

ENVIRONMENTAL, HEALTH AND SAFETY (EHS) CONSIDERATIONS

Table of Contents

Section	Item	Page
1.	General	2
2.	Method Statement (MS), Risk Assessment (RA) and Safe Work Procedures (SWP)	2
3.	Permit to Work	3
4.	EHS and Biodiversity Awareness Training	4
5.	Accidents & Incidents Reporting	5
6.	Personal Protective Equipment (PPE)	5
7.	EHS Inspection	6
8.	Maintenance Regimes	6
9.	Hazardous Substances and Chemicals	6
10.	Temporary Electrical Installations	7
11.	Storage Licence for Petroleum and Flammable Materials	7
12.	Emergency Preparedness	8
13.	Work in Confined Spaces	8
14.	Excavations	8
15.	Lifting Operations	9
16.	Lifting Machinery	9
17.	Lifting Supervisors	11
18.	Crane Operators	11
19.	Lighting	12
20.	General Safety	12
21.	Working at Heights	13
22.	Traffic Control and Road Safety	14
23.	Spillage on Roads	14
24.	Environment	14
25.	Air Pollution	15
26.	Water and Land Pollution	15
27.	Earth Control	17
28.	Flooding Protection	18
29.	Flooding Evacuation and Rescue Procedure	18
30.	Contaminants	18
31.	Groundwater	19
32.	Rodent Control	20
33.	Mosquito Control	20
34.	Waste Management	21
35.	Noise Control	22
36.	Protection of Fauna	23
37.	Protection of Flora	24
38.	Time Restrictions	24
39.	Eating and Resting Areas	25
40.	Company Demerit Scheme	25
	Annex A – Company Demerit Scheme	26

ENVIRONMENTAL, HEALTH AND SAFETY (EHS) CONSIDERATIONS

1. General

- 1.1. The Supplier shall comply with all relevant laws, acts, regulations and codes of practice of Singapore including any amendments or re-enactment thereto.
- 1.2. No works (except for those required for the installation of Earth Control Measures and Tree Protection Zones) shall commence on site before the approval of Contract Environmental Management and Monitoring Plan (EMMP).
- 1.3. The Supplier shall comply with all the EHS requirements contained in this Specifications and supporting documentation, even where these impose a higher standard than that required by current Singapore legislation.
- 1.4. Tool-Box Meetings shall be carried out for each work shift to ensure that involved person who may be exposed to a risk to his or her safety and health due to the work is informed of the nature of the risk involved and any measure or safe work procedure required during that specific work shift.
- 1.5. The EHS policy Statement is as follows:

Mandai Wildlife Group is committed to caring for the environment, health & safety through the following:

INTERVENE to pre-empt and prevent ill-health and injury

COMPLY with obligations

ADOPT best practices and continually improve the environmental, health & safety standards

RESPONSIBLE for caring for the environment, guests, staff and stakeholders

EDUcate on environmental protection, pollution prevention, occupational health & safety

- 1.6. The Supplier shall be responsible for and support the Client to achieve the following environmental objectives:

SN	Objectives	Monitoring Parameter / Trigger Level
1	Protection of native Flora <ul style="list-style-type: none"> • Ensure retained, translocated and planted flora's health • Prevent introduction and proliferation of invasive flora species and weeds 	Dieback from tips Diseases Edge effects
2	Protection of native Fauna <ul style="list-style-type: none"> • Ensure negligible to small* impact to both native and collection animals due to works • Prevent human-wildlife conflicts, animals' escapees, spread of diseases • Minimise wildlife mortality and injuries 	Fauna Monitoring in Buffers and CCNR Wildlife Mortality (Site and Road)

3	Noise	<ul style="list-style-type: none"> • Ensure negligible to small* impact on Native Wildlife / CCNR due to construction and operations • Ensure small to negligible impact on Client's living collection in enclosures and Back-Of-House areas • Comply with NEA requirements for Client's visitors and staff 	Baseline noise levels 70 dB(A) for Zoo animals 85 dB(A) for outdoor zoo visitors and workers
4	Water Surface, Soil and Ground	<ul style="list-style-type: none"> • Ensure zero illegal discharge and pollution into the forested areas, Upper Seletar Reservoir, streams and any other sensitive water bodies • Comply with PUB requirements (Lease Agreement) and NEA Trade Effluent Discharge 	Trade Effluent Discharge
5	Air	<ul style="list-style-type: none"> • Ensure small impact due to contaminants to air from construction and operations • Compliance to NEA requirement 	PM10
6	Vector	<ul style="list-style-type: none"> • Ensure no transmission of vector borne diseases within site • Compliance to NEA requirements 	NEA Requirement
7	Light	<ul style="list-style-type: none"> • Minimise effects of nocturnal lights on habitats 	Baseline lux level

*no loss of viability /function of habitat and does not cause substantial change in the population of the species, or other species dependent on it

- 1.7. The Supplier shall be responsible for the EHS of all operations in connection with the Contract and shall take all necessary actions to ensure the safety and health of all persons who may be on or adjacent to the work location (including but not limited to its employees, sub-contractors and sub-suppliers).
- 1.8. The Supplier shall be responsible for ensuring that all persons entitled to be or who may attend at the workplace in connection with the Contract (including but not limited to its employees, sub-contractors and sub-suppliers) comply with all relevant legal and contractual requirements and shall enforce its compliance.
- 1.9. The Supplier shall be deemed to have considered means and included all costs to ensure that their works are conducted in compliance to all local environmental regulations and relevant requirements listed in this specification. Any variation claims or claims for extension of time in relation to these requirements will not be permitted. In the event requirements cannot be complied with, the Supplier shall propose alternative solutions that will achieve the same intended outcome for Client's approval prior to commencement of work/ activity.

2. Method Statement, Risk Assessment and Safe Work Procedures

- 2.1. The Supplier shall identify all environmental, safety and health critical activities, including those that may result in potential impact to the surrounding flora and fauna. The Supplier shall ensure that a method statement is prepared for each activity and submitted to Client before commencement of such activities. Risk assessments and safe work procedures conforming to Code of Practice on WSH Risk Management guidelines shall be submitted with all method statements.
- 2.2. All method statements submitted by the Supplier shall include considerations on the environmental impacts and their respective mitigations.

- 2.3. The Supplier shall address all comments on the method statement arising from the Client's review. The Supplier shall fully comply with the method statement approved by the Client. If there is any intention to change the method of work, the Supplier shall seek approval from the Client.
- 2.4. The Supplier shall maintain a record of risk assessments conducted, including any control measures taken or to be taken and any safe work procedures.
- 2.5. The Supplier shall ensure all risk assessments and safe work procedures to be adequately briefed in relevant languages and disseminated to all relevant persons prior to the work commencement. Records of such briefings shall be submitted to the Client Superintending Officer prior to the work commencement.

3. Permit-to-Work (PTW)

- 3.1. The Supplier shall comply with all relevant laws, acts, regulations and codes of practice of Singapore including any amendments or re-enactment thereto.
- 3.2. The PTW shall be valid only for the work shift unless otherwise agreed upon by Client. No work shall be carried out without a valid PTW that is evaluated by an appointed assessor and approved by appointed manager who has control over the work.
- 3.3. The Supplier shall ensure all risks and risk control measures addressed in the PTW to be adequately briefed in relevant languages and disseminated to all relevant person prior to work commencement.

4. EHS and Biodiversity Awareness Training

- 4.1. The Supplier shall ensure provision of necessary EHS training under the statutory requirements, including training mandated by the Workplace Safety and Health Act and subsidiary legislations to its employees, sub-contractors and sub-suppliers, or as directed by Client. The Supplier shall keep records of all training conducted and submit the same to Client when so requested.
- 4.2. The Supplier shall ensure that no person, including its sub-contractors and sub-suppliers, carry out works prior to the completion of necessary EHS and Biodiversity Awareness Training and obtaining a security pass. The Supplier shall ensure that training information is given in languages understood by the relevant persons to be trained. In addition, the Supplier shall have a system to clearly identify new employees and workers for their initial thirty (30) days working in Client Premises.
- 4.3. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, employ qualified operators for all machinery to be used in the Client's premises. For machinery where there is no skilled training available in Singapore, the Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, engage the provider of the machinery to train them and authorise them in writing. Examples of a qualified operator include, but not limited to: welder, excavator operator, forklift operator and crane operator.
- 4.4. The Supplier shall ensure that all persons and in particular new persons, or persons transferred to new assignments, are given proper EHS training relevant to their duties.
- 4.5. The Supplier shall implement an identification system to clearly identify all the qualified persons and operators.
- 4.6. The Supplier shall ensure all workers (including those of its sub-contractors and sub-suppliers) are adequately trained and aware for environmental management.
- 4.7. The Supplier shall ensure all workers carrying out works in respect of the Contract (including those of its sub-contractors and sub-suppliers) complete and understand the Biodiversity Awareness Training (as set out in Section 4.8 below). Additionally, all workers must comply

with the Biodiversity Awareness Training's guidelines, as failure to do so could result in a violation of the Wildlife Act.

4.8. The Supplier shall conduct the Biodiversity Awareness Training:

- Prior to commencement of any works or activities on site; and
- A refresher at least once every six (6) months during the Contract period.

4.9. Daily toolbox meetings shall include reminders on wildlife encounters and environmental protection.

5. Accidents and Incidents Reporting

5.1. Notwithstanding the reporting requirements of the Workplace Safety and Health (Incident Reporting) Regulations, the Supplier shall notify Client of any accident, incident, dangerous occurrence, occupational disease and near miss associated with this Contract. Verbal notification shall be made to the Superintending Officer immediately and followed up by written notification within 24 hours.

5.2. The Supplier shall be responsible for reporting of any incidents/accidents relating to harm, injuries and death of fauna/flora, all environmental pollutions (such as discharge of silty water exceeding regulated limits); and emergencies immediately upon discovery to Client.

5.3. The Supplier shall follow up with an investigation and submit an investigation report within 24 hours of the incident to Client. The investigation reports shall contain key details including description, photo records, location, date, time, cause, corrective/preventive actions taken.

5.4. The Supplier shall propose remedial measures to prevent recurrence of the accidents, incidents, dangerous occurrence, occupational disease and near miss to the satisfaction of the Client person-in-charge.

5.5. The Supplier shall submit photos, sketches and evidences related to the incident, accident or near miss in soft and hard copies as deemed necessary to the satisfaction of the Client person-in-charge.

6. Personal Protective Equipment (PPE)

6.1. The Supplier shall provide, maintain and enforce the usage of PPE required for all its employees, sub-contractors, and sub-suppliers working in Client Premises. Following PPE are applicable but not exhaustive:

- Industrial safety helmets with chin strap conforming to SS 98,
- Helmets for pedal cyclists conforming to EN 1078,
- Personal eye protection conforming to SS 473,
- Hearing protection conforming to SS 549,
- Respirators/ dust masks conforming to SS548 shall be provided for activities generating airborne contaminants, or in conditions with presence of airborne contaminants,
- High visibility vest/ clothing conforming to EN ISO 20471,
- Protective clothing for chainsaw users conforming to EN 381,
- Work positioning and restraint system for fall prevention conforming to SS 528,
- Personal fall arrest system conforming to SS 528,
- Respiratory equipment, open-circuit self-contained compressed air diving apparatus requirements, testing and marking conforming to EN 250,
- Protective gloves against chemicals and micro-organisms conforming to EN 374,
- Protective gloves against mechanical risks conforming to EN 388,
- Protective gloves General requirements and test methods conforming to EN 420, and
- Safety footwear with steel toe cap and steel sole plate conforming to SS 513

6.2. The Supplier shall maintain and update all PPE issuance records. A PPE maintenance regime shall be established and implemented. Such records shall be made available for inspection at all times.

6.3. The Supplier shall ensure that all equipment is properly used by its employees, sub-contractors, and sub-suppliers during the course of their work.

7. EHS Inspection

7.1. The Supplier shall carry out internal EHS inspections at least once per work shift to ensure all required risk control measures are in place and effective during the course of their work.

7.2. Inspection of side supports of excavations and trenches, cranes, formworks and scaffolds should be carried out after any episode of inclement weather which may affect their stability/integrity.

7.3. A written record of inspection findings shall be kept by the Supplier, together with the necessary remedial action and due date for completion submitted to Client at Client's request. Any corrective action, as agreed upon with Client, shall be immediately implemented by Supplier.

7.4. The Supplier shall institute an environmental performance reporting and review process as part of the regular updates to Client. The items to be discussed include:

- Environmental objectives i.e. compliance, potential non-compliance, and mitigation actions
- Environment Risk Assessment i.e. new environmental impacts, mitigation measures and status of implementation
- Environmental non-compliances i.e. warnings, fines and stop works with regards to vector control, earth control measures, noise, trade effluent, etc
- Wildlife encounter, injuries, and death
- Grievances
- Inspections and monitoring findings i.e. exceedances, cause, and preventive actions
- Summary of environmental incidents and accidents
- Upcoming environmental impacts in relation to works

7.5. The Supplier shall prepare and submit an Environmental Performance Report, once every 3 months of Works on site, and a final report upon Completion of Works.

8. Maintenance Regimes

8.1. The Supplier shall assess the EHS risks especially in terms of age, noise, emissions, condition etc. associated with the equipment or tool and only those assessed with minimal EHS risks shall be brought to Client Premises.

8.2. The Superintending Officer shall stop the equipment or tool from operation or require its removal if he or she finds the EHS associated risks to be high. The Supplier shall not be entitled to any claim for compensation or extension of time for completion.

8.3. The Supplier shall implement a preventive maintenance program to ensure that all equipment and tools are maintained in a safe and working order.

8.4. The Supplier shall implement a lockout and tag-out system in accordance with SS 571: 2011, Code of practice for energy lockout and tagout.

8.5. The Supplier shall implement an inspection program conforming to applicable standards and manufacturer guidelines. All equipment and tools that have undergone repair or maintenance shall be inspected and checked before returning to service. Stickers or tags shall be displayed to indicate its approval for usage or "Not for Use".

8.6. Job-made or modified tools of any kind shall not be used in Client Premises.

9. Hazardous Substances and Chemicals

- 9.1. The Supplier shall assess the Safety Data Sheets (SDS) of all the hazardous substances and chemicals prior to its entry to Client Premises for its suitability in terms of EHS hazards and consider safer alternatives.
- 9.2. The Superintending Officer may require the removal of any hazardous substance or chemical if there are safer alternatives. In such events, the Supplier shall not be entitled to any claim for compensation or extension of time for completion.
- 9.3. The Supplier shall ensure that all hazardous substance or chemical containers are labelled; its movement is recorded and returned to the designated storage areas when not in use.

10. Temporary Electrical Installations

- 10.1. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, comply with all relevant laws, acts, regulations and codes of practice of Singapore including any amendments or re-enactment thereto.
- 10.2. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, obtain licenses for using electrical power from their own generating sets (where applicable). All temporary electrical installations, equipment and tools shall be checked and certified safe for use prior to usage in Client Premises by a Licensed Electrical Worker (LEW) and thereafter monthly and after any repairs. The LEW shall provide a sticker on the equipment and tools indicating the date on inspection and is safe for use.
- 10.3. A current photograph of the LEW(s) and the contact number(s) shall be displayed on the outside of all boxes containing electrical DBs and equipment for ease of reference. Letter of Appointment for the LEW(s) shall be submitted to the Client when so requested.
- 10.4. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, ensure that all generators and welding sets used in Client Premises are adequately and effectively earthed at all times during operation.

11. Storage Licence for Petroleum and Flammable Materials

- 11.1. The Supplier shall comply with all relevant laws, acts, regulations and codes of practice of Singapore including any amendments or re-enactment thereto.
- 11.2. If the Supplier, its sub-contractor or sub-supplier intends to store petroleum and flammable materials in Client Premises, it shall obtain a storage licence from Singapore Civil Defence Force (SCDF) and a copy of the licence shall be submitted to Superintending Officer.
- 11.3. The Supplier may store petrol up to a maximum volume of 5 litres in Client Premises provided that it is kept in a safe and suitably constructed store which is licensed by the Fire Safety Department of the SCDF.
- 11.4. All diesel stored in Client Premises shall be kept in drums or in bulk tanks which in either case shall be located at a designated place away from any sources of ignition or open drain which does not lead to an interceptor, and shall be properly labelled. A "No Smoking. No Open Flames" sign shall be displayed at the storage location and a charged fire extinguisher of correct type kept on standby.
- 11.5. All bulk diesel tanks shall be properly supported in an elevated position to facilitate gravity discharge. They shall stand within a bund constructed to contain a volume of 110% of the volume of the tank. There shall be no breaches in the bund wall, no material shall be stored within the bund and rain water collecting in the bund shall be regularly removed to prevent build-up. The inner face of the bund wall shall be coated with a chemical resistant material.

A chemical resistant valve, which shall be closed at all times, except for releasing rainwater into a storm water drain via an oil intercepting system, shall be installed at the outlet situated outside the bund, in accordance with the National Environmental Agency (NEA) Code of Practice on Pollution Control. SCDF licence shall be applied for such storage.

- 11.6. All drums of diesel in Client Premises shall be in good condition and shall be kept closed with a lid/ cap when not being used. They shall be stored on end with the lid/ cap uppermost and kept within a tray of sufficient volume to contain the contents of the largest drum in the case of accidental rupture, taking into account the presence of the other drums within the tray.
- 11.7. Drums of diesel shall not be rolled along the ground. They shall be transported vertically chained on a trolley; or by a forklift fitted with a drum handling device and not standing unsupported on the forks or on a pallet; or by crane using a safe rigging technique.
- 11.8. Diesel shall be transferred from the storage drum to another container, or to the tank of machinery using a hand pump whenever practicable and at all times a drip pan must be provided. Where the diesel container is light enough to be lifted by one person it can be poured out by hand, using a funnel to guide the liquid.
- 11.9. The Supplier shall provide Oil-Fuel Spill Kit to mitigate spillages of diesel or related flammable liquids. Any spillages of diesel or related flammable liquids shall straight away be absorbed using sand or other absorbent materials, which shall be disposed of as contaminated waste. On no occasion should diesel be allowed to enter Client Premises drainage system unless this is connected to an interceptor prior to the waste being discharged into the public sewer system.

12. Emergency Preparedness

- 12.1. The Supplier shall brief all its employees, sub-contractors and sub-suppliers on the Client's emergency response plan and ensure their competency in the emergency response procedures required by them.
- 12.2. When required, the Supplier shall ensure all its employees, sub-contractors, and sub-suppliers to take part in Client's table-top exercises and emergency exercises/drills.
- 12.3. The Supplier shall put in place a written rescue plan to ensure all its employees, sub-contractors and sub-suppliers who are using personal fall arrest system can be rescued as soon as practicable.

13. Work in Confined Spaces

- 13.1. The Supplier shall comply with Workplace Safety and Health (Confined Spaces) Regulations and Code of Practice (COP) for Confined Space Singapore Standard (SS) 568.
- 13.2. Where practicable the Supplier shall ensure that there are at least two readily accessible escape routes from each confined space. Confined Space Attendant (CSA) shall be present at access points for monitoring purposes at all times. The CSA shall hold a competent certification and trainings to perform his or her duties safely.
- 13.3. The Supplier shall operate a tag system for entry so that all personnel entering the confined space can be accounted for.
- 13.4. The Supplier shall establish a written rescue plan for the purpose of rescuing persons in the confined space in the event of an emergency.
- 13.5. The Supplier shall have sufficient supply of suitable breathing apparatus, retrieval equipment and reviving apparatus shall be provided and kept readily available for a rescue operation in a confined space.

- 13.6. Gas monitoring shall be conducted by a competent confined space assessor to certify that the confined space is safe for workers to enter and thereafter at every four (4) hours intervals. Gas monitoring calibration shall be done on monthly basis and calibration records shall be kept.
- 13.7. The Supplier is to ensure that at least one of the persons in the confined space shall be equipped with a suitable continuous gas monitoring device when work is being carried out.
- 13.8. Confined space ventilation systems shall be provided of ventilation speeds and equipment calculated and deemed adequate by Professional Engineer. The energy source of ventilation systems shall be of independent supply to prevent sudden ventilation disruption.
- 13.9. The Supplier where necessary shall ensure "Fit Testing" for all personals to ensure suitable and safe respiratory protective devices are provided and checked prior to entry into a confined space.
- 13.10. The Supplier shall ensure that suitable atmospheric monitoring devices such as anemometer and wet/ dry bulb thermometer are made available for the competent confined space assessor to determine the air flow, ambient temperature and humidity level within the confined space.
- 13.11. The Supplier shall ensure that all portable electrical appliances used in confined space such as hand-held tools and inspection lamps, are rated at 110 volts AC via a step-down transformer centre tapped to earth (CTE).

14. Excavations

- 14.1. The Supplier shall comply with all relevant laws, acts, regulations and codes of practice of Singapore including any amendments or re-enactment thereto.
- 14.2. The Supplier shall appoint sufficient number of banksman to coordinate excavation activities. The banksman shall be appointed in writing and should be competent for his or her duties. The banksman shall be properly identified and have overall control of the excavation works.
- 14.3. For excavations exceeding 4 metres in depth, the Supplier shall appoint at least one banksman within 30 metres length of excavation. If deemed necessary by Superintending Officer, the Supplier shall appoint additional banksman.
- 14.4. Communication in the form of walkie-talkie sets shall be established between the banksman and the excavator operators. The banksman shall be equipped with a loud hailer with siren function to communicate during emergency. No one shall be within any excavator's swing radius.
- 14.5. Excavators within the excavation pit shall have suitably reinforced cabin roofs capable of withstanding impact from falling objects from the top of the excavation.
- 14.6. For excavations exceeding 2 metres in depth, the Supplier shall ensure effective guard-rails and toe-boards are provided to prevent falls and falling objects.
- 14.7. Where the Supplier's sub-contractors or sub-suppliers are carrying out any excavation works, the Supplier shall ensure that its sub-contractors or sub-suppliers comply with the requirements in this Section 14.

15. Lifting Operations

- 15.1. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, comply with all relevant laws, acts, regulations and codes of practice of Singapore including any amendments or re-enactment thereto.

- 15.2. The Supplier shall be, and shall ensure that its sub-contractors and sub-suppliers are, responsible for ensuring that all lifting operations carried out in Client Premises and any lifting machines, appliances and gears brought into Client Premises are done so with minimal risk of injury to persons including members of public or damage to property.
- 15.3. Effective control must be exercised at all stages of a lifting operation through the deployment of a competent and authorised lifting supervisor, signalman, rigger and a registered crane operator.
- 15.4. All lifting machines, appliances and gears used in Client Premises must be suitable and safe for the task, used within their rated safe load capacity and must be of good construction, sound material and free from patent defects.
- 15.5. The Supplier is to submit a specification list for all lifting machines (including those to be used by its sub-contractors and sub-suppliers, if any) detailing their ownership, make, identification number, maximum safe working load and the corresponding radius, lifting machine certification number and date of expiry, before the lifting machines may be deployed in Client Premises.
- 15.6. No excavator shall be used as a lifting machine on site unless it is originally designed and manufactured to also function as a lifting machine and comply with all MOM stipulated requirements.
- 15.7. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, ensure that Lifting Plan and Permit to Work System for Lifting Operation are implemented for all lifting operations before work commencement.
- 15.8. Lifting supervisor shall wear brown safety helmets and green reflective vest with identification tags.
- 15.9. Rigger/ signalman shall wear red safety helmets and red reflective vest with identification tags.

16. Lifting Machinery

- 16.1. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, comply with all relevant laws, acts, regulations and codes of practice of Singapore including any amendments or re-enactment thereto.
- 16.2. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, ensure that before any lifting machine, including lorry crane, is brought into use in Client Premises all controls are labelled. Details on safe working load radius chart and any other safety related notices shall be written in English as well as in language comprehensible to the crane operator.
- 16.3. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, ensure that no lifting operation shall be carried out on site using the auxiliary hook of a mobile crane unless its safe working load (SWL) is shown on the Lifting Machine Certificate in addition to that of the main hook block and is not exceeded.
- 16.4. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, ensure that both the lifting supervisor and the crane operator are able to understand the working load chart. No lifting machine over 15 years shall be operated in Client Premises regardless of its intent of use. All mobile cranes shall be fitted with rear view camera for safe rear monitoring.
- 16.5. Cranes fitted with a load radius indicator (LRI) shall sound an audible alarm in the crane cab if its safe working load is exceeded on either the main or the auxiliary hook. A second alarm connected to the LRI, shall be fitted external to the cab and shall emit a signal of a sufficient volume to make it audible above the ambient site noise levels during working

- hours. Visual warning shall also be provided externally to indicate safe working range and overload conditions.
- 16.6. LRI shall be fitted with a limiting device, which disables the crane from continuing with any lifting operation under overload conditions. Once disabled, the device should only permit the crane to return to the safe working range. The device shall be tamper proof, with no over-ride to disable it, and shall be maintained in good working order. In case of provision of bypass switch for LRI, it shall be secured by a lock and kept with the lifting supervisor.
 - 16.7. LRI shall be calibrated and maintained according to the manufacturer specifications and verified by the Authorized Examiner (AE) during his or her annually inspections to ensure good working condition.
 - 16.8. If the crane is down rated by the AE during his or her annually inspections then the LRI shall also be calibrated and a new capacity chart should be drawn up and posted in the crane cab. The AE shall highlight the above details on the lifting machine certificate.
 - 16.9. Lifting machine shall not be used for any unsafe operation that may affect its overall integrity or stability.
 - 16.10. At least 24 hours before any crane is brought into Client Premises (including any crane to be brought by the Supplier's sub-contractor or sub-supplier), the Supplier must submit to the Client person-in-charge:
 - a. The lifting plan for the operation to be carried out.
 - b. A copy of the current lifting machine certificate for the crane.
 - c. A copy of the crane operator's MOM registration.
 - d. The name and the supporting documents of the lifting supervisor responsible for it.
 - 16.11. Lifting operations involving lorry cranes shall take place over the side of the crane body and not in an arc over either the front or rear of the chassis, in accordance with safe working practices.
 - 16.12. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, ensure that every lifting gear and appliance brought into Client Premises, including those accompanying rental cranes, has a valid lifting gear or appliance LG/ LA certificate and clearly marked with its SWL. All LG/ LA shall be inspected by an AE once every 12 months.
 - 16.13. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, ensure that LG/ LA is not loaded beyond its SWL and this includes multi leg chain slings being used at variable angles.
 - 16.14. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, ensure that LG/ LA is not used for any purpose other than the raising or lowering of a load.
 - 16.15. If an item of lifting gear is inadvertently subjected to a force exceeding that it is designed to experience when lifting an object at its SWL then the Supplier shall ensure that it is taken out of use.
 - 16.16. The Supplier shall implement an inspection programme to thoroughly check all LG/ LA by a lifting supervisor prior to its first use in Client Premises and thereafter on a monthly basis. Inspection register and checklist of the thorough check shall be submitted to Client person-in-charge. Defective LG/ LA shall be discarded.
 - 16.17. Prior to use, the operators of lifting equipment and accessories shall perform a pre-use check in order to identify any faults in the equipment. This shall be a daily check at the start of each shift. Defective LG/ LA shall be discarded.
 - 16.18. When not in use the Supplier shall ensure that all items of LG/ LA are stored in a rack sheltered from the weather and maintained regularly. Should any LG/ LA be exposed to a corrosive material, it must be washed off afterwards and re-greased.

16.19. All mobile cranes shall be equipped with a data logger in accordance with EN 13000.

17. Lifting Supervisors

- 17.1. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, comply with all relevant laws, acts, regulations and codes of practice of Singapore including any amendments or re-enactment thereto.
- 17.2. The Supplier shall ensure that a sufficient number of qualified lifting supervisors are employed in Client Premises, whether by itself, its sub-contractors or by sub-suppliers, to provide adequate supervision for all lifting operations carried out both by day and by night including loading/ unloading. There must be a minimum of one lifting supervisor to three cranes if they are co-located within a 50m diameter and carrying out routine lifting operations, and one lifting supervisor to one crane if it is geographically isolated or carrying out a heavy/ abnormal/ awkward lifting operation or operating near building/ public roads. In addition, the Supplier shall also station at least one additional worker to assist signalman for lifting operations carried out near public areas.
- 17.3. Lifting supervisor shall supervise and coordinate all lifting operations under his or her charge. Lifting supervisor shall familiarise himself or herself with the safe working load chart of each crane for which he or she is responsible and has identified himself or herself to the operator of each such crane as being the only individual whose instructions concerning any lifting operation are to be followed. This includes the positioning of the crane prior to the lift as well as slinging of the load.
- 17.4. Prior to any lifting operation involving mobile crane, the lifting supervisor must satisfy himself or herself that the crane is positioned suitably close to the load and its destination to ensure that the operation can be carried out at the safest appropriate radius.
- 17.5. The lifting supervisor shall ensure that the load is safely rigged, and a tag line is attached before signalling to the crane operator to start the lift to control the load. The lifting supervisor is responsible for the load until it is safely resting at the intended destination either by taking control of the operation himself or herself for non-routine lifts or for routine lifting operations, by thoroughly briefing the crane operator, riggers and signalman on the safe work procedures to be followed.

18. Crane operators

- 18.1. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, comply with all relevant laws, acts, regulations and codes of practice of Singapore including any amendments or re-enactment thereto.
- 18.2. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, ensure all crane operators engaged are competent for the lifting operation.
- 18.3. The crane operator shall enter the date, types of maintenance carried out and any malfunction of the crane in a checklist or logbook. He shall not operate the crane until any such defect is rectified, and the crane's use is authorised by his lifting supervisor.
- 18.4. All cranes shall be checked by its operator at the start of any day/ shift using a checklist written in English and in a language comprehensible to the operator. Copies of the checklist together with the lifting machine certificate, operator certificate, permits should be retained in the crane cabin for verification.
- 18.5. The crane operator is to ensure that the outriggers are fully extended, and any adjustments made to the jacks to level the crane before lifting operation commences. Steel plates of minimum dimensions 1m by 1m by 25mm shall be placed under all the outriggers of any lorry cranes deployed for a lifting operation unless that crane is entirely

sited on hard standing such as a reinforced concrete surface, with no void underneath. Pieces of timber are not to be used.

19. Lighting

- 19.1. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, provide temporary illumination with lighting levels of not less than the values as specified in SS 531 part 3.
- 19.2. All lightings shall only be deployed for emergency and safety reasons. All anticipated night works (including potential safety and emergency scenarios) shall be identified and documented in the Supplier's EMMP. The Supplier shall conform with the following lighting requirements, unless otherwise discussed with and approved by the Client:
 - All lighting shall be directed away from vegetated areas beyond the site, habitats, Central Catchment Nature Reserve (CCNR) and the Upper Seletar Reservoir. Upward and directional lighting, lighting into unintended areas shall be avoided. Light fittings shall be installed to reduce nocturnal light impact to the said areas mentioned above.
 - Where lighting is required to be installed for safety and security purposes, regulatory requirements will be followed.
 - Reduce the duration of nocturnal lighting sources by using a timer or movement-based sensor system to turn off lights.
 - Where permanent lights are employed, ensure that darker passages between lights exist for sensitive fauna to pass. Automatic dimming to reduce lighting intensity will also be considered.
 - Lumination that has a high UV component shall be avoided to reduce impacts on insects.
 - Broad spectrum lights shall be avoided.

20. General Safety

- 20.1. The Supplier shall provide, put up, maintain and finally remove, when instructed, Danger, Warning, Caution or Information signs, located appropriate to Client Premises layout. The signs shall be of adequate size and written boldly to ensure prominence and clarity. These shall be put up on existing footpaths and at points of access likely to be used by the public to warn or inform them of the existence of the works. These notices shall be in addition to any notices required to be put up to meet the statutory requirements.
- 20.2. The Supplier shall ensure that all roads, pavements and public footpaths are kept clear of waste materials, debris and dust.
- 20.3. Unless otherwise agreed, the Supplier shall be responsible for the proper fencing, hoarding, lighting, guarding and watching of the works.
- 20.4. The Supplier shall implement a buddy system for all its employees, sub-contractors and sub-suppliers.
- 20.5. The Supplier shall provide capping on all protruding starter reinforcement bars with individual plastic/ rubber caps or hose/ tubes.
- 20.6. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, ensure that horseplay, practical jokes, scuffling, wrestling or fighting are strictly prohibited in Client Premises.

21. Working at Heights

- 21.1. The Supplier, and shall ensure that its sub-contractors and sub-suppliers, shall comply with all applicable legislative environmental, health and safety (EHS) requirements of

- Singapore, including any new laws, acts and regulations which may be gazetted during the period of the Contract including any amendments or re-enactments thereto.
- 21.2. The Supplier shall provide safe and suitable access equipment for its employees, sub-contractors, and/or sub-suppliers (where applicable) to carry out their works at heights safely and ensure safe use of these access equipment.
 - 21.3. The Supplier shall provide platform ladder of suitable height or other safe and suitable access equipment, instead of A-frame ladder, in the event where both hands are required to perform the works at heights.
 - 21.4. All platforms, covers, ladders, stairways, staging, scaffolding and other provisions for access provided by the Supplier shall be installed and maintained in compliance with current legal requirements and made available for use as early as possible. In cases where this is impracticable, the Supplier shall provide all necessary temporary access facilities which shall be constructed, installed and maintained in a safe and secure manner.
 - 21.5. The Supplier shall provide safe and suitable personal fall prevention or arrest system to its employees, sub-contractors and sub-suppliers in the event where safe and secured foothold and edge protections are inadequate or impractical. The Supplier shall ensure these systems are installed and maintained in compliance with current legal requirements and the safe use of these systems.
 - 21.6. For works at heights where a person can fall from a height of more than three (3) metres, including falling into depths, the Supplier shall ensure the said works are carried out safely by implementing a Permit to Work (PTW) System for Working at Heights according to the requirements and format set by Client.
 - 21.7. In accordance with the PTW System for Working at Heights, the Supplier shall ensure all persons involved are informed of the hazards associated and the precautions they have to take, and the necessary safety precautions are taken and enforced when the works at heights are being carried out. The PTW System shall be implemented for each work shift and a copy of the completed PTW System shall be submitted to Superintending Officer.
 - 21.8. The Supplier shall appoint competent work at heights supervisor, work at heights safety assessor and authorised manager to apply, evaluate and issue the PTW respectively.
 - 21.9. The Supplier shall ensure that the appointed authorized manager review and assess the need to continue the work at height on a daily basis, and to revoke the permit-to-work issued in respect of the work at height if he thinks fit to do so.
 - 21.10. Where industrial rope access system is used in Client Premises, the Supplier shall ensure such work is carried out in compliance to WSH (Work at Heights) Regulations, and SS 508 Part 1 & 2. The Supplier shall ensure immediate supervision by a competent industrial rope access and work at heights supervisor is provided at all times to ensure all necessary risk control measures are implemented and maintained effectively.
 - 21.11. The Supplier shall ensure every anchorage and anchorage line of the industrial rope access system is installed in accordance with the design and drawings of a Professional Engineer (PE).
 - 21.12. The Supplier shall ensure a competent industrial rope access and work at heights supervisor to inspect the industrial rope access system at the start of every work shift to ensure that it is in good working condition and is safe for use, immediately remove from service any equipment of the industrial rope access system which is found to be defective, and immediately enter the results of every inspection into a register, which shall be appended with inspection checklists for each critical component of the industrial rope access system.

- 21.13. The Supplier shall ensure a copy of the PE endorsed design and drawings of every anchorage and anchorage line, and the inspection register and checklists of the industrial rope access system are submitted to Superintending Officer.
- 21.14. All works at heights referred to in this section shall include all works carried out by the Supplier and its employees, sub-contractors and sub-suppliers, where applicable.

22. Traffic Control and Road Safety

- 22.1. The Supplier shall provide, install and maintain all necessary traffic and directional signs, barriers, blinkers, rotating beacons, cones, lane markings etc. in accordance with the requirements stipulated in the Code of Practice for Traffic Control at Work Zone to guide and inform the public of works carried out at road area or any road lane closure. The Supplier must observe the minimum clearance required between the working area and the trafficked carriageway and ensure that all plants and materials do not intrude into any area reserved for pedestrians, cyclists or other traffic.
- 22.2. The Supplier shall provide a Traffic Marshal donned in bright green – yellow full uniform with reflective gloves and light strobes for enhanced visibility.
- 22.3. The Supplier must ensure that all construction vehicles (a) travel at a slow speed within the prescribed speed limits within the Mandai precinct (including but not limited to the back-of-house and public areas of the wildlife parks and attractions under the care of the Client), and (b) be aware of wildlife on the roads to prevent causing roadkill incidents.

23. Spillage on Roads

- 23.1. Washings from the wash bay shall be directed into a slit trap before its final discharge into a suitable outlet.
- 23.2. Preventive measures shall be taken to limit the incidence of earth droppings from earth moving vehicles. In the event that any earth dropping occurs onto a public road/ drain, such earth shall be removed and the roads/ drains washed by the Supplier at his own expense to the satisfaction of Superintending Officer.

24. Environment

- 24.1. The Supplier shall be responsible for all impacts on the environment from its activities. Such impacts include any form of pollution and excessive noise affecting those outside Client Premises boundary.
- 24.2. The Supplier shall also be responsible for ensuring the health of the public who may be affected by its activities.
- 24.3. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, comply with all relevant laws, acts, regulations and codes of practice of Singapore including any amendments or re-enactment thereto including, but not be limited to, the following:
 - Code of Practice on Environmental Health
 - Code of Practice on Pollution Control
 - Code of Practice on Surface Water Drainageas well as any environmental submission and conditions as required by relevant environmental regulators. The Supplier shall ensure that submissions are per requirements of the respective regulators and obtain the necessary approvals by the authorities before the commencement of works.
- 24.4. The Supplier shall develop a Contract Environmental Management and Monitoring Plan (EMMP), which includes an EMS that is certified to the current ISO14001 standard, that identifies and defines site-specific measures that:

- Manage environmental aspects, such as flora, noise, vector, air quality, water quality and earth control measures, during the carrying out of Works on site; and
 - Complies to current local environmental regulations and requirements of environmental regulators (NEA, PUB, NParks and SFA amongst others).
- 24.5. The Contract EMMP shall be approved by Client, and any relevant authority's approval obtained, before commencement of Works on site.
- 24.6. The Supplier shall implement the approved Contract EMMP, including the EMS, throughout the duration of the Contract, and ensure that its sub-contractors and sub-suppliers implement the same. The Supplier shall also update the Contract EMMP and EMS to address additional environmental impacts in the course of Works on site.
- 24.7. If requirements per the approved Contract EMMP cannot be complied with, the Supplier shall propose for Client's approval alternative measures that will achieve the same intended outcome.
- 24.8. Superintending Officer may also require additional measures to be put in place if current measures are deemed insufficient.

25. Air Pollution

- 25.1. Any atmospheric pollution (in the form of smoke, fumes, vapours, dust and other pollutants) shall be effectively controlled. Air pollution control requirements such as the concentration and rates of omission of air pollutants shall be within legal limits.
- 25.2. Superintending Officer reserves the right to request for a newer machine or an emission control device be installed if any machine is deemed to be producing excessive greyish/black smoke.
- 25.3. The Supplier shall demonstrate that construction activities are scheduled (such as land clearance, demolition works, earthworks and building construction) in a way that minimises the area of ground exposed and the volume of soil and construction material handled at any one time.
- 25.4. Access routes shall be covered by aggregates, concrete lined or with steel plates to reduce dust emissions.
- 25.5. Dust suppression methods such as misting or via mechanical means shall be used during dry conditions. Water suppression shall be provided for all dust generating activities (e.g. during ground cover removal, soil removal, excavation, and earth handling) and at exposed areas.
- 25.6. All dusty operations must be adequately shielded and/ or arrested with water at point of impact.
- 25.7. Supplier shall ensure all drivers of motor vehicles to turn off engine while it is stationary to prevent vehicle left idling, for any reasons other than traffic conditions.

26. Water and Land Pollution

- 26.1. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, ensure zero discharge to/leading to the forested areas, Upper Seletar Reservoir, streams and any other sensitive water bodies.
- 26.2. Discharge of wastewater shall be to temporary storage tanks for removal by a licensed wastewater collector.
- 26.3. Disposal of construction wastes (wastewater and solid wastes) into streams, storm water channels or Upper Seletar Reservoir are strictly prohibited. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, put in place procedure to ensure compliance.

- 26.4. Quality of wastewater shall comply with the latest limits stipulated in the Trade Effluent Regulations (e.g. concentration of oil and grease in the wastewater shall not exceed 10mg/l for watercourse).
- 26.5. Wastewater shall not be discharged into watercourses. Wastewater shall be discharged into sewers. Gully traps and wastewater drainage system shall be provided to drain wastewater into the sewerage system.
- 26.6. All equipment and machinery used at the work site shall be maintained and operated in a manner such that it does not give rise to leakage of fuel/oil to ground, and will comply with the Environmental Protection and Management (Vehicular Emissions) Regulations.
- 26.7. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, provide bunded and covered storage for all hazardous materials in accordance with the manufacturer's safety requirements. Storage of hazardous materials on-site shall be limited to the minimum necessary to reduce the impact of any spillage or mitigation failure.
- 26.8. Equipment will be bunded to capture and control oil, grease and other spills. All leakages from equipment and machinery including generators and compressors shall be contained with a spill tray of adequate size to prevent leakage. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, ensure that such equipment and machinery are placed on flat ground such that the spill tray is level.
- 26.9. Diesel drums and chemicals shall be stored under shelter within concrete bund walls or in storage containers with good ventilation. Spill trays shall be provided for all drums, plants and machinery and potentially pollutive substances used in Client Premises.
- 26.10. All diesel storage be contained, and with capacity of at least 115% or more than the volume of diesel storage.
- 26.11. All spill containment facilities and spill trays shall be regularly maintained to prevent rain from washing out the pollutive substances.
- 26.12. All portable sanitary facilities and temporary storage facilities for hazardous materials (e.g. fuel, lubricant, oils, paints) shall be located away from surface water courses on hardstand.
- 26.13. Portable sanitary facilities shall be managed and maintained to a satisfactory level of cleanliness by a licensed third party.
- 26.14. Maintenance and mechanical repairs will be undertaken at dedicated designed locations, bunded to capture and control oil, grease and other spills.
- 26.15. Use hand fuel transfer pump and pipes equipped with flow control valves on for refuelling operations.
- 26.16. Spill management kits shall be provided at worksites (in accordance to the type of hazardous materials to be used, include but not limited to rags, sands, eyewash, protective gloves etc.) at where hazardous materials, equipment and machinery will be stored and used.
- 26.17. The Supplier shall put in place a response plan to cater for accidental spillages (leaks from pipework during decommissioning; from machinery and equipment; spills resulting from accidental damage to other underground structures uncovered during excavation works etc.) into any watercourse. This plan shall be communicated to all personnel on the Client Premises.
- 26.18. All spills must be cleaned within the same day or immediately under wet weather conditions.

- 26.19. For works adjacent to Upper Seletar Reservoir, silt curtains shall be deployed onto the water bodies to contain any potential water pollution from work sites. The permission to deploy such shall be sought for by the Supplier with the relevant authorities.
- 26.20. A drainage system shall be provided to drain off all surface water from the worksite into a slit trap before its final discharge into a suitable outlet drain, canal, stream or river. Such slit trap provided shall be of adequate size and regularly desilted throughout the duration of the project.
- 26.21. All activities involving repair, servicing, engine overhaul etc. shall be carried out in a covered area which shall be kerbed or provided with scupper drains to channel all wastewater into the sewerage system.

27. Earth Control

- 27.1 The Supplier shall implement the appropriate covers in order to minimize the extent of any exposed earth surfaces:
- Vegetation is retained within Client Premises.
 - Bare surface not covered by vegetation, is covered by erosion control blanket.
 - Paving used to prevent erosion.
- 27.2 The Supplier shall ensure all excavated materials and soil are either removed from Client Premises or stored in proper containment by the end of the day. Preventive measures shall be taken to limit the incidence of earth droppings from the earth moving vehicles. In the event that any earth dropping occurs onto a public road/ drain, such earth shall be removed by the Supplier to the satisfaction of the Client person-in-charge. No drain, public street or lane shall be obstructed by excavated material during the course of work.
- 27.3 The Supplier shall engage a Qualified Erosion Control Professional (QECP) to design the earth control measures (ECM) in accordance to the PUB's regulatory requirements and best practices.
- 27.4 The Supplier shall prepare, submit, and obtain the necessary clearance from PUB with regards to ECM before start of works.
- 27.5 The Supplier shall submit their ECM Management Plan as part of the Environmental Management Plan including:
- Description of scope of works including sequence of works, site layout and vehicular access route
 - ECM Plan approved by PUB (and shall be specific to the scope of works)
 - Maintenance Regime of the treatment system
 - Monitoring regime of the discharge
 - Inspection Checklists
 - Chemicals used and stored for treatment system
 - QECP's inspection findings and Close up
- 27.6 No construction works shall commence without adequate ECM facilities to ensure no discharge containing Total Suspended Solids (TSS) in concentration greater than the prescribed limits under Regulation 4(1) of the Sewerage and Drainage (Surface Water Drainage) Regulations throughout the project, especially during the site clearance stage.
- 27.7 During interim phases for installation of ECM facilities, all runoff must be contained and transported off site for treatment.
- 27.8 The Supplier shall ensure that their engaged QECP conduct monthly site inspection to verify ECM implementation by its employees, sub-contractors and sub-suppliers and its

effectiveness during construction and submit an ECM inspection report based on the template specified in Guidebook on Erosion & Sediment Control at Construction Sites published by PUB.

- 27.9 During construction works, the Supplier shall revise and resubmit the ECM plans for PUB clearance to ensure the ECM implemented on site is in accordance with what has been cleared by PUB.
- 27.10 The Supplier shall have a staff with Earth Control Measures Officer (ECMO) qualification on site to ensure that the implementation, maintenance and inspection of ECM are in accordance to the QECP's design. The ECMO shall also monitor the effectiveness of ECM throughout the various stages of construction.
- 27.11 Activities that expose bare earth (such as land clearance and earth work) shall be minimized and scheduled in phases to reduce the area of ground exposed and the volume of soil and construction material handled at any one time. The Supplier shall implement the appropriate covers to minimise the extent of any exposed earth surfaces, as set out under Section 27.1 above.
- 27.12 All stockpiles and exposed earth surfaces shall be maintained below a maximum height of 2 m and covered within 3 hours of non-usage with Erosion Control Blankets. Canvas sheets or tarpaulin shall not be deployed for cover for more than 1 day. The Supplier shall maintain and track the cut and fill volume to minimise quantity of soil required to be stockpile for backfill works. All on site stockpile shall be covered with berms and bunds maintained to prevent wash down of soil.
- 27.13 The Supplier shall clear his sedimentation pond within 10 hours of all rainfall events. The sedimentation ponds shall be empty at all times. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, ensure that there is no sediment runoff into water bodies, waterways and/or into the sea resulting from the works.
- 27.14 All runoff shall be contained within the site and allowed discharge after treatment to within regulated levels. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, ensure that there is no untreated or unintended discharge into the forested areas, Upper Seletar Reservoir, streams and any other sensitive water bodies.
- 27.15 Cleared vegetation, particularly at sloped areas, will be covered with mulch or erosion control blankets to control erosion of exposed soil. Re-vegetate exposed ground as soon as possible to stabilise surfaces and minimise re-entrainment of dust and potential for erosion of waste spoil to watercourses.
- 27.16 The Supplier shall not remove the ECM until all works are completed and upon the advice of the QECP. The Supplier shall inform PUB and the Engineer prior to removal of ECM on completion of the project.
- 27.17 All erosion control blankets must be wildlife friendly and made of 100% biodegradable and natural materials with no plastic mesh, which can cause wildlife such as snakes and lizards to get entangled in them.

28 Flooding Protection

- 28.1. The Supplier shall consider the risks of flooding due to nature or arising from the activities and propose relevant risk mitigating measures in its risk assessment where applicable.
- 28.2. When pumping is proposed, the Supplier shall address the following:
- Operating procedures.
 - Provision of a secure power supply and back-up.
 - Automation and/ or reaction time to start up the pumps.
 - Method and arrangement of discharge.

29 Flooding Evacuation and Rescue Procedure

- 29.1. The safety provisions to be put in place shall not be limited to providing of an emergency evacuation and rescue plan, trained rescue teams and water rescue aid or equipment. The trained rescue team and emergency procedure shall be in place before work commencement. The number of trained rescue teams and water rescue aid or equipment shall be increase when deem necessary by the Client person-in-charge. The water rescue aids or equipment shall be properly maintained throughout the lifetime of the project.

30 Contaminants

- 30.1. Soil samples at appropriate depths and spacing shall be taken for testing by a competent person to identify any contaminant present as well as monitoring of airborne contaminants through air sampling when applicable. Soil contaminants to consider shall include, but not limited to, heavy metals and their derivatives, hydrocarbon compounds and asbestos. Airborne contaminants to consider shall include, but not limited to, methane (CH₄) and other flammable gases.
- 30.2. The Supplier must take all necessary precautions to prevent any person from being exposed to the risk posed by the contaminants.
- 30.3. It shall be noted that contamination can be caused by a range of different hazardous materials and by a mixture of concentrations and distributions. Contaminants can also migrate to adjacent areas via ground water.
- Measures shall be taken in the design to alleviate the risks and describe those hazards that are not reasonably practicable to eliminate by design but must be controlled by the Supplier and any other relevant party.
 - The Supplier shall ensure that sufficient information is provided on the nature, extent and level of contamination and that all personnel entering the site shall be informed of the hazards and the precautions needed.
 - All permissible exposure limits shall be established and communicated.
- 30.4. Appropriate Personal Protective Equipment (PPE), which may include but not limited to waterproof safety boots and gloves when handling wet material, shall be provided for all personnel working in Client Premises when applicable.
- 30.5. Practical measures shall be implemented to control dust generation in Client Premises that may pose a possible hazard to those working in Client Premises as well as the public.
- 30.6. Air quality in Client Premises shall be monitored on a frequency deemed appropriate when applicable. Gases to be monitored include, but not limited to, methane (CH₄) and other flammable and toxic gases, with emergency plans prepared in the event permissible limits are breached. A record of the daily monitoring is to be submitted to the Client person-in-charge weekly when applicable.
- 30.7. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, comply with all the statutory requirements as laid down by the National Environment Agency with regards to the disposal of contaminated waste material. The Supplier shall transport waste material directly from the excavation to the approved dumping ground and shall discharge the waste directly into position. No stockpiles of waste are allowed on site.

31 Groundwater (Only Applicable if there is deep excavation)

- 30.1. Discharge of pumped dewatered groundwater shall either be to temporary storage tanks for removal by third party licensed wastewater collector; or to a temporary treatment system prior to discharge to a discharge point agreed with PUB.
- 30.2. The Supplier shall monitor the groundwater levels at the locations determined as required via geotechnical design.
- 30.3. The Supplier shall limit potential groundwater drawdown and subsequent water level impacts during any excavation e.g. use recharge wells as necessary during excavations. The method shall limit groundwater drawdown shall be provided as part of the Environmental Management Plan and extent determined by geotechnical design.
- 30.4. For all locations with excavation of depth near or deeper than groundwater level, an Environmental Baseline Study (EBS) borehole shall be installed in the middle of the area where excavation will be carried out and the groundwater and soil of each locations be tested against the Dutch Intervention and Target Standards. The Supplier shall, with the advice of their consultant, provide the methodology and location of sampling for approval as part the Environmental Management Plan for approval. The test shall be conducted within 3 months of the award of the Contract.
- 30.5. If the location of excavation was found to be contaminated beyond the Dutch Intervention and Target Standards, the water that will ingress into the excavation are shall be contained from leaking to reservoir and drainage system and be transported out of site for proper treatment.
- 30.6. The Supplier shall conduct monthly groundwater quality testing against the Dutch Intervention and Target Standards at the location of the EBS agreed with Client.

32 Rodent and/or Other Pest Control

- 32.1. Use source reduction as the main form of rodent control. Food consumption and storage must be strictly restricted to designated areas where lidded rubbish bins are available.
- 32.2. Food must only be stored in rodent proof storage containers/ cabinets with at least 60cm clearance above the ground.
- 32.3. Pest control team should also look out for evidences of rodents and their burrows during their rounds.
- 32.4. Glue traps are only allowed to be used indoors. All outdoor usage of glue traps is strictly prohibited.
- 32.5. All pest control traps must be regularly monitored and checked to ensure that no non-intended native wildlife are accidentally trapped within. Any incident of non-intended wildlife found within the traps must be immediately reported to the Client.

33 Mosquito Control

- 33.1. The Supplier shall report to Client person-in-charge as soon as possible if any employee of the Supplier, sub-contractor or sub-supplier is found in Client Premises to be a carrier of Dengue Haemorrhagic Fever Virus, Chikungunya Virus, Zika Virus, Malaria or Japanese Encephalitis and remove them from Client Premises when required.
- 33.2. Existing watercourses or anti-mosquito drains in Client Premises shall not be obstructed or otherwise interfered with unless alternative approved drainage is provided.
- 33.3. All water bearing receptacles are to be collected and disposed at dumping grounds approved by the Ministry of the Environment and Water Resources.
- 33.4. Any ground depression collecting water caused by the Supplier shall be filled in, drained to prevent mosquito breeding.

For Construction Projects

- 33.5. The Supplier shall engage an external NEA-licensed Pest Control Operator (**PCO**) to supplement the in-house vector surveillance and control. The PCO shall carry out vector control and surveillance at least once a week. Additional PCO services will be required during epidemic periods or as required by regulatory agencies and incremental costs to provide for additional PCO services are deemed to have been included.
- 33.6. The site is a highly sensitive nature area and only the following vector control can be deployed:
 - a. The Supplier shall ensure breeding grounds of mosquitoes – ponding of water – are removed as the first level of mosquito breeding prevention.
 - b. Environmentally friendly applications such as the use of *Bacillus thuringiensis israelensis* (BTI) shall be used to supplement source reduction. The deployment of BTI shall not be conducted for the vector control zones next to the buffer and the Central Catchment Nature Reserves.
- 33.7. No pesticides and rodenticides shall be used on site by PCO and in-house vector control team. Any chemicals that are proposed to be deployed shall be approved by Client before use on site. Thermal fogging shall not be carried out.
- 33.8. The in-house pest control team shall carry out search and destroy activities of any potential breeding grounds, especially after every rainfall, using the “zoning method”. The team shall:
 - c. Divide the construction site into a maximum of 3 zones for vector control particularly for mosquito control.
 - d. Carry out vector surveillance and control activities in at least one zone per day; and
 - e. Ensure that employees, sub-contractors and sub-suppliers are carrying out proper housekeeping at their individual work zones to complement the in-house pest control team effort.
- 33.9. The Supplier shall develop a Dengue Contingency Plan (in accordance with the Green, Yellow, Red situation listed by NEA), ensure that the said Plan is complied with by its sub-contractors and sub-suppliers (where applicable), and report all suspected dengue cases to Client.
- 33.10. In the event where mosquito breeding is discovered on site by NEA, the Supplier is to carry out a Vector Control Time-out. The Time-out is to a briefing and involve a detailed search and destroy effort to eliminate any potential breeding grounds.
- 33.11. During any outbreak (10 or more dengue cases reported within 21 days) within the site, the Supplier shall implement a system of tracking and maintain an updated list of all personnel entering the site, displaying signs of dengue fever and recovered from dengue. The information shall include at a minimum the residential address.
- 33.12. The Supplier shall develop a response plan specifying the measures to be taken in the event there is any person found on site to be a carrier of or contracted with any vector-borne disease.
- 33.13. The Supplier shall have isolation procedures and a room on site to isolate worker(s) suspected to have contracted dengue. This room shall be designed to prevent mosquitoes from entering the room and shall be well-ventilated.
- 33.14. Any person found on site to be a carrier of or contracted with the dengue/dengue haemorrhagic fever, malaria, Chikungunya or any other vector-borne disease shall be

quarantined on identification and removed from the Project site to prevent the outbreak of the disease.

34 Waste Management

- 34.1. All waste management shall be undertaken by licensed waste contractors (general, sanitary, hazardous and spoil waste) in accordance with the applicable laws and regulations.
- 34.2. Disposal of waste into forested areas, streams, stormwater channels, Upper Seletar Reservoir or any other sensitive water bodies is strictly prohibited.
- 34.3. All waste by the Supplier and its sub-contractors and sub-suppliers shall be cleared up as often as may be necessary to prevent build-up and deposited/ stored in bins. The bins shall be removed from Client Premises and replaced/ emptied once they have been filled.
- 34.4. The Supplier is required to divert renovation waste from incineration and landfill disposal as part of their waste management plan.
- 34.5. The Supplier must implement measures to ensure proper disposal of food waste. This includes ensuring that disposal bins in use are secured and wildlife-proof. Food waste must not be thrown in skid tanks (or equivalent), which are meant for bulk disposal of construction waste.
- 34.6. The Supplier shall carry out effective sorting of waste materials in Client Premises. For example, a separate skip bins for wood waste; plastic waste; paper waste; metal waste; construction waste etc. (to recover inert, reusable and/ or recyclable portion.)
- 34.7. The system of sorting and temporary storage of waste materials shall include the following:
 - Cardboards and paper packaging shall be recovered, properly stockpiled in dry and covered conditions to avoid cross contamination by other materials.
 - Metals shall be recovered for collection by recycling Suppliers.
 - Excavated materials shall be sorted to recover inert portions (e.g. soil and crushed rocks) for re-use on site or disposal to designated filling areas.
- 34.8. Any toxic waste as listed in the Environmental Public Health (Toxic Industrial Waste) Regulations and this includes oil, shall be disposed of by an operator holding a valid toxic industrial waste collector's license.
- 34.9. Preventive measures shall be taken to limit the incidence of earth droppings from earth moving vehicles. In the event that any earth dropping occurs onto a public road/ drain, such earth shall be removed, and the roads/ drains washed by the Supplier at his own expense to the satisfaction of Client Superintending Officer.

35 Noise Control

- 35.1. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, ensure that excessive noise is avoided at all times to protect guests, person and animals in Client Premises as well as public.
- 35.2. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, ensure that noise due to construction activities shall be minimised and appropriate noise barrier shall be used during the works. In the event that works is affecting guest or animals, Client has the right to request for Supplier to stop, or ensure that its sub-contractors or sub-suppliers stop, the works.
- 35.3. The Supplier shall note that machineries, equipment and methods of work which cause excessive noise will not be allowed to be used on site. Superintending Officer has the

discretion to require the Supplier to take necessary precautions, whether specified herein or not, to maintain or to repair such machineries and equipment or to instruct their removal from Client Premises when it is determined that the noise level generated from the works fails to comply with regulations and standards as stated in this annex.

- 35.4. It is the Supplier's responsibility to ensure that machine/ equipment is maintained and operating to the standards indicated in their respective specifications.
- 35.5. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, comply with the latest requirements and regulations on the noise limits at the workplace or site.
- 35.6. The Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, comply with the noise emission standards for all its vehicles, in accordance to the latest statutory regulations.
- 35.7. The Supplier shall take into account the non-working restriction and the Client Premises layout in order to minimize noise as far as possible including but not limited to considering using materials as noise barriers etc.
- 35.8. While planning for the works, the Supplier shall review the working hours and consider the effects of noise on person working in or around Client Premises as well as public within the proximity of Client Premises.
- 35.9. All machines and equipment shall be labelled with weatherproof stickers clearly showing its noise specification i.e. noise levels at 1m from source. The Supplier shall verify the performance using a Class 1(type 1) sound meter on all machines monthly at 1m distance from source. In the event of an exceedance of the stipulated threshold by more than 3 dB(A), the construction equipment shall be sent for maintenance or additional mitigation measures to be deployed.
- 35.10. The Supplier shall put in place noise monitoring in accordance with Annex C & D of the Singapore Standard SS602:2014 to ensure compliance against limits in the Environmental Protection and Management (Control of Noise at Construction Sites) Regulations and guideline values adopted by Client.
- 35.11. Enclose static noisy equipment such as generators and water pumps as fully as possible, allowing for openings for access and safety consideration.
- 35.12. Erect screens around worksites where noisy activities will be carried out to reduce noise level
- 35.13. All noise generating equipment and machines must be turned off during non-working hours.

36 Protection of Fauna

General

- 36.1. Strictly no smoking within the Client's parks and site.
- 36.2. Approval from Client for any use of joss sticks or burning of religious offerings must be sought prior to the activity. There shall be no unsupervised open fires or burning i.e. there must be a watchman if there is burning. All burning must be submitted for WRSs' approval prior to activity.
- 36.3. There shall always be no cooking or heating of food within the Development boundary and in the adjacent forested areas.
- 36.4. Where Erosion Control Blankets (ECB) are to be used, the Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, deploy only types that are wildlife friendly and made of 100% biodegradable and natural materials with no plastic mesh, which can cause wildlife such as snakes and lizards to get entangled in them.

Site Movement

- 36.5. The Supplier, including its site staff, workers, sub-contractors, sub-suppliers and visitors, shall limit their movements and activities (including non-work activities such as eating and resting) to within the Contract boundary and designated areas, including that for eating and resting.
- 36.6. Without prior permission from Client, there shall be strictly no entry into areas outside of the Contract boundary and designated areas, the Development's buffer areas, project setbacks and adjacent Central Catchment Nature Reserve (CCNR).

Biodiversity Awareness

- 36.7. The Supplier shall conduct Biodiversity Awareness Training (based on relevant materials provided by Client) for all its site staff, workers, sub-contractors, sub-suppliers and visitors, to raise their awareness of the ecological sensitivity of the site; proper protocols to adopt when wildlife is encountered; and the need to be cautious when operating machinery to avoid injury/mortality to flora and fauna.
- 36.8. The Supplier shall conduct the Biodiversity Awareness Training:
- Prior to commencement of activities on site; and
 - A refresher at least once every six (6) months during the Contract period.
- 36.9. All workers must comply with the Biodiversity Awareness Training's guidelines, as failure to do so could result in a violation of the Wildlife Act.
- 36.10. Documentation of all trainings conducted by the Supplier and attendance records shall be maintained.

Wildlife Protection

- 36.11. The Supplier shall ensure that its site staff, workers, sub-contractors, sub-suppliers and visitors, are briefed on the 'Provisions for Wildlife Protection During Construction' of the Wildlife Protection Plan.
- 36.12. The Supplier shall also prepare a visual representation of the above provisions for ease of understanding and these visual representations shall be posted around the site.
- 36.13. The Supplier shall enforce the compliance of the 'Provision for Wildlife Protection During Construction' of the Wildlife Protection Plan on site.
- 36.14. The Supplier shall ensure and enforce that its workers do not feed wild animals. Food must be stored in wildlife-proof and rodent-proof storage containers / cabinets with at least 60cm clearance above the ground.

Wildlife Response

- 36.15. Prior to any tree felling, clearance or transplanting exercise, the Supplier need to ensure that pre-clearance wildlife inspections are carried out to check for the presence of arboreal mammals and herpetofauna (reptiles and amphibians), birds, bats and nests before each individual tree may be felled or transplanted.
- 36.16. Any detection of such animals and nests shall be documented and reported to the Client. Tree felling, clearance or transplanting must be postponed until notice to resume work has been issued by the Client.
- 36.17. Prior to the start of construction activities on each workday, a visual inspection of the site for wildlife shall be conducted.
- 36.18. In the event a wildlife, dead or injured, is encountered on site, the Supplier shall not handle the wildlife and shall implement the Wildlife Response and Rescue Plan, including immediately stop construction activities in the immediate area, and notify Client. Construction activities in the immediate area may resume only after notice has been received from Client to continue with the work.
- 36.19. The Supplier shall ensure that the wildlife response protocol is implemented and clearly communicated to all its workers, sub-contractors and sub-suppliers.

37 Protection of Flora

- 37.1. As much as possible, the Supplier shall, and shall ensure that its sub-contractors and sub-suppliers, preserve the trees on site.
- 37.2. Prior to start of works, Supplier shall submit the method statements for, but not limited to, tree felling, tree protection, tree transplanting and transportation, disease control and monitoring regimes.
- 37.3. The Supplier shall be responsible in ensuring, monitoring, and managing the health of retained trees within and around the Contract Boundary.
- 37.4. A Tree Protection Zone (TPZ) shall be installed around each tree identified for retention in accordance to NParks' requirement and Arborist's recommendations.
- 37.5. Following any tree clearance exercise, the Supplier shall document the number of trees felled and removed from site, along with their respective tree numbers, including the treatment of such trees at the receiving locations.
- 37.6. Felled trees that are removed from site shall be recycled and reused. Sending the trees to facility for composting and burning shall be the last resort. The quantities and actions taken shall be tabulated and informed to Client.
- 37.7. When a tree is found to exhibit signs of stress, Supplier shall inform Client.
- 37.8. Machinery shall not be driven to and operated within 10 metres of a retained tree or tree cluster to avoid impacts to root systems through soil compaction. Where machinery is required to be used close to a tree or retained vegetation, it must be a machine that exerts a low pressure on the ground (such as a tracked machine).
- 37.9. Where a tree is found to exhibit signs of stress, the Supplier's appointed Arborist shall inspect the tree and advise on a strategy to reduce further impacts and rehabilitation measures. Where monitoring indicates that drying out or edge impacts are occurring, remediation measures will be undertaken. These measures may be temporary (such as the installation of artificial shading and sprinklers). Long-term solutions shall be investigated and implemented with the advice of the Supplier's appointed Arborist.
- 37.10. The Supplier shall be responsible for all costs required to investigate, correct, mitigate and compensate for any impacts to trees protected by the TPZ if such impacts are determined to be due to works and/or negligence by the Supplier.
- 37.11. The Supplier shall ensure material imported into the Development area be checked for contamination from weed/invasive species seeds/vegetative matter at source. This is particularly important for imported building materials, such as clay and soil. The source site will be inspected to determine presence of weed/invasive species. Where weed or invasive species are identified, alternative supply sources or decontamination will occur before the material is transported to the site.
- 37.12. Use of herbicides is not allowed within the Client Premises (including but not limited to the wildlife parks and attractions under the care of the Client).

38 Time Restrictions

- 38.1. Restriction on working hours shall be as stipulated by Governmental Authorities and/ or the Law, and prescription by the Client person-in-charge based on the nature and location of work.
- 38.2. Works are limited to the daytime (8am to 6pm) and separate requests for night works (those beyond 8am to 6pm) should be submitted to Client for approval. Only emergencies or works to safeguard human safety shall be allowed at night.
- 38.3. The Supplier shall liaise closely with the Client throughout the contract period to schedule the noisiest works (for e.g., piling or demolition) so as to minimize disturbance to visitors and staff during peak visitation periods (such as weekends and public holidays) or during events requiring low noise levels.

V2

6 May 2024

- 38.4. The Supplier shall provide in his Night Works Request the following:
- Identification of all scenarios that require night works and reasons
 - Identification of environmental impacts that accompany the respective work activities
 - Propose mitigation measures to comply to the environmental objectives

39 Eating and Resting Areas

- 39.1 The Supplier shall clarify the location of the designated eating and resting areas with the Client person-in-charge and ensure adherence by its employees, sub-contractors and sub-suppliers.

40 Company Demerit Scheme

- 40.1 The Supplier's EHS performance shall be monitored by the Company Demerit Scheme in Client as included in Annex A.

Annex A – Company Demerit Scheme

A.1. Rating of Frequency of Substandard Act / Condition or Incident

Frequency level of substandard act / condition or incident will be rated in accordance with the guidance provided in Table 1:

Level	Frequency	Definition
1	Infrequent	Happens once within a year
2	Occasional	Happens twice within a year
3	Frequent	Happens thrice within a year

Table 1: Guide to frequency rating

A.2. Rating of Severity of Substandard Act / Condition or Incident

Severity level of substandard act / condition or incident will be rated in accordance with the guidance provided in Table 2:

Level	Severity	Definition
1	Minor	Minor Incidents: Injured guest / staff only requires treatment by first aider on site. Minor property damage and traffic / tram accident without injury or injury treated by first aider. Reversible minimal environmental impact. Minimal reputation impact. *Severity level for substandard act / condition will be rated as minor.
2	Intermediate	Intermediate Incidents: Injured staff / guest needs to seek medical treatment from clinic or guest request for ambulance service. Traffic / Tram Accident involving Injury & Insurance claims against Client. Substantial Property Damage up to \$10,000. Reversible moderate environmental impact. Moderate reputation impact. General media / public interest.
3	Major	Major Incidents: Injured staff / guest needs to evacuate to hospital by ambulance immediately. Significant damage to Client property. Potentially escalate to major disaster. Reversible significant environmental impact. Results in disruption to service and business operations. Significant Reputation damage.
4	Catastrophic	Catastrophic / mission critical incident. State Agencies (e.g. Singapore Police Force, Civil Defense Force) called in to manage such incidents (e.g. Fatality, Terrorist Attacks, Uncontrolled fires). Irreversible significant environmental impact. Results in major disruption to service and business operations.

Table 2: Guide to severity rating

A.3. Demerit Score and Action Required

Demerit score is obtained by multiplying the values of Frequency and Severity level.

The following actions are to be implemented based on the demerit score (Refer to Table 3):

Demerit score	Acceptability	Action Required
Low (1-2)	Acceptable	<p>The Supplier shall:</p> <ol style="list-style-type: none"> 1) Review the effectiveness of the control measures pertaining to the causes of the substandard act / condition or incident. 2) Propose additional control measures to avert such substandard act / condition or incident from reoccurring.
Medium (3-4)	Warning	<ol style="list-style-type: none"> 1) Warning letter will be issued to the Supplier by Director / HOD 2) The Supplier shall re-evaluate the hazards and implement the control measures to mitigate the risk. 3) The Contract might be terminated.
High (4-12)	Not Acceptable	<ol style="list-style-type: none"> 1) Contract might be terminated with immediate effect, or allowed to continue with close monitoring and supervision, subject to the seriousness of the incident. 2) The Supplier concerned will be blacklisted and banned from being awarded any contract from Client in a year. <p>*Demerit score for catastrophic incident will be rated as high.</p>

Table 3: Action required for demerit score