Brown AND Caldwell

DRAFT REPORT

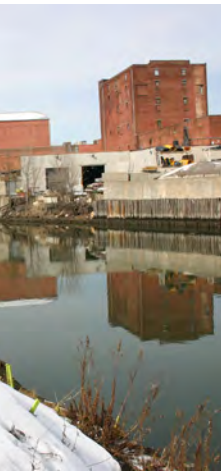
Prepared for
New York City Department of Environmental Protection

CSO Facility Site Recommendation Report for Owl's Head Outfall OH-007

Gowanus Canal, Brooklyn, New York

NYC Environmental Protection

June 2015



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List of Abbreviations

AACEI	Association for the Advancement of Cost Engineering International
BC	Brown and Caldwell Associates
bgs	below ground surface
Blue Book	Rental Rate Blue Book for Construction Equipment
CEQR	New York City Environmental Quality Review
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CSO	combined sewer overflow
CWA	Clean Water Act
DCP	New York City Department of City Planning
DEP	New York City Department of Environmental Protection
DNAPL	Dense Non-Aqueous Phase Liquids
DOS	New York City Department of Sanitation
DSM	deep soil mixing
Fps	feet per second
GAC	granular activated carbon
GC	General Conditions
HVAC	heating, ventilation and air conditioning
I&C	instrumentation and control
ISI	Institute for Sustainable Infrastructure
ISS	in situ stabilization/solidification
LTCP	Long Term Control Plan
MG	million gallon(s)
mgd	million gallon(s) per day
MGP	manufactured gas plant
NAPL	non-aqueous phase liquid
NTP	Notice to Proceed
NYSDEC	New York State Department of Environmental Conservation
OH	Owl's Head
O&M	operations and maintenance
Order	Administrative Order for Remedial Design (USEPA, May 2014)
PCB	polychlorinated biphenyl
PDI	pre-design investigation
PDS	pre-demolition survey
PRG	preliminary remediation goals
PRP	potentially responsible party
QC	quality control
RCRA	resource conservation and recovery act
RD	Remedial Design
ROD	Record of Decision
SOG	slab on grade
SOE	support of excavation
SOW	Statement of Work
ULURP	Uniform Land Use Review Procedure
USEPA	United States Environmental Protection Agency
V	volt
Yd^3=	Cubic Yards

Executive Summary

In September 2013 the United States Environmental Protection Agency (USEPA), acting under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, a/k/a Superfund), issued its Record of Decision (ROD) describing the selected remedy for the Gowanus Canal Superfund site located in Brooklyn, New York. In May 2014, the USEPA issued an Administrative Order for Remedial Design (Order) that contained a Statement of Work (SOW) further defining the selected remedy. As part of the selected remedy, the City of New York (the City) was directed to institute combined sewer overflow (CSO) controls consisting of retention tanks to intercept discharges from outfalls Red Hook RH-034 and Owl's Head OH-007.

The ROD estimates that an 8-million-gallon (MG) tank at RH-034 and a 4 MG tank at OH-007 will be required to reach the Preliminary Remediation Goals (PRGs), and estimates that a 58 to 74 percent reduction of CSO solids discharged to the Canal is needed to meet those PRGs. The ROD states that this estimated volume of CSO solids reduction will prevent recontamination of the post-remedy clean surface by CSOs. The ROD further contemplates that during the Remedial Design (RD), the City will determine final tank sizes and CSO solids reductions based on CSO volume modeling, additional sampling data on discharge characteristics, PRGs, and consideration of alternative technologies to achieve the PRGs and solids reduction goals.

The City has proposed an alternative tank size to the USEPA in a Technical Memorandum titled Gowanus Canal Baseline CSO Volume Modeling and CSO Tank Sizing dated March 20, 2015. Based on the data analysis and conceptual requirements developed thus far, the City believes a 1.4 MG tank for OH-007 will meet the PRGs and clearly exceed the 58 percent CSO solids reduction target estimated in the ROD.

The purpose of this report is to document the site selection and recommendation process and present a recommendation for the siting of a retention tank and associated process components at OH-007, referred to hereafter as the Owl's Head CSO Facility. A separate report for the Red Hook outfalls is being submitted concurrently with this report.

The identification and evaluation of potential sites was conducted in a step-wise manner, with each subsequent step building on the previous effort. A 4 MG tank size was used for the purpose of developing conceptual requirements and comparing potential sites in the preliminary stage of the remedial design process. As this report documents, there are many factors to be considered in the siting and design of a complete CSO facility. The steps used to evaluate and recommend sites are as follows:

- Identification of conceptual requirements, footprint and property size requirements
- Initial site screening and development of a short list of sites
- Evaluation of the short-listed sites, including site specific conceptual designs and cost estimates
- Comparison of sites and final site recommendation

Application of both engineering and environmental criteria yielded a short list of two sites; OH-4, a combination of a City owned vacant parcel adjacent to the OH-007 outfall controlled by the NYC Department of Sanitation (DOS), and a group of privately owned parcels located adjacent to the DOS parcel immediately across 5th Street, and site OH-5 which is comprised of two privately owned parcels located across 2nd Avenue between 6th Street and the 4th Street turning basin.

Site specific conceptual designs were prepared for each site, and Class 4 cost estimates were prepared based on the conceptual designs. Some of the major differentiators between the sites are:

- Protection of Adjacent Buildings – There is a new building, occupied by the DOC, immediately adjacent to the OH-5 site. The foundation of this building would require special geotechnical protection during excavation for tank construction at that site. Those foundation protections could carry significant cost.
- Tank Depth – A tank at Site OH-4, being adjacent to the OH-007 outfall, would require minimal depth of excavation for proper conveyance and hydraulic operation of the Facility. Site OH-5 is located farther from the outfall, and would require the tanks to be excavated to a deeper elevation for proper hydraulic operation. The need for deeper excavation for the tank at OH-5 results in a greater volume of soil requiring excavation and disposal, resulting in greater cost.
- Conveyance Issues – Site OH-4 would require minimal length of conveyance (approximately 250 feet) to move the CSOs from the OH-007 outfall to the tank, and would not require utility crossing for the conveyance. Site OH-5 would require a greater length of conveyance (approximately 800 feet), requiring routing around the new DOC building, utility crossings, and a greater associated cost.
- Community Aspects – Using Site OH-4 would likely result in additional open space and provide new and expanded community access to the waterfront after construction of the tank is completed. Site OH-5 could also provide some open space and waterfront access, but on a much smaller scale.
- Overall Cost – The cost estimates cover all aspects of the project including property acquisition, planning and permitting, pre-design investigations, design services, construction management, demolition and site preparation, waste handling and disposal, tank and conveyance construction, site restoration, and facility start-up and commissioning. The total cost for developing the CSO Facility at each site is:
  - OH-4 – $311,000,000
  - OH-5 – $336,000,000

These estimates include the cost of managing contaminated soil and groundwater as required for the duration of construction and within the footprint of the retention tank and conveyance only.

Based on the analysis of the engineering requirements, operation and maintenance issues, environmental factors, construction schedule and construction costs, OH-4 is the recommended site for the Owl's Head CSO Facility.

Section 1

Introduction

In September 2013, the USEPA issued its ROD describing the selected remedy for the Gowanus Canal Superfund site. In May 2014, the USEPA issued an Order for the remedy that contained an SOW further defining the selected remedy and RA.

As part of the selected remedy, the City was directed to institute CSO controls consisting of retention tanks to intercept discharges from outfalls Red Hook RH-034 and Owl's Head OH-007. The ROD estimates that an 8 MG tank at RH-034 and a 4-MG tank at OH-007 will be needed. The ROD stipulates that the final sizes are to be determined during the RD, and allows for consideration of alternative technologies.

Using the latest model-predicted baseline CSO volumes developed by the Long Term Control Plan (LTCP) for the Canal, the City has presented preliminary sizing calculations for CSO retention tanks to the USEPA in a Technical Memorandum titled "Gowanus Canal Baseline CSO Volume Modeling and CSO Tank Sizing" dated March 20, 2015. Based on the data analysis and conceptual requirements developed thus far, the City believes a 1.4 MG tank for OH-007 will meet the PRGs and clearly exceed the 58% CSO solids reduction target estimated in the ROD.

This report details the site selection process and final recommendation for the Owl's Head CSO Facility. The conceptual designs and conditions associated with a 4 MG tank have been used for the purposes of this study. The use of a smaller tank does not change the site comparison approach or final recommendation.

1.1 Purpose

The purpose of this report is to document the site selection and recommendation process for the siting of the Owl's Head CSO Facility.

The scope of work and approach to conducting the siting study is more fully discussed in Section 2 of this report. This report presents the more detailed analysis of the shortlisted sites, including site specific conceptual designs and detailed cost estimates. The report culminates in the side-by-side comparison of the shortlisted sites and a recommendation for final site selection.

1.2 Organization for the Report

This report is organized to present the progressive steps used in the site selection and recommendation process and documents the satisfaction of the requirements set forth in the ROD and the Order. It is organized as follows:

- Section 1 presents a summary of the project background.
- Section 2 presents the scope of work conducted and outlines the approach used to develop the siting criteria, engineering concepts, and environmental issues used to evaluate site suitability, including the ranking of sites and final site recommendation.
- Section 3 presents a summary of the physical components and engineering requirements for a CSO retention tank and associated facilities specific to the conditions present at the Gowanus Canal.

- Section 4 describes the screening process and development of a short list of two Owl's Head sites for which site specific conceptual designs and cost estimates would be developed.
- Section 5 presents site specific conceptual designs, cost estimates, environmental factors, risks and assumptions used for the detailed comparison of the short listed sites.
- Section 6 presents the side-by-side comparison of the two short listed sites
- Section 7 presents the recommended Owl's Head site and the next steps for moving the project forward.

1.3 Site History

The Gowanus Canal is an approximately 1.8-mile-long, man-made canal in the Borough of Brooklyn, Kings County, New York. Figure 1-1 shows the eleven active CSOs which currently discharge to the Gowanus Canal.

Following its construction in the 1860s to promote local development and commerce, the Canal quickly became one of the nation's busiest industrial waterways, serving heavy industries in the area including coal yards, cement manufacturing, tanneries, paint and ink factories, machine shops, manufactured gas plants, chemical plants, and oil refineries.

Over time, the City has implemented multiple improvements to sewer infrastructure, heavy industrial activity in the area has decreased, and implementation of the Clean Water Act (CWA) have improved the Canal's overall water quality and discharges to the Canal have been reduced. Continued discharges are currently regulated under state and federal rules and regulations.

Detailed information on the history of the Canal, the associated combined sewer system, regulatory actions, and investigation and remediation of upland sources of contamination can be found in the Remedial Design Work Plan previously submitted.

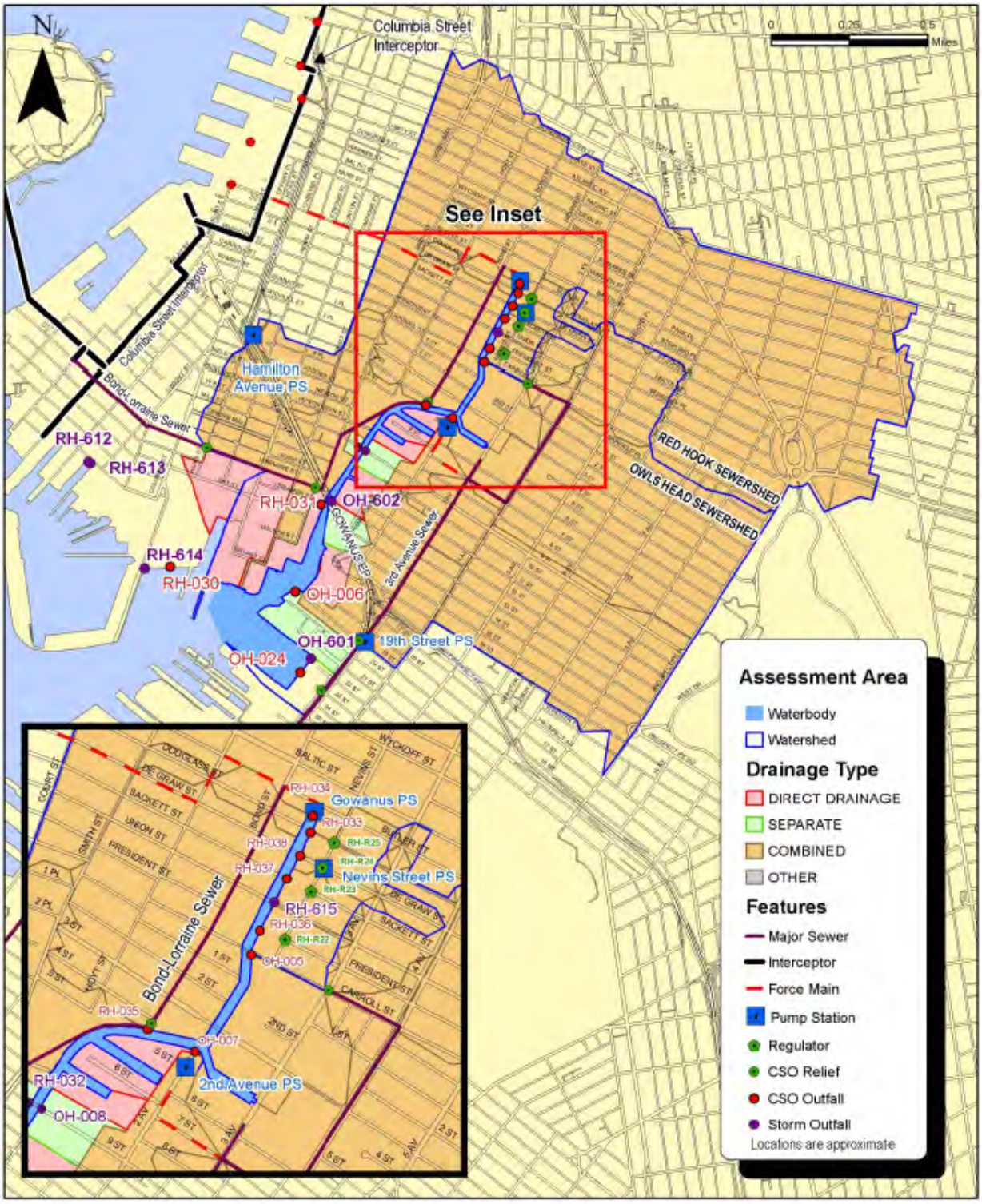


Figure 1-1. CSO Locations along Gowanus Canal

Section 2

Scope of Work

The overall scope of work for this siting study encompasses six major tasks needed to identify, evaluate and recommend a site for the design and construction of a 4-MG CSO retention Facility in proximity to outfall OH-007. This complex Facility not only provides CSO retention, but also contains the equipment and systems required to provide screening, grit collection, flushing and removal, odor control and tank dewatering processes. The details of the required components are described in Sections 3 and 5. This section describes the approach and tasks conducted to develop the site recommendation.

2.1 Project Approach

The identification and evaluation of potential sites was conducted in a step-wise manner, with each subsequent step building on the previous effort. As this report documents, there are many factors to be considered in the siting and design of a complete CSO Facility. The six steps used to evaluate and recommend sites are described below.

2.2 Identification of Conceptual Requirements

The first question to be addressed concerned the size of property required for the CSO Facility. Due to the complex nature of the Facility it would be insufficient to base size on storage volume calculations alone. Some of the more critical features that the Facility requires are conveyance, influent and effluent channels, screening and debris removal, segmented storage chambers, pumping equipment, flushing systems, grit removal, tide gates, odor control, and space for the superstructure to house instrumentation and controls, electrical equipment, odor control systems, vehicle access for waste removal, and other required features.

Section 3 of this report describes the required components and presents a conceptual layout of a Facility that includes all of these features. That conceptual layout, or "Facility footprint," allowed for the calculation of the minimal square footage required for the Facility. Additional space was needed for construction access and for the required setbacks from property lines for the finished Facility. Once the approximate square footage was developed based on the Facility footprint, the initial screening of sites could be conducted. Based on the conceptual requirements, the Facility footprint for a 4-MG Facility was approximately 60,000 square feet. Again it should be noted that the size requirement at this stage of the project was used to begin the property screening process, and does not represent any site specific layout or actual design.

2.3 Initial Site Screening

The first step in the initial site screening was to identify sites of various sizes, ranging from 20,000 square feet to over 100,000 square feet, excluding sites that could not be used such as schools, residential apartment buildings, churches, and others. This initial step, required by the USEPA, was conducted prior to developing the conceptual requirements and Facility footprint, and yielded 86 sites. Information was gathered for each site, including property ownership, zoning, land use, and floor to area ratio as an indication of underdeveloped properties. This high level overview of properties around the canal was submitted to USEPA on April 30, 2014. However, once the

conceptual Facility requirements and footprint were developed, a more focused site screening effort was conducted.

Section 4 of this report describes the secondary screening of the initial 86 sites down to list of 14, eight of which were identified as potential sites for the Owl's Head CSO Facility. The secondary screening was based on three critical criteria considered as fatal flaws for sites not meeting those criteria: size of available property, hydraulic analyses and effective capture of CSOs, and current or planned land use. Additional screening criteria, although not considered fatal flaws, were also used to develop the list of eight OH sites: proximity to existing infrastructure, length of conveyance piping required, and complexity of utility crossing or relocation. These eight sites were then subjected to more detailed analyses intended to reduce the number of sites to a short list of two sites plus one alternative.

2.4 Short List Development

The eight OH sites identified from the preliminary screening were further evaluated and ranked using a multipart analysis that allowed for the application of numerous screening factors to each potential site, resulting in a quantitative ranking. The process started by selecting the key parameters to consider for each potential site. The parameters were defined and the scope of each factor was limited to avoid duplication or double counting of specific items. The screening factors consisted of engineering criteria as well as land use and environmental criteria. The initial screening for land use and environmental considerations was based on the analysis categories in the City Environmental Quality Review (CEQR) Technical Manual.

Section 4 of this report also details the determination of the short list of sites, including the development of a ranking matrix where each site received a ranking score based on a list of eight engineering and environmental criteria. Once the sites received a raw score for each criterion, a weighting factor was applied to differentiate the relative importance of each criterion. The final numerical scoring of the sites allowed for the identification of the top two ranked sites, which were then subject to further detailed analysis.

2.5 Evaluation of the Short Listed Sites

The next step in the site selection process was a more detailed evaluation of the short listed sites, including development of site specific layouts, conceptual designs for the facilities at each of the short listed sites, and a detailed preliminary opinion of probably cost for each of the sites.

The conceptual designs considered not only the site specific footprint, but also the conveyance of the CSO from OH-007 to the Facility and the hydraulics of moving the CSOs from the diversion structure to the tanks. It also considered the return of the CSO back to the collection system after a storm event, or the return of the CSO to the Canal in the event of a storm event exceeding the tank capacity.

The cost estimates cover all aspects of the project, not just the tank construction. They include property acquisition, planning and permitting, pre-design investigations, design of the facilities, construction management, demolition and site preparation, waste handling and disposal, tank and conveyance construction, site restoration, and Facility start-up and commissioning.

Section 5 of this report presents the approach and overview of the conceptual design and cost estimates. The basis of design calculations and drawings, and the basis of the cost estimate are included as Appendices (A, B, and C) to this report.

2.6 Comparison of the Short Listed Sites

Once the conceptual design and cost estimates were completed, a side-by-side comparison was prepared for the short listed sites. Section 6 of this report presents the findings of this comparison. The purpose of the side-by-side comparison is to present the benefits and drawbacks of each site, and to highlight those factors which serve as differentiators between the sites. While some criteria are inherent from the screening level analyses, the side-by-side comparison focuses on the engineering, environmental, sustainability, and cost factors specific to each site. Tables are presented to show the significant cost differences between specific components required to develop the CSO Facility at each site.

2.7 Recommendations

Finally, Section 7 of this report presents the recommended site for the Owl's Head CSO Facility, including the justification for site recommendation, and recommended next steps to move the project forward.

Section 3

Conceptual Facility Requirements

3.1 Development of Facility Requirements

As a preliminary step in developing the conceptual requirements and layouts of storage solutions for the Gowanus Canal CSO storage facilities, the project team conducted a high level benchmarking exercise to identify the features and components required for successful operation of a storage facility. To develop the benchmark for this project, the team identified 16 other CSO storage facilities located in moderate to large, densely populated, urban areas across the United States, with similar site constraints and considerations. The team also examined information from tunnel storage solutions that are often used in city settings and also require similar components.

In addition to the benchmarking effort, the project team toured two of DEP's larger CSO storage facilities with components similar to those needed at the Gowanus Canal. The site tours allowed the team to study the layout, understand operational challenges with the existing facilities, and identify improvements that the operations staff would recommend for future installations.

This section provides a summary of the Facility requirements. A more detailed description of the Facility components can be found in the Conceptual Facility Requirements Report originally submitted in July 2014 and updated in November 2014.

3.2 Required Components

Based on the findings from the review of other storage facilities, the project team identified the key components for the Gowanus storage facilities, including recommendations on unit processes and equipment that were used to develop a conceptual layout and Facility footprint. In general, the conceptual layout assumes that influent flow will need to be screened and potentially degritted, and the Facility would need to be dewatered. Air handling and odor control would also be required for both a tank and linear storage arrangement. Ancillary equipment to minimize operations and maintenance (O&M), such as basin flushing equipment, was also included in the conceptual layout.

Key Facility components include:

- below ground tank (preferred gravity fill with mechanical pump out)
- influent channel/rock trap
- screening
- dewatering pump station with grit flushing and handling provisions
- superstructure (footprint allowance for aboveground features)
- electrical and instrumentation and control (I&C)
- odor control

A detailed discussion of the selected processes and components can be found in the Initial Requirements Report dated November 2014.

Inclusion of these essential components, such as the screens, pumps, grit handling, and odor control is consistent with USEPA guidance on Combined Sewer Overflow Control as published in the EPA/625/R-93/007guidance manual dated September 1993.

3.2.1 Below Ground Tank

The conceptual design of the proposed facilities relies on a gravity in/pump out arrangement, which eliminates the need to construct and operate a large pump station designed to keep pace with the high peak flows anticipated during a CSO event.

3.2.2 Influent Channel and Rock Trap

A rock trap is typically a wider or deeper portion of the inlet channel that experiences a slower velocity (e.g., less than 2 fps), enabling large debris to settle. This debris is removed after each event using a clamshell bucket or similar system connected to a bridge crane that in turn deposits the removed rocky debris into a dumpster for disposal. The proposed Owl's Head CSO Facility will include a rock trap to remove large debris prior to screening.

3.2.3 Screening

Screening is the first mechanical process within a storage Facility and is designed to remove objects that may cause damage and clogging of downstream equipment. Auxiliary screens will also be provided at two other points, located at the OH-007 outfall and along the effluent channel leading out of the Facility. These screens are intended to prevent floatable debris from entering the Canal during an overflow event that exceeds the storage or conveyance capacity of the Facility.

3.2.4 Storage Tanks

For the Owl's Head CSO Facility layout, storage will be provided in the tanks at an average 35 foot sidewater depth. The storage basin will be divided into bays, approximately 50-feet wide that will fill sequentially.

3.2.5 Dewatering Pump Station

The dewatering pump station will include dewatering pumps as well as at least two grit/slurry pumps to remove the solids that settle in the tank and are washed into the pump station at the end of the event. The operation of the station is based on available capacity in the collection system to which the Facility drains, and may take 24 to 48 hours to empty the tanks.

3.2.6 Superstructure

The superstructure of the Facility is an important element as it houses the screenings area and provides space for the electrical room, odor control, and future hypochlorite storage. The superstructure will be designed to be above future flood elevations, consistent with DEP resiliency guidelines.

3.2.7 Electrical and I&C

Power will need to be provided to operate the mechanical, heating, ventilation and air conditioning (HVAC), and life safety equipment associated with the Facility. Per DEP standard, power to the Facility will be provided via a 480-volt (V) connection to the utility power supply grid. Backup power will be provided via a standby generator for life-safety equipment, lights, and ventilation during a loss of utility power.

3.2.8 Air Handling and Odor Control

Air handling is a critical element for covered storage facilities. Ventilation of the tanks, channels, and headspace above the channels, including parts of the superstructure, are important for life-safety considerations and protection of the equipment.

Treatment of the ventilated air using an odor control technology is assumed to be required due to the proximity to sensitive receptors like residential housing and parkland. Odor control systems reduce, if not eliminate, the unpleasant odors that emanate from the storage Facility.

3.3 Layouts

The individual unit processes described above were sized based on an influent flow rate of 150 mgd for the OH-007 site based on the typical year peak flow rate (see Flow Rate Analysis Tech Memo in Appendix B). Based on this sizing exercise, a footprint was developed that incorporated these elements into a reasonable flow path.

The footprint of the 4 MG storage basin, assuming a 150 mgd influent flow rate, is currently estimated to be 176 feet by 175 feet, for a total of approximately 30,800 square feet. This includes the influent screening channel, basins, and downstream (effluent) channel. The estimated footprint for the above ground superstructure under the current layout is 100 feet by 176 feet for a total approximately 17,600 square feet. The conceptual layout is shown in Appendix C.

A more detailed discussion of the required Facility components can be found in the Conceptual Facility Requirements Report.

Section 4

Screening and Short List Development

4.1 Initial and Secondary Screening

The initial screening of potential sites for the Owl's Head CSO Facility development was conducted as a two-step process, and included consideration of sites for both RH-034 and OH-007. Further discussion of development of a CSO Facility at the RH-034 outfall is documented separately.

The first step in site screening, documented in the technical memorandum dated April 30, 2014, utilized broad criteria to narrow site identification from all possible sites.

The second step of the site screening process introduced criteria developed in the Conceptual Facility Requirements Report. This secondary screening narrowed the site selection process to a list of 14 potential sites, 7 sites each for RH-034 and OH-007.

4.2 Short List Analysis and Results

The Owl's Head CSO Facility sites identified from the preliminary screening were further evaluated and ranked using a multipart analysis. This allowed for the application of numerous qualitative screening factors to each potential site, resulting in a quantitative ranking.

The full details of this process and results are included in the technical memorandum titled Short List of Potential Sites, Gowanus Canal CSO Tank Siting Study dated March 19, 2015.

Based on the overall score for each site, two "shortlisted" sites have been identified for CSO OH-007, sites OH-4 and OH-5. The shortlisted sites are shown on Figure 4-1 and are described below.

CSO OH-007 — Sites OH-4 and OH-5. Site OH-4 is a large site made up of a combination of Sites OH-1 (hereafter referred to as OH-4A) and OH-2 (hereafter referred to as OH-4B), comprising Block 977, Lot 3, and Block 990, Lots 1, 16 and 21. Overall, Site OH-4 ranks highest in the OH-007 area, with a total score of 830 out of a possible 1000, and as a practical matter, the combined site would provide the most workable site for the tank.

The OH-4A portion of the site is controlled by the New York City DOS and is currently vacant. The OH-4A portion ranks well for the engineering criteria as it is located immediately downstream of OH-007, and would require minimal utility relocation. However, it is limited in size and is an odd triangular shape. Although the total square footage of OH-4A appears to be large enough for the 4 MG tank, the odd shape presents space constraints for the design of the tank, could result in some encroachment into the Canal, and does not provide space for construction staging. However, it is important to note that a smaller sized tank could potentially fit entirely within the OH-4A parcel without the need for encroachment onto the 4B portion of the site.

The OH-4B portion of the site is privately owned property, but is adjacent to the OH-4A parcel and would provide additional space for tank design as well as for construction staging. Being adjacent to OH-4A, it would still require minimal conveyance and minimal utility crossing. It could also provide for use of the Canal for construction material deliveries.

Overall, Site OH-4 is in an area that is isolated from sensitive uses and therefore ranks well when considering the potential for impacts on land use, air quality, noise, construction and neighborhood character. This site also ranks well with respect to known contamination, although records indicate that some of the additional parcels contain moderate levels of contamination. The historic uses of these additional parcels include a coal yard, warehousing and truck parking.

Site OH-5 is a relatively large site comprising Block 979, Lots 23 and 18. Site OH-5 ranks second highest in the OH-007 area. The property is privately owned, but at 83,000 square feet it is large enough for the 4MG tank as well as some construction staging area. It is relatively close to outfall OH-007, but is not adjacent to it. Being located across Second Avenue, a tank at this location would require additional piping to convey the CSO from the outfall to the tank, and that conveyance would require utility crossings in Second Avenue. Site OH-5 ranks lower with respect to historic and cultural resources as it is closer to, but still outside of, the suspected Revolutionary War burial site. Site OH-5 ranks moderately with respect to known contamination due to the probable presence of contamination from historic manufacturing or petroleum storage uses.

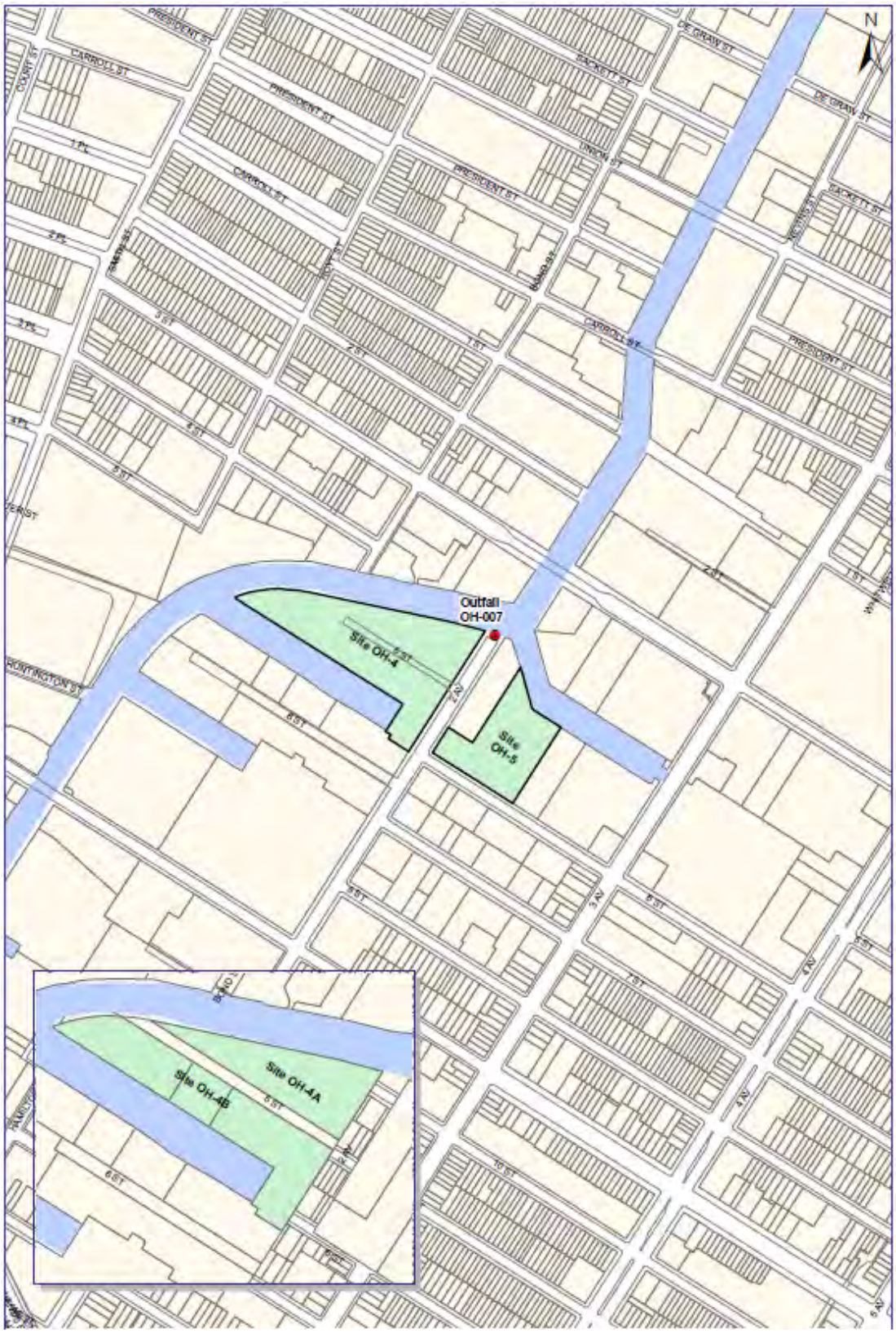


Figure 4-1. Owl's Head Short Listed Sites

Section 5

Evaluation of Short Listed Sites

5.1 Introduction

This section presents a summary of the conceptual engineering and preliminary cost estimates, along with a description of the basis of estimate, for the short listed sites described in Section 4, and identified as sites OH-4 and OH-5. In addition, a sustainability comparison using the Institute for Sustainable Infrastructure Envision Rating System is presented at the end of this section.

5.2 Design Basis

Conceptual designs were prepared for a 4-MG storage Facility associated with the OH-007 outfall on two sites described in Section 5 of this report. The engineering design for the sites was advanced from the concepts outlined in the Conceptual Facility Requirements Report and as described in Section 3. The designs were developed to the level necessary to support a Class 4 cost estimate.

While the designs incorporate preferences and requirements associated with similar DEP facilities, and include provisions for operation and maintenance, the individual designs have not yet been optimized. After selecting the preferred site, it is anticipated that the conceptual designs can be used as the starting point for facilities planning and detailed design. Three workshops were held with DEP operations staff during development of the conceptual designs to verify the required elements and confirm that the Facility layouts were acceptable. Through these workshops, DEP provided recommendations and additional input to the conceptual design process.

The designs were established to accommodate peak flows as described below.

- The Owl's Head CSO Facility conveyance was sized for a peak flow of approximately 146 mgd, which represents the peak overflow from the OH-007 regulator in a typical year. The regulator is basically a flow diversion structure that will manage the flow of wastewater during various conditions. During dry weather flow, the wastewater continues to flow within the collection system via the 2nd Avenue Pumping Station, and during large storm events where the flow exceeds the capacity of the system, the overflows are directed to the OH-007 outfall.
- The OH-007 regulator will be modified to direct wastewater flows to the Owl's Head CSO Facility during an overflow event. In those events where the storage capacity of the Facility is exceeded, the excess CSO will continue to flow through the Facility but will be directed to a new effluent conduit for return to the Canal. The new effluent conduit will be fitted with a mechanically cleaned wet weather screen to remove floatable material from the flow before it returns to the Canal. In the event of an unusually large storm, only that portion of the flow that exceeds the 146 mgd throughput capacity would be discharged to the existing OH-007 outfall. Additional mechanically cleaned CSO screens would be added to the existing outfall to minimize the amount of floatable material returning to the Canal under those conditions.

The following sections provide an overview of the design basis for the major project elements. Conceptual layouts for the facilities and conveyance are presented on Figures 5-1 and 5-2.

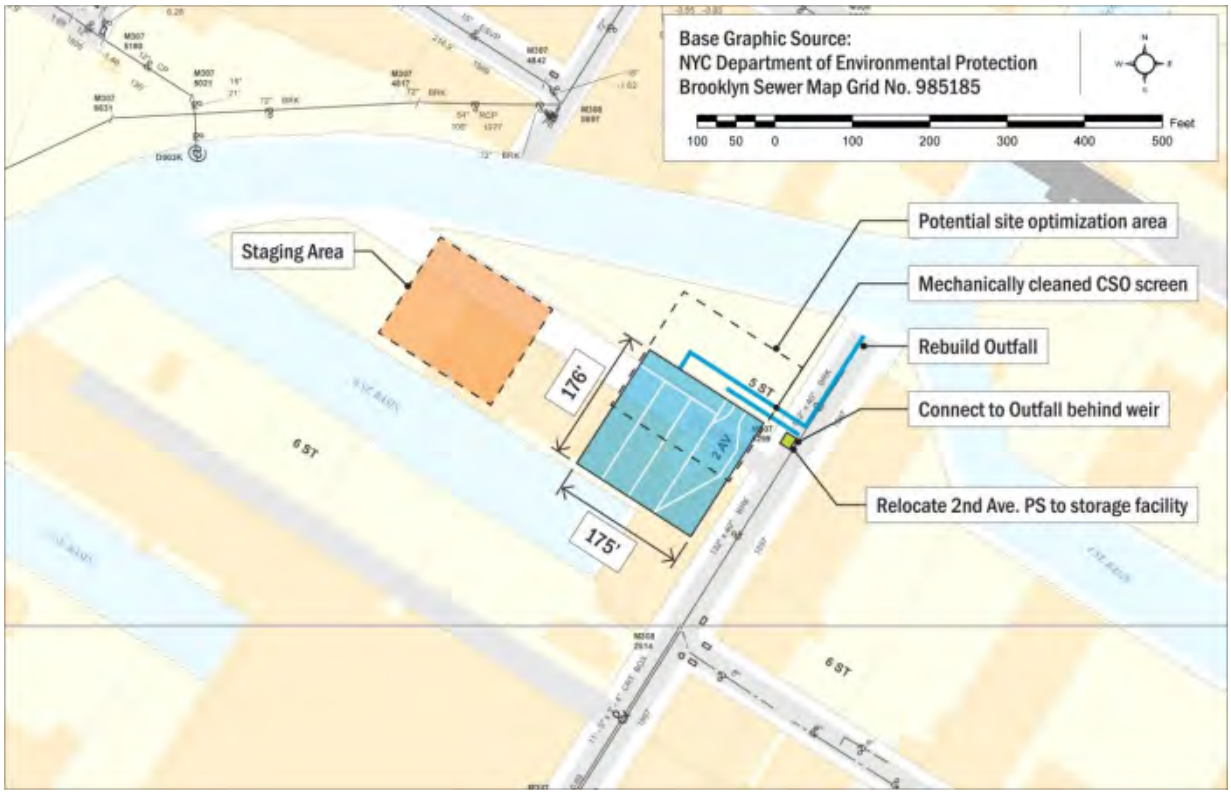


Figure 5-1. OH-4 Conveyance and Layout Plan

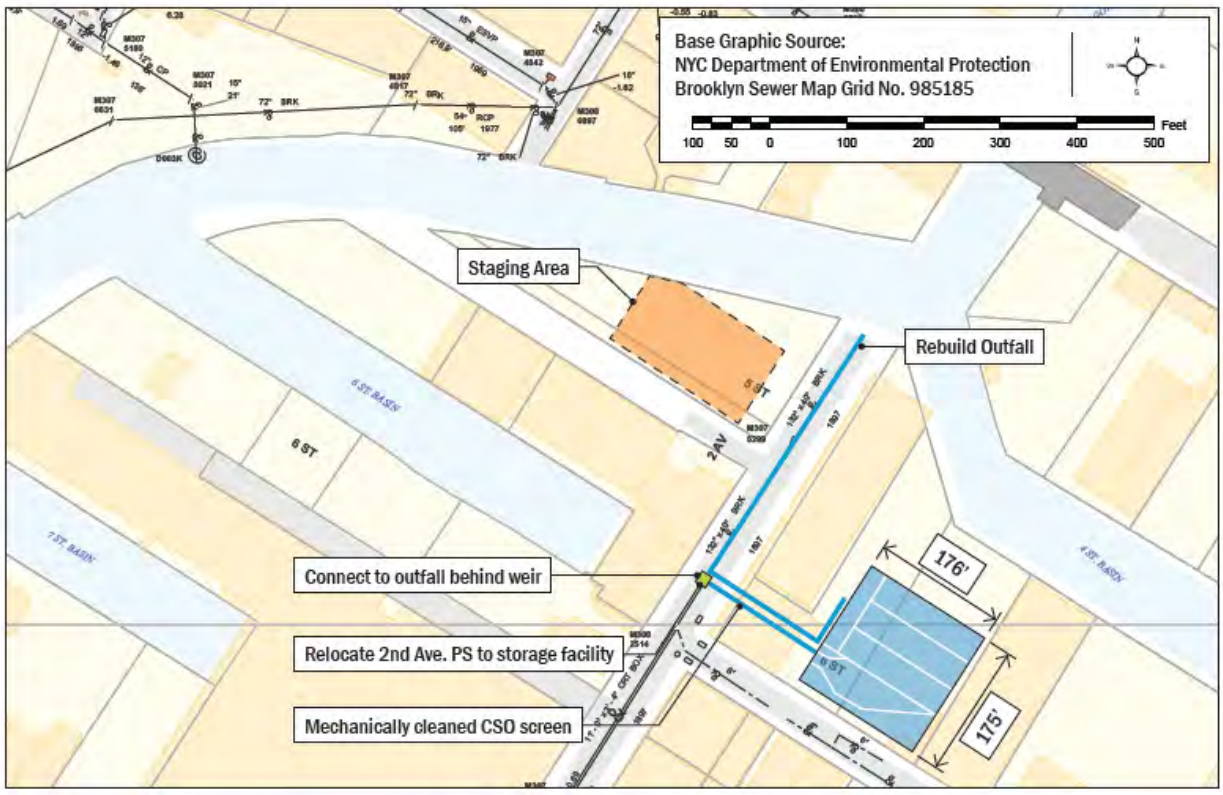


Figure 5-2. OH-5 Conveyance and Layout Plan

5.2.1 Process and Mechanical

Conceptual layouts for the CSO facilities were developed with the following major features:

- Rock trap/grit bay with clamshell removal system followed by 1.25-inch coarse screening using climber screens in accordance with DEP standards and N+1+1 redundancy (i.e., full flow capacity with one unit as stand-by and one unit out of service) with conveyor and delivery to a common 30 cubic yard dumpster.
- Rectangular wet weather storage basins 40-foot wide with 20 foot-wide flushing lanes designed for sequential filling. Sequential filling will provide additional capture of solids. Flushing reservoirs with hydraulically actuated flushing gates and a combined effluent channel with similar flushing systems were also included.
- Self-cleaning trench-style dewatering pumping station and force main sized to empty the tanks in 24 hours (i.e., 4 mgd) using submersible heavy-duty grit handling pumps with fluidizing systems.
- Grit removal systems on two of the OH-007 return flow pumps were included to be used at the end of the draining cycle to remove solids from the tank flushing water prior to discharge back to the sewer system. This consists of cyclone grit separators and grit classifiers discharging to the screening dumpster. (This prevents re-deposition of solids in downstream sewers).
- Non-potable water system including air gap, tank and pumps for supplemental flow for flushing system and wash down.
- A 700 gpm replacement pumping station for the Second Avenue pump station with duplex submersible pumps was included in the design because of its proximity to the sites.
- Mechanically-cleaned CSO screens were included with a launder on the storage basin effluent sized for 146 mgd to remove floatables and solid material from wet weather events that exceed the storage volume of the tank and pass through the Facility. In addition, mechanically cleaned CSO screens were included on a weir wall at the OH-007 structure to remove floatables and other solid material from the flow in excess of 146 mgd that would otherwise pass directly to the Canal in extreme wet weather events.

Conceptual drawings of the facilities are included in Appendix C. The estimating team also relied on the RH-034 drawings and engineering to scale the facilities accordingly.

5.2.2 Civil and Site Work

Conveyance conduits were sized to accommodate the peak through flows for the facilities. The OH-007 conveyance structure was designed to convey a flow of 146 mgd from downstream of the existing OH-007 weir to the storage basin. Included are modifications to the regulator structure as needed.

The streets and corridors around the site are congested with active and abandoned utilities. The conveyance alignments were chosen to avoid utility conflicts to the extent practicable. Relocation of smaller utilities will be required. Available subsurface utility information for the area was obtained from the following sources:

- DEP
- Verizon Communications
- Time Warner Cable
- Fire Department of New York
- National Grid
- Consolidated Edison

It was assumed that a single 6-inch water service would be sufficient for the service water requirements and could be obtained from the nearest street main.

5.2.3 Geotechnical

The general stratigraphy at the sites includes a surficial miscellaneous fill over organic deposits which overlie a glacial sand/silt strata, which in turn overlies deeper decomposed rock and bedrock. Due to the presence of potentially contaminated shallow groundwater at the site, and the depths of excavation required for construction of the tanks and conduit structures, an excavation support system including a groundwater cut-off element was required for the conceptual design to both stabilize the excavated area and to minimize groundwater inflow to the excavation.

Based on the significant depth to bedrock (150+ feet) a "bathtub" concept was selected, consisting of a perimeter cement-bentonite wall with steel sheet piling and a bottom plug consisting of a jet grouted blanket.

The typical foundation for the structures would consist of structural mat slabs supported on the natural competent glacial soils with tie-downs. A sufficient number of tiedowns and tiebacks are included in the foundation and support of excavation (SOE) conceptual design to account for and counteract buoyancy issues.

In terms of the sequence of geotechnical construction work at the main tank's site, the cement-bentonite trench with the inserted steel sheet piling would be installed first, followed by the jet grouted bottom mat. Subsequently, tie-downs would be installed. Upon starting excavation, the bracing elements (typically consisting of tie-backs) would be installed in multiple levels as the excavation progresses. In anticipation of encountering manufactured gas plant (MGP) waste or similar type of contaminated soil, an in-situ soil stabilization/solidification process will be used to allow for excavation, handling and disposal of the contaminated soil. An interior dewatering system would be installed prior to excavation below the groundwater table. For excavations in the streets for construction of the conduit structures, driven steel sheet piling with interlock sealant is required for the perimeter excavation support system. Additional soil stabilization compared to the OH 4 was included for the OH 5 site to protect adjacent structures from damage from below-ground construction activities. A monitoring program will be required during construction to monitor vibrations and movement at adjacent facilities. A geotechnical investigation program will be required prior to design to characterize the subsurface conditions at the selected sites.

The estimate does include a groundwater treatment system for the dewatering activities within the construction zone during construction activities. Groundwater monitoring, groundwater pumping and treatment, or other remediation activities outside the construction zone after construction is complete are not included in the cost estimates.

5.2.4 Environmental Mitigation

The sites are in close proximity to the former Citizens MGP and/or other industrial operations which have impacted the site soils and groundwater. The NYSDEC is responsible for oversight of the remediation at the former Citizens MGP site, which is to be conducted by the Citizens PRP. The City has no responsibility for the remediation of the MGP site or related contamination. However, the excavation, handling, and disposal of contaminated soils, as well as the handling of contaminated groundwater during excavation dewatering, strictly as related to the construction of the Owl's Head CSO Facility, is included in the scope of the conceptual design and cost estimates. This work is limited to the area within the footprint of the tanks and conveyance, including the support of excavation area, and would only take place during construction activities for the CSO tanks.

Appropriate considerations for the health and safety of on-site workers as well as the surrounding community have been included in the approach and cost estimates for the project.

It is important to note that construction of the CSO Facility is the focus of this effort. While some site investigation and characterization is included, these studies are intended to answer construction related issues only. The project does not include a remedial investigation of the locations evaluated, does not include characterization or delineation of the extent of soil or groundwater contamination, and does not include remediation of soil or groundwater contamination outside of the footprint of the tank and conveyance for the CSO Facility, all of which should be the responsibility of the parties responsible for creating that contamination.

Existing site structures will be demolished prior to the start of any intrusive activities. A pre-demolition survey (PDS) of existing site structures will be conducted to identify environmental concerns that may need to be mitigated prior to the demolition, and to identify building materials that may be subject to regulation as hazardous waste or other requirements. There are numerous potential concerns and materials that would be targeted by the PDS and an allowance for disposal was estimated based upon experience with similar investigations. The most likely areas of concern include mercury-containing devices, PCB (polychlorinated biphenyl)-containing materials, electrical equipment (transformers, capacitors, rectifiers), lead based paint, and asbestos-containing materials. After abatement of asbestos and other regulated building materials has been completed, the structures will be demolished and the debris disposed off-site in a permitted construction debris landfill authorized to accept the materials.

After the buildings are demolished but prior to construction of the Owl's Head CSO Facility, a pre-design investigation (PDI) of the tank sites will be conducted to fill data gaps and further characterize impacted soils and groundwater strictly within the footprint of the tank and conveyance that will require special handling, treatment and/or disposal during tank construction. The candidate sites are part of or in close proximity to former MGPs and/or other industrial operations which may have impacted the site soils and groundwater. These investigations are not intended to define the extent of contamination or control groundwater on a regional basis, but are focused on the specific areas where construction of the CSO Facility and associated conveyance is planned.

The scope of the PDI envisioned for each site is based on a review of available information regarding the current and historical use of the site. The findings of the remedial investigations conducted on the Citizens MGP site have shown that there is MGP related contamination in the vicinity of the two sites but it has not been confirmed on the two sites. For the purposes of the cost estimate it was assumed that MGP contamination or similar materials will be encountered.

Based on the available information, other areas of concern were identified for each site. In addition to MGP impacts, examples of concerns that have been identified for investigation include:

- scrap metal recycling (solvents, benzene/toluene/ethylbenzene/ xylenes, semi-volatile organic compounds, PCBs, asbestos, metals)
- Dye manufacturing (phenolic and various aromatic compounds, naphthalene, anthracene, chromium)
- Unspecified warehousing
- Asphalt flooring manufacturing (asbestos, polynuclear aromatic hydrocarbons)
- Metal machining, stamping and plating (cutting oils, degreasers, plating waste)

Investigatory approaches were developed to characterize the environmental media associated with the areas of concern. PDIs include soil borings to characterize shallow soils and fill to be excavated as well as deeper soils to be treated and stabilized in-situ. Monitoring wells will be installed to

evaluate both groundwater contamination and hydraulic conductivity, thereby facilitating selection of appropriate dewatering and water treatment systems.

For construction purposes, based on existing reports and pending results of the PDI, it was assumed that site soils from 0 to 10 feet below ground surface (bgs) have been minimally impacted and are non-hazardous, and that soils from 10 feet bgs to the top of the CSO tank foundation excavation are impacted, including the presence of coal tar, and require treatment prior to disposal.

In anticipation of the potential for dust, odors, and other emissions during the site preparation phase of construction, particularly during excavation activities, health and safety features have been included in the conceptual design for the protection of site workers as well as to mitigate impacts on the surrounding community. The two typical options for control of dust, odors, and emissions are the use of foam to suppress the emissions, or the use of a sprung structure (temporary tent) with air treatment to encapsulate the site during those activities. For the purpose of the conceptual design, the use of a sprung structure is included for both sites. The impact of using a sprung structure on production rates and the overall time required for the project has been included in the project schedules.

The conceptual design also assumes that these subsurface soils will be treated using in situ stabilization/solidification (ISS) also known as deep soil mixing (DSM). ISS/DSM uses crawler-mounted hydraulically-driven soil augers (6- to 8-feet in diameter) to mix the soil column with stabilization and solidification agents to bind the organic and metal contaminants to the soil matrix. The key assumptions for the environmental cost estimate are as follows:

- All volumes are in-place and within the SOE.
- All stabilized soils will be transported offsite for disposal in a Subtitle D (industrial and non-hazardous) facility. The purpose of using ISS is not only to stabilize the soil to facilitate the physical excavation, but to stabilize and bind the contaminants to the soil matrix to allow for this type of disposal.
- Overburden from 0-10 feet bgs (in-board of SOE) removed to prepare ISS/DSM working platform.
- Conveyance conduit soils volumes include jet grout spoils (100 percent displacement) and it was assumed that no soil stabilization is required for disposal purposes.
- Soils from 10 feet bgs to top of the jet grout mat (tank foundation) at each site will be treated by ISS/DSM.
- Soils treatment criteria of 50 psi unconfined compressive strength at 28 days and no free NAPL.
- ISS/DSM additives - ground granulated blast furnace slag at 6 percent by weight of soils, plus Portland cement at 2 percent by weight of soils.
- ISS/DSM soil swelling at 20 percent.
- ISS/DSM and excavation production rates of 500 cubic yards (yd^3) per day based on 10-hour work days.
- ISS/DSM major equipment:
  - Soil Mec SR 100 with 6- to 8-foot diameter augers (100-ton, crawler-mounted, 200,000 ft lbs rotary torque).
  - Grout plant and ancillary equipment (Metax JM 40 or custom-made GSI batch plant with 5 yd^3 mixers, progressing cavity pumps, mission-style pumps, cement silos, pigs, and hoses).

The groundwater at the sites will be controlled and lowered only within the area of excavation prior to construction using excavation supports with low transmissivity (see geotechnical discussion above), jet grout plugs at the elevation of the CSO tank foundations and well points for groundwater

extraction. Extracted groundwater (average flow rate of 175 gpm from within the bathtub) and all contact stormwater (precipitation within the limits of the support of excavation) will be treated onsite using multimedia filters followed by granular activated carbon units. The space needed for this small, temporary treatment system has been included in the site layouts. Treated water will be discharged to the Gowanus Canal in accordance with an NPDES permit, or equivalent under CERCLA, for the CSO construction, or discharged to the sanitary sewer system under a DEP pretreatment permit.

5.2.5 Architecture

It is assumed that the above ground building will be precast slab with brick inlay construction similar to and compatible with nearby construction and existing DEP facilities. A two-story building approximately 50-feet tall was conceptualized with a high bay first floor (20-feet tall) at grade suitable for truck access and a second floor (30-feet tall) with all electrical equipment located well above flood elevation (Elevation 10 NAVD 88 Zone AE from 2013 FEMA FIRM map). Existing grade ranges from 7- to 12-feet elevation NAVD 88 at the various sites.

Basic, conceptual renderings of the above-ground buildings are illustrated on Figures 5-3 and 5-4.

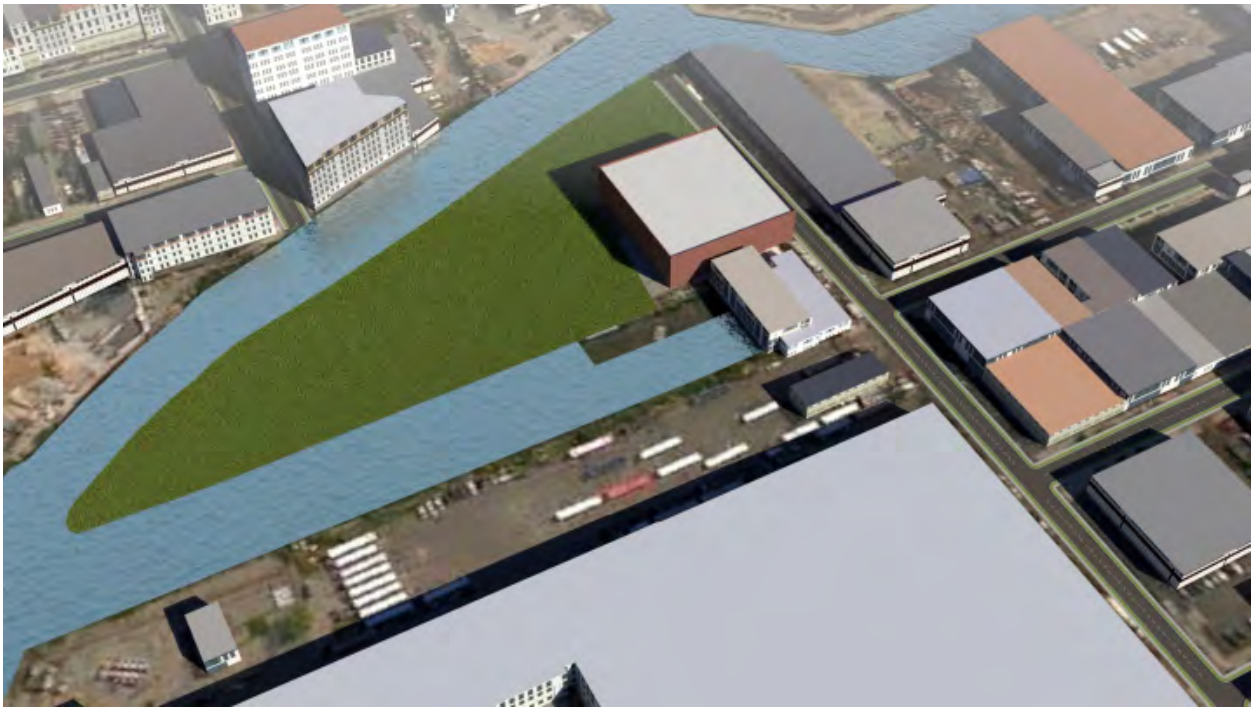


Figure 5-3. OH 4 Building Concept

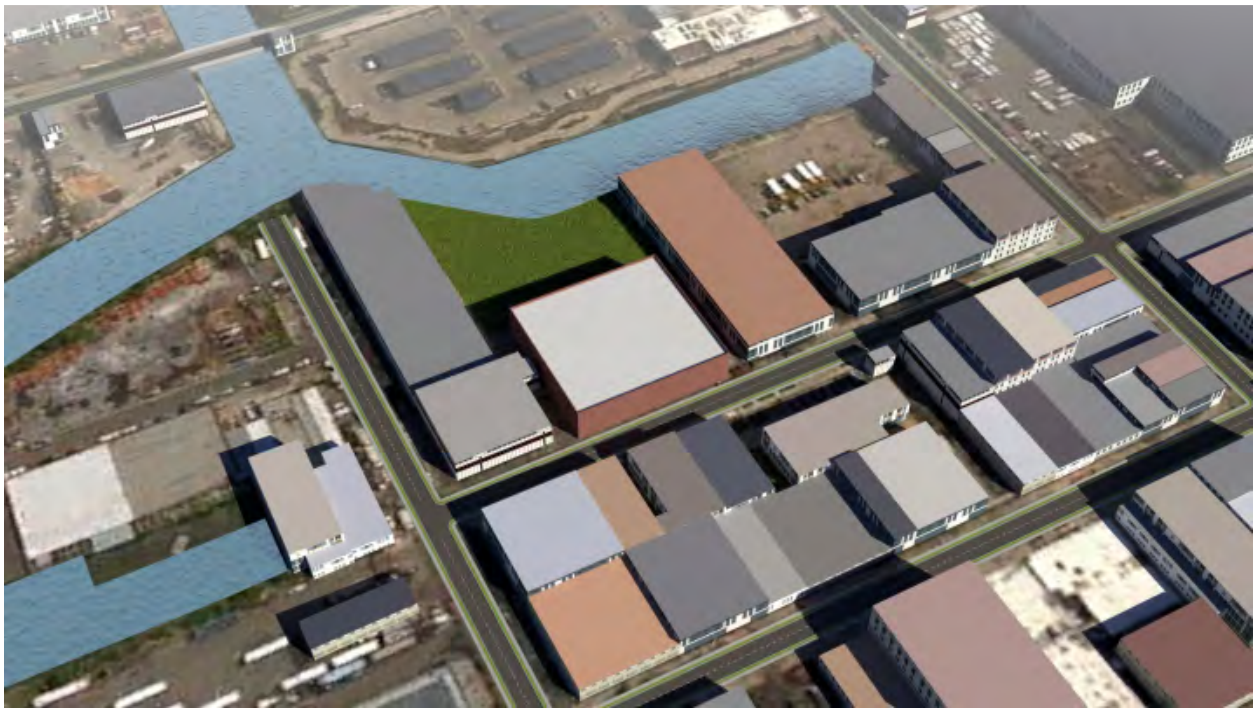


Figure 5-4. OH 5 Building Concept

5.2.6 Structural

The below ground structure and large conveyance were all assumed to be cast-in-place reinforced concrete in accordance with applicable American Concrete Institute requirements and similar to existing DEP facilities. Proper mixing, pouring, and quality control (QC) are needed to assure compatibility with the contaminated soil conditions and adequate curing of the concrete

5.2.7 HVAC and Odor Control

Heating ventilation and odor control concepts were developed to be similar to other DEP facilities. An activated carbon odor control system, as described in the Conceptual Facility Requirements Report, was assumed, and a flow rate of 1 cubic foot per minute per square foot (cfm/sf) of basin area was used for effective capture. An additional purge system was sized for 6 air changes per hour for use prior to personnel entry. The odor control technology chosen was activated carbon. Heating and air conditioning for the support rooms were sized using typical BTU factors and local weather data.

5.2.8 Electrical and Instrumentation

Electrical, instrumentation and control were assumed to be similar to other DEP facilities and requirements in meeting applicable codes and regulations. Key elements included:

- 480V service
- Open frame, diesel engine-driven 650 kW standby power generator with remote-mounted double wall containment fuel system sized to maintain operation during normal power failure for a period of 48 hours.
- Electrical power distribution equipment configuration reduces incident energy levels so that a maximum of Category 1 ArcFlash personal protective equipment required per DEP intradepartmental memo September 15, 2009.
- NEMA 4X, 316 SS disconnects and electrical equipment enclosures.

- PVC-coated Rigid Galvanized Steel for exposed conduit and Rigid Galvanized Steel conduit concrete-encased for subsurface conduit.
- Thermoplastic high-heat resistant nylon-coated wire/ Thermoplastic heat and water resistant nylon-coated conductors

5.3 Cost Estimate

Detailed cost estimates for the two short listed sites are provided in Appendix A. This section describes the scope of work and approach to developing the cost estimates. Project schedules were developed but only for use in supporting the cost estimating effort for issues such as timing for cost escalation factors.

The conceptual designs described above were used as the basis for developing the cost estimates. The cost estimates include costs for planning and permitting efforts, property acquisition and restoration costs, pre-design investigations, engineering costs for design of the facilities, construction costs, and commissioning costs. The schedule does not account for activities associated with remediation efforts outside the footprint of the tank and conveyance for the Owl's Head CSO Facility. The City assumes no responsibility for the effort or cost to remediate any other contaminated areas.

5.3.1 Estimating Methodology

These estimates were prepared using BC's estimating system, which consists of the Timberline operating systems using BC's material and labor database, historical project data, the latest vendor and material cost information, and other costs specific to the project locale and in accordance with DEP's estimating requirements. This estimate was prepared using quantity take-offs, vendor quotes and equipment pricing furnished by either the project team or the estimator based upon the engineering information provided. The estimate includes direct labor costs and anticipated productivity adjustments to labor and equipment. Where possible, estimates for work anticipated to be performed by specialty subcontractors have been identified.

Construction labor crew and equipment hours were calculated from production rates contained in documents and electronic databases published by R.S. Means, Mechanical Contractors Association, National Electrical Contractors Association, and Rental Rate Blue Book for Construction Equipment (Blue Book) and adjusted accordingly for the productivity factors for the New York City metropolitan area.

5.3.2 Class of Estimate

In accordance with the Association for the Advancement of Cost Engineering International (AACEI) criteria, this is a Class 4 estimate. A Class 4 estimate is defined as a Planning Level or Design Technical Feasibility Estimate. Typically, engineering is from 1 percent to 15 percent complete. Class 4 estimates are used to prepare planning level cost scopes or to evaluate alternatives in design conditions, and form the base work for the Class 3 Project Budget or Funding Estimate. Expected accuracy for Class 4 estimates typically range from -30 percent to +50 percent, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination.

5.3.3 Cost Estimate Summary

Due to the size and the anticipated logical order of construction, the project was divided into four separate construction packages, which in turn coincide with the major construction elements of each area of the project. The four construction packages also make the estimate more readily adaptable to the different types of construction, which lends itself to accommodation of the multiple prime requirements of Wick's Law and the anticipated construction sequencing of the various elements.

The key elements and total costs included in each of the four construction packages (CP) are listed in Table 5-1 for both sites.

Table 5-1. Construction Packages and Cost Summary

CP No. and Title	Key Elements	Estimated Cost OH 4	Estimated Cost OH 5
01 Planning, Engineering and Site Acquisitions	• Pre-design soil and groundwater investigations • Pre-design demolition and utility surveys • Design/Engineering • Geotechnical investigation • Planning and permitting activities • Property acquisition costs • Construction contract bidding/award for first construction package, CP-02	$118,000,000	$112,000,000
02 Site Prep and Deep Foundation System	• Demolition of existing structures including hazardous material (e.g., asbestos/lead paint) abatement • SOE shoring system (bentonite trench/shoring/tie-backs and structure tie-downs • Jet grout mat • Dewatering and water treatment (inside SOE) • Mass excavation, in-situ soil stabilization and contaminated soil disposal • Trucking and disposal of excavated material • "Sprung" structure over site to mitigate contaminant emissions, odor, and dust during construction • Decontamination facilities for vehicles and personnel	$115,000,000	$141,000,000
03 Structural and Mechanical, Electrical, Plumbing	• All concrete and mechanical, electrical and plumbing for the tanks, pump station, and screening area (lower level) • New building structure and all mechanical, engineering, and plumbing to support operating the CSO structure • Contractor will have the responsibility for maintaining operation of the existing CSO • Work site will be contained within the perimeter of the SOE shored area	$58,000,000	$60,000,000
04 Site Improvements and Outside Boundary Limits Utilities	• All underground piping and related structures • Relocation or replacement of existing utilities (utilities that go under or conflict with piping or conveyance channel) • Influent/effluent channels excavation and construction, outside of the SOE area, and related structures • Trucking and disposal of excavated material outside of the main structure support of excavation • Final connections to structure constructed in CP-03 • Existing outfall pipeline demolition • This Contractor has all work outside of the SOE area for CP-03 and final site improvements	$20,000,000	$23,000,000
	Grand Total	**$311,000,000**	**$336,000,000**
	Class 4 Estimate Range (-30% to +50%)	**($218,000,000 to $466,500,000)**	**($235,000,000 to $504,000,000)**

5.3.4 Construction Assumptions

The following assumptions apply to this estimate:

- Contractor will perform the work during normal daylight hours, nominally 7 a.m. to 5 p.m., Monday through Friday, in an 8-hour shift, except for ISS mitigation and excavation work. For the ISS activities, the Contractor will work from 7 a.m. to 7 p.m. Monday through Saturday. No other allowance has been made for additional shift or weekend work. No other overtime or shift premium was anticipated in preparation of this estimate or the construction schedules.
- Seasonal constraints and/or delays due to unforeseen circumstances have been addressed in the construction schedules based on normal construction practices and local weather patterns.
- No pre-purchased or owner-purchased equipment was anticipated for this estimate.
- Design, engineering, and soils investigation will be complete by May 2017. This includes required public meetings, review by DEP, and completion of construction documents for CP-02.
- Permits, or permit equivalents as allowed under CERCLA, other than typical construction permits, were assumed to be obtained prior to start of construction bid, but could float out to start of construction. At this time, we are not aware of any permit that will impede the ability to start actual construction work.
- Property acquisition will start during design and be completed by the bid of the construction contracts and no later than the start of construction.
- Construction Bidding and Award from June 1, 2017, and completed by May 2018.
- Notice to Proceed (NTP) for construction – June 1, 2018.
- Contractor would be prepared within 40 working days of the NTP to submit critical submittals to DEP, and DEP would have final approval of the submittal within 120 working days.
- Procurement of materials and equipment is not anticipated to be a problem due to the length of time necessary to excavate the site.
- The durations are in working days with standard holidays. Twenty working days is approximately equivalent to 1 month.
- CP-03 and CP-04 NTP will be issued 3 months prior to Substantial Completion of CP-02. This will allow the CP-02 Contractor to complete any punch list work and demobilize the site, prior to the CP-03 or CP-04 contractor starting their work on the site. This will minimize coordination efforts among the multiple primes and usage of area under the sprung structure.
- Effort includes critical demolition prior to the start of excavation. Additional demolition may be required, but it will not affect the overall construction duration. The demolition of the structures can start when 50 percent of the hazardous material abatement has been completed.
- Effort is allotted to relocate and/or abandon utilities within the SOE; any additional relocation and/or abandonment of utilities will take place after excavation has started, but will not affect the overall construction duration. The utility work can start at the same time as the building demolition.
- Shoring system includes a 3-foot bentonite trench full depth, driving sheet pile and grouting sheet pile connections. Productivity is based on two separate pile driving crews and assumes sufficient materials available to maintain this productivity.
- The 10-foot jet grout mat can start when approximately 50 percent of the shoring system has been constructed.
- The installation of the tie-downs can start when approximately 50 percent of the 10-foot jet grout mat has been installed.

- The sprung structure will be erected prior to the start of bulk excavation, while the tie-down installation is being completed.
- Dewatering will begin after ISS is underway and at the start of excavation. It will be a continuous 24/7 operation until the below grade structure is completed in CP-03.
- The CP-02 contractor will excavate the first 10 feet, and then can begin the ISS mitigation work when 50 percent of the first 10 feet is excavated. Productivity is based on 1,000 yd^3 per day.
- Both sites have the same level of soil contamination and the associated mitigation.
- After the ISS mitigation is 50 percent complete, the balance of the excavation can continue.
- Assumed five 20 yd^3 loads per hour for a 10-hour day; approximately 1000 yd^3 per day to calculate the excavation duration. Assumption takes into consideration the 200-mile round trip to the disposal site, the need to decontaminate the trucks (clean off contaminated soil so it does not get on haul route), getting in and out of the Sprung building, narrow streets used for haul roads, and the unknowns of extent of contamination or debris within the excavation area.
- The critical path to get the CSO structure operational is through the construction of the building, installation of equipment/piping and final instrumentation and controls. Thus, the sequence of the work needs to be focused on getting the Screening Area below grade constructed. The start of the Screening Area below grade requires that the Tanks slab on grade (SOG) and some of the wall separating the Tanks from the Screening Area be constructed.
- When sufficient SOG has been placed to support construction of the wall at the screening area, the concrete placement of this wall will start. When this wall is constructed to above the Screening Area SOG, the Screening Area SOG can start.
- Starting with the SOG in the Screening Area, anticipate using separate crews to work the remainder of the Tank and Screening Area.
- Assumed productivity is 1,200 yd^3 per month for SOG, 1,000 yd^3 for Tank walls, and 600 yd^3 for Screening Area walls and top slab construction.

Major specialized work, multi-prime assignments (Wicks Law-applicable) and anticipated multi-prime contractors are listed below.

- environmental mitigation
- temporary sprung structure enclosure of the site
- sheet piling and slurry wall construction
- excavation and treatment of contaminated soil
- structural concrete
- process mechanical including equipment
- HVAC
- painting
- rigging
- electrical and instrumentation
- final site work

The project was estimated as a Wicks Law-applicable project, and there will be multiple prime contracts between DEP and the various trade contractors. At the present time, there is a Project Labor Agreement in place between the City of New York and the Building and Construction Trades Council of Greater New York. This agreement covers most, but not necessarily all, DEP projects and results in the covered projects being single-prime contract projects. The Project Labor Agreement is

for a defined period of time and may or may not be in effect at the time a particular project goes out to bid.

5.3.5 Cost Basis

The factors described below were used to develop the construction cost estimate.

Material Pricing. Material prices are from the Means Facilities Construction Cost database or other historical data that BC maintains in its database. Individual quotes for major quantity commodities and significant value process equipment are obtained from local sources and used in this estimate. No trade discounts were considered.

Labor and Equipment Rates. Wage Rates are from state and local published websites for the City. Direct labor burdens such as health and welfare, vacation, union benefits, payroll taxes, and workers compensation insurance are added to constitute a true labor cost to the Contractor. New York City Prevailing Wage Rates as published by the Office of the Controller, City of New York, are used.

Labor Productivity. Unless otherwise stated, labor productivity is from the Means Facilities Construction Cost database and adjusted for the associated productivity for the New York metropolitan area as outlined in Table 5-2, below. For work not included in this database, work of a similar nature is extrapolated. If no similar work exists within the database, the estimator made a best judgment of effort and equipment involved based on experience with similar projects in the New York City area.

Table 5-2. Labor Productivity Adjustment Factors

Construction Components	Percent Adjustment from 100%
General requirements	0.77
Demolition	0.60
Concrete	0.67
Masonry	0.72
Metals	0.62
Woods and plastics	0.77
Thermal and moisture protection	0.67
Openings: doors and windows	0.77
Finishes	0.77
Specialties: furnishing and vertical transport	0.72
Fire suppression	0.72
Plumbing and HVAC	0.72
Electrical and communications	0.72
Earthwork and deep foundations	0.72
Site improvement and landscaping	0.77
Utilities - piping and instrumentation	0.67
Process equipment	0.72

Indirect Cost. Percentage allowance for contractor's home office expense has been included in the overall rate mark-ups. The rate is standard for this type of heavy construction and is based on typical percentages outlined in Means Facilities Construction Cost Data. The contractor's cost for builder's risk, general liability and vehicle insurance has been included in this estimate. Based on information

from DEP and review of other supporting documentation of similar projects, all indirect costs have been applied as a percentage mark-up to either above the line or below the line as appropriate.

Taxes and Duties. As directed by DEP, all permanent construction is non-taxable. Local, state, and City of New York taxes have been applied only to areas that are temporary in nature in order to accomplish the construction, including the ISS agents that will become part of the material hauled to the landfill. No taxes have been included on any of the engineering costs in the estimate.

Escalation. In addition to contingency, it is customary for projects that will be built over several years to include an escalation to appropriate points of the anticipated construction period to account for the future escalation of labor, material and equipment costs beyond values at the time the estimate is prepared. Due to volatility between classifications of construction materials, the more stable labor component is separated for separate escalation in accordance with union agreements or other documented data. Key materials are classified according to the Producer Price Index (PPI) for separate escalations. Construction equipment ownership cost generally does not vary much throughout the duration of a project; however, in certain economic conditions, the fuel component can become volatile, and may require an escalation calculation. Table 5-5 summarizes the escalation factors used.

Contractor Markup/Profit. Contractor Costs for General Conditions or Indirect Costs. Costs that are not for the direct installation of the actual work of the given project, such as project management, superintendent, site safety personnel, construction office trailers, etc., were calculated as a percentage of direct cost. These General Condition costs are separate from Contractor Markup/Profit and Overhead which are applied to the entire total cost of a Project. Costs associated with the General Provisions and the Special Provisions of the construction documents, which are collectively referred to as Contractor General Conditions, are based on the estimator's interpretation of the contract documents. The estimates for Contractor General Conditions are divided into two groups: a time-related group (e.g., field personnel), and non-time-related group (e.g., bonds and insurance). No trade discounts were considered

Other Factors. Other factors (e.g., currency exchange, restricted access, restricted work hours and shift work) has not been applied to the overall project estimates

5.3.6 Allowances for Known but Undefined Work

The following allowances were made in the development of this estimate.

- Site improvements
- Allowance for Landscaping/Waterfront Access ($5M)
- Fire sprinkler systems
- Hazardous material abatement in existing structures to be demolished
- Disconnecting existing building services
- Underground utility conflicts, relocations, and temporary support
- Sewer bypass pumping
- Control of air emissions, including air scrubbing and filtering system for soil remediation in air supported structure (Sprung structure).
- CEQR and Uniform Land Use Review Procedure (ULURP) costs are included. Even though USEPA does not believe that these activities are required under Superfund, the cost to conduct the analyses to meet the intent of the City requirements has been included.
- Although some information is available regarding the potential for soil or groundwater contamination at the OH sites, the PDI has been scoped to provide the data needed for subsurface construction activities only. Delineation of the nature and extent of contamination is not included in this estimate.

- Property acquisition costs based on future outlook (worst case speculative) case using cost per buildable square footage. See Attachment B to the AKRF memorandum, dated December 23, 2014, for details included in Appendix D.
- No costs are included for potential historic preservation requirements.

5.3.7 Estimating Assumptions

As the design progresses through different completion stages, it is customary for the estimator to make assumptions to account for details that may not be evident from the documents. The general assumptions listed in Table 5-3 were used in the development of this estimate.

Table 5-3. General Estimate Assumptions

- Bidders must hold valid, current contractor's credentials, applicable to the type of project.
- Bidders will develop estimates with a competitive approach to material pricing and labor productivity, and will not include allowances for changes, extra work, unforeseen conditions, or any other unplanned costs.
- Estimated costs are based on a minimum of four bidders. Actual bid prices may increase for fewer bidders or decrease for more bidders.
- Contractor has complete access for lay-down areas and mobile equipment.
- Equipment rental rates are based on verifiable pricing from the local project area rental yards, Blue Book rates and/or rates contained in the estimating database.
- Contractor mark-up is based on conventionally accepted values that have been adjusted for project-area economic factors.
- Major equipment costs are based on both vendor-supplied price quotes obtained by the project design team and/or estimators, and on historical pricing of like equipment.
- Process equipment vendor training using vendors' standard O&M material is included in the purchase price of major equipment items where so stated in that quotation.
- Bulk material quantities are based on manual quantity take-offs.
- There is sufficient electrical power to feed specified equipment. Local power company will supply power and transformers suitable for this Facility.
- Soils are of an adequate nature to support the structures. Tie-downs have been included in this estimate.

Soft Costs

- CM Fee is based on CP-02, 03, an 04 at 7% adjusted per the multiplier for the mark-ups was selected on the low end of the reported range of typical DEP of 7 to 10% recognizing the size and relatively low complication of the project
- Engineering Design is based on CP-02, 03, and 04 at 10% adjusted per the multiplier for the mark-ups
- Design Services During Construction is based on CP-02, 03, and 04 at 4% adjusted per the multiplier for the mark-ups
- Geotechnical Fee is based on CP-02, 03, and 04 at 0.5% adjusted per the multiplier for the mark-ups
- Inspectors for the in-situ soil stabilization is based on a 2-person crew for 8 hours per day for 160 days at $150 per day
- Dispute Resolution Board (owners) is based on 8 people for 8 hours per day for 26 months at $150 per day
- Dispute Resolution Board (contractor) is based on 6 people for 8 hours per day for 8.6 months at $150 per day per construction package
- Stormwater Pollution Prevention Plan is based on 3 people for 8 hours per day for 8 hours per day for 26 months at $100 per day per construction package
- Noise control monitoring is based on 1 people for 8 hours per day for 26 months at $150 per day per construction package
- Extra scheduling is based on 1 people for 8 hours per day for 26 months at $150 per day per construction package
- Security Guards is based on 2 people for 14 hours per day for 26 months at $100 per day per construction package
- Utility Research is based on 3 people for 8 hours per day for 6 months at $100 per day
- Construction Materials Testing Lab is based on CP-02, 03, and 04 at 0.5%
- Warranty Deposit Financing is based on CP-02, 03, and 04 at 0.5% per construction package
- Additional Public Hearings is an allowance
- All project permit costs used were based upon estimates provided in the Site Selection memorandum described in Section 5

5.3.8 Estimating Exclusions

The following estimating exclusions were assumed in the development of this estimate.

- O&M costs for the project with the exception of the vendor supplied O&M manuals
- Permits beyond those normally needed for the type of project and project conditions
- Bypassing sewer flows at or above CSO discharge levels during construction. Bypassing of normal, in-conveyance sewer flows including wet weather is included in the estimate.
- Salvage and/or recycling value of demolished material
- On-site separation of construction and demolition waste material

5.3.9 Contractor and Other Estimate Markups/Add-Ons

Contractor mark-up is based on conventionally accepted values which have been adjusted for project-area economic factors as described below and summarized in Table 5-4.

Labor Markup. Wage rates are from state and local published websites for the City. Direct labor burdens such as health and welfare, vacation, union benefits, payroll taxes, and workers compensation insurance are added to constitute a true labor cost to the contractor. New York City Prevailing Wage Rates as published by the Office of the Comptroller, City of New York, are used.

Materials and Process Equipment Markup. This mark-up consists of the additional cost to the contractor beyond the raw dollar amount for material and process equipment. This includes shop drawing preparation, submittal and/or re-submittal cost, purchasing and scheduling materials and equipment, accounting charges including invoicing and payment, inspection of received goods, receiving, storage, overhead, and profit.

Equipment (Construction) Markup. This mark-up consists of the costs associated with operating the construction equipment used in the project. Most general contractors (GCs) will rent rather than own the equipment and then charge each project for its equipment cost. The equipment rental cost does not include fuel, delivery and pick-up charges, additional insurance requirements on rental equipment, accounting costs related to home office receiving invoices and payment. However, the crew rates used in the estimate do account for the equipment rental cost. Occasionally, larger contractors will have some or all of the equipment needed for the job, but in order to recoup their initial purchasing cost they will charge the project an internal rate for equipment use which is similar to the rental cost of equipment. The GC will apply an overhead and profit percentage to each individual piece of equipment whether rented or owned.

Subcontractor Markup. This mark-up consists of the GC's costs for subcontractors who perform work on the site. This includes costs associated with shop drawings, review of subcontractor's submittals, scheduling of subcontractor work, inspections, processing of payment requests, home office accounting, and overhead and profit on subcontracts.

Contractor Startup, Training, and O&M Manuals. This cost mark-up is often confused with either vendor startup or owner startup. It is the cost the GC incurs on the project beyond the vendor startup and owner startup costs. The GC generally will have project personnel assigned to facilitate the installation, testing, startup and O&M manual preparation for equipment that is put into operation by either the vendor or owner. These project personnel often include an electrician, pipe fitter or millwright, and/or instrumentation and electrical technician. These personnel are not included in the basic crew makeup to install the equipment but are there to assist with and trouble shoot the startup and proper running of the equipment. The GC also incurs a cost for startup for such things as consumables (oil, fuel, filters, etc.), startup drawings and schedules, startup meetings and coordination with the plant personnel in other areas of the plant operation.

Builders Risk, Liability, and Vehicle Insurance. This percentage comprises all three items. Many factors make up this percentage, including the contractor's track record for claims in each of the categories. Another factor affecting insurance rates has been a dramatic price increase across the country over the past several years due to domestic and foreign influences. Consequently, in the construction industry we have observed a range of 0.5 to 1 percent for Builders Risk Insurance, 1 to 1.25 percent for General Liability Insurance, and 0.85 to 1 percent for Vehicle Insurance. Many factors affect each area of insurance, including project complexity and contractor's requirements and history. The actual cost could be higher or lower based on the bidder, region, insurance climate, and the contractor's insurability at the time the project is bid.

Material Shipping and Handling. This can range from 2 to 6 percent, and is based on the type of project, material makeup of the project, and the region and location of the project. Material shipping and handling covers delivery costs from vendors, unloading costs (and in some instances loading and shipment back to vendors for rebuilt equipment), site paper work, and inspection of materials prior to unloading at the project site. BC typically adjusts this percentage by the amount of materials and whether vendors have included shipping costs in the quotes that were used to prepare the estimate. This cost also includes the GC's cost to obtain local supplies (e.g., oil, gaskets and bolts) that may be missing from the equipment or materials shipped.

Performance and Payment Bonds. Based on historical and industry data, this can range from 0.75 to 3 percent of the project total. There are several contributing factors including such items as size of the project, regional costs, and contractor's historical record on similar projects, complexity and current bonding limits. BC uses 1.5 percent for bonds, which we have determined to be reasonable for most heavy construction projects.

The percentages used for the NET (above the line) and GROSS (below the line) mark-ups are listed in Table 5-4.

Table 5-4. Mark-up Percentages

Item	Mark-up estimate, %
Net	
Labor mark-up	10.0
Construction equipment mark-up	5.0
Material and process equipment mark-up	8.0
Other - soft (non-construction) cost mark-up	2.0
Subcontractor mark-up	5.0
Non-exempt materials sales tax	7.0
Material sales tax-exempt	0
Material shipping & handling	2.0
Gross	
GC Multi-prime administration	2.0
Start-up, training, O&M	1.0
Construction contingency	20.0
Building risk, liability auto insurance	2.5
Performance/payment bonds	1.5
Building department permits	1.0
General corporation tax	0.7

In addition to contingency, it is customary for projects that will be built over several years to include an escalation to the midpoint of anticipated construction to account for the future escalation of

labor, material and equipment costs beyond values at the time the estimate is prepared. The base rate for all escalation calculations that are used on all estimates is shown in Table 5-5.

Table 5-5. Base Rate of Escalation

Estimate Breakdown	Escalation % /Year	Sources
Labor	1.50%	AGC / PPI
Construction equipment	1.50%	AGC / PPI
Material	1.70%	AGC / PPI
Subcontractor	2.00%	AGC
Other soft costs	1.50%	AGC / PPI

5.3.10 Risk and Opportunities

During development of the cost estimate, a series of issues has been identified that have the potential to create a variance between the estimated construction cost and the actual construction costs. Some of these elements will be incorporated into the overall project risk register.

The following risks and opportunities were noted during the development of this estimate:

1. Location and prevalence of abandoned utilities. Available mapping of existing utilities and structures were reviewed during development of the concept design. However, this part of Brooklyn is very old and has seen many different uses over the last 100 years. As such, there are likely abandoned utilities and structures within the construction limits of the conceptual designs. Discovery of these abandoned utilities during construction has the potential to increase the overall construction cost. In response, an allowance for subsurface utility conflicts and relocation has been included.
2. Property acquisition costs. Best available and up-to-date information was used to estimate the property acquisition costs. The actual cost is a function of the real estate market and direct negotiations with current land owners. Appendix D presents the basis for the property acquisition costs used in the estimates.
3. Historical artifacts. Care was taken to map areas of historical significance. However, given the age of this neighborhood, it is possible that unknown or unforeseen historical or archaeological artifacts could be discovered during construction. Mitigation of these elements could delay the project and increase the overall project cost.
4. Geotechnical considerations. Geotechnical data from published sources and from related work around the Gowanus Canal were used to develop the conceptual SOE design and structural elements. Detailed geotechnical investigations will be conducted on the selected site during the early phases of the detailed design contract. Findings from these investigations may change the scope and nature of the SOE and structural design. Such changes would have an impact on the construction cost.
5. Resiliency. Assumptions were made regarding key elevations for designing a Facility that is resilient to future sea level rise and storm surge. These elevations were based on preliminary guidance provided by DEP and the City. Developing a resilient system and establishing elevation benchmarks is an ongoing process. Future updates or changes to these elevations could result in a taller structure, increasing the overall project cost.
6. Bypass pumping. Durations have been assumed for bypass pumping. Unforeseen delays in construction could increase the duration of bypass pumping, increasing the overall project cost.

7. Contaminated sediments and groundwater. The estimated nature and extent of the contaminated soil and groundwater in the construction areas is based on limited available information. Once the PDI activities are conducted, the characterization and volume estimates will be more complete and could affect the soil excavation, handling, and disposal costs. Using ISS should allow for disposal of the soil as non-hazardous, but waste characterization will be required. Should the soil fail RCRA waste characterization for anything but benzene, it can still be disposed of as non-hazardous under the MGP exemption, but would require thermal desorption at a disposal facility, resulting in additional cost.
8. Air emissions. The estimate includes an allowance for a sprung structure to control air emissions. Depending on soil contamination conditions, it may be reasonable to use foam or other less costly methods to control odors and emissions. This would reduce the project costs and reduce time requirements.

5.3.11 Construction Contingency

The contingency factor covers unknown conditions, area economic factors, and general project complexity. This contingency is used to account for those factors that cannot be addressed in each of the labor and/or material installation costs. Based on industry standards, completeness of the project documents, project complexity, the current design stage and area factors, construction contingency varies with completeness of project definition. For this project, the Pre-Determined Percentage method in accordance with AACEI guidelines is 20 percent and also coincides with the estimating team's judgment of the information furnished for preparation of this estimate.

5.4 Envision Sustainability Rating

5.4.1 Introduction and Overview of Process

The Institute for Sustainable Infrastructure (ISI) Envision rating system is an objective framework of sustainability criteria and performance achievements. The Envision system is focused on the built environment, or infrastructure, rather than occupied buildings as has been the focus of similar rating systems such as Leadership in Energy and Environmental Design. It is designed to help users identify ways in which sustainable approaches can be used to plan, design, construct, and operate infrastructure projects.

A comparison of the potential sustainable aspects of the sites was performed using Envision Version 2.0, Stage 2, to score both of the sites under consideration to understand the relative potential of each site for sustainable performance of the constructed work. The overall goal of this process was to identify the best site to reduce and mitigate negative impacts while making the best investment in long-term performance. A separate memorandum with the details of the analysis was submitted to DEP in April 2015 and is included in Appendix E.

The Envision rating system is grouped into five categories and 60 credits. A credit comprises a sustainability indicator on an aspect of environmental, social, or economic concern. Each credit is scored based on the following five levels of achievement:

1. Improved
2. Enhanced
3. Superior
4. Conserving
5. Restorative

A total of 809 points is possible based upon the Conserving level of achievement across all 60 credits. The five categories (and associated points) are described as follows in the Envision Guidance Manual:

- The **Quality of Life** (181) category addresses a project's impact on surrounding communities, from the health and well-being of individuals to the well-being of the larger social fabric as a whole. These impacts may be physical, economic, or social.
- The **Leadership** (121) category measures the potential for the project team to communicate and collaborate with a wide variety of people in creating ideas for the project and understanding the long-term holistic view of the project and its life cycle. This category is less sensitive to siting and is more related to overall organizational commitment. The City of New York and the DEP have demonstrated and documented this commitment in documents such as PlaNYC, the DEP mission statement, and the Bureau of Engineering Design and Construction's adopted sustainability policy.
- The **Resource Allocation** (182) category is broadly concerned with the quantity, source, and characteristics of the resources needed to build infrastructure (construction) and keep it running (operations).
- The **Natural World** (203) category addresses how to understand and minimize negative impacts to the natural world while considering ways in which the infrastructure can interact with natural systems in a synergistic, positive way.
- The **Climate and Risk** (122) category scope is twofold: to minimize emissions that may contribute to increased short- and long-term risks and to ensure that infrastructure projects are resilient to short-term hazards or altered long-term future conditions.

Additional information on ISI and the Envision Sustainable Infrastructure Rating System is available at: www.sustainableinfrastructure.org.

BC used a spreadsheet developed by DEP that automates the scoring of the Envision™ rating system. Each of the two sites was scored using this tool and annotated in the comments column to explain the rationale for the rating based on the potential achievement level. Both sites offer some potential for enhancement of sustainability of the built work. In general, an optimistic approach was taken to the scoring of all of the sites by evaluating the potential maximum reasonable rating in the category. DEP will need to make informed decisions as to what level of achievement is practical and reasonable after the final site is selected and the design process starts in earnest.

5.4.2 Results

Summaries of the scoring results for the two sites are presented on Figure 5-5 below. Both sites scored the same in the assessment, with 54 percent of the total points available offering no significant differentiation. Printouts of the scoring results and associated commentary are provided in Appendix E.

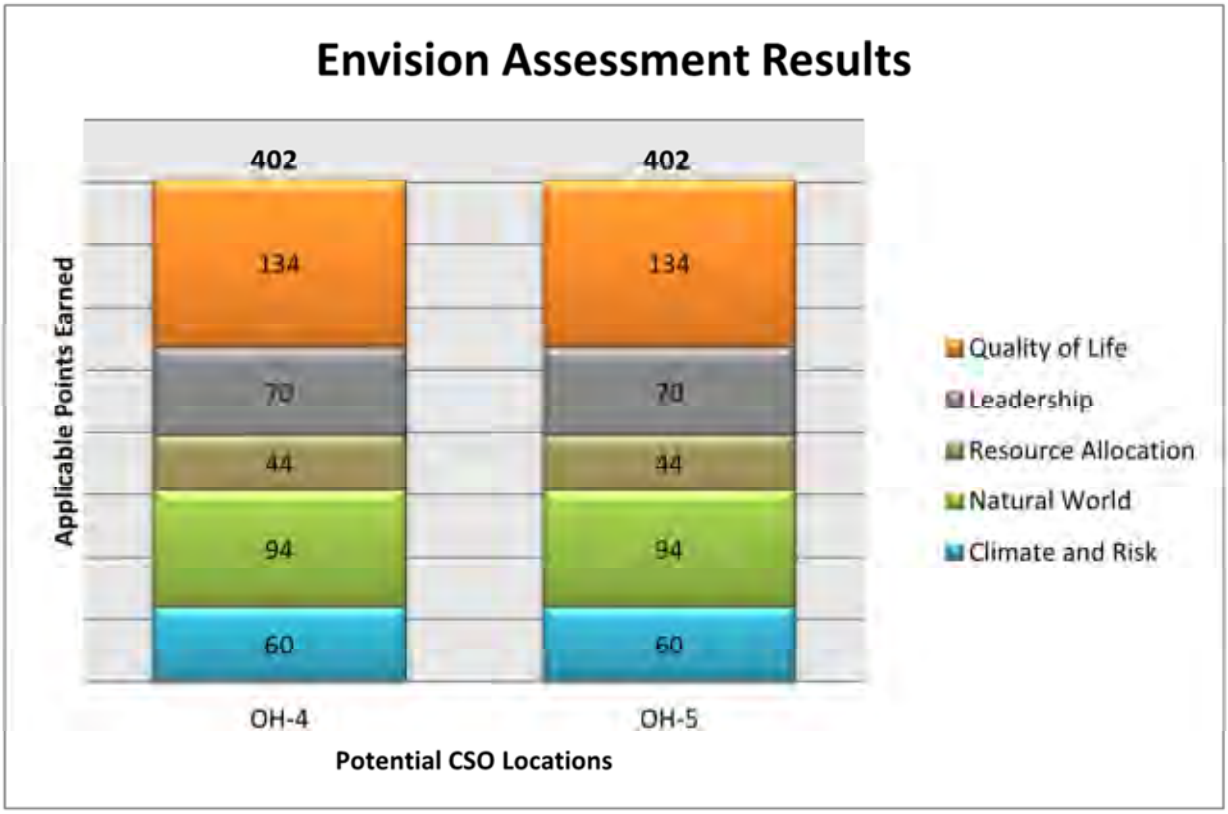


Figure 5-5. Envision Rating Comparison of OH 4 and OH 5 Sites

The following are highlights of the analysis and results in each of the five Envision categories for the two sites:

- **Quality of Life:** The sites both scored 74 percent or 134 of the 181 potential points available with no appreciable difference noted except, perhaps, that the OH 4 could open more waterfront up to the public. However, that slight advantage at OH-4 does not result in a quantifiable difference using the Envision scoring criteria.
- **Leadership:** Both sites scored 66 percent, or 70 of the 106 potential points, and offer essentially the same potential for achievement in the Leadership category.
- **Resource Allocation:** Both sites scored 26 percent, or 44 of the potential 171 points, in this category because of the large amount of waste that will be generated from the proposed removal of contaminated soils along with the waste stream that will be generated during construction. It should be noted that the OH 4 site will generate substantially less waste soil because of the shorter conveyance construction.
- **Natural World:** Both sites scored 59 percent, or 94 of the potential 158 points, in this category. The sites offer the potential to enhance and restore the riparian environment and the associated wildlife access and connectivity as well as provide for a beneficial use of brownfield sites. Also, some potential reduction to risk of groundwater and surface water contamination should be realized with both sites through changing from the current industrial uses to a well-run CSO storage facility.
- **Climate and Risk:** Both sites scored 49 percent, or 60 of the potential 122 points, in this category because of the similar energy use among the sites and the expectation that all vulnerable equipment would be protected from flood risk by locating them on the second floor of the Facility.

Section 6

Comparison of Short Listed Sites

This section provides a comparison of the relative engineering requirements, environmental consequences, potential for sustainability elements, and cost between the two short listed sites.

As described in Section 4, and as shown on Figure 4-1, Sites OH-4 and OH-5 were the top two ranked locations for the CSO retention tank at the OH-007 outfall. As presented in Sections 4 and 5 of this report, some of the major criteria analyzed in the screening level analyses remain as differentiators between the OH-4 and OH-5 sites. Criteria that were considered fatal flaws in the screening process, such as minimum property size and effective capture of the CSOs, are not considered further here since both sites have already met those criteria and they no longer serve as differentiators. Other criteria from the screening process, including hydraulic complexity, land use, proximity to infrastructure, property ownership, the Envision rating system results, and costs are considered in more detail here.

The specific criteria considered for the side-by-side discussions are:

- Engineering. Section 5 provided a detailed evaluation of the engineering factors included in the conceptual designs for each specific site. However, some of the key engineering issues to consider when comparing the two sites include the complexity and risks associated with the hydraulics and controls needed to move wastewater from the outfall to the tanks, the conveyance needed to deliver it to and from the tanks, the depth of excavation required for construction of the tanks, and the complexity of the subsurface utility crossings and relocations related to the conveyance.
- Property Acquisition. Property acquisition affects costs and must also be considered in terms of the project schedule.
- Construction. Construction considerations include the complexities associated with building at each site which will directly affect the associated cost and risks. Construction complexities also influence the construction schedule, which includes demolition, site preparation, construction of the tanks and superstructure, construction of the conveyance, and final site restoration.
- Environmental. The environmental issues fall into two distinct types: 1) soil and groundwater contamination associated with the former industrial and commercial activities in the area, and 2) impacts to site specific and surrounding land use and the community. The sustainability analysis using the ISI Envision system presented in Section 5 provides for a comparison of the overall impacts and benefits to the community.
- Cost. Each of the engineering, environmental, and sustainability criteria carry cost implications. For example, greater lengths of conveyance piping have greater costs, and greater excavation depths have greater associated costs, among others. However, other site specific cost factors are also considered here.

6.1 Side by Side Comparison of Sites OH-4 and OH-5

The following discussion highlights specific factors considered in comparing the OH-4 and OH-5 sites. Some criteria are substantial differentiators whereas others are more or less equal between both sites. While similarities are mentioned, the focus will be on the differentiating factors for each site.

6.1.1 Engineering Considerations

Engineering considerations include planning and permitting efforts, facility design efforts, pre-design investigations, geotechnical engineering efforts, construction management efforts, and other activities required prior to construction. Details of these activities are generally included in Cost Package-01 of the Cost Estimate presented in Section 5 of this report.

Sites OH-4 and OH-5 are comparable in terms of planning, permitting and pre-design investigation efforts, although OH-5 carries a slightly higher effort for the design efforts due to the need for special geotechnical protection for the adjacent DOC building during excavation for the tanks. While both sites have existing buildings that would need to be demolished, OH-4 has a slightly larger square footage of buildings that need to be addressed.

The engineering fees for design of the tanks and superstructure are also similar between the sites. However, engineering design effort for the conveyance and piping needed to move the CSO from the OH-007 outfall to each site and back are greater for OH-5 due to the greater distance from the outfall and the complexity of crossing 2nd Avenue.

The OH-4 site, being located adjacent to the OH-007 outfall, provides minimal distance for conveyance resulting in lower design effort. Its proximity to the Canal also provides opportunities for alternate routing of both influent and effluent piping. It should be noted that the layout of the CSO Facility on the OH-4 site has not yet been optimized. As shown in Section 5, the combined properties that make up OH-4 allow for alternative layouts and orientation of the tanks. An optimized layout would take advantage of using as much of the DOS parcel as possible, would minimize conveyance even further, would possibly allow for a new outfall, and would optimize incorporation of the 2nd Avenue Pumping Station. It is also interesting to note that if a smaller size tank were used, or if some other approach, such as weir modifications, were used for OH-007, then the above and below ground structures could possibly fit entirely within the triangular shaped DOS property, which would not require any property acquisition cost.

Another factor that could affect the use of the OH-4 site is the presence of 6th Street. If the Facility orientation is such that it extends into or fully crosses 6th Street, it may be necessary to officially de-map the street following the NYC Department of City Planning (DCP) procedures. However, the subsurface structure could be designed to allow vehicles to drive over it, keeping the street open. This is a design detail that will be addressed during the design phase of the project, but has the potential to add cost to the planning and permitting activities.

The greater distance from the outfall to OH-5 also requires the influent channel and screen chamber to be deeper for proper hydraulic operation. Design of the deeper structures requires additional design effort, as would the overflow structure and tide gates.

Construction management fees would be greater at OH-5 due to the time and effort needed for the deeper excavation and longer conveyance.

6.1.2 Property Acquisition

The OH-4 site currently consists of three privately-owned parcels and one City owned parcel. The privately owned parcels would need to be purchased for the construction of the CSO Facility at that location. An evaluation of past, present, and speculative future property values is included as Appendix D to this report. The worst-case future speculative cost was used to conservatively estimate property acquisition values in the cost estimates.

Because the OH-4 site is larger than the OH-5 site, the property acquisition costs is higher based on the price per buildable square foot.

It should be noted that the combined OH-4 site is larger than needed for the CSO Facility, but the configuration of properties would not allow a partial purchase if the 4 MG tank is required. If a

smaller tank recommendation is approved, then no additional property acquisition would be required. However, the combined parcels also provide for a staging area for the construction of the Facility, and could provide greater waterfront access and open space for the community once construction is completed.

6.1.3 Construction Considerations

Construction considerations include complexity, risk and cost. The complexity of construction also affects the construction schedule as well as presenting additional constructability risks.

Site work in preparation for tank construction generally includes demolition, support of excavation, ISS, groundwater control, and soil excavation and disposal. Because the influent channel, screen chamber and tanks are deeper at OH-5 and because the ground surface is at a higher elevation at OH-5, the SOE depth and volume of soil requiring excavation is greater at that location. Excavation and disposal of approximately 89,000 cubic yards of soil would be required for the tanks at OH-5, and an additional 29,000 cubic yards of soil would be required for the conveyance to OH-5. Because OH-4 is located adjacent to the outfall, the depth requirements are less for the support of the excavation, and the volume of material requiring excavation is less. OH-4 would require approximately 84,000 cubic yards of soil excavation and disposal for the tanks, and 10,000 cubic yards for the conveyance. This amounts to a net difference of approximately 24,000 cubic yards of waste material generated, in addition to resources associated with removal, trucking and disposal for this volume of material.

Length of the main conveyance from the OH-007 outfall to the tanks is another difference between the two sites. OH-4, being located adjacent to the outfall, requires minimal length of conveyance. Approximately 120 feet of influent conveyance is required to move the CSO from the outfall to the tank at OH-4, and approximately 160 feet of effluent conveyance is needed to return the overflow during pump back. OH-5, being located further from the outfall, would require approximately 600 feet of conveyance to move the CSO from the outfall to the tank at OH-5, and approximately 160 feet of effluent conveyance is needed to return the overflow during pump back. The greater length of conveyance impacts the cost for excavation and soil disposal along the trace of the conveyance, as well as the material and labor cost to construct the conveyance.

Utility crossings and/or relocation are another major construction consideration. OH-4, being located adjacent to the OH-007 outfall, could avoid routing of the main conveyance through the City streets. OH-5 however, would require significantly more conveyance routing as well as utility coordination, relocations, and crossings in 2nd Avenue.

Although construction of the conveyance is a major differentiator between the two sites, construction of the actual CSO Facility, the below ground tanks and appurtenances, and the above ground superstructure is relatively similar at both sites and does not represent a major differentiator. Both sites have the advantage of being located adjacent to the Canal where the water is deep enough to potentially allow the use of barges to deliver construction materials to the sites, and to transport excavated soils away from the sites.

The time needed to construct a CSO Facility at the OH-5 site is approximately 6 months longer than the time needed to construct the Facility at the OH-4 site. Although OH-4 requires more time for demolition of existing structures, OH-5 requires additional time to construct the longer conveyance and deeper excavation, as well as time needed for the additional geotechnical protection of the adjacent building.

Constructability issues mostly center on the unknown aspects of subsurface conditions. While there has been some subsurface investigation conducted near and at the periphery of the OH-4 site (related to the RI for the Gowanus Canal), there have been no site specific investigations conducted

to characterize soil or groundwater contamination at either OH-4 or OH-5. Information available from State and Federal database searches indicates the potential for contamination to exist at both sites. The cost estimates for both sites include the cost to conduct pre-design investigations to better characterize soil and groundwater conditions. The cost estimates also include the handling of soil and groundwater as contaminated at both sites. While it is important to consider the inclusion of these costs, they do not represent a differentiator between the sites at this time.

6.1.4 Environmental Considerations

The environmental issues considered here fall into two categories: 1) soil and groundwater contamination associated with the former MGP sites and other industrial activities in the area, and 2) impacts to site specific and surrounding land use and the community.

Both OH-4 and OH-5 are potentially impacted by soil and groundwater contamination. The potential for contamination from past industrial uses, including MGP waste, is present at both sites. Special health and safety considerations would be needed at both sites to protect site workers and the surrounding community particularly during site preparation and excavation activities. Control of noise, odors, and emissions has been incorporated into the conceptual design and cost for both sites.

The CEQR criteria used during the site screening and short list development process provides some differentiation between the two sites. Evaluation of most of the CEQR criteria, such as traffic, noise, zoning and public policy, socioeconomic conditions, water and sewer infrastructure, solid waste and sanitation services, energy, air quality, GHG and climate change, as well as ULURP and Fair share considerations are important factors but do not serve as significant differentiators between the sites.

Other CEQR criteria such as current and planned surrounding land use, historic and cultural resources, and on-site land use do provide differentiation between the sites. While both sites would involve the displacement of existing businesses, OH-4 is in a more isolated location and would not have the same negative impact on surrounding land use. Upon completion, use of the OH-4 site could result in more waterfront access to the Canal, a desirable feature for the community.

As a supplement to the CEQR criteria, which measures the environmental impacts, the ISI Envision system was used to further evaluate each site with regard to impacts and sustainable performance. A summary of the Envision analysis and rating are included in Section 5 of this report and in Appendix E. Envision categories focus on quality of life in the surrounding community, leadership and the potential for interaction with the community, resources needed to build the infrastructure, interaction with the natural world and minimizing impacts, and minimizing contributions to climate change factors. It also considers minimizing the risks and providing resiliency during natural disasters.

Both sites OH-4 and OH-5 received the same high Envision rating in the Quality of Life and Natural World categories, stemming from opening access to the Canal consistent with the urban renewal efforts in the area associated with economic development, which presents a significant opportunity for the community. OH 4 presents a slight advantage in that it could open more waterfront to the public. However, that slight advantage at OH-4 does not result in a quantifiable difference using the Envision scoring criteria.

Both sites scored high in the Natural World category in recognition of the potential to enhance and restore the Canal as a community asset. Both OH-4 and OH-5 scored similarly in the Leadership, Resource Allocation and Climate and Risk categories.

6.1.5 Cost Summary Comparison

Most of the comparative criteria discussed above carry a cost component, though not all may be obvious. The environmental criteria and Envision rankings may not carry an obvious cost, but participation in the programs and activities, such as community involvement and leadership, require time and effort to conduct properly. However, the engineering and construction elements do carry direct costs and provide a straight forward cost comparison between the sites.

Cost Components. The cost discussion presented here is organized to be consistent with the cost estimate packages presented in Section 5 and included as Appendix A. The major packages were developed and arranged in a sequential manner:

- CP-01 includes the planning, engineering design, and property acquisition cost components for the project.
- CP-02 includes the site preparation and foundation work, all those components from demolition of the existing structures, clearing the sites, excavation and preparing the foundations to be ready for tank construction.
- CP-03 includes construction of the below ground tank, the above ground building, and all of the mechanical, electrical, and process controls within the building and tanks.
- CP-04 includes construction of the influent and effluent conveyance to and from OH-007 and site improvements such as development of open space or waterfront access.
- Below-the-Line Items are also presented, and include escalation factors, mark-ups, contingencies, start-up costs, bonding and other cost requirements.

Cost Summary. Table 6-1 below presents a summary of the major cost components within each of the cost packages. The component breakdown represents broad categories, the details of which are included in the cost estimates included in Appendix A. However, comparison of these categories illustrates the major cost differences between the sites that comprise the total estimated cost for each site as a whole.

Table 6-1. Gowanus Canal CSO Tank Cost Summary			
		OH-4	OH-5
CP-01	**Planning, Engineering, and Property Acquisition**	**$ 94,000,000**	**$ 90,000,000**
	Planning and Permitting (includes Construction Permits & Fees, Planning & Permitting, and Engineering and Consultants	$ 2,460,000	$ 4,000,000
	Pre-Design Investigations	$ 540,000	$ 500,000
	Property Acquisition – Tank	$ 58,000,000	$ 49,800,000
	Property Acquisition – Staging Area	$	$
	Engineering Fee (includes Design, Geotech, Eng during Construction)	$ 22,000,000	$ 24,000,000
	Construction Management	$ 11,000,000	$ 11,700,000
CP-02	**Site Preparation and Foundations**	**$ 77,000,000**	**$ 92,000,000**
	General Site Work and Demolition (includes Sprung structure, General conditions, tie downs, tie backs, demo)	$ 18,300,000	$ 17,420,000
	Support of Excavation – Tank (OH-5, OH-7 include Slurry Walls)	$ 4,000,000	$ 8,000,000
	Support of Excavation - Conveyance	$ 3,000,000	$ 8,000,000
	Jet Grouting - Tank	$ 18,000,000	$ 18,000,000
	Jet Grouting - Conveyance	$ 1,000,000	$ 2,000,000
	InSitu Soil Stabilization	$ 5,000,000	$ 7,400,000
	New Bulk Head	$ 6,000,000	$ 3,400,000
	Soil Excavation and Disposal - Tank	$ 14,000,000	$ 15,000,000
	Soil Excavation and Disposal - Conveyance	$ 1,500,000	$ 6,000,000
	Dewatering - Tank within SOE (was based on duration)	$ 5,000,000	$ 5,000,000
	Soil trucking & decontamination – Tank	$ 1,000,000	$ 1,300,000
	Soil trucking & decontamination - Conveyance (decon not included)	$ 200,000	$ 480,000
CP-03	**Tank, Building, and MEP**	**$ 37,000,000**	**$ 38,000,000**
	Tank Construction	$ 8,500,000	$ 9,500,000
	Building Construction	$ 7,500,000	$ 7,500,000
	Mechanical, Electrical, Process Controls (includes general conditions, equipment, electrical, Mechanical, and piping)	$ 21,000,000	$ 21,000,000
CP-04	**Conveyance and Site Improvements**	**$ 13,000,000**	**$ 14,000,000**
	Influent and Effluent Conveyance	$ 2,000,000	$ 3,000,000
	Utility Relocation	$ 2,000,000	$ 2,000,000
	Site Improvements	$ 5,000,000	$ 5,000,000
	General Conditions	$ 4,000,000	$ 4,000,000
Below-the-Line Items		**$ 90,000,000**	**$ 102,000,000**

Table 6-1. Gowanus Canal CSO Tank Cost Summary			
		OH-4	OH-5
	Mark-Up (includes shipping, markup, sales tax, and GC Multi-Prime Admin)	$ 13,000,000	$ 17,000,000
	Escalation	$ 20,000,000	$ 21,600,000
	Contingency	$ 51,000,000	$ 55,000,000
	Start Up	$ 1,000,000	$ 1,400,000
	Bonding and Other (includes builders risk insurance, bonds, and permits)	$ 6,000,000	$ 7,000,000
Total Cost		**$ 311,000,000**	**$ 336,000,000**
Class 4 Estimate Range (-30% to +50%)		**$218,000,000 to $466,500,000**	**$235,000,000 to $504,000,000**

* This represents a worst case, high end, speculative cost for the property. Accounting for comparable current sales, easement issues, and other factors, the likely cost to purchase this property could be about half of this value. See Appendix D for details.

CP-01 Common Costs. As can be seen in Table 6-1, the CP-01 planning and permitting and pre-design investigation costs are similar. The costs for acquisition of a staging area are not needed for either site. If OH-4 is selected, it would have enough room for an on-site staging area. If the OH-5 site is selected, the triangular shaped DOS property could be used for construction staging.

CP-01 Cost Differences. Property acquisition costs for the CSO Facility construction are similar, but the property acquisition cost for OH-4 is slightly higher than OH-5. This cost could become much more significant if a smaller tank or weir modifications are used at the OH-4 site, in which case there would be no property acquisition cost for that site. Engineering fees are about $2M higher for OH-5 because they include design of significantly longer conveyance and the design of the geotechnical protections for the adjacent building. CM fees are also slightly higher for OH-5 due to the construction schedule and overall cost of the project at OH-5.

CP-02 Common Costs. Costs associated with the SOE, jet grouting, ISS, and dewatering for the basic tank area are similar for both sites, although the costs at OH-5 are slightly higher due to the greater depth of excavation.

CP-02 Cost Differences. The major cost difference between OH-4 and OH-5 in CP-02 is associated with the conveyance. Because the conveyance is significantly longer, the costs for SOE, jet grouting, ISS, and excavation and disposal of contaminated soil for the conveyance are significantly greater than those same items for OH-4. The cost for excavation and disposal of contaminated soil in the tank area is also higher at OH-5 due to the greater depth of the influent channel and screen chamber required for the proper hydraulic operation due to the greater distance of the OH-5 site from the outfall, and due to the higher ground elevation at OH-5. Another major cost difference is for utility crossing and/or relocation for the conveyance to OH-5.

CP-03 Common Costs. The costs to build the tanks and the superstructure are similar for both sites.

CP-03 Cost Differences. There are no major cost differences to differentiate between the sites.

CP-04 Common Costs. There are very few common costs for CP-04 since this package contains the conveyance construction and site improvements following construction. Some minor similar costs can be found within the general conditions costs. One common cost between OH-4 and OH-5 is the site restoration cost assumed in the estimates. Costs for post-construction site improvements are included for both sites, but only provide for general landscaping and waterfront access for the

community. Because OH-4 is a larger property with more frontage to the Canal, the site restoration costs could be higher, but have not been quantified at this time.

CP-04 Cost Differences. Again, because the length of conveyance is significantly greater at OH-5, the cost to construct the conveyance is much greater.

Below-the-Line Items. In general, the below-the-line escalation, mark-up, contingency, and bonding costs are calculated as a percentage of the raw engineering and construction costs. Because the basic engineering and construction costs are higher for OH-5, the below the line items are also higher for OH-5.

Section 7

Recommendations

Based on the analysis of the engineering requirements, operation and maintenance issues, environmental factors, construction schedule and construction costs, the OH-4 site is recommended as the preferred site for the Owl's Head CSO Facility for the Gowanus Canal OH-007 outfall.

The location of the OH-4 site, being directly adjacent to the OH-007 outfall, provides multiple advantages from the standpoint of engineering, hydraulics, conveyance, and constructability. Construction at the OH-4 site will cause the minimum amount of disruption to the community in terms of traffic, construction in local streets, and utility disruption, and would provide waterfront access to the Canal. Finally, accounting for all associated costs, the cost to construct the CSO Facility at the OH-4 site is approximately $25 million dollars less than building at the OH-5 site.

Section 8

Limitations

This document was prepared solely for New York City Department of Environmental Protection (DEP) in accordance with professional standards at the time the services were performed and in accordance with the contract between DEP and BC dated June 4, 2013. This document is governed by the specific scope of work authorized by DEP; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by DEP and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

Appendix A: Cost Estimates

NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION
OWLS HEAD-04 GOWANUS CANAL CSO TANK SITING AND SUPERFUND SUPPORT
CLASS 3-4 ESTIMATE <10% DESIGN

Client	NYCDEP
Engineer	BROWN AND CALDWELL
Estimator	FB-DS-DG-BW-BM
Bid date	4/23/2015
Job cost job number	**145692-**
BC Project Manager	**Donald Cohen**
BC Office	**New York City**
Estimate Issue No.	**6**
QA/QC Reviewer	**BMatthews GDeReamer**
QA/QC Review Date	**4/22/2015**

Notes **PROCESS LOCATION/AREA INDEX**

Work Pkg	Description
CP-01	Planning, Engineering and Property Acquisitions
CP-02	Site prep and deep foundation systems
CP-03	Structure and MEP
CP-04	Site Improvements and OSBL Utilities

System	Description
01	Site Prep and Deep Foundation System
02	Structure and UG Piping
03	Equipment
04	Mechanical
05	Electrical - Instrumentation and Controls
06	Site Improvements
07	General Requirements
08	Engineerings - Pre-Design Investigations and Property Acquisitions

Estimate Breakdown	Labor Man Hr's	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Net Amount
OH-04 Owls Head -04							
CP-01 Planning, Engineering and Property Acquisition							
07 General Requirements						34,385	34,385
08 Engineering - Pre-Design Investigations and Property Acquisition						117,904,014	117,904,014
CP-01 Planning, Engineering and Property Acquisition						117,938,399	117,938,399
CP-02 Site prep and deep foundation systems							
01 Site Prep and Deep Foundation System	57,801	10,338,837	7,141,857	84,881,956	2,804,030		105,166,680
07 General Requirements	17,280	1,412,767	42,818	2,922,858	3,396,215		7,774,658
09 Sprung Structure	1,401	189,143	52,189	1,665,612	24,079		1,931,022
CP-02 Site prep and deep foundation systems	76,482	11,940,746	7,236,864	89,470,426	6,224,324		114,872,360
CP-03 Structure and MEP							
01 Site Prep and Deep Foundation System	892	138,794	212,965		28,542		380,302
02 Structure and UG Piping	93,643	13,724,337	10,604,813		793,594		25,122,744
03 Equipment	6,026	1,258,238	9,614,260		199,199		11,071,697
04 Mechanical	4,242	723,783	572,704	256,266	23,509		1,576,262
05 Electrical - Instrumentation and Controls	9,916	1,432,833	1,599,671	1,100,351	26,040		4,158,894
07 General Requirements	63,606	5,630,015	599,734	3,475,010	5,798,481		15,503,240
CP-03 Structure and MEP	178,325	22,908,001	23,204,147	4,831,627	6,869,365		57,813,139
CP-04 Site Improvements and OSBL Utilities							
01 Site Prep and Deep Foundation System	1,365	220,974	131,471	106,450	53,974		512,869
02 Structure and UG Piping	14,290	2,600,476	1,866,945	75,357	702,465		5,245,243
06 Site Improvements				7,628,390			7,628,390
07 General Requirements	21,391	1,878,094	1,330,527	3,158,038	221,569		6,588,228
CP-04 Site Improvements and OSBL Utilities	37,046	4,699,543	3,328,944	10,968,235	978,008		19,974,730
OH-04 Owls Head -04	291,853	39,548,290	33,769,954	105,270,288	14,071,697	117,938,399	310,598,628

NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION
OWLS HEAD-04 GOWANUS CANAL CSO TANK SITING AND SUPERFUND SUPPORT
CLASS 3-4 ESTIMATE <10% DESIGN

Client	NYCDEP Customer Service Center 59-17 Junction Boulevard, 13th Flushing NY 11373
Engineer	BROWN AND CALDWELL
Estimator	FB-DS-DG-BW-BM
Bid date	4/23/2015
Job cost job number	**145692-**
Project	**C-Infrastructure**
BC Project Manager	**Donald Cohen**
BC Office	**New York City**
Estimate Issue No.	**6**
QA/QC Reviewer	**BMatthews GDeReamer**
QA/QC Review Date	**4/22/2015**

Notes

PROCESS LOCATION/AREA INDEX

Work Pkg	Description
CP-01	Planning, Engineering and Property Acquisitions
CP-02	Site prep and deep foundation systems
CP-03	Structure and MEP
CP-04	Site Improvements and OSBL Utilities

System	Description
01	Site Prep and Deep Foundation System
02	Structure and UG Piping

Project Number: 145692-
Estimate Issue Number: 6
Estimate Issue Date: 4/23/2015
Estimator: FB-DS-DG-BW-BM

OWLS HEAD-04 GOWANUS CANAL CSO TANK SITING AND SUPERFUND SUPPORT

Notes

03 Equipment
04 Mechanical
05 Electrical - Instrumentation and Controls
06 Site Improvements
07 General Requirements
08 Engineerings - Pre-Design Investigations and Property Acquisitions

	Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
OH-04 Owls Head -04								
CP-01 Planning, Engineering and Property Acquisition								
07 General Requirements								
7.06 Construction Permits and Fees								
01999 HVAC Permit							1,725	1,725
01999 Pre-demolition Rat Permit							1,418	1,418
01999 Traffic Control Permit Additional Cost							31,242	31,242
7.06 Construction Permits and Fees							34,385	34,385
07 General Requirements							34,385	34,385
08 Engineering - Pre-Design Investigations and Property Acquisition								
8.01 Planning & Permitting								
01999 Conn Edison Electric Service Connection Fee							6,248	6,248
01999 Gas Service Connectiion Fee							6,248	6,248
01999 Planning, Permitting & Environmental Assessment							828,536	828,536
01999 Potable Water Service Connection Fee							4,374	4,374
01999 Dispute Resolution Board Cost (Owner)							261,868	261,868
01999 Property Acquisition							72,221,389	72,221,389
8.01 Planning & Permitting							73,328,663	73,328,663
8.04 Engineering and Consultants								
01999 CM Fee							13,235,585	13,235,585
01999 Engineering Design Fee							26,471,172	26,471,172
01999 Geotech Fee							945,399	945,399
01999 Demolition Engr Fees							823,522	823,522
01999 Ground Improvement Engr Fees							1,146,338	1,146,338
01999 Surveying (Additional Required)							62,484	62,484
01999 Utility Research							539,861	539,861
01999 Sustainabillity Program Administration							31,242	31,242
01999 Public Hearings							124,968	124,968
01999 Construction Material Testing							1,194,780	1,194,780
8.04 Engineering and Consultants							44,575,351	44,575,351
08 Engineering - Pre-Design Investigations and Property Acquisition							117,904,014	117,904,014
CP-01 Planning, Engineering and Property Acquisition							117,938,399	117,938,399
CP-02 Site prep and deep foundation systems								
01 Site Prep and Deep Foundation System								
1.01 Demo and Abatement								
02220 Building Gross Demolition		9,704.040	1,284,161	14,201		508,084		1,806,446
02228 Electrical Demolition - Lock Out/ Tag Out Services and disconnect		675.926	94,820	12,926				107,745
02999 Construction and Demolition Waste Buildings		541.712	64,730	520,453		85,105		670,288
13999 Hazardous Material Remediation and Abatement					796,456			796,456

	Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
	1.01 Demo and Abatement	**10,921.678**	**1,443,711**	**547,580**	**796,456**	**593,189**		**3,380,935**
	1.02 Support of excavation							
03330	Track Wahing Slab	80.307	13,335	8,002		100		21,436
31250	Shoring Systems			348,296	1,469,243			1,817,539
31250	Shoring Systems - Influent Channnel				2,076,416			2,076,416
31250	Shoring Systems - Effluent Channel				2,677,860			2,677,860
31250	Shoring Systems C-B Trench				4,407,729			4,407,729
31260	Jet Grouting				26,845,900			26,845,900
31260	Jet Grouting for InflueInt Channel				538,570			538,570
31260	Jet Grouting for Effluent Channel				727,070			727,070
31315	Excavation 0-10 ft				901,992			901,992
31315	Excavation 10-59 feet				3,434,636			3,434,636
31315	Excavation Tie Back Spoils				33,977			33,977
31315	Excavation 0-10 ft - Influent Channel				29,004			29,004
31315	Excavation 10-59 feet - Influent Channel				174,030			174,030
31315	Excavation 0-10 ft - Effluent Channel				39,157			39,157
31315	Excavation 10-59 feet - Effluent Channel				234,939			234,939
31455	Tie Back Row 1				1,611,012			1,611,012
31455	Tie Back Row 2				1,611,012			1,611,012
31455	Tie Back Row 3				3,222,024			3,222,024
31455	Tie Back Row 4				2,125,641			2,125,641
31999	Disposal of Excavated Soil				16,107,479			16,107,479
31999	Disposal of Excavated Soil - Tie Backs				129,440			129,440
31999	Disposal of Excavated Soil - Influent Channel				861,859			861,859
31999	Disposal of Excavated Soil - Effluent Channel				1,163,509			1,163,509
31999	Trucking of Excavated Soil	6,745.175	706,396			998,589		1,704,984
31999	Decontamination of Equipment	2,242.063	223,930			22,322		246,252
	1.02 Support of excavation	**9,067.546**	**943,660**	**356,298**	**70,422,501**	**1,021,011**		**72,743,469**
	1.03 Dewatering and water treatment							
31240	Dewatering Systems	25,762.490	5,978,769	766		469,646		6,449,181
46999	Dewatering Water Treatment			456,203				456,203
46999	Dewatering Treament Mobilization and Demobilization				522,087			522,087
	1.03 Dewatering and water treatment	**25,762.490**	**5,978,769**	**456,969**	**522,087**	**469,646**		**7,427,472**
	1.04 Ground Improvements (Soil Stabilization							
31250	New Bulk Head	12,000.000	1,972,696	5,781,009		720,185		8,473,891
31260	Soil Stabilization				7,236,124			7,236,124
	1.04 Ground Improvements (Soil Stabilization	**12,000.000**	**1,972,696**	**5,781,009**	**7,236,124**	**720,185**		**15,710,015**
	1.05 Deep Foundations							
31315	Excavation Tie Downs Spoils				25,894			25,894

Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
31455 Tie Downs for Tanks	49.208			5,780,252			5,780,252
31999 Disposal of Excavated Soil - Tie Downs				98,643			98,643
1.05 Deep Foundations	49.208			5,904,788			5,904,788
01 Site Prep and Deep Foundation System	57,800.921	10,338,837	7,141,857	84,881,956	2,804,030		105,166,680
07 General Requirements							
7.01 Temporary Requirements (Toilets, Utilities, Lighting, Water, etc.)							
01999 SWPPP Extra Cost				69,963			69,963
7.01 Temporary Requirements (Toilets, Utilities, Lighting, Water, etc.)				69,963			69,963
7.02 Trailers and Storage (On and Off Site)							
01500 CSA Construction Facilities & Temp Utilities			42,818	66,059	15,611		124,488
01590 CSA Contractor's Equipment					3,380,603		3,380,603
7.02 Trailers and Storage (On and Off Site)			42,818	66,059	3,396,215		3,505,092
7.03 Fencing and Security							
01999 Full Time Registered Security Guards				2,448,711			2,448,711
7.03 Fencing and Security				2,448,711			2,448,711
7.04 Site Management - Super, General Foreman etc.							
01300 CSA Field Personnel & Project Management	17,280.000	1,412,767					1,412,767
01999 Dispute Resolution Board Cost (Contractor)				209,890			209,890
01999 Noise Control Monitoring				34,982			34,982
01999 Schedule Assembly & Maintenance Additional Cost				34,982			34,982
7.04 Site Management - Super, General Foreman etc.	17,280.000	1,412,767		279,853			1,692,620
7.06 Construction Permits and Fees							
01999 Crane & Derrick Permit				2,749			2,749
01999 Dumpster Permit				2,194			2,194
01999 Hoisting & Rigging Permit				1,773			1,773
01999 Warranty Deposit Financing				49,818			49,818
01999 Excavation Permit				1,740			1,740
7.06 Construction Permits and Fees				58,272			58,272
07 General Requirements	17,280.000	1,412,767	42,818	2,922,858	3,396,215		7,774,658
09 Sprung Structure							
8.06 Sprung Structure Over Site							
44999 Air Supported Structure	1,400.776	189,143	52,189	1,665,612	24,079		1,931,022
8.06 Sprung Structure Over Site	1,400.776	189,143	52,189	1,665,612	24,079		1,931,022
09 Sprung Structure	1,400.776	189,143	52,189	1,665,612	24,079		1,931,022
CP-02 Site prep and deep foundation systems	76,481.698	11,940,746	7,236,864	89,470,426	6,224,324		114,872,360
CP-03 Structure and MEP							
01 Site Prep and Deep Foundation System							
1.05 Deep Foundations							
31315 Backfill	892.283	138,794	212,965		28,542		380,302

	Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
	1.05 Deep Foundations	892.283	138,794	212,965		28,542		380,302
	01 Site Prep and Deep Foundation System	892.283	138,794	212,965		28,542		380,302
02 Structure and UG Piping								
2.01 Mat Slab (Screening)								
03330	Matt Slab	1,782.634	265,058	197,229		6,771		469,058
	2.01 Mat Slab (Screening)	1,782.634	265,058	197,229		6,771		469,058
2.01a Mat Slab (Storage Tank Basin 1)								
03330	Tank 1 Mat Slab	3,276.260	495,167	380,014		11,906		887,087
03330	Effluent Channel Tank 1 Section Matt Slab	451.450	68,479	52,907		1,624		123,010
	2.01a Mat Slab (Storage Tank Basin 1)	3,727.710	563,646	432,921		13,530		1,010,098
2.01b Mat Slab (Storage Tank Basin 2)								
03330	Tank 2 Mat Slab	3,276.260	495,167	380,014		11,906		887,088
03330	Effluent Channel Tank 2 Section Matt Slab	451.450	68,479	52,907		1,624		123,010
	2.01b Mat Slab (Storage Tank Basin 2)	3,727.710	563,646	432,921		13,530		1,010,098
2.01c Mat Slab (Storage Tank Basin 3)								
03330	Efflunet Channel Flush Section Matt Slab	213.048	32,317	24,967		766		58,051
03330	Tank 3 Mat Slab	3,276.260	495,167	380,014		11,906		887,088
03330	Effluent Channel Tank 3 Section Matt Slab	451.450	68,479	52,907		1,624		123,010
	2.01c Mat Slab (Storage Tank Basin 3)	3,940.758	595,963	457,889		14,297		1,068,148
2.02 Walls - Tank Walls, Baffles, Channels, etc. (Screening)								
03345	Concrete Walls	4,524.905	662,561	200,683		19,667		882,911
	2.02 Walls - Tank Walls, Baffles, Channels, etc. (Screening)	4,524.905	662,561	200,683		19,667		882,911
2.02a Walls - Tank Walls, Baffles, Channels, etc. (Storage Tank Basin 1)								
03345	Tank 1 Concrete Walls North, West, and East Walls	6,227.982	907,833	256,357		25,853		1,190,044
03345	Tank 1 Dividing Wall	235.003	34,244	5,885		864		40,993
03345	Tank 1 Flushing Wall	317.419	46,352	14,898		1,491		62,740
03345	Effluent Channel Tank 1 Concrete Wall West, North	2,124.226	311,242	115,741		9,852		436,835
	2.02a Walls - Tank Walls, Baffles, Channels, etc. (Storage Tank Basin 1)	8,904.630	1,299,671	392,881		38,060		1,730,612
2.02b Walls - Tank Walls, Baffles, Channels, etc. (Storage Tank Basin 2)								
03345	Tank 2 Concrete Walls North, West, and East Walls	6,018.812	871,686	225,987		21,989		1,119,663
03345	Tank 2 Dividing Wall	235.003	34,243	5,885		864		40,993
03345	Tank 2 Flushing Wall	317.419	46,352	14,898		1,491		62,740
03345	Effluent Channel Tank 2 Concrete Wall West	1,650.887	242,353	97,501		7,920		347,774
05999	Tank 2 Weir with Baffle			37,978				37,978
	2.02b Walls - Tank Walls, Baffles, Channels, etc. (Storage Tank Basin 2)	8,222.122	1,194,635	382,250		32,264		1,609,148
2.02c Walls - Tank Walls, Baffles, Channels, etc. (Storage Tank Basin 3)								
03345	Tank End Wall South	5,416.427	795,141	319,894		25,984		1,141,019
03345	Effluent Channel Flush Concrete Walls West, East, South	2,225.934	326,771	131,464		10,678		468,913
03345	Effluent Channel Flushing Wall	141.071	20,600	6,621		663		27,883

Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
03345 Tank 3 Dividing Wall	235.003	34,243	5,885		864		40,993
03345 Tank 3 Flushing Wall	317.419	46,352	14,898		1,491		62,740
03345 Tank 3 Concrete Walls North, West, and East Walls	6,018.812	871,686	225,987		21,989		1,119,663
05999 Tank 3 Weir with Baffle			37,978				37,978
2.02c Walls - Tank Walls, Baffles, Channels, etc. (Storage Tank Basin 3)	**14,354.666**	**2,094,794**	**742,727**		**61,668**		**2,899,189**
2.03 Tank Top (Screening)							
03350 Elevated Slabs	2,297.229	316,989	129,331		9,709		456,029
2.03 Tank Top (Screening)	**2,297.229**	**316,989**	**129,331**		**9,709**		**456,029**
2.03a Tank Top (Storage Tank Basin 1)							
03352 Tank 1 Elevated Slab	2,897.144	401,781	183,514		14,071		599,366
03352 Effluent Channel tank 1 Section Elevated Slab	334.873	46,511	20,504		1,989		69,004
2.03a Tank Top (Storage Tank Basin 1)	**3,232.017**	**448,291**	**204,019**		**16,059**		**668,369**
2.03b Tank Top (Storage Tank Basin 2)							
03352 Effluent Channel tank 2 Section Elevated Slab	539.930	74,975	32,957		3,185		111,117
03352 Tank 2 Elevated Slab	2,897.144	401,781	183,514		14,071		599,366
2.03b Tank Top (Storage Tank Basin 2)	**3,437.074**	**476,756**	**216,471**		**17,256**		**710,482**
2.03c Tank Top (Storage Tank Basin 3)							
03352 Effluent Channel Flush Section Elevated Slab	148.756	20,584	8,702		801		30,087
03352 Effluent Channel tank 3 Section Elevated Slab	539.930	74,975	32,957		3,185		111,117
03352 Tank 3 Elevated Slab	2,897.144	401,781	183,514		14,071		599,366
2.03c Tank Top (Storage Tank Basin 3)	**3,585.830**	**497,340**	**225,173**		**18,057**		**740,569**
2.05 Building							
03320 Building Foundation	5,126.985	749,208	420,628		130,168		1,300,003
03330 Slabs Fuel Storage Tank	21.447	3,042	1,790		38		4,870
03355 Slab over Metal Decking Second Floor	2,800.960	378,488	308,647		20,278		707,412
03355 Slab over Metal Decking Roof	2,105.549	282,521	196,265		11,742		490,529
03450 Architectural Precast Panels	4,422.087	693,554	2,637,366		119,321		3,450,241
04250 Interior Masonry First Floor	872.834	123,412	33,107		1,149		157,668
04250 Interior Masonry Second Floor	5,201.748	727,477	198,155		6,276		931,908
05120 Structural Steel - Conceptual First Floor 25 lb/sf	4,101.935	662,347	1,184,091		137,179		1,983,618
05120 Structural Steel - Conceptual Second Floor 15 lb/sf	2,461.161	397,408	710,455		82,308		1,190,171
05122 Elevated Aluminum Platform 8'H	2,024.936	298,811	156,074		16,213		471,098
05200 Steel Joists, Joist Girders and Trusses	28.651	4,231	6,766		894		11,891
05300 Metal Decking	92.599	11,218	11,374		1,046		23,637
05517 Metal Stairs	208.611	30,580	67,158		1,308		99,046
07220 Roof Insulation	346.773	45,035	101,966				147,002
07500 Roofing - Membrane	831.338	108,148	105,507		4,656		218,311
08100 Metal Doors First Floor	11.855	1,681	8,123				9,805
08100 Metal Doors Second Floor	38.084	5,401	22,154				27,556

Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
08115 Metal Door Frames First Floor	17.872	2,556	3,873		44		6,472
08115 Metal Door Frames Second Floor	45.678	6,531	9,494		106		16,130
08700 Finish Hardware - Opening Allowance First Floor	3.436	487	1,114				1,602
08700 Finish Hardware - Opening Allowance Second floor	10.353	1,468	2,637				4,106
08999 Over head Doors First Floor	81.039	12,031	11,391				23,423
08999 Access Hatches	774.297	97,094	298,468				395,562
09510 Acoustic Ceilings Second Floor	79.900	11,332	10,557				21,889
09900 Painting CMU Walls Second Floor	127.836	14,993	3,675				18,668
10800 Toilet Partitions & Bathroom Accessories	12.511	1,774	4,131				5,905
22405 Commercial Plumbing, Conceptual	54.800	9,847	11,040				20,887
2.05 Building	**31,905.275**	**4,680,676**	**6,526,006**		**532,726**		**11,739,408**
2.06 ISBL Piping and Mechanical (Including HVAC, Plumbing, Fire Protection)							
11999 Screening Equipment		25,570	25,570				51,139
11999 Effluent Channel Gates		3,874	3,874				7,748
11999 Tank 1 Gates		11,623	11,623				23,245
11999 Tank 2 Gates		11,623	11,623				23,245
11999 Tank 3 Gates		11,623	11,623				23,245
2.06 ISBL Piping and Mechanical (Including HVAC, Plumbing, Fire Protection)		**64,312**	**64,312**				**128,623**
02 Structure and UG Piping	**93,642.559**	**13,724,337**	**10,604,813**		**793,594**		**25,122,744**
03 Equipment							
3.01 Screens with dumpsters							
11999 Screening Equipment	1,581.958	249,221	4,168,634		63,121		4,480,975
3.01 Screens with dumpsters	**1,581.958**	**249,221**	**4,168,634**		**63,121**		**4,480,975**
3.02 Submersible pumps							
11999 Submersible Pumps	450.000	80,102	480,400		5,971		566,474
11999 2nd Abenue PS	100.000	17,801	100,729		1,327		119,857
11999 Tipping Bucket. Equipment	111.111	19,395	97,181		1,409		117,984
3.02 Submersible pumps	**661.111**	**117,298**	**678,310**		**8,707**		**804,314**
3.03 Generator							
01600 EMGEN Hoisting & Craneage Requirements	41.558	8,680			15,138		23,818
13999 Underground Fuel Storage Tank	11.396	9,717	38,872		3,291		51,880
26321 Emergency Generator Set 750kw & ATS	185.255	28,519	364,338		1,111		393,968
3.03 Generator	**238.209**	**46,916**	**403,210**		**19,540**		**469,666**
3.04 Odor Control							
11999 Odor Control	738.889	402,720	1,300,180		65,188		1,768,087
3.04 Odor Control	**738.889**	**402,720**	**1,300,180**		**65,188**		**1,768,087**
3.07 Sluice Gates							
11999 Effluent Channel Gates	111.111	18,890	61,548		6,751		87,189
11999 Tank 1 Gates	479.444	81,762	427,711		5,888		515,362

	Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
1	1999 Tank 2 Gates	444.444	75,812	458,705		5,463		539,980
1	1999 Tank 3 Gates	444.444	75,812	458,705		5,463		539,980
	3.07 Sluice Gates	**1,479.444**	**252,276**	**1,406,668**		**23,565**		**1,682,510**
3.08	**Bridge Cranes**							
1	1999 Bridge crane and hoists	631.585	95,294	405,023		10,253		510,570
	3.08 Bridge Cranes	**631.585**	**95,294**	**405,023**		**10,253**		**510,570**
3.09	**Grit Handling**							
0	3333 Equipment Pads Grit System	135.129	15,992	5,082		1,500		22,574
1	1999 Grit Handling Equipment	560.000	78,522	1,247,152		7,326		1,333,000
	3.09 Grit Handling	**695.129**	**94,514**	**1,252,234**		**8,825**		**1,355,573**
	03 Equipment	**6,026.326**	**1,258,238**	**9,614,260**		**199,199**		**11,071,697**
04	**Mechanical**							
4.01	**Process Piping**							
1	1999 Screening Equipment		3,874	3,874				7,748
1	1999 Tank 1 Gates		3,874	3,874				7,748
1	1999 Tank 2 Gates		3,874	3,874				7,748
1	1999 Tank 3 Gates		3,874	3,874				7,748
2	2999 Mechanical Piping	758.041	197,817	195,492		3,270		396,579
2	2999 Grit Piping	910.792	157,783	110,512		16,010		284,305
	4.01 Process Piping	**1,668.833**	**371,097**	**321,501**		**19,280**		**711,878**
4.03	**Fire Protection**							
2	2999 Mechanical Piping				256,266			256,266
	4.03 Fire Protection				**256,266**			**256,266**
4.04	**HVAC**							
2	2999 Mechanical Piping	2,298.889	307,967	33,473				341,440
2	3999 HVAC Equipment	274.691	44,719	217,730		4,229		266,678
	4.04 HVAC	**2,573.580**	**352,686**	**251,203**		**4,229**		**608,118**
	04 Mechanical	**4,242.413**	**723,783**	**572,704**	**256,266**	**23,509**		**1,576,262**
05	**Electrical - Instrumentation and Controls**							
5.01	**Primary and Secondary Gear**							
0	1600 Primary and Secondary Switch Gear Hoisting & Craneage Requirements	51.948	11,948			16,281		28,229
0	3330 UT-1 and UT-2 Transformer Pad 10'x15'x8"t w/turndown edges	60.597	8,267	6,041		468		14,776
2	6221 UT-1 and UT-2 Transformer (Primary Service)	185.185	29,927	192,721		2,075		224,723
2	6221 LV Transformers 480v to 120/208V 45kva	55.556	7,942	4,359				12,301
2	6241 MSB-1 Switchboard 1200 amps 480V 3p4w NEMA 1	204.906	29,293	92,881				122,173
2	6244 480V 3p3w Power Panelboards 225A 42 ckt	18.519	2,647	2,784				5,431
2	6244 120/208v Light Branch Panelboards 100A 42 ckts	65.359	9,344	4,130				13,473
	5.01 Primary and Secondary Gear	**642.069**	**99,367**	**302,916**		**18,825**		**421,108**
5.02	**Primary and Secondary Feeders (Conduit and Wire)**							

Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
26040 EMGEN - Conduit, Wire and Terminations (4) Sets (4) #350w/#2/0G 3" RGS	303.472	43,383	19,054				62,437
26040 UT-1 & UT-2 PB to MSB-1 C&W (2) Sets (4) 3"RGS w/ (4) 350mcm each	557.510	79,700	52,895				132,595
26040 MSB-1 to MCC-1 (3) #500mcm #3g 3" RGS	45.620	6,522	4,210				10,732
26040 MSB-1 to PP-1 and PP-2 Conduit, Wire and Terms 4#4/0 #4G - 2.5" RGS	105.185	15,037	9,258				24,295
26040 MSB-1 to T-1 and T-2 Conduit, Wire and Terms 3#6 #8g 1" RGS	35.482	5,072	1,837				6,910
26040 T-1 & T-2 to LP-1 and LP-2 Conduit, Wire and Terms 4#1/0 #6g 2" RGS	33.387	4,773	2,239				7,011
26041 Grounding System	594.656	85,010	72,456				157,466
26999 UT-1 and UT-2 to MSB-1 Terminations	167.172	23,898	30,874				54,772
32740 Primary Electrical Service - Asphaltic Paving, Curbs & Sidewalks	7.197	995	1,909		195		3,099
33500 UT-1 & UT-2 to MSB-1 Trench 1'6"x 4'd x 50'L Cncrt Encase	27.713	3,526	1,105	250	335		5,216
33500 Trench for Primary Electrical Service 2'w x 5'd x 100'l concrete enc.	87.003	10,139	2,152	8,478	322		21,091
33580 UT-1 and UT-2 to MSB-1 (4) runs (4) #350mcm in 4 RGS each (50' Dist)	371.957	53,969	58,593		478		113,040
33580 Primary Electrical, Feeders & Ductbanks (2) 5" empty	43.165	6,568	3,026		239		9,834
5.02 Primary and Secondary Feeders (Conduit and Wire)	**2,379.519**	**338,591**	**259,609**	**8,728**	**1,569**		**608,498**
5.03 Motor Branch Feeders and Controls							
26040 MSB-1 to HPS 1,2 Conduit and Wire 4#10's in 1" RGS	97.229	13,900	5,918				19,818
26040 HPS to 5hp motors Conduit &Terms (Vendor Supplied Cable) 3/4" RGS	47.895	6,847	3,246				10,093
26040 MSB-1 to HPS 3,4 Conduit and Wire 4#10's in 1" RGS	97.229	13,900	5,918				19,818
26040 HPS-3,4, to 5hp motors Conduit &Terms (Vendor Supp Cable) 3/4" RGS	47.895	6,847	3,246				10,093
26040 MSB-1 to Dewatering Pump 1&2 3#1 #6G 1.5" RGS	329.029	48,887	64,633		1,112		114,632
26040 Misc. Motors-Devices not listed (15) 30 AMP CKT ALLOWANCE	454.055	64,910	62,877				127,787
26040 MSB-1 to Purge Supply and Exhaust Fans 3#1w/#6g in 1.5"RGS	348.082	52,227	93,284		1,482		146,994
26040 MSB-1 to Odor Treatment Fan #1 & #2 - (1) 3#2/0 #6G 2" RGS	383.488	56,894	74,576		1,245		132,716
26040 MSB-1 to Dewatering Pump 3,4 (2) 3#1 #6G 1.5" RGS	327.158	48,619	64,521		1,112		114,252
26040 MCC-1 to IS#1 Conduit, Wire and Terms (4) #10 .75" RGS	59.499	8,506	5,794				14,300
26040 MCC-1 to IS#2 Conduit, Wire and Terms (4) #10 .75" RGS	56.451	8,070	5,610				13,680
26040 MCC-1 to IS#3 Conduit, Wire and Terms (4) #10 .75" RGS	53.403	7,634	5,426				13,060
26040 MCC-1 to Conveyor Conduit, Wire and Terms (4) #10 .75" RGS	40.197	5,746	4,627				10,373
26040 MCC-1 to Grit Cyclone #1 Conduit, Wire and Terms (4) #10 .75" RGS	40.197	5,746	4,627				10,373
26040 MCC-1 to Grit Cyclone #2 Conduit, Wire and Terms (4) #10 .75" RGS	40.197	5,746	4,627				10,373
26245 MCC-1 400A 480V 3p4w Motor Control Center	112.912	16,141	35,982				52,124
26999 Install (HPS) Control Panels HPS 1,2,3,4	44.444	6,354	310				6,664
5.03 Motor Branch Feeders and Controls	**2,579.358**	**376,974**	**445,223**		**4,951**		**827,149**
5.04 Light Branch & Controls							
26040 Grnd Flr Lighting Conduit & Wire (20' of 3/4" RGS w/ 3.5#12/lf)	672.560	96,147	33,725				129,871
26040 2nd Flr Lighting Conduit & Wire (20' of 3/4" RGS w/ 3.5#12/lf)	917.127	131,109	45,988				177,097
26040 Grnd Flr Power Branch Conduit, Wire and Terminations	213.996	30,592	10,731				41,323
26040 2nd Flr Power Branch Conduit, Wire and Terminations	343.923	49,166	17,246				66,412
26040 Building Exterior Lighting - Conduit, Wire and Terminations 4#12 .75"	225.945	32,300	12,328				44,628

	Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
	26040 Screening & By-Pass Lighting Conduit, Wire & Lights	110.697	15,825	14,301				30,126
	26040 Tank #1 Lighting Conduit, Wire & Lights	78.639	11,242	8,566				19,808
	26040 Tank #2 Lighting Conduit, Wire & Lights	98.048	14,017	9,746				23,763
	26040 Tank #3 Lighting Conduit, Wire & Lights	115.516	16,514	10,808				27,322
	26092 Ground Flr - Lighting Control Devices	10.256	1,466	1,395				2,861
	26092 2nd Flr Lighting Control Devices	25.641	3,666	3,487				7,153
	26272 Ground Floor Switches and Recetacles	81.012	11,581	12,125				23,706
	26272 Second Floor Switches and Receptacles	75.509	10,794	5,050				15,844
	26511 Light Fixtures Ground Floor (High Bay)	555.688	79,439	190,044				269,483
	26511 Light Fixtures Second Floor	546.655	78,148	186,035				264,183
	26521 Emergency Lighting Ground Floor	25.000	3,574	1,969				5,542
	26521 Emergency Lighting Second Floor	47.222	6,751	3,718				10,469
	26531 Exit Lights Ground Floor	12.500	1,787	1,046				2,833
	26531 Exit Lights Second Floor	11.111	1,588	930				2,518
	26582 Site Electrical, Lighting	99.074	14,681	19,459		311		34,451
	33507 Site Lighting (2) Pole Lights Trench for Utilities	2.141	402	33		105		540
	33580 Site Lighting UG Electric Conduit and Wire	46.498	7,111	3,193		279		10,583
	5.04 Light Branch & Controls	**4,314.760**	**617,900**	**591,922**		**695**		**1,210,517**
	5.05 Special Systems (Life Safety - Fire Alarm - PA - Tele/Data - Security)							
	27199 Ground Floor - Tele/Data - ALLOWANCE				64,078			64,078
	27199 2nd Floor - Tele/Data - ALLOWANCE				85,438			85,438
	28161 Ground Floor Fire/Life Safety System - ALLOWANCE				106,797			106,797
	28161 2nd Floor Fire/Life Safety System - ALLOWANCE				106,797			106,797
	28161 Ground Floor - Security System ALLOWANCE				106,797			106,797
	28161 2nd Floor - Security System ALLOWANCE				106,797			106,797
	5.05 Special Systems (Life Safety - Fire Alarm - PA - Tele/Data - Security)				**576,706**			**576,706**
	5.06 Instruments and Control Panels.							
	27201 Instrumentation				514,916			514,916
	5.06 Instruments and Control Panels.				**514,916**			**514,916**
	05 Electrical - Instrumentation and Controls	**9,915.707**	**1,432,833**	**1,599,671**	**1,100,351**	**26,040**		**4,158,894**
07 General Requirements								
	7.01 Temporary Requirements (Toilets, Utilities, Lighting, Water, etc.)							
	01999 SWPPP Extra Cost				71,486			71,486
	7.01 Temporary Requirements (Toilets, Utilities, Lighting, Water, etc.)				**71,486**			**71,486**
	7.02 Trailers and Storage (On and Off Site)							
	01500 E&I Construction Facilities & Temp Utilities	88.658	12,674	61,908	448,409			522,992
	01500 CSA Construction Facilities & Temp Utilities			62,862	67,497	24,161		154,521
	01590 CSA Contractor's Equipment					5,232,153		5,232,153
	01700 CSA Scaffolding	102.272	14,505					14,505

	Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
01999	Mechanical Construction Facilities & Temp Utilities			470,873		113,648		584,520
	7.02 Trailers and Storage (On and Off Site)	**190.931**	**27,179**	**595,643**	**515,906**	**5,369,962**		**6,508,691**
7.03	**Fencing and Security**							
01999	Mechanical Construction Facilities & Temp Utilities	48.473	6,875	2,045				8,920
01999	Full Time Registered Security Guards				2,502,023			2,502,023
01999	Mechanical Construction Facilities & Temp Utilities	48.473	6,875	2,045				8,920
	7.03 Fencing and Security	**96.945**	**13,750**	**4,091**	**2,502,023**			**2,519,863**
7.04	**Site Management - Super, General Foreman etc.**							
01300	E&I Field Personnel & Project Management	22,252.000	1,828,742					1,828,742
01300	CSA Field Personnel & Project Management	26,400.000	2,199,556					2,199,556
01590	E&I Contractor's Equipment					385,290		385,290
01700	E&I Scaffolding	52.164	11,985					11,985
01999	Mechanical Construction Facilities & Temp Utilities	14,614.026	1,548,804		39,892	43,229		1,631,925
01999	Dispute Resolution Board Cost (Contractor)				214,459			214,459
01999	Noise Control Monitoring				35,743			35,743
01999	Schedule Assembly & Maintenance Additional Cost				35,743			35,743
	7.04 Site Management - Super, General Foreman etc.	**63,318.190**	**5,589,086**		**325,837**	**428,519**		**6,343,443**
7.06	**Construction Permits and Fees**							
01999	Excavation Permit				1,778			1,778
01999	Manhole Permit				215			215
01999	Crane & Derrick Permit				2,808			2,808
01999	Dumpster Permit				2,242			2,242
01999	Hoisting & Rigging Permit				1,811			1,811
01999	Warranty Deposit Financing				50,902			50,902
	7.06 Construction Permits and Fees				**59,757**			**59,757**
	07 General Requirements	**63,606.066**	**5,630,015**	**599,734**	**3,475,010**	**5,798,481**		**15,503,240**
	CP-03 Structure and MEP	**178,325.353**	**22,908,001**	**23,204,147**	**4,831,627**	**6,869,365**		**57,813,139**
CP-04	**Site Improvements and OSBL Utilities**							
01	**Site Prep and Deep Foundation System**							
1.01	**Demo and Abatement**							
02221	Site Demolition Outfall/Influent Conduit	179.891	25,681	2,751		7,246		35,677
02221	Site Demolition 12" Dewatering FM	495.979	75,795	4,222		20,697		100,714
02999	Construction and Demolition Waste Site	126.776	15,438	124,108		20,292		159,838
33500	6" city water				17,850			17,850
33500	12" Dewatering FM				87,608			87,608
33507	2" Natural Gas				992			992
	1.01 Demo and Abatement	**802.647**	**116,913**	**131,081**	**106,450**	**48,235**		**402,679**
1.03	**Dewatering and water treatment**							
31240	Dewatering Outfall/Influent Conduit	562.333	104,061	390		5,739		110,190

Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
1.03 Dewatering and water treatment	562.333	104,061	390		5,739		110,190
01 Site Prep and Deep Foundation System	1,364.980	220,974	131,471	106,450	53,974		512,869
02 Structure and UG Piping							
2.07 OSBL - Influent Line / Conduit							
03330 Influent Channel Matt Slab	264.406	37,792	33,502		765		72,059
03345 Influent Channel Concrete Walls	2,062.356	301,526	72,429		8,279		382,233
03350 Influent Channel Elevated Slab	540.646	75,643	33,728		1,862		111,233
33500 Outfall/Influent Conduit Paving	334.499	44,990	22,888	71,806	2,552		142,236
2.07 OSBL - Influent Line / Conduit	3,201.906	459,950	162,547	71,806	13,458		707,761
2.08 OSBL - Out Flow Line / Conduit							
03330 Effluent Channel Matt Slab	760.476	109,409	94,923		3,558		207,890
03345 Effluent Channel Concrete Walls	4,339.538	634,460	152,402		17,420		804,283
03350 Effluent Channel Elevated Slabs	1,531.804	214,316	95,561		5,276		315,154
2.08 OSBL - Out Flow Line / Conduit	6,631.818	958,186	342,886		26,254		1,327,326
2.11 Relocation of Existing UG Utilities							
02999 Existing Utilities, 12" Dewatering FM		480,361	850,331		486,561		1,817,253
02999 Existing Utilities, Ouffall/Influent Conduit	60.000	131,195	205,233		121,837		458,265
33500 6" city water	944.471	117,078	26,235	3,302	8,863		155,478
33500 12" Dewatering FM	2,895.105	369,600	118,102	250	30,789		518,741
33500 Trench for 18" Gravity Dewatering Drain	407.077	59,987	144,071		12,109		216,167
33507 2" Natural Gas	40.665	7,499	2,968		320		10,786
33635 Manholes & Catch Basins 18" Gravity Dewatering Drain	109.168	16,620	14,573		2,274		33,466
2.11 Relocation of Existing UG Utilities	4,456.486	1,182,339	1,361,512	3,552	662,753		3,210,156
02 Structure and UG Piping	14,290.210	2,600,476	1,866,945	75,357	702,465		5,245,243
06 Site Improvements							
6.03 New Community Park Landscaping							
32945 Landscape Specialties/Site Furnishings Allowance				7,628,390			7,628,390
6.03 New Community Park Landscaping				7,628,390			7,628,390
06 Site Improvements				7,628,390			7,628,390
07 General Requirements							
7.01 Temporary Requirements (Toilets, Utilities, Lighting, Water, etc.)							
01999 SWPPP Extra Cost				71,486			71,486
7.01 Temporary Requirements (Toilets, Utilities, Lighting, Water, etc.)				71,486			71,486
7.02 Trailers and Storage (On and Off Site)							
01999 Mechanical Construction Facilities & Temp Utilities			1,330,527		192,750		1,523,277
7.02 Trailers and Storage (On and Off Site)			1,330,527		192,750		1,523,277
7.03 Fencing and Security							
01999 Full Time Registered Security Guards				2,502,023			2,502,023
7.03 Fencing and Security				2,502,023			2,502,023
7.04 Site Management - Super, General Foreman etc.							

	Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
01999	Close Out Documents Additional Cost				114,889			114,889
01999	Pre-Construction Conference Additional Deliverables				76,593			76,593
01999	Dispute Resolution Board Cost (Contractor)				214,459			214,459
01999	Noise Control Monitoring				35,743			35,743
01999	Schedule Assembly & Maintenance Additional Cost				35,743			35,743
01999	Mechanical Construction Facilities & Temp Utilities	21,390.649	1,878,094		39,892	28,819		1,946,805
7.04	**Site Management - Super, General Foreman etc.**	**21,390.649**	**1,878,094**		**517,319**	**28,819**		**2,424,232**
7.06	**Construction Permits and Fees**							
01999	Driveway Permit				1,811			1,811
01999	Fuel Oil Tank Permit				1,811			1,811
01999	Scaffolding Permit				1,811			1,811
01999	Sidewalk Permit				1,811			1,811
01999	Fire Protection Sprinkler System Permit				2,202			2,202
01999	Crane & Derrick Permit				2,808			2,808
01999	Dumpster Permit				2,242			2,242
01999	Hoisting & Rigging Permit				1,811			1,811
01999	Warranty Deposit Financing				50,902			50,902
7.06	**Construction Permits and Fees**				**67,210**			**67,210**
07	**General Requirements**	**21,390.649**	**1,878,094**	**1,330,527**	**3,158,038**	**221,569**		**6,588,228**
CP-04	**Site Improvements and OSBL Utilities**	**37,045.840**	**4,699,543**	**3,328,944**	**10,968,235**	**978,008**		**19,974,730**
OH-04	**Owls Head -04**	**291,852.890**	**39,548,290**	**33,769,954**	**105,270,288**	**14,071,697**	**117,938,399**	**310,598,628**

NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION
OWLS HEAD-05 GOWANUS CANAL CSO TANK SITING AND SUPERFUND SUPPORT
CLASS 3-4 ESTIMATE <10% DESIGN

Client	NYCDEP
Engineer	BROWN AND CALDWELL
Estimator	FB-DS-DG-BW-BM
Bid date	4/23/2015
Job cost job number	**145692-**
BC Project Manager	**Donald Cohen**
BC Office	**New York City**
Estimate Issue No.	**6**
QA/QC Reviewer	**BMatthews GDeReamer**
QA/QC Review Date	**4/22/2015**

Notes **PROCESS LOCATION/AREA INDEX**

Work Pkg	Description
CP-01	Planning, Engineering and Property Acquisitions
CP-02	Site prep and deep foundation systems
CP-03	Structure and MEP
CP-04	Site Improvements and OSBL Utilities

System	Description
01	Site Prep and Deep Foundation System
02	Structure and UG Piping
03	Equipment
04	Mechanical
05	Electrical - Instrumentation and Controls
06	Site Improvements
07	General Requirements
08	Engineerings - Pre-Design Investigations and Property Acquisitions

See Excel Workbook for Bid Items.

Estimate Breakdown	Labor Man Hr's	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Net Amount
OH-05 Owls Head -05							
CP-01 Planning, Engineering and Property Acquisition							
07 General Requirements						34,514	34,514
08 Engineering - Pre-Design Investigations and Property Acquisition						112,502,401	112,502,401
CP-01 Planning, Engineering and Property Acquisition						112,536,914	112,536,914
CP-02 Site prep and deep foundation systems							
01 Site Prep and Deep Foundation System	60,690	10,662,077	5,039,012	112,085,243	2,930,095		130,716,427
07 General Requirements	20,160	1,653,297	47,942	3,000,180	3,949,593		8,651,012
09 Sprung Structure	1,401	189,724	52,350	1,616,063	23,058		1,881,195
CP-02 Site prep and deep foundation systems	82,251	12,505,098	5,139,303	116,701,486	6,902,746		141,248,634
CP-03 Structure and MEP							
01 Site Prep and Deep Foundation System	1,936	303,574	461,303		62,848		827,725
02 Structure and UG Piping	98,065	14,463,448	10,975,683		813,149		26,252,280
03 Equipment	6,026	1,266,907	8,835,863		194,330	778,504	11,075,604
04 Mechanical	4,242	728,770	576,615	247,060	23,334		1,575,779
05 Electrical - Instrumentation and Controls	9,916	1,442,704	1,682,934	1,109,469	26,217		4,261,325
07 General Requirements	64,158	5,708,181	583,734	3,555,274	5,842,082		15,689,272
CP-03 Structure and MEP	184,343	23,913,585	23,116,132	4,911,803	6,961,962	778,504	59,681,985
CP-04 Site Improvements and OSBL Utilities							
01 Site Prep and Deep Foundation System	1,930	327,870	69,930	56,295	52,598		506,693
02 Structure and UG Piping	23,753	3,985,570	2,234,030	245,850	701,739		7,167,189
06 Site Improvements				8,041,774			8,041,774
07 General Requirements	22,647	2,035,590	1,355,075	3,246,728	201,931		6,839,324
CP-04 Site Improvements and OSBL Utilities	48,329	6,349,030	3,659,035	11,590,647	956,268		22,554,980
OH-05 Owls Head -05	314,923	42,767,713	31,914,470	133,203,936	14,820,976	113,315,419	336,022,513

NEW YORK CITY DEPARTMENT OF ENVIRONMENTAL PROTECTION
OWLS HEAD-05 GOWANUS CANAL CSO TANK SITING AND SUPERFUND SUPPORT
CLASS 3-4 ESTIMATE <10% DESIGN

Client	NYCDEP Customer Service Center 59-17 Junction Boulevard, 13th Flushing NY 11373
Engineer	BROWN AND CALDWELL
Estimator	FB-DS-DG-BW-BM
Bid date	4/23/2015
Job cost job number	**145692-**
Project	**C-Infrastructure**
BC Project Manager	**Donald Cohen**
BC Office	**New York City**
Estimate Issue No.	**6**
QA/QC Reviewer	**BMatthews GDeReamer**
QA/QC Review Date	**4/22/2015**

Notes **PROCESS LOCATION/AREA INDEX**

Work Pkg	Description
CP-01	Planning, Engineering and Property Acquisitions
CP-02	Site prep and deep foundation systems
CP-03	Structure and MEP
CP-04	Site Improvements and OSBL Utilities

System	Description
01	Site Prep and Deep Foundation System
02	Structure and UG Piping

Project Number: 145692-
Estimate Issue Number: 6
Estimate Issue Date: 4/23/2015
Estimator: FB-DS-DG-BW-BM

OWLS HEAD-05 GOWANUS CANAL CSO TANK SITING AND SUPERFUND SUPPORT

Notes

03 Equipment
04 Mechanical
05 Electrical - Instrumentation and Controls
06 Site Improvements
07 General Requirements
08 Engineerings - Pre-Design Investigations and Property Acquisitions

See Excel Workbook for Bid Items.

	Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
OH-05 Owls Head -05								
CP-01 Planning, Engineering and Property Acquisition								
07 General Requirements								
7.06 Construction Permits and Fees								
01999 HVAC Permit							1,731	1,731
01999 Pre-demolition Rat Permit							1,424	1,424
01999 Traffic Control Permit Additional Cost							31,359	31,359
7.06 Construction Permits and Fees							34,514	34,514
07 General Requirements							34,514	34,514
08 Engineering - Pre-Design Investigations and Property Acquisition								
8.01 Planning & Permitting								
01999 Conn Edison Electric Service Connection Fee							6,272	6,272
01999 Gas Service Connectiion Fee							6,272	6,272
01999 Planning, Permitting & Environmental Assessment							787,735	787,735
01999 Potable Water Service Connection Fee							4,390	4,390
01999 Dispute Resolution Board Cost (Owner)							277,646	277,646
01999 Property Acquisition							62,466,864	62,466,864
8.01 Planning & Permitting							63,549,179	63,549,179
8.04 Engineering and Consultants								
01999 CM Fee							14,659,446	14,659,446
01999 Engineering Design Fee							29,318,893	29,318,893
01999 Geotech Fee							1,047,103	1,047,103
01999 Demolition Engr Fees							725,812	725,812
01999 Ground Improvement Engr Fees							1,111,973	1,111,973
01999 Surveying (Additional Required)							62,718	62,718
01999 Utility Research							541,881	541,881
01999 Sustainability Program Administration							31,359	31,359
01999 Public Hearings							125,435	125,435
01999 Construction Materials Testing							1,328,601	1,328,601
8.04 Engineering and Consultants							48,953,222	48,953,222
08 Engineering - Pre-Design Investigations and Property Acquisition							112,502,401	112,502,401
CP-01 Planning, Engineering and Property Acquisition							112,536,914	112,536,914
CP-02 Site prep and deep foundation systems								
01 Site Prep and Deep Foundation System								
1.01 Demo and Abatement								
02220 Building Gross Demolition		14,389.029	2,043,151	9,835		486,604		2,539,591
02228 Electrical Demolition - Lock Out/ Tag Out Services and disconnect		675.926	95,111	13,351				108,462
02999 Construction and Demolition Waste Buildings		657.044	78,753	633,121		98,847		810,721
13999 Hazardous Material Remediation and Abatement					224,453			224,453

	Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
	1.01 Demo and Abatement	**15,721.999**	**2,217,015**	**656,307**	**224,453**	**585,452**		**3,683,227**
	1.02 Shoring of excavation							
03330	Tank Washing Slab	81.806	13,638	10,259		100		23,997
31250	Shoring Systems			349,367	1,678,130			2,027,497
31250	Shoring Systems - Influent Channnel				9,608,646			9,608,646
31250	Shoring Systems - Effluent Channel				2,841,994			2,841,994
31250	Shoring Systems C-B Trench				5,034,389			5,034,389
31250	Shoring Systems - Slurry Wall				4,818,262			4,818,262
31260	Jet Grouting				26,930,068			26,930,068
31260	Jet Grouting for Influent Channel				2,893,641			2,893,641
31260	Jet Grouting for Effluent Channel				772,894			772,894
31315	Excavation 0-10 ft				947,148			947,148
31315	Excavation 10-59 feet				3,878,841			3,878,841
31315	Excavation Tie Back Spoils				35,161			35,161
31315	Excavation 0-10 ft - Influent Channel				155,838			155,838
31315	Excavation 10-59 feet - Influent Channel				935,026			935,026
31315	Excavation 0-10 ft - Effluent Channel				41,624			41,624
31315	Excavation 10-59 feet - Effluent Channel				249,746			249,746
31455	Tie Back Row 1				1,691,663			1,691,663
31455	Tie Back Row 2				1,691,663			1,691,663
31455	Tie Back Row 3				3,383,326			3,383,326
31455	Tie Back Row 4				2,067,588			2,067,588
31999	Disposal of Excavated Soil				17,925,084			17,925,084
31999	Disposal of Excavated Soil - Tie Backs				133,946			133,946
31999	Disposal of Excavated Soil - Influent Channel				4,630,608			4,630,608
31999	Disposal of Excavated Soil - Effluent Channel				1,236,841			1,236,841
31999	Trucking of Excavated Soil	6,350.474	667,105			943,009		1,610,114
31999	Decontamination of Equipment	2,589.855	258,500			65,763		324,263
31999	Trucking of Excavated Soil	2,850.284	299,417			423,251		722,668
	1.02 Shoring of excavation	**11,872.419**	**1,238,661**	**359,627**	**93,582,128**	**1,432,123**		**96,612,538**
	1.03 Dewatering and water treatment							
31240	Dewatering Systems	25,762.490	5,997,157	768		471,072		6,468,996
46999	Dewatering Water Treatment			478,606				478,606
46999	Dewatering Treament Mobilization and Demobilization				548,224			548,224
	1.03 Dewatering and water treatment	**25,762.490**	**5,997,157**	**479,374**	**548,224**	**471,072**		**7,495,827**
	1.04 Ground Improvements (Soil Stabilization							
31250	New Bulkhead	7,333.333	1,209,244	3,543,704		441,449		5,194,398
31260	Soil Stabilization				11,530,042			11,530,042
	1.04 Ground Improvements (Soil Stabilization	**7,333.333**	**1,209,244**	**3,543,704**	**11,530,042**	**441,449**		**16,724,439**
	1.05 Deep Foundations							

	Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
31315	Excavation Tie Downs Spoils				27,190			27,190
31455	Tie Downs for Tanks				6,069,624			6,069,624
31999	Disposal of Excavated Soil - Tie Downs				103,581			103,581
	1.05 Deep Foundations				**6,200,395**			**6,200,395**
	01 Site Prep and Deep Foundation System	**60,690.241**	**10,662,077**	**5,039,012**	**112,085,243**	**2,930,095**		**130,716,427**
07	**General Requirements**							
	7.01 Temporary Requirements (Toilets, Utilities, Lighting, Water, etc.)							
01999	SWPPP Extra Cost				71,825			71,825
	7.01 Temporary Requirements (Toilets, Utilities, Lighting, Water, etc.)				**71,825**			**71,825**
	7.02 Trailers and Storage (On and Off Site)							
01500	CSA Construction Facilities & Temp Utilities			47,942	66,257	18,155		132,354
01590	CSA Contractor's Equipment					3,931,438		3,931,438
	7.02 Trailers and Storage (On and Off Site)			**47,942**	**66,257**	**3,949,593**		**4,063,792**
	7.03 Fencing and Security							
01999	Full Time Registered Security Guards				2,513,876			2,513,876
	7.03 Fencing and Security				**2,513,876**			**2,513,876**
	7.04 Site Management - Super, General Foreman etc.							
01300	CSA Field Personnel & Project Management	20,160.000	1,653,297					1,653,297
01999	Dispute Resolution Board Cost (Contractor)				215,475			215,475
01999	Noise Control Monitoring				35,913			35,913
01999	Schedule Assembly & Maintenance Additional Cost				35,913			35,913
	7.04 Site Management - Super, General Foreman etc.	**20,160.000**	**1,653,297**		**287,300**			**1,940,597**
	7.06 Construction Permits and Fees							
01999	Crane & Derrick Permit				2,634			2,634
01999	Dumpster Permit				2,102			2,102
01999	Hoisting & Rigging Permit				1,698			1,698
01999	Warranty Deposit Financing				52,821			52,821
01999	Excavation Permit				1,667			1,667
	7.06 Construction Permits and Fees				**60,923**			**60,923**
	07 General Requirements	**20,160.000**	**1,653,297**	**47,942**	**3,000,180**	**3,949,593**		**8,651,012**
09	**Sprung Structure**							
	8.06 Sprung Structure Over Site							
44999	Air Supported Structure	1,400.776	189,724	52,350	1,616,063	23,058		1,881,195
	8.06 Sprung Structure Over Site	**1,400.776**	**189,724**	**52,350**	**1,616,063**	**23,058**		**1,881,195**
	09 Sprung Structure	**1,400.776**	**189,724**	**52,350**	**1,616,063**	**23,058**		**1,881,195**
	CP-02 Site prep and deep foundation systems	**82,251.017**	**12,505,098**	**5,139,303**	**116,701,486**	**6,902,746**		**141,248,634**
CP-03	**Structure and MEP**							
01	**Site Prep and Deep Foundation System**							
	1.05 Deep Foundations							

	Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
31315	Backfill	1,935.799	303,574	461,303		62,848		827,725
	1.05 Deep Foundations	**1,935.799**	**303,574**	**461,303**		**62,848**		**827,725**
	01 Site Prep and Deep Foundation System	**1,935.799**	**303,574**	**461,303**		**62,848**		**827,725**
02 Structure and UG Piping								
2.01	**Mat Slab (Screening)**							
03330	Matt Slab	1,782.634	266,884	198,588		6,817		472,289
	2.01 Mat Slab (Screening)	**1,782.634**	**266,884**	**198,588**		**6,817**		**472,289**
2.01a	**Mat Slab (Storage Tank Basin 1)**							
03330	Tank 1 Mat Slab	3,276.260	498,578	382,632		11,987		893,198
03330	Effluent Channel Tank 1 Section Matt Slab	451.450	68,951	53,271		1,635		123,858
	2.01a Mat Slab (Storage Tank Basin 1)	**3,727.710**	**567,530**	**435,904**		**13,622**		**1,017,056**
2.01b	**Mat Slab (Storage Tank Basin 2)**							
03330	Tank 2 Mat Slab	3,276.260	498,578	382,632		11,987		893,198
03330	Effluent Channel Tank 2 Section Matt Slab	451.450	68,951	53,271		1,635		123,858
	2.01b Mat Slab (Storage Tank Basin 2)	**3,727.710**	**567,530**	**435,904**		**13,622**		**1,017,056**
2.01c	**Mat Slab (Storage Tank Basin 3)**							
03330	Efflunet Channel Flush Section Matt Slab	213.048	32,539	25,139		772		58,450
03330	Tank 3 Mat Slab	3,276.260	498,578	382,632		11,987		893,198
03330	Effluent Channel Tank 3 Section Matt Slab	451.450	68,951	53,271		1,635		123,858
	2.01c Mat Slab (Storage Tank Basin 3)	**3,940.758**	**600,069**	**461,043**		**14,394**		**1,075,506**
2.02	**Walls - Tank Walls, Baffles, Channels, etc. (Screening)**							
03345	Concrete Walls	5,646.733	829,967	238,272		23,435		1,091,675
	2.02 Walls - Tank Walls, Baffles, Channels, etc. (Screening)	**5,646.733**	**829,967**	**238,272**		**23,435**		**1,091,675**
2.02a	**Walls - Tank Walls, Baffles, Channels, etc. (Storage Tank Basin 1)**							
03345	Tank 1 Concrete Walls North, West, and East Walls	6,740.750	989,352	279,431		28,174		1,296,957
03345	Tank 1 Dividing Wall	235.003	34,479	5,926		870		41,275
03345	Tank 1 Flushing Wall	317.419	46,671	15,000		1,501		63,172
03345	Effluent Channel Tank 1 Concrete Wall West, North	2,283.549	336,892	125,279		10,663		472,834
	2.02a Walls - Tank Walls, Baffles, Channels, etc. (Storage Tank Basin 1)	**9,576.721**	**1,407,394**	**425,637**		**41,207**		**1,874,238**
2.02b	**Walls - Tank Walls, Baffles, Channels, etc. (Storage Tank Basin 2)**							
03345	Tank 2 Concrete Walls North, West, and East Walls	6,531.600	952,959	248,853		24,283		1,226,096
03345	Tank 2 Dividing Wall	235.003	34,479	5,926		870		41,275
03345	Tank 2 Flushing Wall	317.419	46,671	15,000		1,501		63,172
03345	Effluent Channel Tank 2 Concrete Wall West	1,774.709	262,325	105,536		8,572		376,433
05999	Tank 2 Weir with Baffle			38,240				38,240
	2.02b Walls - Tank Walls, Baffles, Channels, etc. (Storage Tank Basin 2)	**8,858.731**	**1,296,435**	**413,556**		**35,226**		**1,745,217**
2.02c	**Walls - Tank Walls, Baffles, Channels, etc. (Storage Tank Basin 3)**							
03345	Tank End Wall South	5,861.610	866,423	348,572		28,311		1,243,306
03345	Effluent Channel Flush Concrete Walls West, East, South	2,392.884	353,700	142,298		11,557		507,555

Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
03345 Effluent Channel Flushing Wall	141.071	20,742	6,666		667		28,076
03345 Tank 3 Dividing Wall	235.003	34,479	5,926		870		41,275
03345 Tank 3 Flushing Wall	317.419	46,671	15,000		1,501		63,172
03345 Tank 3 Concrete Walls North, West, and East Walls	6,531.600	952,959	248,853		24,283		1,226,096
05999 Tank 3 Weir with Baffle			38,240				38,240
2.02c Walls - Tank Walls, Baffles, Channels, etc. (Storage Tank Basin 3)	**15,479.587**	**2,274,975**	**805,555**		**67,189**		**3,147,719**
2.03 Tank Top (Screening)							
03350 Elevated Slabs	2,297.277	319,180	130,226		9,775		459,181
2.03 Tank Top (Screening)	**2,297.277**	**319,180**	**130,226**		**9,775**		**459,181**
2.03a Tank Top (Storage Tank Basin 1)							
03352 Tank 1 Elevated Slab	2,897.144	404,549	184,779		14,167		603,494
03352 Effluent Channel tank 1 Section Elevated Slab	334.873	46,831	20,646		2,002		69,479
2.03a Tank Top (Storage Tank Basin 1)	**3,232.017**	**451,380**	**205,424**		**16,169**		**672,973**
2.03b Tank Top (Storage Tank Basin 2)							
03352 Effluent Channel tank 2 Section Elevated Slab	539.930	75,492	33,184		3,206		111,882
03352 Tank 2 Elevated Slab	2,897.144	404,549	184,779		14,166		603,494
2.03b Tank Top (Storage Tank Basin 2)	**3,437.074**	**480,040**	**217,962**		**17,373**		**715,376**
2.03c Tank Top (Storage Tank Basin 3)							
03352 Effluent Channel Flush Section Elevated Slab	148.756	20,726	8,762		807		30,295
03352 Effluent Channel tank 3 Section Elevated Slab	539.930	75,491	33,184		3,207		111,882
03352 Tank 3 Elevated Slab	2,897.144	404,549	184,778		14,167		603,494
2.03c Tank Top (Storage Tank Basin 3)	**3,585.830**	**500,766**	**226,724**		**18,180**		**745,670**
2.05 Building							
03320 Building Foundation	5,006.881	738,113	421,958		131,053		1,291,124
03330 Slabs Fuel Storage Tank	21.447	3,063	1,801		39		4,903
03355 Slab over Metal Decking Second Floor	2,786.738	379,170	310,723		20,416		710,309
03355 Slab over Metal Decking Roof	2,105.549	284,468	197,618		11,822		493,907
03450 Architectural Precast Panels	4,422.087	698,332	2,655,537		120,133		3,474,002
04250 Interior Masonry First Floor	872.834	124,262	33,335		1,157		158,754
04250 Interior Masonry Second Floor	5,201.748	732,489	199,520		6,319		938,328
05120 Structural Steel - Conceptual First Floor 25 lb/sf	4,101.935	666,910	1,192,249		138,113		1,997,272
05120 Structural Steel - Conceptual Second Floor 15 lb/sf	2,461.161	400,146	715,350		82,868		1,198,363
05122 Elevated Aluminum Platform 8'H	2,024.936	300,870	157,149		16,323		474,342
05200 Steel Joists, Joist Girders and Trusses	28.651	4,260	6,810		900		11,971
05300 Metal Decking	85.288	10,168	9,915		843		20,926
05517 Metal Stairs	208.611	30,791	67,621		1,317		99,728
07220 Roof Insulation	433.862	56,734	128,454				185,187
07500 Roofing - Membrane	831.338	108,893	106,234		4,688		219,814
08100 Metal Doors First Floor	11.855	1,693	8,179				9,872

Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
08100 Metal Doors Second Floor	38.084	5,439	22,307				27,746
08115 Metal Door Frames First Floor	17.872	2,574	3,899		44		6,517
08115 Metal Door Frames Second Floor	45.678	6,576	9,559		107		16,241
08700 Finish Hardware - Opening Allowance First Floor	3.436	491	1,122				1,613
08700 Finish Hardware - Opening Allowance Second floor	10.353	1,479	2,656				4,134
08999 Over head Doors First Floor	81.039	12,114	11,470				23,584
08999 Access Hatches	774.297	97,763	300,524				398,288
09510 Acoustic Ceilings Second Floor	1,000.999	142,948	133,168				276,116
09900 Painting CMU Walls Second Floor	127.836	15,096	3,700				18,797
10800 Toilet Partitions & Bathroom Accessories	12.511	1,787	4,159				5,946
22405 Commercial Plumbing, Conceptual	54.800	9,915	11,116				21,031
2.05 Building	**32,771.827**	**4,836,542**	**6,716,133**		**536,140**		**12,088,816**
2.06 ISBL Piping and Mechanical (Including HVAC, Plumbing, Fire Protection)							
11999 Screening Equipment		25,746	25,746				51,492
11999 Effluent Channel Gates		3,901	3,901				7,802
11999 Tank 1 Gates		11,703	11,703				23,405
11999 Tank 2 Gates		11,703	11,703				23,405
11999 Tank 3 Gates		11,703	11,703				23,405
2.06 ISBL Piping and Mechanical (Including HVAC, Plumbing, Fire Protection)		**64,755**	**64,755**				**129,509**
02 Structure and UG Piping	**98,064.610**	**14,463,448**	**10,975,683**		**813,149**		**26,252,280**
03 Equipment							
3.01 Screens with dumpsters							
11999 Screening Equipment	1,581.958	250,938	3,351,642		61,910	778,504	4,442,994
3.01 Screens with dumpsters	**1,581.958**	**250,938**	**3,351,642**		**61,910**	**778,504**	**4,442,994**
3.02 Submersible pumps							
11999 Submersible Pumps	450.000	80,654	483,710		5,745		570,110
11999 2nd Abenue PS	100.000	17,923	101,423		1,277		120,623
11999 Tipping Bucket. Equipment	111.111	19,529	97,821		1,419		118,768
3.02 Submersible pumps	**661.111**	**118,106**	**682,954**		**8,441**		**809,501**
3.03 Generator							
01600 EMGEN Hoisting & Craneage Requirements	41.558	8,740			15,241		23,981
13999 Underground Fuel Storage Tank	11.396	9,784	39,129		3,167		52,079
26321 Emergency Generator Set 750kw & ATS	185.255	28,716	368,356		1,118		398,190
3.03 Generator	**238.209**	**47,239**	**407,484**		**19,526**		**474,250**
3.04 Odor Control							
11999 Odor Control	738.889	405,494	1,309,138		62,724		1,777,356
3.04 Odor Control	**738.889**	**405,494**	**1,309,138**		**62,724**		**1,777,356**
3.07 Sluice Gates							
11999 Effluent Channel Gates	111.111	19,020	61,953		6,797		87,771

	Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
1	1999 Tank 1 Gates	479.444	82,326	430,658		5,666		518,649
1	1999 Tank 2 Gates	444.444	76,334	461,865		5,257		543,456
1	1999 Tank 3 Gates	444.444	76,334	461,865		5,257		543,456
	3.07 Sluice Gates	**1,479.444**	**254,014**	**1,416,341**		**22,976**		**1,693,332**
3.08	**Bridge Cranes**							
1	1999 Bridge crane and hoists	631.585	95,950	407,814		9,866		513,630
	3.08 Bridge Cranes	**631.585**	**95,950**	**407,814**		**9,866**		**513,630**
3.09	**Grit Handling**							
0	3333 Equipment Pads Grit System	135.129	16,102	5,116		1,510		22,728
1	1999 Grit Handling Equipment	560.000	79,063	1,255,373		7,378		1,341,814
	3.09 Grit Handling	**695.129**	**95,165**	**1,260,489**		**8,888**		**1,364,541**
	03 Equipment	**6,026.326**	**1,266,907**	**8,835,863**		**194,330**	**778,504**	**11,075,604**
04	**Mechanical**							
4.01	**Process Piping**							
1	1999 Screening Equipment		3,901	3,901				7,802
1	1999 Tank 1 Gates		3,901	3,901				7,802
1	1999 Tank 2 Gates		3,901	3,901				7,802
1	1999 Tank 3 Gates		3,901	3,901				7,802
2	2999 Mechanical Piping	758.041	199,180	196,838		3,146		399,164
2	2999 Grit Piping	910.792	158,870	111,241		16,119		286,230
	4.01 Process Piping	**1,668.833**	**373,654**	**323,682**		**19,265**		**716,601**
4.03	**Fire Protection**							
2	2999 Mechanical Piping				247,060			247,060
	4.03 Fire Protection				**247,060**			**247,060**
4.04	**HVAC**							
2	2999 Mechanical Piping	2,298.889	310,089	33,704				343,793
2	3999 HVAC Equipment	274.691	45,027	219,230		4,069		268,326
	4.04 HVAC	**2,573.580**	**355,116**	**252,934**		**4,069**		**612,119**
	04 Mechanical	**4,242.413**	**728,770**	**576,615**	**247,060**	**23,334**		**1,575,779**
05	**Electrical - Instrumentation and Controls**							
5.01	**Primary and Secondary Gear**							
0	1600 Primary and Secondary Switch Gear Hoisting & Craneage Requirements	51.948	12,030			16,392		28,422
0	3330 UT-1 and UT-2 Transformer Pad 10'x15'x8"t w/turndown edges	60.597	8,324	6,356		471		15,151
2	6221 UT-1 and UT-2 Transformer (Primary Service)	185.185	30,133	202,754		2,090		234,977
2	6221 LV Transformers 480v to 120/208V 45kva	55.556	7,997	4,586				12,583
2	6241 MSB-1 Switchboard 1200 amps 480V 3p4w NEMA 1	204.906	29,494	97,716				127,211
2	6244 480V 3p3w Power Panelboards 225A 42 ckt	18.519	2,666	2,929				5,594
2	6244 120/208v Light Branch Panelboards 100A 42 ckts	65.359	9,408	4,345				13,753
	5.01 Primary and Secondary Gear	**642.069**	**100,052**	**318,686**		**18,953**		**437,690**
5.02	**Primary and Secondary Feeders (Conduit and Wire)**							

Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
26040 EMGEN - Conduit, Wire and Terminations (4) Sets (4) #350w/#2/0G 3" RGS	303.472	43,682	20,046				63,728
26040 UT-1 & UT-2 PB to MSB-1 C&W (2) Sets (4) 3"RGS w/ (4) 350mcm each	557.510	80,249	55,649				135,898
26040 MSB-1 to MCC-1 (3) #500mcm #3g 3" RGS	45.620	6,567	4,429				10,996
26040 MSB-1 to PP-1 and PP-2 Conduit, Wire and Terms 4#4/0 #4G - 2.5" RGS	105.185	15,141	9,740				24,881
26040 MSB-1 to T-1 and T-2 Conduit, Wire and Terms 3#6 #8g 1" RGS	35.482	5,107	1,933				7,040
26040 T-1 & T-2 to LP-1 and LP-2 Conduit, Wire and Terms 4#1/0 #6g 2" RGS	33.387	4,806	2,355				7,161
26041 Grounding System	594.656	85,595	76,228				161,824
26999 UT-1 and UT-2 to MSB-1 Terminations	167.172	24,063	32,480				56,543
32740 Primary Electrical Service - Asphaltic Paving, Curbs & Sidewalks	7.197	1,002	2,008		196		3,207
33500 UT-1 & UT-2 to MSB-1 Trench 1'6"x 4'd x 50'L Cncrt Encase	27.713	3,550	1,162	241	338		5,291
33500 Trench for Primary Electrical Service 2'w x 5'd x 100'l concrete enc.	87.003	10,208	2,264	8,535	324		21,331
33580 UT-1 and UT-2 to MSB-1 (4) runs (4) #350mcm in 4 RGS each (50' Dist)	371.957	54,341	61,643		481		116,465
33580 Primary Electrical, Feeders & Ductbanks (2) 5" empty	43.165	6,614	3,184		241		10,038
5.02 Primary and Secondary Feeders (Conduit and Wire)	**2,379.519**	**340,924**	**273,123**	**8,776**	**1,579**		**624,402**
5.03 Motor Branch Feeders and Controls							
26040 MSB-1 to HPS 1,2 Conduit and Wire 4#10's in 1" RGS	97.229	13,995	6,227				20,222
26040 HPS to 5hp motors Conduit &Terms (Vendor Supplied Cable) 3/4" RGS	47.895	6,894	3,415				10,309
26040 MSB-1 to HPS 3,4 Conduit and Wire 4#10's in 1" RGS	97.229	13,995	6,227				20,222
26040 HPS-3,4, to 5hp motors Conduit &Terms (Vendor Supp Cable) 3/4" RGS	47.895	6,894	3,415				10,309
26040 MSB-1 to Dewatering Pump 1&2 3#1 #6G 1.5" RGS	329.029	49,224	67,998		1,119		118,341
26040 Misc. Motors-Devices not listed (15) 30 AMP CKT ALLOWANCE	454.055	65,357	66,150				131,507
26040 MSB-1 to Purge Supply and Exhaust Fans 3#1w/#6g in 1.5"RGS	348.082	52,587	98,141		1,493		152,220
26040 MSB-1 to Odor Treatment Fan #1 & #2 - (1) 3#2/0 #6G 2" RGS	383.488	57,286	78,459		1,254		136,998
26040 MSB-1 to Dewatering Pump 3,4 (2) 3#1 #6G 1.5" RGS	327.158	48,954	67,880		1,119		117,954
26040 MCC-1 to IS#1 Conduit, Wire and Terms (4) #10 .75" RGS	59.499	8,564	6,096				14,660
26040 MCC-1 to IS#2 Conduit, Wire and Terms (4) #10 .75" RGS	56.451	8,126	5,902				14,028
26040 MCC-1 to IS#3 Conduit, Wire and Terms (4) #10 .75" RGS	53.403	7,687	5,708				13,395
26040 MCC-1 to Conveyor Conduit, Wire and Terms (4) #10 .75" RGS	40.197	5,786	4,868				10,654
26040 MCC-1 to Grit Cyclone#1 Conduit, Wire and Terms (4) #10 .75" RGS	40.197	5,786	4,868				10,654
26040 MCC-1 to Grit Cyclone#2 Conduit, Wire and Terms (4) #10 .75" RGS	40.197	5,786	4,868				10,654
26245 MCC-1 400A 480V 3p4w Motor Control Center	112.912	16,253	37,855				54,108
26999 Install (HPS) Control Panels HPS 1,2,3,4	44.444	6,397	312				6,709
5.03 Motor Branch Feeders and Controls	**2,579.358**	**379,571**	**468,388**		**4,985**		**852,944**
5.04 Light Branch & Controls							
26040 Grnd Flr Lighting Conduit & Wire (20' of 3/4" RGS w/ 3.5#12/lf)	672.560	96,809	35,480				132,290
26040 2nd Flr Lighting Conduit & Wire (20' of 3/4" RGS w/ 3.5#12/lf)	917.127	132,012	48,382				180,395
26040 Grnd Flr Power Branch Conduit, Wire and Terminations	213.996	30,803	11,289				42,092
26040 2nd Flr Power Branch Conduit, Wire and Terminations	343.923	49,505	18,143				67,648
26040 Building Exterior Lighting - Conduit, Wire and Terminations 4#12 .75"	225.945	32,523	12,970				45,492

	Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
	26040 Screening & By-Pass Lighting Conduit, Wire & Lights	110.697	15,934	15,045				30,979
	26040 Tank #1 Lighting Conduit, Wire & Lights	78.639	11,319	9,012				20,332
	26040 Tank #2 Lighting Conduit, Wire & Lights	98.048	14,113	10,254				24,367
	26040 Tank #3 Lighting Conduit, Wire & Lights	115.516	16,628	11,371				27,998
	26092 Ground Flr - Lighting Control Devices	10.256	1,476	1,468				2,944
	26092 2nd Flr Lighting Control Devices	25.641	3,691	3,669				7,360
	26272 Ground Floor Switches and Recetacles	81.012	11,661	12,756				24,417
	26272 Second Floor Switches and Receptacles	75.509	10,869	5,313				16,181
	26511 Light Fixtures Ground Floor (High Bay)	555.688	79,986	199,938				279,925
	26511 Light Fixtures Second Floor	546.655	78,686	195,721				274,407
	26521 Emergency Lighting Ground Floor	25.000	3,599	2,071				5,670
	26521 Emergency Lighting Second Floor	47.222	6,797	3,912				10,709
	26531 Exit Lights Ground Floor	12.500	1,799	1,101				2,900
	26531 Exit Lights Second Floor	11.111	1,599	978				2,578
	26582 Site Electrical, Lighting	99.074	14,782	20,472		313		35,568
	33507 Site Lighting (2) Pole Lights Trench for Utilities	2.141	405	34		106		545
	33580 Site Lighting UG Electric Conduit and Wire	46.498	7,160	3,359		281		10,800
	5.04 Light Branch & Controls	**4,314.760**	**622,157**	**622,738**		**700**		**1,245,595**
	5.05 Special Systems (Life Safety - Fire Alarm - PA - Tele/Data - Security)							
	27199 Ground Floor - Tele/Data - ALLOWANCE				64,611			64,611
	27199 2nd Floor - Tele/Data - ALLOWANCE				86,148			86,148
	28161 Ground Floor Fire/Life Safety System - ALLOWANCE				107,685			107,685
	28161 2nd Floor Fire/Life Safety System - ALLOWANCE				107,685			107,685
	28161 Ground Floor - Security System ALLOWANCE				107,685			107,685
	28161 2nd Floor - Security System ALLOWANCE				107,685			107,685
	5.05 Special Systems (Life Safety - Fire Alarm - PA - Tele/Data - Security)				**581,498**			**581,498**
	5.06 Instruments and Control Panels.							
	27201 Instrumentation				519,195			519,195
	5.06 Instruments and Control Panels.				**519,195**			**519,195**
	05 Electrical - Instrumentation and Controls	**9,915.707**	**1,442,704**	**1,682,934**	**1,109,469**	**26,217**		**4,261,325**
07	**General Requirements**							
	7.01 Temporary Requirements (Toilets, Utilities, Lighting, Water, etc.)							
	01999 SWPPP Extra Cost				73,841			73,841
	7.01 Temporary Requirements (Toilets, Utilities, Lighting, Water, etc.)				**73,841**			**73,841**
	7.02 Trailers and Storage (On and Off Site)							
	01500 E&I Construction Facilities & Temp Utilities	88.658	12,762	64,203	432,300			509,265
	01500 CSA Construction Facilities & Temp Utilities			61,964	68,033	24,326		154,323
	01590 CSA Contractor's Equipment					5,267,742		5,267,742
	01700 CSA Scaffolding	102.272	14,605					14,605

	Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
01999	Mechanical Construction Facilities & Temp Utilities			453,626		109,353		562,979
	7.02 Trailers and Storage (On and Off Site)	**190.931**	**27,367**	**579,793**	**500,334**	**5,401,420**		**6,508,913**
7.03	**Fencing and Security**							
01999	Mechanical Construction Facilities & Temp Utilities	48.473	6,922	1,970				8,893
01999	Full Time Registered Security Guards				2,584,436			2,584,436
01999	Mechanical Construction Facilities & Temp Utilities	48.473	6,922	1,970				8,893
	7.03 Fencing and Security	**96.945**	**13,844**	**3,941**	**2,584,436**			**2,602,221**
7.04	**Site Management - Super, General Foreman etc.**							
01300	E&I Field Personnel & Project Management	22,804.000	1,885,337					1,885,337
01300	CSA Field Personnel & Project Management	26,400.000	2,214,710					2,214,710
01590	E&I Contractor's Equipment					399,067		399,067
01700	E&I Scaffolding	52.164	7,449					7,449
01999	Mechanical Construction Facilities & Temp Utilities	14,614.026	1,559,474		38,459	41,595		1,639,529
01999	Dispute Resolution Board Cost (Contractor)				221,523			221,523
01999	Noise Control Monitoring				36,921			36,921
01999	Schedule Assembly & Maintenance Additional Cost				36,921			36,921
	7.04 Site Management - Super, General Foreman etc.	**63,870.190**	**5,666,970**		**333,823**	**440,663**		**6,441,456**
7.06	**Construction Permits and Fees**							
01999	Excavation Permit				1,714			1,714
01999	Manhole Permit				208			208
01999	Crane & Derrick Permit				2,708			2,708
01999	Dumpster Permit				2,161			2,161
01999	Hoisting & Rigging Permit				1,746			1,746
01999	Warranty Deposit Financing				54,304			54,304
	7.06 Construction Permits and Fees				**62,840**			**62,840**
	07 General Requirements	**64,158.066**	**5,708,181**	**583,734**	**3,555,274**	**5,842,082**		**15,689,272**
	CP-03 Structure and MEP	**184,342.920**	**23,913,585**	**23,116,132**	**4,911,803**	**6,961,962**	**778,504**	**59,681,985**
CP-04	**Site Improvements and OSBL Utilities**							
01	**Site Prep and Deep Foundation System**							
1.01	**Demo and Abatement**							
02221	Site Demolition Outfall/Influent Conduit	628.857	95,740	9,334		24,291		129,364
02221	Site Demolition 12" Dewatering FM	178.581	26,750	1,302		8,721		36,772
02999	Construction and Demolition Waste Site	59.756	7,327	58,902		9,203		75,431
33500	6" city water				17,999			17,999
33500	12" Dewatering FM				37,297			37,297
33507	2" Natural Gas				1,000			1,000
	1.01 Demo and Abatement	**867.194**	**129,816**	**69,537**	**56,295**	**42,215**		**297,863**
1.03	**Dewatering and water treatment**							
31240	Dewatering Outfall/Influent Conduit	1,062.333	198,054	393		10,384		208,830

Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
1.03 Dewatering and water treatment	1,062.333	198,054	393		10,384		208,830
01 Site Prep and Deep Foundation System	1,929.527	327,870	69,930	56,295	52,598		506,693
02 Structure and UG Piping							
2.07 OSBL - Influent Line / Conduit							
03330 Influent Channel Matt Slab	361.363	52,006	46,102		1,052		99,160
03345 Influent Channel Concrete Walls	2,818.546	414,923	99,664		11,391		525,979
03350 Influent Channel Elevated Slab	729.439	102,584	45,777		2,529		150,890
33500 Outfall/Influent Conduit Paving	2,310.350	312,883	159,175	242,291	16,961		731,309
2.07 OSBL - Influent Line / Conduit	6,219.698	882,396	350,718	242,291	31,934		1,507,339
2.08 OSBL - Out Flow Line / Conduit							
03330 Effluent Channel Matt Slab	1,373.341	198,943	172,601		6,468		378,012
03345 Effluent Channel Concrete Walls	10,552.380	1,553,436	373,134		42,647		1,969,217
03350 Effluent Channel Elevated Slabs	2,731.104	384,091	171,394		9,470		564,955
2.08 OSBL - Out Flow Line / Conduit	14,656.825	2,136,470	717,129		58,585		2,912,185
2.11 Relocation of Existing UG Utilities							
02999 Existing Utilities, Ouffall/Influent Conduit	160.000	322,259	479,696		298,166		1,100,121
02999 Existing Utilities, 12" Dewatering FM		290,577	513,562		281,266		1,085,405
33500 6" city water	944.471	117,884	26,416	3,318	8,528		156,146
33500 12" Dewatering FM	1,473.382	189,862	63,671	241	15,712		269,485
33500 Trench for 18" Gravity Dewatering Drain	203.579	30,205	72,516		6,096		108,816
33507 2" Natural Gas	40.665	7,550	2,988		308		10,846
33635 Manholes & Catch Basins 18" Gravity Dewatering Drain	54.584	8,367	7,334		1,145		16,846
2.11 Relocation of Existing UG Utilities	2,876.681	966,704	1,166,183	3,559	611,220		2,747,666
02 Structure and UG Piping	23,753.204	3,985,570	2,234,030	245,850	701,739		7,167,189
06 Site Improvements							
6.03 New Community Park Landscaping							
32945 Landscape Specialties/Site Furnishings Allowance				8,041,774			8,041,774
6.03 New Community Park Landscaping				8,041,774			8,041,774
06 Site Improvements				8,041,774			8,041,774
07 General Requirements							
7.01 Temporary Requirements (Toilets, Utilities, Lighting, Water, etc.)							
01999 SWPPP Extra Cost				73,841			73,841
7.01 Temporary Requirements (Toilets, Utilities, Lighting, Water, etc.)				73,841			73,841
7.02 Trailers and Storage (On and Off Site)							
01999 Mechanical Construction Facilities & Temp Utilities			1,355,075		195,769		1,550,844
7.02 Trailers and Storage (On and Off Site)			1,355,075		195,769		1,550,844
7.03 Fencing and Security							
01999 Full Time Registered Security Guards				2,584,436			2,584,436
7.03 Fencing and Security				2,584,436			2,584,436
7.04 Site Management - Super, General Foreman etc.							

	Estimate Breakdown	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Amount
01999	Close Out Documents Additional Cost				110,762			110,762
01999	Pre-Construction Conference Additional Deliverables				73,841			73,841
01999	Dispute Resolution Board Cost (Contractor)				221,523			221,523
01999	Noise Control Monitoring				36,921			36,921
01999	Schedule Assembly & Maintenance Additional Cost				36,921			36,921
01999	Mechanical Construction Facilities & Temp Utilities	22,646.753	2,035,590		38,459	6,162		2,080,211
7.04	**Site Management - Super, General Foreman etc.**	**22,646.753**	**2,035,590**		**518,426**	**6,162**		**2,560,177**
7.06	**Construction Permits and Fees**							
01999	Driveway Permit				1,746			1,746
01999	Fuel Oil Tank Permit				1,746			1,746
01999	Scaffolding Permit				1,746			1,746
01999	Sidewalk Permit				1,746			1,746
01999	Fire Protection Sprinkler System Permit				2,123			2,123
01999	Crane & Derrick Permit				2,708			2,708
01999	Dumpster Permit				2,161			2,161
01999	Hoisting & Rigging Permit				1,746			1,746
01999	Warranty Deposit Financing				54,304			54,304
7.06	**Construction Permits and Fees**				**70,026**			**70,026**
07	**General Requirements**	**22,646.753**	**2,035,590**	**1,355,075**	**3,246,728**	**201,931**		**6,839,324**
CP-04	**Site Improvements and OSBL Utilities**	**48,329.484**	**6,349,030**	**3,659,035**	**11,590,647**	**956,268**		**22,554,980**
OH-05	**Owls Head -05**	**314,923.421**	**42,767,713**	**31,914,470**	**133,203,936**	**14,820,976**	**113,315,419**	**336,022,513**

Appendix B: Flow Rate Analysis Technical Memorandum

Brown AND Caldwell

1359 Broadway, Suite 1140
New York, NY 10018

T: 646.367.0631

Technical Memorandum

Prepared for: New York City Department of Environmental Protection (DEP)

Project Title: Gowanus Canal CSO Tank Siting and Superfund Support

Project No.: 145692

Technical Memorandum

Subject: Gowanus Flow Rate Analysis

Date: June 29, 2015

To: Kevin Clarke, DEP Portfolio Manager

From: Don Cohen, BC Project Manager

Copy to: Thasha Ramkissoon, DEP Accountable Manager

Lindsay Degueldre, DEP Accountable Manager

Prepared by: _____
Geoffrey Grant, P.E., E-74911

Reviewed by: _____
Donald Cohen, CPG, Project Manager

Limitations:

This document was prepared solely for New York City Department of Environmental Protection (DEP) in accordance with professional standards at the time the services were performed and in accordance with the contract between DEP and Brown and Caldwell dated June 23, 2013. This document is governed by the specific scope of work authorized by DEP; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by DEP and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

1.1 Background

Initial sizing of the conveyance infrastructure for the Gowanus Combined Sewer Overflow (CSO) storage facilities was based on the maximum flow rate of 743.7 mgd (rounded up to 750 mgd) identified by Dvirka and Bartilucci Consulting Engineers (March 2009) during the design of the Gowanus Pump Station expansion for the RH-034 CSO and 250 mgd for the OH—007 CSO which represents the full pipe capacity of the overflow. Later model analyses showed that these flow rates roughly equate to the model predicted flows resulting from the 5-year 2-hour storm event (Table 1).

Table 1. Model Predicted Overflow Flow Rate for the 5-year / 2-hour Storm Event

CSO Structure	Flow (mgd)	Volume of Overflow (MG)
RH-034	780	16.6
OH-007	208	8.3

Initially, the facility was envisioned to be configured as “flow-through”, meaning flows that exceeded the storage capacity of the facility would pass through the storage structure and would be discharged to the canal through a new outfall. This arrangement is similar to other New York City Department of Environmental Protection (DEP) CSO storage basins and provides a base level of screening and limited clarification of all CSO events. Selection of these flow rates for the initial design condition provided for influent and effluent conduits and a screening system that were conservatively sized to match the existing capacity of the overflows and would not restrict flow; resulting in an upstream surcharge, flooding, or overflow. The selection of these flow rates was also influenced by the anticipated requirement that all flows discharging to the canal be disinfected. Due to the uncertainty regarding the targeted level of control for the disinfection system, it was not clear if all flows that passed through the outfall would need to be disinfected, or if a lower flow rate could be used as the design condition. Given the uncertainty regarding the anticipated disinfection requirements, the decision was made to proceed with the 750 mgd and 250 mgd design conditions as this would also provide for a facility that was conservatively sized for disinfection.

1.2 Recent Developments

Several items have emerged during development of the conceptual design that allowed for the re-evaluation of the peak flow design basis for sizing the conveyance infrastructure. These included:

- Water quality data collected during the summer of 2014 indicated that the canal is in full attainment of water quality standards, primarily attributed to the flushing tunnel. This development reduced the likelihood that NYCDEP would need to disinfect flows to the canal.
- Evaluation of “bypass” storage facilities, whereby flows that exceed the storage volume of the basins would bypass storage and continue out the existing outfall structures. The evaluation of this alternative was driven by the cost and complexities of constructing effluent conduits to the canal from upland sites. The fact that disinfection of flows may no longer be required also supported evaluation of this storage arrangement.
- Realization that if disinfection was required, the design basis would likely be a flow rate considerably less than the initial peak flow conditions used at the onset of the conceptual design. Chemical storage and feed systems for a disinfection design flow rate less than 750 mgd and 250 mgd would be less costly and complex to operate. This meant that even flow-through arrangements could be sized to handle a smaller flow rate, allowing some flows to continue to discharge through the existing RH-034 and OH-007 outfalls.

- Reduction in the required storage volume. Preliminary results suggest that the 4 MG and 8 MG storage basins would provide a level of control that exceeds the 58% to 74% Total Suspended Solids (TSS) load reduction required by the Record of Decision (ROD) and Administrative Order (AO). With the smaller sized storage basin, it may be feasible to size the conduits for a smaller peak flow rate.

Given these factors, Brown and Caldwell (BC) embarked on an assessment of the typical year to identify alternate flow rates for sizing the conveyance infrastructure.

1.3 Alternative Flow Rate Evaluation

Assessment of the tank performance against Clean Water Act obligations and the Superfund ROD/AO obligations has been made using the typical year. Under the current design, the 8 MG storage tank at RH-034 reduces typical year CSO activation frequency from 39 events to 7 and reduces typical year activation frequency at OH-007 from 41 events to 5. The expected reduction in typical year CSO volume is 73% at RH-034 and 84% at OH-007. Table 2 presents the results of typical year simulations (Calendar Year 2008) and identifies the top ten overflow events by peak flow in the typical year.

Table 2. Typical Year (2008) Model Results Summarizing Peak Flow for 10 Largest Typical Year Events at RH-034 and OH-007

TY Event Rank	RH-034		OH-007	
	Peak Flow (mgd)	Event Volume (MG)	Peak Flow (mgd)	Event Volume (MG)
1	306	13.6	146	6.2
2	172	11.6	67	7.4
3	167	18.5	56	4.5
4	132	5.7	43	3.6
5	122	8.8	43	4.0
6	120	10.5	43	1.9
7	111	2.8	32	1.5
8	110	4.6	32	4.7
9	88	12.6	31	1.1
10	87	17.4	30	6.4

TY Event Rank is based on peak flow rate.
24-hour IED used to separate events.
Total of 39 events and 137.5 MG for RH-034
Total of 41 events at 57.6 MG for OH-007

As illustrated in Figures 1 and 2, the largest overflow event in the typical year by volume at RH-034 and OH-007 does not equate the largest flow rate in the typical year. This is likely attributed to the magnitude and duration of the rainfall event. For RH-034, the largest overflow volume had the third highest flow rate. For OH-007, the largest overflow by volume had the second highest flow rate.

Based on review of the typical year simulations, it became evident that the peak flow design condition for the conveyance conduits could be reduced to match the largest flow rate in the typical year without impacting the anticipated level of CSO control and TSS reduction. This would reduce the size of the conveyance conduits, reduce cost, and improve constructability. Smaller design flow rates could be considered but during discussions with NYCDEP, concern was raised regarding the potential for an

undersized conveyance conduit to cause overflows to occur before the basin was full. As such, it was determined that a conservative approach of sizing the conduits to convey the largest peak flow in the typical year would provide for both a conservative design and a conservative cost estimate. BC has begun evaluation of the cost and constructability of influent and effluent conduits sized for 310 mgd for RH-034 and 150 mgd for OH-007.

1.4 Next Steps

The size and cost of the smaller conveyance conduits will be compared against the current design which is based on 750 mgd and 250 mgd for RH-034 and OH-007, respectively. In parallel with this evaluation, BC will continue to work with DEP to better define the conditions for a "flow-through" versus "bypass" configuration for the selected sites. In addition, coordination will be required with the Long Term Control Plan (LTCP) team as they continue to examine the disinfection sizing criteria. It may not be necessary for the proposed disinfection strategy and conveyance design to use the same flow condition, but coordination between the two is important.

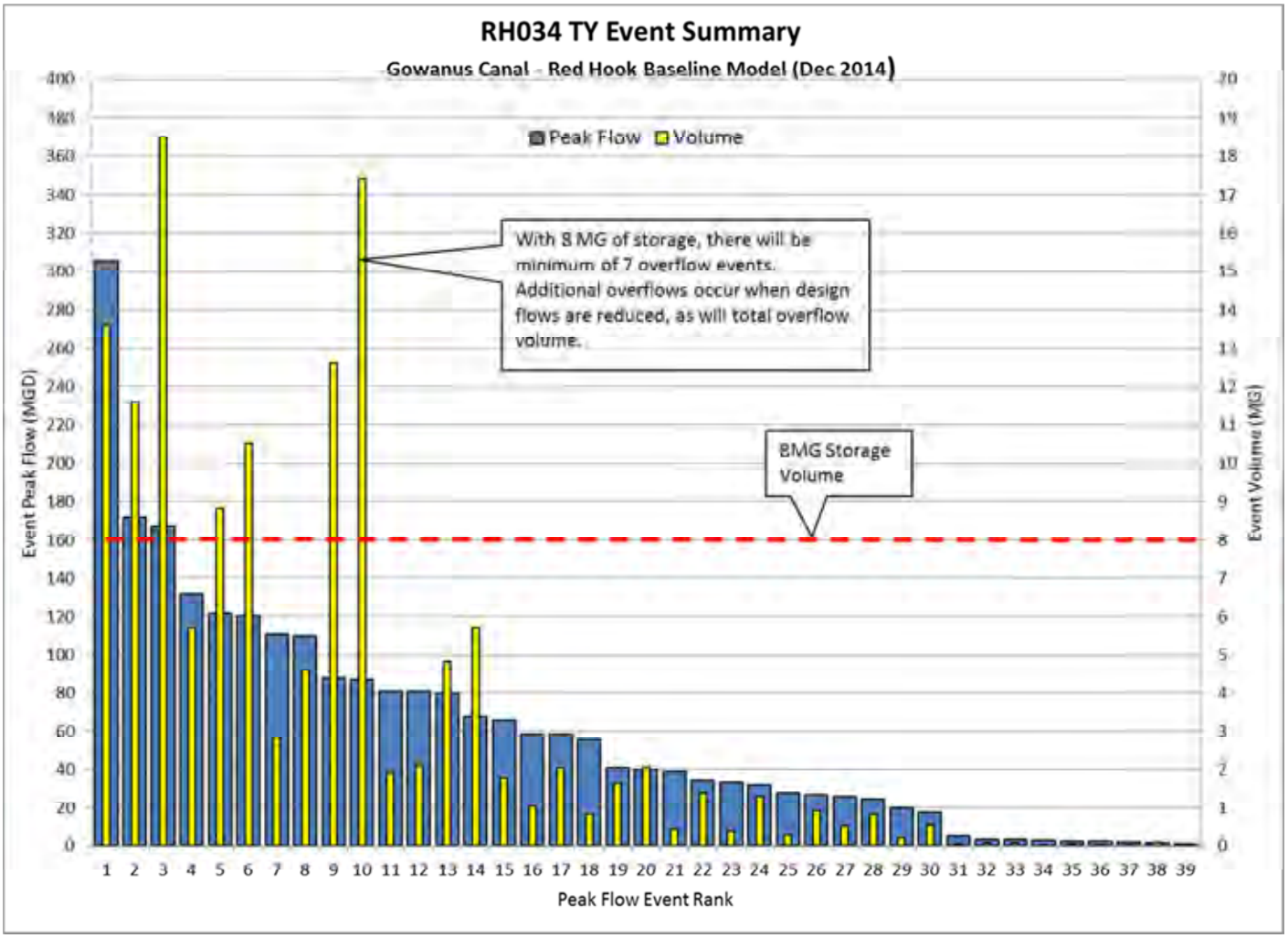


Figure 1. RH-034 overflow volume and peak flow rate summary

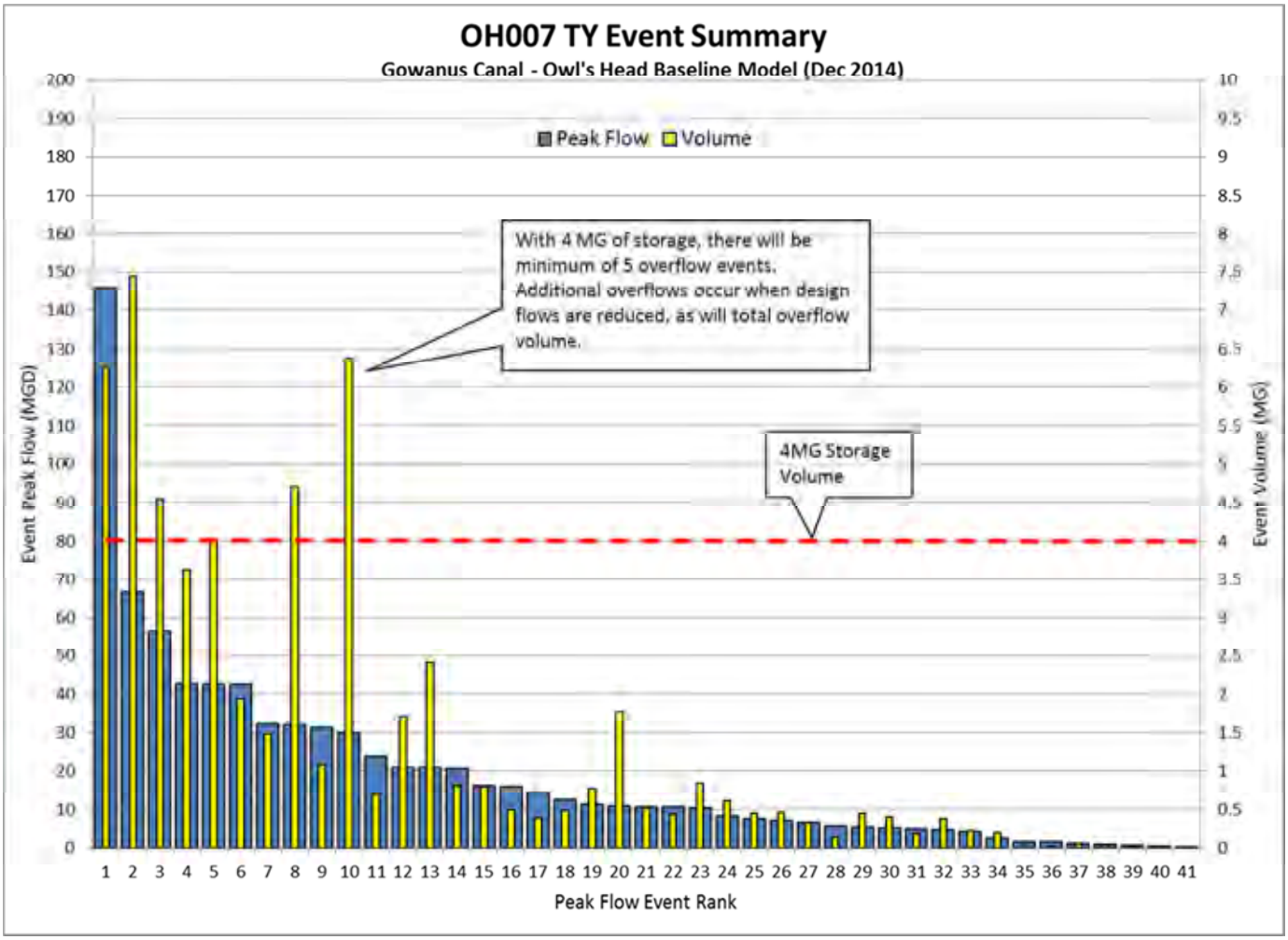


Figure 2. OH-007 overflow volume and peak flow rate summary

THE STATE EDUCATION DEPARTMENT / THE UNIVERSITY OF THE STATE OF NEW YORK / ALBANY, NY 12234

State Board for Engineering and Land Surveying, Education Building, 89 Washington Avenue, 2nd Flr. Mezzanine East-Wing
Tel. (518) 474-3817, Ext. 140 Fax: (518) 473-6282
E-mail: enginbd@mail.nysed.gov
E-mail: lsurvbd@mail.nysed.gov

June 3, 2015

Mr. Geoffrey Michael Grant
6021 Saint Regis Drive
Cincinnati, OH 45236-0000

Dear Mr. Grant:

This is to acknowledge receipt of your fee and Form 1, Application for Licensure and First Registration as a Professional Engineering, together with your notification of intent to practice in New York under subdivision (b) of Section 7208 of the Education Law. This letter authorizes you to engage in such practice, using your ***Ohio*** *license.*

Section 7208(b) exempts from New York State licensure requirements, "Practice as a professional engineer or land surveyor in this state by any person not a resident, or having no established place of practice in this state, or any person resident in this state but who has arrived in this state within six months, provided, however, such a person shall have filed an application for license as a professional engineer or land surveyor, and is legally qualified for such practice in the state or country in which he resides or has his place of practice or in which he had his previous residence or place of practice, such exemption continuing for only such reasonable time as the board requires to grant or deny the application for license, and a person intending to practice under this subdivision shall so state on the application."

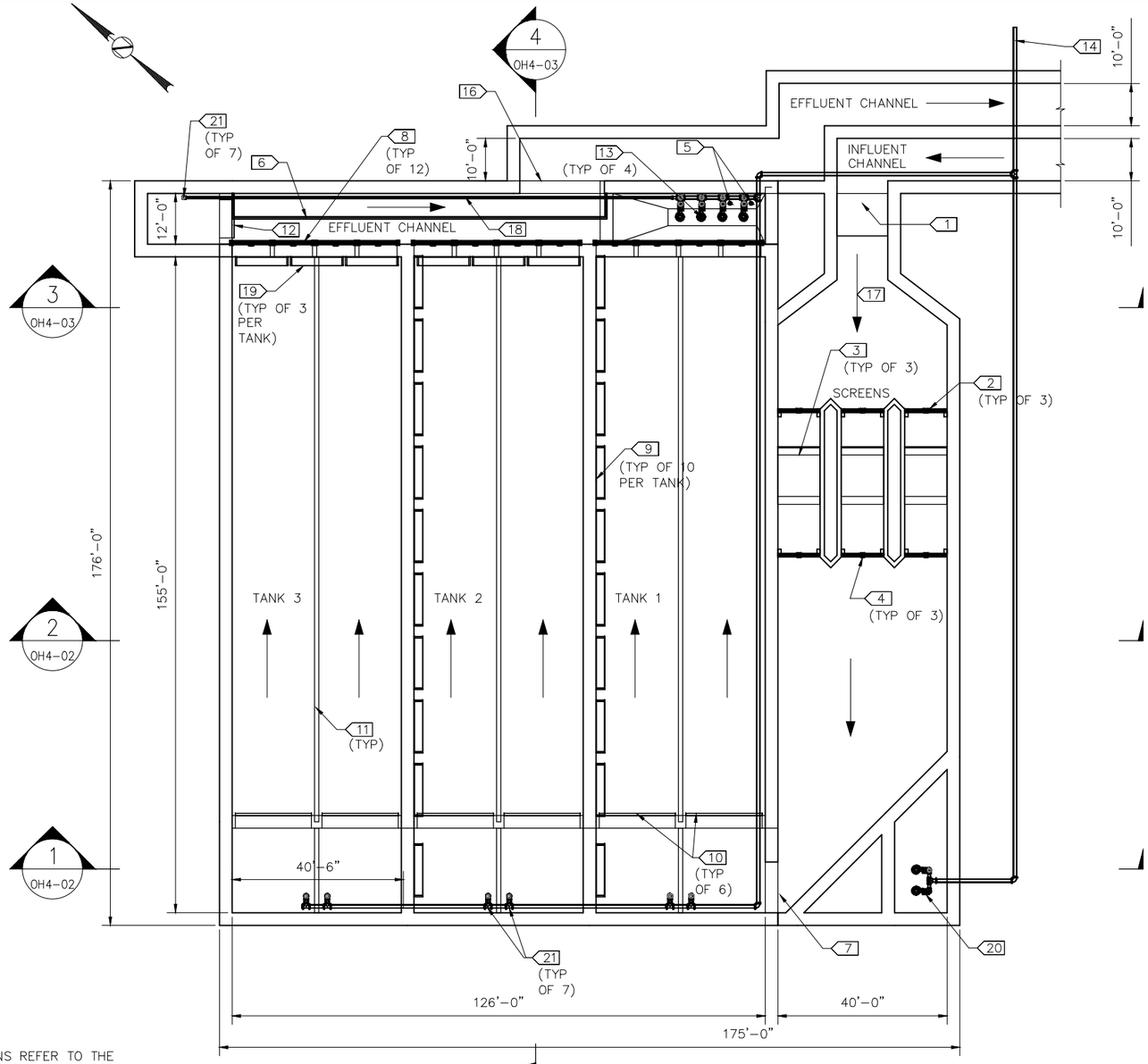
This exemption from licensure continues until whichever of the following occurs first: 1) the Department determines that an applicant fails to document satisfactorily any requirement for licensure (except for examination); 2) the applicant fails to receive a passing score on the first licensing examination for which he or she is eligible; or 3) the applicant receives a New York State license.

Further, Section 7208 states "...that no title, sign, card or device shall be used in such manner as to tend to convey the impression that the person rendering such service is a professional engineer or a land surveyor licensed in this state or is practicing engineering or land surveying."

Sincerely,

Executive Secretary
Jane W. Blair, PE

Appendix C: Conceptual Design



PLAN @ ELEV. −8.62 ft (−10.0 ft)

SCALE: 1/16" = 1'-0"

NOTE: ALL ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), WHICH IS 1.38 FEET BELOW THE BROOKLYN SEWER DATUM.

KEY NOTES:

1. ROCK TRAP
2. SCREEN INLET GATE
3. 1 1/4" MECHANICAL BAR SCREEN
4. SCREEN OUTLET GATE
5. 8" CONNECTIONS UP TO DEGRITTING SYSTEM
6. MECHANICALLY CLEANED CSO SCREEN
7. STORAGE INLET
8. STORAGE TANK OUTLET GATE
9. INTERTANK OVERFLOW WEIR WITH BAFFLE
10. TANK FLUSH GATE
11. FLUSH LANE DIVIDER CURB
12. EFFLUENT CHANNEL FLUSH GATE
13. DEWATERING PUMP
14. DEWATERING FORCEMAIN
15. NOT USED
16. STORAGE EFFLUENT OUTLET
17. FLOW DIRECTION AND FLOOR SLOPE (TYP.)
18. EFFLUENT CHANNEL FLUSH RESERVOIR FILL PIPE
19. BAFFLED STORAGE OVERFLOW WEIR FOR FLOW-THROUGH OPERATION, 3 PER TANK AT TANKS 2 AND 3.
20. 2nd AVENUE PUMP STATION
21. TANK FLUSHING SUPPLEMENTARY FILL PIPE WITH CONTROL VALVE(TYP OF 7)

Brown AND Caldwell

Gowanus Canal

NEW YORK, NEW YORK

DRAWING NUMBER: OH4-01

TITLE: **Plan OH007 - Site OH4 4 MG**

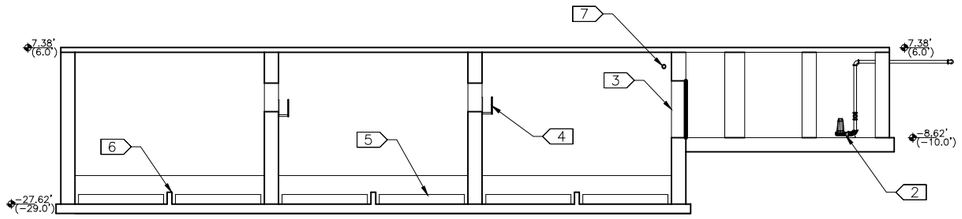
PREPARED FOR: NYC Environmental Protection

CLIENT: New York Department of Environmental Protection

PREPARED BY: Brown and Caldwell, 1359 Broadway, Suite 1140, New York City, NY 10018-7101, Tel: 646.367.0631

KEY NOTES

1. 1 1/4" MECHANICAL BAR SCREEN
2. 2nd AVENUE PUMP STATION AND PIPING
3. STORAGE INLET
4. INTERTANK OVERFLOW WEIR WITH BAFFLE
5. TANK FLUSH GATE
6. FLUSH LANE DIVIDER CURB
7. TANK FLUSHING SUPPLEMENTARY FILL PIPE



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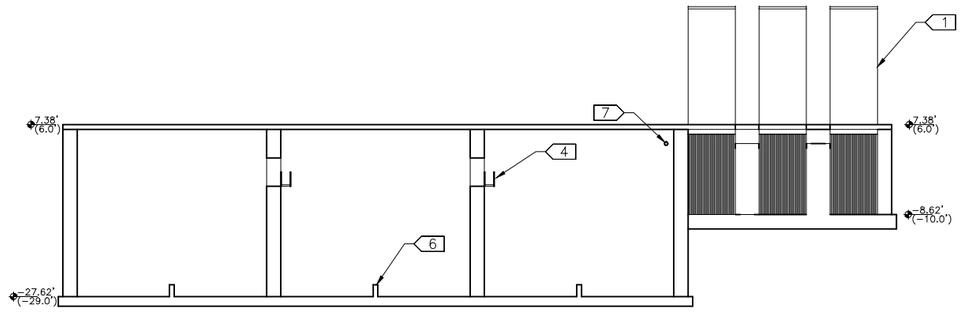

2 OH4-01 SECTION
SCALE: 1/16"=1'-0"

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Brown AND Caldwell

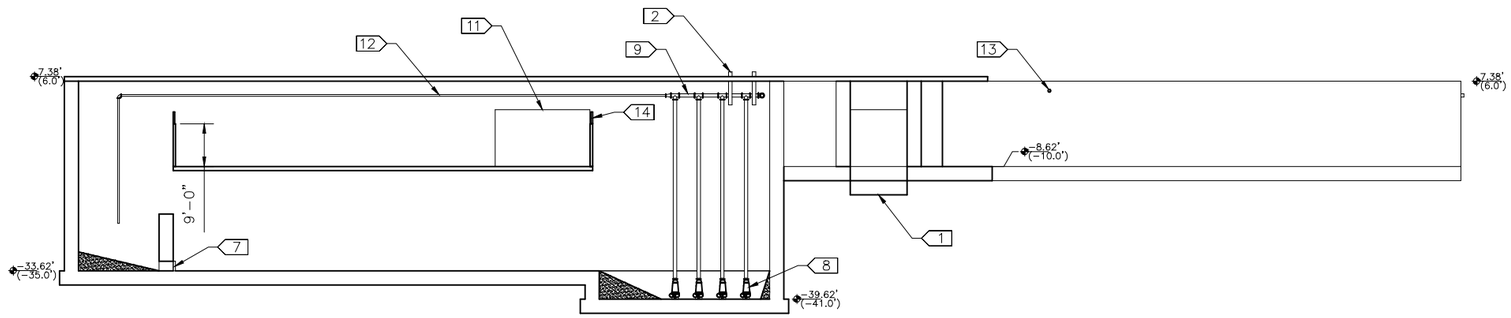
Gowanus Canal
NEW YORK, NEW YORK

DRAWING NUMBER
OH4-02

TITLE
Sections OH007 - Site OH4 4 MG

CLIENT New York Department of Environmental Protection | PREPARED BY Brown and Caldwell, 1359 Broadway, Suite 1140, New York City, NY 10018-7101, Tel: 646.367.0631

PREPARED FOR
NYC Environmental Protection



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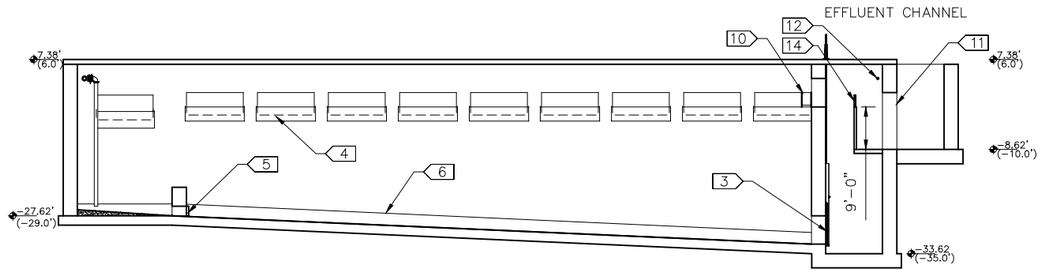
0H4-01 SCALE: 1/16"=1'-0"

KEY NOTES

1. ROCK TRAP
2. 8" CONNECTIONS UP TO DEGRITTING SYSTEM
3. STORAGE TANK OUTLET GATE
4. INTERTANK OVERFLOW WEIR WITH BAFFLE
5. TANK FLUSH GATE
6. FLUSH LANE DIVIDER CURB
7. EFFLUENT CHANNEL FLUSH GATE
8. DEWATERING PUMP
9. DEWATERING FORCEMAIN
10. EFFLUENT WEIR
11. STORAGE EFFLUENT OUTLET
12. TANK FLUSHING SUPPLEMENTARY FILL PIPE
13. 2nd AVENUE PUMP STATION DISCHARGE
14. MECHANICALLY CLEANED CSO SCREEN



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0H4-01 SCALE: 1/16"=1'-0"

NOTE: ALL ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), WHICH IS 1.38 FEET BELOW THE BROOKLYN SEWER DATUM.

Brown AND Caldwell

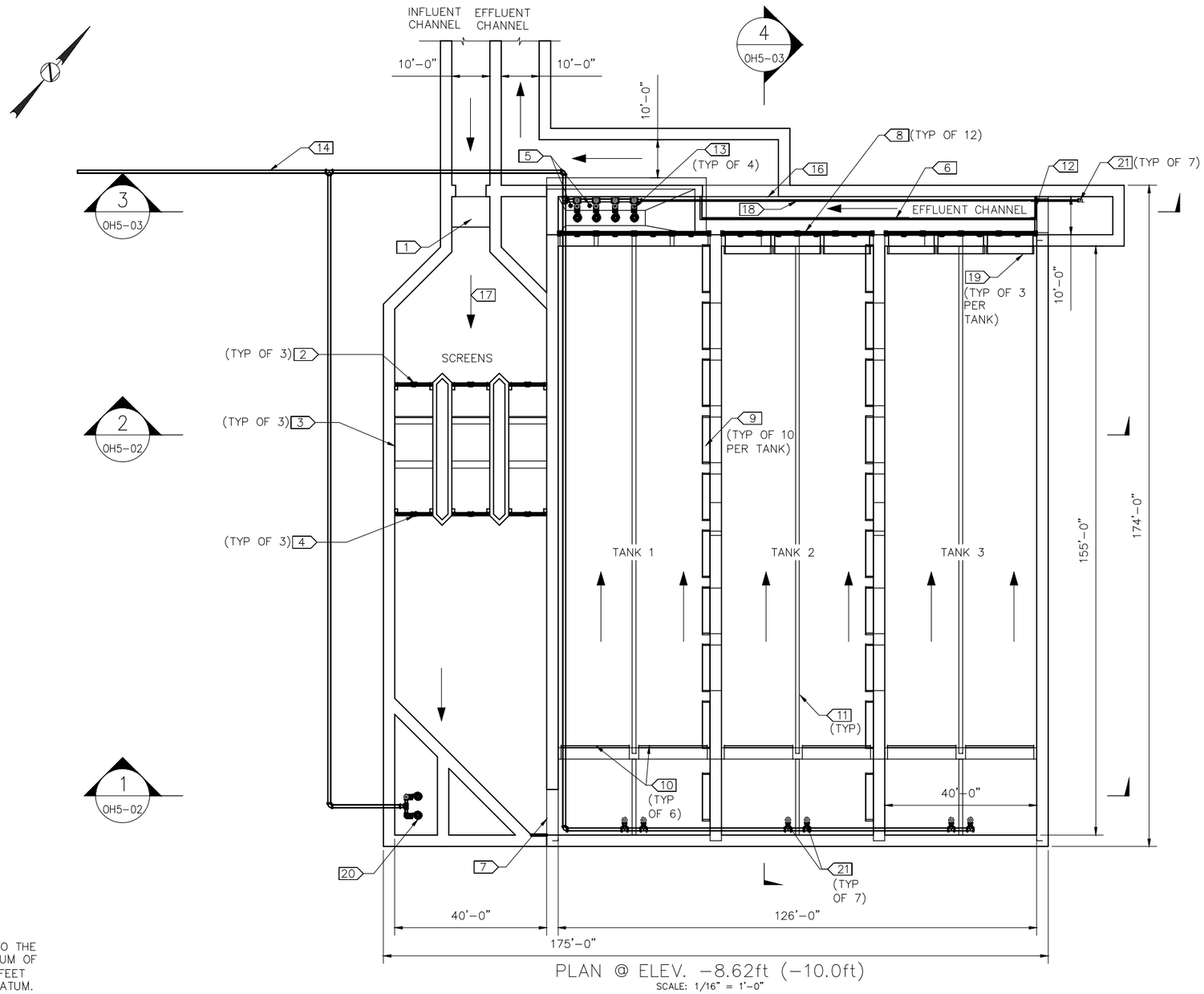
Gowanus Canal
NEW YORK, NEW YORK

DRAWING NUMBER
OH4-03

TITLE
Sections OH007 - Site OH4 4 MG

PREPARED FOR
NYC Environmental Protection

CLIENT New York Department of Environmental Protection | PREPARED BY Brown and Caldwell, 1359 Broadway, Suite 1140, New York City, NY 10018-7101, Tel: 646.367.0631



PLAN @ ELEV. −8.62ft (−10.0ft)

SCALE: 1/16" = 1'-0"

KEY NOTES:

1. ROCK TRAP
2. SCREEN INLET GATE
3. 1 1/4" MECHANICAL BAR SCREEN
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11. FLUSH LANE DIVIDER CURB
12. EFFLUENT CHANNEL FLUSH GATE
13. DEWATERING PUMP
14. DEWATERING FORCEMAIN
15. NOT USED
16. STORAGE EFFLUENT OUTLET
17. FLOW DIRECTION AND FLOOR SLOPE (TYP.)
18. EFFLUENT CHANNEL FLUSH RESERVOIR FILL PIPE
19. BAFFLED STORAGE OVERFLOW WEIR FOR FLOW-THROUGH OPERATION, 3 PER TANK AT TANKS 2 AND 3.
20. 2nd AVENUE PUMP STATION
21. TANK FLUSHING SUPPLEMENTARY FILL PIPE WITH CONTROL VALVE(TYP OF 7)

NOTE: ALL ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), WHICH IS 1.38 FEET BELOW THE BROOKLYN SEWER DATUM.

Brown AND Caldwell

Gowanus Canal

NEW YORK, NEW YORK

DRAWING NUMBER: OH5-01

TITLE: **Plan OH007 - Site OH5 4 MG**

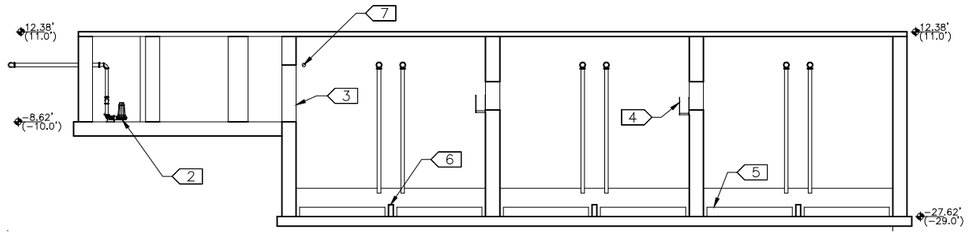
PREPARED FOR: NYC Environmental Protection

CLIENT: New York Department of Environmental Protection

PREPARED BY: Brown and Caldwell, 1359 Broadway, Suite 1140, New York City, NY 10018-7101, Tel: 646.367.0631

KEY NOTES:

1. 1 1/4" MECHANICAL BAR SCREEN
2. 2nd AVENUE PUMP STATION AND PIPING
3. STORAGE INLET
4. INTERTANK OVERFLOW WEIR WITH BAFFLE
5. TANK FLUSH GATE
6. FLUSH LANE DIVIDER CURB
7. TANK FLUSHING SUPPLEMENTARY FILL PIPE



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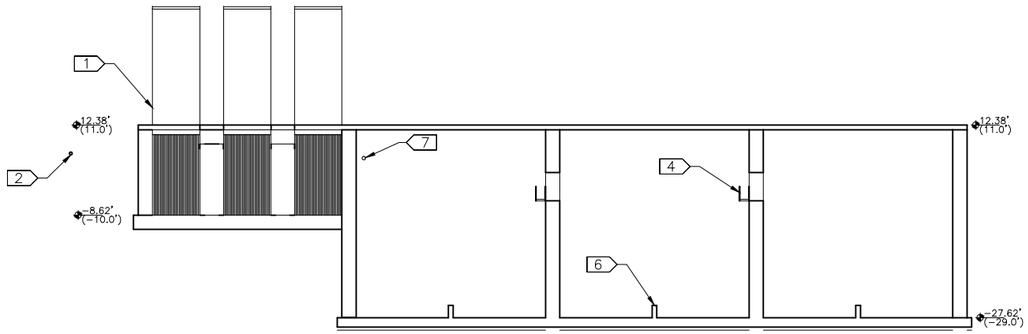

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NOTE: ALL ELEVATIONS REFER TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), WHICH IS 1.38 FEET BELOW THE BROOKLYN SEWER DATUM.

Brown AND Caldwell

Gowanus Canal
NEW YORK, NEW YORK

DRAWING NUMBER
OH5-02

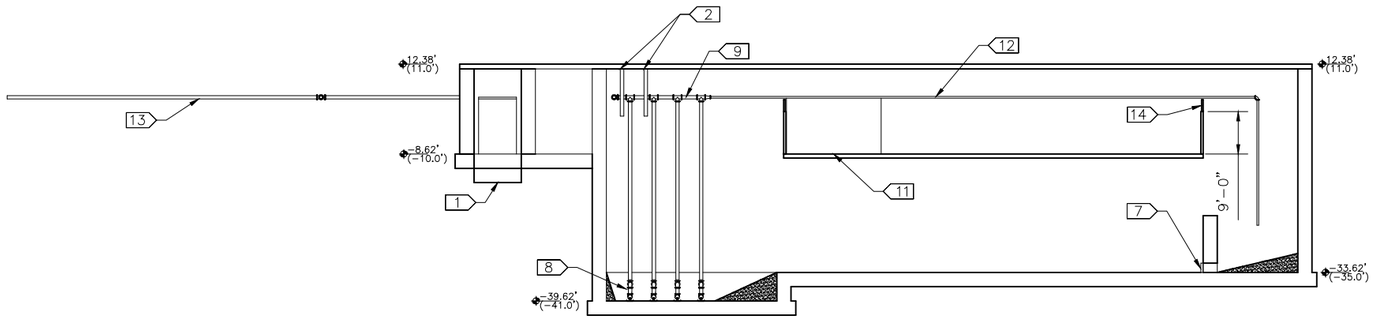
TITLE
Sections OH007 - Site OH5 4 MG

PREPARED FOR
NYC Environmental Protection

CLIENT New York Department of Environmental Protection | PREPARED BY Brown and Caldwell, 1359 Broadway, Suite 1140, New York City, NY 10018-7101, Tel: 646.367.0631

KEY NOTES:

1. ROCK TRAP
2. 8" CONNECTIONS UP TO DEGRITTING SYSTEM
3. STORAGE TANK OUTLET GATE
4. INTERTANK OVERFLOW WEIR WITH BAFFLE
5. TANK FLUSH GATE
6. FLUSH LANE DIVIDER CURB
7. EFFLUENT CHANNEL FLUSH GATE
8. DEWATERING PUMP
9. DEWATERING FORCEMAIN
10. EFFLUENT WEIR
11. STORAGE EFFLUENT OUTLET
12. TANK FLUSHING SUPPLEMENTARY FILL PIPE
13. 2nd AVENUE PUMP STATION AND PIPING
14. MECHANICALLY CLEANED CSO SCREEN



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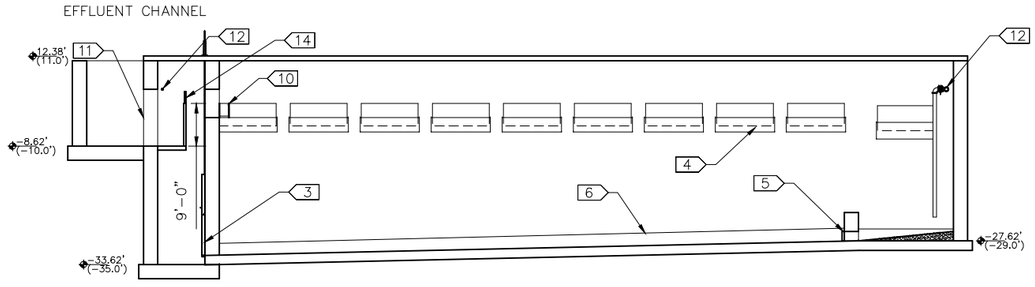

4 SECTION
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Brown AND Caldwell

Gowanus Canal
NEW YORK, NEW YORK

DRAWING NUMBER
0H5-03

TITLE
Sections OH007 - Site OH5 4 MG

CLIENT New York Department of Environmental Protection | PREPARED BY Brown and Caldwell, 1359 Broadway, Suite 1140, New York City, NY 10018-7101, Tel: 646.367.0631

PREPARED FOR
NYC Environmental Protection

Appendix D: AKRF Land Acquisition for Gowanus Canal CSO Tanks Memorandum

AKRF

Environmental and Planning Consultants

440 Park Avenue South
7th Floor
New York, NY 10016
tel: 212 696-0670
fax: 212 213-3191
www.akrf.com

Memorandum

To:	Don Cohen (Brown and Caldwell)
From:	John Neill, Jed Poster, Christian Michel (AKRF)
Original Date:	January 27, 2015
Updated:	June 12, 2015
Re:	Land Acquisition for Gowanus Canal CSO Tanks
cc:	Shabana Tajwar, Jennifer Franco, George Penesis (AKRF)

EXECUTIVE SUMMARY

This memorandum describes AKRF's analysis of potential acquisition costs for the three privately owned short-listed sites being considered as locations for the Gowanus Canal CSO tanks. This analysis was originally prepared in January 2015 and updated in June 2015 in order to identify and account for recent market activity. The results of the analysis are summarized in **Table 1**.

- The **Past Sales** scenario applies the average price per buildable square foot for transactions that have taken place since 2012 and involved an M2-1 parcel adjacent to the Gowanus Canal. AKRF believes that this price is based on outdated market trends and does not reflect current owners' expectations in the neighborhood.
- The **Recent Trend** scenario applies the average price seen in the four transactions involving M1-2 or M2-1 parcels within two blocks of the Canal that took place in 2014 prior to preparation of the January 2015 version of this memorandum.
- The **Future Outlook** scenario inflates the Recent Trend price by approximately 25%, based on conversations with real estate professionals who are active in the Gowanus neighborhood, as well as recent transactions identified as part of the June 2015 update of this memorandum. AKRF believes that this price represents the likely price in the mid-term future.

Table 1
Summary of Preliminary Results

Site	Pricing Scenarios (*price per buildable square foot)*		
	Past Sales	Recent Trend	Future Outlook
	$84	*$241*	*$300*
RH-3	$17,430,000	$50,007,500	$62,250,000
RH-5	$18,480,000	$53,020,000	$66,000,000
OH-4	$16,181,760	$46,426,240	$57,792,000
OH-5	$13,944,000	$40,006,000	$49,800,000
OH-7	$13,110,720	$37,615,280	$46,824,000

BACKGROUND

The New York City Department of Environmental Protection (DEP) has been ordered by the United States Environmental Protection Agency (EPA) to install two CSO tanks near the Gowanus Canal to accommodate combined sewer overflows. The tanks will require the acquisition of properties in the vicinity of the Canal. Three short-listed sites for each of the two proposed CSO tanks are currently under consideration. The purpose of this analysis is to provide guidance to DEP in terms of the total acquisition costs that could reasonably be expected when acquiring the sites.

Sites RH-3, RH-4, and RH-5 are located within a quarter mile of Outfall RH-034, which is at the northern end of the Canal. Sites OH-4, OH-5 and OH-7 are located within a quarter mile of Outfall OH-007, which is at the northern terminus of Second Avenue, just south of 3rd Street (see **Figure 1**).

- **Site RH-3** consists of two tax lots, both of which are privately owned and currently occupied by industrial or transportation and utility uses. Both tax lots include a mapped (but unbuilt) portion of Douglass Street; the presence of that street right-of-way, which totals approximately 6,750 lot square feet per tax lot, could reduce the cost of acquisition for Site RH-3 by up to approximately $8 million under the Future Outlook scenario.
- **Site RH-4** consists of one tax lot, which is currently in use as a public playground (Thomas Greene Playground); because that parcel is in public ownership, its cost of acquisition was assumed to be zero for the purposes of this analysis.
- **Site RH-5** consists of six tax lots, all of which are privately owned and are currently occupied by transportation and utility or parking facility uses.
- **Site OH-4A** consists of one tax lot, which is currently vacant; because that parcel is in public ownership, its cost of acquisition was also assumed to be zero.
- **Site OH-4B** consists of three tax lots, all of which are in private ownership and are currently occupied by industrial or transportation and utility uses.
- **Site OH-5** consists of two tax lots, both of which are in private ownership and are currently occupied by industrial uses.
- **Site OH-7** consists of one tax lot, which is currently occupied by industrial and manufacturing uses.

The data source for the tax block and lot, land use, zoning, and parcel size information for all of the shortlisted sites is the NYC Department of City Planning MapPLUTO 14v1 (2014). The sources for the previous sales data for comparable properties are the Rolling Sales and Annualized Sales tables from the NYC Department of Finance and the Automated City Register Information System (ACRIS). In addition, recent sales data and listing information was obtained from local real estate brokers and other real estate industry sources.

VALUATION METHODOLOGY

Based on the characteristics of the properties subject to this analysis—and on the available data—the market comparables method was used to estimate their potential cost of acquisition. Market comparables represent real estate assets with similar characteristics to the properties to be acquired, and which have sold recently. They therefore allow conclusions on pricing and potential trends observed for a particular area. In order to provide a comprehensive picture of the demand and pricing trends, AKRF also assessed recent transactions published or advertised by brokers, and reached out to brokers and other real estate professionals to obtain their opinion on current and future market conditions.

Please note that sales prices for development sites are typically expressed by the industry as a dollar amount per buildable square foot (bsf)[1]. By reporting pricing information on a bsf basis, development density allowed by zoning is incorporated into the value of the property.

Past Sales - Comparable Transactions from City Records

Using the NYC Department of Finance's ACRIS system, all property transactions involving a parcel located within one block of the Canal and occurring since 2012 were identified. In order to isolate those transactions which most closely match the shortlisted sites, only parcels larger than 8,000 square feet and located in a M2-1 zoning district were selected for further analysis (see **Figure 2**).

The average sales price on a per-square-foot basis for the nine qualifying transactions was approximately $84 bsf (see **Table 2**).

[1] For example: a 1,000 square foot lot with a maximum allowable density (floor-area ratio, or FAR) of 2.0 contains 2,000 buildable square feet (bsf). If that lot sells for $10 per bsf, the total purchase price would be $20,000.

Table 2
Comparable Transactions Since 2012

Address	Block	Lot(s)	Zoning	Buildable SF	Sale Price	Sale Date	$/BSF
400 3rd Avenue	979	1	M2-1	16,000	$2,350,000	2/9/2012	$146.88
322 3rd Avenue	967	1	M2-1	173,034	$7,000,000	8/20/2012	$40.45
420-430 Carroll Street	453	1, 21	M2-1	130,752	$9,000,000	9/14/2012	$68.83
300 Nevins Street	439	1	M2-1	204,140	$14,000,000	12/4/2012	$68.58
Bond/3rd Street Assemblage	n/a	n/a	M2-1	66,580	$5,500,000	6/25/2013	$82.61
365 Bond Street[1]	458	1	M1-4/R7-2/MX-11	89,300	$19,000,000	6/20/2013	$61.85
363 Bond Street[1]	452	1	M1-4/R7-2/MX-11	102,577	$6,950,000	6/26/2013	$67.75
400 Carroll Street[1]	452	15	M1-4/R7-2/MX-11	100,286	$7,200,000	8/19/2013	$71.79
479 DeGraw Street	417	21	M2-1	49,700	$6,000,000	1/28/2014	$120.72
2nd Street/3rd Street Assemblage	462	6, 8, 9, 42, 44	M2-1	52,150	$6,000,000	1/29/2014	$115.05
300 3rd Avenue	967	24	M2-1	81,000	$6,500,000	4/10/2014	$80.25
						Average	**$84**

Notes: 1. These three parcels comprise the Lightstone development site, at which Superfund-related environmental remediation expenses will total $20 million (or roughly $39 per bsf).

Sources: NYC Department of Finance, NYC Department of City Planning

The average sales price of $84 per bsf is far below what is currently demanded for properties in the area and therefore serves as a low-end benchmark when estimating potential sales prices for future transactions. The average sales price reflects mainly pre-2014 market conditions, when the vast majority of properties achieved a sales price of approximately $80 per bsf or less.

Recent Trend – Relevant 2014 Transactions

Recent sales comparables from brokers, along with information from industry publications, revealed a significant upward trend in sales prices that has been occurring in the Gowanus neighborhood in the past year. Several high-profile transactions have closed at sales prices substantially above the average sales price noted in the previous section, leading to the conclusion that a wave of rising sales prices has fundamentally altered the expectations of property owners throughout the neighborhood.

To analyze this trend, AKRF identified four transactions occurring in 2014 that involved parcels located within a manufacturing zone (either M2-1 or M1-2) in close proximity to the Canal (i.e., less than two blocks in any direction).

Rising retail and office rents in the Gowanus neighborhood have likely led to an increase in property values—though many observers have also concluded that many transactions were consummated with the expectation that a residential rezoning (either site-specific or neighborhood-wide) will eventually take place. Because residential uses can command higher rents on a per-buildable square-foot basis than do commercial or manufacturing uses—and because residential zones generally permit a higher density than do manufacturing zones—the mere potential for rezoning can substantially increase property values.

Table 3
2014 Transactions Within Two Blocks of Canal

Site	Transaction Date	Zoning	Current FAR	Buildable SF	Total Purchase	Price per BSF
601-615 Sackett Street	6/27/2014	M1-2	2.0	32,000	$9,500,000	$297
450 Union Street	9/9/2014	M2-1	2.0	57,000	$12,300,000	$216
431 Carroll Street	9/23/2014	M1-2	2.0	106,110	$17,000,000	$160
175-225 Third Street	10/15/2014	M2-1	2.0	266,490	$72,500,000	$272
					Average	**$241**

Sources: NYC Department of Finance, NYC Department of City Planning

Table 3 illustrates the upward trend described in the previous section, as the average sales prices for these transactions are substantially higher than those seen in the previous analysis. The average sales price for development properties sold between June 2014 and October 2014 reached $241 per bsf and exceeds by a wide margin the average sales price achieved in the prior years. The most applicable benchmark is the sales price recorded for the property at 450 Union Street, since it is located only three blocks from the potential northern site (RH-3) and is adjacent to the Canal.

Future Outlook - Mid-Term Market Expectations

To ascertain potential future sales price trends in the Gowanus neighborhood for the January 2015 version of this memorandum, AKRF engaged in conversations with industry professionals active in the neighborhood, including the Director of Acquisitions for a real estate investment firm and a Partner at a prominent brokerage and research firm.

These conversations confirmed AKRF's observation that sale prices in the neighborhood have been rapidly trending upward, particularly over the last year. One property that transacted in September 2014 at $160 per bsf (431 Carroll Street, located two blocks from the Canal; see **Table 3**) was re-listed in October 2014 at just over $300 per bsf. While the listing was subsequently removed, the broker is confident that the property will eventually sell at that level.

There was consensus among the real estate professionals consulted that property owners in the Gowanus area would likely use the most recent $216-per-square-foot sales price at 450 Union Street as a pricing benchmark for manufacturing-zone parcels adjacent to the Canal—even if the parcels are likely to incur substantial costs for environmental remediation or bulkhead reconstruction before they are suitable for redevelopment. From conversations with real estate professionals active in the area, AKRF also learned that several property owners in the neighborhood have been reluctant to sell their properties because they are expecting additional price increases in the future. Instead, these property owners prefer to sign long-term ground leases at rates roughly equivalent to $225-$250 per bsf.

The real estate professionals also strongly indicated that prices for development properties will likely continue to rise. As part of the June 2015 update of this memorandum, AKRF revisited available real estate data to identify new comparable transactions that would illustrate the extent to which recent market trends reflect that forecast. As shown in **Table 4**, the average price per square foot for M1-2 or M2-1 parcels within two blocks of the Canal that transacted between November 2014 and April 2015 increased from the $241 per bsf seen earlier to $271 per bsf; in addition, a $300-per-bsf acquisition cost has already been reached (and exceeded) in some transactions involving smaller parcels. That $300 per bsf threshold, which represents an increase of approximately 25% over the Recent Trend price, should therefore be considered as a likely benchmark for the mid-term future.

Table 4
2014-2015 New Transactions Within Two Blocks of Canal

Site	Transaction Date	Zoning	Current FAR	Buildable SF	Total Purchase	Price per BSF
498 President Street	11/13/2014	M1-2	2.0	8,000	$2,400,000	$300
334 Douglass Street	12/5/2014	M1-2	2.0	5,040	$1,500,000	$298
488 Third Avenue	3/26/2015	M2-1	2.0	2,880	$900,000	$313
109 Second Avenue	4/6/2015	M2-1	2.0	39,234	$10,150,000	$259
					Average	**$271**

Sources: NYC Department of Finance, NYC Department of City Planning

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Appendix E: Envision Comparison of Sites Technical Memorandum

Brown AND Caldwell

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Technical Memorandum

Prepared for: New York City Department of Environmental Protection (DEP)

Project Title: Gowanus Canal CSO Tank Siting and Superfund Support

NYCDEP Contract: EE-DSGN-3D-DES-CM, Contract Reg. No. 20131429596

BC Project No.: 145692

Technical Memorandum

Subject: Gowanus Canal CSO Tank Envision Comparison of Sites

Date: May 11, 2015

To: Kevin Clarke, DEP Portfolio Manager

From: Don Cohen, BC Project Manager

Prepared by: _____
Rick Carrier, ENV SP, Vice President

Reviewed by: _____
Don Cohen, CPG, BC Project Manager

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Section 1: Introduction and Purpose

The purpose of this technical memorandum (TM) is to provide a comparison of the potential sustainable aspects of the sites being evaluated for the possible location of combined sewer overflow (CSO) storage tanks in the vicinity of the Gowanus Canal. The United States Environmental Protection Agency (USEPA) through their Record of Decision and subsequent Administrative Order for Remedial Design (ROD) is requiring the DEP to construct two new tanks along the Gowanus Canal—one at the existing Owls Head 007 (OH 007) CSO and one at the Red Hook 034 (RH 034) CSO. In compliance with the ROD, New York Department of Environmental Protection (DEP) is in the process of comparing and selecting the most suitable site for both tanks.

Six sites (three each for RH 034 and OH 007 respectively) were "shortlisted" for further evaluation as summarized in a TM from Brown and Caldwell Associates (BC) titled "Short List of Potential Sites," dated September 30, 2014, and depicted on Figure 1. All six sites are in the industrial and manufacturing area along the Gowanus Canal and are either in the M2-1 or M1-2 Zoning Districts. All of the sites except RH-4, which is the Thomas Greene Playground, are occupied with light industrial uses and would require the displacement of the businesses or the parkland function. One site, OH 7, was recently vacant and available for lease. The Gowanus Canal area is gentrifying and residential and commercial uses are becoming more common. The surrounding areas will be impacted by both the completed work and the construction process (e.g., traffic, noise, dust, odors, etc.).

The Institute for Sustainable Infrastructure (ISI) Envision (Version 2.0, Stage 2) sustainable infrastructure rating system was used to score each of the six shortlisted sites under consideration to understand the relative potential of each site for sustainable performance of the constructed work. The overall goal of this process was to identify the best site or sites to reduce and mitigate negative impacts while making the best investment in long-term performance.

The Envision system is focused on the built environment, or infrastructure, rather than occupied buildings as has been the focus of similar rating systems such as Leadership in Energy and Environmental Design (LEED).The following excerpts from the introduction to the Envision guidance manual further explain the basic framework and the groups that comprise ISI:

- "The Envision Rating System is an objective framework of criteria and performance achievements. It is designed to help users identify ways in which sustainable approaches can be used to plan, design, construct, and operate infrastructure projects. The goal is to improve the sustainable performance of infrastructure projects in terms of not only the technical performance but also from a social, environmental, and economic perspective. Envision provides an opportunity for infrastructure owners and designers to provide higher-performing solutions by using a life-cycle approach, by working with communities, and by using a restorative approach to infrastructure projects."
- "Envision takes a new tack by establishing a holistic framework for evaluation and rating infrastructure projects against the needs and values of the community."
- "ISI is a not-for-profit association of the American Society of Civil Engineers, American Council of Engineering Companies, and American Public Works Association. Its purpose is to improve the performance and viability of infrastructure through the application of more sustainable technologies and methodologies."

The Envision rating system is grouped into five categories and 60 credits. A credit comprises a sustainability indicator on an aspect of environmental, social, or economic concern. Each credit is scored based on the following five levels of achievement:

1. Improved
2. Enhanced
3. Superior
4. Conserving
5. Restorative

A total of 809 points is achievable based upon the Conserving level of achievement across all 60 credits. The five categories as described in the Envision guidance manual (and associated points) are:

- "The **Quality of Life** (181) category addresses a project's impact on surrounding communities, from the health and well-being of individuals to the well-being of the social fabric as a whole. These impacts may be physical, economic, or social."
- "The **Leadership** (121) category measures the potential for the project team to communicate and collaborate with a wide variety of people in creating ideas for the project and understanding the long-term holistic view of the project and its life cycle." This category is less sensitive to siting and is more related to overall organizational commitment. DEP has demonstrated and documented this commitment in documents such as PlaNYC, the DEP mission statement, and the Bureau of Engineering Design and Construction's (BEDC's) adopted sustainability policy.
- "The **Resource Allocation** (182) category is broadly concerned with the quantity, source, and characteristics of the resources needed to build infrastructure (construction) and keep it running (operations)."
- "The **Natural World** (203) category addresses how to understand and minimize negative impacts to the natural world while considering ways in which the infrastructure can interact with natural systems in a synergistic, positive way."
- The **Climate and Risk** (122) category "general scope is twofold: to minimize emissions that may contribute to increased short- and long-term risks and to ensure infrastructure projects are resilient to short-term hazards or altered long-term future conditions."

Additional information on ISI and the Envision Rating System is available at: www.sustainableinfrastructure.org.

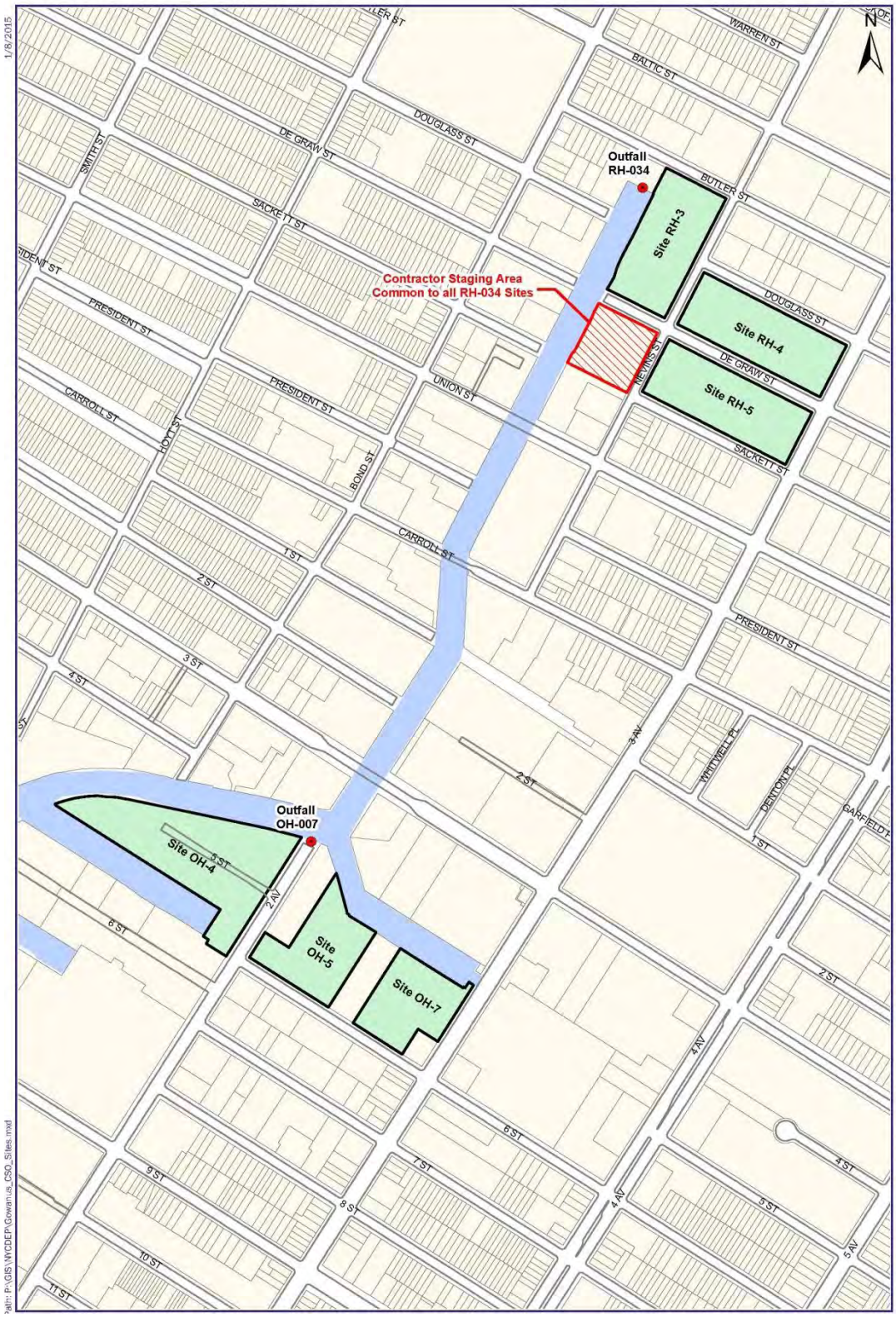


Figure 1. Potential CSO locations

Section 2: Approach

BC used a spreadsheet developed by DEP that automates the scoring of the Envision rating system. Each site was scored using the tool and annotated in the comments column to explain the rationale for the rating based on the potential achievement level. All of the sites offer some potential for enhancement of sustainability of the built work. For example, the sites that are fronted on the Gowanus Canal offer the opportunity for enhancing Quality of Life by expanding public access to the waterfront that is presently limited or not available. In general, an optimistic approach was taken to the scoring of all of the sites by evaluating the potential maximum reasonable rating in the category. DEP will need to make informed decisions as to what level of achievement is practical and reasonable after the final sites are selected and the design process starts in earnest.

Section 3: Results

Summaries of the scoring results for the two outfall locations, Red Hook Outfall 034 (RH 034) and Owls Head Outfall 007 (OH 007), are presented on Figures 2 and 3, respectively. Printouts of the scoring results and associated commentary are provided at the end of this TM.

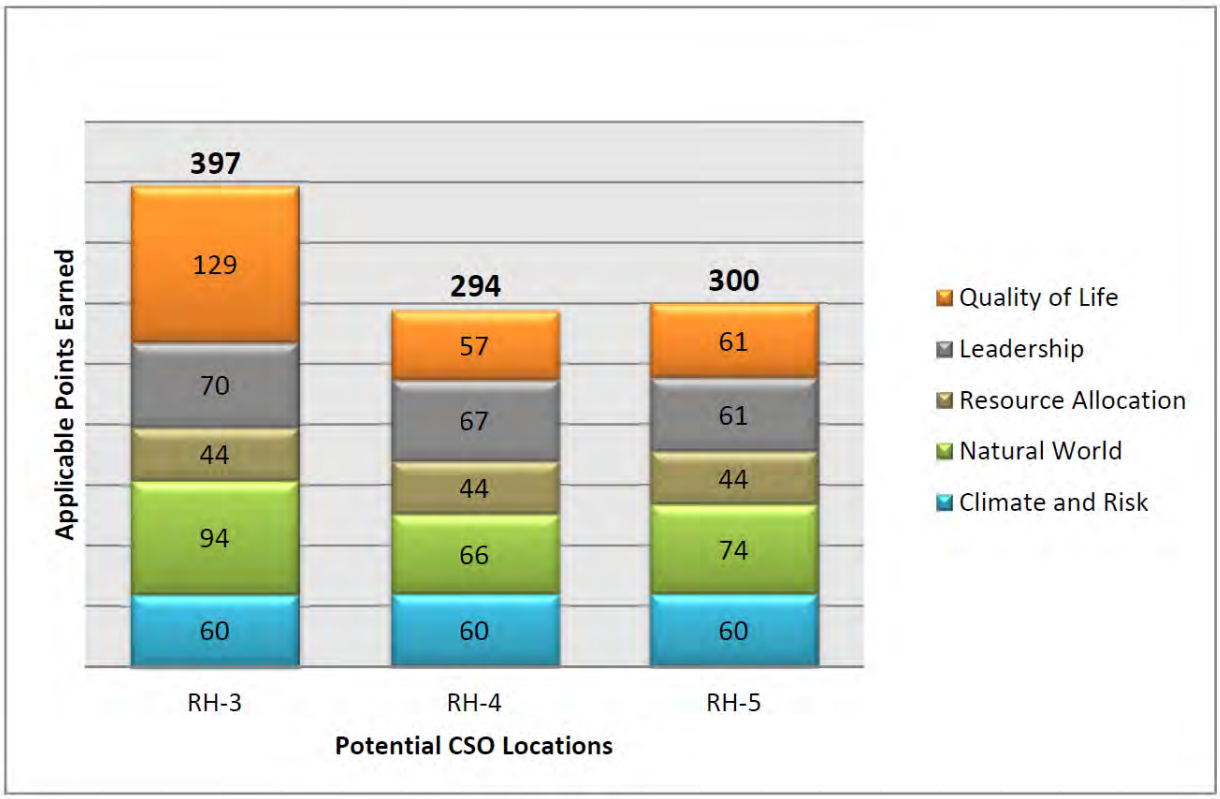


Figure 2. Red Hook Outfall 034 scoring summary results

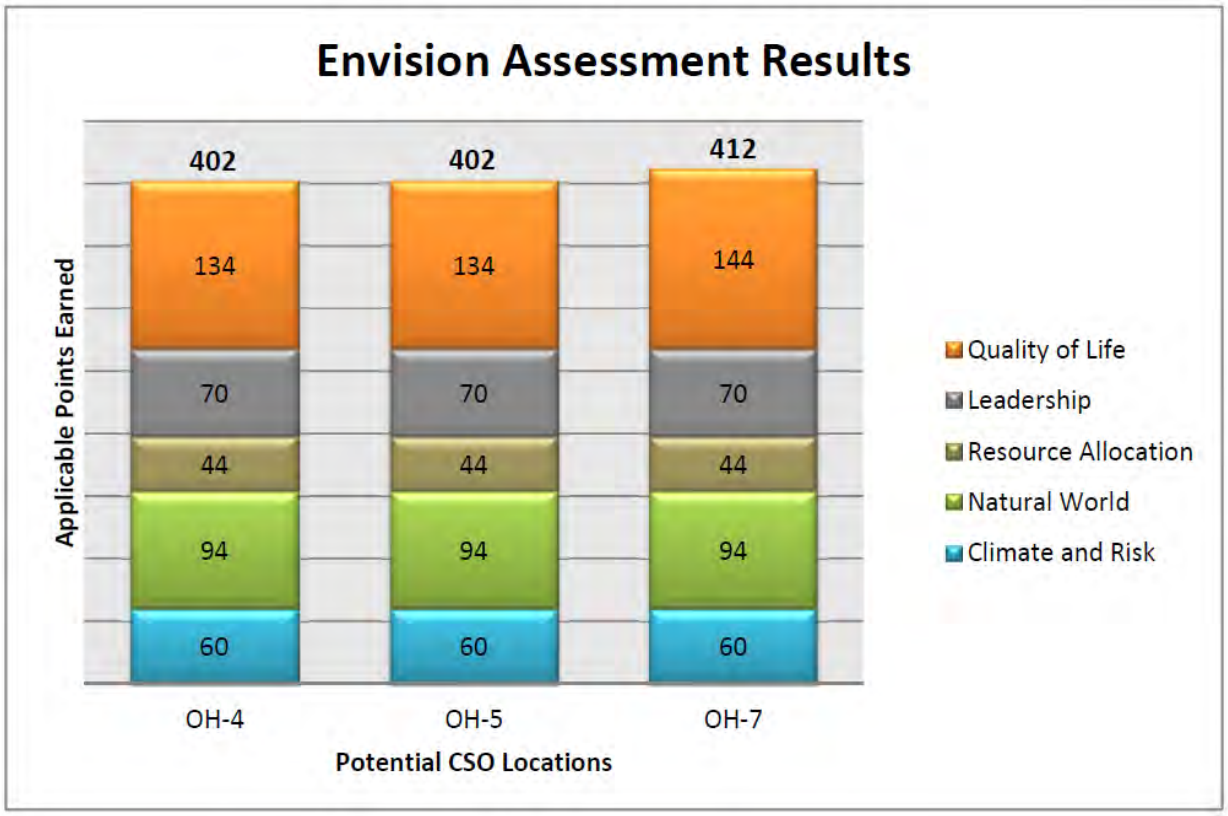


Figure 3. Owls Head Outfall 007 scoring summary results

3.1 RH 034 Sites Results

The RH 3 site presents a significant opportunity for enhanced performance in comparison to the other two sites under consideration. The primary differentiator is that the site offers the opportunity of access to the canal and the associated potential for improved Quality of Life along with the potential for restoration of the waterfront environment and improvement in the Natural World.

The following are highlights of the analysis and results in each of the five Envision categories for the RH 034 sites:

- **Quality of Life:** The RH 034 sites present an opportunity for Quality of Life enhancements with the constructed work associated with aspects of the work that would be compatible with the evolving residential character of the area. For example, the sites can be made more aesthetically pleasing and increase green space from current uses. All of the sites will require at least temporary displacement of workforce associated with the current land use. The RH 3 site scored 71 percent, or 129 of the 181 potential points, compared to 31 and 34 percent, respectively, for the RH 4 and RH 5 sites. As noted above, the potential for opening access to the canal consistent with the urban renewal in the area associated with economic redevelopment presents a significant opportunity for the community. The potential temporary and permanent negative impacts to the Thomas Greene Playground on the RH 4 site led to a lower rating for that site.
- **Leadership:** As noted above, DEP has a demonstrated and documented commitment to sustainability and all three sites offer similar opportunities to demonstrate that commitment through engagement of stakeholders and visible leadership. The three sites scored similarly in the leadership category. The RH 3 site scored 66 percent, or 70 of the 106 potential points, compared to 63 and 58 percent, respectively,

for the RH 4 and RH 5 sites. The primary differentiators in this category are the potential for promoting beneficial access to the waterfront for the RH 3 site and potential for improvements to the Thomas Greene Playground on the RH 4 site.

- **Resource Allocation:** The proposed storage facility will require significant use of materials and energy for both construction and long-term operation regardless of the site location. All three sites scored 26 percent, or 44 of the potential 171 points, in this category because of the large amount of waste that will be generated from the proposed removal of contaminated soils along with the waste stream that will be generated during construction. It should be noted that the RH 3 site will generate substantially less waste soil because of the shorter conveyance construction.
- **Natural World:** The general urban nature of the Gowanus Canal area limits the potential for enhancement of the natural world with the exception of improvements to the riparian environment associated with the canal itself. All three sites provide for a beneficial use of brownfield sites associated with the ROD. The RH 3 site, within the context of the cleanup contemplated by the EPA for the Gowanus Canal, offers the potential opportunity to restore aspects of the riparian environment along the waterfront. The RH 3 site scored 59 percent, or 94 of the 158 potential points, compared to 42 and 47 percent, respectively, for the RH 4 and RH 5 sites. The primary differentiator for the RH 3 site was the recognition of the potential to enhance and restore the riparian environment and the associated wildlife access and connectivity. Some points were recognized for the RH 3 and RH 5 sites for the potential to replace existing truck maintenance facilities with a well-run CSO storage facility and the associated reduction in potential risk to groundwater and surface water resources.
- **Climate and Risk:** The impact on climate change from the construction and operation of the proposed facility is essentially the same for all three sites. Similarly, all of the sites are within the floodplain and should be constructed to avoid damage/interference with operation with potentially higher sea levels. All three sites scored 49 percent, or 60 of the potential 122 points, in this category because of the similar energy use among the sites and the expectation that all vulnerable equipment would be protected from flood risk by locating them on the second floor of the facility.

3.2 OH 007 Sites Results

The OH 007 sites all scored similarly in the assessment, with OH 7 scoring 56 percent of the total points available compared to 54 percent for the OH 4 and 5 sites. The only significant differentiator is the potential for improved access to the bicycle and transit corridor on 3rd Avenue associated with the OH 7 site.

The following are highlights of the analysis and results in each of the five categories for the OH 007 sites:

- **Quality of Life:** The OH 007 sites generally present an opportunity for Quality of Life enhancements associated with aspects of the constructed work that would be compatible with the evolving residential character of the area and opening public access to the Gowanus Canal. All of the sites can be made more aesthetically pleasing and increase green space from current uses. All of the sites will require at least temporary displacement of workforce associated with the current land use. The OH 7 site scored 80 percent, or 144 of the 181 potential points, compared to 74 percent for both of the OH 4 and 5 sites. The only differentiator between the sites is the potential for enhancing the access and usability of the bicycle and transit corridor on 3rd Avenue on the OH 7 site.
- **Leadership:** As noted above, DEP has a demonstrated and documented commitment to sustainability and all three sites offer similar opportunities to demonstrate that commitment through engagement of stakeholders and visible leadership. All three sites scored 66 percent, or 70 of the 106 potential points, and offer essentially the same potential for achievement in the Leadership category.
- **Resource Allocation:** The proposed storage facility will require significant use of materials and energy for both construction and long-term operation regardless of the site location. All three sites scored 26

percent, or 44 of the potential 171 points, in this category because of the large amount of waste that will be generated from the proposed removal of contaminated soils along with the waste stream that will be generated during construction. It should be noted that the OH 4 site will generate substantially less waste soil because of the shorter conveyance construction.

- **Natural World:** The general urban nature of the Gowanus Canal area limits the potential for enhancement of the natural world with the exception of improvements to the riparian environment associated with the canal itself. All three sites provide for a beneficial use of brownfield sites associated with the ROD. Within the context of the proposed cleanup contemplated by the EPA for the Gowanus Canal all of the sites offer the potential opportunity to enhance and restore aspects of the riparian environment along the waterfront and the associated wildlife access and connectivity. Also, some potential reduction to risk of groundwater and surface water contamination should be realized with all three sites through changing from the current industrial uses to a well-run CSO storage facility. All three sites scored 59 percent, or 94 of the potential 158 points, in this category.
- **Climate and Risk:** The impact on climate change from the construction and operation of the proposed facility is essentially the same for all three sites. Similarly, all of the sites are within the floodplain and should be constructed to avoid damage/interference with operation with potentially higher sea levels. All three sites scored 49 percent, or 60 of the potential 122 points, in this category because of the similar energy use among the sites and the expectation that all vulnerable equipment would be protected from flood risk by locating them on the second floor of the facility.

Section 4: Conclusion

Among the RH 034 sites, the RH 3 site presents a superior opportunity for achieving sustainability objectives, scoring 54 percent of the available points compared to 40 percent and 41 percent for the RH 4 and RH 5 sites, respectively. The superior ranking of the RH 3 site is associated primarily with its access to the Gowanus Canal waterfront and the anticipated improvement of quality of life in the neighborhood as well as enhancement of the natural world through restoration of the riparian environment.

The OH 007 sites ranked essentially the same, ranging from 54 to 56 percent of the available points. The OH 4 site would represent a practical benefit of reduced waste disposal because of the lower quantity of contaminated soil that would be required to be landfilled. The OH 7 site offers a marginal benefit in potential enhancement of access and use of the bicycle and transit corridor on 3rd Avenue.

Attachment A: Scoring Results for Red Hook Outfall 034 and Owls Head Outfall 007

Red Hook Outfall 034

1. RH-3 Site
2. RH-4 Site
3. RH-5 Site

Owls Outfall 007

1. OH-4 Site
2. OH-5 Site
3. OH-7 Site

Red Hook Outfall 034

Envision Rating Calculator

Project: Gowanus Canal CSO Facility
Date: 3/18/2015
Reviewer: Rick Carrier
RH-3 Site

Credit ID	Credit Title	Applicable?	Points Available	Rating	Points Achieved	Maximum Possible Points	Percentage of Possible Points	Comments
Section 1: QUALITY OF LIFE								
QL1.1	Improve community quality of life	Yes	25	Restorative (25)	25	25	100%	Potential Waterfront access
QL1.2	Stimulate sustainable growth and development	Yes	16	Superior (5)	5	16	31%	Improved aesthetics for the waterfront
QL1.3	Develop local skills and capabilities	Yes	15	Enhanced (2)	2	15	13%	No real long term employment expected
QL2.1	Enhance public health and safety	Yes	16	Conserving (16)	16	16	100%	Expected to reduce environmental exposure
QL2.2	Minimize noise and vibration	Yes	11	Conserving (8)	8	11	73%	Noise level similar to current use
QL2.3	Minimize light pollution	Yes	11	Superior (4)	4	11	36%	Before and after similar
QL2.4	Improve community mobility and access	Yes	14	Conserving (14)	14	14	100%	Access to canal allows pedestrian crossing
QL2.5	Encourage alternative modes of transportation	Yes	15	Superior (6)	6	15	40%	Adjacent to bike route at Nevins & DeGraw
QL2.6	Improve site accessibility, safety and wayfinding	Yes	15	Superior (6)	6	15	40%	Protect & enhance canal/water environment
QL3.1	Preserve historic and cultural resources	Yes	16	Restorative (16)	16	16	100%	Provides access to canal
QL3.2	Preserve views and local character	Yes	14	Restorative (14)	14	14	100%	Provides access to canal
QL3.3	Enhance public space	Yes	13	Restorative (13)	13	13	100%	Provides access to canal
QL0.0	Innovate or Exceed Credit Requirements	No	8		0	0	N/A	Not considered in analysis
	Total		**181**		129	181	71	
Section 2: LEADERSHIP								
LD1.1	Provide effective leadership and commitment	Yes	17	Conserving (17)	17	17	100%	Organizational commitment by NYC in place
LD1.2	Establish a sustainability management system	Yes	14	Improved (1)	1	14	7%	No significant difference among sites
LD1.3	Foster collaboration and teamwork	Yes	15	Superior (8)	8	15	53%	No significant difference among sites
LD1.4	Provide for stakeholder involvement	Yes	14	Enhanced (5)	5	14	36%	No significant difference among sites
LD2.1	Pursue by-product synergy opportunities	No	15	No Points (0)	0	0	N/A	No significant difference among sites
LD2.2	Improve infrastructure integration	Yes	16	Restorative (16)	16	16	100%	Potential Waterfront Access
LD3.1	Plan for long-term monitoring and maintenance	Yes	10	Conserving (10)	10	10	100%	No significant difference among sites
LD3.2	Address conflicting regulations and policies	Yes	8	Improved (1)	1	8	13%	No significant difference among sites
LD3.3	Extend useful life	Yes	12	Conserving (12)	12	12	100%	No significant difference among sites
LD0.0	Innovate or Exceed Credit Requirements	No	6		0	0	N/A	Not considered in analysis
	Total		**121**		70	106	66	
Section 3: RESOURCE ALLOCATION								
RA1.1	Reduce net embodied energy	Yes	18	Improved (2)	2	18	11%	No significant difference among sites
RA1.2	Support sustainable procurement practices	Yes	9	Improved (2)	2	9	22%	No significant difference among sites
RA1.3	Use recycled materials	Yes	14	Improved (2)	2	14	14%	No significant difference among sites
RA1.4	Use regional materials	Yes	10	Improved (3)	3	10	30%	No significant difference among sites
RA1.5	Divert waste from landfills	No	11	No Points (0)	0	0	N/A	Large volume to landfill due to nature of project
RA1.6	Reduce excavated materials taken off site	Yes	6	No Points (0)	0	6	0%	Large volume to landfill due to nature of project
RA1.7	Provide for deconstruction and recycling	Yes	12	Improved (1)	1	12	8%	Significant cast in place concrete components
RA2.1	Reduce energy consumption	Yes	18	Improved (3)	3	18	17%	No significant difference among sites
RA2.2	Use renewable energy	Yes	20	Enhanced (6)	6	20	30%	No significant difference among sites
RA2.3	Commission and monitor energy systems	Yes	11	Enhanced (3)	3	11	27%	No significant difference among sites
RA3.1	Protect fresh water availability	Yes	21	Conserving (17)	17	21	81%	No significant difference among sites
RA3.2	Reduce potable water consumption	Yes	21	Improved (4)	4	21	19%	No significant difference among sites
RA3.3	Monitor water systems	Yes	11	Improved (1)	1	11	9%	No significant difference among sites
RA0.0	Innovate or Exceed Credit Requirements	No	9		0	0	N/A	Not considered in analysis
	Total		**182**		44	171	26	
Section 4: NATURAL WORLD								
NW1.1	Preserve prime habitat	Yes	18	Restorative (18)	18	18	100%	Allows for restoration of riparian environment
NW1.2	Protect wetlands and surface water	Yes	18	Improved (1)	1	18	6%	50-foot buffer can be incorporated
NW1.3	Preserve prime farmland	No	15	No Points (0)	0	0	N/A	Not applicable
NW1.4	Avoid adverse geology	No	5	No Points (0)	0	0	N/A	Not applicable
NW1.5	Preserve floodplain functions	Yes	14	Enhanced (5)	5	14	36%	No significant difference among sites
NW1.6	Avoid unsuitable development on steep slopes	No	6	No Points (0)	0	0	N/A	Not applicable
NW1.7	Preserve greenfields	Yes	23	Restorative (23)	23	23	100%	Compatable use of brownfield for all sites
NW2.1	Manage stormwater	Yes	21	Superior (9)	9	21	43%	Reduce impervious in combination with storage
NW2.2	Reduce pesticide and fertilizer impacts	Yes	9	Superior (5)	5	9	56%	No significant difference among sites
NW2.3	Prevent surface and groundwater contamination	Yes	18	Restorative (18)	18	18	100%	Replacing maintenance facility reduces risk
NW3.1	Preserve species biodiversity	Yes	16	Improved (2)	2	16	13%	Linkage of habitats along canal
NW3.2	Control invasive species	Yes	11	Superior (5)	5	11	45%	No invasive species expected in project
NW3.3	Restore disturbed soils	Yes	10	Conserving (8)	8	10	80%	No significant difference among sites
NW3.4	Maintain wetland and surface water functions	No	19	No Points (0)	0	0	N/A	Nature of project may preclude options
NW0.0	Innovate or Exceed Credit Requirements	No	8		0	0	N/A	Not considered in analysis
	Total		**203**		94	158	59	
Section 5: CLIMATE AND RISK								
CR1.1	Reduce greenhouse gas emissions	Yes	25	Enhanced (7)	7	25	28%	No significant difference among sites
CR1.2	Reduce air pollutant emissions	Yes	15	Improved (2)	2	15	13%	No significant difference among sites
CR2.1	Assess climate threat	Yes	15	Conserving (15)	15	15	100%	No significant difference among sites
CR2.2	Avoid traps and vulnerabilities	Yes	20	Improved (2)	2	20	10%	No significant difference among sites
CR2.3	Prepare for long-term adaptability	Yes	20	Conserving (16)	16	20	80%	No significant difference among sites
CR2.4	Prepare for short-term hazards	Yes	21	Conserving (17)	17	21	81%	No significant difference among sites
CR2.5	Manage heat islands effects	Yes	6	Improved (1)	1	6	17%	No significant difference among sites
CR0.0	Innovate or Exceed Credit Requirements	No	8		0	0	N/A	Not considered in analysis
	Total		**122**		60	122	49	
	Grand Total		**809**		397	738	53.8%	
					Estimated Rating:			Platnium

Envision Rating Calculator

Project: Gowanus Canal CSO Facility
Date: 3/18/2015
Reviewer: Rick Carrier
RH-4 Site

Credit ID	Credit Title	Applicable?	Points Available	Rating	Points Achieved	Maximum Possible Points	Percentage of Possible Points	Comments
Section 1: QUALITY OF LIFE								
QL1.1	Improve community quality of life	Yes	25	Enhanced (5)	5	25	20%	Will mitigate loss of park amenity
QL1.2	Stimulate sustainable growth and development	Yes	16	Superior (5)	5	16	31%	Park split is neutral
QL1.3	Develop local skills and capabilities	Yes	15	Enhanced (2)	2	15	13%	No real long term employment expected
QL2.1	Enhance public health and safety	Yes	16	Conserving (16)	16	16	100%	Expected to reduce environmental exposure
QL2.2	Minimize noise and vibration	Yes	11	Improved (1)	1	11	9%	Potenital noise source closer to park users
QL2.3	Minimize light pollution	Yes	11	Superior (4)	4	11	36%	Park will require some mitigation
QL2.4	Improve community mobility and access	Yes	14	Improved (1)	1	14	7%	No significant change to existing access
QL2.5	Encourage alternative modes of transportation	Yes	15	Superior (6)	6	15	40%	Adjacent to bike route at Nevins & DeGraw
QL2.6	Improve site accessibility, safety and wayfinding	Yes	15	Enhanced (3)	3	15	20%	Park reconfiguration could enhance safety
QL3.1	Preserve historic and cultural resources	Yes	16	Conserving (13)	13	16	81%	Possible park enhancement
QL3.2	Preserve views and local character	Yes	14	No Points (0)	0	14	0%	Loss of historic park
QL3.3	Enhance public space	Yes	13	Improved (1)	1	13	8%	Enhanced park but with short-term impacts
QL0.0	Innovate or Exceed Credit Requirements	No	8		0	0	N/A	Not considered in analysis
	Total		**181**		57	181	31	
Section 2: LEADERSHIP								
LD1.1	Provide effective leadership and commitment	Yes	17	Conserving (17)	17	17	100%	Organizational commitment by NYC is in place
LD1.2	Establish a sustainability management system	Yes	14	Improved (1)	1	14	7%	No significant difference among sites
LD1.3	Foster collaboration and teamwork	Yes	15	Superior (8)	8	15	53%	No significant difference among sites
LD1.4	Provide for stakeholder involvement	Yes	14	Enhanced (5)	5	14	36%	No significant difference among sites
LD2.1	Pursue by-product synergy opportunities	No	15	No Points (0)	0	0	N/A	No significant difference among sites
LD2.2	Improve infrastructure integration	Yes	16	Conserving (13)	13	16	81%	Improved park facilities in constructed works
LD3.1	Plan for long-term monitoring and maintenance	Yes	10	Conserving (10)	10	10	100%	No significant difference among sites
LD3.2	Address conflicting regulations and policies	Yes	8	Improved (1)	1	8	13%	No significant difference among sites
LD3.3	Extend useful life	Yes	12	Conserving (12)	12	12	100%	No significant difference among sites
LD0.0	Innovate or Exceed Credit Requirements	No	6		0	0	N/A	Not considered in analysis
	Total		**121**		67	106	63	
Section 3: RESOURCE ALLOCATION								
RA1.1	Reduce net embodied energy	Yes	18	Improved (2)	2	18	11%	No significant difference among sites
RA1.2	Support sustainable procurement practices	Yes	9	Improved (2)	2	9	22%	No significant difference among sites
RA1.3	Use recycled materials	Yes	14	Improved (2)	2	14	14%	No significant difference among sites
RA1.4	Use regional materials	Yes	10	Improved (3)	3	10	30%	No significant difference among sites
RA1.5	Divert waste from landfills	No	11	No Points (0)	0	0	N/A	Large volume to landfill due to nature of project
RA1.6	Reduce excavated materials taken off site	Yes	6	No Points (0)	0	6	0%	Large volume to landfill due to nature of project
RA1.7	Provide for deconstruction and recycling	Yes	12	Improved (1)	1	12	8%	Significant cast in place concrete components
RA2.1	Reduce energy consumption	Yes	18	Improved (3)	3	18	17%	No significant difference among sites
RA2.2	Use renewable energy	Yes	20	Enhanced (6)	6	20	30%	No significant difference among sites
RA2.3	Commission and monitor energy systems	Yes	11	Enhanced (3)	3	11	27%	No significant difference among sites
RA3.1	Protect fresh water availability	Yes	21	Conserving (17)	17	21	81%	No significant difference among sites
RA3.2	Reduce potable water consumption	Yes	21	Improved (4)	4	21	19%	No significant difference among sites
RA3.3	Monitor water systems	Yes	11	Improved (1)	1	11	9%	No significant difference among sites
RA0.0	Innovate or Exceed Credit Requirements	No	9		0	0	N/A	Not considered in analysis
	Total		**182**		44	171	26	
Section 4: NATURAL WORLD								
NW1.1	Preserve prime habitat	Yes	18	No Points (0)	0	18	0%	Protection or restoration of habitat unlikely
NW1.2	Protect wetlands and surface water	Yes	18	No Points (0)	0	18	0%	No opportunity to improve buffers
NW1.3	Preserve prime farmland	No	15	No Points (0)	0	0	N/A	Not applicable
NW1.4	Avoid adverse geology	No	5	No Points (0)	0	0	N/A	Not applicable
NW1.5	Preserve floodplain functions	Yes	14	Enhanced (5)	5	14	36%	No significant difference among sites
NW1.6	Avoid unsuitable development on steep slopes	No	6	No Points (0)	0	0	N/A	Not applicable
NW1.7	Preserve greenfields	Yes	23	Restorative (23)	23	23	100%	Compatable use of brownfield for all sites
NW2.1	Manage stormwater	Yes	21	Superior (9)	9	21	43%	Reduce impervious in combination with storage
NW2.2	Reduce pesticide and fertilizer impacts	Yes	9	Superior (5)	5	9	56%	No significant difference among sites
NW2.3	Prevent surface and groundwater contamination	Yes	18	Superior (9)	9	18	50%	Existing park represents little risk
NW3.1	Preserve species biodiversity	Yes	16	Improved (2)	2	16	13%	Expansion of park natural areas possible
NW3.2	Control invasive species	Yes	11	Superior (5)	5	11	45%	No invasive species expected in project
NW3.3	Restore disturbed soils	Yes	10	Conserving (8)	8	10	80%	No significant difference among sites
NW3.4	Maintain wetland and surface water functions	No	19	No Points (0)	0	0	N/A	Nature of project may preclude options
NW0.0	Innovate or Exceed Credit Requirements	No	8		0	0	N/A	Not considered in analysis
	Total		**203**		66	158	42	
Section 5: CLIMATE AND RISK								
CR1.1	Reduce greenhouse gas emissions	Yes	25	Enhanced (7)	7	25	28%	No significant difference among sites
CR1.2	Reduce air pollutant emissions	Yes	15	Improved (2)	2	15	13%	No significant difference among sites
CR2.1	Assess climate threat	Yes	15	Conserving (15)	15	15	100%	No significant difference among sites
CR2.2	Avoid traps and vulnerabilities	Yes	20	Improved (2)	2	20	10%	No significant difference among sites
CR2.3	Prepare for long-term adaptability	Yes	20	Conserving (16)	16	20	80%	No significant difference among sites
CR2.4	Prepare for short-term hazards	Yes	21	Conserving (17)	17	21	81%	No significant difference among sites
CR2.5	Manage heat islands effects	Yes	6	Improved (1)	1	6	17%	No significant difference among sites
CR0.0	Innovate or Exceed Credit Requirements	No	8		0	0	N/A	Not considered in analysis
	Total		**122**		60	122	49	
	Grand Total		**809**		294	738	39.8%	
					Estimated Rating:			Silver

Envision Rating Calculator

Project: Gowanus Canal CSO Facility
Date: 3/18/2015
Reviewer: Rick Carrier
RH-5 Site

Applicable?
Points Available
Points Achieved
Maximum Possible Points
Percentage of Possible Points

Credit ID	Credit Title			Rating				Comments
Section 1: QUALITY OF LIFE								
QL1.1	Improve community quality of life	Yes	25	Superior (10)	10	25	40%	Engage community & mitigate park impacts
QL1.2	Stimulate sustainable growth and development	Yes	16	Superior (5)	5	16	31%	Similar loss of employment as RH 3
QL1.3	Develop local skills and capabilities	Yes	15	Enhanced (2)	2	15	13%	No real long term employment expected
QL2.1	Enhance public health and safety	Yes	16	Conserving (16)	16	16	100%	Expected to reduce environmental exposure
QL2.2	Minimize noise and vibration	Yes	11	Conserving (8)	8	11	73%	Noise level similar to current use
QL2.3	Minimize light pollution	Yes	11	Superior (4)	4	11	36%	Before and after similar
QL2.4	Improve community mobility and access	Yes	14	Enhanced (4)	4	14	29%	Incorporate new access features
QL2.5	Encourage alternative modes of transportation	Yes	15	Superior (6)	6	15	40%	Adjacent to bike route at Nevins & DeGraw
QL2.6	Improve site accessibility, safety and wayfinding	Yes	15	Enhanced (3)	3	15	20%	Could enhance wayfinding and safety near park
QL3.1	Preserve historic and cultural resources	Yes	16	Improved (1)	1	16	6%	No historic or cultural enhancements identified
QL3.2	Preserve views and local character	Yes	14	Improved (1)	1	14	7%	Expect to fit future neighborhood character
QL3.3	Enhance public space	Yes	13	Improved (1)	1	13	8%	Enhanced park but with short-term impacts
QL0.0	Innovate or Exceed Credit Requirements	No	8		0	0	N/A	Not considered in analysis
	Total		**181**		61	181	34	
Section 2: LEADERSHIP								
LD1.1	Provide effective leadership and commitment	Yes	17	Conserving (17)	17	17	100%	Organizational commitment by NYC is in place
LD1.2	Establish a sustainability management system	Yes	14	Improved (1)	1	14	7%	No significant difference among sites
LD1.3	Foster collaboration and teamwork	Yes	15	Superior (8)	8	15	53%	No significant difference among sites
LD1.4	Provide for stakeholder involvement	Yes	14	Enhanced (5)	5	14	36%	No significant difference among sites
LD2.1	Pursue by-product synergy opportunities	No	15	No Points (0)	0	0	N/A	No significant difference among sites
LD2.2	Improve infrastructure integration	Yes	16	Superior (7)	7	16	44%	Potential for integration with park
LD3.1	Plan for long-term monitoring and maintenance	Yes	10	Conserving (10)	10	10	100%	No significant difference among sites
LD3.2	Address conflicting regulations and policies	Yes	8	Improved (1)	1	8	13%	No significant difference among sites
LD3.3	Extend useful life	Yes	12	Conserving (12)	12	12	100%	No significant difference among sites
LD0.0	Innovate or Exceed Credit Requirements	No	6		0	0	N/A	Not considered in analysis
	Total		**121**		61	106	58	
Section 3: RESOURCE ALLOCATION								
RA1.1	Reduce net embodied energy	Yes	18	Improved (2)	2	18	11%	No significant difference among sites
RA1.2	Support sustainable procurement practices	Yes	9	Improved (2)	2	9	22%	No significant difference among sites
RA1.3	Use recycled materials	Yes	14	Improved (2)	2	14	14%	No significant difference among sites
RA1.4	Use regional materials	Yes	10	Improved (3)	3	10	30%	No significant difference among sites
RA1.5	Divert waste from landfills	No	11	No Points (0)	0	0	N/A	Large volume to landfill due to nature of project
RA1.6	Reduce excavated materials taken off site	Yes	6	No Points (0)	0	6	0%	Large volume to landfill due to nature of project
RA1.7	Provide for deconstruction and recycling	Yes	12	Improved (1)	1	12	8%	Significant cast in place concrete components
RA2.1	Reduce energy consumption	Yes	18	Improved (3)	3	18	17%	No significant difference among sites
RA2.2	Use renewable energy	Yes	20	Enhanced (6)	6	20	30%	No significant difference among sites
RA2.3	Commission and monitor energy systems	Yes	11	Enhanced (3)	3	11	27%	No significant difference among sites
RA3.1	Protect fresh water availability	Yes	21	Conserving (17)	17	21	81%	No significant difference among sites
RA3.2	Reduce potable water consumption	Yes	21	Improved (4)	4	21	19%	No significant difference among sites
RA3.3	Monitor water systems	Yes	11	Improved (1)	1	11	9%	No significant difference among sites
RA0.0	Innovate or Exceed Credit Requirements	No	9		0	0	N/A	Not considered in analysis
	Total		**182**		44	171	26	
Section 4: NATURAL WORLD								
NW1.1	Preserve prime habitat	Yes	18	No Points (0)	0	18	0%	Protection or restoration of habitat unlikely
NW1.2	Protect wetlands and surface water	Yes	18	Improved (1)	1	18	6%	No real opportunity to improve buffers
NW1.3	Preserve prime farmland	No	15	No Points (0)	0	0	N/A	Not applicable
NW1.4	Avoid adverse geology	No	5	No Points (0)	0	0	N/A	Not applicable
NW1.5	Preserve floodplain functions	Yes	14	Enhanced (5)	5	14	36%	No significant difference among sites
NW1.6	Avoid unsuitable development on steep slopes	No	6	No Points (0)	0	0	N/A	Not applicable
NW1.7	Preserve greenfields	Yes	23	Restorative (23)	23	23	100%	Compatable use of brownfield for all sites
NW2.1	Manage stormwater	Yes	21	Superior (9)	9	21	43%	Reduce impervious in combination with storage
NW2.2	Reduce pesticide and fertilizer impacts	Yes	9	Superior (5)	5	9	56%	No significant difference among sites
NW2.3	Prevent surface and groundwater contamination	Yes	18	Restorative (18)	18	18	100%	Replacing maintenance facility reduces risk
NW3.1	Preserve species biodiversity	Yes	16	No Points (0)	0	16	0%	No connectivity available
NW3.2	Control invasive species	Yes	11	Superior (5)	5	11	45%	No invasive species expected in project
NW3.3	Restore disturbed soils	Yes	10	Conserving (8)	8	10	80%	No significant difference among sites
NW3.4	Maintain wetland and surface water functions	No	19	No Points (0)	0	0	N/A	Nature of project may preclude options
NW0.0	Innovate or Exceed Credit Requirements	No	8		0	0	N/A	Not considered in analysis
	Total		**203**		74	158	47	
Section 5: CLIMATE AND RISK								
CR1.1	Reduce greenhouse gas emissions	Yes	25	Enhanced (7)	7	25	28%	No significant difference among sites
CR1.2	Reduce air pollutant emissions	Yes	15	Improved (2)	2	15	13%	No significant difference among sites
CR2.1	Assess climate threat	Yes	15	Conserving (15)	15	15	100%	No significant difference among sites
CR2.2	Avoid traps and vulnerabilities	Yes	20	Improved (2)	2	20	10%	No significant difference among sites
CR2.3	Prepare for long-term adaptability	Yes	20	Conserving (16)	16	20	80%	No significant difference among sites
CR2.4	Prepare for short-term hazards	Yes	21	Conserving (17)	17	21	81%	No significant difference among sites
CR2.5	Manage heat islands effects	Yes	6	Improved (1)	1	6	17%	No significant difference among sites
CR0.0	Innovate or Exceed Credit Requirements	No	5		0	0	N/A	Not considered in analysis
	Total		**122**		60	122	49	
	Grand Total		**809**		300	738	40.7%	
					Estimated Rating:			Gold

Owls Outfall 007

Envision Rating Calculator

Project: Gowanus Canal CSO Facility
Date: 3/18/2015
Reviewer: Rick Carrier
OH-5 Site

Credit ID	Credit Title	Applicable?	Points Available	Rating	Points Achieved	Maximum Possible Points	Percentage of Possible Points	Comments
Section 1: QUALITY OF LIFE								
QL1.1	Improve community quality of life	Yes	25	Restorative (25)	25	25	100%	Potential Waterfront access
QL1.2	Stimulate sustainable growth and development	Yes	16	Superior (5)	5	16	31%	Improved aesthetics for the waterfront
QL1.3	Develop local skills and capabilities	Yes	15	Enhanced (2)	2	15	13%	No real long term employment expected
QL2.1	Enhance public health and safety	Yes	16	Conserving (16)	16	16	100%	Expected to reduce environmental exposure
QL2.2	Minimize noise and vibration	Yes	11	Restorative (11)	11	11	100%	Quieter facility will reduce noise
QL2.3	Minimize light pollution	Yes	11	Superior (4)	4	11	36%	Before and after similar
QL2.4	Improve community mobility and access	Yes	14	Improved (1)	1	14	7%	Limited abitlity to improve access
QL2.5	Encourage alternative modes of transportation	Yes	15	Restorative (15)	15	15	100%	Access to canal, little difference among sites
QL2.6	Improve site accessibility, safety and wayfinding	Yes	15	Conserving (12)	12	15	80%	Protect & enhance canal/water environment
QL3.1	Preserve historic and cultural resources	Yes	16	Restorative (16)	16	16	100%	Protect & enhance canal/water environment
QL3.2	Preserve views and local character	Yes	14	Restorative (14)	14	14	100%	Protect & enhance canal/water environment
QL3.3	Enhance public space	Yes	13	Restorative (13)	13	13	100%	Protect & enhance canal/water environment
QL0.0	Innovate or Exceed Credit Requirements	No	8		0	0	N/A	Not considered in analysis
	Total		**181**		134	181	74	
Section 2: LEADERSHIP								
LD1.1	Provide effective leadership and commitment	Yes	17	Conserving (17)	17	17	100%	Organizational commitment by NYC is in place
LD1.2	Establish a sustainability management system	Yes	14	Improved (1)	1	14	7%	No significant difference among sites
LD1.3	Foster collaboration and teamwork	Yes	15	Superior (8)	8	15	53%	No significant difference among sites
LD1.4	Provide for stakeholder involvement	Yes	14	Enhanced (5)	5	14	36%	No significant difference among sites
LD2.1	Pursue by-product synergy opportunities	No	15	No Points (0)	0	0	N/A	No significant difference among sites
LD2.2	Improve infrastructure integration	Yes	16	Restorative (16)	16	16	100%	Potential Waterfront Access
LD3.1	Plan for long-term monitoring and maintenance	Yes	10	Conserving (10)	10	10	100%	No significant difference among sites
LD3.2	Address conflicting regulations and policies	Yes	8	Improved (1)	1	8	13%	No significant difference among sites
LD3.3	Extend useful life	Yes	12	Conserving (12)	12	12	100%	No significant difference among sites
LD0.0	Innovate or Exceed Credit Requirements	No	6		0	0	N/A	Not considered in analysis
	Total		**121**		70	106	66	
Section 3: RESOURCE ALLOCATION								
RA1.1	Reduce net embodied energy	Yes	18	Improved (2)	2	18	11%	No significant difference among sites
RA1.2	Support sustainable procurement practices	Yes	9	Improved (2)	2	9	22%	No significant difference among sites
RA1.3	Use recycled materials	Yes	14	Improved (2)	2	14	14%	No significant difference among sites
RA1.4	Use regional materials	Yes	10	Improved (3)	3	10	30%	No significant difference among sites
RA1.5	Divert waste from landfills	No	11	No Points (0)	0	0	N/A	Large volume to landfill due to nature of project
RA1.6	Reduce excavated materials taken off site	Yes	6	No Points (0)	0	6	0%	Large volume to landfill due to nature of project
RA1.7	Provide for deconstruction and recycling	Yes	12	Improved (1)	1	12	8%	Significant cast in place concrete components
RA2.1	Reduce energy consumption	Yes	18	Improved (3)	3	18	17%	No significant difference among sites
RA2.2	Use renewable energy	Yes	20	Enhanced (6)	6	20	30%	No significant difference among sites
RA2.3	Commission and monitor energy systems	Yes	11	Enhanced (3)	3	11	27%	No significant difference among sites
RA3.1	Protect fresh water availability	Yes	21	Conserving (17)	17	21	81%	No significant difference among sites
RA3.2	Reduce potable water consumption	Yes	21	Improved (4)	4	21	19%	No significant difference among sites
RA3.3	Monitor water systems	Yes	11	Improved (1)	1	11	9%	No significant difference among sites
RA0.0	Innovate or Exceed Credit Requirements	No	9		0	0	N/A	Not considered in analysis
	Total		**182**		44	171	26	
Section 4: NATURAL WORLD								
NW1.1	Preserve prime habitat	Yes	18	Restorative (18)	18	18	100%	Allows for restoration of riparian environment
NW1.2	Protect wetlands and surface water	Yes	18	Improved (1)	1	18	6%	50-foot buffer can be incorporated
NW1.3	Preserve prime farmland	No	15	No Points (0)	0	0	N/A	Not applicable
NW1.4	Avoid adverse geology	No	5	No Points (0)	0	0	N/A	Not applicable
NW1.5	Preserve floodplain functions	Yes	14	Enhanced (5)	5	14	36%	No significant difference among sites
NW1.6	Avoid unsuitable development on steep slopes	No	6	No Points (0)	0	0	N/A	Not applicable
NW1.7	Preserve greenfields	Yes	23	Restorative (23)	23	23	100%	Compatable use of brownfield for all sites
NW2.1	Manage stormwater	Yes	21	Superior (9)	9	21	43%	Reduce impervious in combination with storage
NW2.2	Reduce pesticide and fertilizer impacts	Yes	9	Superior (5)	5	9	56%	No significant difference among sites
NW2.3	Prevent surface and groundwater contamination	Yes	18	Restorative (18)	18	18	100%	Replacement of current use reduces risk
NW3.1	Preserve species biodiversity	Yes	16	Improved (2)	2	16	13%	Potential to begin linkage of habitats along canal
NW3.2	Control invasive species	Yes	11	Superior (5)	5	11	45%	No invasive species expected in constructe works
NW3.3	Restore disturbed soils	Yes	10	Conserving (8)	8	10	80%	No significant difference among sites
NW3.4	Maintain wetland and surface water functions	No	19	No Points (0)	0	0	N/A	Nature of project may preclude options
NW0.0	Innovate or Exceed Credit Requirements	No	8		0	0	N/A	Not considered in analysis
	Total		**203**		94	158	59	
Section 5: CLIMATE AND RISK								
CR1.1	Reduce greenhouse gas emissions	Yes	25	Enhanced (7)	7	25	28%	No significant difference among sites
CR1.2	Reduce air pollutant emissions	Yes	15	Improved (2)	2	15	13%	No significant difference among sites
CR2.1	Assess climate threat	Yes	15	Conserving (15)	15	15	100%	No significant difference among sites
CR2.2	Avoid traps and vulnerabilities	Yes	20	Improved (2)	2	20	10%	No significant difference among sites
CR2.3	Prepare for long-term adaptability	Yes	20	Conserving (16)	16	20	80%	No significant difference among sites
CR2.4	Prepare for short-term hazards	Yes	21	Conserving (17)	17	21	81%	No significant difference among sites
CR2.5	Manage heat islands effects	Yes	6	Improved (1)	1	6	17%	No significant difference among sites
CR0.0	Innovate or Exceed Credit Requirements	No	5		0	0	N/A	Not considered in analysis
	Total		**122**		60	122	49	
	Grand Total		**809**		402	738	54.5%	
					Estimated Rating:			Platnium

Envision Rating Calculator

Project: Gowanus Canal CSO Facility
Date: 3/18/2015
Reviewer: Rick Carrier
OH-4 Site

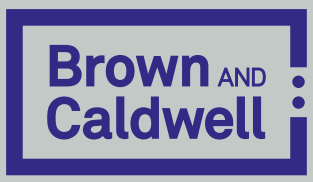
Credit ID	Credit Title	Applicable?	Points Available	Rating	Points Achieved	Maximum Possible Points	Percentage of Possible Points	Comments
Section 1: QUALITY OF LIFE								
QL1.1	Improve community quality of life	Yes	25	Restorative (25)	25	25	100%	Potential Waterfront access
QL1.2	Stimulate sustainable growth and development	Yes	16	Superior (5)	5	16	31%	Improved aesthetics for the waterfront
QL1.3	Develop local skills and capabilities	Yes	15	Enhanced (2)	2	15	13%	No real long term employment expected
QL2.1	Enhance public health and safety	Yes	16	Conserving (16)	16	16	100%	Expected to reduce environmental exposure
QL2.2	Minimize noise and vibration	Yes	11	Conserving (8)	8	11	73%	Noise level similar to current use
QL2.3	Minimize light pollution	Yes	11	Superior (4)	4	11	36%	Before and after similar
QL2.4	Improve community mobility and access	Yes	14	Enhanced (4)	4	14	29%	Limited abitlity to improve access
QL2.5	Encourage alternative modes of transportation	Yes	15	Restorative (15)	15	15	100%	Access to canal, little difference among sites
QL2.6	Improve site accessibility, safety and wayfinding	Yes	15	Conserving (12)	12	15	80%	Protect & enhance canal/water environment
QL3.1	Preserve historic and cultural resources	Yes	16	Restorative (16)	16	16	100%	Protect & enhance canal/water environment
QL3.2	Preserve views and local character	Yes	14	Restorative (14)	14	14	100%	Protect & enhance canal/water environment
QL3.3	Enhance public space	Yes	13	Restorative (13)	13	13	100%	Protect & enhance canal/water environment
QL0.0	Innovate or Exceed Credit Requirements	No	8		0	0	N/A	Not considered in analysis
	Total		**181**		134	181	74	
Section 2: LEADERSHIP								
LD1.1	Provide effective leadership and commitment	Yes	17	Conserving (17)	17	17	100%	Organizational commitment by NYC is in place
LD1.2	Establish a sustainability management system	Yes	14	Improved (1)	1	14	7%	No significant difference among sites
LD1.3	Foster collaboration and teamwork	Yes	15	Superior (8)	8	15	53%	No significant difference among sites
LD1.4	Provide for stakeholder involvement	Yes	14	Enhanced (5)	5	14	36%	No significant difference among sites
LD2.1	Pursue by-product synergy opportunities	No	15	No Points (0)	0	0	N/A	No significant difference among sites
LD2.2	Improve infrastructure integration	Yes	16	Restorative (16)	16	16	100%	Potential Waterfront Access
LD3.1	Plan for long-term monitoring and maintenance	Yes	10	Conserving (10)	10	10	100%	No significant difference among sites
LD3.2	Address conflicting regulations and policies	Yes	8	Improved (1)	1	8	13%	No significant difference among sites
LD3.3	Extend useful life	Yes	12	Conserving (12)	12	12	100%	No significant difference among sites
LD0.0	Innovate or Exceed Credit Requirements	No	6		0	0	N/A	Not considered in analysis
	Total		**121**		70	106	66	
Section 3: RESOURCE ALLOCATION								
RA1.1	Reduce net embodied energy	Yes	18	Improved (2)	2	18	0	No significant difference among sites
RA1.2	Support sustainable procurement practices	Yes	9	Improved (2)	2	9	22%	No significant difference among sites
RA1.3	Use recycled materials	Yes	14	Improved (2)	2	14	14%	No significant difference among sites
RA1.4	Use regional materials	Yes	10	Improved (3)	3	10	30%	No significant difference among sites
RA1.5	Divert waste from landfills	No	11	No Points (0)	0	0	N/A	Large volume to landfill due to nature of project
RA1.6	Reduce excavated materials taken off site	Yes	6	No Points (0)	0	6	0%	Large volume to landfill due to nature of project
RA1.7	Provide for deconstruction and recycling	Yes	12	Improved (1)	1	12	8%	Significant cast in place concrete components
RA2.1	Reduce energy consumption	Yes	18	Improved (3)	3	18	17%	No significant difference among sites
RA2.2	Use renewable energy	Yes	20	Enhanced (6)	6	20	30%	No significant difference among sites
RA2.3	Commission and monitor energy systems	Yes	11	Enhanced (3)	3	11	27%	No significant difference among sites
RA3.1	Protect fresh water availability	Yes	21	Conserving (17)	17	21	81%	No significant difference among sites
RA3.2	Reduce potable water consumption	Yes	21	Improved (4)	4	21	19%	No significant difference among sites
RA3.3	Monitor water systems	Yes	11	Improved (1)	1	11	9%	No significant difference among sites
RA0.0	Innovate or Exceed Credit Requirements	No	9		0	0	N/A	Not considered in analysis
	Total		**182**		44	171	26	
Section 4: NATURAL WORLD								
NW1.1	Preserve prime habitat	Yes	18	Restorative (18)	18	18	100%	Allows for restoration of riparian environment
NW1.2	Protect wetlands and surface water	Yes	18	Improved (1)	1	18	6%	50-foot buffer can be incorporated
NW1.3	Preserve prime farmland	No	15	No Points (0)	0	0	N/A	Not applicable
NW1.4	Avoid adverse geology	No	5	No Points (0)	0	0	N/A	Not applicable
NW1.5	Preserve floodplain functions	Yes	14	Enhanced (5)	5	14	36%	No significant difference among sites
NW1.6	Avoid unsuitable development on steep slopes	No	6	No Points (0)	0	0	N/A	Not applicable
NW1.7	Preserve greenfields	Yes	23	Restorative (23)	23	23	100%	Compatable use of brownfield for all sites
NW2.1	Manage stormwater	Yes	21	Superior (9)	9	21	43%	Reduce impervious in combination with storage
NW2.2	Reduce pesticide and fertilizer impacts	Yes	9	Superior (5)	5	9	56%	No significant difference among sites
NW2.3	Prevent surface and groundwater contamination	Yes	18	Restorative (18)	18	18	100%	Replacement of current use reduces risk
NW3.1	Preserve species biodiversity	Yes	16	Improved (2)	2	16	13%	Potential to begin linkage of habitats along canal
NW3.2	Control invasive species	Yes	11	Superior (5)	5	11	45%	No invasive species expected in constructe works
NW3.3	Restore disturbed soils	Yes	10	Conserving (8)	8	10	80%	No significant difference among sites
NW3.4	Maintain wetland and surface water functions	No	19	No Points (0)	0	0	N/A	Nature of project may preclude options
NW0.0	Innovate or Exceed Credit Requirements	No	8		0	0	N/A	Not considered in analysis
	Total		**203**		94	158	59	
Section 5: CLIMATE AND RISK								
CR1.1	Reduce greenhouse gas emissions	Yes	25	Enhanced (7)	7	25	28%	No significant difference among sites
CR1.2	Reduce air pollutant emissions	Yes	15	Improved (2)	2	15	13%	No significant difference among sites
CR2.1	Assess climate threat	Yes	15	Conserving (15)	15	15	100%	No significant difference among sites
CR2.2	Avoid traps and vulnerabilities	Yes	20	Improved (2)	2	20	10%	No significant difference among sites
CR2.3	Prepare for long-term adaptability	Yes	20	Conserving (16)	16	20	80%	No significant difference among sites
CR2.4	Prepare for short-term hazards	Yes	21	Conserving (17)	17	21	81%	No significant difference among sites
CR2.5	Manage heat islands effects	Yes	6	Improved (1)	1	6	17%	No significant difference among sites
CR0.0	Innovate or Exceed Credit Requirements	No	5		0	0	N/A	Not considered in analysis
	Total		**122**		60	122	49	
	Grand Total		**809**		402	738	54.5%	
					Estimated Rating:			Platnium

Envision Rating Calculator

Project: Gowanus Canal CSO Facility
Date: 3/18/2015
Reviewer: Rick Carrier
OH-7 Site

Credit ID	Credit Title	Applicable?	Points Available	Rating	Points Achieved	Maximum Possible Points	Percentage of Possible Points	Comments
Section 1: QUALITY OF LIFE								
QL1.1	Improve community quality of life	Yes	25	Restorative (25)	25	25	100%	Potential Waterfront access
QL1.2	Stimulate sustainable growth and development	Yes	16	Superior (5)	5	16	31%	Improved aesthetics for the waterfront
QL1.3	Develop local skills and capabilities	Yes	15	Enhanced (2)	2	15	13%	No real long term employment expected
QL2.1	Enhance public health and safety	Yes	16	Conserving (16)	16	16	100%	Expected to reduce environmental exposure
QL2.2	Minimize noise and vibration	Yes	11	Conserving (8)	8	11	73%	Noise level similar to current use
QL2.3	Minimize light pollution	Yes	11	Superior (4)	4	11	36%	Before and after similar
QL2.4	Improve community mobility and access	Yes	14	Conserving (14)	14	14	100%	3rd Avenue bike route may present opportunities
QL2.5	Encourage alternative modes of transportation	Yes	15	Restorative (15)	15	15	100%	Access to canal, little difference among sites
QL2.6	Improve site accessibility, safety and wayfinding	Yes	15	Conserving (12)	12	15	80%	Protect & enhance canal/water environment
QL3.1	Preserve historic and cultural resources	Yes	16	Restorative (16)	16	16	100%	Protect & enhance canal/water environment
QL3.2	Preserve views and local character	Yes	14	Restorative (14)	14	14	100%	Protect & enhance canal/water environment
QL3.3	Enhance public space	Yes	13	Restorative (13)	13	13	100%	Protect & enhance canal/water environment
QL0.0	Innovate or Exceed Credit Requirements	No	8		0	0	N/A	Not considered in analysis
	Total		**181**		144	181	80	
Section 2: LEADERSHIP								
LD1.1	Provide effective leadership and commitment	Yes	17	Conserving (17)	17	17	100%	Organizational commitment by NYC is in place
LD1.2	Establish a sustainability management system	Yes	14	Improved (1)	1	14	7%	No significant difference among sites
LD1.3	Foster collaboration and teamwork	Yes	15	Superior (8)	8	15	53%	No significant difference among sites
LD1.4	Provide for stakeholder involvement	Yes	14	Enhanced (5)	5	14	36%	No significant difference among sites
LD2.1	Pursue by-product synergy opportunities	No	15	No Points (0)	0	0	N/A	No significant difference among sites
LD2.2	Improve infrastructure integration	Yes	16	Restorative (16)	16	16	100%	Potential Waterfront Access
LD3.1	Plan for long-term monitoring and maintenance	Yes	10	Conserving (10)	10	10	100%	No significant difference among sites
LD3.2	Address conflicting regulations and policies	Yes	8	Improved (1)	1	8	13%	No significant difference among sites
LD3.3	Extend useful life	Yes	12	Conserving (12)	12	12	100%	No significant difference among sites
LD0.0	Innovate or Exceed Credit Requirements	No	6		0	0	N/A	Not considered in analysis
	Total		**121**		70	106	66	
Section 3: RESOURCE ALLOCATION								
RA1.1	Reduce net embodied energy	Yes	18	Improved (2)	2	18	11%	No significant difference among sites
RA1.2	Support sustainable procurement practices	Yes	9	Improved (2)	2	9	22%	No significant difference among sites
RA1.3	Use recycled materials	Yes	14	Improved (2)	2	14	14%	No significant difference among sites
RA1.4	Use regional materials	Yes	10	Improved (3)	3	10	30%	No significant difference among sites
RA1.5	Divert waste from landfills	No	11	No Points (0)	0	0	N/A	Large volume to landfill due to nature of project
RA1.6	Reduce excavated materials taken off site	Yes	6	No Points (0)	0	6	0%	Large volume to landfill due to nature of project
RA1.7	Provide for deconstruction and recycling	Yes	12	Improved (1)	1	12	8%	Significant cast in place concrete components
RA2.1	Reduce energy consumption	Yes	18	Improved (3)	3	18	17%	No significant difference among sites
RA2.2	Use renewable energy	Yes	20	Enhanced (6)	6	20	30%	No significant difference among sites
RA2.3	Commission and monitor energy systems	Yes	11	Enhanced (3)	3	11	27%	No significant difference among sites
RA3.1	Protect fresh water availability	Yes	21	Conserving (17)	17	21	81%	No significant difference among sites
RA3.2	Reduce potable water consumption	Yes	21	Improved (4)	4	21	19%	No significant difference among sites
RA3.3	Monitor water systems	Yes	11	Improved (1)	1	11	9%	No significant difference among sites
RA0.0	Innovate or Exceed Credit Requirements	No	9		0	0	N/A	Not considered in analysis
	Total		**182**		44	171	26	
Section 4: NATURAL WORLD								
NW1.1	Preserve prime habitat	Yes	18	Restorative (18)	18	18	100%	Allows for restoration of riparian environment
NW1.2	Protect wetlands and surface water	Yes	18	Improved (1)	1	18	6%	50-foot buffer can be incorporated
NW1.3	Preserve prime farmland	No	15	No Points (0)	0	0	N/A	Not applicable
NW1.4	Avoid adverse geology	No	5	No Points (0)	0	0	N/A	Not applicable
NW1.5	Preserve floodplain functions	Yes	14	Enhanced (5)	5	14	36%	No significant difference among sites
NW1.6	Avoid unsuitable development on steep slopes	No	6	No Points (0)	0	0	N/A	Not applicable
NW1.7	Preserve greenfields	Yes	23	Restorative (23)	23	23	100%	Compatable use of brownfield for all sites
NW2.1	Manage stormwater	Yes	21	Superior (9)	9	21	43%	Reduce impervious in combination with storage
NW2.2	Reduce pesticide and fertilizer impacts	Yes	9	Superior (5)	5	9	56%	No significant difference among sites
NW2.3	Prevent surface and groundwater contamination	Yes	18	Restorative (18)	18	18	100%	Replacement of current use reduces risk
NW3.1	Preserve species biodiversity	Yes	16	Improved (2)	2	16	13%	Potential to begin linkage of habitats along canal
NW3.2	Control invasive species	Yes	11	Superior (5)	5	11	45%	No invasive species expected in constructe works
NW3.3	Restore disturbed soils	Yes	10	Conserving (8)	8	10	80%	No significant difference among sites
NW3.4	Maintain wetland and surface water functions	No	19	No Points (0)	0	0	N/A	Nature of project may preclude options
NW0.0	Innovate or Exceed Credit Requirements	No	8		0	0	N/A	Not considered in analysis
	Total		**203**		94	158	59	
Section 5: CLIMATE AND RISK								
CR1.1	Reduce greenhouse gas emissions	Yes	25	Enhanced (7)	7	25	28%	No significant difference among sites
CR1.2	Reduce air pollutant emissions	Yes	15	Improved (2)	2	15	13%	No significant difference among sites
CR2.1	Assess climate threat	Yes	15	Conserving (15)	15	15	100%	No significant difference among sites
CR2.2	Avoid traps and vulnerabilities	Yes	20	Improved (2)	2	20	10%	No significant difference among sites
CR2.3	Prepare for long-term adaptability	Yes	20	Conserving (16)	16	20	80%	No significant difference among sites
CR2.4	Prepare for short-term hazards	Yes	21	Conserving (17)	17	21	81%	No significant difference among sites
CR2.5	Manage heat islands effects	Yes	6	Improved (1)	1	6	17%	No significant difference among sites
CR0.0	Innovate or Exceed Credit Requirements	No	5		0	0	N/A	Not considered in analysis
	Total		**122**		60	122	49	
	Grand Total		**809**		412	738	55.8%	
					Estimated Rating:			Platnium

Prepared by



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