

Project Dossier



PROJECT DOSSIER

NDRC Micro-tunneling works for Intelligent Traffic Systems (ITS)

PROJECT OVERVIEW

The ITS2020 Project aims to expand the ITS infrastructure, step up the performance of key road networks through improved mobility, safety, traffic control operations, and provision of traveler information for all road users in Dubai. The project involves an expansion of traffic CCTV monitoring, radar detection, and full matrix dynamic message sign sub-systems in addition to a complete Ethernet-based Fiber Optic communication network and an Integrated Advanced Traffic Management System (ATMS). The installation was carried out using the directional drilling technique with launching and receiving shafts at both ends.

WHY MONITORING?

As the project required the construction of NDRC 5.2 m below the Red line metro tracks (on ground towards the end of line), instrumentation was planned for safety monitoring of structures, as well as for the risk management of construction works, even though the shaft excavation was only upto 2.5 m depth below the ground level. The tunneling length was 43 m.

Project	NDRC Micro-tunneling work for Intelligent Traffic Systems (ITS)
Location	Dubai, UAE
Client	Roads And Transport Authority
Contractor	China State Construction Engrg.Corp.Ltd
Consultants	Parsons Overseas Limited
Duration	September 2019

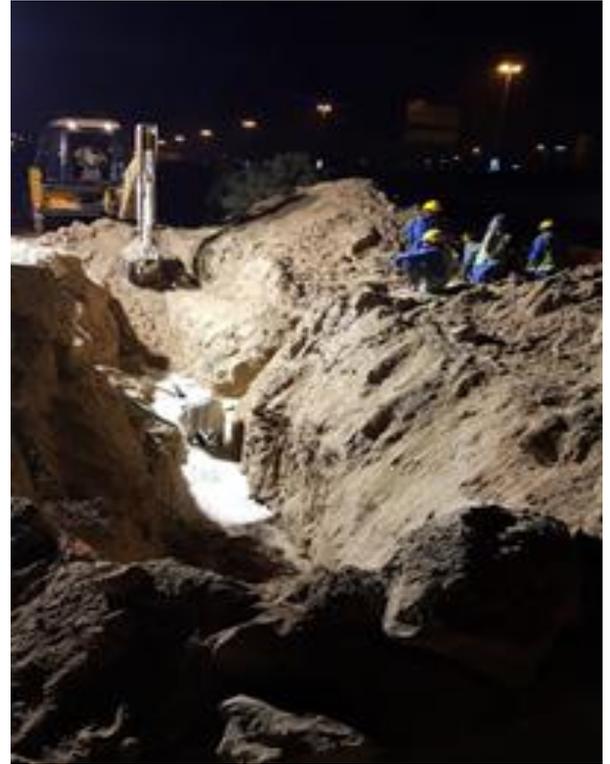


MONITORING SOLUTION

Encardio-rite was instructed by the Road and Transport Authority (RTA-Owner of Metro structure) and China State Construction Engineering Corporation Ltd. to provide instrumentation and monitoring program during NDRC to assess the impact on adjacent structures including the Dubai Red Line metro pier as per M/s RTA code of practice.

Turnkey services

- Pre-construction building condition survey of metro piers and its viaduct
- Supply of geotechnical instruments, precise survey instruments
- Installation of geotechnical instruments including subsurface instruments
- Manual and automatic monitoring
- Precise levelling
- Setting up an online web-based data management system (WDMS) and maintenance during the contract period
- Daily & weekly reporting with evaluation & interpretation



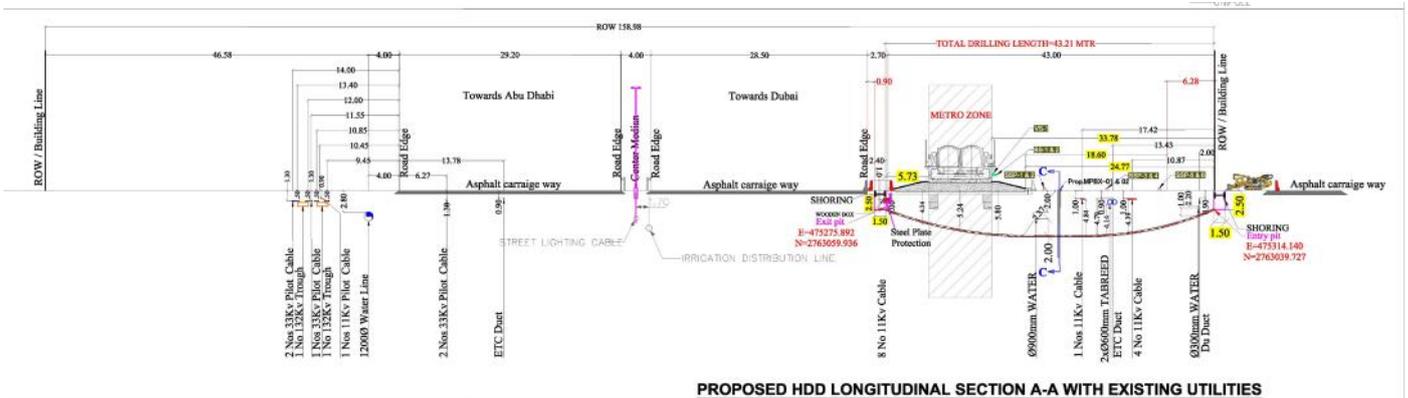
INSTRUMENT USED

Instruments for Metro track monitoring

- Automatic Vibration sensor** Installed near metro track to monitor any vibration caused by nearby construction works.
- Building settlement points** Installed on parapet near metro track to monitor any settlement caused by nearby construction works

Instruments for surface/sub-surface monitoring near construction works

- Borehole extensometer** Installed to monitor settlement in the ground along the tunnel alignment
- Surface settlement points** Installed in the soil to monitor surface settlement along the tunnel alignment



Typical instrumentation layout drawing

BILL OF MATERIALS/ LEGENDS:				
S NO	SYMBOLS	ABBREVIATIONS	INSTRUMENT	QTY.
1		BSP	BUILDING SETTLEMENT POINT	02 no.
2		VS	VIBRATION SENSOR	01 no.
3		SSP	SURFACE SETTLEMENT POINT	6 no.
4		MPBX	MULTI POINT BOREHOLE EXTENSOMETER	02 no.



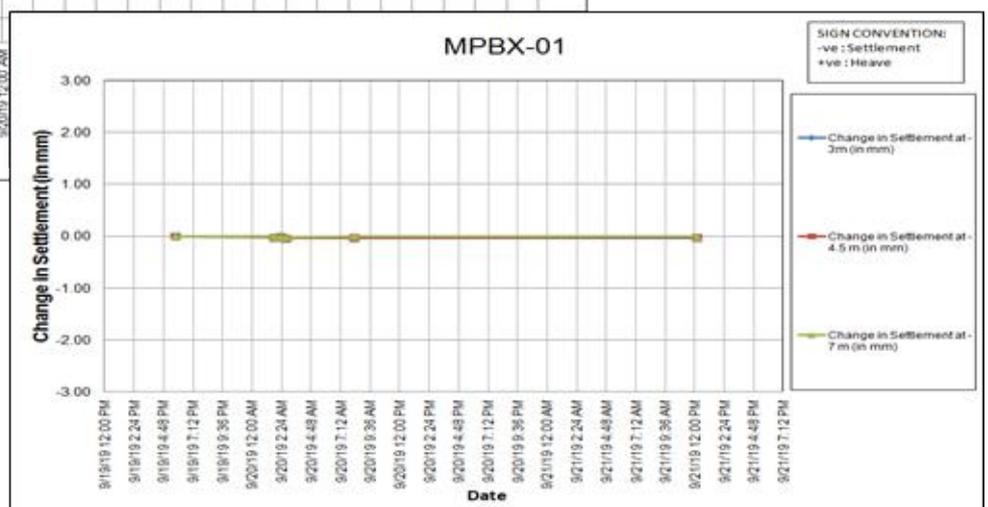
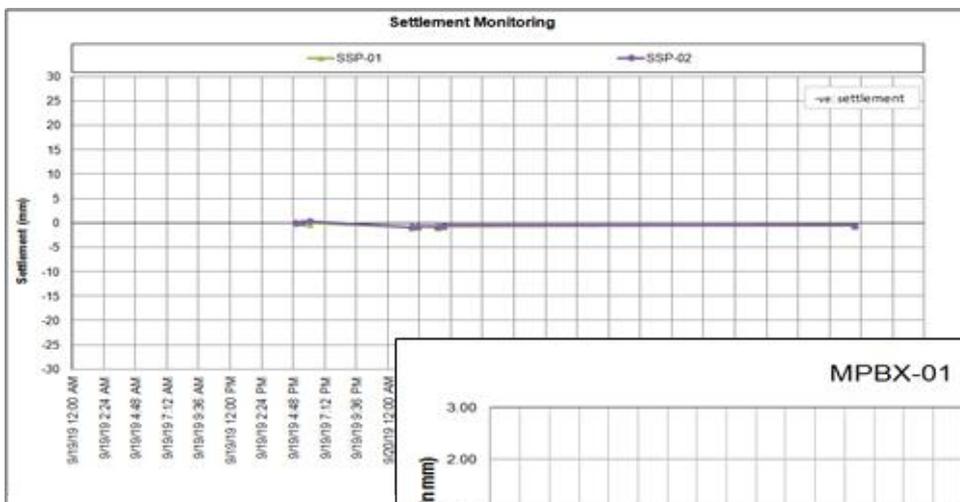
The NDRC works started after the installation of the above instruments and recording their base readings.

CHALLENGE & SOLUTION

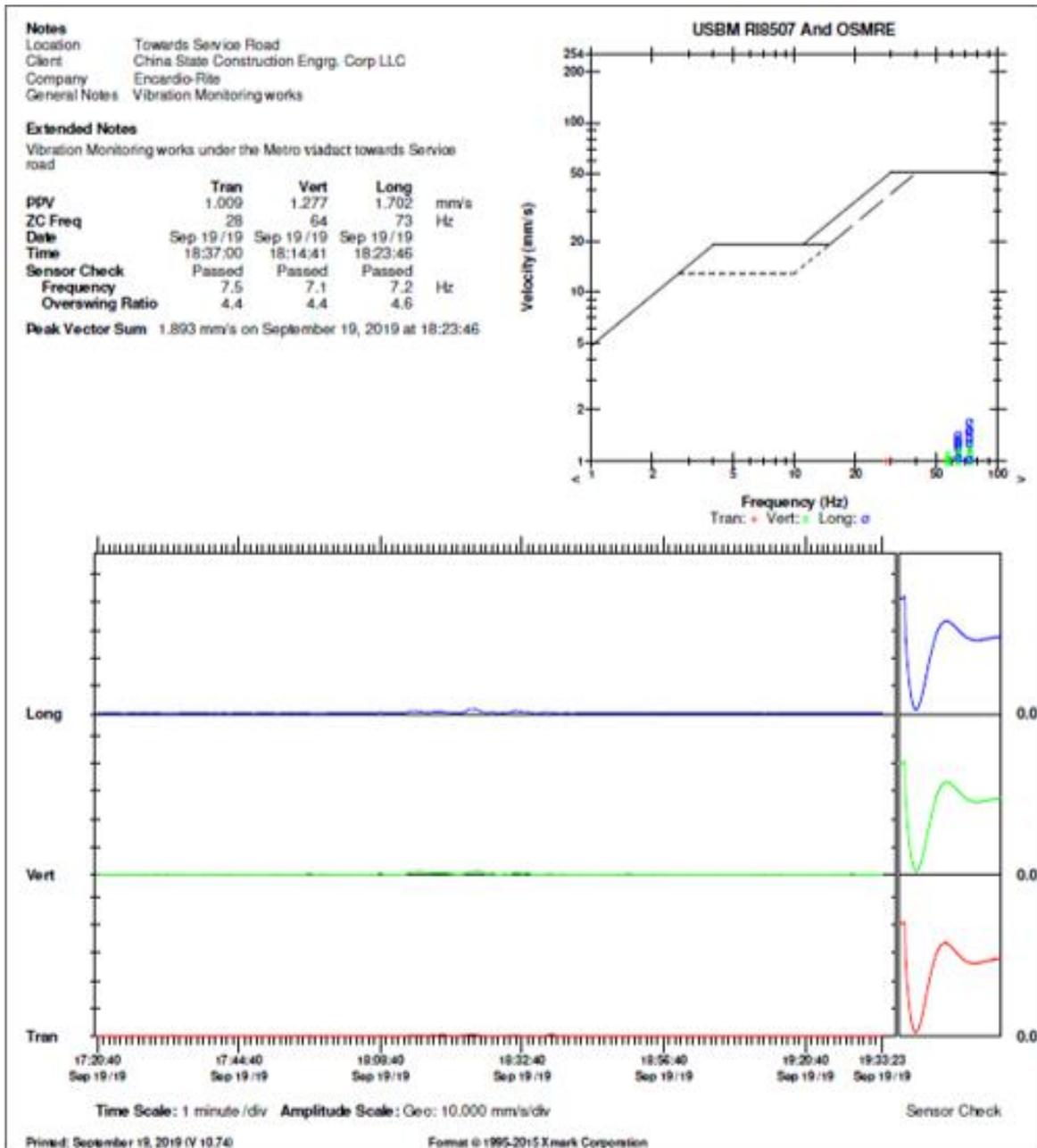
The movement of the metro track was a major concern. Online continuous monitoring of running metro tracks with the vibration sensor was very critical to perform. We used battery operated vibration sensor with the battery back up for one week.

ACHIEVEMENT & RESULTS

Installation and monitoring of the above-mentioned instruments were executed successfully by experienced and proficient I&M team of Encardio-rite.



Surface and sub-surface settlement data from surface settlement point and multipoint point borehole extensometer



Automatic vibration monitoring data

The real-time data from the vibration sensor installed near the existing metro tracks was continuously accessible to the consultant/contractor their desk, during NDRC works. Monitoring reports for the manual data was also provided to the contractor daily. This helped the contractor to perform their construction activities safely, without any delays or failure. Most of the data did not cross the alert levels. All the monitoring results were within the designer's specified limits.



TUNNELS



HYDROELECTRIC



CONSTRUCTION



STRUCTURAL



METRO & RAIL



BRIDGES



MINING