



## Project Summary

### Organization

Navi Mumbai Municipal Corporation (NMMC)

### Solution

Water and Wastewater

### Location

Mumbai, India

### Project Objective

Improving the infrastructure in Navi Mumbai, so that it can sustain a growing population

### Products Used

MicroStation, SewerCAD, WaterGEMS, HAMMER, Bentley Water, Bentley Geo Web Publisher, PowerCivil, and STAAD.Pro

## Fast Facts

- NMMC undertook a \$411 million planning initiative to improve and augment the city infrastructure and provide a sustainable environment for its 2.8 million citizens
- The base map with existing assets and utilities prepared in MicroStation, WaterGEMS, HAMMER, and SewerCAD were used for system design and cost estimation
- The benefits of this project included water conservation, reduction of operations and costs, and better infrastructure services for the population

## ROI

- Mapping the city's systems was two-fold. Not only did it help NMMC understand the infrastructure needs, but also communicate the city's vision to citizens and other stakeholders
- Modeling and analyzing the sewer network enabled NMMC to remove two unnecessary pumping stations, saving 350 million rupees in operation and maintenance expenditures
- Improved transportation and planning resulted in less travel time and an increase in productivity, saving 5 billion rupees per year

# Navi Mumbai Deploys Bentley Software to Meet Demand for Public Services

Efficient Planning and Execution of Project Results in Increased Tax Revenue, Lower Operation and Maintenance Costs for Utilities, and More

## The Challenges of Growth

Developed in the 1970s with 20 self-contained nodes for 100,000 people in each township, Navi Mumbai was hailed as a model planned city. However, rapid migration and unsustainable population growth led to deteriorating public services and infrastructure in the 344-square-kilometer area. Among the challenges were an inadequate water supply, low pressures, sewer overflows, insufficient treatment and disposal, traffic jams, and frequent flooding. The Pollution Control Board had even started issuing warnings to the local bodies regarding violations of standards.

To alleviate the congestion in the city and solve these problems, Navi Mumbai Municipal Corporation (NMMC) undertook a \$411 million planning initiative to improve and augment the city infrastructure and provide a sustainable environment for its 2.8 million citizens. It prepared a base map for city planning using MicroStation® and Bentley® Geo Web Publisher. The plan was to have an integrated and holistic approach for the improvement of the city infrastructure, with the objective to provide a sustainable environment.

*"These Bentley products offered a unique level of interoperability—enabling us to analyze a water network of more than 600 kilometers in length and a sewer network of 240 kilometers."*

— Vijay Nahata, municipal commissioner, NMMC

NMMC chose Tandon and Associates in Mumbai as project management consultants to develop a roadmap to achieve this goal. The roadmap included:

- Taking the city development and planning as a continuous process that requires periodic assessments of various alternatives and different scenarios,
- Proposing a development plan with optimized lifecycle costs by establishing a link between asset creation and management to ensure sustainable service delivery.

Preparing an integrated base map was challenging, as it had to allow interoperability from and to various applications, engineering software, and databases for city planning. NMMC used the MSLINK concept to register

each asset location in MicroStation. This map remained the single data source used to share interdepartmental data and maps, and closely bound IT systems to track utility services and revenue transactions.

## Holistic Approach to Sustainability

Various utilities were mapped along with detailed land-use patterns. Transportation, the water supply, sewerage, solid waste management, and stormwater systems were planned using WaterGEMS®, Bentley® Water, HAMMER®, SewerCAD®, STAAD.Pro®, and PowerCivil®. WaterGEMS, HAMMER, and SewerCAD were used for project designs and cost estimates, which helped prepare accurate city planning and capital investment plans.

The city development plan, sanitation plan, and mobility plan were executed using base maps. Service delivery and facilities centers use these base maps to undertake better service levels and efficient use of resources. MicroStation was not only an effective visual tool for understanding the infrastructure needs of Navi Mumbai, but was also a powerful tool for communicating the city's vision to citizens and other stakeholders.

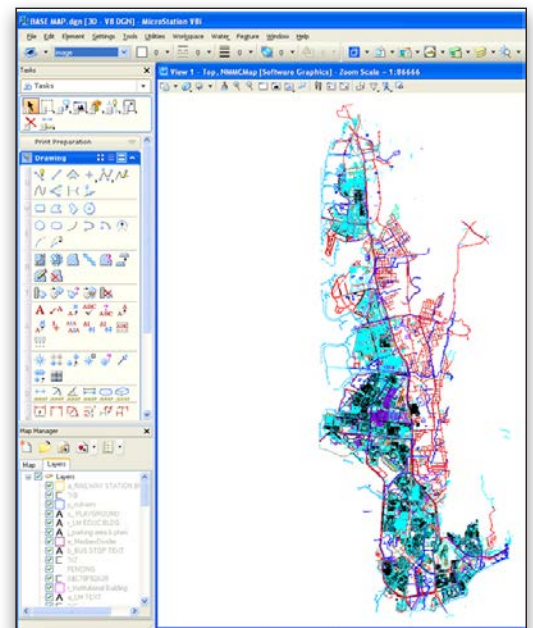


Illustration of a base map in MicroStation.

*“Overall, this integrated approach resulted in efficient planning and execution of the project,”*

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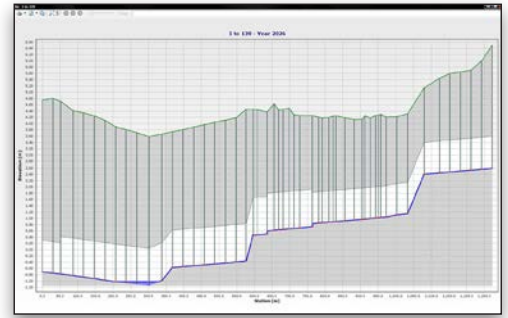
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Vijay Nahata, municipal commissioner at NMMC, explained, “These Bentley products offered a unique level of interoperability—enabling us to analyze a water network of more than 600 kilometers in length and a sewer network of 240 kilometers. They also helped us to design an additional water network of 161 kilometers and a sewer network of 148 kilometers in length.”

City mobility planning and an elevated transportation corridor of 11 kilometers were designed in just two months, which saved 10,000 man-hours. The timely implementation of public health saved 30 milliliters of water per day, which equals a savings 52 million rupees per year.

Redesigning the underground sewer system with SewerCAD helped NMMC identify for removal two unnecessary pumping stations, saving 350 million rupees in operation and maintenance expenditures. The solid waste collection system was monitored through a vehicle tracking system with the help of the base map, saving a further 10 million rupees.

The mobility planning and transportation project saved the 1.5 billion commuters in Mumbai 10 minutes of travel time every day. This resulted in a productivity increase of 250,000 man-hours, which equals a savings of 5 billion rupees every year.



*SewerCAD profile of a section of the sewer network of the Airoli suburb of Navi Mumbai.*

Overall, this integrated approach resulted in efficient planning and execution of the project, and the results were visible in increased tax revenue, reduction in operation and maintenance costs for the utilities, better transport planning, reduced nonrevenue water, and improved citizen visibility and satisfaction. By improving the water supply and water treatment in Navi Mumbai, the city has become the preferred destination of millions of young professionals who aspire to live in a modern urbanized area. NMMC’s investment in mapping its assets, land-use patterns, services and utilities on a common platform will yield benefits for many years.