

**PUBLIC WORKS PROJECT OF THE YEAR AWARD
NOMINATION FORM**

Deadline March 1, 2016
(electronic submittals only)

Project Name
Marblehead Pipeline Replacement Project

Project Completion Date
Must be substantially completed (90%) and available for public use as of December 31, 2015.
8/14/2015

Public Agency
South Essex Sewerage District

- Project Category**
- Structures
 - Transportation
 - Environment
 - Historical Restoration/Preservation
 - Disaster or Emergency Construction/Repair

- Project Division**
- Less than \$5 Million
 - \$5 Million, but less than \$25 Million
 - \$25 Million-\$75 Million
 - More than \$75 Million

Managing Agency
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Name
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Title
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Primary Consultant
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Name
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Title
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Continued...

**2016 APWA
PROFESSIONAL AWARDS**

PUBLIC WORKS PROJECT OF THE YEAR AWARD SUPPORTING DATA FORM

Please address each of the following areas in your nomination, adhering to the sequence below when possible.

- Completion date contained in contract. Any time extensions granted should be addressed in the submittal.
- Construction schedule, management, and control techniques used. Use of alternative materials, practices of funding that demonstrates a commitment to sustainability.
- Safety performance including number of lost-time injuries per 1,000 man-hours worked and overall safety program employed during the construction phase.
- Environmental considerations including special steps taken to preserve and protect the environment, endangered species, etc., during the construction phase.
- Community relations—a summary of the efforts by the agency, consultant and contractor to protect public lives and property, minimize public inconvenience and improve relations.
- Unusual accomplishments under adverse conditions, including but not limited to, adverse weather, soil or site conditions, or other occurrences over which there was no control.
- Additional considerations you would like to bring to the attention of the project review panel, such as innovations in technology and/or management applications during the project.

NOTE: Supporting documentation is **limited to 20 pages**, exclusive of photographs and nomination form. Photographs will be used for promotional purposes by the association. Submittal should include nomination form and supporting documentation form, and photographs. No letters of recommendation please. Simultaneous nomination of the same project in both Public Works Project of the Year and SC/RC Project of the Year or in two categories is not permitted.

Nominations not chosen in a specific year for the Public Works Project of the Year—Small Cities/Rural Communities Award cannot be resubmitted in a subsequent year in the other category.

Nominated by: *(Can only be nominated by managing public agency or APWA chapters.)* Projects that involve or reside within two or more chapters locations can be co-nominated. Each chapter will receive credit to submit a PACE nomination. All chapters must be identified on the nomination form and before the nominations are judged.

Richard Benevento

Name

Awards Committee Chairman

Title

New England Chapter APWA

Agency/Organization

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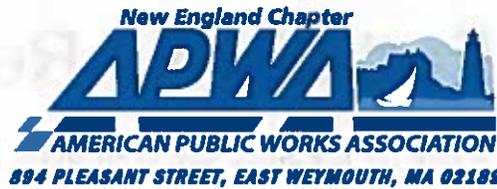
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March 1, 2016

Awards Review Committee
American Public Works Association
2345 Grand Boulevard, Suite 700
Kansas City, Missouri 64108-2625

RE: Nomination – 2016 Project of the Year Award
Marblehead Pipeline Replacement Project

Dear Committee Members:

The New England Chapter of the American Public Works Association is pleased to support the nomination of the Marblehead Pipeline Replacement project for the **2016 Public Works Project of the Year in the Environment Category, Project Division \$5 million to \$25 million.**

In March of 2013, there was a break in a section of pipe that conveys sewer flow from the Town of Marblehead to the South Essex Sewerage District where it is treated. After a repair was made, the District hired a design team (Parsons Brinckerhoff) to fully evaluate the pipeline to determine whether the break was a local failure, or if the remaining pipe was in jeopardy of failure. After performing non-invasive pipe evaluation techniques, it was determined that the entire pipeline exhibited potential for future failure and warranted a replacement from one end to the other.

After an extensive design and permitting process, Caldwell Marine Inc. was awarded a construction contract and mobilized in January of 2015 and completed construction in August 2015. The project submission covers aspects pertaining to the Engineering Design, permitting process, construction phase, and completion of the new state of the art, HDPE pipeline. It features discussion pertaining to the technology used, interaction between the design/construction team and regulatory agencies. It covers environmental concerns and safeguards that were used to minimize impact to the surrounding communities and the environment.

As part of the project, the District produced a feature video documentary that covers the main project aspects. The video is now hosted on the NEAPWA YouTube page and is found by keyword searching "Marblehead Pipeline Replacement Project", as well as by following this link:

<https://www.youtube.com/watch?v=iYnvv2tYmiM>

The Marblehead Pipeline Replacement project is an impressive engineering and construction achievement and exemplifies public works excellence. It is with pleasure that the New England Chapter requests your consideration of the Marblehead Replacement Pipeline project for the 2016 Public Works Project of the Year in the Environment Category, \$5 million to \$25 million.

Sincerely,

NEW ENGLAND CHAPTER - APWA

Jennifer Royce Perry, P.E.
President

As Part of Your Review

The South Essex Sewerage District

encourages you to watch

a **FEATURE VIDEO DOCUMENTARY** of the

“Contract No. 13-1: Marblehead Pipeline Replacement Project”...

...view it on YouTube:

Keyword Search: “Marblehead Pipeline Replacement”

Click Link: <https://youtu.be/iYnvy2tYmiM>

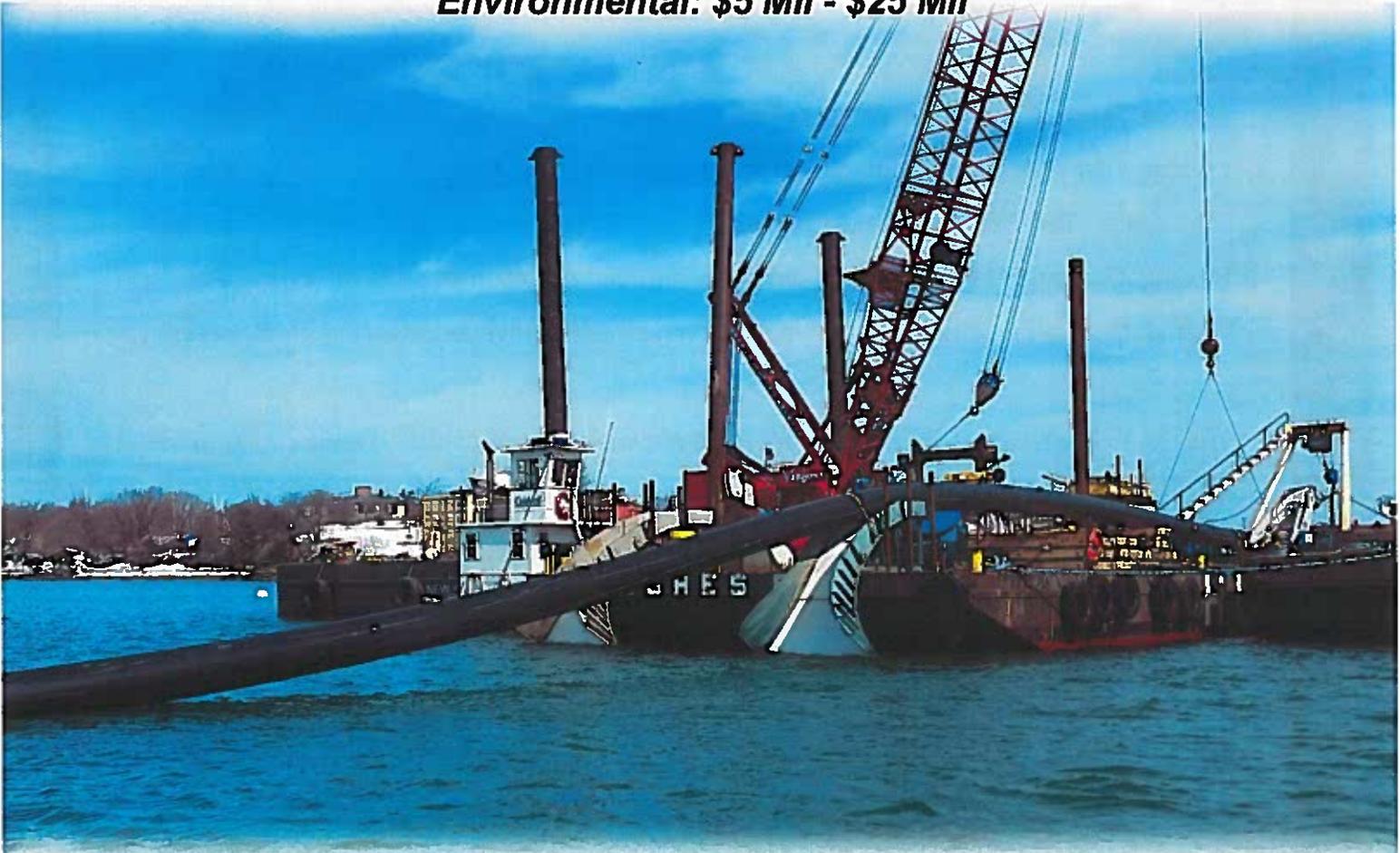




Public Works Project of the Year Award Submission:

Marblehead Pipeline Replacement Project

Environmental: \$5 Mil - \$25 Mil



**Submitted by:
South Essex Sewerage District
50 Fort Avenue, Salem, MA 01970**

**Prepared by:
South Essex Sewerage District**

**Project Design by:
WSP/Parsons Brinckerhoff**



**South Essex Sewerage District
presents...**

**“Contract No. 13-1
Marblehead Pipeline Replacement Project”**

The South Essex Sewerage District (“District”) was established in 1925 to build, maintain and operate a sewerage system to collect and dispose of residential, commercial, and industrial wastewater. The District currently serves nearly 180,000 people and businesses located in Beverly, Danvers, Marblehead, Peabody, Salem, and a portion of the Town of Wenham and Town of Middleton. SESD is a wholesaler of wastewater conveyance and treatment services.

The South Essex Sewerage District operates and maintains secondary wastewater treatment facilities designed to treat 29.71 million gallons per day (MGD). The District also operates and maintains a wastewater collection and conveyance system including 29 miles of interceptor and force main pipelines along with 6 pumping stations and associated metering and sampling facilities. In FY 2016 the District served twenty (20) significant industrial users (SIU’s) that contributed approximately 1.8 MGD. The largest industrial user discharges, on average, approximately 1.50 MGD.

The District would like to express its appreciation for the opportunity to submit the “Marblehead Pipeline Replacement Project” as a candidate for “Public Works Project of the Year”. We believe this project embodies the spirit of hard work, dedication, and team effort required to act when faced with adversity and potential crisis. This project could not have been possible without the dedicated team of owners, designers, regulators (local, State, and Federal), contractors, and local support from the communities of Salem and Marblehead. This submission pays tribute to all that hard work!

Sewage pipe emergency in Salem Harbor

On Sunday, March 3, 2013 at 3:30 P.M., Alan Taubert, the Director of the South Essex Sewerage District, got a phone call that no one wants to receive...

Taubert stated, "I got a phone call from Amy McHugh, Superintendent of Water and Sewer in (the Town of) Marblehead, who told me that there were seagulls in the harbor hanging around in one particular spot. I knew immediately that there was something seriously wrong out in the harbor that day".

The District suspected a leak in one of the twin pipes that delivered sewage from the Town of Marblehead to the South Essex Sewerage District for treatment.

Unfortunately, this belief was correct. Divers from JF White Contracting found a hole in a section of pipe a few hundred feet off the Marblehead shore, and performed an emergency repair using pipe the District had in inventory for emergency purposes.

Realizing the magnitude of the threat that further leaks could develop, the District acted immediately to hire a design team to thoroughly evaluate the pipeline.

Parsons Brinckerhoff was hired on a fast track basis to quickly determine the physical condition of the 2 sub-aqueous ductile iron force main pipelines that convey the sanitary sewage from the Town of Marblehead to the District's wastewater treatment facility in Salem, MA. The scope also included a fast track investigation as to the cause of the corrosion leading to the leak found on March 4, 2013 along with the recommended plan of action to address the findings of the pipeline condition assessment.



Above: JF White operations locate a broken piece of pipe on March 4, 2013.

Below: The broken segment of pipe is removed and repaired.



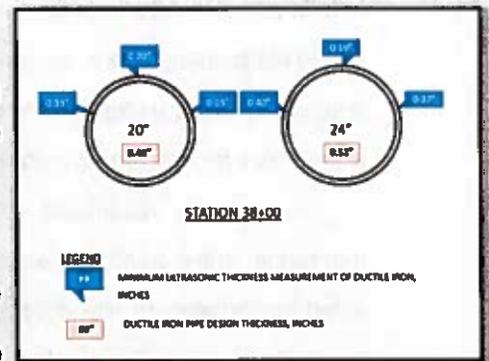
BASIS FOR REPLACEMENT RECOMMENDATION

A conditions assessment was performed by Parsons Brinckerhoff (PB) which identified severe corrosion at three representative locations along the 6,000-foot pipelines alignment. In combination with the pipe conditions discovered by the South Essex Sewerage District ("District") during the pipe section replacement at Station 6+00 in March 2013, the condition assessment in fact confirmed that there was severe deterioration of both the 20-inch and 24-inch pipes. The conditions assessment work included direct underwater observations of the pipelines, ultrasonic thickness tests, and soil corrosivity analysis. All of these investigations indicated that the existing pipes had severe corrosion and needed to be replaced.

The public health and environmental consequences of another rupture could have been substantial, particularly if both pipelines ruptured simultaneously. The discovery of deteriorated pipe at representative locations along several thousand feet of subaqueous pipeline made planning and execution of replacement difficult and expensive. Trenchless methods of replacement were evaluated and determined to be infeasible or would have required considerable time to implement. Because all findings indicated that imminent failure could occur at any time, Parsons Brinckerhoff recommended to the District that the pipelines be replaced using non-corroding high-density polyethylene (HDPE) pipe and installed by direct burial (i.e. the same method used to construct the existing pipelines) in a new trench adjacent to the existing pipes.

Right: Ultrasonic Pipe Wall Thickness testing proved that significant amounts of material had corroded from the outside of the pipe wall.

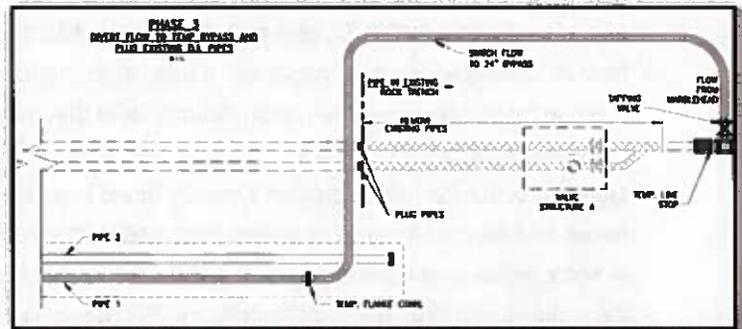
Below: Underwater photographs of the pipeline's exterior surface revealed considerable deterioration, leading to the determination that the entire pipeline was at risk of a rupture.



Completion date contained in contract. Any time extensions granted should be addressed in the submittal.

Per the executed contract documents, contractor Caldwell Marine, Inc. was given the Notice to Proceed, as issued by the District on December 15, 2014. Time for Completion was set as August 12, 2015; 240 consecutive calendar days from the date of commencement as specified in the Notice to Proceed. This Notice also stipulated two Interim Milestones:

Interim Milestone 1: included completing all work from Sta. 506+00 to Sta. 558+00 (off-shore region through the Federal Navigation Channel) and required full operation of the Temporary Bypass line on or before April 14, 2015. These conditions were placed in the contract in response to permitting requirements issued to the Project.



Interim Milestone 2: included completing all work in Marblehead and full demobilization from the Marblehead site by no later than June 19, 2015. This condition was placed in the contract based on the request by the Town of Marblehead to retain usability of the public beach during the recreation season.



Although, ultimately, the contractor completed the contract on time, the Interim Milestone deadlines were not met. Working with the District, Town of Marblehead officials, and Local, State and Federal Regulatory Agencies, the contractor was provided additional time to complete work in areas outlined by the Interim Milestones.



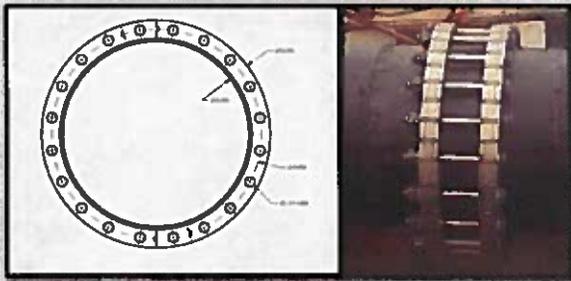
Construction schedule, management, and control techniques used. Use of alternative materials, practices of funding that demonstrates a commitment to sustainability.

The existing ductile iron pipelines were installed in the mid-1970's as part of the "74-17 Marblehead Force-main and Pressure Sewer Project". Because these pipes failed in less than 40 years, the District and design team worked to select new materials that would provide superior long-term performance.

The pipe material selected for the Replacement Pressure Mains was high-density polyethylene (HDPE), SDR11, 24-inch diameter DIPS (Ductile Iron Pipe Size). HDPE is a flexible polyethylene thermoplastic made from petroleum suitable for installation in the marshy/mucky soils that may be present in Salem Harbor. HDPE displays resistance to abrasion and corrosion from elements typically found in wastewater as well as its immunity to attack from aqueous solutions of salts, acids, and bases, and is thus ideal for installation in the marine environment. Additionally, HDPE has a high resistance to biologic attack by action of microorganisms such as bacteria and fungi.



Above: HDPE has high impact strength and resistance to fatigue and propagation of crack growth and creep. HDPE retains its toughness at low temperatures (below freezing) and is suitable for operating temperatures up to 140°F. This material's high strainability makes it very resistant to seismic effects. These properties help the material adapt to shifting and uneven support without sacrificing joint integrity.



The installation phasing plan required bolted connections to be made in the offshore regions of the job. The design team needed to ensure that all underwater connections were made as strong and sound as the rest of the fused pipeline. For these connections, premium materials were specified in the contract. Using the HDPE pipe material along with bolts and flange backing rings made of C276 Hastelloy steel, one of the most corrosion-resistant alloys available, the design team hopes to achieve the goal of providing a 100-year service life.

Pipeline construction utilized a "float and sink" technique to install the pipes. To offset the buoyancy of the pipe, specially shaped ballast blocks or collars, each weighing close to 7000 lbs were precast out of concrete to cradle the twin pipes. To provide the required ballast and sink the pipes into the trench, these blocks needed to be attached to the pipes every 15 feet. A conservative design approach was developed to ensure these ballast blocks would not rely solely on the galvanized bolts that were supposed to keep the ballast blocks affixed to the pipe. It was determined that the use of fiberglass rods with nylon nuts and washers would supplement the design by utilizing a corrosion resistant material along with the galvanized steel to permanently hold the ballast blocks in place.

Unique numbered nameplates machined from galvanized steel were anchored to each one of the blocks. During future inspections, these number plates will give divers a tactile means to positively identify a block, even in the murky harbor floor.

Funding for this project was provided with an emergency loan from the Massachusetts State Revolving Fund in the amount of \$10.6 Million. The early commitment from the State to participate in this important project not only helped with public acceptance, but the below-market interest rates helped to minimize the financial impacts to the rate payers.



Safety performance including number of lost-time injuries per 1,000 man-hours worked and overall safety program employed during the construction phase.

To the District's knowledge, there were no lost-time injuries associated with the Marblehead Pipeline Replacement Project.

As a requirement of the SESD Contract Documents, an Emergency Response Plan was developed for the project and submitted for review and acceptance. Caldwell Marine developed a 374 page document that covered a comprehensive list of job specific topics. Some of the highlights covered site specific information, as well as general practices and procedures based on the nature of work being performed.

OSHA Construction Safety certifications were required to be obtained by all workers, as well as specialized training for disciplines with unique job descriptions. Prior to working on site, each employee was required to undergo safety orientation as outlined in the Emergency Response Plan.

Safety meetings were conducted at a minimum of once per week at the site by the Site Safety Representative or supervisor. Safety meetings included subcontractors. In addition safety briefings were conducted on a daily basis. A log was completed of all Safety meetings and safety briefings and kept onsite.

All personnel and contractors who were actively engaged in performing a job were required to attend safety meetings. Meetings included discussion and instruction of upcoming work and any other applicable safety topic identified.



Environmental Considerations including special steps taken to preserve and protect the environment, endangered species, etc., during the construction phase.

Environmental mitigations were extensive and were carefully detailed in the contract documents, specific to the areas for which they were to be applied. The District and design team worked closely with numerous Federal, State, and local permitting and regulatory agencies to ensure the project was constructed in a fashion that was sensitive to the surrounding environment. These regulatory/permitting agencies included the US Army Corps of Engineers, MA Department of Environmental Protection (including the North East Regional Office, Waterways Program, and Division of Municipal Services), US Environmental Protection Agency, Marblehead Conservation Commission, Salem Conservation Commission, MA Historical Commission, MA Coastal Zone Management, MA Board of Underwater Archaeological Resources, and US Division of Marine Fisheries. The District would like to acknowledge and thank many regulators that supported this project during design and construction. The Project would not have been able to have been built without their flexibility, diligence, and support.

In all, there were over 200 Permit Conditions that had to be adhered to during both the design and construction phases. The following is a summary of some of the basic environmental mitigations, as well as some of the more detailed permit conditions.

Off Shore/In Harbor:

Turbidity booms, turbidity monitoring, silt curtains.



Shoreline Areas:

Trench dewatering plan, erosion and sedimentation controls, turbidity booms, turbidity monitoring and restoration. Existing rock armor was removed as necessary to install the replacement pipelines and then reinstalled. Shoreline areas were restored to pre-construction grades, using sand and landscaping materials and rock armor replaced as required.



On Shore:

Erosion and sedimentation controls such as silt fence, geotextile fabric, hay bales, straw wattle, and anti-tracking pads were used. Onshore areas were backfilled and restored to pre-construction grades and conditions, using sand, grass and landscaping materials as required.



Eel Grass:

In October 2013, a pre-construction eelgrass (*Zostera marina*) survey was performed to delineate and document the limits of the existing eelgrass beds within Salem Harbor in the vicinity of the pipeline project at the request of the US Army Corps of Engineers. In October 2015, a post-construction survey was performed to re-map the same eelgrass beds within Salem Harbor to ensure there was no adverse effects due to the construction.

The October 2015 post-construction eelgrass survey found that the general boundaries of the 2013 mapped eelgrass beds were similar, with some minor changes observed in 2015. While contraction of the outer edges of some of the beds has occurred in several small areas, most of the previously mapped beds experienced an expansion in the eelgrass boundaries within each bed.

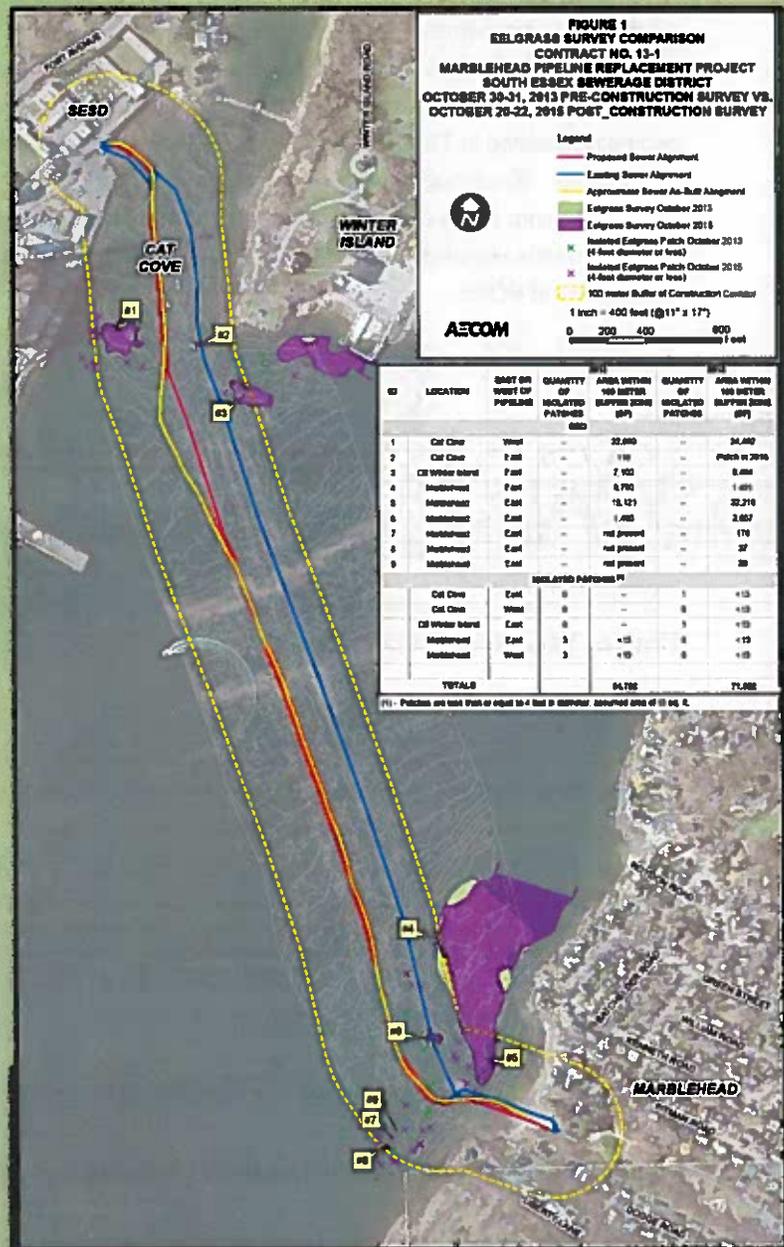
In 2013, the square footage of eelgrass beds and isolated patches located within the outer boundaries of the 365-foot buffer zone totaled approximately 54,750 square feet (1.26 acres). By 2015, the eelgrass beds and patches had increased to approximately 71,020 square feet (1.63 acres), which represents an increase of approximately 29%. The results of this survey revealed that there were no adverse effects from the construction of the pipeline, and, in fact, the eelgrass was protected from silt producing activities.



Photo No. 1: A patch of eelgrass within the western Cat Cove bed (near the power plant) as observed using the color underwater video camera system.



Photo No. 2: Diver photo of a portion of the western Cat Cove bed (near the power plant).

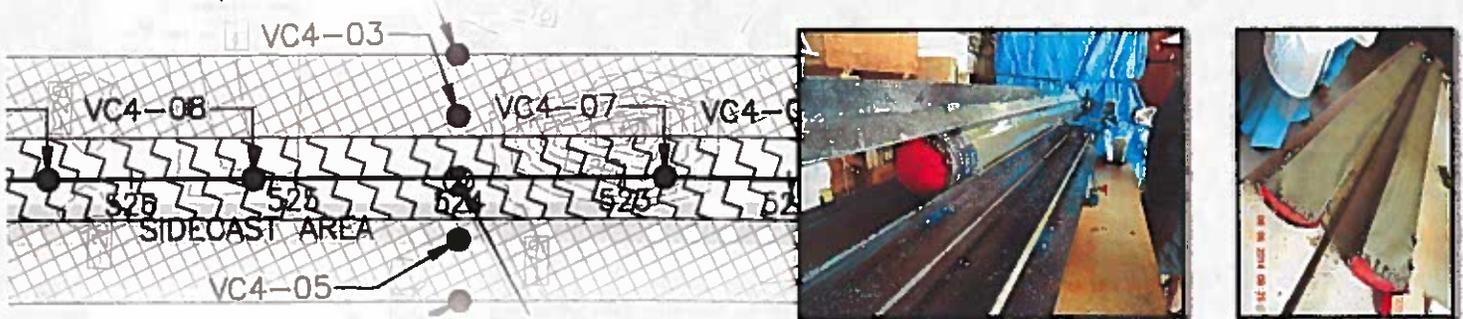


Board of Underwater Archaeological Resources (BUAR)

Replacing the sewer pipeline proved to be a challenge. As well as contending with the modern day boating and recreational activities, working in this historic harbor presented special challenges. Native Americans used this location as a place for hunting and fishing, and state officials and local tribes believed it might be possible to find evidence of their ancestors' habitation in soils buried deep in the sediment below the harbor floor.

For this reason, a survey was performed as part of the permitting process for the Project, in particular for compliance with the National Historic Preservation Act. The Massachusetts Historical Commission (MHC) also requested a detailed archaeological sensitivity assessment of the project area and required further archaeological testing to locate and identify significant submerged archaeological resources that could potentially be affected by the Project.

An initial 17 vibracores were taken in April 2014 at 12 locations distributed approximately 500 feet apart along the centerline of the proposed alignment, but avoided the previously disturbed (and not archaeologically sensitive) areas including the near-shore locations where the pipeline was installed in the trench of the existing pipeline originally installed in 1977. The locations included one vibracore within the limits of the Federal Navigation Channel. Further, three historic-period Potential Cultural Resources (PCRs) were identified and investigated by side-scan sonar and video drop camera, and none were found to be cultural resources. This was reported to the Massachusetts Historical Commission (MHC) and BUAR, who confirmed that no further action was required with respect to the PCRs.



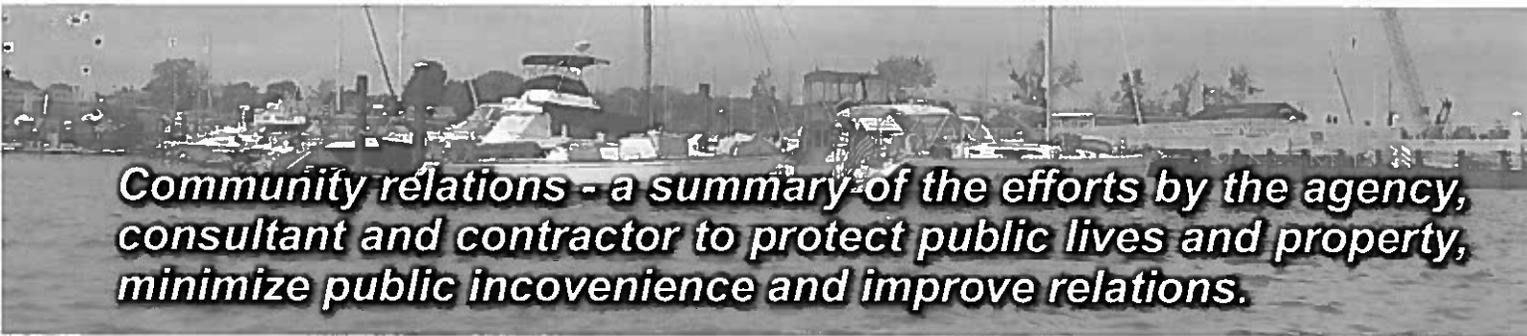
Time of Year Restriction:

Above: Laboratory analysis of a vibracore sample.

Permits required that no silt producing activities were to be conducted during the time of year (TOY) restriction of April 15th to June 30th in order to minimize adverse impacts to winter flounder spawning and juvenile development. Confined work in near-shore areas inside a rigid double wall turbidity curtain was permitted during this time period.

Because adverse winter conditions slowed progress, an amendment request was made in March 2015 to modify the TOY in an effort to allow dredging and backfilling within the Time-of-Year restriction between April 15 and June 30. The amendment request was reviewed and determined there was reasonable assurance the project activities could be conducted in a manner which would not violate applicable water quality standards or other applicable requirements and the amendment was approved, providing the following conditions were met:

1. double silt curtain was deployed encompassing the dredger and area of dredging and backfilling;
2. increase the turbidity monitoring frequency by taking one additional turbidity reading per day;
3. all in-water work was stopped if the turbidity reading was 20 NTU above background. Work was able to resume when the turbidity reading was 15 NTU above background.



Community relations - a summary of the efforts by the agency, consultant and contractor to protect public lives and property, minimize public inconvenience and improve relations.

The District takes community relations and its relationship with its member communities very seriously. Beginning with the Town of Marblehead notifying the District about the sewer break, all the way through the construction and startup of the new pipeline, communication and community relations was at the forefront of everybody's minds.

During the initial design stages, community impact was evaluated. Different pipeline installation techniques required different inconveniences to both the Town of Marblehead and the City of Salem. After careful analysis, it was determined that butt-fused HDPE pipe with a float-and-sink direct burial installation technique was ultimately the least disruptive to the surrounding communities.

It was understood that the float and sink technique required a reduction of maneuverability for boaters in the Salem Harbor. For that reason, installation of the pipeline was scheduled to happen in the offshore regions of the installation prior to the boating season. Unfortunately, due to untimely winter conditions, that schedule was required to be extended well into the recreational season. However with the support of Marblehead and Salem and their associated harbor masters, the District was able to continue seamlessly with the installation of the pipeline.

Local news coverage of the pipeline installation was ongoing at various milestones along the project schedule. Coverage tended to be positive and highlight the good progress being made on the project. The Town of Marblehead also provided updates on its website so that residents could track the progress as the Project moved along.

Funding was a critical component of the Project, as ultimately Town of Marblehead rate payers will be covering the costs associated with the pipeline construction. For this reason, every detail was carefully scrutinized and no financial decisions were made without reviewing them with the Town. Constant communication had to be maintained with the Superintendent of the Water and Sewer Commission, who would then present the Commission and Town leaders with any funding requests that needed approval.

Ultimately, the District maintained direct contact with the neighborhoods that were impacted. Informational flyers, describing critical construction based information were provided to homeowners. In some cases, District personnel interfaced directly with concerned citizens in an effort to most effectively understand their needs. Land/easement issues were settled between private land owners and District representatives to ensure that pipeline installation did not infringe on anyone's privately owned land.

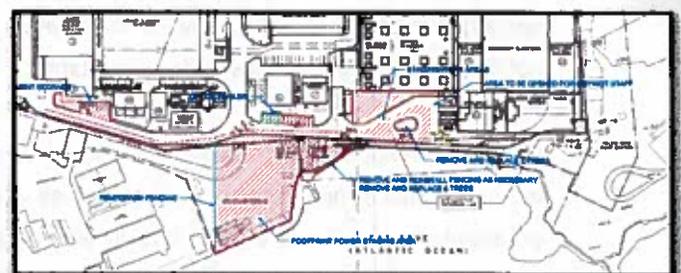
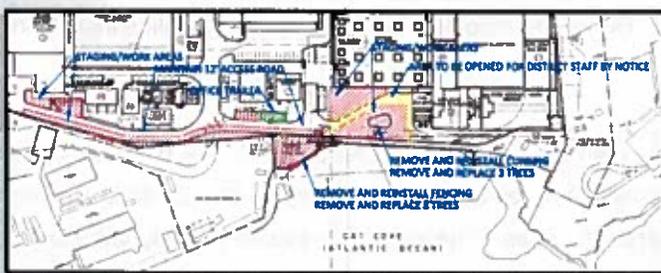
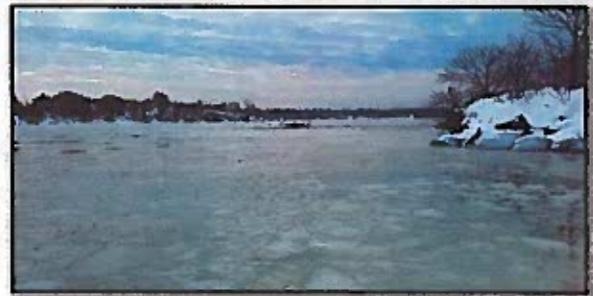
Finally, upon successful completion of the pipeline, the District, all officials, residents, regulators, politicians, environmentalists, fishermen, boaters, swimmers, as well as all creatures that inhabit or rely on the ocean to survive, can go about their business without having any environmental crises. The pipeline was successfully replaced with a state-of-the-art pipeline that was installed in a fashion to last 100+ years. Although many people won't ever think about it this way, the success of this project is the biggest community relations builder...imagine if it had gone the other way?!?!?

Unusual accomplishments under adverse conditions, including but not limited to, adverse weather, soil or site conditions, or other occurrences over which there was no control.

On March 3, 2013 the South Essex Sewerage District was forced to act immediately with the threat of an environmental crisis looming. The broken pipeline drastically changed the course of the South Essex Sewerage District, immediately placing all hands on deck to fix the pipe and evaluate the rest of the line. But the District soon learned that despite fully understanding that the magnitude of the circumstances were profound, correcting the problem would not come easily. Replacing the 6000+ foot long twin pipeline would have been difficult enough to install across an active harbor, never mind the rest of the hurdles that had to be overcome before the District, State and Federal Regulators, and local officials could finally breathe a sigh of relief.

After completing the permitting process (as described earlier), contractor Caldwell Marine was awarded the contract for the installation of the new pipeline. Just as they began to mobilize into Salem, the winter of 2014-2015 produced a record amount of snowfall in the Boston area at over 110 inches. Most of that snow fell during the last weeks of January and throughout February. Caldwell proceeded to assemble their barges and equipment through the difficult winter weather conditions. Slow and steady progress began to ramp up until finally the weather broke in spring of 2015 when Caldwell was then able to set up a staging/pipe assembly area.

Caldwell faced difficult staging issues and submitted many different plans to accommodate 12,000 feet of 24" HDPE pipe. This pipe was delivered in 50 foot lengths and had to be butt-fused in a fashion to allow it to be floated out to barges. Trucking materials this large through a tourist city such as Salem was a concern, so shipments were staggered over a period of two months, which allowed the contractor to take delivery at a regulated pace and without overwhelming the City's streets or the staging area. Fortunately, Caldwell Marine was able to work out a deal with Footprint Power, a direct abutter to the SESD Treatment Facility, which turned out to be a pivotal opportunity for the contractor to maintain a useful staging and assembly area on Footprint property with direct access from District property. Between the Footprint Power staging area and District owned land, Caldwell was able to pre-assemble 500 foot lengths on land where they were pressure tested and eventually floated out to barges where they were fused into longer strands.



Above: An agreement between Caldwell Marine and Footprint Power allowed for greatly increased mobility and production. The temporary acquisition of land allowed pipe assembly and deployment to be performed with greater ease. The illustration on the left demonstrates staging without Footprint land, while the illustration on the right demonstrates the staging area after acquisition of the Footprint land.

During the pipeline installation process, Caldwell Marine faced some unusual challenges. While daily operation required constant attention to minimize impact to the environment or recreational boaters, no one had the "Honourable Henry Jackman" on their radar screens. That was until Captain Bill McHugh, City of Salem Harbor-master, sent an email reading, "Gentlemen: Please be advised that the Bulk Vessel "Henry Jackman" will arrive Salem on April 26 to deliver structural fill to the Footprint property. This will require that all equipment and materials be removed or placed below controlling depth. I will update as more information becomes available including time of arrival".

As misfortune would have it, the scheduled time of arrival gave crews less than two weeks' notice to finish pipeline installations through the Federal Navigation channel, as well as completing backfill over the top of the pipe. The Honourable Henry Jackman is approximately 735 feet long by 96 feet wide. More concerning to crews, the ship's draft was almost 31 feet. Leaving any large spoils piles below the water's surface could have proven to be detrimental to the ship or pipeline. Crews scrambled to complete the required work before the ship's arrival, getting it done with literally less than an hour to spare.



Above: The Honourable Henry Jackman cargo ship. Photo by CSL International.

The design team and construction crew had to maintain constant communication and adapt to situations as they developed. Subsurface conditions proved to provide challenges that needed to be addressed. On the Marblehead side of the job, record drawings from the original pipeline installation in the 1970's showed specific details regarding how the pipe was laid into the trench and backfilled, as well as how the armor stone that protected the pipe was placed on top. Unfortunately the records were not accurate and the material that came out of the trench was virtually unusable as a backfill material due to its size and angular nature. Placing material of that quality had the potential to damage the pipeline by either crushing or gouging the HDPE pipes. Therefore, quick decisions were necessary to determine which materials would be suitable. It was determined that crushed stone would be used as a bedding material, while the material that was removed from the trench would be placed over the top of the pipe as an armor stone to provide protection.



Despite the difficult conditions, the contractor managed to reach substantial completion by the contract completion deadline. It was a great feat completed by a strong team effort. From condition assessment to closeout, all members of the team had to perform diligently to ensure the well-being of the residents and environment. With that dedication came success, and with the new pipeline in service, everyone can rest easy for the next 100 years.

