

# How sustainable monitoring methods were deployed for the Northeast Boundary Tunnel (NEBT) project in Washington D.C.

Country	Project type:	Sector:	Main product:
USA	Wastewater tunnel	Construction	LoadSensing   The Wireless Monitoring System

## Challenge

Ensuring communities are not subject to flooding is a growing concern in a world where the climate is changing. More than 700 cities worldwide have combined sewer systems that could overflow in the event of a severe flood, resulting in major health and infrastructure hazards. One of these cities is Washington DC in the US, where an aging sewer system was overflowing into the nearby Anacostia River.

To avoid such incidents, the city selected Lane Construction to build a large-scale deep-water tunnel called the Northeast Boundary Tunnel or NEBT. The NEBT is the largest of several sections of tunnels that are part of the DC Water Clean Rivers Act. The NEBT was designed to connect sewer systems and reduce stormwater overflow by 98%. But digging a tunnel with a 23-foot diameter for five miles under highly built-up areas was not without its dangers. For Lane Construction, it was vital to ensure the tunneling work was monitored closely so that any risks could be identified and dealt with early on.

## Solution

Lane Construction brought in the instrumentation and monitoring service provider EnTech Engineering, which used Worldsensing's IoT remote monitoring solution, supplied by Specto Technology, to connect an array of sensors used in the project. The instrumentation installed around the five-mile, \$583 million tunneling project included four wireless gateways, configured for redundancy, covering more than 280 monitoring locations and 16 wireless tiltmeters attached to structures around the site.

In addition, EnTech installed 91 vibrating wire one-channel nodes to read piezometers along the tunnel alignment and adjacent to shafts, and 176 vibrating wire five-channel nodes reading multi-point borehole extensometers and strain gauges. Finally, the setup included 15 analog nodes to read previously-deployed Entech tiltmeters. The gateways were installed discretely around the local neighborhood, placed inside enclosures and equipped with three-foot antennas for optimum wireless monitoring capacity.

All the data from the edge devices was sent to the Connectivity Management Tool, the network management platform that helped monitor the status of all the devices and facilitated the integration with 3rd party visualization software.

"Everything with the Loadsensing solution is almost plug and play. If there is any increase [in budget] in you buying additional equipment, you will save on manpower easily. Loadsensing is reliable, it's quick, and for that reason you're able to cut back on a lot of costs."

**Tyree Williams,**

Sales Manager  
Specto Technology

## Benefits

The use of the Worldsensing wireless monitoring solution did away with the need for trenching on the roadway, which in a built-up environment like Washington DC "saves a huge bunch of money and time," according to Tyree Williams, Sales Manager at Specto Technology.

And because the Loadsensing solution uses high-performance, low-power long range (LoRa) technology, its wireless capabilities extend for up to nine miles with line of sight. The network can even pick up signals a mile away from sensors located under steel manhole covers. Also, "There was reduced maintenance because the battery life is so long," Williams says. "Even with the increased sampling rate, you're able to get up to almost five years."

The smooth monitoring of the project helped the NEBT tunnel boring machine complete its work on schedule in April 2021, putting Washington DC on target to improve the water purity of the Anacostia to a point where it could be used for swimming and fishing by 2030.

## Advantages

- The IoT remote solution features a wide range of sensor integrations enabling the deployment of a single network for almost all monitoring technologies.
- LoRa technology makes it quick and easy to deploy monitoring networks even in built-up areas.
- Long battery life reduces the need for maintenance and costly site visits.



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1 - EnTech Engineering installing 1 of 4 Loadsensing gateways used for monitoring the construction of the NEBT

2 - Loadsensing 5-Ch VW Node connected to a MPBX used for monitoring the construction of the NEBT