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9.3.4 Drainage

9.3.4.1 Drainage pumps shall be incorporated at the low point within the tunnels. The pump outlets shall be piped from the tunnels to the seepage water holding tank at ground level via the nearest station.

9.3.4.2 Seepage water holding tank(s) shall be designed to store station and tunnel seepage water, tunnel washing water, and other sources of water entering via station and tunnel drainage pumps accumulated over seven (7) days.

9.3.4.3 Not in use.

9.3.4.4 Design of seepage water holding tank to be based on relevant clauses of the Authority's CDC for Road and Rail Transit Systems and M&W Specification for C&S Works.

9.3.4.5 A high water alarm monitoring system shall be designed to monitor the water level inside the seepage water holding tank using multi-level single probe. This would provide the railway operator with an alert system via ISCS when water level reaches the 'high water level alarm'.

9.3.4.6 A monitoring panel (for the high water alarm monitoring system mentioned in above clause) shall be located in a reinforced concrete closet at ground level and near to the access opening of the seepage water holding tank. A twin Switch Socket Outlets (SSO), shall be provided at the panel location, one for power supply to the monitoring panel and other for maintenance purposes. Interface Terminal Box (ITB) for interfacing with Integrated Supervisory Control System (ISCS) shall be located next to the monitoring panel.

9.3.4.7 The Contractor shall liaise with the Operator, relevant agencies and authorities on the location of the seepage water holding tank in his detailed design and submit to the Engineer for acceptance.

9.3.4.8 To shorten the operation time required for collection of seepage water, an external connection with quick coupler is to be provided with manhole cover that prevents rain water from seeping into the tank. A pipe to the bottom of the seepage water holding tank shall be provided and connected to the external connection. Vent pipe to be provided above ground level. Rain or surface run-off water shall not be allowed to flow into the tank from the access opening / vent pipe.

9.3.4.9 Water proofing membrane shall be provided to the external face seepage water holding tanks. Location of the seepage water holding tank shown in drawings is for reference only. Consultant shall liaise with the Engineer to finalise the location in the detailed design.

9.3.5 Falsework and Formwork Design

9.3.5.6 The Contractor shall not deviate from the accepted drawings without the prior acceptance of his PE and the Engineer.

9.3.5.7 The Contractor's PE shall inspect, certify and issue a "Permit to Load" for the completed formwork structure twice, once prior to reinforcement bar fabrication and once immediately before concreting work.

9.3.6 Earth Retaining or Stabilising Structure (ERSS) and Ground Improvement work

9.3.6.1 The ERSS schemes shown on Authority's drawings are reference schemes and have been developed to facilitate the construction of the works. The Contractor shall develop the full design and be fully responsible for the design, submissions and erection of all the work. The Contractor shall engage a PE to be responsible for the works.

9.3.6.2 Ground improvement works shall be designed and installed whenever required to limit movements, to ensure water-tightness of the ERSS and for the construction of other works.

9.3.6.3 All ground improvement works necessary for the construction and completion of the Works including the relevant testing and any related instrumentation and monitoring works to evaluate the ground improvement works shall be deemed to be included in the Contract Price.

9.3.6.4 The Contractor's attention is drawn to the reference design of Temporary Works scheme shown in the Authority's Drawings. The Contractor shall comply with the minimum requirements specified in this section to develop his own Temporary Works scheme and shall be responsible for the detailed design of the Temporary Works based on the given criteria. Any changes to this reference Temporary Works scheme resulting from compliance with BCA, statutory, relevant authorities and Authority's requirements shall be deemed included in the Contract Price.

9.3.6.5 The Authority's requirements of ERSS at CR16 station are:

(a) Minimum wall thickness of ERSS wall Type 1 to be 1.5m as shown in the Authority's Drawing CR206-LTA---CR16-XX-G-TMP-DR-LPL-3011;

(b) Diaphragm wall for station and entrances ERSS (unless otherwise accepted by the Engineer);

(c) Construction Method for station box except for launch shaft, entrances, and vent shafts, shall be topdown;

(d) Where there is presence of rock, GIV or better, or SIII or better, above the FEL, the ERSS wall penetration shall be at least 2m below FEL;

AHU rooms (Electrical Plant room)	± 3 kPa
VE/VS Plenums	± 1 kPa
Clean Gas Protected Rooms	± 1 kPa

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9.36 Steel Fibre Reinforced Concrete for Cast In-Situ Structure

9.36.1 Contractor may consider the use of Steel Fibre Reinforced Concrete (SFRC) in cast in-situ construction, subject to the Engineer's acceptance. The contribution from SFRC shall only be considered for SLS crack width design.

9.36.2 The adoption of SFRC is not permitted in diaphragm walls, overhead elements, and elevated elements.

9.36.3 The design of SFRC shall comply with SS674:2021 and the Authority's requirements stated in Appendix BK, whichever is more stringent. In the event that Contractor's proposal does not meet these requirements, Contractor shall change his SFRC design to Reinforced Concrete without additional time and cost to the Authority.

9.36.4 This Specification shall be read in conjunction with Appendix BK of the Particular Specifications.