

# 625 Fulton Street – Construction Monitoring

CLIENT: BIG APPLE GROUP

How wireless sensors were used to monitor an MTA tunnel during construction of a 79 floor mixed-use skyscraper in downtown Brooklyn, New York

## Challenge

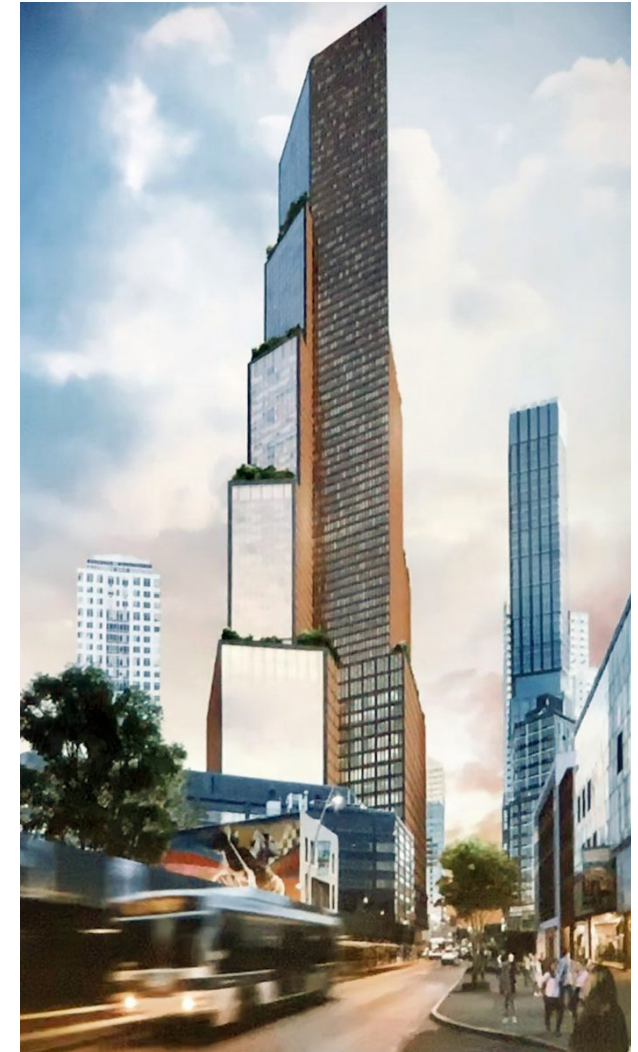
Construction began in summer 2021 on a 942 ft, 79 floor skyscraper in the centre of downtown Brooklyn, New York. The mix-use building will rise 240 ft above what is currently the tallest building in the borough, and will include office, residential and retail space, as well as a school and community spaces for arts and events.

Big Apple Group, a NYC based construction quality assurance and control organisation, was brought into the project before the Support of Excavation (SOE) phase to provide construction monitoring. Due to the size and complexity of the development, as well as the proximity of nearby buildings and an MTA Subway Tunnel, Big Apple Group implemented an in-depth monitoring program including Automated Total Stations, Inclinometers, Vibration Monitoring and Tilt Meters both above and below ground.

The B Line MTA Subway tunnel was within a meter of the construction site, and monitoring for deformation presented unique challenges. The MTA would not permit anything to be mounted above the track, cables could get snagged, and it would be expensive to shut down the track for traditional AMTS monitoring.

## Key Points:

- Traditional wired monitoring was impractical in crowded and hard-to-access subway tunnel and shutting down track would be expensive.
- Low profile optical displacement sensors installed on the tunnel wall offered a solution
- Deformation data is now sent remotely to users above ground and off site. Alerts will be sent if movement breaches predefined thresholds





## Solution

As conventional systems were considered impractical for the subway tunnel monitoring, Big Apple selected a Senceive wireless solution to safeguard the integrity of the tunnel and minimize cost and disruption to train operations.

A total of 12 Optical Displacement Sensors (ODS) were quickly and easily installed on brackets on the subway wall nearest to the excavation works to measure displacement relative to the opposite wall.

Big Apple opted to use the GeoWAN™ wireless platform due to the distance and configuration between the Gateway and monitoring zone – separated by approximately 350 ft around a bend in the tunnel and requiring transmission through several reinforced concrete structures. The GeoWAN™ Gateway, installed on the mezzanine level of the station, was powered by AC power (mains electricity).



## Outcome

The system was operational within a few minutes of installation with data being collected from the sensors and sent via the Gateway to monitoring engineers at a 30 minute reporting rate.

“Installation of the optical displacement sensors was very straightforward and only took a few hours,” says Gagandeep Sihra, Project Engineer at Big Apple Group.

Data can be viewed on Senceive WebMonitor™ software, allowing the project team to remotely check the structural health of the tunnel. The system was configured to send alerts via SMS and email in the event of detected movements outside predefined thresholds.

“We’ve had a few alerts, which provide an opportunity to check the cause. Train traffic and construction work have not been disrupted”, says Gagandeep.

Monitoring will continue in the tunnel until the foundation wall and back fill on the project are complete.

**12 Optical Displacement Sensors  
were installed on brackets on the  
MTA subway wall**