Gall Zeidler Consultants
Geotechnics | Tunnel Design | Engineering

Lower Thames Crossing
National Highways

Location: Between Kent and Essex, United Kingdom

Date: 2023 - Present

Structure: Twin-bored TBM Tunnels
Cross-Passages by mechanised and NATM (SCL) method

Length: 4 km

Cross-Section: TBM Tunnel Outer Dia: 16 m
Cross-Passages Outer Dia: 5 m

Geology: Made Ground, Head Deposits, Alluvium, River Terrace Deposits, Structureless and Structured Chalk.

Cost: £10 Billion (US$ 13.2 Billion)

Client: Bouygues Murphy Joint Venture (BMJV)

Owner: National Highways

Geotechnical and Tunnel Engineering Support Services:

The Lower Thames Crossing (LTC) is a proposed new motorway linking the Essex via two tunnels under the River Thames. The project will increase the road capacity across the River Thames east of London by over 90%. The project is designated as a Nationally Significant Infrastructure Project (NISP).

The new motorway of approximate 23km will connect the A2 and M2 in Kent and A13 and M25 in Essex. The proposed route is shown in Figure 1. The 4km TBM tunnels, one for southbound traffic and one for northbound, are connected by 27 cross-passages (CPs). All 27 CPs are currently proposed to be constructed mechanically with micro-TBMs.

The geology in is predominantly the White Chalk Subgroup, specifically the Seaford Chalk Formation. This is overlaid by varying grades of weaker/weathered chalk (Class 3 and 4), River Terrace Deposits, Alluvium, and Made Ground. During the design development stage, conventional SCL solutions were investigated for 11 selected cross-passages in the chalk formations, including assessments of temporary support, groundwater control and ground treatment measures. All cross-passages are now planned to be constructed using mechanised micro-TBM methods, which means that SCL cross-passages are no longer part of the current scheme.

Gall Zeidler Consultants (GZ) have been commissioned as a sub-consultant by the Bouygues Murphy Joint Venture (BMJV) to provide specialist geotechnical and tunnel engineering support for the detailed design and construction development of the tunnelling works. GZ's services include ground characterisation, chalk rock mass assessment, derivation of design parameters, temporary works design, cutter soil mixing (CSM) works, ground improvement using prefabricated vertical drains (PVDs), accidental blast assessment and instrumentation and monitoring (I&M).

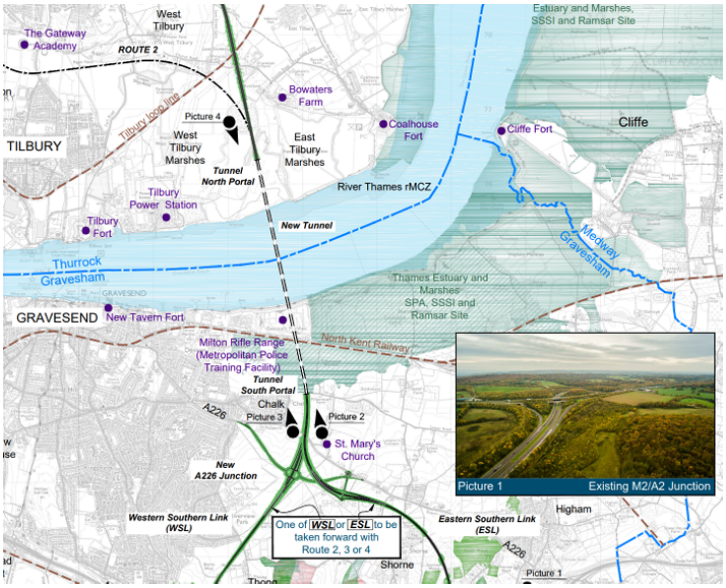

Figure 1. LTC tunnel location (Courtesy of National Highways).

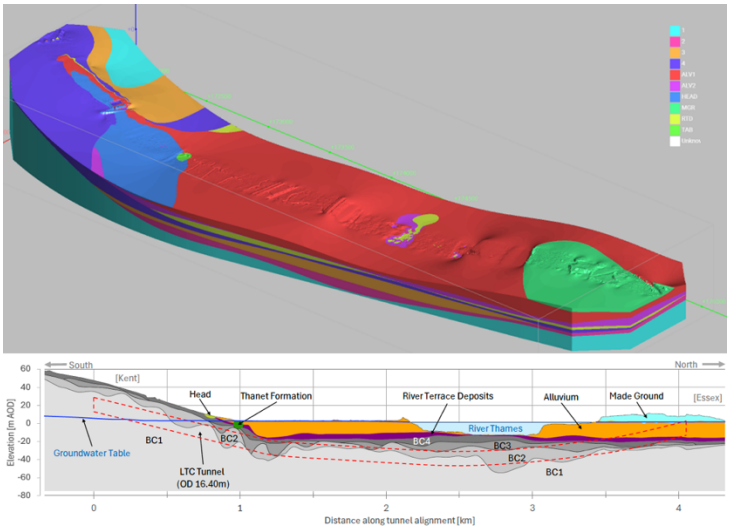

Figure 2. 3D geological model (Leapfrog) and geological long section along LTC tunnel developed.