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**13 SAFETY, SECURITY AND ENVIRONMENTAL PROTECTION****13.1 General**

- 13.1.1 The Contractor shall comply with the Authority's General Specification Safety, Health and Environment requirements as documented on the Authority's website. The latest version of the specifications are available for download at: <http://www.lta.gov.sg> under "Industry Matters" → "Safety, Health and Environment" → "Construction Safety & Environment" → "Specifications for Safety, Health and Environment" and select: Safety, Health and Environment (General Specification **Appendix A**) (March 2023 Edition).
- 13.1.2 The Contractor may refer to **Appendix X** of the Particular Specification for the sample of the noise barrier along worksite.
- 13.1.3 The Contractor shall comply with the standards and conditions set out in the Environmental Monitoring and Management Plan (EMMP) and Construction Equipment List given in **Appendix BE** of the Particular Specification and the environmental considerations stated in **Appendix A** of the General Specification. In the event of discrepancy between the **Appendix BE** and the other relevant authorities' requirements, the more onerous requirements shall prevail.
- 13.1.4 An Environmental Management and Monitoring Plan (EMMP) is **given in Appendix BE** of the Particular Specifications. The Contractor shall review the EMMP and submit a contract-specific EMMP based on his detailed construction method three months after the award of tender. This contract-specific EMMP shall be submitted to the Engineer for approval prior to commencement of Works. The EMMP shall include but not be limited to the following:
- (a) mitigation measures to be implemented for the project construction;
  - (b) environmental monitoring (water, noise, air pollution and ground-borne vibration) to be conducted during the construction period;
  - (c) existing environmental legislation to be followed as well as environmental best practices to be implemented; and
  - (d) contingency planning in case of emergency situations.
- 13.1.5 The Contractor shall comply with National Environmental Agency (NEA)'s Code of Practice for environmental Control Officers ([NEA Practices](#)).

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- (d) Garbage / waste disposal;
  - (e) Vector control and pest control on weekly basis in accordance with NEA guidelines;
  - (f) Fire protection; and
  - (g) Temporary toilet facilities.
- 13.10.7 The central security post shall be manned at all times by a competent uniformed supervising security guard and an assistant from a licensed Security Agency shall be established at an agreed location. It shall be possible to communicate between each satellite security posts and the central security post.
- 13.10.8 At each entrance to the station structure, the Contractor shall install new signs after Station Basic Structure Completion stage that highlight the enhanced security arrangements.
- 13.11 Facial Recognition Biometric Authentication System (FRBAS)**
- 13.11.1 As part of the industry productivity initiative and in line with the latest Building Control (Buildability) Regulations, the Building and Construction Authority (BCA) collects productivity and other related data of construction projects on a regular (monthly and other period) basis using the Electronic Productivity Submission System (ePSS).
- 13.11.2 The Contractor shall implement and deploy Facial Recognition Biometric Authentication System (FRBAS) in the form of access control system, for the purpose of line-wide manpower data collection for the Cross Island Line (CRL). The Contractor shall refer to **Clause 27** of the Particular Specification.
- 13.11.3 This system shall operate to monitor the Contractor's manpower under respective trades, skills, or professions and generate the required data and output in the required format for the Contractor to upload to BCA's ePSS.

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- 13.11.4 The FRBAS shall track the movement of each worker (general workers, skilled personnel, site and management staff, etc.) entering and exiting the Works Areas according to the trade type as shown in **Appendix V** of the Particular Specification, and the working hours per day of each worker and the man-days worked on the Works Areas (one (1) man-day is defined as one (1) man working for eight (8) hours). The system shall also generate the manpower report in Microsoft Excel format (sample as shown in **Appendix W** of the Particular Specification). The Contractor shall submit the required information to BCA at monthly intervals or other frequencies as and when required by the BCA and LTA.
- 13.11.5 The Contractor shall provide all pertinent information related to the requirements of the biometric system and ePSS submissions.
- 13.11.6 The Contractor shall process, compile, and submit manpower usage data in the required format as and when required by the Engineer.
- 13.11.7 The Contractor shall set up site procedures and control in ensuring that all his workers and site staff for the usage of FRBAS. Any lapse in maintaining such control will be considered as a security violation and will be taken into account in the monthly ESS assessment.
- 13.11.8 For the avoidance of doubt, the Contractor shall note that the implementation of the FRBAS shall not alleviate the Contractor from his obligations to maintain adequate site security and access control as specified in the Authority's Requirements.

**13.12 Additional Safety Measures**

- 13.12.1 The Contractor shall provide LED temporary lighting at all worker's access ways within the station and at all staircases, both at temporary and permanent staircases at all stages of the Works and shall maintain these LED lights until CWW or when permanent lighting are accepted to be used by the Engineer. The LED lighting shall have an equivalent luminance at least 100 lux measured at floor level in accordance with BS 6164. The colour temperature of the LED lighting shall fall within the warm color range between 3500 kelvin (k) to 4500k and the color rendering index shall be above 80. The Contractor shall ensure the glare of the LED lights is within satisfactory level and not causing discomfort and inconvenience to the workers and adjacent stakeholders.

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- 13.12.2 The LED lights shall be protected against dust and water with heavy-duty IP65 casing and fitted with polycarbonate diffusers or a similar system to the acceptance of the Engineer and shall be mechanically robust to at least IK 07 to withstand adverse site conditions. All connectors shall be of Bi-pin moulded plastic type non-flammable, with quick connect sockets for the connection of cabling, to BS EN 1875-3, EN60400 and designed to retain positively the lamp caps independently of the contact springs. Terminal block used shall be spring clamp with high contact pressure type which can accommodate various wire sizes. All LED lights shall be such that it allows ease of component replacement. The LED lights shall comply with IEC 62031, IEC 60598-1, IEC 62384 and IEC 61347 requirements as a minimum or equivalent standards for performance and safety specifications. The Contractor shall repair or replace any faulty LED lights immediately and at his own cost.
- 13.12.3 LED lights samples shall be submitted to the Engineer for acceptance followed by site mock-up for acceptance by the Engineer.