

Phase 1 Mitigation Works: Temporary Bearing Installation

Deptford Viaduct, London

Client
TIDEWAY

Principal Contractor
Costain VINCI Construction Grands
Projets & Bachy Soletanche Joint
Venture (CVBJV)

Works Commenced
July 2017

Works Completed
January 2018



The Thames Tideway Tunnel is a 25km storage and transfer tunnel designed to tackle the problem of sewage overflow into London's River Thames. London's 150-year-old sewage system is regularly operating beyond its capacity, resulting in raw untreated waste spilling into the river. The Tideway project seeks to tackle this problem, providing a cleaner and healthier river.

The Deptford Creek Viaduct forms part of the Dockland Light Railway (DLR) system located within the Boroughs of Greenwich and Lewisham. The North bridge structure is located between the Deptford Bridge and Greenwich DLR stations and runs across Tideway Greenwich Pumping Station site (GREPS).

At GREPS site, the Tideway scheme required CVBJV to undertake a number of construction activities including:

- Sinking a 20.8m external diameter 50m deep shaft. The closest Diaphragm Wall (DW) panels are about 5m clear of Pier 2 of the DLR Deptford Creek Viaduct.
- A 6.1m external diameter connection tunnel linking off the shaft, heading in a northwest direction passing between Piers 2 and 3 of the viaduct at about 44m BGL.

An assessment was carried out to investigate structural response of the viaduct to ground movement arising from the works described above. The structural assessment recommended that mitigation measures were implemented to alleviate the effect of the ground movement on the viaduct bearings. The mitigation measures proposal was based upon the philosophy of freeing Pier 2 guided bearing of its transverse restraint capacity in order for Pier 2 to move transversely (relative to the deck above) as a result of the shaft and tunnel construction whilst maintaining its vertical load carrying capacity.

Works were separated into two phases. Phase 1 (before DW construction) consisted of:

- The design and installation of the temporary bearings on Piers 1 and 3 in order to provide additional transverse bearing capacity at Pier 1 and Pier 3.
- Release the lateral guides at bearing 42/5 to allow Pier 2 a free horizontal lateral movement. The lateral loads were redistributed on Piers 1 and 3, which will be possible due to the installation of additional interim bearings.

For Phase 1 of the scheme, Freyssinet was instructed to carry out the mitigation works on the viaduct, including the installation and commissioning of interim bearings at Piers 1 and 3 and the removal of guide restraint at Pier 2. Freyssinet carried out:

- Survey/setting out
- Hydrodemolition and surface preparation of the deck soffit
- Installation of interim bearing assemblies at Pier 1 and 3
- Adjustment of interim bearings top-plates' bias to match existing bearings
- Grouting the friction and "mechanical inter-lock" interface
- Hydraulically pre-load interim bearings
- Removal of existing Pier 2 sliding guided bearing (42/5) restraint.

Pre-loading the temporary bearings and removal of guides took place during DLR night time closures. The temporary bearing on Pier 1 was installed under traffic management (road) in one night, and the jacking of the deck and removal of the guide on existing bearings were done during DLR night closure.

Phase 2 of the Tideway project is currently in the design phase.