



REQUEST FOR PROPOSALS

FOR

**Contract: BEPA- LIS HWQMS -BUREAU OF ENVIRONMENTAL PLANNING AND
ANALYSIS
LONG ISLAND SOUND - HYDRODYNAMIC AND WATER QUALITY MODELLING
SUPPORT**

PIN: 82619BEPLIS

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CONSULTANTS, PROFESSIONAL, TECHNICAL, HUMAN AND
CLIENT SERVICES**

SECTION I – TIMETABLE

A. **Release Date of the Request for Proposals:** July 11, 2019

All questions and requests for additional information concerning this RFP should be directed to Jeanne Schreiber, the Authorized DEP Contact Person, at:

E-Mail Address: RFP@dep.nyc.gov

Last day to submit questions regarding this RFP will be no later than close of business on
August 6, 2019

B. **Pre-Proposal Conference:**

Date: **July 24, 2019**

Time: **10:00 A.M.**

Location: **DEP, 59-17 Junction Blvd, 11th Floor Conference Room, Flushing, NY 11373**

Attendance to the Pre-proposal Conference is not mandatory, but is strongly recommended. Please limit attendance to no more than one person form each firm.

C. **Site Visit:** None

D. **Proposal Due Date and Time and Location:**

Date: **August 20, 2019**

Time: **4:00 P.M.**

Location: Proposals shall be submitted to:

Debra Butlien, Deputy Agency Chief Contracting Officer
NYC Department of Environmental Protection
59-17 Junction Boulevard, 17th Floor Bid Room
Flushing, New York 11373

*Bid Room hours: 8:30 AM – 4:30 PM. Note: Proposals may be submitted early during Bid Room hours prior to Due Date and Time.

E-mailed or faxed proposals will not be accepted.

Proposals received at this location after the Proposal Due Date and Time are late and shall not be accepted, except as provided under the City of New York's Procurement Policy Board Rules. The City of New York ("the City") Department of Environmental Protection ("DEP") will consider requests made, in advance of the Proposal Due Date, to the Authorized DEP Contact Person to extend the Proposal Due Date and Time prescribed above. However, unless DEP issues a written addendum to the RFP which extends the Proposal Due Date and Time for all proposers, the Proposal Due Date and Time prescribed above shall remain in effect.

E. Anticipated Contract Start Date: January 2020

F. Anticipated Procurement Milestones (for planning purposes only):

Proposal Due Date: August 20, 2019

Contract Negotiations Complete: October 2019

Public Hearing for Proposed Award: November 2019

Contract Start: January 2020

Proposers are advised that in order to complete this procurement in accordance with the anticipated schedule, proposers may be required to be present for oral presentations on one week's notice.

SECTION II - SUMMARY OF THE REQUEST FOR PROPOSALS

A. Purpose of RFP

The New York City Department of Environmental Protection (“DEP”) is seeking a cross-disciplinary team of professionals (the “Consultant”) to build upon, update, and/or improve a hydrodynamic and water quality model(s) and associated Graphical User Interface/Decision Support Tool (“GUI/DST”) for Long Island Sound (“LIS”) to assist DEP in integrated water management planning and assessment. The effort is intended to build upon, update, and/or improve the modeling efforts used for watershed management and Clean Water Act (“CWA”) compliance efforts required under the 2000 LIS Total Maximum Daily Load (“TMDL”) and help guide future watershed management, planning, compliance and assessment activities based on more recent water quality and environmental data and the best available science. Given some of the potential deficiencies associated with the current LIS models, and the significant advancements in computer processing since the current system-wide model was developed over 20 years ago, DEP is looking for a consultant team that has experience with both developing and utilizing complex open-source or proprietary hydrodynamic and water quality models, as well as experience in developing software and GUI tools and processes that promote model transparency and usability. The models should be scalable and linkable to address both the open waters of LIS, as well as the rivers and embayments where future nutrient and other pollutant reductions may be required of LIS communities and watersheds. The model(s) developed will also need to support management strategies within system-wide (New York Bight, New York Harbor and LIS) and regional (for example, LIS, New York Harbor) spatial scales.

B. Anticipated Contract Term

It is anticipated that the term of the awarded contract will be for 1,825 calendar days.

C. Anticipated Payment Structure

Cost Plus payment is the anticipated payment method for the contract awarded for the scope of services (Attachment F) including Project Management services outlined in this RFP. The costs for Project Management tasks are capped at 10% of the total for each task.

DEP will consider proposals to structure payments in a different manner and reserves the right to select any payment structure that is in the City’s best interest.

D. Minimum Qualification Requirements: None

E. Travel for Key Personnel

Proposers are reminded that the Department will not reimburse for long distance travel (flights or rail travel) for its Key Personnel that reside outside of New York State or if their corresponding home office is located outside of New York State for work performed under a contract resulting from this RFP.

Key Personnel may include:

Project Director

Project Manager

Task Lead-Hydrodynamic Modeling,

-Water quality modeling

-GUI/DST development

Data/Statistical analysis Lead

GIS/Data Base Software Management/Database Developer

QA/QC Manager

F. Exclusion from participation in this RFP N/A

G. Participation By Minority-Owned And Women-Owned Business Enterprises In City Procurement

The contract resulting from this Request for Proposals will be subject to Local Law 1 of 2013, the Minority-Owned and Women-Owned Business Enterprise (M/WBE) program. Please refer to **Attachment K** for information on the M/WBE requirements established for this solicitation and instructions on how to complete the required forms.

The M/WBE Total Participation Goal for contract(s) awarded from this RFP is twenty percent (20%).

Failure to attain the MBE/WBE goal or demonstrate good faith efforts to do so may subject the Contractor to sanctions.

Note: As fully explained in the Notice to Prospective Contractors—part of Attachment J or Attachment K—if proposer is planning to file a request for waiver of the Target Subcontracting Percentage, the waiver request must be submitted to DEP at least seven days prior to the proposal due date and time in order to be considered.

Access to DEP Information and Materials: N/A

SECTION III: PROJECT DESCRIPTION

A. PROJECT DESCRIPTION

DEP is initiating the development of a comprehensive model for LIS to assist DEP in integrated water management planning and assessment. The LIS is a designated estuary of national significance. It is narrow (21 miles), long (110 miles), relatively shallow (average depth of 65 feet) with a surface area of 1,300 square miles and a drainage basin area of 15,820 square miles (Patten et al., 1997). The watershed of the LIS drains an area of more than 16,000 square miles and encompasses virtually the entire State of Connecticut, portions of Massachusetts, New Hampshire, and Vermont, with a small area at the source of the Connecticut River in Canada. It also includes portions of New York City, and Westchester, Nassau, and Suffolk Counties in New York State. An extensive amount of background information concerning LIS can be found at www.longislandsoundstudy.net

There have been several models developed for LIS and the surrounding estuarine waters to support TMDL efforts, other management scenario planning assessments, and research investigations. However, a new or updated integrated modeling approach is needed for LIS that can be verified by field data to support technically credible modeling evaluations of how changes in environmental conditions or management strategies (e.g., nutrient load reductions) may impact water quality or living resources in the LIS. The effort is intended to build upon, update, and/or improve the modeling efforts used for watershed management and CWA compliance efforts required under the Year 2000 LIS TMDL. A new comprehensive modeling approach is also needed to address some of the potential issues associated with the prior modeling efforts used in the Year 2000 LIS TMDL, to calibrate and update the hydrodynamic and water quality models based on the latest information, science and data accumulated over the years, and to take advantage of new computer processing capabilities. An integrated modeling framework is comprised of the following major scalable and linked components: (a) watershed loading (e.g., rivers, point and non-point, groundwater, etc.), (b) hydrodynamics, (c) water quality/eutrophication, and (d) living resources and ecological processes.

To support the development of a new integrated model for LIS, the United States Environmental Protection Agency (“USEPA”) has entered into a Cooperative Agreement with DEP and provided DEP with a matching grant: to develop, calibrate and validate new or improved linkable and scalable hydrodynamic and water quality model(s); and, to design a user-friendly GUI/DST to improve model transparency and usability, and facilitate the use of the models by DEP in integrated water management planning and assessment. The model(s) developed should address both the open waters of LIS, as well as the rivers and embayments where future nutrient and other pollutant reductions may be required of LIS communities and watersheds.

The scope of services that the Consultant shall perform is provided in Attachment F. This scope of services has been informed by the recommendations of a Technical Advisory Committee (“TAC”) that provided a modeling Technical Guidance Report to DEP and which is provided as **Attachment N**.

KEY PROJECT OBJECTIVES

Objective #1- Create and/or expand upon a three-dimensional hydrodynamic model with sufficient spatial resolution, including coastal embayments and tidal rivers, which represents complex bathymetry accurately and is capable of simulating significant physical characteristics and processes, including open water seasonal stratification, in LIS waters.

Objective #2- Model eutrophication processes to accurately capture dissolved oxygen, phytoplankton, organic carbon, and nutrient distributions in the LIS and to provide accurate parameters to support future ecological assessments and models.

Objective #3- Develop a robust model framework that is capable of linking multiple scale hydrodynamic and water quality models, and is updatable to use new data and to simulate future environmental conditions, such as climate change and sea level rise scenarios.

Objective #4- Establish a model framework that facilitates evaluation of multiple planning and management scenarios on water quality (for example-the impact of sea level rise, increased water temperatures due to climate change, or to estimate the benefits of reduced point or non-point source nitrogen loads).

Objective #5- Incorporate open source coding standards and interoperable data exchange standards to ensure broader access and ability to contribute to hydrodynamic and water quality models testing and development

Objective #6- Create a GUI/DST to support centralized data management, provide tools for pre-processing and post-processing data to assist in data analysis, visualization, and assessment and management scenario evaluations, and to increase usability and transparency of modeling framework for the research community.

B. GENERAL SCOPE OF SERVICES

At the direction of DEP, the Consultant shall perform the following six (6) tasks. DEP reserves the right to delete a task or subtask from the final scope of work. Detailed descriptions of Tasks 1 through 6 are included in **Attachment F** of this RFP.

Task 1 – Mobilization

Task 2 – Quality Control and Quality Assurance

Task 3 – Selection, Calibration and Validation of Hydrodynamic and Water Quality Models

Task 4 – Setup and Execution of a Continuous Long-Term Simulation of the Hydrodynamic and Water Quality Models from 2003-2018

Task 5 – Build Out and Design of GUI/DST

Task 6 – Technology Transfer and Training

C. COMPLIANCE WITH LOCAL LAW 34 OF 2007

Pursuant to Local Law 34 of 2007, amending the City's Campaign Finance Law, the City established a computerized database containing the names of any "person" that has "business dealings with the city" as such terms are defined in the Local Law. For the purposes of the database, proposers are required to complete the attached Doing Business Data Form and return it with this proposal, and should do so in a separate envelope. (If the proposer is a proposed joint venture, the entities that comprise the proposed joint venture must each complete a Data Form.) If the City determines that a proposer has failed to submit a Data Form or has submitted a Data Form that is not complete, the proposer will be notified by the Department and will be given four (4) calendar days from receipt of notification to cure the specified deficiencies and return a complete Data Form to the Department. Failure to do so will result in a determination that the proposal is non-responsive. Receipt of notification is defined as the day notice is e-mailed or faxed (if the proposer has provided an e-mail address or fax number), or no later than five (5) days from the date of mailing or upon delivery, if delivered by other than U.S. mail.

D. COMPLIANCE WITH THE IRAN DIVESTMENT ACT

Pursuant to State Finance Law Section 165-a and General Municipal Law Section 103-g, the City is prohibited from entering into contracts with persons engaged in investment activities in the energy sector of Iran. Each proposer is required to complete the attached Bidders Certification of Compliance with the Iran Divestment Act, certifying that it is not on a list of entities engaged in investments activities in Iran created by the Commissioner of the NYS Office of General Services. If a proposer appears on that list, the Agency/Department will be able to award a contract to such proposer only in situations where the proposer is taking steps to cease its investments in Iran or where the proposer is a necessary sole source. Please refer to **Attachment H** or information on the Iran Divestment Act required for this solicitation and instructions on how to complete the required form and to <http://www.ogs.ny.gov/About/regs/ida.asp> for additional information concerning the list of entities.

E. COMPLIANCE WITH HIRENYC AND REPORTING REQUIREMENTS

The Hiring and Employment Rider shall apply to contracts valued at \$1 million or more for all goods, services and construction except human services contracts that are subject to the Public Assistance Hiring Commitment Rider. The Rider describes the Hire NYC process and obligations, including reporting requirements throughout the life of the contract. The Hire NYC process requires contractors to enroll with the Hire NYC system within thirty days after the registration of the contract subject to this solicitation, to provide information regarding all entry to mid-level job opportunities arising from this contract and located in New York City, and to agree to interview qualified candidates from HireNYC for those opportunities. The Rider also includes reporting requirements unrelated to HireNYC. See **Attachment I** for further description of the requirement details.

F. PROCUREMENT AND SOURCING SOLUTIONS PORTAL (PASSPORT) DISCLOSURE FILING (FORMERLY KNOWN AS VENDOR INFORMATION)

EXCHANGE SYSTEM (VENDEX) FORMS OR CERTIFICATE OF NO CHANGE)

All organizations intending to do business with the City of New York should complete an online disclosure process to be considered for a contract. This disclosure process was formerly completed using Vendor Information Exchange System (VENDEX) paper-based forms. In anticipation of awards, proposers to this RFP must create online accounts in the new Procurement and Sourcing Solutions Portal (PASSPort) and file all disclosure information. Paper submissions, including certifications of no changes to existing VENDEX packages will not be accepted in lieu of complete online filings.

For more information about PASSPort, please visit:

<http://www1.nyc.gov/site/passport/index.page>

G. OWNERSHIP BY THE CITY OF THE CONSULTANT'S WORK PRODUCT

In addition to the requirements set forth in Article 6 of Appendix A, the Consultant shall submit all raw and processed data to DEP at periodic intervals, as set forth in the Scope of Work. Moreover, the Consultant may not use any Copyrightable Materials (as that term is defined in Section 6.02(B) of Appendix A in a scientific or technical publication unless such publication is prepared and credited as a collaborative effort with DEP. The Consultant shall also obtain prior written approval from DEP before initiation of any publications related to this scope.

SECTION IV: PROPOSAL FORMAT AND CONTENT

A. General Instructions:

Proposers should provide all information required in the format described below. The proposal shall be provided in two parts: a technical proposal and a price proposal. Both the technical proposal and the price proposal must be enclosed in a single sealed envelope. The technical proposal must be contained in a single bound document. The price proposal must be contained in a separate unbound document and sealed in an inner envelope separate from the technical proposal. The technical proposal and the price proposal must be typed and double-spaced on both sides of 8½-inch by 11-inch white paper. The City requests that all proposals be submitted on paper with no less than thirty percent (30%) post-consumer material content (i.e., the minimum recovered fiber content level for reprographic papers recommended by the United States Environmental Protection Agency). DEP requests that proposals be bound, but not in a spiral covered binder. Pages must be paginated and tabulated for each section. **Proposals containing electronic media are not acceptable.** The page limit for the Technical Proposal (Section IV B.1 and B.2) shall be thirty-five (35) pages. This limit of pages and paper size does not apply to schedules, resumes, organization charts, or schematics. The proposal will be evaluated based on its content, not length.

Proposers are advised that any portion of a proposal identified as confidential, or proprietary information or a trade secret will be reviewed by DEP; and any decision not to honor a request for confidentiality will be communicated in writing to the proposer. For those proposals that are unsuccessful, all such confidential materials will be returned to the proposer, with the exception of one copy that DEP will retain and hold in a secure manner to the extent reasonably possible. Regardless of any designation of confidentiality made by the proposer, DEP may disclose any information to elected officials of the City when required pursuant to Section 1-04 of the Procurement Policy Board Rules, or to any member of the public when required under the Freedom of Information Law (NY Public Officers Law §87(2)), or when otherwise required pursuant to applicable law or judicial process, as determined by the City's Corporation Counsel. In particular, proposers may NOT simply append a blanket notice to their proposal that purports to limit the City's use, reproduction or distribution of the entire document for valid governmental purposes and any such notice will be of no effect. If the proposer refuses to modify or remove such a notice when DEP so requests, or otherwise refuses to acknowledge the City's right to use, reproduce, and distribute the proposal for valid governmental purposes, the proposal may be rejected as non-responsive. Also, see Paragraph I of Section VI (General Information to Proposers) for information regarding identification of confidential and/or proprietary information or trade secrets.

B. Proposal Format

1. Proposal Cover Letter

The Proposal Cover Letter Form (Attachment A) transmits the proposer's proposal package to DEP. It must accurately identify the legal entity submitting the proposal and be completed, signed, and dated by a duly authorized representative of the proposer.

2. Technical Proposal

The Technical Proposal must include a detailed scope of services. As set forth above, Attachment F (Scope of Services) includes a scope of services for this type of project. The Technical Proposal should include all services, whether included in Attachment F or not, that the proposer deems necessary to perform the project-specific scope of services. The Technical Proposal shall include the following items:

2.1 Experience: Describe the proposer's relevant experience on projects of similar size and scope in providing the services as described in Attachment F of this RFP, and the relevant experience of the proposed key personnel. In addition to the proposer's successful relevant experience, also important is a discussion of its major lessons learned from challenges and problems it faced in connection with projects of similar size and scope. Describe these relevant lessons learned and how the proposer managed, addressed, corrected, and learned from the experience globally in its practice.

Proposer shall detail:

(a) Prime Firm's Relevant Experience. Demonstrate the firm's experience on at least three (3) projects of similar scope, size, and complexity as described in Attachment F of this RFP. In particular, focus on each of the following for those above referenced similar projects:

1. Experience in developing proprietary and/or open source hydrodynamic and water quality models in the marine or estuarine environment and use of these models in management scenario evaluations;
2. Experience and familiarity with Long Island Sound modeling, monitoring, quantitative analyses, or other research efforts, particularly those pertaining to eutrophication processes in the Sound;
3. Experience in calibration, validation, and skill assessment of large scale hydrodynamic and water quality models;
4. Experience in the use of modeling tools for compliance assessments such as analysis of fate, transport, and impact of point/non-point sources of pollution for the purpose of compliance with the Clean Water Act and/or management alternatives assessment (e.g. TMDL, CSO LTCP, MS4);
5. Experience in designing and developing a GUI/DST, including user-friendly tools to assist modelers in data management, data visualization, and statistical analyses of model inputs and outputs;
6. Experience in gathering, analyzing, and mining extensive archived data from public, private, and academic resources.
7. Experience working with industry best practices, technologies and tools associated with water quality, hydrodynamic models and GUI/DST development
8. Experience working with government organizations on projects of similar complexity

For each project, include the following information (at a minimum):

- i. project name, owner, owner contact information (name, title, phone #) (references will be contacted and will be used in the evaluation of your technical proposal);
- ii. description of the firm's role in the project (e.g., prime, member of joint venture, or subconsultant) and its specific responsibilities on the project;
- iii. the project's total value and the contract value of the modeling and GUI/DST related activities
- iv. time period on job (year started and completed – or if on-going);
- v. brief description of services performed by the firm
- vi. description of relevance to this project;
- vii. description of how quality, schedule, budget, and safety were successfully implemented on the project; and
- viii. for projects that included challenges, a description of how the firm overcame the issues and any lessons learned and any policy changes resulting from the challenges.

(b) Proposed Subconsultants: Provide up to two (2) relevant references projects for each proposed subconsultant, in the area of their anticipated Project function (e.g. software development for GUI/DST). The information provided should follow the format used to describe the prime consultant's experience.

(c) Demonstrate expertise, experience and qualifications of proposed manager and key leads and demonstrate ability of these key personnel to lead and collaborate on complex modeling projects.

Note: Prime Consultant must perform fifty-one (51) percent of the total contract value.

2.2 Organizational Capability - Demonstrate the Proposer's organizational capability to provide the work described in **Attachment F**, and provide:

- A detailed schedule of the work to be performed, organized by tasks listed in **Attachment F**, and demonstrate the Proposer's capability to successfully accomplish that schedule including resources available to address unanticipated needs or conditions.
- An organization outline or chart identifying the names and titles of proposed Project team members and reporting relationships within the Project; availability of firm's and sub-consultant's resources to support the project team. A listing of the average weekly number of hours that each key member of the proposed organizational chart will be available for the work described in Section III/Attachment F of this RFP. Anticipated changes in availability for each team member within

the anticipated duration of this work shall also be provided to demonstrate capability of completing this work with those fluctuations built in.

Please be advised that the Proposer may not change proposed project team members during the term of the Contract without the written consent of the Agency.

(a) Expertise and Qualifications: Submit at least two (2) resumes (one primary and one backup) for key personnel identified in your proposal. Resumes should highlight personnel qualifications with appropriate training and project experience. Ideally, key personnel proposed will have primary roles in the firm's relevant experience as described pursuant to subsection 2.1, above.

(b) Staffing: Provide information illustrating the appropriateness of the proposer's staffing and resources to accomplish the scope of services in accordance with the proposed project schedule including resources available to address unanticipated needs or conditions. Describe the firm's ability to adequately staff the project with qualified personnel throughout the contract duration. A staffing schedule must be included to show anticipated changes to staff expertise or staffing levels during the different stages of work. The proposer should demonstrate the efficiency of the proposed staffing levels and the appropriate allocation of the firm's resources.

The proposal must clearly delineate the person(s) who would be responsible for each aspect of anticipated services. By submitting a proposal, the proposer specifically agrees, if awarded the contract, to assign the key personnel identified in its proposal to the project for its entire duration. The failure to provide any individual identified as key personnel in a successful proposal for the duration of the contract will be considered a material breach of the contract and may be grounds for termination for cause by DEP. If any key personnel proposed is not available at time of award, the Proposer may be found non responsive. Replacement of an unavailable individual will only be permitted in the following circumstances: (1) if the designated individual is no longer employed by the consultant; or (2) if the commencement date for the contract (i.e., the date on which the consultant is directed to commence work on the contract) is more than twelve (12) months after the date on which the proposal for the contract was submitted. The replacement of any individual identified as key personnel without written authorization from DEP is prohibited.

Any subconsultants submitted by the proposer in its proposal shall be utilized in the project, unless DEP authorizes a substitute.

If key personnel included in the proposed staffing plan are already committed to other DEP projects, the proposal must specifically explain how these personnel will be available for this project without adversely affecting the quality and schedule of the other DEP projects to which the personnel are dedicated. Additionally, if selected for this project, Consultant shall not propose the key personnel on future DEP solicitations without demonstrating the personnel's availability in its submission.

The proposer must describe its available resources (i.e., administrative and technical staff, facilities, financing and other resources) to support its successful completion of all necessary tasks if the contract is awarded to it.

A copy of the proposer's latest audit report and certified financial statement must be attached to the proposal, or a statement included as to why no report/statement is available. Proposed subconsultants latest audit report and certified financial statement must also be attached to the proposal.

2.3 Technical Approach: Describe in detail how the proposer will provide the services described in Attachment F of this RFP and demonstrate that the proposer's approach will fulfill DEP's goals, addressing all of the following items.

- a. **Project Understanding:** Demonstrate understanding of project goals through a narrative of the proposer's approach to managing the project design. Describe how the firm's approach will be efficient with respect to schedule, budget, and quality, identify critical issues and risks and mitigation measures .
 - i. Demonstrate an understanding of the LIS coastal and estuarine system with a conceptual model description of key physical and biogeochemical processes that control dissolved oxygen, hypoxia, nutrient cycling, phytoplankton production, and ecological processes such as SAV and benthos (shellfish) in Long Island Sound.
 - ii. Demonstrate and summarize understanding of DEP's integrated modeling goals and objectives for hydrodynamic and water quality modeling for Long Island Sound and for GUI/DST design.

- b. **Provide a contract specific scope of work:** for each task that demonstrates an adequate understanding of the specifics and requirements of the project and that is an appropriate approach to the scope of services pursuant to the tasks set forth in the RFP. The purpose of developing the contract-specific scope of services is to use it for finalizing the final contract scope with little modification in the event the proposer is awarded the contract. In developing the scope of work, Proposers should review, for background purposes, the recommendations of the Technical Advisory Committee (**Attachment N**) which provides background information on modeling recommendations for LIS.

Specifically address:

- i. Approach for assuring, measuring, documenting, managing, and checking the quality and reproducibility of the modeling effort and other project activities
- ii. Discuss and justify choice of hydrodynamic and water quality models and choice of requirements for hydrodynamic model (transport, vertical mixing and stratification) and water quality

model (DO, hypoxia, nutrients, phytoplankton) in LIS, and recommendation for either internal or external linkage of these models

- iii. Discuss and justify approach for design and buildout of new finer horizontal resolution grid, and whether proposing to use SWEM grid or use it as a reference, or develop a new system-wide finer resolution grid in LIS. The discussion should also provide and justify recommendation on vertical grid resolution and vertical coordinate system that will be used in this project
- iv. Discuss any proposed modifications of hydrodynamic model for improving transport and mixing processes, and water quality kinetic processes for improving biochemical processes and interactions
- v. Describe approach to be used to pre-process data to develop model input files and observed data sets for model comparison and whether you will use SWEM input files for recalibration to 1994-1995 data set or use alternative input files
- vi. Describe approach to be used to post-process model results for comparison to observed hydrographic and water quality data and water quality target criteria for dissolved oxygen, hypoxia, water clarity, and phytoplankton biomass (as chlorophyll-a)
- vii. Specify approach for model skill assessment statistic(s) and propose performance targets as criteria for model re-calibration. Additionally, describe approach to be used for sensitivity analyses
- viii. Specify approach to be used in proposed hydrodynamic/water quality model to track, output, and post-process model results to develop mass balance flux components for DO, nutrients, phytoplankton biomass, etc. for spatial, temporal, vertical averaging
- ix. Provide estimate of expected model runtime for execution of selected hydrodynamic and water quality models for new grid design for a 1-year simulation period with proposed hardware and specified time-step(s).
- x. Discuss the selection of sampling stations, including stations with vertical profiles (T, S, DO), for model re-calibration in LIS (East River, Narrows, western, central, eastern basins)
- xi. Specify methods and tools to be used for linking regional scale model to nested grid models. Provide approach for

demonstrating that two standalone embayment models can be developed with linkage to new model grid for LIS

- xii. Discuss how respondent would evaluate both hydrodynamic and water quality model performance
- xiii. Discuss hardware design specifications and configuration requirements for data storage, model execution and data processing. The modeling system should support modern processing technology, including use of parallel and multi-core processors and GPUs
- xiv. Approach and design requirements for design and buildout of GUI/DST

3. Proposer Affirmation

The Proposer Affirmation, incorporated with **Appendix A** to this RFP, serves as the Proposer's certification regarding its status with the City regarding arrears, responsibility and qualification.

4. Acknowledgment of Addenda

The Acknowledgment of Addenda form (see RFP Attachment C) serves as the Proposer's acknowledgment of the receipt of addenda, if any, to this RFP. The Proposer should complete the form as instructed and include it with the Proposal Package.

5. Price Proposal

- (a) The Price Proposal is a presentation of a proposer's total price for performing the entirety of the services described in Attachment F. Each proposer must submit its Price Proposal in a separate sealed envelope with the Technical Proposal submission.
- (b) Each proposer must use Attachment B as a template for its Price Proposal. In its Price Proposal, each proposer must provide a proposed total billable hourly rate for each individual that it plans to use in rendering the services, except for Project Management Tasks 1.1, 2.1, 3.1, 4.1, 5.1, and 6.1. Project management tasks are capped at 10% of the proposed cost.
- (c) Each proposed total billable hourly rate is the product of the "Direct Salary Rate" and the "Overhead Multiplier." The Overhead Multiplier is a factor that, when applied to direct labor billings, calculates the total direct labor cost, indirect costs and profit payable to the consultant.
- (d) Overhead terminology in accordance with the City Comptroller's Directive 2 is as follows:

- i) The sum of the contractor's allowable overhead costs and general and administrative expenses is divided by the direct labor for the same period. The quotient is the overhead rate.
 - ii) The overhead rate is added to the integer one (1), representing the direct labor costs billed for the contract, to yield the overhead factor.
 - iii) To allow for profit, the "Overhead Factor" is multiplied by one (1) plus the agreed profit percentage (i.e., where the profit is ten percent (10%), the Overhead Factor is multiplied by 1.10). The product is the Overhead Multiplier.
- (e) The total price associated with each individual over the course of each task will be calculated as the product of the estimated hours for that individual and that proposer's proposed total billable hourly rate for that individual. Each proposer must calculate the total price associated with each task by summing the total price associated with each individual listed under that task. Each proposer must calculate the total price for performing the entirety of the services as the sum of its total price associated with each task and the value of all other direct costs ("ODCs").
- (f) Proposers must submit an hourly salary rate for each individual proposed for the Project, a **proposed initial interim** overhead rate for its firm and each proposed subconsultant firm, and a fee for profit for every title listed in **Attachment A. Any proposed former DEP staff must clearly be identified.** The initial interim overhead rate proposed should be the most accurate overhead rate at the time of the proposal for the firm and any proposed subconsultants. (For example, the proposed initial interim overhead rate can be the latest DEP Office of Engineering Audit ("OEA") audited overhead rate or the most current CPA-certified Overhead Rate that is compliant with the Federal Acquisition Regulations ("FAR") for Government Contracts). If a firm or proposed subconsultant does not have a DEP-audited overhead rate or a FAR compliant CPA-certified overhead rate, DEP will accept, at a maximum, one hundred fourteen percent (114%) as the initial interim overhead rate for the home office and, at a maximum, one hundred percent (100%) as the initial interim overhead rate for the field office. Notwithstanding the foregoing, DEP may conduct an audit of such rates, and adjust the rate based upon its audit, at any time during the performance period of any contract awarded based on this RFP.
- (g) For budget and cost estimating purposes, proposers are encouraged to specify and incorporate their wage escalation factor in the Price Proposal. The total proposed contract price will be used in the contract awarded to the successful proposer without any adjustments for the term of the contract. Labor rates should be based on the anticipated contract start date of January 2020.
- (h) The profit percentage proposed for the proposer and for any proposed sub-consultants may vary, and is subject to negotiation. The profit percentage will remain fixed in the contract for the contract's term. The proposed and negotiated profit percentage may differ for each contract's task.
- (i) The overhead rate used in any future contract amendment issued by DEP will be no greater than the actual audited rate. The profit percentage used in any future contract amendments will be equal to or less than the profit percentage accepted by DEP at the time the contract is negotiated and awarded.

- (j) The interim overhead rate under the contract shall be updated periodically upon completion of an audit by OEA, with a maximum increase fixed at ten (10) percentage points above the proposed initial interim overhead rate. Once the actual OEA-audited overhead rate is determined, it will be used to retroactively adjust prior payments, and will become the new interim rate for future payments, until the next OEA-overhead audited rate is determined. In no event shall any new interim rate be greater than ten (10) percent above the proposed initial interim overhead rate.
- (k) Payment for technical salary costs of the successful proposer and its subconsultants will be limited to the direct payroll costs for technical and professional employees for the time spent performing the services under this contract, and will not include amounts paid for vacation, holidays, social security taxes, unemployment insurance, workers' compensation insurance or other fringe benefits.
- (l) Future salary increases are subject to approval of DEP. Each firm may make adjustments to its employees' salary rates only once each year from the time the proposal is submitted to the end of the term of the contract; however, during the first year of the contract, DEP will allow firms to provide an additional salary increase to account for regularly scheduled salary increases that occurred between negotiation of the contract and registration. The composite adjustment for all employees billing under the contract shall not be greater than the: most recent 2nd Quarter 12 month percent change in the U.S. Bureau of Labor Statistics Employment Cost Index ("ECI") for Private Sector Professional, Scientific, and Technical Services Wages and Salaries (Series Id.: CIU2025400000000A). The weighted average annual salary increase billed to DEP for all of the consultant's employees shall not exceed the ECI in any year. In no case shall the annual salary increase for any single employee billed to DEP be more than five percent (5%) or \$3.00 per hour, whichever is greater. The consultant and any subconsultants may increase their employees' salary in excess of the amounts permitted by the above provisions, however, DEP will not reimburse the consultant for any salary increase in excess of such permitted amounts.
- (m) Billable ODCs are "out-of-pocket" expenses essential for the performance of the services and authorized by DEP that do not involve the practice of "engineering," as defined by Subsection 7201 of the New York State Education Law, and that are not otherwise included in the successful proposer's overhead costs. All equipment and materials authorized and purchased under the contract shall become the property of the City and shall be surrendered to DEP's Bureau of Engineering Design and Construction ("BEDC") at completion of the contract. DEP shall reimburse for ODCs at the actual cost, with no provision for overhead or profit. DEP has identified and listed ODCs as allowances to be capped at certain total and to be paid for in accordance with Section (t). Reimbursable ODCs include the following items:
 - i) authorized direct materials and equipment purchases and/or leases with the exception of computers or tablet devices;
 - ii) bulk printing of reports or special documents as part of the services under this contract;
 - iii) travel and subsistence for the consultant's personnel for trips authorized by DEP including visits to project sites, manufacturers' shops, existing plants, meetings, hearings, etc., essential to the performance of the services, to be paid within the

normal allowances of the City for its own employees in accordance with The City of New York Office of The Comptroller, Directive No. 6: Travel, Meals, Lodging, And Miscellaneous Agency Expenses. The consultant shall submit to DEP for prior approval, on behalf of itself and any subconsultants, anticipated hotel location and the billing rate for a travel request, in order to receive complete reimbursement;

- iv) the use of motor vehicles owned by the employees of the consultant and subconsultants on the project sites or between the project sites and various DEP offices, when directed by DEP Commissioner, or his/her duly authorized representative, on a mileage basis to be paid within the normal allowances of the City for its own employees, in accordance with The City of New York Office of The Comptroller, Directive No. 6: Travel, Meals, Lodging, And Miscellaneous Agency Expenses;
- v) miscellaneous out-of-pocket costs authorized by DEP Commissioner, through his/her duly authorized representative;
- vi) borings, surveys, studies, site investigation, etc., essential for the performance of the services; and
- vii) extraordinary mailing and shipping charges directly related to the project.

Note: The consultant, under no circumstances, is permitted to use ODCs for the purchase of food or beverages for any meetings.

- (n) Billable ODCs may also include, as authorized by DEP Commissioner, permit fees and construction-related services performed by non-engineering subconsultants.
- (o) "Overtime" is defined as the time beyond forty (40) hours in a week worked by an employee of the successful proposer or a subconsultant performing contract services. DEP will provide additional compensation to the successful proposer for Overtime hours only if DEP authorizes such Overtime in advance of its performance and subject to the following:
 - i) The maximum "Overtime Rate" shall not exceed one and one-half (1.5) times the regular hourly rate of the employee.
 - ii) The Overhead Multiplier is applied only to the regular hourly (straight time) portion of the consultant's direct salary costs for Overtime.
 - iii) A factor of 0.15 plus one (1) is multiplied by the premium pay portion of Overtime to compensate the consultant for government mandated insurance expenses paid by the employer for FICA tax, federal and state unemployment insurance and Workers Compensation insurance.
- (p) Compensation for any portion of the contract services performed by a principal of the successful proposer or of a subconsultant firm will be calculated as the product of:
 - i) the direct salary rate incurred by the successful proposer (or a subconsultant) for that portion of the services; and
 - ii) the sum of one hundred percent (100%) and the applicable overhead rate.

However, such compensation will be capped at a maximum billable rate of three hundred fifty dollars (\$350) per hour. No fee shall be paid on such services. The total

compensation for the principal's time shall not exceed thirty-five percent (35%) of the maximum contract amount.

A "principal" means an individual who is duly authorized to legally bind the firm. Depending on the firm, the principal may be an owner, corporate officer, associate, partner, etc. With respect to a corporation, an owner who owns ten percent (10%) or more of the voting stock is deemed to be a principal, even if he/she does not have the authorization to legally bind the firm.

- (q) The contract services being requested herein are being funded through a cooperative (50:50 match) agreement with EPA. EPA's "General Terms and Conditions" for such projects, effective October 1, 2018 are provided as Attachment O and can also be accessed through the following link: <http://www.epa.gov/grants/grant-terms-and-conditions> . Please note that Item 5 of these General Terms and Conditions contains the following language pertaining to salary caps:

"EPA participation in the salary rate (excluding overhead) paid to individual consultants retained by recipients or by a recipient's contractors or subcontractors shall be limited to the maximum daily rate for a Level IV of the Executive Schedule, available at: <https://www.opm.gov/policy-data-oversight/pay-leave/salaries-wages/> to be adjusted annually. This limit applies to consultation services of designated individuals with specialized skills who are paid at a daily or hourly rate. This rate does not include transportation and subsistence costs for travel performed (the recipient will pay these in accordance with their normal travel reimbursement practices).

Subagreements with firms for services which are awarded using the procurement requirements in Subpart D of 2 CFR 200 are not affected by this limitation unless the terms of the contract provide the recipient with responsibility for the selection, direction and control of the individuals who will be providing services under the contract at an hourly or daily rate of compensation. See 2 CFR 1500.9."

- (r) All necessary Project Management Services (as described in Attachment F and Attachment B) required for the delivery of the project must be budgeted in the project task where those services are anticipated to be provided.

The successful proposer shall be bound by the maximum contract amount and the maximum task amounts for labor, Project Management, and ODCs. DEP is not required to pay to the consultant any amount in excess of the maximum contract amount as compensation for its performance of the entirety of the services. Additionally, DEP is not required to pay the consultant any amount in excess of the maximum amount listed for labor, Project Management, or ODCs for each contract task as compensation for its performance of the portion of the services corresponding to that task. No

adjustments to the maximum contract amount, any maximum task amount, nor any allowance amount will be made absent a contract amendment issued by DEP and registered in accordance with Section 328 of the City Charter and the related PPB Rules.

- (s) In the event an amendment is required, the invoice must identify each amendment separately by individual cost code to be paid separately from the base contract amounts. The cost for Project Management is not to be included in any amendment for additional work but may be considered by the Agency by way of a separate amendment.
- (t) Allowances **N/A**

C. Proposal Submission Requirements

1. Submit one (1) signed original hard copy of the proposal and five (5) compact disk copies of the proposal containing the items described above in Sections IV(B)(1)-(4).
2. Submit one (1) separate sealed inner envelope, one unbound signed original of the Price Proposal labeled “Price Proposal for [FIRM NAME] for BEPA LONG ISLAND SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELLING SUPPORT”, IV. 5 above (Attachment B). **In addition, please include (1) separate compact disk of your Price Proposal in Excel format within the same envelope.**
3. Submit one (1) **separate sealed inner envelope** labeled “Doing Business Data Form for [FIRM NAME] for “BEPA LONG ISLAND SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELLING SUPPORT” containing an unbound original, completed Doing Business Data Form. (Attachment D)
4. Submit one (1) **separate sealed inner envelope** labeled “Bidder’s Certification of Compliance with Iran Divestment Act for [FIRM NAME] for BEPA LONG ISLAND SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELLING SUPPORT” containing an unbound original, completed Bidder’s Certification of Compliance with Iran Divestment Act Form. (Attachment H)
5. Submit a **separate sealed inner envelope** labeled “Schedule B for [FIRM NAME] for BEPA LONG ISLAND SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELLING SUPPORT” containing an unbound original, completed **SCHEDULE B: SUBCONTRACTOR UTILIZATION PLAN** and (if partial)/or (if full) **a COPY OF THE REQUEST FOR WAIVER** (Attachment L).

D. Labeling Instructions

The sealed outer envelope, package enclosing the materials submitted in response to this RFP

should have two labels indicating, respectively:

- a. The proposer's name and address, the Title and PIN of this RFP, and the name and telephone number of the Proposer's Contact Person.
- b. The name, title and address of the Deputy Agency Chief Contracting Officer as per Section I.(C).

SECTION V: PROPOSAL EVALUATION AND CONTRACT AWARD PROCEDURES

A. Evaluation Procedures:

All proposals received by DEP will be reviewed to determine whether they are responsive to the requisites of this RFP. Proposals which are determined to be non-responsive will be rejected.

DEP's Evaluation Committee ("EC") will evaluate and rate all remaining proposals on an 90-point scale, based on the Evaluation Criteria (other than the Price Proposal). DEP may require all proposers or, alternatively, only those proposers that are determined by the EC to be of high technical merit (based on their technical scores), to give oral presentations regarding their proposals. DEP may also request proposers to submit Best and Final Offers ("BAFOs"). DEP will open the price proposals of only the firms with the top technical scores. A maximum of Ten (10) additional price points will then be added to the technical scores of these top firms. The lowest priced proposal will receive Ten (10) price points. Each proposer whose price proposal was opened will receive an amount of additional price points equal to the product of Ten (10) and the quotient of the lowest priced proposal divided by that proposer's proposed price. The Department will begin contract negotiations with the proposer with the highest total combined points (i.e., technical points plus price points).

For an arithmetic representation of the price points formula, consider the following equation:

$$[(Total\ Points)]_x = [(Technical\ Points)]_x + (10)\left(\frac{Price_{Lowest}}{Price_x}\right)$$

This formula illustrates that the total points for proposer x will be equal to the sum of proposer x's technical points plus 10 times the quotient of the lowest proposer's price divided by the price of proposer x.

The following example is for the purposes of illustration only: Three (3) proposers deemed to be of highest technical merit have proposed the following prices and received the following technical points from the TAC:

Proposer A: 71 technical points, price \$800,000.00;
Proposer B: 77 technical points, price \$600,000.00; and
Proposer C: 78 technical points, price \$1,000,000.00.

Based on the prices described above, Proposer A, Proposer B and Proposer C would receive Seven and a Half (7.5), Ten (10) and Six (6) additional price points, respectively. Proposer A's, Proposer B's, and Proposer C's combined points would equal Seventy-Eight and a Half (78.5), Eighty-Seven (87) and Eighty-Four (84), respectively.

B. Proposal Evaluation Criteria:

Technical proposals will be evaluated based on the following:

- Demonstrated Relevant Experience (weight 40%)
- Organizational Capability (weight 20%)

- Quality of Technical Approach (weight 30%)
- Cost (weight 10%)

C. Basis for Contract Award:

A contract will be awarded to the responsible proposer that is determined to be the most advantageous to the City, taking into consideration the proposed evaluation criteria and such other factors or criteria that are set forth in this RFP. Contract award shall be subject to the timely completion of contract negotiations between DEP and the selected proposer.

SECTION VI - GENERAL INFORMATION TO PROPOSERS

A. Complaints. The New York City Comptroller is charged with the audit of contracts in New York City. Any Proposer who believes that there has been unfairness, favoritism or impropriety in the proposal process should inform the Comptroller, Office of Contract Administration, 1 Centre Street, Room 835, New York, NY 10007; the telephone number is (212) 669-3000. In addition, the New York City Department of Investigation should be informed of such complaints at its Investigations Division, 80 Maiden Lane, New York, NY 10038; the telephone number is (212) 825-5959.

B. Applicable Laws. This Request for Proposals and the resulting contract award(s), if any, unless otherwise stated, are subject to all applicable provisions of New York State Law, the New York City Administrative Code, New York City Charter and New York City Procurement Policy Board (PPB) Rules. A copy of the PPB Rules may be obtained by contacting the PPB at (212) 788-7820.

C. General Contract Provisions. Contracts shall be subject to New York City's general contract provisions, in substantially the form that they appear in "Appendix A — General Provisions Governing Contracts for Consultants, Professional, Technical, Human and Client Services" or, if the Agency utilizes other than the formal Appendix A, in substantially the form that they appear in the Agency's general contract provisions. A copy of the applicable document is available through the Authorized Agency Contact Person. This contract is also subject to UNIFORM FEDERAL CONTRACT PROVISIONS RIDER FOR FEDERALLY FUNDED PROCUREMENT CONTRACTS (Version 02.16.2018) as appear in Attachment M..

D. Contract Award. Contract award is subject to each of the following applicable conditions and any others that may apply: New York City Fair Share Criteria; New York City MacBride Principles Law; submission by the Proposer of the requisite New York City Department of Business Services/Division of Labor Services Employment Report and certification by that office; submission by the Proposer of the requisite VENDEX Questionnaires/Affidavits of No Change and review of the information contained therein by the New York City Department of Investigation; all other required oversight approvals; applicable provisions of federal, state and local laws and executive orders requiring affirmative action and equal employment opportunity; and Section 6-108.1 of the New York City Administrative Code relating to the Local Based Enterprises program and its implementation rules.

E. Proposer Appeal Rights. Pursuant to New York City's Procurement Policy Board Rules, Proposers have the right to appeal Agency non-responsiveness determinations and Agency non-responsibility determinations and to protest an Agency's determination regarding the solicitation or award of a contract.

F. Multi-Year Contracts. Multi-year contracts are subject to modification or cancellation if adequate funds are not appropriated to the Agency to support continuation of performance in any City fiscal year succeeding the first fiscal year and/or if the contractor's performance is not satisfactory. The Agency will notify the contractor as soon as is practicable that the funds are, or are not, available for the continuation of the multi-year contract for each succeeding City fiscal year. In the event of cancellation, the contractor will be reimbursed for those costs, if any, which are so provided for in the contract.

G. Prompt Payment Policy. Pursuant to the New York City's Procurement Policy Board Rules, it is the policy of the City to process contract payments efficiently and expeditiously.

H. Prices Irrevocable. Prices proposed by the Proposer shall be irrevocable until contract award, unless the proposal is withdrawn. Proposals may only be withdrawn by submitting a written request to the Agency prior to contract award but after the expiration of 90 days after the opening of proposals. This shall not limit the discretion of the Agency to request Proposers to revise proposed prices through the submission of best and final offers and/or the conduct of negotiations.

I. Confidential, Proprietary Information or Trade Secrets. Proposers should give specific attention to the identification of those portions of their proposals that they deem to be confidential, proprietary information or trade secrets and provide any justification of why such materials, upon request, should not be disclosed by the City. Such information must be easily separable from the non-confidential sections of the proposal. All information not so identified may be disclosed by the City.

J. RFP Postponement/Cancellation. The Agency reserves the right to postpone or cancel this RFP, in whole or in part, and to reject all proposals.

K. Proposer Costs. Proposers will not be reimbursed for any costs incurred to prepare proposals.

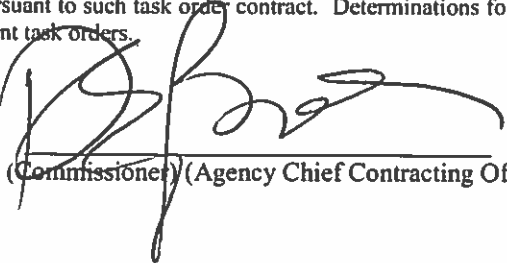
L. Vendex Fees. Pursuant to PPB Rule 2-08(f)(2), the contractor will be charged a fee for the administration of the Vendex system, including the Vendor Name Check Process, if a Vendor Name Check review is required to be conducted by the Department of Investigation. The contractor shall also be required to pay the applicable fees for any of its subcontractors for which Vendor Name Check reviews are required. The fee(s) will be deducted from payments made to the contractor under the contract. For contracts with an estimated value of less than or equal to \$1,000,000, the fee will be \$175. For contracts with an estimated value of greater than \$1,000,000, the fee will be \$350. The estimated value for each contract resulting from this RFP is estimated to be (less than or equal to \$1million) (above \$1million).

M. Charter Section 312(a) Certification.

☒ The Agency has determined that the contract(s) to be awarded through this Request for Proposals will not result in the displacement of any New York City employee within this Agency. See attached Displacement Determination Form.

☐ The Agency has determined that the contract(s) to be awarded through this Request for Proposals will result in the displacement of New York City employee(s) within this Agency. See attached Displacement Determination Form.

☐ The contract to be awarded through this Request for Proposals is a task order contract that does not simultaneously result in the award of a first task order; a displacement determination will be made in conjunction with the issuance of each task order pursuant to such task order contract. Determinations for any subsequent task orders will be made in conjunction with such subsequent task orders.


(Commissioner) (Agency Chief Contracting Officer)

6/27/2019
Date

Message from the New York City Vendor Enrollment Center
Get on mailing lists for New York City contract opportunities!
Submit a NYC-FMS Vendor Application - Call 212/857-1680

Displacement Determination Form – Pursuant to City Charter § 312(a)
(for PSRs or equivalent pre-procurement documents)

This form must be used to certify whether or not there is displacement in the instant contracting action, as defined in City Charter § 312(a) (as amended by Local Law 63 of 2011). You can either certify that there is no displacement by completing Part 1 of this form, or you can certify that there is displacement by completing Part 2 of this form.

If the contract that you are awarding is a task order contract that does not simultaneously result in the award of a first task order, then you must check the box on the bottom of this page; displacement determinations will be made in conjunction with the issuance of task orders pursuant to the subject contract. If the contract that you are awarding does simultaneously result in the award of a first task order, then the displacement determination for that first task order must be done prior to issuance of the solicitation and you must complete either Part 1 or Part 2 of this form.

If you have any questions about Local Law 63 or about completing this form, please contact the Mayor's Office of Contract Services at APTLL63@cityhall.nyc.gov or (212) 788-0010.

Procurement Description:

APT EPIN: 82619P0026

Agency: DEP

Your Name: Abdulai Fofanah

Phone: 718-595-3712

Email: afofanah@dep.nyc.gov

Please specifically identify the service(s) being procured.

FY19NDEPBEP3. The New York City Department of Environmental Protection (DEP), Bureau of Environmental Planning and Analysis (BEPA) seeks qualified professionals (Consultant) to develop hydrodynamic and water quality models for Long Island Sound as part of a comprehensive Integrated Model Framework (IMF) to assist NYCDEP and LIS Communities in integrated water management planning and assessment activities.

— If the contract to be awarded as a result of this procurement action is a task order contract (multiple or single award and multiple or single agency) that does not simultaneously result in the award of a first task order, then displacement determinations will be made in conjunction with the issuance of task orders pursuant to the subject contract. (Check this box *only* if you are completing this form for a task order contract that will *not* simultaneously result in the award of the first task order. If you check this box, do not fill out the remainder of this form.)

If the contract to be awarded as a result of this procurement action *does* simultaneously result in the award of a first task order, then the displacement determination for that first task order must be done prior to issuance of the solicitation and you must complete either Part 1 or Part 2 of this form.

Part 1: Certification of No Displacement

X **The Agency has determined that the contract resulting from this procurement action *will not* result in the displacement of any City employee within this Agency, as defined by Charter § 312(a).**

The basis upon which the Agency has made this determination (Please answer *all* questions under Part 1):

Do any civil service and/or job titles within this Agency currently perform the services sought by the proposed contract and/or services of a substantially similar nature or purpose?

Yes X No __

If so, list the names of such titles and the extent to which Agency employees within such titles currently perform such services.

Even though there are staff at DEP with civil service job titles Project Manager, City Research Scientist, Scientist (Water Ecology), and Computer Associate (Software) and accreditation capable of performing some of the tasks requested in the contract, these staff are fully committed by the agency to their current tasks and are not available to the bureau to assist with the level of effort required for this contract. Furthermore, some tasks in this project require a specific skill set and the number of resources in the agency to assist with this work is further limited, as they are spread among other projects.

Do the services sought by the proposed contract expand, supplement, or replace existing services?

Yes X No __

In either event, include a detailed description comparing the services sought by the proposed contract with such existing services.

The proposed contract supplement DEP staff who are fully committed by the agency to their current tasks and are not available to the bureau to assist with the level of effort required for this contract.

Is there capacity within the Agency to perform the services sought by the proposed contract?

Yes __ No X

If not, provide a detailed description specifying the ways in which the Agency lacks such capacity.

Current DEP resources are currently committed to their existing tasks and are not available to undertake the proposed work. Also, DEP lacks some of the necessary services, capabilities and skills to provide all the services that would be provided by the proposed contract.

For the term of the proposed contract, list the projected headcount of employees within such titles or employees who perform such services and/or services of a substantially similar nature or purpose.

Project Manager (395), City Research Scientist (109), Scientist (Water Ecology) (73), and Computer Associate (Software) (25).

X Check this box to confirm that none of the below events have occurred within the Agency in the past three years.

- The displacement of a City employee within the agency who performs or has performed the services sought by the proposed contract and/or services of a substantially similar nature or purpose; or
- The announcement of spending reductions in connection with a budgetary program, including but not limited to a Program to Eliminate the Gap, that could result or has resulted in the displacement of a City employee within the Agency who performs or has performed the services sought by the proposed contract and/or services of a substantially similar nature or purpose; or
- Any other statement by an Agency or by the Mayor of a specific anticipated employment action that could result or has resulted in the displacement of a City employee within the Agency who performs or has performed the services sought by the proposed contract and/or services of a substantially similar nature or purpose.

List any other bases for the Agency's determination that the contract resulting from this procurement action will not result in the displacement of any City employee within this Agency.

None

Part 2: Certification of Displacement

— The agency has determined that displacement, as defined by Charter § 312(a), has or will occur as a result of this contracting action. The agency has performed the required cost-benefit analysis, as described in Charter § 312(a).

ATTACHMENT A

PROPOSAL COVER LETTER

CONTRACT: BEPA- LIS HWQMS

**RFP TITLE: CONTRACT: BEPA - LIS HWQMS; BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS
LONG ISLAND SOUND- HYDRODYNAMIC AND WATER QUALITY MODELLING SUPPORT**

PIN: 82619BEPLIS

Proposer Name: _____

Single firm ☐ or a multi-firm venture ☐

Address: _____

Tax Identification #: _____

Description of the nature of the entity _____

List of all sub-consultants, if any that are part of the proposal.

Firm Name	Initial Interim Home Office Overhead Rate (%)	Initial Interim Field Office Overhead Rate (%)	Proposed Subconsultant Utilization (%)
Prime Firm			
Subconsultants			

Note: Expand table as necessary for all subconsultants.			

NOTE: Failure to provide OH Rates for any Firm noted above will result in defaulting to 114%.

Proposer's Contact Person:

Name: _____

Title: _____

Telephone #: _____ **Email** _____

Proposer's Authorized Representative:

Name: _____

Title: _____

Signature: _____

Date: _____

Is the response printed on both sides, on recycled paper containing the minimum percentage of recovered fiber content as requested by the City in the instructions to this solicitation?

☐ Yes ☐ No

ATTACHMENT B

PRICE PROPOSAL FORM (COST PLUS)

CONTRACT: BEPA- LIS HWQMS

RFP TITLE: BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS LONG ISLAND SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELLING SUPPORT

PIN: 82619BEPLIS

Firm	Employee	Title	Anticipated Direct Salary Rates (\$)					OH Rate (%)	Profit (%)	Total Billable Rate (\$)	Hours Per Year					Total Hours	Total Cost (\$)
			Year 1	Year 2	Year 3	Year 4	Year 5				Year 1	Year 2	Year 3	Year 4	Year 5		
																1056	
Task 1 Mobilization																	
1.1. PM Services ²																	
1.1.a Monthly Progress Reports and Progress Meetings																	
1.2 Project Kick-off Meeting																	
1.3 Stakeholder Meeting Support																	
1.4 Project Management Plan																	
FP Task ODCs																	
Subtotal Hours FP Task 1																	N/A
Subtotal (cost) FP Task 1																N/A	

Foot Notes:

1: NYC DEP reserves the right to pursue a lump sum price

2: Project Management services are capped at 10% of the total for each task

Firm	Employee	Title	Anticipated Direct Salary Rates (\$)					OH Rate (%)	Profit (%)	Total Billable Rate (\$)	Hours Per Year					Total Hours	Total Cost (\$)
			Year 1	Year 2	Year 3	Year 4	Year 5				Year 1	Year 2	Year 3	Year 4	Year 5	2050	
Task 2 Quality Control and Quality Assurance ¹																	
2.1. Project Management Services ²																	
2.1.a Monthly Progress Reports and Meetings																	
2.2. Data Acquisition Plan																	
2.3. QAPP																	
FP Task ODCs																	
Subtotal Hours FP Task 2																	N/A
Subtotal (cost) FP Task 2																N/A	

Foot Notes:

1: NYC DEP reserves the right to pursue a lump sum price

2: Project Management services are capped at 10% of the total for each task

Firm	Employee	Title	Anticipated Direct Salary Rates (\$)					OH Rate (%)	Profit (%)	Total Billable Rate (\$)	Hours Per Year					Total Hours	Total Cost (\$)
			Year 1	Year 2	Year 3	Year 4	Year 5				Year 1	Year 2	Year 3	Year 4	Year 5	14520	
Task 3 Selection, Calibration and Validation of Hydrodynamic and Water Quality Models ¹																	
3.1. Project Management Services ²																	
3.1.a Monthly Progress Reports and Meetings																	
3.2. Hydrodynamic and Water Quality Modeling																	
FP Task ODCs																	
Subtotal Hours FP Task 3																	N/A
Subtotal (cost) FP Task 3																N/A	

Foot Notes:

1: NYC DEP reserves the right to pursue a lump sum price

2: Project Management services are capped at 10% of the total for each task

Firm	Employee	Title	Anticipated Direct Salary Rates (\$)					OH Rate (%)	Profit (%)	Total Billable Rate (\$)	Hours Per Year					Total Hours	Total Cost (\$)
			Year 1	Year 2	Year 3	Year 4	Year 5				Year 1	Year 2	Year 3	Year 4	Year 5	8294	
Task 4 Setup And Execution of a Continuous Long-Term Simulation of the Hydrodynamic and Water Quality Models From 2003-2018. ¹																	
4.1. Project Management Services ²																	
4.1.a Monthly Progress Reports and Meetings																	
4.2. Long-Term Simulation of Hydrodynamic and Water Quality Models																	
FP Task ODCs																	
Subtotal Hours FP Task 4																	N/A
Subtotal (cost) FP Task 4																N/A	

Foot Notes:

1: NYC DEP reserves the right to pursue a lump sum price

2: Project Management services are capped at 10% of the total for each task

Firm	Employee	Title	Anticipated Direct Salary Rates (\$)					OH Rate (%)	Profit (%)	Total Billable Rate (\$)	Hours Per Year					Total Hours	Total Cost (\$)
			Year 1	Year 2	Year 3	Year 4	Year 5				Year 1	Year 2	Year 3	Year 4	Year 5		
																5729	
Task 5 Build Out and Design of GUI/DST ¹																	
5.1. Project Management Services ²																	
5.1.a Monthly Progress Reports and Meetings																	
5.2. GUI/DST																	
5.2.1 GUI/DST Design																	
5.2.2 Build out and Testing of GUI/DST																	
5.3 Develop recommendations and cost estimates for a central data repository for water quality and model input data																	
5.4 Develop recommendations and cost estimates for in-house hardware or cloud computing and software services																	
5.5-Design and manage IMF Wiki website																	
FP Task ODCs																	
Subtotal Hours FP Task 5																	N/A
Subtotal (cost) FP Task 5																N/A	

Foot Notes:

1: NYC DEP reserves the right to pursue a lump sum price

2: Project Management services are capped at 10% of the total for each task

Firm	Employee	Title	Anticipated Direct Salary Rates (\$)					OH Rate (%)	Profit (%)	Total Billable Rate (\$)	Hours Per Year					Total Hours	Total Cost (\$)
			Year 1	Year 2	Year 3	Year 4	Year 5				Year 1	Year 2	Year 3	Year 4	Year 5	2165	
Task 6 Technology Transfer and Training ¹																	
6.1. Project Management Services ²																	
6.1.a Monthly Progress Reports and Meetings																	
6.2 Licensing and Maintenance Costs and Additional Data Needs																	
6.3 Training																	
6.4 Final Demonstration of Model/GUI/DST and Delivery of Project Documentation to DEP																	
FP Task ODCs																	
Subtotal Hours FP Task 6																	N/A
Subtotal (cost) FP Task 6																N/A	

Foot Notes:

1: NYC DEP reserves the right to pursue a lump sum price

2: Project Management services are capped at 10% of the total for each task

ATTACHMENT C

ACKNOWLEDGMENT OF ADDENDA

CONTRACT: BEPA- LIS HWQMS

**RFP TITLE: BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS
LONG ISLAND SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELLING
SUPPORT**

PIN: 82619BEPLIS

Directions: Complete Part I or Part II, whichever is applicable.

**PART I: LISTED BELOW ARE THE DATES OF ISSUE FOR EACH ADDENDUM
RECEIVED IN CONNECTION WITH THIS RFP:**

ADDENDUM #1, DATED

ADDENDUM #2, DATED

ADDENDUM #3, DATED

ADDENDUM #4, DATED

ADDENDUM #5, DATED

ADDENDUM #6, DATED

ADDENDUM #7, DATED

ADDENDUM #8, DATED

ADDENDUM #9, DATED

ADDENDUM #10, DATED

PART II:

_____ NO ADDENDUM WAS RECEIVED IN CONNECTION WITH THIS RFP.

Proposer's Name _____ Signature _____ Date

ATTACHMENT D

DOING BUSINESS DATA FORM

CONTRACT: BEPA- LIS HWQMS

**RFP TITLE: BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS LONG ISLAND
SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELLING SUPPORT**

PIN: 82619BEPLIS

Doing Business Data Form

To be completed by the City agency prior to distribution

Agency _____ Transaction ID _____

Check One

☐ Proposal ☐ Award

Transaction Type (check one)

☐ Concession ☐ Economic Development Agreement ☐ Franchise ☐ Grant ☐ Pension Investment Contract ☐ Contract

Any entity receiving, applying for or proposing on an award or agreement must complete a Doing Business Data Form (see Q&A sheet for more information). Please either type responses directly into this fillable form or print answers by hand in black ink, and be sure to fill out the certification box on the last page. **Submission of a complete and accurate form is required for a proposal to be considered responsive or for any entity to receive an award or enter into an agreement.**

This Data Form requires information to be provided on principal officers, owners and senior managers. The name, employer and title of each person identified on the Data Form will be included in a public database of people who do business with the City of New York, as will the organizations that own 10% or more of the entity. No other information reported on this form will be disclosed to the public. **This Data Form is not related to the City's PASSPort registration or VENDEX requirements.**

Please return the completed Data Form to the City office that supplied it. Please contact the Doing Business Accountability Project at DoingBusiness@mocs.nyc.gov or 212-788-8104 with any questions regarding this Data Form. Thank you for your cooperation.

Entity Information

If you are completing this form by hand, please print clearly.

Entity EIN/TIN _____ Entity Name _____

Filing Status

NEW: Data Forms submitted now must include the listing of **organizations**, as well as individuals, with 10% or more ownership of the entity. Until such certification of ownership is submitted through a change, new or update form, a no change form will not be accepted.

(Select One)

- ☐ Entity has never completed a Doing Business Data Form. Fill out the entire form.
- ☐ Change from previous Data Form dated _____. Fill out only those sections that have changed, and indicate the name of the persons who no longer hold positions with the entity.
- ☐ No Change from previous Data Form dated _____. Skip to the bottom of the last page.

Entity is a Non-Profit

☐ Yes ☐ No

Entity Type ☐ Corporation (any type) ☐ Joint Venture ☐ LLC ☐ Partnership (any type) ☐ Sole Proprietor ☐ Other (specify) _____

Address _____

City _____ State _____ Zip _____

Phone _____ E-mail _____

Provide your e-mail address in order to receive notices regarding this form by e-mail.

Principal Officers

Please fill in the required identification information for each officer listed below. If the entity has no such officer or its equivalent, please check "This position does not exist." If the entity is filing a Change Form and the person listed is replacing someone who was previously disclosed, please check "This person replaced..." and fill in the name of the person being replaced so his/her name can be removed from the *Doing Business Database*, and indicate the date that the change became effective.

Chief Executive Officer (CEO) or equivalent officer

The highest ranking officer or manager, such as the President, Executive Director, Sole Proprietor or Chairperson of the Board.

☐ This position does not exist

First Name _____ MI _____ Last _____ Birth Date (mm/dd/yy) _____

Office Title _____ Employer (if not employed by entity) _____

Home Address _____

☐ This person replaced former CEO _____ on date _____

Chief Financial Officer (CFO) or equivalent officer

The highest ranking financial officer, such as the Treasurer, Comptroller, Financial Director or VP for Finance.

☐ This position does not exist

First Name _____ MI _____ Last _____ Birth Date (mm/dd/yy) _____

Office Title _____ Employer (if not employed by entity) _____

Home Address _____

☐ This person replaced former CFO _____ on date _____

Chief Operating Officer (COO) or equivalent officer

The highest ranking operational officer, such as the Chief Planning Officer, Director of Operations or VP for Operations.

☐ This position does not exist

First Name _____ MI _____ Last _____ Birth Date (mm/dd/yy) _____

Office Title _____ Employer (if not employed by entity) _____

Home Address _____

☐ This person replaced former COO _____ on date _____

Principal Owners

Please fill in the required identification information for all individuals or organizations that, through stock shares, partnership agreements or other means, **own or control 10% or more of the entity**. If no individual or organization owners exist, please check the appropriate box to indicate why and skip to the **Senior Managers** section. If the entity is owned by other companies that control 10% or more of the entity, those companies must be listed. If an owner was identified on the previous page, fill in his/her name and write "See above." If the entity is filing a Change Form, list any individuals or organizations that are no longer owners at the bottom of this section. If more space is needed, attach additional pages labeled "Additional Owners."

There are no owners listed because (select one):

☐ The entity is not-for-profit ☐ The entity is an individual ☐ No individual or organization owns 10% or more of the entity

Other (explain) _____

Individual Owners (who own or control 10% or more of the entity)

First Name _____ MI ____ Last _____ Birth Date (mm/dd/yy) _____

Office Title _____ Employer (if not employed by entity) _____

Home Address _____

First Name _____ MI ____ Last _____ Birth Date (mm/dd/yy) _____

Office Title _____ Employer (if not employed by entity) _____

Home Address _____

Organization Owners (that own or control 10% or more of the entity)

Organization Name _____

Organization Name _____

Organization Name _____

Remove the following previously-reported Principal Owners

Name _____ Removal Date _____

Name _____ Removal Date _____

Name _____ Removal Date _____

Senior Managers

Please fill in the required identification information for all senior managers who oversee any of the entity's relevant transactions with the City (e.g., contract managers if this form is for a contract award/proposal, grant managers if for a grant, etc.). Senior managers include anyone who, either by title or duties, has substantial discretion and high-level oversight regarding the solicitation, letting or administration of any transaction with the City. At least one senior manager must be listed, or the Data Form will be considered incomplete. If a senior manager has been identified on a previous page, fill in his/her name and write "See above." If the entity is filing a Change Form, list individuals who are no longer senior managers at the bottom of this section. If more space is needed, attach additional pages labeled "Additional Senior Managers."

Senior Managers

First Name _____ MI ____ Last _____ Birth Date (mm/dd/yy) _____

Office Title _____ Employer (if not employed by entity) _____

Home Address _____

First Name _____ MI ____ Last _____ Birth Date (mm/dd/yy) _____

Office Title _____ Employer (if not employed by entity) _____

Home Address _____

First Name _____ MI ____ Last _____ Birth Date (mm/dd/yy) _____

Office Title _____ Employer (if not employed by entity) _____

Home Address _____

Remove the following previously-reported Senior Managers

Name _____ removal date _____

Name _____ removal date _____

Certification

I certify that the information submitted on these two pages and _____ additional pages is accurate and complete. I understand that willful or fraudulent submission of a materially false statement may result in the entity being found non-responsible and therefore denied future City awards.

Name _____ Title _____

Entity Name _____ Work Phone # _____

Signature _____ Date _____

Please return this form to the City agency that supplied it to you, not to the Doing Business Accountability Project.

Standard Form

ATTACHMENT E

DOING BUSINESS DATA FORM FAQs

CONTRACT: BEPA- LIS HWQMS

**RFP TITLE: BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS LONG ISLAND
SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELLING SUPPORT**

PIN: 82619BEPLIS

What is the purpose of the Doing Business Data Form (DBDF)?

To collect accurate, up-to-date identification information about organizations that have business dealings with the City of New York in order to comply with Local Law 34 of 2007 (LL 34), a campaign finance reform law. LL 34 limits municipal campaign contributions from principal officers, owners and senior managers of entities doing business with the City and mandates the creation of a Doing Business Database to allow the City to enforce the law. The information requested in this DBDF must be provided, regardless of whether the organization or the people associated with it make or intend to make campaign contributions. No sensitive personal information collected will be disclosed to the public.

Why have I received this DBDF?

The contract, franchise, concession, grant or economic development agreement you are proposing on, applying for or have already been awarded is considered a business dealing with the City under LL 34. No proposal or application will be considered and no award will be made unless this DBDF is completed. Most transactions valued at more than \$5,000 are considered business dealings and require completion of the Doing Business Data Form. Exceptions include transactions awarded on an emergency basis or by "conventional" competitive sealed bid (i.e. bids that do not use a prequalified list or "Best Value" selection criteria.) Other types of transactions that are considered business dealings include real property and land use actions with the City.

What individuals will be included in the Doing Business Database?

The principal officers, owners and certain senior managers of organizations listed in the Doing Business Database are themselves considered to be doing business with the City and will be included in the Database.

- **Principal Officers** are the Chief Executive Officer (CEO), Chief Financial Officer (CFO) and Chief Operating Officer, or their functional equivalents. See the DBDF for examples of titles that apply.
- **Principal Owners** are individuals who own or control 10% or more of the organization. This includes stockholders, partners and anyone else with an ownership or controlling interest in the entity.
- **Senior Managers** include anyone who, either by job title or actual duties, has substantial discretion and high-level oversight regarding the solicitation, letting or administration of any contract, concession, franchise, grant or economic development agreement with the City. At least one Senior Manager must be listed or the Data Form will be considered incomplete.

NEW FOR 2018: As of January 2018, the DBDF must report organizations, as well as individuals, that own 10% or more of the entity. A DBDF with such a certification, filed as a full (never filed before) or as a change form, must be submitted before an entity can then file a DBDF that indicates no changes since the previous form. Contact DBA at 212-788-8104 or at doingbusiness@mocs.nyc.gov to inquire if DBA has received such a form.

I have already completed a Doing Business Data Form, do I have to submit another one?

Yes. An organization is required to submit a DBDF each time it enters into a transaction considered a business dealing with the City, including contract, concession and franchise proposals. However, the DBDF has both a Change option, which requires only information that has changed since the last DBDF was filed, and a No Change option. No organization should have to fill out the entire DBDF more than once.

If you have already submitted a DBDF for one transaction type (such as a contract), and this is the first time you are completing a DBDF for a different transaction type (such as a grant), please select the Change option and complete Section 4 (Senior Managers) for the new transaction type.

Will the personal information on the DBDF be available to the public?

No. The names and titles of the officers, owners and senior managers reported on the DBDF will be made available to the public, as will information about the organization itself. However, personal identifying information, such as home address and date of birth, will not be disclosed to the public, and home address will not be used for communication purposes.

I provided some of this information in PASSPort; do I have to provide it again?

Yes. Although a Doing Business Data Form and PASSPort request some of the same information, they serve entirely different purposes. In addition, the DBDF requests information concerning senior managers, which is not in PASSPort.

What organizations will be included in the Doing Business Database?

Organizations that hold \$100,000 or more in grants, contracts for goods or services, franchises or concessions (\$500,000 for construction contracts), or that hold any economic development agreement or pension fund investment contract, are considered to be doing business with the City for the purposes of LL 34. Because all of the business that an organization does or proposes to do with the City will be added together, the DBDF must be completed for all transactions valued at more than \$5,000 even if the organization doesn't currently do enough business with the City to be listed in the Database.

No one in my organization plans to contribute to a candidate; do I have to fill out this DBDF?

Yes. All organizations are required to return this DBDF with complete and accurate information, regardless of the history or intention of the entity or its officers, owners or senior managers to make campaign contributions. The Doing Business Data Form must be complete so that the Campaign Finance Board can verify whether future contributions are in compliance with the law.

My organization is proposing on a contract with another firm as a Joint Venture that does not exist yet; how should the Data Form be completed?

A joint venture that does not yet exist must submit a DBDF for each of its component firms. If the joint venture receives the award, it must then complete a form in the name of the joint venture.

How long will an organization and its officers, owners and senior managers remain listed on the Doing Business Database?

- **Contract, Concession and Economic Development Agreement holders:** generally for the term of the transaction, plus one year.
- **Franchise and Grant holders:** from the commencement or renewal of the transaction, plus one year.
- **Pension investment contracts:** from the time of presentation on an investment opportunity or the submission of a proposal, whichever is earlier, until the end of the contract, plus one year.
- **Line item and discretionary appropriations:** from the date of budget adoption until the end of the contract, plus one year.
- **Contract proposers:** for one year from the proposal date or date of public advertisement of the solicitation, whichever is later.
- **Franchise and Concession proposers:** for one year from the proposal submission date.

For information on other transaction types, contact the Doing Business Accountability Project.

How does a person remove him/herself from the Doing Business Database?

When an organization stops doing business with the City, the people associated with it are removed from the Database automatically. However, any person who believes that s/he should not be listed may apply for removal. Reasons that a person would be removed include his/her no longer being the principal officer, owner or senior manager of the organization. Organizations may also update their database information by submitting an update form. Removal Request and Update forms are available online <https://www1.nyc.gov/site/mocs/resources/forms.page> or by calling 212-788-8104.

What are the campaign contribution limits for people doing business with the City?

Contributions to City Council candidates are limited to \$250 per election cycle; \$320 to Borough President candidates; and \$400 to candidates for citywide office. Please contact the NYC Campaign Finance Board for more information at www.nyccfb.info, or 212-306-7100.

The DBDF is to be returned to the City office that issued it.

If you have any questions about the Doing Business Data Form please contact the Doing Business Accountability Project at 212-788-8104 or doingbusiness@mocs.nyc.gov.

ATTACHMENT F

SCOPE OF SERVICES

CONTRACT: BEPA- LIS HWQMS

**RFP TITLE: BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS
LONG ISLAND SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELING SUPPORT**

PIN: 82619BEPLIS

I. GENERAL REQUIREMENTS:

1. The intent of this procurement is to provide services to support the **Long Island Sound-- Hydrodynamic and Water Quality Modeling** Project. Pertinent data which describes the Project, and which states various parameters pertaining to the work to be performed at the Project site, are listed herein and in the attached documents.
2. It is the purpose of this RFP to present a coordinated effort for the Project and to define and outline the major issues and proposed solutions to such issues involved.
3. For each deliverable required in this Scope of Services, the Consultant shall provide three (3) hard copies and three (3) electronic copies on compact disc ("CD" or "DVD"), unless otherwise directed by DEP, or noted in this Scope of Services. **Each deliverable, until approved by DEP, is subject to revisions at no additional cost.**
4. The Consultant shall submit all plans, reports, and memoranda required in this Scope of Services in draft and final form, including the incorporation of all finalized stakeholder comments.
5. DEP will provide comments to the Consultant on all deliverables within 45 calendar days of submission, except where an alternate timeframe is provided by DEP.
6. The Consultant shall provide meeting agenda, materials, attendance sheets, and meeting minutes of all meetings, workshops, and conferences. The minutes will focus on decisions made and open action items. Minutes will be concise and delivered to DEP within three (3) business days of the meeting.
7. Monthly Invoices - For those portions of the Services that are compensated on the basis of Cost Plus, the Consultant shall prepare a monthly invoice, as instructed, that includes a full accounting of all labor, Project Management, ODC (inclusive of allowances) costs organized by Task.

For those portions of the services that are compensated on the basis of lump sum payments, the Consultant shall prepare a document detailing the percentage of the lump sum payment that is being invoiced by the Consultant, and the corresponding portions of the services that were performed by the Consultant and each subconsultant. An acceptance letter, signed by DEP,

must accompany each lump sum item billed from DEP.

Upon DEP's request, the Consultant shall submit all documentation and justification in support of lump sum expenditures or fees, which include but is not limited to timesheets, material and supplies invoices, travel receipts and other proof of lump sum work.

The Consultant shall invoice for services performed and shall provide, in its monthly report to DEP, an accounting and a forecast of all costs at the Subtask level. The Consultant shall collect costs and maintain forecasts to the lowest level of the Scope of Services (Task, Subtask, or Sub-subtask Level) and shall provide this information when requested by DEP.

Note: The Consultant shall not invoice DEP for any efforts associated with the preparation of monthly invoices.

8. The Consultant shall provide all Project Management Services associated with these General Requirements and the sub-Tasks (Tasks 1.1, 2.1, 3.1, 4.1, 5.1, and 6.1) below on a Cost Plus basis, capped at 10% of the maximum contract value.

The total cost of Project Management Services shall not exceed ten (10%) of the total cost of the Contract. These Project Management sub-Tasks (Tasks 1.1, 2.1, 3.1, 4.1, 5.1, and 6.1) require DEP approval, as applicable, of each deliverable prior to payment. The total cost for the Project Management Services is capped and will not increase during the term of the Contract.

9. The following conditions shall apply and must be incorporated into the scope of services.
 - DEP will be responsible for providing access to the Consultant to System Wide Eutrophication Model ("SWEM") input and output files
 - Consultant will be responsible for all data acquisition and compilation for development of the model(s)
 - Model deliverables will include all model source code, training datasets and outputs and model documentation for calibrating, validating and running the model
 - Preferred model delivery is an open source, public-domain, and non-proprietary system
 - The modeling system must be designed to be run in-house by appropriate DEP staff.
 - Ease of use by DEP shall be a consideration in the modeling and GUI/DST design
 - A detailed Quality Assurance Project Plan ("QAPP") is required (see Task 2.3)
 - As part of the acceptance by DEP of the integrated modeling and GUI/DST, the Consultant will provide a final demonstration of the performance of the hydrodynamic and water quality models and GUI/DST to DEP
 - The Consultant shall assist DEP with installation and execution of the model(s) and GUI/DST on DEP's computer system or cloud-based enterprise system.
10. Draft deliverables prepared by the Consultant, for this project, may be subject to peer review by a Technical Advisory Committee (TAC) organized and funded by DEP through separate funding mechanisms, as well as other academic and regulatory stakeholders involved with Long Island Sound research.

II. TASKS:

At the direction of DEP, the Consultant shall perform the following six (6) tasks.

TASK 1. MOBILIZATION

Task 1.1. Project Management Services

The Consultant shall include in this task, all Project Management Services that will occur in the completion of this task..

Task 1.1.a Monthly Progress Reports and Progress Meetings

The Consultant will prepare and submit monthly progress reports and participate in monthly progress meetings. The monthly progress reports must be submitted to DEP no later than the 10th day of each month.

To reduce travel costs for any key staff that may be located outside of the NYC metropolitan area, please describe your approach and capabilities for using webinars or teleconferencing to collaborate with colleagues, DEP, and other stakeholders. DEP has videoconferencing capabilities.

Task 1.2 Project Kick-off Meeting

Prior to the Project Kick-Off Meeting, the Consultant shall submit a draft of its PMP for DEP review. The purpose of the Project Kick-Off Meeting is to create alignment among the stakeholders regarding the Project delivery plan, goals, objectives, expectations of all stakeholders, and measurements of success. The Consultant shall hold the Project Kick-Off Meeting at the start of this project. Approximately two weeks prior to the Project Kick-Off Meeting, the Consultant shall cause its project manager and document controls manager to schedule and attend a “Pre-Project Kick-Off Meeting” with DEP to review the draft PMP (including all required plans), draft Kick-Off Meeting agenda, and draft Kick-Off Meeting handouts.

Task 1.3 Stakeholder Meeting Support

As directed by DEP, the Consultant shall provide technical and administrative support for stakeholder meetings including, but not limited to, the LIS Study Science and Technical Advisory Committee (“STAC”); TAC, LIS management committee and Harbor Estuary Program management committee meetings as well as biannual stakeholder meetings to provide updates on the progress being made with developing the new modeling framework and GUI/DST. The Consultant shall assume up to three (3) meetings on an annual basis. Typical technical and administrative support activities include delivering and helping to assemble technical presentations for public or peer review meetings, providing public presentation materials and information, and helping in making logistical arrangements for meetings such as telecommunication support.

Task 1.4 Project Management Plan

The Consultant shall develop and implement a Project Management Plan (“PMP”) detailing the manner in which the Project will be planned, executed, monitored, controlled, and closed-out. The PMP shall cover staff, scope, schedule, budget, deliverables, workshops, quality, risk, EHS,

stakeholder communications, and document management.

The PMP will also include the following plans:

1. **Quality Management Plan.** The plan will demonstrate how quality assurance and quality control will be managed during the Project and identify the key personnel and responsibilities for quality management.
2. **EHS Management Plan.** The plan will demonstrate and clearly define how EHS will be managed and incorporated into this project.

Task 1 Deliverables

- Monthly progress reports and meetings
- Stakeholder meeting summaries
- Draft and Final PMP

TASK 2. QUALITY CONTROL AND QUALITY ASSURANCE

Task 2.1. Project Management

The Consultant shall include in this task, all Project Management Services efforts that will occur in the completion of this task, as necessary.

Task 2.1.a. Monthly Progress Reports and Meetings

The Consultant shall continue to prepare and submit a monthly progress report for this task.

Task 2.2. Data Acquisition Plan

The Consultant shall describe and provide a data acquisition plan, budget, and schedule for acquiring, uploading and checking water quality, GIS, meteorological, bathymetry, hydraulic and water quality load estimates, and other data sets and information necessary for Task 3 and Task 4 model set-up, calibration and validation activities. DEP will be responsible for providing SWEM input data sets for the modeling objectives described under Task 3, but additional data and information will need to be collected and uploaded as part of Task 4 activities.

DEP will provide DEP Infoworks model outputs as input to the hydrodynamic model for the NYC portion of the LIS hydrodynamic model. For other parts of the modeling domain, other existing watershed monitoring and modeling outputs must be acquired, such as those resulting from ongoing Long Island Nitrogen Action Plan-related groundwater modeling or the United States Geological Survey (“USGS”) tributary monitoring and modeling estimates.

Task 2.3 QAPP

As part of this Task, the Consultant shall provide a Quality Assurance Project Plan (“QAPP”) for the hydrodynamic and water quality modeling and GUI/DST that addresses the topics outlined below. It shall be noted that the QAPP shall include how the work effort will be coordinated and reviewed to assure a high level of quality and performance among the different technical and scientific skill sets. For each major technical activity, the Plan should identify and/or update the key personnel and their education and experience for the work they will be performing and their primary work locations. DEP reserves the right to approve any proposed substitutions of personnel.

1. Modeling and data quality objectives
2. Model skill assessment and error acceptance criteria
3. Sensitivity analyses to test the sensitivity of the hydrodynamic model and water quality models to such issues as atmospheric forcing, vertical advection schemes, grid resolution, temperature, salinity, reaction coefficients (i.e., algal growth and respiration rates, nutrient recycle rates, reaeration rates, etc.) and other factors
4. Model performance criteria
5. Model documentation plan
6. Data quality and corrective action
7. Data Management and Record Keeping
8. Quality Control
9. Management of change plan for documenting, archiving and checking changes to model and software coding and processes
10. Protocols for model (s) version control and documentation of the source code
11. Protocols for GUI/DST version control and documentation of the source code for the same

As required by DEP, the Consultant shall be responsible for making any needed periodic updates to the QAPP, for DEP approval, as the project progresses, and as noted below for individual tasks.

Task 2 Deliverables

- Monthly progress reports and meetings
- Draft and Final Data Acquisition Plan
- Draft and Final QAPP
- Periodic updates to QAPP, as requested by DEP

TASK 3. SELECTION, CALIBRATION AND VALIDATION OF HYDRODYNAMIC AND WATER QUALITY MODELS

Task 3.1. Project Management

The Consultant shall include in this task, all Project Management Services efforts that will occur in the completion of this task, as necessary.

Task 3.1.a. Monthly Progress Reports and Meetings

The Consultant shall continue to prepare and submit a monthly progress report for this task.

Task 3.2 Hydrodynamic and Water Quality Modeling

The purpose of this Task is to select hydrodynamic and water quality model(s) for the integrated model framework, develop a new finer resolution grid for LIS and the larger system-wide domain of New York Harbor and the New York Bight, and use data collected from 1994-1995 to calibrate new or updated hydrodynamic and water quality model(s). Details regarding vertical dimensions, vertical coordinate system, and horizontal dimensions of the existing LIS SWEM framework are discussed in Attachment N. The objectives of this task are as follows:

- Utilizing a new finer resolution grid, the new or updated hydrodynamic model must accurately simulate transport and mixing processes, seasonal vertical stratification at the spatial/temporal scale and an acceptable goodness-of-fit necessary to accurately simulate water level, water temperature, salinity, and density in LIS. The new hydrodynamic model must also accurately represent physical transport and hydrodynamic processes throughout the larger system-wide domain of New York Harbor and the New York Bight.
- The new or updated water quality model must accurately account for the linkage of physical transport and mixing with biogeochemical processes at the spatial scale and goodness-of-fit necessary to accurately simulate dissolved oxygen, hypoxia, nutrients, organic carbon, water clarity and phytoplankton biomass (as chlorophyll-a) and eutrophication processes in LIS. The new or updated model must also accurately represent biogeochemical processes throughout the larger system-wide domain of New York Harbor and the New York Bight.
- LIS embayments and tidal rivers that are embedded in the new or updated model grid must be defined with sufficient spatial resolution to accurately account for tidal volume and mass exchange with LIS.

Task 3.2 activities include:

- Select hydrodynamic and water quality model(s) for the integrated model framework
- Collect/compile/check/inventory data sets required for modeling activities
- Design, build, and test new computational grid that includes finer resolution grid for LIS and system wide domain
- Update model code for selected model as needed to improve parameterization of hydrodynamic and biogeochemical processes, including output of mass flux components for selected state variables
- Model setup, calibration, skill assessment for hydrodynamic/water quality model for period 1994-1995. (Calibration should focus on stations including stations with vertical profiles (temperature, salinity, dissolved oxygen), located in the East River, Narrows, western basin, central and eastern basin of LIS, Upper/Lower NY Harbor, and New York Bight)
- Model setup, calibration, skill assessment for two (2) nested LIS embayments that are embedded in new LIS grid for hydrodynamic/water quality model(s)
- Model setup and testing of two (2) (one (1) Connecticut and one (1) Long Island) standalone LIS embayment models as a demonstration of the functionality of nesting a smaller model grid within a larger new LIS grid
- The Consultant shall conduct model simulation for re-assessment of existing SWEM management scenarios (TMDL plus two (2) other SWEM scenarios) for the period of

1994-1995 and a diagnosis of the model's response to the nutrient reduction scenarios previously evaluated

- Prepare hydrodynamic and water quality technical reports containing but not limited to:
 - overview and analysis of model(s) performance
 - model calibration, validation and skill assessment and uncertainty evaluation;
 - mass balance flux analyses
 - all geospatially-referenced datasets and databases used for development, calibration validation and skill assessment of the model(s)
 - documentation of model(s) source codes and executable programs, final input and representative output files, ancillary or supporting software developed and necessary for creation of model(s) input or processing model(s) output, and/or any other programs necessary for replicating reported results or creating input for additional model scenarios or evaluation periods

Task 3 Deliverables:

- Monthly progress reports and meetings
- Initial model selection and setup technical memo for hydrodynamic & water quality models
- Draft calibration, validation and skill assessment report for hydrodynamic model for period 1994-1995
- Draft calibration, validation and skill assessment report for water quality model for period 1994-1995
- Summary technical report and presentation materials to assist DEP, TAC, and other stakeholders in the peer review of new hydrodynamic and water quality models framework and recommend changes to the modeling effort
- Summary of Consultant response to peer review comments on model framework
- Final calibration, validation and skill assessment Technical Reports for hydrodynamic model for period 1994-1995
- Final calibration, validation and skill assessment Technical Reports for water quality model for period 1994-1995
- Draft and Final Technical reports of one (1) Connecticut and one (1) Long Island standalone embayment models as a demonstration of the functionality of nesting a smaller model grid within a larger new LIS grid
- Draft and Final reports on the SWEM management scenarios for the period of 1994-1995 and the model's response to the nutrient reduction scenarios
- Provide geospatially-referenced datasets and databases used for development, calibration validation and skill assessment for both the hydrodynamic and water quality models
- Provide the hydrodynamic and water quality models source codes and executable programs, final input and representative output files, ancillary or supporting software developed and necessary for creation of model(s) input or processing model(s) output, and/or any other programs necessary for replicating reported results or creating input for additional model scenarios or evaluation periods

TASK 4 SETUP AND EXECUTION OF A CONTINUOUS LONG-TERM SIMULATION OF THE HYDRODYNAMIC AND WATER QUALITY MODELS FROM 2003-2018.

Task 4.1. Project Management

The Consultant shall include in this task, all Project Management Services efforts that will occur in the completion of this task, as necessary.

Task 4.1.a. Monthly Progress Reports and Meetings

The Consultant shall continue to prepare and submit a monthly progress report for this task.

Task 4.2 Long-Term Simulation of Hydrodynamic and Water Quality Models

The purpose of this Task is to collect and compile data sets from primary and secondary data sources needed to support model setup and execution of a continuous long-term simulation of the hydrodynamic and water quality model(s) from 2003 - 2018. Long-term period includes the years before and after the attainment of a 59% nitrogen reduction goal by 2016. The Consultant shall specify the approach to be used to post-process model results for a comparison to observed data and water quality target criteria for dissolved oxygen, hypoxia, water clarity, and phytoplankton biomass (as chlorophyll-a). The objectives of this task are as follows:

- New model framework developed under Task 3 must be updated to represent the years from 2003-2018. Identify, compile and inventory data from primary and secondary sources to represent the years from 2003-2018 for flow boundaries, meteorological, atmospheric forcing, open ocean boundary conditions for tidal forcing, temperature, salinity, water quality, sediment bed data for sediment flux model, and station data for model-data comparison and skill assessment.
- Review and analyze data to support recommendations for a sequence of years, to be selected by DEP in consultation with the Consultant, to confirm re-calibration of model to data collected from 2003-2018. Recommendations for selection of years must consider interannual differences in river discharge, wind forcing, water temperature, nitrogen loading, and other key factors.
- New re-calibrated model(s) must be confirmed to five to six (5-6) years of record selected from 2003-2018 period of record before 59% nitrogen reduction.
- New re-calibrated model(s) must be confirmed for post-audit years (2019 and beyond) after 59% nitrogen reduction.

Task 4 activities include:

- Identify, collect, compile and review data from primary and secondary data sources for the 2003-2018 period for long-term model simulation activities. Data discovery must include, but is not limited to, obtaining new runoff, wastewater, stormwater, CSO, and atmospheric loading information for LIS
- Provide technical report on data discovery and final approach towards model setup and evaluation approach
- Justify and select sequence of five to six (5-6) years to run the model(s) for confirmation (validation) of the model re-calibrated to 1994-1995 data under Task 3

- Setup of hydrodynamic/water quality model(s) for 2003-2018 long-term record
- Model confirmation of calibration, skill assessment for hydrodynamic/water quality model(s) for selected years before attainment of TMDL goal
- Model confirmation of calibration, skill assessment for hydrodynamic/water quality model(s) for selected post-audit years after attainment of TMDL goal
- Model confirmation of calibration, skill assessment for hydrodynamics/water quality model for two (2) (Connecticut and Long Island) LIS embayments embedded in new grid
- Model sensitivity analyses for hydrodynamic/water quality model(s)
- Model simulation of three (3) designated nitrogen reduction scenarios (to be determined by DEP/USEPA) for selected period of 2003-2018 and diagnosis of model(s) response to nutrient reduction scenarios
- Document data gaps identified under Task 4 that would be required to update the model and recommend new data collection efforts that would be used to support modeling efforts to be continued by DEP under Task 6
- Prepare technical report/presentation materials that can be used to assist DEP, TAC, and other stakeholders in the peer review of new hydrodynamic and water quality model framework and to provide opportunity for TAC and others to recommend any changes to the this modeling effort

Task 4 Deliverables:

- Monthly progress reports and meetings
- Fully executable hydrodynamic and water quality models for long term simulation
- Draft and final technical reports for long term simulation containing, including but not limited to:
 - Overview and analysis of model performance;
 - Model calibration, validation and skill assessment and uncertainty evaluations and analyses;
 - Mass balance flux analyses;
 - All geospatially-referenced datasets and databases used for development, calibration validation and skill assessment of the model(s);
 - Documentation of model source codes and executable programs, final input and representative output files, supporting software developed and necessary for creation of model input or processing model output, and/or any other programs necessary for replicating reported results or creating input for additional model scenarios or evaluation periods;
 - Data gaps and recommended new data collection efforts to improve model performance and reduce uncertainty.
- Summary technical report and presentation materials to assist DEP, TAC, and other stakeholders in the peer review of the hydrodynamic and water quality model framework developed under this contract
- Summary of Consultant response to peer review comments on Task 2 model framework
- Technical report to include data gaps identified under Task 2 update of model and recommendation of new data collection efforts that would be used to support modeling efforts to be continued by DEP under Task 3

TASK 5-BUILD OUT AND DESIGN OF GUI/DST

Task 5.1. Project Management

The Consultant shall include in this task, all Project Management Services efforts that will occur in the completion of this task, as necessary.

Task 5.1.a. Monthly Progress Reports and Meetings

The Consultant shall continue to prepare and submit a monthly progress report for this task.

Task 5.2 GUI/DST

The purpose of this Task is to provide a high level menu-driven GUI/DST for the entire model domain, or software as a service (“SAAS”) solution, which, with training, will allow DEP and other stakeholders to run the hydrodynamic/water quality components of the Integrated Modeling Framework (IMF) to support management decision making (such as the cost and benefits of proposed interventions to reduce nutrients). The GUI/DST will also assist in assessment of potential impacts of future conditions on water quality by forcing conditions such as climate change, sea-level rise, and other geophysical or land-use changes. The GUI must include standard formats for representing text and graphics and visual and functional enhancements, such as pop-up windows, radio buttons, list boxes, pull-down menus, toolbars, background graphics and logos. The GUI/DST must provide clear navigation to make it easy to find information. The GUI must allow for formatted data (numeric range or alphanumeric only) by including bounded input widgets that could be used to appropriately limit the user’s input choices. The GUI must not allow the user to complete a dependent step until after the user completes other preceding steps and the dependent steps must be disabled until all its dependencies are satisfied. Every screen should be designed such that a novice can easily tell what steps, especially critical ones, have been performed. The proposed GUI application must be self-evident, with required help materials. The GUI must incorporate suitable warning and error messages that will force the user to address critical issues before returning to a task or finishing a model run. The GUI must be designed so that the users can accomplish their tasks while being minimally aware of the interface itself. The GUI must have good functionality by supporting extensive computer graphics, such as render plotting, interactivity, real time manipulation, scientific visualization and storage of plots/images in memory or other storage mechanisms. During development, the GUI/DST design must include:

- Utilize an Agile iterative approach towards GUI/DST development and conduct periodic meetings with DEP so that any issues and concerns can be addressed early in the development process
- Provide users with access to view and download watershed, hydrodynamic and water-quality data for the system-wide IMF
- Provide tools and libraries for data acquisition, management, visualization, and analysis (such as management scenario or “what-if” libraries) to assist DEP and other users in acquiring data, running models, and reporting on results
- Provide DSTs with a scenario builder and cost-estimator for regulatory agency use to assess the potential costs and benefits of various management strategies to reduce nutrient or other inputs to LIS

- Provide data access and model pre-processing and post-processing tools to facilitate and improve model usability, and to facilitate data evaluation, visualization, and model skill assessment
- Provide centralized access to model code and other documentation to facilitate customization and external review
- Provide a central repository for water quality, GIS linkages, geophysical, and other data interfaces
- Provide capability to parse, process, and format all model data inputs into the native model input format, which will then be stored in the individual user's model input library
- Provide GIS-based pre- and post-processing tools. Allow for editing model inputs and processing model outputs by selecting from a map, rather than only by editing tables
- Provide an archive of previous model run information
- Create an IMF Wiki website to house model and GUI documentation, user manuals, training materials, and code library to foster collaboration
- Develop the GUI/DST to function independently of the LIS model(s) developed under this contract. The GUI/DST, including both initialization and post-processing/data visualization, should be executable on a Windows PC or web-based platform while the model runs. Initial post-processing output activities (e.g., such as aggregating to less granular time-steps or filtering output) must occur on the model server or distributed computing environment
- Allow model outputs to be customizable. Conversion of raw model output to hourly times-series data must occur on the server side, but users should be able to select the geographic region and the vertical layers for which they want to receive results
- The GUI must support the management of user profiles, including individual user security settings, and a stored history of model runs made by the user with their supporting model input data. This tool should also allow for sharing model input data among users.

Task 5.2.1. GUI/DST Design

The Consultant shall conduct stakeholder meetings and a needs assessment with model user-group such as NYCDEP, NYSDEC, CTDEEP, etc., to help refine and finalize preliminary design criteria and schedule for GUI/DST. User interface mockups should be provided and agreed to by DEP, and modified as appropriate thereafter through an Agile iterative process. Any changes to the design or requirements should be memorialized through a management of change plan. The chartering process for GUI/DST design and implementation should identify milestones and dependencies, list resources needed, assign tasks, and identify risks that may need to be addressed for final design in order to assure a successful outcome. The design, build out, and chartering process may be broken up into phases to facilitate early use and beta-testing of the GUI/DST in the Task 3 and Task 4 modeling effort. If this process is broken up into phases, the first phase of design and implementation must focus on model pre-processing, post-processing, and data analysis tools to facilitate and improve model usability, and to facilitate data evaluation, visualization, and model skill assessment. As part of the preliminary design, the design team will include a process flow analysis to articulate the data processing activities that will be carried out on local PC machines, the web, and on any high-end server or the cloud.

Task 5.2.2 Build out and Testing of GUI/DST

This task will include build-out and continued testing and improvements to the functionality and usability of the GUI/DST and visual dashboard. This task will include meetings including testing by DEP and other stakeholders, to identify critical issues pertaining to functionality and efficiency of the GUI/DST and to identify areas requiring improvements or corrective action. The GUI/DST design team will develop and implement a management of change plan to document changes in design, coding, or other attributes of the GUI/DST and the various tools associated with these elements and to document refinements to the preliminary design and chartering plan. A draft GUI/DST should be completed by the start of the Task 4 modeling effort, and with final design completed at least 90 days prior to the end of the project to allow for a training and technology transfer as discussed in Task 6. All changes to the design will be documented and archived as part of a management of change plan. Proposers should use iterative design approaches, such as AGILE, to allow for several rounds of testing and collaboration with DEP and other stakeholders to complete the final design of the GUI/DST for delivery to DEP. This task will also include the development of a GUI/DST design manual documenting software source codes and executable file documentation. All files including model and GUI/DST source codes and executable programs, final input and representative output files, ancillary or supporting software developed and necessary for creation of model input or processing model output, and/or any other programs necessary for replicating reported results or creating input for additional model scenarios or evaluation periods must be prepared.

Task 5.3 Develop recommendations and cost estimates for a central data repository for water quality and model input data.

As part of this Task, the Consultant shall create a draft and final recommendation memo and cost estimates, for a public central data repository. This central repository would serve as a central clearinghouse for measured water quality data, all types of model input data, and model outputs. The purpose of this is to eliminate barriers to participation in centralized data collection, storage and quality control initiatives; and increase regional access and usage of LIS water quality data. The recommendation should include a plan for the development of tools for importing, pre-processing, and formatting external data and for implementing a direct integration between the central data repository and the model, with access through the GUI/DST.

Task 5.4 Develop recommendations and cost estimates for in-house hardware or cloud computing and software services

The Consultant must create a draft and final recommendation memo and cost estimates for in-house hardware, cloud computing or other services, which will also specify the expected performance and execution times for a one (1) year of IMF model simulation, in five (5) minute time steps.

Task 5.5-Design and manage IMF Wiki website

GUI/DST design must include the creation of an IMF Wiki website to house model(s) and GUI documentation, user manuals, training materials and code library to foster collaboration.

Task 5 Deliverables:

- Monthly progress reports and meetings
- Draft and final Technical Reports with GUI/DST design objectives and charter
- Draft and Final GUI/DST design manual
- Draft and Final recommendation memos and cost estimates for Task 5.3 and 5.4 recommendations
- GUI/DST software, source codes and executable file, final input and representative output files, ancillary or supporting software developed and necessary for creation of model(s) input or processing model(s) output, and/or any other programs necessary for replicating reported results or creating input for additional model(s) scenarios or evaluation periods. All changes to the design must be documented and archived as part of a management of change plan
- User's Manual for GUI/DST
- Draft and Final IMF WIKI website

TASK 6 TECHNOLOGY TRANSFER AND TRAINING

Task 6.1. Project Management

The Consultant shall include in this task, all Project Management Services efforts that will occur in the completion of this task, as necessary.

Task 6.1.a. Monthly Progress Reports and Meetings

The Consultant shall continue to prepare and submit a monthly progress report for this task.

Task 6.2 Licensing and Maintenance Costs and Additional Data Needs

Approximately one (1) year before Contract completion, the Consultant must provide a report with: a) options and estimates for the maintenance, licensing, data processing and data repository costs for executing and maintaining the models and GUI/DST on DEP's computer system and/or cloud based application environment; and b) a final report on additional data collection efforts recommended to improve future modeling efforts. The Consultant shall be responsible for up to one (1) year of licensing of the GUI/DST after the Contract has been completed.

Task 6.3 Training

Upon completion of Task 4 modeling, the Consultant shall provide training to selected DEP and other stakeholder's staff. The training must include:

- (1) Basic principles on running the fully executable hydrodynamic/water quality models for management scenario testing
- (2) Development of management scenarios and update the models with future data sets
- (3) Use of GUI/DST for running models, pre and post processing data, and scenario testing; and

(4) Best practices and procedures for updating the models periodically

(5) Videos of training sessions will be recorded

Task 6.4 Final Demonstration of Model/GUI/DST and Delivery of Project Documentation to DEP

As part of the acceptance of the hydrodynamic/water quality models and supporting GUI/DST, the Consultant will provide at an appropriate venue such as NYCDEP training room, a final demonstration to the DEP of the model(s) and GUI/DST application features and performance. The Consultant will assist DEP with installation, testing, and execution of the model(s) on DEP's computer system and/or cloud based application environment, as directed by DEP.

Task 6 Deliverables

- Monthly progress reports and meetings
- Task 6 report with options and cost estimates for licensing and maintenance costs as well as new data collection activities to support or improve future modeling efforts
- All model runs (and their supporting model input data) that were performed prior to the technology transfer and are flagged by DEP should be migrated from the Consultant's modeling system to the final modeling system configured for DEP
- Provide training to selected DEP and other stakeholder's staff
- All training materials

ATTACHMENT G
ENTERPRISE PROJECT MANAGEMENT INFORMATION SYSTEM (“ePMIS”)
Not Used

ATTACHMENT H

IRAN DIVESTMENT ACT COMPLIANCE RIDER

CONTRACT: BEPA- LIS HWQMS

**RFP TITLE: BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS LONG ISLAND
SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELLING SUPPORT**

PIN: 82619BEPLIS

**IRAN DIVESTMENT ACT COMPLIANCE RIDER FOR
NEW YORK CITY CONTRACTORS**

The Iran Divestment Act of 2012, effective as of April 12, 2012, is codified at State Finance Law (“SFL”) §165-a and General Municipal Law (“GML”) §103-g. The Iran Divestment Act, with certain exceptions, prohibits municipalities, including the City, from entering into contracts with persons engaged in investment activities in the energy sector of Iran. Pursuant to the terms set forth in SFL §165-a and GML §103-g, a person engages in investment activities in the energy sector of Iran if:

(a) the person provides goods or services of twenty million dollars or more in the energy sector of Iran, including a person that provides oil or liquefied natural gas tankers, or products used to construct or maintain pipelines used to transport oil or liquefied natural gas, for the energy sector of Iran; or

(b) The person is a financial institution that extends twenty million dollars or more in credit to another person, for forty-five days or more, if that person will use the credit to provide goods or services in the energy sector in Iran and is identified on a list created pursuant to paragraph (b) of subdivision three of Section 165-a of the State Finance Law and maintained by the Commissioner of the Office of General Services.

A bid or proposal shall not be considered for award nor shall any award be made where the bidder or proposer fails to submit a signed and verified bidder’s certification.

Each bidder or proposer must certify that it is not on the list of entities engaged in investment activities in Iran created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law. In any case where the bidder or proposer cannot certify that they are not on such list, the bidder or proposer shall so state and shall furnish with the bid or proposal a signed statement which sets forth in detail the reasons why such statement cannot be made. The City of New York may award a bid to a bidder who cannot make the certification on a case by case basis if:

(1) The investment activities in Iran were made before the effective date of this section (i.e., April 12, 2012), the investment activities in Iran have not been expanded or renewed after the effective date of this section and the person has adopted, publicized and is implementing a formal plan to cease the investment activities in Iran and to refrain from engaging in any new investments in Iran: or

(2) The City makes a determination that the goods or services are necessary for the City to perform its functions and that, absent such an exemption, the City would be unable to obtain the goods or services for which the contract is offered. Such determination shall be made in writing and shall be a public document.

**BIDDER'S CERTIFICATION OF COMPLIANCE WITH
IRAN DIVESTMENT ACT**

Pursuant to General Municipal Law §103-g, which generally prohibits the City from entering into contracts with persons engaged in investment activities in the energy sector of Iran, the bidder/proposer submits the following certification:

[Please Check One]

BIDDER'S CERTIFICATION

- ☐ By submission of this bid or proposal, each bidder/proposer and each person signing on behalf of any bidder/proposer certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief, that each bidder/proposer is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law.
- ☐ I am unable to certify that my name and the name of the bidder/proposer does not appear on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law. I have attached a signed statement setting forth in detail why I cannot so certify.

Dated: _____, New York
_____, 20__

SIGNATURE

PRINTED NAME

TITLE

Sworn to before me this
_____ day of _____, 20__

Notary Public

Dated:

ATTACHMENT I

HIRING AND EMPLOYMENT RIDER-HIRENYC & REPORTING REQUIREMENTS

CONTRACT: BEPA- LIS HWQMS

**RFP TITLE: BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS
LONG ISLAND SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELLING
SUPPORT**

PIN: 82619BEPLIS

HIRING AND EMPLOYMENT RIDER:
HIRENYC AND REPORTING REQUIREMENTS

Introduction

This Rider shall apply to all contracts for goods, services, and construction with a value of one million dollars (\$1,000,000.00) or more, provided, however, that certain requirements of the Rider shall only apply as indicated below. This Rider addresses the HireNYC process, including reporting obligations under the HireNYC process, and certain other reporting requirements imposed by law. In general, the HireNYC process under this Rider requires the Contractor to enroll with the HireNYC portal for the City of New York (“the City”) found within the Department of Small Business Services’s (“SBS”) website, to disclose all entry to mid-level job opportunities described in this Rider arising from this contract and located in New York City, and to agree to interview qualified candidates from HireNYC for those opportunities.

HireNYC Requirements

A. Enrollment

The Contractor shall enroll with the HireNYC system, found at www.nyc.gov/sbs, within thirty (30) days after the registration of this Contract pursuant to Section 328 of the New York City Charter. The Contractor shall provide information about the business, designate a primary contact and say whether it intends to hire for any entry to mid-level job opportunities arising from this contract and located in New York City, and, if so, the approximate start date of the first hire.

B. Job Posting Requirements

Once enrolled in HireNYC, the Contractor agrees to update the HireNYC portal with all entry to mid-level job opportunities arising from this contract and located in New York City, if any, which shall be defined as jobs requiring no more than an associate degree, as provided by the New York State Department of Labor (see Column F of <https://labor.ny.gov/stats/2012-2022-NYS-Employment-Prospects.xls>). The information to be updated includes the types of entry and mid-level positions made available from the work arising from the contract and located in New York City, the number of positions, the anticipated schedule of initiating the hiring process for these positions, and the contact information for the Contractor’s representative charged with overseeing hiring. The Contractor must update the HireNYC portal with any hiring needs arising from the contract and located in New York City, and the requirements of the jobs to be filled, no less than three weeks prior to the intended first day of employment for each new position, except with the permission of SBS, not to be unreasonably withheld, and must also update the HireNYC portal as set forth below.

After enrollment through HireNYC and submission of relevant information, SBS will work with the Contractor to develop a recruitment plan which will outline the candidate screening process,

and will provide clear instructions as to when, where, and how interviews will take place. HireNYC will screen applicants based on employer requirements and refer applicants whom it believes are qualified to the Contractor for interviews. The Contractor must interview referred applicants whom it believes are qualified.

After completing an interview of a candidate referred by HireNYC, the Contractor must provide feedback via the portal within twenty (20) business days to indicate which candidates were interviewed and hired, if any. In addition, the Contractor shall provide the start date of new hires, and additional information reasonably related to such hires, within twenty (20) business days after the start date. In the event the Contractor does not have any job openings covered by this Rider in any given year, the Contractor shall be required to provide an annual update to HireNYC to that effect. For this purpose, the reporting year shall run from the date of the registration of the contract and each anniversary date.

These requirements do not limit the Contractor's ability to assess the qualifications of prospective workers, and to make final hiring and retention decisions. No provision of this Rider shall be interpreted so as to require the Contractor to employ any particular worker.

In addition, the provisions of this Rider shall not apply to positions that the Contractor intends to fill with employees employed pursuant to the job retention provision of Section 22-505 of the Administrative Code of the City of New York. The Contractor shall not be required to report such openings with HireNYC. However, the Contractor shall enroll with the HireNYC system pursuant to Section A, above, and, if such positions subsequently become open, then the remaining provisions of this Rider will apply.

C. Breach and Liquidated Damages

If the Contractor fails to comply with the terms of the contract and this Rider (1) by not enrolling its business with HireNYC; (2) by not informing HireNYC, as required, of open positions; or (3) by failing to interview a qualified candidate, the contracting agency may assess liquidated damages in the amount of two-thousand five hundred dollars (\$2,500.00) per breach. For all other events of noncompliance with the terms of this Rider, the agency may assess liquidated damages in the amount of five hundred dollars (\$500) per breach.

Furthermore, in the event the Contractor breaches the requirements of this Rider during the term of the contract, the City may hold the Contractor in default of this contract.

Audit Compliance

In addition to the auditing requirements set forth in other parts of the contract, the Contractor shall permit SBS and the City to inspect any and all records concerning or relating to job openings or the hiring of individuals for work arising from the contract and located in New York City. The Contractor shall permit an inspection within seven (7) business days of the request.

Other Reporting Requirements

The Contractor shall report to the City, on a monthly basis, all information reasonably requested by the City that is necessary for the City to comply with any reporting requirements imposed by law or rule, including any requirement that the City maintain a publicly accessible database. In addition, the Contractor agrees to comply with all reporting requirements imposed by law or rule, or as otherwise requested by the City.

Construction Requirements

Construction contractors shall comply with the HireNYC requirements set forth above for all non-trades jobs (e.g., for an administrative position arising out of the work of the contract and located in New York City) as set forth above.

In addition, construction contractors shall reasonably cooperate with SBS and the City on specific outreach events, including Hire on the Spot events, for the hiring of trades workers for the work of this contract.

Further, this contract shall be subject to a project labor agreement if so required elsewhere in this contract.

Federal Hiring Requirements

The Contractor shall comply with all federal hiring requirements as may be set forth elsewhere in this contract, including, as applicable:

- Section 3 of the HUD Act of 1968, which requires, to the greatest extent feasible, economic opportunities for 30 percent of new hires be given to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.
- Executive Order 11246, which prohibits discrimination in employment due to race, color, religion, sex or national origin, and requires the implementation of goals for minority and female participation for work involving any Construction trade.

ATTACHMENT J

NOTICE TO ALL PROSPECTIVE CONTRACTORS:
NEW YORK STATE M/WBE REQUIREMENTS FOR STATE FUNDED (SRF) PROJECTS

None Used

CONTRACT: BEPA- LIS HWQMS

**RFP TITLE: BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS
LONG ISLAND SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELLING
SUPPORT**

PIN: 82619BEPLIS

ATTACHMENT K

**NOTICE TO PROPOSERS: PARTICIPATION BY MINORITY-OWNED AND
WOMEN-OWNED BUSINESS ENTERPRISES IN CITY PROCUREMENT FOR CITY
FUNDED (LL1) PROJECTS**

**RFP TITLE: CONTRACT #
BEPA- LIS HWQMS**

**RFP TITLE: BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS
LONG ISLAND SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELLING
SUPPORT**

PIN: 82619BEPLIS

NOTICE TO ALL PROSPECTIVE CONTRACTORS
PARTICIPATION BY MINORITY-OWNED AND WOMEN-OWNED BUSINESS
ENTERPRISES IN CITY PROCUREMENT

ARTICLE I. M/WBE PROGRAM

Local Law No. 129 of 2005 added and Local Law 1 of 2013 amended Section 6-129 of the Administrative Code of the City of New York (hereinafter “Section 6-129”). Section 6-129 establishes the program for participation in City procurement (“M/WBE Program”) by minority-owned business enterprises (“MBEs”) and women-owned business enterprises (“WBEs”), certified in accordance with Section 1304 of the New York City Charter. As stated in Section 6-129, the intent of the program is to address the impact of discrimination on the City’s procurement process, and to promote the public interest in avoiding fraud and favoritism in the procurement process, increasing competition for City business, and lowering contract costs. The contract provisions contained herein are pursuant to Section 6-129, and the rules of the Department of Small Business Services (“DSBS”) promulgated thereunder.

If this Contract is subject to the M/WBE Program established by Section 6-129, the specific requirements of MBE and/or WBE participation for this Contract are set forth in Schedule B of the Contract (entitled the “M/WBE Utilization Plan”), and are detailed below.

The Contractor must comply with all applicable MBE and WBE requirements for this Contract.

All provisions of Section 6-129 are hereby incorporated in the Contract by reference and all terms used herein that are not defined herein shall have the meanings given such terms in Section 6-129.

Article I, Part A, below, sets forth provisions related to the participation goals for construction, standard and professional services contracts.

Article I, Part B, below, sets forth miscellaneous provisions related to the M/WBE Program.

PART A

PARTICIPATION GOALS FOR CONSTRUCTION, STANDARD
AND PROFESSIONAL SERVICES CONTRACTS OR TASK ORDERS

1. The **MBE and/or WBE Participation Goals** established for this Contract or Task Orders issued pursuant to this Contract, (“**Participation Goals**”), as applicable, are set forth on Schedule B, Part I to this Contract (see Page 1, line 1 Total Participation Goals) or will be set forth on Schedule B, Part I to Task Orders issued pursuant to this Contract, as applicable.

The **Participation Goals** represent a percentage of the total dollar value of the Contract or Task Order, as applicable, that may be achieved by awarding subcontracts to firms certified with New York City Department of Small Business Services as MBEs and/or WBEs, and/or by crediting the participation of prime contractors and/or qualified joint ventures as provided in Section 3 below, unless the goals have been waived or modified by Agency in accordance with Section 6-129 and Part A, Sections 10 and 11 below, respectively.

2. If **Participation Goals** have been established for this Contract or Task Orders issued pursuant to this Contract, Contractor agrees or shall agree as a material term of the Contract that Contractor shall be subject to the **Participation Goals**, unless the goals are waived or modified by Agency in accordance with Section 6-129 and Part A, Sections 10 and 11 below, respectively.

3. If **Participation Goals** have been established for this Contract or Task Order issued pursuant to this Contract, a Contractor that is an MBE and/or WBE shall be permitted to count its own participation toward fulfillment of the relevant **Participation Goal**, provided that in accordance with Section 6-129 the value of Contractor's participation shall be determined by subtracting from the total value of the Contract or Task Order, as applicable, any amounts that the Contractor pays to direct subcontractors (as defined in Section 6-129(c)(13)), and provided further that a Contractor that is certified as both an MBE and a WBE may count its own participation either toward the goal for MBEs or the goal for WBEs, but not both.

A Contractor that is a qualified joint venture (as defined in Section 6-129(c)(30)) shall be permitted to count a percentage of its own participation toward fulfillment of the relevant **Participation Goal**. In accordance with Section 6-129, the value of Contractor's participation shall be determined by subtracting from the total value of the Contract or Task Order, as applicable, any amounts that Contractor pays to direct subcontractors, and then multiplying the remainder by the percentage to be applied to total profit to determine the amount to which an MBE or WBE is entitled pursuant to the joint venture agreement, provided that where a participant in a joint venture is certified as both an MBE and a WBE, such amount shall be counted either toward the goal for MBEs or the goal for WBEs, but not both.

4. A. If **Participation Goals** have been established for this Contract, a prospective contractor shall be required to submit with its bid or proposal, as applicable, a completed Schedule B, M/WBE Utilization Plan, Part II (see Pages 2-4) indicating: (a) whether the contractor is an MBE or WBE, or qualified joint venture; (b) the percentage of work it intends to award to direct subcontractors; and (c) in cases where the contractor intends to award direct subcontracts, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs, and the time frames in which such work is scheduled to begin and end. In the event that this M/WBE Utilization Plan indicates that the bidder or proposer, as applicable, does not intend to meet the **Participation Goals**, the bid or proposal, as applicable, shall be deemed non-responsive, unless Agency has granted the bidder or proposer, as applicable, a pre-award waiver of the **Participation Goals** in accordance with Section 6-129 and Part A, Section 10 below.

B. (i) If this Contract is for a master services agreement or other requirements type contract that will result in the issuance of Task Orders that will be individually registered ("Master Services Agreement") and is subject to M/WBE **Participation Goals**, a prospective

contractor shall be required to submit with its bid or proposal, as applicable, a completed Schedule B, M/WBE Participation Requirements for Master Services Agreements That Will Require Individually Registered Task Orders, Part II (page 2) indicating the prospective contractor's certification and required affirmations to make all reasonable good faith efforts to meet participation goals established on each individual Task Order issued pursuant to this Contract, or if a partial waiver is obtained or such goals are modified by the Agency, to meet the modified **Participation Goals** by soliciting and obtaining the participation of certified MBE and/or WBE firms. In the event that the Schedule B indicates that the bidder or proposer, as applicable, does not intend to meet the **Participation Goals** that may be established on Task Orders issued pursuant to this Contract, the bid or proposal, as applicable, shall be deemed non-responsive.

(ii) **Participation Goals** on a Master Services Agreement will be established for individual Task Orders issued after the Master Services Agreement is awarded. If **Participation Goals** have been established on a Task Order, a contractor shall be required to submit a Schedule B – M/WBE Utilization Plan For Independently Registered Task Orders That Are Issued Pursuant to Master Services Agreements, Part II (see Pages 2-4) indicating: (a) whether the contractor is an MBE or WBE, or qualified joint venture; (b) the percentage of work it intends to award to direct subcontractors; and (c) in cases where the contractor intends to award direct subcontracts, a description of the type and dollar value of work designated for participation by MBEs and/or WBEs, and the time frames in which such work is scheduled to begin and end. The contractor must engage in good faith efforts to meet the **Participation Goals** as established for the Task Order unless Agency has granted the contractor a pre-award waiver of the **Participation Goals** in accordance with Section 6-129 and Part A, Section 10 below.

C. THE BIDDER/PROPOSER MUST COMPLETE THE SCHEDULE B INCLUDED HEREIN (SCHEDULE B, PART II). A SCHEDULE B SUBMITTED BY THE BIDDER/PROPOSER WHICH DOES NOT INCLUDE THE VENDOR CERTIFICATION AND REQUIRED AFFIRMATIONS (SEE SECTION V OF PART II) WILL BE DEEMED TO BE NON-RESPONSIVE, UNLESS A FULL WAIVER OF THE PARTICIPATION GOALS IS GRANTED (SCHEDULE B, PART III). IN THE EVENT THAT THE CITY DETERMINES THAT THE BIDDER/PROPOSER HAS SUBMITTED A SCHEDULE B WHERE THE VENDOR CERTIFICATION AND REQUIRED AFFIRMATIONS ARE COMPLETED BUT OTHER ASPECTS OF THE SCHEDULE B ARE NOT COMPLETE, OR CONTAIN A COPY OR COMPUTATION ERROR THAT IS AT ODDS WITH THE VENDOR CERTIFICATION AND AFFIRMATIONS, THE BIDDER/PROPOSER WILL BE NOTIFIED BY THE AGENCY AND WILL BE GIVEN FOUR (4) CALENDAR DAYS FROM RECEIPT OF NOTIFICATION TO CURE THE SPECIFIED DEFICIENCIES AND RETURN A COMPLETED SCHEDULE B TO THE AGENCY. FAILURE TO DO SO WILL RESULT IN A DETERMINATION THAT THE BID/PROPOSAL IS NON-RESPONSIVE. RECEIPT OF NOTIFICATION IS DEFINED AS THE DATE NOTICE IS E-MAILED OR FAXED (IF THE BIDDER/PROPOSER HAS PROVIDED AN E-MAIL ADDRESS OR FAX NUMBER), OR NO LATER THAN FIVE (5) CALENDAR DAYS FROM THE DATE OF MAILING OR UPON DELIVERY, IF DELIVERED.

5. Where an M/WBE Utilization Plan has been submitted, the Contractor shall, within 30 days of issuance by Agency of a notice to proceed, submit a list of proposed persons or entities to which it intends to award subcontracts within the subsequent 12 months. In the case of multi-year contracts, such list shall also be submitted every year thereafter. The Agency may also require the Contractor to report periodically about the contracts awarded by its direct

subcontractors to indirect subcontractors (as defined in Section 6-129(c)(22)). **PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or below \$3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at the time of bid submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the Contractor must identify all those to which it intends to award construction subcontracts for any portion of the Wicks trade work at the time of bid submission, regardless of what point in the life of the contract such subcontracts will occur. In identifying intended subcontractors in the bid submission, bidders may satisfy any Participation Goals established for this Contract by proposing one or more subcontractors that are MBEs and/or WBEs for any portion of the Wicks trade work. In the event that the Contractor's selection of a subcontractor is disapproved, the Contractor shall have a reasonable time to propose alternate subcontractors.**

6. MBE and WBE firms must be certified by DSBS in order for the Contractor to credit such firms' participation toward the attainment of the **Participation Goals**. Such certification must occur prior to the firms' commencement of work. A list of MBE and WBE firms may be obtained from the DSBS website at www.nyc.gov/buycertified, by emailing DSBS at buyer@sbs.nyc.gov, by calling (212) 513-6356, or by visiting or writing DSBS at 110 William St., New York, New York, 10038, 7th floor. Eligible firms that have not yet been certified may contact DSBS in order to seek certification by visiting www.nyc.gov/getcertified, emailing MWBE@sbs.nyc.gov, or calling the DSBS certification helpline at (212) 513-6311. A firm that is certified as both an MBE and a WBE may be counted either toward the goal for MBEs or the goal for WBEs, but not both. No credit shall be given for participation by a graduate MBE or graduate WBE, as defined in Section 6-129(c)(20).

7. Where an **M/WBE** Utilization Plan has been submitted, the Contractor shall, with each voucher for payment, and/or periodically as Agency may require, submit statements, certified under penalty of perjury, which shall include, but not be limited to,: the total amount the Contractor paid to its direct subcontractors, and, where applicable pursuant to Section 6-129(j), the total amount direct subcontractors paid to indirect subcontractors; the names, addresses and contact numbers of each MBE or WBE hired as a subcontractor by the Contractor, and, where applicable, hired by any of the Contractor's direct subcontractors; and the dates and amounts paid to each MBE or WBE. The Contractor shall also submit, along with its voucher for final payment: the total amount it paid to subcontractors, and, where applicable pursuant to Section 6-129(j), the total amount its direct subcontractors paid directly to their indirect subcontractors; and a final list, certified under penalty of perjury, which shall include the name, address and contact information of each subcontractor that is an MBE or WBE, the work performed by, and the dates and amounts paid to each.

8. If payments made to, or work performed by, MBEs or WBEs are less than the amount specified in the Contractor's **M/WBE** Utilization Plan, Agency shall take appropriate action, in accordance with Section 6-129 and Article II below, unless the Contractor has obtained a modification of its **M/WBE** Utilization Plan in accordance with Section 6-129 and Part A, Section 11 below.

9. Where an **M/WBE** Utilization Plan has been submitted, and the Contractor requests a change order the value of which exceeds the greater of 10 percent of the Contract or Task Order, as applicable, or \$500,000, Agency shall review the scope of work for the Contract or Task Order, as applicable, and the scale and types of work involved in the change order, and determine whether the **Participation Goals** should be modified.

10. Pre-award waiver of **the Participation Goals**. (a) A bidder or proposer, or contractor with respect to a Task Order, may seek a pre-award full or partial waiver of the Participation Goals in accordance with Section 6-129, which requests that Agency change one or more **Participation Goals** on the grounds that the **Participation Goals** are unreasonable in light of the availability of certified firms to perform the services required, or by demonstrating that it has legitimate business reasons for proposing a lower level of subcontracting in its M/WBE Utilization Plan.

(b) To apply for a full or partial waiver of the **Participation Goals**, a bidder, proposer, or contractor, as applicable, must complete Part III (Page 5) of Schedule B and submit such request no later than seven (7) calendar days prior to the date and time the bids, proposals, or Task Orders are due, in writing to the Agency by email at **scimino@dep.nyc.gov** or via facsimile at (718)595-3221. Bidders, proposers, or contractors, as applicable, who have submitted requests will receive an Agency response by no later than two (2) calendar days prior to the due date for bids, proposals, or Task Orders; provided, however, that if that date would fall on a weekend or holiday, an Agency response will be provided by close-of-business on the business day before such weekend or holiday date.

(c) If the Agency determines that the **Participation Goals** are unreasonable in light of the availability of certified firms to perform the services required, it shall revise the solicitation and extend the deadline for bids and proposals, or revise the Task Order, as applicable.

(d) Agency may grant a full or partial waiver of the **Participation Goals** to a bidder, proposer or contractor, as applicable, who demonstrates—before submission of the bid, proposal or Task Order, as applicable—that it has legitimate business reasons for proposing the level of subcontracting in its **M/WBE** Utilization Plan. In making its determination, Agency shall consider factors that shall include, but not be limited to, whether the bidder, proposer or contractor, as applicable, has the capacity and the bona fide intention to perform the Contract without any subcontracting, or to perform the Contract without awarding the amount of subcontracts represented by the **Participation Goals**. In making such determination, Agency may consider whether the **M/WBE** Utilization Plan is consistent with past subcontracting practices of the bidder, proposer or contractor, as applicable, whether the bidder, proposer or contractor, as applicable, has made efforts to form a joint venture with a certified firm, and whether the bidder, proposer, or contractor, as applicable, has made good faith efforts to identify other portions of the Contract that it intends to subcontract.

11. Modification of **M/WBE** Utilization Plan. (a) A Contractor may request a modification of its **M/WBE** Utilization Plan after award of this Contract. **PLEASE NOTE: If this Contract is a public works project subject to GML §101(5) (i.e., a contract valued at or below \$3M for projects in New York City) or if the Contract is subject to a project labor agreement in accordance with Labor Law §222, and the bidder is required to identify at the time of bid**

submission its intended subcontractors for the Wicks trades (plumbing and gas fitting; steam heating, hot water heating, ventilating and air conditioning (HVAC); and electric wiring), the Contractor may request a Modification of its M/WBE Utilization Plan as part of its bid submission. The Agency may grant a request for Modification of a Contractor's M/WBE Utilization Plan if it determines that the Contractor has established, with appropriate documentary and other evidence, that it made reasonable, good faith efforts to meet the **Participation Goals**. In making such determination, Agency shall consider evidence of the following efforts, as applicable, along with any other relevant factors:

(i) The Contractor advertised opportunities to participate in the Contract, where appropriate, in general circulation media, trade and professional association publications and small business media, and publications of minority and women's business organizations;

(ii) The Contractor provided notice of specific opportunities to participate in the Contract, in a timely manner, to minority and women's business organizations;

(iii) The Contractor sent written notices, by certified mail or facsimile, in a timely manner, to advise MBEs or WBEs that their interest in the Contract was solicited;

(iv) The Contractor made efforts to identify portions of the work that could be substituted for portions originally designated for participation by MBEs and/or WBEs in the M/WBE Utilization Plan, and for which the Contractor claims an inability to retain MBEs or WBEs;

(v) The Contractor held meetings with MBEs and/or WBEs prior to the date their bids or proposals were due, for the purpose of explaining in detail the scope and requirements of the work for which their bids or proposals were solicited;

(vi) The Contractor made efforts to negotiate with MBEs and/or WBEs as relevant to perform specific subcontracts, or act as suppliers or service providers;

(vii) Timely written requests for assistance made by the Contractor to Agency's M/WBE liaison officer and to DSBS;

(viii) Description of how recommendations made by DSBS and Agency were acted upon and an explanation of why action upon such recommendations did not lead to the desired level of participation of MBEs and/or WBEs.

Agency's M/WBE officer shall provide written notice to the Contractor of the determination.

(b) The Agency may modify the **Participation Goals** when the scope of the work has been changed by the Agency in a manner that affects the scale and types of work that the Contractor indicated in its M/WBE Utilization Plan would be awarded to subcontractors.

12. If this Contract is for an indefinite quantity of construction, standard or professional services or is a requirements type contract and the Contractor has submitted an **M/WBE** Utilization Plan and has committed to subcontract work to MBEs and/or WBEs in order to meet the **Participation Goals**, the Contractor will not be deemed in violation of the M/WBE Program requirements for this Contract with regard to any work which was intended to be subcontracted to an MBE and/or WBE to the extent that the Agency has determined that such work is not needed.

13. If **Participation Goals** have been established for this Contract or a Task Order issued pursuant to this Contract, at least once annually during the term of the Contract or Task Order, as applicable, Agency shall review the Contractor's progress toward attainment of its **M/WBE** Utilization Plan, including but not limited to, by reviewing the percentage of work the Contractor has actually awarded to MBE and/or WBE subcontractors and the payments the Contractor made to such subcontractors.

14. If **Participation Goals** have been established for this Contract or a Task Order issued pursuant to this Contract, Agency shall evaluate and assess the Contractor's performance in meeting those goals, and such evaluation and assessment shall become part of the Contractor's overall contract performance evaluation.

PART B

MISCELLANEOUS

1. The Contractor shall take notice that, if this solicitation requires the establishment of a **M/WBE** Utilization Plan, the resulting contract may be audited by DSBS to determine compliance with Section 6-129. See §6-129(e)(10). Furthermore, such resulting contract may also be examined by the City's Comptroller to assess compliance with the **M/WBE** Utilization Plan.

2. Pursuant to DSBS rules, construction contracts that include a requirement for a **M/WBE** Utilization Plan shall not be subject to the law governing Locally Based Enterprises set forth in Section 6-108.1 of the Administrative Code of the City of New York.

3. DSBS is available to assist contractors and potential contractors in determining the availability of MBEs and/or WBEs to participate as subcontractors, and in identifying opportunities that are appropriate for participation by MBEs and/or WBEs in contracts.

4. Prospective contractors are encouraged to enter into qualified joint venture agreements with MBEs and/or WBEs as defined by Section 6-129(c)(30).

5. By submitting a bid or proposal the Contractor hereby acknowledges its understanding of the M/WBE Program requirements set forth herein and the pertinent provisions of Section 6-129, and any rules promulgated thereunder, and if awarded this Contract, the Contractor hereby agrees to comply with the M/WBE Program requirements of this Contract and pertinent provisions of Section 6-129, and any rules promulgated thereunder, all of which shall be deemed to be material terms of this Contract. The Contractor hereby agrees to make all reasonable, good

faith efforts to solicit and obtain the participation of MBEs and/or WBEs to meet the required **Participation Goals**.

ARTICLE II. ENFORCEMENT

1. If Agency determines that a bidder or proposer, as applicable, has, in relation to this procurement, violated Section 6-129 or the DSBS rules promulgated pursuant to Section 6-129, Agency may disqualify such bidder or proposer, as applicable, from competing for this Contract and the Agency may revoke such bidder's or proposer's prequalification status, if applicable.

2. Whenever Agency believes that the Contractor or a subcontractor is not in compliance with Section 6-129 or the DSBS rules promulgated pursuant to Section 6-129, or any provision of this Contract that implements Section 6-129, including, but not limited to any **M/WBE** Utilization Plan, Agency shall send a written notice to the Contractor describing the alleged noncompliance and offering the Contractor an opportunity to be heard. Agency shall then conduct an investigation to determine whether such Contractor or subcontractor is in compliance.

3. In the event that the Contractor has been found to have violated Section 6-129, the DSBS rules promulgated pursuant to Section 6-129, or any provision of this Contract that implements Section 6-129, including, but not limited to, any **M/WBE** Utilization Plan, Agency may determine that one of the following actions should be taken:

(a) entering into an agreement with the Contractor allowing the Contractor to cure the violation;

(b) revoking the Contractor's pre-qualification to bid or make proposals for future contracts;

(c) making a finding that the Contractor is in default of the Contract;

(d) terminating the Contract;

(e) declaring the Contractor to be in breach of Contract;

(f) withholding payment or reimbursement;

(g) determining not to renew the Contract;

(h) assessing actual and consequential damages;

(i) assessing liquidated damages or reducing fees, provided that liquidated damages may be based on amounts representing costs of delays in carrying out the purposes of the M/WBE Program, or in meeting the purposes of the Contract, the costs of meeting utilization goals through additional procurements, the administrative costs of investigation and enforcement, or other factors set forth in the Contract;

(j) exercising rights under the Contract to procure goods, services or construction from another contractor and charge the cost of such contract to the Contractor that has been found to be in noncompliance; or

(k) taking any other appropriate remedy.

4. If an **M/WBE** Utilization Plan has been submitted, and pursuant to this Article II, Section 3, the Contractor has been found to have failed to fulfill its **Participation Goals** contained in its **M/WBE** Utilization Plan or the **Participation Goals** as modified by Agency pursuant to Article I, Part A, Section 11, Agency may assess liquidated damages in the amount of ten percent (10%) of the difference between the dollar amount of work required to be awarded to MBE and/or WBE firms to meet the **Participation Goals** and the dollar amount the Contractor actually awarded and paid, and/or credited, to MBE and/or WBE firms. In view of the difficulty of accurately ascertaining the loss which the City will suffer by reason of Contractor's failure to meet the **Participation Goals**, the foregoing amount is hereby fixed and agreed as the liquidated damages that the City will suffer by reason of such failure, and not as a penalty. Agency may deduct and retain out of any monies which may become due under this Contract the amount of any such liquidated damages; and in case the amount which may become due under this Contract shall be less than the amount of liquidated damages suffered by the City, the Contractor shall be liable to pay the difference.

5. Whenever Agency has reason to believe that an MBE and/or WBE is not qualified for certification, or is participating in a contract in a manner that does not serve a commercially useful function (as defined in Section 6-129(c)(8)), or has violated any provision of Section 6-129, Agency shall notify the Commissioner of DSBS who shall determine whether the certification of such business enterprise should be revoked.

6. Statements made in any instrument submitted to Agency pursuant to Section 6-129 shall be submitted under penalty of perjury and any false or misleading statement or omission shall be grounds for the application of any applicable criminal and/or civil penalties for perjury. The making of a false or fraudulent statement by an MBE and/or WBE in any instrument submitted pursuant to Section 6-129 shall, in addition, be grounds for revocation of its certification.

7. The Contractor's record in implementing its **M/WBE** Utilization Plan shall be a factor in the evaluation of its performance. Whenever Agency determines that a Contractor's compliance with an **M/WBE** Utilization Plan has been unsatisfactory, Agency shall, after consultation with the City Chief Procurement Officer, file an advice of caution form for inclusion in VENDEX as caution data.

ATTACHMENT L

SCHEDULE B: SUBCONTRACTOR UTILIZATION PLAN/WAIVER APPLICATION

CONTRACT: BEPA- LIS HWQMS

**RFP TITLE: BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS
LONG ISLAND SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELLING
SUPPORT**

PIN: 82619BEPLIS



THE CITY OF NEW YORK

SCHEDULE B – M/WBE Utilization Plan
Part I: M/WBE Participation Goals

Part I to be completed by contracting agency

Contract Overview

APT E- Pin #	82619P0026		FMS Project ID#:	_____	
Project Title/	_____				
Agency PIN #	BEPA-LIS: Long Island Sound – Hydrodynamic And Water Quality Modeling Support/82619BEPALIS				
Bid/Proposal	_____				
Response Date	2019-08-20				
Contracting	_____				
Agency	DEP				
Agency Address	59-17 Junction Blvd	City	Flushing	State	NY Zip Code 11373
Contact Person	David Lipsky	Title	Senior Policy Advisor		
Telephone #	718-595-5340	Email	dlipsky@dep.nyc.gov		

Project Description *(attach additional pages if necessary)*

The New York City Department of Environmental Protection (NYCDEP) is seeking a Consultant to develop hydrodynamic and water quality models for Long Island Sound ("LIS"). The consultant is also expected to develop a Graphical User Interface/Decision Support Tool (GUI/DST) to enhance the transparency and usability of the models.

M/WBE Participation Goals for Services

Enter the percentage amount for each group or for an unspecified goal. Please note that there are no goals for Asian Americans in Professional Services.

Prime Contract Industry: Professional Services

Group	Percentage
<u>Unspecified</u>	20%
or	
Black American	%
Hispanic American	%
Asian American	%
Women	%
Total Participation Goals	20%

SCHEDULE B - Part II: M/WBE Participation Plan**Part II to be completed by the bidder/proposer.**

Please note: For Non-M/WBE Prime Contractors who will NOT subcontract any services and will self-perform the entire contract, you must obtain a FULL waiver by completing the Waiver Application on pages 5 and 6 and timely submitting it to the contracting agency pursuant to the Notice to Prospective Contractors. Once a FULL WAIVER is granted, it must be included with your bid or proposal and you do not have to complete or submit this form with your bid or proposal.

Section I: Prime Contractor Contact Information

Tax ID # _____	FMS Vendor ID # _____
Business Name _____	Contact Person _____
Address _____	
Telephone # _____	Email _____

Section II: M/WBE Utilization Goal Calculation: Check the applicable box and complete subsection.**PRIME CONTRACTOR ADOPTING AGENCY M/WBE PARTICIPATION GOALS**

<input type="checkbox"/> For Prime Contractors (including Qualified Joint Ventures and M/WBE firms) adopting Agency M/WBE Participation Goals.	Total Bid/Proposal Value		Agency Total Participation Goals (Line 1, Page 1)		Calculated M/WBE Participation Amount
<p>Calculate the total dollar value of your total bid that you agree will be awarded to M/WBE subcontractors for services and/or credited to an M/WBE prime contractor or Qualified Joint Venture.</p> <p>Please review the Notice to Prospective Contractors for more information on how to obtain credit for M/WBE participation.</p>	\$	X		=	\$ Line 2

PRIME CONTRACTOR OBTAINED PARTIAL WAIVER APPROVAL: ADOPTING MODIFIED M/WBE PARTICIPATION GOALS

<input type="checkbox"/> For Prime Contractors (including Qualified Joint Ventures and M/WBE firms) adopting Modified M/WBE Participation Goals.	Total Bid/Proposal Value		Adjusted Participation Goal (From Partial Waiver)		Calculated M/WBE Participation Amount
<p>Calculate the total dollar value of your total bid that you agree will be awarded to M/WBE subcontractors for services and/or credited to an M/WBE prime contractor or Qualified Joint Venture.</p> <p>Please review the Notice to Prospective Contractors for more information on how to obtain credit for M/WBE participation.</p>	\$	X		=	\$ Line 3

Section III: M/WBE Utilization Plan: How Proposer/Bidder Will Fulfill M/WBE Participation Goals. Please review the Notice to Prospective Contractors for more information on how to obtain credit for M/WBE participation. Check applicable box. The Proposer or Bidder will fulfill the M/WBE Participation Goals:

☐ As an M/WBE Prime Contractor that will self-perform and/or subcontract to other M/WBE firms a portion of the contract the value of which is at least the amount located on Lines 2 or 3 above, as applicable. The value of any work subcontracted to non-M/WBE firms will not be credited towards fulfillment of M/WBE Participation Goals. Please check all that apply to Prime Contractor:

☐ MBE ☐ WBE

☐ As a Qualified Joint Venture with an M/WBE partner, in which the value of the M/WBE partner's participation and/or the value of any work subcontracted to other M/WBE firms is at least the amount located on Lines 2 or 3 above, as applicable. The value of any work subcontracted to non M/WBE firms will not be credited towards fulfillment of M/WBE Participation Goals.

☐ As a non M/WBE Prime Contractor that will enter into subcontracts with M/WBE firms the value of which is at least the amount located on Lines 2 or 3 above, as applicable.

Section IV: General Contract Information

What is the expected percentage of the total contract dollar value that you expect to award in subcontracts for services, regardless of M/WBE status? % _____

Enter brief description of the type(s) and dollar value of subcontracts for all/any services you plan on subcontracting if awarded this contract. For each item, indicate whether the work is designated for participation by MBEs and/or WBEs and the time frame in which such work is scheduled to begin and end. Use additional sheets if necessary.

✓ Scopes of Subcontract Work

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____

Section V: Vendor Certification and Required Affirmations

I hereby:

- 1) acknowledge my understanding of the M/WBE participation requirements as set forth herein and the pertinent provisions of Section 6-129 of the Administrative Code of the City of New York ("Section 6-129"), and the rules promulgated thereunder;*
- 2) affirm that the information supplied in support of this M/WBE Utilization Plan is true and correct;*
- 3) agree, if awarded this Contract, to comply with the M/WBE participation requirements of this Contract, the pertinent provisions of Section 6-129, and the rules promulgated thereunder, all of which shall be deemed to be material terms of this Contract;*
- 4) agree and affirm that it is a material term of this Contract that the Vendor will award the total dollar value of the M/WBE Participation Goals to certified MBEs and/or WBEs, unless a full waiver is obtained or such goals are modified by the Agency; and*
- 5) agree and affirm, if awarded this Contract, to make all reasonable, good faith efforts to meet the M/WBE Participation Goals, or If a partial waiver is obtained or such goals are modified by the Agency, to meet the modified Participation Goals by soliciting and obtaining the participation of certified MBE and/or WBE firms.*

Signature _____**Date** _____**Print Name** _____**Title** _____

SCHEDULE B – PART III – REQUEST FOR WAIVER OF M/WBE PARTICIPATION REQUIREMENT**Contract Overview**

Tax ID # _____ FMS Vendor ID # _____

Business Name _____

Contact Name _____ Telephone # _____ Email _____

Type of Procurement ☐ Competitive Sealed Bids ☐ Other Bid/Response Due Date _____

APT E-PIN # (for this procurement): 82619P0026 Contracting Agency: DEP

M/WBE Participation Goals as described in bid/solicitation documents

_____ 20%
 _____ Agency M/WBE Participation Goal

Proposed M/WBE Participation Goal as anticipated by vendor seeking waiver

_____ % of the total contract value anticipated in good faith by the bidder/proposer to be subcontracted for services and/or credited to an M/WBE Prime Contractor or Qualified Joint Venture.

Basis for Waiver Request: Check appropriate box & explain in detail below (attach additional pages if needed)

- ☐ Vendor does not subcontract services, and has the capacity and good faith intention to perform all such work itself with its own employees.
- ☐ Vendor subcontracts *some* of this type of work but at a *lower* % than bid/solicitation describes, and has the capacity and good faith intention to do so on this contract. (Attach subcontracting plan outlining services that the vendor will self-perform and subcontract to other vendors or consultants.)
- ☐ Vendor has other legitimate business reasons for proposing the M/WBE Participation Goal above. Explain under separate cover.

References

List 3 most recent contracts performed for NYC agencies (if any). Include information for each subcontract awarded in performance of such contracts. Add more pages if necessary.

CONTRACT NO.	AGENCY	DATE COMPLETED
Total Contract Amount \$	Total Amount Subcontracted \$	
Item of Work Subcontracted and Value of subcontract	Item of Work Subcontracted and Value of subcontract	Item of Work Subcontracted and Value of subcontract
CONTRACT NO.	AGENCY	DATE COMPLETED
Total Contract Amount \$	Total Amount Subcontracted \$	
Item of Work Subcontracted and Value of subcontract	Item of Work Subcontracted and Value of subcontract	Item of Work Subcontracted and Value of subcontract
CONTRACT NO.	AGENCY	DATE COMPLETED
Total Contract Amount \$	Total Amount Subcontracted \$	
Item of Work Subcontracted and Value of subcontract	Item of Work Subcontracted and Value of subcontract	Item of Work Subcontracted and Value of subcontract

List 3 most recent contracts performed for other entities. Include information for each subcontract awarded in performance of such contracts. Add more pages if necessary.

(Complete ONLY if vendor has performed fewer than 3 New York City contracts.)

TYPE OF Contract	_____	AGENCY/ENTITY	_____	DATE COMPLETED	_____
Manager at agency/entity that hired vendor (Name/Phone No./Email) _____					
Total Contract Amount	_____	Total Amount Subcontracted	_____		
	\$		\$		
Type of Work Subcontracted	_____				

TYPE OF Contract	_____	AGENCY/ENTITY	_____	DATE COMPLETED	_____
Manager at agency/entity that hired vendor (Name/Phone No./Email) _____					
Total Contract Amount	_____	Total Amount Subcontracted	_____		
	\$		\$		
Item of Work Subcontracted and Value of subcontract	_____	Item of Work Subcontracted and Value of subcontract	_____	Item of Work Subcontracted and Value of subcontract	_____

TYPE OF Contract	_____	AGENCY/ENTITY	_____	DATE COMPLETED	_____
Manager at agency/entity that hired vendor (Name/Phone No./Email) _____					
Total Contract Amount	_____	Total Amount Subcontracted	_____		
	\$		\$		
Item of Work Subcontracted and Value of subcontract	_____	Item of Work Subcontracted and Value of subcontract	_____	Item of Work Subcontracted and Value of subcontract	_____

VENDOR CERTIFICATION: *I hereby affirm that the information supplied in support of this waiver request is true and correct, and that this request is made in good faith.*

Signature: _____	Date: _____
Print Name: _____	Title: _____

Shaded area below is for agency completion only

AGENCY CHIEF CONTRACTING OFFICER APPROVAL

Signature: _____	Date: _____
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CITY CHIEF PROCUREMENT OFFICER APPROVAL

Signature: _____	Date: _____
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Waiver Determination

Full Waiver Approved: ☐
 Waiver Denied: ☐
 Partial Waiver Approved: ☐
 Revised Participation Goal: _____%

ATTACHMENT M

**UNIFORM FEDERAL CONTRACT PROVISIONS RIDER
FOR FEDERALLY FUNDED PROCUREMENT CONTRACTS**

CONTRACT: BEPA- LIS HWQMS

**RFP TITLE: BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS
LONG ISLAND SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELLING
SUPPORT**

PIN: 82619BEPLIS

**UNIFORM FEDERAL CONTRACT PROVISIONS RIDER
FOR FEDERALLY FUNDED PROCUREMENT CONTRACTS
(Version 02.16.2018)**

A. *Definitions.* As used in this Rider:

- (1) “Awarding Entity” means the entity awarding the Contract. The Awarding Entity may be the City or a contractor at any tier.
- (2) “City” means the City of New York.
- (3) “Commissioner” means the head of the City agency entering into this Contract.
- (4) “Construction” means the building, rehabilitation, alteration, conversion, extension, demolition, painting or repair of any improvement to real property.
- (5) “Contract” refers to the contract or the agreement between the Awarding Entity and the Contractor.
- (6) “Contractor” means the entity performing the services pursuant to a Contract.
- (7) “Federal Agency” means the U.S. agency or agencies funding this Contract in whole or in part.
- (8) “Government” means the U.S. government.
- (9) “Rider” means this Uniform Federal Contract Provisions Rider.

B. *Termination and Remedies for Breach of Contract.* The following provisions concerning remedies for breach of contract and termination apply to Contracts between the City and the City’s Contractor.

- (1) **Remedies for Breach of Contract.** If the Contractor violates or breaches the Contract, the City may avail itself of any or all of the remedies provided for elsewhere in this Contract. If there are no remedies provided for elsewhere in this Contract, the City may avail itself of any or all of the following remedies.

After declaring the Contractor in default pursuant to the procedures in paragraph (a) of subdivision (2) of this section (B) below, the City may (i) withhold payment for unsatisfactory services, (ii) suspend or terminate the Contract in whole or in part; and/or (iii) have the services under this Contract completed by such means and in such manner, by contract procured with or without competition, or otherwise, as the City may deem advisable in accordance with all applicable Contract provisions and law. After completion of the services under this Contract, the City shall certify the expense incurred in such completion, which shall include the cost of procuring that contract. Should the expense of

such completion, as certified by the City, exceed the total sum which would have been payable under the Contract if it had been completed by the Contractor, any excess shall be promptly paid by the Contractor upon demand by the City. The excess expense of such completion, including any and all related and incidental costs, as so certified by the City may be charged against and deducted out of monies earned by the Contractor.

(2) **Termination.** The City shall have the right to terminate the Contract in whole or in part for cause, for convenience, due to force majeure, or due to reductions in federal funding. If the Contract does not include termination provisions elsewhere, the following termination provisions apply:

a. **Termination for Cause.** The City shall have the right to terminate the Contract, in whole or in part, for cause upon a determination that the Contractor is in default of the Contract. Unless a shorter time is determined by the City to be necessary, the City shall effect termination according to the following procedure:

- i. *Notice to Cure.* The City shall give written notice of the conditions of default signed by the Commissioner, setting forth the ground or grounds upon which such default is declared ("Notice to Cure"). The Contractor shall have ten (10) days from receipt of the Notice to Cure or any longer period that is set forth in the Notice to Cure to cure the default. The Commissioner may temporarily suspend services under the Contract pending the outcome of the default proceedings pursuant to this section.
- ii. *Opportunity to be Heard.* If the conditions set forth in the Notice to Cure are not cured within the period set forth in the Notice to Cure, the Commissioner may declare the Contractor in default. Before the Commissioner may exercise his or her right to declare the Contractor in default, the Contractor must be given an opportunity to be heard upon not less than five (5) business days' notice. The Commissioner may, in his or her discretion, provide for such opportunity to be in writing or in person. Such opportunity to be heard shall not occur prior to the end of the cure period but notice of such opportunity to be heard may be given prior to the end of the cure period and may be given contemporaneously with the Notice to Cure.
- iii. *Notice of Termination.* After an opportunity to be heard, the Commissioner may terminate the Contract, in whole or in part, upon finding the Contractor in default. The Commissioner shall give the Contractor written notice of such termination ("Notice of Termination"), specifying the applicable provision(s) under which the Contract is terminated and the effective date of termination. If no date is specified in the Notice of Termination, the termination shall be effective either 10 calendar days from the date the notice is personally delivered or 15 calendar days from

the date Notice of Termination is sent by another method. The Notice of Termination shall be personally delivered, sent by certified mail return receipt requested, or sent by fax and deposited in a post office box regularly maintained by the United States Postal Service in a postage pre-paid envelope.

iv. *Grounds for Default.* The City shall have the right to declare the Contractor in default:

1. Upon a breach by the Contractor of a material term or condition of this Contract, including unsatisfactory performance of the services;

2. Upon insolvency or the commencement of any proceeding by or against the Contractor, either voluntarily or involuntarily, under the Bankruptcy Code or relating to the insolvency, receivership, liquidation, or composition of the Contractor for the benefit of creditors;

3. If the Contractor refuses or fails to proceed with the services under the Contract when and as directed by the Commissioner;

4. If the Contractor or any of its officers, directors, partners, five percent (5%) or greater shareholders, principals, or other employee or person substantially involved in its activities are indicted or convicted after execution of the Contract under any state or federal law of any of the following:

a. a criminal offense incident to obtaining or attempting to obtain or performing a public or private contract;

b. fraud, embezzlement, theft, bribery, forgery, falsification, or destruction of records, or receiving stolen property;

c. a criminal violation of any state or federal antitrust law;

d. violation of the Racketeer Influence and Corrupt Organization Act, 18 U.S.C. § 1961 et seq., or the Mail Fraud Act, 18 U.S.C. § 1341 et seq., for acts in connection with the submission of bids or proposals for a public or private contract;

e. conspiracy to commit any act or omission that would constitute grounds for conviction or liability under any statute described in subparagraph (d) above; or

f. an offense indicating a lack of business integrity that seriously and directly

affects responsibility as a City vendor.

5. If the Contractor or any of its officers, directors, partners, five percent (5%) or greater shareholders, principals, or other employee or person substantially involved in its activities are subject to a judgment of civil liability under any state or federal antitrust law for acts or omissions in connection with the submission of bids or proposals for a public or private contract; or

6. If the Contractor or any of its officers, directors, partners, five percent (5%) or greater shareholders, principals, or other employee or person substantially involved in its activities makes or causes to be made any false, deceptive, or fraudulent material statement, or fail to make a required material statement in any bid, proposal, or application for City or other government work.

v. *Basis of Settlement.* The City shall not incur or pay any further obligation pursuant to this Contract beyond the termination date set by the City in its Notice of Termination. The City shall pay for satisfactory services provided in accordance with this Contract prior to the termination date. In addition, any obligation necessarily incurred by the Contractor on account of this Contract prior to receipt of notice of termination and falling due after the termination date shall be paid by the City in accordance with the terms of this Contract. In no event shall such obligation be construed as including any lease or other occupancy agreement, oral or written, entered into between the Contractor and its landlord.

b. **Termination for Convenience.** The City shall have the right to terminate the Contract for convenience, by providing written notice ("Notice of Termination") according to the following procedure. The Notice of Termination shall specify the applicable provision(s) under which the Contract is terminated and the effective date of termination, which shall be not less than 10 calendar days from the date the notice is personally delivered or 15 days from the date the Notice of Termination is sent by another method. The Notice of Termination shall be personally delivered, sent by certified mail return receipt requested, or sent by fax and deposited in a post office box regularly maintained by the United States Postal Service in a postage pre-paid envelope. The basis of settlement shall be as provided for in subparagraph (iv) of paragraph (a) of subdivision (2) of this section (B), above.

c. **Termination due to Force Majeure**

- i. For purposes of this Contract, a force majeure event is an act or event beyond the control and without any fault or negligence of the Contractor ("Force Majeure Event"). Force Majeure Events may include, but are not limited to, fire, flood, earthquake, storm or other natural disaster, civil commotion, war, terrorism, riot, and labor disputes not brought about by any act or omission of the Contractor.
- ii. In the event the Contractor cannot comply with the terms of the Contract (including any failure by the Contractor to make progress in the performance of the services) because of a Force Majeure Event, then the Contractor may ask the Commissioner to excuse the nonperformance and/or terminate the Contract. If the Commissioner, in his or her reasonable discretion, determines that the Contractor cannot comply with the terms of the Contract because of a Force Majeure Event, then the Commissioner shall excuse the nonperformance and may terminate the Contract. Such a termination shall be deemed to be without cause.
- iii. If the City terminates the Contract due to a Force Majeure Event, the basis of settlement shall be as provided for in subparagraph (iv) of paragraph (a) of subdivision (2) of this section (B), above.

d. Termination due to Reductions in Federal Funding

- i. This Contract is funded in whole or in part by funds secured from the Federal government. Should the Federal government reduce or discontinue such funds, the City shall have, in its sole discretion, the right to terminate this Contract in whole or in part, or to reduce the funding and/or level of services of this Contract caused by such action by the Federal government, including, in the case of the reduction option, but not limited to, the reduction or elimination of programs, services or service components; the reduction or elimination of contract-reimbursable staff or staff-hours, and corresponding reductions in the budget of this Contract and in the total amount payable under this Contract. Any reduction in funds pursuant to this paragraph shall be accompanied by an appropriate reduction in the services performed under this Contract.
- ii. In the case of the reduction option referred to in subparagraph (i), above, any such reduction shall be effective as of the date set forth in a written notice thereof to the Contractor, which shall be not less than 30 calendar days from the date of such notice. Prior to sending such

notice of reduction, the City shall advise the Contractor that such option is being exercised and afford the Contractor an opportunity to make within seven calendar days any suggestion(s) it may have as to which program(s), service(s), service component(s), staff or staff-hours might be reduced or eliminated, provided, however, that the City shall not be bound to utilize any of the Contractor's suggestions and that the City shall have sole discretion as to how to effectuate the reductions.

- iii. If the City reduces funding pursuant to this paragraph (c), the basis of settlement shall be as provided for in subparagraph (iv) of paragraph (a) of subdivision (2) of this section (B), above.

C. Standard Provisions. The Contractor shall comply with, include in its subcontracts, and cause its subcontractors to comply with the following provisions, as applicable:

- (1) *Reporting.* Contractor shall be required to produce and deliver such reports relating to the services performed under the Contract as may be required by the Awarding Entity, City or any other State or Federal governmental agency with jurisdiction.
- (2) *Non-Discrimination.* Contractor shall not violate any Federal, State, or City law prohibiting discrimination concerning employment, the provision of services, and, if applicable, housing, funded by this Contract.
- (3) *Environmental Protection.* If the Contract is in excess of \$150,000, the Contractor shall comply with all applicable standards, orders, or regulations issued under the Clean Air Act (42 U.S.C. § 7401-7671q), Federal Water Pollution control Act (33 U.S.C. §§ 1251-1387) Section 508 of the Clean Water Act (33 U.S.C. § 1368), Executive Order 11738, and Environmental Protection Agency regulations (provisions of 40 CFR Part 50 and 2 CFR Part 1532 related to the Clean Air Act and Clean Water Act). Violations must be reported to the Federal Agency and the Regional Office of the Environmental Protection Agency (EPA). The Contractor shall include this provision in all subcontracts.
- (4) *Energy Efficiency.* The Contractor shall comply with mandatory standards and policies relating to energy efficiency that are contained in the New York State energy conservation plan issued in compliance with the Energy Policy Conservation Act (Pub. L. 94-163).
- (5) *Debarment.* The Contractor certifies that neither it nor its principals is currently in a state of debarment, suspension, or other ineligible status as a result of prior performance, failure, fraud, or violation of City laws. The Contractor further certifies that neither it nor its principals is debarred, suspended, otherwise excluded from or ineligible for participation in Federal assistance programs. The City reserves the right to terminate this Contract if knowledge of debarment, suspension or other ineligibility has been withheld by the Contractor.
- (6) *Lobbying.* The Contractor certifies, to the best of its knowledge and belief, that:
 - (a) No Federal appropriated funds have been paid or will be paid, by or on behalf of it, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in

connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement;

- (b) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, it will complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," (which is available on the HUD website or here: <https://www.hudexchange.info/resources/documents/HUD-Form-Sflll.pdf>) in accordance with its instructions; and
 - (c) It will require that the language of this Section (C)(6) be included in the award documents for all subcontracts at all tiers.
 - (d) This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. § 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.
- (7) *Solid Waste Disposal Act.* Pursuant to 2 CFR § 200.322, Contractor must comply with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (codified at 42 USC § 6962). The requirements of Section 6002 include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR Part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds \$ 10,000 or the value of the quantity acquired during the preceding fiscal year exceeded \$ 10,000; procuring solid waste management services in a manner that maximizes energy and resource recovery; and establishing an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines.
- (8) *Documentation of Costs.* All costs shall be supported by properly executed payrolls, time records, invoices, or vouchers, or other official documentation evidencing in proper detail the nature and propriety of the charges. All checks, payrolls, invoices, contracts, vouchers, orders or other accounting documents, pertaining in whole or in part to the Agreement, shall be clearly identified and regularly accessible.
- (9) *Records Retention.* The Contractor shall retain all books, documents, papers, and records relating to the services performed under the Contract for three years after final payment under the Contract is made and all other pending matters are closed.
- (10) *Records Access.* The Contractor shall grant access to the City, State or any other pass-through entity, the Federal Agency, Inspectors General, and/or the Comptroller General of the United States, or any of their duly authorized representatives, to any books, documents, papers, and/or records of the Contractor that are pertinent to the

Contract for the purpose of making audits, examinations, excerpts, and transcripts. The right also includes timely and reasonable access to the Contractor's personnel for the purpose of interview and discussion related to such documents. The rights of access in this section are not limited to the required retention period but last as long as the records are retained.

(11) *Small Firms, M/WBE Firms, and Labor Surplus Area Firms.* Contractor shall take the following affirmative steps in the letting of subcontracts, if subcontracts are to be let, in order to ensure that minority firms, women's business enterprises, and labor surplus area firms are used when possible:

- a. Placing qualified small and minority businesses and women's business enterprises on solicitation lists;
- b. Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;
- c. Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses, and women's business enterprises;
- d. Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises; and
- e. Using the services and assistance of the Small Business Administration, and the Minority Business Development Agency of the Department of Commerce.

(12) *Intangible Property.*

- a. Pursuant to 2 CFR § 200.315(d), the Government reserves a royalty-free, non-exclusive, and irrevocable right to obtain, reproduce, publish, or otherwise use, and to authorize others to use, for Government purposes: (a) the copyright in any work developed under the Contract or subcontract; and (b) any rights of copyright to which a Contractor purchases ownership with grant support.
- b. Any reports, documents, data, photographs, deliverables, and/or other materials produced pursuant to the Contract ("Copyrightable Materials"), and any and all drafts and/or other preliminary materials in any format related to such items produced pursuant to the contract, shall upon their creation become the exclusive property of the City. The Copyrightable Materials shall be considered "work-made-for-hire" within the meaning and purview of Section 101 of the United States Copyright Act, 17 U.S.C. § 101, and the City shall be the copyright owner thereof and of all aspects, elements and

components thereof in which copyright protection might exist. To the extent that the Copyrightable Materials do not qualify as “work-made-for-hire,” the Contractor hereby irrevocably transfers, assigns and conveys exclusive copyright ownership in and to the Copyrightable Materials to the City, free and clear of any liens, claims, or other encumbrances. The Contractor shall retain no copyright or intellectual property interest in the Copyrightable Materials. The Copyrightable Materials shall be used by the Contractor for no purpose other than in the performance of this Contract without the prior written permission of the City. The City may grant the Contractor a license to use the Copyrightable Materials on such terms as determined by the City and set forth in the license.

- c. The Contractor acknowledges that the City may, in its sole discretion, register copyright in the Copyrightable Materials with the United States Copyright Office or any other government agency authorized to grant copyright registrations. The Contractor shall fully cooperate in this effort, and agrees to provide any and all documentation necessary to accomplish this.
- d. The Contractor represents and warrants that the Copyrightable Materials: (i) are wholly original material not published elsewhere (except for material that is in the public domain); (ii) do not violate any copyright law; (iii) do not constitute defamation or invasion of the right of privacy or publicity; and (iv) are not an infringement, of any kind, of the rights of any third party. To the extent that the Copyrightable Materials incorporate any non-original material, the Contractor has obtained all necessary permissions and clearances, in writing, for the use of such non-original material under this Contract, copies of which shall be provided to the City upon execution of this Contract.
- e. The Contractor shall promptly and fully report to the City any discovery or invention arising out of or developed in the course of performance of this Contract and the Contractor shall promptly and fully report to the Government to make a determination as to whether patent protection on such invention shall be sought and how the rights in the invention or discovery, including rights under any patent issued thereon, shall be disposed of and administered in order to protect the public interest.
- f. If the Contractor publishes a work dealing with any aspect of performance under this Agreement, or with the results of such performance, the City shall have a royalty-free, non-exclusive irrevocable license to reproduce, publish, or otherwise use such work for City governmental purposes.

D. Special Provisions for Construction Contracts. If this Contract involves Construction work, design for Construction, or Construction services, all such work or services performed by the Contractor and its subcontractors shall be subject to the following requirements in addition to those set forth above in paragraphs (A), (B), and (C):

(1) *Federal Labor Standards.* The Contractor will comply with the following:

- a. The Davis-Bacon Act (40 U.S.C. §§ 3141-3148): If required by the federal program legislation, in Construction contracts involving an excess of \$2000, and subject to any other federal program limitations, all laborers and mechanics must be paid at a rate not less than those determined by the Secretary of Labor to be prevailing for the City, which rates are to be provided by the City. These wage rates are a federally mandated minimum only, and will be superseded by any State or City requirement mandating higher wage rates. The Contractor also agrees to comply with Department of Labor Regulations pursuant to the Davis-Bacon Act found in 29 CFR Parts 1, 3, 5 and 7 which enforce statutory labor standards provisions.
- b. If required by the federal program legislation and subject to any other federal program limitations, Sections 103 and 107 of the Contract Work Hours and Safe Standards Act (40 U.S.C. §§ 3701-3708), which provides that no laborer or mechanic shall be required or permitted to work more than eight hours in a calendar day or in excess of forty hours in any workweek, unless such laborer or mechanic is paid at an overtime rate of 1½ times his/her basic rate of pay for all hours worked in excess of these limits, under any Construction contract costing in excess of \$2000. In the event of a violation of this provision, the Contractor shall not only be liable to any affected employee for his/her unpaid wages, but shall be additionally liable to the United States for liquidated damages.
- c. The Copeland “Anti-Kickback” Act (18 U.S.C. § 874), as supplemented by the regulations contained in 29 CFR Part 3, requiring that all laborers and mechanics shall be paid unconditionally and not less often than once a week, and prohibiting all but “permissible” salary deductions.
- d. If this Contract involves Construction work, design for Construction, or Construction services, a more complete detailed statement of Federal Labor Standards annexed hereto as FEDERAL EXHIBIT 2.

(2) *Equal Employment Opportunity.* Executive Order 11246, as amended by Executive Order 11375, and as supplemented in Department of Labor regulations (41 CFR chapter 60) for Construction contracts or subcontracts in excess of \$10,000. The Contractor shall include the notice found at FEDERAL EXHIBIT I in all Construction subcontracts. For the purposes of the Equal Opportunity Construction Contract Specifications and Clause below, the term “Construction Work” means the construction, rehabilitation, alteration,

conversion, extension, demolition or repair of buildings, highways, or other changes or improvements to real property, including facilities providing utility services. The term also includes the supervision, inspection, and other onsite functions incidental to the actual construction .

Standard Federal Equal Employment Opportunity Construction Contract Specifications for Contracts and Subcontracts in Excess of \$10,000.

1. As used in these specifications:
 - a. “Covered area” means the geographical area described in the solicitation from which this Contract resulted;
 - b. “Director” means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
 - c. “Employer identification number” means the Federal Social Security number used on the Employer’s Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
 - d. “Minority” includes:
 - (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 - (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
 - (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
 - (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any Construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this Contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or subcontractors toward a goal in an approved Plan does not excuse any covered Contractor’s or subcontractor’s failure to take good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards

provided in paragraphs 7 a through p of these specifications. The goals set forth in the solicitation from which this Contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each Construction trade in which it has employees in the covered area. Covered Construction Contractors performing Construction Work in geographical areas where they do not have a Federal or federally assisted Construction contract shall apply the minority and female goals established for the geographical areas where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each Construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organization's responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or

unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where Construction Work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of Construction Work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these

employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female Construction contractors and suppliers, including circulation of solicitations to minority and female Contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a Contractor association, joint Contractor-union, Contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the Program are reflected in the Contractor's minority and female work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246 or suspended or is otherwise excluded from or ineligible for participation in federal assistance programs.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of

Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, Construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, Contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for hiring of local or other areas residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

(3) **Equal Opportunity Clause** (for contracts for Construction Work) required by 41 CFR § 60-1.4(b).

During the performance of this contract, the Contractor agrees as follows:

(1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:

Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The Contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired

about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the Contractor's legal duty to furnish information.

(4) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(5) The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(6) The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(7) In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(8) The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

E. Rights to Inventions. [Special Provisions For Contracts Involving Experimental, Developmental, or Research Work.]

- (1) If this Contract involves the performance of experimental, developmental, or research work by the Contractor or its subcontractors, and the entity performing such work is a Nonprofit Organization or Small Business Firm as defined below, the following provisions apply in addition to those set forth above in paragraphs (A), (B), and (C), unless the Contract specifically states that this provision is superseded:

a. Definitions. The following definitions apply to this section (D).

- i. “Invention” means any invention or discovery which is or may be patentable or otherwise protectable under Title 35 of the United States Code, or any novel variety of plant which is or may be protected under the Plant Variety Protection Act (7 U.S.C. § 2321 *et seq.*).
- ii. “Subject invention” means any invention of the Contractor conceived or first actually reduced to practice in the performance of work under this Contract, provided that in the case of a variety of plant, the date of determination (as defined in section 41(d) of the Plant Variety Protection Act, 7 U.S.C. 2401(d)) must also occur during the period of Contract performance.
- iii. “Practical Application” means to manufacture in the case of a composition or product, to practice in the case of a process or method, or to operate in the case of a machine or system; and, in each case, under such conditions as to establish that the invention is being utilized and that its benefits are, to the extent permitted by law or government regulations, available to the public on reasonable terms.
- iv. “Made” when used in relation to any invention means the conception or first actual reduction to practice of such invention.
- v. “Small Business Firm” means a small business concern as defined at section 2 of Pub. L. 85-536 (15 U.S.C. 632) and implementing regulations of the Administrator of the Small Business Administration. For the purpose of this clause, the size standards for small business concerns involved in government procurement and subcontracting at 13 CFR 121.3-8 and 13 CFR 121.3-12, respectively, will be used.
- vi. “Nonprofit Organization” means a university or other institution of higher education or an organization of the type described in section 501(c)(3) of the Internal Revenue Code of 1954 (26 U.S.C. 501(c) and exempt from taxation under section 501(a) of the Internal Revenue Code (25 U.S.C. 501(a)) or any nonprofit

scientific or educational organization qualified under a state nonprofit organization statute.

- b. *Allocation of Principal Rights.* The Contractor may retain the entire right, title, and interest throughout the world to each subject invention subject to the provisions of this clause and 35 U.S.C. 203. With respect to any subject invention in which the Contractor retains title, the Federal government shall have a nonexclusive, nontransferable, irrevocable, paid-up license to practice or have practiced for or on behalf of the United States the subject invention throughout the world.
- c. *Invention Disclosure, Election of Title and Filing of Patent Application by Contractor.*
 - i. The Contractor will disclose each subject invention to the City and the Federal Agency within two months after the inventor discloses it in writing to Contractor personnel responsible for patent matters. Such disclosure shall be in the form of a written report and shall identify the contract under which the invention was made and the inventor(s). It shall be sufficiently complete in technical detail to convey a clear understanding to the extent known at the time of the disclosure, of the nature, purpose, operation, and the physical, chemical, biological or electrical characteristics of the invention. The disclosure shall also identify any publication, on sale or public use of the invention and whether a manuscript describing the invention has been submitted for publication and, if so, whether it has been accepted for publication at the time of disclosure. In addition, after such disclosure, the Contractor will promptly notify the City and the Federal Agency of the acceptance of any manuscript describing the invention for publication or of any on sale or public use planned by the Contractor.
 - ii. The Contractor will elect in writing whether or not to retain title to any such invention by notifying the City and the Federal Agency within two years of disclosure to the City and the Federal Agency. However, in any case where publication, on sale or public use has initiated the one year statutory period wherein valid patent protection can still be obtained in the United States, the period for election of title may be shortened by the Federal Agency to a date that is no more than 60 days prior to the end of the statutory period.
 - iii. The Contractor will file its initial patent application on a subject invention to which it elects to retain title within one year after election of title or, if earlier, prior to the

end of any statutory period wherein valid patent protection can be obtained in the United States after a publication, on sale, or public use. The Contractor will file patent applications in additional countries or international patent offices within either ten months of the corresponding initial patent application or six months from the date permission is granted by the Commissioner of Patents and Trademarks to file foreign patent applications where such filing has been prohibited by a Secrecy Order.

- iv. Requests for extension of the time for disclosure, election, and filing under subparagraphs (1), (2), and (3) may be granted at the discretion of the Federal Agency.

d. Conditions When the Government May Obtain Title

The Contractor will convey to the Federal Agency, upon written request, title to any subject invention --

- i. If the Contractor fails to disclose or elect title to the subject invention within the times specified in (c), above, or elects not to retain title; provided that the Federal Agency may only request title within 60 calendar days after learning of the failure of the Contractor to disclose or elect within the specified times.
- ii. In those countries in which the Contractor fails to file patent applications within the times specified in (c) above; provided, however, that if the Contractor has filed a patent application in a country after the times specified in (c) above, but prior to its receipt of the written request of the Federal Agency, the Contractor shall continue to retain title in that country.
- iii. In any country in which the Contractor decides not to continue the prosecution of any application for, to pay the maintenance fees on, or defend in reexamination or opposition proceeding on, a patent on a subject invention.

e. Minimum Rights to Contractor and Protection of the Contractor Right to File

- i. The Contractor will retain a nonexclusive royalty-free license throughout the world in each subject invention to which the Government obtains title, except if the Contractor fails to disclose the invention within the times specified in (c), above. The Contractor's license extends to its domestic subsidiary and affiliates, if any, within the corporate structure of which the Contractor is

a party and includes the right to grant sublicenses of the same scope to the extent the Contractor was legally obligated to do so at the time the Contract was awarded. The license is transferable only with the approval of the Federal Agency except when transferred to the successor of that party of the Contractor's business to which the invention pertains.

- ii. The Contractor's domestic license may be revoked or modified by the funding Federal Agency to the extent necessary to achieve expeditious practical application of the subject invention pursuant to an application for an exclusive license submitted in accordance with applicable provisions at 37 CFR Part 404 and agency licensing regulations (if any). This license will not be revoked in that field of use or the geographical areas in which the Contractor has achieved practical application and continues to make the benefits of the invention reasonably accessible to the public. The license in any foreign country may be revoked or modified at the discretion of the funding Federal Agency to the extent the Contractor, its licensees, or the domestic subsidiaries or affiliates have failed to achieve practical application in that foreign country.
- iii. Before revocation or modification of the license, the funding Federal Agency will furnish the Contractor a written notice of its intention to revoke or modify the license, and the Contractor will be allowed thirty calendar days (or such other time as may be authorized by the funding Federal Agency for good cause shown by the Contractor) after the notice to show cause why the license should not be revoked or modified. The Contractor has the right to appeal, in accordance with applicable regulations in 37 CFR Part 404 and Federal Agency regulations (if any) concerning the licensing of Government-owned inventions, any decision concerning the revocation or modification of the license.

f. Contractor Action to Protect the Government's Interest

- i. The Contractor agrees to execute or to have executed and promptly deliver to the Federal Agency all instruments necessary to (i) establish or confirm the rights the Government has throughout the world in those subject inventions to which the Contractor elects to retain title, and (ii) convey title to the Federal Agency when requested under paragraph (d) above and to enable the Government to obtain patent protection throughout the world in that subject invention.

- ii. The Contractor agrees to require, by written agreement, its employees, other than clerical and nontechnical employees, to disclose promptly in writing to personnel identified as responsible for the administration of patent matters and in a format suggested by the Contractor each subject invention made under contract in order that the Contractor can comply with the disclosure provisions of paragraph (c), above, and to execute all papers necessary to file patent applications on subject inventions and to establish the Government's rights in the subject inventions. This disclosure format should require, as a minimum, the information required by (c)(1), above. The Contractor shall instruct such employees through employee agreements or other suitable educational programs on the importance of reporting inventions in sufficient time to permit the filing of patent applications prior to U.S. or foreign statutory bars.
- iii. The Contractor will notify the Federal Agency of any decisions not to continue the prosecution of a patent application, pay maintenance fees, or defend in a reexamination or opposition proceeding on a patent, in any country, not less than thirty calendar days before the expiration of the response period required by the relevant patent office.
- iv. The Contractor agrees to include, within the specification of any United States patent applications and any patent issuing thereon covering a subject invention, the following statement, "This invention was made with government support under (identify the contract) awarded by (identify the Federal Agency). The government has certain rights in the invention."

g. Subcontracts

- i. The Contractor will include this clause, suitably modified to identify the parties, in all subcontracts, regardless of tier, for experimental, developmental or research work to be performed by a small business firm or domestic nonprofit organization. The subcontractor will retain all rights provided for the Contractor in this clause, and the Contractor will not, as part of the consideration for awarding the subcontract, obtain rights in the subcontractor's subject inventions.
- ii. The Contractor will include in all other subcontracts, regardless of tier, for experimental developmental or research work the patent rights clause required by 2 CFR § 200.315(c) and Appendix II to 2 CFR Part 200.

- h. *Reporting on Utilization of Subject Inventions.* The Contractor agrees to submit on request periodic reports no more frequently than annually on the utilization of a subject invention or on efforts at obtaining such utilization that are being made by the Contractor or its licensees or assignees. Such reports shall include information regarding the status of development, date of first commercial sale or use, gross royalties received by the Contractor, and such other data and information as the Federal Agency may reasonably specify. The Contractor also agrees to provide additional reports as may be requested by the Federal Agency in connection with any march-in proceeding undertaken by the Federal Agency in accordance with paragraph (j) of this clause. As required by 35 U.S.C. § 202(c)(5), the Federal Agency agrees it will not disclose such information to persons outside the Government without permission of the Contractor.
- i. *Preference for United States Industry.* Notwithstanding any other provision of this clause, the Contractor agrees that neither it nor any assignee will grant to any person the exclusive right to use or sell any subject inventions in the United States unless such person agrees that any products embodying the subject invention or produced through the use of the subject invention will be manufactured substantially in the United States. However, in individual cases, the requirement for such an agreement may be waived by the Federal Agency upon a showing by the Contractor or its assignee that reasonable but unsuccessful efforts have been made to grant licenses on similar terms to potential licensees that would be likely to manufacture substantially in the United States or that under the circumstances domestic manufacture is not commercially feasible.
- j. *March-in Rights.* The Contractor agrees that with respect to any subject invention in which it has acquired title, the Federal Agency has the right in accordance with the procedures in 37 CFR § 401.6 and any supplemental regulations of the Federal Agency to require the Contractor, an assignee or exclusive licensee of a subject invention to grant a nonexclusive, partially exclusive, or exclusive license in any field of use to a responsible applicant or applicants, upon terms that are reasonable under the circumstances, and if the Contractor, assignee, or exclusive licensee refuses such a request the Federal Agency has the right to grant such a license itself if the Federal Agency determines that:
 - i. Such action is necessary because the Contractor or assignee has not taken, or is not expected to take within a reasonable time, effective steps to achieve practical application of the subject invention in such field of use.

- ii. Such action is necessary to alleviate health or safety needs which are not reasonably satisfied by the Contractor, assignee or their licensees;
 - iii. Such action is necessary to meet requirements for public use specified by Federal regulations and such requirements are not reasonably satisfied by the Contractor, assignee or licensees; or
 - iv. Such action is necessary because the agreement required by paragraph (i) of this clause has not been obtained or waived or because a licensee of the exclusive right to use or sell any subject invention in the United States is in breach of such agreement.
- k. *Special Provisions for Contracts with Nonprofit Organizations.*
If the Contractor is a nonprofit organization, it agrees that:
 - i. Rights to a subject invention in the United States may not be assigned without the approval of the Federal Agency, except where such assignment is made to an organization which has as one of its primary functions the management of inventions, provided that such assignee will be subject to the same provisions as the Contractor;
 - ii. The Contractor will share royalties collected on a subject invention with the inventor, including Federal employee co-inventors (when the Federal Agency deems it appropriate) when the subject invention is assigned in accordance with 35 U.S.C. § 202(e) and 37 CFR § 401.10;
 - iii. The balance of any royalties or income earned by the Contractor with respect to subject inventions, after payment of expenses (including payments to inventors) incidental to the administration of subject inventions, will be utilized for the support of scientific research or education; and
 - iv. It will make efforts that are reasonable under the circumstances to attract licensees of subject invention that are Small Business Firms and that it will give a preference to a Small Business Firm when licensing a subject invention if the Contractor determines that the Small Business Firm has a plan or proposal for marketing the invention which, if executed, is equally as likely to bring the invention to practical application as any plans or proposals from applicants that are not Small Business Firms; provided, that the Contractor is also satisfied that the Small Business Firm has the capability

and resources to carry out its plan or proposal. The decision whether to give a preference in any specific case will be at the discretion of the Contractor. However, the Contractor agrees that the Secretary may review the Contractor's licensing program and decisions regarding Small Business Firm applicants, and the Contractor will negotiate changes to its licensing policies, procedures, or practices with the Secretary when the Secretary's review discloses that the Contractor could take reasonable steps to implement more effectively the requirements of this paragraph (k)(iv).

1. *Communication.* The central point of contact at the Federal Agency for communications on matters relating to this clause may be obtained from the City upon request.

FEDERAL EXHIBIT 1

NOTICE TO BIDDERS

NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246, as amended) FOR ALL CONSTRUCTION CONTRACTS AND SUB-CONTRACTS IN EXCESS OF \$10,000.

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all Construction Work in the covered area, are as follows:

Goals and Timetables for Minorities

<u>Trade</u>	<u>Goal (percent)</u>	
Electricians	9.0	to 10.2
Carpenters	27.6	to 32.0
Steamfitters	12.2	to 13.5
Metal Lathers	24.6	to 25.6
Painters	28.6	to 26.0
Operating Engineers	25.6	to 26.0
Plumbers	12.0	to 14.5
Iron Workers (structural)	25.9	to 32.0
Elevator Constructors	5.5	to 6.5
Bricklayers	13.4	to 15.5
Asbestos Workers	22.8	to 28.0
Roofers	6.3	to 7.5
Iron Workers (ornamental)	22.4	to 23.0
Cement Masons	23.0	to 27.0
Glazers	16.0	to 20.0
Plasterers	15.8	to 18.0
Teamsters	22.0	to 22.5
Boilermakers	13.0	to 15.5
All Other	16.4	to 17.5

Goals and Timetables for Women

From April 1, 1980 until the present	6.9
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These goals are applicable to all the Contractor's Construction Work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs Construction Work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical

area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and nonfederally involved Construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any Construction subcontract in excess of \$10,000 at any tier for Construction Work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

4. As used in this Contract, the "covered area" is the City of New York.

ATTACHMENT N
TECHNICAL GUIDANCE REPORT

CONTRACT: BEPA- LIS HWQMS

**RFP TITLE: BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS
LONG ISLAND SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELLING
SUPPORT**



Dynamic Solutions LLC

June 29, 2018

Abdulai Fofanah, Director, Water Resources Modeling
NYC Department of Environmental Protection
Bureau of Environmental Planning and Analysis
59-17 Junction Blvd, 11th Floor
Flushing, New York 11373

Final Report: "Technical Advisory Committee Peer-Review for Long Island Sound Integrated Model"

Abdulai:

I am pleased to submit my final report to you and your colleagues at NYC DEP. I am also sending this final report to my TAC team members.

Please let me know if you have any questions about this final deliverable. It has been a pleasure working with you, Pinar, Dave, other DEP colleagues and the TAC team members.

Sincerely



Andrew Stoddard, PhD
Chair, Technical Advisory Committee

**Technical Advisory Committee
Peer-Review for
Long Island Sound Integrated Model**

FINAL REPORT

Submitted to:

New York City Department of Environmental Protection
Bureau of Environmental Planning and Analysis
59-17 Junction Blvd, 11th Floor
Flushing, New York 11373

June 29, 2018

DYNAMIC SOLUTIONS, LLC
6421 DEANE HILL DRIVE
KNOXVILLE, TENNESSEE 37919



Technical Advisory Committee Peer-Review for the Long Island Sound Integrated Model

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A – Background

The New York City Department of Environmental Protection (DEP) is initiating the development of a comprehensive model for Long Island Sound (LIS) to assist DEP in integrated water management planning and assessment. There have been several models developed for LIS and the surrounding estuarine waters to support Total Maximum Daily Load (TMDL) efforts, other management scenario planning assessments, and research investigations. Although there are several current models available, a comprehensive integrated modeling approach is needed for LIS that can be verified by field data to support technically credible modeling evaluations of how changes in natural drivers (e.g., changes in weather patterns) and management strategies (e.g., nitrogen load reduction, bioharvesting of nutrients) for estuary protection and ecosystem restoration efforts may impact water quality conditions and living resources in this large estuary. Long Island Sound is narrow (21 miles), long (110 miles), relatively shallow (average depth of 65 ft) with a surface area of 1,300 square miles and a drainage basin area of 15,820 square miles (Patten et al., 1997). DEP, accordingly, plans to develop an integrated LIS model in phases over the next few years in coordination with stakeholders, academics and regulators in the region. The LIS integrated model will be part of a much larger domain system-wide framework that includes LIS.

Integrated Modeling Framework. The new integrated model framework will be designed to ensure that physical, biogeochemical, and ecological sub-models provide a good representation of how these components drive circulation, mixing, dissolved oxygen, the onset and persistence of hypoxia, water quality, ecological conditions and living resources in LIS. The new integrated model will support management strategies within system-wide (New York Bight, New York Harbor and Long Island Sound), regional (Long Island Sound and New York Harbor), and local (embayments, tidal rivers) spatial scales. The new integrated model framework is expected to be developed in a modular fashion over a period of several years to represent linkages between watershed flow and loads, hydrodynamics, water quality, sediment flux, and ecological processes (living resources). Successful development of all anticipated components of the new integrated model will require support from a strong interdisciplinary team of scientists and engineers.

The new system-wide, LIS regional and local scale integrated model framework will support decision-making investments to implement management strategies for the next decade by NYC DEP, NYSDEC, CTDEEP, NJDEP, and EPA to achieve compliance with regulatory goals (MS4, CSO controls, TMDLs). The new model framework must be accessible to all Stakeholders including the academic community, state, federal, local agencies, environmental advocacy groups and regulated entities.

The new integrated modeling framework will be comprised of the following major components: (a) watershed loading, (b) hydrodynamics, (c) water quality/eutrophication, and (d) living resources and ecological processes (Figure 1).

Watershed loading includes flow and concentration characterizations of (a) coastal rivers, (b) nonpoint source distributed runoff, (c) municipal and industrial wastewater treatment facilities, (d) stormwater (MS4) outlets, (e) CSO outfalls, and (f) groundwater inputs. In addition to watershed loading, external loading also includes wet and dry atmospheric deposition of nutrients.

The selected hydrodynamic model should represent the effects of shoreline and bathymetry, external freshwater forcing from coastal rivers and other watershed point source and nonpoint source flow inputs, atmospheric forcing (e.g., incident solar radiation), meteorological forcing (e.g., winds), and open ocean tidal forcing. Three-dimensional hydrodynamic models should account for the barotropic (pressure gradient) and baroclinic (density gradient) components of 3-dimensional horizontal and vertical transport and mixing processes. State variables of a hydrodynamic model are water surface elevation, velocity, water temperature and salinity. State variables of a hydrodynamic model can also include suspended sediment.

The selected water quality model should represent the interactions of water temperature, salinity, nutrients, inorganic sediment, and organic carbon on dissolved oxygen and eutrophication processes. The selected water quality model should be internally coupled to a sediment flux model that accounts for the deposition of particulate organic matter settled out from the water column to the sediment bed, decomposition of the organic matter within the sediment bed, and the benthic release of nutrients and sediment oxygen demand across the sediment-water interface. State variables of the water quality model should include dissolved oxygen, nutrients, and organic carbon. State variables of the sediment flux model should include the organic content of the sediment bed, nutrient concentrations in porewater, and benthic fluxes of inorganic nutrients and sulfide (methane), and sediment oxygen demand. State variables of the water quality model can also include pathogenic organisms.

Ecological models should represent the effects of physical forcing and water quality interactions on the living resources of the coastal and estuarine ecosystem, including fish, zooplankton, invertebrates, and aquatic plants. Ecological models can be used to perform ecological risk assessments for aquatic ecosystems and to apply the Valued Ecosystem Component (VEC's) approach as an indicator of the ecological health of the estuarine ecosystem. Target criteria for living resources (e.g., water clarity) are developed and used to evaluate attainment of management objectives by providing suitable physical and water quality conditions for the Valued Ecosystem Component. Management strategies that improve water clarity in a shallow embayment, for example, may support restoration efforts to re-establish a healthy community of submersed aquatic vegetation such as eelgrass beds which, in turn, can support the restoration of desirable fishery resources.

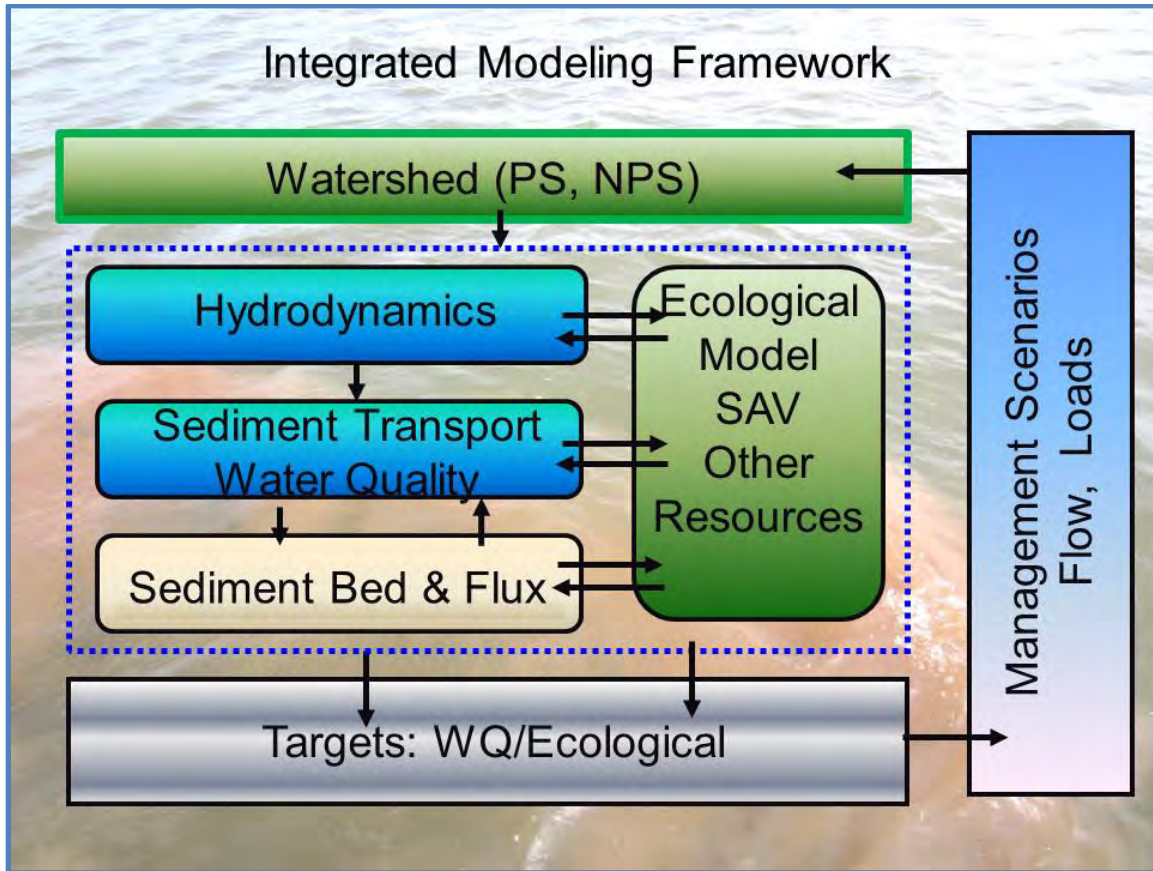


Figure 1- Integrated Modeling Framework for System-Wide Domain including Long Island Sound

Section A References

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B – Technical Advisory Committee

A Technical Advisory Committee (TAC) has been appointed by DEP to provide a peer review of the DEP project team’s “Draft Long Island Sound Integrated Modeling Scope of Work” and several other documents relevant to the integrated model envisioned for LIS. The DEP draft scope of work includes modeling objectives, goals, modeling design requirements, and the hydrodynamic, water quality, sediment and ecosystem data that will be needed to setup, run, calibrate, validate, and apply the models. The TAC has been charged by DEP to provide a peer review of the draft scope of work against the DEP’s modeling objectives and the scope of the proposed effort and the TAC has been asked to provide their review, recommendations and comments on the accuracy, completeness and quality of the draft scope of work.

Members of the TAC are identified in Table 1.

Table 1- Technical Advisory Committee for Peer Review of LIS Integrated Modeling Scope of Work

Name	TAC	Affiliation	E-Mail
Andrew Stoddard, PhD	Chair	Dynamic Solutions, LLC	astoddard@dslc.com
Prof. Robert Wilson, PhD	Hydrodynamics	Stony Brook University, School of Marine & Atmospheric Sciences (SoMAS)	robert.wilson@stonybrook.edu
Prof. Jian Shen, PhD	Water Quality	Virginia Institute of Marine Science (VIMS)	shen@vims.edu
Mark Tedesco	Lead representing EPA	EPA Long Island Sound Program	Tedesco.mark@epa.gov
Lorraine Holdridge, PE	Lead representing NYSDEC	NY State Dept. Environmental Conservation (NYSDEC)	lorraine.holdridge@dec.ny.gov
Kelly Streich	Lead representing CTDEEP	CT Dept. Energy and Environmental Protection (CTDEEP)	Kelly.Streich@ct.gov
Emmet Owens, PhD	Lead representing NYC DEP	NYC Dept. Environmental Protection (NYC DEP)	EOwens@dep.nyc.gov

Technical Advisory Committee Peer-Review for Long Island Sound Integrated Model

Goals and Objectives. As part of their review, TAC members were asked to comment on five (5) NYC DEP goals and objectives for the LIS integrated modeling framework.

Objective #1- Model water quality parameters and accurately captures hypoxia and dissolved oxygen/water quality in the LIS.

Objective #2- Create a more refined framework that enhances responsiveness and represents physical characteristics and processes in LIS waters including embayments.

Objective #3- Develop a robust model framework that is linkable, scalable, and updatable to future environmental conditions and new data.

Objective #4- Establish a framework that facilitates evaluation of multiple planning and management scenarios.

Objective #5- Provide a transparent, open, and user-friendly framework.

The TAC recommends revision of the wording to clarify NYC DEP Goals and Objectives #1, #2 and #3 as follows:

Objective #1- Model eutrophication processes to accurately capture dissolved oxygen, phytoplankton, organic carbon, and nutrient distributions in the LIS and to provide accurate parameters to support future ecological assessments and models.

Objective #2- Create a three-dimensional hydrodynamic model with sufficient spatial resolution, including coastal embayments and tidal rivers, which represents complex bathymetry accurately and is capable of simulating significant physical characteristics and processes, including open water seasonal stratification, in LIS waters.

Objective #3- Develop a robust model framework that is capable of linking multiple scale hydrodynamic and water quality models, and is updatable to use new data and to simulate future environmental conditions such as climate change and sea level rise scenarios.

Comments, and recommendations of the TAC related to the Goals and Objectives are presented in Appendix 1 of this report.

Questions for Technical Advisory Committee. As part of their review, TAC members were asked to address five (5) questions related to review of the documents provided by NYC DEP.

Question #1- Are the five objectives reasonable and achievable? Do you have any recommendations on the objectives?

- Does the proposed LIS Model Framework outline the most critical considerations to address needs and objectives identified? Identify any elements that have not been discussed but should be considered.

Question#2- Is the recommended approach well suited for achieving the five objectives?

Technical Advisory Committee Peer-Review for Long Island Sound Integrated Model

- Does the LIS Model Technical Guidance document summarize the most recent and relevant hydrodynamic and water quality modeling advances to support the evaluation of hypoxia in Long Island Sound? If not, what additional modeling advances are recommended for consideration?

Question #3- Are you aware of existing data that may help fill the preliminary gaps identified? If so, are these data publicly available and easily accessible? Are there additional data gaps that you believe exist?

Question #4- Two options (1b and 2b) were identified in the document as achieving the overall highest rank based on the objectives. The following questions apply to these options.

- Can you comment on the application of a sigma, Z, or pseudo Z coordinate system for representation of Long Island Sound?
- In addition to the discussed vertical coordinate, horizontal and vertical resolutions, are there any other numerical issues to be considered for the simulation of vertical mixing?
- Do you have any recommendations on balancing the spatial resolution and computation time for open water areas?
- What could be the potential reasons for the occurrences of hypoxia after N reductions that were driven by the TMDL? Any recommendations on potential changes of the nutrient uptake behaviors of phytoplankton after N reduction? Do you have any experiences from other bays and estuaries?
- Are there any recommendations on balancing the horizontal spatial resolution and representation of eelgrass in the shallow embayment environment?
- Do you expect that rates and coefficients for sediment flux modeling vary across different bays and estuaries on the east coast?
- Are there advantages to implementing an internally or externally linked hydrodynamic and water quality model?
- Do you have any recommendations on internally-linked receiving water models?

Question #5- Does the document present a realistic schedule for accomplishing the proposed modeling objectives? Identify any specific concerns regarding the schedule.

Comments, and recommendations of the TAC related to the questions are presented in Appendix 2 of this report.

Documents Provided for Review. DEP provided the following documents to the Technical Advisory Committee (TAC) for review:

Technical Advisory Committee Peer-Review for Long Island Sound Integrated Model

#1- Long Island Sound Model Technical Guidance: Technical Advisory Committee (TAC) Kick-off Presentation (50 slides)

- Objectives
- High Level Review of Modeling and Data in LIS
- Proposed Technical Approach
- Questions for the TAC

#2- Long Island Sound Model Technical Guidance, Draft Sections 1 through 5 (56 pages)

- Proposed Goals and Objectives
- Review of Existing Model Frameworks
- Key Model Components Required to Meet Goals and Objectives
- Data Constraint Analysis
- Approaches Moving Forward
- References

Supplemental Documents Provided by NYC DEP to TAC

#3- Blumberg, Alan F., L.A. Khan, and J.P. St. John. (1999). Three-Dimensional Hydrodynamic Model of New York Harbor Region. ASCE Journal of Hydraulic Engineering, Vol. 125, No. 8. Paper No. 18077.

#4- Krumholz, J. and E. Bird. (2015) Proceedings of the 2015 Long Island Sound Water Quality Workshop. July 14-15, 2015. LISS, USEPA, NEIWPCC, CIRCA.

#5- Miller, Robin L. (2010) System Wide Eutrophication Model (SWEM) – Case Study: 20 Years of Hypoxia Management in the NY/NJ Harbor-NY Bight-Long Island Sound System. Sea Grant, New York Bight Workshop. July 7, 2010.

#6- O'Donnell, James & McCardell, Grant & Fake, Todd & Dam, Hans. (2010). Final Report: Simulation of Long Island Sound with the System-Wide Eutrophication Model (SWEM): Inter-annual Variability and Sensitivity. 10.13140/RG.2.1.4796.0083, May.

#7- O'Donnell, J., J.J. Fitzpatrick, G. McCardell, T. Fake, and R. Horowitz. (2014). Final Report: The Development of a Community Model of Nutrient Transport and Cycling for Long Island Sound. New England Interstate Water Pollution Control Commission and the Long Island Sound Study, September.

#8- University of Connecticut. System Wide Eutrophication Model. <https://swem.uconn.edu/> Accessed 2018.

Additional Documents Provided by TAC Members and NYC DEP

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Jolliff, J.K. et al. (2009). Summary diagrams for coupled hydrodynamic-ecosystem model skill assessment. *Journal of Marine Systems*, 76:64-82.

Mid-Atlantic Bight and Long Island Sound Sediment Bed Characterization. Sources include BNL (Premuzic, 1980), NOAA NMFS (Wigley and Theroux, 1976), URI (Saila, 1973), WHOI (Hathaway, 1971), and NOAA Long Island Sound Seminar (Koppelman, 1976).

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O'Brien-Clayton, K. (2015) Long Island Sound Water Quality Monitoring, CTDEEP, Long Island Sound Water Quality Workshop, U. Connecticut Avery Point Campus, Groton, CT.

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UConn (2018) UConn source code for original RCA and modified version (V2) of RCA model available for download <https://swem.uconn.edu/programs/>

C- Overview of System-Wide Eutrophication Model (SWEM)

Following completion of the LIS 3.0 model developed for the EPA Long Island Sound Study to model water quality conditions to data collected in 1988-1989 (NOAA, 1994, HydroQual, 1996), NYC DEP initiated a field monitoring program to collect data in 1994-1995 to develop a new hydrodynamic and water quality model. A new model was needed to support NYC DEP needs for management assessment studies including development of Long Term Control Plans to address CSO control strategies and upgrades of NYC wastewater facilities for nitrogen removal. In contrast to the Long Island Sound Study model framework (LIS 3.0) that was limited only to Long Island Sound, the NYC DEP System-Wide Eutrophication Model (SWEM) framework was based on a much larger geographic domain that extended over the continental shelf of the New York Bight from Nantucket Shoals to Cape May and included the estuarine waters of New York Harbor, the Hudson River, Long Island Sound, and the Peconic Estuary (Figure 2). The existing SWEM grid is characterized by a horizontal resolution ranging from 200 m in New York Harbor to 50 km in the New York Bight and 10 sigma layers in the vertical domain. In western LIS, the existing SWEM grid includes only 3 to 5 cross-Sound cells with a resolution of 1 to 2 km (lateral) and 1 to 6 km (longitudinal).

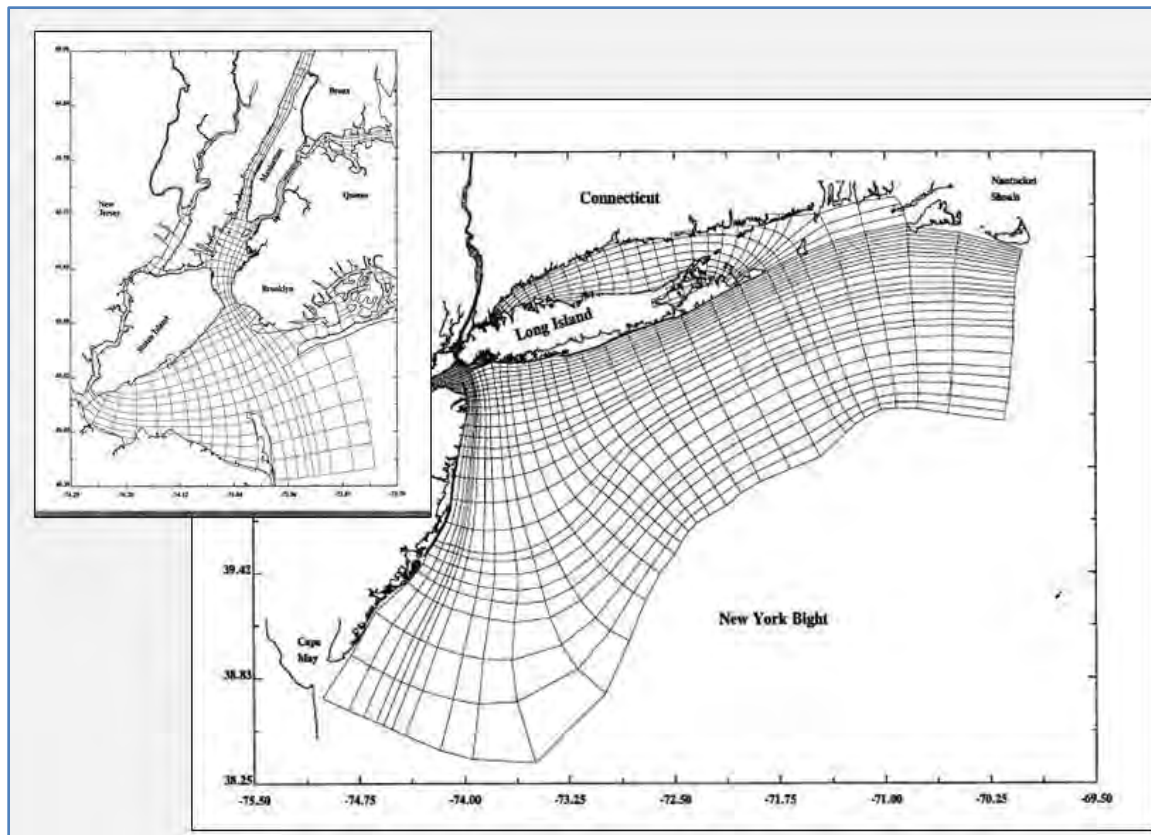


Figure 2- System-Wide Eutrophication Model (SWEM) Model Domain.

The SWEM framework incorporated external linkage of the ECOM hydrodynamic model (Blumberg et al., 1999) with the RCA water quality model of nutrients, eutrophication, dissolved oxygen, and sediment flux interactions (Miller, 2010, HydroQual, 2001b). External inputs for the SWEM hydrodynamic and water quality model framework included wet and dry deposition of nutrients, atmospheric, meteorological, and surface heat flux forcing, freshwater flow boundary inputs, initial conditions and open ocean boundary conditions for tidal forcing, salinity, temperature, sediment, and water quality state variables.

Flow boundary inflows included coastal rivers, nonpoint source runoff, municipal and industrial wastewater discharges, and stormwater (MS4) and CSO outfall. All loads to SWEM are presented in the Sub-task 10.2 report prepared by HydroQual (2001a). Coastal river discharge and loading data were compiled from the network of USGS gage network and flow-concentration relationships. Wastewater discharge and loading data were compiled from Discharge Monitoring Reports, operational records, and effluent concentration measurements collected specifically for modeling purposes during the 1994-95 monitoring program that supported SWEM.

Landside urban runoff models used to setup stormwater and CSO model input included InfoWorks, XP-SWMM, and RRMP. NYC DEP used InfoWorks to model the city-wide drainage network of stormwater and CSO outfalls and RAINMAN was the tool used to assemble data from InfoWorks, SWMM and RRMP urban runoff models. In the two decades of intervening time since SWEM was developed, a lot more work has been done by NYCDEP and other urban CSO communities to improve their watershed models with CSO Long Term Control Plans and MS4 programs as regulatory drivers. Groundwater modeling has also advanced around the Long Island Sound region.

The TMDL for nitrogen loading to LIS, developed with the LIS 3.0 model (NOAA, 1994 and HydroQual, 1996a, 1996b), was adopted in 2000. Calibration and validation of the SWEM hydrodynamic and water quality models (HydroQual, 1997a, 1997b, 2001b) was approved by a Model Evaluation Group and SWEM was subsequently used to perform an evaluation of the TMDL scenario for nitrogen reduction for Long Island Sound. The SWEM hydrodynamic (ECOM) and water quality (RCA) model framework is in the public domain as an open source model. Although model documentation and user manuals are available for ECOM and RCA, these models are not currently supported by a full GUI. The latest versions of ECOM and RCA support post-processing of model outputs via NetCDF compatible files and, therefore, are considered to be somewhat “user-friendly”. The TAC recommends that Fortran source code, input files, user’s manuals (HydroQual, 2004, 2007), and documentation reports for model setup, calibration, and validation of the ECOM hydrodynamic and RCA water quality models for the existing SWEM framework should be made available by HDR to NYC DEP for posting on NYC DEP’s website.

In addition to the modeling analyses based on SWEM for evaluation of the TMDL for nitrogen reduction for Long Island Sound, the SWEM framework was used by NYC DEP to develop nested grid models of the East River/Narrows, local embayments (e.g., Jamaica Bay) and tidal rivers

(e.g., Hutchinson River, Newtown Creek) to support development of Long Term Control Plans for CSO strategies and wastewater upgrades such as the plan for Newton Creek (HydroQual, 2001). Figure 3 shows examples of the nested grid models developed with the SWEM framework and Table 2 presents a list of the nested grid models developed by NYC DEP to support development of Long Term Control Plans for CSO's. Separate water quality models based on SWEM were developed by NYC DEP for each Long Term Control Plan to address (a) dissolved oxygen, nutrients and eutrophication and (b) pathogens.

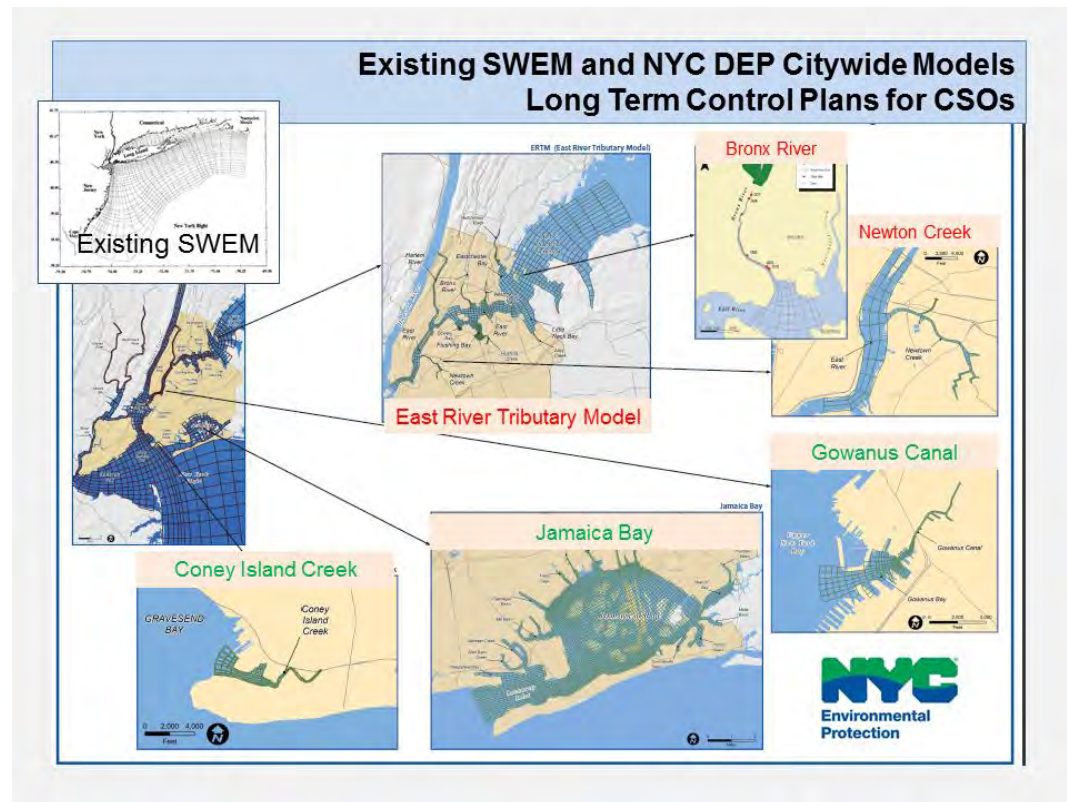


Figure 3- Examples of Existing SWEM and NYC DEP Citywide Models Developed to Support Long Term Control Plans for CSOs. Source: NYC DEP

Table 2- NYC DEP Long Term Control Plans for CSO Projects.

A-Existing SWEM	B-East River Tributary Model
Gowanus Canal	Bronx River
Coney Island Creek	Newton Creek
Jamaica Bay	Alley Creek-Little Neck Bay
Paerdegat Basin	Westchester Creek
East River Tributary Model	Hutchinson River
	Flushing Creek
	Flushing Bay

The SWEM framework was accepted by the NY NJ Harbor Estuary Program for assessments of nutrients and dissolved oxygen issues. The Harbor Estuary Program also selected the SWEM hydrodynamic model (ECOM) to support toxic chemical modeling under the Contaminant Assessment and Reduction Project (CARP) and the USACE New York District selected SWEM to support the Harbor and Tributary Study (HATS). The SWEM hydrodynamic model (ECOM) has been applied by NYS DEC to support the Long Island Nitrogen Action Plan (LINAP) by providing open water boundary conditions as input to high-resolution hydrodynamic models of North Shore Long Island embayments including Oyster Bay, Hempstead Bay, Manhasset Bay and Little Neck Bay in Nassau County and Huntington Bay, Port Jefferson Harbor and Mt. Sinai Harbor in Suffolk County.

Researchers at the University of Connecticut Marine Sciences performed a detailed independent evaluation of the SWEM model (O'Donnell et al., 2010, 2014) with the original data collected in 1988-1989 and 1994-1995 to develop SWEM and new data sets collected from 1999-2002. Although considerable effort was expended to eliminate the adjustment of vertical mixing and to reformulate algal growth kinetics and dissolved oxygen budget terms that were identified as weaknesses of the SWEM water quality model by O'Donnell et al. (2010), O'Donnell et al. (2014) concluded that the RCA water quality model, as currently configured for the SWEM grid resolution of Long Island Sound (see Figure 2), was unable to accurately represent the observed summer distribution of near bottom low dissolved oxygen and hypoxia under stratified summer conditions in western Long Island Sound. The re-calibration effort of O'Donnell et al (2014) was not considered to be a sufficient advancement in the SWEM water quality model to support the TMDL evaluation.

O'Donnell et al. (2014) recommended that a finer horizontal resolution grid for Long Island Sound be developed to reduce the effect of numerical dispersion on vertical mixing and to improve the hydrodynamic simulation of cross-Sound (lateral) transport of water as a response to wind forcing. These improvements to the hydrodynamic model, in turn, are expected to improve agreement between field observations and the simulation of near bottom low dissolved oxygen under summer stratified conditions.

Section C References

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UConn (2018) UConn source code for original RCA and modified version (V2) of RCA model available for download (<https://swem.uconn.edu/programs/>)

D- Overview of Other Surface Water Models for Long Island Sound and the Middle Atlantic Bight

New York Bight and Middle Atlantic Bight. The New York Harbor Observing and Prediction System (NYHOPS) was established by Stevens Institute of Technology (Urban Ocean Observatory at Davidson Laboratory) with major funding from the NY NJ Port Authority to permit operational assessments of ocean, weather, environmental, and vessel traffic conditions throughout the New York Harbor and New Jersey Coast regions. NYHOPS is designed to provide knowledge of meteorological and oceanographic conditions both in real-time and forecasted out to 72 hours in the Hudson River, the East River, NY/NJ Estuary, Raritan Bay, Long Island Sound and the coastal waters of New Jersey (<http://hudson.dl.stevens-tech.edu/maritimeforecast/>).

The hydrodynamic model for NYHOPS is driven by the Stevens Estuarine and Coastal Ocean Model (sECOM) (Georgas et al., 2016) which is an enhanced version of ECOM (Blumberg et al., 1999) that was applied for the SWEM applications for NYC DEP. The current version of the sECOM hydrodynamic model is well developed with extensive applications and assessment of model skill (e.g. Blumberg et al., 1999; Blumberg and Georgas, 2008; Georgas, 2010; Georgas and Blumberg, 2010; Orton et al., 2012). The NYHOPS domain extends over the Middle Atlantic Bight from Nantucket Shoals south to Chesapeake Bay with 0.025-4 km spatial resolution and 10 sigma layers in the vertical domain (Figure 4). The hydrodynamic model is forced by coastal river discharge, wastewater inputs, stormwater, tides, and surface heat flux. Although NYHOPS is primarily designed as a real-time operational forecasting system, the model framework has been applied to validate hindcasts of historical conditions. As of June 2018, the NYHOPS modeling system is proprietary and is not considered to be an open source model.

The Thematic Real-time Environmental Distributed Data Services server (THREDDS) is an open access data server designed to facilitate data exchange. An online THREDDS Data Server (<http://colossus.dl.stevens-tech.edu/thredds/catalog.html>) was set up to serve the NYHOPS model's results in oceanographic NetCDF format over the web using the OPENDAP protocol, enabling open access to daily averaged or monthly averaged time series for all the gridded hindcast physical variables in or over the NYHOPS region (including LIS and NYNJH). Simulated climatologies (mean simulated climate conditions averaged over the three decades of the NYHOPS hindcast period) for two- and three-dimensional fields such as water temperatures and salinities, were also generated, and included in THREDDS.

Open Waters of Long Island Sound. Hydrodynamic models that have been developed as community open source models for Long Island Sound include applications of the Regional Ocean Modeling System (ROMS, Haidvogel et al., 2008) and the Finite Volume Community Ocean Model (FVCOM, Chen and Beardsley, 2013). ROMS hydrodynamic applications for Long Island Sound include investigations by Michael Whitney at UCONN (Whitney et al., 2011, 2014, 2016; Schmidt and Whitney, 2018) where the resolution of the model domain ranged from 0.5 - 1.0 km and 20 sigma layers in the vertical. The ROMS model is forced by river discharge of all Long Island Sound tributaries (including the Hudson River), tides, and surface heat flux. Model

results have been quantitatively compared to observed tidal currents throughout LIS and salinity and tidal-averaged transports in eastern LIS. ROMS is modular, well maintained, with excellent documentation, and an extremely strong user community. ROMS supports two-way nesting capability.

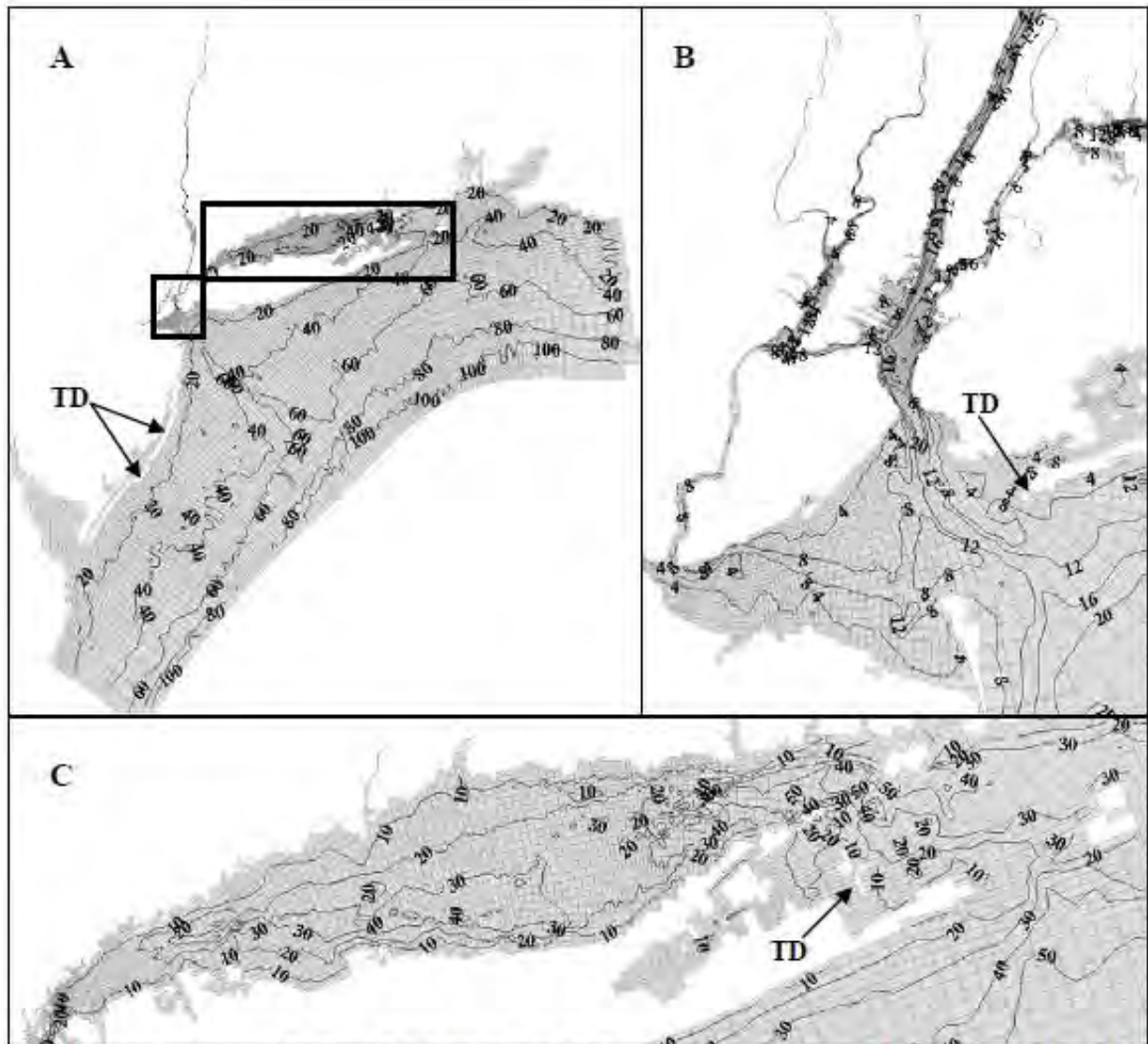


Figure 2. High-resolution NYHOPS v3 finite difference grid created with Delft3d RGFGRID[®]: A) Complete grid, B) NY/NJ Harbor zoom, C) Long Island / Block Island sounds zoom. Contoured bathymetry is in meters [max of 200m offshore].

Figure 4- High-resolution NYHOPS v3 Finite Difference Grid. Source: Georgas and Blumberg (2010)

FVCOM hydrodynamic applications for Long Island Sound include a study by James O'Donnell and Grant McCardell at UCONN (O'Donnell et al, 2015) where the resolution of the model domain ranged from 0.1 – 0.5 km. The FVCOM model is forced by river discharge of all Long Island Sound tributaries, tides, and surface heat flux. Model results have been quantitatively compared to observed tidal currents, temperature, and salinity throughout Long Island Sound. FVCOM is modular, reasonably well maintained, with good documentation and a strong user community.

Embayments and Tidal Rivers of Long Island Sound. In addition to applications of ROMS and FVCOM for the open waters of Long Island Sound, hydrodynamic models have been developed for embayments and tidal rivers of Long Island Sound. In support of NYS DEC Harmful Algal Bloom (HAB) modeling for Northport-Huntington Harbor, Flagg and Hinrichs at Stony Brook University, SoMAS used FVCOM to develop an open source community hydrodynamic model of this embayment with 6 sigma levels in the vertical and horizontal resolution varying from 0.04-0.23 km (Wilson and Flagg, 2018). The embayment model is forced by ground water inflow, local surface water inflow and surface heat flux. With a specified date range, open boundary conditions for temperature, salinity and water level time series were obtained through the open access Thematic Real-time Environmental Distributed Data Services server (THREDDS) from the archived hindcast dataset for Long Island Sound produced using the Stevens Institute of Technology New York Harbor Observing and Prediction System (NYHOPS) (Georgas et al., 2016). This application could be considered an example of one-way nesting with open boundary conditions obtained from a larger domain model.

FVCOM community open source model applications for a tidal river of Long Island Sound include studies by Ralston et al. (2017) of the Connecticut River estuary. The investigators used a fine grid model with horizontal resolution of 0.015 km and a coarse grid model with resolution of 0.45 km. The fine grid and coarse grid models were both represented with either 30 or 40 sigma layers in the vertical domain. With support from the NSF, the objective of the study was to perform an evaluation of the effects of grid resolution on vertical mixing. Hydrodynamic model boundary conditions included water levels at the eastern and western boundaries of Long Island Sound, discharge from the Connecticut River, and surface wind stress over the domain.

In support of NYSDEC's Long island Nitrogen Action Plan (LINAP), Stony Brook University, SoMAS and HDR HydroQual used SWEM and EFDC to develop hydrodynamic models of Long Island North Shore embayments. SoMAS used EFDC to develop hydrodynamic simulations for Oyster Bay, Hempstead Bay, Manhasset Bay and Little Neck Bay in Nassau County (Wilson, 2018) and HDR also used EFDC to develop nested embayment models for Huntington Bay, Port Jefferson Harbor and Mt. Sinai Harbor in Suffolk County. The version of the EFDC model that can be downloaded from EPA is in the public domain but the source code is not made available by EPA (<https://www.epa.gov/ceam/environment-fluid-dynamics-code-efdc-download-page>). Sandia National Laboratory developed an open source version of EFDC that incorporates the dynamic memory allocation code used in EFDC+. Source code can be downloaded at <https://sourceforge.net/p/snl-efdc/code/HEAD/tree/>. The multi-processor version of the EFDC+

model and the GUI Interface EFDC_Explorer are proprietary and are not an open source modeling package (<https://www.eemodelingsystem.com/>).

Grid resolution varied from 0.056-0.29 km with 5 sigma layers used for the vertical domain. Hydrodynamic simulations were forced by local inputs of surface fresh water and ground water and open boundary conditions for water elevation, salinity and temperature were extracted along the interfaces of each embayment from matching grid cells of the existing SWEM domain for Long Island Sound. HDR also performed simulations with EFDC for nested embayments to the east (Huntington Bay, Port Jefferson Harbor and Mt. Sinai Harbor), also forcing the hydrodynamic simulations with surface fresh water, ground water inflow and open boundary conditions for water elevation, salinity and temperature were extracted from matching grid cells of the larger domain SWEM. The North Shore embayment models provide examples of functional one-way nesting.

Biogeochemical Models. Biogeochemical models that have been developed for the Middle Atlantic Bight include a coupled model of hydrodynamics and biological processes based on the ocean circulation Regional Ocean Modeling System (ROMS, Haidvogel et al., 2008) and a biological model that considers separate state variables for phytoplankton biomass (as nitrogen) and phytoplankton biomass (as chlorophyll-a) with other pelagic and benthic processes for nitrogen cycling (Fennel et al., 2006).

A one-dimensional, time variable vertical profile model was developed by Liu et al. (2015) for Western LIS by coupling a wind-driven physical transport/vertical mixing model (GOTM) with a biogeochemical model (ERGOM) of phytoplankton, zooplankton, nutrients, detritus, dissolved oxygen, and sediment bed organic matter. Liu et al. modified the biogeochemical model to include bacterial biomass as a new state variable that was linked to consumption of dissolved oxygen. The researchers concluded that bacterial dynamics need to be correctly parameterized in biogeochemical models to accurately simulate dissolved oxygen variability and recovery from summer, stratified hypoxic conditions in Long Island Sound.

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E- New Integrated Model Framework for Long Island Sound

With funding support from EPA, NYC DEP plans to develop an integrated LIS model in phases over the next 4-5 years in coordination with stakeholders, academics and regulators in the region. The integrated model framework will be designed to ensure that physical, biogeochemical, and ecological sub-models provide a good representation of how these components drive circulation, mixing, dissolved oxygen, the onset and persistence of hypoxia, water quality, ecological conditions and living resources in LIS. The model will be designed to support management strategies, at system-wide (New York Bight, New York Harbor and Long Island Sound), regional (Long Island Sound and New York Harbor), and local (embayments, tidal rivers) geographic scales. The new system-wide and LIS regional integrated model framework will support decision-making investments to implement management strategies for the next decade (and perhaps longer) by NYC DEP, NYSDEC, CTDEEP, NJDEP, and EPA to achieve compliance with regulatory goals (MS4, CSO controls, TMDLs).

As transport and mixing processes in LIS are linked to transport and mixing processes in New York Harbor and the continental shelf of the Middle Atlantic Bight, the system-wide domain of the new integrated model framework should include the coastal waters of the New York Bight from Nantucket Shoals to Cape May, NJ, the estuarine waters and embayments of LIS, the Peconic Estuary, New York Harbor, the Hudson River and other coastal rivers of the system-wide domain (Figure 5). Open ocean boundary conditions will be assigned along the eastern, southern, and offshore boundaries of the New York Bight. The integrated model that will be developed to support modeling investigations in LIS will thus be part of a much larger system-wide domain that includes LIS.

The new model framework must be accessible to all Stakeholders including the academic community, state, federal, local agencies, environmental advocacy groups and regulated entities. It is expected that the model framework will be developed in a modular fashion over a period of several years to represent linkages between watershed flow and loads, hydrodynamics, water quality, sediment flux, ecological processes and living resources.

The new computational grid and the new hydrodynamic model must accurately simulate transport and mixing processes and seasonal vertical stratification at the spatial scale and goodness-of-fit necessary to accurately simulate water level, water temperature, salinity and density in Long Island Sound and throughout the larger system-wide domain of New York Harbor and the New York Bight. The new water quality model, in turn, must be designed and developed to account for the linkage of physical transport and mixing with biogeochemical processes at the spatial scale and goodness-of-fit necessary to accurately simulate spatial and temporal distributions of dissolved oxygen, hypoxia, phytoplankton, nutrients, organic carbon, and eutrophication processes in Long Island Sound and throughout the larger system-wide domain of New York Harbor and the New York Bight.

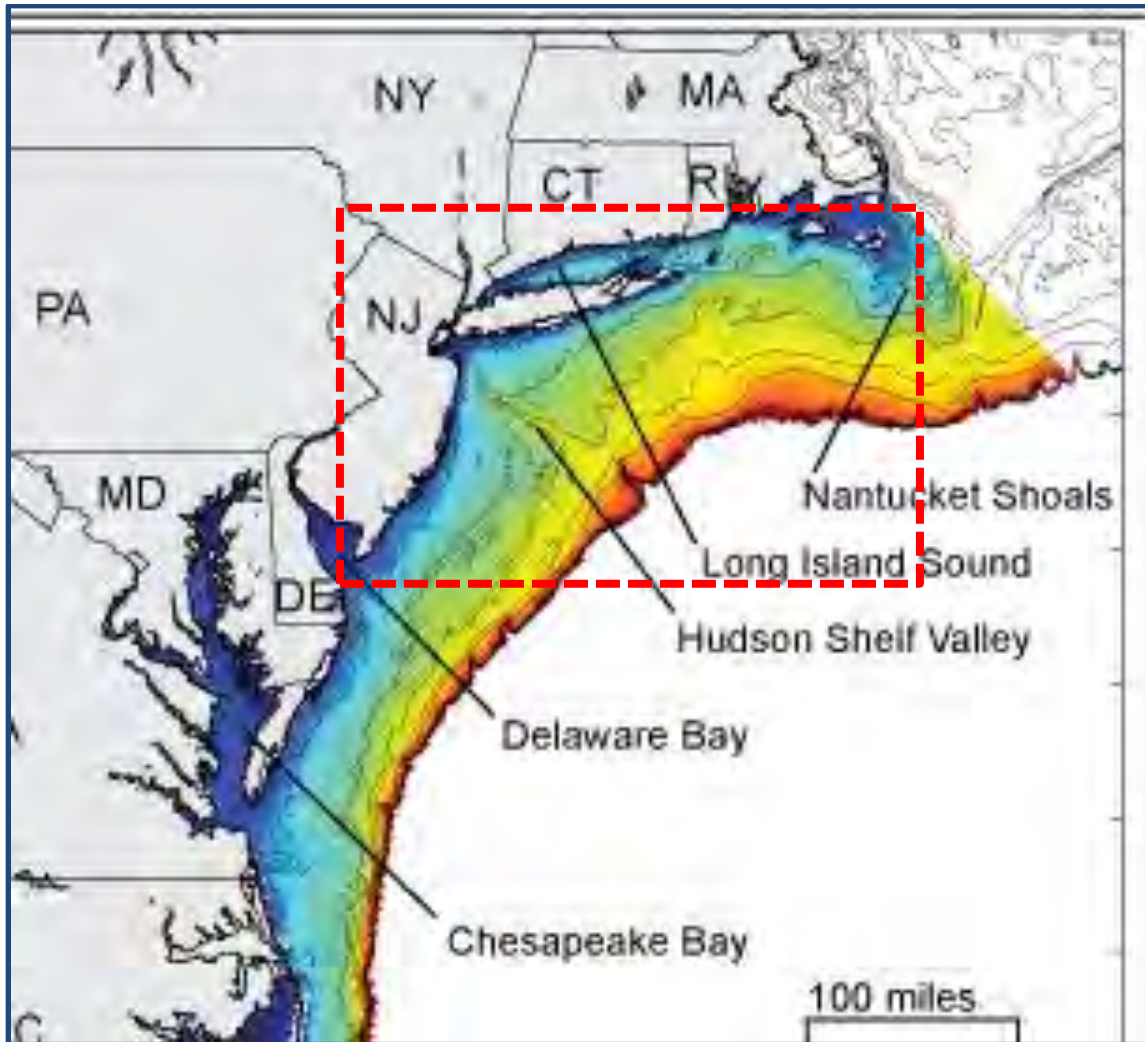


Figure 5- System-wide geographic domain for New York Bight, New York Harbor, Hudson River, Long Island Sound, and Peconic Estuary from Nantucket Shoals to Cape May NJ. Source: https://woodshole.er.usgs.gov/project-pages/mobility/mid_atl_bight.html

The TAC recommends that the new hydrodynamic and water quality model for LIS and the larger system-wide domain be developed under three phases as follows:

- **Phase 1-** Select hydrodynamic and water quality model for new model framework, develop new grid that includes finer resolution grid for LIS, and use data collected from 1994-1995 to re-visit existing SWEM to re-calibrate new hydrodynamic and water quality models.
- **Phase 2-** Collect and compile data sets from secondary data sources to support model setup and execution of a continuous long-term simulation of the hydrodynamic and water quality model from 2003 through 2018. Long-term period includes years before and after attainment of 59% nitrogen reduction goal by 2016.

- Phase 3- NYC DEP modeling staff performs periodic updates and testing of the new hydrodynamic and water quality model to assimilate future data sets (2019-2020, 2021-2022, etc.).

Phase 1. The existing SWEM framework has been developed using data collected in 1988-1989, 1994-1995, and 1999-2002. Under Phase 1, the objective is to re-visit data sets used for SWEM modeling performed previously. A hydrodynamic and water quality model will be selected as the foundation of the new integrated model framework and a new computational grid will be designed and developed with a finer resolution in LIS to address the weaknesses identified in the peer review of the existing SWEM framework (O'Donnell et al., 2010, 2014).

Under Phase 1, the new model grid will be designed to encompass the system-wide domain that incorporates high spatial resolution of LIS including coastal embayments and tidal rivers. The model framework will be designed and developed to re-calibrate the new version of the hydrodynamic and water quality model. Although the previous SWEM work used data sets from 1988-1989, 1994-1995, and 1999-2002, the Phase 1 re-calibration effort will be focused on the much richer data set that was collected in 1994-1995 specifically to support development of the SWEM framework for hydrodynamics and water quality.

Hydrodynamic and water quality model input files developed for the existing SWEM for the 1994-1995 time period should be made available by HDR to NYC DEP to assist in the development of the new model framework. External flow boundary input files for the SWEM framework include 34 coastal rivers entering the model at 28 locations, 99 wastewater facilities, more than 1,700 stormwater and CSO outfalls captured in runoff model outputs that were spatially aggregated to align with the SWEM grid. All loads to SWEM are presented in the Sub-task 10.2 report prepared by HydroQual (2001). Coastal river discharge and loading data were compiled from the network of USGS gage network and flow-concentration relationships. Wastewater discharge and loading data were compiled from Discharge Monitoring Reports, operational records, and effluent concentration measurements collected specifically for modeling purposes during the 1994-95 monitoring program that supported SWEM.

Landside urban runoff models used to setup stormwater and CSO model input included InfoWorks, XP-SWMM, and RRMP. NYC DEP used InfoWorks to model the city-wide drainage network of stormwater and CSO outfalls and RAINMAN was the tool used to assemble data from InfoWorks, SWMM and RRMP urban runoff models. Stormwater and CSO loading input data developed for the existing SWEM for 1994-1995 will be made available by NYC DEP for re-calibration of the new model framework.

In addition to flow boundary data sets, other model input files that will be made available include atmospheric deposition of nutrients, meteorological, and surface heat flux forcing, and open ocean boundary conditions for tidal forcing of water level, salinity, temperature, and water quality state variables. Initial conditions are specified for water level, salinity, temperature, water quality variables, and sediment bed conditions for the sediment flux model. Model input files also include external forcing functions, model parameters, constants, and kinetic rate reactions for the hydrodynamic and water quality models. The respondent is

encouraged to collect any available data or better forcing data to support re-calibration of the new model framework.

As a fully transparent process for public funding, the SWEM hydrodynamic (ECOM) and water quality (RCA) models are in the public domain and are considered to be open source models. Fortran source code, input files, user's manuals (HydroQual, 2004, 2007), and documentation reports for the existing SWEM model setup, calibration, and validation of the ECOM hydrodynamic and RCA water quality models should be made available to NYC DEP by HDR for posting on NYC DEP's website. The respondent can use these resources as references to support model selection and development of the new model framework.

Under Phase 1, tasks will include the following:

- Prepare modeling QAPP
- Data sources, collect/compile data, inventory, synthesis of Phase 1 data sets
- Design, build, and test new computational grid that includes finer resolution grid for LIS
- Update model code for selected model, as needed to improve hydrodynamic and biogeochemical processes, including output of mass flux components for selected state variables
- Model setup, re-calibration, skill assessment for hydrodynamic/water quality model
- Model setup, re-calibration, skill assessment for 2 nested LIS embayments that are embedded in new LIS grid for hydrodynamic/water quality model
- Model simulation for re-assessment of existing SWEM management scenarios (TMDL plus two other SWEM scenarios) for the period of 1994-1995 and diagnosis of model response to nutrient reduction scenarios previously evaluated
- Model setup, testing of 2 (CT+LI) standalone LIS embayment models as demonstration of the functionality of nesting smaller model grid within larger new LIS grid
- Technical report/presentation to TAC for peer review of new hydrodynamic and water quality model framework. Provides opportunity for TAC to recommend any changes in the new model framework that may be needed prior to completion of Phase 1 effort
- Technical report/presentation to Stakeholders for public review of new hydrodynamic and water quality model framework. Provides opportunity for Stakeholders to comment on development of new model framework prior to completion of Phase 1 effort
- Technical reporting for hydrodynamic/water quality model

Phase 2. Under Phase 2, data sets will be collected and compiled from secondary data sources to support setup and execution of a continuous long-term simulation of the hydrodynamic and water quality models from 2003 through 2018. During this 15+ year period since development of the existing SWEM framework, significant interannual changes have been identified in Long Island Sound for wind forcing, water temperature, and watershed loading of nutrients. Significant investments have been made to upgrade wastewater facilities in NY and CT to achieve the 59% goal for reduction of nitrogen that was established by the Long Island Sound TMDL in 2000 (Figure 6); the nitrogen reduction goal was attained by 2016.

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In the two decades of intervening time since SWEM was developed, a lot more work has been done by NYCDEP and other urban CSO communities to improve their watershed models with CSO Long Term Control Plans and MS4 programs as regulatory drivers. Groundwater modeling has also advanced around the Long Island Sound region. Under Phase 2, the respondent will be responsible for identifying and obtaining urban runoff data sources needed to compile time series input data to describe stormwater and CSO loading for the period from 2003 through 2018.

Under Phase 2, the re-calibration effort of Phase 1 will be confirmed (i.e., validated) by selecting at least 6 sequential years from the 2003-2018 period of record before the 59% TMDL goal was attained for nitrogen reduction. Wind forcing, water temperature, and coastal river discharges are factors to be considered in selecting the years for testing the model. A post-audit assessment will then be performed to evaluate the model response subsequent to attainment of the 59% nitrogen reduction goal for years by 2016.

Under Phase 2, tasks will include the following:

- Discovery of secondary data sources, collect/compile data, inventory, synthesis of Phase 2 data sets
- Technical reporting for data discovery
- Setup of hydrodynamic/water quality model for 2003-2018 long-term record
- Model confirmation of re-calibration, skill assessment for hydrodynamic/water quality model for selected years before attainment of TMDL goal
- Model confirmation of re-calibration, skill assessment for hydrodynamic/water quality model for selected post-audit years after attainment of TMDL goal
- Model confirmation of re-calibration, skill assessment for hydrodynamics/water quality model for 2 (CT+LI) LIS embayments embedded in new grid
- Model sensitivity analyses for hydrodynamic/water quality model
- Model simulation of 3 designated nitrogen reduction scenarios (to be determined by NYC DEP/EPA) for selected period of 2003-2018 and diagnosis of model response to nutrient reduction scenarios
- Technical report/presentation to TAC for peer review of updated hydrodynamic and water quality model framework. Provides opportunity for TAC to recommend any changes in the new model framework that may be needed prior to completion of Phase 2 effort
- Technical report/presentation to Stakeholders for public review of updated hydrodynamic and water quality model framework. Provides opportunity for Stakeholders to comment on development of updated model framework prior to completion of Phase 2 effort
- Technical reporting for hydrodynamic/water quality model
- Technical reporting to include data gaps identified under Phase 2 update of model and recommendation of new data collection efforts that would be used to support modeling efforts to be continued by NYC DEP under Phase 3

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- Technology transfer of pre-processing/post-processing software tools used for development of new model
- Technology transfer of model code, input and output files, and documentation for application of new model
- Training of NYC DEP, EPA, and other agency staff in basic principles, application of new model, how to develop management scenarios, and how to update new models with future data sets. Videos of training sessions will be recorded and posted on You Tube.

Phase 3. NYC DEP should view the new integrated model framework for LIS and the larger system-wide NY-NJ-CT region as a tool that will be routinely updated as new data becomes available. This means that, after the initial model development and applications are completed at the end of Phase 2, NYC DEP should commit to a 1-2 year schedule of updating model input to include the new data needed to run the model after all the data from the previous 1-2 years becomes available, is assembled, and receives the appropriate QA/QC scrutiny. As shown in Figure 6, external loading of nitrogen has gradually been reduced from 1995 through 2016 to attain the nitrogen reduction goal established by the TMDL for LIS. As external loads of nitrogen will continue to vary over time, it is essential to have the capability to update the new model periodically to evaluate the effect of nutrient management actions on water quality and ecological conditions because the system may take a long time to respond to nutrient reduction strategies.

The Massachusetts Water Resources Authority (MWRA), for example, has updated the Massachusetts Bay ECOM-RCA model every 1 to 2 years since the model was developed by HydroQual and Signell (2001). A research team at University of Massachusetts at Dartmouth currently supports MWRA with periodic updating and reporting for the Massachusetts Bay model (e.g., Chen et al., 2009).

The work plan for the new model should require that the model developers will train NYC DEP staff on how to add new data as model inputs, how to run and test the model for those new conditions. It should be a goal that NYC DEP staff complete this work on a 1-2 year basis without any input or technical support from the model developers after the contract is complete for development of the new model. NYC DEP will invite EPA, NYS DEC, CTDEEP, and NJDEP to participate in the periodic updating of the new model by providing data to support updating of the model and to review and comment on technical reports and/or memoranda prepared to document updates of the new model.

Under Phase 3, NYC DEP modeling staff will have responsibility for periodic updates of the new integrated model framework after the hydrodynamic and water quality model development work is completed, approved, and delivered to NYC DEP and EPA. Work on Phase 3 will begin upon completion of Phase 2 of the project. As new data sets become available from future monitoring efforts and field experiments etc., NYC DEP staff will perform the necessary pre-processing tasks to update the model input files to extend the time series period of record for external flow boundaries, atmospheric, meteorological, and tidal forcing, and open ocean boundary conditions. The TAC recommends that data be updated on a 1-2 year cycle to update

model input, test and evaluate model performance/skill assessment against new data sets, and evaluate if any changes may be needed for the model framework. Technical memoranda should be prepared for the record to document new data sources, findings, and any recommendations for changes to the model framework etc.

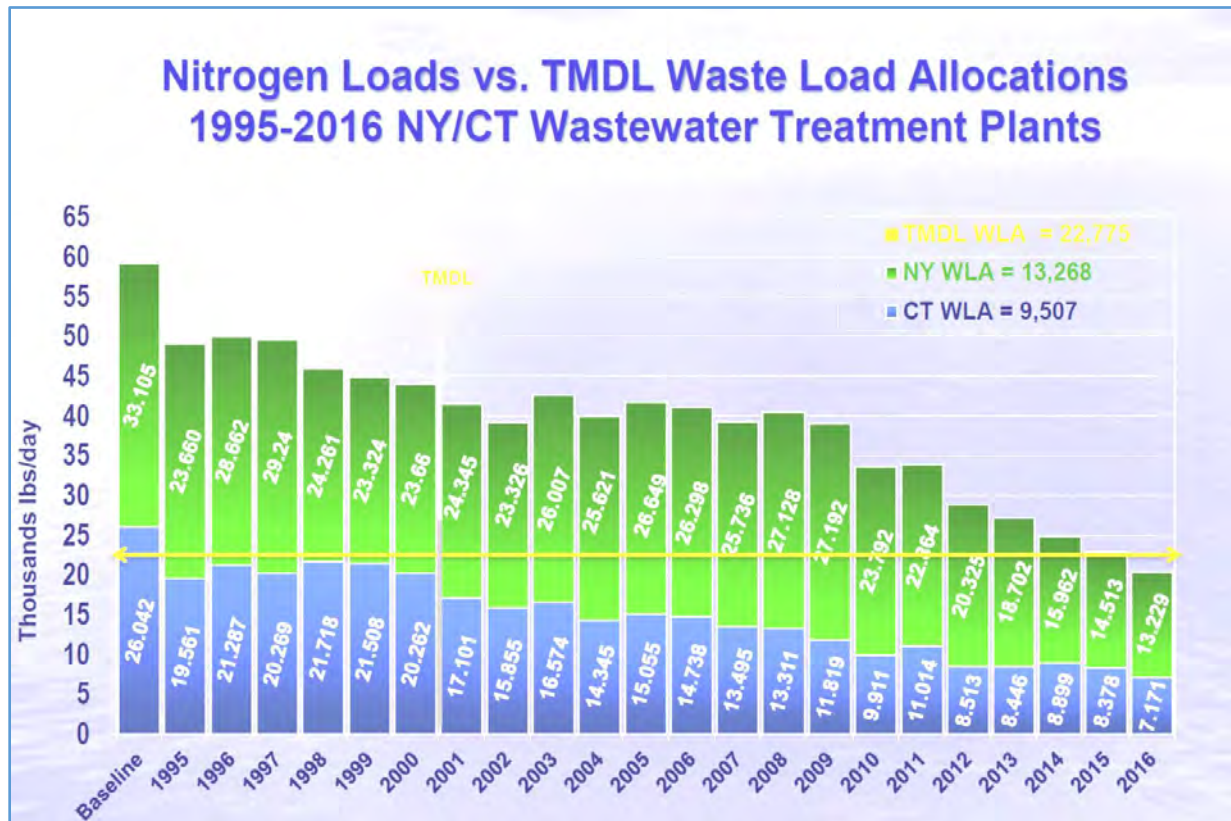


Figure 6- Long-term trend in nitrogen loading to Long Island Sound from NY and CT wastewater treatment plants.

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F- TAC Recommendations for RFP Requirements

Table 3- RFP Requirements for Phase 1

RFP Requirements, Phase 1
<i>Phase 1- Select hydrodynamic and water quality model for new model framework, develop new grid that includes finer resolution grid for LIS, and use data collected from 1994-1995 to re-visit existing SWEM to re-calibrate new hydrodynamic and water quality models.</i>
The new hydrodynamic model must accurately simulate transport and mixing processes, seasonal vertical stratification at the spatial/temporal scale and goodness-of-fit necessary to accurately simulate water level, water temperature, salinity and density in Long Island Sound. The new hydrodynamic model must also accurately represent physical transport processes throughout the larger system-wide domain of New York Harbor and the New York Bight.
The new water quality model must accurately account for the linkage of physical transport and mixing with biogeochemical processes at the spatial scale and goodness-of-fit necessary to accurately simulate dissolved oxygen, hypoxia, nutrients, organic carbon, and eutrophication processes in Long Island Sound. The new model must also accurately represent biogeochemical processes throughout the larger system-wide domain of New York Harbor and the New York Bight.
The new finer resolution grid must be designed to accurately simulate transport and mixing processes, seasonal vertical stratification at the spatial/temporal scale and goodness-of-fit necessary to accurately simulate hydrodynamic processes in Long Island Sound. The grid must also accurately represent hydrodynamic processes throughout the larger system-wide domain of New York Harbor and the New York Bight.
LIS embayments and tidal rivers that are embedded in new model grid must be defined with sufficient spatial resolution to accurately account for tidal volume and mass exchange with LIS.
Modeling QAPP must be prepared
Re-visit existing SWEM 1994-1995 input data set and make necessary changes if it is needed or develop new input data sets for 1994-1995.
New model must be re-calibrated to observation data used for existing SWEM or other available data sets for 1994-1995.
Re-calibrate new model framework to stations located in East River, Narrows, western basin, central and eastern basin of LIS, Upper/Lower NY Harbor, and New York Bight.
Develop 2 standalone nested grid LIS embayment models (CT+LI) as demonstration of the functionality of nesting smaller model grid within larger new LIS grid.
Specify approach to be used for re-assessment of existing SWEM management scenarios (TMDL plus two other SWEM scenarios) for the period of 1994-1995 and

to diagnose model response to nutrient reduction scenarios
Specify approach to be used to pre-process data to develop model input files and observed data sets for model comparison.
Specify approach to be used to post-process model results for comparison to observed hydrographic and water quality data and water quality target criteria for dissolved oxygen, hypoxia, water clarity, and phytoplankton biomass (as chlorophyll-a).
Specify methods and proposed model performance targets to perform model skill assessment for hydrodynamic and water quality models.
Specify approach to be used in proposed hydrodynamic/water quality model to track, output, and post-process model results to develop mass balance flux components for DO, nutrients, phytoplankton biomass, etc. for spatial, temporal, vertical averaging
Discuss how respondent would evaluate both hydrodynamic and water quality model performance, in collaboration with regional managers and scientists, to identify and recommend observational programs to enhance model parameterization in space and time, as well as to foster continuous improvements during the model development process.

Table 4- RFP Requirements for Phase 2

RFP Requirements, Phase 2
<i>Phase 2- Collect, compile data sets from secondary data sources needed to support model setup and execution of a continuous long-term simulation of the hydrodynamic and water quality model from 2003 - 2018. Long-term period includes years before/after attainment of 59% nitrogen reduction goal ca. 2016.</i>
New model framework must be updated in time to represent years from 2003-2018. Update data sets for flow boundaries, meteorological, atmospheric forcing, open ocean boundary conditions for tidal forcing, temperature, salinity, water quality, sediment bed data for sediment flux model, and station data for model-data comparison and skill assessment.
Discovery of secondary data sources, collection/compilation of data sets, inventory, review, synthesis of data to support recommendations for selected sequence of years to confirm re-calibration of model to data collected from 2003-2018. Recommendations for selection of years must consider interannual differences in river discharge, wind forcing, water temperature, N loading, and other key factors.
New re-calibrated model must be confirmed to 5-6 years of record selected from 2003-2018 period of record before 59% N reduction.

New re-calibrated model must be confirmed for post-audit years after 59% N reduction.
Specify approach to be used to model 3 designated nitrogen reduction scenarios (to be determined by NYC DEP/EPA) for selected period of 2003-2018 and to diagnose model response to nutrient reduction scenarios
Specify approach to be used to pre-process data to develop model input files and observed data sets for model comparison.
Specify approach to be used to post-process model results for comparison to observed hydrographic and water quality data and water quality target criteria for dissolved oxygen, hypoxia, water clarity, and phytoplankton biomass (as chlorophyll-a).
Specify methods to be used in model to track, output, and post-process model results to develop mass balance flux components for DO, nutrients, phytoplankton biomass, etc.
Specify methods and performance targets to perform model skill assessment for models.
Specify parameters to be tested, describe proposed approach to perform sensitivity analyses for models.
Specify methods and tools to be used for linking regional scale model to nested grid models.
Document data gaps identified under Phase 2 update of model and recommend new data collection efforts that would be used to support modeling efforts to be continued by NYC DEP under Phase 3.
Technology transfer of (a) pre-processing/post-processing software tools used for development of new model and (b) model code, input and output files, and documentation for application of new model.

G- TAC Recommendations for Respondents

Table 5- Respondent Requirements for Phase 1

Respondent Requirements
<i>Phase 1- Select hydrodynamic and water quality model for new model framework, develop new grid that includes finer resolution grid for LIS, and use data collected from 1994-1995 to re-visit existing SWEM to re-calibrate new hydrodynamic and water quality models.</i>
Respondents demonstrate their understanding of this coastal and estuarine system with a conceptual model description of key physical and biogeochemical processes that control dissolved oxygen, hypoxia, nutrient cycling, phytoplankton production, and ecological processes such as SAV and benthos (shellfish) in Long Island Sound.
Respondent chooses hydrodynamic and water quality model. Respondent could choose either internal or external linkage of hydrodynamic and water quality model. Respondent must justify choice.
Respondent provides proposed modifications of hydrodynamic model for improving transport and mixing processes, and water quality kinetic processes for improving biochemical processes and interactions.
Respondent designs and builds new grid as needed to satisfy RFP requirements for hydrodynamic model (transport, vertical mixing and stratification) and water quality model (DO, hypoxia, nutrients, phytoplankton) in LIS. Respondent could choose to use SWEM grid, or use it as a reference, and develop a nested LIS grid with finer resolution. Respondent could choose to build new system-wide grid with fine resolution grid in LIS to satisfy RFP requirements. Respondent chooses and justifies representation of vertical domain.
Respondent provides estimate of expected model runtime for execution of selected hydrodynamic and water quality model for new grid design for a 1-year simulation period.
Respondent chooses how to develop input files for re-calibration to 1994-1995 data sets. Respondent could choose to use SWEM input files and adapt as needed for input files for selected hydrodynamic/water quality model. Respondent could choose to collect raw data to re-develop input files needed for 1994-1995 conditions.
Respondent selects stations, including stations with vertical profiles (T, S, DO), for model re-calibration in LIS (East River, Narrows, western, central, eastern basins).
Respondent selects model skill assessment statistic(s) and proposes performance targets as criteria for model re-calibration.

Respondent chooses one embayment in CT and one embayment in LI to build two standalone embayment models as proof of concept for linkage to LIS domain. Respondent demonstrates that standalone embayment models can be developed with linkage to new model grid for LIS.
Respondent describes approach for pre and post-processing and tracking of mass flux components for model results.

Table 6- Respondent Requirements for Phase 2

Respondent Requirements
<i>Phase 2- Collect, compile data sets from secondary data sources needed to support model setup and execution of a continuous long-term simulation of the hydrodynamic and water quality model from 2003 - 2018. Long-term period includes years before/after attainment of 59% nitrogen reduction goal ca. 2016.</i>
Respondent identifies secondary data sources, collects, compiles, reviews available data from 2003-2018. Respondent selects and justifies sequence of 5-6 years to run model for confirmation (validation) of model re-calibrated to 1994-1995 data under Phase 1. Respondent specifies approach to be used to post-process model results for comparison to observed data and water quality target criteria for dissolved oxygen, hypoxia, water clarity, and phytoplankton biomass (as chlorophyll-a).
Respondent chooses embayments (CT + LI) that are embedded in LIS grid for model-data comparisons and skill assessment to confirm new LIS grid resolution provides accurate hydrodynamic and water quality model results. Respondent demonstrates model skill for two embayments that are represented in new model grid for LIS.
Respondent chooses how to perform sensitivity analysis, selects model parameters to be tested, and justifies approach.
Respondent documents data gaps identified under Phase 2 update of model. Respondent recommends new data collection efforts that would be used to support modeling efforts by NYC DEP under Phase 3.

H- TAC Review and Recommendations

Geographic Domain. Regional and local decision-making for water quality management and ecosystem restoration strategies is best achieved with evaluations of alternative management scenarios within a regional-scale, system-wide model framework. The system-wide framework should be capable of supporting nested linkages of the model from system-wide to regional scale domains and regional to local scale domains. As transport and mixing processes in Long Island Sound are linked to transport and mixing processes in New York Harbor and the continental shelf of the Middle Atlantic Bight, the system-wide domain of the new integrated model framework must include the coastal waters of the New York Bight from Nantucket Shoals to Cape May, NJ, the estuarine waters of Long Island Sound, the Peconic Estuary, New York Harbor, and coastal rivers of New York (Hudson River), Connecticut (e.g., Housatonic River) and New Jersey (e.g., Raritan River). Open ocean boundary conditions for the system-wide domain will be assigned along the eastern (Nantucket Shoals), southern (Cape May), and offshore shelf boundaries of the Middle Atlantic Bight (see Figure 5).

The regional-scale domain for Long Island Sound includes the East River, Harlem River, the Narrows, and the western, central and eastern basins. The regional-scale domain for New York Harbor includes the Hudson River, Upper and Lower Bay, Newark Bay, Passaic and Hackensack Rivers, Kill van Kull, Arthur Kill, Raritan Bay and Raritan River, Sandy Hook Bay, Shrewsbury and Navesink Rivers, and the Rahway and Elizabeth tidal rivers. The local-scale domain includes embayments of Long Island Sound (e.g., Manhasset Bay, Port Jefferson Harbor) and New York Harbor (e.g., Raritan Bay) and tidal rivers of Long Island Sound (e.g., Housatonic River) and New York Harbor (e.g., Navesink River).

Stakeholders. The new integrated modeling framework that will be used to support management decision-making at regional and local scales needs to be accessible to all Stakeholders including State, local, and Federal government agencies, the academic community, environmental advocacy organizations, regulated entities, and the general public. As the new Integrated Modeling Framework is developed, the process should include opportunities for stakeholders to be both briefed on the modeling effort at regular intervals, but also, where appropriate, that the process include the ability for Stakeholders to comment on assumptions and decisions that go into the new model. Although the details of the models are very technical, the new model development process should allow for periodic updates to Stakeholders, and allow them to comment and have their input be considered as part of the decision-making process. Inclusion of Stakeholders from the earliest stages of the new model development process has the potential to produce a better product with Stakeholders “buying in” when the need for developing acceptable management strategies arises.

Technical Advisory Committee and Model Evaluation Group. A fully-functioning, ongoing Technical Advisory Committee should be formed with sufficient funding to ensure that TAC members can commit enough time to be adequately involved with the model development process under Phase 1 and Phase 2. The TAC will provide an important advisory role over the several years that will be needed for development and testing of the new integrated model

framework. The specific charge to the TAC should be to follow the progress of the development of the new model framework, new monitoring and field efforts in order to identify any potential issues, review and comment on interim/final results/findings and conclusions, and to offer recommendations to enhance the scientific quality of the modeling effort. The TAC would also be asked to establish a framework for formal peer reviews, and to summarize issues for presentations and discussion at Stakeholder and public meetings. The TAC should be composed of experts who are well-respected for their expertise in watershed hydrology and runoff, hydrodynamics, sediment transport, water quality, and ecological resources.

NYC DEP should plan and budget for perhaps 4 TAC meetings per year for the duration of the project where the TAC members would have the opportunity to meet with the modeling team, NYC DEP, EPA and other state and local agencies. Perhaps once per year, an in-depth workshop/symposium could be convened to hear presentations by the modeling team, agency and academic scientists, and Stakeholders. TAC meeting locations could be rotated between NYC, LI, CT and NJ to encourage local participation.

In addition to periodic meetings with a Technical Advisory Committee during model development, the current TAC recommends that much stronger relationships should be established through periodic meetings between the modeling team and academic and agency scientific participants (field and laboratory) involved in monitoring programs in the CT, NJ, and NY watersheds, Long Island Sound, New York Harbor, and the New York Bight. This concept should be considered intrinsic to the development of the modeling framework through interactions between the modeling team, NYC DEP, other state and local agencies, the scientific community, and the ongoing TAC for the project. The potential issues identified after a cursory review of the sediment oxygen demand and Chlorophyll-a data during the past two months were notable with other questions raised that remain to be addressed.

The Model Evaluation Group (MEG) for the new integrated model of LIS and the larger system-wide region should be convened two times during the project: (1) near the end of Phase 1 and (2) near the end of Phase 2. The role of the MEG will be to provide an independent technical review of the data sources, development, calibration, validation, and applications of the new model framework as well as a review of any data analyses and syntheses that may be developed by the modeling team and other investigators involved in development of the new model. The MEG should be composed of experts who are well-respected for their expertise in watershed hydrology and runoff, hydrodynamics, sediment transport, water quality, and ecological resources. Membership of the MEG should reflect the regional scale of the system-wide model framework to foster integration of model development and application projects across the system-wide New York-New Jersey-Connecticut region. Outreach efforts to the scientific community are needed to ensure that key assumptions made for biogeochemical processes, interactions, or state variables can be backed up with site-specific data and/or lab or field experiments.

Target Criteria. Dissolved oxygen has been the primary focus of target criteria for water quality modeling endpoints for Long Island Sound. Metrics related to hypoxia have been quantified based on the interannual variability of the volume, area and duration of hypoxic conditions in Long Island Sound. Consideration of only hypoxia as a metric for evaluation of the effectiveness of management strategies is too narrow for the next generation model framework envisioned for Long Island Sound. As described in the technical guidance document prepared for the TAC review, the new model will be used to support assessments of future ecological conditions in Long Island Sound. Although hypoxia metrics are appropriate for the deep and stratified open waters of Long Island Sound, a metric based on hypoxia is not suitable for assessments of current and future conditions in shallow environments and coastal embayments of Long Island Sound.

In addition to a metric based on hypoxia, the TAC recommends that metrics based on comparison of observations and model results to water quality criteria for dissolved oxygen (i.e., area, volume, duration lower than target criteria) be considered for the next generation of models for Long Island Sound. The TAC also recommends consideration of other target criteria such as phytoplankton biomass (Chl-a) or water clarity and light availability to support restoration of shallow water habitats for submerged aquatic vegetation (SAV) or other ecological resources. Chlorophyll-a (phaeophytin corrected) measures living phytoplankton biomass and can be used as a target criteria for assessments of the trophic status of Long Island Sound and embayments. Water clarity, as measured with a secchi disk, is simple and easy to understand, but it provides Stakeholders with a very powerful metric to track water quality and ecological conditions either within an area of Long Island Sound over time or to develop comparisons of a water clarity metric across multiple areas of the Sound or embayments.

The Chesapeake Bay Program, for example, is currently implementing different target criteria for different habitats in the Bay. Other target criteria metrics, including phytoplankton biomass, SAV coverage, water clarity and light attenuation, and benthic resources such as oysters, can be important for evaluations of the effectiveness of management strategies to restore and maintain beneficial uses of the different types of waterbodies of Long Island Sound.

Data Availability. Data sets used for development of the model framework must be available and accessible to all parties, including regulated entities, involved in state, local, and federal decision-making that may be based on the outcomes of the model. Hydrodynamic and water quality models require a large amount of data to describe spatial distributions to specify initial conditions and time series to assign flow boundary conditions (coastal rivers, wastewater sources, stormwater/CSO discharges), atmospheric deposition of nutrients, and atmospheric, meteorological, and open ocean tidal forcing for model setup. Model calibration and model validation is dependent on the availability of hydrographic and water quality station observations located in Long Island Sound and other areas of the system-wide domain in the New York Bight and New York Harbor.

As one of the initial tasks in the development of the new integrated model of Long Island Sound, the 'discovery' of data available from secondary data sources should be performed and

documented in a task deliverable as a technical memorandum. The available data sets should be compiled as a comprehensive project database with a data inventory, station maps, and documentation of data availability. The data availability task should also include a descriptive analysis and synthesis of spatial, temporal, and vertical distributions of key hydrographic and water quality constituents in key areas of the Sound. Tetra Tech, under contract with EPA has completed discovery of LIS water quality data covering the years from 2006-2015. A data report summarizing the effort is found at http://longislandsoundstudy.net/wp-content/uploads/2016/02/Summary-for-Subtask-D-09-15-17_Final.pdf

As indicated in the technical guidance document (Tetra Tech, 2018, page 47 of 56), a review of available hydrographic and water quality data reveals that adequate data are available to support model setup, calibration, and validation of the new Long Island Sound model framework. Tetra Tech does, however, identify the lack of vertical profiles of temperature, salinity, and dissolved oxygen in data sets collected by several agencies and academic groups in Long Island Sound. Based on this perceived data gap, they recommend that future monitoring efforts collect vertical profiles of temperature, salinity, and dissolved oxygen.

As documented below, the assessment of an apparent data gap for vertical profiles in Long Island Sound is not supported by information provided by TAC member Professor Robert Wilson of Stony Brook University, SoMAS. There are two important observational data sets [CTD profiles of T, S, DO] that are available from (1) CT DEEP LIS which covers the entire Sound http://www.ct.gov/deep/cwp/view.asp?a=2719&q=325570&deepNav_GID=1654 and (2) IEC which covers the western Sound.

The CTD casts available from CT DEEP provide very high resolution and very high quality vertical profiles of temperature, salinity, and dissolved oxygen collected from 1991-present at stations shown in the CT DEEP monitoring program map (Figure 7). Prof. Wilson and his colleagues have all of the CT DEEP data sets which are well organized. At this time, the IEC data sets are not as well organized as the CT DEEP LIS data. A good overview of the hydrographic and water quality data available for the Sound is given in CTDEEP and IEC (2017). CTD station data (T, S, DO) and station data for salinity, temperature, dissolved oxygen, nutrients, and chlorophyll-a for Long Island Sound, New York Harbor and the New York Bight are also available from NOAA's NODC World Ocean Database 2013. A Fortran program is available from the Chair (Dr. Andy Stoddard) to read and extract station records from NOAA's NODC World Ocean database. <https://www.nodc.noaa.gov/OC5/SELECT/dbsearch/dbsearch.html>.

In the Proceedings of the 2015 Long Island Sound Water Quality Workshop held at the University of Connecticut Avery Point Campus, the following statements are made about data sharing, communication and collaboration.

"LISS does an excellent job of communicating scientific data to general audiences, both through the LISS website and environmental indicators programs, through internal efforts such as Sound Health, Protection and Progress, teacher workshops, and Report cards, and through collaborations with partner organizations (e.g., Save the Sound, Harbor Watch, etc.)."

However, our ability to synthesize data across multiple sources (e.g., CTDEEP, NEIWPCC/IEC, USGS, academic institutions, embayment monitoring programs), and participate in regional and national collaborations is limited by the lack of easy access to properly QA'ed, uniformly stored, and formatted data.

While some efforts have been made in the past to tackle aspects of this problem (e.g., LIS Sentinel Monitoring data clearinghouse effort, unification of the CTDEEP and NEIWPCC/IEC annual water quality monitoring report), a central data repository remains elusive, and should be a priority to maximize effectiveness of underway and planned projects such as the report card, advanced water quality instrumentation projects funded by NERACOOS and EPA, and any future embayment monitoring collaborative.

Improving access to data for researchers outside our region will also help to ensure that our data are used in synthetic research, which may help reveal additional insights into how to improve our ability to adaptively manage water quality."

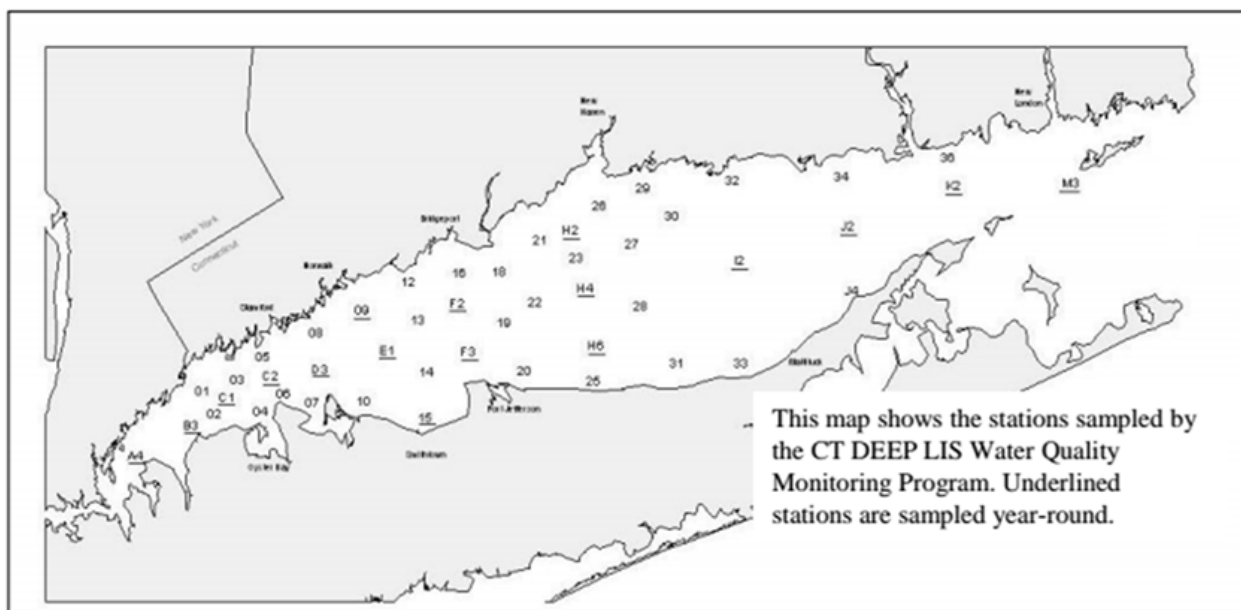


Figure 7- CT DEEP LIS Water Quality Monitoring Program station locations.

The UCONN Long Island Sound workshop recommended the following Potential Action Items: (a) implement a central data repository for water quality data; (b) eliminate barriers to participation in centralized data collection, storage and quality control initiatives; and (c) increase regional and national access and usage of LIS water quality data.

The TAC endorses the recommendation made at the workshop to establish a central data repository for water quality data collected in the region. The TAC also recommends that a new wheel not be re-invented.

One example of a new ‘wheel’ is the Ocean Data Evaluation System (ODES) that was developed by EPA in the mid-1980s to support the Clean Water Act’s 301(h) program to grant waivers for municipal wastewater discharges to marine waters. The ‘record last revised’ is dated December 2002 https://cfpub.epa.gov/si/si_public_record_report.cfm?dirEntryId=2790. When ODES was created, EPA had already established a successful central data repository called ‘STORET’ that was widely used by state, local, federal agencies, academic groups, and other data contributors. Managers of the 301(h) Program, however, perceived that coastal and estuarine data collected for ‘their’ program was unique enough to start from scratch to build a new central database that is now long forgotten.

Water Quality Portal

The TAC recommends that the **Water Quality Portal (WQP)** (Read et al., 2017) be considered as the central data repository (Figure 8) for all Long Island Sound, New York Harbor, New York Bight data collection efforts. The WQP (<http://www.waterqualitydata.us/>) was developed as a national (and international) database by the National Water Quality Monitoring Council (NWQMC), EPA, and the USGS to provide a single point of access to water quality data collected over the past century. The WQP provides access to EPA STORET, USGS NWIS, and USDA STEWARDS hydrographic and water quality data.

Water quality data archived in the WQP is organized by several ‘Characteristic Groups’. Hydrodynamic parameters such as water level, temperature, salinity, and velocity, for example would be stored in the ‘physical parameters’ group which also includes wind, incident light, total suspended solids, secchi depth, and discharge rate. Water quality parameters would be stored in several groups including inorganics (e.g., DO, pH, alkalinity), nutrients (N, P), organic parameters (e.g., organic carbon), biological parameters (e.g., Chl-a, periphyton), and microbiological parameters. Sediment bed parameters would be stored in the sediment group. A list of characteristic groups and associated parameters is available from <https://help.waterdata.usgs.gov/codes-and-parameters/parameters>.

As EPA requires that all water quality data collected under EPA contracts or grants be submitted to the WQP, some of the data collected for Long Island Sound has been archived in the WQP. Consideration of the WQP as a central database repository for Long Island Sound and system-wide data collection programs will address the frustration and recommendations discussed at the 2015 UCONN Workshop. Close collaboration among various monitoring groups will be needed to coordinate data collection, analytical methods, and data management efforts. All the regional data collection programs operated by NYC DEP, IEC, NEIWPCC, CT DEPP, NJ DEP, NYS DEC, and NOAA should be required to submit all monitoring data through EPA STORET-WQX to the WQP as a central repository for archiving data.

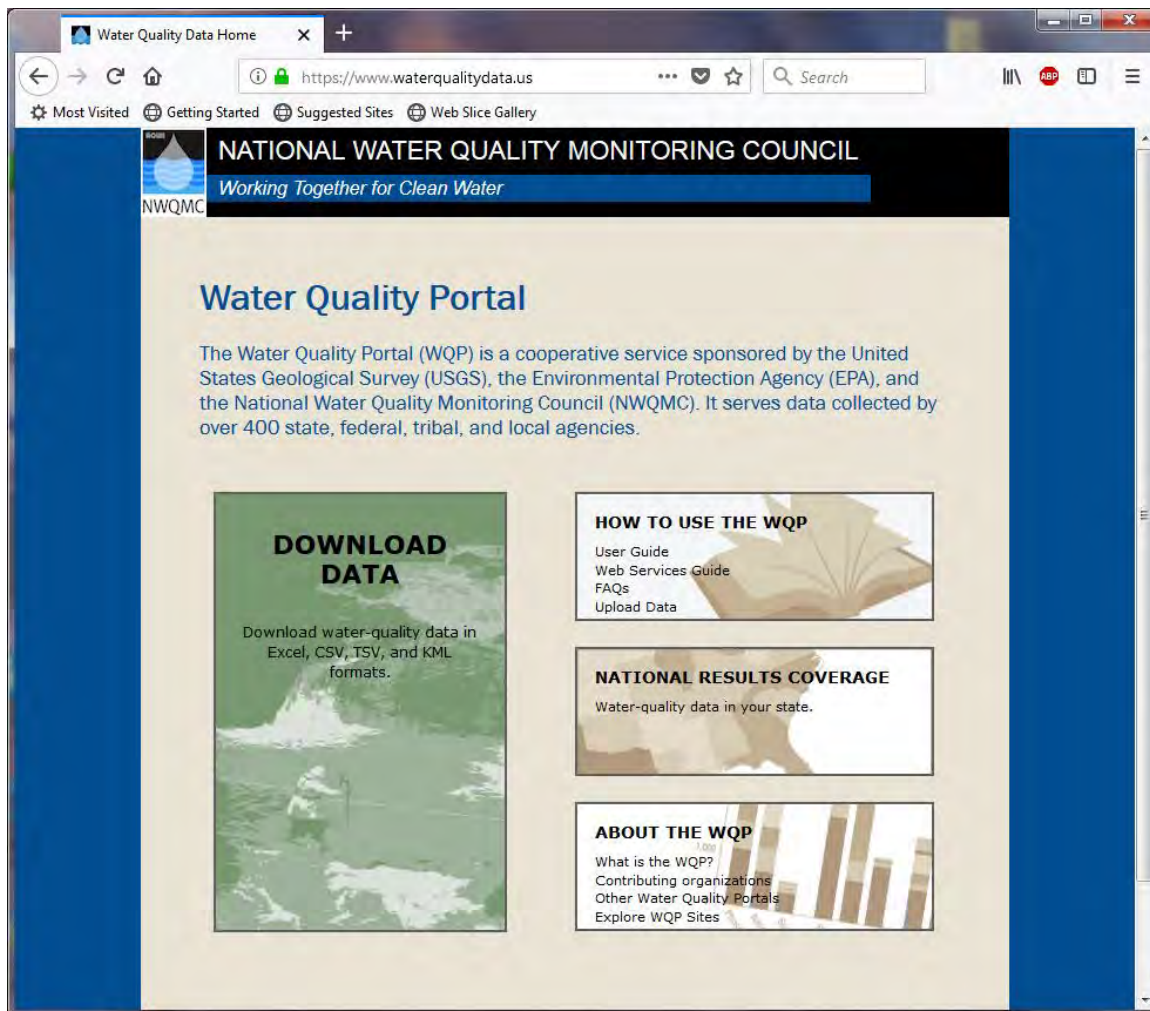


Figure 8- Water Quality Portal <https://www.waterqualitydata.us/>

The TAC recommends that NYC DEP invite representatives from the NWQMC, EPA and the USGS to present a briefing on the WQP to NYC DEP, EPA, NYS DEC, NJDEP, CTDEEP, IEC, interested academics and Stakeholders (e.g., NJ Harbor Discharge Group). The purpose of the meeting would be to gain a clear understanding of metadata, data entry procedures and how the WQP can support the goals and objectives for development of the new integrated modeling framework for LIS, New York Harbor and the New York Bight.

Although a Water Quality Portal Data Discovery Tool has been developed, the TAC recognizes that the tool does not provide the wide range of analytical products needed to support data analysis tasks (e.g., summary statistics) and related graphic products (e.g., time series or vertical profile plots) (<https://www.epa.gov/waterdata/water-quality-portal-data-discovery-tool>). Data analysis tools, however, can be developed either as new tools, or existing tools can be modified as needed, to import the data structure used by the WQP. An advantage of using the WQP as a

central data repository is that any data analysis tools designed by the New York Harbor, Long Island Sound, New York Bight community of modelers, researchers, scientists, stakeholders, etc. can also be used for any other geographic setting. This standardized approach was used to design data analysis tools to extract data records from numerous secondary data sources that had been compiled with a standard data structure into a large historical database of hydrographic and water quality data for the New York Bight. The data analysis tool was applied to retrospective assessments of observations of nutrients, eutrophication, and hypoxia in the New York Bight (Stoddard et al., 1986) and post-processing of simulation results obtained with a biogeochemical model of the 1976 anoxic event (Stoddard, 1988, 1990).

In addition to a central data repository for surface water data, the TAC recommends that central data repositories should also be considered as warehouses for GIS data sets (shoreline, bathymetric, and topographic data, locations of wastewater, stormwater and CSO outfalls), meteorological forcing, and other data types used for model development and other purposes.

Thematic Real-time Environmental Distributed Data Services server (THREDDS)

The Thematic Real-time Environmental Distributed Data Services server (THREDDS) is an open access data server designed to facilitate data exchange among user communities. An online THREDDS Data Server (<http://colossus.dl.stevens-tech.edu/thredds/catalog.html>) was set up to serve the NYHOPS model's results in oceanographic NetCDF format over the web using the OPENDAP protocol, enabling open access to daily averaged or monthly averaged time series for all the gridded hindcast physical variables in or over the NYHOPS region (including LIS and NYNJH). Simulated climatologies (mean simulated climate conditions averaged over the three decades of the NYHOPS hindcast period) for two- and three-dimensional fields such as water temperatures and salinities, were also generated, and included in THREDDS (Georgas et al., 2016).

Wilkin and Hunter (2013) performed an extensive skill assessment of several real-time Mid-Atlantic Bight hydrodynamic models including the NYHOPS model. *"The adoption of THREDDS and CDM (Common Data Model) standards by most of the groups archiving these data greatly facilitated this project by enabling us to use software tools developed for interoperability of CDM formatted data to access the output of several diverse models with minimal code customization."*

The TAC recommends that NYC DEP, EPA, NYS DEC, NJDEP, CTDEEP, and IEC convene a meeting with invited regional experts who are knowledgeable about open access data sharing within the oceanographic community. Based on a cursory review of the literature (and without the TAC Chair's personal knowledge of the open access tools available for data sharing), it appears that open access tools (like THREDDS and CDM) could provide a huge benefit for open sharing of observational data and results generated with the new integrated model.

Existing Data and Data Gaps. In the course of our review, TAC members identified several types of data that would be very useful to support development of the new integrated model for Long Island Sound. These data types are either not available for Long Island Sound or, if data

are available, the data sets are considered to be sparse in either geographic coverage and/or time. The TAC recognizes that new data collection efforts will not be included in the RFP for development of the new model framework. The TAC recommendations presented below are, therefore, presented to advise EPA, NYC DEP, NYSDEC, NJDEP, IEC, NEIWPCC, and CTDEEP of types of data that should be collected under a separate funding mechanism to support the new modeling efforts.

A data set for sediment oxygen demand and benthic nutrient fluxes was collected in 1994-1995 to support development of the existing SWEM water quality model (HydroQual, 2001). Sediment oxygen demand and benthic nutrient fluxes are available from surveys performed by Dr. Jonathan Garber of University of Maryland (Garber et al., 1990), Dr. Brian Howes of WHOI (Howes et al., 1997) and Normandeau Associates (1994, 1995) to support development of models of the Peconic Estuary (Tetra Tech, 1999) and Norwalk Harbor (Tetra Tech, 1995). More recent benthic flux studies in the Long Island Sound region have been performed by Balcom et al. (2007), the Fulweiler laboratory at Boston University (<https://www.fulweilerlab.com/long-island-sound-benthic-fluxes.html>), the Tobias laboratory at the University of Connecticut (<https://tobias.lab.uconn.edu/current-projects/>), and the Altabet laboratory at the University of Massachusetts (http://webserver.smast.umassd.edu/lab_altabet/).

Recent findings of SOD and nutrient cycling in sediments were presented by Fulweiler, Tobias and Altabet at the February 2018 LISS STAC meeting. Minutes from the meeting summarize the three presentations which included actual *in-situ* studies <http://longislandsoundstudy.net/wp-content/uploads/2014/09/STAC-meeting-summary-2.23.18.pdf>

Sediment bed data is used to setup initial conditions and to calibrate and validate the sediment flux model. Sediment bed organic matter content, porewater concentration, and sediment type varies across Long Island Sound and the larger system-wide region. Within Long Island Sound, harbors, nearshore areas of the Sound, and the western basin are likely to have the highest organic content in the sediment bed because of external loading and longer residence times of depositional areas. It is possible that the long history of high BOD and organic matter loading from East River wastewater dischargers may have resulted in a sub-surface profile of organic carbon in the Narrows and western basin of the Sound that may be much higher than other areas of the Sound. Sediment bed surveys in Long Island Sound (Figure 9) and the Middle Atlantic Bight (Figure 10) have been compiled as part of a world-wide investigation of sediment bed properties by Premuzic (1980). Sediment bed carbon and nitrogen data compiled by Hathaway (1971) for the WHOI CONMAR program are available from <https://darchive.mblwhoilibrary.org/handle/1912/2293>. A Fortran program is available from the Chair (Dr. Andy Stoddard) to read and extract sediment bed data from this archive.

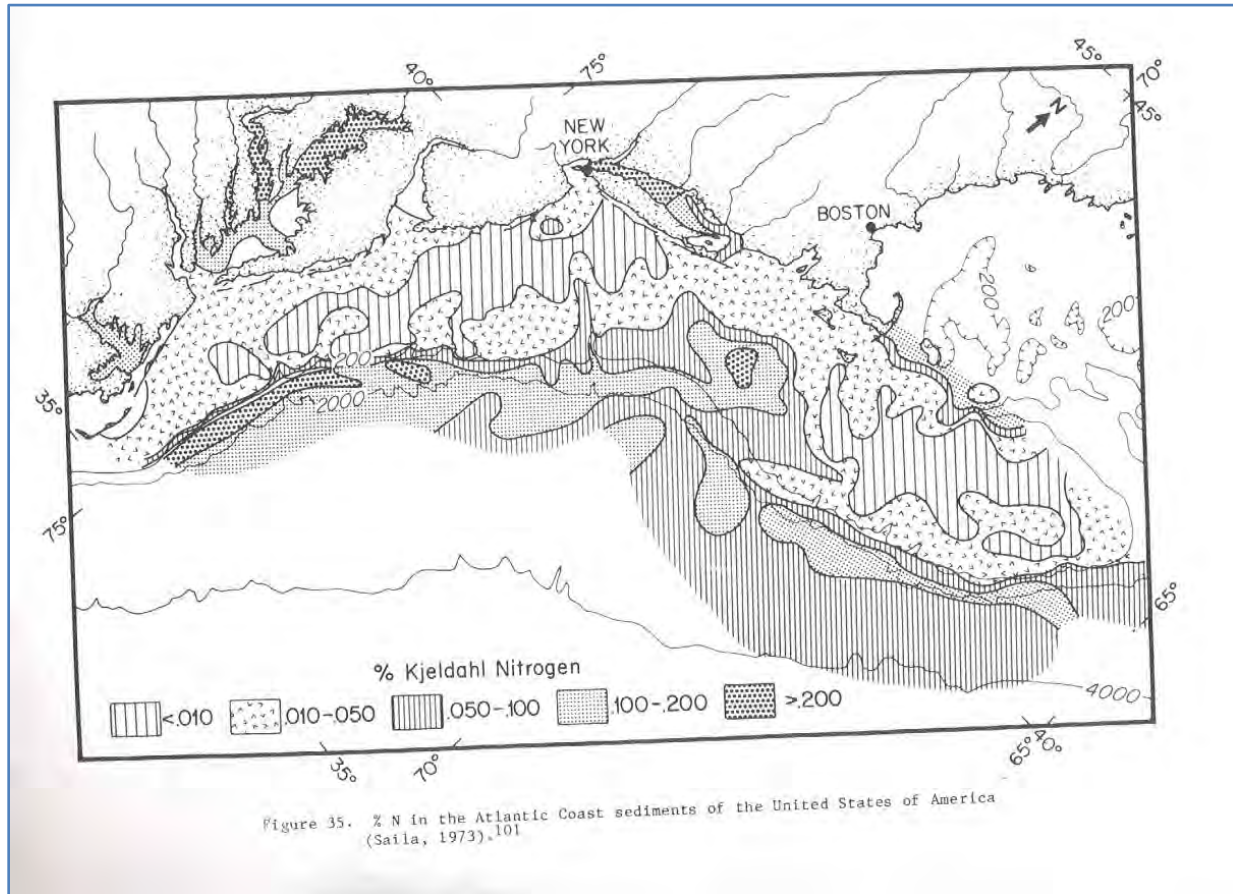


Figure 9- % Nitrogen in sediment bed of Middle Atlantic Bight and Long Island Sound. Source: Saila (1973) from Premuzic (1980).

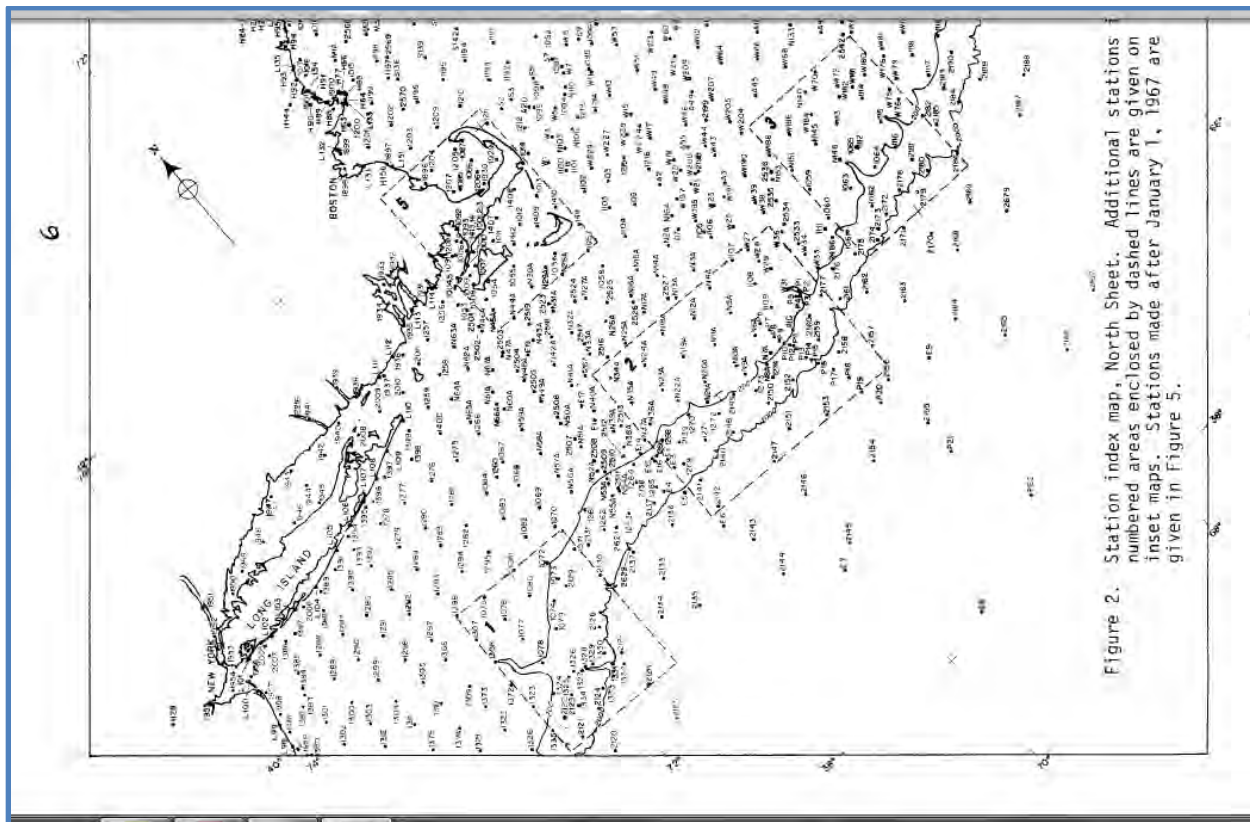


Figure 10- Station locations for WHOI CONMAR sediment bed characterization of carbon and nitrogen content. Source: Hathaway (1971).

The TAC recommends a literature review and synthesis of SOD, benthic nutrient flux, sediment bed and sediment core data to describe historic and contemporary availability of sediment bed organic content, porewater nutrients, and sediment type/grain size. Sediment bed data is needed to setup initial conditions and compile calibration and validation data for the sediment transport and sediment flux models.

The water quality model for dissolved oxygen accounts for euphotic zone primary productivity, respiration of living phytoplankton and mineralization of detritus throughout the water column, and sediment oxygen demand in the near bottom layer. Process oriented field studies and experiments have been performed in Long Island Sound (McCardell and O'Donnell, 2014; Goebel et al., 2006; Collins et al., 2013) and the data are available to support model development.

As funding is available, new field studies are recommended by the TAC to support development of the new integrated model framework for the Sound. *In situ* measurements are recommended to obtain process data to characterize primary productivity in the euphotic zone and respiration (phytoplankton + detrital decomposition) within the euphotic layer, pycnocline

layer, and near bottom layer. Ideally, benthic flux measurements would also be obtained at each station location to define sediment oxygen demand and benthic nutrient fluxes.

The TAC recommends that key academic and agency scientists from the LIS, NY Harbor, NY Bight region be invited to scope out the level of effort and cost associated with implementation of these recommendations for future field work. New field studies could be planned, funding obtained and initiated during the interim period before a contract is finalized by NYC DEP to begin work on the new integrated model.

Other ongoing, or recently completed, studies funded by EPA Long Island Sound Study address various aspects of transport and fate processes that influence carbon and nutrients in the Sound. A recent LISS funded project, *Nutrient and Carbon Fluxes Through Long Island Sound, Linking River Sources to Impacted Areas. Principal Investigators: Michael Whitney and Penny Vlahos, University of Connecticut*, will study sources, movement, and fates of carbon and nutrients, as well as their flow from wastewater treatment plants, to understand the input from river sources and impacted areas. This project is expected to help determine the nature of nutrient and carbon sources and whether certain locations in the Sound can store carbon. Three other LISS funded projects include evaluations of sediment and water column biogeochemical processes involving nitrogen loss and recycling in Long Island Sound <http://longislandsoundstudy.net/research-monitoring/lis-research-grant-program/2015-research-project-descriptions/>. While data from these and other ongoing research projects in the Sound may not be available now (June 2018), the data sets and findings of the research will become available in the next few years during development of the new integrated system-wide model framework for Long island Sound.

In response to the question about potential changes of the nutrient uptake behaviors of phytoplankton after nitrogen loading reduction, the TAC commented that the behavior of individual phytoplankton groups is not likely to change due to nutrient reduction alone. It is more likely that the relative abundance of different phytoplankton classes, and the seasonal succession of those different classes, will change due to nutrient reduction. With this question in mind, the TAC recommends, as funding is available, that laboratory experiments be conducted to directly measure the response of LIS phytoplankton to conditions for nutrient and light limitation. Laboratory microcosms containing samples of the natural phytoplankton assemblage in LIS would be subjected in the lab to various levels of nutrients and light availability, with carbon fixation, respiration, and nutrient uptake measurements collected over the course of the experiments. Samples from different seasons should be collected and analyzed to evaluate the effect of seasonal succession in the dominant algal groups. Experiments such as these can provide insight into the nutrient levels at which significant reduction in phytoplankton uptake will begin, and can provide some guidance as to appropriate choices of parameter values for half-saturation constants for nitrogen, phosphorus and silica for use in the new integrated model framework.

In the technical guidance document for the Long Island Sound model, Tetra Tech (2018, page 41 of 56) reminds the reader that data to assign model input for many model state variables are

not directly obtained by measurements of water samples but rather are estimated from direct observations and stoichiometric relationships. As an example, direct measurements of CBOD5 are often available from discharge monitoring reports submitted by wastewater facilities while measurements of Total Organic Carbon (TOC) may be available from coastal rivers discharging into the Sound. The water quality model however represents TOC as four state variables derived from the dissolved (DOC) and particulate (POC) forms that are in turn split into refractory (very slow decay) and labile (fast decay) fractions. Stoichiometric relationships, although available from the literature for a variety of waterbodies, are desirable to obtain for site-specific studies. For the example described above, stoichiometric coefficients are needed to transform wastewater CBOD5 measurements to TOC and DOC:TOC and POC:TOC ratios are needed to assign DOC and POC concentrations. Finally labile and refractory splits are needed to assign the four state variables as the labile and refractory forms of DOC and POC.

Although paired data sets were collected to support derivation of stoichiometric coefficients for use in the existing SWEM framework, the TAC recommends new data collection efforts be implemented from time to time to obtain additional paired measurements of TOC, POC, DOC, CBOD5, CBODU (long-term CBOD), Chl-a (phaeophytin corrected), total suspended solids (TSS), non-volatile (inorganic) suspended solids (NVSS), and volatile (organic) suspended solids (VSS). Paired measurements can be used to support derivation of stoichiometric coefficients including C:Chl, CBODU:CBOD5, DOC:CBODU, DOC:TOC, POC:TOC, VSS:TSS, and POC:VSS (Carbon: Dry Weight) to characterize tributary inflows, wastewater discharges, stormwater and CSO discharges, and open waters and embayments of Long Island Sound. Implementation of new monitoring efforts to collect new paired data sets would require approval of a QAPP and analytical measurements performed by Environmental Laboratory Approval Program (ELAP) certified labs for ELAP parameters.

EPA has been reviewing internally the different methods used to measure Chl-a. The Interstate Environmental Commission now uses the acidification technique for acetone extracted chlorophyll to estimate phaeophytin corrected Chl-a while the CTDEEP uses a non-acidification technique. This method is based upon EPA Methods 445.0, 446.0, and other published methods for the measurement of Chl-a in environmental samples (Arar 1997, Arar and Collins 1997, Welschmeyer, 1994). This method describes a non-acidification procedure for the extraction and determination of Chl-a in fresh and marine water using fluorescence. The fluorometer is equipped with a modified optical kit utilizing narrow bandpass excitation and emission filters. This allows the accurate detection of Chl-a without interference or contributions from pheopigments, chlorophyll-b, and chlorophyll-c, thereby making acidification unnecessary. CTDEEP then “corrects” the vertical water column profile of chlorophyll measured by a CTD fluorometer. CTDEEP does this by using their filtered water samples from that day, analyzed for chlorophyll via the extraction method, to post-correct the CTD fluorometer measurement. This calibrates the CTD fluorometer, as the standard (i.e., fluorescein dye) is not a very good approximation of the variations in the chlorophyll content of the phytoplankton community. The recommendation to use corrected Chl-a still stands, but NYC DEP, EPA, NYSDEC, NJDEP, and CTDEEP should not confuse the acidification technique as the only means to obtain corrected Chl-a measurements that can be reliably used for comparison to water quality model results.

The TAC recommends that EPA, NYC DEP, NJDEP, NYSDEC, CTDEEP, Tetra Tech and other concerned parties work together to ensure that the methods used to estimate chlorophyll-a by different groups are understood and properly interpreted. As close collaboration among various monitoring groups will be needed to coordinate data collection, analytical methods, and data management efforts, this recommendation will also apply to any other monitoring data used to support the modeling effort that is collected and analyzed by a variety of groups under different protocols.

Model Skill Assessment. Model performance or skill assessment of the hydrodynamic and water quality model is not discussed in the technical guidance document (Tetra Tech, 2018). As a product of surface water modeling studies, model versus observation plots are presented to visually and qualitatively demonstrate how well the model compares to observations. Quantitative comparisons based on statistical analyses are, however, needed, to rigorously answer the manager's question "How good is the model and how well does the model compare to the observations?"

Model performance (or skill assessment) is often evaluated using a "weight of evidence" approach that has been adopted for many water quality models (Donigian and Imhoff 2009). This approach includes visual inspection of model-data plots (e.g., station time series) and calculation and analysis of model-data performance statistics. The "weight of evidence" approach recognizes that, as a numerical model approximation of a waterbody like Long Island Sound, perfect agreement between observed data and model results is not expected and model performance statistics are used, not as absolute criteria for acceptance of the model, but rather, as guidelines to supplement visual assessments of model-data plots to determine "how good is the model and how well does the model compare to the observations?" The "weight of evidence" approach thus acknowledges the approximate nature of a coastal/estuarine model and the inherent uncertainties in input data, observed data, and the numerical values assigned during model calibration for model coefficients.

Numerous statistical methods are available for analyzing and summarizing model performance and model skill. There is no consensus, however, about a specific set of statistical measures to judge model skill. Ji (2017) and Fitzpatrick (2009) present overviews of several statistical methodologies, such as RMS Error, Relative Error, %Relative Error, Nash-Sutcliffe, that have been applied to demonstrate model skill assessments. Zhang et al. (2010) present model skill assessment methods used by NOAA NOS to evaluate hydrodynamic model forecasting for operational application in the nation's ports and harbors. As examples of model skill, model performance data was compiled from the literature for 153 water quality modeling studies for water temperature, dissolved oxygen, nutrients, and chlorophyll-a (Ahrendtis and Brett, 2004). Model performance targets could also be defined and evaluated following the basic logic developed for skill assessment of Chesapeake Bay models (Friedrichs, 2013) using target diagrams that map Bias and Root Mean Square Difference for skill assessment of relevant parameters for coupled hydrodynamic and water quality models (Jolliff et al. ,2009).

It is crucial that scientifically credible models with quantitatively demonstrated model skill be used to support management decision-making for Long Island Sound and the larger system-wide domain of the New York Bight and New York Harbor. The respondent's proposed approach for model skill assessment must be incorporated in the modeling Quality Assurance Project Plan (QAPP) prepared for the new model framework (EPA, 2002). Model skill assessment must be required as tasks for development of the hydrodynamic and water quality models incorporated in the new integrated model framework. The respondent should be required to identify the statistical method(s) and model performance targets that will be used to demonstrate model skill assessment.

Hydrodynamic Model. As described in Section B, the TAC recommends that Objective #2 be revised as follows:

Objective #2- Create a three-dimensional hydrodynamic model with sufficient spatial resolution, including coastal embayments and tidal rivers, which represents complex bathymetry accurately and is capable of simulating significant physical characteristics and processes, including open water seasonal stratification, in LIS waters.

An accurate hydrodynamic simulation of horizontal/vertical transport and mixing processes is of primary importance for the simulation of vertical mixing and the onset and persistence of stratification in Long Island Sound. The hydrodynamic model must accurately simulate transport and mixing processes and seasonal vertical stratification at the spatial scale and goodness-of-fit necessary to accurately simulate water level, water temperature, salinity and density in Long Island Sound and throughout the larger system-wide domain of New York Harbor and the New York Bight.

As the first step for the development of the new hydrodynamic model of Long Island Sound within the larger system-wide domain of the New York Bight and New York Harbor, a new computational grid must be designed, developed and tested. One of the weaknesses of the current SWEM framework is the relatively coarse resolution of the model grid for Long Island Sound, particularly in the Narrows and the western basin. O'Donnell et al. (2010, 2014) concluded that one of the main reasons that the SWEM framework is not able to simulate dissolved oxygen and hypoxia accurately is because of the coarse resolution grid that induces numerical mixing that does not result in an accurate simulation of the onset and persistence of summer stratification. Besides, a coarse grid model cannot accurately simulate lateral circulation caused by wind forcing which is important for simulation of the vertical distribution of dissolved oxygen (Scully, 2013). The existing SWEM grid also does not adequately characterize the areal coverage of embayments and tidal rivers of Long Island Sound. In the new integrated model, the water quality and ecological response of the embayments to actual nutrient loading and management scenarios for nutrient controls will become important for local-scale analyses and evaluations of the effectiveness of local management options. As embayments and tidal rivers can be shallow, especially at low tide, the hydrodynamic model needs to be able to represent wetting and drying of shallow grid cells.

Bathymetry used for the existing SWEM computational grid was based on data available 20 years ago. More recent bathymetry data available from NOAA NOS, the USACE and other data sources is most likely adequate for development of a new grid for Long Island Sound and the larger system-wide domain. NOAA is currently conducting an extensive seafloor mapping initiative in Long Island Sound that will provide bathymetry data, benthic habitat maps, sediment texture and grain size, sedimentary environments (erosion, deposition), and physical and chemical data (T,S, DO, and bottom stress) (Figure 11). The project team will use a central data management system to facilitate storage and transfer of information during the project. As data sets are finalized, they will be archived in repositories such as NOAA's National Geophysical Data Center. Academic teams involved in this project include the University of Connecticut and Columbia University Lamont Doherty Lab. The Long Island Sound data portal (<http://www.marine-geo.org/portals/lis/>) and the NOAA website for the mapping initiative provide more information <https://coastalscience.noaa.gov/project/mapping-long-island-sound-seafloor/>. Publications describing the project include the LISS Newsletter (2013) and Battista and O'Brien (2012). Datasets available for Phase 1 (central basin), Phase 2 (eastern basin) and Phase 3 (western basin) are available for download at the following links:

Download: [Bathymetry and acoustic backscatter collected in Long Island Sound for the Phase I Long Island Sound Seafloor Mapping Project 2014 \(NCEI Accession 0167946\)](#)

Download: [Bathymetry, acoustic backscatter, and LiDAR data collected in Long Island Sound for the Phase II Long Island Sound Seafloor Mapping Project 2015 \(NCEI Accession 0167531\)](#)

Download: [Bathymetry and acoustic backscatter data collected in Long Island Sound for the Phase III Long Island Sound Seafloor Mapping Project 2015 \(NCEI Accession 0167532\)](#)

With development of a new grid for Long Island Sound and the larger system-wide domain, calibration and validation of the hydrodynamic model must be confirmed for water level, density, salinity, temperature, and vertical mixing. Model-data plots should be presented as time series plots, spatial transects, vertical profiles, and contour maps. Accurate simulation of stratification by the hydrodynamic model should be confirmed by comparison of observed and simulated Δ (surface – bottom) differences for salinity (ΔS), water temperature (ΔT), density ($\Delta \rho$) and the thickness of the pycnocline. The TAC also notes that the vertical resolution of grid layers within the pycnocline layer may be critical for accurate simulation of the onset and persistence of stratification. In addition to model-data plots and maps, model performance should be demonstrated quantitatively with various statistical approaches for model skill assessment (e.g., Fitzpatrick, 2009, Jolliff et al., 2009, Zhang et al., 2010).

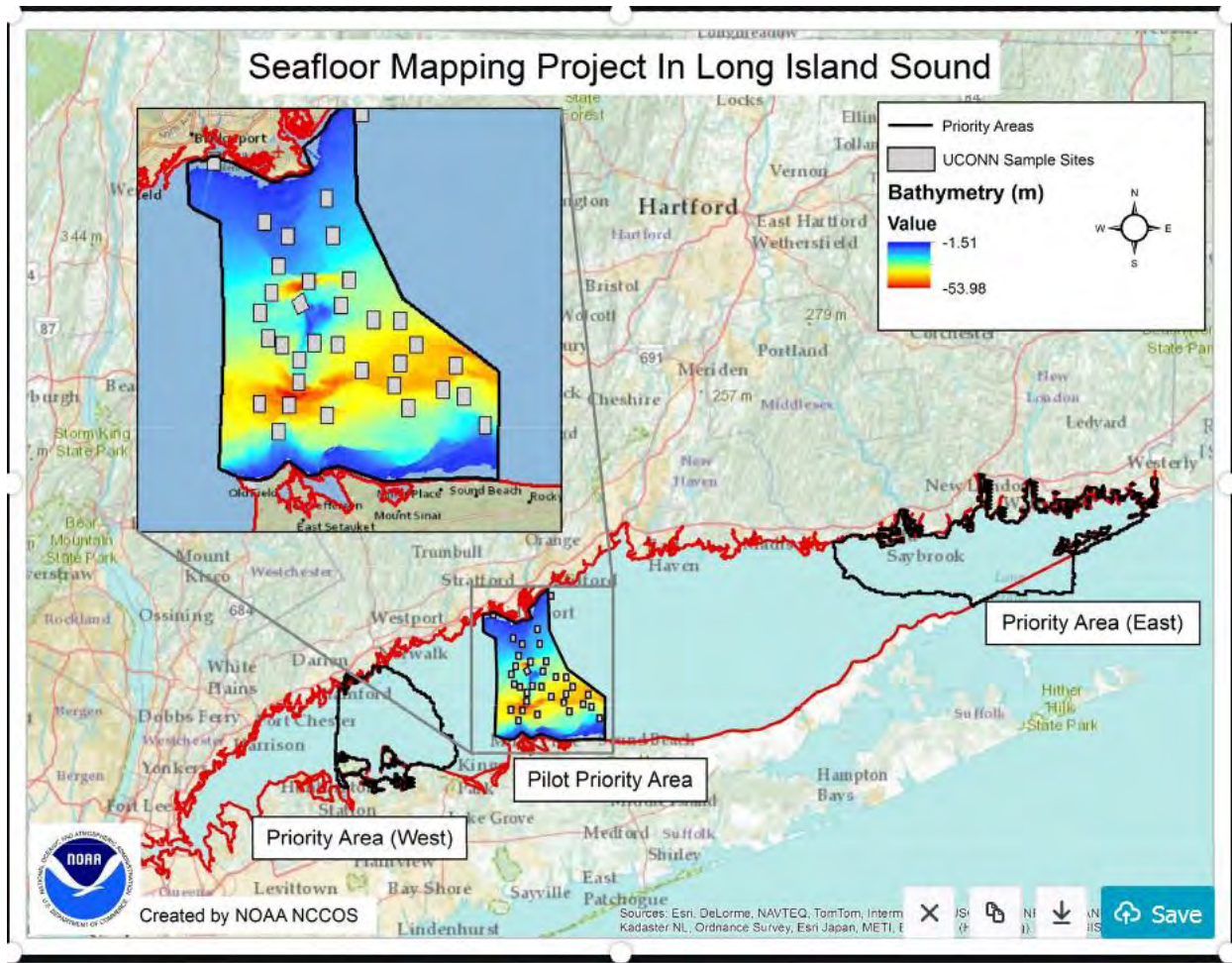


Figure 11- Seafloor Mapping Project in Long Island Sound. Source: <https://coastalscience.noaa.gov/project/mapping-long-island-sound-seafloor/>.

Researchers at the University of Connecticut Marine Sciences performed a detailed independent evaluation of the SWEM model (O'Donnell et al., 2010, 2014) with the original data collected in 1988-1989 and 1994-1995 to develop SWEM and new data sets collected from 1999-2002. Based on data collected in June 2006 and a new method designed to estimate vertical mixing (McCardell and O'Donnell, 2009), O'Donnell et al. (2010) concluded that the ECOM model provided a reasonable hydrodynamic simulation of vertical mixing processes in Long Island Sound. They did note, however, that the hydrodynamic model often failed to reproduce the vertical temperature and salinity structure and did not properly capture surface/bottom density gradients. They recommended that future efforts be directed towards improving the hydrodynamic model comparison with observations in Long Island Sound and the East River. O'Donnell et al. (2014) used a high resolution FVCOM hydrodynamic model of LIS (O'Donnell, 2012) that was shown to provide a reasonable representation of circulation and patterns of flow in different areas of the Sound. The FVCOM model was used to evaluate the

effect of wind-forcing on differences in cross-Sound (lateral) flow. The fine-scale wind-driven cross-Sound flow simulated with the high-resolution FVCOM model, particularly near the bottom, could be significant but was not represented in the coarser resolution ECOM hydrodynamic model used in SWEM. One of the recommendations of O'Donnell et al. (2014) was to develop a finer horizontal resolution grid for Long Island Sound to reduce the effect of numerical dispersion on vertical mixing and to improve the hydrodynamic simulation of cross-Sound (lateral) transport of water as a response to wind forcing.

The effect of differences in horizontal grid resolution on vertical mixing was documented by Ralston et al. (2017) with an FVCOM hydrodynamic model of the Connecticut River estuary. The investigators used a fine grid model with a horizontal resolution of 0.015 km and a coarse grid model with a resolution of 0.45 km. The fine grid and coarse grid models were both represented with either 30 or 40 sigma layers in the vertical domain. Numerical experiments showed that the finer scale grid resolution minimized numerical dispersion and improved the hydrodynamic simulation of vertical mixing and stratification. HDR performed similar numerical experiments with the SWEM ECOM hydrodynamic model for Western Long Island Sound that showed increased thermal stratification.

A finer resolution grid in Long Island Sound, particularly in the Narrows and the Western Basin, with increased horizontal resolution would improve representation of horizontal exchange flows, lateral circulation, and improve the simulation of vertical mixing processes by reducing numerical diffusion. Hydrodynamic modeling of exchange flow, stratification, and vertical mixing simulated with a finer resolution grid could be tested with western Long Island Sound data (Fibrance et al., 2013; McCardell and O'Donnell, 2016)

The technical guidance document (Tetra Tech, 2018, pages 19-26) discusses at length the options for representing the vertical domain of the model with the sigma-grid, z-grid, and pseudo-z-grid vertical coordinate schemes as alternative approaches to obtain accurate simulations of vertical mixing and stratification in Long Island Sound. The technical guidance document (page 29) also discusses the options for external and internal linkage of the hydrodynamic model with the water quality model.

The advantages and disadvantages of the vertical grid options are debatable among physical oceanographers and there are advantages to using both internal and external linkage of a hydrodynamic model with a water quality model. The TAC strongly recommends that the selection of a vertical grid scheme and the choice to use either internal or external linkage of the hydrodynamic model with the water quality model should be left up to each team that responds to the RFP. Each respondent team should also be asked to describe their methodology and technical approach to address the identified weaknesses of the existing SWEM model to accurately simulate vertical mixing, and the onset and persistence of stratification that results in hypoxia in Western Long Island Sound.

With refinement of the resolution of the grid for Long Island Sound, the volume and area of coastal embayments and tidal rivers need to be explicitly included in the finer grid domain with a spatial resolution sufficient to correctly maintain the water volume and mass balance that is

driven by tidal exchange between the embayment/tidal river and the open water of the Sound to facilitate the need of developing fine-scale nested grid model for these embayment. As described in Section C and shown in Figure 3, the East River Tributary Model (ERTM) was developed for NYC DEP as a nested grid model of the SWEM to provide a finer resolution grid for Flushing Bay and other embayments and tidal creeks/rivers such as Newton Creek and the Hutchinson River.

In shallow embayments, hydrodynamic processes can be affected via bottom friction from SAV beds. For an embayment model that includes SAV as a component of the water quality model, internal linkage between the hydrodynamic model and the water quality model that accounts for SAV will directly feedback the velocity response to the friction effect from SAV beds. External linkage of the hydrodynamic and water quality model, however, would not provide direct feedback of the SAV friction effect to the hydrodynamic model. A methodology, such as specification of vegetation resistance as a friction term in the hydrodynamic model, would be required to parameterize the effect of SAV beds on bottom friction in a shallow embayment. The approach to be used to represent the friction effect of SAV beds in the hydrodynamic model needs to be considered and proposed by each team responding to the RFP.

The TAC recommends that a Sensitivity Analysis of the hydrodynamic model be performed when calibration and validation of the hydrodynamic model is completed before work begins on development and calibration of the water quality model. Who knows what the team might learn from a well-designed sensitivity analysis of the hydrodynamic model that, in turn, could impact the water quality model results?

Water Quality Model. As described in Section B, the TAC recommends that Objective #1 be revised as follows:

Objective #1- Model eutrophication processes to accurately capture dissolved oxygen, phytoplankton, organic carbon, and nutrient distributions in the LIS and to provide accurate parameters to support future ecological assessments and models.

An accurate simulation of biogeochemical processes and interactions is of primary importance for modeling organic carbon, dissolved oxygen, eutrophication, nutrient cycles and the onset and persistence of hypoxic conditions in Long Island Sound. The water quality model must be designed and developed to account for the linkage of physical transport and mixing with biogeochemical processes at the spatial scale and goodness-of-fit necessary to accurately simulate dissolved oxygen, hypoxia, nutrients, organic carbon, and eutrophication processes in Long Island Sound and throughout the larger system-wide domain of New York Harbor and the New York Bight.

The interactions of external loading of nutrients, sediment, and organic matter with physical transport processes with biogeochemical processes/interactions over the large system-wide domain of the New York Bight, New York Harbor and Long Island Sound is complex. The RFP should require that respondents demonstrate their understanding of this coastal and estuarine system with a conceptual model description of key physical and biogeochemical processes that

control dissolved oxygen and hypoxia in Long Island Sound. Prior to building the water quality model, a conceptual model is needed to clearly identify how the system-wide spatial domain, external forcing, and physical and biogeochemical processes interact to control transport, mixing, the onset and persistence of stratification, and spatial/vertical/seasonal patterns of dissolved oxygen, hypoxia, eutrophication/chlorophyll-a, organic carbon, water clarity, and nutrient cycling in LIS.

Calibration and validation of the water quality model should be confirmed for dissolved oxygen concentration and percent saturation, inorganic sediment, nutrients, organic carbon, and phytoplankton biomass. Model-data plots should be presented as time series plots, spatial transects, vertical profiles, and contour maps. Quantitative evaluation of primary production, respiration, and net ecosystem metabolism together with SOD and bottom nutrient fluxes should be conducted. In addition to model-data plots and maps, model performance should be demonstrated quantitatively with statistical approaches for model skill assessment (e.g., Fitzpatrick, 2009, Jolliff et al., 2009, Zhang et al., 2010).

Watershed Loading

As described above in Section C, watershed hydrology and loading data is input to the existing SWEM framework as external flow boundary conditions. Freshwater inputs include coastal rivers, nonpoint source runoff, municipal and industrial wastewater discharges, and stormwater (MS4) and CSO outfalls. Flow and loading data compiled for the SWEM framework included: 34 coastal rivers entering the model at 28 locations, 99 wastewater facilities, more than 1,700 stormwater and CSO outfalls captured in runoff model outputs spatially aggregated to align with the SWEM grid. All loads to SWEM are presented in the Sub-task 10.2 report prepared by HydroQual (2001). Coastal river discharge and loading data were compiled from the network of USGS gage network and flow-concentration relationships. Wastewater discharge and loading data were compiled from Discharge Monitoring Reports, operational records, and effluent concentration measurements collected specifically for modeling purposes during the 1994-95 monitoring program that supported SWEM.

Landside urban runoff models used to setup stormwater and CSO model input included InfoWorks, XP-SWMM, and RRMP. NYC DEP used InfoWorks to model the city-wide drainage network of stormwater and CSO outfalls and RAINMAN was the tool used to assemble data from InfoWorks, SWMM and RRMP urban runoff models. In the two decades of intervening time since SWEM was developed, a lot more work has been done by NYCDEP and other urban CSO communities to improve their watershed models with CSO Long Term Control Plans and MS4 programs as regulatory drivers. Groundwater modeling has also advanced around the Long Island Sound region.

Successful linkage of the hydrodynamic and water quality model to watershed hydrology and external loading data is a critical component of the overall model framework. All evaluations of management alternatives, including projections of future environmental conditions such as climate change and warmer temperature conditions, will require changes to represent external flow and loading. There are numerous watershed loading models of varying complexity that

are presently available (e.g., HSPF, SWAT, etc.) and have been applied in the NY-NJ-CT region and other large coastal watersheds such as Chesapeake Bay. Many watershed models focus on the simulation of nitrogen and phosphorus. An accurate simulation of organic carbon runoff, however, has not been well verified. The recent review of next-generation Chesapeake Bay water quality models suggests there is a need to improve the representation of organic carbon loading from the watershed which is important for the modeling of dissolved oxygen. In addition, the reactivity of DOC input from the open ocean and of DOC from terrestrial watershed sources can be different and will need to be considered in developing external flow boundary conditions and open ocean boundary conditions for model input. The respondent to the RFP should demonstrate familiarity with the alternative methods available to develop the flow and loading data needed for model input to characterize watershed runoff, wastewater discharges, and urban stormwater and CSO outfalls over the large system-wide NY-NJ-CT coastal domain. The respondent should describe their technical approach proposed to develop watershed flow and loading inputs for the new integrated model framework.

Peer Review of SWEM

As described above in Section C, O'Donnell et al. (2010, 2014) performed a detailed independent evaluation of the SWEM model with the original data collected in 1988-1989 and 1994-1995 to develop SWEM and new data sets collected from 1999-2002 to support refinement of the SWEM water quality model. O'Donnell et al. (2014) concluded that since the hydrodynamic model reproduced vertical mixing processes the arbitrary adjustment of vertical mixing to calibrate dissolved oxygen under stratified conditions in the RCA water quality was not appropriate. O'Donnell et al. (2014) also concluded that, even with a reasonable hydrodynamic simulation of vertical mixing and reformulation of oxygen budget terms to better model primary production and community respiration, the RCA water quality model, as configured for the SWEM grid for Long Island Sound, was unable to accurately represent the observed distribution of near bottom low dissolved oxygen and hypoxia under summer conditions in the Western Basin. The re-calibration effort of O'Donnell et al (2014) was not considered to be a sufficient advancement in the SWEM water quality model to support the TMDL evaluation.

One of the weaknesses of the current SWEM framework is that it is unable to simulate ecosystem respiration correctly in addition to the problems with simulation of stratification. As described above for the hydrodynamic model, O'Donnell et al. (2014) recommended that a much finer horizontal resolution grid be developed for Long Island Sound, particularly in the Western Basin, to improve the hydrodynamic simulation of vertical mixing and lateral cross-Sound near bottom flow. Improvements in the hydrodynamic model are expected, in turn, to improve model-data agreement for dissolved oxygen under summer conditions. The TAC recommends that RFP respondents clearly describe their proposed approach to address the hydrodynamic and water quality weaknesses of the existing SWEM framework identified by O'Donnell et al. (2010, 2014) for the accurate simulation of low dissolved oxygen and hypoxic conditions under summer, stratified conditions in the western basin of the Sound.

Water Quality Model State Variables

The SWEM water quality model (RCA) developed for the system-wide domain of the New York Bight, New York Harbor, and Long Island Sound includes state variables for dissolved oxygen, particulate/dissolved and refractory/labile components of organic matter (as carbon and nutrients), inorganic nutrients, and two functional groups of phytoplankton (Miller, 2010). The water quality model selected for development of the new integrated modeling framework should have the capability to incorporate state variables that are not represented in the SWEM RCA model for Long Island Sound and the larger system-wide domain. Additional state variables could include, for example, multiple classes of inorganic suspended solids and phytoplankton groups, zooplankton, bacteria, pH, alkalinity, and living resources such as submersed aquatic vegetation and benthos (shellfish such as oysters, mussels, or clams).

Microbial Degradation of Organic Matter

Organic matter in natural waters is a mixture of dissolved and particulate material that can be either resistant to microbial decomposition (refractory) or can be degraded quickly (labile fast) or slowly (labile slow). The water quality model should have the flexibility to allow the modeler to assign organic matter state variables based on at least 3 classes of reactivity (fast, slow, inert) for dissolved and particulate organic compounds. Long Island Sound is somewhat unique as an urban estuary because of significant differences in the reactivity of dissolved organic matter along a west to east gradient. In the East River, the Narrows and the western basin, dissolved organic matter is relatively “fresh” from wastewater discharges and is representative of labile material with a fast degradation rate. In the eastern basin and Block Island Sound, however, dissolved organic matter is representative of open ocean conditions with a much slower refractory degradation rate for “relict” material. In the existing SWEM water quality model for Long Island Sound, water column organic matter is represented by 4 state variables for the labile and refractory forms of dissolved and particulate organic matter. The sediment flux model then represents decomposition of particulate organic matter that settles from the water column to the bed with two reactive classes (fast G1 and slow G2) and one non-reactive class (G3). Water column labile POM is routed via settling to the three reactive classes of sediment bed organic matter (G1, G2, G3) while water column refractory POM is routed via settling to the less reactive sediment bed organic matter classes (G2, G3).

In almost all water quality and biogeochemical models, the effect of microbial degradation of organic matter on dissolved oxygen is represented as a simple first-order temperature dependent reaction rate for the loss of organic matter and the associated oxygen demand. Recent modeling investigations in western LIS by Liu et al. (2015) coupled a wind-driven physical transport/vertical mixing model (GOTM) with a modified biogeochemical model (ERGOM) included bacterial biomass as a new state variable and a new sink term for oxygen demand. Liu et al. concluded that bacterial dynamics need to be correctly parameterized in biogeochemical models to accurately simulate dissolved oxygen variability and recovery from summer, stratified hypoxic conditions in Long Island Sound.

In the absence of an adequate database of bacterial biomass measurements needed to specify external point sources (coastal rivers, wastewater, stormwater, etc.) flow boundary conditions, initial conditions, open ocean boundary conditions, oxygen consumption rates, and station data within the domain for model calibration, the TAC concludes that it would be very difficult to develop a calibrated and validated model that includes bacteria as an explicit dynamic state variable that is coupled to oxygen demand in the water column.

In the absence of field data to support a more complex approach to modeling bacterially mediated decay of organic matter and consumption of dissolved oxygen, the TAC recommends that bacterial degradation of organic matter continue to be represented as a simple, first-order temperature dependent rate reaction for decay of dissolved and particulate organic matter. As the new integrated model framework is intended to support management decision making for LIS and the larger system-wide region, it is not appropriate to attempt to incorporate an advanced representation of bacteria as a new state variable that does not have a long track record of applications in water quality modeling.

The idea, however, of including bacteria as an explicit state variable to quantify the microbial effect in a biogeochemical model of organic carbon, nutrients, eutrophication and dissolved oxygen does have merit as a research project by the academic community. The TAC recommends that EPA LISS consider funding research efforts to collect field data, including data to characterize external sources, needed to develop, test, and calibrate a biogeochemical model of LIS that includes bacteria as an explicit state variable.

Inorganic Solids and Light Attenuation

The existing SWEM framework does not include inorganic suspended solids in the linkage from the ECOMSED model. If suspended solids are to be included in the new model framework to represent the effect of particles on light attenuation, it is important to include the particle sizes that absorb or scatter most of the light. While large particles account for most of the mass and the measurement of total suspended solids, it is the smaller particles that scatter most of the light in the water column. The model developer should be able to specify how many sediment size classes are simulated, and for each size class represented, specify the percent contribution from external sources of total suspended solids, the settling velocity, and the light attenuation coefficient associated with each size class. The model code should allow the user to assign the number of size classes and the associated input data needed to define each size class. The number of size classes should not be hardwired in the software for the water quality model.

Light attenuation is a controlling factor for phytoplankton productivity in open water and for benthic algae and SAV productivity in shallow water environments. The availability of light in the euphotic zone and bottom is related to the attenuation of light in clear water, dissolved organic matter (color), inorganic sediments, detritus, and phytoplankton biomass. The SWEM RCA model represents light extinction [K_e , m^{-1}] as the sum of chlorophyll-a dependent attenuation [K_e (Chl)] and a base non-algal extinction coefficient [K_e (base)]. The base non-algal extinction implicitly accounts for the combined effect of color, detritus, and inorganic sediment.

Station observations of secchi depth and chlorophyll-a biomass were used to derive spatial and temporal forcing functions to represent base non-algal light extinction.

Many water quality models (e.g., WASP, EFDC, CE-QUAL-ICM) typically account for the effect of inorganic sediment and detritus by assigning multiplier coefficients for the sediment and detritus concentrations that are either site-specific relationships or are obtained from the literature. Research efforts over the past 10-20 years have focused on the development of models of light attenuation in coastal waters that explicitly account for the dissolved organic matter contribution to color (CDOM, Colored (or Chromophoric) Dissolved Organic Matter). Stevens Institute of Technology has developed the capability to incorporate sources of CDOM and model CDOM kinetics with the NYHOPS modeling system (Blumberg, 2006). As a component of a NOAA ECOHAB physical-biogeochemical modeling investigation at the University of South Florida, Milroy (2007) developed a light attenuation sub-model for the West Florida Shelf that accounts for the spectral components of incident solar radiation and color (CDOM) as labile and refractory fractions of dissolved organic carbon (DOC). EPA Region 4 opted for a much simpler approach by updating WASP7 with a representation of the effect of CDOM on light attenuation as a simple user-assigned multiplier coefficient of DOC. The same simple relationship with DOC was also included as a user-assigned coefficient of DOC in EFDC_Explorer and the EFDC water quality model developed to support TMDL assessments for the Caloosahatchee Estuary in Florida (DSLCC, 2012). The TAC recommends that available data sets in Long Island Sound should be reviewed to test and evaluate alternative formulations for modeling light attenuation as part of the water quality model development phase.

Phytoplankton and Primary Productivity

The existing SWEM water quality model uses two phytoplankton classes. TAC members have found it valuable to be able to use a model that allows the modeler to add or remove phytoplankton classes easily through model input records. The water quality model code allows the modeler to assign the number of classes and to provide input data for the kinetic and stoichiometric coefficients needed for each class or functional group such as nutrient uptake requirements, stoichiometric ratios, temperature coefficients, etc. The existing SWEM simulates two classes as (1) winter diatoms and (2) a mixed assemblage that includes green algae, dinoflagellates, and diatoms. What would be the effect if the mixed assemblage class was sub-divided instead into 2 or 3 groups? A flexible water quality model framework and is needed to support investigations of changes in the representation of phytoplankton in a waterbody. Ideally, phytoplankton enumeration and/or biomass data would be available to support the splitting of total biomass measurements into multiple classes for both model input and comparison of model results to observations. As an example of such a flexible model (e.g., Bruce et al., 2015), the Aquatic Ecodynamics Model (AED) is an open-source community-driven library of model components for simulation of "aquatic ecodynamics" - water quality, habitat and aquatic ecosystem dynamics. The model has been developed by researchers at the University of Western Australia Aquatic Ecodynamics Research group (<http://aed.see.uwa.edu.au/research/models/AED/overview.html>).

An accurate simulation of phytoplankton biomass and primary productivity is important for simulating dissolved oxygen correctly. There are a few different methods used in models to simulate phytoplankton growth that need to be considered in developing the new integrated model for the system-wide domain and LIS. Some models use a traditional approach with the maximum growth rate prescribed for different algal species that is then reduced according to Di Toro's (1971) daily and vertically integrated form of Steele's equation for the effect of light on phytoplankton growth. Some models use the Jassby-Platt formulation where the growth rate depends on light saturation and seasonal fixed carbon to Chl-a (C:Chl) ratios for different phytoplankton species (Jassby-Platt, 1976). The time varying C:Chl ratio can also be determined based on a light attenuation coefficient that has been used to simulate the phytoplankton growth function (Cercio and Nole, 2004). As nutrients decrease, the light attenuation coefficient can change and this change will, in turn, affect the C:Chl ratio and the growth rate. Another approach, applied for the Middle Atlantic Bight, is used in the current ROMS biogeochemical model where phytoplankton biomass is modeled separately as two different state variables based on nitrogen and Chl-a, respectively (Fennel et al., 2006). The use of different growth formulations for phytoplankton can result in different simulation outcomes for primary production and biomass. Following the approach used by O'Donnell et al. (2014), the TAC recommends that alternative formulations for phytoplankton growth and primary productivity be investigated as part of the water quality model development phase.

Living Resources and Ecological Models

A management alternative for control of nutrients in Long Island Sound includes the concept of bioextraction of nutrients from a waterbody. Aquaculture harvesting of seaweed and shellfish and restoration of shellfish beds have been evaluated as BMP options for nutrient reduction and are considered to be effective techniques to account for nutrient reduction credits (Bricker et al., 2018). Application of the new integrated model to Long Island Sound embayments and tidal rivers will, therefore, require consideration of methodologies that can be developed to represent living resources to evaluate the effectiveness of bioextraction alternatives for specific embayments and tidal rivers. Ecological state variables linked to living resources would include SAV, benthos (shellfish), benthic algae, water clarity, zooplankton, and higher trophic levels of the food web.

Ecological sub-models have been linked with hydrodynamic and water quality models in large coastal and estuarine systems including the Sacramento-San Joaquin Delta (DSLCC, 2012) and Barataria Bay and the Northern Gulf of Mexico (DSLCC, 2016). In these projects, hydrodynamic and water quality model generated outputs for temperature, salinity, water level/depth, TSS, POC, DOC, and nutrient concentrations were linked as input data to drive a separate ecological model (CASM, Comprehensive Aquatic System Model) to simulate daily production (change in biomass per day) of a food web that included phytoplankton, zooplankton, benthic infauna and epifauna, benthic invertebrates (shrimps, crabs) and multiple fish species. In Chesapeake Bay, the approach has been somewhat different in that living resources (e.g., SAV and shellfish) are directly coupled as sub-models of the water quality model. This approach provides a feedback effect to the hydrodynamic and water quality model from the living resource sub-

model. Hydrodynamic processes in shallow embayments, for example, are influenced via friction from SAV and shellfish beds and nutrient cycling in the water column is influenced by nutrient uptake of SAV and nutrient excretion of shellfish.

Although the focus of the current effort to develop the new integrated model framework is on development of a new hydrodynamic and water quality model, the intention of NYC DEP and EPA is that ecological models will be incorporated into the model framework in a modular fashion over time as funding becomes available. Ecological models will be incorporated in the new integrated model framework to help support both the development of management tools that can be shown to achieve various endpoints for living resources, as well as to ensure that the physical, chemical, and biological processes and interactions provide the best representation of how the system works. This will be the key to success for the new integrated model framework for Long Island Sound and the larger system-wide domain of the New York Bight and New York Harbor. The TAC recommends that respondents to the RFP present a strong interdisciplinary modeling team with the scientific expertise to clearly express the connections between watershed hydrology/pollutant loading, transport and mixing of hydrodynamics, water quality and eutrophication, and ecological processes that support living resources. The respondent must be able to demonstrate how these diverse components can be incorporated into the new integrated model framework in a modular fashion as needs arise and as funding permits.

Mass Balance Fluxes

Inspection of the interannual variability of the duration and spatial extent of hypoxia in Long Island Sound clearly suggests that there are factors -- other than export of N from the East River, Connecticut and New York and phytoplankton uptake -- that must control the onset, persistence, and recovery of hypoxia in the Western Basin of the Sound. Various investigators have performed analyses of field data to infer estimates of the mass flux of dissolved oxygen from physical transport processes (McCardell and O'Donnell, 2014) and estimates of primary productivity from *in situ* nutrient and dissolved oxygen observations (Collins et al., 2013). The water quality model computes the sources and sinks of dissolved oxygen and other state variables from the equations used to describe physical transport and kinetic interactions of biogeochemical processes. Post-processing of water quality model results as mass balance flux terms can be used in conjunction with rate measurements collected in the field to help identify the key physical and biogeochemical processes that control dissolved oxygen, nutrient cycling, and phytoplankton biomass in Long Island Sound and other regions of the system-wide domain.

Eutrophication models once included the capability to post-process mass balance fluxes to provide comparisons of model results to rates measured in the field. Models of the Great Lakes, for example, developed by Scavia (1979) and Thomann et al. (1976) used analyses of mass flux components to support explanations of the sequence of physical and biogeochemical events to describe the evolution of phytoplankton blooms over time (Figure 12). In the system-wide domain of Long Island Sound and the New York Bight, linked hydrodynamic and water quality models were developed for Norwalk Harbor, CT (Tetra Tech, 1995) and the New York

Bight (Stoddard, 1988) to output mass flux components for analyses of (a) time-averaging of nitrogen exchanges between the inner and Outer Harbors zones and (b) spatial averaging of time-series of dissolved oxygen sources and sinks over the NJ Mid-Shelf zone (Figure 13).

Most contemporary water quality models (e.g., EFDC/HEM3D, WASP6/7/8) do not have the capability to track, and export, the computations of the numerous source/sink derivative terms for the state variables of a model. Most modeling projects also do not have the funding resources or the time available in a schedule to support the coding effort required to track, and output, the source/sink derivative terms for either all, or selected, state variables of a water quality model. The next generation modeling project envisioned by EPA and NYC DEP for the new system-wide integrated model framework, however, will have adequate time and funding resources and will require that the new model(s) be in the public domain with open source code. The TAC recommends that the capability to track and output physical and biogeochemical mass flux terms for selected state variables be included as a requirement for the new model framework in addition to the usual output of state variable results.

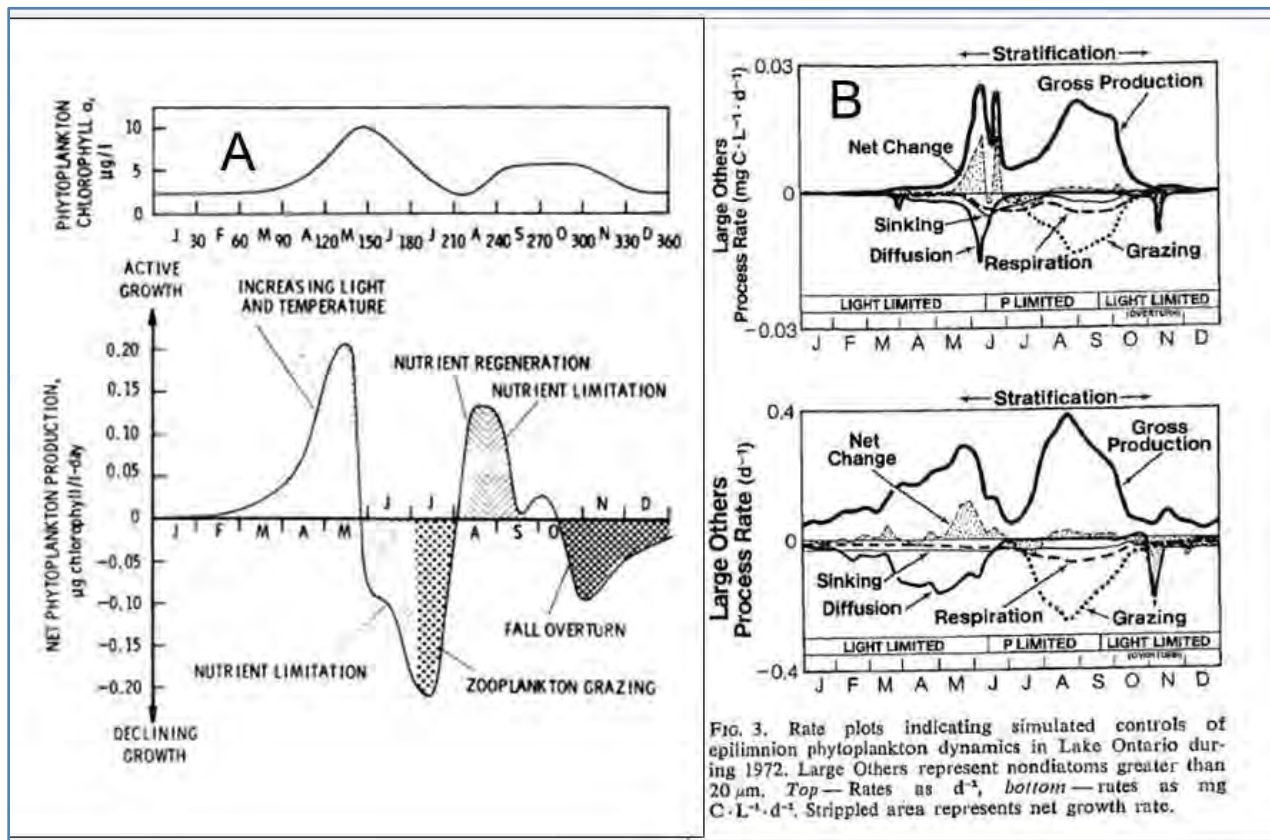


Figure 12- Mass flux component analysis for phytoplankton dynamics of Lake Ontario. Source: (A) Thomann et al. (1976) and (B) Scavia (1979).

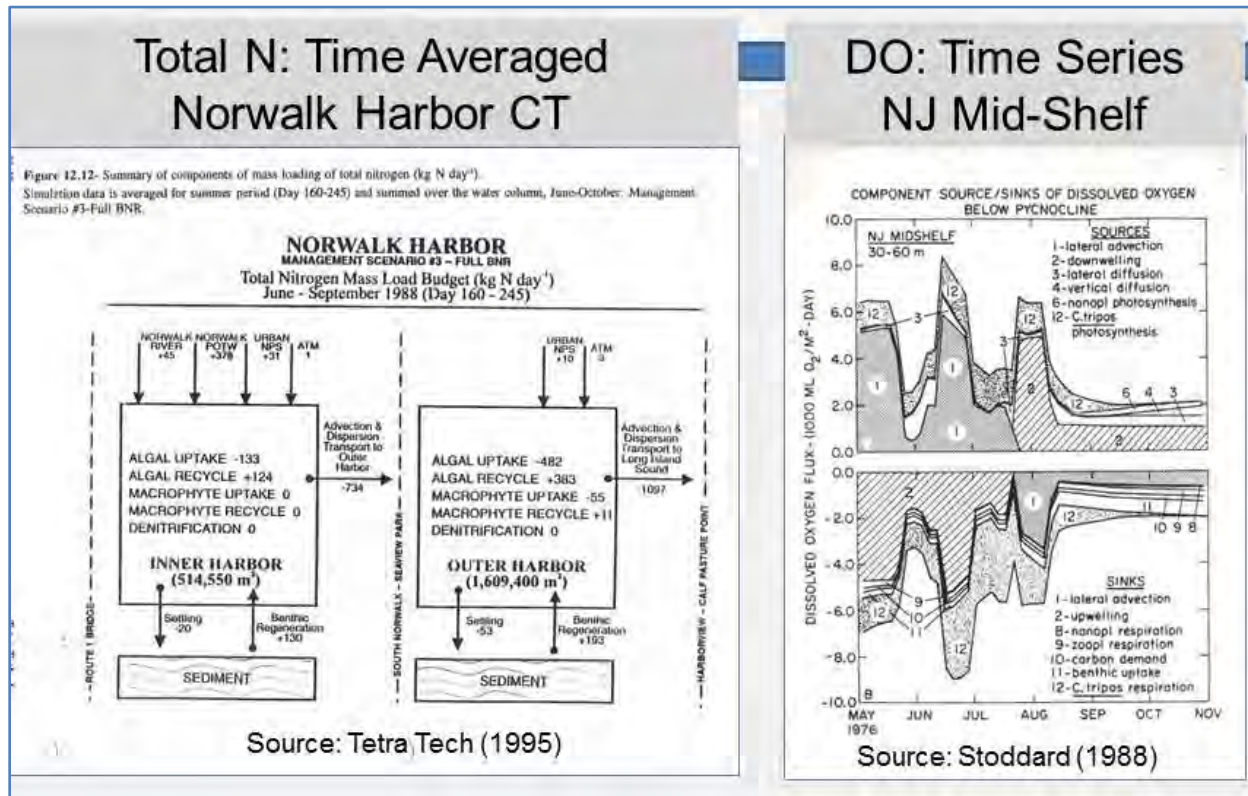


Figure 13- Mass flux component analysis for Total Nitrogen in Norwalk Harbor (Tetra Tech, 1995) and dissolved oxygen dynamics in the New York Bight (Stoddard, 1988).

Sediment Flux Model. The sediment flux models incorporated in many water quality models are based on the sediment flux model (Di Toro, 2001) developed by Di Toro and Fitzpatrick (1993) and have been implemented in RCA, CE-QUAL-ICM, and EFDC (Figure 14). A modification of this sediment flux model has been published that includes more kinetics (e.g., Clark et al., 2017), but the improvement in results is not substantial, given the uncertainty associated with erosion, which is not accounted for by the sediment flux model. Based on TAC member applications and sensitivity tests of the sediment flux model, the model is most sensitive to changes in the water column settling velocity assigned for particulate organic matter and phytoplankton biomass. Other than a few parameters related to phosphate exchange across the sediment-water interface, most of the parameters incorporated into the sediment flux model are not very sensitive. As noted by Di Toro (2001), the sediment flux model has been applied for many shallow and deep estuarine systems and very few model parameters needed to be changed (unless there was a very good reason) to obtain reasonable agreement with observations. In a shallow estuary, the benthic and macro-algal uptake of nutrients will influence the overall benthic flux of nutrients more significantly than will benthic exchange of nutrients across the sediment –water interface.

As described above under Existing Data and Data Gaps, the TAC recommends a literature review and synthesis of SOD, benthic nutrient flux, sediment bed and sediment core data to describe historic and contemporary availability of sediment bed organic content, porewater nutrients, and sediment type/grain size. Sediment bed data is needed to setup initial conditions and compile calibration and validation data for the sediment flux model.

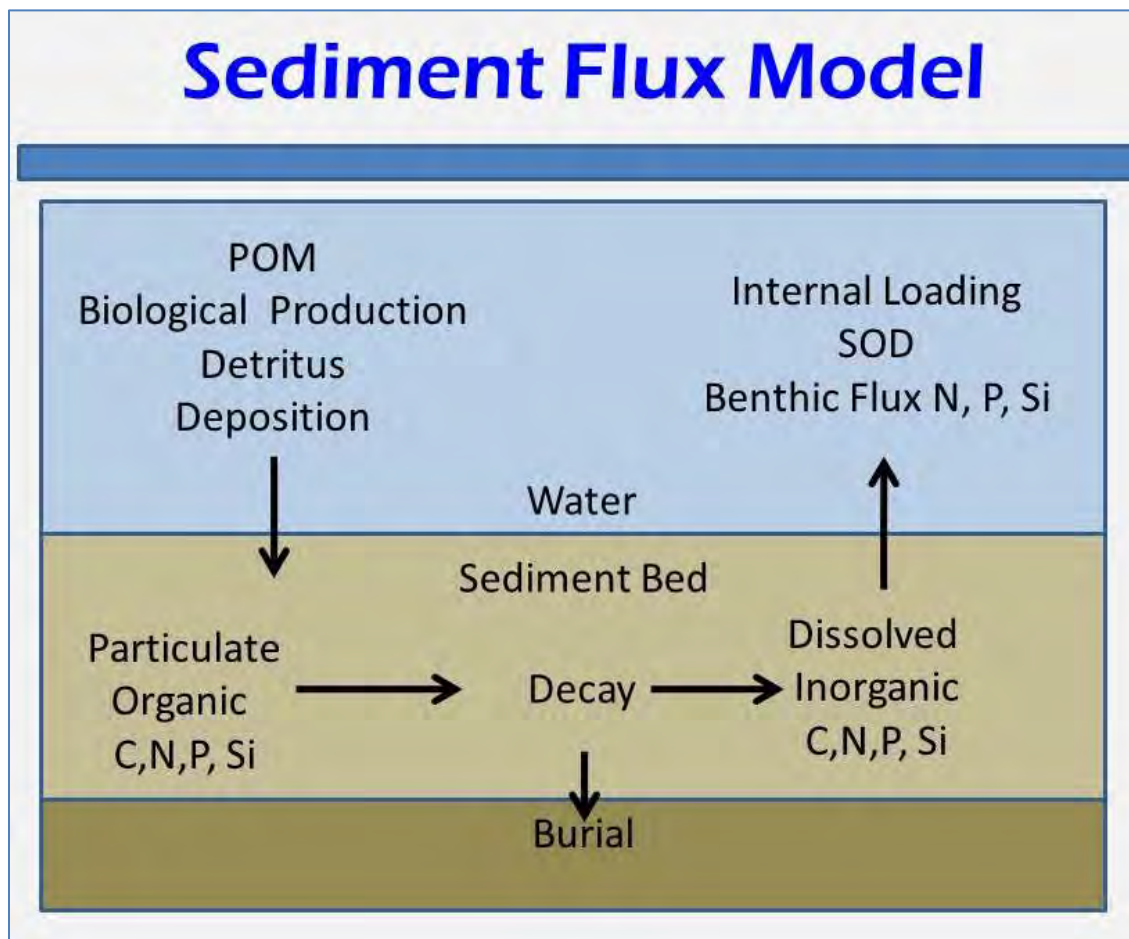


Figure 14 State Variables and Processes of Sediment Flux Model

Management Scenarios. The new system-wide and LIS regional integrated model framework will support decision-making investments to implement management strategies for the next decade (or longer) by NYC DEP, NYSDEC, CTDEEP, NJDEP, and EPA to achieve compliance with regulatory goals (MS4, CSO controls, TMDLs). Management scenarios typically represent control strategies to reduce discharge loading of nutrients, sediment, pathogens, etc. from tributaries, wastewater facilities, and stormwater and CSO outfalls within a watershed. External flow boundary input data for the existing SWEM framework includes 34 coastal rivers entering the system-wide domain at 28 locations, 99 wastewater facilities, and more than 1,700

stormwater and CSO outfalls that are captured in urban runoff model outputs that were spatially aggregated to align with the SWEM grid.

Management scenarios for stormwater and CSO outfalls will be complex because of the large number of outfalls (1,700) represented in the system-wide domain and the variety of different landside urban runoff models that are used to assign stormwater and CSO loading data for model input. NYC DEP uses InfoWorks, and other agencies use XP-SWMM and RRMP. RAINMAN was the tool developed for SWEM to assemble flow and loading data from InfoWorks, SWMM and RRMP urban runoff models. In the two decades of intervening time since SWEM was developed, a lot more work has been done by NYCDEP and other urban CSO communities to improve their urban watershed models with CSO Long Term Control Plans and MS4 programs as regulatory drivers. Groundwater modeling has also advanced around the Long Island Sound region.

Scenarios can be developed on a system-wide or LIS basis where a uniform percent reduction of a contaminant, such as nitrogen, is applied globally for all tributary, wastewater, stormwater and CSO sources. Management strategies can also be tested on a system-wide or LIS basis for a uniform reduction of only tributaries, or only wastewater, or only stormwater and CSO outfalls. Management scenarios can also be tested for alternative control strategies, such as the NYC DEP Long-Term Control Plans for CSO controls for Flushing Bay, Newton Creek, etc. for sources contributing only to local scale site-specific embayments or tidal rivers.

Under Phase 1 of the new modeling project, management scenarios will be evaluated based on three (3) established SWEM loading scenarios. In addition to the re-calibration of the new model framework, it would be very informative to evaluate the response of LIS to the TMDL scenario and two other SWEM reduction scenarios, as well as the sensitivity of the response to the geographic location of inputs. Are the projected responses similar to what was previously forecast with the existing SWEM? This effort will provide valuable information that can be more thoroughly evaluated by NYC DEP, EPA and other agencies as the processing and visualization tools are developed and model application training is implemented.

Under Phase 2 of the new modeling project, management scenarios will be evaluated based on three (3) designated nitrogen reduction scenarios (to be determined by NYC DEP/EPA) for the selected period of 2003-2018. The management scenario assessments will be used to support a diagnosis of the model response to nutrient reduction strategies.

A management alternative for control of nutrients in Long Island Sound includes the concept of bioextraction of nutrients from a waterbody. Aquaculture harvesting of seaweed and shellfish and restoration of shellfish beds have been evaluated as a BMP option for nutrient reduction and are considered to be effective techniques to account for nutrient reduction credits (Bricker et al., 2018). Application of the new integrated model to Long Island Sound embayments and tidal rivers will, therefore, require consideration of methodologies that can be developed to represent living resources to evaluate the effectiveness of bioextraction alternatives for specific embayments and tidal rivers. Ecological state variables linked to living resources would include SAV, benthos (shellfish), benthic algae, water clarity, zooplankton, and higher trophic levels of

the food web. Ecological models will be incorporated in the new integrated model framework to help support development of management alternatives that can be shown to achieve various endpoints for living resources.

In addition to structural and non-structural strategies for controlling nutrients and other contaminant loads to LIS and the larger system-wide domain of the New York Bight and New York Harbor, management scenarios also need to consider anticipated future conditions. Climate change, sea level rise, and increased water temperature, for example, must be considered for long-term planning because such future conditions will have an interacting impact on possible outcomes of different management strategies.

Clear expectations from NYC DEP, local, state and federal agencies are essential for the design of tools to support a wide array of multiple management scenarios to test the effectiveness of alternative control plans for watershed BMPs, wastewater facilities, stormwater (MS4) and CSOs, and bioextraction options for nutrient removal credits. All agencies (NYC DEP, NYSDEC, CTDEEP, NJDEP, and EPA) should clearly describe their agency expectations for representation of management scenarios. The agencies must also clearly describe how they water quality and living resource target criteria metrics to be derived from model results will provide data for comparison of the effectiveness of management scenarios. Target metrics will include, for example the area, volume, and duration of hypoxia and DO less than water quality standards, algal biomass levels as Chl-a, water clarity as secchi depth, and area coverage of SAV beds. NYC DEP, EPA and the state agencies should present their expectations for specifying the setup of management scenarios and how management scenario results will be post-processed for evaluation before the modeling team completes re-calibration of the new model framework under Phase 1 of the project.

The next generation system-wide and LIS model will be management based with nitrogen reduction scenarios to alleviate symptoms of eutrophication provided as an output. Managers will then need to estimate costs associated with scenarios (and ultimately, feasibility). The scenarios alone, however, do not provide enough information to move towards implementation. A tool designed to provide cost estimates is highly recommended to support BMP selection and implementation at the local watershed scale. Costs and effectiveness of nitrogen removal will vary among different scenarios and BMPs selected. For example, Scenario #1 with complete removal of nitrogen might eliminate all signs of eutrophication in LIS. The high cost of this scenario, however, may make this impractical and infeasible to implement. Scenario #2, however, may alleviate 95% of the problems associated with eutrophication symptoms and the estimated cost is significantly less to implement than the alternative Scenario #1. With this information, a manager can determine that Scenario #2 is more favorable for implementation. The availability of reliable cost information is not only important for planning nitrogen reduction strategies and BMP selection, the cost information is also critical for communicating with stakeholders and local level municipal government officials and planners who are responsible for on the ground implementation of actions selected to control nutrient loading. Examples of the Cape Cod multi-variant watershed BMP cost

estimator tool (Watershed MVP 3.0) and the Chesapeake Assessment Tool are shown in Figure 15.

As can be seen in in Figure 15, the Cape Cod and Chesapeake Bay examples show how management scenarios can be configured with a GUI interface designed to support pre-processing setup of management scenarios for input to hydrodynamic and water quality models. The other tool needed for the evaluation of management scenarios is based on post-processing of model scenario results for comparison to target metrics for water quality and living resources. The Chesapeake Bay Program Decision Support System is shown as an example in Figure 16.

The development of a user-friendly GUI tool designed to support management scenario evaluations for a site-specific model framework represents a significant commitment of funding resources, effort, and software development skill. The TAC recommends that a user-friendly GUI management scenario “builder tool” should not be included as a requirement of the RFP at this stage of development for the new integrated model framework.

In lieu of a user-friendly GUI for a management scenario builder, a deliverable product of the project should include the technology transfer of pre- and post-processing tools used by the model developer to support development of the new model and the setup and processing of data to represent management scenarios. The model developer should provide NYC DEP with executable versions of the computer programs and software tools along with site-specific project files (i.e., LIS and system-wide domain) for input and output, and documentation for use of the software tools by NYC DEP staff and other interested agency parties for the Long Island Sound and system-wide modeling project. As part of training for use of the new model framework, the model developer should be required to transfer the technology developed to support pre-and post-processing tools used to develop management scenarios and to provide the training required to successfully use the tools to setup and evaluate the outcomes of management scenarios. This approach proposed for development of management scenarios would satisfy Objective #4- *Establish a framework that facilitates evaluation of multiple planning and management scenarios.*


As envisioned by the scope of work for the new model framework, watershed loading models will be developed to represent coastal river discharge using future funding resources rather than the funding currently targeted for the hydrodynamic and water quality model. The TAC recommends that efforts to obtain a user-friendly GUI tool to support setup and processing of management scenarios be deferred to a future development phase for the new integrated modeling framework. During Phase 1 and Phase 2 when the new hydrodynamic and water quality model will be developed, EPA, NYC DEP, NJDEP, NYS DEC, and CTDEEP can learn from the examples provided by the Cape Cod Watershed MVP 3.0 tool, the Chesapeake Bay Program scenario builder tools, and other management scenario tools that may have been developed to support TMDL determinations.

The TAC recommends that key staff of the Chesapeake Bay Program and the Cape Cod Watershed organization be invited to share their experience with the design, issues encountered, and development of open-access, user-friendly GUI management scenario builder tools.

The ongoing NYC DEP project with the IT contractor SCALA is currently developing pre- and post-processing tools for the existing SWEM. The nested model developed by HDR for Coney Island Creek is being used as a prototype to develop a pre- and post-processing tool that would also include the capability to define management scenarios. Lessons learned from the management scenario tool examples given above can help to inform the design and development of tools, including management scenario tools, currently envisioned and being developed by SCALA to support pre- and post-processing tasks for the existing SWEM.

Tools for Management Scenarios

WatershedMVP Cape Cod Commission




Here, the breakdown of treatment costs associated with each of the selected treatment types is shown.

WatershedMVP also displays a breakdown of collection costs, O&M costs, capital costs, transport & disposal costs, and non-construction costs.

Provides cost Breakdown for BMP option

WebCAST²: A CAST Training



Chesapeake Assessment Scenario Tool

Devereux Consulting
Data • Research • Analysis • Strategy

http://www.capecodcommission.org/resources/RWMP/WatershedMVP_PrimerDec2012.pdf

http://chesapeakestormwater.net/wp-content/uploads/dlm_uploads/2018/03/CAST_CSNwebcast.pdf

Figure 15 - Examples of Cape Cod and Chesapeake Bay Tools Designed for Evaluations of BMP Scenarios for Watershed Management Planning.

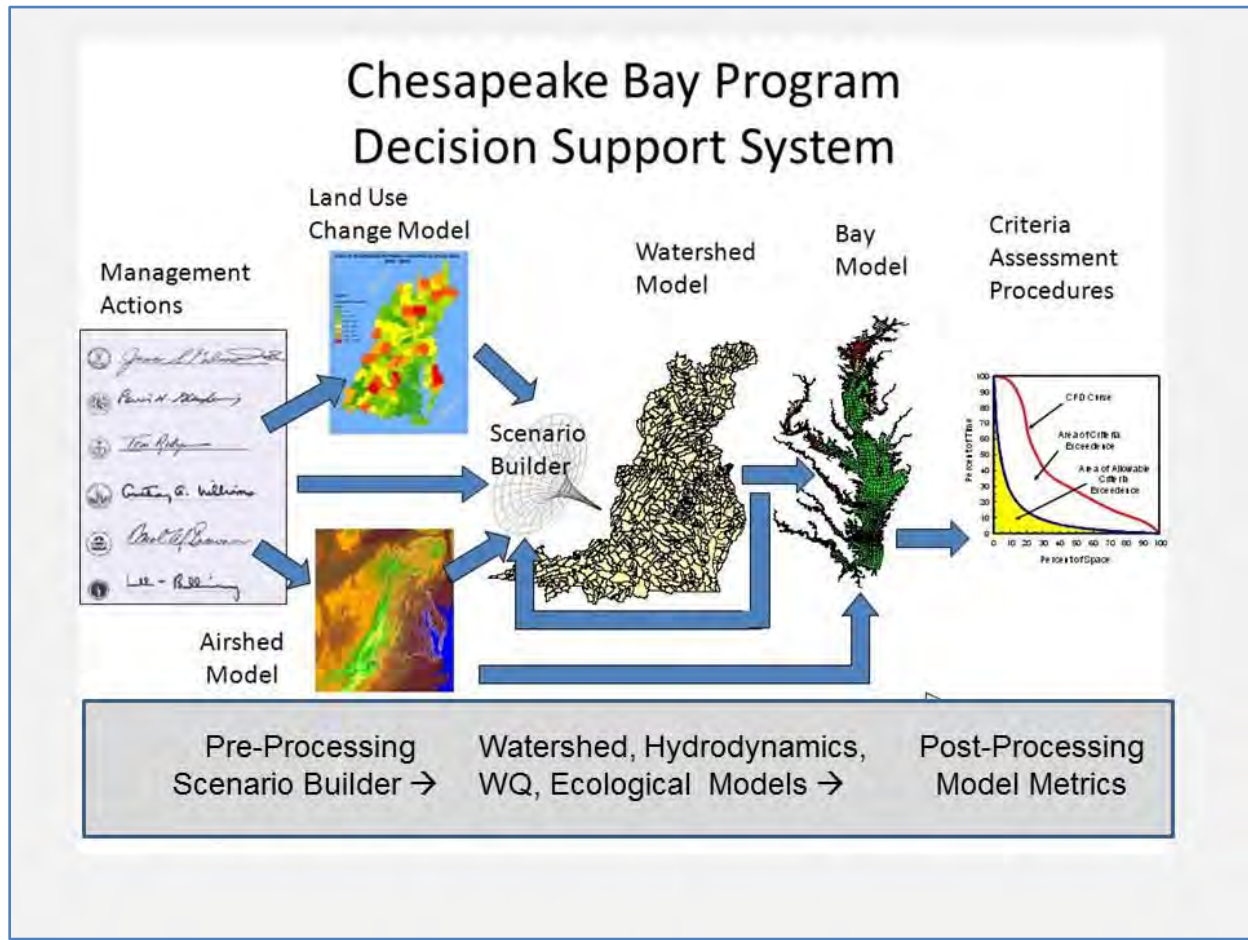


Figure 16 - Chesapeake Bay Program Decision Support System

Pre- and Post-Processing Tools. Hydrodynamic and water quality model setup and applications for calibration, validation, sensitivity analyses, post-audits, nested models of embayments, and evaluations of management scenarios all require pre- and post-processing tasks to manipulate data sets needed for models. Pre-processing involves the manipulation of real world data sets to prepare data for model setup and model input (Figure 17). Post-processing involves the extraction and manipulation of observed data sets and model output to display model-vs-observed data comparisons as time series, vertical profiles, spatial transects, and contour maps (Figure 16 and Figure 18). Post-processing can also include the extraction of model results to develop mass balance flux analyses for nutrients, dissolved oxygen, and other state variables where the model results are aggregated over geographic zones, vertical layers, and time (see Figure 12 and Figure 13). Post-processing can provide matrix required for assessment of water quality attainment and extract boundary conditions from regional scale model and convert them to input data for fine-scale nested grid models. Post-processing should be able to convert model outputs for user selected state variables to a standard format (e.g., NetCDF) available for linking to ecological models.

One of the EPA grant objectives includes “capability for external review and GUI development” and as noted by Tetra Tech (2018, page 32-33) *“One of NYCDEP’s primary goals is to have a user-friendly model interface. A user-friendly model interface may enable users to readily process data for model input, to set up the model, make model adjustments, view results, and run scenarios. NYCDEP staff are particularly interested in conducting scenario analysis with little to no external support.”* As described by Tetra Tech, currently available models provide a wide range of capabilities to facilitate pre- and post-processing tasks needed to support development of a surface water model.

An ongoing NYC DEP project with the IT contractor SCALA is currently developing pre- and post-processing tools for the existing SWEM. The nested model developed by HDR to support the Long Term Control Plan for CSOs for Coney Island Creek is being used by NYC DEP as a prototype to develop a pre- and post-processing tool that would also include the capability to define management scenarios.

Even for models that provide a user-friendly interface, such as EFDC_Explorer and WASP7/8, there is still an enormous amount of data manipulation effort required to collect, compile, organize, and pre-process data sets to prepare the model-specific data formats and data layout needed to import data into a user-friendly interface. Typically, surface water modelers will have developed their own software tools designed to facilitate the tasks needed to prepare data for input to either a user-friendly interface or input files designed for a particular model. On the post-processing end of a modeling project, the user-friendly interface may have the capability to extract and display model results to generate graphic products as time series plots, transect profiles, contour maps, vertical profiles, and animations of model results. The modeler, however, must prepare and organize observed data sets in specific data formats to enable the interface to overlay model results with observed data to visually assess model performance.

As described by Tetra Tech (2018, page 33), *“Although an interface is helpful for model setup and configuration, these activities are not required to run and evaluate management scenarios with a developed/calibrated model.”*

Most environmental science and engineering firms or academic teams that have the expertise to develop a hydrodynamic and water quality model of LIS and the larger system-wide domain of the New York Bight and New York Harbor will have a collection of software tools they have developed over the years to support pre- and post-processing tasks for various models. The TAC recommends that the RFP should not require a respondent to propose how they would provide, or develop, a user-friendly interface to cover all pre-and post-processing tasks needed for model setup, calibration, validation, management scenario analyses, etc. The respondent, rather, should be required to clearly describe the approach they use to handle pre- and post-processing tasks for developing hydrodynamic and water quality models, output model results for analysis and water quality assessment, extract model results and convert them to inputs for nested grid models, and output model results for selected state variables and convert them to a standard format to be used for input to ecological models. Upon completion of the new

modeling work, a deliverable product of the project would be the technology transfer of pre- and post-processing tools used by the respondent to support development of the new model. The respondent would provide executable versions of the computer programs and software tools along with site-specific project files (i.e., LIS and system-wide domain) for input and output, and documentation for use of the software tools by NYC DEP staff and other interested agency parties for the Long Island Sound and system-wide modeling project. As part of training for use of the new model framework, the respondent should be required to transfer the technology developed to support pre- and post-processing tools and to provide the training required to successfully use the tools.

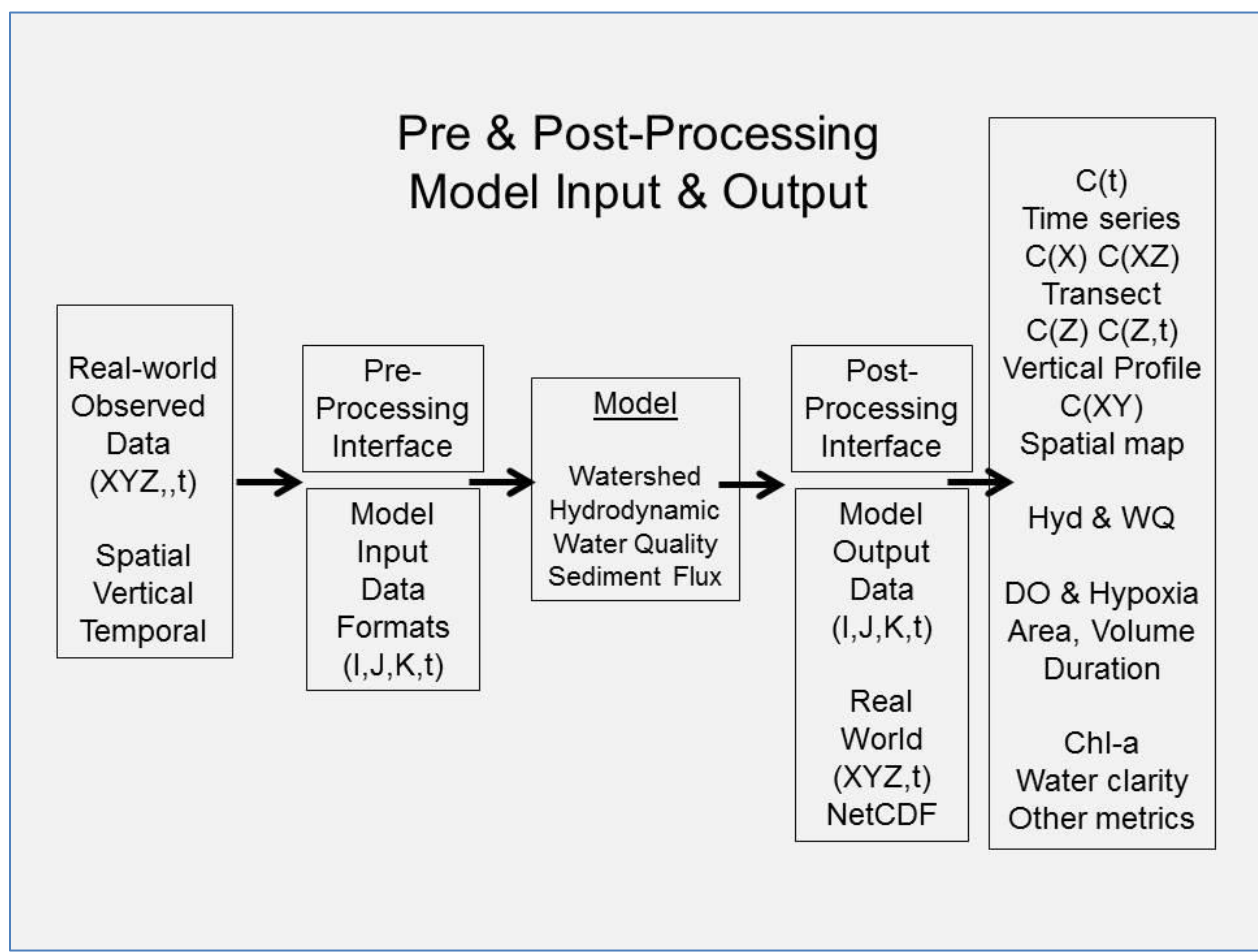


Figure 17- Pre- and Post-Processing Model Input and Output

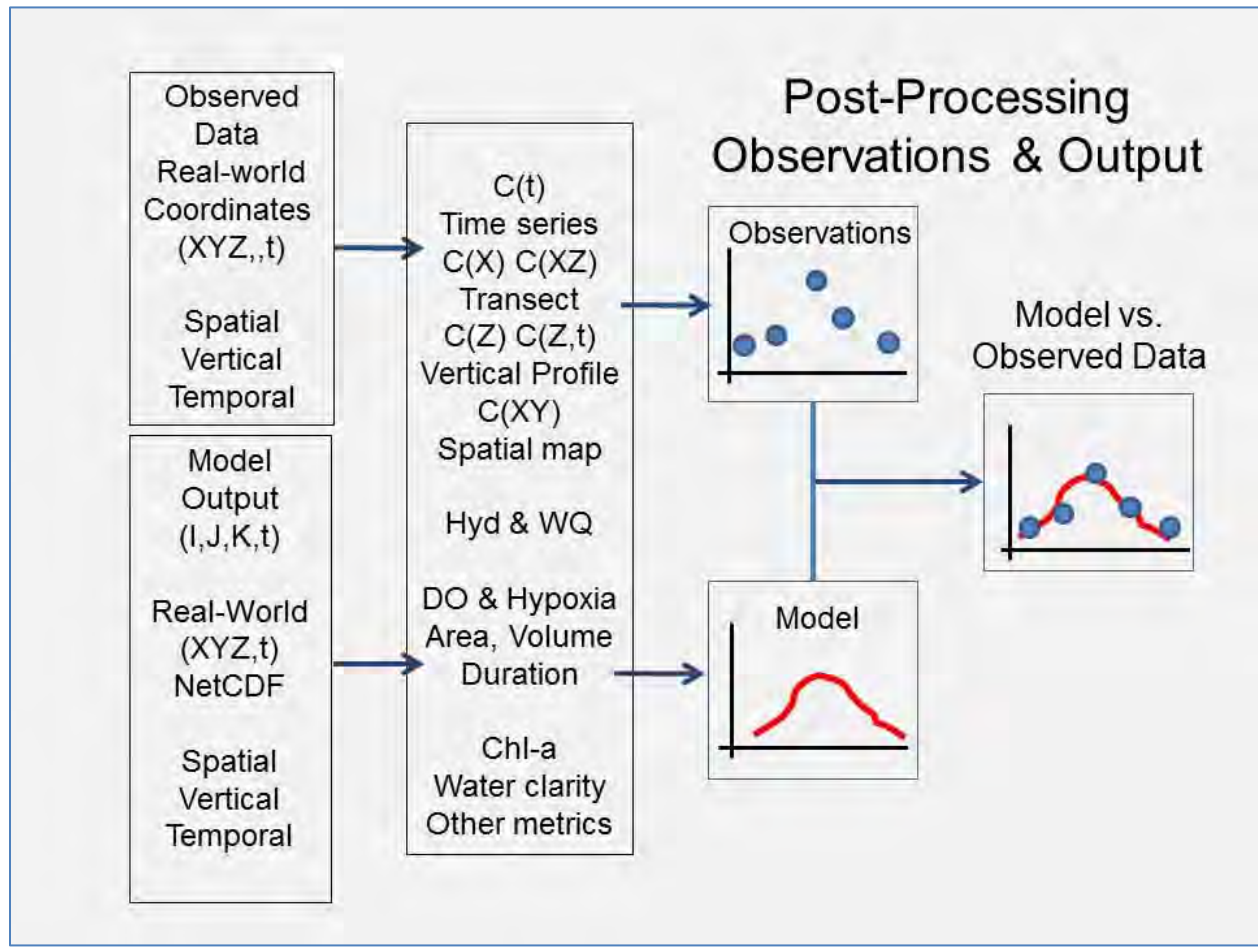


Figure 18- Post-Processing Observations and Model Output

Training and In-House Capability. Tetra Tech (2018, page 32-33) states that “One of NYCDEP’s primary goals is to have a user-friendly model interface. A user-friendly model interface may enable users to readily process data for model input, to set up the model, make model adjustments, view results, and run scenarios. NYCDEP staff are particularly interested in conducting scenario analysis with little to no external support.” Despite this clear expression of NYC DEP’s goals for using the new model, the technical guidance document does not include any discussion at all about either training or development of in-house capability at NYC DEP for coastal and estuarine hydrodynamic and water quality modeling. Following the expenditure of considerable resources to develop the new model framework, training by the model development team should be considered one of the major tasks of the project with adequate time and resources allocated to this objective. If training is not considered a major task, then training will become a task that is pushed to the end of the project when resources of time and money are limited and training does not get the attention this subject really requires.

Technical Advisory Committee Peer-Review for Long Island Sound Integrated Model

The work plan for the new model should require that the model development team will train NYCDEP staff on the basic principles of the model framework, the types of data needed to build the model, how to add new data as model inputs, and how to run and test the model for those new conditions. Under Phase 3, after development of the new model is completed, it should be a goal that NYCDEP staff be capable of updating the new model on a 1-2 year basis without any input or technical support from the model developers after the contract is completed for development of the new model. NYC DEP staff will not be able to perform the work outlined under Phase 3 unless they are given adequate training and experience with applying the new model.

The TAC recommends that, ideally, and after initial model development and scenario evaluations are completed at the conclusion of Phase 2 of the project, and assuming that funding is available, EPA, NYC DEP, NYSDEC, CTDEEP, NJDEP, and NJ Harbor Dischargers Group staff should be trained by the model development team to use the model and how to update the model periodically as new data becomes available in the future. Training workshops could be developed for face-to-face class room training with the model developers and recorded as video files to make training modules available via a You Tube channel. As NYC DEP staff gain proficiency in applying and updating the new model, additional training and instructional video productions could be developed as a “visual archive” to pass on the knowledge gained by NYC DEP staff.

In-House Capability

The TAC recommends that NYC DEP, and perhaps NYSDEC, CTDEEP, NJDEP and EPA Region 2, should plan on the allocation of budget resources to support recruitment of staff to build in-house staff capability to perform modeling tasks to support planning assessments and periodic updates of the new model framework for LIS and the larger system-wide New York Bight and New York Harbor regions. The short-term goal (during development of the new model) and long-term goal (after completion of the new model) is to build in-house staff capability at NYC DEP and the other agencies to support high quality modeling work with the new model framework for LIS and the larger system-wide region. There is precedent in NYC DEP for the TAC recommendation to recruit staff to support coastal and estuarine modeling projects. The NYC DEP Bureau of Water Supply FY16 report shows 5 staff positions in the Water Quality – Watershed Water Quality Science & Research program to support source water protection and management of the Catskill/Delaware reservoir system as part of the filtration avoidance agreement between NYC DEP, EPA, and the NY State Department of Health. TAC member Emmet Owens is the Section Chief of the Water Quality Modeling Group.

Recognition of NY-NJ-CT agencies and EPA by academics and professional scientists and engineers as a “hot bed” for advanced hydrodynamic and water quality modeling can be cultivated over a period of time by agency sponsorship of regional modeling workshops and conferences for projects related to Long Island Sound, the Middle Atlantic and New York Bight, New York Harbor, and the embayments of the south coast of Long Island and New Jersey. NYC

DEP, EPA and other agencies could also provide grant support for internships, graduate students, and post-docs. The agencies could reach out and cultivate relationships with regional academic institutions such as U. Connecticut, Stony Brook University SoMAS, Manhattan College, Rutgers University, Stevens Institute of Technology, Columbia University, etc. to support coastal and estuarine modeling projects. The goal of such outreach efforts is to build personal relationships between agency professionals and professors and graduate students of the academic community to generate interest in working for NYC DEP, EPA, and other NY-NJ-CT agencies.

Transparency and Open Source Access. The new model framework, including source code and model documentation, must be accessible to all Stakeholders including the academic community, state, federal, local agencies, environmental advocacy groups and regulated entities. Although many of the parties interested in the new coastal and estuarine model for LIS and the larger system-wide NY-NJ-CT domain do not have the scientific understanding about hydrodynamic and water quality models that comes from experience, “black box” models that provides outputs based on “secret” model equations and input data is not acceptable in a world that demands transparency in public decision-making. To be successful as a scientific undertaking and as a public decision-making tool that will require the investment of public and private money, full transparency of model theory, equations, coefficients, peer reviewed studies, access to documentation of models and input data sets is absolutely essential for the next generation of LIS and system-wide models of NY-NJ-CT coastal and estuarine waters.

Documentation related to the development of the existing SWEM framework must be available on the NYC DEP website. Source code, input files, pre- and post-processing tools, user manuals, and key technical reports prepared during development of SWEM should be made available by HDR to NYC DEP for public posting on a NYC DEP website. All SWEM-related documents, including fact sheets, should be made available to NYC DEP by HDR and posted online at the NYC DEP website as the lead agency serving as the “home” for existing SWEM products and all new products developed for the new LIS and system-wide model. A listing of the available SWEM documents and citations is presented in Section C and will not be repeated in this section.

Open Source Access

As described above, a “black box” model that provides outputs based on “secret” model computer code is not acceptable in a world that demands transparency and open access to information used to support public decision-making. Full public access to model source code and input files is becoming increasingly common as ‘open-source community models’ in the academic community (Ganju et al., 2016) and will be essential for the success of the next generation of LIS and system-wide models of NY-NJ-CT coastal and estuarine waters. Hydrodynamic and water quality models selected for the new framework for LIS and the larger system-wide domain must be in the public domain with source code, input files, and documentation fully available for open access. As with the documentation for SWEM and any other new products developed as part of the new model framework, source code and related

documentation should be made available to NYC DEP by the model developer for public posting on the NYC DEP website.

Open source access will enable all interested parties to obtain source code for the models, scripts and batch files developed to help execute the models, and well written user manuals. Protocols for version control and documentation of the source code will need to be written as a part of the modeling QAPP for the project. Rules must be specified in advance early in the LIS modeling project for tracking code changes, bug fixes, upgrades, enhancements, etc. that may be made to the open source code by the user-community. The TAC recommends that NYC DEP host periodic workshops (two times per year perhaps) with the user community to share whatever changes and upgrades might have been made to the model source codes. O'Donnell et al. (2010, 2014) made changes to the source code for the SWEM water quality model (RCA) that is maintained with the original source code on a UCONN website for the original RCA and modified version (V2) of the RCA model (<https://swem.uconn.edu/programs/>).

The SWEM hydrodynamic (ECOM) and water quality (RCA) model framework is in the public domain as open source model. Although model documentation and user manuals are available for ECOM and RCA, these models are not currently supported by a full GUI. The latest versions of ECOM and RCA support post-processing of outputs via NetCDF compatible files and, therefore, are considered to be somewhat “user-friendly”. Hydrodynamic and water quality model source code, batch files for model compilation, input files, observed data files for calibration and validation, and pre-post processing tools developed to support the existing SWEM (ECOM/RCA) application should be made available by HDR HydroQual to NYC DEP and posted for public access on the NYC DEP website. For the existing SWEM framework, the following issues identified for SWEM ECOM and RCA models have been confirmed by HDR:

- ECOM and RCA model codes are written in Fortran and can be compiled and executed on PC-based Windows desktop computers in addition to Linux-based computers
- ECOM and RCA source codes have been compiled and executed with INTEL, GNU Fortran, and PGI (Portland Group Inc.) compilers
- ECOM and RCA codes are written to take advantage of parallel processing capabilities
- ECOM and RCA codes have not been modified (as of June 2018) to take advantage of parallel computing with multi-thread processors.

As the new LIS and system-wide hydrodynamic and water quality model framework is developed, source code, input files, pre- and post-processing tools, user manuals and documentation of the development of the new hydrodynamic and water quality models must also be provided to NYC DEP for public access on the NYC DEP website.

Open-source community applications of the Regional Ocean Modeling System (ROMS, Haidvogel et al., 2008) and Finite Volume Community Ocean Model (FVCOM, Chen and Beardsley, 2013) in the open waters of LIS and embayments and tidal river of LIS are discussed in Section D of this report and will not be repeated in this section. Open-source community applications of the existing SWEM framework and modifications made to SWEM by O'Donnell et

al. (2010, 2014) are presented and discussed in Section C of this report and will not be repeated in this section.

As a closing statement for the TAC review of this topic, one important point which neither the Long Island Sound Technical Model Guidance nor the Proposed Technical Approach confront directly is the difficulty of providing a PC-based Stakeholder user-friendly model interface which must be coupled to a modern, complex fully 3D hydrodynamic and water quality model that requires an experienced user community of scientists and engineers. Ganju et al. (2016) provide an excellent summary about the transition to open-source community approaches for coastal and estuarine modeling.

The TAC recommends that academics and/or key staff of the Chesapeake Bay Program and NY-NJ-CT regional agencies and universities be invited to share their experience with the development of open-source community models for hydrodynamics, water quality, and living resources.

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End TAC review and Recommendations Report

Separate Attachments

Appendix 1- TAC Responses to Objectives

Appendix 2- TAC Responses to Questions

ATTACHMENT O

EPA GENERAL TERMS AND CONDITIONS, EFFECTIVE OCTOBER 1, 2018

CONTRACT: BEPA- LIS HWQMS

**RFP TITLE: BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS
LONG ISLAND SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELLING
SUPPORT**

EPA General Terms and Conditions

Effective October 1, 2018

1. Introduction

- (a) The recipient and any sub-recipient must comply with the applicable EPA general terms and conditions outlined below. These terms and conditions are in addition to the assurances and certifications made as part of the award and terms, conditions or restrictions reflected on the official assistance award document. Recipients **must** review their official award document for additional administrative and programmatic requirements. Failure to comply with the general terms and conditions outlined below and those directly reflected on the official assistance award document may result in enforcement actions as outlined in 2 CFR 200.338 and 200.339.
- (b) If the EPA General Terms and Conditions have been revised, EPA will update the terms and conditions when it provides additional funding (incremental or supplemental) prior to the end of the period of performance of this agreement. The recipient must comply with the revised terms and conditions after the effective date of the EPA action that leads to the revision. Revised terms and conditions do not apply to the recipient's expenditures of EPA funds or activities the recipient carries out prior to the effective date of the EPA action. EPA will inform the recipient of revised terms and conditions in the action adding additional funds.

2. Uniform Administrative Requirements, Cost Principles and Audit Requirements for Federal Awards This award is subject to the requirements of the Uniform Administrative Requirements, Cost Principles and Audit Requirements for Federal Awards; Title 2 CFR, Parts 200 and 1500. 2 CFR 1500.1, Adoption of 2 CFR 200, states Environmental Protection Agency adopts the Office of Management and Budget (OMB) guidance Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards to Non-Federal Entities (subparts A through F of 2 CFR 200), as supplemented by 2 CFR Part 1500, as the Environmental Protection Agency (EPA) policies and procedures for financial assistance administration. 2 CFR Part 1500 satisfies the requirements of 2 CFR 200.110(a) and gives regulatory effect to the OMB guidance as supplemented by 2 CFR Part 1500. This award is also subject to applicable requirements contained in EPA programmatic regulations located in 40 CFR Chapter 1 Subchapter B.

2.1. Implementing Procurement Standards. Per 2 CFR 200.110, there is a three-year grace period available to non-Federal entities for implementation of the procurement standards in 2 CFR 200.317 through 200.326. As detailed in the 2015 OMB Compliance Supplement and OMB's July 2017 Frequently Asked Questions, non-Federal entities choosing to delay implementation will need to specify in their documented policies and procedures that they continue to comply with 40 CFR Part 30 or 31, as applicable, for three additional fiscal years which begins after December 26, 2014.

2.2. Effective Date and Incremental or Supplemental Funding. Consistent with the OMB Frequently Asked Questions at <https://cfo.gov/cofar> on Effective Date and Incremental Funding, any new funding through an amendment (supplemental or incremental) on or after December 26, 2014, and any unobligated balances (defined at 200.98) remaining on the award at the time of the amendment, will be subject to the requirements of the Uniform Administrative Requirements, Cost Principles and Audit Requirements (2 CFR 200 and 1500).

Financial Information

3. Reimbursement Limitation

EPA's financial obligations to the recipient are limited by the amount of federal funding awarded to date as reflected on the award document. If the recipient incurs costs in anticipation of receiving additional funds from EPA, it does so at its own risk. See 2 CFR 1500.8

4. Automated Standard Application Payments (ASAP) and Proper Payment Draw Down

Electronic Payments. Recipients must be enrolled or enroll in the Automated Standard Application for Payments (ASAP) system to receive payments under EPA financial assistance agreements unless:

- EPA grants a recipient specific exception or the assistance program has received a waiver from this requirement;
- The recipient is exempt from this requirement under [31 CFR 208.4](#); or,
- The recipient is a fellowship recipient pursuant to [40 CFR Part 46](#).

EPA will not make payments to recipients until the ASAP enrollment requirement is met unless the recipients fall under one of the above categories. Recipients may request exceptions using the procedures below but only EPA programs may obtain waivers.

To enroll in ASAP, complete the ASAP Initiate Enrollment form located at:

<http://www2.epa.gov/financial/forms> and email it to LVFC-grants@epa.gov or mail it to:

USEPA LVFC
4220 S. Maryland Pkwy Bldg. C, Suite 503
Las Vegas, NV 89119

Under this payment mechanism, the recipient initiates an electronic payment request online via ASAP, which is approved or rejected based on the amount of available funds authorized by EPA in the recipient's ASAP account. Approved payments are credited to the account at the financial institution of the recipient organization set up by the recipient during the ASAP enrollment process. Additional information concerning ASAP and enrollment can be obtained by contacting the EPA Las Vegas Finance Center (LVFC), at 702-798-2485, or by visiting:

https://www.fiscal.treasury.gov/fsservices/gov/pmt/asap/asap_home.htm.

EPA will grant exceptions to the ASAP enrollment requirement only in situations in which the recipient demonstrates to EPA that receiving payment via ASAP places an undue administrative or financial management burden on the recipient or EPA determines that granting the waiver is in the public interest. Recipients may request an exception to the requirement by following the procedures specified in [RAIN-2018-G06](#).

Proper Payment Drawdown (for recipients other than states)

a. As required by [2 CFR 200.305\(b\)](#), the recipient must draw funds from ASAP only for the minimum amounts needed for actual and immediate cash requirements to pay employees, contractors, subrecipients or to satisfy other obligations for allowable costs under this assistance agreement. The timing and amounts of the drawdowns must be as close as administratively feasible to actual disbursements of EPA funds. Disbursement within 5 business days of drawdown will comply with this requirement and the recipient agrees to meet this standard when performing this award.

b. Recipients may not retain more than 5% of the amount drawn down, or \$1,000 whichever is less, 5 business days after drawdown to materially comply with the standard. Any EPA funds subject to this paragraph that remain undisbursed after 5 business days must be fully disbursed within 15 business days of draw down or be returned to EPA.

- c. If the recipient draws down EPA funds in excess of that allowed by paragraph b., the recipient must contact LVFC-grants@epa.gov for instructions on whether to return the funds to EPA. Recipients must comply with the requirements [at 2 CFR 200.305\(b\)\(8\) and \(9\)](#) regarding depositing advances of Federal funds in interest bearing accounts.
- d. Information on how to repay EPA via check is available at <https://www.epa.gov/financial/makepayment>. Instructions on how to return funds to EPA electronically via ASAP are available at www.fms.treas.gov/asap.
- e. Failure on the part of the recipient to materially comply with this condition may, in addition to EPA recovery of the un-disbursed portions of the drawn down funds, lead to changing the payment method from advance payment to a reimbursable basis. EPA may also take other remedies for noncompliance under [2 CFR 200.207](#) and/or [200.338](#).
- f. If the recipient believes that there are extraordinary circumstances that prevent it from complying with the 5-business day disbursement requirement throughout the performance period of this agreement, recipients may request an exception to the requirement by following the procedures specified in [RAIN-2018-G06](#). EPA will grant exceptions to the 5-business day disbursement requirement only if the recipient demonstrates that compliance places an undue administrative or financial management burden or EPA determines that granting the exception is in the public interest.

Selected Items of Cost

5. Consultant Cap

EPA participation in the salary rate (excluding overhead) paid to individual consultants retained by recipients or by a recipient's contractors or subcontractors shall be limited to the maximum daily rate for a Level IV of the Executive Schedule, available at: <https://www.opm.gov/policy-data-oversight/pay-leave/salaries-wages/>, to be adjusted annually. This limit applies to consultation services of designated individuals with specialized skills who are paid at a daily or hourly rate. This rate does not include transportation and subsistence costs for travel performed (the recipient will pay these in accordance with their normal travel reimbursement practices).

Subagreements with firms for services which are awarded using the procurement requirements in Subpart D of 2 CFR 200 are not affected by this limitation unless the terms of the contract provide the recipient with responsibility for the selection, direction and control of the individuals who will be providing services under the contract at an hourly or daily rate of compensation. See 2 CFR 1500.9.

6. Establishing and Managing Subawards

If the recipient chooses to pass funds from this assistance agreement to other entities, the recipient must comply with applicable provisions of 2 CFR Part 200 and the EPA Subaward Policy, which may be found at: <https://epa.gov/grants/epa-subaward-policy>.

As a pass-through entity, the recipient agrees to:

- 6.1.** Be responsible for selecting subrecipients and as appropriate conducting subaward competitions using a system for properly differentiating between subrecipients and procurement contractors under the standards at 2 CFR 200.330 and EPA's supplemental guidance in Appendix A of the EPA Subaward Policy.

- a.** For-profit organizations and individual consultants, in almost all cases, are not eligible

subrecipients under EPA financial assistance programs and the pass-through entity must obtain prior written approval from EPA's Award Official for subawards to these entities unless the EPA-approved budget and work plan for this agreement contain a precise description of such subawards.

b. Stipends and travel assistance for trainees (including interns) and similar individuals who are not employees of the pass-through entity must be classified as participant support costs rather than subawards as required by 2 CFR 200.75 and 2 CFR 200.92.

6.2. Establish and follow a system that ensures all subaward agreements are in writing and contain all of the elements required by 2 CFR 200.331(a). EPA has developed a template for subaward agreements that is available in Appendix D of the EPA Subaward Policy.

6.3. Prior to making subawards, ensure that each subrecipient has a "unique entity identifier." This identifier is required for registering in the System for Award Management (SAM) and by 2 CFR Part 25 and 2 CFR 200.331(a)(1). The unique entity identifier currently is the subrecipient's Data Universal Numbering System (DUNS) number. Information regarding obtaining a DUNS number and registering in SAM is available in the General Condition of the pass-through entity's agreement with EPA entitled "**Central Contractor Registration/System for Award Management and Universal Identifier Requirements**" T&C of the pass-through entity's agreement with the EPA.

6.4. Ensure that subrecipients are aware that they are subject to the same requirements as those that apply to the pass-through entity's EPA award as required by 2 CFR 200.331(a)(2). These requirements include, among others:

a. Title VI of the Civil Rights Act and other Federal statutes and regulations prohibiting discrimination in Federal financial assistance programs, as applicable.

b. Reporting Subawards and Executive Compensation under Federal Funding Accountability and Transparency Act (FFATA) set forth in the General Condition pass-through entity's agreement with EPA entitled "**Reporting Subawards and Executive Compensation.**"

c. Limitations on individual consultant fees as set forth in 2 CFR 1500.9 and the General Condition of the pass-through entity's agreement with EPA entitled "**Consultant Fee Cap.**"

d. EPA's prohibition on paying management fees as set forth in General Condition of the pass-through entity's agreement with EPA entitled "**Management Fees.**"

e. The Procurement Standards in 2 CFR Part 200 including those requiring competition when the subrecipient acquires goods and services from contractors (including consultants). EPA provides general information on other statutes, regulations and Executive Orders on the Grants internet site at www.epa.gov/grants. Many Federal requirements are agreement or program specific and EPA encourages pass-through entities to review the terms of their assistance agreement carefully and consult with their EPA Project Officer for advice if necessary.

6.5. Establish and follow a system for evaluating subrecipient risks of noncompliance with Federal statutes, regulations and the terms and conditions of the subaward as required by 2 CFR 200.331(b) and document the evaluation. Risk factors may include:

a. Prior experience with same or similar subawards;

b. Results of previous audits;

c. Whether new or substantially changed personnel or systems, and;

d. Extent and results of Federal awarding agency or the pass-through entity's monitoring.

- 6.6.** Establish and follow a process for deciding whether to impose additional requirements on subrecipients based on risk factors as required by 2 CFR 200.331(c). Examples of additional requirements authorized by 2 CFR 200.207 include:
- a.** Requiring payments as reimbursements rather than advance payments;
 - b.** Withholding authority to proceed to the next phase until receipt of evidence of acceptable performance within a given period of performance;
 - c.** Requiring additional, more detailed financial reports;
 - d.** Requiring additional project monitoring;
 - e.** Requiring the non-Federal entity to obtain technical or management assistance, and
 - f.** Establishing additional prior approvals.
- 6.7.** Establish and follow a system for monitoring subrecipient performance that includes the elements required by 2 CFR 200.331(d) and report the results of the monitoring in performance reports as provided in the reporting terms and conditions of this agreement.
- 6.8.** Establish and maintain an accounting system which ensures compliance with the \$25,000 limitation at 2 CFR 200.68 on including subaward costs in Modified Total Direct Cost for the purposes of distributing indirect costs.
- 6.9.** Work with EPA's Project Officer to obtain the written consent of EPA's Office of International and Tribal Affairs (OITA), prior to awarding a subaward to a foreign or international organization, or a subaward to be performed in a foreign country even if that subaward is described in a proposed scope of work.
- 6.10.** Obtain written approval from EPA's Award Official for any subawards that are not described in the approved work plan in accordance with 2 CFR Part 200.308.
- 6.11.** Obtain the written approval of EPA's Award Official prior to awarding a subaward to an individual if the EPA-approved scope of work does not include a description of subawards to individuals.
- 6.12.** Establish and follow written procedures under 2 CFR 200.302(b)(7) for determining that subaward costs are allowable in accordance with 2 CFR Part 200, Subpart E and the terms and conditions of this award. These procedures may provide for allowability determinations on a pre-award basis, through ongoing monitoring of costs that subrecipients incur, or a combination of both approaches provided the pass-through entity documents its determinations.
- 6.13.** Establish and maintain a system under 2 CFR 200.331(d)(3) and 2 CFR 200.521(c) for issuing management decisions for audits of subrecipients that relate to Federal awards. However, the recipient remains accountable to EPA for ensuring that unallowable subaward costs initially paid by EPA are reimbursed or mitigated through offset with allowable costs whether the recipient recovers those costs from the subrecipient or not.
- 6.14.** As provided in 2 CFR 200.332, pass-through entities must obtain EPA approval to make fixed amount subawards. EPA is restricting the use of fixed amount subawards to a limited number of situations that are authorized in official EPA pilot projects. Recipients should consult with their EPA Project Officer regarding the status of these pilot projects.

By accepting this award, the recipient is certifying that it either has systems in place to comply with the requirements described in Items 7.1 through 7.14 above or will refrain from making subawards until the systems are designed and implemented.

7. Management Fees

Management fees or similar charges in excess of the direct costs and approved indirect rates are not allowable. The term "management fees or similar charges" refers to expenses added to the direct costs in order to accumulate and reserve funds for ongoing business expenses; unforeseen liabilities; or for other similar costs which are not allowable under this assistance agreement. Management fees or similar charges may not be used to improve or expand the project funded under this agreement, except to the extent authorized as a direct cost of carrying out the scope of work.

8. Federal Employee Costs

The recipient understands that none of the funds for this project (including funds contributed by the recipient as cost sharing) may be used to pay for the travel of Federal employees or for other costs associated with Federal participation in this project unless a Federal agency will be providing services to the recipient as authorized by a Federal statute.

9. Foreign Travel

EPA policy requires that all foreign travel must be approved by its Office of International and Tribal Affairs. The recipient agrees to obtain prior EPA approval before using funds available under this agreement for international travel unless the trip(s) are already described in the EPA approved budget for this agreement. Foreign travel includes trips to Mexico and Canada but does not include trips to Puerto Rico, the U.S. Territories or possessions. Recipients that request post-award approval to travel frequently to Mexico and Canada by motor vehicle (e.g. for sampling or meetings) may describe their proposed travel in general terms in their request for EPA approval. Requests for prior approval must be submitted to the Project Officer for this agreement.

10. The Fly America Act and Foreign Travel

The recipient understands that all foreign travel **funded under this assistance agreement** must comply with the Fly America Act. All travel must be on U.S. air carriers certified under 49 U.S.C. Section 40118, to the extent that service by such carriers is available even if foreign air carrier costs are less than the American air carrier.

Reporting and Additional Post-Award Requirements

11. Central Contractor Registration/System for Award Management and Universal Identifier Requirements

11.1. Requirement for System for Award Management (SAM) Unless exempted from this requirement under 2 CFR 25.110, the recipient must maintain the currency of the organization's information in SAM until the submittal of the final financial report required under this award or receipt of the final payment, whichever is later. This requires that the recipient reviews and updates the information at least annually after the initial registration, and more frequently if required by changes in the information or another award term.

11.2. Requirement for Data Universal Numbering System (DUNS) numbers. If the recipient is authorized to make subawards under this award, the recipient:

- a.** Must notify potential subrecipients that no entity (definition paragraph 12.3 of this award term) may receive a subaward unless the entity has provided its DUNS number.
- b.** May not make a subaward to an entity unless the entity has provided its DUNS number.

11.3. Definitions. For the purposes of this award term:

- a. System for Award Management (SAM)** means the Federal repository into which an entity must provide information required for the conduct of business as a recipient. Additional information about registration procedures may be found at the System for

- Award Management (SAM) Internet site: <https://www.sam.gov>.
- b. **Data Universal Numbering System (DUNS) number** means the nine-digit number established and assigned by Dun and Bradstreet, Inc. (D&B) to uniquely identify business entities. A DUNS number may be obtained from D&B by telephone (currently 866-705-5711) or the Internet (currently at <http://fedgov.dnb.com/webform>).
 - c. **Entity**, as it is used in this award term, means all of the following, as defined at 2 CFR part 25, subpart C:
 - 11.3.c.1. A Governmental organization, which is a State, local government, or Indian tribe;
 - 11.3.c.2. A foreign public entity;
 - 11.3.c.3. A domestic or foreign nonprofit organization;
 - 11.3.c.4. A domestic or foreign for-profit organization; and
 - 11.3.c.5. A Federal agency, but only as a subrecipient under an award or subaward to a non-Federal entity.
 - d. **Subaward:**
 - 11.3.d.1. This term means a legal instrument to provide support for the performance of any portion of the substantive project or program for which the recipient received this award and that the recipient awards to an eligible subrecipient.
 - 11.3.d.2. The term does not include procurement of property and services needed to carry out the project or program (for further explanation, see 2 CFR 200 Subpart D).
 - 11.3.d.3. A subaward may be provided through any legal agreement, including an agreement that the recipient considers a contract.
 - e. **Subrecipient** means an entity that:
 - 11.3.e.1. Receives a subaward from the recipient under this award; and
 - 11.3.e.2. Is accountable to the recipient for the use of the Federal funds provided by the subaward.

12. Reporting Subawards and Executive Compensation

12.1. Reporting of first-tier subawards.

- a. **Applicability.** Unless the recipient is exempt as provided in paragraph 12.4. of this award term, the recipient must report each action that obligates \$25,000 or more in Federal funds that does not include Recovery funds (as defined in section 1512(a)(2) of the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5) for a subaward to an entity (see definitions in paragraph 10.5 of this award term).
- b. **Where and when to report.** (1) The recipient must report each obligating action described in paragraph 10.1.1 of this award term to www.fsrs.gov. (2) For subaward information, report no later than the end of the month following the month in which the obligation was made. (For example, if the obligation was made on any date during the month of November of a given year, the obligation must be reported by no later than December 31 of that year.)
- c. **What to report.** The recipient must report the information about each obligating action as described in the submission instructions available at: <http://www.fsrs.gov>.

12.2. Reporting Total Compensation of Recipient Executives.

- a. **Applicability and what to report.** The recipient must report total compensation for each of their five most highly compensated executives for the preceding completed fiscal year, if:
 - 12.2.a.1. the total Federal funding authorized to date under this award is \$25,000 or more;
 - 12.2.a.2. in the preceding fiscal year, the recipient received: (i.) 80 percent or more of their annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR

170.320 (and subawards); (ii.) and \$25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and

12.2.a.3. The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at: <http://www.sec.gov/answers/execomp.htm>.)

b. Where and when to report. The recipient must report executive total compensation described in paragraph 12.2.a of this award term: (i.) As part of the registration Central System for Award Management profile available at www.sam.gov. (ii.) By the end of the month following the month in which this award is made, and annually thereafter.

12.3. Reporting of Total Compensation of Subrecipient Executives.

a. Applicability and what to report. Unless exempt as provided in paragraph 12.4. of this award term, for each first-tier subrecipient under this award, the recipient shall report the names and total compensation of each of the subrecipient's five most highly compensated executives for the subrecipient's preceding completed fiscal year, if:

12.3.a.1. in the subrecipient's preceding fiscal year, the subrecipient received: (i.) 80 percent or more of its annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and (ii.) \$25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts), and Federal financial assistance subject to the Transparency Act (and subawards); and

12.3.a.2. The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at: <http://www.sec.gov/answers/execomp.htm>.)

b. Where and when to report. The recipient must report subrecipient executive total compensation described in paragraph 12.3.a. of this award term:

12.3.b.1. To the recipient.

12.3.b.2. By the end of the month following the month during which the recipient makes the subaward. For example, if a subaward is obligated on any date during the month of October of a given year (i.e., between October 1 and 31), the recipient must report any required compensation information of the subrecipient by November 30 of that year.

12.4. Exemptions

a. If, in the previous tax year, the recipient had gross income, from all sources, under \$300,000, the recipient is exempt from the requirements to report:

12.4.a.1. subawards, and the total compensation of the five most highly compensated executives of any subrecipient.

12.5. Definitions. For purposes of this award term:

a. Entity means all of the following, as defined in 2 CFR Part 25: (i.) A Governmental organization, which is a State, local government, or Indian tribe; (ii.) A foreign public entity; (iii.) A domestic or foreign nonprofit organization; (iv.) A domestic or foreign for-profit organization; (v.) A Federal agency, but only as a subrecipient under an award or subaward to a non-Federal entity.

- b. **Executive** means officers, managing partners, or any other employees in management positions.
- c. **Subaward:**
 - 12.5.c.1. This term means a legal instrument to provide support for the performance of any portion of the substantive project or program for which you received this award and that the recipient award to an eligible subrecipient.
 - 12.5.c.2. The term does not include procurement of property and services needed to carry out the project or program (for further explanation, see 2 CFR 200 Subpart D).
 - 12.5.c.3. A subaward may be provided through any legal agreement, including an agreement that the recipient or a subrecipient considers a contract.
- d. **Subrecipient** means an entity that:
 - 12.5.d.1. Receives a subaward from the recipient under this award; and
 - 12.5.d.2. Is accountable to the recipient for the use of the Federal funds provided by the subaward.
- e. **Total compensation** means the cash and noncash dollar value earned by the executive during the recipient's or subrecipient's preceding fiscal year and includes the following (for more information see 17 CFR 229.402(c)(2)):
 - 12.5.e.1. Salary and bonus.
 - 12.5.e.2. Awards of stock, stock options and stock appreciation rights. Use the dollar amount recognized for financial statement reporting purposes with respect to the fiscal year in accordance with the Statement of Financial Accounting Standards No. 123 (Revised 2004) (FAS 123R), Shared Based Payments.
 - 12.5.e.3. Earnings for services under non-equity incentive plans. This does not include group life, health, hospitalization or medical reimbursement plans that do not discriminate in favor of executives, and are available generally to all salaried employees.
 - 12.5.e.4. Change in pension value. This is the change in present value of defined benefit and actuarial pension plans.
 - 12.5.e.5. Above-market earnings on deferred compensation which is not tax-qualified.
 - 12.5.e.6. Other compensation, if the aggregate value of all such other compensation (e.g. severance, termination payments, value of life insurance paid on behalf of the employee, perquisites or property) for the executive exceeds \$10,000.

13. Recipient Integrity and Performance Matters - Reporting of Matters Related to Recipient Integrity and Performance

13.1. General Reporting Requirement

If the total value of your currently active grants, cooperative agreements, and procurement contracts from all Federal awarding agencies exceeds \$10,000,000 for any period of time during the period of performance of this Federal award, then you as the recipient during that period of time must maintain the currency of information reported to the System for Award Management (SAM) that is made available in the designated integrity and performance system (currently the Federal Awardee Performance and Integrity Information System (FAPIIS)) about civil, criminal, or administrative proceedings described in paragraph 2 of this award term and condition. This is a statutory requirement under section 872 of Public Law 110-417, as amended (41 U.S.C. 2313). As required by section 3010 of Public Law 111-212, all information posted in the designated integrity and performance system on or after April 15, 2011, except past performance reviews required for Federal procurement contracts, will be publicly available.

13.2. Proceedings About Which You Must Report

Submit the information required about each proceeding that:

- a. Is in connection with the award or performance of a grant, cooperative agreement, or procurement contract from the Federal Government;
- b. Reached its final disposition during the most recent five-year period; and
- c. Is one of the following:

13.2.c.1. A criminal proceeding that resulted in a conviction, as defined in paragraph 5 of this award term and condition;

13.2.c.2. A civil proceeding that resulted in a finding of fault and liability and payment of a monetary fine, penalty, reimbursement, restitution, or damages of \$5,000 or more;

13.2.c.3. An administrative proceeding, as defined in paragraph 5. of this award term and condition, that resulted in a finding of fault and liability and your payment of either a monetary fine or penalty of \$5,000 or more or reimbursement, restitution, or damages in excess of \$100,000; or

13.2.c.4. Any other criminal, civil, or administrative proceeding if:

13.2.c.4.1. It could have led to an outcome described in paragraph 13.2.c.1, 13.2.c.2, or 13.2.c.3 of this award term and condition;

13.2.c.4.2. It had a different disposition arrived at by consent or compromise with an acknowledgment of fault on your part; and

13.2.c.4.3. The requirement in this award term and condition to disclose information about the proceeding does not conflict with applicable laws and regulations.

13.3. Reporting Procedures

Enter in the SAM Entity Management area the information that SAM requires about each proceeding described in paragraph 2 of this award term and condition. You do not need to submit the information a second time under assistance awards that you received if you already provided the information through SAM because you were required to do so under Federal procurement contracts that you were awarded.

13.4. Reporting Frequency

During any period of time when you are subject to the requirement in paragraph 11.1 of this award term and condition, you must report proceedings information through SAM for the most recent five year period, either to report new information about any proceeding(s) that you have not reported previously or affirm that there is no new information to report. Recipients that have Federal contract, grant, and cooperative agreement awards with a cumulative total value greater than \$10,000,000 must disclose semiannually any information about the criminal, civil, and administrative proceedings.

13.5. Definitions

For purposes of this award term and condition:

a. Administrative proceeding means a non-judicial process that is adjudicatory in nature in order to make a determination of fault or liability (*e.g.*, Securities and Exchange Commission Administrative proceedings, Civilian Board of Contract Appeals proceedings, and Armed Services Board of Contract Appeals proceedings). This includes proceedings at the Federal and State level but only in connection with performance of a Federal contract or grant. It does not include audits, site visits, corrective plans, or inspection of deliverables.

b. Conviction, for purposes of this award term and condition, means a judgment or conviction of a criminal offense by any court of competent jurisdiction, whether entered upon a verdict or a plea, and includes a conviction entered upon a plea of *nolo contendere*.

c. Total value of currently active grants, cooperative agreements, and procurement contracts includes—

13.5.c.1. Only the Federal share of the funding under any Federal award with a recipient cost share or match; and

13.5.c.2. The value of all expected funding increments under a Federal award and options, even if not yet exercised.

14. Federal Financial Reporting (FFR)

Pursuant to 2 CFR 200.327 and 200.343, EPA recipients must submit the Federal Financial Report (SF-425) at least annually and no more frequently than quarterly. EPA's standard reporting frequency is annual unless an EPA Region has included an additional term and condition specifying greater reporting frequency within this award document. EPA recipients must submit the SF-425 no later than

30 days after the end of each specified reporting period for quarterly and semi-annual reports, and 90 calendar days for annual and final reports. Extension of reporting due dates may be approved by EPA upon request of the recipient. The FFR form is available on the internet at: <http://www2.epa.gov/financial/forms>. All FFRs must be submitted to the Las Vegas Finance Center (LVFC) via email LVFC-grants@epa.gov or mail it to:

USEPA LVFC
4220 S. Maryland Pkwy Bldg. C, Suite 503
Las Vegas, NV 89119

The LVFC will make adjustments, as necessary, to obligated funds after reviewing and accepting a final Federal Financial Report. Recipients will be notified and instructed by EPA if they must complete any additional forms for the closeout of the assistance agreement.

15. Indirect Cost Rate Agreements

This term and condition implements EPA's [Indirect Cost Policy for Recipients of EPA Assistance Agreements](#) (IDC Policy) and applies to all EPA assistance agreements unless there are [statutory or regulatory limits on IDCs](#).

In order for the assistance agreement recipient to use EPA funding for indirect costs, the IDC category of the recipient's assistance agreement award budget must include an amount for IDCs and at least one of the following must apply:

- With the exception of "exempt" agencies and Institutions of Higher Education as noted below, all recipients must have one of the following current (not expired) IDC rates, including IDC rates that have been extended by the cognizant agency:
 - Provisional;
 - Final;
 - Fixed rate with carry-forward;
 - Predetermined;
 - 10% *de minimis* rate authorized by 2 CFR 200.414(f)
 - EPA-approved use of one of the following on an exception basis for EPA agreements:
 - 10% *de minimis* as detailed in section 6.3 of the IDC Policy; or
 - Expired fixed rate with carry-forward as detailed in section 6.4.a. of the IDC Policy.
- "Exempt" state or local governmental departments or agencies are agencies that receive up to and including \$35,000,000 in Federal funding per the department or agency's fiscal year, and must have an IDC rate proposal developed in accordance with [2 CFR 200 Appendix VII](#), with documentation maintained and available for audit.
- Institutions of Higher Education must use the IDC rate in place at the time of award for the life of the assistance agreement (unless the rate was provisional at time of award, in which case the rate will change once it becomes final). As provided by [2 CFR Part 200, Appendix III\(C\)\(7\)](#), the term "life of the assistance agreement", means each competitive segment of the project. Additional information is available in the regulation.

IDCs incurred during any period of the assistance agreement that are not covered by the provisions above are not allowable costs, and must not be drawn down by the recipient. Recipients may budget for IDCs pending approval of their IDC rate by the cognizant Federal agency or an exception granted by EPA under section 6.3 or 6.4 of the IDC Policy. However, recipients may not draw down IDCs until their rate is approved or EPA grants an exception.

This term and condition does not govern indirect rates for subrecipients or recipient procurement

contractors under EPA assistance agreements. Pass-through entities are required to comply with [2 CFR 200.331\(a\)\(4\)](#) when establishing indirect cost rates for subawards.

See the [Indirect Cost Guidance for Recipients of EPA Assistance Agreements](#) for additional information.

16. Audit Requirements

In accordance with 2 CFR 200.501(a), the recipient hereby agrees to obtain a single audit from an independent auditor, if their organization expends \$750,000 or more in total Federal funds in their fiscal year beginning on or after December 26, 2014.

The recipient must submit the form SF-SAC and a Single Audit Report Package within 9 months of the end of the recipient's fiscal year or 30 days after receiving the report from an independent auditor. The SF-SAC and a Single Audit Report Package MUST be submitted using the Federal Audit Clearinghouse's Internet Data Entry System available at:

[https://harvester.census.gov/facides/\(S\(3wauez2yufokbe3engv0dtek\)\)/account/login.aspx](https://harvester.census.gov/facides/(S(3wauez2yufokbe3engv0dtek))/account/login.aspx).

For complete information on how to accomplish the single audit submissions, you will need to visit the Federal Audit Clearinghouse Web site: <https://harvester.census.gov/facweb/Default.aspx>.

17. Closeout Requirements

Reports required for closeout of the assistance agreement must be submitted in accordance with this agreement. Submission requirements and frequently asked questions can also be found at:

<http://www2.epa.gov/grants/frequently-asked-questions-about-closeout-information>.

18. Suspension and Debarment

Recipient shall fully comply with Subpart C of 2 C.F.R. Part 180 entitled, "Responsibilities of Participants Regarding Transactions Doing Business With Other Persons," as implemented and supplemented by 2 C.F.R. Part 1532. Recipient is responsible for ensuring that any lower tier covered transaction, as described in Subpart B of 2 C.F.R. Part 180, entitled "Covered Transactions," and 2 C.F.R. § 1532.220, includes a term or condition requiring compliance with 2 C.F.R. Part 180, Subpart C. Recipient is responsible for further requiring the inclusion of a similar term and condition in any subsequent lower tier covered transactions. Recipient acknowledges that failing to disclose the information required under 2 C.F.R. § 180.335 to the EPA office that is entering into the transaction with the recipient may result in the delay or negation of this assistance agreement, or pursuance of administrative remedies, including suspension and debarment. Recipients may access the System for Award Management (SAM) exclusion list at <https://www.sam.gov> to determine whether an entity or individual is presently excluded or disqualified.

19. Representation by Corporations Regarding Delinquent Tax Liability or a Felony Conviction under any Federal Law. This award is subject to the provisions contained in an appropriations act(s) which prohibits the Federal Government from entering into a contract, memorandum of understanding, or cooperative agreement with, make a grant to, or provide a loan or loan guarantee to any corporation having a delinquent Federal tax liability or a felony conviction under any Federal law, unless the agency has considered suspension or debarment of the corporation and has made a determination that this further action is not necessary to protect the interests of the Government. A "corporation" is a legal entity that is separate and distinct from the entities that own, manage, or control it. It is organized and incorporated under the jurisdictional authority of a governmental body, such as a State or the District of Columbia. A corporation may be a for-profit or non-profit organization.

As required by the appropriations act(s) prohibitions, the Government will not enter into a contract, memorandum of understanding, or cooperative agreement with, make a grant to, or provide a loan or loan guarantee with any corporation that — (1) Has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax

liability, where the awarding agency is aware of the unpaid tax liability, unless an agency has considered suspension or debarment of the corporation and made a determination that suspension or debarment is not necessary to protect the interests of the Government; or (2) Was convicted of a felony criminal violation under any Federal law within the preceding 24 months, where the awarding agency is aware of the conviction, unless an agency has considered suspension or debarment of the corporation and made a determination that this action is not necessary to protect the interests of the Government.

By accepting this award, the recipient represents that it is not a corporation that has any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability; and it is not a corporation that was convicted of a felony criminal violation under a Federal law within the preceding 24 months.

Alternatively, by accepting this award, the recipient represents that it disclosed unpaid Federal tax liability information and/or Federal felony conviction information to the EPA. The Recipient may accept this award if the EPA Suspension and Debarment Official has considered suspension or debarment of the corporation based on a tax liabilities and/or Federal felony convictions and determined that suspension or debarment is not necessary to protect the Government's interests.

If the recipient fails to comply with this term and condition, EPA will annul this agreement and may recover any funds the recipient has expended in violation of the appropriations act(s) prohibition(s). The EPA may also pursue other administrative remedies as outlined in 2 CFR 200.338, and may also pursue suspension and debarment.

20. Disclosing Conflict of Interests

20.1. For awards to Non-federal entities and individuals (other than states and fellowship recipients under 40 CFR Part 46).

As required by 2 CFR 200.112, EPA has established a policy (COI Policy) for disclosure of conflicts of interest (COI) that may affect EPA financial assistance awards. EPA's COI Policy is posted at <http://www2.epa.gov/grants/epas-financial-assistance-conflict-interest-policy>. The posted version of EPA's COI Policy is applicable to new funding (initial awards, supplemental and incremental funding) awarded on or after October 1, 2015. This COI term and condition supersedes prior COI terms and conditions for this award based on either EPA's May 22, 2015 Revised Interim COI Policy or December 26, 2014 Interim COI Policy.

For competitive awards, recipients must disclose any competition related COI described in section 4.0(a) of the COI Policy that are discovered after award to the EPA Grants Specialist listed on the Assistance Agreement/Amendment within 30 calendar days of discovery of the COI. The Grants Specialist will respond to any such disclosure within 30 calendar days.

EPA's COI Policy requires that recipients have systems in place to address, resolve and disclose to EPA COIs described in sections 4.0(b), (c) and/or (d) of the COI Policy that affect any contract or subaward regardless of amount funded under this award. The recipient's COI Point of Contact for the award must disclose any COI to the EPA Grants Specialist listed on the Assistance Agreement/Amendment within 30 calendar days of the discovery of the potential COI and their approach for resolving the COI.

EPA's COI Policy requires that subrecipients have systems in place to address, resolve and disclose COI's described in section 4.0(b)(c) and (d) of the COI Policy regardless of the amount of the transaction. Recipients who are pass-through entities as defined at 2 CFR 200.74 must require that subrecipients being considered for or receiving subawards

disclose COI to the pass-through entities in a manner that, at a minimum, is in accordance with sections 5.0(d) and 7.0(c) of EPA's COI Policy. Pass-through entities must disclose the subrecipient COI along with the approach for resolving the COI to the EPA Grants Specialist listed on the Assistance Agreement/Amendment within 30 calendar days of receiving notification of the COI by the subrecipient.

EPA only requires that recipients and subrecipients disclose COI's that are discovered under their systems for addressing and resolving COI. If recipients or subrecipients do not discover a COI, they do not need to advise EPA or the pass-through entity of the absence of a COI.

Upon notice from the recipient of a potential COI and the approach for resolving it, the Agency will then make a determination regarding the effectiveness of these measures within 30 days of receipt of the recipient's notice unless a longer period is necessary due to the complexity of the matter. Recipients may not request payment from EPA for costs for transactions subject to the COI pending notification of EPA's determination. Failure to disclose a COI may result in cost disallowances.

Disclosure of a potential COI will not necessarily result in EPA disallowing costs, with the exception of procurement contracts that the Agency determines violate 2 CFR 200.318(c)(1) or (2), provided the recipient notifies EPA of measures the recipient or subrecipient has taken to eliminate, neutralize or mitigate the conflict of interest when making the disclosure.

20.2. For awards to states including state universities that are state agencies or instrumentalities

As required by 2 CFR 200.112, EPA has established a policy (COI Policy) for disclosure of conflicts of interest (COI) that may affect EPA financial assistance awards. EPA's COI Policy is posted at:

<http://www2.epa.gov/grants/epas-financial-assistance-conflict-interest-policy>. The posted version of EPA's COI Policy is applicable to new funding (initial awards, supplemental, incremental funding) awarded on or after October 1, 2015. This COI term and condition supersedes prior COI terms and conditions for this award based on either EPA's May 22, 2015 Revised Interim COI Policy or December 26, 2014 Interim COI Policy.

For competitive awards, recipients must disclose any competition related COI described in section 4.0(a) of the COI Policy that are discovered after award to the EPA Grants Specialist listed on the Assistance Agreement/Amendment within 30 calendar days of discovery of the COI. The Grants Specialist will respond to any such disclosure within 30 calendar days.

States including state universities that are state agencies and instrumentalities receiving funding from EPA are only required to disclose subrecipient COI as a pass-through entity as defined by 2 CFR 200.74. Any other COI are subject to state laws, regulations and policies. EPA's COI Policy requires that subrecipients have systems in place to address, resolve and disclose COIs described in section 4.0(b)(c) and (d) of the COI Policy that arise after EPA made the award regardless of the amount of the transaction. States who are pass-through entities as defined at 2 CFR 200.74 must require that subrecipients being considered for or receiving subawards disclose COI to the state in a manner that, as a minimum, in accordance with sections 5.0(d) and 7.0(c) of EPA's COI Policy. States must disclose the subrecipient COI along with the approach for resolving the COI to the EPA Grants Specialist listed on the Assistance Agreement/Amendment within 30 calendar days of receiving notification of the COI by the subrecipient.

EPA only requires that subrecipients disclose COI's to state pass-through entities that are discovered under their systems for addressing, resolving, and disclosing COI. If subrecipients do not discover a COI, they do not need to advise state pass-through entities of the absence of a COI.

Upon receiving notice of a potential COI and the approach for resolving it, the Agency will make a determination regarding the effectiveness of these measures within 30 days of receipt of the state's notice of a subrecipient COI unless a longer period is necessary due to the complexity of the matter. States may not request payment from EPA for costs for transactions subject to the COI pending notification of EPA's determination. A subrecipient's failure to disclose a COI to the state and EPA may result in cost disallowances.

Disclosure of a potential subrecipient COI will not necessarily result in EPA disallowing costs, with the exception of procurement contracts that the Agency determines violate 2 CFR 200.318(c)(1) or (2), provided the subrecipient has taken measures that EPA and the state agree eliminate, neutralize or mitigate the conflict of interest.

21. Transfer of Funds

Applicable to all assistance agreements other than Continuing Environmental Program Grants subject to 40 CFR 35.114 and 40 CFR 35.514 when the amount of the award exceeds the 2 CFR 200.88 Simplified Acquisition Threshold.

(1) As provided at 2 CFR 200.308(e), recipient must obtain prior approval from EPA's Grants Management Officer if the cumulative amount of funding transfers among direct budget categories or programs, functions and activities exceeds 10% of the total budget. Recipients must submit requests for prior approval to the Grant Specialist and Grants Management Officer for this agreement.

(2) Recipients must notify EPA's Grant Specialist and Project Officer of cumulative funding transfers among direct budget categories or programs, functions and activities that do not exceed 10% of the total budget for the agreement. Recipients must also notify EPA when transferring funds from direct budget categories to the indirect cost category or from the indirect cost category to the direct cost category. Prior approval by EPA's Grant Management Officer is required if the transfer involves any of the items listed in 2 CFR 200.407 that EPA did not previously approve at time of award or in response to a previous post-award request by the recipient.

Applicable to Continuing Environmental Program Grants subject to 40 CFR 35.114 and 40 CFR 35.514. when the amount of the award exceeds the 2 CFR 200.88 Simplified Acquisition Threshold.

Recipients of continuing environmental program grants subject to 40 CFR 35.114 and 40 CFR 35.514 must notify EPA of funding transfers among direct budget categories, programs, functions and activities or transfers that change amounts budgeted for indirect costs, but prior EPA approval is not required unless the transfer results in significant changes to work plan commitments. Recipients must obtain prior written approval if the transfer involves any of the items listed in 2 CFR 200.407 that EPA did not previously approve at time of award, in response to a previous post-award request by the recipient, or is subject to an EPA waiver of prior approval under 40 CFR 35.114(d) or 40 CFR 35.514(d).

Programmatic General Terms and Conditions

22. Sufficient Progress

EPA will measure sufficient progress by examining the performance required under the workplan in conjunction with the milestone schedule, the time remaining for performance within the project period and/or the availability of funds necessary to complete the project. EPA may terminate the assistance agreement for failure to ensure reasonable completion of the project within the project period.

23. Copyrighted Material and Data

In accordance with 2 CFR 200.315, EPA has the right to reproduce, publish, use and authorize others to reproduce, publish and use copyrighted works or other data developed under this assistance agreement for Federal purposes.

Examples of a Federal purpose include but are not limited to: (1) Use by EPA and other Federal employees for official Government purposes; (2) Use by Federal contractors performing specific tasks for the Government; (3) Publication in EPA documents provided the document does not disclose trade secrets (e.g. software codes) and the work is properly attributed to the recipient through citation or otherwise; (4) Reproduction of documents for inclusion in Federal depositories; (5) Use by State, tribal and local governments that carry out delegated Federal environmental programs as “co-regulators” or act as official partners with EPA to carry out a national environmental program within their jurisdiction and; (6) Limited use by other grantees to carry out Federal grants provided the use is consistent with the terms of EPA’s authorization to the other grantee to use the copyrighted works or other data.

Under Item 6, the grantee acknowledges that EPA may authorize another grantee(s) to use the copyrighted works or other data developed under this grant as a result of:

- the selection of another grantee by EPA to perform a project that will involve the use of the copyrighted works or other data or;
- termination or expiration of this agreement.

In addition, EPA may authorize another grantee to use copyrighted works or other data developed with Agency funds provided under this grant to perform another grant when such use promotes efficient and effective use of Federal grant funds.

24. Patents and Inventions

Rights to inventions made under this assistance agreement are subject to federal patent and licensing regulations, which are codified at Title 37 CFR Part 401 and Title 35 USC Sections 200-212.

Pursuant to the Bayh-Dole Act (set forth in 35 USC 200-212), EPA retains the right to a worldwide, nonexclusive, nontransferable, irrevocable, paid-up license to practice the invention owned by the assistance agreement holder, as defined in the Act. To streamline the invention reporting process and to facilitate compliance with the Bayh-Dole Act, the recipient must utilize the Interagency Edison extramural invention reporting system at <http://iEdison.gov>. Annual utilization reports must be submitted through the system. The recipient is required to notify the Project Officer identified on the award document when an invention report, patent report, or utilization report is filed at <http://iEdison.gov>. EPA elects not to require the recipient to provide a report prior to the close-out of a funding agreement listing all subject inventions or stating that there were none.

In accordance with Executive Order 12591, as amended, government owned and operated laboratories can enter into cooperative research and development agreements with other federal laboratories, state and local governments, universities, and the private sector, and license, assign, or waive rights to intellectual property “developed by the laboratory either under such cooperative research or development agreements and from within individual laboratories.”

25. Acknowledgement Requirements for Non-ORD Assistance Agreements

The recipient agrees that any reports, documents, publications or other materials developed for public distribution supported by this assistance agreement shall contain the following statement:

"This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement (number) to (recipient). The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does the EPA endorse trade names or recommend the use of commercial products mentioned in this document."

Recipients of EPA Office of Research Development (ORD) research awards must follow the acknowledgement requirements outlined in the research T&Cs available at: <http://www.nsf.gov/awards/managing/rtc.jsp>. A Federal-wide workgroup is currently updating the Federal-Wide Research Terms and Conditions Overlay to the Uniform Administrative Requirements, Cost Principles and Audit Requirements for Federal Awards and when completed recipients of EPA ORD research must abide by the research T&Cs.

26. Electronic and Information Technology Accessibility

Recipients are subject to the program accessibility provisions of Section 504 of the Rehabilitation Act, codified in 40 CFR Part 7, which includes an obligation to provide individuals with disabilities reasonable accommodations and an equal and effective opportunity to benefit from or participate in a program, including those offered through electronic and information technology (“EIT”). In compliance with Section 504, EIT systems or products funded by this award must be designed to meet the diverse needs of users (e.g., U.S. public, recipient personnel) without barriers or diminished function or quality. Systems shall include usability features or functions that accommodate the needs of persons with disabilities, including those who use assistive technology. At this time, the EPA will consider a recipient’s websites, interactive tools, and other EIT as being in compliance with Section 504 if such technologies meet standards established under Section 508 of the Rehabilitation Act, codified at 36 CFR Part 1194. While Section 508 does not apply directly to grant recipients, we encourage recipients to follow either the 508 guidelines or other comparable guidelines that concern accessibility to EIT for individuals with disabilities.

Recipients may wish to consult the latest Section 508 guidelines issued by the U.S. Access Board or W3C’s Web Content Accessibility Guidelines (WCAG) 2.0 (see <http://www.access-board.gov/sec508/guide/index.htm>).

27. Human Subjects

Human subjects research is any activity that meets the regulatory definitions of both research AND human subject. *Research* is a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge. *Human subject* means a living individual about whom an investigator (whether professional or student) conducting research obtains (1) data through intervention or interaction with the individual, or (2) identifiable private information. [40 CFR 26.102 (d)(f)]

No research involving human subjects will be conducted under this agreement without prior written approval of the EPA to proceed with that research. If engaged in human subjects research as part of this agreement, the recipient agrees to comply with all applicable provisions of EPA Regulation 40 CFR 26 (Protection of Human Subjects). This includes, at Subpart A, the Basic Federal Policy for the Protection of Human Research Subjects, also known as the Common Rule. It also includes, at Subparts B, C, and D, prohibitions and additional protections for children, nursing women, pregnant women, and fetuses in research conducted or supported by EPA.

The recipient further agrees to comply with EPA’s procedures for oversight of the recipient’s compliance with 40 CFR 26, as given in EPA Order 1000.17 Change A1 (Policy and Procedures on Protection of Human Research Subjects in EPA Conducted or Supported Research). As per this order, no human subject may be involved in any research conducted under this assistance agreement, including recruitment, until the research has been approved or determined to be exempt by the EPA Human Subjects Research Review Official (HSRRO) after review of the approval or exemption determination of the Institutional Review Board(s) (IRB(s)) with jurisdiction over the research under 40 CFR 26.

For HSRRO approval, the recipient must forward to the Project Officer: (1) copies of all documents upon which the IRB(s) with jurisdiction based their approval(s) or exemption determination(s), (2) copies of the IRB approval or exemption determination letter(s), (3) copy of the IRB-approved consent forms and

subject recruitment materials, if applicable, and (4) copies of all supplementary IRB correspondence.

Following the initial approvals indicated above, the recipient must, as part of the annual report(s), provide evidence of continuing review and approval of the research by the IRB(s) with jurisdiction, as required by 40 CFR 26.109(e). Materials submitted to the IRB(s) for their continuing review and approval are to be provided to the Project Officer upon IRB approval. During the course of the research, investigators must promptly report any unanticipated problems involving risk to subjects or others according to requirements set forth by the IRB. In addition, any event that is significant enough to result in the removal of the subject from the study should also be reported to the Project Officer, even if the event is not reportable to the IRB of record.

28. Animal Subjects

The recipient agrees to comply with the Animal Welfare Act of 1966 (P.L. 89-544), as amended, 7 USC 2131-2156. Recipient also agrees to abide by the “U.S. Government Principles for the Utilization and Care of Vertebrate Animals used in Testing, Research, and Training.” (Federal Register 50(97): 20864-20865. May 20,1985). The nine principles can be viewed at <http://grants.nih.gov/grants/olaw/references/phspol.htm#USGovPrinciples>. For additional information about the Principles, the recipient should consult the *Guide for Care and Use of Laboratory Animals*, prepared by the Institute of Laboratory Animal Resources, National Research Council and can be accessed at: <http://www.nap.edu/readingroom/books/labrats/>.

29. Light Refreshments and/or Meals

APPLICABLE TO ALL AGREEMENTS EXCEPT STATE CONTINUING ENVIRONMENTAL PROGRAMS (AS DESCRIBED BELOW):

Unless the event(s) and all of its components are described in the approved workplan, the recipient agrees to obtain prior approval from EPA for the use of grant funds for light refreshments and/or meals served at meetings, conferences, training workshops and outreach activities (events). The recipient must send requests for approval to the EPA Project Officer and include:

- (1) An estimated budget and description for the light refreshments, meals, and/or beverages to be served at the event(s);
- (2) A description of the purpose, agenda, location, length and timing for the event; and,
- (3) An estimated number of participants in the event and a description of their roles.

Costs for light refreshments and meals for recipient staff meetings and similar day-to-day activities are not allowable under EPA assistance agreements.

Recipients may address questions about whether costs for light refreshments, and meals for events may be allowable to the recipient’s EPA Project Officer; however, the Agency Award Official or Grant Management Officer will make final determinations on allowability. Agency policy prohibits the use of EPA funds for receptions, banquets and similar activities that take place after normal business hours unless the recipient has provided a justification that has been expressly approved by EPA's Award Official or Grants Management Officer.

EPA funding for meals, light refreshments, and space rental may not be used for any portion of an event where alcohol is served, purchased, or otherwise available as part of the event or meeting, even if EPA funds are not used to purchase the alcohol.

Note: U.S. General Services Administration regulations define light refreshments for morning, afternoon or evening breaks to include, but not be limited to, coffee, tea, milk, juice, soft drinks, donuts, bagels, fruit, pretzels, cookies, chips, or muffins. (41 CFR 301-74.7)

FOR STATE CONTINUING ENVIRONMENTAL PROGRAM GRANT RECIPIENTS EXCLUDING STATE UNIVERSITIES:

If the state maintains systems capable of complying with federal grant regulations at 2 CFR 200.432 and 200.438, EPA has waived the prior approval requirements for the use of EPA funds for light refreshments and/or meals served at meetings, conferences, and training, as described above. The state may follow its own procedures without requesting prior approval from EPA. However, notwithstanding state policies, EPA funds may not be used for (1) evening receptions, or (2) other evening events (with the exception of working meetings). Examples of working meetings include those evening events in which small groups discuss technical subjects on the basis of a structured agenda or there are presentations being conducted by experts. EPA funds for meals, light refreshments, and space rental may not be used for any portion of an event (including evening working meetings) where alcohol is served, purchased, or otherwise available as part of the event or meeting, even if EPA funds are not used to purchase the alcohol.

By accepting this award, the state is certifying that it has systems in place (including internal controls) to comply with the requirements described above.

30. Tangible Personal Property

30.1 Reporting Pursuant to 2 CFR 200.312 and 200.314, property reports, if applicable, are required for Federally-owned property in the custody of a non-Federal entity upon completion of the Federal award or when the property is no longer needed. Additionally, upon termination or completion of the project, residual unused supplies with a total aggregate fair market value exceeding \$5,000 not needed for any other Federally-sponsored programs or projects must be reported. For Superfund awards under Subpart O, refer to 40 CFR 35.6340 and 35.6660 for property reporting requirements. Recipients should utilize the Tangible Personal Property Report form series (SF-428) to report tangible personal property.

30.2 Disposition

- 30.2.1 Most Recipients.** Consistent with 2 CFR 200.313, unless instructed otherwise on the official award document, this award term, or at closeout, the recipient may keep the equipment and continue to use it on the project originally funded through this assistance agreement or on other federally funded projects whether or not the project or program continues to be supported by Federal funds.
- 30.2.2 State Agencies.** Per 2 CFR 200.313(b), state agencies may manage and dispose of equipment acquired under this assistance agreement in accordance with state laws and procedures.
- 30.2.3 Superfund Recipients.** Equipment purchased under Superfund projects is subject to specific disposal options in accordance with 40 CFR Part 35.6345.

31. Dual Use Research of Concern (DURC)

The recipient agrees to conduct all life science research* in compliance with [*EPA's Order on the Policy and Procedures for Managing Dual Use Research of Concern*](#) (EPA DURC Order) and [*United States Government Policy for Institutional Oversight of Life Sciences Dual Use Research of Concern \(iDURC Policy\)*](#). If the recipient is an institution within the United States that receives funding through this agreement, or from any other source, the recipient agrees to comply with the iDURC Policy if they conduct or sponsor research involving any of the agents or toxins identified in Section 6.2.1 of the iDURC Policy. If the institution is outside the United States and receives funding through this agreement to conduct or sponsor research involving any of those same agents or toxins, the recipient agrees to comply with the iDURC Policy. The recipient agrees to provide any additional information that may be requested by EPA regarding DURC and iDURC. The recipient agrees to immediately notify the EPA Project Officer should the project use or introduce use of any of the agents or toxins identified in the iDURC Policy. The recipient's Institution/Organization must also comply with USG iDURC policy and EPA DURC Order and will inform the appropriate government agency if funded by such agency of research with the agents or toxins identified in Section 6.2.1 of the iDURC Policy. If privately funded the recipient agrees to notify the National Institutes of Health at DURC@od.nih.gov.

*“*Life Sciences Research*,” for purposes of the EPA DURC Order, and based on the definition of research in 40 CFR §26.102(d), is a systematic investigation designed to develop or contribute to generalizable knowledge involving living organisms (e.g., microbes, human beings, animals, and plants) and their products. EPA does not consider the following activities to be research: routine product testing, quality control, mapping, collection of general-purpose statistics, routine monitoring and evaluation of an operational program, observational studies, and the training of scientific and technical personnel. [Note: This is consistent with Office of Management and Budget Circular A-11.]

32. Research Misconduct

In accordance with 2 CFR 200.328, the recipient agrees to notify the EPA Project Officer in writing about research misconduct involving research activities that are supported in whole or in part with EPA funds under this project. EPA defines research misconduct as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results [65 FR 76262. I], or ordering, advising or suggesting that subordinates engage in research misconduct. The recipient agrees to:

- (1) Immediately notify the EPA Project Officer who will then inform the EPA Office of Inspector General (OIG) if, at any time, an allegation of research misconduct falls into one of the categories listed below:
 - A. Public health or safety is at risk.
 - B. Agency resources or interests are threatened.
 - C. Circumstances where research activities should be suspended.
 - D. There is a reasonable indication of possible violations of civil or criminal law.
 - E. Federal action is required to protect the interests of those involved in the investigation.
 - F. The research entity believes that the inquiry or investigation may be made public prematurely so that appropriate steps can be taken to safeguard evidence and protect the rights of those involved.
 - G. Circumstances where the research community or public should be informed. [65 FR 76263.III]
- (2) Report other allegations to the OIG when they have conducted an inquiry and determined that there is sufficient evidence to proceed with an investigation. [65 FR 76263. III]

33. Scientific Integrity Terms and Conditions

The recipient agrees to comply with [EPA’s Scientific Integrity Policy](#) when conducting, supervising, and communicating science and when using or applying the results of science. For purposes of this award condition scientific activities include, but are not limited to, computer modelling, economic analysis, field sampling, laboratory experimentation, demonstrating new technology, statistical analysis, and writing a review article on a scientific issue. The recipient agrees to:

33.1 Scientific Products

- 33.1.1** Produce scientific products of the highest quality, rigor, and objectivity, by adhering to applicable EPA [information quality guidelines](#), [quality policy](#), and peer review policy.
- 33.1.2** Prohibit all recipient employees, contractors, and program participants, including scientists, managers, and other recipient leadership, from suppressing, altering, or otherwise impeding the timely release of scientific findings or conclusions.
- 33.1.3** Adhere to [EPA’s Peer Review Handbook, 4th Edition](#), for the peer review of scientific and technical work products generated through EPA grants or cooperative agreements which, by definition, are not primarily for EPA’s direct use or benefit.

33.2 Scientific Findings

- 33.2.1** Require that reviews regarding the content of a scientific product that are conducted by the project manager and other recipient managers and the broader management chain be based only on scientific quality considerations, e.g., the methods used are clear and appropriate, the presentation of results and conclusions is impartial.

- 33.2.2 Ensure scientific findings are generated and disseminated in a timely and transparent manner, including scientific research performed by employees, contractors, and program participants, who assist with developing or applying the results of scientific activities.
- 33.2.3 Include, when communicating scientific findings, an explication of underlying assumptions, accurate contextualization of uncertainties, and a description of the probabilities associated with both optimistic and pessimistic projections, if applicable.
- 33.2.4 Document the use of independent validation of scientific methods.
- 33.2.5 Document any independent review of the recipient's scientific facilities and testing activities, as occurs with accreditation by a nationally or internationally recognized sanctioning body.
- 33.2.6 Make scientific information available online in open formats in a timely manner, including access to data and non-proprietary models.

33.3 Scientific Misconduct

- 33.3.1 Prohibit intimidation or coercion of scientists to alter scientific data, findings, or professional opinions or non-scientific influence of scientific advisory boards. In addition, recipient employees, contractors, and program participants, including scientists, managers, and other leadership, shall not knowingly misrepresent, exaggerate, or downplay areas of scientific uncertainty.
- 33.3.2 Prohibit retaliation or other punitive actions toward recipient employees who uncover or report allegations of scientific and research misconduct, or who express a differing scientific opinion. Employees who have allegedly engaged in scientific or research misconduct shall be afforded the due process protections provided by law, regulation, and applicable collective bargaining agreements, prior to any action. Recipients shall ensure that all employees and contractors of the recipient shall be familiar with these protections and avoid the appearance of retaliatory actions.
- 33.3.3 Require all recipient employees, contractors, and program participants to act honestly and refrain from acts of research misconduct, including publication or reporting, as described in [EPA's Policy and Procedures for Addressing Research Misconduct](#), Section 9.C. Research misconduct does not include honest error or differences of opinion. While EPA retains the ultimate oversight authority for EPA-supported research, grant recipients conducting research bear primary responsibility for prevention and detection of research misconduct and for the inquiry, investigation, and adjudication of research misconduct alleged to have occurred in association with their own institution.
- 33.3.4 Take the actions required on the part of the recipient described in EPA's Policy and Procedures for Addressing Research Misconduct, Sections 6 through 9, when research misconduct is suspected or found.

33.4 Additional Resources

For more information about the Scientific Integrity Policy, an introductory video can be accessed at: <https://youtu.be/FQJCy8BXXq8>. A training video is available at: <https://youtu.be/Zc0T7fooot8>.

Public Policy Requirements

34. Civil Rights Obligations

This term and condition incorporates by reference the signed assurance provided by the recipient's authorized representative on: 1) EPA Form 4700-4, "Preaward Compliance Review Report for All Applicants and Recipients Requesting EPA Financial Assistance"; and 2) Standard Form 424B or

Standard Form 424D, as applicable.

These assurances and this term and condition obligate the recipient to comply fully with applicable civil rights statutes and implementing EPA regulations.

a. Statutory Requirements

- i. In carrying out this agreement, the recipient must comply with:
 1. Title VI of the Civil Rights Act of 1964, which prohibits discrimination based on race, color, and national origin, including limited English proficiency (LEP), by entities receiving Federal financial assistance.
 2. Section 504 of the Rehabilitation Act of 1973, which prohibits discrimination against persons with disabilities by entities receiving Federal financial assistance; and
 3. The Age Discrimination Act of 1975, which prohibits age discrimination by entities receiving Federal financial assistance.
- ii. If the recipient is an education program or activity (e.g., school, college or university) or if the recipient is conducting an education program or activity under this agreement, it must also comply with:
 1. Title IX of the Education Amendments of 1972, which prohibits discrimination on the basis of sex in education programs and activities operated by entities receiving Federal financial assistance. For further information about your compliance obligations regarding Title IX, see 40 CFR Part 5 and <https://www.justice.gov/crt/title-ix>
- iii. If this agreement is funded with financial assistance under the Clean Water Act (CWA), the recipient must also comply with:
 1. Section 13 of the Federal Water Pollution Control Act Amendments of 1972, which prohibits discrimination on the basis of sex in CWA-funded programs or activities.

b. Regulatory Requirements

- i. The recipient agrees to comply with all applicable EPA civil rights regulations, including:
 1. For Title IX obligations, 40 C.F.R. Part 5; and
 2. For Title VI, Section 504, Age Discrimination Act, and Section 13 obligations, 40 CFR Part 7.
 3. As noted on the EPA Form 4700-4 signed by the recipient's authorized representative, these regulations establish specific requirements including maintaining compliance information, establishing grievance procedures, designating a Civil Rights Coordinator and providing notices of non-discrimination.

c. TITLE VI – LEP, Public Participation and Affirmative Compliance Obligation

- i. As a recipient of EPA financial assistance, you are required by Title VI of the Civil Rights Act to provide meaningful access to LEP individuals. In implementing that requirement, the recipient agrees to use as a guide the Office of Civil Rights (OCR) document entitled "Guidance to Environmental Protection Agency Financial Assistance Recipients Regarding Title VI Prohibition Against National Origin Discrimination Affecting Limited English Proficient Persons." The guidance can be found at: <https://www.federalregister.gov/documents/2004/06/25/04-14464/guidance-to-environmental-protection-agency-financial-assistance-recipients-regarding-title-vi>
- ii. If the recipient is administering permitting programs under this agreement, the recipient agrees to use as a guide OCR's Title VI Public Involvement Guidance for EPA Assistance Recipients Administering Environmental Permitting Programs. The Guidance can be found at <http://edocket.access.gpo.gov/2006/pdf/06-2691.pdf>.
- iii. In accepting this assistance agreement, the recipient acknowledges it has an affirmative obligation to implement effective Title VI compliance programs and ensure that its actions do not involve discriminatory treatment and do not have discriminatory effects

even when facially neutral. The recipient must be prepared to demonstrate to EPA that such compliance programs exist and are being implemented or to otherwise demonstrate how it is meeting its Title VI obligations.

35. Drug-Free Workplace

The recipient organization of this EPA assistance agreement must make an ongoing, good faith effort to maintain a drug-free workplace pursuant to the specific requirements set forth in Title 2 CFR Part 1536 Subpart B. Additionally, in accordance with these regulations, the recipient organization must identify all known workplaces under its federal awards, and keep this information on file during the performance of the award.

Those recipients who are individuals must comply with the drug-free provisions set forth in Title 2 CFR Part 1536 Subpart C.

The consequences for violating this condition are detailed under Title 2 CFR Part 1536 Subpart E. Recipients can access the Code of Federal Regulations (CFR) Title 2 Part 1536 at www.ecfr.gov/.

36. Hotel-Motel Fire Safety

Pursuant to 15 USC 2225a, the recipient agrees to ensure that all space for conferences, meetings, conventions or training seminars funded in whole or in part with federal funds complies with the protection and control guidelines of the Hotel and Motel Fire Safety Act (PL 101-391, as amended). Recipients may search the Hotel-Motel National Master List at <https://apps.usfa.fema.gov/hotel/> to see if a property is in compliance, or to find other information about the Act.

37. Lobbying Restrictions (Updated 11/19/18)

This assistance agreement is subject to lobbying restrictions as described below.

a) Applicable to all assistance agreements:

- i) The chief executive officer of this recipient agency shall ensure that no grant funds awarded under this assistance agreement are used to engage in lobbying of the Federal Government or in litigation against the U.S. unless authorized under existing law. The recipient shall abide by the Cost Principles available at 2 CFR 200 which generally prohibits the use of federal grant funds for litigation against the U.S. or for lobbying or other political activities.
- ii) The recipient agrees to comply with Title 40 CFR Part 34, New Restrictions on Lobbying. The recipient shall include the language of this provision in award documents for all subawards exceeding \$100,000 and require that subrecipients submit certification and disclosure forms accordingly.
- iii) In accordance with the Byrd Anti-Lobbying Amendment, any recipient who makes a prohibited expenditure under Title 40 CFR Part 34 or fails to file the required certification or lobbying forms shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such expenditure.
- iv) Contracts awarded by a recipient shall contain, when applicable, the anti-lobbying provision as stipulated in the Appendix II to Part 200—Contract Provisions for Non-Federal Entity Contracts Under Federal Awards.
- v) By accepting this award, the recipient affirms that it is not a nonprofit organization described in Section 501(c)(4) of the Internal Revenue Code of 1986 as required by Section 18 of the

Lobbying Disclosure Act; or that it is a nonprofit organization described in Section 501(c)(4) of the Code but does not and will not engage in lobbying activities as defined in Section 3 of the Lobbying Disclosure Act. Nonprofit organizations exempt from taxation under section 501(c)(4) of the Internal Revenue Code that engage in lobbying activities are ineligible for EPA subawards.

b) Applicable to assistance agreements when the amount of the award is over \$100,000:

- i) By accepting this award, the recipient certifies, to the best of its knowledge and belief, that:
 - (1) No Federal appropriated funds have been or will be paid, by or on behalf of the recipient, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
 - (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, or any employee of a Member of Congress in connection with this Federal grant or cooperative agreement, the recipient shall complete and submit the linked [Standard Form -- LLL, "Disclosure Form to Report Lobbying,"](#) in accordance with its instructions.
 - (3) The recipient shall require that the language of this certification be included in the award documents for all subawards exceeding \$100,000 at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.
- ii) This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each failure.

38. Recycled Paper

When directed to provide paper documents, the recipient agrees to use recycled paper and double-sided printing for all reports which are prepared as a part of this agreement and delivered to EPA. This requirement does not apply to reports prepared on forms supplied by EPA.

39. Resource Conservation and Recovery Act

Consistent with goals of section 6002 of RCRA (42 U.S.C. 6962), State and local institutions of higher education, hospitals and non-profit organization recipients agree to give preference in procurement programs to the purchase of specific products containing recycled materials, as identified in 40 CFR Part 247.

Consistent with section 6002 of RCRA (42 U.S.C. 6962) and 2 CFR 200.322, State agencies or agencies of a political subdivision of a State and its contractors are required to purchase certain items made from recycled materials, as identified in 40 CFR Part 247, when the purchase price exceeds \$10,000 during the course of a fiscal year or where the quantity of such items acquired in the course of the preceding fiscal year was \$10,000 or more. Pursuant to 40 CFR 247.2 (d), the recipient may decide not to procure such items if they are not reasonably available in a reasonable period of time; fail to meet reasonable

performance standards; or are only available at an unreasonable price.

40. Trafficking in Persons

a. Provisions applicable to a recipient that is a private entity.

- i. The recipient, the recipient's employees, subrecipients under this award, and subrecipients' employees may not—
 - 1. Engage in severe forms of trafficking in persons during the period of time that the award is in effect;
 - 2. Procure a commercial sex act during the period of time that the award is in effect; or
 - 3. Use forced labor in the performance of the award or subawards under the award.
- ii. We as the Federal awarding agency may unilaterally terminate this award, without penalty, if the recipient or a subrecipient that is a private entity—
 - 1. Is determined to have violated a prohibition in paragraph a of this award term; or
 - 2. Has an employee who is determined by the agency official authorized to terminate the award to have violated a prohibition in paragraph a of this award term through conduct that is either—
 - a. Associated with performance under this award; or
 - b. Imputed to the recipient or subrecipient using the standards and due process for imputing the conduct of an individual to an organization that are provided in 2 CFR part 180, "OMB Guidelines to Agencies on Governmentwide Debarment and Suspension (Nonprocurement)," as implemented by our Agency at 2 CFR 1532.

b. Provision applicable to a recipient other than a private entity. EPA may unilaterally terminate this award, without penalty, if a subrecipient that is a private entity—

- i. Is determined to have violated an applicable prohibition in paragraph a. of this award term; or
- ii. Has an employee who is determined by the agency official authorized to terminate the award to have violated an applicable prohibition in paragraph a of this award term through conduct that is either—
 - 1. Associated with performance under this award; or
 - 2. Imputed to the subrecipient using the standards and due process for imputing the conduct of an individual to an organization that are provided in 2 CFR part 180, "OMB Guidelines to Agencies on Governmentwide Debarment and Suspension (Nonprocurement)," as implemented by EPA at 2 CFR 1532

c. Provisions applicable to any recipient.

- i. The recipient must inform the EPA immediately of any information received from any source alleging a violation of a prohibition in paragraph a of this award term.
- ii. Our right to terminate unilaterally that is described in paragraph a and b:
 - 1. Implements section 106(g) of the Trafficking Victims Protection Act of 2000 (TVPA), as amended (22 U.S.C. 7104(g)), and
 - 2. Is in addition to all other remedies for noncompliance that are available to us under this award.
- iii. The recipient must include the requirements of paragraph a of this award term in any subaward made to a private entity.

d. Definitions. For purposes of this award term:

- i. "Employee" means either:
 - 1. An individual employed by you or a subrecipient who is engaged in the

- performance of the project or program under this award; or
- 2. Another person engaged in the performance of the project or program under this award and not compensated by you including, but not limited to, a volunteer or individual whose services are contributed by a third party as an in-kind contribution toward cost sharing or matching requirements.
- ii. “Forced labor” means labor obtained by any of the following methods: the recruitment, harboring, transportation, provision, or obtaining of a person for labor or services, through the use of force, fraud, or coercion for the purpose of subjection to involuntary servitude, peonage, debt bondage, or slavery.
- iii. “Private entity”:
 - 1. Means any entity other than a State, local government, Indian tribe, or foreign public entity, as those terms are defined in 2 CFR 175.25.
 - 2. Includes:
 - a. A nonprofit organization, including any nonprofit institution of higher education, hospital, or tribal organization other than one included in the definition of Indian tribe at 2 CFR 175.25(b).
 - b. A for-profit organization.
- iv. “Severe forms of trafficking in persons,” “commercial sex act,” and “coercion” have the meanings given at section 103 of the TVPA, as amended (22 U.S.C. 7102).

APPENDIX A

**GENERAL PROVISIONS GOVERNING CONTRACTS FOR CONSULTANTS,
PROFESSIONAL, TECHNICAL, HUMAN AND CLIENT SERVICES**

FOR THE SERVICES FOR:

CONTRACT: BEPA- LIS HWQMS

**RFP TITLE: BUREAU OF ENVIRONMENTAL PLANNING AND ANALYSIS LONG ISLAND
SOUND-- HYDRODYNAMIC AND WATER QUALITY MODELLING SUPPORT**

APPENDIX A

**GENERAL PROVISIONS GOVERNING CONTRACTS FOR
CONSULTANTS, PROFESSIONAL, TECHNICAL, HUMAN, AND CLIENT SERVICES**

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ARTICLE 1 - DEFINITIONS

Section 1.01 Definitions

The following words and expressions, or pronouns used in their stead, shall, wherever they appear in this Agreement, be construed as follows, unless a different meaning is clear from the context:

A. “Agency Chief Contracting Officer” or “ACCO” means the position delegated authority by the Agency Head to organize and supervise the procurement activity of subordinate Agency staff in conjunction with the City Chief Procurement Officer.

B. “Agreement” means the various documents, including this Appendix A, that constitute the contract between the Contractor and the City.

C. “City” means the City of New York.

D. “City Chief Procurement Officer” or “CCPO” means the position delegated authority by the Mayor to coordinate and oversee the procurement activity of Mayoral agency staff, including the ACCOs.

E. “Commissioner” or “Agency Head” means the head of the Department or his or her duly authorized representative. The term “duly authorized representative” shall include any person or persons acting within the limits of his or her authority.

F. “Comptroller” means the Comptroller of the City of New York.

G. “Contractor” means the entity entering into this Agreement with the City.

H. “Days” means calendar days unless otherwise specifically noted to mean business days.

I. “Department” or “Agency” means the City agency or office through which the City has entered into this Agreement.

J. “Law” or “Laws” means the New York City Charter (“Charter”), the New York City Administrative Code (“Admin. Code”), a local rule of the City of New York, the Constitutions of the United States and the State of New York, a statute of the United States or of the State of New York and any ordinance, rule or regulation having the force of law and adopted pursuant thereto, as amended, and common law.

K. “Procurement Policy Board” or “PPB” means the board established pursuant to Charter § 311 whose function is to establish comprehensive and consistent procurement policies and rules that have broad application throughout the City.

L. “PPB Rules” means the rules of the Procurement Policy Board as set forth in Title 9 of the Rules of the City of New York (“RCNY”), § 1-01 *et seq.*

M. “SBS” means the New York City Department of Small Business Services.

N. “State” means the State of New York.

ARTICLE 2 – REPRESENTATIONS, WARRANTIES, CERTIFICATIONS, AND DISCLOSURES

Section 2.01 Procurement of Agreement

A. The Contractor represents and warrants that, with respect to securing or soliciting this Agreement, the Contractor is in compliance with the requirements of the New York State Lobbying Law (Legislative Law §§ 1-a *et seq.*). The Contractor makes such representation and warranty to induce the City to enter into this Agreement and the City relies upon such representation and warranty in the execution of this Agreement.

B. For any breach or violation of the representation and warranty set forth in Paragraph A above, the Commissioner shall have the right to annul this Agreement without liability, entitling the City to recover all monies paid to the Contractor; and the Contractor shall not make claim for, or be entitled to recover, any sum or sums due under this Agreement. The rights and remedies of the City provided in this Section 2.01(B) are not exclusive and are in addition to all other rights and remedies allowed by Law or under this Agreement.

Section 2.02 Conflicts of Interest

A. The Contractor represents and warrants that neither it nor any of its directors, officers, members, partners or employees, has any interest nor shall they acquire any interest, directly or indirectly, which conflicts in any manner or degree with the performance of this Agreement. The Contractor further represents and warrants that no person having such interest or possible interest shall be employed by or connected with the Contractor in the performance of this Agreement.

B. Consistent with Charter § 2604 and other related provisions of the Charter, the Admin. Code and the New York State Penal Law, no elected official or other officer or employee of the City, nor any person whose salary is payable, in whole or in part, from the City Treasury, shall participate in any decision relating to this Agreement which affects his or her personal interest or the interest of any corporation, partnership or other entity in which he or she is, directly or indirectly, interested; nor shall any such official, officer, employee, or person have any interest in, or in the proceeds of, this Agreement. This Section 2.02(B) shall not prevent directors, officers, members, partners, or employees of the Contractor from participating in decisions relating to this Agreement where their sole personal interest is in the Contractor.

C. The Contractor shall not employ a person or permit a person to serve as a member of the Board of Directors or as an officer of the Contractor if such employment or service would violate Chapter 68 of the Charter.

Section 2.03 Certification Relating to Fair Practices

A. The Contractor and each person signing on its behalf certifies, under penalties of perjury, that to the best of its, his or her knowledge and belief:

1. The prices and other material terms set forth in this Agreement have been arrived at independently, without collusion, consultation, communication, or agreement with any other bidder or proposer or with any competitor as to any matter relating to such prices or terms for the purpose of restricting competition;

2. Unless otherwise required by Law or where a schedule of rates or prices is uniformly established by a government agency through regulation, policy, or directive, the prices and other material terms set forth in this Agreement that have been quoted in this Agreement and on the bid or proposal submitted by the Contractor have not been knowingly disclosed by the Contractor, directly or indirectly, to any other bidder or proposer or to any competitor prior to the bid or proposal opening; and

3. No attempt has been made or will be made by the Contractor to induce any other person or entity to submit or not to submit a bid or proposal for the purpose of restricting competition.

B. The fact that the Contractor (i) has published price lists, rates, or tariffs covering items being procured, (ii) has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or (iii) has sold the same items to other customers at the same prices and/or terms being bid or proposed, does not constitute, without more, a disclosure within the meaning of this Section 2.03.

Section 2.04 Disclosures Relating to Vendor Responsibility

The Contractor represents and warrants that it has duly executed and filed all disclosures as applicable, in accordance with Admin. Code § 6-116.2, PPB Rule § 2-08, and the policies and procedures of the Mayor's Office of Contract Services. The Contractor acknowledges that the Department's reliance on the completeness and veracity of the information stated therein is a material condition to the execution of this Agreement, and the Contractor represents and warrants that the information it and its principals have provided is accurate and complete.

Section 2.05 Disclosure Relating to Bankruptcy and Reorganization

If the Contractor files for bankruptcy or reorganization under Chapter Seven or Chapter Eleven of the United States Bankruptcy Code, the Contractor shall disclose such action to the Department within seven days of filing.

Section 2.06 Authority to Execute Agreement

The Contractor represents and warrants that: (i) its execution, delivery and performance of this Agreement have been duly authorized by all necessary corporate action on its part; (ii) it has all necessary power and authority to execute, deliver and perform its obligations under this Agreement; and (iii) once executed and delivered, this Agreement will constitute its legal, valid and binding obligation, enforceable in accordance with its terms.

ARTICLE 3 - ASSIGNMENT AND SUBCONTRACTING

Section 3.01 Assignment

A. The Contractor shall not assign, transfer, convey, or otherwise dispose of this Agreement, or the right to execute it, or the right, title, or interest in or to it or any part of it, or assign, by power of attorney or otherwise, any of the monies due or to become due under this Agreement, without the prior written consent of the Commissioner. The giving of any such consent to a particular assignment shall not dispense with the necessity of such consent to any further or other assignments. Any such assignment, transfer, conveyance, or other disposition without such written consent shall be void.

B. Before entering into any such assignment, transfer, conveyance, or other disposal of this Agreement, the Contractor shall submit a written request for approval to the Department giving the name and address of the proposed assignee. The proposed assignee's disclosure that is required by PPB Rule § 2-08(e) must be submitted within 30 Days after the ACCO has granted preliminary written approval of the proposed assignee, if required. Upon the request of the Department, the Contractor shall provide any other information demonstrating that the proposed assignee has the necessary facilities, skill, integrity, past experience, and financial resources to perform the specified services in accordance with the terms and conditions of this Agreement. The Department shall make a final determination in writing approving or disapproving the assignee after receiving all requested information.

C. Failure to obtain the prior written consent to such an assignment, transfer, conveyance, or other disposition may result in the revocation and annulment of this Agreement, at the option of the Commissioner. The City shall thereupon be relieved and discharged from any further liability and obligation to the Contractor, its assignees, or transferees, who shall forfeit all monies earned under this Agreement, except so much as may be necessary to pay the Contractor's employees.

D. The provisions of this Section 3.01 shall not hinder, prevent, or affect an assignment by the Contractor for the benefit of its creditors made pursuant to the Laws of the State.

E. This Agreement may be assigned, in whole or in part, by the City to any corporation, agency, or instrumentality having authority to accept such assignment. The City shall provide the Contractor with written notice of any such assignment.

Section 3.02 Subcontracting

A. In accordance with PPB Rule § 4-13, all subcontractors must be approved by the Department prior to commencing work under a subcontract.

1. *Approval when subcontract is \$20,000 or less.* The Department hereby grants approval for all subcontractors providing services covered by this Agreement pursuant to a subcontract in an amount that does not exceed \$20,000.00. The Contractor must submit monthly reports to the Department listing all such subcontractors and shall list the subcontractor in the City's Payee Information Portal (www.nyc.gov/pip).

2. *Approval when subcontract is greater than \$20,000.*

a. The Contractor shall not enter into any subcontract for an amount greater than \$20,000.00 without the prior approval by the Department of the subcontractor.

b. Prior to entering into any subcontract for an amount greater than \$20,000.00, the Contractor shall submit a written request for the approval of the proposed subcontractor to the Department giving the name and address of the proposed subcontractor, the portion of the work and materials that it is to perform and furnish, and the estimated cost of the subcontract. If the subcontractor is providing professional services under this Agreement for which professional liability insurance or errors and omissions insurance is reasonably commercially available, the Contractor shall submit proof of professional liability insurance in the amount required by Article 7. In addition, the Contractor shall list the proposed subcontractor in the City's Payee Information Portal (www.nyc.gov/pip) and provide the following information: maximum subcontract value, description of subcontractor work, start and end date of the subcontract, and the subcontractor's industry.¹

c. Upon receipt the information required above, the Department in its discretion may grant or deny preliminary approval for the Contractor to contract with the subcontractor.

¹ Assistance establishing a Payee Information Portal account and using the system may be obtained by emailing the Financial Information Services Agency Help Desk at pip@fisa.nyc.gov.

d. The Department shall notify the Contractor within 30 Days whether preliminary approval has been granted. If preliminary approval is granted, the Contractor shall provide such documentation as may be requested by the Department to show that the proposed subcontractor has the necessary facilities, skill, integrity, past experience and financial resources to perform the required work, including, the proposed subcontract and/or any of the items listed in PPB Rule 4-13(d)(3).

e. Upon receipt of all relevant documentation, the Department shall notify the Contractor in writing whether the proposed subcontractor is approved. If the proposed subcontractor is not approved, the Contractor may submit another proposed subcontractor unless the Contractor decides to do the work. No subcontractor shall be permitted to perform work unless approved by the Department.

f. For proposed subcontracts that do not exceed \$25,000.00, the Department's approval shall be deemed granted if the Department does not issue a written approval or disapproval within 45 Days of the Department's receipt of the written request for approval or, if PPB Rule 2-08(e) is applicable, within 45 Days of the Department's acknowledged receipt of fully completed disclosures for the subcontractor.

B. All subcontracts must be in writing. All subcontracts shall contain provisions specifying that:

1. The work performed by the subcontractor must be in accordance with the terms of the Agreement between the City and the Contractor;

2. Nothing contained in the agreement between the Contractor and the subcontractor shall impair the rights of the City;

3. Nothing contained in the agreement between the Contractor and the subcontractor, or under the Agreement between the City and the Contractor, shall create any contractual relation between the subcontractor and the City; and

4. The subcontractor specifically agrees to be bound by Section 4.05(D) and Article 5 of this Appendix A and specifically agrees that the City may enforce such provisions directly against the subcontractor as if the City were a party to the subcontract.

C. The Contractor agrees that it is as fully responsible to the Department for the acts and omissions of its subcontractors and of persons either directly or indirectly employed by such subcontractors as it is for the acts and omissions of any person directly employed by it.

D. For determining the value of a subcontract, all subcontracts with the same subcontractor shall be aggregated.

E. The Department may revoke the approval of a subcontractor granted or deemed granted pursuant to Section 3.02(A) if revocation is deemed to be in the interest of the City in writing on no less than 10 Days' notice unless a shorter period is warranted by considerations of health, safety, integrity issues, or other similar factors. Upon the effective date of such revocation, the Contractor shall cause the subcontractor to cease all work under the Agreement. The City shall not incur any further obligation for services performed by such subcontractor pursuant to this Agreement beyond the effective date of the revocation. The City shall pay for services provided by the subcontractor in accordance with this Agreement prior to the effective date of revocation.

F. The Department's approval of a subcontractor shall not relieve the Contractor of any of its responsibilities, duties, and liabilities under this Agreement. At the request of the Department, the Contractor shall provide the Department a copy of any subcontract.

G. Individual employer-employee contracts are not subcontracts subject to the requirements of this Section 3.02.

H. The Contractor shall report in the City's Payee Information Portal payments made to each subcontractor within 30 days of making the payment. If any of the information provided in accordance with Section 3.02(A)(2)(b) changes during the term of this Agreement, the Contractor shall update the information in such Portal accordingly. Failure of the Contractor to list a subcontractor and/or to report subcontractor payments in a timely fashion may result in the Department declaring the Contractor in default of the Agreement and will subject Contractor to liquidated damages in the amount of \$100 per day for each day that the Contractor fails to identify a subcontractor along with the required information about the subcontractor and/or fails to report payments to a subcontractor, beyond the time frames set forth herein or in the notice from the City.

ARTICLE 4 - LABOR PROVISIONS

Section 4.01 Independent Contractor Status

The Contractor and the City agree that the Contractor is an independent contractor and not an employee, subsidiary, affiliate, division, department, agency, office, or unit of the City. Accordingly, the Contractor and its employees, officers, and agents shall not, by reason of this Agreement or any performance pursuant to or in connection with this Agreement, assert the existence of any relationship or status on the part of the Contractor, with respect to the City, that differs from or is inconsistent with that of an independent contractor.

Section 4.02 Employees and Subcontractors

All persons who are employed by the Contractor and all the Contractor's subcontractors (including without limitation, consultants and independent contractors) that are retained to perform services under or in connection with this Agreement are neither employees of the City nor under contract with the City. The Contractor, and not the City, is responsible for their work, direction, compensation, and personal conduct while the Contractor is engaged under this Agreement. Nothing in this Agreement, and no entity or person's performance pursuant to or in connection with this Agreement, shall create any relationship between the City and the Contractor's employees, agents, subcontractors, or subcontractor's employees or agents (including without limitation, a contractual relationship, employer-employee relationship, or quasi-employer/quasi-employee relationship) or impose any liability or duty on the City (i) for or on account of the acts, omissions, liabilities, rights or obligations of the Contractor, its employees or agents, its subcontractors, or its subcontractor's employees or agents (including without limitation, obligations set forth in any collective bargaining agreement); or (ii) for taxes of any nature; or (iii) for any right or benefit applicable to an official or employee of the City or to any officer, agent, or employee of the Contractor or any other entity (including without limitation, Workers' Compensation coverage, Employers' Liability coverage, Disability Benefits coverage, Unemployment Insurance benefits, Social Security coverage, employee health and welfare benefits or employee retirement benefits, membership or credit). The Contractor and its employees, officers, and agents shall not, by reason of this Agreement or any performance pursuant to or in connection with this Agreement, (i) hold themselves out as, or claim to be, officials or employees of the City, including any department, agency, office, or unit of the City, or (ii) make or support in any way on behalf of or for the benefit of the Contractor, its employees, officers, or agents any demand, application, or claim upon or against the City for any right or benefit applicable to an official or employee of the City or to any officer, agent, or employee of the Contractor or any other entity. Except as specifically stated in this Agreement, nothing in the Agreement and no performance pursuant to or in connection with the Agreement shall impose any liability or duty on the City to any person or entity whatsoever.

Section 4.03 Removal of Individuals Performing Work

The Contractor shall not have anyone perform work under this Agreement who is not competent, faithful, and skilled in the work for which he or she shall be employed. Whenever the Commissioner shall inform the Contractor, in writing, that any individual is, in his or her opinion, incompetent, unfaithful, or unskilled, such individual shall no longer perform work under this Agreement. Prior to making a determination to direct a Contractor that an individual shall no longer perform work under this Agreement, the Commissioner shall provide the Contractor an opportunity to be heard on no less than five Days' written notice. The Commissioner may direct the Contractor to prohibit the individual from performing work under the Agreement pending the opportunity to be heard and the Commissioner's determination.

Section 4.04 Minimum Wage; Living Wage

A. Except for those employees whose minimum wage is required to be fixed in accordance with N.Y. Labor Law §§ 220 or 230 or by Admin. Code § 6-109, all persons employed by the Contractor in the performance of this Agreement shall be paid, without subsequent deduction or rebate, unless expressly authorized by Law, not less than the minimum wage as prescribed by Law. Any breach of this Section 4.04 shall be deemed a material breach of this Agreement.

B. If this Agreement involves the provision of homecare services, day care services, head start services, services to persons with cerebral palsy, building services, food services, or temporary services, as those services are defined in Admin. Code § 6-109 (“Section 6-109”), in accordance with Section 6-109, the Contractor agrees as follows:

1. The Contractor shall comply with the requirements of Section 6-109, including, where applicable, the payment of either a prevailing wage or a living wage, as those terms are defined in Section 6-109.

2. The Contractor shall not retaliate, discharge, demote, suspend, take adverse employment action in the terms and conditions of employment or otherwise discriminate against any employee for reporting or asserting a violation of Section 6-109, for seeking or communicating information regarding rights conferred by Section 6-109, for exercising any other rights protected under Section 6-109, or for participating in any investigatory or court proceeding relating to Section 6-109. This protection shall also apply to any employee or his or her representative who in good faith alleges a violation of Section 6-109, or who seeks or communicates information regarding rights conferred by Section 6-109 in circumstances where he or she in good faith believes it applies.

3. The Contractor shall maintain original payroll records for each of its covered employees reflecting the days and hours worked on contracts, projects, or assignments that are subject to the requirements of Section 6-109, and the wages paid and benefits provided for such hours worked. The Contractor shall maintain these records for the duration of the term of this Agreement and shall retain them for a period of four years after completion of this Agreement. For contracts involving building services, food services, or temporary services, the Contractor shall submit copies of payroll records, certified by the Contractor under penalty of perjury to be true and accurate, to the Department with every requisition for payment. For contracts involving homecare, day care, head start or services to persons with cerebral palsy, the Contractor shall submit either certified payroll records or categorical information about the wages, benefits, and job classifications of covered employees of the Contractor, and of any subcontractors, which shall be the substantial equivalent of the information required in Section 6-109(2)(a)(iii).

4. The Contractor and all subcontractors shall pay all covered employees by check and shall provide employees check stubs or other documentation at least once each month containing information sufficient to document compliance with the requirements of the Living Wage Law concerning living wages, prevailing wages, supplements, and health benefits. In addition, if this Agreement is for an amount greater than \$1,000,000.00, checks issued by the Contractor to covered employees shall be generated by a payroll service or automated payroll system (an in-house system may be used if approved by the Department). For any subcontract for an amount greater than \$750,000.00, checks issued by a subcontractor to covered employees shall be generated by a payroll service or automated payroll system (an in-house system may be used if approved by the Department).

5. The Department will provide written notices to the Contractor, prepared by the Comptroller, detailing the wages, benefits, and other protections to which covered employees are entitled under Section 6-109. Such notices will be provided in English, Spanish and other languages spoken by ten percent or more of a covered employer's covered employees. Throughout the term of this Agreement, the Contractor shall post in a prominent and accessible place at every work site and provide each covered employee a copy of the written notices provided by the Department. The Contractor shall provide the notices to its subcontractors and require them to be posted and provided to each covered employee.

6. The Contractor shall ensure that its subcontractors comply with the requirements of Section 6-109, and shall provide written notification to its subcontractors of those requirements. All subcontracts made by the Contractor shall be in writing and shall include provisions relating to the wages, supplements, and health benefits required by Section 6-109. No work may be performed by a subcontractor employing covered employees prior to the Contractor entering into a written subcontract with the subcontractor.

7. Each year throughout the term of the Agreement and whenever requesting the Department's approval of a subcontractor, the Contractor shall submit to the Department an updated certification, as required by Section 6-109 and in the form of the certification attached to this Agreement, identifying any changes to the current certification.

8. Failure to comply with the requirements of Section 6-109 may, in the discretion of the Department, constitute a material breach by the Contractor of the terms of this Agreement. If the Contractor and/or subcontractor receives written notice of such a breach and fails to cure such breach within 30 Days, the City shall have the right to pursue any rights or remedies available under this Agreement or under applicable law, including termination of the Agreement. If the Contractor fails to perform in accordance with any of the requirements of Section 6-109 and fails to cure such failure in accordance with the preceding sentence, and there is a continued need for the service, the City may obtain from another source the required service as specified in the original Agreement, or

any part thereof, and may charge the Contractor for any difference in price resulting from the alternative arrangements, and may, as appropriate, invoke such other sanctions as are available under the Agreement and applicable law. In addition, the Contractor agrees to pay for all costs incurred by the City in enforcing the requirements of Section 6-109, including the cost of any investigation conducted by or on behalf of the Department or the Comptroller, where the City discovers that the Contractor or its subcontractor(s) failed to comply with the requirements of this Section 4.04(B) or of Section 6-109. The Contractor also agrees, that should it fail or refuse to pay for any such investigation, the Department is hereby authorized to deduct from a Contractor's account an amount equal to the cost of such investigation.

Section 4.05 Non-Discrimination in Employment

A. General Prohibition. To the extent required by law, the Contractor shall not unlawfully discriminate against any employee or applicant for employment because of actual or perceived age, religion, religious practice, creed, sex, gender, gender identity or gender expression, sexual orientation, status as a victim of domestic violence, stalking, and sex offenses, familial status, partnership status, marital status, caregiver status, pregnancy, childbirth or related medical condition, disability, presence of a service animal, predisposing genetic characteristics, race, color, national origin (including ancestry), alienage, citizenship status, political activities or recreational activities as defined in N.Y. Labor Law 201-d, arrest or conviction record, credit history, military status, uniformed service, unemployment status, salary history, or any other protected class of individuals as defined by City, State or Federal laws, rules or regulations. The Contractor shall comply with all statutory and regulatory obligations to provide reasonable accommodations to individuals with disabilities, due to pregnancy, childbirth, or a related medical condition, due to status as a victim of domestic violence, stalking, or sex offenses, or due to religion.

B. N.Y. Labor Law § 220-e. If this Agreement is for the construction, alteration or repair of any public building or public work or for the manufacture, sale, or distribution of materials, equipment, or supplies, the Contractor agrees, as required by N.Y. Labor Law § 220-e, that:

1. In the hiring of employees for the performance of work under this Agreement or any subcontract hereunder, neither the Contractor, subcontractor, nor any person acting on behalf of such Contractor or subcontractor, shall by reason of race, creed, color, disability, sex or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the work to which the employment relates;

2. Neither the Contractor, subcontractor, nor any person on his or her behalf shall, in any manner, discriminate against or intimidate any employee hired for the performance of work under this Agreement on account of race, creed, color, disability, sex or national origin;

3. There may be deducted from the amount payable to the Contractor by the City under this Agreement a penalty of \$50.00 for each person for each calendar day during which such person was discriminated against or intimidated in violation of the provisions of this Agreement; and

4. This Agreement may be terminated by the City, and all monies due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of this Section 4.05.

The provisions of this Section 4.05(B) shall be limited to operations performed within the territorial limits of the State of New York.

C. Admin. Code § 6-108. If this Agreement is for the construction, alteration or repair of buildings or the construction or repair of streets or highways, or for the manufacture, sale, or distribution of materials, equipment or supplies, the Contractor agrees, as required by Admin. Code § 6-108, that:

1. It shall be unlawful for any person engaged in the construction, alteration or repair of buildings or engaged in the construction or repair of streets or highways pursuant to a contract with the City or engaged in the manufacture, sale or distribution of materials, equipment or supplies pursuant to a contract with the City to refuse to employ or to refuse to continue in any employment any person on account of the race, color or creed of such person.

2. It shall be unlawful for any person or any servant, agent or employee of any person, described in Section 4.05(C)(1) above, to ask, indicate or transmit, orally or in writing, directly or indirectly, the race, color, creed or religious affiliation of any person employed or seeking employment from such person, firm or corporation.

Breach of the foregoing provisions shall be deemed a breach of a material provision of this Agreement.

Any person, or the employee, manager or owner of or officer of such firm or corporation who shall violate any of the provisions of this Section 4.05(C) shall, upon conviction thereof, be punished by a fine of not more than \$100.00 or by imprisonment for not more than 30 Days, or both.

D. E.O. 50 -- Equal Employment Opportunity

1. This Agreement is subject to the requirements of City Executive Order No. 50 (1980) ("E.O. 50"), as revised, and the rules set forth at 66 RCNY §§ 10-01 *et seq.* No agreement will be awarded unless and until these requirements have been complied with in their entirety. The Contractor agrees that it:

a. Will not discriminate unlawfully against any employee or applicant for employment because of race, creed, color, national origin, sex, age, disability,

marital status, sexual orientation or citizenship status with respect to all employment decisions including, but not limited to, recruitment, hiring, upgrading, demotion, downgrading, transfer, training, rates of pay or other forms of compensation, layoff, termination, and all other terms and conditions of employment;

b. Will not discriminate unlawfully in the selection of subcontractors on the basis of the owners', partners' or shareholders' race, color, creed, national origin, sex, age, disability, marital status, sexual orientation, or citizenship status;

c. Will state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that all qualified applicants will receive consideration for employment without unlawful discrimination based on race, color, creed, national origin, sex, age, disability, marital status, sexual orientation or citizenship status, and that it is an equal employment opportunity employer;

d. Will send to each labor organization or representative of workers with which it has a collective bargaining agreement or other contract or memorandum of understanding, written notification of its equal employment opportunity commitments under E.O. 50 and the rules and regulations promulgated thereunder;

e. Will furnish before this Agreement is awarded all information and reports including an Employment Report which are required by E.O. 50, the rules and regulations promulgated thereunder, and orders of the SBS, Division of Labor Services ("DLS"); and

f. Will permit DLS to have access to all relevant books, records, and accounts for the purposes of investigation to ascertain compliance with such rules, regulations, and orders.

2. The Contractor understands that in the event of its noncompliance with the nondiscrimination clauses of this Agreement or with any of such rules, regulations, or orders, such noncompliance shall constitute a material breach of this Agreement and noncompliance with E.O. 50 and the rules and regulations promulgated thereunder. After a hearing held pursuant to the rules of DLS, the Director of DLS may direct the Commissioner to impose any or all of the following sanctions:

- a. Disapproval of the Contractor; and/or
- b. Suspension or termination of the Agreement; and/or
- c. Declaring the Contractor in default; and/or

d. In lieu of any of the foregoing sanctions, imposition of an employment program.

3. Failure to comply with E.O. 50 and the rules and regulations promulgated thereunder in one or more instances may result in the Department declaring the Contractor to be non-responsible.

4. The Contractor agrees to include the provisions of the foregoing Sections 4.05(D)(1)-(3) in every subcontract or purchase order in excess of \$100,000.00 to which it becomes a party unless exempted by E.O. 50 and the rules and regulations promulgated thereunder, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as may be directed by the Director of DLS as a means of enforcing such provisions including sanctions for noncompliance. A supplier of unfinished products to the Contractor needed to produce the item contracted for shall not be considered a subcontractor or vendor for purposes of this Section 4.05(D)(4).

5. The Contractor further agrees that it will refrain from entering into any subcontract or modification thereof subject to E.O. 50 and the rules and regulations promulgated thereunder with a subcontractor who is not in compliance with the requirements of E.O. 50 and the rules and regulations promulgated thereunder. A supplier of unfinished products to the Contractor needed to produce the item contracted for shall not be considered a subcontractor for purposes of this Section 4.05(D)(5).

6. Nothing contained in this Section 4.05(D) shall be construed to bar any religious or denominational institution or organization, or any organization operated for charitable or educational purposes, that is operated, supervised or controlled by or in connection with a religious organization, from lawfully limiting employment or lawfully giving preference to persons of the same religion or denomination or from lawfully making such selection as is calculated by such organization to promote the religious principles for which it is established or maintained.

Section 4.06 Paid Sick Leave Law

A. Introduction and General Provisions.

1. The Earned Sick Time Act, also known as the Paid Sick Leave Law (“PSLL”), requires covered employees who annually perform more than 80 hours of work in New York City to be provided with paid sick time.² Contractors of the City or of other governmental entities may be required to provide sick time pursuant to the PSLL.

² Pursuant to the PSLL, if fewer than five employees work for the same employer, as determined pursuant Admin. Code § 20-912(g), such employer has the option of providing such employees uncompensated sick time.

2. The PSLL became effective on April 1, 2014, and is codified at Title 20, Chapter 8, of the Admin. Code. It is administered by the City's Department of Consumer Affairs ("DCA"). DCA's rules promulgated under the PSLL are codified at Chapter 7 of Title 6 of the Rules of the City of New York ("Rules").

3. The Contractor agrees to comply in all respects with the PSLL and the Rules, and as amended, if applicable, in the performance of this Agreement. The Contractor further acknowledges that such compliance is a material term of this Agreement and that failure to comply with the PSLL in performance of this Agreement may result in its termination.

4. The Contractor must notify the ACCO in writing within 10 Days of receipt of a complaint (whether oral or written) regarding the PSLL involving the performance of this Agreement. Additionally, the Contractor must cooperate with DCA's education efforts and must comply with DCA's subpoenas and other document demands as set forth in the PSLL and Rules.

5. The PSLL is summarized below for the convenience of the Contractor. The Contractor is advised to review the PSLL and Rules in their entirety. On the website www.nyc.gov/PaidSickLeave there are links to the PSLL and the associated Rules as well as additional resources for employers, such as Frequently Asked Questions, timekeeping tools and model forms, and an event calendar of upcoming presentations and webinars at which the Contractor can get more information about how to comply with the PSLL. The Contractor acknowledges that it is responsible for compliance with the PSLL notwithstanding any inconsistent language contained herein.

B. Pursuant to the PSLL and the Rules: Applicability, Accrual, and Use.

1. An employee who works within the City of New York for more than eighty hours in any consecutive 12-month period designated by the employer as its "calendar year" pursuant to the PSLL ("Year") must be provided sick time. Employers must provide a minimum of one hour of sick time for every 30 hours worked by an employee and compensation for such sick time must be provided at the greater of the employee's regular hourly rate or the minimum wage. Employers are not required to provide more than 40 hours of sick time to an employee in any Year.

2. An employee has the right to determine how much sick time he or she will use, provided that employers may set a reasonable minimum increment for the use of sick time not to exceed four hours per Day. In addition, an employee may carry over up to 40 hours of unused sick time to the following Year, provided that no employer is required to allow the use of more than 40 hours of sick time in a Year or carry over unused paid sick time if the employee is paid for such unused sick time and the employer provides the employee with at least the legally required amount of paid sick time for such employee for the immediately subsequent Year on the first Day of such Year.

3. An employee entitled to sick time pursuant to the PSLL may use sick time for any of the following:

a. such employee's mental illness, physical illness, injury, or health condition or the care of such illness, injury, or condition or such employee's need for medical diagnosis or preventive medical care;

b. such employee's care of a family member (an employee's child, spouse, domestic partner, parent, sibling, grandchild, or grandparent, or the child or parent of an employee's spouse or domestic partner) who has a mental illness, physical illness, injury or health condition or who has a need for medical diagnosis or preventive medical care;

c. closure of such employee's place of business by order of a public official due to a public health emergency; or

d. such employee's need to care for a child whose school or childcare provider has been closed due to a public health emergency.

4. An employer must not require an employee, as a condition of taking sick time, to search for a replacement. However, an employer may require an employee to provide: reasonable notice of the need to use sick time; reasonable documentation that the use of sick time was needed for a reason above if for an absence of more than three consecutive work days; and/or written confirmation that an employee used sick time pursuant to the PSLL. However, an employer may not require documentation specifying the nature of a medical condition or otherwise require disclosure of the details of a medical condition as a condition of providing sick time and health information obtained solely due to an employee's use of sick time pursuant to the PSLL must be treated by the employer as confidential.

5. If an employer chooses to impose any permissible discretionary requirement as a condition of using sick time, it must provide to all employees a written policy containing those requirements, using a delivery method that reasonably ensures that employees receive the policy. If such employer has not provided its written policy, it may not deny sick time to an employee because of non-compliance with such a policy.

6. Sick time to which an employee is entitled must be paid no later than the payday for the next regular payroll period beginning after the sick time was used.

C. *Exemptions and Exceptions.* Notwithstanding the above, the PSLL does not apply to any of the following:

1. an independent contractor who does not meet the definition of employee under N.Y. Labor Law § 190(2);

2. an employee covered by a valid collective bargaining agreement in effect on April 1, 2014, until the termination of such agreement;
3. an employee in the construction or grocery industry covered by a valid collective bargaining agreement if the provisions of the PSLI are expressly waived in such collective bargaining agreement;
4. an employee covered by another valid collective bargaining agreement if such provisions are expressly waived in such agreement and such agreement provides a benefit comparable to that provided by the PSLI for such employee;
5. an audiologist, occupational therapist, physical therapist, or speech language pathologist who is licensed by the New York State Department of Education and who calls in for work assignments at will, determines his or her own schedule, has the ability to reject or accept any assignment referred to him or her, and is paid an average hourly wage that is at least four times the federal minimum wage;
6. an employee in a work study program under Section 2753 of Chapter 42 of the United States Code;
7. an employee whose work is compensated by a qualified scholarship program as that term is defined in the Internal Revenue Code, Section 117 of Chapter 20 of the United States Code; or
8. a participant in a Work Experience Program (WEP) under N.Y. Social Services Law § 336-c.

D. *Retaliation Prohibited.* An employer may not threaten or engage in retaliation against an employee for exercising or attempting in good faith to exercise any right provided by the PSLI. In addition, an employer may not interfere with any investigation, proceeding, or hearing pursuant to the PSLI.

E. *Notice of Rights.*

1. An employer must provide its employees with written notice of their rights pursuant to the PSLI. Such notice must be in English and the primary language spoken by an employee, provided that DCA has made available a translation into such language. Downloadable notices are available on DCA's website at <http://www.nyc.gov/html/dca/html/law/PaidSickLeave.shtml>.
2. Any person or entity that willfully violates these notice requirements is subject to a civil penalty in an amount not to exceed \$50.00 for each employee who was not given appropriate notice.

F. *Records.* An employer must retain records documenting its compliance with the PSLI for a period of at least three years, and must allow DCA to access such records in furtherance of an investigation related to an alleged violation of the PSLI.

G. *Enforcement and Penalties.*

1. Upon receiving a complaint alleging a violation of the PSLI, DCA has the right to investigate such complaint and attempt to resolve it through mediation. Within 30 Days of written notification of a complaint by DCA, or sooner in certain circumstances, the employer must provide DCA with a written response and such other information as DCA may request. If DCA believes that a violation of the PSLI has occurred, it has the right to issue a notice of violation to the employer.

2. DCA has the power to grant an employee or former employee all appropriate relief as set forth in Admin. Code § 20-924(d). Such relief may include, among other remedies, treble damages for the wages that should have been paid, damages for unlawful retaliation, and damages and reinstatement for unlawful discharge. In addition, DCA may impose on an employer found to have violated the PSLI civil penalties not to exceed \$500.00 for a first violation, \$750.00 for a second violation within two years of the first violation, and \$1,000.00 for each succeeding violation within two years of the previous violation.

H. *More Generous Policies and Other Legal Requirements.* Nothing in the PSLI is intended to discourage, prohibit, diminish, or impair the adoption or retention of a more generous sick time policy, or the obligation of an employer to comply with any contract, collective bargaining agreement, employment benefit plan or other agreement providing more generous sick time. The PSLI provides minimum requirements pertaining to sick time and does not preempt, limit, or otherwise affect the applicability of any other law, regulation, rule, requirement, policy or standard that provides for greater accrual or use by employees of sick leave or time, whether paid or unpaid, or that extends other protections to employees. The PSLI may not be construed as creating or imposing any requirement in conflict with any federal or state law, rule, or regulation.

Section 4.07 Whistleblower Protection Expansion Act

A. In accordance with Local Laws 30 and 33 of 2012, codified at Admin. Code §§ 6-132 and 12-113, respectively,

1. Contractor shall not take an adverse personnel action with respect to an officer or employee in retaliation for such officer or employee making a report of information concerning conduct which such officer or employee knows or reasonably believes to involve corruption, criminal activity, conflict of interest, gross mismanagement or abuse of authority by any officer or employee relating to this Agreement to (i) the Commissioner of the Department of Investigation, (ii) a member of

the New York City Council, the Public Advocate, or the Comptroller, or (iii) the City Chief Procurement Officer, ACCO, Agency head, or Commissioner.

2. If any of Contractor's officers or employees believes that he or she has been the subject of an adverse personnel action in violation of this Section 4.07, he or she shall be entitled to bring a cause of action against Contractor to recover all relief necessary to make him or her whole. Such relief may include but is not limited to: (i) an injunction to restrain continued retaliation, (ii) reinstatement to the position such employee would have had but for the retaliation or to an equivalent position, (iii) reinstatement of full fringe benefits and seniority rights, (iv) payment of two times back pay, plus interest, and (v) compensation for any special damages sustained as a result of the retaliation, including litigation costs and reasonable attorney's fees.

3. Contractor shall post a notice provided by the City (attached hereto) in a prominent and accessible place on any site where work pursuant to the Agreement is performed that contains information about:

a. how its employees can report to the New York City Department of Investigation allegations of fraud, false claims, criminality or corruption arising out of or in connection with the Agreement; and

b. the rights and remedies afforded to its employees under Admin. Code §§ 7-805 (the New York City False Claims Act) and 12-113 (the Whistleblower Protection Expansion Act) for lawful acts taken in connection with the reporting of allegations of fraud, false claims, criminality or corruption in connection with the Agreement.

4. For the purposes of this Section 4.07, "adverse personnel action" includes dismissal, demotion, suspension, disciplinary action, negative performance evaluation, any action resulting in loss of staff, office space, equipment or other benefit, failure to appoint, failure to promote, or any transfer or assignment or failure to transfer or assign against the wishes of the affected officer or employee.

5. This Section 4.07 is applicable to all of Contractor's subcontractors having subcontracts with a value in excess of \$100,000.00; accordingly, Contractor shall include this Section 4.07 in all subcontracts with a value in excess of \$100,000.00.

B. Section 4.07 is not applicable to this Agreement if it is valued at \$100,000.00 or less. Sections 4.07(A)(1), (2), (4), and (5) are not applicable to this Agreement if it was solicited pursuant to a finding of an emergency. Section 4.07(A)(3) is neither applicable to this Agreement if it was solicited prior to October 18, 2012 nor if it is a renewal of a contract executed prior to October 18, 2012.

ARTICLE 5 - RECORDS, AUDITS, REPORTS, AND INVESTIGATIONS

Section 5.01 Books and Records

The Contractor agrees to maintain separate and accurate books, records, documents, and other evidence, and to utilize appropriate accounting procedures and practices that sufficiently and properly reflect all direct and indirect costs of any nature expended in the performance of this Agreement.

Section 5.02 Retention of Records

The Contractor agrees to retain all books, records, documents, other evidence relevant to this Agreement, including those required pursuant to Section 5.01, for six years after the final payment or expiration or termination of this Agreement, or for a period otherwise prescribed by Law, whichever is later. In addition, if any litigation, claim, or audit concerning this Agreement has commenced before the expiration of the six-year period, the books, records, documents, and other evidence must be retained until the completion of such litigation, claim, or audit. Any books, records, documents, and other evidence that are created in an electronic format in the regular course of business may be retained in an electronic format. Any books, records, documents, or other evidence that are created in the regular course of business as a paper copy may be retained in an electronic format provided that they satisfy the requirements of N.Y. Civil Practice Law and Rules (“CPLR”) 4539(b), including the requirement that the reproduction is created in a manner “which does not permit additions, deletions, or changes without leaving a record of such additions, deletions, or changes.” Furthermore, the Contractor agrees to waive any objection to the admissibility of any such books, records, documents, or other evidence on the grounds that such documents do not satisfy CPLR 4539(b).

Section 5.03 Inspection

A. At any time during the Agreement or during the record retention period set forth in Section 5.02, the City, including the Department and the Department’s Office of the Inspector General, as well as City, State, and federal auditors and any other persons duly authorized by the City shall, upon reasonable notice, have full access to and the right to examine and copy all books, records, documents, and other evidence maintained or retained by or on behalf of the Contractor pursuant to this Article 5. Notwithstanding any provision herein regarding notice of inspection, all books, records, documents, and other evidence of the Contractor kept pursuant to this Agreement shall be subject to immediate inspection, review, and copying by the Department’s Office of the Inspector General, the Comptroller, and/or federal auditors without prior notice and at no additional cost to the City. The Contractor shall make such books, records documents, and other evidence available for inspection in the City of New York or shall reimburse the City for expenses associated with the out-of-City inspection.

B. The Department shall have the right to have representatives of the Department or of the City, State or federal government present to observe the services being performed. If

observation of particular services or activity would constitute a waiver of a legal privilege or violate the Law or an ethical obligation under the New York Rules of Professional Conduct for attorneys, National Association of Social Workers Code of Ethics or other similar code governing the provision of a profession's services in New York State, the Contractor shall promptly inform the Department or other entity seeking to observe such work or activity. Such restriction shall not act to prevent government representatives from inspecting the provision of services in a manner that allows the representatives to ensure that services are being performed in accordance with this Agreement.

C. The Contractor shall not be entitled to final payment until the Contractor has complied with any request for inspection or access given under this Section 5.03.

Section 5.04 Audit

A. This Agreement and all books, records, documents, and other evidence required to be maintained or retained pursuant to this Agreement, including all vouchers or invoices presented for payment and the books, records, and other documents upon which such vouchers or invoices are based (e.g., reports, cancelled checks, accounts, and all other similar material), are subject to audit by (i) the City, including the Comptroller, the Department, and the Department's Office of the Inspector General, (ii) the State, (iii) the federal government, and (iv) other persons duly authorized by the City. Such audits may include examination and review of the source and application of all funds whether from the City, the State, the federal government, private sources, or otherwise.

B. Audits by the City, including the Comptroller, the Department, and the Department's Office of the Inspector General, are performed pursuant to the powers and responsibilities conferred by the Charter and the Admin. Code, as well as all orders, rules, and regulations promulgated pursuant to the Charter and Admin. Code.

C. The Contractor shall submit any and all documentation and justification in support of expenditures or fees under this Agreement as may be required by the Department and by the Comptroller in the exercise of his/her powers under Law.

D. The Contractor shall not be entitled to final payment until the Contractor has complied with the requirements of this Section 5.04.

Section 5.05 No Removal of Records from Premises

Where performance of this Agreement involves use by the Contractor of any City books, records, documents, or data (in hard copy, or electronic or other format now known or developed in the future) at City facilities or offices, the Contractor shall not remove any such items or material (in the format in which it originally existed, or in any other converted or derived format) from such facility or office without the prior written approval of the Department's designated official. Upon the request by the Department at any time during the Agreement or after the

Agreement has expired or terminated, the Contractor shall return to the Department any City books, records, documents, or data that has been removed from City premises.

Section 5.06 Electronic Records

As used in this Appendix A, the terms “books,” “records,” “documents,” and “other evidence” refer to electronic versions as well as hard copy versions.

Section 5.07 Investigations Clause

A. The Contractor agrees to cooperate fully and faithfully with any investigation, audit or inquiry conducted by a State or City agency or authority that is empowered directly or by designation to compel the attendance of witnesses and to examine witnesses under oath, or conducted by the Inspector General of a governmental agency that is a party in interest to the transaction, submitted bid, submitted proposal, contract, lease, permit, or license that is the subject of the investigation, audit or inquiry.

B.

1. If any person who has been advised that his or her statement, and any information from such statement, will not be used against him or her in any subsequent criminal proceeding refuses to testify before a grand jury or other governmental agency or authority empowered directly or by designation to compel the attendance of witnesses and to examine witnesses under oath concerning the award of or performance under any transaction, agreement, lease, permit, contract, or license entered into with the City, or State, or any political subdivision or public authority thereof, or the Port Authority of New York and New Jersey, or any local development corporation within the City, or any public benefit corporation organized under the Laws of the State, or;

2. If any person refuses to testify for a reason other than the assertion of his or her privilege against self-incrimination in an investigation, audit or inquiry conducted by a City or State governmental agency or authority empowered directly or by designation to compel the attendance of witnesses and to take testimony under oath, or by the Inspector General of the governmental agency that is a party in interest in, and is seeking testimony concerning the award of, or performance under, any transaction, agreement, lease, permit, contract, or license entered into with the City, the State, or any political subdivision thereof or any local development corporation within the City, then;

C.

6. The Commissioner or Agency Head whose agency is a party in interest to the transaction, submitted bid, submitted proposal, contract, lease, permit, or license shall convene a hearing, upon not less than five (5) Days written notice to the parties involved to determine if any penalties should attach for the failure of a person to testify.

7. If any non-governmental party to the hearing requests an adjournment, the Commissioner or Agency Head who convened the hearing may, upon granting the adjournment, suspend any contract, lease, permit, or license pending the final determination pursuant to Paragraph E below without the City incurring any penalty or damages for delay or otherwise.

D. The penalties that may attach after a final determination by the Commissioner or Agency Head may include but shall not exceed:

1. The disqualification for a period not to exceed five years from the date of an adverse determination for any person, or any entity of which such person was a member at the time the testimony was sought, from submitting bids for, or transacting business with, or entering into or obtaining any contract, lease, permit or license with or from the City; and/or

2. The cancellation or termination of any and all such existing City contracts, leases, permits or licenses that the refusal to testify concerns and that have not been assigned as permitted under this Agreement, nor the proceeds of which pledged, to an unaffiliated and unrelated institutional lender for fair value prior to the issuance of the notice scheduling the hearing, without the City incurring any penalty or damages on account of such cancellation or termination; monies lawfully due for goods delivered, work done, rentals, or fees accrued prior to the cancellation or termination shall be paid by the City.

E. The Commissioner or Agency Head shall consider and address in reaching his or her determination and in assessing an appropriate penalty the factors in Paragraphs (1) and (2) below. He or she may also consider, if relevant and appropriate, the criteria established in Paragraphs (3) and (4) below, in addition to any other information that may be relevant and appropriate:

1. The party's good faith endeavors or lack thereof to cooperate fully and faithfully with any governmental investigation or audit, including but not limited to the discipline, discharge, or disassociation of any person failing to testify, the production of accurate and complete books and records, and the forthcoming testimony of all other members, agents, assignees or fiduciaries whose testimony is sought.

2. The relationship of the person who refused to testify to any entity that is a party to the hearing, including, but not limited to, whether the person whose testimony is sought has an ownership interest in the entity and/or the degree of authority and responsibility the person has within the entity.

3. The nexus of the testimony sought to the subject entity and its contracts, leases, permits or licenses with the City.

4. The effect a penalty may have on an unaffiliated and unrelated party or entity that has a significant interest in an entity subject to penalties under Paragraph D above, provided that the party or entity has given actual notice to the Commissioner or Agency Head upon the acquisition of the interest, or at the hearing called for in Paragraph (C)(1) above gives notice and proves that such interest was previously acquired. Under either circumstance, the party or entity must present evidence at the hearing demonstrating the potential adverse impact a penalty will have on such person or entity.

F. Definitions

1. The term “license” or “permit” as used in this Section shall be defined as a license, permit, franchise, or concession not granted as a matter of right.

2. The term “person” as used in this Section shall be defined as any natural person doing business alone or associated with another person or entity as a partner, director, officer, principal or employee.

3. The term “entity” as used in this Section shall be defined as any firm, partnership, corporation, association, or person that receives monies, benefits, licenses, leases, or permits from or through the City, or otherwise transacts business with the City.

4. The term “member” as used in this Section shall be defined as any person associated with another person or entity as a partner, director, officer, principal, or employee.

G. In addition to and notwithstanding any other provision of this Agreement, the Commissioner or Agency Head may in his or her sole discretion terminate this Agreement upon not less than three (3) Days written notice in the event the Contractor fails to promptly report in writing to the City Commissioner of Investigation any solicitation of money, goods, requests for future employment or other benefits or thing of value, by or on behalf of any employee of the City or other person or entity for any purpose that may be related to the procurement or obtaining of this Agreement by the Contractor, or affecting the performance of this Agreement.

Section 5.08 Confidentiality

A. The Contractor agrees to hold confidential, both during and after the completion or termination of this Agreement, all of the reports, information, or data, furnished to, or prepared, assembled or used by, the Contractor under this Agreement. The Contractor agrees to maintain the confidentiality of such reports, information, or data by using a reasonable degree of care, and using at least the same degree of care that the Contractor uses to preserve the confidentiality of its own confidential information. The Contractor agrees that such reports, information, or data shall not be made available to any person or entity without the prior written approval of the Department. The obligation under this Section 5.08 to hold reports, information or data confidential shall not apply where the Contractor is legally required to disclose such reports, information or data, by virtue of a subpoena, court order or otherwise (“disclosure

demand”), provided that the Contractor complies with the following: (1) the Contractor shall provide advance notice to the Commissioner, in writing or by e-mail, that it received a disclosure demand for to disclose such reports, information or data and (2) if requested by the Department, the Contractor shall not disclose such reports, information, or data until the City has exhausted its legal rights, if any, to prevent disclosure of all or a portion of such reports, information or data. The previous sentence shall not apply if the Contractor is prohibited by law from disclosing to the Department the disclosure demand for such reports, information or data.

B. The Contractor shall provide notice to the Department within three days of the discovery by the Contractor of any breach of security, as defined in Admin. Code § 10-501(b), of any data, encrypted or otherwise, in use by the Contractor that contains social security numbers or other personal identifying information as defined in Admin. Code § 10-501 (“Personal Identifying Information”), where such breach of security arises out of the acts or omissions of the Contractor or its employees, subcontractors, or agents. Upon the discovery of such security breach, the Contractor shall take reasonable steps to remediate the cause or causes of such breach, and shall provide notice to the Department of such steps. In the event of such breach of security, without limiting any other right of the City, the City shall have the right to withhold further payments under this Agreement for the purpose of set-off in sufficient sums to cover the costs of notifications and/or other actions mandated by any Law, or administrative or judicial order, to address the breach, and including any fines or disallowances imposed by the State or federal government as a result of the disclosure. The City shall also have the right to withhold further payments hereunder for the purpose of set-off in sufficient sums to cover the costs of credit monitoring services for the victims of such a breach of security by a national credit reporting agency, and/or any other commercially reasonable preventive measure. The Department shall provide the Contractor with written notice and an opportunity to comment on such measures prior to implementation. Alternatively, at the City’s discretion, or if monies remaining to be earned or paid under this Agreement are insufficient to cover the costs detailed above, the Contractor shall pay directly for the costs, detailed above, if any.

C. The Contractor shall restrict access to confidential information to persons who have a legitimate work related purpose to access such information. The Contractor agrees that it will instruct its officers, employees, and agents to maintain the confidentiality of any and all information required to be kept confidential by this Agreement.

D. The Contractor, and its officers, employees, and agents shall notify the Department, at any time either during or after completion or termination of this Agreement, of any intended statement to the press or any intended issuing of any material for publication in any media of communication (print, news, television, radio, Internet, etc.) regarding the services provided or the data collected pursuant to this Agreement at least 24 hours prior to any statement to the press or at least five business days prior to the submission of the material for publication, or such shorter periods as are reasonable under the circumstances. The Contractor may not issue any statement or submit any material for publication that includes confidential information as prohibited by this Section 5.08.

E. At the request of the Department, the Contractor shall return to the Department any and all confidential information in the possession of the Contractor or its subcontractors. If the Contractor or its subcontractors are legally required to retain any confidential information, the Contractor shall notify the Department in writing and set forth the confidential information that it intends to retain and the reasons why it is legally required to retain such information. The Contractor shall confer with the Department, in good faith, regarding any issues that arise from the Contractor retaining such confidential information. If the Department does not request such information or the Law does not require otherwise, such information shall be maintained in accordance with the requirements set forth in Section 5.02.

F. A breach of this Section 5.08 shall constitute a material breach of this Agreement for which the Department may terminate this Agreement pursuant to Article 10. The Department reserves any and all other rights and remedies in the event of unauthorized disclosure.

ARTICLE 6 - COPYRIGHTS, PATENTS, INVENTIONS, AND ANTITRUST

Section 6.01 Copyrights and Ownership of Work Product

A. Any reports, documents, data, photographs, deliverables, and/or other materials produced pursuant to this Agreement, and any and all drafts and/or other preliminary materials in any format related to such items produced pursuant to this Agreement, shall upon their creation become the exclusive property of the City.

B. Any reports, documents, data, photographs, deliverables, and/or other materials provided pursuant to this Agreement (“Copyrightable Materials”) shall be considered “work-made-for-hire” within the meaning and purview of Section 101 of the United States Copyright Act, 17 U.S.C. § 101, and the City shall be the copyright owner thereof and of all aspects, elements, and components thereof in which copyright protection might exist. To the extent that the Copyrightable Materials do not qualify as “work-made-for-hire,” the Contractor hereby irrevocably transfers, assigns and conveys exclusive copyright ownership in and to the Copyrightable Materials to the City, free and clear of any liens, claims, or other encumbrances. The Contractor shall retain no copyright or intellectual property interest in the Copyrightable Materials. The Copyrightable Materials shall be used by the Contractor for no purpose other than in the performance of this Agreement without the prior written permission of the City. The Department may grant the Contractor a license to use the Copyrightable Materials on such terms as determined by the Department and set forth in the license.

C. The Contractor acknowledges that the City may, in its sole discretion, register copyright in the Copyrightable Materials with the United States Copyright Office or any other government agency authorized to grant copyright registrations. The Contractor shall fully cooperate in this effort, and agrees to provide any and all documentation necessary to accomplish this.

D. The Contractor represents and warrants that the Copyrightable Materials: (i) are wholly original material not published elsewhere (except for material that is in the public domain); (ii) do not violate any copyright Law; (iii) do not constitute defamation or invasion of the right of privacy or publicity; and (iv) are not an infringement, of any kind, of the rights of any third party. To the extent that the Copyrightable Materials incorporate any non-original material, the Contractor has obtained all necessary permissions and clearances, in writing, for the use of such non-original material under this Agreement, copies of which shall be provided to the City upon execution of this Agreement.

E. If the services under this Agreement are supported by a federal grant of funds, the federal and State government reserves a royalty-free, non-exclusive irrevocable license to reproduce, publish, or otherwise use and to authorize others to use, for federal or State government purposes, the copyright in any Copyrightable Materials developed under this Agreement.

F. If the Contractor publishes a work dealing with any aspect of performance under this Agreement, or with the results of such performance, the City shall have a royalty-free, non-exclusive irrevocable license to reproduce, publish, or otherwise use such work for City governmental purposes.

Section 6.02 Patents and Inventions

The Contractor shall promptly and fully report to the Department any discovery or invention arising out of or developed in the course of performance of this Agreement. If the services under this Agreement are supported by a federal grant of funds, the Contractor shall promptly and fully report to the federal government for the federal government to make a determination as to whether patent protection on such invention shall be sought and how the rights in the invention or discovery, including rights under any patent issued thereon, shall be disposed of and administered in order to protect the public interest.

Section 6.03 Pre-existing Rights

In no case shall Sections 6.01 and 6.02 apply to, or prevent the Contractor from asserting or protecting its rights in any discovery, invention, report, document, data, photograph, deliverable, or other material in connection with or produced pursuant to this Agreement that existed prior to or was developed or discovered independently from the activities directly related to this Agreement.

Section 6.04 Antitrust

The Contractor hereby assigns, sells, and transfers to the City all right, title, and interest in and to any claims and causes of action arising under the antitrust laws of the State or of the United States relating to the particular goods or services procured by the City under this Agreement.

ARTICLE 7 - INSURANCE

Section 7.01 Agreement to Insure

The Contractor shall maintain the following types of insurance if and as indicated in Schedule A (with the minimum limits and special conditions specified in Schedule A) throughout the term of this Agreement, including any applicable guaranty period. All insurance shall meet the requirements set forth in this Article 7. Wherever this Article 7 requires that insurance coverage be “at least as broad” as a specified form (including all ISO forms), there is no obligation that the form itself be used, provided that the Contractor can demonstrate that the alternative form or endorsement contained in its policy provides coverage at least as broad as the specified form.

Section 7.02 Workers’ Compensation, Disability Benefits, and Employers’ Liability Insurance

A. The Contractor shall maintain workers’ compensation insurance, employers’ liability insurance, and disability benefits insurance, in accordance with Law on behalf of, or in regard to, all employees providing services under this Agreement

B. Within 10 Days of award of this Agreement or as otherwise specified by the Department, and as required by N.Y. Workers’ Compensation Law §§ 57 and 220(8), the Contractor shall submit proof of Contractor’s workers’ compensation insurance and disability benefits insurance (or proof of a legal exemption) to the Department in a form acceptable to the New York State Workers’ Compensation Board. ACORD forms are not acceptable proof of such insurance. The following forms are acceptable:

1. Form C-105.2, *Certificate of Workers’ Compensation Insurance*;
2. Form U-26.3, *State Insurance Fund Certificate of Workers’ Compensation Insurance*;
3. Form SI-12, *Certificate of Workers’ Compensation Self-Insurance*;
4. Form GSI-105.2, *Certificate of Participation in Worker’s Compensation Group Self-Insurance*;
5. Form DB-120.1, *Certificate of Disability Benefits Insurance*;
6. Form DB-155, *Certificate of Disability Benefits Self-Insurance*;
7. Form CE-200 – *Affidavit of Exemption*;
8. Other forms approved by the New York State Workers’ Compensation Board; or

9. Other proof of insurance in a form acceptable to the City.

Section 7.03 Other Insurance

A. *Commercial General Liability Insurance.* The Contractor shall maintain commercial general liability insurance in the amounts specified in Schedule A covering operations under this Agreement. Coverage must be at least as broad as the coverage provided by the most recently issued ISO Form CG 00 01, primary and non-contributory, and “occurrence” based rather than “claims-made.” Such coverage shall list the City, together with its officials and employees, and any other entity that may be listed on Schedule A as an additional insured with coverage at least as broad as the most recently issued ISO Form CG 20 10 or CG 20 26 and, if construction is performed as part of the services, ISO Form CG 20 37.

B. *Commercial Automobile Liability Insurance.* If indicated in Schedule A and/or if vehicles are used in the provision of services under this Agreement, the Contractor shall maintain commercial automobile liability insurance for liability arising out of ownership, maintenance or use of any owned, non-owned, or hired vehicles to be used in connection with this Agreement. Coverage shall be at least as broad as the most recently issued ISO Form CA 00 01. If vehicles are used for transporting hazardous materials, the commercial automobile liability insurance shall be endorsed to provide pollution liability broadened coverage for covered vehicles (endorsement CA 99 48) as well as proof of MCS-90.

C. *Professional Liability Insurance.*

1. If indicated in Schedule A, the Contractor shall maintain and submit evidence of professional liability insurance or errors and omissions insurance appropriate to the type(s) of such services to be provided under this Agreement. The policy or policies shall cover the liability assumed by the Contractor under this Agreement arising out of the negligent performance of professional services or caused by an error, omission, or negligent act of the Contractor or anyone employed by the Contractor.

2. All subcontractors of the Contractor providing professional services under this Agreement for which professional liability insurance or errors and omissions insurance is reasonably commercially available shall also maintain such insurance in the amount specified in Schedule A. At the time of the request for subcontractor approval, the Contractor shall provide to the Department, evidence of such professional liability insurance on a form acceptable to the Department.

3. Claims-made policies will be accepted for professional liability insurance. All such policies shall have an extended reporting period option or automatic coverage of not less than two years. If available as an option, the Contractor shall purchase extended reporting period coverage effective on cancellation or termination of such insurance unless a new policy is secured with a retroactive date, including at least the last policy year.

D. *Crime Insurance.* If indicated in Schedule A, the Contractor shall maintain crime insurance during the term of the Agreement in the minimum amounts listed in Schedule A. Such insurance shall include coverage, without limitation, for any and all acts of employee theft including employee theft of client property, forgery or alteration, inside the premises (theft of money and securities), inside the premises (robbery or safe burglary of other property), outside the premises, computer fraud, funds transfer fraud, and money orders and counterfeit money. The policy shall name the Contractor as named insured and shall list the City as loss payee as its interests may appear.

E. *Cyber Liability Insurance.* If indicated in Schedule A, the Contractor shall maintain cyber liability insurance covering losses arising from operations under this Agreement in the amounts listed in Schedule A. The City shall approve the policy (including exclusions therein), coverage amounts, deductibles or self-insured retentions, and premiums, as well as the types of losses covered, which may include but not be limited to: notification costs, security monitoring costs, losses resulting from identity theft, and other injury to third parties. If additional insured status is commercially available under the Contractor's cyber liability insurance, the insurance shall cover the City, together with its respective officials and employees, as additional insured.

F. *Other Insurance.* The Contractor shall provide such other types of insurance in the amounts specified in Schedule A.

Section 7.04 General Requirements for Insurance Coverage and Policies

A. Unless otherwise stated, all insurance required by Section 7.03 of this Agreement must:

1. be provided by companies that may lawfully issue such policies;
2. have an A.M. Best rating of at least A- / VII, a Standard & Poor's rating of at least A, a Moody's Investors Service rating of at least A3, a Fitch Ratings rating of at least A- or a similar rating by any other nationally recognized statistical rating organization acceptable to the New York City Law Department unless prior written approval is obtained from the New York City Law Department; and
3. be primary (and non-contributing) to any insurance or self-insurance maintained by the City (not applicable to professional liability insurance/errors and omissions insurance) and any other entity listed as an additional insured in Schedule A.

B. The Contractor shall be solely responsible for the payment of all premiums for all required insurance policies and all deductibles or self-insured retentions to which such policies are subject, whether or not the City is an insured under the policy.

C. There shall be no self-insurance program, including a self-insurance retention, exceeding \$10,000.00, with regard to any insurance required under Section 7.03 unless approved in writing by the Commissioner. Any such self-insurance program shall provide the City and any other additional insured listed on Schedule A with all rights that would be provided by traditional insurance required under this Article 7, including but not limited to the defense obligations that insurers are required to undertake in liability policies.

D. The limits of coverage for all types of insurance for the City, including its officials and employees, and any other additional insured listed on Schedule A that must be provided to such additional insured(s) shall be the greater of (i) the minimum limits set forth in Schedule A or (ii) the limits provided to the Contractor as named insured under all primary, excess, and umbrella policies of that type of coverage.

Section 7.05 Proof of Insurance

A. For each policy required under Section 7.03 and Schedule A of this Agreement, the Contractor shall file proof of insurance and, where applicable, proof that the City, including its officials and employees, is an additional insured with the Department within ten Days of award of this Agreement. The following proof is acceptable:

1. A certificate of insurance accompanied by a completed certification of insurance broker or agent (included in Schedule A of this Agreement) and any endorsements by which the City, including its officials and employees, have been made an additional insured; or

2. A copy of the insurance policy, including declarations and endorsements, certified by an authorized representative of the issuing insurance carrier.

B. Proof of insurance confirming renewals of insurance required under Section 7.03 must be submitted to the Department prior to the expiration date of the coverage. Such proof must meet the requirements of Section 7.05(A).

C. The Contractor shall provide the City with a copy of any policy required under this Article 7 upon the demand for such policy by the Commissioner or the New York City Law Department.

D. Acceptance by the Commissioner of a certificate or a policy does not excuse the Contractor from maintaining policies consistent with all provisions of this Article 7 (and ensuring that subcontractors maintain such policies) or from any liability arising from its failure to do so.

E. If the Contractor receives notice, from an insurance company or other person, that any insurance policy required under this Article 7 shall expire or be cancelled or terminated for any reason, the Contractor shall immediately forward a copy of such notice to both the address referred to in Section 14.04 and Schedule A and to the New York City Comptroller, Attn: Office

of Contract Administration, Municipal Building, One Centre Street, Room 1005, New York, New York 10007.

Section 7.06 Miscellaneous

A. Whenever notice of loss, damage, occurrence, accident, claim, or suit is required under a policy required by Section 7.03 and Schedule A, the Contractor shall provide the insurer with timely notice thereof on behalf of the City. Such notice shall be given even where the Contractor may not be covered under such policy if this Agreement requires that the City be an additional insured (for example, where one of Contractor's employees was injured). Such notice shall expressly specify that "this notice is being given on behalf of the City of New York, including its officials and employees, as additional insured" (such notice shall also include the name of any other entity listed as an additional insured on Schedule A) and contain the following information to the extent known: the number of the insurance policy; the name of the named insured; the date and location of the damage, occurrence, or accident; the identity of the persons or things injured, damaged, or lost; and the title of the claim or suit, if applicable. The Contractor shall simultaneously send a copy of such notice to the City of New York c/o Insurance Claims Specialist, Affirmative Litigation Division, New York City Law Department, 100 Church Street, New York, New York 10007. If the Contractor fails to comply with the requirements of this paragraph, the Contractor shall indemnify the City, together with its officials and employees, and any other entity listed as an additional insured on Schedule A for all losses, judgments, settlements and expenses, including reasonable attorneys' fees, arising from an insurer's disclaimer of coverage citing late notice by or on behalf of the City together with its officials and employees, and any other entity listed as an additional insured on Schedule A.

B. The Contractor's failure to maintain any of the insurance required by this Article 7 and Schedule A shall constitute a material breach of this Agreement. Such breach shall not be waived or otherwise excused by any action or inaction by the City at any time.

C. Insurance coverage in the minimum amounts required in this Article 7 shall not relieve the Contractor or its subcontractors of any liability under this Agreement, nor shall it preclude the City from exercising any rights or taking such other actions as are available to it under any other provisions of this Agreement or Law.

D. With respect to insurance required by Section 7.03 and Schedule A (but not including professional liability/errors and omissions insurance), the Contractor waives all rights against the City, including its officials and employees, and any other entity listed as an additional insured on Schedule A for any damages or losses that are covered under any insurance required under this Article 7 (whether or not such insurance is actually procured or claims are paid thereunder) or any other insurance applicable to the operations of the Contractor and/or its subcontractors in the performance of this Agreement.

E. In the event the Contractor requires any subcontractor to maintain insurance with regard to any operations under this Agreement and requires such subcontractor to list the Contractor as an additional insured under such insurance, the Contractor shall ensure that such

entity also list the City, including its officials and employees, and any other entity listed as an additional insured on Schedule A as an additional insured. With respect to commercial general liability insurance, such coverage must be at least as broad as the most recently issued ISO form CG 20 26.

ARTICLE 8 - PROTECTION OF PERSONS AND PROPERTY AND INDEMNIFICATION

Section 8.01 Reasonable Precautions

The Contractor shall take all reasonable precautions to protect all persons and the property of the City and of others from injury, damage, or loss resulting from the Contractor's and/or its subcontractors' operations under this Agreement.

Section 8.02 Protection of City Property

The Contractor assumes the risk of, and shall be responsible for, any loss or damage to City property, including property and equipment leased by the City, used in the performance of this Agreement, where such loss or damage is caused by negligence, any tortious act, or failure to comply with the provisions of this Agreement or of Law by the Contractor, its officers, employees, agents or subcontractors.

Section 8.03 Indemnification

To the fullest extent permitted by Law, the Contractor shall defend, indemnify, and hold harmless the City, including its officials and employees, against any and all claims (even if the allegations of the claim are without merit), judgments for damages on account of any injuries or death to any person or damage to any property, and costs and expenses to which the City or its officials or employees, may be subject to or which they may suffer or incur allegedly arising out of any of the operations of the Contractor and/or its subcontractors under this Agreement to the extent resulting from any negligent act of commission or omission, any intentional tortious act, and/or the failure to comply with Law or any of the requirements of this Agreement. Insofar as the facts or Law relating to any of the foregoing would preclude the City or its officials or employees from being completely indemnified by the Contractor, the City and its officials and employees shall be partially indemnified by the Contractor to the fullest extent permitted by Law.

Section 8.04 Infringement Indemnification

To the fullest extent permitted by Law, the Contractor shall defend, indemnify, and hold harmless the City, including its officials and employees, against any and all claims (even if the allegations of the claim are without merit), judgments for damages, and costs and expenses to which the City or its officials or employees, may be subject to or which they may suffer or incur allegedly arising out of any infringement, violation, or unauthorized use of any copyright, trade

secret, trademark or patent or any other property or personal right of any third party by the Contractor and/or its employees, agents, or subcontractors in the performance of this Agreement. To the fullest extent permitted by Law, the Contractor shall defend, indemnify, and hold harmless the City and its officials and employees regardless of whether or not the alleged infringement, violation, or unauthorized use arises out of compliance with the Agreement's scope of services/scope of work. Insofar as the facts or Law relating to any of the foregoing would preclude the City and its officials and employees from being completely indemnified by the Contractor, the City and its officials and employees shall be partially indemnified by the Contractor to the fullest extent permitted by Law.

Section 8.05 Indemnification Obligations Not Limited By Insurance Obligation

The Contractor's obligation to indemnify, defend and hold harmless the City and its officials and employees shall neither be (i) limited in any way by the Contractor's obligations to obtain and maintain insurance under this Agreement, nor (ii) adversely affected by any failure on the part of the City or its officials or employees to avail themselves of the benefits of such insurance.

Section 8.06 Actions By or Against Third Parties

A. If any claim is made or any action brought in any way relating to Agreement other than an action between the City and the Contractor, the Contractor shall diligently render to the City without additional compensation all assistance that the City may reasonably require of the Contractor.

B. The Contractor shall report to the Department in writing within five business days of the initiation by or against the Contractor of any legal action or proceeding relating to this Agreement.

Section 8.07 Withholding of Payments

A. If any claim is made or any action is brought against the City for which the Contractor may be required to indemnify the City pursuant to this Agreement, the City shall have the right to withhold further payments under this Agreement for the purpose of set-off in sufficient sums to cover the said claim or action.

B. If any City property is lost or damaged as set forth in Section 8.02, except for normal wear and tear, the City shall have the right to withhold payments under this Agreement for the purpose of set-off in sufficient sums to cover such loss or damage.

C. The City shall not, however, impose a set-off in the event that an insurance company that provided insurance pursuant to Section 7.03 above has accepted the City's tender of the claim or action without a reservation of rights.

D. The Department may, at its option, withhold for purposes of set-off any monies due to the Contractor under this Agreement up to the amount of any disallowances or questioned costs resulting from any audits of the Contractor or to the amount of any overpayment to the Contractor with regard to this Agreement.

E. The rights and remedies of the City provided for in this Section 8.07 are not exclusive and are in addition to any other rights and remedies provided by Law or this Agreement.

Section 8.08 No Third Party Rights

The provisions of this Agreement shall not be deemed to create any right of action in favor of third parties against the Contractor or the City or their respective officials and employees.

ARTICLE 9 - CONTRACT CHANGES

Section 9.01 Contract Changes

Changes to this Agreement may be made only as duly authorized by the ACCO or his or her designee and in accordance with the PPB Rules. Any amendment or change to this Agreement shall not be valid unless made in writing and signed by authorized representatives of both parties. The Contractor deviates from the requirements of this Agreement without a duly approved and executed change order document or written contract modification or amendment at its own risk.

Section 9.02 Changes Through Fault of Contractor

If any change is required in the data, documents, deliverables, or other services to be provided under this Agreement because of negligence or error of the Contractor, no additional compensation shall be paid to the Contractor for making such change, and the Contractor is obligated to make such change without additional compensation.

ARTICLE 10 - TERMINATION, DEFAULT, REDUCTIONS IN FUNDING, AND LIQUIDATED DAMAGES

Section 10.01 Termination by the City Without Cause

A. The City shall have the right to terminate this Agreement, in whole or in part, without cause, in accordance with the provisions of Section 10.05.

B. In its sole discretion, the City shall have the right to terminate this Agreement, in whole or in part, upon the request of the Contractor to withdraw from the Contract, in accordance with the provisions of Section 10.05.

C. If the City terminates this Agreement pursuant to this Section 10.01, the following provisions apply. The City shall not incur or pay any further obligation pursuant to this Agreement beyond the termination date set by the City pursuant to Section 10.05. The City shall pay for services provided in accordance with this Agreement prior to the termination date. In addition, any obligation necessarily incurred by the Contractor on account of this Agreement prior to receipt of notice of termination and falling due after the termination date shall be paid by the City in accordance with the terms of this Agreement. In no event shall such obligation be construed as including any lease or other occupancy agreement, oral or written, entered into between the Contractor and its landlord.

Section 10.02 Reductions in Federal, State, and/or City Funding

A. This Agreement is funded in whole or in part by funds secured from the federal, State and/or City governments. Should there be a reduction or discontinuance of such funds by action of the federal, State and/or City governments, the City shall have, in its sole discretion, the right to terminate this Agreement in whole or in part, or to reduce the funding and/or level of services of this Agreement caused by such action by the federal, State and/or City governments, including, in the case of the reduction option, but not limited to, the reduction or elimination of programs, services or service components; the reduction or elimination of contract-reimbursable staff or staff-hours, and corresponding reductions in the budget of this Agreement and in the total amount payable under this Agreement. Any reduction in funds pursuant to this Section 10.02(A) shall be accompanied by an appropriate reduction in the services performed under this Agreement.

B. In the case of the reduction option referred to in Section 10.02(A), above, any such reduction shall be effective as of the date set forth in a written notice thereof to the Contractor, which shall be not less than 30 Days from the date of such notice. Prior to sending such notice of reduction, the Department shall advise the Contractor that such option is being exercised and afford the Contractor an opportunity to make within seven Days any suggestion(s) it may have as to which program(s), service(s), service component(s), staff or staff-hours might be reduced or eliminated, provided, however, that the Department shall not be bound to utilize any of the Contractor's suggestions and that the Department shall have sole discretion as to how to effectuate the reductions.

C. If the City reduces funding pursuant to this Section 10.02, the following provisions apply. The City shall pay for services provided in accordance with this Agreement prior to the reduction date. In addition, any obligation necessarily incurred by the Contractor on account of this Agreement prior to receipt of notice of reduction and falling due after the reduction date shall be paid by the City in accordance with the terms of this Agreement. In no event shall such obligation be construed as including any lease or other occupancy agreement, oral or written, entered into between the Contractor and its landlord.

D. To the extent that the reduction in public funds is a result of the State determining that the Contractor may receive medical assistance funds pursuant to title eleven of article five of

the Social Services Law to fund the services contained within the scope of a program under this Agreement, then the notice and effective date provisions of this Section 10.02 shall not apply, and the Department may reduce such public funds authorized under this Agreement by informing the Contractor of the amount of the reduction and revising attachments to this Agreement as appropriate.

Section 10.03 Contractor Default

A. The City shall have the right to declare the Contractor in default:

1. Upon a breach by the Contractor of a material term or condition of this Agreement, including unsatisfactory performance of the services;

2. Upon insolvency or the commencement of any proceeding by or against the Contractor, either voluntarily or involuntarily, under the Bankruptcy Code or relating to the insolvency, receivership, liquidation, or composition of the Contractor for the benefit of creditors;

3. If the Contractor refuses or fails to proceed with the services under the Agreement when and as directed by the Commissioner;

4. If the Contractor or any of its officers, directors, partners, five percent or greater shareholders, principals, or other employee or person substantially involved in its activities are indicted or convicted after execution of the Agreement under any state or federal law of any of the following:

a. a criminal offense incident to obtaining or attempting to obtain or performing a public or private contract;

b. fraud, embezzlement, theft, bribery, forgery, falsification, or destruction of records, or receiving stolen property;

c. a criminal violation of any state or federal antitrust law;

d. violation of the Racketeer Influence and Corrupt Organization Act, 18 U.S.C. §§ 1961 *et seq.*, or the Mail Fraud Act, 18 U.S.C. §§ 1341 *et seq.*, for acts in connection with the submission of bids or proposals for a public or private contract;

e. conspiracy to commit any act or omission that would constitute grounds for conviction or liability under any statute described in subparagraph (d) above; or

f. an offense indicating a lack of business integrity that seriously and directly affects responsibility as a City vendor.

5. If the Contractor or any of its officers, directors, partners, five percent or greater shareholders, principals, or other employee or person substantially involved in its activities are subject to a judgment of civil liability under any state or federal antitrust law for acts or omissions in connection with the submission of bids or proposals for a public or private contract; or

6. If the Contractor or any of its officers, directors, partners, five percent or greater shareholders, principals, or other employee or person substantially involved in its activities makes or causes to be made any false, deceptive, or fraudulent material statement, or fail to make a required material statement in any bid, proposal, or application for City or other government work.

B. The right to declare the Contractor in default shall be exercised by sending the Contractor a written notice of the conditions of default, signed by the Commissioner, setting forth the ground or grounds upon which such default is declared ("Notice to Cure"). The Contractor shall have ten Days from receipt of the Notice to Cure or any longer period that is set forth in the Notice to Cure to cure the default. The Commissioner may temporarily suspend services under the Agreement pending the outcome of the default proceedings pursuant to this Section 10.03.

C. If the conditions set forth in the Notice to Cure are not cured within the period set forth in the Notice to Cure, the Commissioner may declare the Contractor in default pursuant to this Section 10.03. Before the Commissioner may exercise his or her right to declare the Contractor in default, the Commissioner shall give the Contractor an opportunity to be heard upon not less than five business days' notice. The Commissioner may, in his or her discretion, provide for such opportunity to be in writing or in person. Such opportunity to be heard shall not occur prior to the end of the cure period but notice of such opportunity to be heard may be given prior to the end of the cure period and may be given contemporaneously with the Notice to Cure.

D. After the opportunity to be heard, the Commissioner may terminate the Agreement, in whole or in part, upon finding the Contractor in default pursuant to this Section 10.03, in accordance with the provisions of Section 10.05.

E. The Commissioner, after declaring the Contractor in default, may have the services under the Agreement completed by such means and in such manner, by contract with or without public letting, or otherwise, as he or she may deem advisable in accordance with applicable PPB Rules. After such completion, the Commissioner shall certify the expense incurred in such completion, which shall include the cost of re-letting. Should the expense of such completion, as certified by the Commissioner, exceed the total sum which would have been payable under the Agreement if it had been completed by the Contractor, any excess shall be promptly paid by the Contractor upon demand by the City. The excess expense of such completion, including any and all related and incidental costs, as so certified by the Commissioner, and any liquidated damages assessed against the Contractor, may be charged against and deducted out of monies earned by the Contractor.

Section 10.04 Force Majeure

A. For purposes of this Agreement, a force majeure event is an act or event beyond the control and without any fault or negligence of the Contractor (“Force Majeure Event”). Such events may include, but are not limited to, fire, flood, earthquake, storm or other natural disaster, civil commotion, war, terrorism, riot, and labor disputes not brought about by any act or omission of the Contractor.

B. In the event the Contractor cannot comply with the terms of the Agreement (including any failure by the Contractor to make progress in the performance of the services) because of a Force Majeure Event, then the Contractor may ask the Commissioner to excuse the nonperformance and/or terminate the Agreement. If the Commissioner, in his or her reasonable discretion, determines that the Contractor cannot comply with the terms of the Agreement because of a Force Majeure Event, then the Commissioner shall excuse the nonperformance and may terminate the Agreement. Such a termination shall be deemed to be without cause.

F. If the City terminates the Agreement pursuant to this Section 10.04, the following provisions apply. The City shall not incur or pay any further obligation pursuant to this Agreement beyond the termination date. The City shall pay for services provided in accordance with this Agreement prior to the termination date. Any obligation necessarily incurred by the Contractor on account of this Agreement prior to receipt of notice of termination and falling due after the termination date shall be paid by the City in accordance with the terms of this Agreement. In no event shall such obligation be construed as including any lease or other occupancy agreement, oral or written, entered into between the Contractor and its landlord.

Section 10.05 Procedures for Termination

A. The Department and/or the City shall give the Contractor written notice of any termination of this Agreement. Such notice shall specify the applicable provision(s) under which the Agreement is terminated and the effective date of the termination. Except as otherwise provided in this Agreement, the notice shall comply with the provisions of this Section 10.05 and Section 14.04. For termination without cause, the effective date of the termination shall not be less than ten Days from the date the notice is personally delivered, or 15 Days from the date the notice is either sent by certified mail, return receipt requested, delivered by overnight or same day courier service in a properly addressed envelope with confirmation, or sent by email and, unless the receipt of the email is acknowledged by the recipient by email, deposited in a post office box regularly maintained by the United States Postal Service in a properly addressed postage pre-paid envelope. In the case of termination for default, the effective date of the termination shall be as set forth above for a termination without cause or such earlier date as the Commissioner may determine. If the City terminates the Agreement in part, the Contractor shall continue the performance of the Agreement to the extent not terminated.

B. Upon termination or expiration of this Agreement, the Contractor shall comply with the City close-out procedures, including but not limited to:

1. Accounting for and refunding to the Department, within 45 Days, any unexpended funds which have been advanced to the Contractor pursuant to this Agreement;
2. Furnishing within 45 Days an inventory to the Department of all equipment, appurtenances and property purchased through or provided under this Agreement and carrying out any Department or City directive concerning the disposition of such equipment, appurtenances and property;
3. Turning over to the Department or its designees all books, records, documents and material specifically relating to this Agreement that the Department has requested be turned over;
4. Submitting to the Department, within 90 Days, a final statement and report relating to the Agreement. The report shall be made by a certified public accountant or a licensed public accountant, unless the Department waives, in writing, the requirement that a certified public accountant or licensed public accountant make such report; and
5. Providing reasonable assistance to the Department in the transition, if any, to a new contractor.

Section 10.06 Miscellaneous Provisions

A. The Commissioner, in addition to any other powers set forth in this Agreement or by operation of Law, may suspend, in whole or in part, any part of the services to be provided under this Agreement whenever in his or her judgment such suspension is required in the best interest of the City. If the Commissioner suspends this Agreement pursuant to this Section 10.06, the City shall not incur or pay any further obligation pursuant to this Agreement beyond the suspension date until such suspension is lifted. The City shall pay for services provided in accordance with this Agreement prior to the suspension date. In addition, any obligation necessarily incurred by the Contractor on account of this Agreement prior to receipt of notice of suspension and falling due during the suspension period shall be paid by the City in accordance with the terms of this Agreement.

B. Notwithstanding any other provisions of this Agreement, the Contractor shall not be relieved of liability to the City for damages sustained by the City by virtue of the Contractor's breach of the Agreement, and the City may withhold payments to the Contractor for the purpose of set-off in the amount of damages due to the City from the Contractor.

C. The rights and remedies of the City provided in this Article 10 shall not be exclusive and are in addition to all other rights and remedies provided by Law or under this Agreement.

Section 10.07 Liquidated Damages

If Schedule A or any other part of this Agreement includes liquidated damages for failure to comply with a provision of this Agreement, the sum indicated is fixed and agreed as the liquidated damages that the City will suffer by reason of such noncompliance and not as a penalty.

ARTICLE 11 - PROMPT PAYMENT AND ELECTRONIC FUNDS TRANSFER

Section 11.01 Prompt Payment

A. The prompt payment provisions of PPB Rule § 4-06 are applicable to payments made under this Agreement. With some exceptions, the provisions generally require the payment to the Contractor of interest on payments made after the required payment date, as set forth in the PPB Rules.

B. The Contractor shall submit a proper invoice to receive payment, except where the Agreement provides that the Contractor will be paid at predetermined intervals without having to submit an invoice for each scheduled payment.

C. Determination of interest due will be made in accordance with the PPB Rules and the applicable rate of interest shall be the rate in effect at the time of payment.

Section 11.02 Electronic Funds Transfer

A. In accordance with Admin. Code § 6-107.1, the Contractor agrees to accept payments under this Agreement from the City by electronic funds transfer. An electronic funds transfer is any transfer of funds, other than a transaction originated by check, draft, or similar paper instrument, which is initiated through an electronic terminal, telephonic instrument or computer or magnetic tape so as to order, instruct, or authorize a financial institution to debit or credit an account. Prior to the first payment made under this Agreement, the Contractor shall designate one financial institution or other authorized payment agent and shall complete the "EFT Vendor Payment Enrollment Form" available from the Agency or at <http://www.nyc.gov/dof> in order to provide the commissioner of the Department of Finance with information necessary for the Contractor to receive electronic funds transfer payments through the designated financial institution or authorized payment agent. The crediting of the amount of a payment to the appropriate account on the books of a financial institution or other authorized payment agent designated by the Contractor shall constitute full satisfaction by the City for the amount of the payment under this Agreement. The account information supplied by the Contractor to facilitate the electronic funds transfer shall remain confidential to the fullest extent provided by Law.

B. The Agency Head may waive the application of the requirements of this Section 11.02 to payments on contracts entered into pursuant to Charter § 315. In addition, the

commissioner of the Department of Finance and the Comptroller may jointly issue standards pursuant to which the Department may waive the requirements of this Section 11.02 for payments in the following circumstances: (i) for individuals or classes of individuals for whom compliance imposes a hardship; (ii) for classifications or types of checks; or (iii) in other circumstances as may be necessary in the best interest of the City.

C. This Section 11.02 is applicable to contracts valued at \$25,000.00 and above.

ARTICLE 12 - CLAIMS

Section 12.01 Choice of Law

This Agreement shall be deemed to be executed in the City and State of New York, regardless of the domicile of the Contractor, and shall be governed by and construed in accordance with the Laws of the State of New York (notwithstanding New York choice of law or conflict of law principles) and the Laws of the United States, where applicable.

Section 12.02 Jurisdiction and Venue

Subject to Section 12.03, the parties agree that any and all claims asserted by or against the City arising under or related to this Agreement shall solely be heard and determined either in the courts of the United States located in the City or in the courts of the State located in the City and County of New York. The parties shall consent to the dismissal and/or transfer of any claims asserted in any other venue or forum to the proper venue or forum. If the Contractor initiates any action in breach of this Section 12.02, the Contractor shall be responsible for and shall promptly reimburse the City for any attorneys' fees incurred by the City in removing the action to a proper court consistent with this Section 12.02.

Section 12.03 Resolution of Disputes

A. Except as provided in Subparagraphs (A)(1) and (A)(2) below, all disputes between the City and the Contractor that arise under, or by virtue of, this Agreement shall be finally resolved in accordance with the provisions of this Section 12.03 and PPB Rule § 4-09. This procedure shall be the exclusive means of resolving any such disputes.

1. This Section 12.03 shall not apply to disputes concerning matters dealt with in other sections of the PPB Rules or to disputes involving patents, copyrights, trademarks, or trade secrets (as interpreted by the courts of New York State) relating to proprietary rights in computer software, or to termination other than for cause.

2. For construction and construction-related services this Section 12.03 shall apply only to disputes about the scope of work delineated by the Agreement, the interpretation of Agreement documents, the amount to be paid for extra work or disputed work performed in connection with the Agreement, the conformity of the Contractor's

work to the Agreement, and the acceptability and quality of the Contractor's work; such disputes arise when the City Engineer, City Resident Engineer, City Engineering Audit Officer, or other designee of the Agency Head makes a determination with which the Contractor disagrees. For construction, this Section 12.03 shall not apply to termination of the Agreement for cause or other than for cause.

B. All determinations required by this Section 12.03 shall be clearly stated, with a reasoned explanation for the determination based on the information and evidence presented to the party making the determination. Failure to make such determination within the time required by this Section 12.03 shall be deemed a non-determination without prejudice that will allow application to the next level.

C. During such time as any dispute is being presented, heard, and considered pursuant to this Section 12.03, the Agreement terms shall remain in full force and effect and, unless otherwise directed by the ACCO or Engineer, the Contractor shall continue to perform work in accordance with the Agreement and as directed by the ACCO or City Engineer, City Resident Engineer, City Engineering Audit Officer, or other designee of the Agency Head. Failure of the Contractor to continue the work as directed shall constitute a waiver by the Contractor of any and all claims being presented pursuant to this Section 12.03 and a material breach of contract.

D. Presentation of Dispute to Agency Head.

1. Notice of Dispute and Agency Response. The Contractor shall present its dispute in writing ("Notice of Dispute") to the Agency Head within the time specified herein, or, if no time is specified, within 30 Days of receiving written notice of the determination or action that is the subject of the dispute. This notice requirement shall not be read to replace any other notice requirements contained in the Agreement. The Notice of Dispute shall include all the facts, evidence, documents, or other basis upon which the Contractor relies in support of its position, as well as a detailed computation demonstrating how any amount of money claimed by the Contractor in the dispute was arrived at. Within 30 Days after receipt of the complete Notice of Dispute, the ACCO or, in the case of construction or construction-related services, the City Engineer, City Resident Engineer, City Engineering Audit Officer, or other designee of the Agency Head, shall submit to the Agency Head all materials he or she deems pertinent to the dispute. Following initial submissions to the Agency Head, either party may demand of the other the production of any document or other material the demanding party believes may be relevant to the dispute. The requested party shall produce all relevant materials that are not otherwise protected by a legal privilege recognized by the courts of New York State. Any question of relevancy shall be determined by the Agency Head whose decision shall be final. Willful failure of the Contractor to produce any requested material whose relevancy the Contractor has not disputed, or whose relevancy has been affirmatively determined, shall constitute a waiver by the Contractor of its claim.

2. Agency Head Inquiry. The Agency Head shall examine the material and may, in his or her discretion, convene an informal conference with the Contractor and the ACCO and, in the case of construction or construction-related services, the City Engineer, City Resident Engineer, City Engineering Audit Officer, or other designee of the Agency Head, to resolve the issue by mutual consent prior to reaching a determination. The Agency Head may seek such technical or other expertise as he or she shall deem appropriate, including the use of neutral mediators, and require any such additional material from either or both parties as he or she deems fit. The Agency Head's ability to render, and the effect of, a decision hereunder shall not be impaired by any negotiations in connection with the dispute presented, whether or not the Agency Head participated therein. The Agency Head may or, at the request of any party to the dispute, shall compel the participation of any other contractor with a contract related to the work of this Agreement and that contractor shall be bound by the decision of the Agency Head. Any contractor thus brought into the dispute resolution proceeding shall have the same rights and obligations under this Section 12.03 as the Contractor initiating the dispute.

3. Agency Head Determination. Within 30 Days after the receipt of all materials and information, or such longer time as may be agreed to by the parties, the Agency Head shall make his or her determination and shall deliver or send a copy of such determination to the Contractor and ACCO and, in the case of construction or construction-related services, the City Engineer, City Resident Engineer, City Engineering Audit Officer, or other designee of the Agency Head, together with a statement concerning how the decision may be appealed.

4. Finality of Agency Head Decision. The Agency Head's decision shall be final and binding on all parties, unless presented to the Contract Dispute Resolution Board ("CDRB") pursuant to this Section 12.03. The City may not take a petition to the CDRB. However, should the Contractor take such a petition, the City may seek, and the CDRB may render, a determination less favorable to the Contractor and more favorable to the City than the decision of the Agency Head.

E. Presentation of Dispute to the Comptroller. Before any dispute may be brought by the Contractor to the CDRB, the Contractor must first present its claim to the Comptroller for his or her review, investigation, and possible adjustment.

1. Time, Form, and Content of Notice. Within 30 Days of receipt of a decision by the Agency Head, the Contractor shall submit to the Comptroller and to the Agency Head a Notice of Claim regarding its dispute with the Agency. The Notice of Claim shall consist of (i) a brief statement of the substance of the dispute, the amount of money, if any, claimed and the reason(s) the Contractor contends the dispute was wrongly decided by the Agency Head; (ii) a copy of the decision of the Agency Head; and (iii) a copy of all materials submitted by the Contractor to the Agency, including the Notice of Dispute. The Contractor may not present to the Comptroller any material not presented to the Agency Head, except at the request of the Comptroller.

2. Agency Response. Within 30 Days of receipt of the Notice of Claim, the Agency shall make available to the Comptroller a copy of all material submitted by the Agency to the Agency Head in connection with the dispute. The Agency may not present to the Comptroller any material not presented to the Agency Head, except at the request of the Comptroller.

3. Comptroller Investigation. The Comptroller may investigate the claim in dispute and, in the course of such investigation, may exercise all powers provided in Admin. Code §§ 7-201 and 7-203. In addition, the Comptroller may demand of either party, and such party shall provide, whatever additional material the Comptroller deems pertinent to the claim, including original business records of the Contractor. Willful failure of the Contractor to produce within 15 Days any material requested by the Comptroller shall constitute a waiver by the Contractor of its claim. The Comptroller may also schedule an informal conference to be attended by the Contractor, Agency representatives, and any other personnel desired by the Comptroller.

4. Opportunity of Comptroller to Compromise or Adjust Claim. The Comptroller shall have 45 Days from his or her receipt of all materials referred to in Paragraph (E)(3) above to investigate the disputed claim. The period for investigation and compromise may be further extended by agreement between the Contractor and the Comptroller, to a maximum of 90 Days from the Comptroller's receipt of all the materials. The Contractor may not present its petition to the CDRB until the period for investigation and compromise delineated in this Paragraph has expired. In compromising or adjusting any claim hereunder, the Comptroller may not revise or disregard the terms of the Agreement.

F. Contract Dispute Resolution Board. There shall be a Contract Dispute Resolution Board composed of:

1. the chief administrative law judge of the Office of Administrative Trials and Hearings ("OATH") or his or her designated OATH administrative law judge, who shall act as chairperson, and may adopt operational procedures and issue such orders consistent with this Section 12.03 as may be necessary in the execution of the CDRB's functions, including, but not limited to, granting extensions of time to present or respond to submissions;

2. the City Chief Procurement Officer ("CCPO") or his or her designee; any designee shall have the requisite background to consider and resolve the merits of the dispute and shall not have participated personally and substantially in the particular matter that is the subject of the dispute or report to anyone who so participated; and

3. a person with appropriate expertise who is not an employee of the City. This person shall be selected by the presiding administrative law judge from a prequalified panel of individuals, established, and administered by OATH, with appropriate background to act as decision-makers in a dispute. Such individuals may not

have a contract or dispute with the City or be an officer or employee of any company or organization that does, or regularly represent persons, companies, or organizations having disputes with the City.

G. Petition to CDRB. In the event the claim has not been settled or adjusted by the Comptroller within the period provided in this Section 12.03, the Contractor, within thirty (30) Days thereafter, may petition the CDRB to review the Agency Head determination.

1. Form and Content of Petition by the Contractor. The Contractor shall present its dispute to the CDRB in the form of a petition, which shall include (i) a brief statement of the substance of the dispute, the amount of money, if any, claimed, and the reason(s) the Contractor contends that the dispute was wrongly decided by the Agency Head; (ii) a copy of the decision of the Agency Head; (iii) copies of all materials submitted by the Contractor to the Agency; (iv) a copy of the decision of the Comptroller, if any, and (v) copies of all correspondence with, and material submitted by the Contractor to, the Comptroller's Office. The Contractor shall concurrently submit four complete sets of the petition: one to the Corporation Counsel (Attn: Commercial and Real Estate Litigation Division), and three to the CDRB at OATH's offices, with proof of service on the Corporation Counsel. In addition, the Contractor shall submit a copy of the statement of the substance of the dispute, cited in (i) above, to both the Agency Head and the Comptroller.

2. Agency Response. Within 30 Days of receipt of the petition by the Corporation Counsel, the Agency shall respond to the statement of the Contractor and make available to the CDRB all material it submitted to the Agency Head and Comptroller. Three complete copies of the Agency response shall be submitted to the CDRB at OATH's offices and one to the Contractor. Extensions of time for submittal of the Agency response shall be given as necessary upon a showing of good cause or, upon the consent of the parties, for an initial period of up to 30 Days.

3. Further Proceedings. The CDRB shall permit the Contractor to present its case by submission of memoranda, briefs, and oral argument. The CDRB shall also permit the Agency to present its case in response to the Contractor by submission of memoranda, briefs, and oral argument. If requested by the Corporation Counsel, the Comptroller shall provide reasonable assistance in the preparation of the Agency's case. Neither the Contractor nor the Agency may support its case with any documentation or other material that was not considered by the Comptroller, unless requested by the CDRB. The CDRB, in its discretion, may seek such technical or other expert advice as it shall deem appropriate and may seek, on its own or upon application of a party, any such additional material from any party as it deems fit. The CDRB, in its discretion, may combine more than one dispute between the parties for concurrent resolution.

4. CDRB Determination. Within 45 Days of the conclusion of all submissions and oral arguments, the CDRB shall render a decision resolving the dispute. In an unusually complex case, the CDRB may render its decision in a longer period of

time, not to exceed 90 Days, and shall so advise the parties at the commencement of this period. The CDRB's decision must be consistent with the terms of this Agreement. Decisions of the CDRB shall only resolve matters before the CDRB and shall not have precedential effect with respect to matters not before the CDRB.

5. Notification of CDRB Decision. The CDRB shall send a copy of its decision to the Contractor, the ACCO, the Corporation Counsel, the Comptroller, the CCPO, and, in the case of construction or construction-related services, the City Engineer, City Resident Engineer, City Engineering Audit Officer, or other designee of the Agency Head. A decision in favor of the Contractor shall be subject to the prompt payment provisions of the PPB Rules. The required payment date shall be 30 Days after the date the parties are formally notified of the CDRB's decision.

6. Finality of CDRB Decision. The CDRB's decision shall be final and binding on all parties. Any party may seek review of the CDRB's decision solely in the form of a challenge, filed within four months of the date of the CDRB's decision, in a court of competent jurisdiction of the State of New York, County of New York pursuant to Article 78 of the Civil Practice Law and Rules. Such review by the court shall be limited to the question of whether or not the CDRB's decision was made in violation of lawful procedure, was affected by an error of Law, or was arbitrary and capricious or an abuse of discretion. No evidence or information shall be introduced or relied upon in such proceeding that was not presented to the CDRB in accordance with PPB Rules § 4-09.

H. Any termination, cancellation, or alleged breach of the Agreement prior to or during the pendency of any proceedings pursuant to this Section 12.03 shall not affect or impair the ability of the Agency Head or CDRB to make a binding and final decision pursuant to this Section 12.03.

Section 12.04 Claims and Actions

A. Any claim, that is not subject to dispute resolution under the PPB Rules or this Agreement, against the City for damages for breach of contract shall not be made or asserted in any action, unless the Contractor shall have strictly complied with all requirements relating to the giving of notice and of information with respect to such claims, as provided in this Agreement.

B. No action shall be instituted or maintained on any such claims unless such action shall be commenced within six months after the final payment under this Agreement, or within six months of the termination or expiration of this Agreement, or within six months after the accrual of the cause of action, whichever first occurs.

Section 12.05 No Claim Against Officials, Agents, or Employees

No claim shall be made by the Contractor against any official, agent, or employee of the City in their personal capacity for, or on account of, anything done or omitted in connection with this Agreement.

Section 12.06 General Release

The acceptance by the Contractor or its assignees of the final payment under this Agreement, whether by check, wire transfer, or other means, and whether pursuant to invoice, voucher, judgment of any court of competent jurisdiction or any other administrative means, shall constitute and operate as a release of the City from any and all claims of and liability to the Contractor, of which the Contractor was aware or should reasonably have been aware, arising out of the performance of this Agreement based on actions of the City prior to such acceptance of final payment, excepting any disputes that are the subject of pending dispute resolution procedures.

Section 12.07 No Waiver

Waiver by either the Department or the Contractor of a breach of any provision of this Agreement shall not be deemed to be a waiver of any other or subsequent breach and shall not be construed to be a modification of the terms of the Agreement unless and until the same shall be agreed to in writing by the parties as set forth in Section 9.01.

ARTICLE 13 - APPLICABLE LAWS

Section 13.01 PPB Rules

This Agreement is subject to the PPB Rules. If there is a conflict between the PPB Rules and a provision of this Agreement, the PPB Rules shall take precedence.

Section 13.02 All Legal Provisions Deemed Included

Each and every provision required by Law to be inserted in this Agreement is hereby deemed to be a part of this Agreement, whether actually inserted or not.

Section 13.03 Severability / Unlawful Provisions Deemed Stricken

If this Agreement contains any unlawful provision not an essential part of the Agreement and which shall not appear to have been a controlling or material inducement to the making of this Agreement, the unlawful provision shall be deemed of no effect and shall, upon notice by either party, be deemed stricken from the Agreement without affecting the binding force of the remainder.

Section 13.04 Compliance With Laws

The Contractor shall perform all services under this Agreement in accordance with all applicable Laws as are in effect at the time such services are performed.

Section 13.05 Unlawful Discrimination in the Provision of Services

A. *Discrimination in Public Accommodations.* With respect to services provided under this Agreement, the Contractor shall not unlawfully discriminate against any person because of actual or perceived age, religion, creed, sex, gender, gender identity or gender expression, sexual orientation, partnership status, marital status, disability, presence of a service animal, race, color, national origin, alienage, citizenship status, or military status, or any other class of individuals protected from discrimination in public accommodations by City, State or Federal laws, rules or regulations. The Contractor shall comply with all statutory and regulatory obligations to provide reasonable accommodations to individuals with disabilities.

B. *Discrimination in Housing Accommodations.* With respect to services provided under this Agreement, the Contractor shall not unlawfully discriminate against any person because of actual or perceived age, religion, creed, sex, gender, gender identity or gender expression, sexual orientation, status as a victim of domestic violence, stalking, and sex offenses, partnership status, marital status, presence of children, disability, presence of a service or emotional support animal, race, color, national origin, alienage or citizenship status, lawful occupation, or lawful source of income (including income derived from social security, or any form of federal, state, or local public government assistance or housing assistance including Section 8 vouchers), or any other class of individuals protected from discrimination in housing accommodations by City, State or Federal laws, rules or regulations. The Contractor shall comply with all statutory and regulatory obligations to provide reasonable accommodations to individuals with disabilities.

C. *Admin. Code § 6-123.* In accordance with Admin. Code § 6-123, the Contractor will not engage in any unlawful discriminatory practice as defined in and pursuant to the terms of Title 8 of the Admin. Code. The Contractor shall include a provision in any agreement with a first-level subcontractor performing services under this Agreement for an amount in excess of \$50,000.00 that such subcontractor shall not engage in any such unlawful discriminatory practice.

D. *Immigration status.* In connection with the services provided under this Agreement, the Contractor shall not inquire about the immigration status of a recipient or potential recipient of such services unless (i) it is necessary for the determination of program, service or benefit eligibility or the provision of City services or (ii) the Contractor is required by law to inquire about such person's immigration status.

Section 13.05 Americans with Disabilities Act (ADA)

A. This Agreement is subject to the provisions of Subtitle A of Title II of the Americans with Disabilities Act of 1990, 42 U.S.C. §§ 12131 *et seq.* ("ADA") and regulations promulgated pursuant thereto, see 28 CFR Part 35. The Contractor shall not discriminate against an individual with a disability, as defined in the ADA, in providing services, programs, or activities pursuant to this Agreement. If directed to do so by the Department to ensure the

Contractor's compliance with the ADA during the term of this Agreement, the Contractor shall prepare a plan ("Compliance Plan") which lists its program site(s) and describes in detail, how it intends to make the services, programs and activities set forth in the scope of services herein readily accessible and usable by individuals with disabilities at such site(s). If the program site is not readily accessible and usable by individuals with disabilities, contractor shall also include in the Compliance Plan, a description of reasonable alternative means and methods that result in making the services, programs or activities provided under this Agreement, readily accessible to and usable by individuals with disabilities, including but not limited to people with visual, auditory or mobility disabilities. The Contractor shall submit the Compliance Plan to the ACCO for review within ten Days after being directed to do so and shall abide by the Compliance Plan and implement any action detailed in the Compliance Plan to make the services, programs, or activities accessible and usable by the disabled.

B. The Contractor's failure to either submit a Compliance Plan as required herein or implement an approved Compliance Plan may be deemed a material breach of this Agreement and result in the City terminating this Agreement.

Section 13.06 Voter Registration

A. *Participating Agencies.* Pursuant to Charter § 1057-a, if this Agreement is made by and through a participating City agency and the Contractor has regular contact with the public in the daily administration of its business, the Contractor must comply with the requirements of this Section 13.06. The participating City agencies are: the Administration for Children's Services; the City Clerk; the Civilian Complaint Review Board; the Commission on Human Rights; Community Boards; SBS; the Department of Citywide Administrative Services; the Department of Consumer Affairs; the Department of Correction; the Department of Environmental Protection; the Department of Finance; the Department of Health and Mental Hygiene; the Department of Homeless Services; the Department of Housing Preservation and Development; the Department of Parks and Recreation; the Department of Probation; the Taxi and Limousine Commission; the Department of Transportation; and the Department of Youth and Community Development.

B. *Distribution of Voter Registration Forms.* In accordance with Charter § 1057-a, the Contractor, if it has regular contact with the public in the daily administration of its business under this Agreement, hereby agrees as follows:

1. The Contractor shall provide and distribute voter registration forms to all persons together with written applications for services, renewal, or recertification for services and change of address relating to such services. Such voter registration forms shall be provided to the Contractor by the City. The Contractor should be prepared to provide forms written in Spanish or Chinese, and shall obtain a sufficient supply of such forms from the City.

2. The Contractor shall also include a voter registration form with any Contractor communication sent through the United States mail for the purpose of

supplying clients with materials for application, renewal, or recertification for services and change of address relating to such services. If forms written in Spanish or Chinese are not provided in such mailing, the Contractor shall provide such forms upon the Department's request.

3. The Contractor shall, subject to approval by the Department, incorporate an opportunity to request a voter registration application into any application for services, renewal, or recertification for services and change of address relating to such services provided on computer terminals, the World Wide Web or the Internet. Any person indicating that they wish to be sent a voter registration form via computer terminals, the World Wide Web or the Internet shall be sent such a form by the Contractor or be directed, in a manner subject to approval by the Department, to a link on that system where such a form may be downloaded.

4. The Contractor shall, at the earliest practicable or next regularly scheduled printing of its own forms, subject to approval by the Department, physically incorporate the voter registration forms with its own application forms in a manner that permits the voter registration portion to be detached therefrom. Until such time when the Contractor amends its form, the Contractor should affix or include a postage-paid City Board of Elections voter registration form to or with its application, renewal, recertification, and change of address forms.

5. The Contractor shall prominently display in its public office, subject to approval by the Department, promotional materials designed and approved by the City or State Board of Elections.

6. For the purposes of Paragraph A of this Section 13.06, the word "Contractor" shall be deemed to include subcontractors having regular contact with the public in the daily administration of their business.

7. The provisions of Paragraph A of this Section 13.06 shall not apply to services that must be provided to prevent actual or potential danger to life, health, or safety of any individual or of the public.

C. *Assistance in Completing Voter Registration Forms.* In accordance with Charter § 1057-a, the Contractor hereby agrees as follows:

1. In the event the Department provides assistance in completing distributed voter registration forms, the Contractor shall also provide such assistance, in the manner and to the extent specified by the Department.

2. In the event the Department receives and transmits completed registration forms from applicants who wish to have the forms transmitted to the City Board of Elections, the Contractor shall similarly provide such service, in the manner and to the extent specified by the Department.

3. If, in connection with the provision of services under this Agreement, the Contractor intends to provide assistance in completing distributed voter registration forms or to receive and transmit completed registration forms from applicants who wish to have the forms transmitted to the City Board of Elections, the Contractor shall do so only by prior arrangement with the Department.

4. The provision of Paragraph B services by the Contractor may be subject to Department protocols, including protocols regarding confidentiality.

D. *Required Statements.* In accordance with Charter § 1057-a, the Contractor hereby agrees as follows:

1. The Contractor shall advise all persons seeking voter registration forms and information, in writing together with other written materials provided by the Contractor or by appropriate publicity, that the Contractor's or government services are not conditioned on being registered to vote.

2. No statement shall be made and no action shall be taken by the Contractor or an employee of the Contractor to discourage an applicant from registering to vote or to encourage or discourage an applicant from enrolling in any particular political party.

3. The Contractor shall communicate to applicants that the completion of voter registration forms is voluntary.

4. The Contractor and the Contractor's employees shall not:

- a. seek to influence an applicant's political preference or party designation;
- b. display any political preference or party allegiance;
- c. make any statement to an applicant or take any action the purpose or effect of which is to discourage the applicant from registering to vote; or
- d. make any statement to an applicant or take any action the purpose or effect of which is to lead the applicant to believe that a decision to register or not to register has any bearing on the availability of services or benefits.

E. The Contractor, as defined above and in this Agreement, agrees that the covenants and representations in this Section 13.06 are material conditions of this Agreement.

F. The provisions of this Section 13.06 do not apply where the services under this Agreement are supported by a federal or State grant of funds and the source of funds prohibits the use of federal or State funds for the purposes of this Section.

Section 13.07 Political Activity

The Contractor's provision of services under this Agreement shall not include any partisan political activity or any activity to further the election or defeat of any candidate for public, political, or party office, nor shall any of the funds provided under this Agreement be used for such purposes.

Section 13.08 Religious Activity

There shall be no religious worship, instruction, or proselytizing as part of or in connection with the Contractor's provision of services under this Agreement, nor shall any of the funds provided under this Agreement be used for such purposes.

Section 13.09 Participation in an International Boycott

A. The Contractor agrees that neither the Contractor nor any substantially-owned affiliated company is participating or shall participate in an international boycott in violation of the provisions of the federal Export Administration Act of 1979, as amended, 50 U.S.C. Appendix. §§ 2401 *et seq.*, or the regulations of the United States Department of Commerce promulgated thereunder.

B. Upon the final determination by the Commerce Department or any other agency of the United States as to, or conviction of, the Contractor or a substantially-owned affiliated company thereof, of participation in an international boycott in violation of the provisions of the Export Administration Act of 1979, as amended, or the regulations promulgated thereunder, the Comptroller may, at his or her option, render forfeit and void this Agreement.

C. The Contractor shall comply in all respects, with the provisions of Admin. Code § 6-114 and the rules issued by the Comptroller thereunder.

Section 13.10 MacBride Principles

A. In accordance with and to the extent required by Admin. Code § 6-115.1, the Contractor stipulates that the Contractor and any individual or legal entity in which the Contractor holds a ten percent (10%) or greater ownership interest and any individual or legal entity that holds a ten percent (10%) or greater ownership interest in the Contractor either (a) have no business operations in Northern Ireland, or (b) shall take lawful steps in good faith to conduct any business operations they have in Northern Ireland in accordance with the MacBride Principles, and shall permit independent monitoring of their compliance with such principles.

B. The Contractor agrees that the covenants and representations in Paragraph A above are material conditions to this Agreement.

C. This Section does not apply if the Contractor is a not-for-profit corporation.

Section 13.11 Access to Public Health Insurance Coverage Information

A. Participating Agencies. Pursuant to Charter § 1069, if this Agreement is with a participating City agency and the Contractor is one to whom this Section 13.11 applies as provided in Paragraph B of this Section 13.11, the Contractor hereby agrees to fulfill the obligations in Paragraph C of this Section 13.11. The participating City agencies are: the Administration for Children's Services; the City Clerk; the Commission on Human Rights; the Department for the Aging; the Department of Corrections; the Department of Homeless Services; the Department of Housing Preservation and Development; the Department of Juvenile Justice; the Department of Health and Mental Hygiene; the Department of Probation; the Department of Social Services/Human Resources Administration; the Taxi and Limousine Commission; the Department of Youth and Community Development; the Office to Combat Domestic Violence; and the Office of Immigrant Affairs.

B. Applicability to Certain Contractors. This Section 13.11 shall be applicable to a Contractor operating pursuant to an Agreement which (i) is in excess of \$250,000.00 and (ii) requires such Contractor to supply individuals with a written application for, or written renewal or recertification of services, or request for change of address form in the daily administration of its contractual obligation to such participating City agency. "Contractors" to whom this Section 13.11 applies shall be deemed to include subcontractors if the subcontract requires the subcontractor to supply individuals with a written application for, or written renewal or recertification of services, or request for change of address form in the daily administration of the subcontractor's contractual obligation.

C. Distribution of Public Health Insurance Pamphlet. In accordance with Charter § 1069, when the participating City agency supplies the Contractor with the public health insurance program options pamphlet published by the Department of Health and Mental Hygiene pursuant to Section 17-183 of the Admin. Code (hereinafter "pamphlet"), the Contractor hereby agrees as follows:

1. The Contractor will distribute the pamphlet to all persons requesting a written application for services, renewal or recertification of services or request for a change of address relating to the provision of services.

2. The Contractor will include a pamphlet with any Contractor communication sent through the United States mail for the purpose of supplying an individual with a written application for services, renewal or recertification of services or with a request for a change of address form relating to the provision of services.

3. The Contractor will provide an opportunity for an individual requesting a written application for services, renewal or recertification for services or change of address form relating to the provision of services via the Internet to request a pamphlet, and will provide such pamphlet by United States mail or an Internet address where such

pamphlet may be viewed or downloaded, to any person who indicates via the Internet that they wish to be sent a pamphlet.

4. The Contractor will ensure that its employees do not make any statement to an applicant for services or client or take any action the purpose or effect of which is to lead the applicant or client to believe that a decision to request public health insurance or a pamphlet has any bearing on their eligibility to receive or the availability of services or benefits.

5. The Contractor will comply with: (i) any procedures established by the participating City agency to implement Charter § 1069; (ii) any determination of the commissioner or head of the participating City agency (which is concurred in by the commissioner of the Department of Health and Mental Hygiene) to exclude a program, in whole or in part, from the requirements of Charter § 1069; and (iii) any determination of the commissioner or head of the participating City agency (which is concurred in by the commissioner of the Department of Health and Mental Hygiene) as to which Workforce Investment Act of 1998 offices providing workforce development services shall be required to fulfill the obligations under Charter § 1069.

D. Non-applicability to Certain Services. The provisions of this Section 13.11 shall not apply to services that must be provided to prevent actual or potential danger to the life, health or safety of any individual or to the public.

Section 13.12 Distribution of Personal Identification Materials

A. Participating Agencies. Pursuant to City Executive Order No. 150 of 2011 (“E.O. 150”), if this Agreement is with a participating City agency and the Contractor has regular contact with the public in the daily administration of its business, the Contractor must comply with the requirements of this Section 13.12. The participating City agencies are: Administration for Children’s Services, Department of Consumer Affairs, Department of Correction, Department of Health and Mental Hygiene, Department of Homeless Services, Department of Housing Preservation and Development, Human Resources Administration, Department of Parks and Recreation, Department of Probation, and Department of Youth and Community Development.

B. Policy. As expressed in E.O. 150, it is the policy of the City to provide information to individuals about how they can obtain the various forms of City, State, and Federal government-issued identification and, where appropriate, to assist them with the process for applying for such identification.

C. Distribution of Materials. If the Contractor has regular contact with the public in the daily administration of its business, the Contractor hereby agrees to provide and distribute materials and information related to whether and how to obtain various forms of City, State, and Federal government-issued identification as the Agency directs in accordance with the Agency’s plans developed pursuant to E.O. 150.

ARTICLE 14 - MISCELLANEOUS PROVISIONS

Section 14.01 Conditions Precedent

A. This Agreement shall be neither binding nor effective unless and until it is registered pursuant to Charter § 328.

B. The requirements of this Section 14.01 shall be in addition to, and not in lieu of, any approval or authorization otherwise required for this Agreement to be effective and for the expenditure of City funds.

Section 14.02 Merger

This written Agreement contains all the terms and conditions agreed upon by the parties, and no other agreement, oral or otherwise, regarding the subject matter of this Agreement shall be deemed to exist or to bind either of the parties, or to modify any of the terms contained in this Agreement, other than a written change, amendment or modification duly executed by both parties pursuant to Article 9 of this Appendix A.

Section 14.03 Headings

Headings are inserted only as a matter of convenience and therefore are not a part of and do not affect the substance of this Agreement.

Section 14.04 Notice

A. The Contractor and the Department hereby designate the business addresses and email addresses specified in Schedule A (and if not specified in Schedule A, as specified at the beginning of this Agreement) as the places where all notices, directions, or communications from one such party to the other party shall be delivered, or to which they shall be mailed. Either party may change its notice address at any time by an instrument in writing executed and acknowledged by the party making such change and delivered to the other party in the manner as specified below.

B. Any notice, direction, or communication from either party to the other shall be in writing and shall be deemed to have been given when (i) delivered personally; (ii) sent by certified mail, return receipt requested; (iii) delivered by overnight or same day courier service in a properly addressed envelope with confirmation; or (iv) sent by email and, unless receipt of the e-mail is acknowledged by the recipient by email, deposited in a post office box regularly maintained by the United States Postal Service in a properly addressed, postage pre-paid envelope.

C. Nothing in this Section 14.04 shall be deemed to serve as a waiver of any requirements for the service of notice or process in the institution of an action or proceeding as provided by Law, including the New York Civil Practice Law and Rules.

AFFIRMATION

The undersigned proposer or bidder affirms and declares that said proposer or bidder is not in arrears to the City of New York upon debt, contract or taxes and is not a defaulter, as surety or otherwise, upon obligation to the City of New York, and has not been declared not responsible, or disqualified, by any agency of the City of New York, nor is there any proceeding pending relating to the responsibility or qualification of the proposer or bidder to receive public contract except _____.

Full name of Proposer or Bidder *[below]*

Address _____

City _____ State _____ Zip Code _____

CHECK ONE BOX AND INCLUDE APPROPRIATE NUMBER:

☐ A - ☐ Individual or Sole Proprietorships

SOCIAL SECURITY NUMBER _____

☐ B - ☐ Partnership, Joint Venture or other unincorporated organization

EMPLOYER IDENTIFICATION NUMBER _____

☐ C - ☐ Corporation

EMPLOYER IDENTIFICATION NUMBER _____

By _____

Signature

Title

If a corporation place seal here

Must be signed by an officer or duly authorized representative.

* Under the Federal Privacy Act, the furnishing of Social Security numbers by bidders or proposers on City contracts is voluntary. Failure to provide a Social Security number will not result in a bidder's/proposer's disqualification. Social Security numbers will be used to identify bidders, proposers, or vendors to ensure their compliance with laws, to assist the City in enforcement of laws, as well as to provide the City a means of identifying businesses seeking City contracts.

SCHEDULE A

Article 7 -- Insurance		
Types of Insurance (per Article 7 in its entirety, including listed paragraph)		Minimum Limits and Special Conditions
<input checked="" type="checkbox"/> Workers' Compensation §7.02 <input checked="" type="checkbox"/> Disability Benefits Insurance §7.02 <input checked="" type="checkbox"/> Employers' Liability §7.02		Statutory amounts.
<input checked="" type="checkbox"/> Commercial General Liability §7.03(A)		<u>\$1,000,000.00</u> per occurrence <u>\$1,000,000.00</u> personal & advertising injury (unless waived in writing by the Department) <u>\$2,000,000.00</u> aggregate <u>\$0</u> products/completed operations Additional Insureds: 1. City of New York, including its officials and employees, and 2. _____ 3. _____
<input type="checkbox"/> Commercial Auto Liability §7.03(B)		<u>\$1,000,000.00</u> per accident combined single limit If vehicles are used for transporting hazardous materials, the Contractor shall provide pollution liability broadened coverage for covered vehicles (endorsement CA 99 48) as well as proof of MCS 90
<input type="checkbox"/> Professional Liability/Errors & Omissions <div style="text-align: right;">§7.03(C)</div>		<u>\$1,000,000.00</u> per claim
<input type="checkbox"/> Crime Insurance §7.03(D)		\$_____ Employee Theft/Dishonesty

	<p>\$ _____ Computer Fraud</p> <p>\$ _____ Funds Transfer Fraud</p> <p>\$ _____ Client Coverage</p> <p>\$ _____ Forgery or Alteration</p> <p>\$ _____ Inside the Premises (theft of money and securities)</p> <p>\$ _____ Inside the Premises (robbery or safe burglary of other property)</p> <p>\$ _____ Outside the Premises</p> <p>\$ _____ Money Orders and Counterfeit Money</p> <p>City of New York is a loss payee as its interests may appear</p>
<input type="checkbox"/> Cyber Liability Insurance §7.03(E)	<i>[If there is a significant cyber risk, please consult with the Law Department about specific insurance requirements.]</i>
<input type="checkbox"/> [OTHER]	<i>[If other type(s) of insurance need to be required under the Contract, the Contracting Agency should (a) check the box and fill in the type of insurance in left-hand column, and (b) in this right-hand column, specify appropriate limit(s) and appropriate Named Insured and Additional Insured(s).]</i>
<input type="checkbox"/> [OTHER]	<i>[If other type(s) of insurance need to be required under the Contract, the Contracting Agency should (a) check the box and fill in the type of insurance in left-hand column, and (b) in this right-hand column, specify appropriate limit(s) and appropriate Named Insured and Additional Insured(s).]</i>
Section 10.07 – Liquidated Damages	
<ul style="list-style-type: none"> Violation of Section 3.02(H), reporting subcontractors in the City’s Payee Information Portal 	\$100 per day
<ul style="list-style-type: none"> _____ 	\$ _____
Section 14.04 – Notice	

Appendix A January 2018 Final

Department's Mailing Address and Email Address for Notices	
Contractor's Mailing Address and Email Address for Notices	

CERTIFICATES OF INSURANCE

Instructions to New York City Agencies, Departments, and Offices

All certificates of insurance (except certificates of insurance solely evidencing Workers' Compensation Insurance, Employer's Liability Insurance, and/or Disability Benefits Insurance) must be accompanied by one of the following:

- (1) the Certification by Insurance Broker or Agent on the following page setting forth the required information and signatures;

-- OR --

- (2) copies of all policies as certified by an authorized representative of the issuing insurance carrier that are referenced in such certificate of insurance. If any policy is not available at the time of submission, certified binders may be submitted until such time as the policy is available, at which time a certified copy of the policy shall be submitted.

CITY OF NEW YORK
CERTIFICATION BY INSURANCE BROKER OR AGENT

The undersigned insurance broker or agent represents to the City of New York that the attached Certificate of Insurance is accurate in all material respects.

[Name of broker or agent (typewritten)]

[Address of broker or agent (typewritten)]

[Email address of broker or agent (typewritten)]

[Phone number/Fax number of broker or agent (typewritten)]

[Signature of authorized official, broker, or agent]

[Name and title of authorized official, broker, or agent (typewritten)]

State of)

) ss.:

County of)

Sworn to before me this ____ day of _____ 20__

NOTARY PUBLIC FOR THE STATE OF _____

WHISTLEBLOWER PROTECTION EXPANSION ACT POSTER



REPORT
CORRUPTION, FRAUD, UNETHICAL CONDUCT
RELATING TO A NYC-FUNDED CONTRACT
OR PROJECT
CALL THE NYC DEPARTMENT OF INVESTIGATION
212-825-5959

DOI CAN ALSO BE REACHED BY MAIL
OR IN PERSON AT:
New York City Department of
Investigation (DOI)
80 Maiden Lane, 17th floor
New York, New York 10038
Attention: COMPLAINT BUREAU

OR FILE A COMPLAINT ON-LINE AT:
www.nyc.gov/doi

All communications are confidential



Or scan the QR Code above
to make a complaint

**THE LAW PROTECTS EMPLOYEES OF
CITY CONTRACTORS WHO REPORT CORRUPTION**

- Any employee of a City contractor, or subcontractor of the City, or a City contractor with a contract valued at more than \$100,000 is protected under the law from retaliation by his or her employer if the employee reports wrongdoing related to the contract to the DOI.
- **To be protected by this law**, an employee must report to DOI – or to certain other specified government officials – information about fraud, false claims, corruption, criminality, conflict of interest, gross mismanagement, or abuse of authority relating to a City contract valued at more than \$100,000.
- Any employee who makes such a report and who believes he or she has been dismissed, demoted, suspended, or otherwise subject to an adverse personnel action because of that report is entitled to bring a lawsuit against the contractor and recover damages