

CIPP SEWER REHABILITATION IN THE ENVIRONMENTALLY SENSITIVE COMMUNITY OF WAREHAM, MA

Protecting Marshes, Waterways & Coastline

By: Robert Drake, PE, BETA Group, Inc.
Guy Campinha, Town of Wareham, MA

Wareham's aging sanitary sewer system is comprised of clay, ductile iron, and RCP, running 15-16 feet deep through sandy soil with a tidally influenced groundwater level at six to eight-foot depth. The sewer system runs directly underneath beaches, sensitive bays, salt marshes, cranberry bogs, and fish farms that are typical of the Massachusetts coastline. With 54 miles of sandy beach coast, this beautiful seaside community was faced with the challenge of rehabilitating a sewer system situated within a sensitive coastal ecosystem.

Serious structural integrity issues were found within an 18/21-inch reinforced concrete pipe (RCP) interceptor that carries flow from the western side of the Town around marshes and waterways within the Town boundaries. The deteriorated sections of RCP showed visible spalling, deposited aggregate from infiltration, root infiltrations, and exposed structural reinforcement. These sections of interceptor were clearly weakened and urgently needed repair. Additionally, manholes along this 1.8-mile interceptor were structurally compromised, showing signs of



Wareham is a densely populated beachfront community with narrow streets

infiltration and also needed immediate rehabilitation.

There was urgency because exfiltration from the deteriorating pipe would entail costly cleanup and negatively affect the wildlife of the marshland and estuaries, also damaging the commercial and recreational fishery. (*NASTT-NE Journal, Spring/2019*).

The location of this interceptor in environmentally sensitive areas made open trench cut construction cost prohibitive and permitting a challenge. In addition to

ensuring the marshlands and waterways within the town were protected, it was also vitally necessary to reduce disruption from the construction work to local residents. Wareham is densely populated with narrow streets, so any underground construction work required a very compact site footprint.

These factors prompted Town officials to select a construction method that would ensure minimal disruption to the community and also protect the marshes,

Infiltration at Joints



Merchants Way

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Roots at Joints



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Spalling Concrete / Exposed Reinforcing



High Street: Downstream of Kennedy Pump Station ~ (604,500 Gallons per Day)

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The 1.8 mile segment of 18/21-inch RCP interceptor was structurally compromised and urgently needed repair



Protection of the marshes and waterways was of vital importance

waterways, and coastline. Wareham Sewer Department Director, Guy Campinha, and the Wareham Sewer Board, were determined to execute rehabilitation of the interceptor without disrupting neighborhoods or damaging the delicate ecology of the ocean area. “One of our main concerns was the impact to the community affected by the need to rehabilitate the 21-inch RCP. A trenchless method was the only option that made sense,” said Campinha.

Trenchless technology had already proven to be beneficial to this seaside community, when a 1,600 LF eight-inch AC gravity main running at 17 feet

“A TRENCHLESS METHOD WAS THE ONLY OPTION THAT MADE SENSE.”

—GUY CAMPINHA, DIRECTOR, WAREHAM SEWER DEPARTMENT

below grade under the coastline near Swifts Beach was repaired in 2017 using the trenchless epoxy CIPP method. Valuable experience was gained during this project using CIPP to reestablish a pipe’s structural integrity when the pipe is at a depth completely below the town’s six to eight-foot-deep tidally fluctuating water table. These depths also make the dewatering necessary for open excavation sewer replacement work difficult and cost prohibitive, thus favoring the use of trenchless applications. (*NASTT-NE Journal, Fall/2017*).

This time around, with assistance from Robert Drake, PE, Vice President of BETA Group, Inc, and his team, the Town again chose a trenchless solution to rehabilitate the deteriorated pipe without digging it up. The team opted for a CIPP repair method, using only specified products which had passed rigorous standardized laboratory testing proving them to be low toxicity, aquatic-safe for fragile aquatic life.

A low toxicity aquatic safe epoxy CIPP lining technology supplied by Warren Environmental was selected, along with a structural glass and felt liner which had passed third-party ASTM testing. The epoxy resin selected was zero VOC, 100



Compact site footprint during liner installation minimized impact on the community

percent solids, non-toxic, solvent free, laminar system, and moisture insensitive with superior strength and chemical resistant properties.

The CIPP system chosen would guarantee the protection of the local ecology, especially in the places where pipe was submerged in the ocean. Work began in early March of 2019, with completion in May. To further minimize disruption and reduce traffic concerns, night work was scheduled when installing CIPP liner in the downtown area of Wareham. The knowledge gained from the Town’s previous trenchless projects was helpful, however the tidal influence and high water table again presented monumental challenges during construction.

Locally approved Warren Environmental, A&W Maintenance, and subcontractor SAK Construction, overcame tremendous challenges during installation of the liner, including managing major infiltration leaks at several pipe locations. Prior to installation, grouting was applied to these areas in order to stop the leakage.



The 39 manholes along the 1.8 mile segment were coated with an aquatic-safe epoxy



To reduce traffic disruption in downtown Wareham, CIPP liner was installed at night



Bypass setup pumped over 110,000 gallons average daily flow

In order to protect the surrounding environment from erosion runoff coming from the construction site, straw wattles were installed around the salt marshes, cranberry bogs, and ecologically sensitive bays.

While the liner was being installed, use of residential sump pumps was another major concern. If a sump pump activated during the installation process, the force or pressure of the sewer flow could potentially cause the liner to deform, or even collapse, at the location of the service lateral. To prevent this from happening, mail-outs were sent to residents requesting them not to flush their toilets or take showers during the liner installation in front of their homes. Additionally, on the morning of installation in the

neighborhood, crews went from house to house reminding residents not to flush their toilets or take showers.

During construction, there were three pump stations connected to the 1.8 mile section of gravity 18/21-inch RCP being rehabilitated. The total average daily sanitary flows to the work zone from these three pump stations was 113,445 gallons. Each of these pump stations had to be individually bypassed using pumper trucks. The pumper trucks remained on-site 24/7 until the lining work proceeded past each pump station connection point. After that, individual pipe segments were bypassed with six-inch pumps during liner installation and curing. Flows were picked up from a manhole located upstream of the segment being lined, to a manhole located downstream from it.

As graduation for local high school approached in May, the bypass setup made it very difficult for students to go from the school onto the field. Though this created some anxiety, close and regular communication with both the school superintendent and principal helped graduation to go off without a hitch. Construction work was suspended during the graduation ceremony to accommodate this important event in so many young lives. This ability to accommodate the needs of the community through flexibility, collaboration, and teamwork was exemplary throughout the entire project. According to Campinha, "Various town departments, the engineers, and the contractors had daily conversations to address issues that came up as the project proceeded."

At completion in May 2019, local contractor A&W Maintenance, along with subcontractor SAK Construction, had successfully installed a host bonded structural CIPP system along all 35 lined pipe segments which passed acute marine toxicology testing. Following installation and steam curing of the liner, A&W Maintenance went on to coat each of the 39 manholes along the entire 1.8 mile section with an aquatic-safe epoxy system that is also manufactured by Warren Environmental.

With the constant support and collaboration of the local authorities and Conservation and Sewer Department, A&W Maintenance and SAK were able to complete the project on time at the end of June with no impact on the sensitive marshlands, waterways, and coastline, along with minimal disruption to the lives

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Selection of the aquatic-safe CIPP system guaranteed protection of the local ecology

of local residents. By rehabilitating this critical length of interceptor, the Town of Wareham, in collaboration with BETA Group, Inc., A&W Maintenance, SAK Construction, and Warren Environmental, was able to create an ecologically harmless monolithic lining system which will protect the Town's sanitary sewer system and surrounding environment for many years to come.

Trenchless technology applications have proven to be very beneficial for the beautiful seaside community of Wareham, helping preserve its valuable coastline resources for future generations. Driven by the goal of leaving the earth better than how it was inherited, the Town of Wareham chose to do what was best for all of its stakeholders, including those who do not have a voice. †

ABOUT THE AUTHOR:



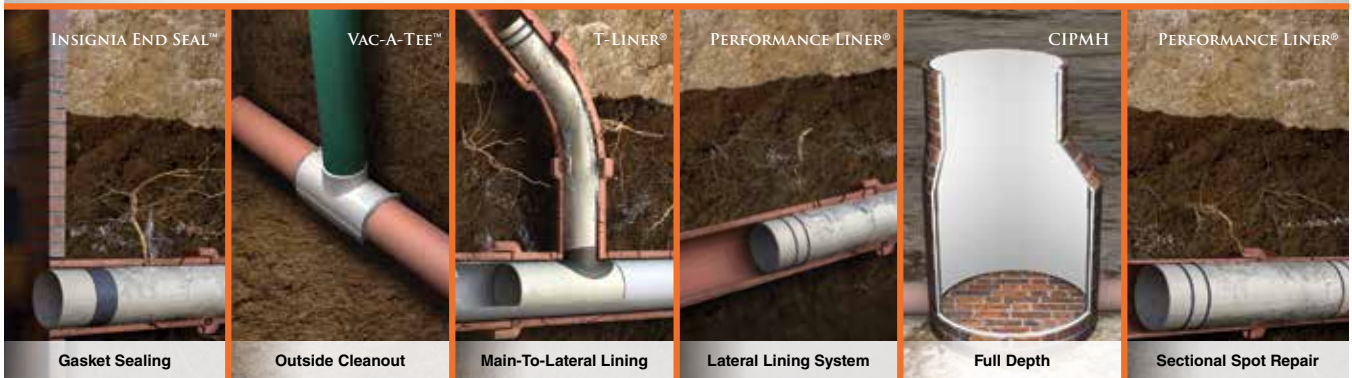
Robert Drake, PE is Vice President of BETA Group, Inc. He has over 36 years of experience in the water and environmental fields overseeing the planning, scheduling, and execution of the environmental projects. Bob specializes in the planning and design of water distribution systems, sewer and drainage collection systems including installation/rehabilitation of main pipe by trenchless technology methods.



Guy Campinha Sr. is Director of Water Pollution Control for the Town of Wareham. He has spent the past 20 years managing Wastewater facilities and was also Past Chair of the Wareham Board of Health. Guy is a NASSCO: LACP, MACP, PACP certified Member, and is a Certified Grade 7 Wastewater Operator in Massachusetts. He is a currently serving member of the NASTT-NE Board of Directors.



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