredged material shall be calculated using average soundings binned to a 3-foot by 3-foot matrix using cell-centered positioning.

- E. The following methodology shall be used for editing and sorting hydrographic surveys relating to backfilling and capping operations;
1. Unless field conditions or construction constraints dictate the use of other methods to be approved by the Owner's Representative, surveys shall be collected using a multibeam sonar system following recommended best-practices outlined in EM 1110-2-1003;
 2. A minimum of 100% survey coverage must be obtained for all record surveys for payment, volumes, and/or acceptance;
 3. The Contractor shall provide soundings in two matrix sizes for backfilling and capping surveys: a 3-foot by 3-foot matrix shall be used to determine compliance with requirements for minimum layer thickness and to calculate cap placement volumes. A 9-foot by 9-foot matrix shall be used to determine compliance with maximum construction tolerance requirements for thickness;
 4. The origin coordinates and azimuth shall remain consistent for the 3-foot by 3-foot matrix and 9-foot by 9-foot matrix for record surveys;
 5. Soundings shall be recorded to the nearest tenth (0.1) of a foot;
 6. Soundings shall be provided as average data with cell-centered positioning for all backfilling and cap placement surveys.

[END OF SECTION]

SECTION 01 71 23

**ATTACHMENT A – VERIFICATION OF
SURVEY ACCURACY AND
REPEATABILITY**

A reference surface quality assurance daily procedure shall be used to establish a high level of repeatability between surveys. Prior to start of construction, a reference surface is chosen by the Contractor with concurrence from independent 3rd party hydrographic surveyor. The reference survey will be utilized by both parties throughout the duration of the project to confirm survey accuracy. In general, the Contractor shall conduct a survey at the reference area as part of their daily quality control checks, but no less than weekly when surveys are being performed, to ensure the survey equipment is functioning properly and providing consistent results.

The reference surface shall be a relatively flat, stable area selected before the start of survey work. This reference surface should be close in depth and proximity to the areas of operation, and it should be expected to remain unaltered by boat traffic, dredging, backfill, erosion and deposition throughout the project. After the reference surface is selected, the surveyors shall use multibeam soundings to collect data across the surface in multiple perpendicular paths (Figure 1). This provides dense, high quality data to ensure consistent and repeatable results on future surveys.

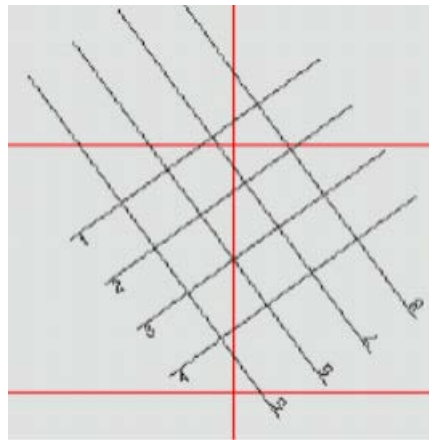


Figure 1. Cross-section of paths made for reference surface (Image Courtesy of Hypack / Xylem, Inc.)

Surveyors shall run performance tests to compare daily survey soundings with the original reference surface. Two perpendicular paths are run across the original reference surface to collect the necessary data. This data is used to check depth sounding accuracy and compare surface depths between each survey to measure consistency and assess the calibration of the boat's equipment.

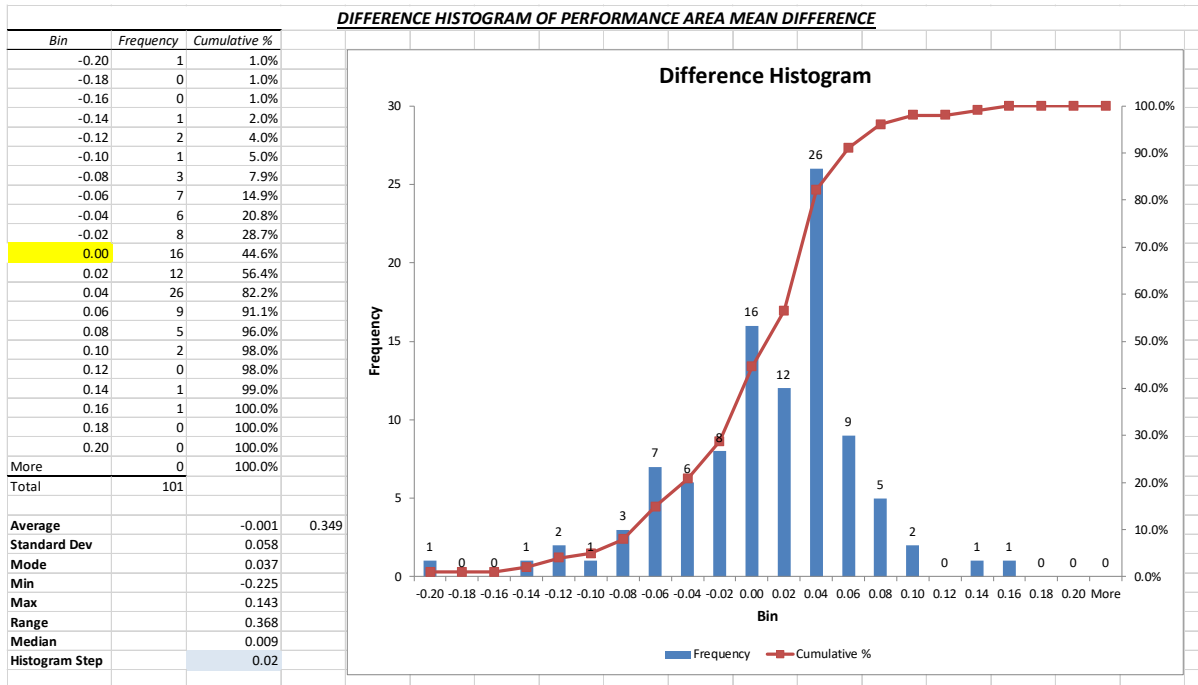


Figure 2. Typical histogram of 101 survey performance area comparisons.

Barring any disturbances to the reference surface and equipment malfunction, the survey results will provide highly repeatable results or quickly alert the surveyor that an issue with the equipment or calibration must be checked and addressed. Results shall be evaluated by the Contractor each time a reference area survey is conducted.

The results of reference checks shall also be used to generate qualitative and quantitative comparison of the depths on a regular basis but not less than monthly. The Contractor shall prepare a histogram as shown in Figure 2 and generate quality control statistics including minimum, maximum, mean, median, range and standard deviation and provide results to the Owner's Representative. In addition, the Contractor shall provide reports with the results of quality control checks at the completion of dredging and at the completion of capping.

Repeatability shall be determined at the 95% confidence level, and compliance with USACE bathymetric survey requirements shall be evaluated routinely. In addition, accuracy and precision results will be used by the Owner's Representative to determine compliance with quality control requirements for measuring treatment cap thicknesses by bathymetric surveying.

SECTION 01 78 00

PROJECT CLOSURE

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 01 78 00 **TITLE:** PROJECT CLOSURE

SPECIFICATION PREPARED BY: (Specification Preparer, SP) Signature _____
Name Julie Chambers Date _____

SCOPE AND FORMAT CHECKED BY: (Scope and Format Checker, SFC) Signature _____
Name Russell Hyatt Date _____

DETAILED REQUIREMENTS CHECKED BY: (Detailed Requirements Checker, DRC) Signature _____
Name Darrell Nicholas Date _____

APPROVED BY: (Specification Approver, SA) Signature _____
Name J.F. Beech Date _____

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	LW	JF	GDN	JFB
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	LW	JF	GDN	JFB
C	RTA1 65% Remedial Design	11/20/17	LW	JF	GDN	JFB
D	RTA1 90% Remedial Design	09/30/19	RH	JC	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	JC	RH	GDN	JFB

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SECTION 01 78 00

PROJECT CLOSURE

PART 1 GENERAL

1.01 SUMMARY

- A. The requirements listed herein must be met prior to Contractor demobilization.

1.02 RELATED SECTIONS

- A. Section 01 33 00 Submittals
- B. Section 01 71 23 Site Surveying and Grade Control
- C. Section 02 22 00 Building Condition Assessments
- D. Section 02 51 19 Dredged Material and Waste Management
- E. Section 44 08 40 Dredge Water Treatment System Requirements
- F. Contract Documents

1.03 REFERENCES

- A. Geosyntec, 2017. "Stormwater Pollution Prevention Plan (SWPPP) for Construction Activities at Gowanus Canal Superfund Site."

1.04 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:
 - 1. Signed warranties as specified;
 - 2. Certifications as specified;
 - 3. Project Closeout set of Record Drawings showing original design and all changes made during construction, including:
 - a. As-Built drawings to include actual dimensions and elevations of significant features described in Section 01 71 23;
 - b. All field changes to dimensions, details, and elevations;
 - c. All details not shown on the original drawings; and
 - d. Post-Construction building condition assessments (Section 02 22 00).

4. Post-Construction Staging Site Bulkhead Survey as described in Section 31 10 00;
5. Record documents including, but not limited to, interim surveys, records of waste and recyclables generated and documentation of any inspections or testing completed;
6. Documentation of completion of punch list items as described in this Section;
7. Maintenance/operation manuals as specified;
8. Documentation of system testing and startups as specified; and
9. Final payment request with supporting documentation.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.01 SUBSTANTIAL COMPLETION

- A. The following are prerequisites to substantial completion:
 1. Leave project site clean of rubbish and ready for use;
 2. Treat and remove from Site all debris, sediment, and water in accordance with Sections 02 51 19 and 44 08 40;
 3. Return any temporarily relocated drum storage boxes to their original locations as indicated on the Construction Drawings;
 4. Conduct maintenance on temporary erosion and sediment controls or remove as directed by the Owner's Representative;
 5. Repair and/or replace any site improvements damaged by the Contractor during the project;
 6. Clean paved surfaces according to Section 02 51 19;
 7. Conduct soil stabilization consistent with the project Stormwater Pollution Prevention Plan (SWPPP);
 8. Complete all repairs, call-backs, corrections, re-adjustments of equipment, final cleaning, and final touch-up;
 9. Remove all equipment, materials, tools, and supplies, unless approved in writing by the Owner's Representative; and
 10. Restore Staging Site to pre-construction conditions, unless approved in writing by the Owner's Representative.

3.02 INTERIM INSPECTIONS

- A. Notify the Owner's Representative in writing when site operations require demobilization of equipment that will not be maintained on-Site to project completion.
- B. The Owner's Representative will prepare and submit to the Contractor a punch list of items to be completed or corrected prior to demobilization of specified equipment. The Owner's Representative will review the completed punch list with the Contractor and establish a timeframe for completion and correction.
- C. The Contractor shall take immediate steps to remedy the listed deficiencies and notify the Owner's Representative in writing that the tasks are complete and ready for interim inspection. Equipment shall not be demobilized without approval of the Owner's Representative.

3.03 FINAL INSPECTION

- A. Notify the Owner's Representative in writing when the Contractor believes the project is substantially complete.
- B. The Owner's Representative will prepare and submit to the Contractor a punch list of items to be completed or corrected. The Owner's Representative will review the completed punch list with the Contractor and establish a timeframe for completion and correction.
- C. The Contractor shall take immediate steps to remedy the listed deficiencies and notify the Owner's Representative in writing that the project is complete and ready for final inspection.
- D. The Contractor shall conduct final Site inspection with Owner's Representative prior to completion of Contractor demobilization to verify the following items:
 - 1. Completion of items listed in 3.01(A) of this Section; and
 - 2. Completion of punch list. The punch list will be created prior to project closeout by the Owner's Representative.

[END OF SECTION]

SECTION 02 22 00

**BUILDING CONDITION ASSESSMENTS
AND MONITORING**

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 02 22 00 **TITLE:** BUILDING CONDITION ASSESSMENTS AND MONITORING

SPECIFICATION PREPARED BY: _____ Signature
(Specification Preparer, SP)

Name Panos Andonyadis Date

SCOPE AND FORMAT CHECKED BY: _____ Signature
(Scope and Format Checker, SFC)

Name Russell Hyatt Date

DETAILED REQUIREMENTS CHECKED BY: _____ Signature
(Detailed Requirements Checker, DRC)

Name Panos Andonyadis Date

APPROVED BY: _____ Signature
(Specification Approver, SA)

Name J.F. Beech Date

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	PA	LW	GDN	JFB
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	PA	LW	GDN	JFB
C	RTA1 65% Remedial Design	11/20/17	PA	LW	GDN	JFB
A1	RTA1 100% Access Dredge Design	09/30/19	PA	RH	GDN	JFB
D	RTA1 90% Remedial Design	09/30/19	PA	RH	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	PA	RH	PA	JFB

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SECTION 02 22 00

BUILDING CONDITION ASSESSMENTS AND MONITORING

PART 1 GENERAL

1.01 SUMMARY

- A. Construction operations in Remediation Target Area 1 (RTA1) include installation of bulkhead support, in situ stabilization/solidification, excavation, backfill and compaction near existing structures. The Work of this section consists of performing Baseline, Interim, and Post-Construction Building Condition Assessments.
- B. The Contractor shall complete Building Condition Assessments and make recommendations for the installation of geotechnical and structural monitoring instrumentation, where appropriate. In addition, monitoring of bulkheads, bulkhead supports, and bridges will be conducted.
- C. The Contractor shall furnish all labor, materials, tools, and equipment necessary for completion of this Work.

1.02 RELATED SECTIONS, PLANS, AND DOCUMENTS

- A. Section 01 33 00 Submittals
- B. Section 01 35 29 Health, Safety, and Emergency Response Requirements
- C. Contract Documents

1.03 REFERENCES

None.

1.04 DEFINITIONS

- A. Baseline Building Condition Assessment (Baseline Assessment): The initial assessment that is performed prior to the start of work. The purpose of this assessment is to document existing conditions of the buildings and other structures.
- B. Building Condition Assessment: A visual assessment of an existing structure such as a building, bridge, or above ground utility located on a property adjacent or within 200 ft of construction activities in RTA1. The Contractor shall also include bulkheads and bridges in RTA2 in the Building Condition Assessment as directed by the Owner's Representative. The purpose of the assessment is to document evidence of structural or

cosmetic damage within or on the exterior of the assessed building or other structure. The results of these assessments may be used to resolve disputes.

- C. Building Condition Assessment Subcontractor: Firm retained by the Contractor to conduct the Building Condition Assessments.
- D. Interim Building Condition Assessment (Interim Assessment): A building condition assessment performed during construction activities. The purpose of these assessments is to provide an update on the performance or condition of the assessed structure.
- E. Post-Construction Building Condition Assessment (Post-Construction Assessment): The final building condition assessment that is performed upon completion and acceptance of all construction activities. The purpose of this assessment is to document final conditions of the structures and identify any structural or cosmetic damage that is different from the baseline assessment.

1.05 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:
 - 1. A Building Condition Assessment Work Plan that includes:
 - a. A description of the process the Contractor will follow to assess and document the condition of buildings and other structures;
 - b. Qualifications of the Building Condition Assessment Subcontractor retained by the Contractor to conduct the Building Condition Assessments; and
 - c. A list of properties, structures or buildings that the Contractor identified as potentially sensitive and on which the Contractor recommends performing Building Condition Assessments.
 - 2. A Baseline Building Condition Assessment Report that includes:
 - a. Address/location of the building, building unit (apartment), or structure assessed;
 - b. Time and date of the assessment;
 - c. For video documentation, a brief on-camera introduction of the person performing the assessment and the date and start time of the assessment;
 - d. Photographic and/or video documentation of the interior and exterior of the buildings and structures with commentary (verbal or written) describing the extent and location of signs of building distress (i.e., cracks, concrete spalling, evidence of settlement, flooding stains, leaking stains, etc.). Exterior structures on adjacent properties to be documented may include retaining walls, sidewalks/promenades, concrete and asphalt driveways, detached garages or shed, chimneys, pipes that penetrate bulkheads, etc.;

- e. A written opinion from the Contractor on the current (i.e., baseline) condition of the building and/or structures. The opinion shall indicate any observable structural or cosmetic deficiencies and quantify concerns the Contractor's activities may have on structures; and
 - f. A list of recommended instruments such as crack gauges, inclinometers, optical survey targets, etc., to be installed and used for future monitoring. This shall include an update to the Building Condition Assessment Workplan with a Monitoring Instrumentation Plan. The Monitoring Instrumentation Plan shall include instrumentation specification, instrumentation locations, monitoring frequency, and installation instructions.
3. Interim Building Condition Assessment Report (Interim Assessment Report) that includes:
- a. All visible changes in the building and other structure conditions from the baseline condition and which provides an evaluation of the observed changes and potential causes of the changes;
 - b. A record of any observed measurements from installed monitoring instrumentation; and
 - c. Is in the same format as the Baseline Assessment Report.
4. A Post-Construction Building Condition Assessment Report:
- a. Post-Construction Building Condition Assessment Report (Post-Construction Assessment Report) shall document all changes from the baseline condition assessment and any subsequent update assessments, including an evaluation of the changes with explanations of the potential causes;
 - b. A record of any observed measurements from installed monitoring instrumentation; and
 - c. The Post-Construction Assessment Report shall be in the same format as the Baseline Assessment Report.
5. Baseline Existing Bulkhead Condition Survey to include:
- a. Photographs of each existing bulkheads taken at low tide to document the pre-construction conditions of the bulkheads;
 - b. Identification of all existing outfalls along the existing bulkhead; and
 - c. Baseline (or initial) survey of the optical survey targets to be used to monitor the movements of the existing bulkheads. An initial drawing of the survey shall be prepared in accordance with Section 01 71 23. The Drawing and initial survey data shall be submitted for review by EPA prior to start of construction.
6. A Monitoring Instrumentation Plan that includes the use of total survey stations (TSS) that record data from survey prisms. The general location of the TSSs and prisms is described in this specification. Actual install locations shall be chosen by the Contractor and shown on a plan drawing of the work area. In addition, the location of optical survey targets described in this section that will be manually

surveyed to verify readings from the TSS system shall be shown on the drawing with the prisms. Locations of prisms and optical targets must be approved by the Owner's Representative. A nomenclature for identifying prisms and targets shall be established. Requirements for repair of the system and replacement of the prisms and optical targets will be included. The Contractor shall make data accessible via a website by members of the project team. Requirements for any other instrumentation recommended by the Contractor shall be included in the plan.

7. Vibration Monitoring Work Plan to include:
 - a. The name and qualifications of the Vibration Specialist to perform the monitoring;
 - b. A list of monitoring equipment to be used for the Work, including relevant certificates of calibration;
 - c. A description of the monitoring procedures;
 - d. Vibration threshold limits at which corrective action is to be taken;
 - e. Vibration monitoring requirements around critical structures (i.e., bridges, buildings, etc.
 - f. A template for daily monitoring reports to include at a minimum:
 - i. Date of monitoring;
 - ii. Name of the reporter/monitoring technician;
 - iii. Identification of the equipment used for monitoring;
 - iv. Plot of measured particle velocity and particle acceleration for the reported work day;
 - v. Explanation of any peak exceedances and observations of any damaged caused by exceedances; and
 - vi. Identification of any potential sources of vibration in addition to the project work.

1.06 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.

1.07 QUALIFICATIONS

- A. The Contractor shall procure the services of a Building Condition Assessment Subcontractor that can provide a structural engineer with a New York-licensed Professional Engineer (PE) with a minimum of five years of applicable experience to conduct the Building Condition Assessments.

PART 2 PRODUCTS

2.01 EQUIPMENT

- A. The digital photography and digital video equipment shall be capable of superimposing the date and time on all images as needed to properly document the Building Condition Assessment.

PART 3 EXECUTION

3.01 GENERAL

- A. Building Condition Assessments shall be performed on structures, such as buildings, bridges, and above ground utilities, identified to be within 200 feet of any construction activities shown on the Construction Drawings. The Contractor shall also perform condition assessments of the bulkheads and bridges in RTA2. The Owner will provide access agreements to the individual properties. If the Owner is unable to obtain access for a property, building, or portion thereof, the assessment shall include the exterior of the building, assessed from a nearby vantage point on the Site and/or within the public right-of-way (limited assessment). Access restrictions shall be noted in the Building Condition Assessment Report. For bulkheads and bridges in RTA2, limited assessments shall be conducted from within the public right-of-way.
- B. The Owner's inability to provide access to a property, building, or structure for conducting a Building Condition Assessment does not relieve the Contractor of the requirement to indemnify and hold harmless the Owner, the Owner's Representative, and their agents from all claims, damages, losses, and expenses in accordance with the Contract Documents.
- C. The Contractor shall notify the Owner's Representative at least five workdays prior to conducting Building Condition Assessments of dates that the Contractor will be available to conduct the assessments. The Owner and/or Owner's Representative will coordinate access to the property based on the schedule provided and on the availability of the property owner. The Owner and/or Owner's Representative will work to schedule multiple assessments within a workday during normal working hours; however, the Contractor shall be prepared to conduct the assessments over non-consecutive days with separate mobilization and outside of normal working hours such as evenings, weekends, and holidays.
- D. The Owner and/or Owner's Representative reserves the right to accompany the Contractor during assessment events.
- E. At a minimum, the inspections shall include documentation (as relevant):
 - 1. Locations and size of cracks within interior and exterior structure walls, floors, and ceilings;

2. Missing mortar or other damages to walls;
 3. Evidence of water damage or leaking from the roof or pipes;
 4. Evidence of wear or damage to load bearing structures, such as columns or beams;
 5. Walls or columns that appear to be out of plumb;
 6. Floor or ceilings that appear to not be level;
 7. Signs of seepage through basement walls;
 8. Evidence of previous repairs;
 9. Condition and of the exterior grading surface around structures and apparent drainage and low spots; and
 10. Cracking and unevenness in exterior features such as asphalt, sidewalks, etc.
- F. It should be noted on the reports if no deficiencies are observed.
- G. Monitoring of Structures shall include, at a minimum:
1. Survey prisms that are part of the TSS system shall be set on top of the edge of the existing bulkhead with prisms set a maximum of 25 ft apart along the existing bulkhead wall alignment to monitor displacements. The prisms shall be set such that they will not become obstructed from the TSS or damaged by any construction work (i.e. installation of bulkhead supports). The prisms shall be installed and a Baseline Existing Bulkhead Condition Survey shall be taken 30 days before any construction activities begin. The Contractor shall setup the TSS system to take survey readings at a minimum of once per hour, and more frequently when deemed necessary by the Contractor. Data collection shall include easting, northing, and elevation displacements and incremental and cumulative measurements shall be made available through use of an online system. The surveys shall be performed in accordance with Section 01 71 23 and shall continue from the time of the baseline survey to the end of construction activities, including dredging, ISS installation, and capping. If the cumulative displacement at any survey targets of the existing bulkhead equals or exceeds two inches from the baseline position, the Contractor shall stop all construction work and notify the Owner's Representative. Work may resume after the Owner's Representative assesses the condition of the existing bulkhead and identifies the required contingency bulkhead support to be implemented per the Contractor's contingency strategy within the Bulkhead Support Workplan.
 2. The Contractor shall establish TSS prisms on top of the edge of all bridges along RTA1 with targets set a maximum of 25 ft apart along the superstructure of each bridge to monitor for displacements. The prisms shall be set such that they will not become obstructed from the TSS or damaged by any construction work (i.e. installation of bridge supports). The prisms shall be installed and a baseline survey of the bridge shall be included with the Baseline Existing Bulkhead Condition Survey. The Contractor shall setup the TSS system to take survey readings at a minimum of once per hour, and more frequently when work is within 200 ft of any bridge. Data collection shall include easting, northing, and elevation displacements

and incremental and cumulative measurements shall be made available through use of an online system. The surveys shall be performed in accordance with Section 01 71 23 and shall continue until the end of construction activities. If the cumulative displacement at any survey target of the bridge equals or exceeds 0.25 inches from the baseline position, the Contractor shall stop all construction work and notify the Owner's Representative.

3. The Contractor shall establish prisms on top of the bulkhead support sheet pile wall with the targets set a maximum of 25 ft apart along the sheet pile wall alignment to monitor displacements. The prisms shall be installed and a Baseline Bulkhead Support Survey shall be performed before Phase II dredging or ISS construction begins within 200 ft of the bulkhead support. The Contractor shall setup the TSS system to take survey readings at a minimum of once per hour, and more frequently when deemed necessary by the Contractor. Data collection shall include easting, northing, and elevation displacements and incremental and cumulative measurements shall be made available through use of an online system. The surveys shall be performed in accordance with Section 01 71 23 and shall continue from the time of the baseline survey to the end of construction activities, including dredging, ISS installation, and capping. If the cumulative displacement at any survey targets of the existing bulkhead equals or exceeds two inches from the baseline position, the Contractor shall stop all construction work and notify the Owner's Representative. Work may resume after the Owner's Representative assesses the condition of the existing bulkhead and identifies the required contingency bulkhead support to be implemented per the Contractor's contingency strategy within the Bulkhead Support Workplan.
4. The Contractor shall be responsible for maintaining the TSS monitoring system. Any system failures must be resolved within 24 hours.
5. The Contractor shall install and manually survey optical survey markers that will be setup adjacent to select TSS prisms and used to monitor the performance of the TSS system. A minimum of one optical survey marker will be established for every ten TSS prisms. The optical survey markers shall be evenly distributed around the work area and positioned within four inches of the TSS prism.
6. The Contractor shall provide northing, easting, and elevation data for all installed survey prisms and optical survey markers with the Baseline Existing Bulkhead Condition Survey and follow applicable requirements in Section 01 71 23.
7. The Contractor shall perform weekly manual surveys of the optical survey markers in the area of work. Surveys shall be performed in accordance with Section 01 71 23 and shall continue until the end of construction activities.
8. When deviances greater than quarter inch are observed between a TSS prism and its matching optical survey marker the TSS system shall be investigated. Until a resolution regarding the TSS system is established, additional optical survey markers shall be installed within four inches of any TSS prism that may not be reading accurately, and daily surveys shall be performed of the optical survey markers.

3.02 PROCEDURES

- A. The Baseline Assessment shall be performed prior to commencing any intrusive construction activities, such as dredging or pile driving. The Contractor shall notify the Owner of any conditions that the Contractor has identified to have the potential to be damaged by the planned construction activities.
- B. The Contractor shall use the findings and information obtained during the Baseline Assessment to identify the need and location for instrumentation and monitoring (e.g., inclinometers, vibration monitors, optical assessment targets, crack gauges) of the inspected structures. If additional monitoring is deemed necessary, the Contractor shall develop a Monitoring Instrumentation Plan to be used for future monitoring.
- C. Interim Assessments shall be performed at the request of the Owner and/or Owner's Representative.
- D. The Contractor may perform Interim Assessments in addition to those requested by the Owner's Representative. If the Contractor elects to perform additional Interim Assessments, the Contractor shall be responsible to obtain access for, schedule, and conduct assessments or inspections at no additional cost to the Owner.
- E. The Contractor shall complete the Post-Construction Assessments after completion of all intrusive construction and any upland equipment is removed from the properties. The Contractor shall submit the Post-Construction Assessment Reports before demobilization from the Site.
- F. The Contractor shall perform vibration monitoring in areas that are within 50 ft of bulkhead support sheet pile installation and ISS work.

[END OF SECTION]

SECTION 02 51 19

**DREDGED MATERIAL AND WASTE
MANAGEMENT**

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 02 51 19 **TITLE:** DREDGED MATERIAL AND WASTE MANAGEMENT

SPECIFICATION PREPARED BY: (Specification Preparer, SP) Signature
Name: Russell Hyatt Date

SCOPE AND FORMAT CHECKED BY: (Scope and Format Checker, SFC) Signature
Name: Lauren Wellborn Date

DETAILED REQUIREMENTS CHECKED BY: (Detailed Requirements Checker, DRC) Signature
Name: Darrell Nicholas Date

APPROVED BY: (Specification Approver, SA) Signature
Name: J.F. Beech Date

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	RH	LW	GDN	JFB
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	RH	LW	GDN	JFB
C	RTA1 65% Remedial Design	11/20/17	RH	LW	GDN	JFB
A1	RTA1 100% Access Dredge Design	09/30/19	RH	JC	GDN	JFB
D	RTA1 90% Remedial Design	09/30/19	RH	LW	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	RH	DMO	GDN	JFB

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SECTION 02 51 19

DREDGED MATERIAL AND WASTE MANAGEMENT

PART 1 GENERAL

1.01 SUMMARY

- A. This Section describes the Contractor's responsibilities for Dredged Sediment solidification/stabilization (S/S), Thermal Treatment (as required), and transport to an end-use facility; Debris management; and waste management (including management of waste generated in the dredge water treatment system (DWTS) and Other Waste generated during the Work).

1.02 RELATED SECTIONS AND PLANS

- A. Section 01 32 00 Construction Progress Documentation
- B. Section 01 33 00 Submittals
- C. Section 01 41 00 Regulatory Requirements
- D. Section 01 57 13 Temporary Erosion and Sediment Control
- E. Section 01 57 19 Temporary Environmental Controls
- F. Section 01 78 00 Project Closure
- G. Section 01 60 00 Product Requirements
- H. Section 02 60 16 Sediment and Floatables Containment
- I. Section 03 11 00 In Situ Stabilization and Solidification
- J. Section 31 10 00 Site Preparation
- K. Section 35 20 23.13 Dredging, Dewatering, and Leveling Layer
- L. Section 44 08 40 Dredge Water Treatment System Requirements
- M. Contract Documents

1.03 REFERENCES

- A. "Cultural Resources Monitoring Plan." – Most recent version prepared by AHRS.

- B. Geosyntec 2017. "PD-10/21 Dredge Material Stabilization and Dewatering Treatability Study Report (Draft)."
- C. Gowanus Community Air Monitoring Plan – To be prepared prior to start of Phase I Dredging.
- D. New York City Department of Design and Construction, 2003. "Construction & Demolition Waste Manual."
- E. Geosyntec 2016. "Citizens Parcel 3 Bulkhead Stability Assessment Report."
- F. Geosyntec 2016. "PD-8 NAPL Investigation Report."

1.04 DEFINITIONS

- A. Canal-Derived Media – Impacted sediments, processed dredged material (PDM), decant water, leachates, and surface runoff.
- B. Debris – Material separated from Dredged Sediment during the separation process (as shown in the Construction Drawings and described in this Section) or any object greater than 6 inches, including, but not limited to: wood, pilings, concrete, tires, plastic, rocks, rubbish, wire/cable/chain, sheet metal, anchors, and watercraft.
- C. Dredged Sediment – Material removed from the Canal which passes through the Debris screening process and is not considered Debris.
- D. Dredged Material – Dredged Sediment and Debris removed from the Canal.
- E. Dredge Water Treatment System (DWTS) – The water treatment system installed in accordance with Section 44 08 40.
- F. Dredge Water Treatment System Waste – Waste generated from the DWTS including solid waste and sludges, oil from the oil/water separator, and spent treatment media.
- G. Other Waste – Waste generated from day-to-day operations (e.g. office rubbish/recycling) to be regularly collected and removed from the Staging Site in accordance with this Section.
- H. Processed Dredged Material (PDM) – Dredged Sediment which has been treated (via S/S and potentially thermal desorption) to meet the acceptance criteria for beneficial use end-placement.
- I. Reagent – Type I or Type II Portland cement, or an approved alternative as proposed by the Contractor, used for Dredged Sediment S/S.

- J. Solidification/stabilization (S/S) – The processing of Dredged Sediment through addition of reagent and mixing of reagent with Dredged Sediment to obtain a homogenous material.
- K. Thermal Treatment – The processing of Dredged Sediment through off-Site thermal desorption.
- L. Treatment – May refer to S/S with reagent at the selected dosage to meet the acceptance criteria for beneficial use end-placement or Thermal Treatment.
- M. Underdrain Water – Water that passes through the asphalt pad and is collected in the gravel layer beneath the pad.
- N. Wash Water – Collected water used to wash Debris, the asphalt pad, and any separate decontamination pad.

1.05 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:
 - 1. Dredged Material Management Work Plan
The Contractor shall describe the sequencing, details, and means and methods for Dredged Material management including, but not limited to, the following information:
 - a. A schedule and flow chart showing on-Site preparation for transport of Dredged Material to an off-Site sediment processing facility, on-Site screening and processing of Debris, transport of Dredged Material and/or Dredged Sediment to the off-Site sediment processing facility, Debris screening of Dredged Material off-Site, off-Site Debris processing, Dredged Sediment S/S, Thermal Treatment activities, and end-placement of Debris and PDM; throughputs and hold times associated with processing, waste characterization laboratory testing, and end-placement; decision points, reprocessing activities, and their inter-relationship to demonstrate adequate process capacity.
 - b. An equipment list including all equipment to be used for Dredged Material handling, transport of Dredged Material and/or Dredged Sediment for off-Site processing and/or off-Site Thermal Treatment, processing and handling of Debris and end-placement of Debris and PDM.
 - i. If a material handler is to be placed in the “Limited Work Area” at the Staging Site shown in the Construction Drawings, the Contractor shall provide calculations documenting that the existing bulkhead and Site will remain stable. Calculations shall be stamped and sealed by a New York State licensed Professional Engineer. The Contractor may use as reference the “Citizens Parcel 3 Bulkhead Stability Assessment Report”

(Geosyntec, 2016), which provides information related to the condition of the bulkhead currently present on the Staging Site prior to any upcoming bulkhead improvements scheduled for the property.

- c. A detailed description of means and methods for mooring, anchoring, or spudding of barges and scows during any Dredged Material processing to occur along the Staging Site. The Contractor shall include a drawing with the layout of all proposed vessels.
- d. The name, location, relevant points of contact, telephone numbers, and a copy of the permit or license of the off-Site sediment processing facility selected by the Contractor.
- e. Acceptance criteria of the selected off-Site sediment processing facility.
- f. A detailed description of proposed means and methods for screening, processing, sorting, and temporarily storing Debris to allow for inspection of Debris in accordance with the most recent Cultural Resources Monitoring Plan prepared by AHRS.
- g. A detailed description of equipment, methods, and techniques for transporting and off-Site unloading of Dredged Material and/or Dredged Sediment.
- h. A description of any additional processing which may be required to manage recovered tires (e.g., quartering, shredding) prior to recycling or disposal.
- i. A list of recycling facilities, landfills, and/or treatment facilities planned for disposal of Debris. This list shall include the name, location, phone number, and copy of the permit or license for each facility.
- j. A detailed description of mix design including equipment, means, and techniques for the introduction and mixing of S/S reagents performed at the Subcontractor off-Site sediment processing facility. The Contractor shall provide a mixing plan assuming Type I or II Portland cement will be the S/S reagent. In addition, the Contractor may also submit a value engineering proposal indicating an alternative mix design using an alternative reagent, if, in the judgement of the Contractor, the use of the alternative reagent would provide engineering value.
- k. A site layout of the Subcontractor's off-Site sediment processing facility that shall include a detailed description of the dedicated low-permeability pad areas for PDM stockpiling and staging, all soil and erosion control measures, construction access roads to accommodate material rehandling, and a temporary retention basin, as appropriate. Show how runoff will be collected, stored, and treated prior to discharge.
- l. A description of the PDM loadout operations and measures taken to prevent cross-contamination and/or tracking of PDM onto roadways by haulers as they leave the off-Site sediment processing facility.
- m. A detailed description of how Canal-Derived Media will be managed separately from dredged materials being processed at the off-Site sediment processing facility from other sites.

- n. A detailed description of equipment, methods and techniques for off-Site Thermal Treatment including:
 - i. The name, location, relevant points of contact, telephone numbers, and a copy of permit or license of the off-site Thermal Treatment facility selected by the Contractor;
 - ii. Acceptance criteria of the selected off-Site Thermal Treatment facility;
 - iii. A schedule and flowchart showing mobilization activities (if required), sediment processing activities, throughputs, hold times, and decision points;
 - iv. A detailed description of equipment, methods, and techniques for material handling, staging, and Thermal Treatment at the Thermal Treatment facility;
 - v. A detailed description of areas for stockpiling and staging dedicated by Subcontractor for the thermally treated material including all soil and erosion control measures;
 - vi. A description of the loadout operations, and measures taken to prevent cross-contamination and/or tracking of materials onto roadways by haulers as they leave the Subcontractor's facility; and
 - vii. A detailed description of how Canal-Derived Media will be managed separately from other materials being processed at the facility.
- o. A Waste Characterization Sampling Plan for compliance with sampling requirements for acceptance at the off-Site sediment processing facility, Thermal Treatment facility, and end-placement facility.
- p. A facility list including the names, locations, relevant points of contact, telephone numbers, a copy of permit or license for the acceptable end-placement facilities selected by the Contractor.
- q. Acceptance criteria of the selected end-placement facilities.
- r. Ullage tables for scows containing Dredged Material and/or PDM to be used for estimating quantities.
- s. Signed Delegation of Authority to sign waste manifests consistent with Contract Documents.
- t. Documentation of EPA approval for the off-Site sediment processing facility, Thermal Treatment facility, and end-placement facility to receive Dredged Material in accordance with the Off-Site Rule for Superfund Sites.

2. Waste Management Work Plan

The Contractor shall demonstrate compliance with the requirements outlined in this Section. The Contractor shall describe the sequencing, details, and means and methods for waste management including, but not limited to, the following information:

- a. A description of the process by which relevant waste media including DWTS Waste and Other Waste generated from the Work shall be discarded.

3. The Contractor shall provide a Transportation Plan to include the following:
 - a. Copies of permits obtained for transportation and off-Site disposal of DWTS Waste and Other Waste generated from the Work;
 - b. A description of the means and methods for transporting Dredged Material from the Staging Site to the off-Site sediment processing facility;
 - c. A description of the means and methods for transporting Debris to the sediment processing facility, recycling facility, and/or landfills.
 - d. A description of the means and methods for transporting Debris identified as potentially culturally significant from the sediment processing to an EPA designated storage area;
 - e. A description of the means and methods for transporting PDM to the Thermal Treatment facility if necessary and to the end-placement facility; and
 - f. Copies of all relevant authorizations or permits for transportation of all material from the Staging Site including, but not limited to, Dredged Material, Debris, and Other Waste.
4. The Contractor shall provide a Quality Assurance Project Plan (QAPP) as specified in Section 01 40 00 which shall include waste characterization.
5. The Contractor shall provide an Asphalt Pad Management Plan to provide detailed means and methods for the following activities conducted at the asphalt pad shown on the Construction Drawings:
 - a. Managing surface runoff and Underdrain Water:
 - i. A detailed description of the specific approaches to be used to manage runoff from the surface of the asphalt pad as well as Underdrain Water.
 - b. Covering Debris on the asphalt pad
 - i. Include the equipment expected to be used during the covering of Debris, the thickness and type of cover material intended for use, and the proposed methods for securing the cover material over the piles.
 - c. Cleaning of Asphalt Pad:
 - i. A detailed description of the specific methods and equipment to be used in washing any accumulated sediment from the asphalt pad as needed to minimize loading to the DWTS. Include areas on-Site where related equipment will be stored.
6. Progress Reports:
 - a. Detailed requirements for daily and weekly submittals are provided in Section 01 32 00.
7. The Contractor shall prepare Waste Profile and Transport Submittals to include the following:
 - a. Waste profile sampling results and waste profiles for PDM and Debris;
 - b. Transportation manifests and weight tickets or equivalent for PDM as delivered to the end-placement facility from the off-Site sediment processing

facility compiled by scow-load of Dredged Material transported to the off-Site sediment processing facility;

- c. Weight tickets or equivalent of reagent added at the off-Site sediment processing facility compiled by scow-load of Dredged Material transported to the off-Site sediment processing facility;
- d. Transportation manifests and weight tickets or equivalent of Debris as delivered to the disposal/recycling facility;
- e. For Phase I Dredging, transportation manifests and weight tickets or equivalent of dredge water transported for off-Site treatment compiled by scow-load of Dredged Material transported to the off-Site sediment processing facility should the Contractor select off-Site water treatment;
- f. Volume of water per scow-load treated through the DWTS as indicated in Section 44 08 40 should the Contractor select on-Site water treatment;
- g. For off-Site Thermal Treatment:
 - i. Weight tickets or equivalent records from the Thermal Treatment facility for S/S treated Dredged Sediment delivered to the Thermal Treatment facility;
 - ii. Weight tickets or equivalent records for PDM transported from the Thermal Treatment facility to the end-placement facility;
 - iii. Waste profile sampling results and waste profiles for thermally treated PDM; and
 - iv. Fully executed transportation manifests.
- h. Certification or other means of evidence demonstrating beneficial use end-placement of PDM; and
- i. Manifests, treatment, and disposal paperwork for all other relevant media including, but not limited to, DWTS Waste and Other Waste.

1.06 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.

PART 2 PRODUCTS

2.01 EQUIPMENT

- A. The Contractor shall provide all equipment to perform the activities associated with Dredged Material and waste management including, but not limited to:
 1. Dredge scows. Dredge scows shall be sized to ensure that it can be maneuvered between the Staging Site and RTA1 as described in 35 20 23.13. Scows must be equipped with markings for use with ullage tables. The Contractor shall provide

enough dredge scows such that dredged material may be temporarily stored in dredge scows prior to processing should delays in on-Site dredged material processing occur in order to avoid slowdown of upstream dredging operations.

2. Tugs. Tugs shall be appropriately sized to allow for safe maneuvering throughout the Canal as described in 35 20 23.13.
3. Equipment used for handling of Dredged Material and/or Debris. Unloading cranes, buckets, hoppers, and other equipment shall be kept clean and designed and equipped with spill plates, drip pans, and/or other mechanisms to prevent Dredged Material or water from being spilled into the Canal or onto the Staging Site. Any handling equipment placed on the Staging Site along the bulkhead shall be in a location consistent with the “Citizens Parcel 3 Bulkhead Stability Assessment Report” (Geosyntec, 2016).
4. Equipment used for handling Wash Water and dredge water. The Contractor shall furnish pumps and piping to transfer dredge water and Wash Water from scows and Wash Water from the asphalt pad and any separate decontamination pad in accordance with Section 44 08 40.
5. Equipment used for Debris screening of Dredged Material. Should the Contractor perform Debris screening on-Site, the Contractor shall store redundant screening equipment on-Site in case of screening equipment failure.
6. Equipment used for transporting Debris, Dredged Material, Dredged Sediment, PDM, DWTS Waste, and Other Wastes for off-Site processing and off-Site disposal. Trucks or railcars for transporting Debris, PDM, DWTS Waste, and Other Wastes shall be covered to prevent release of material during transport and water-tight covers will be required for transport during precipitation. Transportation of scows carrying dredged material to the off-Site sediment processing facility shall be scheduled to minimize accumulation of precipitation in the scows. Excess free water that accumulates during transport shall be removed for treatment in the DWTS or approved alternative method. The Contractor shall be responsible for safeguarding transportation equipment from leakage of material in transport. Scows, trucks, or railcars shall be kept clean such that sediment and Debris are not present outside of containment.

PART 3 EXECUTION

3.01 GENERAL

- A. Dredged Material from the Canal will be processed to meet acceptance criteria at beneficial use end-placement facilities, to the extent practical. The dredged sediment treatment approach has been developed based on the results of the PD-10/21 Treatability Study, Fourth Street Turning Basin Pilot Study, and feedback from Thermal Treatment and beneficial use end-placement facilities and is as follows:
 1. Dredged Sediment will undergo S/S treatment off-Site at a licensed commercial sediment processing facility;

2. After S/S treatment, PDM will be tested to determine acceptability at the beneficial use end-placement facility and suitability for thermal treatment as directed by EPA. As an alternative to post S/S testing, the Contractor is permitted to collect in situ samples of sediment for pre-characterization of PDM prior to dredging following procedures permissible by end-placement facility permits and EPA directive for determination of thermal treatment suitability;
 3. If PDM does not meet the acceptance criteria at the beneficial use end-placement facility, PDM could require Thermal Treatment prior to end-placement. As directed by EPA, PDM could also require thermal treatment based on EPA review of existing field data and thermal treatment suitability testing results conducted by the Contractor; and
 4. PDM determined to require thermal treatment due to pre-characterization of PDM prior to dredging and EPA directive shall be handled separately from other PDM throughout the dredged material management processing steps.
- B. This section establishes execution requirements pertaining to:
1. On-Site Dredged Material processing operations;
 2. Off-Site S/S at a licensed commercial sediment processing facility;
 3. Off-Site Thermal Treatment at a licensed Thermal Treatment facility as needed for Dredged Sediment requiring further treatment after S/S to meet beneficial use end-placement acceptance criteria and Dredged Sediment requiring thermal treatment as directed by EPA;
 4. Placement of PDM at an Owner-approved and permitted end-placement facility;
 5. Handling and disposal of Debris;
 6. Handling and disposal of DWTS Waste; and
 7. Handling and disposal of all Other Waste streams generated during the Work.
- C. All Work shall be conducted in accordance with the regulatory requirements outlined in Section 01 41 00.
- D. All waste streams generated during the Work will be disposed of in compliance with all applicable local, state, and federal regulations.

3.02 GENERAL DREDGED MATERIAL TREATMENT AND END-PLACEMENT REQUIREMENTS

- A. PDM shall be beneficially used following S/S and Thermal Treatment (if Thermal Treatment is required). The Contractor is responsible for identifying acceptable facilities to beneficially use the PDM. Acceptable beneficial use applications include, but are not limited, to the following:
1. Landfill cover for solid waste and
 2. Strip mine reclamation.

- B. Dredged Sediment will undergo S/S at an off-Site commercial sediment processing facility such that PDM meets the acceptance criteria for the approved beneficial use end-placement application. Dosage of Portland cement shall be no greater than 25% by wet weight of Dredged Sediment. Should review of analytical testing of the PDM or pre-characterization samples indicate that the material is not adequate to meet beneficial use end-placement acceptance criteria, PDM is to be thermally treated to meet beneficial use end-placement acceptance criteria. As directed by EPA, PDM could also require thermal treatment based on EPA review of existing field data and thermal treatment suitability testing results conducted by the Contractor. The “PD-10/21 Dredge Material Stabilization and Dewatering Treatability Study Report” (Geosyntec 2017) includes laboratory analytical testing data for untreated soft and native sediment as well as treated soft and native sediment. The Contractor may use this data as a reference; however, waste profiling is the responsibility of the Contractor.
- C. The Contractor shall perform all testing and inspections required to evaluate compliance with end-placement acceptance criteria for beneficial use.
- D. The Contractor shall obtain EPA approval for the off-Site sediment processing facility, Thermal Treatment facility, and end-placement facility to receive Dredged Material in accordance with the Off-Site Rule for Superfund Sites.
- E. The Contractor shall estimate quantities of Dredged Material contained in scows prior to and after decanting of excess dredge water through use of ullage tables.

3.03 ON-SITE DREDGED MATERIAL PROCESSING OPERATIONS

- A. The Contractor shall adhere to the following specifications regarding On-Site Dredged Material processing operations:
 - 1. In addition to complying with the Community Air Monitoring Plan (CAMP), the Contractor shall monitor air in the workers’ breathing zone during On-Site Dredged Material processing operations in accordance with the Contractor’s Health and Safety Plan (HASP).
 - 2. The Contractor shall be prepared to implement appropriate operational and water quality control measures in accordance with Section 01 57 19.
 - 3. The Contractor shall have readily available adequate spill containment and cleanup supplies in the event of a spill in accordance with Section 01 57 19.
 - 4. The Contractor must coordinate on-water movements with all local marine traffic.
 - 5. Untreated Dredged Material shall be managed exclusively on scows and shall not be permitted to be stockpiled on the Staging Site including on the asphalt pad.
 - 6. Barges and scows shall not be moored to any pre-existing structure located on the Staging Site. Any installation of a temporary structure needed for mooring barges or scows along the Staging Site property must be approved by the Owner’s Representative and removed upon completion of the Work.

3.04 S/S OF DREDGED MATERIAL AT A COMMERCIAL SEDIMENT PROCESSING FACILITY

- A. The Contractor shall arrange for Dredged Material to be solidified/stabilized for beneficial use end-placement at an off-Site commercial sediment processing facility.
- B. It is the responsibility of the Contractor to ensure that Dredged Material meets any requirements for transport and acceptance to the commercial sediment processing facility (Section 01 41 00).
- C. The commercial sediment processing facility Subcontractor must size and design operations and stockpile pad to ensure that processing operations are not impacted by lack of capacity.
- D. Canal-Derived Media shall be managed separately from other dredged materials from other sites being processed at the facility.
- E. Haulers shall not track material onto roadways as they leave the Subcontractor's facility.
- F. The Contractor is responsible for coordinating the transportation of PDM from the commercial sediment processing facility to a Thermal Treatment facility, if required, and/or to the end-placement facility.
- G. The Contractor is responsible for performing all required sampling of the PDM to determine if PDM meets beneficial use end-placement criteria or if Thermal Treatment is appropriate.
- H. The Contractor shall be responsible for costs associated with additional transportation, handling, and treatment of PDM due to rejection of PDM that has been transported to the end-placement facility or Thermal Treatment facility.

3.05 MANAGEMENT OF PHASE III DREDGED SEDIMENTS

- A. For Phase III Dredged Material treated at an off-Site sediment processing, waste characterization samples shall be collected after S/S treatment prior to transportation to the beneficial use end-placement facility to determine if further thermal treatment is required. Alternatively, the Contractor is permitted to collect in situ samples of sediment for pre-characterization of Phase III PDM prior to dredging following procedures permissible by end-placement facility permits and EPA directive for determination of thermal treatment suitability. The Contractor may refer to the "PD-8 NAPL Investigation Report" for RTA1 TarGOST® results.
- B. If PDM from Phase III does not meet acceptance criteria at the end-use facility or EPA directs PDM be thermally treated based on thermal treatment suitability testing results, the material shall be thermally treated prior to beneficial use.

- C. PDM slated for thermal treatment shall be handled separately from other PDM throughout the dredged material management processing steps.

3.06 DEBRIS MANAGEMENT

- A. Debris shall be managed as follows:
 1. Dredged Material shall be screened for Debris in accordance with the most recent Cultural Resources Monitoring Plan prepared by AHRS and Contract Documents.
 2. Debris shall be washed in accordance with Section 35 20 23.13.
 3. The Contractor shall make reasonable efforts to divert Debris from landfills and to facilitate recycling of materials in accordance with guidelines in the Construction and Demolition Waste Manual (NYC DDC, 2003). The Contractor shall separate, store, protect, and handle identified recyclable Debris in a manner that maximizes recyclability of identified materials.
 4. Debris shall be managed exclusively on barges or scows, the asphalt pad, or the off-Site sediment processing facility and shall not be placed elsewhere on the Staging Site.
 5. Debris shall be placed on the asphalt pad or the off-Site sediment processing facility to allow for inspection of the Debris in accordance with the most recent Cultural Resources Monitoring Plan prepared by AHRS.
 6. The Contractor shall preserve cultural resources in accordance with Section 35 20 23.13 and the most recent Cultural Resources Monitoring Plan prepared by AHRS.
 7. For Debris staged on the asphalt pad, at the end of each work day and prior to the onset of rain or snow, or more frequently as directed by the Owner's Representative, Debris piles shall be covered and secured using, at a minimum, 6-mil plastic sheeting free from holes or other damage to prevent precipitation from entering the Debris piles. Covers shall be secured suitably to protect Debris piles from wind and replaced when damaged.
 8. After Debris is segregated and cultural resources inspection is completed, items to discard shall be transported to the recycling facility or landfill for disposal as non-hazardous waste. Items to keep shall be transported to an EPA designated storage area and stored in accordance with the most recent Cultural Resources Monitoring Plan. The Contractor is responsible for transporting the Debris in a manner compliant with all applicable local, state, and federal regulations.

3.07 ASPHALT PAD AND WASH WATER MANAGEMENT

- A. The Contractor shall manage activities on the asphalt pad such that unnecessary delays are not incurred due to spatial limitations on the pad.
- B. For stockpiling of Debris and for washing of vehicles on the asphalt pad, the following specifications apply:

1. To prevent the release of sediment from the asphalt pad, the Contractor shall wash (i.e. spray down) the asphalt pad with potable water or recycled water from the DWTS (Section 44 08 40) as needed to minimize loading to the DWTS, or as directed by the Owner's Representative. Water pressure shall be adequate to effectively wash sediment from the pad and shall be no less than 150 psi. When the pad is washed free of visible sediment and sheen, this process will be referred to as "decontaminating" the asphalt pad.
 2. Wash Water will be allowed to accumulate on the asphalt pad to a depth less than that which would allow water to overtop the curb. Any water which overflows the asphalt pad shall be considered a spill and managed in accordance with the Contractor's Spill Prevention and Control Plan.
 3. Wash Water will drain to a sump area in the northeast corner of the asphalt pad from which the Contractor will be responsible for transferring the Wash Water to the DWTS or approved alternative for Phase I Dredging and after decommissioning of the DWTS. Wash Water shall not be left overnight to settle and must be pumped at a minimum at the end of each day when Wash Water is present on the pad.
 4. The Contractor shall treat accumulated sediment from the sump area as Dredged Sediment and it shall be sent for off-Site S/S at a commercial sediment processing facility.
- C. If the asphalt pad has been decontaminated or is not in use, stormwater accumulating on the asphalt pad may be directed to the stormwater grate indicated on the Construction Drawings.
- D. The Contractor shall collect Underdrain Water from the aggregate base underlying the asphalt pad after dredging activities are complete and the pad has been decontaminated. Underdrain Water shall be transferred to the DWTS and treated in accordance with Section 44 08 40 or treated via an alternative approved by the Owner's Representative for Phase I Dredging and after decommissioning of the DWTS.
- E. The Contractor shall be responsible for maintaining the integrity of the asphalt pad and shall conduct weekly inspections of the asphalt pad accompanied by the Owner's Representative. If cracks are detected, the Contractor shall be responsible for the required repairs.

3.08 MANAGEMENT OF DWTS WASTE AND OTHER WASTES GENERATED FROM THE WORK

- A. The Contractor shall treat all spent treatment media from the DWTS as contaminated material and shall either recycle the media or discard properly in accordance with local, state, and federal regulations.
- B. Oil from the oil/water separator of the DWTS shall be containerized and disposed properly in accordance with local, state, and federal regulations.

- C. Used personal protection equipment (PPE) shall be discarded in accordance with local, state, and federal regulations.
- D. All water generated during this Work shall be treated in the DWTS or approved alternative for Phase I Dredging in accordance with Section 44 08 40.
- E. All other contaminated material generated during the Work shall be containerized and discarded properly in accordance with local, state, and federal regulations.

3.09 MAINTAINING STAGING SITE AND IN-CANAL CLEANLINESS

- A. The Contractor shall keep the Staging Site clean while construction is in progress. The Contractor shall perform cleaning operations daily such that structures, grounds, and public property are free from accumulations of waste materials and rubbish.
- B. The Contractor shall implement adequate spill protection measures on the Staging Site and on any vessels to prevent remediation-derived waste from polluting the Staging Site or the Canal. The Contractor shall be prepared with spill containment equipment in the event of a release of sediment or dredge water according to the Spill Prevention Plan and Section 01 57 19.
- C. The Contractor shall manage all wastes on the Staging Site and temporary facilities such that they do not create a hazardous condition and are not a hazard to on-Site personnel.
- D. The Contractor shall control accumulation of waste materials and trash. Recycle or dispose of collected materials off-Site at regular intervals. Maintain good housekeeping practices for the Staging Site and temporary facilities throughout construction:
 - 1. Separate, store, protect, and handle identified recyclable and salvageable waste products in a manner that maximizes recyclability and salvage ability of identified materials; and
 - 2. Provide and clearly identify and label the necessary containers, bins, and storage areas to facilitate effective waste management.
- E. The Contractor shall comply with all regulations pertaining to management of waste and with Section 01 41 00.
- F. When work is complete, conduct project closure activities in accordance with Section 01 78 00.

[END OF SECTION]

SECTION 02 60 16

**SEDIMENT AND FLOATABLES
CONTAINMENT**

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 02 60 16 **TITLE:** SEDIMENT AND FLOATABLES CONTAINMENT

SPECIFICATION PREPARED BY: (Specification Preparer, SP) Signature
Name: Russell Hyatt Date

SCOPE AND FORMAT CHECKED BY: (Scope and Format Checker, SFC) Signature
Name: Dillon O'Donnell Date

DETAILED REQUIREMENTS CHECKED BY: (Detailed Requirements Checker, DRC) Signature
Name: Darrell Nicholas Date

APPROVED BY: (Specification Approver, SA) Signature
Name: J.F. Beech Date

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	JG	JF	GDN	JFB
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	JG	JF	GDN	JFB
C	RTA1 65% Remedial Design	11/20/17	JG	JF	GDN	JFB
A1	RTA1 100% Access Dredge Design	09/30/19	RH	JF	GDN	JFB
D	RTA1 90% Remedial Design	09/30/19	RH	JF	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	RH	DMO	GDN	JFB

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SECTION 02 60 16

SEDIMENT AND FLOATABLES CONTAINMENT

PART 1 GENERAL

1.01 SUMMARY

- A. Work activities in the Canal will suspend sediment in the water column, thus increasing the turbidity and total suspended solids (TSS) concentrations. Dredging and other activities also have the potential for creating a sheen on the water surface. To mitigate increased TSS/turbidity and sheen throughout the Canal, the Contractor is required to install and maintain sediment resuspension control (air and/or turbidity curtains) near their operations that have the potential to cause TSS/turbidity or sheen in the work area. This specification details the sediment and floatables containment to be used in the Canal.

1.02 RELATED SECTIONS, PLANS, AND DOCUMENTS

- A. Section 01 33 00 Submittals
- B. Section 01 35 29 Health and Safety Requirements
- C. Section 01 41 00 Regulatory Requirements
- D. Section 01 57 19 Temporary Environmental Controls
- E. Section 03 11 00 In Situ Stabilization/Solidification
- F. Section 31 41 00 Bulkhead Support
- G. Section 35 20 23.13 Dredging and Dewatering
- H. Section 35 43 00 Capping
- I. Construction Drawings
- J. Contract Documents

1.03 REFERENCES

- A. Geosyntec, 2020. "Water Quality Monitoring Plan for In-Waterway Construction Activities."
- B. ASTM International (ASTM) Standards:

1. ASTM D 4632-08 Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; and
2. ASTM D 4751-04 Standard Test Method for Determining Apparent Opening Size of a Geotextile.

1.04 SUBMITTALS

1. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:
 - a. Plans and specifications detailing the support pilings for the sediment and floatable containment, which will include the following:
 - i. Exact location of the pilings (a map depicting the northing and easting, see Construction Drawings);
 - ii. Piling details (e.g. material type, diameter, overall length, length embedded within the sediment, etc.); and
 - iii. Method of installation.
 - b. Plans and specifications for the air curtain, which will include the following:
 - i. Equipment (e.g. blower/compressor, header piping, diffuser nozzles, power source, etc.) and layout;
 - ii. Anchoring and support design;
 - iii. Design and operation calculations (e.g. air flowrate, pipe sizing, nozzle spacing, electrical power requirements, etc.);
 - iv. Buoys and automatic flashing lights or other navigational warnings; and
 - v. Executed access agreements with property owner(s) whose land will be used by the Contractor for any land-based equipment.
 - c. Plans and specifications for the turbidity curtain, which will include the following:
 - i. Manufacturer's product data for turbidity curtains and related appurtenances;
 - ii. Number of curtain panels, length, connections and reefing;
 - iii. Turbidity curtain mooring design;
 - iv. Manufacturer's product data for lights and associated power supply;
 - v. Oil booms;
 - vi. Procedure for deploying the turbidity curtain at the correct location and depth; and
 - vii. Procedure for storing the turbidity curtain during working hours, when the air curtain is in use.

1.05 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.

PART 2 PRODUCTS

2.01 ANCHORING AND WARNING EQUIPMENT

- A. Equipment required for the set-up and anchoring of sediment and floatables containment devices includes, but is not limited to:
 - 1. Pilings to anchor the air curtain and the turbidity curtain, as depicted in the Construction Drawings;
 - 2. Buoys to mark the construction zone; and
 - 3. Automatic flashing lights.

2.02 AIR CURTAIN EQUIPMENT

- A. The Contractor shall provide all equipment for the air curtain as follows:
 - 1. Air source such as blowers or compressors;
 - 2. Power source for the equipment;
 - 3. Header and diffuser piping:
 - a. Minimum 2-inch diameter with maximum diffuser spacing of 18 inches; and
 - b. Capable of providing a minimum of 3 cubic feet per minute (cfm) per lineal foot throughout the diffuser piping.
 - 4. Non-clog coarse bubble diffusers (such as Tideflex Technologies, a division of Red Valve Company) or similar alternate;
 - 5. Anchors and supports; and
 - 6. Any other applicable equipment.
- B. Operation of the air curtain shall meet the following requirements:
 - 1. Noise control in accordance with Section 01 57 19;
 - 2. Provide sufficient pressure to overcome hydrostatic head and pipe losses throughout the full range of water depth and tidal conditions encountered at the site; and
 - 3. Provide a minimum airflow of 600 cfm.

2.03 TURBIDITY CURTAIN EQUIPMENT

- A. The Contractor shall provide all equipment for the turbidity curtain as follows:

1. Curtains and connections:
 - a. Fabric shall have a minimum grab strength of 300 pounds per square inch (psi) when tested in accordance with ASTM D 4632-08.
 - b. Curtains shall be a bright color (yellow or “international” orange are recommended) that will be visible to nearby boaters.
 - c. The top geosynthetic section shall consist of an 18-22-ounce PVC coated nylon fabric.
 - d. The bottom geosynthetic section shall consist of a geosynthetic having a filtration Apparent Opening Size (AOS) of 0.220 mm maximum for non-woven geotextiles, and AOS of 0.425 mm maximum for woven textiles, when tested in accordance with ASTM D 4751-04.
 - e. Turbidity curtain floatation material shall be a closed cell solid foam material which has sufficient buoyancy to provide the curtain with continuous support, and a minimum freeboard of six inches. The sections of floatation shall be installed such that they cannot move along inside the sleeve and the space between sections shall not be more than twice the thickness of the floatation material.
2. Curtain anchoring:
 - a. Load lines shall be minimum 5/16-inch vinyl coated galvanized aircraft cable with 9,800-pound breaking strength. The load line shall have galvanized connectors with tool free disconnect.
 - b. Reefing lines shall be minimum 1/2-inch nylon rope.
 - c. Ballast shall be minimum 5/16-inch galvanized steel chain.
 - d. Additional anchorage shall be provided as necessary.
3. Any other applicable equipment.

PART 3 EXECUTION

3.01 PILING INSTALLATION

- A. Prior to commencement of dredging activities, the Contractor shall install pilings as shown in the Construction Drawings. The pilings will serve as anchor points for both the air and turbidity curtains. The air and turbidity curtains shall not be affixed to any bulkhead.
- B. The pilings shall be of sufficient strength and installed to a sufficient depth to support both the air and turbidity curtains without attachment to the bulkhead.
- C. The pilings shall be installed to minimize any gap between the piling and bulkhead. The Contractor shall include a contingency in their design such that if any gap is present following installation of the pilings, a turbidity curtain or other barrier approved by the

Owner's Representative shall be installed between the piling and bulkhead to eliminate the gap.

3.02 SEDIMENT AND FLOATABLES CONTAINMENT APPROACH

- A. Sediment and floatables containment shall be used for the duration of dredging operations (Section 35 20 23.13). The primary method of sediment resuspension control during dredging operations will be through the use of an air curtain. The air curtain is to be in operation during the day and at all times when activities are occurring that could resuspend sediment.
- B. Sediment and floatables containment shall be used for the duration of sheet pile installation (Section 31 41 00). The Contractor may use either the air curtain or the turbidity curtain to control sediment resuspension during sheet pile installation.
- C. At the completion of dredging and sheet pile installation, use of the air curtain may be discontinued. The turbidity curtain shall remain ready for deployment during in situ stabilization/solidification (Section 03 11 00) and capping operations (Section 35 43 00). If necessary, the turbidity curtain shall be used during capping to prevent re-contamination of the capped surface during storms and to contain capping material.
- D. During dredging and sheet pile installation, a turbidity curtain shall be readily available to deploy when the air curtain is not in use (e.g., on nights and weekends). The turbidity curtain will also serve as a backup sediment and floatables containment method should the air curtain become nonoperational. If the air curtain becomes nonoperational, the Contractor shall notify the Owner's Representative. The Owner's Representative will determine if the Contractor shall stop operations to repair the air curtain or to deploy the turbidity curtain while the air curtain is under repair.
- E. The Contractor shall avoid positioning barges, tugs, or other obstructions over the air curtain for extended periods of time and minimize transit times consistent with prudent operation.
- F. At any time, the Owner's Representative reserves the right to change this approach (e.g. terminate the use of the air curtain or the turbidity curtain) due to observations or water quality results.
- G. The Contractor shall coordinate with New York City Department of Environmental Protection (NYCDEP) to determine scheduling of opening and closing of the NYCDEP turbidity curtain associated with the Flushing Tunnel. The Contractor shall also coordinate with NYCDEP to allow for NYCDEP to maintain their turbidity curtain.

3.03 AIR CURTAIN PLACEMENT AND OPERATION

- A. An air curtain is to be installed as follows prior to commencing Work and is to remain in place until completion of dredging activities:

1. The Contractor shall provide barge-mounted air and power sources. Alternate land-based power sources are acceptable with submittal of access agreements with the property owner and approval from the Owner's Representative.
2. The air curtain shall operate during working hours (as described in the Contract Documents) and in all weather conditions.
3. If the exceedance of the threshold turbidity criteria (as defined in Section 01 57 19) is observed during work in the Canal, the Contractor shall implement water quality controls in accordance with this Section and Section 01 57 19, including but not limited to, slowing or halting operations, modifying operational procedures, and modifying turbidity control measures.

3.04 TURBIDITY CURTAIN PLACEMENT

- A. A turbidity curtain is to be installed as follows prior to commencing Work and is to remain in place until the Work is completed:
 1. The turbidity curtain shall be moored to the newly installed pilings described above.
 2. A gap of approximately one (1) foot should exist between the weighted lower end of the skirt and the bottom of the Canal at mean low water (MLW).
 3. Seams in the fabric shall be either vulcanized or sewn, and shall develop the full strength of the fabric.
 4. Bottom anchors shall be sufficient to hold the curtain in the same position relative to the bottom of the watercourse without interfering with the action of the curtain. Anchors may dig into the bottom (grappling hook, plow or fluke-type) or may be weighted (mushroom type) and shall be attached to a floating anchor buoy via an anchor line.
- B. The turbidity curtain shall be deployed at all times when the air curtain is not operational (i.e. nights, weekends, and during equipment malfunctions with the air curtain).
- C. Absorbent oil booms shall be placed on the sediment-disturbing side of the turbidity curtain any time the turbidity curtain is deployed to control non-aqueous phase liquids (NAPL) and sheen in the Canal.
- D. If an exceedance of the threshold turbidity criteria is observed during Work in the Canal, the Contractor shall implement water quality controls in accordance with this Section and Section 01 57 19, including but not limited to, slowing or halting operations, modifying operational procedures, and modifying turbidity control measures.
- E. During times that the air curtain is deployed (i.e. during daytime operations), the turbidity curtain shall be stored as detailed in the Contractor's approved plans and specifications for the turbidity curtain.

3.05 INSPECTIONS

- A. The Contractor shall be responsible for maintenance of sediment and floatables containment for the duration of the project.
- B. The Contractor is required to perform daily inspections of all parts of the sediment and floatables containment.
- C. If upon inspection it is determined that any part of the sediment and floatables containment is damaged or no longer functional, it must be repaired or replaced prior to continuing construction activities.
- D. If turbidity curtains or air curtains are deployed, the Contractor shall collect, remove and dispose of floating debris and visual surface oil sheen resulting from project activities. The Contractor shall drum spent absorbent materials and transport them for disposal or to the Staging Site for temporary off-loading and on-site storage. A release of floating debris or surface sheen resulting from project activities upon opening the turbidity curtain or shutting down the air curtain is not permitted. The Contractor shall establish means and methods for containment of floating debris and surface sheen resulting from project activities upon opening the turbidity curtain or shutting down the air curtain. In the event that the presence of floating debris or surface sheen is not due to in-waterway construction activities (e.g., during a CSO discharge event), the source of the release will be investigated to an extent that substantiates that the in-waterway construction activities are not responsible.
- E. When the sediment and floatable containment is no longer required as determined by the Owner's Representative following completion of construction, the pilings, curtains, and related components shall be removed in such a manner as to minimize turbidity. The Contractor is responsible for the removal and disposal of the turbidity curtains and related components.

3.06 NAVIGATIONAL IMPACTS

- A. All work performed on the Canal that may restrict access by others shall be communicated with a Local Notice to Mariners as described in Section 01 41 00.
- B. Buoys shall be installed to mark locations of pilings, air curtain, and turbidity curtain.
- C. Automatic flashing lights shall be affixed on top of the pilings and to the turbidity curtain and shall operate from dusk until dawn.

[END OF SECTION]

SECTION 03 11 00

**IN SITU
STABILIZATION/SOLIDIFICATION**

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 03 11 00 **TITLE:** IN SITU STABILIZATION/SOLIDIFICATION

SPECIFICATION PREPARED BY: (Specification Preparer, SP) Signature _____
Name Jule A. Carr Date _____

SCOPE AND FORMAT CHECKED BY: (Scope and Format Checker, SFC) Signature _____
Name Dogus Meric Date _____

DETAILED REQUIREMENTS CHECKED BY: (Detailed Requirements Checker, DRC) Signature _____
Name Christopher A. Robb Date _____

APPROVED BY: (Specification Approver, SA) Signature _____
Name J.F. Beech Date _____

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	-	-	-	-
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	-	-	-	-
C	RTA1 65% Remedial Design	11/20/17	JAC	LSW	CAR	JFB
D	RTA1 90% Remedial Design	09/30/19	JAC	DM	CAR	JFB
E	RTA1 100% Remedial Design	02/28/20	JAC	DM	CAR	JFB

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SECTION 03 11 00

IN SITU STABILIZATION/SOLIDIFICATION (ISS)

PART 1 GENERAL

1.01 SUMMARY

- A. This Section presents details regarding the Contractor's in situ stabilization/solidification (ISS) work in Remedial Target Area (RTA) 1.

1.02 RELATED SECTIONS, PLANS, AND DOCUMENTS

- A. Section 01 22 00 Measurement and Payment
- B. Section 01 32 00 Construction Progress Documentation
- C. Section 01 33 00 Submittals
- D. Section 01 35 29 Health, Safety, and Emergency Response Requirements
- E. Section 01 40 00 Quality Requirements
- F. Section 01 41 00 Regulatory Requirements
- G. Section 01 57 13 Temporary Erosion and Sediment Control
- H. Section 01 57 19 Temporary Environmental Controls
- I. Section 01 60 00 Product Requirements
- J. Section 01 71 23 Site Surveying and Grade Control
- K. Section 02 60 16 Sediment and Floatables Containment
- L. Section 31 10 00 Site Preparation
- M. Section 35 20 23.13 Dredging and Dewatering
- N. Section 35 43 00 Cap Construction - Treatment Layer
- O. Section 35 43 29 Cap Construction – Isolation and Armor Layer
- P. Contract Documents

1.03 REFERENCES

- A. Geosyntec, 2019. ISS Design Calculation Packages (Appendices B19 through B23).
- B. CH2M Hill, Inc., 2015. *In Situ Solidification/Stabilization Pilot Test Construction Completion Report Gowanus Canal Superfund Site, Brooklyn, New York*. (Draft ISS Pilot Test Report). Available upon request.
- C. CH2M Hill, Inc., 2014. *Bench-Scale Testing Report Pre-Design Investigations, Gowanus Canal, Brooklyn, New York* (ISS Treatability Study Report). Available upon request.
- D. GEI Consultants, Inc., 2013. *In Situ Solidification Treatability Study Status Report, Gowanus Canal Superfund Site, Brooklyn, New York*. Available upon request.
- E. Gowanus Community Air Monitoring Plan – To be prepared prior to start of Phase I Dredging.
- F. Latest version of ASTM International (ASTM) Standards:
 - 1. ASTM C143 Standard Test Method for Slump of Hydraulic-Cement Concrete
 - 2. ASTM C150 Standard Specification for Portland Cement.
 - 3. ASTM C989 Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
 - 4. ASTM D1632 Standard Test Method for Making and Curing Soil-Cement Compression and Flexure Test Specimens in the Laboratory.
 - 5. ASTM D1633 Standard Test method for Compressive Strength of Molded Soil-Cement Cylinders.
 - 6. ASTM D2113 Standard Practice for Rock Core Drilling and Sampling of Rock for Site Exploration.
 - 7. ASTM D2166 Standard Test method for Unconfined Compressive Strength of Cohesive Soil.
 - 8. ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.
 - 9. ASTM D2937 Standard Test Method for Density of Soil in Place by the Drive-Cylinder Method
 - 10. ASTM D4380 Standard Test Method for Density of Bentonitic Slurries.
 - 11. ASTM D5084 Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.
 - 12. ASTM D6910 Standard Test Method for Marsh Funnel Viscosity of Clay Construction Slurries.

13. ASTM D7263 Standard Test Methods for Laboratory Determination of Density (Unit Weight) of Soil Specimens

- G. American Petroleum Institute (API) 13A Specification for Oil-Well Drilling-Fluid Materials.

1.04 DEFINITIONS

- A. Additives – Fluidizers or fillers added to the Grout to enhance the mix design’s mixability/solidification/stabilization performance. Examples include bentonite, and anti-washout additive.
- B. Free Non-Aqueous Phase Liquid (NAPL) - NAPL that is present as a free-phase in the pore space of the ISS treated Soil and is not amalgamated within the ISS treated Soil matrix.
- C. Glacial Deposits – Sediment consists of gravelly sand, poorly and well graded sand, fine to coarse grained sand and small to large sub-angular gravel, with varying amounts of silt and silty sand, with some clay (sometimes interbedded to laminated). Color ranges from tan to brown to gray to dark gray and reddish brown. Density ranges from very loose to very dense, generally densifying with depth.
- D. Grout – The mixture of water, Additives, and reagents used to solidify/stabilize the sediment.
- E. Homogenous Mixture – A column of mixed Grout and sediment that have been thoroughly mixed together to create a solidified material that generally exhibits a uniform appearance and consistency (i.e., similar grain size distribution) with no unmixed Soil clumps greater than three (3) inches in diameter, and meets all the performance criteria specified in this Section.
- F. In Situ Stabilization/Solidification (ISS) – Stabilization and solidification of Native Alluvial Sediment and/or Glacial Deposits in RTA1. ISS also is referenced herein as Work.
- G. ISS Area – All portions of RTA1 where ISS is specified to be performed.
- H. ISS Design Elevations – Design top and bottom of ISS treatment elevation in feet NAVD88.
- I. ISS Column – A column or area of mixed sediment and cementitious Grout created by mixing with a vertical rotary mixing tool or an excavator-mounted specialty mixing tool specifically manufactured to perform ISS.
- J. ISS Mix Design – The grout mix design proposed by the Contractor based on the formulation directed by the EPA including the ISS materials, additives, and reagents

used, that were used in achieving the Performance Requirements as shown in the Draft ISS Pilot Test Report (CH2M, 2015).

- K. ISS Swell Material – Material resulting from volumetric expansion resulting from addition of Grout to targeted *in situ* sediments. ISS Swell Material typically consists of a mixture of sediment and Grout above the top of an ISS Column.
- L. ISS Spoils – ISS materials including wasted Grout, out of spec Grout, and wash water that may be generated during the course of ISS operations.
- M. Mixing Pass – One full Mixing Pass is a down stroke to full treatment depth with the mixing tool, and an up-stroke where the mixing tool is withdrawn to just above the designed top of ISS Design Elevation whereby mixing of the Soil and Grout occurs.
- N. Mixing Area –The confined area where ISS implementation occurs and provides turbidity, total suspended solids (TSS) and sheen control measures (e.g., turbidity curtains, sorbent booms/NAPL recovery tools, bubble curtains, etc.) as described in Specification 02 60 16 and this Section.
- O. Native Alluvial Sediment – Sediment consists of marsh deposits (denser than Soft Sediment), mixtures of silt, sandy silt, sand, clay, fibrous roots, and vegetation/wood debris. Color ranges from reddish brown to dark gray to black. Consistency ranges from very soft to stiff/medium.
- P. Obstruction – A condition that occurs when boulders, timbers, or other debris, are encountered and the penetration rate becomes so slow as to either become impractical or unproductive, or to present a danger to personnel or equipment. Obstruction in this Work is defined as less than 6 inches of penetration/advancement over a 15-minute period under maximum down-pressure/mixing capacity of ISS machine.
- Q. Performance Requirements – Requirements to pass visual inspection, hydraulic conductivity requirements, unconfined compressive strength requirements, and NAPL immobilization requirements are presented in Part 3.07 of this Section.
- R. Phase I Dredging – Dredging of Soft Sediment, as presented in the Construction Drawings, to provide access throughout RTA1 for bulkhead work and Phase II Dredging.
- S. Phase II Dredging – High production dredging throughout RTA1, but not beneath/around the bridges. Conducted prior to ISS.
- T. Phase III Dredging – Dredging to the final surface, presented in the Construction Drawings, throughout RTA1, including beneath the bridges. Conducted after ISS.
- U. Reagent – Cementitious materials used to solidify/stabilize the sediment. Examples include Portland cement, Ground Granulated Blast-Furnace Slag (GGBFS), lime, fly ash, and other pozzolanic materials that exhibit cementitious properties.

- V. Refusal – An Obstruction for which no further action on the part of the Contractor is required, as determined by the Owner’s Representative.
- W. Soft Sediment – Sediment consists of organics, organic silts and clays with varying components of sand, silty sand, gravel, and debris/trash. Color ranges from grey to black and dark brown to black. Consistency ranges from very soft to soft.
- X. Soil – Term used to generally reference Soft Sediment, Native Alluvial Sediment, Glacial Deposits or any combination of these materials.
- Y. Survey - Marine surveys of the ISS Areas shall be hydrographic surveys in accordance with the USACE Hydrographic Surveying Manual and Section 01 71 23.

1.05 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00 and Construction Drawings:
 - 1. Draft ISS Work Plan that demonstrates compliance with the requirements outlined in this Section and in related Sections and Construction Drawings. Describe the sequencing, details, and means and methods of all ISS operations, including, but not limited to, the following information:
 - a. Mobilization:
 - i. Proposed means and methods for mobilization and deployment of ISS equipment and support equipment including equipment used to explore and/or remove Obstructions; and
 - ii. Proposed staging layout for equipment barges and material laydown areas.
 - b. Equipment:
 - i. Description and specification of ISS equipment and processes including barges, grout pressure, flow rates, batch plant measures, ISS rig - including alternative equipment utilized adjacent to the critical structures - specifications and software (e.g., Clamvision, Gamperl & Hatlapa[®] measuring data evaluation system), augers, global positioning system (GPS), and method, accuracy and documentation of auger positioning, including column verticality;
 - ii. Description and specification of ISS equipment and processes to minimize sediment resuspension during ISS mixing activities and to control sediment and NAPL dispersion in the canal;
 - iii. Provide Failure Modes and Effects Analysis;
 - iv. Description of support equipment used for Obstruction exploration and removal and procedures for removing; and
 - v. Description of fuel storage areas and refueling procedures.

- c. Scheduling:
 - i. Proposed project schedule for the completion of the Work that identifies key milestones including start and end milestones;
 - ii. Anticipated production rate for ISS Columns; and
 - iii. Procedure for barge movement (for both Reagent/Additive delivery and ISS Swell/Spoils management), scheduling, and frequency.
- d. Proposed means and methods for the following:
 - i. Proposed ISS Column layout including overlap ratio and ISS top and bottom Design Elevations (as specified in the Construction Drawings), Phase II start elevation, and effective area/volume for each column. ISS Columns should have unique identifiers for current and future drawing reference;
 - ii. Proposed ISS layout for transition from column to the secondary mixing approach near sensitive structures;
 - iii. ISS Spoils (e.g., wash out and grout) disposal facilities and practices;
 - iv. A description of turbidity, TSS and sheen control measures that meet the requirements of this Section and Section 02 60 16;
 - v. A description of air emissions, odor, and dust control measures that meet the requirements of Section 01 57 19; and
 - vi. A description of recommended strategies for managing process interruptions and maintenance of ISS equipment.
- e. Parameters proposed for Construction Quality Control (CQC) of the ISS Work including:
 - i. Methods for determining and verifying the coordinate, elevations, and depths of the ISS Columns;
 - ii. Methods for verifying Reagent/Additive dosage and achievement of a Homogenous Mixture;
 - iii. Methods to prevent sediment dispersion throughout ISS mixing activities;
 - iv. Methods to collect Construction Quality Assurance (CQA) samples; and
 - v. Example daily equipment operation and maintenance logs, quality control record logs, and inspection forms.
 - vi. References to the Quality Assurance Project Plan (QAPP) submitted pursuant to Specification Section 01 40 00.
- f. Statement of Qualifications:
 - i. Certifications, qualifications, and resumes (including years of experience) shall be provided for key personnel assigned to conduct the Work, including the Project Manager, Project Superintendent, equipment operators, batch plant operators, supervisory engineering staff and other technical staff;

- ii. A complete list of subcontractors the Contractor will use on this project, including certifications, qualifications, and resumes; and
 - iii. Organizational chart that illustrates project management team, along with the ISS crew, and chain of communication during ISS operations.
2. The name and location of all sources that will be used to obtain the materials specified in this Section.
3. Certificates of compliance attesting that the cementitious materials meet the requirements of this Section and Section 01 60 00. Cementitious material will be evaluated on the basis of a manufacturer's certificate of compliance, accompanied by test reports that the material meets the requirements specified herein.
4. Final ISS Work Plan that includes all information included in the Draft ISS Work Plan, including updates as appropriate, and also including the following:
 - a. Mobilization:
 - i. A finalized location for temporary material staging and equipment laydown areas;
 - ii. Final design of batch plant configuration including connection to batch plant silos and grout delivery system; and
 - iii. All required utility connections.
 - b. Equipment:
 - i. Design of barges and details regarding their conformance with Section 16.L: Floating Cranes/Derricks, Crane Barges, and Auxiliary Shipboard-Mounted Cranes in the USACE Safety and Health Requirements (USACE 2014);
 - ii. Proposed means/methods for calibrating mixing equipment components and testing specific gravity of grout; and
 - iii. A finalized description of major ISS equipment with identified backup equipment to minimize delays attributable to equipment failures. Include certifications for equipment.
 - c. Scheduling:
 - i. Finalized project schedule with start and end milestones and barge schedule; and
 - ii. Expected times and durations any bridges will need to be held open for ISS work.
 - d. Proposed means and methods for the following:
 - i. Failure Modes and Effects Analysis as described in Part 3.04 of this Specification;
 - ii. Startup/Demonstration Evaluation as described in Part 3.05 of this Specification;
 - iii. Methods, sequence, and final column layout of ISS operations. ISS Column layout shall be submitted in PDF and AutoCAD formats;

- iv. A description of methods to deliver, prepare and measure Reagents/Additives and to verify proper quantities and proportions, and sample calculations based on theoretical column volume and Soil density;
 - v. Performing ISS in areas in, around, and beneath bridges and their approaches;
 - vi. Performing ISS adjacent to bulkheads;
 - vii. Performing ISS adjacent to the Flushing Tunnel culvert;
 - viii. Monitoring and recording Grout injection pressure, Grout injection flow rate, and mixing equipment horizontal, vertical (i.e., insertion/withdrawal) and radial velocity (i.e., rotational speed) as applicable;
 - ix. Moving Reagents/Additives onto the barge in accordance with the spill prevention and control plan described in Section 01 57 19;
 - x. A final description of the turbidity, TSS and sheen control measures that meet the requirements of Section 02 60 16 and this Section;
 - xi. A final description of methods for assessing presence of NAPL within the mixing area and measures for removal/management of NAPL within the mixing area that meet the requirements of Section 02 60 16 and this Section;
 - xii. Final methods for odor, vapor, and dust control that meet the requirements of the CAMP;
 - xiii. Protecting structures, utilities, and banks during ISS (e.g., the use of protective bumpers, areas intended for anchoring along with the location of sensitive structures, etc.);
 - xiv. Tying up and securing barges; and
 - xv. Keeping the public clear of ISS operations.
5. Addenda to the Final ISS Work Plan.
 6. Daily and Weekly progress reports in accordance with Section 01 32 00.
 7. Operational logs including ISS Column logs, ISS Grout plant logs, surveyor/engineer notes, and ISS production logs according to the schedule in Section 01 33 00 to the Owner's Representative for review. The operational logs should include the following:
 - a. Description of the Work completed with a drawing identifying completed columns. Drawing shall be submitted in PDF and AutoCAD® drawing format (.dwg).
 8. For each ISS Column:
 - a. ISS Column Identification Number and location;
 - b. Date and time of beginning and completion of each column, including any interruptions to the mixing process or material supply;

- c. Horizontal location of each column;
 - d. Design and actual top elevation of ISS treatment;
 - e. Design and actual bottom elevation of ISS treatment;
 - f. Column verticality (if appropriate);
 - g. Barge platform elevation;
 - h. Tidal elevation and water depth;
 - i. ISS Column geometry (column diameter; cell length and width; overlap area, effective area, effective volume as applicable);
 - j. Auger advancement rate in feet per minute per Mixing Pass;
 - k. Auger mixing rate in rotations per minute per Mixing Pass;
 - l. Auger torque, measured continuously for each Mixing Pass;
 - m. Grout pressure, grout flow rate, and grout take per unit depth;
 - n. Mix design used for each ISS Column completed including design calculated Grout volume (cubic yards), Reagent/Additive addition weight (pounds), Reagent/Additive addition volume, and actual volumes injected in each 2-foot interval;
 - o. Grout mix data including mix proportion and unit weight/density measurements and volume of water used;
 - p. Number of Mixing Passes;
 - q. Auger diameter and/area of columns completed;
 - r. Obstructions encountered; and
 - s. Details regarding any quality assurance/quality control (QA/QC) samples collected from the column.
9. Any unforeseen Site conditions or equipment problems that may affect ISS activities.
 10. Any modifications or deviations from the Specifications, Construction Drawings, or Work Plans.
 11. Quantities of Reagent/Additives received and stored, including total weight received versus stored. The Contractor shall store on-Site the amount of Reagent/Additives required to complete ISS production for the following day, at a minimum, including water. Contractor shall receive written notice from the Owner's Representative to deviate from this requirement.
 12. Final record documents of all ISS construction-related activities. Record documents shall include, but not be limited to, daily operation logs of ISS equipment, record drawings of all ISS Columns completed by date, Grout mix design, horizontal location, and elevation, and type of quantity of Reagents/Additives used.

1.06 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.
- B. The Contractor shall comply with environmental health and safety/training requirements in accordance with the USACE Safety and Health Requirements (EM 385-1-1), specifically sections 16 – Cranes and Hoisting Equipment and 19 – Floating Plant and Marine Activities.

PART 2 PRODUCTS

2.01 EQUIPMENT

- A. ISS Equipment
 - 1. The Contractor shall provide ISS equipment that utilizes a single shaft auger head (e.g. Kelly bar), excavator mounted mixing tools, or other equipment approved by the Owner’s Representative. ISS mixing approaches based on bucket mixing techniques and equipment will be disallowed in all areas. The ISS equipment shall be capable of performing the ISS Work in all the ISS Areas from a barge. ISS mixing in ISS Areas within RTA1 as shown on the Drawings will be implemented using a single shaft auger head. ISS Areas within two (2) feet of all bulkheads and in areas in, around, and beneath bridges and their approaches will be implemented using a secondary mixing approach.
 - 2. Auger-Based Approaches
 - a. The auger shall have and shall use discharge capability at the bottom and along the auger flights. The auger flights shall be configured so as to blend the sediment and Grout into a Homogenous Mixture that meets the Performance Requirements. Continuous flight augers that lift material shall not be allowed. The Subcontractor shall maintain a sufficient number of spare augers on site to provide uninterrupted ISS production.
 - 3. Secondary Mixing Approach
 - a. The Contractor shall provide alternative ISS equipment (e.g., excavator mounted mixing tools) capable of performing the ISS Work within two (2) feet of all bulkheads in the ISS Areas from a barge as shown on the Construction Drawings. Alternative ISS equipment shall have and shall use discharge capability near the bottom of the mixing tool and within the zone of mixing. The alternative ISS equipment shall have the capacity to blend the sediment and Grout into a Homogenous Mixture that meets the Performance Requirements. The alternative ISS equipment requires approval by the Owner’s Representative.

- b. The Contractor may propose use of alternative ISS equipment for all portions of the ISS Work, subject to the requirements of the Startup/Demonstration Evaluation and approval by the Owner's Representative.
 4. The ISS Equipment barges shall be capable of maneuvering between the Staging Site and ISS Areas within RTA1. There shall be sufficient room on board the barges to accommodate ISS equipment, a support excavator capable of reaching the bottom of all ISS Areas and having sufficient power to perform removal of Obstructions, NAPL collection/management equipment, the ISS Batch Plant, and storage for Reagents, Additives and water. Configuration of the barges shall not impede implementation of the ISS work.
 5. ISS equipment shall be capable of applying Grout at the horizontal and vertical point of use and uniformly mixing the Grout with the targeted sediment. ISS equipment that relies on applying Grout on top of the sediment and then mixing through the column shall not be used.
 6. The power source for driving the mixing shafts shall be sufficient to maintain the rotations per minute (rpm) and penetration rates required to blend *in situ* sediment and Grout into a Homogeneous Mixture from a stopped position at the depths specified on the Construction Drawings.
 7. ISS mixing equipment shall have instrumentation installed with a measuring data evaluation system to verify ISS Column measurements at minimum to record parameters listed in Part 1.05A(4)(d) of this Section. ISS Column logs shall be measured using the Gamperl & Hatlapa[®] measuring data evaluation system, if available for the Contractor's selected ISS equipment, or equivalent alternative instrumentation approved by the Owner's Representative prior to project start.
 - a. ISS mixing within two (2) feet of bulkheads and in areas in, around, and beneath bridges and their approaches shall use GPS and related controls as approved by the Owner's Representative prior to project start to verify ISS top and bottom elevations in these areas.
 8. Equipment with sufficient reach and power for obstruction removal up to 10 feet below Phase II Dredge Surface shall be available.
- B. ISS Batch Plant
1. The Contractor shall provide mixing equipment that has a minimum capacity adequate to meet performance and schedule requirements. The Grout mixing plant shall contain the necessary equipment to produce a stable Grout mixture and shall be equipped with a positive means for controlling and documenting mixing proportions, maintaining constant mixing time, and maintaining the appropriate mixing speed.
 2. The Contractor shall provide bulk storage of dry materials used in the mix design at a dry and approved material staging area accessible by barge.
 3. The ISS Batch Plant barges shall be capable of maneuvering between the Staging Site and ISS Areas within RTA1. There shall be sufficient room on board the barges for the ISS Batch Plant, Reagents, Additives and water.

4. Calibration of the mixing equipment components shall be performed at the beginning of the project and at a minimum frequency of weekly thereafter. Reagent feed equipment shall be calibrated using a predetermined weight or alternate method as submitted by the Contractor and approved by the Owner's Representative. Water shall be controlled via a flow meter or equivalent, as approved by the Owner's Representative .
5. The Contractor shall test the specific gravity of the Grout using a mud balance (ASTM D4380), viscosity (ASTM D6910), temperature and pH. The specific gravity of the Grout shall be determined for the mix design prior to implementation to ensure the Grout meets the Performance Requirements. Equipment shall be calibrated at the beginning of each day.
6. Grout volumes shall be measured with a flow meter, or equivalent as approved by the Owner's Representative, capable of measuring liquids containing high solids.

C. Sediment and NAPL Control Equipment

1. The Contractor shall provide equipment to minimize sediment resuspension during ISS mixing activities and to control sediment and NAPL dispersion in the canal.
2. The Contractor shall provide equipment to manage NAPL that accumulates in the barge mixing area such that the surface water can be cleared of NAPL during full-scale operations.

D. Environmental Control Equipment

1. All equipment shall be equipped with noise control apparatus in accordance with Section 01 57 19.
2. The Contractor shall provide equipment to manage air emissions and odors in accordance with Section 01 57 19.

2.02 ISS MATERIALS, ADDITIVES AND REAGENTS

- A. Water: Potable water used for ISS Grout production shall be provided by the Contractor and staged in the approved material laydown area accessible by barge. The Contractor will be responsible for connecting and conveying water from the identified potable water source location to the water storage tank. At least 14 days prior to implementation, the Contractor shall verify that the water source used for Grout mixing will result in Grout that meets the Performance Requirements.
- B. Cement: Cement shall conform to ASTM C150 Standard Specification for Portland Cement. The cement shall be adequately protected from moisture and contamination in accordance with Section 01 60 00. Cement containing lumps or defects shall not be used. In addition, Portland Cement utilized in all mix designs shall be Type V.
- C. GGBFS: GGBFS shall conform to ASTM C989 Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars. The GGBFS shall be adequately protected from moisture and contamination in accordance with Section 01 60 00. In addition, GGBFS utilized in all mix designs shall be Grade 120.

- D. Bentonite: Powdered bentonite shall meet the requirements of API 13A, Section 4 with a yield of 90 barrels per ton. The bentonite shall be adequately protected from moisture and contamination in accordance with Section 01 60 00.
- E. Anti-washout Additive shall be MasterMatrix UW 450, as manufactured by BASF.

PART 3 EXECUTION

3.01 SCOPE OF WORK

- A. The Contractor shall conform to Protection, Communication, and Canal and Site Access requirements from Section 35 20 23.13.
- B. The Contractor shall protect bulkheads, utility services and distribution systems, and existing improvements against damage. Repair or replace items damaged during ISS Work at no cost to owner.
- C. The Contractor shall source, receive, store, and mix ISS Reagents/Additives to stabilize and solidify impacted sediment within the ISS Area limits in RTA1 to elevations indicated on the Construction Drawings. ISS treatment shall be installed after Phase II Dredging (Section 35 20 23.13) of RTA1 and prior to Phase III Dredging or installation of the cap (Sections 35 43 00 and 35 43 29). The ISS Work shall be constructed to the limits, elevations, cross sections, and details shown on the Construction Drawings and in accordance with the Contract Documents unless otherwise approved by the Owner's Representative.
- D. The Contractor shall prepare Site prior to construction, including mobilization of equipment and materials, setting up equipment, providing utility connections, inspecting support facilities prepared by Others, staging materials, and staging the ISS work platform.
- E. The Contractor shall maintain and repair sediment and floatables containment according to Section 02 60 16.
- F. The Contractor shall perform a Startup/Demonstration Evaluation prior to full scale implementation of the ISS Work as specified herein.
- G. The Contractor shall implement ISS by mixing impacted sediments with Grout within the ISS Area limits to produce a stabilized and solidified Homogenous Mixture that shall meet the Performance Requirements.
- H. The Contractor shall be familiar with the Obstructions and sediment that will be encountered during the ISS Work. Variations in the sediment material targeted for ISS treatment are expected, and the geotechnical results from the site investigations are available in the Contract Documents.

- I. Horizontal Alignment of ISS Columns: The ISS Columns shall be aligned to fit the ISS Areas limits based on the size of the auger or equipment used. Overlap for adjacent ISS Columns shall be designed with a “neat line” overlap as shown on the Construction Drawings. Untreated zones between ISS Columns and within the ISS Area will not be allowed. Overlap for adjacent ISS Areas completed with equipment other than a large diameter auger (i.e., diameter greater than 2 ft and a secondary mix approach) shall be a minimum of one foot at the point of maximum overlap.
- J. Vertical Alignment of ISS Columns: The Contractor shall maintain a vertical alignment to within 4° degrees in X and Y direction for all ISS Columns. The minimum vertical overlap for adjacent ISS Areas shall not be less than 3 feet.
- K. The Contractor shall explore ISS areas to top of Native Alluvial Sediment interface with support excavator immediately prior to constructing ISS Columns to verify no Obstructions are present. The Contractor shall remove Obstructions to facilitate ISS to the extent practical.
- L. Contractor shall be responsible for injection of the Reagents/Additives as determined in the mix design ratio(s).
- M. Passes and/or columns shall be laid out in a manner to solidify the entire area and provide an overlap between adjacent passes and/or columns so that all sediment is treated, in compliance with this Section.
- N. Ensure that a Homogenous Mixture has been created, as defined herein.
- O. The Contractor shall establish Survey control for location of all ISS Columns prior to treatment.
- P. The Contractor shall conform to design top elevations and thicknesses of ISS Columns during ISS operations as depicted on the Construction Drawings. The minimum thickness of ISS Columns shall be three feet.
- Q. ISS mixing shall begin at the top of ISS treatment elevations as specified on the Construction Drawings. The Contractor shall verify the top of ISS treatment elevation prior to mixing each ISS Column. The ISS auger shall be able to pass through the Soft Sediment at the dredge surface.
- R. The Contractor shall manage ISS Swell Material to the extent possible, as determined by the Owner’s Representative . ISS Swell Material shall be removed by the Contractor either to the Phase III Dredge line elevation or to an alternate surface above the Phase III dredge line that does not impact final navigation depth or placement of the leveling layer or various cap layers. Alternate cap surfaces are to be approved by the Owner’s Representative in writing.

- S. The Contractor shall remove, transport, and dispose of materials and debris in accordance with Section 02 51 19. Material shall be disposed or recycled in accordance with all local, state, and federal laws, codes, and ordinances.
- T. The Contractor shall protect bulkheads in accordance with Section 31 41 16 and the Construction Drawings. Repair any damage caused to bulkheads during ISS at no cost to and to the satisfaction of the Owner.
- U. The Contractor shall manage air emissions and odors during ISS operations as necessary to comply with the Community Air Monitoring Plan (CAMP) and Section 01 57 19.
- V. The Contractor shall maintain controls for turbidity, TSS, and sheen as necessary and in compliance with Section 02 60 16 and this Section.
- W. The Contractor shall collect construction quality assurance (CQA) samples and provide them to the Owner's Representative to verify that the properties of the ISS treated sediment meet the Performance Requirements.
- X. The Contractor shall be responsible for reprocessing ISS Columns that do not meet the Performance Requirements, at the Contractor's expense, as detailed in Part 3.11 of this specification.
- Y. The Contractor shall dispose of excess wash out water and grout in a watertight container unless injection of wash out water and grout is successfully demonstrated during the Startup/Demonstration Evaluation and approved by the Owner's Representative pursuant to 3.05. ISS Columns that receive excess wash out water and grout are required to meet all Performance Requirements specified herein. No injection of wash out water and grout will be allowed when moving to a non-contiguous ISS Area and must be disposed in a watertight container. The Contractor shall minimize amount of wash out water and grout required at the end of each day.
- Z. ISS operations shall be conducted without damage to adjacent property, bulkheads or structures.
- AA. The Contractor shall minimize the dispersion of sediment, NAPL, odors, vapors, and dust during implementation of the Work in compliance with water quality, spill prevention, dust, noise and air emission requirements described in Section 01 57 19 and community air monitoring plan (CAMP). The batch plant shall be constructed and operated such that potentially dust is controlled within the staging area in accordance with Section 01 57 19.
- BB. The Contractor shall manage NAPL that accumulates in the barge mixing area such that the surface water can be cleared of NAPL during ISS implementation, at the end of each work shift and that NAPL is contained within the mixing area at all times.
- CC. Final completion of the ISS will be determined by the Owner's Representative and confirmed by EPA.

3.02 EQUIPMENT OPERATION

- A. Pumps, hoses, valves, mixing devices, tanks, and all support equipment shall be in excellent working order when mobilized to the Site and shall be properly maintained throughout the duration of the Work.
- B. Mixing Shaft/ToolSpeed: The Contractor shall adjust the mixing shaft speed (rpm) as needed to accommodate a constant rate of mixing and shaft penetration based on the degree of drilling difficulty.
- C. Penetration Rate: The penetration rate of the ISS Columns shall be adequate to ensure proper mixing and achieve the projected production rates.
- D. Mixing Passes per Column: The Contractor shall perform a minimum of three (3) Mixing Passes per column. The Contractor should be aware that three mixing passes were needed to obtain a homogeneous mixture during the ISS Pilot Test. Additional passes per column shall be performed until the desired treated Homogeneous Mixture is obtained, meeting the Performance Requirements as described in Part 3.07, at no additional cost to Owner.
- E. Refusal: If Obstructions, including, but not limited to, boulders, timbers, or other debris, are encountered which effectively stop the penetration of the auger or equipment, the Contractor shall remove the Obstruction to the extent practicable, as determined by the Owner's representative, with an excavator or other appropriate equipment. If the Obstruction cannot be removed, the ISS Column shall be completed to the depth achieved in accordance with this Specification and as approved by the Owner's Representative. Failure to cut an ISS Column into an adjacent partially or fully cured ISS column shall not be considered to be either Obstructions or auger Refusal.
- F. Notify the Owner's Representative of unexpected subsurface conditions immediately in writing and discontinue work in affected area until notified by Owner's Representative to resume ISS Work.

3.03 QUALIFICATIONS

- A. Equipment operators & ISS Support Staff shall have the following minimum levels of experience:
 - 1. Contractor shall have completed at least three (3) ISS auger-mixing remediation projects. The minimum size of the ISS project shall be 10,000 cubic yards for an upland application or 1,000 cubic yards for a marine/barge-based application.
 - 2. Contractor's Project Superintendent shall have a minimum of five (5) years of cumulative experience directly conducting ISS projects, with a minimum of three (3) of those years in the role of project superintendent on ISS projects.
 - 3. Contractor's ISS rig operator shall have a minimum of two (2) years of experience directly conducting ISS auger mixing projects, specialty mixing tool techniques, and ISS projects with congested/tight spaces near critical structures

4. Contractor's other Key Personnel shall have a minimum of two (2) years of experience directly conducting ISS projects. Other Key Personnel include equipment operators, batch plant operator, supervisory engineering staff, QA/QC personnel, and technical staff involved with the ISS system operation.

3.04 FAILURE MODES AND EFFECTS ANALYSIS

- A. Contractor shall identify and maintain sufficient reserve or backup equipment to limit downtime associated with scheduled routine maintenance and delays attributable to equipment failures and unplanned maintenance.
- B. Prior to mobilization, Contractor shall conduct a Failure Modes and Effects Analysis and determine (in the judgment of the Contractor) systems or components that are likely to fail or require routine maintenance in the course of normal operation for this project. This analysis shall determine credible failure modes and maintenance activities, which, if occurred, would result in the inability to measure parameters critical to the performance of the work, or result in significant delays in the Work. In cases where it is cost-prohibitive or impractical to maintain backup resources, components or parts for certain equipment, Contractor shall identify, pre-qualify, etc., backup equipment or repair resources to minimize delays in the event that these resources are needed.
- C. The Contractor shall be responsible for all costs associated with delays of the Work attributable to equipment failures, and deliveries of ISS Reagents or Additives.

3.05 STARTUP/DEMONSTRATION EVALUATION

- A. The Startup/Demonstration Evaluation shall be used to confirm application parameters of the selected mix design(s) required to meet the Performance Requirements. These application parameters shall include, but not be limited to, Grout mix design percentages, Grout flow rates and pressures, water-to-Reagent/Additive ratios, auger/tool advance and retraction rates, and Grout specific gravity.
- B. The Contractor shall perform pre-clearing of debris to the top of the native alluvial in the Startup/Demonstration areas, selected by the Contractor and approved by the Owner's Representative, prior to performing the Startup/Demonstration ISS Columns.
- C. A minimum of four weeks prior to full-scale ISS operations, and after Phase II Dredging is completed in the test areas, a Startup/Demonstration evaluation shall be performed at the Site. At a minimum, the Contractor shall select three distinct ISS Areas shown on the Construction Drawings and construct:
 1. Four overlapped ISS Columns in each selected area (12 columns total);
 2. Two additional overlapped ISS Columns adjacent to bulkheads (i.e. secondary approach mixing areas) in each selected area (6 columns total); and
 3. ISS Columns shall be constructed to evaluate the performance of the selected mix design at the site, across a range of cement percentages starting at 7.5% minimum

and range of water to cement ratios. Changes to the mix design for the Startup/Demonstration evaluation shall be approved by the Owner's Representative and EPA prior to ISS implementation.

- D. The Contractor shall construct a pair of ISS Columns for each significant change in the mix design (e.g., 2% variation in any Reagent/Additive), water to Reagent/Additive ratio, or significant change in site Soils, as reviewed and approved by the Owner's Representative.
- E. The Contractor shall perform the ISS Columns for the Startup/Demonstration evaluation(s) using their proposed full-scale ISS equipment and barges. The Contractor shall use the largest diameter auger that is proposed for full-scale ISS production. The Startup/Demonstration columns shall be constructed to the full depth specified on the Construction Drawings for each Startup/Demonstration area. The Contractor shall perform a minimum of three (3) Mixing Passes per column.
- F. The Contractor shall perform a test that injects excess wash out water and grout into the last ISS Column of the day. That same ISS Column shall receive ISS treatment as the first ISS Column the following day of ISS. ISS Columns that receive excess wash out water and grout are required to meet all Performance Requirements specified herein. Disposal of excess wash out water and grout during full-scale performance of ISS shall be reviewed and approved by the Owner's Representative and in accordance with Part 3.01.Y of this specification.
- G. The Contractor shall implement and verify efficacy of controls for turbidity, TSS, and sheen as necessary and in compliance with Section 02 60 16 and this Section.
- H. From the Startup/Demonstration evaluation ISS Columns, representative Construction Quality Assurance (CQA) samples shall be collected, visually inspected, and tested in accordance with Part 3.10 of this Specification.
- I. The Contractor shall determine the ISS Swell Material volume and surface elevation increase resulting from the ISS treatment during the Startup/Demonstration evaluation(s). The Contractor shall be responsible for making appropriate adjustments in the field to the cement/slag dosage and water to cement ratio to limit excessive expansion of treated materials as coordinated with the Owner's Representative.
- J. The Startup/Demonstration evaluation shall confirm or be used as a basis to modify the mix designs and application parameters including final selection of water:cement ratios for Grout resulting in the CQA samples meeting the required Performance Requirements. Upon confirmation that the Startup/Demonstration samples and ISS mix design meet the Performance Requirements provided in these Specifications, or as approved by the Owner's Representative, the Contractor shall proceed to full-scale ISS operations. The Contractor shall not be compensated for stand-by time while awaiting the results of the Startup/Demonstration evaluation and authorization to proceed to full-scale ISS operations, or subsequent implementation of additional Startup/Demonstration evaluations, if required.

- K. The Contractor shall reprocess Soils not meeting the Performance Requirements during the Startup/Demonstration Evaluation, as directed by the Owner's Representative. The cost for reprocessing of a ISS Column will be at the Unit Price in the Contractors proposal only if the proportions of cement and GGBFS used in the evaluation are determined to be deficient by the Owner's Representative, and the Contractor demonstrates and documents that all other parameters used the Startup/Demonstration Evaluation and approved by the Owner's Representative during the evaluation for Soil treatment show the increase of GGBFS and/or cement is essential to meet the Performance Requirements.

3.06 GROUT MIX DESIGN

- A. Grout mix designs based on the ISS Mix Design formulation provided below were successful in achieving the Performance Requirements as shown in the Draft ISS Pilot Test Report (CH2M, 2015). The Contractor shall propose a cement /slag dosage based on the mix design indicated below. Minimum Portland Cement/Slag and bentonite percentage is based on the total dry weight of each listed component relative to the wet weight of untreated Soil:

1. Grout Mix Design¹:

- a. *Portland Cement to Slag (PC/Slag) Dose: 7.5% minimum*

i. *Required PC/Slag Ratio:*

- *Type V Portland Cement: 60%*
- *GGBFS, Grade 120: 40%*

- b. *Bentonite: 0.5%**

- c. *Anti-Washout Additive: 0.1% (MasterMatrix UW 450 (BASF))*

- d. *Water: Cement (W:C) Mix Ratio: 0.7 (minimum) to 2.0 (maximum)***

**Bentonite addition to be verified during the Startup/Demonstration Evaluation.*

***Water content shall be verified during the Startup/Demonstration Evaluation and adjusted as needed to adjust to changes in % PC/Slag addition, and to minimize swell and meet the Performance Requirements. Minimum water:cement ratio shall be as stated, unless otherwise approved by the Owner's Representative. Wash out water incorporated into the ISS column must be included in the Water: Cement mix ratio.*

- B. The Contractor shall review the results of the ISS Treatability Study Report and ISS Pilot Test Report prior to bid submittal and shall notify the Owner's Representative in writing of any concerns or objections regarding the ISS Mix Design.

¹ The mix design, the ISS materials, additives, and reagents used, and associated performance criteria are based on a directive from EPA. Therefore the text in italics was not performed under the responsible charge of the Engineer-of-Record.

- C. It is the Contractor's responsibility to demonstrate that the ISS Mix Design is effective in meeting the Performance Requirements using the Contractor's construction techniques by conducting a Startup/Demonstration Evaluation as described in this Specification. Following the Startup/Demonstration Evaluation, the Contractor shall confirm or submit a final ISS Mix Design based on the Startup/Demonstration Evaluation results. If the proposed ISS Mix Design changes the quantity of Reagents/Additives outside of the Unit Price structure provided for ISS in the Contractor's proposal, and the Owner's Representative approves the ISS Mix Design, then the unit price for ISS treatment will be revised before ISS treatment begins (post Startup/Demonstration Evaluation). If changes to the ISS Mix Designs are required, to be determined by the Owner's Representative, during performance of the ISS Work after the Startup/Demonstration Evaluation period and after approval of the final ISS Mix Design, this will be considered incidental to the Work and adjustments to the unit cost for ISS will not be considered.
- D. The Contractor shall represent and warrant that implementation of the ISS Mix Design will meet the requirements of this Specification. For any mix design changes proposed by the Contractor, the Contractor shall represent and warrant that design and the implementation of the Grout mix design will meet the requirements of this Specification. Costs for conducting additional treatability studies shall be the sole responsibility of the Contractor.
- E. The Contractor shall use the approved ISS Mix Design in the targeted treatment areas throughout the ISS Area limits as detailed in the Construction Drawings and Contract Documents.

3.07 PERFORMANCE REQUIREMENTS

- A. The Work shall be conducted in a manner that will provide ISS treatment to pass visual inspection following the completion of each ISS Column. The criteria for visual inspection of wet-grab samples collected from the ISS column include the following requirements as determined solely by the Owner's Representative:
 - 1. Free NAPL is not visible, in wet grab samples collected immediately after mixing;
 - 2. ISS material is a Homogenous Mixture such that the Grout and Soil are thoroughly mixed; and
 - 3. Clumps of Soil greater than three (3) inches are not present. Clumps are defined as intact Soil that has not been mixed.

Unconfined Compressive Strength (UCS): The ISS treated sediment shall have an UCS greater than twenty (20) pounds per square inch (psi) after twenty-eight (28) days of curing in 90% or more of the confirmation samples, with no samples with less than 12 psi UCS as determined by ASTM D2166 Standard Test method for Unconfined Compressive Strength of Cohesive Soil or ASTM D1633 Standard Test method for Compressive Strength of Molded Soil-Cement Cylinders.

- B. NAPL immobilization: Samples from the UCS confirmation testing will be visually inspected to document that no Free NAPL is visible after the sample break. The presence of Free NAPL in a crushed UCS sample may require reprocessing in the area associated with the sample. If Free NAPL is observed, the Owner's Representative will review the sample location and CQC data to determine potential reprocessing requirements. Reprocessing triggered by the presence of Free NAPL will include the failed ISS Column, and ISS Columns implemented during the relevant day's production and will not extend beyond the relevant day's production or beyond an adjacent sample location with no Free NAPL present.

3.08 ADDITIONAL TESTING AND OBSERVATION

- A. Hydraulic Conductivity: The ISS treated sediment shall be tested for hydraulic conductivity for information only. The target hydraulic conductivity is less than or equal to 2×10^{-6} centimeters per second (cm/s) at twenty-eight (28) days of curing. An individual sample with a hydraulic conductivity $\geq 2 \times 10^{-6}$ cm/s and $\leq 5 \times 10^{-6}$ cm/s will be accepted and testing concluded if the geometric mean of all hydraulic conductivity samples collected from a contiguous ISS Area (shown on the Construction Drawings) is $\leq 2 \times 10^{-6}$ cm/s. A single sample with a hydraulic conductivity greater than 5×10^{-6} cm/s will be considered for retesting after 56-days of curing. The hydraulic conductivity will be determined by ASTM D5084 Standard Test Methods for Measurement of Hydraulic Conductivity of Statured Porous Materials Using a Flexible Wall Permeameter using a consistent basis for backpressure saturation for all samples; for example, the average elevation of the mid-height of the sampled ISS layer.

3.09 ISS SWELL MANAGEMENT

- A. The Contractor shall manage and minimize ISS Swell Material to the extent possible, as determined by the Owner's Representative.
- B. The Contractor shall remove ISS Swell Material above the Phase III dredge elevations during the final dredge pass as described in Section 35 20 23.13 and in Part 3.01 R of this specification. The Contractor shall survey the final top of ISS elevation pending acceptance of all ISS sample testing confirming conformance with the Performance Requirements and prior to the final dredge pass to document swell material volume. Swell above the navigational elevation as shown on the Drawings shall be removed by the Contractor immediately after ISS mixing is complete in each ISS Area.

3.10 ISS CONSTRUCTION QUALITY ASSURANCE (CQA)

- A. CQA activities shall be in accordance with the Construction Quality Assurance Plan (CQAP).
- B. Mixing time, mixing speed, auger diameter, column depth, column location, number of passes, Grout flow rate, rotary head pressure, and the amounts of Grout (i.e., Reagents, Additives and water) added to each column may be recorded by the Owner's

Representative to verify compliance with the limits specified in the approved ISS Work Plan and Specifications, and, if applicable, as modified during the Startup/Demonstration Evaluation.

- C. The Contractor shall provide a sampling tool capable of collecting discrete CQA wet grab samples from random locations selected by the Owner's Representative. The sample tool shall collect enough ISS treated material from the ISS Column to create sample molds for all physical CQA tests, typically five (5) gallons in total and shall have a large enough opening to accommodate the maximum Soil clump size of three (3) inches. The sampling tool shall be equipped with hydraulic control which can be opened and closed from the surface, and be capable of reaching the bottom of the ISS Column.
- D. Discrete samples will be collected from the top, middle or bottom of the selected ISS Column, as directed by the Owner's Representative, immediately following installation. Minimum sampling frequencies include the following:
 - 1. The Contractor shall collect a minimum of one CQA sample every 100 cubic yards of material treated by ISS, or once every day of ISS production at minimum.
 - 2. The Contractor shall collect one CQA sample every 50 linear horizontal feet of material treated by ISS along the perimeter of the bulkhead alignment as shown on the Construction Drawings, or once every day of ISS production along the perimeter of the bulkhead alignment at a minimum.
- E. Visual Inspection:
 - 1. The Owner's Representative will visually inspect CQA samples for homogeneity (Homogeneous Mixture), and Free NAPL as described in the Performance Requirements specified herein and CQAP. Should the Owner's Representative determine materials from any depth fail one or more of these criteria, the ISS Column will be considered inadequately mixed, and the Contractor will be instructed to re-mix the column at no additional cost to the Owner. Following re-mixing, the Contractor shall collect additional CQA samples from a location selected by the Owner's Representative within the reprocessed ISS Column(s) failing the visual inspection.
- F. Physical Testing:
 - 1. The Owner's Representative will prepare the sample molds, and pack/ship samples to an independent geotechnical laboratory for testing after the samples have sufficient strength to prevent adverse effects to the properties. Contractor will provide assistance in the sample collection and preparation of sample molds.
 - 2. Representative samples will be collected and cured in accordance with ASTM D1632 and tested for UCS (ASTM D1633 or ASTM D2166) at 3, 7, and 28 days of cure and hydraulic conductivity (ASTM D5084) at 7 and 28 days of cure. The samples may also be tested for moisture content in accordance with ASTM D2216 and/or ASTM D4643, and slump in accordance with ASTM C143 / C143M.

- G. The Owner's Representative and EPA may require additional sampling of ISS treated materials as deemed necessary. A minimum of six (6) total 2x4 molds shall be constructed by the Owner's Representative. Samples will be provided to EPA upon request. . The laboratory data will be made available to the Contractor upon receipt.

3.11 REPROCESSING – ISS TREATED COLUMNS

- A. The Contractor shall re-process ISS-treated sediment not meeting the Performance Requirements at the Contractor's expense as directed by the Owner's Representative and specified herein.
- B. If a CQA sample does not meet the requirements for the unconfined compressive strength, the Owner's Representative shall immediately notify the Contractor. The Contractor may perform additional testing on samples at their own cost and must submit all results to the Owner's Representative in a timely manner. Acceptance of additional testing is subject to approval of Owner's Representative. The Contractor shall reprocess the failed ISS Column and ISS Columns constructed during the relevant day's production; reprocessing will not extend beyond the relevant day's production or beyond an adjacent sample location that meets Performance Requirements. ISS reprocessing shall be conducted in the presence of the Owner's Representative. The Contractor will not be compensated for stand-by time for rework of ISS Columns out of compliance, including the ISS Columns that were treated during the same relevant day's production as described above.

[END OF SECTION]

SECTION 31 10 00

SITE PREPARATION

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% RTA1 Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 31 10 00 **TITLE:** SITE PREPARATION

SPECIFICATION PREPARED BY: (Specification Preparer, SP) Signature

Name Russell Hyatt Date

SCOPE AND FORMAT CHECKED BY: (Scope and Format Checker, SFC) Signature

Name Jessica Fears Date

DETAILED REQUIREMENTS CHECKED BY: (Detailed Requirements Checker, DRC) Signature

Name Darrell Nicholas Date

APPROVED BY: (Specification Approver, SA) Signature

Name J.F. Beech Date

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	EM	MWS	GDN	JFB
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	EM	MWS	GDN	JFB
C	RTA1 65% Remedial Design	11/20/17	EM	MWS	GDN	JFB
A1	RTA1 100% Access Dredge Design	09/30/19	RH	JC	GDN	JFB
D	RTA1 90% Remedial Design	09/30/19	RH	JC	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	RH	JF	GDN	JFB

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SECTION 31 10 00
SITE PREPARATION

PART 1 GENERAL

1.01 SUMMARY

- A. This Section details site preparations to be conducted before Work begins.

1.02 RELATED SECTIONS, PLANS, AND DOCUMENTS

- A. Section 01 11 00 Summary of Work
- B. Section 01 33 00 Submittals
- C. Section 01 35 29 Health, Safety, and Emergency Response Requirements
- D. Section 01 41 00 Regulatory Requirements
- E. Section 01 51 00 Temporary Utilities
- F. Section 01 57 13 Temporary Erosion and Sediment Control
- G. Section 01 57 19 Temporary Environmental Controls
- H. Section 01 71 23 Site Survey and Grade Control
- I. Section 02 51 19 Dredged Sediment and Waste Management
- J. Section 31 23 00 Upland Excavation and Fill
- K. Section 35 20 23.13 Dredging and Dewatering
- L. Section 44 08 40 Dredge Water Treatment System Requirements
- M. Contract Documents

1.03 REFERENCES

- A. Rules of the City of New York (RCNY). "Title 34: Department of Transportation." <<http://rules.cityofnewyork.us/codified-rules?agency=DOT>>.
- B. New York City Department of Transportation (NYC DOT) Street Works Manual. <<http://streetworksmanual.nyc>>.

- C. American Society for Testing and Materials (ASTM) Standards (versions as of April 2017):
 - 1. ASTM D25 - Specification for Round Timber Piles.
- D. American Wood Preservers' Association (AWPA) Standards (versions as of April 2017):
 - 1. AWPA C3 - Piles - Preservative Treatment by Pressure Processes.
 - 2. AWPA C18 - Standard for Pressure Treated Material in Marine Construction.

1.04 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:
 - 1. Site Preparation Work Plan detailing the following:
 - a. Provision of 24-hour Site security, including maintenance of Site gate access control (i.e., staffing guard booths) throughout the Work. Provide a schedule with proposed staffing for the guard booths needed to maintain security at the Site. The Contractor is only required to staff guard booths at construction gates in use by the Contractor. Construction gates not in use by the Contractor must be closed and secured.
 - b. Plans for installation, maintenance, and inspection of temporary fencing, erosion and sediment controls, and environmental controls prior to the start of earthwork, stockpiling, and equipment installation activities.
 - c. A Grading Plan describing proposed excavation and fill activities to be completed in accordance with Section 31 23 00. The Grading Plan shall include items needed for the Staging Site to facilitate road construction, storage of supplies and equipment, and installation of the dredge water treatment system (Section 44 08 40). The Contractor's Grading Plan shall promote positive drainage to mitigate ponded water.
 - d. Plan for installation of dock facilities including means and methods of installation, dock layout and design, and dock construction materials. The Contractor shall be responsible for having the design for the installation of the dock facilities signed and stamped by a Professional Engineer in the State of New York.
 - e. Proposed plan for relocation of storage containers and site trailers, as needed, to facilitate installation of Contractor's equipment and supplies.
 - f. If the Contractor elects the option to construct a separate decontamination pad, as described in Section 01 57 19, the Contractor shall submit the design to the Owner's Representative for review and approval.
 - g. Proposed methods for controlling traffic. The Owner's Representative's will review the Traffic Plan and coordinate with applicable regulatory agencies prior to approval. The traffic control plan shall show and describe the following:

- i. Proposed plan for closing Huntington Street in accordance with the requirements of this Section and Section 01 41 00, including:
 - Schedule for obtaining street closure permits;
 - Plan for reinstalling gate and fence using existing materials stored on-Site;
 - Schedule for installing the 24-ft wide swing gate and fence; and
 - Temporary measures to control access during working hours on Huntington St. immediately south of the sliding gate and west of the 24-ft wide swing gate.
 - ii. Vehicular traffic routing along local streets;
 - iii. Any traffic blockage anticipated to be caused by the Work under this Contract;
 - iv. Trucking plan for delivery of materials and removal of debris, sediment, and wash water if the plan differs from the Construction Drawings; and
 - v. Construction parking plan for areas at the Staging Site.
 - h. Proposed Staging Site Layout showing the proposed locations and approximate dimensions of the following Staging Site facilities.
 - i. Parking areas;
 - ii. Construction fencing;
 - iii. Drainage improvement areas;
 - iv. Personnel trailers/administrative areas;
 - v. Secondary containment structure placement areas;
 - vi. Material laydown and storage areas;
 - vii. Equipment staging and storage areas;
 - viii. Decontamination facilities;
 - ix. Roadways;
 - x. Barge tie-up areas;
 - xi. Dock facilities for material and crew transfer;
 - xii. Waste management/sanitary facilities; and
 - xiii. Other temporary facilities proposed for installation at Staging Site.
2. Site surveys to be conducted in accordance with Section 01 71 23 and consisting of the following:
 - a. Initial survey to: (i) verify existing topographic conditions for areas in which grading or earthwork activities shall occur; (ii) to verify the location of utilities planned to be used by the Contractor; and (iii) identification or confirmation of the location of utilities for areas where excavation activities are planned.

- b. Final or as-built surveys for the following (if applicable): (i) new, modified, or relocated utilities; (ii) new asphalt or concrete pads; (iii) treatment facilities; (iv) new fencing and gates; and (v) a revised topographic conditions map for areas where grading or earthwork activities occurred.
 3. Photographic surveys documenting the conditions of the existing bulkheads along the Staging Site shall be performed at low tide. The survey will create a visual log of the entire length of bulkhead. One photographic survey, referred to as the Pre-Construction Staging Site Bulkhead Survey, shall be completed prior to the start of construction activities. One photographic survey, referred to as the Post-Construction Staging Site Bulkhead Survey, shall be completed at the end of construction activities.

1.05 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.

PART 2 PRODUCTS

2.01 MATERIALS

- A. If the Contractor desires to reinstall the stored dock facilities available at the Staging Site (i.e., support platform, gangway, and dock) and new materials are required, timber piles shall meet requirements of ASTM D25. The wood material shall be treated with a preservative suitable for marine use that meets applicable environmental standards, including AWWA C3 and AWWA C18. Documentation of the location, length and diameter of replaced piles shall be maintained by the Contractor.

PART 3 EXECUTION

3.01 GENERAL

- A. Verify existing conditions as shown on the Construction Drawings prior to beginning Work in this Section.
- B. Perform site staging work within the Limits of Work presented on the Construction Drawings. The Contractor may use the area delineated as the Limit of Work by Others until upland remediation begins. Requirements associated with the Limits of Work by Others are presented on the Construction Drawings.
- C. Maintain site security and gate access in accordance with the Site Preparation Work Plan for the duration of the Work.

- D. Maintain site cleanliness in accordance with Section 02 51 19.
- E. Provide temporary utilities for the Work in accordance with Section 01 51 00.
- F. Install, maintain, and inspect erosion and sediment controls and environmental controls prior to beginning Work in accordance with Section 01 57 13 and the Sediment and Erosion Control (S&EC) Plan (shown on the Construction Drawings and associated notes) and Section 01 57 19, respectively.
- G. Install, maintain, and inspect temporary fencing for the duration of the Work.
- H. Utilize water application methods to control on-site dust as described in Section 01 57 19 and Section 31 23 00.
- I. Perform excavation, fill, and road construction in accordance with Section 31 23 00.
- J. All vehicles hauling sediment or debris shall be decontaminated in accordance with Section 01 57 19 prior to leaving the Site.
- K. The Contractor shall install a dock to support RTA1 remediation activities. The Contractor may choose to install the stored dock available at the Staging Site or install an alternate dock. Should the Contractor elect to use the stored dock, the Contractor is responsible for inspecting the dock and making any necessary repairs.
- L. Debris and sediment within the vicinity of the dock shall be moved, as needed, to allow the dock to float at mean lower low water. The debris and sediment shall be managed in accordance with Section 02 51 19.
- M. If the Contractor chooses to install the dock in front of 459 Smith St., the Contractor shall coordinate the relocation with the Owner's Representative.
- N. If the Contractor chooses to install the dock in front of Huntington St., the Contractor shall coordinate with the Owner's Representative and must account for the street closure permit for Huntington St.
- O. If the Contractor chooses to install the dock in front of 230 Huntington St. (Block 477, Lot 8), the Contractor shall coordinate with the Owner's Representative and property owner of 230 Huntington St. The Contractor shall be responsible for obtaining an access agreement with the property owner, if necessary.
- P. The Contractor is responsible for security of the dock including any marine vessels moored to the dock.

- Q. The dock may need to be relocated throughout the work in RTA1 to avoid impacting upland remediation activities.
- R. Coordinate the relocation of storage containers with the Owner's Representative, as needed, to facilitate installation of Contractor's equipment.
- S. If wells interfere with the Contractor's proposed site layout, existing stickup wells within the footprint of the available work area (e.g. monitoring wells CGMW-35, and 36) shall be converted to flush-mount wells as presented on the Construction Drawings. If the Contractor uses any areas designated as Limit of Work Area By Others, the Contractor shall convert the existing stickup wells to flush-mount wells in locations where the wells may interfere with the Contractor's proposed site layout. The Contractor shall protect all existing monitoring wells from damage. Existing and proposed monitoring well and recovery well barriers and enclosures shall be maintained to protect the wells and not create new hazards (i.e. slips, trips, falls, and protrusions) to personnel on-Site.
- T. Complete initial, final, as-built, and measurement and payment surveys in accordance with Section 01 71 23.
- U. Complete Pre-Construction and Post Construction Staging Site Bulkhead Surveys.

3.02 TRAFFIC CONTROL

- A. The Contractor shall retain the responsibility for traffic operations. The Contractor shall cooperate with the Owner's Representative so that traffic flow is minimized by the execution of the Work under this Contract.
- B. The Contractor shall understand the special requirement of maintaining the facility in full operation concurrent with the construction activity and shall provide continuous and safe access by the Owner's Representative to all areas of the Site not specifically designated for Work by the Contractor under this Contract. Work will be coordinated with other Contractors and the Owner's Representative as indicated in Section 01 11 00.
- C. Other than as shown on the approved traffic control plans, at no time shall the Contractor's operations interfere with the traffic flow of occupied areas of the Staging Site or neighborhood.
- D. The Contractor shall install temporary fencing and a gate on Huntington Street as shown on the Construction Drawings to control traffic and Site access. The Contractor may install additional traffic measures to control access immediately south of the sliding gate at the southern construction entrance and west of the Huntington St. gate during working hours. The Contractor shall comply with the regulatory requirements in Section 01 41 00.
- E. Upon completion of the Work, temporary traffic control items furnished by the Contractor shall remain the Contractor's property and shall be removed from the Site by

the Contractor. Existing traffic control features furnished by the Owner, such as existing fencing and the Huntington St. gate and fence, shall remain and moved (if necessary) onto the Owner's property.

3.03 CONSTRUCTION PARKING

- A. Construction parking on the Staging Site shall be limited to the Contractor's parking, laydown, and storage areas. The Contractor shall locate a parking lot to accommodate additional parking for workers, as needed, and provide a means for transporting workers from the parking lot to the Site (e.g., van, shuttle, etc.).
- B. The Contractor shall be responsible for informing all workers of parking restrictions and removing any vehicle from areas designated as NO PARKING.
- C. Construction parking shall not be allowed in the following areas:
 - 1. Legal parking areas on adjacent city streets;
 - 2. Adjacent city streets where parking is not allowed, such as bus loading zones, driveways, etc.; or
 - 3. On-Site in non-parking areas.

3.04 STREET CLOSURE

- A. A portion of Huntington Street indicated on the Construction Drawings shall be closed for the duration of the Work to provide parking, to provide material and equipment storage, and to protect pedestrians. A chain-link fence and swing gate are stored at the Site and shall be installed across Huntington Street as part of the street closure scope of work in accordance with this Section. The Contractor shall follow all requirements set forth in the Rules of the City of New York, Title 34, Chapter 2: "Highway Rules," and Section 3 of the NYC DOT Street Works Manual. The Contractor shall obtain the following Street Opening and Building Operations/Construction Activity permits for Non-Emergency Work:
 - 1. Permit 0132 – Install Fence;
 - 2. Permit 0201 – Place Material on Street;
 - 3. Permit 0204 – Place Equipment other than Crane or Shovel on Street;
 - 4. Permit 0211 – Occupancy of Roadway as Stipulated; and
 - 5. Permit 0215 – Occupancy of Sidewalk as Stipulated.

The scope of work for obtaining permits related to the closure of Huntington Street is summarized below.

- 1. **Register with NYC DOT.** The Contractor must have a current and valid Permittee ID number issued by NYC DOT. To obtain a Permittee ID number, the Contractor should submit a completed Permittee Registration Application and all supporting

documentation in person to the NYC DOT central Permit Office located at 55 Water Street, New York, New York 10041. Review of the application typically takes between two (2) and seven (7) days. The application can be found on the NYC DOT Street Works Manual website at <http://streetworksmannual.nyc/chapter-three/required-documentation-permittee-application>.

2. **Complete Building Operations/Construction Activity Permit Applications.** The Contractor may submit permit applications online using NYCStreets (<https://www.nycstreets.net/public/signin/index>) or in person using the Application for Roadway/Sidewalk Permit(s), <http://www.nyc.gov/html/dot/downloads/pdf/permapp.pdf>.
3. **Complete a Request for Full Roadway Closure.** The Contractor shall submit an Application for Full Roadway Closure found in Appendix B of the Street Works Manual, http://www.nyc.gov/html/dot/downloads/pdf/dot_full_roadway_closure_procedures.pdf).
4. **Permit Renewal.** If necessary for completion of the Work, the Contractor shall apply for a permit renewal at the request of the Owner's Representative at least 30 days prior to the permit expiration date. The Application to Re-Issue Permits found in Appendix B of the Street Works Manual shall be completed online or submitted in-person. A copy of the original permit must be attached to the application for renewal.
5. **Other Provisions Pertaining to Permits.** The Contractor should be aware of the types of holds that may be placed on Roadway/Sidewalk Permits. Of note, a Full Closure Review hold will be automatically placed on the 90th consecutive calendar day of any full street closure. The Office of Construction Mitigation and Coordination will review the project to determine if a Community Reassessment Impact and Amelioration (CRIA) statement must be submitted to NYC DOT. Preparation of a CRIA statement is not included in this scope of work.
6. **Executing work in the Street.** The Contractor shall follow all General Requirements for Roadway/Sidewalk work outlined in Section 4.1 of the Street Works Manual. This includes work site safety, signage, and applicable restoration.
 - a. The Contractor shall keep a copy of all Permits at the Site at all times and shall make permits available for inspection upon request of any authorized person as described in the NYC Rules.
 - b. Permittees will be required to post Project Informational Signs in conformance with the NYC Rules for any project with a projected completion time of three months or more, or as otherwise directed by the Commissioner. Signs shall be kept in readable, good condition.
7. At the end of the project, the Contractor shall restore Huntington Street to its original condition.

[END OF SECTION]

SECTION 31 23 00

UPLAND EXCAVATION AND FILL

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 31 23 00 **TITLE:** UPLAND EXCAVATION AND FILL

SPECIFICATION PREPARED BY: _____ Signature
(Specification Preparer, SP)

Name Russell Hyatt Date

SCOPE AND FORMAT CHECKED BY: _____ Signature
(Scope and Format Checker, SFC)

Name Jessica Fears Date

DETAILED REQUIREMENTS CHECKED BY: _____ Signature
(Detailed Requirements Checker, DRC)

Name Darrell Nicholas Date

APPROVED BY: _____ Signature
(Specification Approver, SA)

Name J.F. Beech Date

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	EM	JF	GDN	JFB
B	RTA1 35% Remedial Design – Capping and ISS	12/23/2016	EM	JF	GDN	JFB
C	RTA1 65% Remedial Design	11/20/17	EM	JF	GDN	JFB
A1	RTA1 100% Access Dredge Design	09/30/19	RH	JC	GDN	JFB
D	RTA1 90% Remedial Design	09/30/19	RH	JC	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	RH	JF	GDN	JFB

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SECTION 31 23 00

UPLAND EXCAVATION AND FILL

PART 1 GENERAL

1.01 SUMMARY

- A. Work in this Section covers earthwork-related activities to be conducted at the upland Staging Site to facilitate (i) storage of supplies and equipment and (ii) installation of the dredge water treatment system. Work activities include: installation of construction safety fencing and barriers around excavation areas, any necessary repairs to the gravel road, excavation and fill, subgrade preparation, compaction, and grading.

1.02 RELATED SECTIONS, PLANS, AND DOCUMENTS

- A. Section 01 33 00 Submittals
- B. Section 01 35 29 Health, Safety, and Emergency Response Requirements
- C. Section 01 41 00 Regulatory Requirements
- D. Section 01 57 13 Temporary Erosion and Sediment Control
- E. Section 01 57 19 Temporary Environmental Controls
- F. Section 02 51 19 Dredged Material and Waste Management
- G. Section 44 08 40 Dredge Water Treatment System Requirements
- H. Contract Documents

1.03 REFERENCES

- A. Latest version of American Society for Testing and Materials (ASTM) Standards:
 - 1. ASTM D422 Standard Test Method for Particle-Size Analysis of Soils.
 - 2. ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 lbf/ft³ (600 kN-m/m³)).
 - 3. ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.
 - 4. ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

5. ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- B. New York State Department of Environmental Conservation (NYSDEC) Regulations, Division of Environmental Remediation (DER)-10, Appendix 5: *Allowable Constituent Levels for Imported Fill or Soil*.
- C. New York State Department of Transportation (NYSDOT). *Standard Specifications, Construction and Materials (USC)*, latest version.
- D. NYSDOT Compilation. *Manual for Uniform Recordkeeping (MURK) Part 1B Construction Inspection Manual (CIM)*, latest version.

1.04 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:
 1. Proposed sources of offsite fill materials;
 2. Material Property Testing submittals, including the following information:
 - a. Name and address of the Material Property Testing Laboratory proposed for use during the project;
 - b. Certificate documenting American Association of State Highway and Transportation Officials (AASHTO) accreditation or the Material Property Testing Laboratory;
 - c. Results of material property testing for proposed fill materials that meet the sampling requirements listed in this Section. Each composite sample shall be tested for the following material properties:
 - i. Particle size distribution by ASTM D422;
 - ii. Atterberg limits by ASTM D4318;
 - iii. USCS Classification by ASTM D2487;
 - iv. Natural water content by ASTM D2216; and
 - v. Compaction curve under standard Proctor effort by ASTM D698.
 3. Virgin source certification for soils and supporting documentation of photo ionization detector (PID) screening results as applicable;
 4. Analytical testing shall be required for soils that do not have a virgin source certification. For such soils, analytical chemistry testing submittals shall include the following information:
 - a. Results of analytical chemistry testing for proposed fill materials that meet the sampling requirements listed in this Section. The Contractor shall send composite soil samples to an Analytical Chemistry Testing Laboratory selected by the Owner's Representative. Each composite sample for each material shall be tested for the compounds in Appendix 5 of NYSDEC DER-

10 and other compounds identified by the Owner's Representative. Commercial cleanup objectives apply.

5. Test results from compaction QC testing described in this Section;
6. Graded aggregate base material (GAB) submittals, including the following information:
 - a. Material test results or written certification from the supplier that the GAB conforms to the requirements of this Section.

1.05 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Structural fill and backfill materials shall be free of debris, foreign objects, large rock fragments, demolition debris, organics, and deleterious materials. Visible particles shall be a maximum dimension of 2 inches for maximum 8-inch thick loose lifts, and 1 inch for maximum 4-inch thick loose lifts. Material for compacted fill shall conform to GW, GP, GM, GC, SW, SP, SM or SC according to the United Soil Classification System (per ASTM D2487).
- B. Furnish GAB conforming to the requirements of New York State Department of Transportation Standard Specification (USC) 733.0401 – *Subbase Course, Type 1*, or 733.0402 – *Subbase Course, Type 2*.
- C. Contractor shall obtain construction water in accordance with permit requirements listed in Section 01 41 00 for moisture conditioning of fill and for dust control.
- D. Contractor shall implement appropriate safety controls around work areas.
- E. Furnish materials for chain-link fence and gate repairs to match materials currently installed at the site.

2.02 EQUIPMENT

- A. Contractor shall furnish equipment to perform earthwork in accordance with this Section.
- B. Contractor shall furnish hand compaction equipment, such as walk-behind pad-foot compactors, hand tampers, or vibratory plate compactors, for compaction in areas inaccessible to large compaction equipment.

- C. Contractor shall furnish water tank trucks or water wagons, water storage tanks, pressure distributors, and/or other equipment designed to apply water uniformly and in controlled quantities at variable surface widths in order to provide the required in-place moisture content and to prevent drying of soil surfaces in accordance with this Section.

PART 3 EXECUTION

3.01 GENERAL

- A. No imported materials shall be delivered to the Site before the required material property testing results for that batch has been provided to the Owner's Representative and the Contractor has received written approval from the Owner's Representative. For soils that do not have virgin source certifications, analytical chemistry testing results for that batch must also be provided to the Owner's Representative and approved by the Owner's Representative prior to delivery to the Site. Unapproved material shall be removed from the Site and disposed of at the Contractor's expense.
- B. Imported material shall be screened using a PID per 500 cy delivered to the Site. PID screenings must be conducted on-Site. Supporting documentation of PID testing shall be provided to the Owner's Representative.
- C. Verify the accuracy of the existing conditions shown on the Construction Drawings prior to beginning the Work described in this Section.
- D. Drawings may not show all subsurface utilities. Contractor shall locate all subsurface utilities before initiating work. Subsurface utilities damaged by Contractor shall be repaired by Contractor to the satisfaction of the Owner's Representative at no additional cost to the Owner.
- E. Immediately notify the Owner's Representative of deviations from the existing conditions shown on the Construction Drawings verbally and in writing in accordance with the Contract Documents.
- F. Prior to performing Work described in this Section, install and maintain erosion and sediment controls in accordance with Section 01 57 13 and the Sediment and Erosion Control Plan shown on the Construction Drawings.
- G. Manage earthwork material stockpiles as specified in this Section.
- H. Implement environmental controls and dust control in accordance with Section 01 57 19.

3.02 SAMPLING

- A. The Contractor shall collect and transport samples of imported fill without virgin certification in compliance with the Quality Assurance Project Plan (QAPP) described in Section 02 51 19. The Owner's Representative reserves the right to observe sampling

and testing of the materials. The Contractor shall provide at least a 24-hour notice of a sampling event to the Owner's Representative.

- B. Analytical chemistry test results for fill materials without virgin certification shall be below the Commercial cleanup objective concentrations provided in Appendix 5 of NYSDEC DER-10. Failure of a single compound test result shall mean that the entire material batch will be rejected unless specifically accepted on a test-by-test basis in writing by the Owner's Representative.
- C. For imported fill material without virgin certification, the Contractor shall obtain representative composite samples of each specific material type from each specific material source. The total composite sample mass shall be at least the minimum size required to conduct all of the required material property and analytical chemistry tests for that material type. Each of the individual samples will be obtained from within the boundaries of the material mass that the composite sample represents.
- D. For imported fill material without virgin certification, the Contractor shall collect one (1) CQC composite sample for every 250 cubic yard (cy) batch of imported fill type from each specific fill source for the first 500 cy and one sample per each additional 500 cy or fraction thereof.
- E. The Contractor shall conduct compaction testing in accordance with frequencies specified in the NYSDOT compilation of the Manual for Uniform Recordkeeping (MURK) Part 1B Construction Inspection Manual (CIM), Section 203 Excavation and Embankment.

3.03 SITE PREPARATION

- A. Relocate construction safety controls as required to support construction activities. Install signs and barricades around trenches and excavated areas in accordance with the Site Health and Safety Plan and Section 01 35 29.
- B. Maintain and repair plywood construction safety fence and chain-link gates for the duration of the Contract Work. Repair chain-link fence and gates to match materials currently installed at the site, if damage occurs during the Work.
- C. For excavations within 3 feet of existing subsurface structures or utilities, excavate by hand or other means and methods approved by the Owner's Representative, and use shoring or other means, methods, and techniques as approved by the Owner's Representative. Protect structures and utilities during earthwork activities by means, methods, and techniques approved by the Owner's Representative.

3.04 EXCAVATION

- A. Blasting, including use of explosives or explosive devices, shall not be permitted.

- B. Minimize sloughing and caving of excavations. In areas of excavations that cave or slough, over-excavate and backfill in accordance with this Section.

3.05 EXCAVATION DEWATERING

- A. Manage groundwater, surface water runoff, and surface water run-on in excavations and trenches in accordance with the requirements of this Section.
- B. Collect water that accumulates in excavations or trenches with a suitable sump pump and transport to water treatment plant or a location approved by the Owner's Representative.
- C. Verify that collected water does not have oil sheen prior to pumping using a method such as Kolor Kut[®] gasoline gauging paste applied onto a steel tape. If sheen is present notify the Owner's Representative prior to pumping. If oil is present, collect the sheen with an oil absorbent cloth or other means, methods, and techniques approved by the Owner's Representative until no oil sheen is present based on testing by a method such as Kolor Kut[®] gasoline gauging paste.
- D. Prevent surface water run-on from adjacent areas from entering excavations and trenches by installing a temporary diversion berm, diversion channel, or other surface water management feature approved by the Owner's Representative.

3.06 STOCKPILING

- A. Stockpile materials from excavation and trenching activities at locations approved by the Owner's Representative. Deleterious materials and unsuitable soil from the above-mentioned activities shall be placed on poly sheeting in separate stockpiles for disposal. Prior to disposal, these stockpiles shall be covered by the end of the work day or if it rains in accordance with Section 01 57 13.
- B. The Contractor shall maintain an approximately 5 cubic yard stockpile of GAB at the site to repair the road, as necessary.
- C. The Contractor shall manage stockpiles to control infiltration of precipitation and to control the release of dust.

3.07 SUBGRADE PREPARATION

- A. Subgrade shall be free of debris, foreign objects, organics, and other deleterious materials.
- B. In the event saturated subgrade is encountered, construct localized sumps to facilitate removal of water. Manage removed water in accordance with this Section and Sections 02 51 19 and 44 08 40.

- C. Where fill is to be placed on existing ground or subgrade, prepare the existing ground or subgrade by scarifying to a depth of approximately 2 inches.
- D. In areas where unsuitable soils exhibiting pumping, deformation or rutting are encountered, remove and replace the soils to a minimum depth of 6 inches. Remove additional depth of unsuitable subgrade material, if necessary, to obtain a suitable soil surface for fill placement. For a soil surface exhibiting pumping, deformation (e.g., more than 2 inches under vehicle or equipment traffic) or developing ruts more than 2 inches deep, remove soil to a minimum depth of 6 inches and replace or dry in place by discing or by other appropriate means, methods, and techniques. Removal of additional unsuitable soils shall be approved by the Owner's Representative. In areas from which soil has been removed, replace with fill in accordance with this Section.
- E. In excavations or other areas where water accumulates, implement measures to remove the water in accordance with this Section. Maintain the subgrade free of standing water and in a firm condition which conforms to the requirements of this Section. Maintain dewatered areas in this condition until overlying construction is complete.
- F. In areas where suitable subgrade conditions are not practical to achieve, the Contractor may propose bridging the non-conforming subgrade area or adding soil amendments such as Portland cement or other means and methods approved by the Owner's Representative. Bridging or amending non-conforming subgrade shall be performed using methods approved in writing by the Owner's Representative.

3.08 FILL

- A. Place fill material that conforms to the material requirements of this Section.
- B. Place fill material on surfaces that are free of debris, branches, vegetation, mud, ice, and other deleterious materials.
- C. Place fill material in loose lifts with a maximum thickness of 8 inches. In areas where compaction is to be performed using hand-operated equipment, place fill material in loose lifts with a maximum thickness of 4 inches.
- D. Continuously remove visible rock particles with a maximum dimension larger than one-quarter of the loose lift thickness.
- E. Place fill in horizontal lifts, benching into embankments as necessary to maintain the full lift thickness.
- F. Prior to placing a lift of fill material over a previously compacted lift, thoroughly scarify the previous lift to a depth of approximately 2 inches by discing, raking, or tracking. Moisture condition the preceding lift in accordance with this Section if its surface moisture content is not within the range of acceptable moisture contents specified in this Section.

- G. In areas where fill is placed to bring Site to grade or to promote drainage, the Contractor shall compact placed material to a firm and unyielding condition. The Contractor shall proof roll areas of fill with the heaviest equipment available at the Site. Areas that exhibit pumping or excessive rutting (greater than 2 inches), as identified by the Owner's Representative, shall be removed and reworked to achieve a firm and unyielding condition.
- H. Fill placed for embankments or as part of structures, filling of trenches, or backfill for critical structures shall be compacted to 95 percent of the maximum dry density, and within plus or minus 3 percent of the optimum moisture content, as measured in ASTM 698.
- I. Moisture-condition the fill material to achieve the compaction requirements specified in this Section. During wetting or drying, regularly disc, rake, or otherwise mix the material to thoroughly blend the moisture throughout the lift.
- J. Do not place frozen fill or fill on a frozen surface.
- K. Do not compact fill material at temperatures below 32°F unless authorized in writing by the Owner's Representative.
- L. Do not place fill during periods of precipitation. Placement may occur during periods of misting or drizzle, but only if authorized in writing by the Owner's Representative.
- M. Grade and seal the uppermost lift of fill placement to a relatively smooth surface that is free draining and does not promote ponding.

3.09 GRADED AGGREGATE BASE MATERIAL INSTALLATION

- A. Install geotextile separator over the prepared subgrade as described in this Section and as shown on the Construction Drawings.
- B. Anchor or weight geotextile separator with sandbags, or by other means, methods, and techniques as approved by the Owner's Representative, to prevent damage and displacement from wind.
- C. Overlap geotextile separator for road areas a minimum of 12 inches, with potential for greater overlap if recommended by the manufacturer.
- D. Do not operate equipment directly on the geotextile separator.
- E. Do not damage or displace the geotextile separator by pushing or shoving material across the geotextile separator. Place the GAB on top of the geotextile separator by dumping the material on the preceding lift and placing in a manner that cascades the material onto the geotextile separator.

- F. Construct the GAB layer on subgrade approved by the Owner's Representative in accordance with this Section to the thickness, grades, and limits shown on the Construction Drawings.
- G. GAB shall be free of debris, foreign objects, organics, and other deleterious materials.
- H. Spread and place the GAB in accordance with fill placement requirements described in this Section and as shown on the Construction Drawings.
- I. Compact the GAB by tracking with a dozer, smooth drum roller, or other equipment approved by the Owner's Representative to achieve a firm and unyielding surface.
- J. The Contractor shall maintain the GAB for the duration of the Contract.

3.10 CONSTRUCTION QUALITY REQUIREMENTS

- A. Construction Quality Control (CQC) shall be performed in accordance with the Contract Documents.
- B. If CQC tests indicate that any portion of the fill or subgrade do not conform to the requirements of this Section, the Owner's Representative will delineate the extent of the non-conforming area. At no additional cost to Owner, the Contractor shall rework the nonconforming area until it conforms to the requirements of this Section. If materials (e.g., fill, subgrade, GAB) do not conform to this specification, then Contractor shall remove all nonconforming material and replace it with conforming material at no additional cost to the Owner.

[END OF SECTION]

SECTION 31 41 00

BULKHEAD SUPPORT

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 31 41 00 **TITLE:** BULKHEAD SUPPORT

SPECIFICATION PREPARED BY: (Specification Preparer, SP) Signature _____

Name Panos Andonyadis Date

SCOPE AND FORMAT CHECKED BY: (Scope and Format Checker, SFC) Signature _____

Name Russell Hyatt Date

DETAILED REQUIREMENTS CHECKED BY: (Detailed Requirements Checker, DRC) Signature _____

Name Darrell Nicholas Date

APPROVED BY: (Specification Approver, SA) Signature _____

Name J.F. Beech Date

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 90% Remedial Design	09/30/19	PA	RH	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	PA	RH	GDN	JFB

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SECTION 31 41 00
BULKHEAD SUPPORT

PART 1 GENERAL

1.01 SUMMARY

- A. As directed by the Owner's Representative, the Contractor will evaluate the other bulkheads in RTA1 and identify any additional support, institutional controls, or controlled dredging and backfill required at these properties.
- B. As directed by the Owner's Representative, the Contractor will install temporary bulkhead supports at select properties in RTA1. These properties may include but are not be limited to: (i) Douglass Street end, (ii) Butler Street property, (iii) Union Street Bridge, (iv) Carroll Street Bridge, and (v) Turning Basin 1 Canal Cutoff Wall.

1.02 RELATED SECTIONS, PLANS, AND DOCUMENTS

- A. Section 01 35 29 Health, Safety, and Emergency Response Requirements
- B. Section 02 22 00 Building Condition Assessment and Monitoring
- C. Section 02 60 16 Sediment and Floatables Containment
- D. Contract Documents
- E. Aptim Construction Drawings for Douglass Street Bulkhead
- F. Aptim Construction Drawings for Butler Street Bulkhead
- G. GPI Construction Drawings for Union Street Bridge and Carroll Street Bridge
- H. AKRF Construction Drawings for Turning Basin 1 Cut Off Wall

1.03 ORDER OF WORK

- A. The Contractor shall be aware of the requirements of Section 02 22 00, which need to be completed in advance of any bulkhead support directed by the Owner's Representative.
- B. The Contractor shall be aware of the requirements of Section 02 60 16, which need to be completed in advance of any bulkhead support directed by the Owner's Representative.

- C. Prior to the start of dredging, the Contractor and Owner's Representative shall review the status of bulkheads at other properties, to determine if any adjustments to the planned Phase I and Phase II dredge surfaces need to be made.

1.04 CONSTRUCTION QUALITY CONTROL

- A. As directed by the Owner's Representative, the Contractor shall prepare Bulkhead Support Construction Records of the bulkhead support upon completing construction of the bulkhead support. Any deviations from the Construction Drawings will be reported to the Owner's Representative for approval prior to implementation.

1.05 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.

PART 2 PRODUCTS

[NOT USED]

PART 3 EXECUTION

[NOT USED]

[END OF SECTION]

SECTION 35 20 23.13

**DREDGING, DEWATERING, AND
LEVELING LAYER**

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 35 20 23.13 **TITLE:** DREDGING AND DEWATERING

SPECIFICATION PREPARED BY: _____ Signature
(Specification Preparer, SP)

Name Dillon O'Donnell Date

SCOPE AND FORMAT CHECKED BY: _____ Signature
(Scope and Format Checker, SFC)

Name Russell Hyatt Date

DETAILED REQUIREMENTS CHECKED BY: _____ Signature
(Detailed Requirements Checker, DRC)

Name Darrell Nicholas Date

APPROVED BY: _____ Signature
(Specification Approver, SA)

Name J.F. Beech Date

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	JG	JF	GDN	JFB
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	JG	JF	GDN	JFB
C	RTA1 65% Remedial Design	11/20/17	JG	JF	GDN	JFB
A1	RTA1 100% Access Dredge Design	09/30/19	GDN	RH	JC	JFB
D	RTA1 90% Remedial Design	09/30/19	GDN	RH	JC	JFB
E	RTA1 100% Remedial Design	02/28/20	DMO	RH	GDN	JFB

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SECTION 35 20 23.13

DREDGING, DEWATERING, AND LEVELING LAYER

PART 1 GENERAL

1.01 SUMMARY

- A. This Section presents details regarding the Contractor's dredging and subsequent dewatering in RTA1.

1.02 RELATED SECTIONS, PLANS, AND DOCUMENTS

- A. Section 01 32 00 Construction Progress Documentation
- B. Section 01 33 00 Submittals
- C. Section 01 35 29 Health, Safety, and Emergency Response Requirements
- D. Section 01 41 00 Regulatory Requirements
- E. Section 01 57 19 Temporary Environmental Controls
- F. Section 01 71 23 Site Surveying and Grade Control
- G. Section 02 22 00 Building Condition Assessment and Monitoring
- H. Section 02 51 19 Dredged Sediment and Waste Management
- I. Section 02 60 16 Sediment and Floatables Containment
- J. Section 03 11 00 In Situ Stabilization and Solidification
- K. Section 31 10 00 Site Preparation
- L. Section 31 41 00 Bulkhead Support
- M. Section 35 43 00 Cap Construction – Treatment Layer
- N. Section 44 08 40 Dredge Water Treatment System
- O. Contract Documents

1.03 REFERENCES

- A. "Cultural Resource Monitoring Plan" – most recent prepared by AHRS.

- B. B&B Engineers and Geologists of New York, P.C. (“B&B”), 2019. “Summary of Geotechnical Design Parameters.”
- C. B&B, 2019. “Draft Construction Completion Report, 4th Street Turning Basin Pilot Study, Gowanus Canal.”
- D. United States Army Corps of Engineers (USACE), November 2013. “Hydrographic Surveying Engineer Manual.” EM 1110-2-1003.
- E. USACE, November 2014. “Safety and Health Requirements.” EM 385-1-1.
- F. GPI Construction Drawings for Union Street Bridge and Carroll Street Bridge
- G. Gowanus Community Air Monitoring Plan – To be prepared prior to start of Phase I Dredging.
- H. ASTM International Standards:
 - 1. ASTM D5084 Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.
 - 2. ASTM D5890 Standard Test Method for Swell Index of Clay Mineral Component of Geosynthetic Clay Liners.
- I. New York State Department of Transportation (NYSDOT) *Standard Specifications*, Construction and Materials (USC), latest version.

1.04 DEFINITIONS

- A. Bed Leveling or Dragging – The use of a drag bar or similar apparatus to level the sediment surface.
- B. Debris – Material separated from dredged sediments during the material separation process (as shown in the Construction Drawings and described in this Section) or any object greater than 6 inches, including, but not limited to: wood, pilings, concrete, tires, plastic, rocks, rubbish, wire/cable/chain, sheet metal, anchors, and watercraft.
- C. Dredged Sediment – Material removed from the Canal that is not segregated by the material separation process and not considered debris.
- D. Engineered Leveling Layer - Layer of material placed to provide a level base for cap installation. The material shall be placed on top of the dredged sediment surface, or post-dredging backfill surface in RTA1 after completion of Phase III Dredging. Engineered Leveling Layer shall consist of a sand and bentonite mixture meeting the requirements of Part 2.02B of this specification.

- E. Excessive Dredging – Material removed outside of the dredge area or below the allowable overdredge will be considered excessive. Removal and handling, processing, and disposal of excessive dredging material will not be paid for by Owner.
- F. Glacial Deposits – Sediment consists of gravelly sand, poorly and well graded sand, fine to coarse grained sand and small to large sub-angular gravel, with varying amounts of silt and silty sand, with some clay (sometimes interbedded to laminated). Color ranges from tan to brown to gray to dark gray and reddish brown. Density ranges from very loose to very dense, generally densifying with depth.
- G. Grade or Required Depth – Depth of dredging the Contractor must achieve for approval of dredging completion.
- H. Grizzly Bars – A deck of equally spaced bars placed on a collection container or hopper to separate debris from excavated or dredged material.
- I. In Situ Stabilization/Solidification (ISS) – In-place stabilization and solidification of Native Alluvial Sediment and/or Glacial Deposits in RTA1.
- J. Leveling Layer – Layer of material placed to provide a level base for cap installation. The material shall be placed on top of the dredged sediment surface, ISS, or post-dredging backfill surface in RTA1 after completion of Phase III Dredging. The Leveling Layer is composed of sand meeting the requirements of Section 2.02A of this specification.
- K. Native Alluvial Sediment – Sediment consists of marsh deposits (denser than soft sediment), mixtures of silt sandy silt, sand, clay, fibrous roots, and vegetation/wood debris. Color ranges from reddish brown to dark gray to black. Consistency ranges from very soft to stiff/medium.
- L. Overdredge Allowance (OD) – Depth below grade that is not required to be removed, but for which the Contractor will be paid if removed.
- M. Overdredge Volume – In situ volume between grade (required depth) and OD depth that is not required to be removed, but for which the Contractor will be paid if it is removed.
- N. Phase I Dredging – Dredging of soft sediment, as presented in the Construction Drawings, to provide access throughout RTA1 for bulkhead work and Phase II Dredging. Areas at the Carroll Street Bridge noted on the GPI Construction Drawings will also be dredged during Phase I.
- O. Phase II Dredging – High production dredging conducted, prior to in situ stabilization/solidification (ISS), throughout RTA1, but not beneath or within a 25 foot offset from the bridges with the exception of areas around the Carroll Street Bridge dredged during Phase I.

- P. Phase III Dredging – Dredging to the final surface, presented in the Construction Drawings, throughout RTA1 after ISS, including the offset areas within 25 feet of and beneath the bridges shown on the GPI Construction Drawings, with the exception of areas around the Carroll Street Bridge dredged during Phase 1.
- Q. Required Dredge Volume – In situ volume of material, excluding OD volume, that the Contractor must remove prior to acceptance of dredging completion.
- R. Refusal – the condition reached when excavation equipment operated by a skilled operator following standard operating procedures and following manufacturer’s recommendations cannot penetrate soil, sediment, or rock.
- S. Side Slopes – Slope of the cut or fill expressed as the ratio of horizontal distance to vertical distance.
- T. Slotted Excavation – Dredging method potentially used during Phase III Dredging that consists of limiting the width of the open dredging cut (slot width) below elevations established to maintain slope and structural stability, combined with daily post-dredging backfill to limit the potential for destabilization of bulkheads.
- U. Soft Sediment – Sediment consists of organics, organic silts and clays with varying components of sand, silty sand, gravel, and debris/trash. Color ranges from grey to black and dark brown to black. Consistency ranges from very soft to soft.
- V. Survey – All surveys of the dredging area shall be hydrographic surveys in accordance with the USACE Hydrographic Surveying Manual.
- W. Sweeping – The movement of the dredge bucket along the Canal bottom with the intent to level the dredged surface.
- X. Third-party surveyor – An individual or business entity contracted by the Owner’s Representative to perform surveys independently of the Contractor.

1.05 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:
 - 1. Dredging Work Plan

The Contractor shall demonstrate compliance with the requirements outlined in this Section and in related Sections and Construction Drawings. Describe the sequencing, details, and means and methods of all dredging operations. In addition, the work plan shall include the following information:

 - a. Equipment:
 - i. A list of dredge equipment to be used, including specifications and capacities and design of barges/dredging equipment.

- ii. Details regarding the conformance of barges and mechanical dredging equipment with Section 16.L: Floating Cranes/ Derricks, Crane Barges, and Auxiliary Shipboard-Mounted Cranes in the USACE Safety and Health Requirements (USACE 2014);
 - iii. Size of scows to be used, ullage tables, and scow drafts when loaded;
 - iv. Description of fuel storage areas and refueling procedures;
 - v. Details about global positioning and data acquisition system (GPS) to be used;
 - vi. Dredge visualization software to be used;
 - vii. Vendor information and/or detailed drawings of the environmental and conventional clamshell buckets to be used;
 - viii. Vendor information and/or detailed drawings of the conventional excavator bucket and required closing mechanism to be used;
 - ix. Details regarding grapples, rakes, or other debris removal equipment.
 - x. Details regarding specialty dredging equipment needed to work in tight areas around and under bridges and bulkheads.
 - xi. Details regarding equipment used for mixing sand and bentonite in Engineered Leveling Layer.
- b. Scheduling:
- i. Sequencing of all major dredging and dewatering operations;
 - ii. Anticipated dredge production rates and average cycle times;
 - iii. Procedure for barge movement, scheduling, and frequency;
 - iv. Any work or procedures that will need to be scheduled during a certain tide cycle; and
 - v. Expected times and durations the Carroll and Union Street bridges will need to be held open for dredging.
- c. Proposed means and methods for the following:
- i. Dredging in areas beneath the Carroll and Union Street bridges;
 - ii. Dredging using specialty equipment in the vicinity of the bulkheads and under the Union and Carroll Street bridges;
 - iii. Best management practices to minimize the resuspension of sediments and control of odor;
 - iv. Separating debris from dredged sediment on-Site;
 - v. Means and methods for excavating sediment adjacent to bulkheads and/or located in wall corrugations and offsets;
 - vi. Dredging with a closing mechanism on a conventional excavator bucket;
 - vii. Executing slotted excavation during Phase III Dredging;

- viii. Sourcing, transport, staging, and placement of post-dredging backfill and Leveling Layer, and Engineered Leveling Layer;
 - ix. Offloading sorted debris and dredged material (if applicable) onto the asphalt pad at the Staging Site;
 - x. Removing and transporting decant water from barges to the Dredge Water Treatment System located at the Staging Site;
 - xi. Monitoring, surveying, and reporting dredging progress to meet the final grades shown on the Construction Drawings;
 - xii. Protecting structures, utilities, and banks during dredging (e.g., the use of protective bumpers, areas intended for anchoring along with the location of sensitive structures, etc.);
 - xiii. Tying up and securing barges; and
 - xiv. Keeping the public clear of dredging operations.
- d. Statement of Qualifications:
- i. Current crane and other equipment operator (i.e. boat captains, etc.) certifications and qualifications shall be provided for all operators, including years of experience; and
 - ii. Organizational chart that illustrates project management team, along with the dredge crew, and chain of communication during dredging operations.
- e. Daily Inspections:
- i. Inspection forms of all barges and scows including load limits; and
 - ii. Procedure and inspection forms for inspecting major equipment (e.g. excavators, bucket/grapple/rake attachments, pumps, generators, piping), mixing equipment, including inspection frequency and proposed plan for addressing equipment malfunction.
2. Surveys Conducted by the Contractor:
- a. The contractor shall perform the surveys described in Part 3.06 of this Section and provide submittals to the Owner's Representative indicating that required grades have been met in all of RTA I, as noted on the construction drawings and that the toes of all slopes are clear to final grades.
 - b. The before dredging survey and surveys performed by the Contractor after each phase of dredging, prior to each backfilling event during slotted excavation, and following post-dredging backfill shall be submitted with the following information:
 - i. Binned minimum sounding data in the format specified in Section 01 71 23 – Site Surveying and Grade Control;
 - ii. Binned average sounding data in the format specified in Section 01 71 23 – Site Surveying and Grade Control;

- iii. Bathymetry maps depicting 0.5-foot contours within RTA1 with minimum soundings from each grid cell (three different colors shall be used for soundings displayed on bathymetric maps; one color for soundings below grade but above OD, a second color for soundings below OD, and third color for soundings above grade);
 - iv. Total dredge volume to grade calculation and OD volume calculation (for Phase III AD survey only); and
 - v. Total backfill, Leveling Layer, and Engineered Leveling Layer volumes.
- c. Leadline manual surveys will be conducted by the Contractor along the sheet pile bulkhead supports as indicated in Part 3.06 of this Section.
3. Daily and Weekly Progress Reports. Detailed requirements for daily and weekly submittals are provided in Section 01 32 00.

1.06 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.
- B. The Contractor shall comply with environmental health and safety/training requirements in accordance with the USACE *Safety and Health Requirements* (EM 385-1-1), specifically sections 16 – Cranes and Hoisting Equipment and 19 – Floating Plant and Marine Activities.

PART 2 PRODUCTS

2.01 EQUIPMENT

- A. Furnish equipment necessary to perform dredging, dewatering, and Leveling Layer placement operations in accordance with this Section, the Construction Drawings, and the approved Dredging Work Plan. Clean and decontaminate equipment and vessels in accordance with Section 02 51 19. Equipment to include:
 - 1. Material Handler. Described in Section 02 51 19.
 - 2. Dredge. Barge shall be narrow enough to maneuver between the Staging Site and RTA1. Additionally, the barge shall have a shallow enough draft to accommodate draft limitations and confined conditions within the Canal. There shall be sufficient room on board the barge to accommodate the excavator or crane, water tanks, buckets, office, and other equipment. Excavators, cranes, and derricks mounted on barges, pontoons or other means of floatation shall be secured to the deck in accordance with Section 16.L.04.c of EM 385-1-1, USACE Safety and Health Requirements Manual, 15 September 2008. The barge and excavator shall be equipped with real time kinematic (RTK) GPS and dredge visualization/tracking software (e.g. Hypack, TELEDYNE PDS Dredge, etc.).

3. Tugboats. Tugboats shall be of a size that allows maneuvering between the Staging Site and RTA1 with sufficient clearance to avoid damaging property or creating excessive turbidity.
4. Scows. Scows shall be narrow enough to maneuver between the Staging Site and RTA1. Split hull scows (i.e. dump scows) are not permitted.
5. Grapples and Rakes. Grapples and rakes shall be capable of manipulating a variety of debris types and sizes, as shown on the Construction Drawings.
6. Environmental Clamshell Bucket. Enclosed level-cut environmental bucket shall be sealed with venting to relieve pressure while lowering the bucket, but shall not allow water to drain following collection of material. The bucket shall be of sufficient capacity to efficiently remove the sediment as shown on the Construction Drawings.
7. Conventional Clamshell Bucket. Conventional clamshell bucket shall have a completely open top. The bucket shall be of sufficient capacity to efficiently remove the sediment as shown on the Construction Drawings. Use of Conventional Clamshell Buckets shall be justified and approved by the Owner's Representative and the EPA prior to use.
8. Conventional Excavator Bucket. Conventional excavator bucket shall be fitted with a mechanism to keep the bucket closed while lifting the bucket through the water column. The bucket shall be of sufficient capacity to efficiently remove the sediment as shown on the Construction Drawings. Use of Conventional Excavator Buckets shall be justified and approved by the Owner's Representative and the EPA prior to use.
9. Engineered Leveling Layer Mixing Equipment. Plant or pugmill type mixer with sufficient power and capacity to efficiently and uniformly mix sand and bentonite to achieve the requirements of Part 2.02 of this specification.
10. Lighting. Equipment and barges shall have adequate lighting and proper reflection for periods of restricted visibility in accordance with OSHA 29 CFR 1926.56.
11. All marine vessels, including but not limited to tugs, barges, dredges, and work boats, shall meet U.S. Coast Guard requirements.

2.02 MATERIALS

A. Sand

1. Sand used for Leveling Layer and Engineered Leveling Layer shall meet the requirements of NYSDOT 733-15 for source, gradation, durability, and pH.
2. Sand materials shall be inspected and tested in accordance with requirements in Section 35 43 00.

B. Engineered Leveling Layer

1. Engineered Leveling Layer shall consist of a sand and bentonite mixture with a target permeability of 1×10^{-5} cm/sec and a maximum value of 5×10^{-4} cm/sec.

Engineered Leveling Layer shall be prepared by thoroughly and uniformly mixing sand and bentonite using equipment and methods approved by the Owner's Representative. At least one permeability test (ASTM D5084) shall be conducted prior to placement per 200 cubic yards of Engineered Leveling Layer prepared. Tests shall be conducted at an effective confining stress of 250 psf.

2. Bentonite used for Engineered Leveling Layer shall be free flowing, high swelling, granular sodium bentonite. Bentonite shall be American Colloid Company, Volclay SG-40; Wyo-Ben, Envirogel-10; or equivalent. The bentonite shall have a free swell of at least 18 cc / 2 gm as measured by ASTM Standard Test Method D 5890 and shall meet the following gradation:

3.

Sieve Size	Percentage Passing by Weight
10	100
20	60-100
200	0-20

PART 3 EXECUTION

3.01 GENERAL

- A. Locate and protect utilities within RTA1 and any other areas where utilities may be encountered during Work.
- B. Verify existing conditions as shown on the Construction Drawings prior to beginning Work in this Section.
- C. Review sediment characteristics provided in the Summary of Geotechnical Design Parameters.
- D. Conduct Work in accordance with the regulatory requirements outlined in Section 01 41 00.
- E. Remove, transport, process, and dispose of dredged materials and solid waste in accordance with Section 02 51 19.
- F. Equipment and barges should be decontaminated in accordance with Section 01 57 19.

3.02 EQUIPMENT OPERATORS

- A. All dredge and equipment operators (i.e. boat captains) shall have a minimum of 2 years of experience with the type and size of equipment they are to be operating.

3.03 DREDGING OPERATIONS

- A. Dredging activities shall be completed according to the following sequence:
1. Conduct pre-construction photographic survey of bulkheads and bridges in accordance with Section 02 22 00;
 2. Install sediment and floatables containment as described in Section 02 60 16;
 3. Conduct Phase I Dredging within RTA1 to the depths presented in the Construction Drawings;
 4. Necessary bulkhead work will be completed following Phase I Dredging in accordance with Section 31 41 00 before proceeding to Phase II Dredging;
 5. Conduct Phase II Dredging to the depths presented in the Construction Drawings;
 6. Conduct ISS following Phase II Dredging in accordance with Section 03 11 00;
 7. Conduct Phase III Dredging including any slotted excavation, in the areas and to depths specified herein and on the Construction Drawings; and
 8. Complete post-dredging placement of Leveling Layer and Engineered Leveling Layer in accordance with the Construction Drawings.

- B. The sequence of work should be logical and account for vessel traffic throughout the Canal, restrictions to navigation (e.g. bridges, tides, known work on the Canal), long lead-time items such as permit approvals or disposal facility approvals/authorizations, removal of large debris, and the time needed to close the Carroll Street and Union Street bridges to dredge beneath.

The Contractor shall provide equipment such as grapples and rakes for the removal of large debris that cannot be removed by the dredging equipment.

- C. The Contractor shall remove sediment to the extents and grades shown on the Construction Drawings and within the tolerances defined in this Section.
1. Dredging will be performed with an environmental clamshell bucket to the extent practical. If debris present in the Canal prevents the environmental clamshell bucket from fully closing or otherwise significantly interferes with operations, a conventional clamshell bucket may be used with the approval of the Owner's Representative and EPA. The Owner's Representative shall be provided with the basis for recommending the use of a conventional clamshell bucket. Unless otherwise approved by the Owner's Representative, the Contractor shall switch back to the environmental clamshell bucket when conditions improve which allow successful operation of the environmental clamshell bucket.
 2. All dredging positioning equipment shall be checked daily by placing the bucket over a temporary benchmark with known coordinates and elevation, checking location and elevation with independent surveying equipment, or other method approved by the Owner's Representative. Dredging positioning equipment shall be

- recalibrated if vertical or horizontal tolerances exceed 6 inches. The results of calibration checks and descriptions of any necessary corrective measures shall be provided in daily progress reports. In the event the Owner's Representative approves the use of a conventional clamshell bucket or conventional excavator bucket with required closing mechanism, the calibration shall be adjusted to reflect current equipment and conditions.
3. Phase I Dredging: The dredging of Phase I is needed to allow barge access for bulkhead work. Phase I shall be completed to the grades shown in the Construction Drawings.
 - a. No OD will be counted in measurement for payment for Phase I, as payment for dredging below target depth will be calculated for Phase II work.
 - b. Dredging shall be between the limits shown on the Construction Drawings unless otherwise approved by the Owner's Representative.
 4. Bulkhead work will be performed following Phase I Dredging in accordance with Sections 31 41 00.
 5. For Phase I and Phase II dredging, the Contractor shall dredge to grades shown in the Construction Drawings.
 6. Phase II Dredging: After Phase I Dredging and required bulkheads improvements are made, the Contractor shall begin Phase II Dredging in accordance with the Construction Drawings.
 - a. Phase II Dredging will be completed in lifts no greater than 4 ft in depth, unless otherwise approved by Owner's Representative to allow for bulkhead monitoring during dredging. If instability of the bulkheads is observed according to Section 02 22 00, or if any other problem is encountered, the Contractor shall be prepared to Stop Work. If bulkhead monitoring indicates the bulkhead stability is acceptable, then the Contractor shall continue with additional passes with a maximum thickness of 4 ft or to design grade, whichever is shallowest, throughout RTA1. This process shall continue until the Phase II design grade is achieved across the entire dredge area.
 - b. No OD for Phase II Dredging will be measured for payment, as payment for OD volumes removed during Phase II dredging will be calculated for Phase III Dredging.
 7. ISS will be performed following Phase II Dredging in accordance with Section 03 11 00. As part of the Phase II dredging operation, obstructions as defined in Specification 03 11 00 shall be removed prior to the implementation of ISS.
 8. The Contractor may propose the removal of additional Soft Sediment below the Phase II dredge surface in ISS areas to facilitate the implementation of ISS. Additional dredging can only be conducted after receipt of written approval from the Owner's Representative.
 9. Swell of ISS material is expected to be generated during ISS Work. ISS swell material may need to be removed by the Contractor during Phase III Dredging to achieve the final grades as described on the Construction Drawings.

10. Phase III Dredging: After Phase II Dredging and ISS are completed, the Contractor shall begin Phase III Dredging in accordance with the Construction Drawings.
 - a. The Contractor shall remove the remaining soft sediment to the top of the interface with native alluvial sediment or ISS swell material. The top of the interface is depicted by the Phase III dredge surface, but is determined as either: 1) excavation refusal with an environmental clamshell bucket meeting the requirements of this Section, 2) the top of native alluvial sediment as determined visually by the Contractor and confirmed by the Owner's Representative, or 3) the top of ISS swell material as determined visually by the Contractor and confirmed by the Owner's Representative.
 - b. For environmental clamshell buckets suspended by cable from a crane, recovery of minimal material (e.g., less than 10% of bucket capacity) in three consecutive passes under the full weight of the bucket constitutes refusal if there is no evidence of interference with bucket closure by debris, boulders, or man-made materials.
 - c. For environmental clamshell buckets attached to hydraulic excavator, failure to penetrate the sediment while applying excavator boom and arm down pressure under standard operating conditions within the limits of normal hydraulic pressures constitutes refusal. The equipment shall be operated according to manufacturer's recommendations and the equipment operator shall not try to achieve additional penetration by transferring equipment weight to the bucket by raising the excavator off its tracks or using the physical attachment to the barge or pontoon as an additional counterweight.
 - d. Verifying removal of soft sediments due to refusal with an environmental clamshell bucket shall adhere to the following procedure:
 - i. Upon the first refusal with an environmental clamshell bucket, the Contractor shall notify the CQA engineer and EPA representative that their presence is needed for confirmation of soft sediment removal.
 - ii. The contractor shall continue to remove soft sediment to refusal until an area no large than 50 ft by 50 ft has been dredged to refusal or to no more than 0.5 ft below the Phase III dredge surface.
 - iii. The Contractor shall attempt to take another bucket within the area dredged to refusal while under observation by the Owner's Representative and EPA representative. The sediment removed shall be placed in a manner to allow the Owner's Representative and EPA representative to observe the sediment characteristics and obtain photo documentation to determine if either the top of native alluvial sediment or the top of ISS swell material has been reached. At the Owner's Representative or EPA Representative discretion, a second sample from another location in the area dredged to refusal may be collected.
 - iv. If the Owner's Representative and EPA representative determine that soft sediment remains at the location of refusal, the operator will continue to dig within the area being evaluated until the Owner's

Representative and EPA onsite representative agree that either all soft sediment is removed or a conventional clamshell bucket or conventional excavator bucket with approved closing mechanism is required for later removal of the soft sediment. If native alluvial sediment or ISS swell material has not been reached the location shall be marked in the dredge visualization/tracking software for later removal of soft sediment.

- v. The coordinates and elevation for every refusal with an environmental clamshell bucket shall be recorded with the dredge visualization/tracking software.
 - e. If native alluvial sediment or ISS swell material has not been encountered after dredging to an elevation 0.5 ft below the target elevation shown on the Phase III Construction Drawings, the Contractor shall notify the Owner's Representative. While the Owner's Representative observes, the Contractor shall remove additional sediment and place the sediment in the barge or scow in a manner where the Owner's Representative can observe sediment characteristics and obtain photo documentation. If the Owner's Representative verifies native alluvial sediment or ISS swell has been reached, the Contractor shall continue dredging to the elevation established from visual identification of native alluvial sediment or ISS swell. If native alluvial sediment or ISS swell has not been reached, the Contractor shall evaluate whether additional excavation affects bulkhead stability as described later in this Section and determine if special dredging methods such as slotted excavation are required for excavation to continue. Unless approved by the Owner's Representative, dredging more than 0.5 ft below the target elevation will be considered Excessive Dredging.
 - f. If the surveyed Phase III post-dredging surface at refusal is higher than the designed target Phase III dredge surface elevation, the predicted elevation of the top of the cap shall be calculated, adding the construction tolerances of the leveling layer and the respective capping layers to the nominal thickness. If the calculated top of cap elevation exceeds the approved navigation elevation, the tolerance of the capping layer thicknesses may be further reduced as needed at the direction of the Owner's Representative with EPA approval to avoid exceeding the approved navigation elevation. As part of this review, the type of ACB mat selected for use in the area in question will be reevaluated to ensure protection against erosive forces. If native alluvial sediment or ISS swell material has not been reached the location shall be marked in the dredge visualization/tracking software for later removal with a conventional clamshell bucket or conventional excavator bucket with approved closing mechanism.
- 11. Side slopes for all dredging activities are designed at no steeper than 3H:1V, unless otherwise specified. Side slopes may be formed by box cutting or dredging along the side slope.
 - 12. Surveys shall be conducted in accordance with Section 01 71 23 and this Section.

13. Dredged areas are not to be bed leveled or swept with the dredge bucket.
- D. Dredging shall occur in an orderly and logical manner in accordance with this Section, the Construction Drawings, and the Dredging Work Plan. If unanticipated conditions are encountered, the Contractor shall immediately stop and verbally notify the Owner's Representative. Following resolution of the situation, the Contractor will provide written notification to the Owner's Representative detailing the unanticipated conditions and resulting resolution.
 - E. Debris shall be separated from sediment and disposed in accordance with Section 02 51 19 and the Construction Drawings.
 1. The Contractor shall remove debris larger than 6 inches.
 2. Cultural resources are to be preserved in accordance with the most recent Cultural Resources Monitoring Plan prepared by AHRs.
 3. Debris is to be washed as follows:
 - a. All wash water shall be from a potable or other approved water source.
 - b. Only debris that has been selected for further inspection for cultural significance must be washed. The need for washing of debris that has not been selected for further inspection for cultural significance shall be determined based on debris disposal requirements set forth by the end-placement facility.
 - c. Large debris that requires washing may be washed on the barge, on the asphalt pad at the Staging Site, or at the off-site processing facility.
 - d. The Contractor shall wash debris to remove sediment that can be practically removed from the debris surface using high pressure spray water unless it is determined that high pressure spraying would damage a potential artifact. If the Owner's Representative determines that sediment that is practical to remove with high pressure spray water has not been removed, the Contractor shall perform additional washing at no additional cost to the Owner. Removal of sediment from paper, cardboard and decaying wood is not considered to be practical. Additionally, the removal of adhered sediment that would require the use of a putty knife or similar scraping tool is not required. The removal of sediment from voids and cavities in the debris that requires special handling of debris will not be required. The Contractor shall apply sufficient effort to demonstrate that all exposed surfaces on the debris are pressure washed.
 - F. Barge dewatering and transport of wash water shall be conducted as follows:
 1. Barges will contain water that must be decanted prior to sediment processing. The Contractor shall provide an adequate period of mooring to allow solids to settle in the barge. After the initial barge settling period, the Contractor shall transfer decant water to the Dredge Water Treatment System (DWTS) described in Section 44 08 40. For Phase I Dredging, alternative water treatment approaches such as off-Site treatment are allowed.

2. Wash water from debris washing shall be captured and transported to the DWTS. For Phase I Dredging, alternative water treatment approaches such as off-site treatment are allowed.
- G. Discharges of sediment, fuel, oil, or other materials into the Canal are prohibited. The Contractor shall notify the Owner's Representative immediately if accidental discharge occurs and shall take appropriate actions to mitigate the spill/release. Spills will be prevented and managed in accordance with Section 01 57 19. Maintain and repair sediment and floatables containment in accordance with Section 02 60 16.
- H. Maintain Site order and cleanliness in accordance with Section 02 51 19.
- I. For safety of the deckhands or other crew walking down the scows, the walkways shall be cleaned of sediment in the following fashion:
1. The walkways shall first be shoveled clear of sediment and the sediment placed in the scow;
 2. The remaining residual sediment can be washed with water from the Canal, so long as an excessive amount of water is not used; and
 3. This wash water will not need to be captured for treatment.
- J. The Contractor shall protect and maintain the stability of bulkheads, bridges, and other structures adjacent to RTA1 that could be impacted by sediment removal. The Contractor shall repair damages to structures resulting from dredging or bulkhead support operations at the Contractor's expense.
- K. For all phases of dredging:
1. The Contractor will be paid for OD for Phase III dredging as noted in this Section and the Construction Drawings. Horizontal dredging extents shall conform to the neat lines indicated in the Construction Drawings, and no OD will be paid for horizontal OD;
 2. Any material that is classified as excessive dredging will be removed, processed, and disposed at the Contractor's expense;
 3. Any post-dredging backfill required as a result of excessive dredging will be sourced and placed at the Contractor's expense; and
 4. Any damage to adjacent structures, bulkheads, and bridges due to excessive dredging shall be repaired at the cost of the Contractor.

3.04 LEVELING LAYER PLACEMENT

- A. Following completion of Phase III dredging and completion of post-dredging bathymetric surveys, the Owner's Representative and the Contractor will review the surveys to identify areas:
1. Requiring additional excavation prior to Leveling Layer placement.

2. Requiring additional Leveling Layer material to fill depressions or provide a uniform surface for treatment layer placement.
 3. Areas requiring additional excavation after completion of Phase III dredging will have an allowable OD of 6 inches.
- B. Next, a Leveling Layer shall be placed to provide a reasonably level base for treatment layer installation. The Leveling Layer shall be placed on top of the dredged sediment surface, ISS, or filled areas in RTA1 after completion of Phase III Dredging. The Contractor shall notify the Owner's Representative at least two business days prior to placement of the Leveling Layer to allow time for coordination with NYC to reduce Flushing Tunnel flows or shutdown Flushing Tunnel if needed prior to placement. The Contractor shall not place material until flows have been reduced or shutdown as needed, and confirmation has been provided by the Owner's Representative.
- C. The Leveling Layer shall consist of either sand or a sand and bentonite mixture meeting the requirements for Engineered Leveling Layer as described in Part 2.02 of this specification and as shown on the Construction Drawings. The Leveling Layer shall be placed according to the dimensions specified in the Construction Drawings and as follows:
1. The horizontal tolerance for placement of the Leveling Layer shall be plus or minus two feet from the southern limit of the cap termination and from the boundaries presented on the Construction Drawings except adjacent to bulkheads. Adjacent to bulkheads, the leveling layer shall be placed against the bulkhead.
 2. Except where used to fill depressions prior to placement of subsequent layers, Leveling Layer consisting of Post Dredging Sand Backfill shall have a typical thickness of 4 inches with a minimum and maximum thickness of 3 and 6 inches, respectively. The areas where the Post Dredging Sand Backfill shall be placed in the Leveling Layer is presented on the Construction Drawings. The Contractor shall not be reimbursed for placement of materials beyond tolerances.
 3. Engineered Leveling Layer shall have a typical thickness of 8 inches with a minimum and maximum thickness of 6 and 10 inches, respectively. The areas where the Engineered Leveling Layer shall be placed is presented on the Construction Drawings. The Contractor shall not be reimbursed for placement of materials beyond tolerances.

3.05 ENVIRONMENTAL PROTECTION

- A. The Contractor shall control sediment and floatables in accordance with Section 02 60 16 during dredging.
- B. Work will be conducted in compliance with water quality requirements described in Section 01 57 19.
- C. Work will be conducted in compliance with the community air monitoring plan (CAMP), which will be provided upon request.

- D. Implement environmental controls for spill prevention, dust, noise, and air in accordance with Section 01 57 19.

3.06 PROTECTION

- A. Protect bulkheads against damage. The Contractor shall not use bulkheads to reposition barges or other vessels. The Contractor shall repair or replace bulkheads damaged during the Work at no cost to, and to the satisfaction of, the Owner.
- B. Bulkhead protection (e.g. bumpers) shall be installed prior to tying of scows. Scows may not be moored to any other bulkhead or dock without the written authorization of the property owner.
- C. Protect existing utility services and distribution systems from damage or displacement.
- D. Protect existing improvements against damage. Repair or replace items damaged during Work.

3.07 SURVEYS AND VERIFICATION OF MATERIAL REMOVAL

- A. Hydrographic Surveys by Contractor - Conduct hydrographic surveys in accordance with this Section and Section 01 71 23.
 - 1. Progress Surveys. At a minimum, the Contractor shall conduct weekly hydrographic surveys during Phases I, II, and III dredging to maintain a record of the depth and extent of dredging throughout the course of the Work.
 - 2. Before Dredge Survey. The Contractor shall conduct and submit a hydrographic survey prior to work.
 - 3. After Dredge Surveys. The Contractor shall conduct hydrographic surveys as follows to verify that sediment has been removed to the grades shown on the Construction Drawings:
 - a. Phase I Dredging survey to be conducted following Phase I Dredging and prior to bulkhead work or Phase II Dredging;
 - b. Phase II Dredging survey to be conducted following Phase II Dredging and prior to ISS;
 - c. Post ISS survey to be conducted following treatment of areas by ISS;
 - d. Slotted excavation surveys to be performed during Phase III Dredging, prior to backfilling. Surveys will also be performed following placement of backfill.
 - e. Phase III Dredging survey to be conducted following Phase III Dredging. The Phase III Dredging survey, along with the surveys performed during slotted excavation, will be used to verify final depths have been achieved before the Third-Party survey.

- f. The Contractor will conduct a survey after post-dredging backfill is complete.
 - g. The Contractor will conduct a survey after leveling layer placement is complete.
- 4. If surveys indicate that required grades have not been met in all grids, the Contractor shall re-dredge any grid with elevation higher than the Phase III elevation established as described in this section. The toe of all slopes must show clearance to final grade.
 - 5. Surveys related to slotted excavation during Phase III Dredging shall be conducted daily, or more frequently if required to conform with requirements listed on the Construction Drawings, and shall be completed prior to backfilling.
 - 6. Since a hydrographic survey may not be accurate within the notches of the sheet pile wall, sediment removal shall be verified in these areas by probing as follows:
 - a. At every 5th notch in the sheet pile, the Contractor shall measure with a leadline within the notch to determine the AD soft sediment depth. A weight with a minimum diameter of eight inches and weighing at least 8 pounds shall be used for the leadline. If the AD depth meets the design depth presented in the Construction Drawings, that section of sheet pile is considered to have passed clearance. If the leadline measurements indicate the depth is insufficient, the Contractor shall measure all the notches between the failing measurement and the last passing measurement to establish the area where additional dredging is required.

B. Third-Party Hydrographic Surveys

- 1. Before Dredging. Before dredging begins, the Owner's Representative will have a Before Dredge (BD) survey performed. The survey will meet the requirements of Section 01 71 23, and the results of the survey will be provided to the Contractor for their use no later than 3 business days after the Contractor submits their BD survey. The BD survey shall provide the baseline for volume calculations for measurement for payment.
- 2. Post ISS. A hydrographic survey will be performed by a Third-Party surveyor following treatment of areas by ISS. This survey will become the BD baseline for Phase III Dredging and account for any swell in volume from ISS.
- 3. After Dredging. A hydrographic survey will be performed by a Third-Party surveyor following completion of Phase III Dredging. Following Owner's Representative approval of the Contractor's survey submittals, the hydrographic survey will be scheduled for the next business day. The Contractor shall relocate their equipment at no additional cost to the Owner to allow access for the hydrographic survey.
- 4. After Leveling Layer Placement. A hydrographic survey will be performed by a Third-Party surveyor following placement of the Leveling Layer. This survey will become the baseline for cap construction.

C. Comparison of Contractor and Third-Party Hydrographic Surveys

1. Hydrographic surveys conducted by the Contractor will be compared to the Third-Party hydrographic surveys conducted by the Owner's Representative. In the event of differences between surveys less than 0.25 feet on average and 0.5 feet maximum at a given location, the hydrographic survey by the Third-Party Surveyor shall govern and be used for measurement for payment. In the event of differences greater than 0.25 feet on average and 0.5 feet maximum at a given location, the Contractor, the Third-Party Surveyor, and the Owner's Representative shall meet to resolve discrepancies between the surveys and reach agreement on the appropriate corrections to the surveys.
2. If discrepancies cannot be resolved on Post ISS surveys, the hydrographic survey by the Third-Party Surveyor shall govern and be used for measurement for payment.
3. If discrepancies cannot be resolved on Before Dredging and Post Phase III Dredging surveys, the Owner's Representative and the Contractor shall either: 1) agree to use the mean of the two surveys; or 2) retain a mutually acceptable surveyor with costs divided equally between the Contractor and the Owner and perform another hydrographic survey. If following the evaluation of a third survey, the Owner's Representative and the Contractor cannot reach agreement on the resolution of discrepancies between the previous surveys by the Contractor and the Third-Party Surveyor, then the mean of the three surveys shall be used to determine elevations and calculate volumes.

3.08 COMMUNICATION

- A. For all marine work, the Contractor shall provide a means of communication between personnel working on vessels and on land (e.g., two-way marine VHF radio).
- B. At minimum, every vessel operator and the dredge operator shall have a working VHF radio at all times.
- C. The Contractor shall determine a working channel for the project and inform all Site personnel as well as coordinate communication channels with others working on or near the Canal.
- D. In addition to the designated project channel, the Contractor shall monitor VHF channels 14 (New York Traffic) and 16 (USCG).

3.09 CANAL AND SITE ACCESS AND COORDINATION

- A. For all marine work, the Contractor must coordinate with the Coast Guard and any local marine traffic.
- B. The Contractor shall minimize their impact on vessel traffic within the Canal.

- C. The Contractor is responsible for coordinating all required bridge openings through NYC DOT in one of the following three ways:
 - 1. DOT Bridge Operator on marine radio channel 13;
 - 2. DOT Bridge Operations Office at 212-839-3740; or
 - 3. DOT Communications Center at 718-433-3340.
- D. Several bridges in the Canal have restricted horizontal and vertical clearances as documented on the Construction Drawings.
- E. The Contractor shall be responsible for Site security and shall maintain site gate access control throughout the work as specified in Section 31 10 00. Details regarding vehicular access and parking are also discussed in Section 31 10 00.

3.10 CULTURAL RESOURCES MONITORING

- A. Cultural resources refer to archaeological features, artifacts, and historic structures (bridges, bulkheads, buildings, etc.) located within the Canal that are potentially eligible for the National Register of Historic Places (NRHP). In general, properties (including objects and vessels) that are in excess of 50 years old are potentially eligible for the NRHP.
- B. The Contractor shall be responsible for reviewing the requirements listed in the most recent Cultural Resources Monitoring Plan prepared by AHRS.
- C. Cultural resources will be evaluated during dredging (all phases) and the debris management process.
 - 1. Dredging and debris sorting activities must conform to the requirements of the Cultural Resources Monitoring Plan.
 - 2. When dredging within the Level 2 Monitoring Areas as shown in the Construction Drawings, an on-Site archaeologist (provided by the Owner's Representative) will be present for visual inspection of debris.
 - 3. When dredging outside the limits of the Level 2 Monitoring Areas, Contractor personnel who received training from the archaeologist (as described herein) shall monitor dredging activities in accordance with requirements in the Cultural Resources Monitoring Plan. A monitoring archaeologist may not be on-Site during this time; however, the Contractor shall photograph all man-made debris captured during screening and send the photographs to the archaeologist for review on a daily basis.
 - 4. Training will be provided on-Site by the monitoring archaeologist for Contractor staff working on debris and sediment sorting and management prior to the start of Work. This training will help non-archaeological staff to identify potential cultural resources and understand the protocol in the event any cultural resources are

encountered during dredging and debris sorting activities. Training will consist of approximately 60 minutes of discussion and PowerPoint presentation.

- D. Should the monitoring archaeologist note features of archaeological potential during dredging and debris sorting activities, he/she may, as per the agreed monitoring methodology, request the operator to stop excavation as necessary. Further actions, such as avoiding the area of the potential resource or altering the way in which the machine is operated, may be specified by the Owner's Representative.
1. If unknown or unanticipated cultural resources are encountered, additional investigation may be needed. This may be accomplished by removing relevant debris for evaluation, if the deposit is small enough.
 2. For some areas where Work is being conducted and known or suspected cultural resources are located nearby, an on-Site Archaeologist (provided by the Owner's Representative) may be present on the barge for visual inspection of the debris during removal activities. The areas of known or suspected cultural resources are highlighted on the Construction Drawings.
 3. Objects classified as potential cultural resources (i.e. potentially historic or pre-historic artifacts) by the on-site Archaeologist shall be stored in coordination with the Owner's Representative.

3.11 DREDGED MATERIAL TRANSPORT, TREATMENT, AND MANAGEMENT

- A. The Contractor shall transport, treat and manage dredged material in accordance with Section 02 51 19.

[END OF SECTION]

SECTION 35 43 00

**CAP CONSTRUCTION – TREATMENT
LAYER**

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 35 43 00 **TITLE:** CAP CONSTRUCTION – TREATMENT LAYER

SPECIFICATION PREPARED BY: _____ Signature
(Specification Preparer, SP)

Name Jennifer Wilkie Date

SCOPE AND FORMAT CHECKED BY: _____ Signature
(Scope and Format Checker, SFC)

Name Dogus Meric Date

DETAILED REQUIREMENTS CHECKED BY: _____ Signature
(Detailed Requirements Checker, DRC)

Name Darrell Nicholas Date

APPROVED BY: _____ Signature
(Specification Approver, SA)

Name J.F. Beech Date

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	MS	JAW	GDN	JFB
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	MS	JAW	GDN	JFB
C	RTA1 65% Remedial Design	11/20/17	MS	JAW	GDN	JFB
D	RTA1 90% Remedial Design	09/30/19	JAW	AS	GDN	JFB
E	RTA1 100% Remedial Design	2/28/20	JAW	DM	GDN	JFB

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SECTION 35 43 00

CAP CONSTRUCTION – TREATMENT LAYER

PART 1 GENERAL

1.01 SUMMARY

- A. A cap shall be installed in Remediation Target Area (RTA) 1 as shown on the Construction Drawings and as specified herein for the cap treatment layer. The cap is to be installed after dredging and leveling layer is completed according to Section 35 20 23.13 and the Construction Drawings.
- B. The Contractor shall furnish all labor, materials, tools, and equipment necessary for completion of this Work.

1.02 RELATED SECTIONS, PLANS, AND DOCUMENTS

- A. Section 01 32 00 Construction Progress Documentation
- B. Section 01 33 00 Submittals
- C. Section 01 35 29 Health, Safety, and Emergency Response Requirements
- D. Section 01 60 00 Product Requirements
- E. Section 01 71 23 Site Surveying and Grade Control
- F. Section 02 60 16 Sediment and Floatables Containment
- G. Section 03 11 00 In Situ Stabilization/Solidification
- H. Section 35 20 23.13 Dredging, Dewatering, and Leveling Layer
- I. Section 35 43 29 Cap Construction – Isolation and Armor Layers
- J. Contract Documents

1.03 REFERENCES

- A. Geosyntec (2016), Pre-design Investigation 17 (PD-17) “Treatability Testing of Active Cap Layer Materials”
- B. CETCO (2014), Technical Reference NAPL Sorption Capacity and Permeability of Organoclay/Sand Mixture, TR_821_AM_EN_201401_v1.

- C. New York State Department of Environmental Conservation (NYSDEC) Environmental Remediation Programs of December 14, 2006 Part 375 – 6 Remedial Program Soil Cleanup Objectives.
- D. New York State Department of Transportation (NYSDOT) *Standard Specifications, Construction and Materials (USC)*, latest version.
- E. ASTM International (ASTM) Standards:
 - 1. ASTM C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates;
 - 2. ASTM D6913 Standard Test Method for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis;
 - 3. ASTM D854 Standard Test Method for Specific Gravity of Soil Solids;
 - 4. ASTM D2216 Standard Test Method for Determination of Water (Moisture) Content of Soil and Rock by Mass;
 - 5. ASTM D2434 Standard Test Method for Permeability of Granular Soils (Constant Head);
 - 6. ASTM D2974-14 Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils
 - 7. ASTM D3860 Standard Practice for Determination of Adsorptive Capacity of Activated Carbon by Aqueous Phase Isotherm Technique;
 - 8. ASTM D5029 Standard Test Method for Water Solubles in Activated Carbon;
 - 9. ASTM D5084 Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter
 - 10. ASTM D7481 Standard Test Methods for Determining Loose and Tapped Bulk Densities of Powders using a Graduated Cylinder; and
 - 11. ASTM D7626 Standard Test Methods for Determining the Organic Treat Loading of Organophilic Clay.

1.04 DEFINITIONS

- A. AquaBlok® 3070SW (AB) – AquaBlok® is a patented low permeability, bentonite-based, capping material. AB will replace the treatment layer in the vicinity of monopiles and pipe piles to provide a low permeable seal.
- B. Armor Layer – Layer overlying the filter and isolation layer designed to protect the other cap layers by withstanding erosional forces in the Canal. The Armor Layer shall be comprised of open and closed-cell articulated concrete blocks (ACBs).

- C. Backfill for the Southern Limits of the Cap – Gravel backfill placed above the Isolation and Filter Layer between the dredge cut slope and southern termination of the ACB mats as shown in the Construction Drawings.
- D. Demonstration Area – a fifty (50) lineal foot (ft) long section across the full width of the canal where the Treatment Layer will be installed to test the placement equipment and methods prior to capping the remainder of RTA1.
- E. Ecological Habitat Layer – The Ecological Habitat Layer is comprised of both the gravel placed within the voids of the ACB mats used in the Armor Layer and the sand that constitutes the Isolation and Filter Layer.
- F. Structural Concrete for Underwater Applications – Structural concrete placed underwater to provide protection of the underlying cap in locations where placement of ACB mats is impractical due to geometric constraints such as near bulkhead edges.
- G. Granular Activated Carbon (GAC) – Processed carbon with micropores and high sorbent surface area intended to sorb dissolved phase contaminants.
- H. GAC+sand – The portion of the Treatment Layer comprised of GAC mixed at a grain-size scale with sand.
- I. In Situ Stabilization/Solidification (ISS) – Stabilization and solidification of native alluvial and/or glacial deposits.
- J. Isolation and Filter Layer – Sand layer that will be placed above the Treatment Layer to confine the adsorptive Treatment Layer and serve as the base for the armoring layer.
- K. Leveling Layer – Layer of material placed to provide a level base for cap installation. The material shall be placed on top of the dredged sediment surface or ISS swell material surface in RTA1 after completion of Phase III Dredging.
- L. Oleophilic Clay (OC) – Clay mineral treated with a quaternary amine resulting in an oleophilic material.
- M. OC+sand – The portion of Treatment Layer comprised of OC mixed with sand.
- N. Phase III Dredging – Dredging to the final surface presented in the Construction Drawings.
- O. Reactive Material – Material that adsorbs and sequesters contaminants, such as OC and GAC.
- P. Survey – Marine Surveys of the capping area shall be hydrographic surveys in accordance with the USACE Hydrographic Surveying Manual and Section 01 71 23.

- Q. Treatment Layer – Treatment Layer refers to the combined, distinct adsorptive Treatment Layers: (i) lower layer comprising OC+sand and (ii) upper layer comprising GAC+sand.

1.05 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:

1. Treatment Layer Construction Plan:

- a. The Contractor shall identify proposed material sources and submit supplier information along with material characterization reports. The Contractor shall supply supporting documentation of testing material for organic vapors with photo-ionization detector (PID) in addition to virgin source certifications. If virgin source certifications cannot be obtained, the contractor shall perform analytical tests in accordance with 3.02 A.6. of this specification. The Contractor shall verify that materials are available in sufficient quantities to complete the Work.
- b. The Contractor shall describe field procedures for mixing Reactive Material batches to achieve Reactive Material batch mass per unit volumes and pre-installation/post installation grain-size scale homogeneity as specified in this Section and in the Construction Drawings.
- c. The Contractor shall describe the proposed location of a fifty (50) lineal foot (ft) long Demonstration Area across the full width of the canal to evaluate the pre-installation and post-installation quality control (QC) requirements as specified in this Section. The Contractor shall propose the timing of the demonstration application with the final schedule to be agreed upon with the Owner's Representative.
- d. The Contractor shall describe placement methods and equipment and provide expected production rates (area per unit time) for each capping layer. The EPA has directed the Owner that hydraulic capping, utilizing the exact same application technology (hydraulic spreader with nozzles) and in the manner that was used during the capping pilot in TB-4, be utilized in the capping of the Gowanus Canal including RTA1. Fine tuning modifications of applying the hydraulic capping method may be required for specific areas. The Contractor should specify such areas and the proposed modifications of the hydraulic capping application technology. In addition, should, in limited situations, certain site constraints (such as cap placement under a bridge) require a different application technology, the Contractor may propose an alternative method, to complement the hydraulic capping method for those limited situations, for review and approval by EPA. The Contractor shall describe the unique characteristics and constraints of those areas and provide justification as to why the hydraulic capping technology cannot be used in those specific areas as well as why the proposed alternative method would prove more successful. If catch pan samples collected near the bridges (or

other “challenging” locations) indicate that the hydraulic spreader method is not capable of achieving design requirements, then alternative methods, to be utilized only at those locations, may be discussed with EPA.

- e. The Contractor shall describe the sequence of placement for each capping layer and coordination with dredging, ISS, confirmation surveys, and other project components.
 - f. The Contractor shall describe placement sequence and means and methods to limit disturbance (i.e., movement, erosion, and suspension) of capping layers and sediment during and after placement of individual layers.
 - g. The Contractor shall describe the means and methods of preventing transport of suspended materials into the capping layers during adjacent construction.
 - h. The Contractor shall describe the means and methods of reducing potential re-contamination of cap materials by on-going discharges to the Canal (e.g., Combined Sewer Overflows [CSOs]) when exposed during construction.
 - i. The Contractor shall describe means and methods for measuring progress and verifying areal coverage and thickness of each capping layer.
 - j. The Contractor shall maintain cap material stockpile areas in accordance with Section 01 55 29.
2. Reactive Material Certification for each manufacturer or supplier as follows:
 - a. The Contractor shall provide a supplier quality assurance (QA)/QC certificate for AB, OC and GAC, including certification of virgin material, as applicable.
 - b. The Contractor shall request instructions on handling and storage for AB, OC and GAC from the manufacturer or supplier.
 3. Sand Material Characterization Reports:
 - a. Sand shall be sourced from a New York State Department of Transportation (NYSDOT) certified quarry that provides virgin source certification and PID testing. If virgin source certifications cannot be acquired, the contractor shall provide analytical tests to the Owner’s Representative for approving the selected source of sand in accordance with 3.02 A.6. of this specification.
 - b. Grain Size Distribution Results Reports for sand.
 4. Daily and weekly progress reports in accordance with Section 01 32 00.
 5. Available CQC (contractor quality control) data including:
 - a. Reactive Material pre-installation CQC field test results as specified in this Section;
 - b. Thickness verification report upon completion of each layer within the cap Treatment Layer; and
 - c. Reactive Material post-installation *in situ* CQC testing results as specified in this Section.
 6. Surveys

- a. Hydrographic capping survey required : (i) after placement of the OC+sand Treatment Layer, (ii) after placement of the GAC+sand Treatment Layer, and (iii) after placement of AB in the vicinity of the monopiles and pipe piles.
- b. Required submittals for the Surveys include:
 - i. Sorted minimum sounding data in the format specified in Section 01 71 23 – Site Surveying and Grade Control;
 - ii. Sorted average sounding data in the format specified in Section 01 71 23 – Site Surveying and Grade Control; and
 - iii. A bathymetry map depicting 0.5-foot contours within RTA1 with minimum soundings from each grid cell (soundings below grade shall be in one color, while soundings above grade shall be in another).

1.06 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.

PART 2 PRODUCTS

2.01 SAND MATERIALS

- A. Sand used for the Treatment Layer shall meet the requirements of NYSDOT 733-15 for source, gradation, durability, and pH.

2.02 REACTIVE MATERIAL

- A. Oleophilic Clay (OC)
 1. The adsorptive layer shall consist of CETCO Organoclay[®] PM-200.
 2. OC shall be suitably packaged to isolate the material from the environment to preserve its efficacy, and to avoid loss of material in transit and/or for the duration of storage. Prior to shipment, Vendor shall label each package with the following information:
 - a. Manufacturer name;
 - b. Manufacturer address;
 - c. Product code and lot number; and
 - d. Certification documentation.
- B. Granular Activated Carbon (GAC)
 1. The GAC+sand Treatment Layer shall incorporate virgin Calgon Carbon Filtrasorb[®]400 GAC.

2. GAC shall be suitably packaged by the Vendor to isolate the material from the environment in order to preserve its efficacy for the duration of shipment and storage. Prior to shipment, Vendor shall label each package with the following information:
 - a. Manufacturer name;
 - b. Manufacturer address;
 - c. Product code and lot number; and
 - d. Certification documentation.
- C. AquaBlok[®] 3070SW (AB)
1. AB will replace the treatment layer in the vicinity of monopiles and pipe piles.
 2. AB shall be suitably packaged by the Vendor to isolate the material from the environment in order to preserve its efficacy for the duration of shipment and storage. Prior to shipment, Vendor shall label each package with the following information:
 - a. Manufacturer name;
 - b. Manufacturer;
 - c. Product code and lot number; and
 - d. Certification documentation.

PART 3 EXECUTION

3.01 GENERAL

- A. Maintain stockpile areas free of water, debris, and foreign material during storage, handling, and placement of materials in accordance with this Section and Section 01 60 00. Provide stormwater protection of stockpiled material in accordance with the best management practices described in the approved Treatment Layer Construction Plan.
- B. An appropriate mixing method, using equipment designed for material blending, shall be used to achieve a uniform mix of Reactive Material with sand on a grain size scale. Mixing with excavation equipment, such as an excavator bucket, shall not be permitted. The mixing method will be approved by the Owner's Representative.
- C. The Contractor shall control sediment and floatables in accordance with Section 02 60 16 as needed during capping operations (e.g., to prevent cap cross-contamination during adjacent construction activities).
- D. During demonstration: Perform installation of each Treatment Layer in accordance with the approved Treatment Layer Construction Plan within the approved Demonstration Area to evaluate and identify the effective placement methods.

- E. Perform installation of each Treatment Layer in accordance with the approved Treatment Layer Construction Plan.
- F. The Contractor shall sequence the dredging activities and placement of cap layers to minimize cross-contamination and re-contamination of the Treatment Layer when exposed to on-going sources (e.g., CSOs). The Contractor shall not start placing cap layers prior to completion of Phase III Dredging and confirmation survey in a given area. After placing a given cap layer, the Contractor shall not start placing the subsequent layer until the previously placed layer is approved by the Owner's Representative based on the CQA testing requirements discussed in Part 3.04B.
- G. The GAC+sand Treatment Layer shall be pre-wetted prior to placement to minimize loss of carbon.
- H. The OC+sand Treatment Layer shall be pre-wetted prior to placement to minimize loss of Oleophilic Clay.
- I. Cap Treatment Layers shall be placed in a manner that minimizes the separation of Reactive Material from the sand.
- J. The Cap Treatment Layers shall be replaced with AB in the vicinity of monopiles and pipe piles.
- K. Cap Treatment Layers and AB shall be placed in a manner which: (i) minimizes resuspension of sediment and mixing of sediment with capping materials, and (ii) minimizes disturbance of and mixing with previously placed cap materials.
- L. The Contractor shall notify the Owner's Representative two business days prior to placement of the Treatment Layers to allow time for coordination with NYC to reduce Flushing Tunnel flows or shutdown Flushing Tunnel if needed prior to placement. The Contractor shall not place material until flows have been reduced or shutdown as needed, and confirmation has been provided by the Owner's Representative. Materials shall be placed according to the dimensions specified in the Construction Drawings and as follows:
 - 1. The horizontal tolerance for placement of the Treatment Layers, shall be plus or minus two feet from the southern limit of the cap termination, as presented on the Construction Drawings. The materials shall extend to the bulkheads to the north, west, and east of RTA1.
 - 2. The horizontal tolerance for the placement of the Treatment Layer(s) shall be plus or minus two feet from the boundary presented on the Construction Drawings.
 - 3. The minimum thickness and Reactive Material dosage of the GAC+sand Treatment Layer shall be as shown on the Construction Drawings. The vertical construction tolerance for the GC+sand layer is +2 inches for layers up to 12 inches thick, +3 inches for layers between 12 in and 24 inches thick, and +4 inches for layers greater than 24 inches thick.

4. The OC+sand Treatment Layer will be placed throughout RTA1 and shall have a minimum thickness of 8 inches with a maximum thickness of 10 inches and a minimum Reactive Material dosage of 25% by dry weight.
5. In the vicinity of pipe piles: At least 12 inches of AB shall be placed behind the pipe piles; on the canal side, AB shall be placed with a minimum 1-foot offset from the pipe piles at a thickness equivalent to the Cap Treatment Layers.
6. In the vicinity of monopiles: AB shall be placed with a minimum 1-foot offset from the monopiles at a thickness equivalent to the Cap Treatment Layers.
7. Capping surveys shall be conducted after the placement of each treatment layer. Capping surveys shall be sorted to two grid sizes (bin sizes): 3-foot by 3 foot grid and 9-foot by 9-foot grid. The average soundings for a 3-foot by 3-foot grid size shall be used to determine compliance with requirements for minimum layer thickness.
8. The average soundings for the 9-foot by 9-foot grid size shall be used to determine compliance with maximum construction tolerance requirements for thickness. The Contractor will not be reimbursed for placement of materials beyond the maximum construction tolerances as determined using a 9-foot by 9-foot grid size.
9. Cap placement volumes shall be determined with a 3-foot by 3-foot grid using average soundings.
10. The Contractor shall complete corrective measures on any layer prior to placement of the next successive material.

3.02 INSPECTION AND TESTING OF CAP MATERIALS

A. Sand

1. The Contractor shall supply supporting documentation of PID testing for organic vapors in addition to virgin source certifications. If virgin source certifications cannot be obtained, the contractor shall perform analytical tests in accordance with 3.02 A.6. of this specification.
2. The Contractor shall inspect material at the Site prior to placement.
3. The Contractor shall visually inspect material for the presence of foreign, recycled, or reprocessed materials. The presence of such materials will be cause for rejection and return to the supplier.
4. The Contractor shall be responsible for meeting the gradations specified herein. Materials which do not meet gradation or quality criteria specified herein shall be rejected and no payment will be made regardless of any general or provisional acceptance of materials from a stockpile or pit source.
5. The Contractor shall conduct a representative grain size distribution analysis (ASTM D6913) prior to delivery for every 2,000 tons of sand delivered to the Site for placement. If multiple sources are used (e.g., if different sand is used for the Isolation and Filter Layer versus Leveling Layer), the Contractor shall conduct

representative grain size distribution analyses (ASTM D6913) for each source, at the above frequency.

6. If virgin source certifications cannot be obtained, the Contractor shall perform chemical analyses of the representative sand material according to the requirements in 6 NYCRR 375-6. Analytical testing shall be conducted on a 5-point composite sample prior to delivery for every 5,000 tons of material delivered to the Site for placement. If multiple sources are used, the Contractor shall conduct the above analytical testing for each source. The analytical testing shall include:
 - a. Priority Pollutant Metals (EPA 6000/7000 Series Methods);
 - b. Volatile Organic Compounds (EPA Method 8260);
 - c. Semivolatile Organic Compounds (EPA Method 8270);
 - d. Chlorinated Pesticides (EPA Method 8081);
 - e. Polychlorinated Biphenyls (EPA Method 8082); and
 - f. Other constituents requested by the Owner's Representative.
7. Samples will be collected in accordance with the Contractor's Quality Assurance Project Plan (see Section 01 40 00).
8. If the testing results indicate that the material does not meet acceptance criteria based on 6 NYCRR 375-6, the Contractor shall identify another material source and proceed with material testing in a timely manner.
9. Upon receipt, a 3-point composite sample of sand will be collected and shipped to a third-party laboratory by the Contractor for loss on ignition (LOI) testing (ASTM D2974-14) to serve as a blank control sample. If multiple sources are used, a composite sample shall be collected and tested for each source. The Contractor and Owner's Representative shall evaluate the LOI results upon receipt and consider procuring new sources of sand if LOI results greater than 1% are obtained. The blank control sample shall be used by the Contractor to adjust the GAC dosage if determined necessary by the Owner's Representative.

B. Oleophilic Clay

1. Contractor shall conduct a visual inspection of OC upon receipt to identify any damage to packaging. Contractor shall further inspect product received in damaged packaging to verify product integrity in accordance with Section 01 60 00.
2. Contractor shall provide appropriate protection of OC from weather and other environmental stressors until use (e.g., spills).

C. Granular Activated Carbon

1. Contractor shall conduct a visual inspection of GAC upon receipt to identify any damage to packaging in accordance with Section 01 60 00. Contractor shall further inspect product received in damaged packaging to verify product integrity.
2. Contractor shall provide appropriate protection of GAC from weather and other environmental stressors until use (e.g., spills).

3. Upon receipt, a 3-point composite sample of GAC will be collected by the Contractor and shipped to a third-party laboratory by the Owner's Representative for loss on ignition testing (ASTM D2974-14) to confirm content.

D. AquaBlok® 3070SW

1. Contractor shall conduct a visual inspection of AB upon receipt to identify any damage to packaging. Contractor shall further inspect product received in damaged packaging to verify product integrity in accordance with Section 01 60 00.
2. Contractor shall provide appropriate protection of AB from weather and other environmental stressors until use (e.g., spills).

3.03 TREATMENT LAYER MIXING

A. The Contractor shall adhere to the following for the duration of the Treatment Layer construction:

1. For Reactive Materials mixed with sand, verify mix fractions by documenting dry weight of Reactive Material and dry weight of sand in the mix, prior to mixing, for each batch.
2. For the mixing procedure to be accepted as set forth in Part 3.04 of this section, the calculated mix fraction of Reactive Material in each sample shall achieve the design criteria listed in the Contract Documents and this Section, and the uniformity of the Reactive Material shall be approved by the Owner's Representative.
3. The Contractor shall number each 100-ton batch and calculate mix fractions of each batch until consistent compliance with the criteria specified herein is demonstrated. Owner's Representative will provide approval to the Contractor upon receipt of EPA's review and final acceptance of batch mixes. Once consistent compliance is met, the batch size may be increased per EPA approval.
4. All mixed Reactive Materials shall be stockpiled at a location approved by the Owner's Representative prior to placement.
5. The Contractor shall collect 3 grab samples from each stockpiled batch of OC and Sand and visually inspect and photo-document each for homogeneity.
6. The Contractor shall collect 3 grab samples from each stockpiled batch of GAC and Sand and visually inspect and photo-document each for homogeneity. The grab samples shall then be composited and shipped by the Contractor to a third-party laboratory approved by the Owner's Representative for loss on ignition testing (ASTM D2974-14) to confirm content. The Contractor shall account for laboratory testing and turnaround times. There will be no payment for stand-by time used while awaiting the results of testing for acceptance.
7. If the Contractor proposes to mix Reactive Materials with sand at an Off-Site location and transport the materials for stockpiling to a location approved by the

Owner's Representative prior to placement, the Contractor shall collect these grab samples after the mix is transported.

8. The Contractor shall submit mixing documentation daily.

3.04 TREATMENT LAYER PLACEMENT

A. *In Situ* Demonstration Testing:

1. Prior to implementation of the Treatment Layer Construction Plan, the method of Treatment Layer placement shall be verified to ensure design specifications are met. The Treatment Layer shall be installed on a fifty (50) lineal foot (ft) long section across the full width of the canal in RTA1 (the Demonstration Area) to test the Treatment Layer placement method:
 - a. The Contractor shall propose a method to collect *in situ* samples, using catch pans, with minimum sample plan dimensions of 12 inch by 12 inch squares with a wall height of 18 inches for both visual inspection and laboratory testing as specified herein. The sampler shall be:
 - i. Placed on the leveling layer prior to OC+sand material placement and removed after the OC+sand layer is installed in the Demonstration Area;
 - ii. Placed on the OC+sand layer prior to GAC+sand material placement and removed after a maximum of 12 inches of the GAC+sand layer is installed in the Demonstration Area. If the GAC+sand layer is more than 12 inches in thickness, the Contractor shall repeat this process until the total layer thickness is achieved; and
 - iii. Constructed of clear material that shall permit visual observation of any stratification within the individual Treatment Layers (e.g., OC+sand and GAC+sand).
 - b. The Contractor shall collect a minimum of 5 *in situ* CQC catch pan samples of each Treatment Layer within the Demonstration Area from locations selected by the Owner's Representative.
 - c. The Contractor shall place 5 additional *in situ* CQC replacement catch pans (CQC-R) to be co-located with every CQC catch pan. CQC-R catch pans are to be used as back up in the event the original CQC catch pan is disturbed during layer placement. If any corner of the CQC catch pan measures plus or minus two inches from the average of the four corners, the pan will be assessed for disturbance. A review of inclination of the sample striations will be conducted and, if determined to be disturbed, the catch pan will be replaced by the co-located CQC-R catch pan. Co-located CQC-R catch pans will not be used as samples unless the CQC catch pan has been evaluated as disturbed by the Owner's Representative. In the event both the CQC and CQC-R catch pans are determined to be disturbed by the Owner's Representative, cores will be collected to verify thickness and composition.

- d. The CQC catch pan samples will be used to (i) measure thickness of each Treatment Layer and (ii) qualitatively (i.e., visually) evaluate the uniformity of the as-built mixing. The GAC+sand catch pans will then be sampled by the Contractor in accordance with the Capping Work Plan. The samples will be shipped to a third-party laboratory by the Owner's Representative for loss on ignition testing (ASTM D2974-14) to determine as-built GAC content. If GAC+sand placement is completed through the use of multiple pans (i.e. for samples greater than 12 inches in thickness), a composite sample will be collected by the Contractor in accordance with the Capping Work Plan and shipped to a third-party laboratory by the Owner's Representative for loss on ignition testing (ASTM D2974-14) to determine as-built GAC content.
- e. Before proceeding to constructing the next layer, the Contractor shall correct any deficiency in thickness of each Treatment Layer and/or composition of the GAC+sand layer by adding additional Treatment Layer material to obtain the minimum thicknesses and dosage. The corrective measures can be applied either to the midpoint of a line between a failing sample location and the closest sampling point in compliance with thickness requirements or delineated by coring or other sampling method approved by the Owner's Representative in 10-foot directionally orthogonal increments around the failing sample location.
- f. If test results indicate that the as-built thickness of each Treatment Layer, and composition of the GAC+sand layer do not meet the design specifications provided herein, the Contractor shall modify the installation method and perform an additional 50-ft Demonstration Area across the Canal, conducting *in situ* sampling requirements as specified above. The Contractor shall rework the areas represented by samples that are out of compliance by installing an additional thickness of Treatment Layer materials to obtain the desired dosage on a pound per square foot of active ingredient basis at no additional cost. It is the responsibility of the Contractor to place each Treatment Layer in such a way that does not compromise the top of cap navigational depth. If it is determined that navigational depth may be compromised, the Contractor must consult with the Owner's representative regarding dosage and thickness before proceeding. The Contractor shall account for GAC+sand laboratory testing and turnaround times. There will be no payment for stand-by time used while awaiting the results of testing for acceptance of Demonstration Areas or for rework of areas out of compliance.
- g. When the results indicate that the as-built thickness of each Treatment Layer and composition of the GAC+sand layer in the Demonstration Area meet the design specifications and following EPA's approval of the Demonstration Area testing and findings, the Contractor shall proceed with the approved installation method throughout RTA1.
- h. The Contractor shall repeat the above testing requirements if mixing or placement methodology varies from the methodology tested in initial Demonstration Area.

B. Post-demonstration *In Situ* Full Scale Implementation Testing :

1. Following full-scale installation of each Treatment Layer in RTA1, the Contractor shall verify thickness placement of each Treatment Layer by either collecting *in situ* catch pan samples or hydrographic surveying. Hydrographic surveying will only be utilized in areas where the Treatment Layer thickness is greater than 12 inches.
2. For all areas , two *in situ* catch pan samples will be collected within every 50-ft linear section of RTA1 for LOI testing, with a minimum of 3 samples per cap zone, using the method approved for collection of *in situ* samples from the Demonstration Area. Co-located CQC and CQC-R catch pans will be placed as determined by the Owner's Representative on each side of the centerline of the Canal. Catch pan samples will be used to measure thickness of the Treatment Layer and qualitatively (i.e., visually) evaluate the uniformity of the as-built mixing. Once consistent compliance for LOI testing is demonstrated the number of LOI tests may be reduced with EPA approval.
- 3.. The Contractor shall support CQA activities selected to verify CQC methodology as outlined in the Construction Quality Assurance Plan (CQAP).
4. Before proceeding to the next layer, the Contractor shall correct any deficiency in thickness by adding additional Treatment Layer material to obtain the minimum thicknesses. The corrective measures shall be applied to the midpoint of a line between a failing sample location and the closest sampling point in compliance with thickness and dosage requirements or delineated by coring or other method approved by the Owner's Representative in 10-ft directionally orthogonal increments around the failing location. There will be no payment for time used for the rework of areas out of compliance.
5. It is the responsibility of the Contractor to place each Treatment Layer in such a way which does not compromise the top of cap navigational depth. If it is determined that navigational depth may be compromised, the Contractor must consult with the Owner's Representative regarding dosage and thickness before proceeding.

3.05 SURVEYS AND VERIFICATION OF CAP PLACEMENT

- A. The thickness of the individual Treatment Layers (i.e., OC+sand or GAC+sand alone) and AB in the vicinity of monopiles and pipe piles will be determined based on the collected *in situ* samples or hydrographic surveying as described in Part 3.04B of this specification.
- B. For areas where the Treatment Layers less than 12 inches thick, the Contractor shall conduct hydrographic surveys after thickness of the OC+sand layer is verified by catch pan sampling and after thickness of the GAC+sand layer is verified by catch pan sampling or other method approved by the Owner's Representative. Owner's Representative will provide approval to the Contractor upon receipt of EPA's review and final acceptance of each Treatment Layer thickness. The hydrographic surveys will be

used to verify that the treatment components of the cap have been placed as specified herein and in Construction Drawing, to the extents of areas as presented on the Construction Drawings.

- C. If a hydrographic survey shows potential low areas less than the repeatability requirements in EM 1110-2-1003 described in 1.01.A of Section 01 71 23, and the pans meet the minimum thickness requirements the layer will be considered acceptable. If the hydrographic survey shows potential low areas greater than the repeatability requirements in EM 1110-2-1003 described in 1.01.A of Section 01 71 23, cores will be taken at these locations to verify that the minimum layer thickness has been achieved. If the minimum layer thickness has not been achieved, cores will be taken in 10-foot directionally orthogonal increments around the failing core location to delineate the deficient area.
- D. The Contractor has the option to place additional fill material, in place of post-survey thickness verification cores, at no cost to the Owner. After placement of material, final acceptance of the area will be based on passing cores or other method approved by the Owner's Representative. Owner's Representative will provide approval to the Contractor upon receipt of EPA's review and final acceptance of each Treatment Layer thickness.

3.06 PROTECTION, COMMUNICATION, AND CANAL AND SITE ACCESS

- A. The Contractor shall conform to Protection, Communication, and Canal and Site Access requirements from Section 35 20 23.13.

[END OF SECTION]

SECTION 35 43 29

**CAP CONSTRUCTION – ISOLATION AND
ARMOR LAYER**

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B&B Engineers & Geologists 
of new york, p.c.

an affiliate of Geosyntec Consultants

SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 35 43 29 **TITLE:** CAP CONSTRUCTION – ISOLATION AND ARMOR LAYER

SPECIFICATION PREPARED BY: (Specification Preparer, SP) Signature _____
Name J. Antonio Sanchez Date _____

SCOPE AND FORMAT CHECKED BY: (Scope and Format Checker, SFC) Signature _____
Name Jennifer Wilkie Date _____

DETAILED REQUIREMENTS CHECKED BY: (Detailed Requirements Checker, DRC) Signature _____
Name Darrell Nicholas Date _____

APPROVED BY: (Specification Approver, SA) Signature _____
Name J.F. Beech Date _____

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	MS	JW	GDN	JFB
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	MS	JW	GDN	JFB
C	RTA1 65% Remedial Design	11/20/17	MS	JW	GDN	JFB
D	RTA1 90% Remedial Design	09/30/19	JAS	JW	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	JAS	JW	GDN	JFB

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SECTION 35 43 00

CAP CONSTRUCTION – ISOLATION AND ARMOR LAYERS

PART 1 GENERAL

1.01 SUMMARY

- A. A cap shall be installed in Remediation Target Area (RTA) 1 as shown on the Construction Drawings and as specified herein for the cap isolation and armor layers. A sand Isolation Layer shall be installed following dredging and the construction of the cap treatment layer according to Section 35 20 23.13, 35 43 00, and the Construction Drawings. The Armor Layer, consisting of open- and closed-cell articulated concrete block (ACB) mats, shall be installed on top of the Isolation Layer.
- B. The Isolation Layer, along with gravel integrated into the Armor Layer, will serve as a filter over the previously installed Treatment Layer and ecological habitat. Open-cell ACB mats in the Armor Layer will be filled with gravel. Gravel will be placed in the gaps between the prefabricated sheets of ACB mats. A low-strength Structural Concrete for Underwater Applications will be placed in the space between the ACB mats and the bulkheads.
- C. At the southern boundary of RTA1, gravel backfill will be placed above the Isolation Layer between the dredge cut slope and southern termination of the ACB mats (see Construction Drawings).
- D. The Contractor shall furnish all labor, materials, tools, and equipment necessary for completion of this Work.

1.02 RELATED SECTIONS, PLANS, AND DOCUMENTS

- A. Section 01 32 00 Construction Progress Documentation
- B. Section 01 33 00 Submittals
- C. Section 01 35 29 Health, Safety, and Emergency Response Requirements
- D. Section 01 60 00 Product Requirements
- E. Section 01 71 23 Site Surveying and Grade Control
- F. Section 02 60 16 Sediment and Floatables Containment
- G. Section 03 11 00 In Situ Stabilization/Solidification
- H. Section 35 20 23.13 Dredging and Dewatering

- I. Section 35 43 00 Cap Construction – Treatment Layers
- J. Contract Documents

1.03 REFERENCES

- A. American Association of State Highway and Transportation Officials (AASHTO) AASHTO T-85: Specific Gravity and Absorption of Coarse Aggregate.
- B. New York State Department of Environmental Conservation (NYSDEC) Environmental Remediation Programs of December 14, 2006 Part 375 – 6 Remedial Program Soil Cleanup Objectives.
- C. New York State Department of Transportation (NYSDOT) *Standard Specifications, Construction and Materials (USC)*, latest version.
- D. ASTM International (ASTM) Standards:
 - 1. ASTM C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates;
 - 2. ASTM D6913 Standard Test Method for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis;
 - 3. ASTM D854 Standard Test Method for Specific Gravity of Soil Solids;
 - 4. ASTM D2216 Standard Test Method for Determination of Water (Moisture) Content of Soil and Rock by Mass;
 - 5. ASTM D6684 Standard Specification for Materials and Manufacture of Articulating Concrete Block Revetment Systems;
 - 6. ASTM D6884 Standard Practice for Installation of Articulating Concrete Block Revetment Systems;
 - 7. ASTM D7276 Standard Guide for Analysis and Interpretation of Test Data for Articulating Concrete Block (ACB) Revetment Systems in Open Channel Flow;
 - 8. ASTM D7277 Standard Guide for Performance Testing of Articulating Concrete Block (ACB) Revetment Systems for Hydraulic Stability in Open Channel Flow;

1.04 DEFINITIONS

- A. Armor Layer – Layer overlying the isolation layer designed to protect the other cap layers by withstanding erosional forces in the Canal. The Armor Layer shall be comprised of open and closed-cell ACBs.

- B. Backfill for the Southern Limits of the Cap – Gravel backfill placed above the Isolation Layer between the dredge cut slope and southern termination of the ACB mats as shown in the Construction Drawings.
- C. Ecological Habitat–Ecological Habitat is comprised of both the gravel placed within the voids of the ACB mats used in the Armor Layer and the sand that constitutes the Isolation Layer.
- D. Controlled Low Strength Material (CLSM) – A type of flowable fill material to be placed underwater as backfill between the gaps of ACB mats.
- E. Granular Activated Carbon (GAC) – Processed carbon with micropores and high sorbent surface area intended to sorb dissolved phase contaminants.
- F. GAC+sand – The portion of the Treatment Layer comprised of GAC mixed with sand.
- G. In Situ Stabilization/Solidification (ISS) – Stabilization and solidification of sediments, native alluvial and/or glacial deposits.
- H. Isolation Layer – Sand layer that will be placed above the Treatment Layer to confine the adsorptive Treatment Layer and serve as the base for the armoring layer.
- I. Oleophilic Clay (OC) – Clay mineral treated with a quaternary amine resulting in an oleophilic material.
- J. OC+sand – The portion of Treatment Layer comprised of OC mixed with sand.
- K. Structural Concrete for Underwater Applications – Structural concrete placed underwater to provide protection of the underlying cap in locations where placement of ACB mats is impractical due to geometric constraints, such as near bulkhead edges.
- L. Survey – Marine surveys of the capping area conducted in accordance with the USACE Hydrographic Surveying Manual and Section 01 71 23.
- M. Treatment Layer – Treatment Layer refers to the combined, distinct adsorptive Treatment Layers: (i) lower layer comprising OC+sand and (ii) upper layer comprising GAC+sand.

1.05 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:
 - 1. Isolation and Armor Layers Construction Plan:
 - a. The Contractor shall identify proposed material sources for sand and gravel and submit supplier information along with material characterization reports. The Contractor shall verify that materials are available in sufficient quantities to complete the Work.

- b. Vendor product data and technical specifications for the selected ACB mat shall be provided which include summaries of recommended critical shear stresses and velocities for the mats, results of testing and analysis per ASTM D7277 and D7276, results of ASTM D7276 regression analysis, and appropriate design details including weight, percentage of open areas, and sizes.
 - c. The Contractor shall describe the means, methods, and verification procedures proposed to place ACB mats adhering to the design tolerances for spacing between individual mats and spacing near bulkhead edges.
 - d. The Contractor shall describe the means, methods, and verification procedures to place gravel within the voids and gaps of the ACB mats to the specified design tolerances.
 - e. The Contractor shall describe how the Class G Structural Concrete for Underwater Applications will be placed in accordance with NYSDOT Specification 555-3.05, the source of concrete, and equipment necessary for installation. The Contractor shall describe the means and methods for verification of placement within the design tolerances and appropriate mixing has been achieved as specified in this Section and in the Construction Drawings.
 - f. The Contractor shall describe placement methods and equipment and provide expected production rates (area per unit time) for each capping layer.
 - g. The Contractor shall describe the means and methods of reducing potential re-contamination of cap materials by on-going discharges to the Canal (e.g., Combined Sewer Overflows [CSOs]) when exposed during construction.
 - h. The Contractor shall describe means and methods for measuring progress and verifying areal coverage and thickness of each capping layer.
 - i. The Contractor shall maintain cap material stockpile areas in accordance with Section 01 55 29.
2. Sand Material Characterization Reports:
 - a. Sand shall be sourced from a New York State Department of Transportation (NYSDOT) certified quarry that provides virgin source certification and photo-ionization testing. If virgin source certifications cannot be acquired, the contractor shall provide analytical tests to the Owner's Representative for approving the selected source of sand.
 3. Grain Size Distribution Results Reports for sand and gravel.
 4. Daily and weekly progress reports in accordance with Section 01 32 00.
 5. Available CQC (contractor quality control) data including thickness verification report upon completion of the Isolation Layer; and
 6. The following QC data for the ACB mats:
 - a. Test data showing the concrete products were manufactured within 24 months prior to anticipated placement date per ASTM D6684;

- b. Compressive strength, water absorption, and unit weight (density) sampling methodologies and results in accordance with ASTM D6684; and
 - c. Vendor product data and technical specifications for the selected ACB mat shall be provided, including: summary of recommended critical shear stresses and velocities for the mats, results of testing and analysis per ASTM D7277 and D7276, results of ASTM D7276 regression analysis, and appropriate design details including weight, percentage of open areas, and sizes.
7. The Contractor shall provide a report from the concrete supplier verifying the Structural Concrete for Underwater Applications is Class G in accordance with NYSDOT specifications Table 501-3 for concrete mixtures.
 8. The Contractor shall provide a report from the concrete supplier verifying the CLSM mix-design in accordance with NYSDOT specification 733-01A.1. and unconfined compressive strength in accordance with NYSDOT specifications Table 733-01C.
 9. Surveys
 - a. Hydrographic capping survey required (i) after placement of the Isolation Layer and (ii) completion of the cap and backfilling at the southern termination of the cap (i.e., the final cap Survey).
 - b. Required submittals for the Surveys include:
 - i. Sorted minimum sounding data in the format specified in Section 01 71 23 – Site Surveying and Grade Control;
 - ii. Sorted average sounding data in the format specified in Section 01 71 23 – Site Surveying and Grade Control; and
 - iii. A bathymetry map depicting 0.5-foot contours within RTA1 with minimum soundings from each grid cell (soundings below grade shall be in one color, while soundings above grade shall be another).
 10. Calculations
 - a. Calculations for the combined area of ACB mat placed.

1.06 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.

PART 2 PRODUCTS

2.01 SAND MATERIALS

- A. Sand used for the Isolation Layer shall meet the requirements of NYSDOT 733-15 for source, gradation, durability, and pH.
- B. Gravel placed within the ACB mats and at the southern limits of the cap:

1. The Contractor shall furnish material consisting of crushed stone or gravel, free of soft, non-durable particles, organic material, and thin or elongated particles having a gradation for AASHTO #67 as presented in Table 1 below.

Table 1. Gradation for Gravel Placed within the ACB Mats and at Southern Limits of Cap

Sieve Size	Percentage Passing by Weight
1 inch	100
3/4 inch	90-100
3/8 inch	20-55
No. 4	0-10
No. 8	0-5

2.02 ARMOR LAYER

- A. The ACB mats, constituting the Armor Layer, are designed to protect the underlying layers from erosional forces associated with hydrodynamic forces and vessel traffic. The required properties of the armoring material are summarized as follows:
 1. The armoring material shall consist of ACB mats; where ACB mats are defined as a matrix of interconnected concrete block units connected by geometric interlock and/or cables.
 2. The ACB mats shall have a thickness of 4.75 to 6 inches (depending on location within RTA1) with manufactured construction tolerances no greater than plus or minus 0.5 inches.
 3. The cementitious materials of the ACB mats shall conform to ASTM D6684.
 4. The aggregate materials of the ACB mats shall conform to ASTM D6684.
 5. Revetment cables and fittings shall be designed in accordance with ASTM D6684 and shall provide a minimum factor of safety of 5.0 for lifting and handling. Physical requirements for ACB mats shall conform to Table 1 from ASTM D6664.
 6. The minimum critical shear stress and critical velocity based on full-scale laboratory testing and certification by the manufacturer shall exceed the minimum values presented on the Construction Drawings. The test and analysis of the values shall be in accordance with ASTM D7277 and ASTM D7276.
 7. The percentage of open area of the open-cell ACB mats shall be between 15 and 25 percent. The size of the open areas shall be larger than the maximum size of the gravel placed within the voids.
- B. The Armor Layer design presented on Construction Drawing C-9 was developed based on the ArmorFlex® ACB product line offered by Contech® Engineered Solutions. The contractor shall submit product specifications for approval by the Owner's Representative if any alternative ACB mats will used as a substitute for the ArmorFlex® ACB product line.

- C. The Armor Layer design presented on Construction Drawing C-9 requires the use of various ACB mats with varying degrees of erosional resistance. As such, three ACB mat products are specified across RTA1 as shown in the construction drawings.

2.03 STRUCTURAL CONCRETE FOR UNDERWATER APPLICATIONS

- A. The Structural Concrete for Underwater Applications shall consist of NYSDOT Class G Concrete. The concrete shall not contain fly ash. The structural concrete shall have a thickness of 6 inches plus or minus 2 inches and generally be flush with the top of the ACB mats.

2.04 CONTROLLED LOW STRENGTH MATERIAL (CLSM)

- A. CLSM shall meet the mix design requirements of NYSDOT specification 733-01.A.1, however, the mix design shall not contain fly ash. The CLSM shall have a thickness of 6 inches plus or minus 2 inches and generally be flush with the top of the ACB mats.

PART 3 EXECUTION

3.01 GENERAL

- A. Maintain stockpile areas free of water, debris, and foreign material during storage, handling, and placement of materials in accordance with this Section and Section 01 60 00. Provide stormwater protection of stockpiled material in accordance with the best management practices described in the approved Isolation and Armor Layers Construction Plan.
- B. The Contractor shall control sediment and floatables in accordance with Section 02 60 16 as needed during capping operations (e.g., to prevent cap cross-contamination during adjacent construction activities).
- C. Perform installation of each Isolation and Armor Layer in accordance with the approved Isolation and Armor Layers Construction Plan.
- D. After placing a given cap layer, the Contractor shall not start placing the subsequent layer until the previously placed layer is approved by the Owner's Representative based on the CQA testing requirements discussed in Part 3.04B.
- E. Cap Isolation and Armor Layers shall be placed in a manner which: (i) minimizes resuspension of sediment and mixing of sediment with capping materials, and (ii) minimizes disturbance of and mixing with previously placed cap materials.
- F. Following completion of treatment layer placement and associated bathymetric surveys, the Owner's Representative and the Contractor will review the bathymetric surveys to establish the final surface of the Isolation Layer to allow for placement of the Armor

layer, and will account for the expected variations in the Phase III dredge surface, any allowed over placement of Treatment Layers, and the design Navigational Elevation. The thickness of the Isolation Layer is expected to vary. The established treatment layer surface will be approved by EPA prior to construction.

- G. Materials shall be placed according to the dimensions specified in the Construction Drawings and as follows:
1. The horizontal tolerance for placement of the Isolation Layer shall be plus or minus two feet from the southern limit of the cap termination, as presented on the Construction Drawings. The materials shall extend to the bulkheads to the north, west, and east of RTA1.
 2. The horizontal tolerance for placement of the Armor Layer and gravel placed within the voids of the ACB mats shall be:
 - a. The typical spacing between the larger horizontal dimension of the ACB mats shall be 2 inches. This spacing shall be filled with gravel.
 - b. The shorter horizontal dimension of the ACB mats include the cabled ends. The typical spacing between the ACB mats along the shorter horizontal dimension shall be 6 inches. This spacing shall be filled with controlled low strength material (CLSM).
 - c. If there are locations where the shorter and longer horizontal dimension abut one another, then the typical spacing shall be 6 inches. This spacing shall be filled with CLSM.
 - d. The ACB mats shall have a spacing between 1 and 2 feet from the front of the bulkheads as shown in the Construction Drawings.
 - e. The ACB mats shall terminate at plus or minus two feet from the southern limits of RTA as shown in the Construction Drawings.
 - f. In confined locations, the Contractor may request a greater allowance. The request shall be written and provided to the Owner's Representative for approval five business days prior to placement.
 3. The Isolation Layer will have a minimum thickness of 6 inches in areas where open ACB mats are installed.. The vertical construction tolerance is 3 inches, however in select areas a more restrictive tolerance may be needed to meet the design Navigational Elevation. The Contractor will not be reimbursed for placement of materials beyond tolerances.
 4. Gravel placed within the voids of the open-cell ACB mats (Armor Layer) shall be the thickness of the ACB mat (6 inches) plus 2 inches, for a typical thickness of 8 inches.
 5. Gravel backfill placed at the southern limits of the cap shall be to the elevation of the top of Armor Layer plus 1 to 3 inches.
 6. The Contractor shall complete corrective measures on any layer prior to placement of the next successive material.

7. The Contractor will not be reimbursed for placement of materials beyond tolerances.
 8. ACB mats shall provide close contact with the underlying Isolation Layer and limit disturbance during placement in accordance with the manufacturer's recommendations. The maximum spacing between individual ACB mats shall be six inches. Installation of the ACB mats shall be in accordance with the applicable requirements of ASTM D6884.
 9. The Contractor shall tremie or pump the structural concrete for underwater placement in accordance with New York State Department of Transportation (NYSDOT) Specification 555-3.05(A) and 555-3.05(B)(1) or (2) including the source of concrete and equipment necessary for installation. The structural concrete shall be placed level with the top of the ACB mats, plus or minus two inches. Concrete shall only be placed in water when temperatures range from 32°F to 90°F.
- H. When the Contractor has finished placement of the ACB mats and ecological and habitat layer, The Contractor shall notify the owner's Representative so the Flushing Tunnel may resume normal operations.

3.02 INSPECTION AND TESTING OF CAP MATERIALS

A. Gravel

1. The Contractor shall conduct one representative grain size distribution analysis (ASTM D422-63) for every 2,000 tons of gravel delivery to the Staging Site. If multiple sources are used, the Contractor shall conduct a representative grain size distribution analysis (ASTM D422-63) for each source.
2. The Contractor shall provide certification from each source documenting that gravel is free of contaminants according to the requirements in 6 NYCRR 375-6.
3. The Contractor shall inspect the gravel to confirm the material is free of soft, non-durable particles, organic material, and thin or elongated particles

B. Sand

1. The Contractor shall inspect material at the Site prior to placement.
2. The Contractor shall visually inspect material for the presence of foreign, recycled, or reprocessed materials. The presence of such materials will be cause for rejection and return to the supplier.
3. The Contractor shall be responsible for meeting the gradations specified herein. Materials which do not meet gradation or quality criteria specified herein shall be rejected and no payment will be made regardless of any general or provisional acceptance of materials from a stockpile or pit source.
4. The Contractor shall conduct a representative grain size distribution analysis (ASTM D6913) prior to delivery for every 2,000 tons of sand delivered to the Site for placement. If multiple sources are used, the Contractor shall conduct

representative grain size distribution analyses (ASTM D6913) for each source, at the above frequency.

5. The Contractor shall submit virgin source certifications, as applicable, and shall supply results of PID testing of materials during construction to support virgin source certifications. If virgin source certifications cannot be obtained, the Contractor shall perform chemical analyses of the representative sand material according to the requirements in 6 NYCRR 375-6. Analytical testing shall be conducted on a 5-point composite sample prior to delivery for every 5,000 tons of material delivered to the Site for placement. If multiple sources are used, the Contractor shall conduct the above analytical testing for each source. The analytical testing shall include:
 - a. Priority Pollutant Metals (EPA 6000/7000 Series Methods);
 - b. Volatile Organic Compounds (EPA Method 8260);
 - c. Semivolatile Organic Compounds (EPA Method 8270);
 - d. Chlorinated Pesticides (EPA Method 8081); and
 - e. Polychlorinated Biphenyls (EPA Method 8082).
 - f. Samples will be collected in accordance with the Contractor's Quality Assurance Project Plan (see Section 01 40 00).
6. If the testing results indicate that the material does not meet acceptance criteria based on 6 NYCRR 375-6, the Contractor shall identify another material source and proceed with material testing in a timely manner.

C. Armor Layer

1. Contractor shall conduct a visual inspection of ACB mats upon receipt to identify any damage to the product prior to placement in accordance with Section 01 60 00.
2. Products with cracks exceeding 0.25 inches in width or 1.0 inches in depth shall be rejected.
3. Products which are chipped where chipping results in a loss exceeding 10% of the average weight of a concrete unit shall be rejected.

- D. The Contractor shall verify the structural concrete is mixed adequately prior to placement and verify the correct volume of material was placed.

3.03 SURVEYS AND VERIFICATION OF CAP PLACEMENT

- A. The thickness of the Isolation Layer will be measured by collecting *in situ* catch pan samples or hydrographic surveying. However, hydrographic surveying will only be utilized in areas where the Isolation Layer thickness is greater than 12 inches. Two *in situ* catch pan samples will be collected within every 50-ft station along the centerline of RTA1 using the method approved for collection of *in situ* samples from the Demonstration Area. Co-located CQC and CQC-R (replacement) catch pans will be placed as determined by the Owner's Representative on each side of the centerline of the Canal. CQC-R catch pans are to be used as back up in the event the original CQC catch

pan is disturbed during layer placement. If any corner of the CQC catch pan measures plus or minus two inches from the average of the four corners, the pan will be considered disturbed and will be replaced by the co-located CQC-R catch pan. Co-located CQC-R catch pans will not be used as samples unless the CQC catch pan has been evaluated as disturbed by Owner's Representative.

- B. The Contractor shall support CQA activities selected to verify CQC methodology as outlined in the Construction Quality Assurance Plan (CQAP).
- C. Before proceeding to the next layer, the Contractor shall correct any deficiency in thickness by adding additional material to obtain the minimum thicknesses. The corrective measures shall be applied to the midpoint of a line between a failing sample location and the closest sampling point in compliance with thickness requirements or delineated in 10-ft directionally orthogonal increments around the failing location using methods approved by Owner's Representative. There will be no payment for time used for the rework of areas out of compliance.
- D. Conduct a hydrographic survey after completion of the Isolation and Armor Layer. (Final Cap Survey).
 - 1. The area of coverage of the ACB mats shall be confirmed with the Final Cap Survey. The Contractor shall also maintain documentation of where ACB mats were placed to confirm placement in the areas presented on the Construction Drawings.
 - 2. The area of coverage of backfill placed at the southern limits of the cap shall be confirmed with the Final Cap Survey. The Survey will be used to verify adequate placement. Owner's Representative will provide approval to the Contractor upon receipt of EPA's review and final acceptance of the Isolation Layer and the Armor Layers.
- E. The backfill thickness within the voids of the ACB mats Treatment Layer shall be verified using the procedures provided in the Isolation and Armor Layers Construction Plan, as approved by the Owner's Representative.
- F. Placement of the Structural Concrete for Underwater Applications shall be verified in these areas by probing as follows:
 - 1. At every 5th notch in the sheet pile, the Contractor shall probe within the notch to determine the top elevation of the structural concrete. If the structural concrete is more than two inches below the top of the ACB mats as indicated from the hydrographic Survey, the Contractor shall place additional structural concrete underwater until the top of the structural fill is within two inches of the top of ACB mats for the closest three sheet pile notches on both sides (total of seven notches) of the measured sheet pile notch. Notes shall be maintained and submitted to the Owner's Representative which verify the probing has occurred and meets the tolerances required.

3.04 PROTECTION, COMMUNICATION, AND CANAL AND SITE ACCESS

- A. The Contractor shall conform to Protection, Communication, and Canal and Site Access requirements from Section 35 20 23.13.

[END OF SECTION]

SECTION 44 08 40

**DREDGE WATER TREATMENT SYSTEM
REQUIREMENTS**

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SPECIFICATION COVER SHEET

Client: Gowanus Canal Remedial Design Group (RD Group) **Project:** RTA1 100% Remedial Design Gowanus Canal Superfund Site, Brooklyn, New York **Project #:** HPH106A

SPECIFICATION SECTION: 44 08 40 **TITLE:** DREDGE WATER TREATMENT SYSTEM REQUIREMENTS

SPECIFICATION PREPARED BY: (Specification Preparer, SP) Signature
Name Jessica Fears Date

SCOPE AND FORMAT CHECKED BY: (Scope and Format Checker, SFC) Signature
Name Russell Hyatt Date

DETAILED REQUIREMENTS CHECKED BY: (Detailed Requirements Checker, DRC) Signature
Name Darrell Nicholas Date

APPROVED BY: (Specification Approver, SA) Signature
Name J.F. Beech Date

Submittal History (Number and initial all submittals)

No.	Description	Date	SP	SFC	DRC	SA
A	RTA1 35% Remedial Design – Dredging and Treatment	10/31/16	JF	LW	GDN	JFB
B	RTA1 35% Remedial Design – Capping and ISS	12/23/16	JF	LW	GDN	JFB
C	RTA1 65% Remedial Design	11/20/17	JF	LW	GDN	JFB
A1	RTA1 100% Access Dredge Design	09/30/19	JF	RH	GDN	JFB
D	RTA1 90% Remedial Design	09/30/19	JF	RH	GDN	JFB
E	RTA1 100% Remedial Design	02/28/20	JF	RH	GDN	JFB

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SECTION 44 08 40

DREDGE WATER TREATMENT SYSTEM REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. This Section describes the Contractor's responsibilities for: (i) sizing the dredge water treatment system (DWTS) based on anticipated dredging process and processing rates, storm water from secondary containment, and other washing activities; (ii) designing, furnishing, installing, operating, and maintaining water treatment equipment to treat dredge water and other water inputs; and (iii) discharging treated water back to the Canal through one of the Discharge Locations shown on the Construction Drawings.

1.02 RELATED SECTIONS AND PLANS

- A. Section 01 33 00 Submittals
- B. Section 01 35 29 Health, Safety, And Emergency Response Requirements
- C. Section 01 51 00 Temporary Utilities
- D. Section 01 57 19 Temporary Environmental Controls
- E. Section 02 51 19 Dredged Material and Waste Management
- F. Section 35 20 23.13 Dredging, Dewatering, and Leveling Layer
- G. Section 01 78 00 Project Closure
- H. Construction Drawings

1.03 SUBMITTALS

- A. The Contractor shall submit the following to the Owner's Representative in accordance with Section 01 33 00:

- 1. Dredge Water Treatment and Management Plan

- The Contractor shall demonstrate compliance with the requirements outlined in this Section and in related Sections and Construction Drawings. The plan shall be approved and stamped by a professional engineer (PE) licensed in the State of New York. The Contractor shall provide qualified operators meeting the requirements of the State of New York. The Plan shall outline the construction sequence,

installation details, and means and methods for installation and operation of all water treatment operations including, but not limited to:

- a. A description of means and methods for the DWTS operation including treatment capacity, distribution and treatment components, and appurtenances;
- b. A description of pumps, piping, and other equipment necessary for:
 - i. Transferring wash water and decant water from sediment barges to the DWTS;
 - ii. Transferring water between treatment processes;
 - iii. Injecting treatment chemicals;
 - iv. Backwashing filters and transferring treatment sludges;
 - v. Filter media changeouts; and
 - vi. Discharging treated water to Canal through one of the Discharge Locations shown on the Construction Drawings.
- c. Calculations supporting the selection of component and sizing for each component. The Contractor shall determine flow paths, flow rates, pressures, and temperatures for various system operating conditions.
- d. Schematic drawings of the DWTS, including:
 - i. DWTS layout and instrumentation diagram including:
 - Proposed locations of treatment system components, including a pump layout, piping scheme, and instrumentation diagram;
 - Details of any pipe trenches and pipe support systems;
 - Routing of influent piping from the sediment barge to the DWTS; and
 - Routing of effluent piping from the DWTS to the Treated Water and Stormwater Discharge Locations on the Staging Site shown on the Construction Drawings.
 - ii. Sizes, type, grade, or class for all tanks, pumps, piping, filters, and other equipment;
- e. Manufacturer's product data for pumps, tanks, process instrumentation, flow meters, filter media, and any other devices needed for dredge water treatment;
- f. Manufacturer's product data including but not limited to commercial names, function and Safety Data Sheets for water treatment chemicals, polymers and/or flocculants. A description of polymer/chemical dosage concentration, how it will be applied, and proposed usage frequency (continuous or slug dose); and
- g. Procedure for determining if stormwater from the DWTS secondary containment system can be direct discharged or requires treatment before discharge.

- h. A copy of DWTS operation and maintenance (O&M) manual on site, including but not limited to compliance with performance standards and maintaining operations including maintenance of adequate spare parts, startup and shutdown, and preventative maintenance.
2. Operator certifications and qualifications including years of experience.
3. Initial calibration records and weekly inspection reports of pumps, piping and tanks during operation.
4. Results of bench-scale jar testing of polymer/chemical.
5. Procedure for sampling and monitoring the granular activated carbon tanks for contaminant breakthrough.
6. Daily summary of continuous effluent monitoring for turbidity, flow, pH and conductivity, and daily record of any downtime of DWTS, including cause and repairs.
7. Calibration records of continuous discharge monitoring instrumentation including turbidity, pH, and conductivity meters.
8. Laboratory analytical results for discharge monitoring in accordance with permit equivalency requirements.

1.04 HEALTH AND SAFETY REQUIREMENTS

- A. The Contractor shall comply with environmental health and safety/training requirements in accordance with the approved Health and Safety Plan and Section 01 35 29.

1.05 REFERENCES

- A. The following codes and standards (versions as of April 2017):
 1. American Water Work Association (AWWA) D103 Standard for Potable Water Storage Tanks;
 2. New York City Fire Code Chapter 27 – Hazardous Materials;
 3. Rules of the City of New York (RCNY) Title 15, Chapter 28: Citywide Construction Noise Mitigation;
 4. New York Administrative Code Title 24, Chapter 1: Environmental Protection and Utilities – Air Pollution Control;
 5. National Electric Code (NEC);
 6. Hydraulic Institute, *Hydraulic Institute Standards*, 14th ed., Hydraulic Institute, Cleveland, OH;
 7. AWWA Standard for Granular Filter Material, American National Standards Institute (ANSI)/AWWA B100-01;
 8. AWWA B604 Standard for Granular Activated Carbon;
 9. ASTM D1125-14 Standard Test Methods for Electrical Conductivity and Resistivity of Water; and

10. ASME Boiler and Pressure Vessel Code.
- B. Geosyntec, 2014. Modified Elutriate Testing (MET) Results.

PART 2 PRODUCTS

2.01 PROCESS INSTRUMENTATION AND CONTROL SYSTEM

- A. The Contractor shall evaluate four levels of control methods: manual, semiautomatic, automatic, and supervisory; and select the appropriate degree of instrumentation and control based on equipment selection and manufacturer's specifications.
- B. The Contractor shall provide an instrumentation and control system that, at a minimum, provides basic automation for the following items: flow rate control, chemical feed rate control, pump rate control, filter control, and analysis and continuous recording of effluent water quality for pH, turbidity, and conductivity. The Contractor shall provide automatic shutdown and alarm system for high-high level condition.
- C. The Contractor shall provide measurement devices that measure the water level, pressure, flow rate, turbidity, pH, conductivity, and polymer/chemical dosages as follows:
 1. Flow meters shall be provided to measure flow rate.
 2. Turbidity meters shall be provided. Nephelometric turbidimeters shall be selected. An air bubble trap shall be installed in the sample line upstream of the turbidity meter to prevent false high reading of water that contains air bubbles.
 3. pH meters shall be composed of three electrodes that are chemically resistant: a pH sensing electrode, a reference electrode, and an electrode that compensates for the temperature. These electrodes shall be mounted in a chamber and installed in the sample line or submerged in the tank. The pH meter shall have the capability for temperature compensation and have a pH range of 0 to 14.0 standard units (s.u.) with a minimum resolution of 0.1 s.u.
 4. Conductivity meter. The Contractor shall provide the proper in-line conductivity meter with a minimum resolution of 5% of the measured value. The conductivity electrodes shall be composed of chemically resistant materials, and conform to ASTM D1125 Standard Test Methods for Electrical Conductivity and Resistivity of Water.
 5. Automatic controllers that check the polymer/chemical dosage.
- D. The Contractor shall provide the appropriate types of control modes, proportional control, cascade control, and ratio control for each application.
- E. The Contractor shall maintain spare pH, turbidity, and conductivity meters onsite so that they can be immediately replaced (and discharge allowed to continue) if any of these meters require maintenance or repair.

2.02 SECONDARY CONTAINMENT

- A. The Contractor shall provide secondary containment for the DWTS components which comply with the requirements of the New York City Fire Code Chapter 27 – Hazardous Materials and the requirements of 40 Code of Federal Regulations (CFR) 112.7 “General Requirements for Spill Prevention, Control, and Countermeasure Plans.”
- B. Secondary containment is required when a container exceeds 55 gallons or aggregate capacity of multiple containers exceeds 1,000 gallons.
- C. Secondary containment for outdoor storage areas shall be designed to contain a spill from the largest container plus the volume of a 24-hour rainfall from a 25-year storm.
- D. Secondary containment shall be designed to contain a spill from the largest container plus the design flow volume of fire protection water for a minimum period of 20 minutes.

2.03 PUMPS

- A. All pumps used in the DWTS shall conform to the applicable ANSI or ASTM standards.
- B. The Contractor shall provide transfer pumps that transfer wash water, decant water, and stormwater from sediment barges, decontamination pads (if applicable), and the asphalt pad to the DWTS. The transfer pumps shall be capable of handling solids remaining after sediment has decanted.
- C. The Contractor shall provide suitable types of noncorrosive pumps, such as peristaltic pumps or equivalent, for liquid chemical metering and injecting of treatment chemicals.
- D. The Contractor shall provide proper types of pumps suitable for transferring water between treatment processes, per manufacturer’s recommendations.
- E. The Contractor shall provide proper types, diaphragm, peristaltic, or gear pumps, for polymer/chemical feed pumps. The chemical feed pumps shall be noncorrosive and compatible with the chemicals.
- F. The Contractor shall provide proper types of pumps for backwashing filters and transferring treatment sludges.
- G. The Contractor shall provide proper types of pumps for transferring treated water to the Canal.
- H. The Contractor shall provide sludge return pumps to transfer solids back to the barge for transportation and disposal.
- I. The Contractor shall provide proper pumps for transferring oil from the oil/water separator to non-aqueous phase liquid (NAPL) storage tank. The pumps for this application shall be capable of handling oily materials.

- J. The capacity of the pumps shall be such that, with any one pump out of service, the remaining pumps shall have the capacity to handle peak daily flow of the dredging operation. Or a replacement pump shall be maintained on site.

2.04 PIPING

- A. Pipe sizes, joints, and wall thicknesses (or thickness schedule) shall be provided.
- B. The Contractor shall provide piping systems with strength that can resist internal pressure, handling, the pipe characteristics must enable the pipe to withstand corrosion, abrasion, expansion, and contraction of the pipeline.
- C. The piping materials shall be such that they are compatible with the fluid or sludge they are transferring, and conform to applicable industry standards. The sludge piping shall be provided to have the appropriate diameter and velocity to prevent clogging.
- D. The thickness design, pipe trench dimensions and details concerning pipe support, bedding, compact fill around the pipes, and backfill of piping shall conform to the latest industry standards applicable to the pipe material selected and manufacturers' specifications.
- E. The Contractor shall provide pipe-related products per manufacturer's recommendations, including but not limited to the following items: fittings, couplings, manifolds, flexible and rigid tubing, riser tubing, dip tubes, hoses, and drop pipes.

2.05 VALVES

- A. Valves shall be used only where they are essential. The Contractor shall select appropriate types of valves for each application which can resist corrosion, abrasion, and pressure, and conform to manufacturer's specifications and applicable ANSI/AWWA standards.
- B. The Contractor shall provide suitably sized control valves that are capable of handling the full range of anticipated flows.
- C. The Contractor shall install suitable shutoff and/or check valves at the suction and discharge lines of each pump. All shutoff and check valves shall be operable from ground level and accessible for maintenance.
- D. The system controls valve shall control all functions of the filter's back flushing, rinsing, and service cycles.

2.06 TANKS

- A. The Contractor shall provide tanks that have appropriate working capacities.

- B. The tanks may be new or used, but shall be certified clean by the tank vendor, serviceable and adequate for the intended purpose. The Owner's Representative reserves the right to inspect and approve/reject the use of the tank. If the Owner's Representative determines that an alternate tank is required, the cost to demobilize the dirty tank and mobilize a new clean tank must be paid for by the Contractor.
- C. Tanks shall be of a design that can be easily installed. The tank shall be equipped with tie-down lugs or other devices which will hold the tank in place.
- D. Tanks shall be constructed of a material that is chemically compatible with the material to be contained and shall be resistant to ultraviolet degradation. Double walled storage tanks shall be sized with the containment tank providing 110 percent capacity of the primary tank. The containment tank shall be sealed to the outer wall of the primary tank to prevent contamination.
- E. Tanks shall be closed-top or equipped with removable covers. Tanks shall be filled and drained with through-the-wall or drain ports. Each tank shall be fitted with ports for draining the tank.
- F. Exterior and interior walls of tanks shall be properly coated in accordance with manufacturer's specifications.
- G. Tank walls shall be adequately supported and protected to prevent collapse, rupture or puncture under normal conditions.
- H. Tanks shall be equipped with control devices to prevent overflowing. Each tank shall have a dedicated fill line.
- I. Tanks shall have suitably sized nozzles/fittings as standard equipment, at various locations, such as fill, tank vent and pump suction, depending on tank size. All nozzles attached to the tanks below the full level of the tanks shall be two-flanged style. Gaskets shall be of Viton, cross-linked polyethylene, or other material recommended by the manufacturer. Bolts shall clamp the two flanges together, clamping the gaskets to the tank wall.
- J. Tanks for chemical mixing or storing shall be lined with corrosion-resistant material and shall be capable of handling cleaning agents at temperatures of at least 90 °C (200 °F).
- K. Tank vents shall comply with health and safety requirements for normal venting of atmospheric tanks. Vent devices shall be designed in accordance with industry standards to provide adequate relief in the event of deflagration of the tank contents. Proper caution or warning signs as prescribed by health and safety requirements shall be affixed to the tank, in accordance with the approved Health and Safety Plan and Section 01 35 29.

2.07 FLOW MEASUREMENT SYSTEM

- A. The Contractor shall provide a non-mechanical (e.g., electromagnetic, ultrasonic) flow measurement system to measure influent flow in accordance with the manufacturer's written instructions and industry standards. The Contractor shall furnish manufacturer's product data, test reports, and material certifications.
- B. The flow measurement system shall be capable of operating continuously in outdoor conditions between the ambient temperatures of -10° to 50° C (14 °F to 122 °F) and between 0 to 95% relative humidity. The flow measurement system shall be capable of handling suspended solids in the liquid without affecting the accuracy of the system. The flow measurement system shall be constructed of corrosion resistant materials.
- C. The flow measurement system shall display instantaneous flow rate, and the register must remain legible over the life of the meter. The system shall include a flow totalizer and a data logger that records instantaneous flow at a maximum interval of 5 minutes.
- D. The flow measurement system shall operate at all times that liquid is being pumped.
- E. The flow measurement system shall have a +/- 2% accuracy over the complete operating range as supplied. The flow measurement system as installed shall be capable of measuring flows over the full operating range of the influent pumping system to an accuracy of +/- 5%.
- F. The flow measurement system shall have a factory wet calibration certificate stating the calibration date, time, and accuracy of the meter. A calibration certificate stating the meter's serial number, person or facility conducting the test, and the date, time, and location of the test shall be provided upon request.

2.08 FLOW EQUALIZATION TANK AND OIL/WATER SEPARATOR

- A. The Contractor shall provide flow equalization tanks as follows:
 - 1. Tanks shall be sized to hold a full day's volume of dredge water;
 - 2. Tanks shall have means to remove settleable solids and sludge during operation;
 - 3. Tank inlets and outlets for all basin compartments shall be suitably equipped with accessible external valves, stop plates, weirs, or other devices to permit flow control and the removal of an individual unit from service. Tanks shall also be equipped with means to measure and indicate liquid levels and flow rates;
 - 4. Any electrical work in equalization tanks shall meet the appropriate National Electric Code (NEC) requirements; and
 - 5. Suitable access shall be provided to facilitate cleaning and the maintenance of the equipment.

- B. The oil/water separator shall be designed for gravity separation of sand, grit, settleable solids, semisolids, and free oils (hydrocarbons and other petroleum products) from wastewater associated with dredging operations.

The oil/water separator shall be a pre-packaged, pre-engineered unit designed as follows:

1. Inlet and outlet shall have suitably sized National Pipe Thread (NPT) or flanged connections;
2. A non-clogging stationary under-flow diffusion baffle shall be located in the inlet chamber with discharge located below the normal liquid level. Under-flow diffusion baffle shall be angled and designed to:
 - a. Reduce horizontal velocity and flow turbulence;
 - b. Distribute the flow equally over the separator cross sectional area;
 - c. Direct the flow in a serpentine path so as to enhance hydraulic characteristics and fully utilize all interceptor volume;
 - d. Completely isolate all inlet turbulence from the oil separation/storage compartment to prevent re-suspension of separated oil; and
 - e. Promote the separation of settleable solids from wastewater.
3. Vent and waste oil draw-off shall have suitably sized NPT or flanged fittings;
4. The sludge baffle shall retain settleable solids and sediment and prevent them from entering the separation chamber; and
5. A separation/storage chamber shall disperse flow and collect oily solids and sediments.

2.09 POLYMER FEED AND PH ADJUSTMENT SYSTEMS

- A. The Contractor shall provide a polymer feed system. The components and appurtenances shall include, but not be limited to:
1. Feeder. The feeder materials shall be compatible with the chemicals. The feeder type shall consist of metering pumps, a magnetic flow meter, or a rotameter. The feeder shall be provided to cover the range for dosage setting and flow pacing. Automatic or manual control shall be provided for dosage setting and flow pacing. Feeder accuracy shall be $\pm 1.0\%$.
 2. Storage. Storage shall be made of noncorrosive material; a steel tank may be used if it has a protective lining. The capacity shall be 15 days of storage, based on the maximum dosage and average daily flow rate. A content indicator shall be provided for each tank.
 3. Feed line. Feed line shall be made of noncorrosive materials such as PVC or type 316 stainless steel, and conform to applicable industry standards. A removable top channel with gravity flow is often used for lime slurry in dry feed system.
 4. Diffuser. The Contractor shall select the proper type of diffuser depending on the type of chemical used. Types A (in-line) and B diffusers (in a tank inlet or in a

channel) that are perforated-pipe diffusers are appropriate for non-scale-forming chemicals or polymer addition, and they shall be used if mixing is achieved solely by diffusion and not by means of positive flash mixing. Types A and B diffusers shall be avoided if the chemical has scale-forming characteristics and types C (in-line removable), D (in a tank inlet or in a structure), and E (gravity feed from a trough above water surface) diffusers shall be considered.

- B. The Contractor shall select polymers/chemicals that are EPA-approved for drinking water use and approved for use in the State of New York. The maximum dosages shall conform with the aquatic criteria set by regulatory authorities.
- C. The Contractor shall provide emergency spill kits around the polymer feed system to contain and dispose of the spilled material in accordance with requirements in this Section and Sections 01 57 19 and 02 51 19.
- D. In chemical storage areas, the Contractor shall provide: clear warning signs on chemical storage areas, eyewashes and safety showers, berms for secondary containments, and adequate lighting and ventilations. All chemical storage tanks shall have tags labeling their contents, access ports, a fill line, drains, overflows, discharge valves, vents, and content indicators (such as a load cell or a differential pressure cell, or sonic-level indicators).
- E. The Contractor shall use mixing devices with relatively low speeds, such as mechanical mixers at 400 revolutions per minute (rpm) or less, in order to reduce the potential for breaking the polymer chains.

2.10 LAMELLA CLARIFIER

- A. The clarifier units shall be designed as pre-fabricated commercial complete package units to integrate settling and flocculation. The inclined plates shall be National Sanitation Foundation (NSF)-approved and installed in tanks with either a hopper or a sludge thickening bottom.
- B. The rapid mixing tanks shall have appropriate design retention time. Design settling velocity shall not exceed 500 gallons per day per square foot. Design parameters must meet laminar flow conditions (Reynolds number shall not exceed 200).
- C. The Contractor shall install inclined plate angles and plate spacing conforming to manufacturer's specifications.
- D. The clarifiers shall be equipped with a control panel to start and stop operation, or complete system control panel with various stages of control (e.g. manual to fully automatic).
- E. The clarifiers shall have suitably sized inlet and outlet connections for transferring influent, sludge, and effluent.

F. Appurtenances shall include:

1. Convenient access (catwalks, ladders, and stairs) for inspection and maintenance;
2. Sludge scraper and underdrain for sludge discharge; and
3. Sampling points for influent and effluent.

2.11 SAND FILTER

- A. The Contractor shall provide sand filter media and conform to manufacturer's specifications and NSF requirements set forth for the media's uniformity coefficient, bulk density, specific gravity, effective size, and depth.
- B. The sand filter hydraulic loading rate shall not exceed 5 gallons per minute per square foot.
- C. The following appurtenances shall be provided:
1. Washwater troughs, surface wash or air scouring equipment;
 2. Suitably sized inlet and outlet connections;
 3. Valves which can be backwashed individually and which have means of positive control of the backwash rate;
 4. Flow and head loss measuring devices;
 5. Positive means of shutting off flow to a filter being backwashed;
 6. Filter influent and effluent sampling points; and
 7. Drain ports which allow for uniform distribution of backwash water.

2.12 GRANULAR ACTIVATED CARBON FILTER

- A. The granular activated carbon (GAC) tank shall be a circular configuration or unless otherwise approved by the Owner's Representative.
- B. The Contractor shall provide GAC media, either virgin or reactivated, which conforms to manufacturer's specifications and NSF requirements set forth for the media's uniformity coefficient, bulk density, specific gravity, effective size, and depth.
- C. Each vessel shall have convenient access to all components and the media surface for inspection and maintenance.
- D. The following appurtenances shall be provided:
1. Wash water troughs, surface wash or air scouring equipment;
 2. Suitably sized inlet and outlet connections;
 3. Valves which can be backwashed individually and which have means of positive control of the backwash rate;
 4. Flow and head loss measuring devices;

5. Positive means of shutting off flow to a filter being backwashed;
6. Filter influent and effluent sampling points; and
7. Drain ports which allow for uniform distribution of backwash water.

2.13 BACKWASH WATER/EFFLUENT STORAGE TANK

- A. The Contractor shall provide a backwash water/effluent holding tank at the end of the DWTS.
- B. The tank shall have the same size and working capacity as the Equalization Tank to hold a total day's dredging flow.

PART 3 EXECUTION

3.01 DREDGE WATER TREATMENT SYSTEM

- A. The DWTS shall be designed to treat dredging-related wastewater to reduce pollutants to levels that comply with applicable federal, state, and local regulations. The system shall be designed to treat wastewater in a timely manner so as to not adversely impact dredging production.
- B. The DWTS shall include sufficient equalization storage capacity for a full day of dredging. The Contractor shall size the DWTS to match the planned dredge production rate and predicted capture of all sources of dredge water. However, the design flow rate shall not be less than 120 gallons per minute (gpm). Sources of dredge water include, but are not limited to:
 1. Free water captured in bucket during dredging;
 2. Porewater from sediment dewatering activities;
 3. Water from debris washing and equipment decontamination;
 4. Asphalt pad underdrain water; and
 5. Stormwater that comes into contact with contaminated sediment on the barge/scow and on the upland Staging Site.
- C. The GAC filters shall be designed in series with lead and lag tanks to facilitate treatment media replacement to prevent discharge of effluent in violation of applicable discharge criteria. The piping between tanks shall be designed to accommodate sampling by the Contractor after the lead tank to determine if contaminants have exceeded the breakthrough capacity of the lead tank.
- D. Treatment System Redundancy
 1. During Phase I dredging, because of the short duration of DWTS operation required to support Phase I dredging operations and limited volume of water to be treated, redundant treatment trains are not required. However, flow equalization tanks must

meet the requirements of Part 2.08, FLOW EQUALIZATION TANK AND OIL/WATER SEPARATOR, of this specification. Alternative water treatment approaches such as off-site treatment at a licensed disposal facility are allowed during Phase I dredging. Use of alternative water treatment approaches shall be described in the Dredge Water Treatment and Management Plan, and applicable permit requirements shall be provided. Alternative water treatment plans shall be approved by the Owner's Representative and the USEPA before being allowed for use.

2. During Phase II and Phase III dredging, the system shall be designed with sufficient redundancy to accommodate system maintenance and unanticipated failure of a single component. Two treatment trains will be operated in parallel with each train sized to treat 50% or more of the maximum daily flow during a typical 8-hour shift to allow the DWTS to operate continuously between dredging shifts if one train is out of service.
- E. The Contractor shall install the DWTS prior to initiating dredging activities. Installation and operation shall be subject to approval by the Owner's Representative before dredging activities may commence.
- F. The Contractor shall control noise and odors in accordance with Section 01 57 19. Generators or similar off-grid sources shall comply with requirements set forth in RCNY Title 15, Chapter 28: "Citywide Construction Noise Mitigation," New York Administrative Code Title 24, Chapter 1: "Environmental Protection and Utilities – Air Pollution Control," and Section 01 57 19.
- G. The Contractor shall provide electrical service in accordance with the electrical requirements of Section 01 51 00, NEC, and local ordinances.
- H. The Contractor shall transport reagents and wastes in accordance with Section 02 51 19.

3.02 WATER QUALITY COMPLIANCE

- A. Continuous Monitoring
1. Treated water shall be direct discharged to one of the Discharge Locations shown on the Construction Drawings.
 2. The Contractor shall continuously monitor treated effluent for the analytes listed in Table 44 08 40-1 and in accordance with the Contractor's Quality Assurance Project Plan (QAPP) (Refer to Section 01 40 00).
 3. In the event the measured turbidity exceeds the limit in Table 44 08 40-1, the Contractor shall notify the Owner's Representative, identify the cause of exceedance, and implement corrective measures. If the corrective measures are unsuccessful in producing effluent that meets turbidity limits, the effluent water shall be stored in the effluent storage tanks until further corrective measures are taken that succeed in producing effluent that meets turbidity limits. If necessary,

the Contractor shall halt dredging operations that generate additional influent water at no additional cost to the Owner until effluent turbidity limits are met. The Owner’s Representative will be notified prior to recommencement of direct discharge.

Table 44 08 40-1 – Continuous Monitoring Criteria

Analyte	Maximum Concentration
Turbidity ¹	30 NTU
Daily Flow ¹ , MGD	Monitor
Conductivity ¹	Monitor
pH	Monitor

1. Parameters will be monitored, but results are not reported under permit equivalency requirements.

Abbreviations:

MGD = million gallons per day

NTU = nephelometric turbidity units

B. Water Quality Monitoring for Permit Equivalency Requirements

1. Discharges from the DWTS shall be monitored as described in this Section and in accordance with the QAPP (Refer to Section 01 40 00) and meet the discharge limits given in Table 44 08 40-2. The Contractor shall continuously monitor treated effluent for pH. For the remainder of the parameters listed in Table 44 08 40-2, the Contractor will sample treated effluent within the first week of DWTS operation and according to the frequencies outlined in Table 44 08 40-2 thereafter.
2. If either the turbidity limit is exceeded or the discharge limit for any other parameter is exceeded, then the Contractor shall implement corrective measures. During the time required to implement the corrective measures, water will be held in the effluent storage/backwash supply tank and will not be discharged. After corrective measures are implemented, water in the effluent storage/backwash supply tank will be recycled through the treatment system, and the effluent will be resampled and analyzed for the “failed” parameter on a rushed turnaround time (TAT) basis. After exceeding a discharge limit, water will not be discharged until corrective measures are taken and the “failed” parameter(s) meets discharge criteria. The Contractor shall notify the Owner’s Representative prior to recommencement of direct discharge to the Canal via the selected Discharge Location.

Table 44 08 40-2 – Water Quality Requirements for Permit Equivalency

Parameter	Discharge Limits¹	Monitoring Requirement (Frequency and sample type)
pH	Monitor	Continuous meter
Ammonia, as N	Monitor	Monthly grab
BOD5	20 mg/L	Weekly grab
Dissolved oxygen	Monitor	Weekly grab
Oil and grease	15 mg/L	Weekly grab
Total suspended solids	20 mg/L	Weekly grab
Copper, total	79 ug/L	Weekly grab
Lead, total	200 ug/L	Weekly grab
Benzo(a)pyrene	90 ng/L	Weekly grab
PCBs (per Aroclor)	200 ng/L	Weekly grab

Abbreviations:

- BOD = biochemical oxygen demand
- mg/L = milligram per liter
- µg/L = microgram per liter
- ng/L = nanogram per liter
- PCBs = polychlorinated biphenyls

Additional Conditions and Footnotes for Table 44 08 40-2:

1. All numerical values contained herein are daily maximum values.
2. Following consideration by the EPA Remedial Project Manager of the Contaminants of Concern (COCs) for the Site, the available sediment and surface water data regarding COCs and other hazardous substances, the ARARs and TBCs for the Site, the discharge recommendations of the NYSDEC and their derivation, including from guidance values, the temporary remedial nature of the discharge, current surface water quality conditions, including the NYSDEC LTCP determination regarding CWA compliance for CSO discharges, the technology of the approved water treatment system, and the use of Best Engineering Judgment, the values in this section shall be evaluated.
3. Discharge not authorized until such time as an engineering submission detailing the method of treatment is approved by USEPA. The discharge rate may not exceed the effective or design treatment system capacity.
4. Only site generated wastewater is authorized for treatment and discharge.
5. Where applicable, both concentration (mg/l, µg/l or ng/l) and mass loadings (lbs/day) must be reported to USEPA for all parameters except flow and pH.
6. Any water treatment chemicals used in the treatment process must be authorized by the USEPA prior to use.
7. This discharge and administration of this discharge must comply with the substantive requirements of 6 NYCRR Part 750, except as modified herein.

8. The Water Quality Based Effluent Limit (WQBEL) of 6 ng/l for benzo(a)pyrene is superseded by the analytical Minimum Level (ML) of 90 ng/l.
9. Monitoring shall be performed for all priority pollutants specified in EPA Methods 624, 625 and 608.
10. Due to the short-term duration of the discharge, WET testing, mercury minimization and PCB minimization requirements have not been specified.
11. The turbidity/air curtains shall be operated for the duration of the dredging project unless otherwise approved by USEPA.

3.03 STORMWATER TREATMENT

- A. Stormwater which falls on the existing asphalt pad may be stored on pad until it can be managed in accordance with Section 02 51 19. The asphalt pad was designed to contain the 100-year, 24-hour storm event without the storage of materials on the pad.
- B. Any spills within the treatment plant secondary containment shall be controlled in accordance with the Spill Prevention and Control Plan described in Section 01 57 19. All stormwater coming in contact with spills or sediment from Canal shall be treated. Stormwater that has not been in contact with spills or sediment from Canal can either be released or treated.

3.04 SYSTEM COMPONENTS

- A. Process Instrumentation and Control System
 1. Preparation. The Contractor shall inspect all parts and appurtenances for defects prior to installation.
 2. Installation. The Contractor shall install and calibrate the process instrumentation and control system per manufacturer's specifications.
 3. Testing. Production performance testing shall be conducted by the Contractor.
- B. Secondary Containment
 1. Preparation. The Contractor shall inspect all parts and appurtenances for defects prior to installation.
 2. Installation. The Contractor shall install secondary containment in accordance with manufacturer's recommendations.
- C. Pumps
 1. Preparation. The Contractor shall inspect pumps for defects prior to installation.
 2. Installation. The Contractor shall install pumps in accordance with the manufacturer's installation instructions and recommendations. After installation and connection work is completed, the Contractor shall check the installation for correctness, verifying that connections are free of leaks and the system is operational. Installation personnel shall correct discrepancies. Prior to operating

pumps, the Contractor shall furnish and install necessary lubricants for proper operation.

D. Piping

1. Preparation. The Contractor shall inspect piping for defects prior to installation.
2. Installation. The Contractor shall install piping system to match pumps and in accordance with manufacturer's specifications.
3. Testing. The Contractor shall leak test piping with potable water prior to beginning of operation. The Contractor shall correct any leaks disclosed by this test in accordance with the manufacturer's recommendations.

E. Valves

1. Preparation. The Contractor shall inspect all valves for defects prior to installation.
2. Installation. The Contractor shall install valves per manufacturer's specifications. The Contractor shall install suitable shutoff and/or check valves at the suction and discharge lines of each pump. All shutoff and check valves shall be operable from floor level and accessible for maintenance.
3. Testing. The Contractor shall leak test valves with potable water prior to beginning of operation. The system controls valve shall be tested to control all functions of the filter's back flushing, rinsing, and service cycles. The Contractor shall correct any leaks disclosed by this test in accordance with the manufacturer's recommendations.

F. Tanks

1. The Contractor shall install and secure tanks in accordance with manufacturer's specifications. Care shall be exercised in handling and bolting of the tank plates, supports, and members to avoid abrasion or scratching of the coating. Touch-up coating shall be done in accordance with the manufacturer's recommendations as required and if directed by the Owner's Representative.
2. Following completion of installation and cleaning of the tanks, the tanks shall be tested for liquid tightness by filling the tank to its overflow elevation. The Contractor shall correct any leaks disclosed by this test in accordance with the manufacturer's recommendations.
3. The Contractor shall use clean potable water at the time of installation for hydrostatically testing the tanks. The wash wastewater shall be captured and stored in backwash water/effluent storage tank during process startup.
4. Filling and emptying the tanks shall be the responsibility of the Contractor.
5. The backwash water/effluent storage tank:
 - a. Shall be large enough to accommodate the water volume of two to three backwashes, depending on the anticipated frequency of filter washing.
 - b. Shall be used to capture and test treated water to prove proper operation during process startup before discharge.

c. Shall serve as a backwash water storage tank during routine operation.

G. Flow Measurement Systems

1. All components shall be inspected for defects prior to installation.
2. The Contractor shall mount instruments so that local indicators and readouts are readily observable from the ground. Mount instrumentation as high as possible in vault areas to avoid potential water damage per manufacturer's specifications.
3. The Contractor shall install the flow element in the DWTS influent line in the correct direction and orientation of flow as recommended by the manufacturer. Unless otherwise specified by the manufacturer, the flow measurement system shall be installed with a minimum length of ten diameters of straight unobstructed rigid pipe on the intake side of the meter and a minimum of five diameters of straight unobstructed rigid pipe on the discharge side of the meter.
4. The flow measurement system shall be installed so the pipe is full of water at all flow rates on both the intake and discharge sides of the meter. The Contractor shall inspect each unit periodically as part of a scheduled maintenance program, as indicated in manufacturer's instructions.
5. The meter shall be installed in the correct direction to flow. The Contractor shall install tamper seals in the presence of the Owner's Representative and secure electronic settings that may alter the accuracy and integrity of the meter and associated devices.
6. The Contractor shall calibrate unit for ranges as indicated in manufacturer's specifications. The Contractor shall record initial flow meter reading at time of installation. The Contractor shall record all measurement and configuration data, and complete appropriate documentation within one month of the completion of the flow-meter installation.

H. Flow Equalization Tank and Oil/Water Separator

1. Preparation. The Contractor shall inspect all parts and appurtenances for defects prior to installation.
2. Installation. The Contractor shall perform installation in accordance with manufacturer's specifications.
3. Testing. Testing shall be performed per manufacturer's specifications.

I. Polymer Feed and pH Adjustment Systems

1. Preparation. The Contractor shall inspect all parts and appurtenances for defects prior to installation.
2. Installation. The Contractor shall perform installation in accordance manufacturer's specifications.
3. Testing. Testing shall be performed per manufacturer's specifications. The Contractor shall perform bench-scale test to optimize polymer/chemical dosage and adjust mixing conditions in accordance with this section.

J. Lamella Clarifier

1. Preparation. The Contractor shall inspect all parts and appurtenances for defects prior to installation.
2. Installation. The Contractor shall perform installation in accordance with manufacturer's specifications.
3. Testing. Testing shall be performed per manufacturer's specifications.

K. Sand Filter

1. Preparation. The Contractor shall inspect equipment and appurtenances for defects prior to installation.
2. Installation. The Contractor shall perform installation in accordance with manufacturer's specifications.
3. Testing. Testing shall be performed per manufacturer's specifications.

L. Granular Activated Carbon Filter

1. Preparation. The Contractor shall inspect GAC vessels and appurtenances for defects prior to installation. The Contractor shall soak GAC media in potable water for maturation prior to installation.
2. Installation. The Contractor shall perform installation in accordance with manufacturer's specifications.
3. Testing. Testing shall be performed per manufacturer's specifications.

M. Backwash/Effluent Storage Tank

1. Preparation. The Contractor shall inspect all parts and appurtenances for defects prior to installation.
2. Installation. The Contractor shall perform installation in accordance with manufacturer's specifications.
3. Testing. Testing shall be performed per manufacturer's specifications.

N. Winterizing

1. If ambient temperatures are expected to fall below freezing during the duration of Work, tanks, pumps and associated pipes and valves shall be winterized to prevent leaking and to maintain DWTS operation.

O. Chemical Storage and Handling Areas

1. All chemical storage and handling areas shall conform to the local safety codes and requirements in Section 01 35 29.

P. Labelling

1. All piping, tanks, equipment shall be labelled with component name, number, treatment train number, flow direction, and fluid/chemical in pipe or component (i.e., NAPL, backwash, polymer, etc.).

3.05 INSTALLATION AND INITIAL TESTING

- A. The Contractor shall perform initial testing for the completed DWTS and component units per manufacturer's specifications to confirm that the system meets the design standards. These performance tests shall be conducted at design load conditions wherever practical.
- B. The Contractor shall perform initial testing of the entire assembled DWTS with clean water and test the water to make sure the treatment system does not have remnant contamination from other sites. The clean water testing shall be subject to approval of the Owner's Representative prior to treating and discharging any fluids from the DWTS.
- C. The Contractor shall perform bench-scale jar testing of polymer/chemical prior to water treatment system startup per manufacturer's recommendations to optimize polymer/chemical dosage and adjust mixing conditions for flocculation application.
- D. Process instrumentation and control devices, such as flow meters, polymer/chemical dose control devices, pH meter, turbidity meter, and conductivity meter shall be calibrated prior to DWTS operation. The Contractor shall be prepared to debug items during DWTS startup. The Contractor shall execute the following items during startup including, but not limited to: maturation of granular medium filters, optimization of filter wash conditions, ensuring the proper pump operation sequence, and analysis and control of the treated water quality prior to discharge.

3.06 OPERATION AND MAINTENANCE

- A. The Contractor shall monitor the dredge water treatment effluent continuously for the following parameters: pH, conductivity and turbidity. Monitoring equipment shall be maintained and calibrated in accordance with the manufacturer's recommended procedures. Calibration of monitoring instrumentation shall be performed prior to the start of discharge and in accordance with manufacturer's recommendations. Effluent discharge monitoring tests will be performed by the Contractor.
- B. The Contractor shall conduct weekly inspections of the pumps, piping and tanks. Inspections shall determine if there is evidence of deterioration, or evidence of leaks. An inspection report shall be written to describe the results of each inspection and submitted to the Owner's Representative.
- C. The Contractor shall manage and/or dispose of DWTS-generated waste, including sludge, solids, oil and grease, and spent filter media, according to Section 02 51 19.
- D. The Contractor shall periodically monitor back pressure of sand filters and backwash filters as needed with treated effluent from the backwash/effluent storage tank.
- E. The Contractor shall routinely monitor effluent from the lead activated carbon unit for breakthrough of organics. Activated carbon media shall be replaced as directed by the manufacturer's specifications.

- F. The Contractor shall notify the Owner's Representative immediately and record in field reports when the water treatment system is taken offline and again when the system is operational.
- G. The Contractor shall maintain good housekeeping and neat conditions in the area of the DWTS. Clean up of soils and or water contaminated due to malfunction of the wastewater treatment system shall be the responsibility of the Contractor.

[END OF SECTION]