



2018 WEDA Environmental Excellence Award Nomination

**Former Gloucester Gas Light Company Manufactured Gas Plant Facility  
Remedy Implementation**

Submitted by Charter Contracting Company, LLC



## SUMMARY

### PROJECT HISTORY

The Phase IV Remedy Implementation in Gloucester, MA is a \$30M, multi-scope, highly complex project executed in the congested, industrial and commercial waterfront in Gloucester, MA, the oldest active harbor in the Country. The work was performed along the historic waterfront and encompassed an upland and nearshore area, and an offshore area extending across 12 acres of the inner harbor. In the late 1850's Gloucester Gas Light Company (GGLC) operated a Manufactured Gas Plant (MGP) along the waterfront. The operation left behind various waste products that contaminated the waterfront.

### NATIONAL GRID ASSEMBLED TEAM OF EXPERTS

National Grid, the successor to GGLC, inherited the legacy contamination, as well as the responsibility for cleaning up the former MGP site. To complete the work, National Grid assembled a construction team that included Charter Contracting Company (Charter) to perform both the upland and marine construction work; GZA GeoEnvironmental (GZA) to provide environmental and geotechnical engineering support and construction oversight; and Anchor QEA to provide marine engineering support. While managing this project, National Grid provided oversight and guidance required to meet the complex state and federal environmental regulatory requirements, while restoring a vital historic area and community resource.

### COMPLEX AND UNIQUE

The Gloucester project is one of the most complex and sequenced projects the Team had undertaken. The site is a compact area that sits on four properties owned by National Grid, the US Coast Guard, City of Gloucester, and Maritime Gloucester Museum. The Team began work on the project in 2015 and completed this multi-scope project over the course of two construction seasons while working with a 9-foot tidal change. This complex project included demolition and construction / reconstruction of historic waterfront structures; operation of a barge-mounted 200 gpm temporary water treatment plant; and excavation and transportation of more than 42,000 tons

of impacted soils and sediments via barges for off-site thermal treatment and/or disposal. In the upland areas, the project included demolition/deconstruction of an upland park and waterfront structures; removal of MGP-impacted soil; construction of an MGP product recovery system; and construction/reconstruction of waterfront structures. In the marine areas, work included removal of existing piers/pilings; removal of submerged debris; dredging of impacted sediment; backfill of dredged areas; placement of a sand cap with an organo-clay mixture; and a sand cap to support the marine armor mattresses used to reinforce near shore areas; replaced piles and piers for Gloucester Harbormaster and Maritime Gloucester Museum; and restored piles on the U.S. Coast Guard Pier. Throughout the work, communication was essential with the multiple stakeholders, including the U.S. Coast Guard, Gloucester Harbormaster, Maritime Gloucester Museum, maritime traffic, and local City officials relating to the work schedule and sequence; coordination of multiple permits from local and State officials and special interest organizations; and provided site security throughout the project to ensure the safety of the many impacted abutters, business owners, and visitors.

The Project Team, under direction from National Grid, successfully completed this project within a constrained footprint with virtually no laydown area, while mitigating impacts to the waterfront and community. Due to the complexities of the site, each course of action was assessed and reviewed for efficiency and minimization of impact prior to implementation. The Team worked together throughout the project to ensure each task was executed to minimize impact to marine habitat and historic resources. This Team went above and beyond to ensure the final product provided safe and stable infrastructure for the community to enjoy.

### PROJECT TEAM MEMBERS

<b>OWNER</b> National Grid	<b>ENGINEER</b> GZA GeoEnvironmental
<b>CONTRACTOR &amp; NOMINATING ENTITY</b> Charter Contracting Company, LLC WEDA Member	<b>MARINE ENGINEER</b> Anchor QEA

## ENVIRONMENTAL BENEFITS

The Project Team's goal for the Gloucester Project was to not only meet the mandates set by the environmental regulatory agencies, but to create a healthy environment with significant upgrades to the landscape to be enjoyed by the community-at-large.

### POSITIVE IMPACT TO FISH AND WILDLIFE

The environmental driver at the core of the Gloucester Project was the removal of DNAPL in the Harbor to eliminate its negative impact on wildlife, commercial/recreational fishing, and boating activities. The project scope included the deconstruction of a historic seawall at the Solomon Jacobs Park, to excavate contaminants 35 feet beneath the surface; and the removal of MGP-impacted sediment through land-based excavations of the park area and barge-mounted mechanical and diver-assisted suction dredging of the Harbor. State-of-the-art engineering controls were installed in the dredge footprint to re-establish grades and ecological/wetland habitats. Aging and contaminated waterfront structures were reconstructed, including bulkheads, the granite seawall, the Solomon Jacobs Park, and several piers to restore the site to its natural state.

Prior to beginning work, National Grid and the Project Team invested heavily in pre-construction planning to engineer creative solutions to each anticipated project challenge. However, once the Team mobilized, they were met with additional on-site obstructions and unforeseen conditions. In response to changing conditions, each pre-determined approach was reviewed for efficiency. Once a planned approach was determined to be ineffective, the Team, with full support and direction from National Grid, value engineered an alternate approach to complete the work in the most effective manner with environmental restoration at the core of each of those decisions.

### ENVIRONMENTAL CHALLENGES ENCOUNTERED

One of the major challenges the Team encountered was the extent and complexity of the soil and sediment waste stream. The level of contamination varied within the harbor front areas and resulted

in varying Release Tracking Numbers (RTN). This required the Team to distinctly manage the varying waste streams and ensure that materials were not co-mingled. After careful consideration, it was determined that all sediments and materials would be disposed at a facility that was capable of treating the higher level contaminants to accommodate the short dredge window and limited work area. The Team successfully completed the removal of sediments from the outer and near shore Harbor areas using an environmental bucket that was supplemented with diver-assisted suction dredging in the near shore areas to safeguard existing structures and to work around obstructions.

### ENGINEERING WITH NATURE

To eliminate the future spread of contamination, the Team used engineering controls that worked with the natural landscape, including an organo-clay mix to control residual contaminants and a series of custom built Marine Armor Mattresses (MAMs) constructed with rock, organo-clay, and stone, which acted as the protective armor.

The Team was also tasked with the proper handling of historic, existing infrastructure within the Harbor that was infiltrated and surrounded by contamination, which included dredging around the oldest, active marine railway in the Country operated by Maritime Gloucester, as well as the sensitivity and oversight required for the deconstruction and reconstruction of the granite seawall. To ensure all accommodations were made to maintain the integrity of these historic structures, the Team worked with the historic representative from the Public Archaeology Laboratory (PAL) who were on-site to observe the reconstruction of the seawall, and to observe and catalog artifacts unearthed during the diver-assisted suction dredging of sediments around the historic marine railway.

The Project Team worked around the clock to meet stringent in-water regulatory permit deadlines. The result was a revitalized waterfront and inner harbor area that provided the Community with a contaminant-free, secure, and vibrant harbor for the areas many residents, businesses, visitors, and tourists.

## INNOVATION

### GETTING BEYOND TRADITIONAL METHODS

Over the course of the two construction seasons, this project addressed various challenges with innovative means and methods. One of the most significant innovations implemented was the alternative, sustainable approach to transporting MGP-impacted sediments to a treatment and disposal facility via barge.

To better meet the needs of the client and the community, Charter proposed an alternative transportation method where 1,800 truckloads of contaminated material were replaced with thirteen barge loads shipped to a water-side stabilization facility in New Jersey before treatment and disposal. This eliminated the need to trans-load onto land, dewater, stockpile, and process the MGP-impacted sediments in downtown Gloucester preventing disruptions to nearby businesses, residents, and tourists.

The barging of contaminants for water transport to the disposal facility was the first of its kind to be implemented in New England and is revolutionizing the way the industry is handling the transportation of impacted sediment. Eliminating truck traffic in this urban, dense locale through the use of barges was an innovation and alternative construction method that was praised by the Community and extremely successful in its implementation.

### PROJECT TEAM BREAKS NEW GROUND

The Project Team also implemented materials and engineered controls, such as the placement of 80 MAMs. Using its Rockport staging area to minimize impact to the already constrained project footprint, the Team filled the prefabricated MAMs with rock and an organo-clay mix. Once filled, the team trucked the MAMs to the Coast Guard's staging area. During this task, the team encountered large, non-movable boulders requiring the meticulous placement of the nearly two-ton MAMs with a land-based crane and diver-assistance. This complex activity was successfully executed within a tidally-impacted waterway by sequencing placement around the tides.

The Team also placed a state-of-the-art pore water cap area, yet another engineered control that was placed on the sea floor after dredging to safeguard the Harbor from future DNAPL migration. The cap extended out from underneath the face of the newly constructed sea wall across the National Grid property adding an additional layer of complexity.

Finally, Charter completed the design/build of the state-of-the-art DNAPL collection treatment room built within the National Grid Building. The DNAPL collection system consists of interconnected piping installed in drilled wells along the upland face of the seawall to monitor and remove DNAPL for treatment.

The level of detail and implementation of innovative technologies by the Team ensured that this historic and vital Harbor thrives well into the future.

## ECONOMIC BENEFITS

Over decades of growth, Gloucester Inner Harbor developed into a vibrant neighborhood with a bustling fishing industry and various store fronts, especially in the area known as Duncan's Point, the site of the Gloucester project. The remediation and restoration of this area was performed to give the stakeholders, the community, its visitors, and the City back a thriving waterfront. Not only did the Team execute this work with the ultimate goal of positively impacting the local community, but the Team also considered cost-effective and efficient means and methods that would benefit the project during its execution.

### INNOVATION RESULTS IN COST SAVINGS AND ECONOMIC EFFICIENCIES

The method selected to transport dredged materials off-site via barge yielded the greatest cost efficiencies, while also reducing the project's carbon footprint. The Team was acutely aware of the high traffic volume of this downtown area and sensitive to the potential this project had to grind normal downtown operations to a halt with the amount of truck traffic the land-based transportation of sediment would add to the City streets.

To mitigate increased traffic and impacts to local business operations, the Contractor proposed an alternative disposal method whereby 1,800 truckloads of sediment were replaced with thirteen barge loads. This solution effectively reduced the trucking of MGP-impacted sediments through the downtown area along with the negative impacts of noise, odor, and traffic.

To reduce disturbances to the active and operating businesses and stakeholders located within the project footprint the Team:

- Conducted work in the fall and winter outside the tourist season in Gloucester, working in 12-hour double shifts and in accordance with the "fish window" established by the Massachusetts Division of Marine Fisheries to protect local fish species.
- Worked with the U.S. Coast Guard, local agencies, and property owners to limit the impact of in-water operations on harbor

activities, particularly commercial fishing and other marine industry.

- Coordinated with local authorities, agencies, and the surrounding community on transportation safety issues.
- Consulted with the Massachusetts Historical Commission, Gloucester Historical Commission and Maritime Gloucester to ensure that historic and archaeological properties in the work areas that relate to Gloucester's maritime heritage were preserved throughout the project.

### IMPROVEMENTS ENJOYED BY STAKEHOLDERS

Upon completion, the Gloucester Project provided many benefits to the stakeholders, including the remediated and restored Solomon Jacobs Park, new seawalls at Solomon Jacobs Park, and the reinforcement of existing seawalls at neighboring properties. Steel pipe piles and concrete docks were installed in front of maritime Gloucester adjacent to a new floating dock system that provides enhanced landing facilities for use by the Harbormaster and recreational boaters. During reconstruction, seawalls were also re-aligned to better suit the needs of the City of Gloucester Harbormaster and dredging provided additional draft for the Harbormaster's vessels.

The reconstructed seawall and land in front of the National Grid building provides enhanced public access to, and views of, the waterfront; and important historical and archaeological properties relating to Gloucester's maritime heritage were preserved.

#### STAKEHOLDERS

- *City of Gloucester*
- *Maritime Gloucester*
- *US Coast Guard*
- *MA Department of Environmental Protection*
- *US Army Corps of Engineers*
- *US Environmental Protection Agency*

## TRANSFERABILITY

### COMPLEXITIES YIELD TRANSFERABLE LESSONS

The Gloucester project is one of the most complex and meticulously sequenced project that Charter and National Grid have undertaken. The site is a compact area that sits on four properties owned by National Grid, the US Coast Guard, City of Gloucester, and Maritime Gloucester Museum. Among the many lessons learned during this Project, one that is certainly transferable is the importance of pre-characterization of the multiple soil and sediment waste streams and disposal facility approval prior to work beginning. Understanding the level of contamination and working through the disposal options, up and to, securing the facility that will accept the impacted materials is crucial. Working this important project driver mitigates schedule and cost impacts during the project's execution.

Given the unique site complexities, another critical lesson learned is the importance of partnership, collaboration, and communication amongst the Project Team. The continuous collaboration during the implementation of the many highly technical solutions—solutions that had never been

implemented by the Project Team previously along a waterfront and within a tidally-influenced Harbor required an extensive amount of interaction.

The coordination and high level of communication that the Team engaged in throughout the project ensured the critical mission of the US Coast Guard remained uninterrupted and eliminated any impact to the Coast Guard's critical marine rescue and enforcement operations.

The Team also worked closely with Maritime Gloucester to minimize disruptions to their programs, especially during peak summer months when hundreds of visitors and tourists visited the site.

Throughout the project, the Team encountered unforeseen conditions that impacted the project. The complexities of the site and the number of changes that were executed in the field successfully is a testament to the Team's ability to collaborate under duress. Given the size of site footprint, and the number of obstructions encountered, the twice-daily fluctuation of the tides, and the on-site project staff that worked within this small footprint, the result was truly tremendous and a nod to effective communication and successful partnering.

## OUTREACH

### FOLLOWING THE REJUVENATION OF A HISTORIC HARBOR

The historic nature of the Gloucester Harbor and the level of attention this compact area receives from visitors, residents, and commercial and recreational boaters heightened the prominence and importance of the work done to restore it to its natural state. Local media were very interested in the project and understood how important it was and the benefits it would provide upon completion. As featured in a local news article, the Executive Director of Gloucester Maritime, Tom Balf, had the following to say at the onset of the project, "The good news is the harbor will be cleaner, and our facilities will be fully restored and ready to resume full waterfront operations in the Spring of 2017," Balf said in a letter to Maritime Gloucester members. "The impacts are what we — Maritime Gloucester and the community — make of them; namely educational and teaching opportunities to learn about contamination, risk, cleanup and jobs."

This historic project was also closely followed by the many local, interested parties. The true beauty of the project was not found in its final aesthetics, but it was found in the level of collaboration that took place throughout. Due to the advance community involvement work performed by National Grid during the pre-construction phase, the local community was aware of and understood the level of disruption this project could impose, and instead of fighting it, they worked with the Project

Team to minimize disruptions throughout. Each stakeholder respected the need for this clean-up and made the necessary concessions to make this project a true victory for everyone involved, as well as the community at large. The Project Team coordinated on a daily basis (sometime numerous times throughout the day) the schedule and ensured impacts would be as minimal as possible. When working around the active U.S. Coast Guard Base, the Team would relocate vessels to ensure access and continuity of mission critical operations.

National Grid also developed a Project web page to provide the public with information about the environmental remediation project in and adjacent to Gloucester's Inner Harbor. The site offered regular status updates, answered frequently asked questions, and provided historical information as well as the vision for the future of the site and the benefits the community would enjoy as a result of the remediation of the Harbor and reconstruction of its infrastructure.

National Grid also gave an on site presentation to a select group of MA Maritime Marine Construction Students that detailed the project and its benefits to the community.

With our award application, we have included a drone highlight video that best illustrates the compact footprint of the site and the work the team completed over two seasons through all weather conditions in this active and historical Seaport.

Video Link - [HTTPS://VIMEO.COM/268049230](https://vimeo.com/268049230)

PW - WEDA



**PROJECT HIGHLIGHT VIDEO - [HTTPS://VIMEO.COM/268049230](https://vimeo.com/268049230)**

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